Revision and Phylogenetic Analysis of the North American Genus *Slaterocoris* Wagner with New Synonymy, the Description of Five New Species and a New Genus from Mexico, and a Review of the Genus *Scalponotatus* Kelton (Heteroptera: Miridae: Orthotylinae)

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REVISION AND PHYLOGENETIC ANALYSIS OF THE NORTH AMERICAN GENUS *SLATEROCORIS* WAGNER WITH NEW SYNONYMY, THE DESCRIPTION OF FIVE NEW SPECIES AND A NEW GENUS FROM MEXICO, AND A REVIEW OF THE GENUS *SCALPONOTATUS* KELTON (HETEROPTERA: MIRIDAE: ORTHOTYLINAE)

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DEDICATION

Wagner (1956) provided the patronym *Slaterocoris* to honor James A. Slater, who was the first person to recognize that the female genitalia of the North American species *stygicus* Say, 1832 placed in *Strongylocoris*, Blanchard, 1840, was not congeneric with the type species of the genus, *Cimex leucocephalus* Linnaeus, 1758. I dedicate this revision of *Slaterocoris* to Jim Slater in recognition of his many contributions to heteropteran systematics over his long career, which came to a close upon his death on November 2, 2008, at 88 productive years (Schuh, 2009).

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ABSTRACT

The North American genus *Slaterocoris* Wagner is revised and now contains 32 species. The new genus *Josephinus* is erected to accommodate three Mexican species, the type species, *Slaterocoris reinhardi* Carvalho and Schaffner, 1973, along with *Scalponotatus albicornis* Kelton, 1970, and *Scalponotatus capitatus* Kelton, 1970. *Slaterocoris argenteoides*, *S. clavatus*, *S. elongatus*, *S. maculatus*, and *S. tanydexios* from southern Mexico are described as new. The new combinations *Slaterocoris punctatus* (Distant, 1893) [*Jornandes*] and *Slaterocoris subalbicans* (Distant, 1893) [*Jornandes*] are proposed resulting in two subjective junior synonyms of *Slaterocoris* for the monotypic genera, *Guerrerocoris* Carvalho and China, 1959 and *Amulacoris* Carvalho and China, 1959, respectively. A review of the genus *Scalponotatus* Kelton, 1969, provides a new diagnosis and description of the genus and the type species, *S. maturus* Kelton, 1969, and a checklist of the nine species included in the newly conceived genus. Based on examination of the holotypes, the new combinations, *Scalponotatus dissimulans* (Distant, 1893) [*Jornandes*] and *Jornandes sinaloensis* (Carvalho and Costa, 1992) [*Scalponotatus*] are proposed. The following 23 new specific subjective synonymies are proposed (senior synonym first): *Slaterocoris alpinus* Kelton, 1968 = *Slaterocoris schaffneri* Knight, 1970; *Slaterocoris ambrosiae* (Knight, 1938) [*Strongylocoris*] = *Slaterocoris arizonensis* Knight, 1970, *Slaterocoris bispinosus* Knight, 1970, *Slaterocoris ovatus* Knight, 1970, and *Slaterocoris severini* Knight, 1970; *Slaterocoris apache* Kelton, 1968 = *Slaterocoris bifidus* Knight, 1970 and *Slaterocoris burkei* Knight, 1970; *Slaterocoris breviatus* (Knight, 1938) [*Strongylocoris*] = *Slaterocoris minimus* Knight, 1970 and *Slaterocoris rarus* Knight, 1970; *Slaterocoris flavipes* Kelton, 1968 = *Slaterocoris sculleni* Knight, 1970; *Slaterocoris longipennis* Knight, 1968 = *Slaterocoris knowltoni* Knight, 1970 and *Slaterocoris utahensis* Knight, 1968; *Slaterocoris mohri* (Knight, 1941) [*Strongylocoris*] = *Slaterocoris fuscicornis* Knight, 1970; *Slaterocoris punctatus* (Distant, 1893) = *Slaterocoris grandis* Kelton, 1970; *Slaterocoris robustus* (Uhler, 1895) [*Stiphrosoma*] = *Slaterocoris nevadensis* Knight, 1970; *Slaterocoris rubrofemoratus* Knight, 1968 = *Slaterocoris nicholi* Knight, 1970; *Slaterocoris sheridani* Knight, 1968 = *Slaterocoris basicornis* Knight, 1970, *Slaterocoris custeri* Knight, 1970, *Slaterocoris dakotae* Knight, 1970, *Slaterocoris texanus* Knight, 1970, and *Slaterocoris woodgatei* Knight, 1970; *Slaterocoris stygicus* (Say, 1832) [*Capsus*] = *Slaterocoris getzendaneri* Knight, 1970. The ambiguous lectotype designations (Kelton, 1968) for *Stiphrosoma atrata* Uhler, 1894, *Stiphrosoma croceipes* Uhler, 1893, and *Stiphrosoma robusta* Uhler, 1895, are stabilized. A neotype is designated for the lost primary type of *Capsus stygicus* Say, 1832. Revised diagnoses, redescriptions, color digital habitus photographs, line drawings of the legs for each species, and scanning micrographs of dorsal vestiture and sculpturation for most species are provided. Line drawings of the male genitalia of most species and the female genitalia of representative species-group taxa are included. Scanning micrographs are used to document diagnostic features of the genera. Maps and label records are provided to portray the distributions of all species. Where known, host-plant records are presented. Keys to *Josephinus* and *Slaterocoris* and their included species are offered to facilitate identification. A phylogenetic analysis is conducted for 32 ingroup and seven outgroup taxa resulting in the informal assignment of most of the species of *Slaterocoris* into six species groups.

INTRODUCTION

Wagner (1956) championing the observations of Slater (1950), erected the genus *Slaterocoris* Wager, 1956, to accommodate the type species *Capsus stygicus* Say, 1832, and another six of thirteen North American species previously placed in *Strongylocoris* Blanchard, 1840. Based on morphology of the genitalia, head, and pretarsus, it was apparent to Wagner that the New World representatives of this Old World halticine generic construct were misplaced and required assignment in a new genus of Orthotylini. The diagnostic features of each of these orthotyline tribes were discussed by Schwartz and Tatarnic (2008) and Schwartz et al. (2008). Wagner (1956) deferred the generic assignment of the six remaining New World species of *Strongylocoris* to his North American colleagues. Kelton (1968) placed four of these nominal species in *Slaterocoris*, considered *uniformis* Van Duzee, 1925, a junior synonym of *robustus* Uhler, 1895, assigned *albibasis* Knight, 1938, to the genus of Orthotylini, *Scalponotatus* Kelton, 1969,

and described nine new species of *Slaterocoris*. Knight (1970) added 22 new species, raising the total number of nominal species of *Slaterocoris* to 46.

Several factors have prompted the current study: (1) the generally unsatisfactory results obtained when attempting to identify the mass of easily collected specimens of *Slaterocoris* from North America with either of the available keys to species for the genus (Kelton, 1968 and Knight, 1970); (2) the significant number of specimens collected from the southern Mexican states of Guerrero, Puebla, and Oaxaca deposited in the collections of Texas A&M University and the U.S. National Museum; these specimens seemed to be beyond the geographical utility of current keys; (3) what appears to be several new Mexican species-level taxa; (4) the knowledge that the obscure monotypic genera, *Amulacoris* Carvalho and China, 1959 and *Guerrerocoris* Carvalho and China, 1959, known only from female primary types from Guerrero, Mexico, are both strikingly similar to species of *Slaterocoris*; and (5) the limitations of the differential diagnoses of *Scalponotatus* and *Slaterocoris*, which are founded on dorsal sculpturation and make no use of the male genitalic structure.

Reconciliation of the contemporary revisions of Kelton (1968) and Knight (1970) is impeded by different species concepts and inconsistent documentation employed in each revision. Knight (1938) recognized that intraspecific character variation was the norm among the species of *Slaterocoris*, remarking that "slight variations have been found in the number of spines on a clasper… the general form of both claspers, when considered together, give distinctive characters for the separation of the species." However, in apparent contradiction to this knowledge Knight (1970), in his final offering on the genus, chose to base all but one of his 22 new species on one or, at the most, four specimens (Knight, 1970). In doing so, minute variation in the right paramere was promoted as the primary character support for these new species, essentially typifying extreme or aberrant character variation.

Even though Kelton (1968) illustrated the right paramere and endosomal spicule, he explicitly stated only that a range in number and size of the spines on the right paramere (*ambrosiae*, *argenteus*, *breviatus*) was indicative of intraspecific variation. He did not comment on the variability of the lobes in the endosomal spicule. Illustrations of the right paramere in Kelton and Knight are not easily compared, as they were not presented with consistent orientation. Knight (1970) did not dissect his specimens and made no mention of the endosomal spicule, leaving what is probably the most conserved male genitalic character of the genus undocumented for 22 new nominal species. Lacking documentation of the endosomal spicule, these new species cannot be placed easily within the taxonomy of Kelton (1968), even though their descriptions were accompanied by illustrations of the right paramere and a key to species (Knight, 1970).

The intent of the current research project is to consolidate the taxonomy of the previous generic reviews by Knight and Kelton, as well as to incorporate a tremendous amount of material collected primarily by Joseph C. Schaffner that was previously unstudied. As part of the process, a new genus and five new species from Mexico are described and a review of *Scalponotatus* and its type species are included, which incorporates newly documented character information of the genitalia. Detailed descriptions of the genera are provided. All species are provided with differential diagnoses and descriptions paying special attention to variation in coloration, vestiture, and genitalic structure. The morphology of *Slaterocoris*, especially the male and female genitalia, provide the opportunity for cladistic analysis because of their intricate nature and substantial variation across the group. I attempted to incorporate what appeared to be the least homoplastic of these features into the following phylogenetic analyses.

The taxa treated in the present paper are largely restricted to feeding on Asteraceae, to the seeming exclusion of other host groups. These species appear to have a stronger association with that host-plant family when compared with members of other North American genera of Orthotylini known to occur on Asteraceae (*Ilnacora* Reuter, 1876, *Ilnacorella* Knight, 1925, and *Pseudopsallus* Van Duzee, 1916). The feeding preference

exhibited by the majority of the treated species is similar to that known for several North American genera of Phylini (*Europiella* Reuter, 1909 [Schuh, 2004], *Chlamydatus* Curtis, 1833 [Schuh and Schwartz, 2005], and *Phyllopidea* Knight, 1919); species of these phyline genera are often collected with species of *Scalponotatus* and *Slaterocoris* (personal obs.).

Materials and Methods

The genera treated in this paper are arranged in the order of the outcome of the phylogenetic analysis, i.e., *Scalponotatus*, *Josephinus*, and *Slaterocoris*. The species of *Slaterocoris* are organized into species groups, as a result of the analysis, with the species groups and two species (*S. ambrosiae* and *S. robustus*) not contained in any group, listed in alphabetical order. The species treatments within a group are also arranged alphabetically. To facilitate the phylogenetic analysis only the type species of *Scalponotatus*, *maturus*, is redescribed. Subsequently the generic discussion of *Scalponotatus* will argue that all the contained species conform to the revised diagnosis of the genus and are congeneric with the type species. Observations and measurements were made with a Leitz stereoscope. Observations and drawings of the male and female genitalia were made with a Nikon Optiphot compound microscope and camera lucida at magnifications of 100× or 200×. Scanning electron micrographs of gold-coated preparations were taken with a digital Philips XL30 ESEM. Dorsal habitus photographs were taken on a Microptics-USA photographic system equipped with an Infinity Photo-Optical K-2, three-lens system and Nikon D1X digital camera.

Measurements (table 3) were made as follows: total length—apex of clypeus to posterior margin of membrane, in lateral view; pronotum length—at midline from anterior to posterior margin, in dorsal view; cuneus length—costal fracture at costal margin to apex of cuneus, in dorsal view; labium length—apex of segment IV to base of labrum, in lateral view; antennal segment lengths (I–IV, III, and IV from nonteneral specimens)—from base to apex; body width (from specimens with fully closed hemelytra)—across costal margins at widest part of hemelytra (usually at claval apex), in dorsal view; pronotum width—across lateral margins at humeral angle, in dorsal view; head width—across lateral margins of eyes, in dorsal view; vertex (interocular) width—across medial margins of eyes, just anterior to transverse basal carina, in dorsal view. Four ratios are reported (table 3) to aid species identification. The number of specimens measured (*N*), and the mean, standard deviation (SD), range, minimum, and maximum of those measurements are included (table 3). For some species the number of measurements of antennal segments 3 and 4 are less than *N*; these cases are denoted with an asterisk (*) or plus sign (+) located under the number of specimens measured. Where reference is made to measurements in the text, the mean, followed by the range is reported inside parentheses; sometimes only the range is reported. All measurements are reported in millimeters.

Genitalic dissections were prepared as presented in Forero (2008). Drawings were made from preparations placed in depression slides, being either embedded in glycerin jelly or tucked under a cover slip using lactic acid. Terminology for the genitalic structures follows that presented by Cassis (2008) for the male and Davis (1955) and Scudder (1959) for the female. See genitalia section below for further discussion.

Specimens studied during this project were borrowed from many entomological collections; these institutions are listed in the ''Acknowledgments.'' Matrix code labels were affixed to specimens examined as a way to explicitly identify them. The codes are referred to as ''unique specimen identifiers'' (USI). The USI codes, e.g., AMNH_PBI 00081052, comprise an institution and project code (AMNH_PBI) and a unique number (00081052), are provided for the majority (62%) of the specimens examined. The institution and project code are included in the holotype and lectotype information but omitted, to enhance clarity, from the locality data, dorsal habitus photographs (appendix 1), and figure captions for the scanning electron micrographs and genitalic illustrations (appendix 2). The distribution maps

and "Specimens Examined" sections of *Slaterocoris atritibialis*, *S. breviatus*, and *S. stygicus* were augmented with literature records (Henry and Smith, 1979; Wheeler et al., 1983; Snodgrass et al., 1984; Henry et al., 2005) to provide locality information for Arkansas, Georgia, Kentucky, Louisiana, Mississippi, and West Virginia. Many of the specimens reported in this literature are deposited in the USNM; these were examined and received USI codes during the current study. It was not possible to ascertain the specific location of specimens with ambiguous label data, these are listed under "Unknown co." following the other state records. Where the county is known but the specific location is ambiguous, coordinates are given for the county seat. The associated information (host, collecting technique, previous determinations, and specimen notes) for each specimen with a USI can be searched by consulting several sources: the locality database of the Planetary Biodiversity Inventory of the Plant Bugs (http://research.amnh.org/pbi/databases/locality_database.html), the "Discover Life" website (http://www.discoverlife.org/) "search window," or the "Heteroptera Species Pages" website (http://research.amnh.org/pbi/heteropteraspeciespages). For each species the total number of specimens examined, the percent with USI numbers (if less than the total number), and the number of unique collection events are noted. A collection event is the combination of the locality, date, and collector. A total of 14,612 specimens were examined for this project.

Character numbers and states (#–#) corresponding to tables 1 (Description of Characters and States) and 2 (Character Matrix for *Slaterocoris* Cladistic Analysis) are indicated on most illustrations and in the text. Taxa with polymorphic character states are indicated by an asterisk on table 2 with the character and states listed in a footnote. Where possible, georeferenced localities are incorporated with specimen data when this information was not included on the original label. For holotypes and lectotypes label data are given verbatim and delimited by quotes and interpolated data—geographical coordinates and secondary political divisions—are enclosed by brackets. The distribution maps were produced with the aid of ArcMap 9.1 (ESRI, 2005), Corel Draw, and Photo-Paint X3. All latitude-longitude data are presented in degree and decimal parts thereof. Altitude data are presented as metric with imperial units included in the holotype data if part of the original label. The deposition of all the specimens examined is provided.

The color habitus photos are scaled to the size of the actual specimens so that relative sizes can be deduced from comparison of the images. Actual sizes of specimens and other dimensions for each species are available in the individual species treatments and table 3. The taxa treated in this paper are grouped in a manner consistent with the results of the cladistic analysis. Synonymies include references to the original descriptions, taxonomic changes, biological information, and citations for the catalogs of Henry and Wheeler (1988) and Schuh (1995). Black is the predominant color of all the taxa treated in this project. Areas of paler coloration are initially described as whitish yellow, orange-red, or orange-brown with subsequent reference to nonblack area as "pale" only. The new species descriptions are internally complete; other species treatments include only the features that differ from those of the generic or species group descriptions. Unless otherwise indicated, the female is similar to the conspecific male in coloration, vestiture, and structure except for the slightly wider interocular distance at the vertex with the concomitantly smaller eyes and the more strongly convex costal margin of the hemelytron.

The dorsal margin of the pygophore aperture is illustrated only for those species where the tergal process is developed. The genitalia are illustrated so that the maximum amount of information is documented; the orientation of each structure is included within the figure or the figure caption. The majority of the structures are orientated as follows: endosomal spicule—dorsolateral or lateral views from either side, sometimes dorsal view or apex of ventral lobe illustrated "end on"; phallotheca—lateral view from each side; left paramere—apicolateral, apicodorsal, dorsal views; right paramere—apicolateral, lateral views; pygophore posterior view; tergal process dorsal and posterior

view; first gonapophysis—anterior and posterior views; posterior wall—anteroventral and anterior views. For the endosoma, except for categorizing the form of membrane attachment, the discussion and documentation of the endosoma are confined to the structure of the sclerotized spicule. For some species the arrangement of the spines or points on the right paramere and the length of auxiliary lobes and their marginal serration on the endosomal spicule are variable. Intraspecific variation of morphological structure is documented in many of the accompanying figures and descriptions and is associated with USI numbers (without the AMNH_PBI prefix) printed next to each structure or set of structures. Truncated locality information is given for all the individual illustrations in the figure captions; Appendices 1 and 2 lists the USI and a somewhat expanded locality for each structure illustrated. Sometimes variation was encountered among individuals of the same population, and where appropriate this is included in the figures and discussed in the species treatments. All figures are accompanied by numerical references to characters and states listed in table 1 and sometimes arrows pointing to species specific features.

The terms ''breeding host'' or ''host'' are used interchangeably herein. Both adult and immature stages feed, develop, and mate on plant species designated as hosts (Forero, 2008). Nymphs associated with adults on the same plant, though uncommon in museum collections, were encountered frequently enough for the taxa treated in the present paper to unambiguously identify some plants as hosts. Because individuals of *Scalponotatus* and *Slaterocoris* are usually conspicuous and numerous in the field, nonspecialists using sweep nets have sometimes collected specimens with inaccurate plant records. I attributed specimens collected in this manner as sitting records and not hosts. Host plants for most species were determined by tabulating the number of collection events for a particular plant; however, if all specimens received USI numbers, then the number of individuals taken from a particular plant was also evaluated. In the text, specimens taken on an unidentified species of plant are indicated by ''sp.'' (e.g., *Artemisia* sp.) or clearly stated as such. Host-plant nomenclature was standardized using the databases of USDA-NRCS (2009) PLANTS and the Angiosperm Phylogeny Website (Stevens, 2008) for current synonymy and generic placement. The majority of specimens (by virtue of total number of specimens and/or collection events) were collected on plants of the family Asteraceae, table 4 provides the binomial, author, and common name for hosts; this information is not repeated in the text. Plant authors are given in the text for specimens collected on plants considered to be sitting records. Biological information on hosts was gathered from references listed in the synonymy.

Delimitation of Taxa

A preliminary discussion concerning a diverse assemblage of North American orthotyline genera was presented by Schaffner and Schwartz (2008). Here I provide additional characters that, based on examination of many genera of Orthotylini, support the hypothesis that certain of those genera belong to a monophyletic group. This section is a preview to the subsequent phylogenetic discussion and the statements contained herein are concordant with that phylogenetic analysis (e.g., *Josephinus* n. gen.). Previously discussed (Schaffner and Schwartz, 2008) were *Amulacoris* Carvalho and China, 1959; *Ficinus* Distant, 1893; *Fulgenticapsus* Schaffner, 1979; *Guerrerocoris* Carvalho and China, 1959; *Ilnacora* Reuter, 1876; *Ilnacorella* Knight, 1925; *Jornandes* Distant, 1894; *Jornandinus* Carvalho and Schaffner, 1974; *Lopidea*, Uhler, 1872; *Lopidella* Knight 1925; *Oaxacaenus* Carvalho and Schaffner, 1973; *Rolstonocoris* Schaffner and Ferreira, 1995; *Scalponotatus* Kelton, 1969; and *Slaterocoris* Wagner, 1956. These genera were considered together because most of them contain some black species and seldom do they have the body form or green coloration commonly seen in species of *Orthotylus* Fieber, 1858. This probably polyphyletic group was easily subdivided by Schaffner and Schwartz (2008) based on the structure of the left paramere apex and the number of endosomal spicules. Unresolved in that study was the placement of three genera: *Amulacoris* and *Guerrerocoris*,

which could not be placed in a subgroup based solely on male genitalia, as both were represented by female type specimens, and the species of *Scalponotatus,* which did not have uniform male genitalic structure. The present study provides evidence and phylogenetic results for considering *Slaterocoris* as a monophyletic group when *Amulacoris* and *Guerrerocoris* are treated as junior generic synonyms of it. Furthermore, *Scalponotatus* is rendered monophyletic by erecting a new genus to contain two species previously placed in that group.

The *Slaterocoris* group of genera (*Slaterocoris* + *Scalponotatus* + *Sarona* Kirkaldy, 1902) as conceived by Asquith (1994) can be judged monophyletic based on the presence of one, moderately branched, endosomal spicule. Although not discussed previously, a suite of nongenitalic characters further bolsters support for this grouping. Externally most included species are characterized by coloration of entirely black or black with bold red areas, although a few are entirely pale or patterned with pale and black. Most, but not all, have the costal margins in both sexes strongly curved. Some species have elongate body form in both sexes or where the sexes are dimorphic, only the male is elongate with the costal margin of the female curved with variable conformation. The form of dorsal vestiture does not contribute to the identity of the group, with glabrous to densely setose species included. Dorsal sculpturation is variable as well, with the hemelytron surface composed of small to moderately large punctures or with variable punctures on a rugose or reticulate surface.

Head structure seems to be congruent with the possession of one endosomal spicule. All the constituent taxa have the posterior margin of the eyes and the head straight, continuous, and in the same plane (with the posterior margin of the eye denoted by the posterior edge of the faceted portion of the eye, anterior of the smooth and pale posterior surface). The vertex is relatively wide and the eye of the male is relatively large with the ventral margin extending below the ventral margin of the antennal fossa. *Sarona* shares these head features. Only those genera with two endosomal spicules (e.g., *Ilnacora*, *Lopidea*, and some *Orthotylus*) have the eye bent anteriorly and the posterior surface of the eye obviously exposed in dorsal view.

Additional head characteristics are found in all the North American genera except the endemic Hawaiian genus, *Sarona*. These are as follows: the anteroventral edge of the clypeus is narrow and pointed, sometimes with the apex produced ventrally (or slightly tumid, cf. *Rolstonocoris*); the entire anterior margin of the clypeus projects beyond the mandibular and maxillary plates and is gradually curved, in lateral view (e.g., Schaffner and Schwartz, 2008: 39, fig. 17B); the posterior margin of the head is clearly produced, usually with a sharp transverse basal carina; the posterior region of the frons anterior to the transverse basal carina is variably concave, sometimes scalloped-out medially, or the angle anteroventral to the carina is steep. Asquith (1994) listed different states for the same characters as apomorphies for the 40 species of *Sarona*.

An undescribed genus and species of Orthotylini from central Australia has a superficial resemblance to *Scalponotatus albibasis* (Knight), being completely black except for the white transverse basal carina of the vertex (personal obs.). The head structure is similar as well, with respect to the coplanar posterior margin of the head and eye. The endosoma is unlike any North American member of the Orthotylini, being similar in structure to species of the *Lattinova* group of genera with large dorsal and ventral spicules (Cassis, 2008). The parameres of the undescribed taxon are similarly different in form from all North American taxa. Additionally, two genera of Australian Halticini, *Dampierella* Tatarnic, 2009 (cf. Tatarnic, 2009: 46, fig. 2D), and *Goodeniaphila* Tatarnic, 2009 (cf. ibid.: 55, fig. 6D), also closely approach the head structure just described for the *Slaterocoris* group of genera. However, the genitalia in the three species contained by these halticine genera clearly do not have any of the diagnostic features of Orthotylini (Schwartz and Tatarnic, 2008). The similar head structure in the Australian taxa is interpreted as convergence and not an indication of relationship with the North American group of genera.

As mentioned above, members of the *Slaterocoris* group of genera, including *Sar-*

ona, have a single endosomal spicule. However, *Sarona* lacks the distal region of the spicule strongly recurved or otherwise modified as is the case in the remaining genera. Asquith (1994) interpreted the single spicule found in the group as the "right vesical appendage" of Southwood (1953) and the diverse dorsal processes emanating from various positions on its basal portion as homologous with the dorsal spicule found in other orthotyline genera (Asquith, 1991; Stonedahl and Schwartz, 1986). There are other North American orthotyline genera with only one endosomal spicule (e.g., *Brooksetta* Kelton, 1979, *Labopidea* Uhler, 1877, and some *Orthotylus*), but, as in *Ilnacora* and *Lopidea*, none have the head structure described above.

Other structures of the male genitalia are too variable to contribute to the diagnosis of the large generic group, except for the left paramere, whose structure serves to divide the genera into two sections (Schaffner and Schwartz, 2008). In one section the apex of the left paramere has medial and lateral lobes separated by a notch of variable depth. The other section has the apex unnotched, terminating in a simple smoothly curved point. Schaffner and Schwartz (2008) erroneously treated *Ilnacorella* as having two endosomal spicules and a strongly notched apex of the left paramere. In point of fact, this genus has one spicule and a pointed apex of the left paramere, but the head structure is similar to that of *Brooksetta* and *Labopidea*. To summarize, *Jornandinus*, *Slaterocoris*, and some *Scalponotatus*, genera with one endosomal spicule, an unnotched apex of the left paramere, and a specific head structure are the subject of this current paper.

Morphological Discussion

Male Genitalia

Cassis (2008) provided a discussion of character homology and terminology for the male genitalia of the Miridae. He concluded that continued usage of the terms *conjunctiva* and *vesica* was unwarranted and recommended that the term *endosoma* be applied to the inner tubule of the aedeagus. Cassis (2008) also suggested a scheme by which homologies could be recognized and terminology consistently applied to the sclerotized appendages of the endosoma in the Austromirini. Herein I follow these recommendations, extending this application to the Orthotylini with the following comments.

Invoking the *torsion hypothesis of endosomal spicules*, Cassis (2008) facilitated homology recognition and discussion. His inspection of the literature suggested that previous authors had applied terminology to these conspicuous orthotyline structures based on restricted observations within individual genera. A summary interpretation of the arrangement of endosomal spicules was established by Southwood (1953) (also cf. Kullenberg, 1947). In the British species of *Orthotylus*, including the type species, *O. marginalis* Reuter, 1883, Southwood noted that the endosoma (vesica) has a pair of spicules attached to the membrane (conjunctiva) basal to the secondary gonopore, level with the sclerotized portion of the ductus seminis, and distal to the ribbed region of the ductus (cf. Southwood, 1953: 426, fig. 23; Kerzhner and Konstantinov, 1999: 132, figs. 40, 41). The bases of the spicules attach to the membrane slightly dorsal and ventral of the cross-sectional midline or long axis of the ductus. Southwood (1953) used the terms right and left appendage, for the dorsal and ventral spicule, respectively, because of the their directional canting. Cassis (2008) provided the terms dorsal and ventral endosomal spicule for these structures.

It was also apparent to Southwood (1953) that the dorsal spicule is frequently deeply bisected to its base, giving the endosoma the appearance of having three spicules. Stonedahl and Schwartz (1986) used the term dorsal spicule for this modification in *Pseudopsallus* Van Duzee, 1916, but the ubiquitous basal process, or ramus, of the dorsal endosomal spicule is found throughout the Orthotylini. Others have commented on the number of endosomal spicules. Kelton (1959) documented the male genitalia of 18 North American orthotyline genera, many of which have two spicules. In a series of papers (Stonedahl and Schwartz, 1986, 1988; Schwartz and Stonedahl 1986, 1987; Stonedahl and Schuh, 1986; Asquith, 1991; Schwartz and Scudder, 2003; Schwartz,

2004, 2005), endosomal spicules were clearly described and all conform to the dorsal (right) and ventral (left or lateral) arrangement around the ductus seminis. Forero (2009) reviewed South American Orthotylini of the genera *Biobiocoris* Carvalho, 1985, *Chileria* Carvalho, 1985, *Hyporhinocoris* Reuter, 1909, and *Orthotylus* and documented the one or two greatly ramose endosomal spicules for several of the species. Cassis (2008) provided documentation and discussion of the arrangement of the endosomal spicules in the 18 species of the *Lattinova* complex of Austromirini.

The dorsal and ventral spicules may have as many as seven arrangements around the long axis of the ductus. The integrity of the torsion hypothesis is maintained by recognition of a conspicuous ''keel'' at the base of the dorsal endosomal spicule. This structure is a ubiquitous feature of orthotyline taxa. When present, it can be wide or narrow and is securely attached to the endosomal membrane (personal obs.). In *Lopidea media* (Say), 1832, the type of the genus (cf. Asquith, 1991: 239, fig. 104), two endosomal spicules are both clearly attached separately to the membrane, the dorsal spicule having a small keel. A larger keel is seen in *Lopidea hesperus* (Kirkaldy), 1902 (cf. Asquith, 1991: 237, fig. 95).

Asquith (1991) presented a hypothesis for evolutionary trends in spicule modification based on observations of several North American genera of Orthotylini. He proposed that from a full complement of three appendages—dorsal [right] endosomal spicule, with a prominent, dorsal lobe or ramus and ventral [left] endosomal spicule—there is a trend toward reduction in number of endosomal spicules. He also suggested that the loss of a spicule or dorsal lobe has a mosaic, rather than a sequential or branching pattern. In many species, it is difficult to discern whether the bases of the endosomal spicules are separate or joined because of variable sclerotization. The base of the spicule(s) is usually a flat, ribbonlike band, which can be folded in a complicated fashion. Where cursory observation may lead one to believe that the bases of the spicules are separate, careful manipulation, especially when the endosoma is observed with the ductus in caudal view, reveals folds of a continuous sclerotized band. This is clearly the case with *Orthotylus notabilis* Knight, 1927 (cf. Kelton, 1959: 27, fig. 54), in proper orientation, the four striplike spicules described by Kelton are actually four lobes emanating from a broad convoluted base of the dorsal endosomal spicule. This is also the situation in the unrelated *Nesidiorchestes hawaiiensis* Kirkaldy, 1902, where three lobes emanate from the flattened base of the dorsal endosomal spicule (Schwartz and Tatarnic, 2008).

For the taxa described and discussed herein, the number of individual endosomal spicules is easily apprehended. Schaffner and Schwartz (2008) commented that the following Mexican genera have only one strongly sclerotized spicule: *Ficinus*, *Fulgenticapsus*, *Jornandes*, *Jornandinus*, *Lopidella*, *Oaxacaenus*, *Rolstonocoris*, *Scalponotatus*, and *Slaterocoris*. In all these genera the single endosomal spicule is considered homologous with the dorsal endosomal (vesical) spicule (Southwood, 1953; Cassis, 2008).

In *Slaterocoris*, the single spicule is strongly bifurcate subbasally (cf. figs. 16A, 18E, 39A–D, 52A, 57A, 64A, 65D). The bifurcate portions are denoted here as the ventral and dorsal lobes. The ventral lobe is situated closest to the dorsal surface of the ductus seminis; it is longer than the dorsal lobe, and marked by a strongly recurved distal region. The distal surface of the ventral lobe is usually marked by marginal serration, although it is sometimes smooth and rarely bifurcate subapically. The dorsal lobe of the single endosomal spicule in *Slaterocoris* can be entire or bifurcate and is usually flattened and marginally serrate. Sometimes the entire dorsal lobe is slightly twisted on its long axis (cf. *S. simplex*, fig. 65C–E). When bifurcate the sections of the dorsal lobe are denoted here as the medial and lateral rami. The medial ramus is situated nearest the surface of the ventral lobe, whereas the lateral ramus is opposite the ventral lobe. The dorsal endosomal spicule in *Josephinus*, compared with *Slaterocoris*, has a greatly reduced dorsal lobe, being limited to a narrow tubular process, with the length shorter than the apex of the ductus seminis, sometimes reduced to a spine (cf. *J. reinhardi*, fig. 10A). The distal

portion of the ventral lobe in *Josephinus*, is not strongly recurved as in *Slaterocoris*, but is bifurcate subapically with parallel rami (cf. fig. 7A). The dorsal lobe of the dorsal endosomal spicule in *Scalponotatus* is usually present as a spine projecting from the left subbasal margin or is absent as in the type species, *S. maturus*. The distal portion of the dorsal endosomal spicule (here the ventral lobe) is recurved as in *Slaterocoris* (cf. fig. 4A). In *Jornandinus grandis*, the dorsal endosomal spicule is apically recurved and attached to the membrane by a broad quadrate recurved keel. The distal end of the body of the spicule is deeply bifurcate and has a substantial process projecting from the middle, a structure not present in *Josephinus*, *Scalponotatus*, and *Slaterocoris*. As in *Josephinus* and *Slaterocoris* a dorsal lobe is present, being solitary, narrow, and short.

The *Slaterocoris* group of genera and *Sarona*

A sister-group relationship for *Scalponotatus* + *Slaterocoris* and *Sarona* was proposed by Asquith (1994). Support for this hypothesis was founded on six synapomorphies: dorsal surface shiny and rugulose punctate; posterior margin of eye straight and contiguous with the posterior margin of the vertex; hemelytra posterior of cuneal fracture moderately to strongly deflected; abdomen short and broad; endosoma with single spicule; and the posterior wall of the female with at least the apex of the interramal lobe modified as a sclerotized process. Several of these characters are not specific to these genera and are also found in several other Mexican genera. The hemelytron with a deflected cuneus and the short and broad abdomen are found in genera throughout the tribe Orthotylini and, conversely, several Mexican species of *Slaterocoris* have practically unreflected hemelytra and a longer more narrow abdomen. The structure of the interramal lobe has only been documented sporadically within the tribe, so statements of relationship based on this character are probably premature.

Asquith (1994) did not include the structure of the left paramere in the group of characters uniting *Sarona*, *Scalponotatus*, and *Slaterocoris*. Schaffner and Schwartz (2008) noted that a simple or unnotched apex of the left paramere partially defined a group of genera with a single endosomal spicule and mostly black coloration. These are *Jornandinus*, two species of *Scalponotatus*, and *Slaterocoris*. The apex of the left paramere in all species of *Sarona* also has a roughly similar structure to these taxa, although it is more pointed as compared with the smoothly curved point in the North American taxa. Also, a region of the left paramere, denoted by Asquith (1994) as the basal angle, is usually developed in *Sarona* and is a feature not found in the other genera. The left paramere is less variable among the species of *Sarona* when compared to the right paramere (Asquith, 1994), an observation that may be extended to *Slaterocoris*. Besides the variable overall size, the proportion of the distal region to the basal region, or curvature of the apex, the only obvious modification of the left paramere seen in *Slaterocoris* is the bifurcate apex in *S. ambrosiae*. This condition is also noted in *Sarona makua* Asquith (cf. Asquith, 1994: 55, fig. 48B), but otherwise is unlike that seen in North American genera.

Sarona has many features of the male and female genitalia that do not show a relationship to *Slaterocoris*. It does have a single spicule and the simple apex of the left paramere. But the right paramere does not have ventrally directed spines, the aperture of the pygophore is very wide, and the subgenital plate (or cup-shaped sclerite of Konstantinov, 2003; Forero, 2008) meets the ventral margin flush and is not recessed as in *Slaterocoris*.

Asquith (1991) recognized ''growth centers'' or specific regions of the right paramere that produce distinct and modified structures. I have extended this method of codifying areas of paramere development to *Slaterocoris*. Unique among the North American orthotylines are the ventrally directed spines of the right paramere, as seen in *Slaterocoris* (fig. 37C). The areas of modification are the apical or distal region, the subapical region, and the basal lobe (figs. 15A, 17A, 28H, 38E, 41E, 46A, 51A, 57F, 68B, 72D). The left paramere shows little diversity, with the length of the distal region the only variable area. The left paramere of all species can be categorized as L-shaped with an undifferentiated apex (fig. 37C). The apex is simple without the

medial or lateral lobes described by Asquith (1991) for *Lopidea* and also known in species of *Jornandes* (Schaffner and Schwartz, 2008).

Female Genitalia

Terminology for the female genitalic structures presented by Davis (1955) and Scudder (1959) and employed by Schaffner and Schwartz (2008) and Forero (2008, 2009) are followed in this paper. Although the features of one orthotyline, *Lopidea staphyleae* Knight, 1917, and one phyline, *Plagiognathus albatus* Van Duzee, 1915, were discussed, Davis (1955) predominantly documented the morphology of the mirines, *Lygus lineolaris* (Palisot de Beauvois, 1818) and *Leptopterna dolobrata* (L., 1758). Several revisions (Southwood, 1953; Schwartz, 2004; Cassis, 2008; Forero, 2008, 2009), discussions (Schwartz and Tatarnic, 2008; Schwartz et al., 2008), and one survey paper (Pluot-Sigwalt and Matocq, 2006) have documented the morphology of the orthotyline female genitalia, but the results of these studies are not all easily compared to the observations of Davis (1955). Therefore, I comment on current usage and highlight structural differences between mirine and orthotyline female genitalia.

The morphology of the ovipositor and the associated genitalic structures can be summarized as follows. Abdominal segments eight and nine contain the female genitalia. Ventrally the genital segments are demarcated by paired plates, the lateral tergites or paratergites, that are separated at the midline by paired ovipositor sheaths. Internally the ovipositor consists of two pairs of blades emanating from segments eight and nine. Two sets of terms have been given to these paired structures of the ovipositor—valvulae and valvifers or gonapophyses and gonocoxites. Blades derived from segments eight or nine are respectively denoted as first and second valvulae and valvifers (Davis, 1955) or first and second (Scudder, 1959) or eighth and ninth (Pluot-Sigwalt and Matocq, 2006) gonapophyses and gonocoxites. Herein the names applied by Scudder (1959) will be followed (cf. Forero 2008, 2009) because this terminology was extended across the Heteroptera with reference to classification.

The first gonocoxa is located ventrolaterally and beneath the paratergite on either side of segment 8, in all cimicomorphan Heteroptera, except the Miroidea (Tingidae + Miridae) (Schuh et al., 2009). In Nabidae (cf. *Nabis*, Scudder, 1959: 428, fig. 30) the ventral (also the anterior, outer, or external) portion of the first gonapophysis is sclerotized and obviously attached posteriorly to the first gonocoxa that in turn is rigidly adhered as an obvious, flat apodeme to paratergite 8. In Miridae, the ventral region of the first gonapophysis is membranous and much reduced with only a thin membranous attachment to a completely fused first gonocoxa and paratergite 8. The dorsal edge of the first gonapophysis is heavily sclerotized and forms the grooved first ramus. The first ramus is produced anteriorly beyond the base of the first gonapophysis. The dorsal (also the posterior, inner, or internal) base of the first ramus is attached to the gonangulum. The gonangulum consists of two pieces (limbs or struts) connected dorsolaterally at an acute angle. The anterior piece of the gonangulum is attached to the base of the first ramus, with the posterior piece fused posteriorly to the anterior edge of paratergite 9. For Miridae, Davis (1955) did not recognize the composite construction of the first ramus and anterior piece of the gonangulum, instead referring to both as the first ramus with the posterior piece of the gonangulum coined the ramal plate of paratergite 9 (cf. Davis, 1955:137, figs. 5, 6). Segment 9 carries a pair of second gonocoxa, to which are attached a pair of second gonapophyses. The ventral edge of each second gonapophysis is heavily sclerotized and forms the ridged second ramus that interlocks with the first ramus. These specialized regions of the gonapophyses form the sliding mechanism of the ovipositor. The second gonapophyses are fused along their dorsal margins forming a bulbous base.

Sternal structures associated with abdominal segments eight and nine compose the entire bursa copulatrix. The intraramal portions of the first gonapophyses (segment eight) form the anterior structures and the intraramal portions of the second gonapophyses (segment nine) form the posterior structures. The constituent parts of the anterior region or "anterior wall" (Kullenberg, 1947) are the basal and medial parts of

the first gonapophyses, the vestibulum, and anterior parts of the genital chamber—the rest of ventral labiate plate, seminal depository, and the dorsal labiate plate. The posterior region of the genital chamber is the "posterior wall." The genital chamber is enclosed dorsally by the posteriormost reach of the dorsal labiate plate, forming a continuous surface with the dorsalmost (or posteriormost) region of the posterior wall. This spanning dorsal sheet carries the sclerotized rings, the oviducts (paired lateral and median common), and the accessory, vermiform, or spermathecal gland. The ventral portion of the genital chamber is open, leading to the vulva (or secondary gonopore).

In many Orthotylini (cf. Forero, 2008; Pluot-Sigwalt and Matocq, 2006), the basal region of the first gonapophyses is asymmetrical and extremely complex. Although the real extent to which this structure is asymmetrical in the tribe is poorly documented. The basal ventral portions of the first gonapophyses are medial swellings that are variable in size, conformation, protuberance, and convolution. The protuberant anteromedial parts extend anterolaterally and are confluent medially across the posterior margin of the ventral labiate plate. The medial regions of the first gonapophyses, which span across the anterior wall through the connecting posterior margin of the ventral labiate plate, form the vestibulum ventral to the genital chamber. The posterior edge of the ventral labiate plate is often protuberant, sometimes joining the anterolateral regions of first gonapophyses in forming a complex, convoluted vestibulum, where the constituent parts may be difficult to unravel with manipulation. The complex structure of the vestibulum is species specific.

A membranous or variably sclerotized structure of the anterior wall, anterior to the gnarled vestibulum, was observed in some genera. This feature can form an anterior "cap" surrounding the anterior surface of the first gonapophyses (cf. *Lopidea media*, personal obs.; *Orthotylus* spp., fig. 16A–D; Forero, 2009: 33) or span the intraramal region of the anterior wall forming a "shroud" anterior to the vestibulum (fig. 40B). In species of *Hadronema*, this region of the anterior wall bears a sclerotized central plate or protuberance(s) that extends posteriorly into the vulva. This type of structure is not known in other Orthotylini (Forero, 2008).

A survey of some Orthotylinae showed that most *Orthotylus*-group genera have asymmetrical first gonapophyses (refs. in Pluot-Sigwalt and Matocq, 2006). However, first gonapophyses are symmetrical in the *Hadronema* group (Forero, 2008), *Araucanocoris* Carvalho, 1983, *Hadronemella* Carvalho, 1984 (Forero, 2009); Halticini (Schwartz and Tatarnic, 2008, Schwartz et al., 2008), and in the types species of the apparently unrelated genera for *Apachemiris* Carvalho and Schaffner, 1977, *Cyrtorhinus* Fieber, 1858, *Fieberocapsus* Carvalho and Southwood, 1955, *Hyalochloria* Reuter, 1907, *Jobertus* Distant, 1893, *Labopella* Knight 1929, *Mecomma* Fieber, 1858, *Parthenicus* Reuter, 1876, *Pseudoloxops* Kirkaldy, 1905, *Saileria* Hsiao, 1945, *Schaffneria* Knight, 1966, and *Sericophanes* Reuter, 1876 (personal obs.).

The vestibulum, formed by the first gonapophyses, is a passage starting at the vulva with the dorsalmost portion forming the entrance to the genital chamber. The anterior wall of the vestibulum (Davis, 1955), or just the anterior wall (Forero, 2008, 2009), and the ventral labiate plate are regions of a continuous, sclerotized folded surface of the first gonapophyses (cf. Southwood, 1953: 425, fig. 21, V1 = convoluted base of right first gonapophyses, af = ventral labiate plate). The more anterior portion of the ventral labiate plate lies in the horizontal plane of the bursa copulatrix, its dorsal surface is usually spinose, and it forms the ventroposterior entrance to the membranous intersegmental seminal depository sac.

The dorsal labiate plate, forming the dorsal surface of the genital chamber, is continuous at the lateral margins with the ventral labiate plate. The dorsal labiate plate of Orthotylini, in transverse cross section, at the level of the sclerotized rings, shows strong dorsomedial folding of the rings at their lateral margins. In this view, it is easy to observe that the dorsal and ventral labiate plates are joined laterally. The medial region of the dorsal labiate plate can be membranous or with sclerotized plates of various size.

Sometimes parts of the medial region can be strongly sunken ventrally (cf. *Chileria*, Forero, 2009: 11, fig. 6). The sclerotized portions of the dorsal and ventral plates are diminished anteriorly, and continue forward unbroken as a membranous baglike structure—the seminal depository sac. The anterior end, formed by the junction of the dorsal and ventral labiate plates, is closed with the posterior end of the seminal depository open to the anterior reaches of the genital chamber.

The posterior wall, the diversely modified intraramal plate spanning the base of the second gonapophyses, was surveyed for taxonomic information (Slater, 1950). This complicated structural feature of the posterior wall requires discussion beyond the observations currently available in the literature. In mirines, a sclerotized thickening occupying the midline between paired lateral or fused interramal sclerites was termed the ''sigmoid process'' by Davis (1955) because it is S-shape in lateral view. In members of this subfamily, the structure includes a variably shaped prominence that extends posteriorly (or ventrally) from the ventromedial portion of the wall to abut the bulb of the ovipositor. In medial lateral view, the sclerotization extends dorsally (or posteriorly), forming a plate on the dorsal (or posterior) end of the posterior wall that is the base of a variously shaped membranous dorsal sac. The name was intended to supplant structure B of Slater (1950: 69, fig. 17). Kelton (1955) used the term *median process* for the same feature. Davis (1955) mentioned that in *Lopidea* and *Plagiognathus* this structure was simple, not S-shaped. Cassis (2008) and Forero (2008) used *sigmoid process* with reference to the medial part of the posterior wall between the paired interramal sclerites of the *Lattinova* complex and the *Hadronema* group, both Orthotylini. Because the morphology of the posterior wall in these groups and in *Slaterocoris* and its relatives, is mostly a flat plate in lateral view, I refer to this area in Orthotylini as the medial region of the posterior wall. Forero (2009) has referred to projections from the medial region as a medial process, I concur with this interpretation.

Dorsal Sculpturation

There seems to be an interaction between vestiture density and the integrity of dorsal puncturation of the hemelytron. Punctures can merge to form rugosity or reticulation or if discrete, punctures can form an underlayment to the rugose or reticulate surface of the hemelytron. In taxa with sparsely punctured hemelytra, punctures usually maintain their discreetness, regardless of the individual diameter of a puncture. Puncture discreetness is also maintained in taxa where punctures merge with or form a rugose or reticulate surface. In taxa with dense vestiture, a surface of discrete punctures, rugosity, or reticulation can be disrupted and replaced by rows of shingle-shaped plates. In *Lopidella*, whose species have dense dorsal vestiture, the sculpturation is apparently not disrupted as is the condition in *Slaterocoris* and *Josephinus* species. The punctures are discrete and the rugosity or reticulation integrity is maintained in the species of the latter genera.

The dorsal surface structure in *Sarona*, as described by Asquith (1994), is usually ''shining, weakly rugulose, with minute shallow punctures'' or with ''minutely shagreened sculpturing'' (cf. *S. myoporicola*, Asquith, 1994: 3, fig. 1), but other species of the genus have a different surface structure. The sculpturation in the type species, *S. adonias*, is best described as lacking punctures and instead formed by rows of shingle-shaped plates. In *Scalponotatus* and *Slaterocoris*, the sculpturation is a combination of either small to moderately sized punctures that cover a reticulate surface (fig. 3A, pl. 4A–R). The dorsal surface structure in other North American orthotylines with a single spicule and the other group-forming features mentioned by Asquith are diverse. *Ficinus* and *Jornandes* have a distinctly shagreened hemelytral dorsum formed by minute, densely distributed punctures on an otherwise smooth surface (e.g., *J. cruralis* Distant, Schaffner and Schwartz, 2008: 39, fig. 17A). Species of *Lopidella* all have deep, densely distributed punctures without surface reticulation or rugosity, whereas *Fulgenticapsus* and *Rolstonocoris* are characterized by small, faint, sparsely distributed punctures

on a smooth surface. Whether sculpturation in orthotyline Miridae is a plesiomorphic character, as suggested by Asquith (1994), requires further investigation. Certainly, it is a variable character as noted in *Sarona* and also in *Josephinus*, whereas *J. albicornis* has minutely shagreened sculpturing (as in *Ficinus* and *Jornandes*) and the surface of the remaining two species is characterized by shingle-shaped plates.

PHYLOGENETIC ANALYSIS

Taxa

Two analyses were conducted, one with 40 taxa and another with 38, because of the absence of two species of *Slaterocoris* with substantial missing data; *S. atratus* could not be coded for 19 female genitalic characters and *S. subalbicans* could not be coded for 49 male and female genitalic characters. Eight outgroups were included in analyses with either 32 or 30 species of *Slaterocoris* as ingroup taxa. All of the outgroup genera are members of the *Orthotylus* group of Schuh (1974) and have been mentioned in the discussions above. The outgroup taxa are *Orthotylus marginalis*, *Sarona adonias*, *Jornandes cruralis*, *Scalponotatus maturus*, three species of *Josephinus*, and *Jornandinus grandis*. The cladograms were rooted with *O. marginalis*. All these taxa, except *O. marginalis*, the type species of the type genus of the nominate subfamily and tribe, were included in a group of North American Orthotylini recognized by features of the male genitalia and head structure (Schaffner and Schwartz, 2008) or were included in the cladistic analysis by Asquith (1994). Forero (2008) also included *O. marginalis* as the root and *Slaterocoris atritibialis* as one of four additional outgroups in a cladistic analysis of the *Hadronema* group.

Data

The morphological matrix, constructed with WinClada (Nixon, 2002), incorporated 71 characters of coloration, vestiture, dorsal sculpturation, and the structure of the head, hemelytron, and genitalia. Regions of the genitalia were treated as separate characters employing multistate codings to capture their diversity. Intraspecific character variations of polymorphic species (amounting to $<1\%$ of the matrix) were scored with multiple states. Table 1 presents a list of the character descriptions, including figure references for most of the character states; table 2 shows the distribution of the characters and states for all the taxa. Multistate characters accounted for 68% of the matrix and were treated as nonadditive. Binary characters comprised the remaining 32% of the matrix. Some characters were not applicable for all species and in two species all genitalic characters were not available for coding (amounting to 8% of the matrix). Four characters were coded but ultimately proved to be uninformative (16, 17, 21, 22) and were deactivated and are not part of the analyses. In the cladograms (figs. 1A–D, 2) all unsupported branches were collapsed; characters are mapped to figure 2 using unambiguous optimization and homoplasy set to character, so any extra steps are homoplasious, with black hashmarks indicating nonhomoplasious states and white hashmarks indicating homoplasious states. Ambiguous characters that support various nodes under slow or fast optimization, as implemented by WinClada, are referenced in the following discussion and in the species group discussions below.

Analysis Strategy

The optimality criterion used was parsimony. The phylogenetic analyses were initially conducted with equal weighting of the characters using NONA (Goloboff, 1999) with the following parameters in a heuristic search: hold 20001; hold/20; mult*1000; max*. For each replication subtree pruning and regrafting and tree bisection and reconnection swapping was performed (Swofford et al., 1996). Two analyses were processed, one with all the terminals and the other lacking two species (*Slaterocoris atratus*, *S. subalbicans*) with appreciable missing data. Successive approximations weighting (Farris, 1969; Carpenter, 1988) was implemented in an effort to choose among equally parsimonious cladograms.

TABLE 1
Description of Characters and States[1]

COLORATION

0. **Head:** predominately green = **0**; vertex and frons paler than pronotum = **1** (pl. 1, e.g., *J. reinhardi*); predominately black = **2** (pl. 1–3, e.g., *Slaterocoris* spp.).
1. **Vertex:** unicolorous black = **0** (pl. 3, e.g., *Slaterocoris* spp.); pale near dorsal margin eye only = **1** (pl. 1, e.g., *J. albicornis*); pale including medial margin of eye = **2** (pl. 2, e.g., *S. maculatus*); unicolorous pale = **3** (pl. 1, e.g., *J. capitatus*).
2. **Antennal segment I and II in male:** concolorous pale = **0** (pl. 2, e.g., *S. pallidicornis*); concolorous black = **1** (pl. 2, e.g., *Sc. maturus*); segment I pale, segment II black = **2** (pl. 2, e.g., *S. flavipes*); segment I pale, segment II pale and black distally = **3**; segment I either pale or dark, segment II black = **4** (pl. 2, e.g., *S. sheridani*).
3. **Coxa:** black, concolorous with legs and thoracic venter = **0** (fig. 12, e.g., *S. digitalis*); concolorous pale with base of femur = **1** (pl. 2, fig. 13, e.g., *S. elongatus*); concolorous pale with legs, thoracic venter, and usually dorsum = **2** (pl. 1, e.g., *J. reinhardi*); concolorous pale with legs and thoracic venter, contrasting with dorsum = **3** (pl. 2, fig. 13, e.g., *S. pallipes*).
4. **Femur base:** concolorous black with remainder of femur = **0** (pl. 3, fig. 12, e.g., *S. punctatus*); pale, discrete margin with darker distal portion = **1** (pl. 2, e.g., *S. elongatus*); pale orange brown, diffuse margin with darker distal portion = **2** (pl. 2, fig. 13, e.g., *S. maculatus*); concolorous orange, with remainder of femur = **3** (pl. 2, fig. 13, e.g., *S. pallipes*).
5. **Femur apex:** narrowly pale = **0** (pl. 1, fig. 12, e.g., *S. ambrosiae*); apex and variable portion of femur pale = **1** (pl. 1, fig. 12, e.g., *S. croceipes*); black = **2** (pl. 3, fig. 12, e.g., *S. robustus*); orange = **3** (pl. 2, fig. 13, e.g., *S. pallipes*).
6. **Hind tibia:** pale = **0** (pl. 1, fig. 12, e.g., *S. apache*); black = **1** (pl. 3, fig. 12, e.g., *S. tanydexios*).
7. **Tarsus:** all segments black = **0** (pl. 3, fig. 12, e.g., *S. rubrofemoratus*); pale, segment 3 black = **1** (pl. 2, fig. 12, e.g., *S. pilosus*); all segments pale = **2**.

VESTITURE

8. **Length:** short = **0** (pl. 4G, e.g., *S. breviatus*); moderately long = **1** (pl. 4C, e.g., *S. pilosus*); long = **2** (pl. 4M, e.g., *S. mohri*).
9. **Color:** black = **0** (pl. 3, e.g., *S. robustus*); pale = **1** (pl. 1, e.g., *S. apache*); brown = **2** (pl. 2, e.g., *S. maculatus*); silvery = **3** (pl. 1, e.g., *S. clavatus*).
10. **Distribution:** sparse = **0** (pl. 4G, e.g., *S. breviatus*); moderately dense = **1** (pl. 4N, e.g., *S. pilosus*); dense = **2** (pl. 4H, e.g., *S. clavatus*).
11. **Angle:** reclining = **0** (pl. 4G, e.g., *S. breviatus*); suberect = **1** (pl. 4N, e.g., *S. pilosus*); erect = **2** (pl. 4M, e.g., *S. mohri*).
12. **Type:** simple setae = **0** (pl. 4E, e.g., *S. apache*); simple setae and some sericeous setae = **1** (pl. 4S, fig. 63C, e.g., *S. simplex*); bristlelike simple setae = **2** (pl. 4P, e.g., *S. robustus*); matted simple setae with recurved apices = **3** (pl. 4F, e.g., *S. argenteoides*).

STRUCTURE

13. **Surface sculpturation:** smooth = **0**; with discrete punctures = **1** (fig. 27B, e.g., *S. argenteoides*; fig. 31A, e.g., *S. breviatus*; fig. 36B, e.g., *S. stygicus*; fig. 63A, e.g., *S. punctatus*); with merged punctures = **2** (fig. 3A, e.g., *Sc. maturus*); with minute discrete punctures = **3** (fig. 6C, e.g., *J. albicornis*).
14. **Body conformation:** both sexes similar = **0** (pl. 2, e.g., *S. pilosus*); dimorphic, large, male elongate, female with arcuate costal margin = **1** (pl. 1, e.g., *S. atritibialis*); dimorphic, small, male and female with arcuate costal margin = **2** (pl. 1, e.g., *S. croceipes*); both sexes elongate, costal margin subparallel = **3** (pl. 2, e.g., *S. elongatus*); dimorphic, male parallel sided, female arcuate = **4** (pl. 2, e.g., *S. hirtus*).
15. **Costal margin, female:** sublinear = **0** (pl. 2, e.g., *S. elongatus*); curved = **1** (pl. 1, e.g., *S. apache*); strongly curved = **2** (pl. 2, e.g., *S. mohri*).
16. **Head orientation:** prognathus = **0**; hypognathus = **1** (fig. 6B, e.g., *J. albicornis*; fig. 36A, e.g., *S. stygicus*; fig. 59A, e.g., *S. elongatus*). Uninformative.
17. **Clypeus:** produced anterior and dorsal to mandibular plate = **0** (fig. 36A, e.g., *S. stygicus*; fig. 56A, e.g., *S. clavatus*; fig. 59A, e.g., *S. elongatus*); not produced beyond mandibular plate = **1**. Uninformative.
18. **Frons surface:** smooth = **0** (fig. 20A, e.g., *S. croceipes*; fig. 71A, e.g., *S. robustus*); striate = **1** (fig. 27A, e.g., *S. argenteoides*; fig. 50A, e.g., *S. hirtus*; fig. 56A, e.g., *S. clavatus*).
19. **Frons conformation:** curved hypognathous = **0** (fig. 6A, B, e.g., *J. albicornis*); flattened hypognathous = **1** (fig. 27A, e.g., *S. argenteoides*; fig. 36A, C, e.g., *S. stygicus*; fig. 56A, e.g., *S. clavatus*); porrect = **2**.

TABLE 1
(Continued)

20. **Vertex anterior of transverse basal carina:** flat = **0**; slightly convex = **1**; sunken, vertex/eye contour smooth = **2** (fig. 6A, B, e.g., *J. albicornis*); sunken, vertex/eye contour variably angled = **3** (fig. 27A, e.g., *S. argenteoides*; fig. 36A, C, e.g., *S. stygicus*; fig. 50A, e.g., *S. hirtus*; fig. 56A, e.g., *S. clavatus*); almost tumid = **4**.
21. **Head, posterior margin:** straight = **0**; lateral margins curved posteriorly = **1** (fig. 36C, e.g., *S. stygicus*; fig. 59A, e.g., *S. elongatus*; fig. 71B, e.g., *S. robustus*). Uninformative.

Male Genitalia

22. **Pygophore:** produced on horizontal plane = **0**; produced on vertical plane = **1**. Uninformative.
23. **Tergal process(s):** medial margin humplike = **0** (fig. 8H, e.g., *J. capitatus*); short, 1 or 2 point(s) on right side apex directed medially = **1** (Figs. 19E, 29D, e.g., *S. atratus*, *S. argenteoides*); long, apical margin variously bifurcate = **2** (figs. 30J, 32E, e.g., *S. atritibialis*, *S. breviatus*); long, apical margin solitary = **3** (fig. 60F, e.g., *S. elongatus*); short, 1 point with broad base = **4** (fig. 52D, E, e.g., *S. hirtus*); hooked = **5** (fig. 4H, e.g., *Sc. maturus*); bilateral = **6**; on far left lateral margin = **7**.
70. **Tergal process(s), position on dorsal margin of aperture:** far left = **0**; right = **1** (fig. 4H, e.g., *Sc. maturus*; fig. 39F, e.g., *S. stygicus*); middle = **2** (fig. 10F, e.g., *J. reinhardi*; fig. 60F, e.g., *S. elongatus*); bilateral = **3**.
24. **Pygophore, ventral margin of aperture:** entire = **0** (fig. 9F, e.g., *J. reinhardi*); cleft = **1** (figs. 37C, 39F, e.g., *S. stygicus*).
25. **Subgenital plate:** merging with ventral margin of aperture = **0** (fig. 6F, e.g., *J. albicornis*); removed from ventral margin of aperture = **1** (fig. 39F, e.g., *S. stygicus*).
26. **Phallotheca, shape:** tubelike = **0**; conelike = **1** (fig. 4B, e.g., *Sc. maturus*).
27. **Phallotheca, aperture:** open distally and dorsally = **0**; open dorsally, extending on right side = **1** (fig. 4B, e.g., *Sc. maturus*).
28. **Phallotheca, distal portion:** uniform = **0** (fig. 4B, e.g., *Sc. maturus*); convoluted = **1** (fig. 26A, B, e.g., *S. rubrofemoratus*).
29. **Phallotheca, left lateral surface:** slightly compressed = **0** (fig. 26A, B, e.g., *S. rubrofemoratus*); strongly compressed = **1** (fig. 39E, e.g., *S. stygicus*); with additional opening on left side = **2** (fig. 65A, B, F, e.g., *S. simplex*); not compressed = **3** (fig. 4B, e.g., *Sc. maturus*).
30. **Endosoma, membrane attachment:** to recurved spicule process = **0** (fig. 4A, e.g., *Sc. maturus*); to spicule base = **1** (fig. 39A–D, e.g., *S. stygicus*).
31. **Endosomal spicule(s) structure:** two spicules = **0**; one spicule, undivided = **1** (fig. 4A, e.g., *Sc. maturus*); one spicule, divided, ventral and dorsal lobes = **2** (fig. 18A–E, e.g., *S. apache*); one spicule, divided, ventral lobe and minute dorsal lobe = **3** (fig. 8A, e.g., *J. capitatus*).
32. **Endosomal spicule-ventral lobe, structure:** straight = **0**; bifurcate distally = **1** (fig. 7A, e.g., *J. albicornis*); recurved = **2** (fig. 22A–H, e.g., *S. croceipes*).
33. **Endosomal spicule-ventral lobe, subapex:** uniform thickness throughout apical region = **0** (fig. 30A, B, e.g., *S. atritibialis*); thickened = **1** (fig. 34A–C, e.g., *S. pallipes*).
34. **Endosomal spicule-ventral lobe, distal portion:** marginally serrate = **0** (fig. 29A, E, H, e.g., *S. argenteoides*, *S. argenteus*, *S. digitatus*); smooth = **1** (fig. 73A, e.g., *S. robustus*); smooth short = **2** (fig. 69A, e.g., *S. tanydexios*); serrate long = **3** (fig. 35A, B, e.g., *S. solidaginis*).
35. **Endosomal spicule-dorsal lobe, division:** entire = **0** (fig. 29A, E, H, e.g., *S. argenteoides*, *S. argenteus*, *S. digitatus*); bifid = **1** (fig. 73A, e.g., *S. robustus*).
36. **Endosomal spicule-dorsal lobe, conformation:** flattened = **0** (fig. 26C–G, e.g., *S. rubrofemoratus*); rolled = **1** (fig. 45A–E, e.g., *S. sheridani*, *S. sparsus*); dorsal margin with incurved basal spine = **2** (fig. 34A–C, e.g., *S. pallipes*); narrow = **3** (fig. 73A, e.g., *S. robustus*); flattened with strong marginal serration = **4** (fig. 35A, B, e.g., *S. solidaginis*); flattened with wide separation between bifid portions = **5** (fig. 64A–C, e.g., *S. punctatus*); narrow spike = **6** (fig. 57A, B, e.g., *S. clavatus*).
37. **Endosomal spicule-dorsal lobe, entire and flattened:** wide distally = **0** (fig. 22A–E, G, H, e.g., *S. croceipes*); narrow distally = **1** (fig. 22F, e.g., *S. croceipes*).
38. **Right paramere, spines:** without branches = **0**; dorsally directed, produced distally = **1** (fig. 4E–G, e.g., *Sc. maturus*; fig. 7E, F, *J. albicornis*; fig. 8E, F, *J. capitatus*; fig. 10E, G–I, *J. reinhardi*); ventrally directed = **2** (fig. 37C, e.g., *S. stygicus*); multibranched = **3**.
39. **Right paramere – ventral directed spines; size:** small = **0** (fig. 17A–I, e.g., *S. apache*); large = **1** (fig. 38A–M, e.g., *S. stygicus*).

TABLE 1
(Continued)

40. **Right paramere – ventral directed spines; apical region:** variable number of ventral spines = **0** (fig. 17A–I, e.g., *S. apache*); parallel spines = **1** (fig. 51A–G, e.g., *S. hirtus*); narrowed = **2** (fig. 41A–J, e.g., *S. flavipes*); radial = **3** (fig. 38A–M, e.g., *S. stygicus*); elongate narrow = **4** (figs. 67B, 68A–E, e.g., *S. tanydexios*); clubbed = **5** (fig. 57F, G, e.g., *S. clavatus*).
41. **Right paramere – ventral directed spines; apical region parallel:** spines short = **0** (fig. 28A–L, e.g., *S. argenteoides*, *S. argenteus*); spines narrow = **1** (fig. 54A–F, e.g., *S. mohri*); spines large = **2** (fig. 60E, e.g., *S. elongatus*).
42. **Right paramere – ventral directed spines; radial type:** radial = **0** (fig. 32I–O, e.g., *S. breviatus*); bifurcate = **1** (fig. 30C–G, e.g., *S. atritibialis*); large = **2** (fig. 34H, I, e.g., *S. pallipes*).
43. **Right paramere – ventral directed spines; subapical or medial region:** short = **0** (fig. 25K–N, e.g., *S. pilosus*); constricted = **1** (fig. 33I–K, e.g., *S. pallidicornis*); wide = **2** (fig. 28A–L, e.g., *S. argenteoides*, *S. argenteus*); with prominent solitary spine = **3** (fig. 72A–F, e.g., *S. robustus*); narrow = **4** (fig. 68A–E, e.g., *S. tanydexios*).
44. **Right paramere – ventral directed spines; basal lobe:** rounded = **0** (fig. 41A–J, e.g., *S. flavipes*); prominent, erect = **1** (fig. 26J–N, e.g., *S. rubrofemoratus*); broad at base = **2** (fig. 35G–I, e.g., *S. solidaginis*); narrow elongate base = **3** (fig. 52A–G, e.g., *S. hirtus*); short serrate process = **4** (fig. 65J–M, e.g., *S. simplex*); prominent, erect = **5** (fig. 28A–L, e.g., *S. argenteoides*, *S. argenteus*).
45. **Left paramere apex:** entire = **0** (fig. 25I, J, e.g., *S. pilosus*); entire with large process = **1** (fig. 16C, D, e.g., *S. ambrosiae*); mittenlike = **2** (fig. 4C, D, e.g., *Sc. maturus*).
46. **Left paramere basal region:** developed ventrally = **0** (fig. 4C, D, e.g., *Sc. maturus*); unmodified = **1** (fig. 8C, D, e.g., *J. capitatus*; fig. 27H, I, e.g., *S. rubrofemoratus*).
47. **Left paramere – unmodified; distal portion:** subequal to basal portion = **0** (fig. 73C, e.g., *S. robustus*); longer than basal portion = **1** (fig. 39G, H, e.g., *S. stygicus*; shorter than basal portion = **2** (fig. 43A, e.g., *S. longipennis*).
48. **Left paramere – unmodified; distal portion short ventral surface:** diameter equal throughout = **0** (fig. 29C, G, J, e.g., *S. argenteoides*, *S. argenteus*, *S. digitatus*); ventral margin scalloped = **1**.
49. **Paramere insertions:** right and left on same level = **0**; right slightly dorsal to left = **1** (fig. 37C, e.g., *S. stygicus*); right dorsal to left by diameter of insertion = **2**.

FEMALE GENITALIA

50. **Female subgenital plate, triangular shape:** elongate = **0**; equilateral = **1**; base wide, apex broad = **2**; base moderately wide, apex blunt = **3**.
51. **First gonapophyses, overlap (ventral view):** left over right = **0** (fig. 23A, B, e.g., *S. croceipes*); right over left = **1** (fig. 5A, B, e.g., *Sc. maturus*; fig. 40A, B, e.g., *S. stygicus*); left over right (right lateral surface small) = **2** (fig. 11A, B, e.g., *J. reinhardi*); left over right medial surface long = **3**; left convoluted = **4**.
52. **First gonapophyses, comparative size at overlap:** left greater than right = **0** (fig. 47A, B, e.g., *S. sheridani*); right greater than left = **1** (fig. 40A, B, e.g., *S. stygicus*).
53. **Left first gonapophysis, length:** long, composed of one section = **0**; short, composed of two sections = **1** (fig. 5A, B, e.g., *Sc. maturus*; fig. 11A, B, e.g., *J. reinhardi*; fig. 40A, B, e.g., *S. stygicus*).
54. **Left first gonapophysis, mediodistal area:** not projecting = **0** (fig. 5B, e.g., *Sc. maturus*; fig. 11A, e.g., *J. reinhardi*); prominence obviously larger than right first gonapophysis = **1** (fig. 23A, e.g., *S. croceipes*; fig. 40B, e.g., *S. stygicus*); large prominence, but without more anterior structure = **2**.
55. **Left first gonapophysis, dorsal surface:** concave = **0** (fig. 23A, e.g., *S. croceipes*); protuberant = **1** (fig. 5A, e.g., *Sc. maturus*; fig. 11A, e.g., *J. reinhardi*; fig. 40A, e.g., *S. stygicus*).
56. **Left first gonapophyses, apex:** narrow = **0** (fig. 5A, e.g., *Sc. maturus*; fig. 23B, e.g., *S. croceipes*); wide = **1** (fig. 47B, e.g., *S. sheridani*); broad convoluted = **2** (fig. 58B, e.g., *S. clavatus*); roughly confluent with distal portion = **3** (fig. 11B, e.g., *J. reinhardi*; fig. 40B, e.g., *S. stygicus*).
57. **Vestibulum, anteroventral margin of anterior wall:** practically membranous = **0**; sclerotized medially, spanning width of first gonapophyses = **1**; sclerotized medially, width extending just lateral of first gonapophyses = **2**; wider than width of bursa copulatrix = **3**; sclerotized as in state 2, but incised medially = **4** (fig. 47B, e.g., *S. sheridani*); sclerotized as in state 2, but height deeper = **5**.
58. **Ventral labiate plate ventral surface:** broadly produced into vulva = **0** (fig. 5B, e.g., *Sc. maturus*; fig. 11B, e.g., *J. reinhardi*); strongly produced into vulva = **1** (fig. 23A, e.g., *S. croceipes*; fig. 40A, e.g., *S. stygicus*; fig. 47A, e.g., *S. sheridani*; fig. 53A, e.g., *S. hirtus*; fig. 58A, e.g., *S. clavatus*; fig. 70A, e.g., *S. tanydexios*); narrowly produced into vulva = **2**; membranous broadly not produced into vulva = **3**.

TABLE 1
(Continued)

59. **Ventral labiate plate – strongly produced:** broad = **0** (fig. 70A, e.g., *S. tanydexios*); moderately wide triangular at base = **1** (fig. 23A, e.g., *S. croceipes*; fig. 53A, e.g., *S. hirtus*); wide triangular at base = **2** (fig. 40A, e.g., *S. stygicus*; fig. 58A, e.g., *S. clavatus*); moderately wide triangular at base with cleft apex = **3** (fig. 47B, e.g., *S. sheridani*).

60. **Dorsal labiate plate, paired medial sclerites:** centralized faintly sclerotized or membranous = **0**; sclerotized, length greater than width = **1** (fig. 5A, e.g., *Sc. maturus*); sclerotized, width greater than length = **2** (fig. 47A, e.g., *S. sheridani*; fig. 70A, e.g., *S. tanydexios*); paired medial sclerites of dorsal labiate plate large, reaching infolded edge of sclerotized rings = **3** (fig. 11D, e.g., *J. reinhardi*); sclerotized, clearly confluent anteromedially with lateral infolded sclerotized region of dorsal labiate plate = **4**.

61. **Dorsal labiate plate, dorsal medioanterior margin:** membranous including dorsal surface = **0**; strongly sclerotized, convoluted dorsally = **1** (fig. 11D, e.g., *J. reinhardi*).

62. **Anterior medial surface of second gonapophyses:** slightly convex = **0** (fig. 40D, e.g., *S. stygicus*; fig. 47D, e.g., *S. sheridani*; fig. 58C, e.g., *S. clavatus*; fig. 62B, e.g., *S. maculatus*; fig. 66B, e.g., *S. simplex*; fig. 70C, e.g., *S. tanydexios*); strongly convex = **1** (fig. 23D, e.g., *S. croceipes*; fig. 53D, e.g., *S. hirtus*); very strongly protuberant = **2**; with two protuberant lobes (each side) = **3**; with large angulate protuberance = **4**.

63. **Interramal sclerite, dorsomedial region:** flat, not produced anteriorly = **0** (fig. 62D, e.g., *S. maculatus*; fig. 11E, e.g., *J. reinhardi*; fig. 23D, e.g., *S. croceipes*; fig. 53D, e.g., *S. hirtus*; fig. 62B, e.g., *S. maculatus*; fig. 70D, e.g., *S. tanydexios*); convex anteriorly = **1** (fig. 47C, e.g., *S. sheridani*); tumid anteriorly = **2** (fig. 40D, e.g., *S. stygicus*; fig. 58D, e.g., *S. clavatus*); region membranous = **3**; asymmetrical left side produced = **4**; strong and narrowly convex = **5** (fig. 66B, e.g., *S. simplex*).

64. **Interramal sclerite, medial region:** obscure, IRS meet on medial line = **0**; platelike = **1** (fig. 23D, e.g., *S. croceipes*; fig. 40D, e.g., *S. stygicus*; fig. 47D, e.g., *S. sheridani*; fig. 53D, e.g., *S. hirtus*; fig. 58D, e.g., *S. clavatus*; fig. 62B, e.g., *S. maculatus*; fig. 66B, e.g., *S. simplex*; fig. 70D, e.g., *S. tanydexios*); narrow platelike = **2** (fig. 5D, e.g., *Sc. maturus*; fig. 11E, e.g., *J. reinhardi*).

65. **Interramal sclerite, posteromedial portion:** without process or plate abutting ovipositor bulb = **0**; with flat plate abutting ovipositor bulb = **1** (fig. 40C, e.g., *S. stygicus*; fig. 47C, e.g., *S. sheridani*); with narrow process abutting ovipositor bulb = **2** (fig. 5C, e.g., *Sc. maturus*; fig. 66B, e.g., *S. simplex*); with tumid process abutting ovipositor bulb = **3** (fig. 11E, e.g., *J. reinhardi*; fig. 23C, e.g., *S. croceipes*; fig. 53C, e.g., *S. hirtus*; fig. 62A, e.g., *S. maculatus*; fig. 70D, e.g., *S. tanydexios*).

66. **Interramal sclerite, ventromedial region:** not greatly overlapping second gonapophyses basally = **0** (fig. 5D, e.g., *Sc. maturus*; fig. 11E, e.g., *J. reinhardi*; fig. 62A, e.g., *S. maculatus*; fig. 66A, e.g., *S. simplex*); overlapping ventromedial plate of interramal sclerite = **1** (fig. 23D, e.g., *S. croceipes*; fig. 40D, e.g., *S. stygicus*; fig. 47D, e.g., *S. sheridani*); overlapping second gonapophyses basally and ventromedial plate of interramal sclerite = **2** (fig. 53D, e.g., *S. hirtus*; fig. 58D, e.g., *S. clavatus*).

67. **Interramal lobe, basal (dorsal) insertion:** attachment sclerotized = **0** (fig. 5D, e.g., *Sc. maturus*; fig. 40D, e.g., *S. stygicus*; fig. 47D, e.g., *S. sheridani*); attachment membranous = **1** (fig. 11E, e.g., *J. reinhardi*; fig. 23D, e.g., *S. croceipes*; fig. 53D, e.g., *S. hirtus*; fig. 58D, e.g., *S. clavatus*; fig. 62B, e.g., *S. maculatus*; fig. 66B, e.g., *S. simplex*; fig. 70D, e.g., *S. tanydexios*).

68. **Interramal lobe, dorsomedial margin:** not produced as lobe = **0** (fig. 5D, e.g., *Sc. maturus*; fig. 40D, e.g., *S. stygicus*); with narrow lobe = **1** (fig. 11E, e.g., *J. reinhardi*; fig. 53D, e.g., *S. hirtus*; fig. 66B, e.g., *S. simplex*); broad prominence with narrow lobe = **2** (fig. 58D, e.g., *S. clavatus*; fig. 62B, e.g., *S. maculatus*; fig. 70D, e.g., *S. tanydexios*); with short process = **3**; large apical prominence = **4**; massive medial surface = **5**.

69. **Interramal lobe, ventral projection:** with blunt lateral projection = **0**; short with concave anterior surface = **1** (fig. 23E, e.g., *S. croceipes*; fig. 40D, e.g., *S. stygicus*; fig. 47D, e.g., *S. sheridani*; fig. 53D, e.g., *S. hirtus*); long with concave anterior surface = **2** (fig. 58D, e.g., *S. clavatus*; fig. 62B, e.g., *S. maculatus*; fig. 66B, e.g., *S. simplex*; fig. 70D, e.g., *S. tanydexios*); long with convex anterior surface = **3** (fig. 5D, e.g., *Sc. maturus*; fig. 11E, e.g., *J. reinhardi*); acute process = **4**.

[1]*J* = *Josephinus*, *S.* = *Slaterocoris*, *Sc.* = *Scalponotatus.*

RESULTS

Analysis of the complete data set of 40 taxa resulted in three most parsimonious cladograms with a length of 328 steps, and consistency (Ci) and retention (Ri) indices of 52 and 73 respectively (figs. 1A, B, 2). The cladograms supported the same relationships

TABLE 2
Character Matrix for *Slaterocoris* Cladistic Analysis[1]

Taxon	0000000000111111111122222222223333333333444444444455555555556666666667 0123456789012345678901234567890123456789012345678901234567890123456789
Orthotylus marginalis	0302330111010000000200070000030000-----0------20--0040001300-00330000500
Sarona adonias	1332030101100221110011160000030010-----3------00--0040021032-00401301543
Jornandes cruralis	1303330201000331101131150110303011-----1------21--2130100113-10001310431
Scalponotatus maturus	2110001002000221100131150111030012-----1------20--1210101010-10002200031
Josephinus albicornis	2100000102000321100021100011131131-----1------01--1320101320-31002301132
Josephinus capitatus	1302330111110221100021100011130031-----1------01--1320101320-31002301132
Josephinus reinhardi[2]	13*233*113211221101021100011131131-----1------01--1320101320-31002301132
Jornandinus grandis	1300021102010101102041111111000120 0---1------01--0320111300-30001111011
Slaterocoris apache[3]	2010000011010121100131111111101220000020 0--0101011300110021*20101311*11
Slaterocoris atratus	201000101211012?101131121111101220000120 0--0101011?????????????????????1
Slaterocoris croceipes[4]	2010010002010121100131111111101220000*200--0101011300110021*20101311311
Slaterocoris fuscomarginalis	2010010011010121100131111111101220000120 0--0101011300110021120101311111
Slaterocoris pilosus	2000000113110101100131111111101220000120 0--0101011300110021120101311011
Slaterocoris rubrofemoratus[5]	2010011012010121100131111111101220000120 0--0101011300110021*20101311311
Slaterocoris tibialis	2010000012010121100131111111101220000020 0--0101011300110021120101311011
Slaterocoris argenteus	2010021013213142101131111111101220000120 10-2501001320110021120001311321
Slaterocoris argenteoides	2010021013213141101131111111101220000120 10-2501001320110021120141311011
Slaterocoris digitatus	2010021013213142101131111111101220000120 10-2501001300110021120001311021
Slaterocoris ambrosiae	2010000012210122100131111111101220013-200--3111001320110121120101311021
Slaterocoris robustus	2010021010212102100131111111101220113-202--3001001300110121120001311021
Slaterocoris atritibialis	2010001002000112101131121111111220314-213-112011-1311111321220121311011
Slaterocoris breviatus	2000000102000112101131121111111220314-213-012010-1311111321220021311011
Slaterocoris pallidicornis	2000000102000112101131121111111221312-213-112011-1311111321220121111011
Slaterocoris pallipes	2013330102000112101131121111111221212-213-212011-1311111321220021111011
Slaterocoris solidaginis	2010000102000112101131121111111220314-213-112011-1310111321220121111011
Slaterocoris stygicus	2010001102000112101131121111111221212-213-212011-1311111321220021110011
Slaterocoris flavipes[6]	2020010013210101100131111111101220101-202--*0012013001101213200113110 11
Slaterocoris longipennis[7]	201000*013210121100131111111101220101-202--0001201300110121*20111111011
Slaterocoris sheridani	2040000000000102100131111111101220101-202--3001201300110141320011110311
Slaterocoris sparsus	2000010002000102100131111111101220101-202--0001201300110141320001311311
Slaterocoris alpinus	2010001012210101101131141111101220000121 11-2301001320110121120101321111
Slaterocoris hirtus[8]	20*000**2221014210113114111101220 0*012111-2301001320110121120101321111
Slaterocoris mohri	2010001122220142101131141111101220013-2111-2301001320110121120101321111
Slaterocoris elongatus[9]	2011211232201301011311311111101220015-2112-2401001300110121120001301*22
Slaterocoris punctatus	2010021112110132101131131111101220015-2112-2401001300110251220251311222

TABLE 2
(Continued)

	0000000000111111111222222223333333334444444455555555566666666667
	0123456789012345678901234567890123456789012345678901234567890
Slaterocoris maculatus	2213221112111130101131131111101220015-2112-2001001300110251120001301222
Slaterocoris simplex	2010021013211102101131131111121221015-2111-2401001320110221120051201122
Slaterocoris subalbicans	2010021113211?1101131?????????????????????3??????????????????????
Slaterocoris tanydexios	2011121023211131101131121111012210101214--4401001310111221020001311222
Slaterocoris clavatus	2211121123220131101131131111101220006-215--2201001301111251240021121222

[1]Asterisk indicates taxon polymorphic for character state.
[2][2=0,1; 6=0,1].
[3][59=1,3; 68=0,1].
[4][37=0,1; 59=1,3].
[5][59=1,3].
[6][43=0,3].
[7][6=0,1; 59=1,3].
[8][2=1,4; 6,7=0,1; 35=0,1].
[9][68=1,2].

between the outgroup taxa and *Slaterocoris* and segregated the species of *Slaterocoris* into almost identical species groups, but differed in the interrelationships among the species groups. The strict consensus of the three cladograms collapsed seven nodes (fig. 1C). Weighting of successive approximations did not select among the three cladograms, but instead produced one cladogram with length of 329 steps (CI = 52, RI = 73) or one step longer than the input cladograms. This cladogram maintained all the previously recognized species groups but provided a different topology of relationships among the species groups.

An analysis of the 38-taxa matrix resulted in two most parsimonious cladograms with length of 326 steps (CI = 52, RI = 73). All the species group found in the 40-taxa analysis were present. The only difference between the two most parsimonious cladograms was the relationship between three species of the *punctatus* species group (in node 10); *Slaterocoris clavatus* is either more closely related to *S. elongatus* or *S. tanydexios*. The strict consensus of the two cladograms collapsed the node containing these three species. Successive approximations weighting selected neither of the two cladograms, instead produced one cladogram of 327 steps (CI = 52, RI = 73) that maintained all the previously recognized species groups and preferred one of two arrangements of the three species in node 10 found in the unweighted analysis. The single successive approximation cladogram also reported unique relationships between the species groups that were not reflected in the three most parsimonious cladograms of 40-taxa analysis (fig. 1D).

Slaterocoris and *Josephinus* are monophyletic in all the analyses. *Jornandes*, *Scalponotatus*, *Josephinus*, and *Slaterocoris* form a monophyletic group of genera. Regardless of the number of taxa included or the character weighting of the analyses, five species groups of *Slaterocoris* are recovered. A sixth species group, the *flavipes* group, is found, but was polyphyletic in one cladogram (fig. 1A). The constituent taxa in the species groups were the same, except for the two species removed from the 38-taxa analysis. I have chosen to map the characters and states on one of the

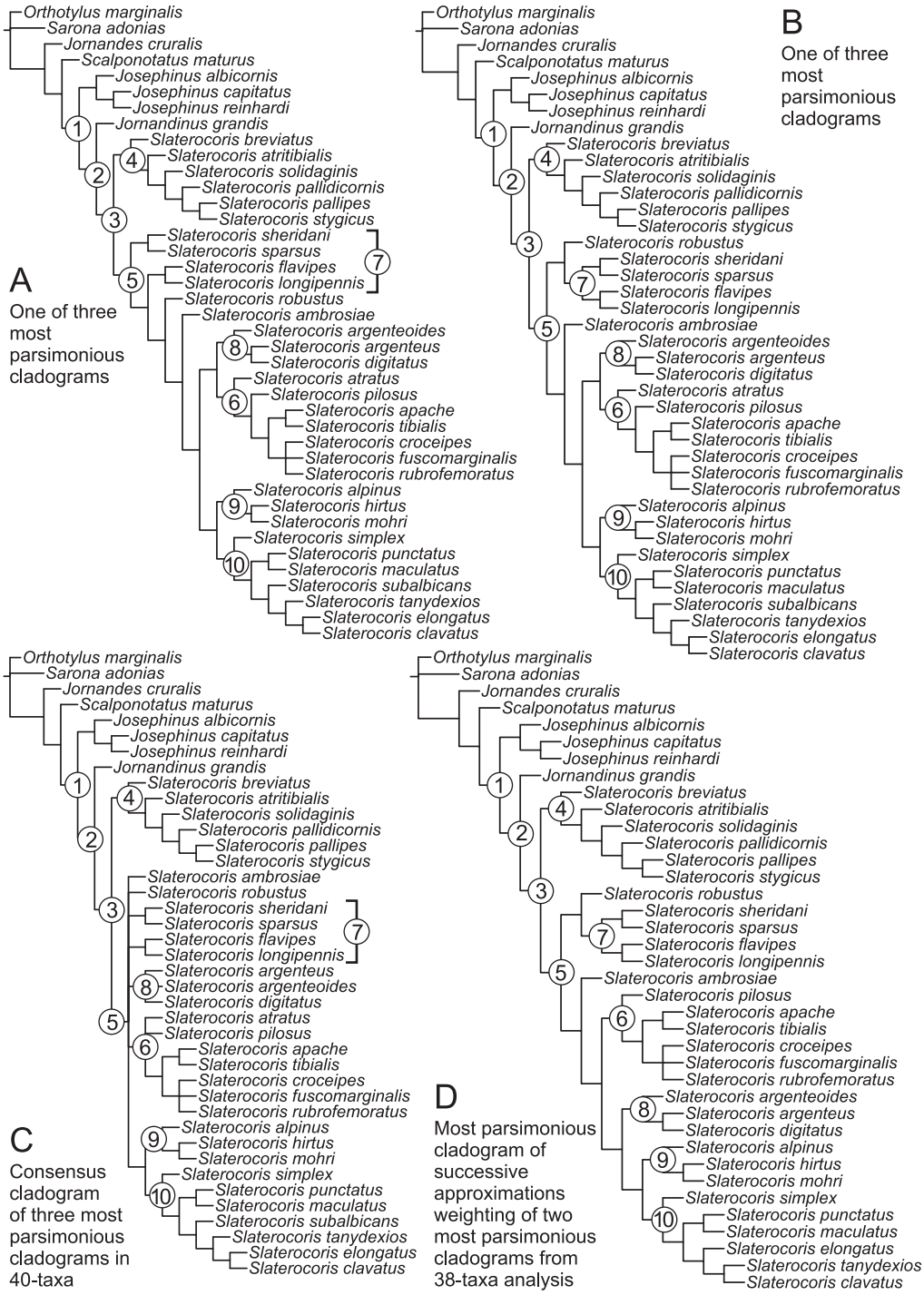


Fig. 1. Cladograms for *Slaterocoris* and outgroups.

Fig. 2. One of three most parsimonious cladograms found in 40-taxa analysis for *Slaterocoris* and outgroups.

most parsimonious cladograms derived from the 40-taxa analysis (fig. 2), because it has the same relationships between the species groups (except for the placement of three terminal species in *S. punctatus* group) as in two most parsimonious cladograms found in the 38-taxa equal-weight analysis.

Discussion

The characters (numbers-states) supporting the nodes in figure 2 as a result of the analyses are as follows:

Node 1, *Josephinus*, *Jornandinus*, and *Slaterocoris*: The left paramere apex is entire (45-0) for all of these taxa, except for *S. ambrosiae* with an autapomorphic, large, subapical process (45-1). The anteroventral margin of the anterior wall (57) is a difficult and homoplastic character to code; however, all taxa in the group have the margin sclerotized and reaching just lateral of the combined width of the first gonapophyses, only *Jornandinus* has this feature membranous (57-0). The large, paired medial sclerites of the dorsal labiate plate reaching the sclerotized rings (60-3) support *Josephinus* and also occurs in *Jornandinus*. In all *Slaterocoris*, except *S. clavatus*, where the medial sclerotization is confluent with the medial portion of the sclerotized rings (60-4), the width of the medial sclerotization is greater than the length (60-2). The degree of sclerotization in the interramal lobe and sclerite attachment (67-1, homoplasious) defines the node in the present analyses, however, it seems unlikely that this character would provide such strong support after an exploration of the female genitalia structure in the Orthotylini is extended to other genera. Under slow optimization a subgenital plate with a moderately wide base and blunt apex (50-3) provides nonhomoplasious support to this clade.

Node 2, *Jornandinus* and *Slaterocoris*: Discrete punctures underlying rugose dorsal surface sculpturation (13-1) is a nonhomoplasious character state found in all members of this group. Similar body conformation in both sexes (14-0) gives homoplasious support to this clade, however, all other body conformation states are found in several species of *Slaterocoris*; two states provide character support for most of the constituents in two species groups (cf. five species in *apache* group, 14-2; five species in *punctatus* group, 14-3). A medial cleft in the ventral margin of the pygophore aperture (24-1) is found in all members the group, but is homoplasious because of *Jornandes cruralis*. Whether the cleft ventral margin of the pygophore is present in other Orthotylini is at present unknown. The slightly compressed left lateral surface of the phallotheca (29-0) is reversed in the *breviatus* group (29-1) and *S. simplex* (29-2). Information of the first gonapophysis in *S. atratus* and *S. subalbicans* would clarify whether all members of the clade share the same character state for this structure (54-1). The extent to which the ventromedial margin of the interramal sclerite overlaps nearby structures (66-1) is homoplasious in *Slaterocoris*; seven species have other states of the character. The shape of the ventral projection of the interramal lobe (69-1) is homoplasious in *Slaterocoris*, with one state (69-2) providing partial support to the *S. punctatus* group.

Node 3, *Slaterocoris*: All species of the genus have uniformly black vertex coloration (1-0), except for two autapomorphic occurrences in *S. clavatus* and *S. maculatus*, where the vertex and frons are marked with white adjacent to the medial margin of the eye (1-2). The markings found in these two species are not known in any of the outgroup taxa. In *Josephinus albicornis* and *Scalponotatus maturus*, the entire vertex is pale, but the pale area does not extend anteriorly on the frons (1-1). The curvature of the costal margin of the female (15) is an ambiguous character that is not mapped in figure 2. However, under fast optimization this character provides partial homoplasious support to *Slaterocoris* at node 2 (strongly curved, 15-2). The endosomal spicule with a unique formation of the dorsal and ventral lobes (31-2) and the spines of the right paramere directed ventrally (38-2) are found only in *Slaterocoris*. Two female characters provide unambiguous support to *Slaterocoris*: the ventral labiate plate strongly produced into vulva (58-1) and the dorsal labiate plate with wide paired medial sclerites (60-2). Greater knowledge of the distribution of these and other female characters in the Orthotylini is needed before the

results in this analysis can be considered significant.

Depending on the optimization implemented in WinClada, other characters lend support to *Slaterocoris*. Under slow optimization, four are noted: predominantly black body (0-2), hypognathous head with flattened frons (19-1), phallotheca with convoluted distal portion (28-1), and endosomal spicule basally attached to membrane (without recurved keel) (30-1). Black body coloration is not homoplasious within *Slaterocoris*, but is also seen in *Josephinus albicornis* and *Scalponotatus maturus*. Species of *Josephinus* also have the distal portion of the phallotheca convoluted and two of three species have the endosomal spicule attached basally. Under fast optimization, three characters provide support: hypognathous head with flattened frons (19-1), endosomal spicule with smooth distal portion of ventral lobe (34-1), and left first gonapophysis overlapping a right (51-0). Under either fast or slow optimization the flattened vertex (20-3) is not homoplasious in *Slaterocoris* but is also present in *Jornandes* and *Scalponotatus*. The ventral lobe of the endosomal spicule with a marginally serrate distal region (34-0) was optimized as the basal condition in *Slaterocoris*. The overlapping condition of the first gonapophyses (51) is a highly homoplastic character, with six within-genus state changes. Only the *breviatus* group is uniquely defined by a large right first gonapophysis overlapping the left (51-1).

Node 4, *Slaterocoris breviatus* group: A large dimorphic body with the male elongate and the costal margin of the female arcuate (14-1) uniquely defines the group. The frons with a striate surface (18-1) a homoplasious character, also occurs in all the species distal to *S. robustus* and *S. atratus*. The tergal process was circumscribed by seven character states with only one condition, a bifurcate apex (23-2), providing homoplasious support to the node; only *S. tanydexios* in the *punctatus* group has a tergal process of roughly similar structure. The strongly compressed left lateral surface of the phallotheca (29-1) provides unique nonhomoplasious support to the clade. Within this species group, *S. pallidus* and *S. stygicus* are supported as sisters by the endosomal spicule with a short and smooth distal portion of the ventral lobe (34-2), a homoplasious state as it also occurs in *S. tanydexios*. The other four species in the *breviatus* group have strongly serrate margins (34-3) for this endosomal spicule feature. The right first gonapophysis overlapping the left (51-1) defines the *breviatus* group but this condition is also found in *S. tanydexios*. Two more character states defining the *breviatus* group, right first gonapophysis larger than the left at overlap (52-1) and tumid dorsomedial region of the interramal sclerite (63-2), are also found in *S. clavatus*.

Six additional characters provide ambiguous support to the *breviatus* group regardless of the optimization. The character states of the endosomal spicule (36-4), right paramere (39-1, 40-3, 43-1, 44-2), and ventral labiate plate (59-2) show limited homoplasy in the clade. The flattened and strong marginally serrate lateral ramus of the dorsal endosomal lobe (36-3) is optimized as the basal state in the *breviatus* group with *S. pallidicornis*, *S. pallipes,* and *S. stygicus* additionally having an incurved basal spine (36-2). The large size of the right paramere (39-1) supports this group, but is also found in the *hirtus* and *punctatus* groups. In the right paramere the radial arrangement of apical spines (40-3) and the constricted subapical region (43-1) are nonhomoplasious states, whereas the broad basal lobe (44-2) is also found outside of this clade in *S. clavatus*. The wide triangular base of the ventral labiate plate (59-2) found in all the species of the *breviatus* group is homoplasious, with *S. clavatus* and *S. punctatus* having the same state for this structure.

Reclining dorsal vestiture (11-0) provides homoplasious character support to the group under fast optimization, with the same state also known in two species of the *apache* group. Under slow optimization, the strongly curved or arcuate costal margin of the female hemelytron (15-1) provides homoplasious support, as this character state occurs in many other species of *Slaterocoris*.

Node 5, Remainder of *Slaterocoris*: The following four unambiguous homoplasious characters support this clade. An entirely black tarsus (7-0) is reversed for most of the *punctatus* group and is polymorphic in *S. hirtus*. Moderately long dorsal vestiture (8-1)

is found in the majority of the descendant species, but species with long vestiture (8-2) are found in the *hirtus* group and three species of the *punctatus* group and species with short vestiture (8-0) occur in three other species from two species groups. The concave dorsal surface of the left gonapophysis (55-0) predominates in the clade, but is reversed in two species of the *punctatus* group. The structure of the left first gonapophysis is quite variable in node 5 taxa. A wide apex (56-1) is optimized as supporting this node, but a narrow apex (56-0) lends support to the contained *argenteus* group and the *apache* group, and a broad convoluted apex (56-2) provides support to the *punctatus* group. One character placed at this node is ambiguous. A concolorous black antennal segment I and II (2-1) under slow optimization provides homoplasious support to this clade of *Slaterocoris* species, with several descendant species in the *apache* and *flavipes* groups autapomorphic for other states of this character.

Node 6, *Slaterocoris apache* group: The distal portion of the left paramere with a scalloped ventral margin (48-1) is found uniquely in the *apache* group. The narrow apex of the left first gonapophysis (56-0) is homoplasious being found in the *argenteus* group while the strongly convex anterior medial surface of second gonapophysis (62-1), a highly homoplastic character, is found in species from several other species groups. A descendant clade containing five of the seven species of the *apache* group have dimorphic body conformation with the costal margins of both sexes arcuate (14-2). This state is homoplasious because *S. ambrosiae* and *Josephinus* species share this condition. Two characters of the right paramere provide ambiguous homoplasious support to the clade under fast or slow optimization. The apical region with a variable number of ventral spines (40-0) and the prominent and erect basal lobe or region (44-1) are also found in *S. ambrosiae*.

Node 7, *Slaterocoris flavipes* group: The endosomal spicule with a marginally smooth distal portion of the ventral lobe (34-1) supports the *flavipes* group and is homoplasious in *S. robustus*. However, the combination of the endosomal spicule with an entire (35-1) and marginally rolled (36-1) dorsal lobe uniquely occurs in the *flavipes* group. The short distal portion of the left paramere (47-2) also uniquely supports the *flavipes* group. The cleft apex of the ventral labiate plate (59-3) is found in all species of the this group, but is polymorphic, in *S. longipennis*. Three species of the *apache* group are polymorphic for this character as well. An expanded discussion of the character support for the *flavipes* group follows the group diagnosis below.

Node 8, *Slaterocoris argenteus* group: Dorsal vestiture composed of matted setae with recurved apices (12-3) is unique to this species group. Three additional homoplasious characters further define the *argenteus* group. Dimorphic body conformation with parallel-sided male and arcuate female (14-4) is also found in two species of the *hirtus* group. An entire dorsal lobe of the endosomal spicule (35-0) occurs in all species of the *croceipes* and *flavipes* groups as well as *S. alpinus* and *S. clavatus*. A narrow apex of the left first gonapophysis (56-0) also occurs in the *croceipes* group. Other characters with ambiguous placement or alternative mapping on other most parsimonious cladograms are discussed following the *argenteus* group diagnosis below.

Node 9, *Slaterocoris hirtus* group: Only the long dorsal vestiture (8-2) supports this species group in all analyses. This is a homoplasious character state that also is present in a group of three species of the *punctatus* group. The narrowly pale apex of the femur (5-0), the strongly convex structure of the anteromedial portion of the second gonapophyses (62-1), and the short ventral projection of the interramal lobe with a concave anterior surface (69-1) offer homoplastic support for the *hirtus* group, and are found elsewhere in the genus. Characters offering ambiguous support for the *hirtus* group are discussed after the diagnosis of the species group below.

Node 10, *Slaterocoris punctatus* group: The following four characters provide homoplastic support for this clade of seven species: dorsal vestiture composed of a mixture of simple and some sericeous setae (12-1); dorsal lobe of the endosomal spicule flattened with a wide separation between the bifurcate rami (36-5); apex of left first gonapophysis broadly

convoluted (56-2); and tergal process situated medially on the aperture of the pygophore (70-2). A further discussion of the characters supporting node 10 follows the diagnosis of the *punctatus* group below.

Summary comments on character support: The utility of many of the female genitalia characters to discriminate species groups is probably an artifact of the taxa used in the analyses. Many characters and character states are homoplasious even within this small group of taxa. Further exploration of tribal morphology may dictate that many have no, or limited, application in supporting groupings when more taxa are examined. Conversely examining more taxa may be better define the characters used in this analysis.

In light of the cladistic analysis, a group of North American Orthotylini genera is here defined primarily on head and male genitalia structure and contains *Slaterocoris*, *Jornandinus*, and *Josephinus*. All have the posterior margin of the eye straight and contiguous with the posterior margin of the vertex, a dorsal endosomal spicule of variable structure, and a L-shaped left paramere with a narrow, smoothly curved apex. Almost all other North American Orthotylini with one endosomal spicule have the apex of the left paramere wide with obvious medial and lateral lobes of various length and thickness. *Ilnacorella*, however, with one endosomal spicule and L-shaped left paramere, unlike *Slaterocoris*, *Jornandinus*, and *Josephinus*, has a head structure and body conformation akin to *Orthotylus*, with the lateral margin of the eye curved anteriorly of the posterior margin of the vertex. As currently known, the single dorsal endosomal spicule and coplanar posterior margin of the head have congruent distributions. Within this group additional features of the male genitalia, head structure, and dorsal sculpturation serve to place the included species into realigned genus-level taxa.

TAXONOMY

KEY TO THE *SLATEROCORIS* GROUP OF GENERA

1. Posterolateral margin of eye and posterior margin of head alined on same plane 2
– Posterolateral margin of eye curved anterior to posterior margin of head . . . . . *Ilnacorella* Knight, 1925
2. Apex of left paramere broad, deeply dissected, with medial and lateral lobes of variable width 3
– Apex of left paramere attenuate with narrow distal region, and undivided, rounded apical knob 6
3. Clavus and corium with distinct shagreened surface; sculpturation composed of minute, dense, shallow punctures without reticulation 4
– Clavus and corium with sculpturation composed of large, moderately dense, deep punctures or with small to moderately large, moderately dense, moderately deep punctures covering a generally undulating or reticulate surface 5
4. Pronotum subrectangular with shagreened surface; both sexes elongate, costal margins parallel sided, hemelytron not declivous at cuneal fracture . . . . . *Ficinus* Distant, 1893
– Pronotum subtriangular with shining, smooth to faintly rugulose surface; sexes dimorphic, costal margins of male variably rounded, costal margin female always more rounded than in male; hemelytron declivous at cuneal fracture . . . . . *Jornandes* Distant, 1894
5. Head either entirely black or orange, sometimes black with vertex broadly orange; dorsal vestiture composed of very dense, long, recurved silvery setae; body large, sometimes total length of macropterous specimens reaching 7.50 mm, always greater than 4.50 mm, if female brachypterous then ranging from 3.55 to 4.00 mm and scutellum usually pale yellowish orange . . . . *Lopidella* Knight, 1925
– Head usually black with vertex narrowly pale yellow, sometimes head black with pale yellow near eyes or if head completely black then body small, dorsum shining, and vestiture sparse and black; dorsal vestiture variable, either composed of sparse, short, brown to black or moderately dense, longer recurved, silvery simple setae; body small usually shorter than 4.50 mm; females never brachypterous or with pale scutellum . . . . . *Scalponotatus* Kelton, 1969
6. Body large and broad (length and width usually greater than 6.00 and 2.75 in male and 6.50 and 3.50 in female); head shining orange, labium short, reaching just beyond forecoxa, frons strongly protruding; dorsum glabrous; endosomal spicule with long, thin, smooth spine at base and middle, both spines perpendicular to body of spicule; right paramere without ventrally directed spines distal to strongly serrate basal lobe . . . . . *Jornandinus* Carvalho and Schaffner, 1973

TABLE 3
Measurements of Species of *Josephinus*, *Scalponotatus*, and *Slaterocoris*

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
Josephinus																	
J. albicornis																	
Male	**Mean**	**2.74**	**0.73**	**0.49**	**0.85**	**1.46**	**1.22**	**0.84**	**0.41**	**0.23**	**0.82**	**0.57**	**0.35**	**1.02**	**0.49**	**0.69**	**0.70**
($N = 12$)	SD	0.14	0.05	0.02	0.04	0.10	0.05	0.02	0.01	0.01	0.04	0.04	0.02	0.02	0.01	0.02	0.05
	Range	0.50	0.13	0.06	0.11	0.25	0.15	0.08	0.04	0.02	0.13	0.15	0.06	0.09	0.04	0.06	0.17
	Min	2.50	0.68	0.46	0.80	1.35	1.16	0.80	0.40	0.22	0.75	0.50	0.31	0.98	0.47	0.65	0.60
	Max	3.00	0.80	0.53	0.91	1.60	1.31	0.88	0.44	0.24	0.88	0.65	0.38	1.07	0.51	0.71	0.77
Female	**Mean**	**2.90**	**0.80**	**0.54**	**0.91**	**1.60**	**1.34**	**0.87**	**0.47**	**0.24**	**0.85**	**0.58**	**0.37**	**1.03**	**0.53**	**0.65**	**0.68**
($N = 10$)	SD	0.19	0.03	0.02	0.02	0.07	0.05	0.02	0.02	0.01	0.04	0.02	0.04	0.04	0.02	0.02	0.05
	Range	0.60	0.13	0.06	0.08	0.25	0.15	0.06	0.05	0.03	0.14	0.09	0.15	0.14	0.05	0.06	0.18
	Min	2.70	0.75	0.51	0.88	1.50	1.28	0.85	0.45	0.23	0.79	0.53	0.34	0.96	0.51	0.62	0.57
	Max	3.30	0.88	0.58	0.95	1.75	1.43	0.91	0.50	0.25	0.93	0.62	0.49	1.10	0.56	0.68	0.75
J. capitatus																	
Male	**Mean**	**2.73**	**0.68**	**0.48**	**0.93**	**1.35**	**1.15**	**0.79**	**0.39**	**0.21**	**0.79**	**0.53**	**0.30**	**1.00**	**0.49**	**0.69**	**0.67**
($N = 12$)	SD	0.15	0.03	0.03	0.03	0.06	0.06	0.02	0.01	0.01	0.04	0.02	0.02	0.03	0.01	0.03	0.04
	Range	0.45	0.09	0.10	0.11	0.20	0.21	0.08	0.04	0.03	0.13	0.06	0.04	0.09	0.04	0.10	0.12
	Min	2.50	0.63	0.44	0.89	1.25	1.04	0.75	0.38	0.19	0.73	0.49	0.29	0.96	0.47	0.64	0.59
	Max	2.95	0.71	0.54	1.00	1.45	1.25	0.83	0.41	0.23	0.85	0.55	0.33	1.04	0.51	0.74	0.72
Female	**Mean**	**3.17**	**0.77**	**0.55**	**1.06**	**1.65**	**1.29**	**0.83**	**0.44**	**0.22**	**0.91**	**0.58**	**0.35**	**0.91**	**0.53**	**0.65**	**0.62**
($N = 6$)	SD	0.15	0.03	0.03	0.04	0.09	0.04	0.02	0.01	0.01	0.03	0.05	0.01	0.02	0.01	0.01	0.06
	Range	0.30	0.08	0.08	0.11	0.25	0.09	0.05	0.03	0.03	0.08	0.09	0.03	0.04	0.03	0.02	0.11
	Min	3.00	0.73	0.50	0.99	1.55	1.25	0.80	0.43	0.21	0.88	0.53	0.34	0.89	0.51	0.64	0.55
	Max	3.30	0.80	0.58	1.10	1.80	1.34	0.85	0.45	0.24	0.95	0.61	0.36	0.93	0.55	0.66	0.66
J. reinhardi																	
Male	**Mean**	**3.54**	**0.83**	**0.45**	**0.57**	**1.67**	**1.33**	**0.92**	**0.45**	**0.25**	**0.91**	**0.69**	**0.34**	**1.02**	**0.49**	**0.69**	**0.76**
($N = 20$)	SD	0.16	0.03	0.01	0.02	0.06	0.04	0.02	0.01	0.01	0.04	0.04	0.02	0.06	0.01	0.02	0.04
	Range	0.75	0.13	0.05	0.08	0.25	0.15	0.10	0.05	0.04	0.16	0.16	0.08	0.21	0.05	0.08	0.13
	Min	3.05	0.75	0.43	0.54	1.53	1.25	0.88	0.43	0.23	0.81	0.59	0.30	0.94	0.46	0.65	0.69
	Max	3.80	0.88	0.48	0.63	1.78	1.40	0.98	0.48	0.26	0.97	0.75	0.38	1.15	0.51	0.74	0.82
Female	**Mean**	**3.81**	**0.88**	**0.61**	**1.00**	**1.82**	**1.41**	**0.97**	**0.50**	**0.25**	**0.97**	**0.69**	**0.35**	**0.99**	**0.52**	**0.68**	**0.70**
($N = 13$)	SD	0.10	0.03	0.02	0.04	0.10	0.05	0.02	0.02	0.01	0.04	0.03	0.01	0.06	0.02	0.02	0.02
	Range	0.40	0.11	0.08	0.14	0.35	0.19	0.08	0.05	0.03	0.19	0.10	0.05	0.23	0.05	0.06	0.09

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
	Min	3.65	0.81	0.58	0.95	1.65	1.30	0.93	0.48	0.24	0.86	0.65	0.33	0.93	0.49	0.65	0.67
	Max	4.05	0.93	0.65	1.09	2.00	1.49	1.00	0.53	0.26	1.05	0.75	0.38	1.16	0.54	0.71	0.75
Scalponotatus maturus																	
Male	**Mean**	**3.34**	**0.72**	**0.64**	**0.95**	**1.64**	**1.31**	**0.91**	**0.45**	**0.23**	**0.95**	**0.66**	**0.34**	**0.97**	**0.50**	**0.70**	**0.70**
(N = 10)	SD	0.43	0.05	0.09	0.05	0.15	0.09	0.04	0.02	0.01	0.11	0.07	0.02	0.08	0.02	0.03	0.03
	Range	1.40	0.15	0.30	0.19	0.40	0.24	0.13	0.05	0.04	0.36	0.26	0.08	0.27	0.06	0.08	0.09
	Min	2.85	0.65	0.55	0.90	1.43	1.16	0.85	0.43	0.21	0.78	0.51	0.30	0.86	0.46	0.67	0.66
	Max	4.25	0.80	0.85	1.09	1.83	1.40	0.98	0.48	0.25	1.14	0.78	0.38	1.13	0.51	0.75	0.75
Female	**Mean**	**3.39**	**0.77**	**0.57**	**1.02**	**1.89**	**1.43**	**1.00**	**0.56**	**0.24**	**0.92**	**0.61**	**0.34**	**1.09**	**0.56**	**0.70**	**0.67**
(N = 10)	SD	0.23	0.05	0.05	0.05	0.14	0.08	0.03	0.02	0.01	0.08	0.04	0.02	0.08	0.01	0.03	0.03
	Range	0.85	0.15	0.15	0.15	0.49	0.25	0.10	0.06	0.03	0.24	0.10	0.06	0.25	0.03	0.10	0.08
	Min	2.95	0.70	0.48	0.95	1.58	1.29	0.95	0.54	0.23	0.79	0.56	0.31	1.00	0.55	0.67	0.63
	Max	3.80	0.85	0.63	1.10	2.06	1.54	1.05	0.59	0.25	1.03	0.66	0.38	1.25	0.58	0.77	0.71
Slaterocoris																	
S. alpinus																	
Male	**Mean**	**3.86**	**0.88**	**0.58**	**0.89**	**1.75**	**1.49**	**1.09**	**0.62**	**0.25**	**0.84**	**0.64**	**0.37***	**1.30**	**0.57**	**0.73**	**0.76**
(N = 10)	SD	0.17	0.05	0.02	0.03	0.06	0.07	0.03	0.02	0.01	0.05	0.01	0.01	0.06	0.01	0.02	0.04
(* = 7)	Range	0.60	0.18	0.05	0.10	0.18	0.23	0.09	0.06	0.04	0.15	0.05	0.03	0.17	0.04	0.06	0.14
	Min	3.50	0.78	0.55	0.83	1.65	1.40	1.05	0.59	0.23	0.75	0.61	0.35	1.23	0.55	0.69	0.71
	Max	4.10	0.95	0.60	0.93	1.83	1.63	1.14	0.65	0.26	0.90	0.66	0.38	1.40	0.59	0.75	0.85
Female	**Mean**	**4.11**	**0.93**	**0.57**	**0.96**	**1.94**	**1.58**	**1.17**	**0.71**	**0.27**	**0.81**	**0.61**	**0.37**	**1.45**	**0.61**	**0.74**	**0.75**
(N = 10)	SD	0.10	0.03	0.03	0.04	0.07	0.06	0.02	0.02	0.01	0.03	0.04	0.02	0.05	0.02	0.02	0.03
	Range	0.40	0.10	0.10	0.14	0.21	0.19	0.05	0.05	0.01	0.09	0.14	0.08	0.14	0.06	0.06	0.11
	Min	3.90	0.88	0.50	0.89	1.84	1.48	1.15	0.68	0.26	0.76	0.54	0.34	1.37	0.57	0.72	0.68
	Max	4.30	0.98	0.60	1.03	2.05	1.66	1.20	0.73	0.28	0.85	0.68	0.41	1.51	0.63	0.78	0.79
S. ambrosiae																	
Male	**Mean**	**4.11**	**0.76**	**0.77**	**1.01**	**1.75**	**1.37**	**0.92**	**0.47**	**0.28**	**1.03**	**0.80***	**0.37+**	**0.91**	**0.52**	**0.67**	**0.77**
(N = 36)	SD	0.55	0.06	0.13	0.07	0.16	0.10	0.03	0.03	0.03	0.15	0.12	0.02	0.11	0.03	0.03	0.06
(* = 24)	Range	1.90	0.23	0.45	0.30	0.75	0.43	0.15	0.18	0.09	0.55	0.43	0.09	0.44	0.17	0.13	0.25
(+ = 16)	Min	3.20	0.63	0.55	0.83	1.45	1.14	0.83	0.42	0.23	0.70	0.63	0.34	0.77	0.46	0.62	0.68
	Max	5.10	0.85	1.00	1.13	2.20	1.56	0.98	0.60	0.31	1.25	1.05	0.43	1.21	0.63	0.74	0.93
Female	**Mean**	**3.67**	**0.75**	**0.58**	**1.03**	**1.81**	**1.43**	**1.00**	**0.57**	**0.25**	**0.94**	**0.68**	**0.38**	**1.07**	**0.57**	**0.70**	**0.73**

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/ AII	VW/ HW	HW/ PW	AIII/ AII
(*N* = 15)	SD	0.27	0.03	0.05	0.06	0.10	0.08	0.04	0.02	0.02	0.09	0.07	0.02	0.09	0.01	0.02	0.04
	Range	0.90	0.10	0.19	0.20	0.39	0.33	0.13	0.09	0.06	0.31	0.25	0.08	0.27	0.05	0.08	0.12
	Min	3.30	0.70	0.50	0.93	1.70	1.33	0.95	0.53	0.24	0.81	0.56	0.35	0.93	0.54	0.66	0.66
	Max	4.20	0.80	0.69	1.13	2.09	1.65	1.08	0.61	0.30	1.13	0.81	0.43	1.21	0.59	0.73	0.78
S. apache																	
Male	**Mean**	**4.45**	**0.87**	**0.75**	**1.02**	**1.78**	**1.47**	**1.17**	**0.62**	**0.33**	**1.17**	**0.93***	**0.35+**	**1.01**	**0.53**	**0.81**	**0.80**
(*N* = 28)	SD	0.52	0.03	0.13	0.03	0.12	0.06	0.03	0.02	0.02	0.08	0.08	0.02	0.05	0.01	0.05	0.05
(* = 20)	Range	1.98	0.13	0.48	0.15	0.41	0.24	0.15	0.09	0.05	0.33	0.28	0.07	0.20	0.06	0.19	0.18
(+ = 14)	Min	3.53	0.80	0.58	0.93	1.60	1.36	1.08	0.58	0.30	1.05	0.78	0.31	0.89	0.50	0.74	0.71
	Max	5.50	0.93	1.05	1.08	2.01	1.60	1.23	0.66	0.35	1.38	1.05	0.38	1.09	0.56	0.94	0.89
Female	**Mean**	**4.10**	**0.92**	**0.64**	**1.08**	**1.96**	**1.55**	**1.28**	**0.77**	**0.52**	**1.05**	**0.78**	**0.36**	**1.23**	**0.60**	**0.83**	**0.75**
(*N* = 17)	SD	0.31	0.04	0.05	0.04	0.10	0.06	0.08	0.02	0.03	0.06	0.06	0.02	0.06	0.04	0.04	0.05
	Range	1.18	0.15	0.18	0.20	0.30	0.21	0.36	0.08	0.09	0.18	0.21	0.06	0.27	0.17	0.20	0.17
	Min	3.43	0.85	0.55	0.95	1.80	1.46	1.01	0.73	0.48	0.96	0.68	0.34	1.06	0.56	0.68	0.66
	Max	4.60	1.00	0.73	1.15	2.10	1.66	1.38	0.81	0.57	1.13	0.89	0.40	1.33	0.73	0.87	0.83
S. argenteoides n. sp.																	
Male	**Mean**	**4.65**	**0.82**	**0.80**	**1.07**	**1.59**	**1.39**	**0.97**	**0.50**	**0.32**	**1.32**	**0.94***	**0.36+**	**0.74**	**0.52**	**0.70**	**0.71**
(*N* = 11)	SD	0.20	0.04	0.05	0.04	0.09	0.05	0.06	0.02	0.01	0.08	0.07	0.03	0.05	0.03	0.03	0.05
(* = 10)	Range	0.50	0.13	0.15	0.13	0.28	0.15	0.20	0.08	0.03	0.21	0.24	0.08	0.17	0.10	0.12	0.15
(+ = 9)	Min	4.40	0.78	0.70	1.00	1.40	1.33	0.83	0.48	0.31	1.21	0.79	0.31	0.65	0.49	0.61	0.65
	Max	4.90	0.90	0.85	1.13	1.68	1.48	1.03	0.55	0.34	1.43	1.03	0.39	0.82	0.59	0.73	0.80
Female	**Mean**	**4.07**	**0.79**	**0.63**	**1.11**	**1.80**	**1.40**	**1.04**	**0.59**	**0.32**	**1.13**	**0.86**	**0.36**	**0.93**	**0.57**	**0.74**	**0.76**
(*N* = 5)	SD	0.23	0.03	0.04	0.03	0.10	0.06	0.06	0.01	0.02	0.08	0.07	0.02	0.06	0.04	0.04	0.05
	Range	0.60	0.08	0.11	0.08	0.28	0.19	0.06	0.03	0.05	0.24	0.23	0.05	0.19	0.11	0.13	0.15
	Min	3.70	0.75	0.58	1.08	1.63	1.29	1.00	0.58	0.29	0.98	0.75	0.34	0.85	0.49	0.70	0.68
	Max	4.30	0.83	0.69	1.15	1.90	1.48	1.06	0.61	0.34	1.21	0.98	0.39	1.04	0.60	0.82	0.83
S. argenteus																	
Male	**Mean**	**4.79**	**0.80**	**0.92**	**0.89**	**1.81**	**1.46**	**0.98**	**0.52**	**0.31**	**1.20**	**0.96**	**0.36**	**0.82**	**0.53**	**0.67**	**0.79**
(*N* = 10)	SD	0.34	0.03	0.12	0.03	0.16	0.07	0.03	0.01	0.01	0.10	0.04	0.01	0.04	0.01	0.02	0.05
	Range	1.10	0.08	0.38	0.07	0.40	0.20	0.08	0.04	0.04	0.27	0.10	0.03	0.13	0.03	0.05	0.13
	Min	4.30	0.78	0.75	0.86	1.70	1.40	0.95	0.50	0.29	1.13	0.90	0.35	0.73	0.51	0.64	0.71
	Max	5.40	0.85	1.13	0.93	2.10	1.60	1.03	0.54	0.33	1.40	1.00	0.38	0.86	0.54	0.69	0.84
Female	**Mean**	**3.60**	**0.75**	**0.58**	**0.93**	**1.91**	**1.45**	**1.02**	**0.62**	**0.30**	**0.98**	**0.71**	**0.37**	**1.04**	**0.61**	**0.71**	**0.73**

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/ AII	VW/ HW	HW/ PW	AIII/ AII
(*N* = 5)	SD	0.19	0.03	0.03	0.05	0.10	0.11	0.02	0.02	0.01	0.05	0.04	0.02	0.04	0.02	0.05	0.05
	Range	0.55	0.08	0.09	0.13	0.30	0.31	0.04	0.05	0.01	0.14	0.10	0.04	0.10	0.05	0.13	0.13
	Min	3.40	0.73	0.55	0.88	1.80	1.35	1.01	0.60	0.30	0.91	0.65	0.34	1.01	0.59	0.62	0.68
	Max	3.95	0.80	0.64	1.00	2.10	1.66	1.06	0.65	0.31	1.05	0.75	0.38	1.11	0.63	0.75	0.81
S. atratus																	
Male	**Mean**	**4.68**	**0.94**	**0.83**	**0.91**	**2.24**	**1.68**	**1.13**	**0.58**	**0.28**	**1.19**	-	-	**0.95**	**0.51**	**0.51**	-
(*N* = 4)	SD	0.21	0.03	0.05	0.04	0.12	0.04	0.02	0.00	0.01	0.05	-	-	0.02	0.01	0.03	-
	Range	0.40	0.08	0.10	0.08	0.28	0.10	0.04	0.00	0.01	0.08	-	-	0.03	0.02	0.07	-
	Min	4.50	0.90	0.78	0.88	2.13	1.63	1.11	0.58	0.28	1.15	-	-	0.94	0.50	0.46	-
	Max	4.90	0.98	0.88	0.95	2.40	1.73	1.15	0.58	0.29	1.23	-	-	0.97	0.52	0.53	-
S. atritibialis																	
Male	**Mean**	**4.45**	**0.98**	**0.72**	**1.13**	**2.16**	**1.63**	**1.12**	**0.62**	**0.34**	**1.15**	**0.83**	**0.45**	**0.98**	**0.55**	**0.69**	**0.72**
(*N* =16)	SD	0.26	0.09	0.06	0.03	0.17	0.12	0.05	0.03	0.02	0.13	0.12	0.05	0.08	0.02	0.03	0.04
	Range	0.88	0.28	0.20	0.10	0.53	0.36	0.14	0.11	0.06	0.40	0.42	0.16	0.27	0.05	0.09	0.15
	Min	4.00	0.83	0.63	1.08	1.85	1.46	1.05	0.56	0.31	0.95	0.60	0.38	0.85	0.53	0.64	0.63
	Max	4.88	1.10	0.83	1.18	2.38	1.83	1.19	0.68	0.38	1.35	1.02	0.54	1.12	0.58	0.74	0.78
Female	**Mean**	**4.50**	**1.01**	**0.68**	**1.18**	**2.34**	**1.72**	**1.20**	**0.72**	**0.33**	**1.09**	**0.76**	**0.46**	**0.86**	**0.81**	**0.55**	**0.70**
(*N* = 19)	SD	0.28	0.10	0.07	0.06	0.21	0.13	0.05	0.04	0.02	0.11	0.09	0.04	0.20	0.21	0.14	0.06
	Range	0.95	0.28	0.23	0.19	0.60	0.40	0.20	0.16	0.06	0.33	0.24	0.14	0.60	0.42	0.34	0.22
	Min	4.00	0.88	0.58	1.08	2.03	1.53	1.10	0.62	0.30	0.93	0.66	0.40	0.56	0.58	0.39	0.58
	Max	4.95	1.15	0.80	1.26	2.63	1.93	1.30	0.78	0.36	1.25	0.90	0.54	1.17	1.00	0.72	0.79
S. breviatus																	
Male	**Mean**	**4.33**	**0.90**	**0.75**	**1.10**	**1.95**	**1.49**	**1.05**	**0.57**	**0.37**	**1.30**	**0.91**	**0.44**	**0.80**	**0.54**	**0.70**	**0.70**
(*N* = 22)	SD	0.21	0.03	0.08	0.04	0.08	0.06	0.03	0.02	0.04	0.07	0.06	0.04	0.04	0.01	0.02	0.04
	Range	0.77	0.15	0.44	0.13	0.35	0.24	0.12	0.10	0.16	0.25	0.26	0.11	0.15	0.06	0.10	0.14
	Min	3.83	0.83	0.62	1.03	1.75	1.34	0.96	0.53	0.32	1.20	0.80	0.38	0.71	0.52	0.67	0.63
	Max	4.60	0.98	1.06	1.15	2.10	1.58	1.08	0.63	0.48	1.45	1.06	0.49	0.86	0.58	0.76	0.77
Female	**Mean**	**4.28**	**0.92**	**0.69**	**1.14**	**2.17**	**1.54**	**1.10**	**0.63**	**0.35**	**1.18**	**0.81**	**0.45**	**0.94**	**0.57**	**0.71**	**0.69**
(*N* = 22)	SD	0.24	0.04	0.04	0.06	0.09	0.08	0.03	0.02	0.01	0.06	0.06	0.03	0.06	0.01	0.03	0.03
	Range	0.90	0.18	0.18	0.25	0.44	0.34	0.13	0.08	0.05	0.22	0.21	0.10	0.23	0.03	0.09	0.14
	Min	3.70	0.83	0.58	1.00	1.86	1.34	1.03	0.60	0.33	1.06	0.71	0.40	0.86	0.56	0.67	0.63
	Max	4.60	1.00	0.75	1.25	2.30	1.68	1.15	0.68	0.38	1.28	0.93	0.50	1.09	0.59	0.77	0.77

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
S. clavatus n. sp.																	
Male	**Mean**	**5.56**	**1.09**	**0.88**	**1.39**	**2.06**	**1.73**	**1.16**	**0.51**	**0.40**	**1.49**	**1.14**	**0.44**	**0.78**	**0.44**	**0.67**	**0.77**
(*N* = 7)	SD	0.27	0.05	0.06	0.06	0.14	0.10	0.03	0.02	0.02	0.05	0.05	0.02	0.02	0.01	0.03	0.04
	Range	0.75	0.14	0.18	0.16	0.33	0.28	0.09	0.04	0.05	0.14	0.15	0.05	0.06	0.03	0.09	0.14
	Min	5.25	1.00	0.80	1.31	1.90	1.60	1.11	0.50	0.38	1.41	1.06	0.41	0.74	0.42	0.62	0.68
	Max	6.00	1.14	0.98	1.48	2.23	1.88	1.21	0.54	0.43	1.56	1.21	0.46	0.80	0.45	0.70	0.82
Female	**Mean**	**5.08**	**1.12**	**0.70**	**1.49**	**2.23**	**1.76**	**1.19**	**0.62**	**0.42**	**1.50**	**1.06**	**0.42**	**0.79**	**0.52**	**0.68**	**0.71**
(*N* = 5)	SD	0.29	0.09	0.13	0.19	0.15	0.13	0.05	0.03	0.01	0.06	0.04	0.03	0.01	0.01	0.03	0.01
	Range	0.75	0.18	0.13	0.19	0.38	0.31	0.11	0.06	0.03	0.14	0.10	0.09	0.02	0.02	0.07	0.02
	Min	4.60	1.00	0.63	1.38	1.98	1.56	1.11	0.59	0.40	1.40	0.99	0.38	0.78	0.51	0.64	0.70
	Max	5.35	1.18	0.75	1.56	2.35	1.88	1.23	0.65	0.43	1.54	1.09	0.46	0.80	0.53	0.71	0.71
S. croceipes																	
Male	**Mean**	**4.07**	**0.87**	**0.70**	**1.01**	**1.69**	**1.46**	**1.15**	**0.62**	**0.31**	**1.09**	**0.85***	**0.35+**	**1.08**	**0.54**	**0.78**	**0.80**
(*N* = 19)	SD	0.56	0.03	0.13	0.05	0.08	0.05	0.03	0.03	0.01	0.16	0.12	0.03	0.14	0.02	0.01	0.09
(* = 13)	Range	2.13	0.10	0.33	0.16	0.33	0.19	0.12	0.13	0.05	0.51	0.40	0.08	0.44	0.07	0.06	0.31
(+ = 8)	Min	3.15	0.83	0.58	0.90	1.58	1.35	1.06	0.53	0.29	0.80	0.69	0.31	0.89	0.49	0.75	0.66
	Max	5.28	0.93	0.90	1.06	1.90	1.54	1.18	0.66	0.34	1.31	1.09	0.39	1.33	0.56	0.81	0.97
Female	**Mean**	**3.89**	**0.92**	**0.61**	**1.08**	**1.93**	**1.56**	**1.27**	**0.77**	**0.51**	**1.02**	**0.76**	**0.36**	**1.26**	**0.61**	**0.81**	**0.75**
(*N* = 11)	SD	0.27	0.06	0.04	0.06	0.16	0.08	0.08	0.05	0.08	0.15	0.09	0.03	0.13	0.02	0.02	0.03
(* = 9)	Range	0.75	0.23	0.13	0.20	0.55	0.25	0.26	0.13	0.23	0.45	0.28	0.09	0.41	0.09	0.06	0.12
	Min	3.45	0.80	0.55	0.95	1.60	1.40	1.09	0.71	0.39	0.78	0.63	0.30	1.09	0.58	0.78	0.69
	Max	4.20	1.03	0.68	1.15	2.15	1.65	1.35	0.84	0.61	1.23	0.90	0.39	1.50	0.67	0.83	0.81
S. digitatus																	
Male	**Mean**	**3.69**	**0.85**	**0.63**	**0.93**	**1.68**	**1.44**	**0.99**	**0.57**	**0.29**	**1.06**	**0.82**	**0.35**	**0.93**	**0.57**	**0.69**	**0.78**
(*N* = 8)	SD	0.14	0.03	0.03	0.02	0.04	0.05	0.02	0.02	0.01	0.04	0.03	0.01	0.03	0.01	0.02	0.03
	Range	0.45	0.10	0.08	0.06	0.10	0.15	0.06	0.06	0.02	0.10	0.08	0.03	0.09	0.04	0.06	0.08
	Min	3.50	0.80	0.60	0.90	1.65	1.36	0.95	0.54	0.28	1.00	0.77	0.34	0.89	0.56	0.67	0.74
	Max	3.95	0.90	0.68	0.96	1.75	1.51	1.01	0.60	0.30	1.10	0.86	0.37	0.98	0.59	0.72	0.82
Female	**Mean**	**3.51**	**0.83**	**0.52**	**0.99**	**1.97**	**1.48**	**1.05**	**0.68**	**0.28**	**0.95**	**0.75**	**0.36**	**1.10**	**0.65**	**0.71**	**0.78**
(*N* = 5)	SD	0.17	0.03	0.03	0.01	0.06	0.02	0.02	0.01	0.01	0.04	0.03	0.02	0.03	0.01	0.01	0.03
	Range	0.40	0.08	0.08	0.04	0.15	0.04	0.05	0.04	0.01	0.09	0.08	0.04	0.06	0.01	0.02	0.08
	Min	3.40	0.80	0.50	0.98	1.90	1.46	1.03	0.66	0.28	0.91	0.71	0.34	1.08	0.64	0.69	0.74

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
	Max	3.80	0.88	0.58	1.01	2.05	1.51	1.08	0.70	0.29	1.00	0.79	0.38	1.14	0.65	0.72	0.82
S. elongatus n. sp.																	
Male	**Mean**	**7.01**	**1.09**	**1.27**	**1.42**	**2.08**	**1.82**	**1.09**	**0.47**	**0.46**	**1.85**	**1.39**	**0.43**	**0.59**	**0.43**	**0.35**	**0.75**
(*N* = 6)	SD	0.11	0.04	0.03	0.02	0.15	0.03	0.01	0.02	0.01	0.06	0.07	0.02	0.01	0.01	0.12	0.03
	Range	0.30	0.08	0.08	0.04	0.38	0.10	0.03	0.05	0.04	0.14	0.20	0.05	0.03	0.04	0.31	0.08
	Min	6.80	1.08	1.23	1.41	1.88	1.76	1.08	0.45	0.44	1.79	1.30	0.41	0.57	0.41	0.30	0.73
	Max	7.10	1.15	1.30	1.45	2.25	1.86	1.10	0.50	0.48	1.93	1.50	0.46	0.60	0.45	0.60	0.81
Female	**Mean**	**6.06**	**1.11**	**0.94**	**1.49**	**2.15**	**1.84**	**1.15**	**0.58**	**0.47**	**1.73**	**1.10**	**0.42**	**0.67**	**0.51**	**0.38**	**0.64**
(*N* = 5)	SD	0.14	0.00	0.05	0.03	0.09	0.02	0.00	0.01	0.01	0.04	0.03	0.01	0.02	0.01	0.14	0.01
	Range	0.35	0.00	0.13	0.08	0.20	0.04	0.01	0.02	0.03	0.11	0.06	0.03	0.04	0.02	0.31	0.04
	Min	5.90	1.10	0.88	1.45	2.00	1.81	1.15	0.58	0.45	1.67	1.06	0.41	0.65	0.50	0.31	0.61
	Max	6.25	1.10	1.00	1.53	2.20	1.85	1.16	0.59	0.48	1.78	1.13	0.44	0.69	0.52	0.62	0.65
S. flavipes																	
Male	**Mean**	**3.66**	**0.79**	**0.55**	**0.87**	**1.56**	**1.36**	**1.06**	**0.58**	**0.35**	**0.87**	**0.61***	**0.32+**	**1.23**	**0.55**	**0.78**	**0.70**
(*N* = 21)	SD	0.38	0.04	0.07	0.04	0.09	0.05	0.03	0.02	0.08	0.09	0.05	0.02	0.12	0.02	0.03	0.07
(* =16)	Range	1.55	0.15	0.33	0.16	0.30	0.20	0.09	0.08	0.29	0.38	0.20	0.05	0.46	0.06	0.12	0.28
(+ = 12)	Min	3.00	0.70	0.48	0.78	1.45	1.25	1.02	0.55	0.27	0.75	0.51	0.29	0.91	0.52	0.72	0.50
	Max	4.55	0.85	0.80	0.94	1.75	1.45	1.11	0.63	0.56	1.13	0.71	0.34	1.37	0.58	0.84	0.78
Female	**Mean**	**3.75**	**0.83**	**0.52**	**0.93**	**1.75**	**1.45**	**1.17**	**0.71**	**0.38**	**0.76**	**0.53**	**0.32**	**1.54**	**0.61**	**0.80**	**0.71**
(*N* = 14)	SD	0.20	0.06	0.03	0.06	0.12	0.07	0.06	0.03	0.03	0.07	0.04	0.02	0.10	0.01	0.02	0.03
	Range	0.75	0.23	0.10	0.22	0.55	0.27	0.20	0.10	0.12	0.24	0.16	0.05	0.37	0.05	0.09	0.11
	Min	3.45	0.70	0.48	0.81	1.50	1.29	1.05	0.65	0.33	0.65	0.46	0.29	1.39	0.58	0.76	0.66
	Max	4.20	0.93	0.58	1.03	2.05	1.56	1.25	0.75	0.44	0.89	0.63	0.34	1.76	0.63	0.85	0.77
S. fuscomarginalis																	
Male	**Mean**	**4.96**	**0.83**	**0.92**	**0.94**	**1.83**	**1.46**	**1.08**	**0.58**	**0.30**	**1.19**	**0.81**	**0.35**	**0.92**	**0.54**	**0.74**	**0.69**
(*N* = 10)	SD	0.36	0.03	0.11	0.03	0.14	0.05	0.03	0.01	0.01	0.08	0.07	0.03	0.05	0.01	0.02	0.05
	Range	1.25	0.11	0.36	0.09	0.48	0.18	0.10	0.04	0.04	0.28	0.24	0.08	0.17	0.04	0.06	0.15
	Min	4.00	0.78	0.63	0.90	1.55	1.39	1.03	0.56	0.28	1.08	0.73	0.31	0.83	0.52	0.72	0.59
	Max	5.25	0.89	0.99	0.99	2.03	1.56	1.13	0.60	0.31	1.35	0.96	0.39	1.00	0.56	0.78	0.74
Female	**Mean**	**3.72**	**0.84**	**0.56**	**1.02**	**1.79**	**1.50**	**1.18**	**0.69**	**0.46**	**0.92**	**0.67**	**0.33**	**1.29**	**0.59**	**0.79**	**0.73**
(*N* = 5)	SD	0.08	0.01	0.02	0.02	0.04	0.04	0.01	0.03	0.01	0.03	0.02	0.01	0.04	0.02	0.01	0.04
	Range	0.20	0.03	0.05	0.05	0.08	0.10	0.02	0.08	0.04	0.08	0.04	0.03	0.09	0.06	0.04	0.09

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
	Min	3.60	0.83	0.53	1.00	1.75	1.44	1.16	0.65	0.44	0.88	0.65	0.31	1.25	0.56	0.77	0.69
	Max	3.80	0.85	0.58	1.05	1.83	1.54	1.19	0.73	0.48	0.95	0.69	0.34	1.34	0.62	0.81	0.79
S. hirtus																	
Male	**Mean**	**5.03**	**0.97**	**0.89**	**1.12**	**2.20**	**1.64**	**1.07**	**0.54**	**0.34**	**1.40**	**1.00**	**0.52**	**0.76**	**0.51**	**0.65**	**0.71**
(*N* = 10)	SD	0.26	0.03	0.04	0.04	0.06	0.05	0.02	0.03	0.01	0.07	0.10	0.04	0.03	0.02	0.02	0.05
	Range	0.90	0.10	0.12	0.13	0.20	0.16	0.08	0.09	0.03	0.20	0.33	0.15	0.08	0.06	0.06	0.20
	Min	4.70	0.90	0.83	1.05	2.10	1.53	1.03	0.50	0.33	1.30	0.76	0.45	0.72	0.48	0.63	0.58
	Max	5.60	1.00	0.94	1.18	2.30	1.69	1.10	0.59	0.35	1.50	1.09	0.60	0.80	0.53	0.69	0.78
Female	**Mean**	**4.29**	**0.95**	**0.70**	**1.13**	**2.24**	**1.62**	**1.09**	**0.60**	**0.34**	**1.25**	**0.88**	**0.49**	**0.88**	**0.55**	**0.68**	**0.70**
(*N* = 10)	SD	0.16	0.03	0.03	0.04	0.09	0.07	0.02	0.01	0.01	0.05	0.03	0.02	0.03	0.01	0.04	0.03
	Range	0.50	0.08	0.11	0.14	0.30	0.20	0.08	0.05	0.02	0.13	0.10	0.05	0.08	0.02	0.12	0.10
	Min	4.00	0.90	0.64	1.05	2.05	1.50	1.08	0.58	0.33	1.20	0.81	0.48	0.83	0.53	0.65	0.65
	Max	4.50	0.98	0.75	1.19	2.35	1.70	1.15	0.63	0.35	1.33	0.91	0.53	0.92	0.56	0.77	0.75
S. longipennis																	
Male	**Mean**	**5.53**	**0.88**	**1.04**	**0.95**	**1.90**	**1.55**	**1.07**	**0.57**	**0.57**	**1.14**	**0.79***	**0.35+**	**0.94**	**0.53**	**0.69**	**0.68**
(*N* = 17)	SD	0.29	0.04	0.09	0.04	0.12	0.05	0.04	0.02	0.03	0.06	0.07	0.02	0.05	0.01	0.02	0.04
(* = 16)	Range	1.20	0.13	0.31	0.14	0.48	0.19	0.14	0.09	0.13	0.27	0.25	0.06	0.19	0.05	0.08	0.14
(+ = 12)	Min	4.80	0.80	0.86	0.88	1.63	1.45	0.99	0.53	0.52	1.03	0.66	0.31	0.84	0.51	0.66	0.60
	Max	6.00	0.93	1.18	1.03	2.10	1.64	1.13	0.61	0.65	1.30	0.91	0.38	1.02	0.56	0.74	0.74
Female	**Mean**	**4.00**	**0.83**	**0.61**	**0.99**	**1.86**	**1.51**	**1.13**	**0.69**	**0.42**	**0.83**	**0.59***	**0.34+**	**1.36**	**0.61**	**0.75**	**0.70**
(*N* = 13)	SD	0.27	0.05	0.04	0.06	0.11	0.08	0.05	0.03	0.03	0.05	0.06	0.02	0.08	0.02	0.03	0.04
(* = 11)	Range	1.00	0.19	0.16	0.19	0.48	0.33	0.15	0.10	0.08	0.15	0.18	0.04	0.32	0.08	0.13	0.14
(+ = 10)	Min	3.50	0.70	0.50	0.90	1.60	1.33	1.05	0.63	0.38	0.75	0.51	0.31	1.20	0.58	0.67	0.63
	Max	4.50	0.89	0.66	1.09	2.08	1.65	1.20	0.73	0.45	0.90	0.69	0.36	1.52	0.67	0.79	0.76
S. maculatus n. sp.																	
Male	**Measurement**	**5.30**	**1.05**	**0.83**	**1.23**	**2.05**	**1.66**	**1.18**	**0.45**	**0.36**	**1.44**	**0.99**	**0.50**	**0.82**	**0.38**	**0.71**	**0.69**
(*N* = 1)																	
Female	**Mean**	**5.28**	**1.11**	**0.80**	**1.26**	**2.17**	**1.73**	**1.18**	**0.54**	**0.36**	**1.39**	**0.94**	**0.41**	**0.85**	**0.44**	**0.69**	**0.68**
(*N* = 4)	SD	0.09	0.03	0.03	0.05	0.12	0.02	0.03	0.01	0.01	0.05	0.06	0.04	0.02	0.04	0.01	0.05
	Range	0.23	0.08	0.06	0.10	0.28	0.04	0.06	0.01	0.02	0.10	0.13	0.09	0.05	0.09	0.03	0.12
	Min	5.18	1.08	0.76	1.20	2.08	1.70	1.15	0.54	0.36	1.35	0.88	0.38	0.82	0.38	0.68	0.63
	Max	5.40	1.15	0.83	1.30	2.35	1.74	1.21	0.55	0.38	1.45	1.00	0.46	0.87	0.47	0.71	0.74

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
S. mohri																	
Male	**Mean**	**4.18**	**0.95**	**0.66**	**1.07**	**2.21**	**1.65**	**1.07**	**0.59**	**0.33**	**1.14**	**0.80**	**0.48**	**0.94**	**0.55**	**0.65**	**0.71**
($N = 10$)	SD	0.24	0.02	0.03	0.04	0.07	0.04	0.02	0.01	0.01	0.04	0.06	0.03	0.03	0.01	0.01	0.05
	Range	0.70	0.08	0.10	0.13	0.20	0.13	0.08	0.03	0.03	0.11	0.17	0.10	0.10	0.02	0.03	0.16
	Min	3.80	0.93	0.60	1.00	2.10	1.57	1.04	0.57	0.31	1.09	0.75	0.44	0.90	0.53	0.64	0.63
	Max	4.50	1.00	0.70	1.13	2.30	1.70	1.12	0.60	0.34	1.20	0.92	0.54	0.99	0.56	0.67	0.78
Female	**Mean**	**4.15**	**0.98**	**0.69**	**1.15**	**2.44**	**1.73**	**1.15**	**0.67**	**0.33**	**1.12**	**0.80**	**0.47**	**1.02**	**0.59**	**0.66**	**0.71**
($N = 10$)	SD	0.21	0.05	0.04	0.03	0.13	0.08	0.03	0.02	0.01	0.06	0.05	0.02	0.04	0.01	0.01	0.03
	Range	0.70	0.18	0.13	0.10	0.33	0.20	0.10	0.05	0.03	0.18	0.14	0.06	0.10	0.02	0.04	0.10
	Min	3.90	0.88	0.63	1.10	2.25	1.61	1.10	0.65	0.31	1.03	0.74	0.44	0.98	0.57	0.65	0.65
	Max	4.60	1.05	0.75	1.20	2.58	1.81	1.20	0.70	0.34	1.20	0.88	0.50	1.07	0.60	0.69	0.74
S. pallidicornis																	
Male	**Mean**	**4.41**	**0.91**	**0.69**	**1.17**	**1.97**	**1.53**	**1.06**	**0.55**	**0.35**	**1.27**	**0.92**	**0.48**	**0.84**	**0.52**	**0.70**	**0.72**
($N = 10$)	SD	0.19	0.03	0.02	0.03	0.09	0.06	0.02	0.02	0.01	0.08	0.06	0.01	0.04	0.01	0.02	0.02
	Range	0.65	0.08	0.06	0.09	0.29	0.19	0.09	0.05	0.04	0.24	0.19	0.05	0.13	0.04	0.05	0.08
	Min	4.10	0.88	0.66	1.13	1.81	1.45	1.03	0.53	0.33	1.13	0.80	0.45	0.78	0.50	0.67	0.68
	Max	4.75	0.95	0.73	1.23	2.10	1.64	1.11	0.58	0.38	1.36	0.99	0.50	0.91	0.54	0.72	0.76
Female	**Mean**	**4.41**	**0.93**	**0.65**	**1.26**	**2.12**	**1.59**	**1.12**	**0.62**	**0.36**	**1.22**	**0.86**	**0.51**	**0.92**	**0.56**	**0.70**	**0.70**
($N = 10$)	SD	0.16	0.04	0.03	0.03	0.08	0.06	0.02	0.03	0.01	0.05	0.03	0.02	0.03	0.02	0.02	0.03
	Range	0.40	0.13	0.10	0.11	0.24	0.19	0.06	0.08	0.03	0.13	0.12	0.07	0.10	0.06	0.06	0.10
	Min	4.20	0.85	0.60	1.19	2.00	1.50	1.09	0.58	0.35	1.16	0.79	0.48	0.87	0.52	0.67	0.66
	Max	4.60	0.98	0.70	1.30	2.24	1.69	1.15	0.65	0.38	1.29	0.91	0.54	0.98	0.58	0.73	0.75
S. pallipes																	
Male	**Mean**	**4.83**	**0.97**	**0.81**	**1.17**	**2.10**	**1.66**	**1.18**	**0.61**	**0.39**	**1.36**	**1.08**	**0.46**	**0.87**	**0.52**	**0.71**	**0.79**
($N = 10$)	SD	0.30	0.03	0.04	0.04	0.09	0.04	0.02	0.02	0.01	0.06	0.06	0.03	0.03	0.01	0.01	0.02
	Range	1.08	0.10	0.13	0.13	0.26	0.14	0.08	0.05	0.03	0.19	0.17	0.08	0.08	0.05	0.03	0.06
	Min	4.23	0.93	0.73	1.10	1.94	1.59	1.14	0.58	0.38	1.25	1.00	0.41	0.83	0.49	0.70	0.75
	Max	5.30	1.03	0.85	1.23	2.20	1.73	1.21	0.63	0.40	1.44	1.17	0.49	0.91	0.54	0.73	0.81
Female	**Mean**	**4.78**	**1.02**	**0.75**	**1.22**	**2.30**	**1.73**	**1.26**	**0.68**	**0.38**	**1.29**	**0.97**	**0.49**	**0.98**	**0.54**	**0.73**	**0.75**
($N = 10$)	SD	0.15	0.03	0.03	0.04	0.09	0.03	0.02	0.01	0.01	0.04	0.03	0.02	0.03	0.01	0.01	0.02
	Range	0.40	0.10	0.08	0.13	0.21	0.09	0.08	0.05	0.01	0.13	0.10	0.07	0.08	0.02	0.03	0.06
	Min	4.60	0.98	0.70	1.17	2.19	1.69	1.23	0.65	0.38	1.23	0.93	0.46	0.93	0.53	0.72	0.71

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
	Max	5.00	1.08	0.78	1.30	2.40	1.78	1.30	0.70	0.39	1.35	1.03	0.53	1.01	0.55	0.75	0.77
S. pilosus																	
Male	**Mean**	**3.50**	**0.80**	**0.53**	**0.90**	**1.59**	**1.33**	**1.10**	**0.61**	**0.28**	**0.86**	**0.66**	**0.32**	**1.27**	**0.56**	**0.83**	**0.77**
($N = 14$)	SD	0.09	0.02	0.03	0.05	0.04	0.03	0.02	0.01	0.01	0.05	0.05	0.02	0.08	0.01	0.02	0.04
	Range	0.30	0.08	0.11	0.18	0.15	0.10	0.06	0.05	0.05	0.20	0.18	0.08	0.31	0.04	0.07	0.12
	Min	3.35	0.75	0.49	0.80	1.50	1.29	1.08	0.59	0.25	0.75	0.54	0.28	1.16	0.53	0.79	0.71
	Max	3.65	0.83	0.60	0.98	1.65	1.39	1.14	0.64	0.30	0.95	0.71	0.35	1.47	0.57	0.86	0.83
Female	**Mean**	**3.51**	**0.83**	**0.49**	**0.98**	**1.66**	**1.40**	**1.18**	**0.71**	**0.39**	**0.78**	**0.56**	**0.31**	**1.51**	**0.61**	**0.84**	**0.73**
($N = 10$)	SD	0.13	0.03	0.02	0.05	0.05	0.02	0.04	0.02	0.02	0.03	0.03	0.01	0.10	0.03	0.03	0.03
	Range	0.40	0.08	0.06	0.16	0.15	0.08	0.15	0.04	0.05	0.10	0.09	0.05	0.34	0.08	0.11	0.09
	Min	3.30	0.80	0.47	0.85	1.60	1.36	1.08	0.70	0.38	0.75	0.53	0.28	1.26	0.59	0.76	0.68
	Max	3.70	0.88	0.53	1.01	1.75	1.44	1.23	0.74	0.43	0.85	0.61	0.33	1.60	0.67	0.88	0.77
S. punctatus																	
Male	**Mean**	**5.60**	**1.11**	**0.87**	**1.35**	**2.30**	**1.84**	**1.13**	**0.59**	**0.37**	**1.42**	**1.06**	**0.50**	**0.80**	**0.52**	**0.62**	**0.74**
($N = 15$)	SD	0.21	0.04	0.06	0.09	0.09	0.06	0.04	0.02	0.02	0.07	0.08	0.06	0.04	0.01	0.02	0.04
	Range	0.70	0.13	0.20	0.30	0.33	0.21	0.13	0.08	0.06	0.26	0.26	0.19	0.12	0.05	0.06	0.14
	Min	5.10	1.05	0.78	1.18	2.18	1.75	1.09	0.55	0.34	1.30	0.91	0.40	0.75	0.49	0.59	0.68
	Max	5.80	1.18	0.98	1.48	2.50	1.96	1.21	0.63	0.40	1.56	1.18	0.59	0.87	0.54	0.64	0.82
Female	**Mean**	**5.14**	**1.13**	**0.75**	**1.38**	**2.44**	**1.87**	**1.18**	**0.64**	**0.36**	**1.35**	**0.96**	**0.49**	**1.09**	**0.54**	**0.63**	**0.71**
($N = 10$)	SD	0.32	0.08	0.05	0.07	0.13	0.11	0.05	0.04	0.01	0.08	0.08	0.05	0.13	0.02	0.03	0.05
	Range	1.20	0.29	0.20	0.25	0.48	0.39	0.14	0.11	0.04	0.30	0.28	0.15	0.40	0.06	0.12	0.18
	Min	4.40	0.91	0.63	1.25	2.10	1.56	1.11	0.59	0.34	1.18	0.85	0.43	0.83	0.51	0.59	0.66
	Max	5.60	1.20	0.83	1.50	2.58	1.95	1.25	0.70	0.39	1.48	1.13	0.58	1.23	0.57	0.71	0.84
S. robustus																	
Male	**Mean**	**3.96**	**0.88**	**0.65**	**0.92**	**1.85**	**1.54**	**1.18**	**0.69**	**0.28**	**0.83**	**0.64**	**0.35**	**1.43**	**0.59**	**0.77**	**0.78**
($N = 42$)	SD	0.39	0.04	0.07	0.05	0.12	0.08	0.05	0.03	0.02	0.07	0.05	0.05	0.09	0.02	0.02	0.04
	Range	1.78	0.18	0.29	0.23	0.53	0.33	0.17	0.16	0.08	0.36	0.16	0.23	0.50	0.08	0.11	0.20
	Min	3.35	0.80	0.55	0.80	1.65	1.38	1.10	0.63	0.25	0.70	0.55	0.26	1.12	0.55	0.72	0.67
	Max	5.13	0.98	0.84	1.03	2.18	1.70	1.27	0.79	0.33	1.06	0.71	0.49	1.63	0.63	0.83	0.86
Female	**Mean**	**3.95**	**0.93**	**0.60**	**0.97**	**2.10**	**1.67**	**1.33**	**0.85**	**0.28**	**0.86**	**0.62**	**0.38**	**1.54**	**0.64**	**0.80**	**0.72**
($N = 20$)	SD	0.31	0.05	0.04	0.06	0.17	0.08	0.04	0.03	0.02	0.07	0.04	0.02	0.10	0.01	0.02	0.05
	Range	0.95	0.16	0.16	0.28	0.70	0.26	0.18	0.13	0.07	0.25	0.13	0.09	0.36	0.04	0.07	0.20

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
	Min	3.40	0.84	0.50	0.77	1.70	1.50	1.23	0.78	0.24	0.70	0.55	0.33	1.41	0.61	0.77	0.61
	Max	4.35	1.00	0.66	1.05	2.40	1.76	1.40	0.90	0.31	0.95	0.68	0.41	1.77	0.66	0.83	0.80
S. rubrofemoratus																	
Male	**Mean**	**4.07**	**0.82**	**0.67**	**0.91**	**1.65**	**1.34**	**1.06**	**0.57**	**0.29**	**0.96**	**0.82***	**0.37+**	**1.09**	**0.54**	**0.79**	**0.84**
(N = 15)	SD	0.18	0.03	0.05	0.03	0.09	0.08	0.02	0.03	0.01	0.05	0.04	0.02	0.06	0.02	0.05	0.04
(* = 11)	Range	0.65	0.08	0.14	0.08	0.38	0.36	0.07	0.13	0.04	0.19	0.09	0.05	0.23	0.08	0.20	0.13
(+ = 8)	Min	3.70	0.78	0.59	0.88	1.48	1.10	1.03	0.50	0.26	0.85	0.79	0.34	1.02	0.49	0.73	0.79
	Max	4.35	0.85	0.73	0.95	1.85	1.46	1.09	0.63	0.30	1.04	0.88	0.39	1.25	0.57	0.93	0.92
Female	**Mean**	**3.68**	**0.87**	**0.56**	**1.00**	**1.74**	**1.50**	**1.18**	**0.71**	**0.46**	**0.91**	**0.70**	**0.36**	**1.30**	**0.60**	**0.79**	**0.76**
(N = 13)	SD	0.14	0.04	0.02	0.04	0.08	0.08	0.03	0.02	0.03	0.07	0.06	0.02	0.09	0.01	0.03	0.05
	Range	0.43	0.13	0.08	0.13	0.25	0.31	0.13	0.08	0.11	0.23	0.19	0.05	0.25	0.03	0.10	0.14
	Min	3.40	0.78	0.53	0.90	1.55	1.35	1.10	0.67	0.39	0.78	0.63	0.33	1.17	0.59	0.73	0.70
	Max	3.83	0.90	0.60	1.03	1.80	1.66	1.23	0.75	0.50	1.00	0.81	0.38	1.42	0.61	0.83	0.84
S. sheridani																	
Male	**Mean**	**3.85**	**0.85**	**0.64**	**0.89**	**1.73**	**1.44**	**1.06**	**0.58**	**0.28**	**0.88**	**0.65***	**0.33+**	**1.20**	**0.55**	**0.74**	**0.73**
(N = 27)	SD	0.19	0.03	0.04	0.05	0.05	0.05	0.03	0.02	0.01	0.04	0.06	0.02	0.05	0.01	0.02	0.06
(* = 20)	Range	0.84	0.15	0.18	0.26	0.21	0.21	0.12	0.09	0.04	0.18	0.21	0.05	0.19	0.05	0.08	0.21
(+ = 16)	Min	3.35	0.75	0.53	0.70	1.60	1.33	0.98	0.54	0.24	0.76	0.54	0.30	1.11	0.53	0.68	0.63
	Max	4.19	0.90	0.70	0.96	1.81	1.54	1.10	0.63	0.29	0.94	0.75	0.35	1.30	0.57	0.76	0.85
Female	**Mean**	**3.73**	**0.87**	**0.56**	**0.93**	**1.90**	**1.51**	**1.16**	**0.70**	**0.41**	**0.82**	**0.57**	**0.33**	**1.43**	**0.60**	**0.77**	**0.70**
(N = 13)	SD	0.20	0.06	0.04	0.03	0.12	0.06	0.04	0.02	0.02	0.04	0.04	0.02	0.07	0.01	0.01	0.03
	Range	0.70	0.20	0.13	0.09	0.43	0.25	0.14	0.10	0.08	0.15	0.13	0.08	0.22	0.04	0.04	0.08
	Min	3.45	0.75	0.50	0.89	1.70	1.35	1.08	0.65	0.39	0.78	0.51	0.30	1.28	0.59	0.76	0.66
	Max	4.15	0.95	0.63	0.98	2.13	1.60	1.21	0.75	0.46	0.93	0.64	0.38	1.51	0.63	0.80	0.74
S. simplex																	
Male	**Mean**	**4.09**	**0.83**	**0.63**	**0.96**	**1.83**	**1.49**	**0.98**	**0.56**	**0.29**	**1.01**	**0.73**	**0.40**	**1.03**	**0.57**	**0.66**	**0.72**
(N = 7)	SD	0.14	0.01	0.03	0.03	0.09	0.06	0.03	0.02	0.01	0.06	0.04	0.04	0.04	0.01	0.01	0.03
	Range	0.40	0.02	0.08	0.10	0.25	0.15	0.10	0.05	0.04	0.18	0.11	0.09	0.12	0.03	0.04	0.09
	Min	3.90	0.83	0.60	0.90	1.75	1.45	0.93	0.54	0.28	0.95	0.68	0.35	0.97	0.55	0.64	0.67
	Max	4.30	0.85	0.68	1.00	2.00	1.60	1.03	0.59	0.31	1.13	0.79	0.44	1.09	0.58	0.68	0.77
Female	**Mean**	**4.01**	**0.85**	**0.57**	**1.01**	**2.03**	**1.56**	**1.05**	**0.63**	**0.29**	**0.96**	**0.68**	**0.42**	**0.93**	**0.60**	**0.67**	**0.70**
(N = 8)	SD	0.19	0.03	0.04	0.05	0.11	0.06	0.03	0.02	0.01	0.04	0.04	0.03	0.06	0.01	0.01	0.05

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/AII	VW/HW	HW/PW	AIII/AII
	Range	0.60	0.10	0.15	0.14	0.30	0.15	0.08	0.05	0.01	0.11	0.12	0.10	0.20	0.02	0.02	0.14
	Min	3.80	0.80	0.48	0.94	1.85	1.48	1.01	0.60	0.29	0.89	0.61	0.36	0.85	0.59	0.67	0.64
	Max	4.40	0.90	0.63	1.08	2.15	1.63	1.08	0.65	0.30	1.00	0.73	0.46	1.05	0.61	0.69	0.77
S. solidaginis																	
Male	**Mean**	**4.48**	**0.99**	**0.72**	**1.15**	**2.09**	**1.66**	**1.13**	**0.60**	**0.32**	**1.24**	**0.90**	**0.42**	**0.91**	**0.54**	**0.68**	**0.73**
(N = 10)	SD	0.24	0.04	0.04	0.04	0.12	0.07	0.02	0.02	0.01	0.06	0.06	0.02	0.05	0.01	0.02	0.03
	Range	0.70	0.13	0.10	0.16	0.45	0.21	0.06	0.05	0.04	0.20	0.20	0.04	0.15	0.03	0.07	0.12
	Min	4.10	0.95	0.68	1.08	1.85	1.56	1.10	0.58	0.30	1.15	0.80	0.40	0.84	0.52	0.64	0.68
	Max	4.80	1.08	0.78	1.24	2.30	1.76	1.16	0.63	0.34	1.35	1.00	0.44	0.99	0.55	0.71	0.80
Female	**Mean**	**4.38**	**1.01**	**0.68**	**1.16**	**2.22**	**1.68**	**1.18**	**0.69**	**0.31**	**1.14**	**0.78**	**0.42**	**1.04**	**0.59**	**0.71**	**0.69**
(N = 10)	SD	0.30	0.06	0.04	0.04	0.14	0.09	0.04	0.03	0.01	0.04	0.07	0.01	0.04	0.02	0.02	0.05
	Range	1.20	0.23	0.15	0.15	0.40	0.28	0.14	0.10	0.03	0.13	0.23	0.04	0.14	0.05	0.05	0.19
	Min	3.70	0.90	0.60	1.08	2.00	1.50	1.10	0.63	0.30	1.10	0.64	0.39	0.97	0.55	0.68	0.58
	Max	4.90	1.13	0.75	1.23	2.40	1.78	1.24	0.73	0.33	1.23	0.86	0.44	1.11	0.61	0.73	0.77
S. sparsus																	
Male	**Mean**	**3.56**	**0.87**	**0.55**	**0.97**	**1.66**	**1.41**	**1.16**	**0.65**	**0.28**	**0.95**	**0.72***	**0.35***	**1.22**	**0.56**	**0.82**	**0.76**
(N = 15)	SD	0.33	0.03	0.07	0.04	0.15	0.06	0.03	0.04	0.01	0.05	0.04	0.02	0.06	0.02	0.04	0.03
(* = 11)	Range	1.20	0.10	0.21	0.13	0.60	0.25	0.10	0.14	0.03	0.15	0.14	0.06	0.22	0.10	0.15	0.14
	Min	3.10	0.83	0.50	0.90	1.45	1.33	1.10	0.56	0.26	0.87	0.64	0.33	1.10	0.50	0.71	0.69
	Max	4.30	0.93	0.71	1.03	2.05	1.58	1.20	0.70	0.29	1.03	0.78	0.39	1.31	0.60	0.86	0.82
Female	**Mean**	**3.96**	**0.96**	**0.56**	**1.08**	**1.89**	**1.55**	**1.28**	**0.80**	**0.45**	**0.89**	**0.69**	**0.39**	**1.44**	**0.63**	**0.83**	**0.77**
(N = 10)	SD	0.19	0.03	0.03	0.05	0.12	0.04	0.01	0.02	0.02	0.03	0.05	0.05	0.05	0.01	0.02	0.04
	Range	0.55	0.11	0.10	0.13	0.38	0.11	0.05	0.05	0.05	0.10	0.15	0.13	0.17	0.03	0.06	0.12
	Min	3.75	0.91	0.50	1.00	1.70	1.49	1.26	0.78	0.43	0.85	0.63	0.35	1.34	0.61	0.81	0.69
	Max	4.30	1.03	0.60	1.13	2.08	1.60	1.31	0.83	0.48	0.95	0.78	0.48	1.51	0.65	0.87	0.82
S. stygicus																	
Male	**Mean**	**4.22**	**0.93**	**0.69**	**1.12**	**1.94**	**1.51**	**1.04**	**0.56**	**0.34**	**1.18**	**0.85**	**0.48**	**0.88**	**0.54**	**0.69**	**0.72**
(N = 20)	SD	0.29	0.05	0.04	0.06	0.11	0.07	0.04	0.02	0.02	0.08	0.08	0.03	0.05	0.02	0.03	0.04
	Range	1.20	0.18	0.14	0.20	0.38	0.27	0.21	0.08	0.06	0.30	0.29	0.10	0.18	0.10	0.10	0.19
	Min	3.70	0.83	0.63	1.00	1.73	1.35	0.95	0.53	0.31	1.03	0.71	0.43	0.79	0.47	0.64	0.61
	Max	4.90	1.00	0.76	1.20	2.10	1.62	1.16	0.60	0.38	1.33	1.00	0.53	0.98	0.58	0.74	0.80
Female	**Mean**	**4.50**	**1.01**	**0.70**	**1.20**	**2.17**	**1.64**	**1.10**	**0.63**	**0.35**	**1.16**	**0.81**	**0.48**	**0.95**	**0.57**	**0.68**	**0.70**

TABLE 3
(Continued)

Species		Length				Width				Antennal length				Ratio			
		Total Body	Pronotum	Cuneus	Labium	Body	Pronotum	Head	Vertex	I	II	III	IV	HW/ AII	VW/ HW	HW/ PW	AIII/ AII
(*N* = 22)	SD	0.32	0.07	0.06	0.06	0.12	0.09	0.04	0.02	0.02	0.06	0.07	0.04	0.04	0.01	0.03	0.04
	Range	1.30	0.23	0.19	0.25	0.53	0.35	0.16	0.09	0.06	0.23	0.29	0.13	0.15	0.05	0.09	0.16
	Min	3.70	0.90	0.60	1.10	1.83	1.43	0.99	0.58	0.31	1.05	0.69	0.43	0.90	0.54	0.63	0.63
	Max	5.00	1.13	0.79	1.35	2.35	1.78	1.15	0.66	0.38	1.28	0.98	0.55	1.05	0.59	0.72	0.78
S. subalbicans																	
Female	**Mean**	**3.73**	**0.88**	**0.54**	**1.04**	**1.83**	**1.49**	**0.94**	**0.54**	**0.28**	**1.18**	**0.79**	**0.45**	**0.80**	**0.57**	**0.64**	**0.67**
(*N* = 2)	SD	0.04	0.01	0.00	0.02	0.11	0.07	0.01	0.02	0.00	-	-	-	-	0.01	0.02	-
	Range	0.05	0.01	0.00	0.03	0.15	0.10	0.01	0.03	0.01	-	-	-	-	0.02	0.03	-
	Min	3.70	0.88	0.54	1.03	1.75	1.44	0.94	0.53	0.28	-	-	-	-	0.56	0.62	-
	Max	3.75	0.89	0.54	1.05	1.90	1.54	0.95	0.55	0.28	-	-	-	-	0.58	0.65	-
S. tanydexios n. sp.																	
Male	**Mean**	**5.17**	**0.96**	**0.84**	**1.09**	**1.73**	**1.60**	**1.01**	**0.51**	**0.31**	**1.22**	**0.87***	**0.36+**	**0.83**	**0.50**	**0.63**	**0.72**
(*N* = 14)	SD	0.34	0.04	0.10	0.02	0.09	0.07	0.03	0.02	0.02	0.06	0.04	0.01	0.03	0.01	0.02	0.03
(* = 12)	Range	1.00	0.13	0.28	0.08	0.25	0.21	0.08	0.07	0.04	0.19	0.14	0.04	0.09	0.04	0.05	0.08
(+ = 9)	Min	4.73	0.88	0.74	1.05	1.63	1.50	0.98	0.47	0.30	1.13	0.83	0.35	0.78	0.48	0.61	0.69
	Max	5.73	1.00	1.01	1.13	1.88	1.71	1.06	0.54	0.34	1.31	0.96	0.39	0.87	0.52	0.66	0.77
Female	**Mean**	**4.58**	**0.95**	**0.71**	**1.13**	**2.02**	**1.62**	**1.07**	**0.60**	**0.31**	**1.15**	**0.81**	**0.37**	**0.93**	**0.56**	**0.66**	**0.70**
(*N* = 10)	SD	0.41	0.04	0.08	0.04	0.18	0.10	0.05	0.03	0.02	0.08	0.04	0.01	0.05	0.01	0.02	0.04
	Range	1.20	0.15	0.23	0.11	0.51	0.28	0.13	0.09	0.08	0.23	0.14	0.05	0.16	0.02	0.06	0.13
	Min	4.00	0.88	0.60	1.06	1.80	1.45	1.00	0.55	0.29	1.03	0.74	0.35	0.89	0.55	0.63	0.64
	Max	5.20	1.03	0.83	1.18	2.31	1.73	1.13	0.64	0.36	1.26	0.88	0.40	1.04	0.57	0.69	0.77
S. tibialis																	
Male	**Mean**	**4.34**	**0.84**	**0.73**	**1.02**	**1.65**	**1.42**	**1.13**	**0.64**	**0.29**	**1.07**	**0.82***	**0.35+**	**1.07**	**0.56**	**0.80**	**0.76**
(N = 17)	SD	0.31	0.02	0.09	0.03	0.07	0.03	0.02	0.03	0.01	0.04	0.04	0.02	0.05	0.02	0.03	0.05
(* = 13)	Range	1.30	0.05	0.39	0.10	0.21	0.10	0.08	0.09	0.02	0.18	0.16	0.10	0.19	0.06	0.10	0.18
(+ = 14)	Min	3.90	0.83	0.59	0.96	1.54	1.38	1.09	0.58	0.28	0.98	0.73	0.30	0.99	0.53	0.76	0.64
	Max	5.20	0.88	0.98	1.06	1.75	1.48	1.18	0.68	0.30	1.15	0.88	0.40	1.18	0.59	0.85	0.83
Female	**Mean**	**3.84**	**0.87**	**0.56**	**1.07**	**1.85**	**1.52**	**1.26**	**0.77**	**0.48**	**0.95**	**0.70**	**0.36**	**1.33**	**0.61**	**0.83**	**0.73**
(N = 11)	SD	0.25	0.04	0.05	0.03	0.07	0.04	0.03	0.03	0.03	0.05	0.05	0.02	0.07	0.01	0.02	0.03
	Range	0.80	0.14	0.18	0.10	0.20	0.13	0.11	0.09	0.08	0.15	0.18	0.05	0.19	0.05	0.05	0.13
	Min	3.50	0.79	0.48	1.03	1.75	1.44	1.21	0.71	0.44	0.88	0.60	0.34	1.25	0.59	0.81	0.67
	Max	4.30	0.93	0.65	1.13	1.95	1.56	1.32	0.80	0.51	1.03	0.78	0.39	1.44	0.64	0.86	0.79

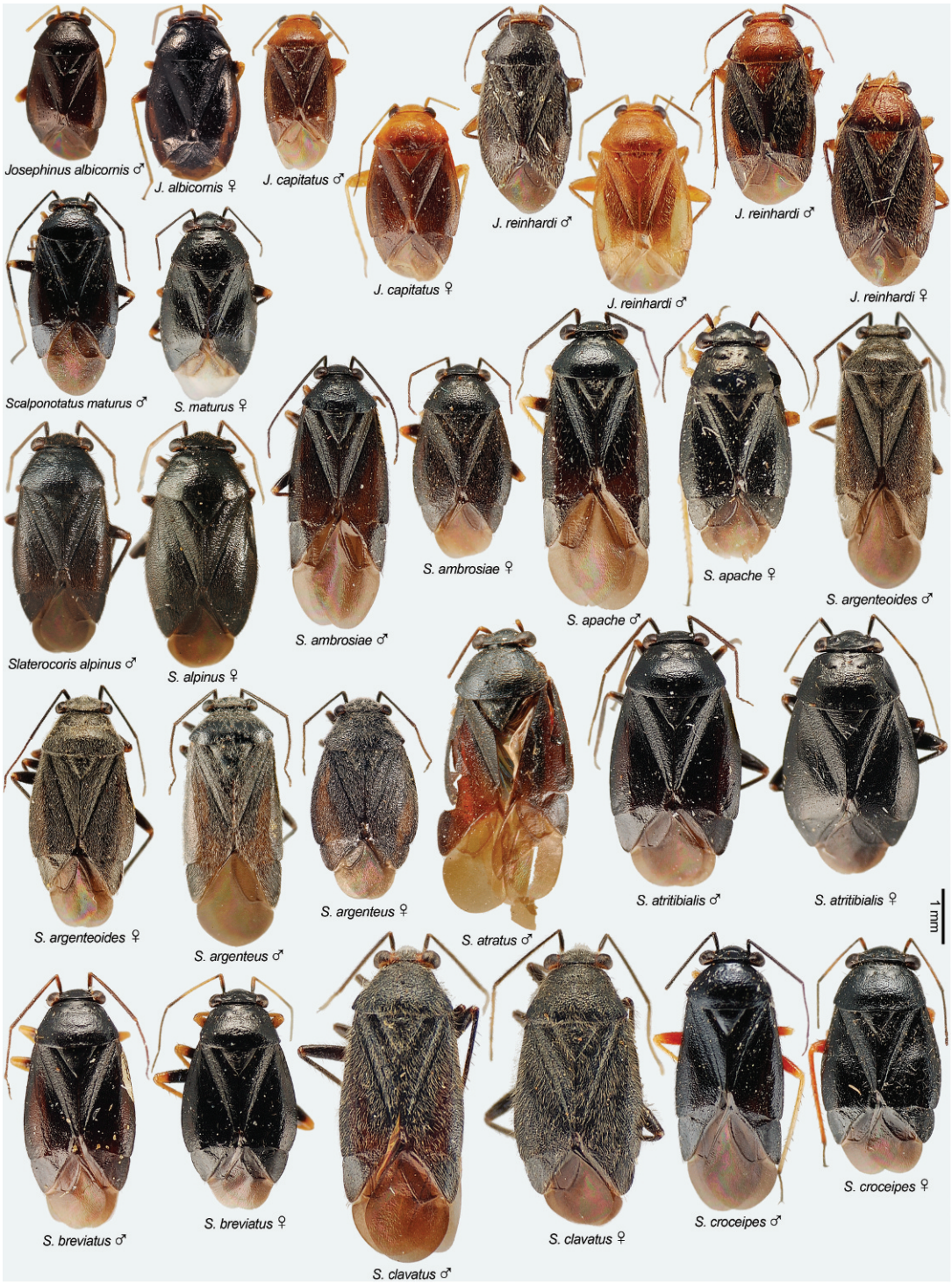


Plate 1. Dorsal habitus photographs of *Josephinus* species and *Slaterocoris alpinus*—*S. croceipes* (see appendix 1 for USI codes and localities).

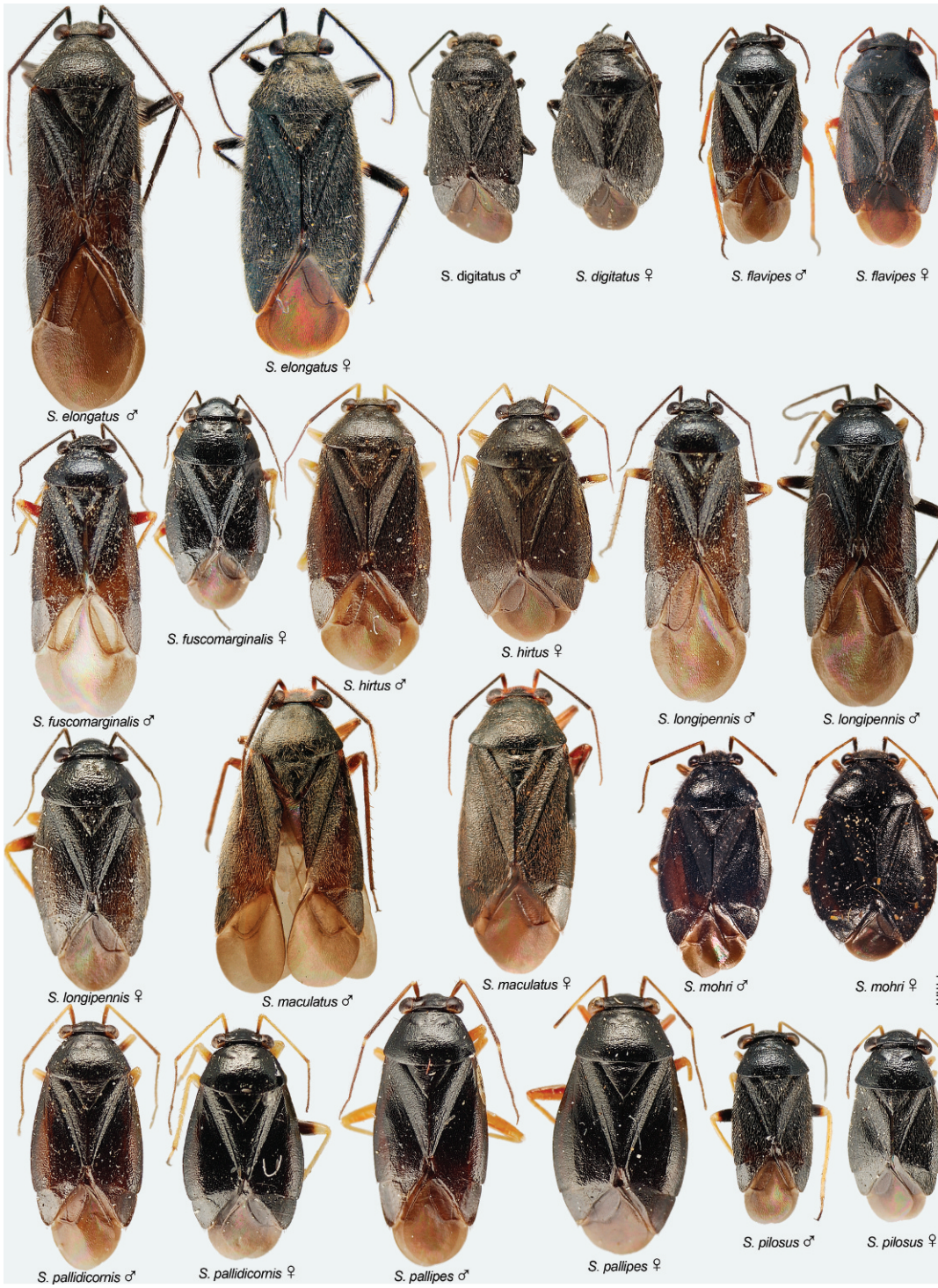


Plate 2. Dorsal habitus photographs of *Slaterocoris elongatus*—*S. pilosus* (see appendix 1 for USI codes and localities).

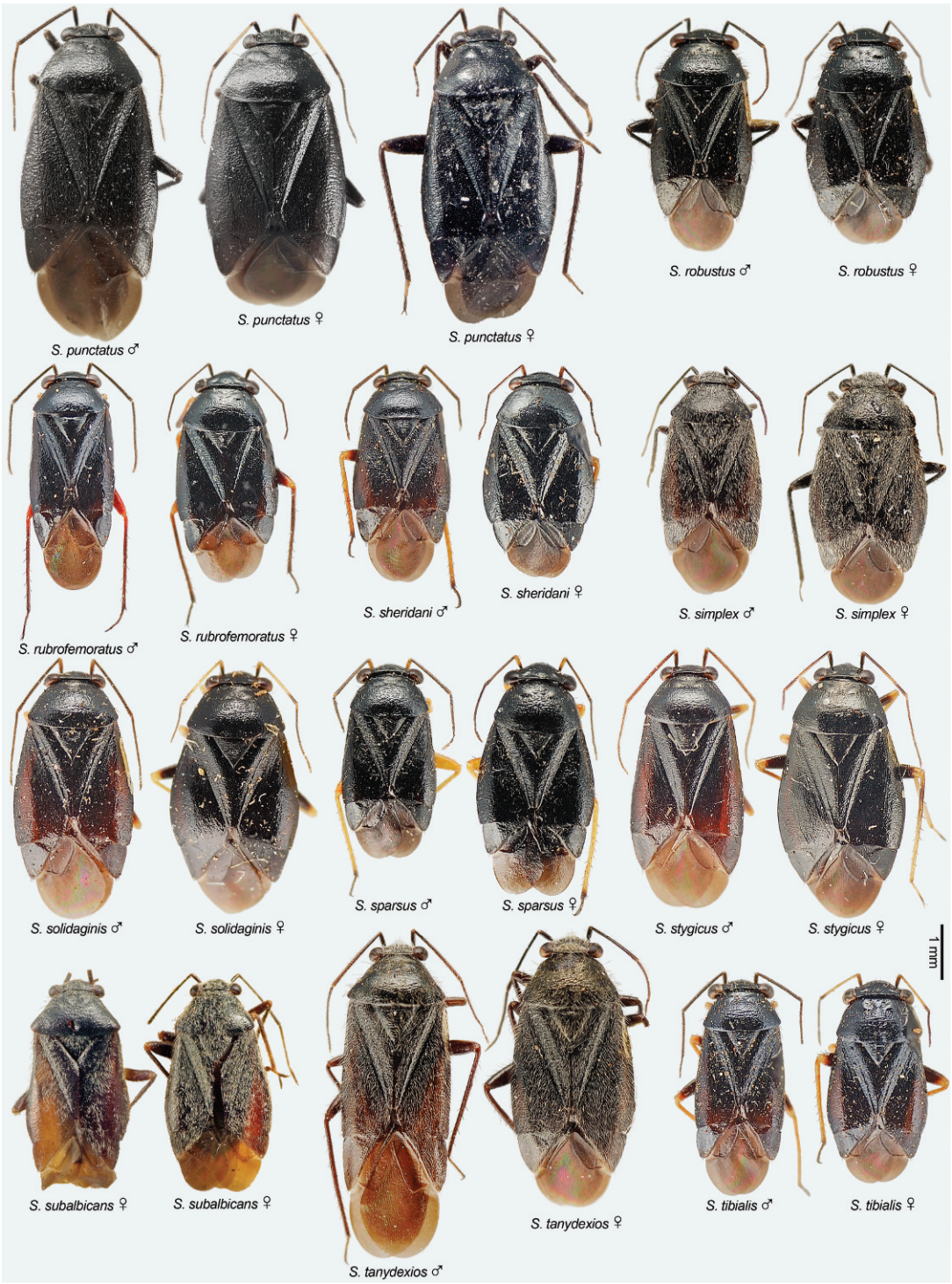


Plate 3. Dorsal habitus photographs of *Slaterocoris punctatus*—*S. tibialis* (see appendix 1 for USI codes and localities).

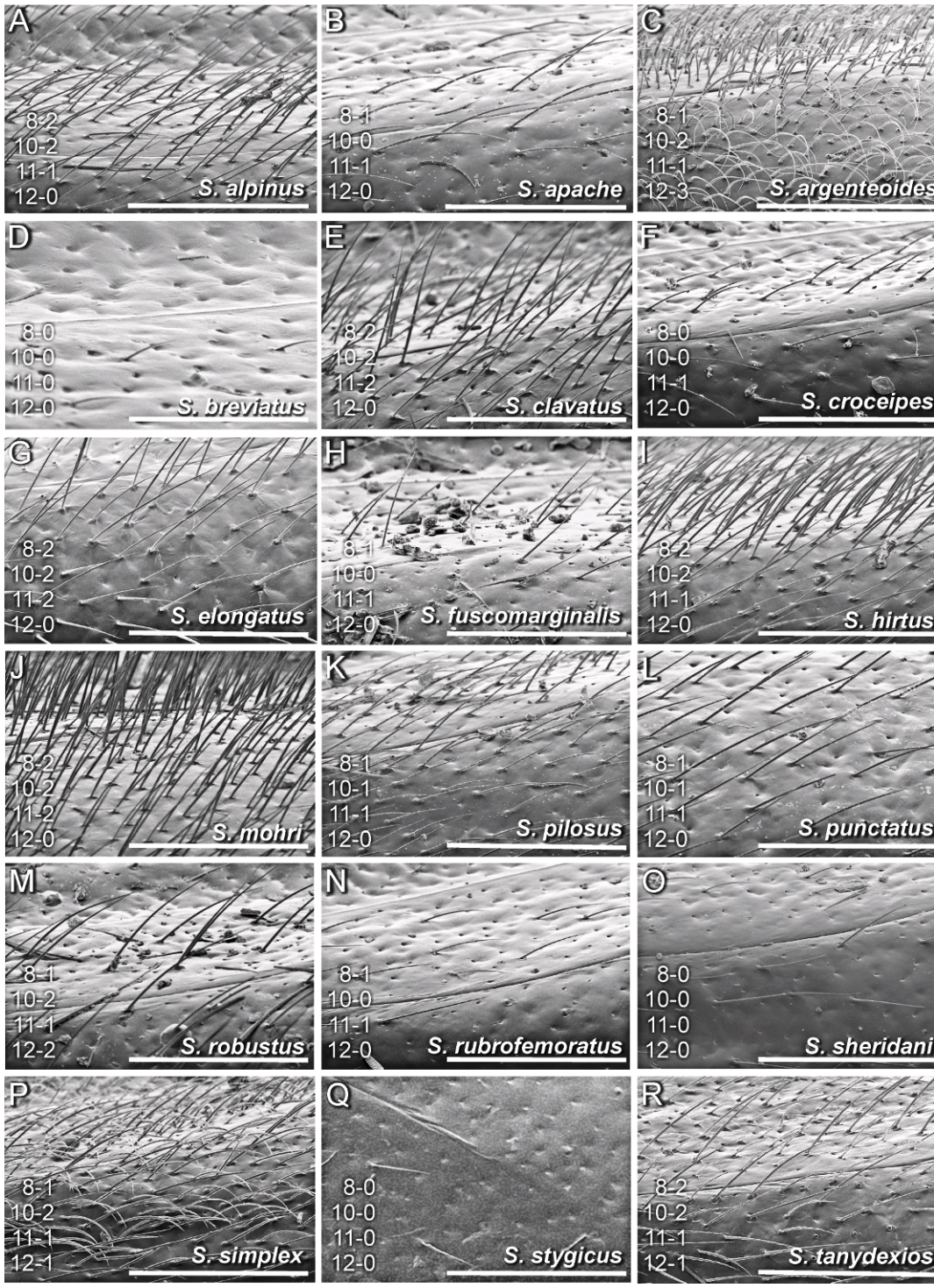


Plate 4. *Slaterocoris* species detail of dorsal vestiture, lateral view. Character-state: length, density, angle, type.

– Body almost always shorter; if length of male 7.00 then width is less than 2.25; head usually entirely black, sometimes pale near medial margin of eye; if head orange then dorsum pubescent; labium always surpassing middle coxa; dorsum with variable vestiture; endosomal spicule either clearly bifurcate with dorsal and ventral lobes, or with small spine parallel to body of spicule; right paramere with ventrally directed spines, or basal lobe without spines 7

7. Vertex anterior to transverse basal carina steeply angled; hemelytron rugose or reticulate surface with moderately large discrete or obscure punctures; endosomal spicule clearly bifurcate with dorsal and ventral lobes, apex of dorsal lobe extending beyond apex of secondary gonopore; right paramere with ventrally directed spines . . . . . *Slaterocoris* Wagner, 1956

– Vertex anterior to transverse basal carina gradually angled; hemelytron with variable sculpturation—either discrete, minute punctures only, or with discrete, minute punctures underlying shingle-shaped plates, or with shingle-shaped plates only; endosomal spicule with small spine parallel to body of spicule, apex of spine not extending beyond apex of secondary gonopore; right paramere with one large dorsally directed lobe or without lobes . . . . . *Josephinus*, n. gen.

Scalponotatus Kelton

Scalponotatus Kelton, 1969: 16 (orig. desc.); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 194 (catalog); Asquith, 1994: 1, 6, 8–9, 13 (disc.); Schaffner and Schwartz, 2008: 3, 5, 20, 21, 83 (disc.).

TYPE SPECIES: *Scalponotatus maturus* Kelton, 1969 (orig. design.).

DIAGNOSIS: Distinguished from *Slaterocoris* and *Josephinus*, both of which share almost entirely black body coloration, by the usually pale basal carina of the vertex (sometimes pale laterally but not on the adjacent frons). The carina in *Slaterocoris* is black, but rarely, if the head has pale patches on the frons adjacent to the eye (not on the carina), then the body length is greater than 4.60; in *Scalponotatus*, if the carina is black, then the male is rarely as long as 4.55. In *Josephinus*, the vertex and frons are entirely pale or the lateral portions of the frons and adjacent basal carina are pale near the eye. The dorsal sculpturation of the hemelytron in *Scalponotatus* is formed by very small discrete punctures underlying a smoothly undulating rugosity, regardless of the vestiture density. In *Slaterocoris*, the punctures are larger and obscurely confluent and the underlying rugosity or broken reticulation is of a larger scale. The dorsal sculpturation in *Josephinus* has rows of overlapping shingle-like plates, or plates underlying small discrete punctures, and with small discrete punctures only.

The most consistent diagnostic characters for *Scalponotatus* are in the male genitalia. The tergal processes in *Scalponotatus*, *Slaterocoris*, and *Josephinus* usually project from right of midline on the dorsal edge of the pygophore aperture. The tergal process in *Scalponotatus* is usually stout, entire, strongly curved medially, and with an oval cross section. In *Slaterocoris*, the tergal process is smaller, usually truncate with a slightly bifurcate apex, and a flat cross section (sometimes projecting from the aperture slightly more to midline). The tergal process in *Josephinus* projects from the midline or just right of it, but is usually absent or small, moundlike, and flat in cross section.

The parameres unambiguously distinguish the genera. In *Scalponotatus* the left paramere has a mittenlike apex with obvious medial and lateral lobes and the right paramere has an undeveloped sensory lobe and dorsally directed, variously attenuate apical region. The distal portion of the left paramere in *Slaterocoris* and *Josephinus* is entire and narrowed; *S. ambrosiae* has a subapical process (fig. 16C, D); nevertheless, the structure is not mittenlike as in *Scalponotatus*. Sometimes the basal area or sensory lobe of the left paramere area in *Josephinus* has a small spine (fig. 7C, D). The right paramere in *Slaterocoris* has ventrally directed spines, including the sensory lobe area; in *Josephinus*, the sensory lobe projects dorsally.

The endosomal spicule in *Scalponotatus* is attached to the membrane by a basal keel and has a small, spinelike dorsal lobe (rarely large and bifurcate) emanating subbasally from the edge of the left side; the distal region is usually slightly and simply recurved. In *Slaterocoris*, the endosomal spicule is attached basally without a keel, the dorsal lobe is large and variously modified and emanates subbasally medial of the left side, and the

distal region is strongly recurved. The endosomal spicule in *Josephinus* is usually attached to the membrane without a keel, has a narrow or spinelike subbasal dorsal lobe on the left side edge, and the distal region is strongly bifurcate subapically before the recurved apex.

REDESCRIPTION: *Male:* Small, total length 2.85–4.55, width 1.43–1.83, costal margin arcuate. COLORATION: Body and appendages predominantly black, vertex near dorsal margin of eye and femur narrowly at apex pale; carina sometimes black. VESTITURE: Variable, either sparsely distributed short, reclining, brown simple setae or moderately dense, longer, reclining silvery simple setae. DORSAL SCULPTURATION: Surface of minute, discrete punctures, forming smooth reticulations, most easily observed on corium; pronotum smoothly punctate; frons smooth. STRUCTURE: Head hypognathous, posterolateral margin straight; clypeus produced dorsal to mandibular plate; frons flattened; vertex sunken anterior of transverse basal carina, vertex/eye contour angled in anterior view; metepisternal spiracle slitlike, roughly teardrop shaped ventrally, with elongate evaporative area on tergum; external metepisternal scent gland area with ostiole flattened and elevated and evaporative area wide, triangular, and spanning width of metepisternum, peritreme and evaporative surface with evaporative bodies (fig. 3C); pretarsus with claw strongly curved; pulvillus moderately large, not extending beyond medial curve of claw; parempodium fleshy, apically convergent (fig. 3D). GENITALIA: **Pygophore**: Deep dorsoventrally; tergal process situated on right side of aperture, apex hooked toward medial line, sometimes apex bifurcate or with small, separate, more medial spine; ventral margin of aperture entire (not cleft); subgenital plate separated dorsally from ventral margin of aperture; right paramere inserted slightly dorsal to left. **Phallotheca**: Cone shaped, aperture open and extending to apex on right side, distal margin not convoluted, left lateral surface not compressed. **Endosomal spicule**: Membrane attached to flat, recurved, basal keel; usually with small spinelike dorsal lobe projecting subbasally from curved left side of spicule (dorsal to basal keel), dorsal lobe sometimes bifurcate; spicule recurved distally, or bifurcate apically; endosomal spicule may extend beyond phallotheca apex in repose and be easily observed without dissection. **Right paramere**: Apex attenuate, directed dorsally, usually pointed, although sometimes truncate and serrate; dorsomedial region sometimes with small spines. **Left paramere**: Apex mittenlike, lateral lobe as wide as paramere body, medial lobe of variable width, usually narrower than lateral lobe; basal region not developed ventrally.

Female: Total length 2.95–3.85, width 1.58–2.06; as in male except vertex wider, eye smaller, and costal margin more strongly convex. ABDOMEN: **Subgenital plate**: Broadly triangular. GENITALIA: **First gonapophyses**: Right overlapping left, in ventral view; left side larger than right at overlap, short, composed of two sections with mediodistal area not produced, dorsal surface protuberant, with apex narrow. **Vestibulum**: Anteroventral margin of anterior wall sclerotized medially, spanning width of first gonapophyses. **Ventral labiate plate**: Ventral surface broadly produced into vulva. **Dorsal labiate plate**: Paired medial sclerites small with intersclerite length greater than sclerite width; dorsal region mostly membranous. **Second gonapophyses**: Anterior medial surface weakly convex. **Posterior wall**: Interramal sclerite with dorsomedial region flat, not produced anteriorly; medial region narrow, platelike; posteromedial portion with narrow process abutting ovipositor bulb; ventromedial region not greatly overlapping second gonapophyses basally; interramal lobe with sclerotized basal (dorsal) attachment; dorsomedial margin not produced as lobe; ventral projection long with convex anterior surface.

DISCUSSION: When Kelton (1968) revised *Slaterocoris*, *Strongylocoris albibasis* Knight was excluded from the expanded genus. Subsequently *Scalponotatus* (Kelton, 1969) was erected with *S. maturus,* the type species, and nine other species, including *albibasis,* were placed in the genus. Two species, *S. lagunensis* Carvalho and Costa, 1992, and *S. sinaloensis* Carvalho and Costa, 1992, were subsequently added to the genus. *Scalponotatus* was founded on the ''finely sculptured and shallowly punctate'' hemelytron, the

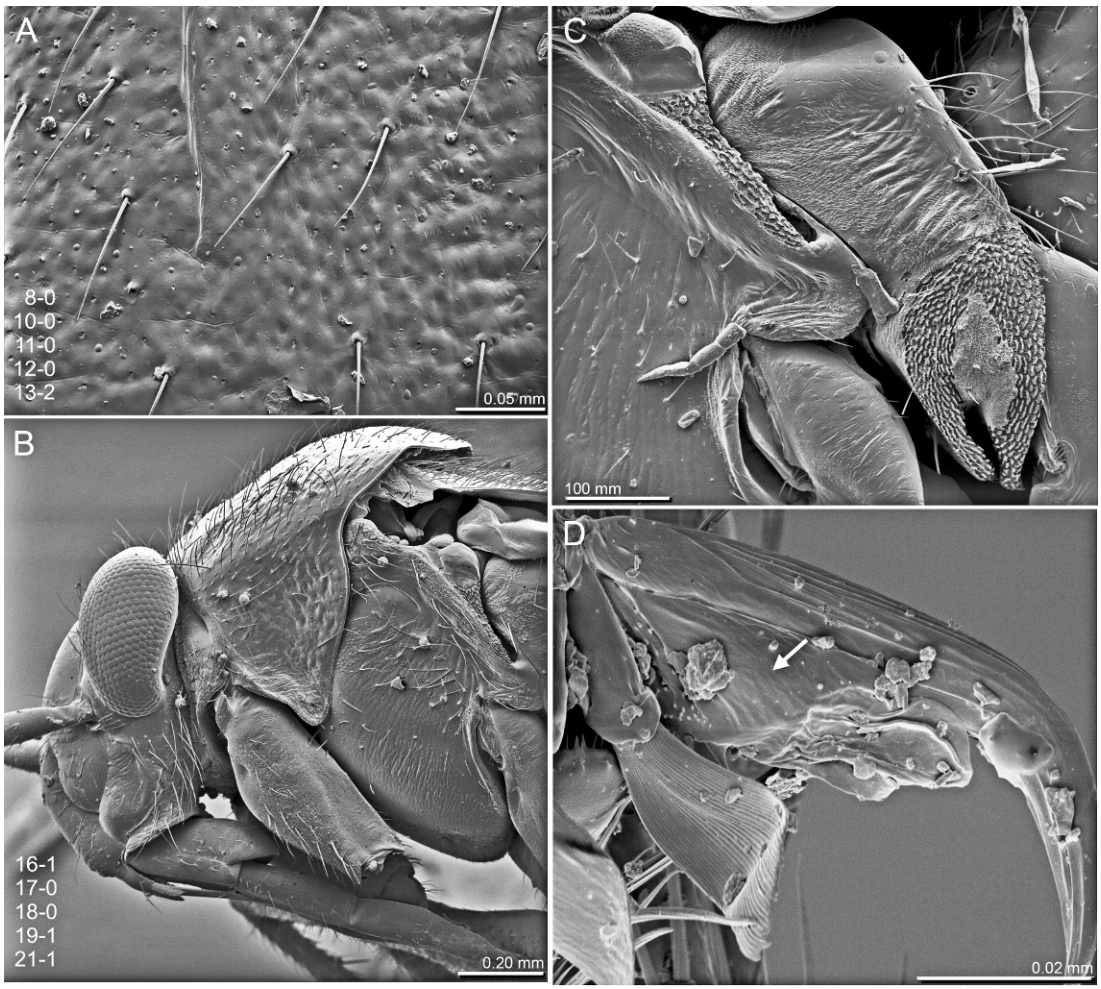


Fig. 3. *Scalponotatus maturus*, scanning electron micrographs. **A**. Hemelytron, vestiture and cuticular sculpture, dorsal view. **B**. Head and thorax, lateral view. **C**. Mesothoracic spiracle and metathoracic scent-efferent system, lateral view. **D**. Pretarsus, apical view.

usually pale transverse basal carina of the head, and the general pattern of the male genitalia. As discussed in Schaffner and Schwartz (2008) and previously herein, two species initially included in *Scalponotatus* do not have the defining characters of the genus as presented by Kelton (1969). These will be discussed below under *Josephinus*, new genus. The revised diagnosis of *Scalponotatus* requires new combinations for *Jornandes dissimulans* Distant, 1893, and *S. sinaloensis*. The taxonomic justification for the former species follows the checklist of species placed in *Scalponotatus*, while the taxonomic consideration for the latter species, under a separate heading, precedes the treatment of *Josephinus*, new genus.

The single endosomal spicule is dorsal of the ductus and tilted to the right side in all of the black orthotylines or *Slaterocoris*-group genera discussed in this paper. In the terminology of Cassis (2008), these are dorsal endosomal spicules. Herein, I refer to two portions of the dorsal endosomal spicule—the ventral lobe or the main body of the spicule arising from the basal attachment to the membrane and the dorsal lobe emanating from the subbasal area of the main body of the spicule (figs. 4A, 10A, 16A, 18A, 29A, 39D, 42A, 52A, 57A, 61A, 64A, 65D, 73A).

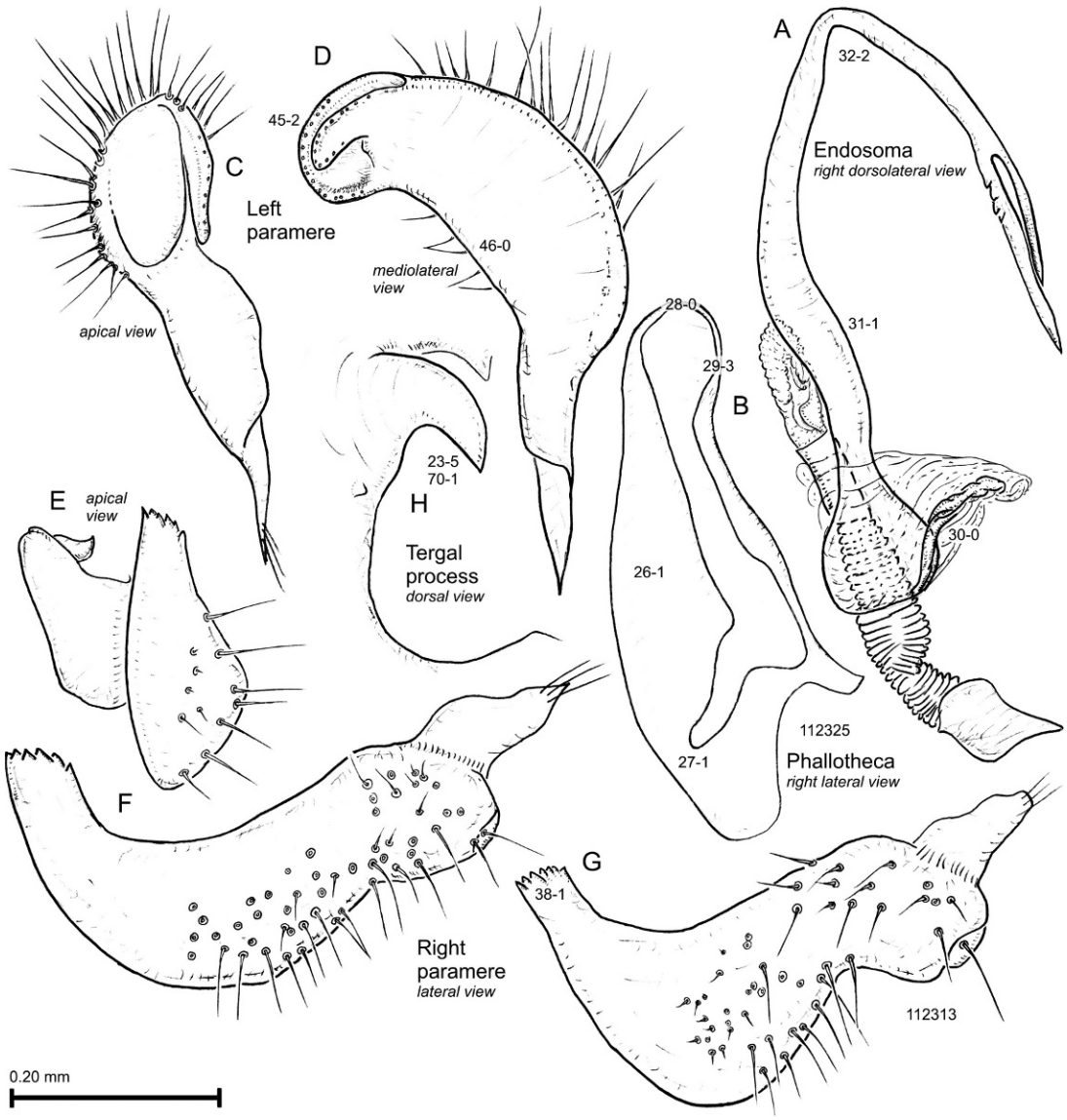


Fig. 4. *Scalponotatus maturus*, male genitalia. **A–F**, **H**. 5.3 mi SW of Salome, AZ. **G**. Thousand Palms, CA.

The ventral lobe of the spicule in *Jornandinus*, *Josephinus*, and *Scalponotatus* are recurved distally regardless of the structure of the basal attachment to the membrane or the dorsal lobe. The dorsal lobes of *Scalponotatus* and *Slaterocoris* have a slightly different form.

In *Scalponotatus*, an endosomal spine (not the flattened keel attached to the endosomal membrane) is absent just left of the sinuate basal portion of the spicule on the left subbasal margin (fig. 4A). I interpret this region to be homologous to the area in *Slaterocoris* (fig. 39A), where the dorsal lobe projects, even though in the majority of *Slaterocoris* species the dorsal lobe clearly emanates from the dorsal surface at the midline of the spicule. However, in *S. simplex*, the base of the dorsal lobe is shifted

to the left and twisted on its axis, so that the medial and lateral rami of the dorsal lobe are perpendicular to the body of the spicule (fig. 65C–F, arrow). In *S. clavatus* (fig. 57A, B), the dorsal lobe is most similar in arrangement to those in *Josephinus* and *Scalponotatus*. A small dorsal lobe projecting from the left side is also present in *Jornandinus* and *Josephinus*. The curvature of the endosomal base in *Scalponotatus* is also more sinuate basally than in either *Josephinus* and *Slaterocoris*.

The tergal process of *Scalponotatus* is curved and solitary in *S. maturus* (fig. 4H), but sometimes, even in this species, it has a little mound medial to the curving right lateral process. Other species (cf. *S. mimosus*) have a more prominent medial spine at the same position as the mound in *S. maturus*. There is a concordant structure in the ventral margin of the pygophore and the mitten-shaped apex of the left paramere. The posterior margin of the subgenital plate or cup-shaped sclerite in *Scalponotatus* is either separated dorsally from the ventral margin of the aperture (*S. maturus*), or additionally projects posteriorly beyond the aperture (*S. mimosus*). In either case, there is a triangular or U-shaped depression ventral to the raised subgenital plate; in repose, the apex and lateral surface of the left paramere covers this space. In *Jornandinus*, *Josephinus*, and *Slaterocoris*, all with the apical portion of the left parameres narrow, the subgenital plate merges with the ventral margin roughly at the level of the aperture, closing the space ventral to the subgenital plate.

The structure of the right paramere in *Scalponotatus* is rather simple; the variable regions are generally confined to the length of the roughly rectangular body and the length and angle of the distal region. The body of the right paramere is here defined as the region between the attenuated distal section and the wider basal area region of the paramere, situated before the internal sinuate insertion and flat apodeme. The distal region is variably attenuate, usually terminating in a single point, although the type species, *S. maturus*, has a truncate, serrate apex (fig. 4E–G). The basal area is not produced dorsally into a "sensory lobe" as in *Jornandinus*, *Josephinus*, and *Slaterocoris*. In the left paramere, the medial lobe of the apex can be long and narrower than (cf. *S. maturus*, especially in *S. insignis*) or as wide as (cf. *S. mexicanus*) the lateral lobe. Variation in the apical region of the left paramere is greater than in any portion of the right paramere.

CHECKLIST OF SPECIES-GROUP NAMES PROPOSED OR CURRENTLY USED IN *SCALPONOTATUS*

(valid species names in *Scalponotatus* are listed in boldface, and species placed in other genera are in italics)

albibasis (Knight, 1938) (*Strongylocoris* Blanchard, 1938)
albicornis Kelton, 1969: see *Josephinus*, new genus
albipes Kelton, 1969: see *Jornandes* Distant, 1884 (ref. Schaffner and Schwartz, 2008)
capitatus Kelton, 1969: see *Josephinus*, new genus
chillcotti Kelton, 1969
dissimulans Distant, 1893 (*Jornandes* Distant, 1884; n. comb., herein)
howdeni Kelton, 1969
insignis Kelton, 1969
lagunensis Carvalho and Costa, 1992
maturus Kelton, 1969
mexicanus Kelton, 1969
mimosus Kelton, 1969
sinaloensis Carvalho and Costa, 1992: see *Jornandes* Distant, 1884 (n. comb., herein)

Scalponotatus dissimulans (Distant, 1893), **new combination**

Jornandes dissimulans Distant, 1893: 448, pl. 39, fig. 12 (orig. desc.); Carvalho and Dolling, 1976: 796 (desig. lectotype); Carvalho, 1988: 101 (restored status); Schuh, 1995: 81 (catalog); Schaffner and Schwartz, 2008: 21 (disc., incertae sedis).
Jornandes subalbicans: Carvalho, 1952: 6 (n. synonymy); Carvalho, 1958: 80 (catalog).
Amulacoris subalbicans: Carvalho and China, 1959: 70 (n. comb.).
Amulacoris dissimulans: Carvalho, 1981: 1 (n. comb.).

HOLOTYPE: **MEXICO: Guerrero:** Amula [17.6333° N -99.2500° W], 6000 ft. [1829 m], Sept., H.H. Smith, 1♀ (AMNH_PBI 00085375) (BMNH).

DISCUSSION: *Jornandes dissimulans* Distant, 1893, was treated as incertae sedis by Carvalho (1988; Schaffner and Schwartz, 2008) based on dorsal sculpturation without dense, small, discrete punctures and the absence of an associated male. However, its

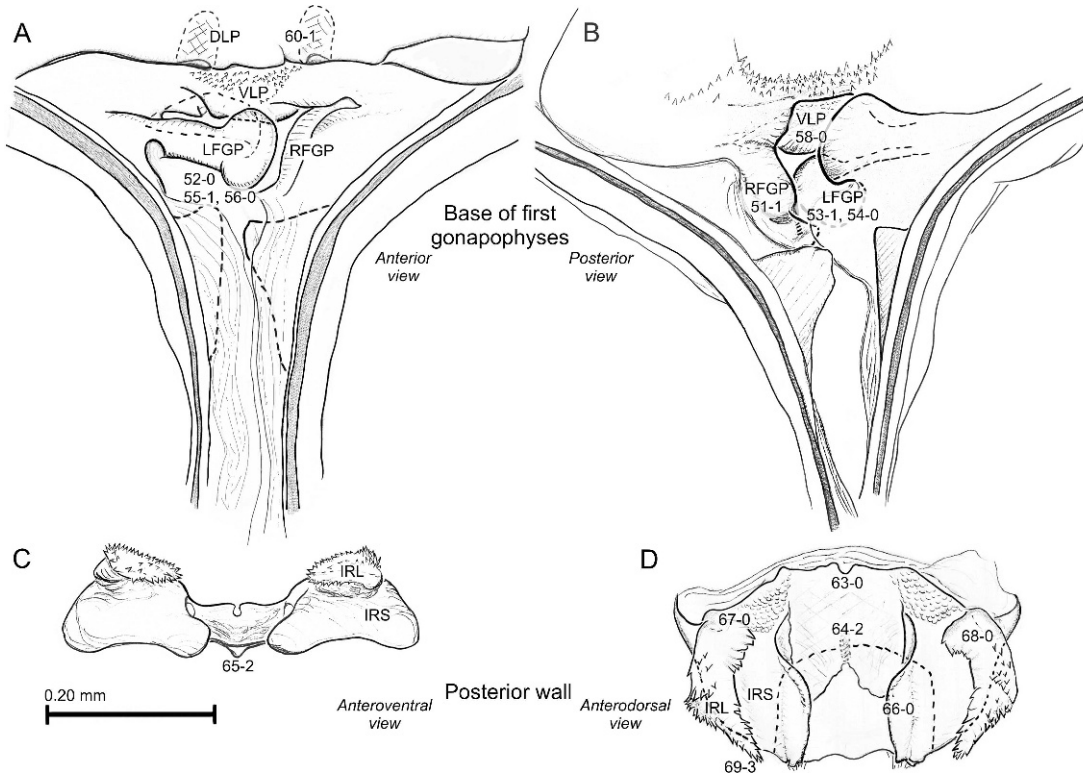


Fig. 5. *Scalponotatus maturus*, female genitalia. Stag Cove, CA.

cuticular sculpturation, composed of a surface of minute, discrete punctures forming smooth reticulations, does fit the revised diagnosis of *Scalponotatus*. The female holotype, the only known specimen was not dissected. Absent an association with a male and knowledge of the female genitalia, a better placement for this species is in *Scalponotatus*, necessitating the new combination, *S. dissimulans* (Distant). Although placed in *Scalponotatus*, the following features of *S. dissimulans* are unlike any known species of the genus: sparse dorsal vestiture; black coloration with obscure pale markings on the lateral margins of the transverse basal carina and adjacent temporal area of the frons, pale antennal segments I (except with black basally along ventral margin and apically) and II (except black at base and distal one fourth), trochanter, femur apically, tibia (except apex), and tarsomeres I and II; and length of antennal segment II (0.90). Within the genus, the practically glabrous dorsum of *S. dissimulans* is similar to the vestiture in *S. albibasis*, *S. howdeni*, and *S. maturus*, but it can be distinguished by the black carina of the vertex, shorter length of the hemelytron, and pale antennal segment II and tibia, respectively.

Scalponotatus maturus Kelton
Figures 3–5; plate 1; map 1

Scalponotatus maturus Kelton, 1969: 19, fig. 9 (orig. desc.); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 194 (catalog); Schaffner and Schwartz, 2008: 4, 6 (disc., SEM).

DIAGNOSIS: Recognized by the almost completely black coloration, including the antenna, pronotum, and the head, except for the obscurely pale lateral portion of the vertex carina; the sparse, dark simple setae; the dorsal sculpturation formed by minute punctures merging with rugosity, and the male genitalia. Similar to *S. albibasis* Knight, 1938, in overall size, body conformation, and

TABLE 4
Major and Minor Asteraceae Host Plants for Species of *Slaterocoris*[1]

* *Achillea millefolium* L., common yarrow
* *A. millefolium* L. var. *occidentalis* DC., western yarrow

Ambrosia

A. artemisiifolia L., annual ragweed
A. chenopodiifolia (Benth.) Payne, San Diego burr ragweed
A. confertiflora DC., weakleaf burr ragweed
A. deltoidea (Torr.) Payne, triangle burr ragweed
A. dumosa (A. Gray) Payne, burrobush
A. eriocentra (A. Gray) Payne, woolly fruit burr ragweed
A. psilostachya DC., cuman, perennial, or western ragweed
A. trifida L., great ragweed

Artemisia

A. cana Pursh, silver sagebrush
A. douglasiana Besser, Douglas' sagewort
A. filifolia Torr., sand sagebrush
A. frigida Willd., prairie, or fringed sagewort
A. tridentata Nutt., big sagebrush
A. tridentata Nutt. ssp. *parishii* (A. Gray) H.M. Hall & Clem.
A. tridentata Nutt. ssp. *tridentata*
A. vulgaris L., common wormwood

Baccharis

B. braunii (Pol.) Standl.
B. halimifolia (Pol.) Standl., eastern baccharis, groundsel tree

Chrysothamnus

C. viscidiflorus (Hook.) Nutt, yellow rabbitbrush
**Cirsium arvense* (L.) Scop., Canada thistle
**Conyza canadensis* (L.) Cronquist, Canadian horseweed

Encelia

E. actonii Elmer, Acton's brittlebush
E. farinosa A. Gray ex Torr., brittlebush
E. frutescens (A. Gray) A. Gray, button brittlebush
E. virginensis A. Nelson, Virgin River brittlebush

Ericameria

E. nauseosa (Pall. ex Pursh) G.L. Nesom & Baird, rubber rabbitbrush
E. nauseosa (Pall. ex Pursh) G.L. Nesom & Baird ssp. *consimilis* (Greene) G.L. Nesom & Baird
E. nauseosa (Pall. ex Pursh) G.L. Nesom & Baird ssp. *nauseosa* var. *speciosa* (Nutt.) G.L. Nesom & Baird
E. parryi (A. Gray) G.L. Nesom & Baird var. *vulcanica* (Greene) G.L. Nesom & Baird, Parry's rabbitbrush
**Eupatorium capillifolium* (Lam.) Small, dogfennel
**Eurybia macrophylla* (L.) Cass., bigleaf aster

Gutierrezia

G. californica (DC.) Torr. & A. Gray, San Joaquin snakeweed
G. microcephala (DC.) A. Gray, gray threadleaf snakeweed
G. sarothrae (Pursh) Britton & Rusby, broom snakeweed
**Hymenoclea salsola* Torr. & A. Gray, burrobrush
**Helianthus tuberosus* L., Jerusalem artichoke
**Iva axillaris* Pursh, poverty weed
**Leucanthemum vulgare* Lam., oxeye daisy
**Polymnia canadensis* L., whiteflower leafcup
**Rudbeckia laciniata* L., cutleaf coneflower
Silphium *perfoliatum* L., cup plant

TABLE 4
(Continued)

Solidago
S. altissima L., late goldenrod
S. canadensis L., Canada goldenrod
S. gigantea Aiton, giant goldenrod
Tetradymia *glabrata* Torr. & A. Gray, littleleaf horsebrush
**Verbesina encelioides* (Cav.) Benth. & Hook. f. ex A. Gray, golden crownbeard
**Viguiera dentata* (Cav.) Spreng., toothleaf goldeneye

[1]Major host genus in bold; minor host with asterisk.

vestiture but distinguished simply by the coloration of the carina, being predominantly black with pale on the lateral margins only, as opposed to the entirely pale carina in *S. albibasis*. Features of the male genitalia also separate *S. maturus* from *S. albibasis* as follows: apex of right paramere truncate and serrate and long ramus of bifurcate endosomal spicule smooth in the former and right paramere with pointed apex and long, serrate ramus in the latter. When the two species are compared side by side, the lateral lobe of the right paramere is deeper in *S. maturus* than in *S. albibasis*. The mitten-shaped apex of the left paramere will also serve to distinguish *S. maturus* from all sympatric species of *Slaterocoris* (e.g., *S. ambrosiae*, *S. croceipes*, and *S. flavipes*).

REDESCRIPTION: *Male:* Body small, obovate; length 2.85–4.25, width 1.43–1.83 (pl. 1). COLORATION: Body shining black; basal carina of vertex laterally, extreme apex of femur, and base and apex of fore- and middle tibiae obscurely pale yellowish brown. Venter including abdomen shining black. VESTITURE: Sparse, short, brown, reclining simple setae, not longer than diameter of antennal segment II (fig. 3A) [scale incorrect in Schaffner and Schwartz, 2008: 6, fig. 1D]. DORSAL SCULPTURATION: Dorsum with dense, minute, obscure punctures merging with undulating reticulation (fig. 3A). GENITALIA: **Pygophore**: Tergal process situated on right side of aperture, strongly curved toward midline (fig. 4H). **Phallotheca**: Aperture open at base on right side extending apically on right side, reaching apex without opening on dorsal surface (fig. 4B). **Endosomal spicule**: Membrane attached to flat, recurved, basal process or keel; spicule without dorsal lobe projecting from subbasally left side; spicule broadest basally tapering toward apex; recurved distally, bifurcate apically (fig. 4A). **Right paramere**: J-shaped in lateral view; without expanded basal sensory lobe, distal region gradually attenuate, terminating in serrate, truncate apex (fig. 4E–G). **Left paramere**: C-shaped in dorsal view (fig. 4C, D); apex mittenlike, lateral lobe wide, medial lobe about one-third as wide as paramere width.

Female: Obovate, length 2.85–4.25, width 1.58–2.06 (pl. 1); costal margin more strongly arcuate, vertex wider, color and vestiture same as for male. GENITALIA: See description of genus (fig. 5A–D).

HOST PLANTS: Two genera of Asteraceae, *Ambrosia* and *Encelia*, provide the majority of host-plant records. Three widespread and common desert species, *A. dumosa*, *E. actonii*, and *E. farinosa* are considered breeding hosts. Eight other desert Asteraceae are also identified as hosts: *A. chenopodiifolia*, *A. confertiflora*, *A. deltoidea*, *A. eriocentra*, *E. frutescens*, *E. virginensis*, *Ericameria nauseosa*, and *Hymenoclea salsola*. The remaining plants from non-asteraceous families, known from single records only, are considered to be sitting records.

DISTRIBUTION: Apparently confined to the Sonoran Desert of southwestern Arizona, southeastern California, and Baja California and the Mojave Desert regions of Arizona, California, Nevada, and extreme southwestern Utah (map 1).

COLLECTION SUMMARY: 897 specimens (50% with USI numbers) from 116 collection events with dates spanning March to June.

DISCUSSION: Across its geographic range, this desert inhabiting species exhibits little variation in coloration and structure of the male genitalia. For example, compare the

apex of the right paramere in specimens from the Sonoran Desert of western Arizona (fig. 4F) and western portion of the Mojave Desert in California (fig. 4G). The presumptive sister species, *S. albibasis* and *S. maturus*, have allopatric desert distributions with one another, with the former ranging from Tucson, AZ, southeast to Big Bend National Park, TX, and San Luis Potosi, Mexico, or roughly confined to the Chihuahuan Desert.

HOLOTYPE: **USA: California:** ***Riverside Co.:*** Thousand Palms [33.82° N 116.38944° W], 03 Apr 1955, W.R. Richards, 1♂ (AMNH_PBI 00112313) (CNC).

OTHER SPECIMENS EXAMINED: **MEXICO: Baja California:** 0.3 mi SE of Catavina, in arroyo, 29.92084° N 114.97407° W, 586 m, 27 Mar 1979, J.D. Pinto, 1♀ (00119937 [cat UCRC ENT 59031]) (UCR). 3 mi W of Rancho Aquila, 32.41667° N 116.96667° W, 350 m, 14 Jun 1973, J. Doyen, 1♀ (00119467) (UCB). 6 mi NW of El Rosario, nr Consuelo, 30.1365° N 115.7669° W, 114 m, 18 Apr 1965, D.Q. Cavagnaro, C.E. and E.S. Ross, V.L. Vesterby, 1♂ (00121895), 2♀ (00242677–00242678), 1 immature (00242686) (CAS), 1♂ (00119475) (UCB). 19 km E of El Rosario (km 47), 30.06691° N 115.65595° W, 143 m, 28 Mar 1980, J.D. Pinto and E. Fisher, 1♀ (00119902) (UCR). 24 mi N of Punta Prieta, 29.1388° N 114.149° W, 483 m, 01–02 Apr 1973, S.L. Szerlip, J. Doyen, J.A. Powell, *Ambrosia dumosa*, 3♂ (00119468, 00119559–00119560), 8♀ (00119561–00119568), 1 immature (00119569) (UCB). Arroyo Catavina, 35 mi S of El Progreso, 29.79021° N 114.7751° W, 643 m, 02 Apr 1976, P. Rude, *Ambrosia confertiflora*, 1♂ (00119469) (UCB). El Crucero, 29.25° N 114.13° W, 612 m, 04 Apr 1976, P. Rude, *Ambrosia dumosa*, 8♂ (00119470, 00119570–00119576), 2♀ (00119577–00119578) (UCB); 04 Apr 1976, J. Doyen, P. Rude, *Ambrosia chenopodiifolia*, 1♀ (00119558), 1♂ (00119557) (UCB). Isla de Cedros, vicinity of El Pueblo, 28.09272° N 115.18929° W, 50 m, 29 Mar 1983, unknown, 1♀ (00244262) (SDNH); 04 Apr 1983, unknown, 1♂ (00244263) (SDNH). **USA: Arizona:** ***La Paz Co.:*** 5.3 mi SW of Salome, 33.7387° N 113.67714° W, 560 m, 31 Mar 1981, R.T. Schuh and M.D. Schwartz, *Ambrosia dumosa*, 1♀ (00124460) (AMNH), *Ambrosia dumosa*, 3♂ (00112324–00112325, 00112919), 1♀ (00112326) (CNC). W of Kofa Mountains, 33.40633° N 114.12332° W, 567 m, 21 Mar 1980, J.T. and D.A. Polhemus, *Artemisia* sp., 1♂ (00116851), 1♀(00117344) (JTP). ***Maricopa Co.:*** 0.5 mi E of milepost 22 on Rt 85, 32.66775° N 112.85012° W, 375 m, 02 Apr 1981, R.T. Schuh, *Ambrosia dumosa*, 2♂ (00108428, 00170027) (AMNH). ***Mohave Co.:*** 9 mi W of Beaver Creek and Virgin River on US 15, Cedar Pocket Rest Stop, 36.81442° N 113.99665° W, 792 m, 12 May 1982, M.D. Schwartz, *Ambrosia dumosa*, 1♀ (00111396) (CNC). Littlefield, ca 5 mi N of, 36.96666° N 113.90722° W, 665 m, 05 May 1998, J.D. Pinto, 1♀ (00119938) (UCR). ***Pima Co.:*** 14 mi S of Ajo, 32.20203° N 112.7588° W, 539 m, 02 Apr 1966, L. and C.W. O'Brien, paratypes, 3♂ (00112318–00112320) (CNC), 1♂ (00244369), 1♀ (00244370) (TAMU). Organ Pipe Cactus National Monument, Ajo Valley, 32.13012° N 112.76851° W, 552 m, 10 Apr 1981, D.A. Polhemus, *Ambrosia dumosa*, 11♂ (00116850, 00117234, 00117345–00117353), 13♀ (00117340, 00117354–00117365) (JTP). Organ Pipe Cactus National Monument, Alamo Wash, 32.06907° N 112.71248° W, 750 m, 26 Mar 1981–27 Mar 1981, R.T. Schuh and M.D. Schwartz, *Ambrosia deltoidea*, 1♂ (00112331) (CNC). ***Yuma Co.:*** 23 mi N of Yuma, 32.81284° N 114.39369° W, 81 m, 02 Apr 1967, D.M. Wood, 1♀ (00112322) (CNC). Dateland, 32.79639° N 113.54028° W, 14 Mar 1941, Loyd L. Stitt, 1♂ (00133531) (USNM). Mohawk, 32.72671° N 113.7552° W, 165 m, 06 Apr 1937, Loyd L. Stitt, *Ambrosia dumosa*, 2♀ (00133535–00133536) (USNM); 19 Mar 1941, Loyd L. Stitt, 1♀ (00133534) (USNM). Yuma County, no specific locality, 32.72528° N 114.62361° W, Mar 1932, Dobzhansky, 1♀ (00133532) (USNM); 24 Mar 1939, Loyd L. Stitt, *Ambrosia dumosa*, 1♂ (00133530), 1♀ (00133523) (USNM). **California:** ***Imperial Co.:*** 4 mi NW of Ocotillo Wells, 32.75494° N 116.05288° W, 150 m, 28 Mar 1981, R.T. Schuh and M.D. Schwartz, *Ambrosia dumosa*, 1♂ (00112327), 1♀ (00124420) (CNC). 5.4 mi NW of Ocotillo on Rt S2, 32.79381° N 116.05899° W, 23 Apr 1980, Schwartz and Russell, *Tiquilia palmeri* (A. Gray) A. Rich (Boraginaceae), 1♂ (00124456) (CNC). Ocotillo, 32.7351° N 115.9946° W, 122 m, 10 May

1978, Faulkner, Brown, 2♂ (00244264–00244265), 5♀ (00244266–00244270) (SDNH). Ocotillo, T16S R9E S18, 32.77777° N 116.0794° W, 183 m, 03 Mar 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-70-4D, 1♀ (00119918) (UCR); 18 Mar 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-70-11D, 1♂ (00119912) (UCR); 07 Apr 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-70-16N, 1♂ (00119914) (UCR). ***Inyo Co.:*** 7 mi E of Big Pine, 37.23171° N 118.2241° W, 1671 m, 02 Jun 1987, W.F. Barr, *Encelia* sp., 1♀ (00122372) (UID). Grapevine Canyon, T15S R40E S34, 36.59192° N 117.6112° W, 912 m, 20 May 1988, R D. Goeden and D.W. Ricker, *Encelia actonii* EVA-88-9F, 1♂ (00119908) (UCR). Lone Pine, 36.60611° N 118.06194° W, 11 May 1937, N.W. Frazier, 1♀ (00119476) (UCB). ***Kern Co.:*** 20 mi NW of Mojave on Hwy 58, 35.25694° N 118.42343° W, 13 Jun 1983, G.M. Stonedahl, *Artemisia* sp., 1♂ (00108431) (AMNH). Iron Canyon, 1.5 mi NE of Garlock, 35.4211° N 117.764° W, 732 m, 13 Apr 1960, C.A. Toschi, 1♂ (00119477), 3♀ (00119478–00119480) (UCB). Red Rock Canyon, 35.325° N 117.94972° W, 18 May 1937, E.P. Van Duzee, 1♀ (00121900) (CAS), 1♀ (00112321) (CNC). ***Los Angeles Co.:*** E of Pearblossom, N of Hwy 138, T5N R9W S25, 34.4985° N 117.7209° W, 1040 m, 02 May 1995, Rob Garcia, 1♀ (00119944) (UCR). Largo Vista Rd 3.1 mi S of Rt 18, SE of Llano, 34.45251° N 117.7651° W, 1275 m, 17 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Encelia actonii*, det. A. Sanders no voucher, det. by photo, 14♂ (00107879, 00139725–00139727, 00323475–00323479, 00323482, 00323523–00323526), 12♀ (00139728–00139729, 00323480–00323481, 00323483–00323487, 00323552, 00323556–00323557) (AMNH), 3♂ (00329793–00329795 [cat CNC HEM 0459–0461) (CNC). Little Rock, Mojave Desert, 35.52167° N 115.31528° W, 19 May 1937, E.P. Van Duzee, 4♀ (00121901, 00242679–00242681) (CAS); 20 May 1937, E.P. Van Duzee, *Lycium andersonii* Gray (Solanaceae), 1♀ (00121654) (CAS). Llano, T5N R8W S28, 34.4892° N 117.7282° W, 1073 m, 19 May 1971, R.D. Goeden and D.W. Ricker, *Encelia farinosa* AD-71-44G, 1♀ (00119917) (UCR). ***Mono Co.:*** 16 mi NE of Bishop, 37.4879° N 118.35715° W, 15 Jun 1973, J.D. Pinto, *Encelia farinosa*, 1♀ (00119916) (UCR). ***Riverside Co.:*** 2.8 mi E of Eden, 33.8948° N 117.0542° W, 549 m, 27 Mar 1941, Timberlake, *Ambrosia dumosa*, 1♂ (00119925) (UCR). Bautista Canyon, T6S R1E S1, 33.6833° N 116.841° W, 707 m, 29 May 1980, J.N. Chandler, 1♂ (00119928) (UCR); 16 Apr 1987, R.D. Goeden and D.W. Ricker, *Encelia actonii* EVA-87-1H, 1♂ (00133525) (USNM); 05 May 1987, R.D. Goeden and D.W. Ricker, *Encelia actonii* EVA-87-3G, 1♂ (00133524), 1♀ (00133526) (USNM). Cabazon, 33.9175° N 116.78639° W, 25 May 1935, E.L. Paddock, *Encelia farinosa*, 1♀ (00070037) (USNM). Cathedral City, 33.77972° N 116.46444° W, 24 Apr 1938, Timberlake, *Ambrosia dumosa*, 1♂ (00119926) (UCR). Chuckawalla Bench, Bob's Cabin, 33.60722° N 115.64194° W, 21 Apr 2001, G.R. Ballmer, *Ambrosia dumosa*, 1♂ (00119936 [cat UCRC ENT 59031]) (UCR). Deep Canyon, W of Indio, 33.9529° N 116.7829° W, 750 m, 02 Apr 1981, D.A. Polhemus, *Artemisia* sp., 1♂ (00116849) (JTP). Desert Center, 33.71252° N 115.4022° W, 275 m, 12 Apr 1939, B.P. Bliven, 1♂ (00121655), 4♀ (00242682–00242685) (CAS). Desert Center, T6S R15E S5, 33.6833° N 115.4396° W, 427 m, 04 Mar 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-70-5J, 1♂ (00119906) (UCR); 22 Apr 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa*, 2♀ (00133975–00133976) (USNM); 15 Mar 1988, R.D. Goeden and D.W. Ricker, *Encelia farinosa* EF-88-33D, 1♂ (00119905) (UCR). Happy Valley, T4S R3E S2, 33.9394° N 116.5363° W, 305 m, 10 Feb 1979, Augst Allen, 1♂ (00119930) (UCR). Hemet, 33.7475° N 116.97111° W, 26 Apr 1961, Wart and Brawler, *Encelia* sp., 1♀ (00119939) (UCR). Hwy 74 by Black Hill, 33.66666° N 116.68333° W, 991 m, 26 May 1998, J.L. Mottern, 1♀ (00119935) (UCR). Mecca, T7S R9E S2, 33.5976° N 116.0245° W, 37 m, 05 Mar 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-70-5J, 1♂ (00119912) (UCR). Millard Canyon, 33.94361° N 116.795° W, 890 m, 20 Apr 1968, E.I. Schlinger, 1♀ (00119941) (UCR). Palm Springs, 33.83028° N 116.54444° W, 29 Mar 1945, Timberlake, *Ambrosia dumosa*, 1♂

(00119924) (UCR). Pauba Valley, T8S R1W S19, 33.5015° N 117.0307° W, 366 m, 12 May 1987, R.D. Goeden and D.W. Ricker, *Encelia actonii* EVA-87-4K, 1♂ (00119910) (UCR) *Encelia actonii*, 1♂ (00133938) (USNM). San Jacinto Mountains, 33.75028° N 116.66667° W, 30 May 1946, R. Husbands, *Asclepias* sp. (Asclepiadaceae), 1♀ (00119481) (UCB). Snow Creek Rd, T3S R3E S16, 33.9042° N 116.6686° W, 350 m, 13 Apr 1993, unknown, 1♀ (00119945) (UCR). Thousand Palms, 33.82° N 116.38944° W, 03 Apr 1955, W.R. Richards, paratypes, 1♂ (00112314), 2♀ (00112315–00112316) (CNC); 11 Apr 1955, W.R. Richards, paratype, 1♂ (00112317) (CNC). Thousand Palms Canyon, 33.8354° N 116.3107° W, 183 m, 31 Mar 1983, J.S. Bradberry, 1♂ (00119934) (UCR). White Water Exit South, T3S R3E S10, 33.9274° N 116.6627° W, 387 m, 21 Apr 1998, J.L. Mottern, 1♀ (00119942) (UCR). Wilson Creek, T7S R1E S35, 33.5148° N 116.8578° W, 671 m, 23 Apr 1987, R.D. Goeden and D.W. Ricker, *Encelia actonii* EVA-87-2G, 1♂ (00119911) (UCR). nr Cathedral City, 33.8453° N 116.4639° W, 122 m, 26 Apr 1941, Timberlake, *Ambrosia dumosa*, 1♂ (00119927) (UCR). ***San Bernardino Co.:*** 4.5 mi E of Lucerne Valley, 34.44389° N 116.88805° W, 1000 m, 13 May 1978, J.D. Pinto and R.T. Schuh, *Ambrosia dumosa*, 2♂ (00108427–00170028), 1♀ (00170029) (AMNH), *Ambrosia dumosa*, 1♀ (00124421) (CNC); 13 May 1978, J.D. Pinto, *Ambrosia dumosa*, 2♀ (00119915, 00120084) (UCR). 8 mi N of Lucerne Valley, 34.53715° N 116.95113° W, 873 m, 03 May 1985, J.D. Pinto, *Ambrosia dumosa*, 1♀ (00119946) (UCR). 12.5 mi SE of Ivanpah, Ivanpah Road, 35.21277° N 115.15332° W, 25 May 1977, J.D. Pinto, *Ambrosia eriocentra*, 1♂ (00119929) (UCR). 26.7 mi S of Barstow on Rt 247, 34.51261° N 117.02194° W, 1000 m, 02 May 1985, R.T. Schuh and B.M. Massie, *Ambrosia dumosa*, 1♂ (00108434), 1♀ (00108435) (AMNH). Baker, 35.265° N 116.07361° W, 280 m, 09 Apr 1942, O. Bryant, 2♀ (00121897, 00121898) (CAS). Clark's Pass, T1S R13E S13, 34.0793° N 115.5728° W, 122 m, 22 Apr 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-70-17B, 1♀ (00119919) (UCR). Goffs Butte, T9N R19E S7, 34.88083° N 115.06778° W, 06 Apr 1988, R.D. Goeden and D.W. Ricker, *Encelia farinosa* EF-88-33D, 1♂ (00119904) (UCR). Granite Pass, 34.81194° N 115.60972° W, 1237 m, 27 Apr 1968, E.I. Schlinger, 1♀ (00119940) (UCR). Halloran Spring, T15N R10E S15, 35.383° N 115.8928° W, 911 m, 19 Apr 1971, R.D. Goeden and D.W. Ricker, *Ambrosia eriocentra* AE-71-11F, 1♂ (00119903) (UCR). Kane Spring, T7N R3E S6, 34.7271° N 116.7066° W, 1097 m, 04 May 1988, R.D. Goeden and D.W. Ricker, *Encelia actonii*, 1♂ (00120083), *Encelia actonii* EVA-88-3A, 1♂ (00119907) (UCR). Kramer Hills, T9N R6W S26, 34.99444° N 117.585° W, 19 May 1982, R.D. Goeden and D.W. Ricker, *Hymenoclea salsola* HS-82-27L, 1♀ (00119920) (UCR). Lucerne Valley, 34.4439° N 116.9678° W, 898 m, 27 May 1974, G.A. Marsh, 1♀ (00119482) (UCB). Mountain Pass, Mescal Range, T16N R13E S14, 35.4743° N 115.5435° W, 1410 m, 04 May 1993, Ali Al-Wahaibi, 1♂ (00119932) (UCR). Ord Mountain, 34.6744° N 116.8159° W, 1904 m, 19 Apr 1960, J. Powell, *Encelia frutescens*, paratype, 1♂ (00119472) (UCB); 19 Apr 1960, J.F. Lawrence, *Encelia frutescens*, paratypes, 2♀ (00119473–00119474) (UCB). Pachalka Spring, Clark Mountains, T16N R12E S1, 35.4983° N 115.6487° W, 1240 m, 04 May 1993, Ali Al-Wahaibi, *Salsola* sp. (Chenopodiaceae), 1♂ (00119921) (UCR). Phelan, Rt 138 at Phelan Road, 34.42531° N 117.6174° W, 1310 m, 16 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Encelia actonii*, det. A. Sanders no voucher, det by photo, 69♂ (00139731–00139734, 00323457–00323458, 00323461–00323462, 00323466–00323468, 00323472, 00323474, 00323488–00323507, 00323522, 00323527–00323538, 00323560–00323569, 00323595–00323606), 95♀ (00139735–00139737, 00323451–00323456, 00323459–00323460, 00323463–00323465, 00323469–00323471, 00323473, 00323508–00323521, 00323539–00323551, 00323553–00323555, 00323558–00323559, 00323570–00323594, 00323607–00323627), 6 immatures (00323628–00323633), *Ericameria nauseosa*, det. A. Sanders UCR 149595 [PBI_CAL04-H2], 13♂ (00107877, 00108134, 00323018–00323023, 00323634–00323638), 15♀ (00323024–00323030, 00323639–00323646) (AMNH). Pinto Basin,

Joshua Tree National Monument, 33.9247° N 115.6683° W, 670 m, 19 Apr 1995, J. Freillch, *Ambrosia* sp., 1♂ (00119931) (UCR). Pioneertown, T1N R4E S13, 34.1753° N 116.5246° W, 1296 m, 27 Apr 1988, R.D. Goeden and D.W. Ricker, *Encelia actonii* EVA-88-1V, 1♂ (00119909) (UCR). Providence Mountains, 34.94721° N 115.50804° W, 1236 m, 06 May 1939, E.P. Van Duzee, 1♂ (00121899) (CAS). Providence Mountains State Recreation Area, 35.03028° N 115.52722° W, 1311 m, 18 May 1982, M.D. Schwartz, *Encelia virginensis*, 2♂ (00112970, 00124457), 4♀ (00112323, 00124454, 00124458–00124459) (CNC). Rock Corral, T3N R4E S27, 34.3233° N 116.5609° W, 1136 m, 13 May 1980, R.T. Ervin, 1♀ (00119947) (UCR). Timico Acres, T3N R5E S20, 34.3318° N 116.4833° W, 1030 m, 27 Apr 1988, R.D. Goeden and D.W. Ricker, *Encelia actonii* EVA-88-1F, 1♂ (00133527), 1♀ (00133937) (USNM). Twentynine Palms, T1N R9E S33, 34.1287° N 116.0446° W, 610 m, 25 Mar 1970, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-70-15B, 1♂ (00119914) (UCR). West Ord Mountain, T7N R1E S31, 34.5675° N 116.9237° W, 914 m, 15 Apr 1986, Gabriel Lara, 1♂ (00119922) (UCR). Just E of Wrightwood on Rt 2, 34.35774° N 117.6105° W, 1700 m, 18 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Purshia glandulosa* Curran (Rosaceae), 1♂ (00137235) (AMNH). ***San Diego Co.:*** 9.3 mi NW of Scissors Crossing on Rt 52, 33.18199° N 116.58219° W, 940 m, 23 Apr 1980, L. Russell and M.D. Schwartz, 1♂ (00112329) (CNC). Anza-Borrego Desert State Park, 3 mi S of Sweeney Pass, 32.81346° N 116.13992° W, 354 m, 01 Apr 1978, D.K. Faulkner, 2♀ (00244277–00244278) (SDNH). Anza-Borrego Desert State Park, Borrego Springs, 33.04866° N 117.04194° W, 01 Apr 1978, D. Faulkner, 3♂ (00244271–00244273), 1♀ (00244274) (SDNH). Anza-Borrego Desert State Park, Bow Willow Campground, 33.22111° N 116.33333° W, 300 m, 29 Mar 1981, R.T. Schuh and M.D. Schwartz, *Atriplex polycarpa* (Torr.) S. Wats. (Chenopodiaceae), 1♂ (00108433) (AMNH). Anza-Borrego Desert State Park, Carrizo Creek, 10.2 mi NW of Ocotillo on Rt S2, 32.87° N 116.1000° W, 23 Apr 1980, M.D. Schwartz and L. Russell, *Hymenoclea salsola*, 1♀ (00112333) (CNC). Anza-Borrego Desert State Park, Elephant Tree trail, 4.7 mi S Ocotillo Wash, 33.05832° N 116.13287° W, 166 m, 22 Apr 1980, M.D. Schwartz and L. Russell, *Acacia greggii* A. Gray (Fabaceae), 1♂ (00112328) (CNC). Anza-Borrego Desert State Park, Grapevine Canyon, milepost 74 on county Rt 52, 33.22889° N 116.26028° W, 22 Apr 1980, Russell and Schwartz, *Ambrosia dumosa*, 2♂ (00112330, 00124455) (CNC). Anza-Borrego Desert State Park, Stag Cove, 0.2 mi W of milepost 78 on Co. Rt S2, 33.09583° N 116.46513° W, 22 Apr 1980, M.D. Schwartz, *Ambrosia dumosa*, 2♀ (00112332, 00112971) (CNC). Anza-Borrego Desert State Park, Yaqui Pass, 33.1454° N 116.3523° W, 533 m, 01 Apr 1978, D.K. Faulkner, 2♀ (00244275–00244276) (SDNH). Borrego, 33.22111° N 116.33333° W, 23 Apr 1955, R.O. Schuster, 1♀ (00119471) (UCB). Borrego Springs, T10S R6E S6, 33.2615° N 116.3963° W, 218 m, 17 Mar 1971, R.D. Goeden and D.W. Ricker, *Ambrosia dumosa* AD-71-25C, 1♂ (00119923) (UCR). McClain Valley, T14S R6E S11, 32.84866° N 116.8269° W, 510 m, 19 Apr 1994, M. Cooperband, 1♀ (00119943) (UCR). San Diego County, 33.03333° N 116.8000° W, Coquillett, 2♂ (00133528–00133529) (USNM). Vallecito Valley, Hwy S-2, T14S R6E S11, 32.9706° N 116.34779° W, 480 m, 07 Apr 1992, Kathleen Campbell, 1♀ (00119933) (UCR). **Nevada:** ***Clark Co.:*** 1 mi E of Searchlight, 35.46528° N 114.90114° W, 1095 m, 17 May 1978, R.T. Schuh, 1♂ (00108432) (AMNH). Overton, 36.54305° N 114.44666° W, 21 Jun 1940, Oman, 1♀ (00134080) (USNM). Red Rock Canyon Area, 30 km WSW of Las Vegas, 36.08333° N 115.46666° W, 1320 m, 17 May 1993, W.E. Steiner, J.M. Swearingen, J.M. Mitchell, 4♂ (00133533, 00133550–00133552), 4♀ (00133553–00133556) (USNM). ***Nye Co.:*** Atomic Test Site, 2.6 mi W of Mercury Hwy, Cane Springs Rd (A5), 36.66056° N 116.04046° W, 1036 m, 06 Jun 1983, Schuh, Schwartz, and Stonedahl, *Ambrosia dumosa*, 1♂ (00108430) (AMNH). Atomic Test Site, 4.5 mi S of GS500 on Jackass Flats Rd (A25), 36.73605° N 116.3125° W, 1006 m, 06 Jun 1983, Schuh, Schwartz, and Stonedahl, *Ambrosia dumosa*, 1♂ (00108429) (AMNH).

Jornandes sinaloensis (Carvalho and Costa), **new combination**

Scalponotatus sinaloensis Carvalho and Costa, 1992: 118, figs. 40–43 (orig. desc.). Schuh, 1995: 194 (catalog).

HOLOTYPE: **MEXICO: Sinaloa:** 26 mi N of Pericos, [25.33989° N 107.9529° W, 95 m], 13 Aug 1960, P.H. Arnaud Jr., E.S. Ross, D.C. Rentz, 1♂ (AMNH_PBI 00242724) (CAS).

REDESCRIPTION: COLORATION: Entirely yellowish orange-brown (a little bit darker than photo of *Jornandes sinaloa*, in Schaffner and Schwartz, 2008: 9, fig. 3). VESTITURE: Densely distributed, relatively long (just longer than width of antennal segment II), golden (pale, but shining), reclining simple setae. DORSAL SCULPTURATION: Composed of closely placed small punctures without additional rugosity. GENITALIA: **Pygophore** and **phallotheca**: Unknown. **Endosomal spicule**: Small; thick and sinuate on basal half; distal recurved region slightly less than one-half length of spicule body; subapically with one spine; basally with minute spine on left side shoulder (= dorsal lobe) and wide keel attached to membrane. **Right paramere**: Size similar to left paramere; C-shaped in apical and dorsal views, S-shaped in lateral view; dorsal margin sinuate; basal or sensory lobe, region broadly rounded; distal region short, attenuate, terminating in minute serration and one subapical point. **Left paramere**: C-shaped in dorsal view; sensory lobe not produced beyond diameter of paramere; distally broadly rounded, mittenlike with medial lobe pointed and one-half width of lateral lobe. MEASUREMENTS: Body length 3.50, length apex from clypeus to apex of cuneus 2.20, body width 1.31; head width 0.81, length 0.26; vertex width 0.30, eye height, in lateral view 0.43; antennal segment I 0.25, II 0.95, III 0.68, IV 0.38 (slightly teneral); labium length 0.81, reaching level with base of mesocoxa, in lateral view; pronotum width 1.05, length 0.63; cuneus length 0.50, width 0.33.

DISCUSSION: *Scalponotatus sinaloensis* is known from the original description (Carvalho and Costa, 1992) and one catalog citation (Schuh, 1995). The examination of the holotype, the only specimen, prompted its transfer to *Jornandes*, resulting in the new combination, *J. sinaloensis*. This action is based on the observation of external and genitalic features. All species of *Scalponotatus* are black, including the appendages, and usually the only pale regions are the transverse basal carina of the vertex and sometimes the posterior margin, or rarely the humeral angles, of the pronotum. *Jornandes* species have variable coloration, but usually the legs are pale. One species with uniform coloration, only slightly paler than in *sinaloensis*, is *J. sinaloa* (Carvalho, 1987). Interestingly, the holotypes of both species were taken during the same collection event; also, the host plant of both are unknown. The sculpturation of *Jornandes* and *Scalponotatus* differ in the degree of rugosity on the corium, both have dense, small or minute dorsal punctures, whereas in *Scalponotatus* the punctures underlie a rugulose or reticulate surface. In *Jornandes*, the dorsal sculpturation is composed of punctures only, as found in *J. sinaloensis*.

The general form of the male genitalia in *Jornandes* and *Scalponotatus* are similar, both of which have the apical portion of the left paramere mitten shaped, recurved ventral lobe of the endosomal spicule, and diverse tergal processes. Features unique to each genus that provide character evidence to support the reassignment of *J. sinaloensis* are subtle. The most persuasive morphology is found in the shape of the right paramere. The form of the right paramere in *Scalponotatus* is generally L-shaped in lateral view with morphological diversity focused on the length of the medial and attenuation of the distal regions. Specifically, the distance from the basal or sensory lobe region to the beginning of the attenuate distal portion is usually the longest part of the paramere and the basal or sensory lobe, in lateral view, is little if at all produced dorsal to the immediate and more distal portion of the paramere. The structure of the right paramere is diverse in *Jornandes*, ranging from simple, with the form similar to those in *Scalponotatus* species, to complex with many having the apical, basal, or both regions enlarged with strong spines or large processes. The small, C-shaped right paramere in *J. sinaloensis* is sinuate in lateral view and the

basal region or sensory lobe is broadly produced; this form is most similar to several species of *Jornandes*.

In the key to species of *Jornandes* (Schaffner and Schwartz, 2008), *J. sinaloensis* will exit with *J. burserae* Schaffner and Schwartz, 2008, and *J. viridulus* Schaffner and Schwartz, 2008. Vestiture with dense, reclining setae will distinguish *J. sinaloensis* from these two species possessing sparse, erect to suberect setae. The large eye, browner coloration, and somewhat smaller body length of the former will further separate it, as the male of *J. burserae* and *J. viridulus* have smaller eyes, greener general coloration, and slightly longer body length. All structures of the male genitalia of *J. sinaloensis* differ significantly from the latter species. However, *J. sinaloensis* is clearly related to *J. jaredi* and *J. zapotecas*, a pair of black species united by parallel-sided costal margin; long, reclining, evenly distributed dorsal simple setae; pale antennae and legs; sexually dimorphic eyes, being larger in the male (cf. Schaffner and Schwartz, 2008: 9, 10: figs. 3, 4); and the male genitalia with small, apically serrate endosomal spicule, and large tergal processes on right side of genital aperture (cf. ibid.: 51, figs. 23 and 82, and 38, respectively). In *J. sinaloensis* the body is not black (Carvalho and Costa, 1992: 119, fig. 40) and females are not known, relegating the possibility of sexually dimorphic head structure to speculation. The genitalic preparation of the holotype of *J. sinaloensis* lacks the pygophore and phallotheca, and thus no comment concerning the tergal process can be made. Otherwise, the endosoma and right and left parameres of the three species are of similar form. All have the endosomal spicule simply recurved, somewhat thick and sinuate basally, and distally with minimal apical serration; the right paramere, from the insertion to the distal curve is longer than the minimally serrate distal region; the distal region of left paramere is broadly rounded, with the medial lobe pointed and about one-half the width of the lateral lobe (ibid.: 119, figs. 41–43). Additionally, all three species have a minute spine on the left basal margin of the endosomal spicule, a feature not illustrated in either Schaffner and Schwartz (2008) or Carvalho and Costa (1992). The male genitalia of *J. sinaloensis* is also somewhat similar to *J. michoacanensis*, but in the former the endosomal spicule is larger, the fine structure of the distal portion of the right paramere lacks more extensive lateral serration, and the left paramere has a narrower lateral lobe. The body color (black) and conformation (more rounded) conspicuously differ from the completely pale and elongate *J. sinaloensis*.

Josephinus, new genus

TYPE SPECIES: *Slaterocoris reinhardi* Carvalho and Schaffner, 1973.

DIAGNOSIS: Recognized by the small ovate body with slightly arcuate costal margin, the strongly declivous hemelytral membrane, and the head with short anteocular portion and posterolateral margin of the eye curved posteriorly and practically adhering to the anterior margin of the pronotum. The body in the male is more compact in *Josephinus* than in *Scalponotatus* and *Slaterocoris*. In lateral view, the hemelytron posterior to the cuneal fracture is more strongly deflexed and, in combination with the short anteocular region of the head, gives *Josephinus* a more rounded habitus. In comparison to *Scalponotatus* and *Slaterocoris*, the overall length of the body and the postcuneal fracture length of the hemelytron are also short. The short anteocular region of the head will serve to distinguish *Josephinus* species from the shortest *Slaterocoris* species (e.g., *S. digitatus*, *S. mohri*).

The form of the vertex and frons anterior of the transverse basal carina is different in *Josephinus* than in the other two genera. In *Slaterocoris*, the anterior surface of the carina is sharply declivent ventrally directly posterior of the temporal areas; between the temporal areas the surface of the frons is slightly tumid forming a cone-shaped prominence (figs. 6A, 14A, 20A–C, 36C). In *Scalponotatus*, the declivous edge anterior of the carina more or less reaches across the intertemporal area, giving this region a deeply sunken look. In *Josephinus*, the region is less sunken, sometimes the entire region anterior of the carina is rounded as opposed to being flattened as in the other two genera. In the male the length of the anteocular portion of the head—measured, in lateral

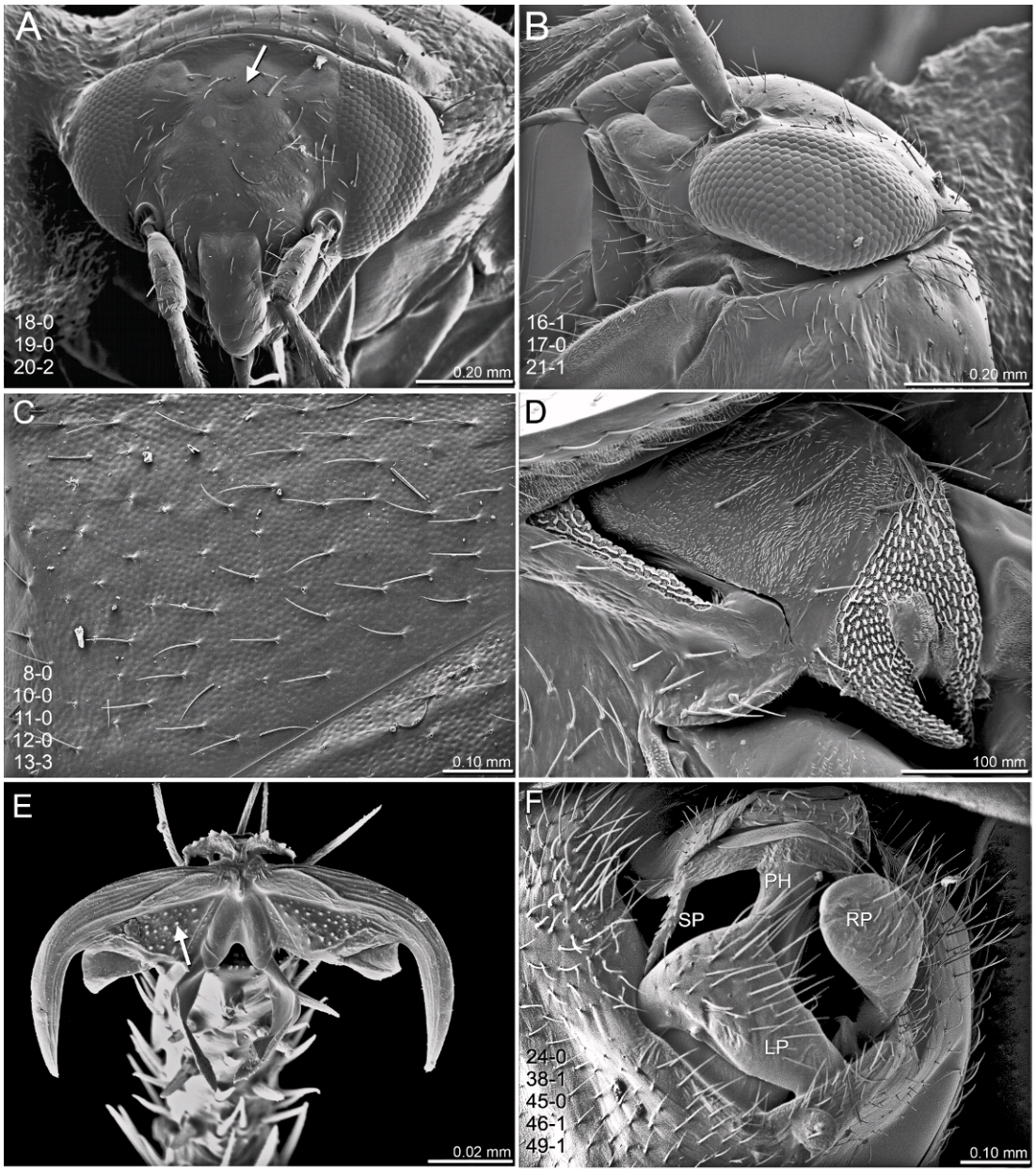


Fig. 6. *Josephinus albicornis*, scanning electron micrographs. A, B. Head. **A**. Anterior view. **B**. Lateral view. **C**. Hemelytron, vestiture and cuticular sculpture, dorsal view. **D**. Mesothoracic spiracle and metathoracic scent-efferent system, lateral view. **E**. Pretarsus, apical view. **F**. Pygophore with endosomal spicule, left and right parameres, posterior view.

view, from the ventral edge of the eye adjacent to the antennal insertion to the apex of the clypeus—is different among the three genera. *Scalponotatus* and *Slaterocoris* have the anteocular region longer than the height of the eye and the eye appears smaller (cf. figs. 3B, 14B, 36A, 59A), whereas in *Josephinus* (cf. figs. 6B, 9B), the anteocular region is shorter than, or equal to the height of the eye, and the eye is larger.

The dorsal sculpturation of small discrete punctures with underlying shinglelike plates or with plates alone distinguish *Josephinus* (fig. 6C) from *Slaterocoris* in which larger, obscure punctures merge with areas of rugosity or reticulation (figs. 14C, 31A, 36B, 59B). *Scalponotatus* has small discrete punctures on a surface of undulating reticulation. Features of the genitalia unequivocally distinguish *Josephinus* from *Scalponotatus* and *Slaterocoris*. The apex of the left paramere is narrow as in *Slaterocoris*, not mitten shaped as in *Scalponotatus*, and the spines of the right paramere are dorsally directed whereas in *Slaterocoris* they are ventrally directed. The dorsal lobe of the endosomal spicule in *Josephinus* is short, small, and narrow; in *Slaterocoris*, it is much larger and frequently bifurcate.

DESCRIPTION: *Male:* Small, total length 2.50–3.80, width 1.25–1.78, costal margin arcuate. COLORATION: Body predominantly black or with vertex, frons, pronotum, and sometimes hemelytron ranging from orange-yellow to orange-brown; vertex unicolorous pale or pale near dorsal margin eye only; antennal segments I and II, legs including coxa, and venter either concolorous pale or concolorous black; femoral base either concolorous black or concolorous orange, with remainder of femur; femoral apex either narrowly pale or concolorous orange; hind tibia either pale or black; tarsus pale with segment III black. VESTITURE: Ranging from sparsely to densely distributed, short to moderately long, pale, brown or silvery, reclining to suberect, entirely simple setae or simple with some sericeous setae; setae on antennal segments decumbent; reclining setae on abdomen longer and more dense, especially on posterior margin of pygophore. DORSAL SCULPTURATION: Usually with merged punctures forming confluent plates or sometimes with minute discrete punctures (fig. 6C); frons smooth. STRUCTURE: Head hypognathous, posterolateral margin curved posteriorly; clypeus produced dorsal to mandibular plate; frons curved; vertex, anterior of transverse basal carina, slightly sunken with vertex/eye contour smooth, in anterior view; vertex clearly wider than length of antennal segment I; labium reaching apex of mesocoxa; width of pronotum greater than length of antennal segment II; hemelytron with strongly deflected cuneus; metepisternal spiracle variable, either slitlike with elongate evaporative area on tergum (fig. 6D) or elongate with small evaporative area (fig. 9D); external metepisternal scent gland area with ostiole flattened and elevated and evaporative area wide, triangular, and spanning width of metepisternum, peritreme, and evaporative surface with evaporative bodies (figs. 6C, 9D); pretarsus with spicules on base of claw, claw strongly curved; pulvillus moderately small, not extending beyond medial curve of claw; parempodium fleshy, apically convergent (figs. 6E, 9E). GENITALIA: **Pygophore**: Produced on ventral plane; tergal process either absent or situated medially, short, not bifurcate, broad basally; ventral margin of aperture not cleft; subgenital plate merging with ventral margin of aperture; right paramere insertion produced slightly dorsal to left. **Phallotheca**: Cone-shaped, with aperture large, open dorsally, extending on right side; distal portion convoluted, left lateral surface not compressed; sometimes distally with ventral out pocketing. **Endosomal spicule**: Membrane either attached directly to base or on recurved, basal process; spicule divided, with distally bifurcate ventral lobe and variable length dorsal lobe, dorsal lobe usually minute or small, not extending distal to secondary gonopore; apical portion of endosomal spicule projecting beyond apex of phallotheca, in repose (figs. 6F, 9F). **Right paramere**: Usually with variable length dorsally produced basal process and with variable distal region either rounded with small medial spine, or with large attenuate medial process, or with large dorsally directed variably spinose process. **Left paramere**: L-shaped; apex entire; basal region unmodified.

Female: Small, total length 2.50–3.80, width 1.60–2.00; as in male except vertex wider, eye smaller, and costal margin more strongly convex. ABDOMEN: **Subgenital plate**: Bluntly triangular. GENITALIA: **First gonapophyses**: Left overlapping right in ventral view; left larger than right at overlap; left short, composed of two sections, mediodistal area not projecting, dorsal surface protuberant, and apex of roughly equal width as body of gonapophyses. **Vestibulum**:

Anteroventral margin of anterior wall sclerotized medially, spanning to lateral margins of bursa copulatrix. **Ventral labiate plate**: Ventral surface broadly produced into vulva. **Dorsal labiate plate**: Paired medial sclerites large, confluent with infolded lateral margins of plate; dorsal anteromedial margin strongly sclerotized, convoluted on left side. **Second gonapophyses**: Anterior medial surface slightly convex. **Posterior wall**: Interramal sclerite with dorsomedial region flat, not produced anteriorly; medial region narrow platelike; posteromedial portion with tumid process abutting ovipositor bulb; ventromedial region not greatly overlapping second gonapophyses basally; interramal lobe with membranous basal (dorsal) attachment; dorsomedial margin with narrow lobe; ventral projection long with convex anterior surface.

ETYMOLOGY: Named for Joseph C. Schaffner, in recognition of his long career in entomology at Texas A&M University and his many contributions to our knowledge of Mexican Miridae, which include numerous new genera and species descriptions with J.C.M. Carvalho and other coauthors. During this tenure he made many collecting trips with numerous colleagues to southern Mexico. It is the result of his unflagging efforts that the collections at College Station contain the world's premier assemblage of Mexican Miridae. It gives me great pleasure to honor Joe with this patronym. The gender of this genus-group name is masculine.

DISCUSSION: Other previously unexplored characters supporting the diagnosis of *Josephinus* have come to light as a result of this current study. The claw base of *J. reinhardi* and *J. albicornis* (cf. figs. 6E, 9E, arrow) have distinct spinules on the apical surface. The distribution of this feature among the genera included in this paper is incompletely known and therefore not included in the phylogenetic analysis. However, the surface of the claw base is smooth (figs. 3D, 20F, 37B, arrow) in three species of *Scalponotatus* and *Slaterocoris* examined. The peglike field was not observed in scanning electron micrographs of the claw from other orthotyline taxa (Schuh, 1976; Stonedahl and Schwartz, 1986; Schwartz and Scudder, 2003). The ventral margin of the genital aperture in *Josephinus* is broadly curved, mostly flat, and with the subgenital plate (cup-shaped sclerite) meeting the ventral margin flush, not projecting posterior to the edge of the aperture. In *Scalponotatus* the ventral margin is deeply angled ventrally with the subgenital plate lifted dorsal to the ventral margin of the aperture and usually projecting beyond the aperture edge. The ventral margin of the aperture in *Slaterocoris* is about as wide as in *Josephinus* but has an obvious medial crease. The subgenital plate in *Slaterocoris* terminates just anterior to the edge of the aperture and not beyond it.

Among species of the mostly black North American, or *Slaterocoris*-group, genera with a single endosomal spicule as discussed above, the structure of the dorsal labiate plate in the female genitalia of *Josephinus* is apparently unique. The anteriormost portion of the dorsal labiate plate is strongly sclerotized and curved anteriorly. The lateral deeply folded portions of the plate containing the sclerotized rings are strongly sclerotized and span the width of the genital chamber. The left side of dorsal labiate plate is rolled in on itself (like a scroll, anterior view), a feature not observed in other genera (fig. 11D, E). The medial portion of the dorsal labiate plate has a pair of broad sclerotized areas that are confluent on a sunken midline (fig. 11D). The dorsal labiate plate in species of *Slaterocoris* have the anterior margin membranous and the medial plates narrow with the midline not sunken ventrally.

Additionally, other features of the female genitalia may be unique to *Josephinus*. The first gonapophysis is asymmetrical with the left side larger (flat on ventral surface, anterodorsal surface protuberant) than the right (right side developed little, if at all) (fig. 11B); a portion of the left first gonapophysis covers part of the posterior surface of ventral labiate plate in anterior view (fig. 11A). In *Slaterocoris*, the left first gonapophysis is anterior to the ventral labiate plate in anterior view (cf. fig. 40A). The posterodorsal surface of the medial section of the interramal sclerite in *Josephinus* is not protuberant anteriorly (fig. 11E),

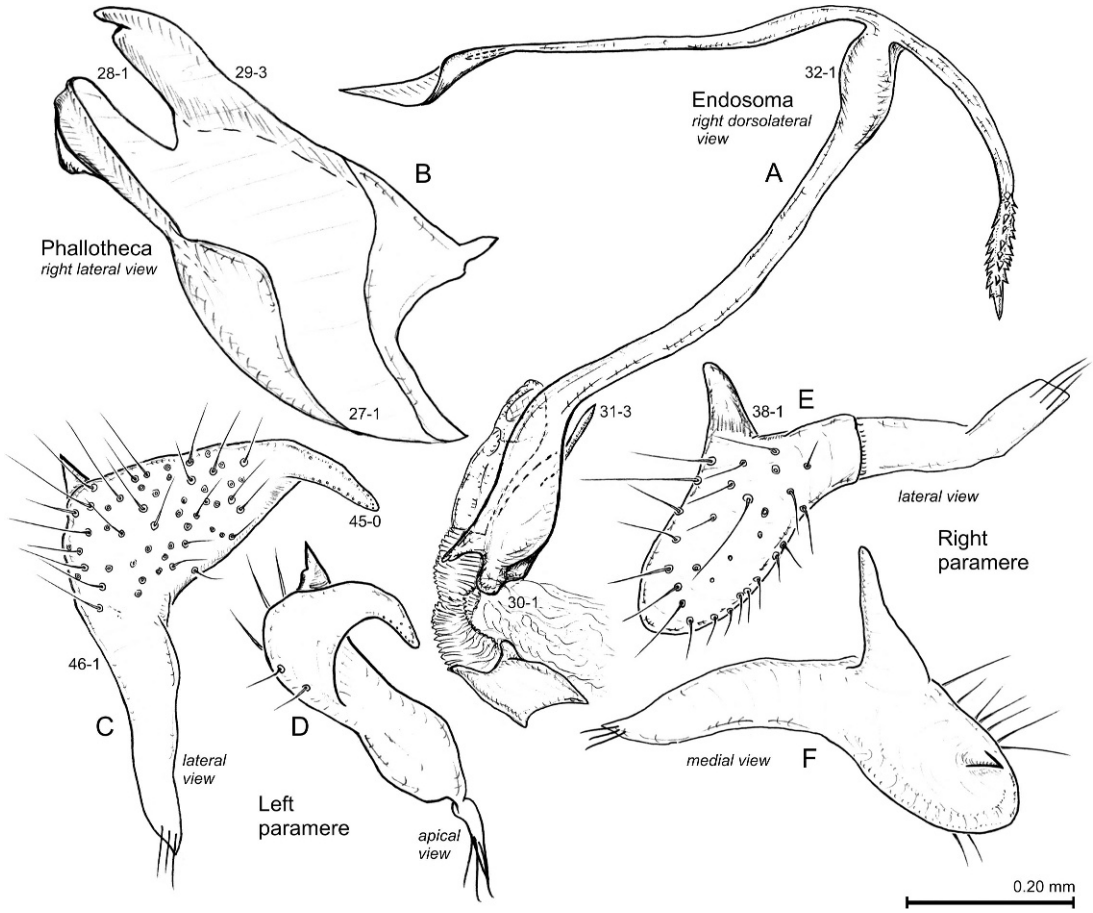


Fig. 7. *Josephinus albicornis*, male genitalia. 5 mi N of Mazatlan, SI.

whereas this region is sometimes strongly swollen (cf. fig. 58C, D) in *Slaterocoris*.

Previously, Schaffner and Schwartz (2008) diagnosed *Jornandes* in part on the shagreened sculpturation of the hemelytron formed by dense, minute punctures. One former *Scalponotatus* species, *albipes*, was transferred to *Jornandes* in part due to its surface structure and the mittenlike apex of the left paramere. *Josephinus albicornis*, another former *Scalponotatus* species, also has similar surface sculpturation but, based on the genitalic structure, especially the narrow, somewhat attenuate apex of the left paramere, is accommodated in *Josephinus* with which it also shares all of the other features discussed above. In the cladistic analysis *J. albicornis* groups with the other species of *Josephinus* and not with *Jornandes cruralis*.

Key to the Species of *Josephinus*

1. Hemelytron with minute discrete punctures; male genitalia as in fig. 7A–F . . . . . *albicornis* (Kelton)
– Hemelytron with merged punctures forming confluent plates 2
2. Body length short (2.50–2.95♂, 3.00–3.30♀); male genitalia as in fig. 8A–H . . . . . *capitatus* (Kelton)
– Body length large (3.05–3.30♂, 3.65–4.05♀); male genitalia as in fig. 10A–H . . . . . *reinhardi* (Carvalho and Schaffner)

Josephinus albicornis (Kelton), new combination
Figures 6, 7; plate 1; map 1

Scalponotatus albicornis Kelton, 1969: 19, fig. 9 (orig. desc.); Schuh, 1995: 194 (catalog); Schaffner and Schwartz, 2008: 30 (disc.).

DIAGNOSIS: Recognized by the uniformly shining dark brown to black pronotum and hemelytron, with sparse, dark simple setae; head dark with yellowish brown areas laterally on vertex and adjacent temporal areas of frons near dorsomedial margin of eye, antenna mostly pale yellowish brown; femur, except apex, dark brown; and male genitalia as in figure 7.

REDESCRIPTION: *Male:* Small, ovate; length 2.50–3.00, width 1.35–1.60 (pl. 1). COLORATION: Body generally shining dark brown to black, head dark brown to black with yellowish brown frequently extending onto lateral margin of transverse basal carina, mandibular plate reddish brown; labial segment I and apex of labium dark reddish brown, reminder pale yellowish brown; base of antennal segment I usually faintly brown, remainder of antenna pale yellowish brown. Thorax dark brown to black, membrane of hemelytron dark brown, evaporative area brown. Coxa, trochanter, femur, except for extreme apex, and apex of tarsomere III and claw dark brown, apex of femur, tibia, and rest of tarsomere pale yellowish brown. Abdomen usually dark reddish brown. VESTITURE: Sparse, short, brown, reclining simple setae, not longer than diameter of antennal segment II (fig. 6C). DORSAL SCULPTURATION: With dense, minute, discrete punctures (fig. 6C). GENITALIA: **Pygophore**: Tergal process absent, with only right side of aperture thickened. **Phallotheca**: Aperture open on left ventral surface, apex on left and right side with thickened pockets, right side larger than left (fig. 7B). **Endosomal spicule**: Membrane attached directly to spicule base; spicule thick subapically, bifurcate distal to thickening, one shorter ramus thick and serrate at apex (fig. 6F), longer ramus with pointed spoon-shaped apex; dorsal lobe narrow, straight, reaching apex of ductus seminis (fig. 7A). **Right paramere**: Subrectangular with small subapical spine on dorsomedial edge and large attenuate basal process, subequal to length of paramere body (fig. 7E, F). **Left paramere**: Attenuate distally, terminating in narrow apex, short pointed spine at base (fig. 7C, D).

Female: Small, ovate; length 2.70–3.30, width 1.50–1.75 (pl. 1); costal margins more strongly convex, vertex wider than in male; color and vestiture same as for male. GENITALIA: See description of genus.

HOST PLANT: *Buddleja wrightii* B.L. Rob. (Lamiales: Scrophulariaceae: Buddlejeae). Treated as a synonym of Rio Grande butterfly bush, *B. sessiliflora* Kunth by some authors (Felger et al., 2001).

DISTRIBUTION: Known from the environs of Mazatlan, Sinaloa, and nearby northern Nayarit, Mexico. This is a dry forest habitat in the western lowlands of the Sierra Madre Occidental (map 1).

DISCUSSION: Kelton (1969) erected *Scalponotatus* for *S. maturus*, the type species, and nine other species. Two of these, *S. albicornis* and *S. capitatus*, do not have the defining characters of the genus as redefined herein. The sculpturation, head coloration, male genitalia, particularly the apex of the left paramere and the endosomal spicule are sufficiently different from *S. maturus*, as well as any known genus, to require their accommodation in a new genus level taxon. They are therefore transferred to *Josephinus*, new combination.

Superficially similar to *Jornandes michoacanensis* with the mandibular plate reddish brown; however, *Josephinus albicornis* is less shining, relatively narrower, and with a longer body. Also superficially similar to *Jornandes albipes*, but the femur of *J. albicornis* is primarily brown and the head has limited brown areas. In *Jornandes albipes*, the femur is pale and the head is uniformly dark. *Josephinus albicornis* is also longer than *Jornandes albipes*. Both taxa are primarily distributed in the environs of Mazatlan.

HOLOTYPE: **MEXICO: Sinaloa:** Mazatlan [23.21666° N 106.41666° W], 06 Aug 1964, L.A. Kelton, Holotype, 1♂ (AMNH_PBI 00112344) (CNC).

OTHER SPECIMENS EXAMINED: 113 specimens from 14 collection events in late July and early August are known from: **MEXICO: Nayarit:** Acaponeta, 22.49638° N 105.35944° W, 07 Aug 1964, L.A. Kelton, 1♂ (00112340), paratype, 1♂ (00112343) (CNC). **Sinaloa:** 5 mi N of Mazatlan, 23.28895° N 106.41666° W, 24 Jul 1964, H.F. Howden, 2♂ (00318769, 00318783), 1♀ (00318784), paratype, 1♂ (00112342) (CNC);

24 Jul 1964–29 Jul 1964, H.F. Howden, paratypes, 1♂ (00112341), 2♀ (00112337–00112338) (CNC); 25 Jul 1964, H.F. Howden, 1♂ (00318768) (CNC); 27 Jul 1964, J. Powell, 1♀ (00119512) (UCB); 27 Jul 1964, J.A. Chemsak, *Buddleja wrightii*, paratypes, 3♂ (00112334–00112336) (CNC); 28 Jul 1964, H.F. Howden, paratype, 1♀ (00112339) (CNC); 31 Jul 1972, J. and M.A. Chemsak, A. and M. Michelbacher, *Buddleja wrightii*, 2♀ (00119507–00119508) (UCB); 01 Aug 1972, J. and M.A. Chemsak, *Buddleja wrightii*, 12♂ (00119490–00119501), 6♀ (00119502–00119506, 00119509), *Buddleja wrightii* 1♂ (00119227) (UCB), *Buddleja wrightii* 4♀ (00133557–00133560) (USNM); 30 Jul 1973, J. Chemsak, E.G. Linsley, A.E. Michelbacher, 2♀ (00119510–00119511) (UCB). 13 mi E of Concordia, 23.28319° N 105.861° W, 244 m, 05 Aug 1964, L.A. Kelton, paratype, 1♂ (00111393) (CNC). Mazatlan, 23.21666° N 106.41666° W, 06 Aug 1964, L.A. Kelton, paratypes, 1♀ (00111394), 32♂ (00112346–00112377), 26♀ (00112345, 00112378–00112402) (CNC), paratypes, 1♂ (00106420), 1♀ (00106421) (TAMU); 14 Aug 1965, Burke and J. Meyer, 2♂ (00106423–00106424), 5♀ (00106425–00106429) (TAMU). Mazatlan, near beach, 23.21873° N 106.42213° W, 2 m, 18 Aug 1964, H.R. Burke and J. Apperson, 1♂ (00106422) (TAMU).

Josephinus capitatus (Kelton), **new combination**

Figure 8; plate 1; map 1

Scalponotatus capitatus Kelton, 1969: 22, fig. 10 (orig. desc.); Schuh, 1995: 194 (catalog).

DIAGNOSIS: Recognized by the small size, the contrasting coloration being predominantly pale yellowish brown, except for the usually brown to dark brown antennal segment II, distally, segment II and IV, pronotum, on the posterior margin, scutellum, hemelytron, and abdomen; sometimes coloration completely pale yellowish brown; the moderately dense, golden simple setae; and the male genitalia as in figure 8.

REDESCRIPTION: *Male:* Small, moderately ovate; length 2.50–2.95, width 1.25–1.88 (pl. 1). COLORATION: Body generally shining, contrasting pale yellowish brown and dark brown or sometimes completely pale yellowish brown; head pale yellowish brown to orange-brown, with base, or entire clypeus and adjacent mandibular plate sometimes diffusely darker; labial segment IV brown; antennal segment I and II basally pale yellowish brown, segment II distally, and segments III and IV brown. Pronotum, except for variable posterior margin, side of thorax, including evaporative area, legs, except for tarsomere III, pale yellowish brown; dark brown on variable portion of posterior margin of pronotum, or more extensively on disc, scutellum, tarsomere III, hemelytron, including membrane, and abdomen dark brown; sometimes entire body pale yellowish brown, except for hemelytral membrane dusky and labial segment IV and tarsomere III dark brown. VESTITURE: Moderately dense, short, golden, reclining simple setae, about as long as diameter of antennal segment II. DORSAL SCULPTURATION: With dense, minute, discrete punctures, underlying broad shinglelike plates. GENITALIA: **Pygophore**: Tergal process broad, low and medially situated (fig. 8H). **Phallotheca**: Aperture large, open broadly on right side; distally without thickening or concavities (fig. 8B). **Endosomal spicule**: Membrane attached to flat basal keel; subapical bifurcation of spicule flattened and subtriangular, rami at bifurcation of conspicuously unequal length, short ramus pointed, long ramus recurved, with bifurcate apex reaching to secondary gonopore; dorsal lobe narrow, curving perpendicular to ventral lobe of spicule (fig. 8A). **Right paramere**: C-shaped, with large apical and basal processes (fig. 8E–G). **Left paramere**: Attenuate distally, terminating in narrow apex (fig. 8C, D).

Female: Small, more ovate than male; length 3.00–3.30, width 1.55–1.80 (pl. 1); coloration as in male. GENITALIA: See description of genus.

HOST PLANT: Unknown.

DISTRIBUTION: Known from the lowland dry forests west of the Sierra Madre Occidental in central and southern Sinaloa, Mexico (map 1).

DISCUSSION: As discussed in the preceding species treatment, *S. capitatus* does not have the defining characters of *Scalponotatus* as redefined herein, but is accommodated within the diagnosis of *Josephinus*, into which it is

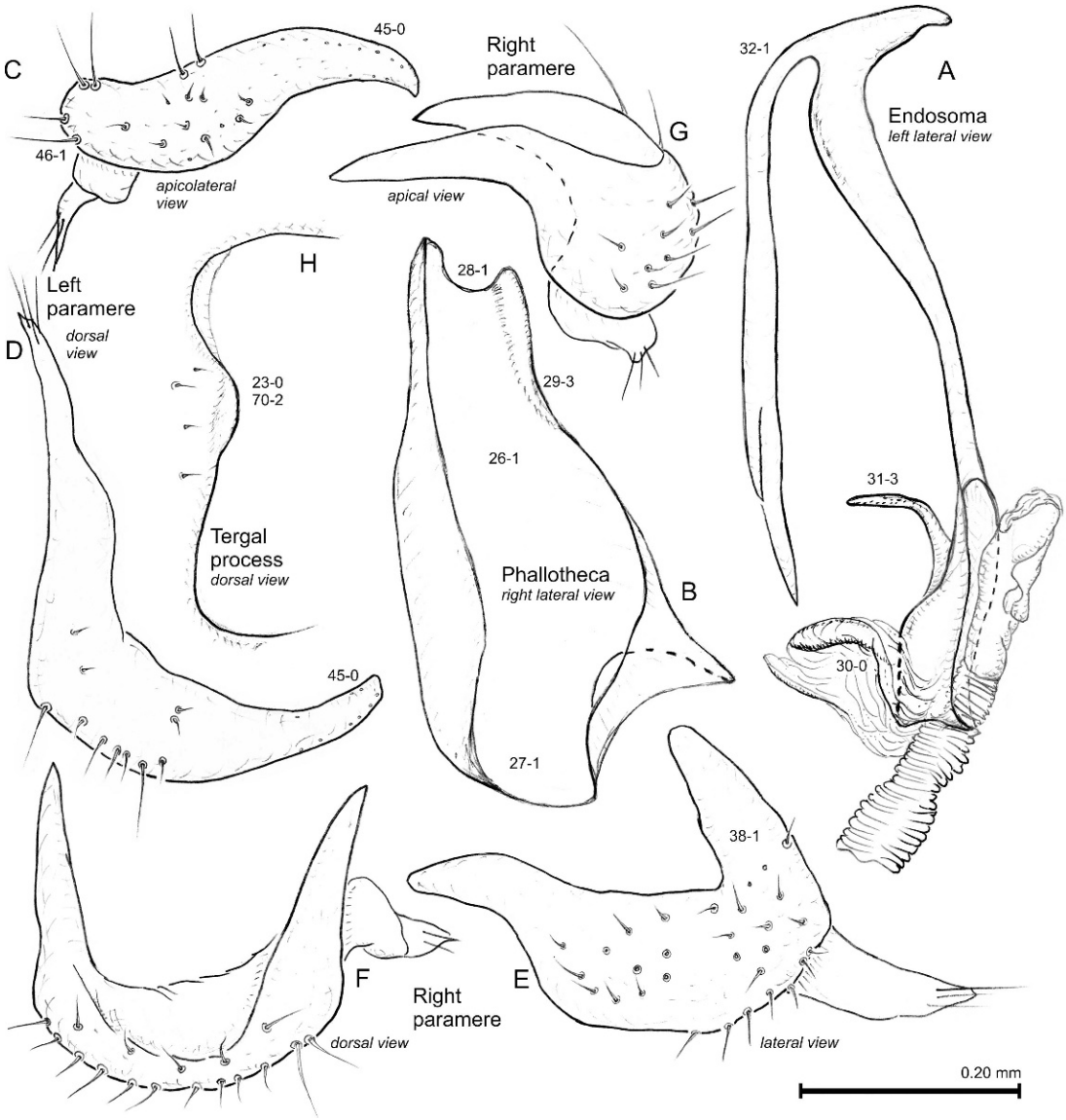


Fig. 8. *Josephinus capitatus*, male genitalia. Mazatlan, SI.

transferred forming a new combination. Specimens from 26 mi N of Pericos, the most northerly records examined, do not have contrasting pale and dark coloration, but are completely pale yellowish brown or pale orange-brown. The male genitalia are identical to those of the holotype and other topotypic specimens.

HOLOTYPE: **MEXICO: Sinaloa:** Mazatlan [23.21666° N 106.41666° W], 06 Aug 1964, L.A. Kelton, 1♂ (AMNH_PBI 00111373) (CNC).

OTHER SPECIMENS EXAMINED: 32 specimens from 8 collection events in August are known from: **MEXICO: Sinaloa:** 2.5 mi N of Mazatlan, 23.25299° N 106.41666° W, 11 Aug 1970, M. Wasbauer, 1♀ (00119278) (UCB); 12 Aug 1970, M. Wasbauer, 2♂ (00119229, 00119277), 1♀ (00245181), 1♂

(00119229) (UCB). 5 mi N of Mazatlan, 23.28895° N 106.41666° W, 09 Aug 1970–15 Aug 1970, J.A. Chemsak, 1♀ (00119279) (UCB). 10 mi NW of Mazatlan, 23.31938° N 106.52847° W, 15 Aug 1965, H.R. Burke and J. Meyer, 2♂ (00118383–00118384), 2♀ (00118385–00118386) (TAMU). 26 mi N of Pericos, 26.47587° N 107.46666° W, 13 Aug 1960, P.H. Arnaud Jr., E.S. Ross, D.C. Rentz, 5♂ (00121885–00121886, 00242655–00242657), 1♀ (00242658) (CAS). Mazatlan, 23.21666° N 106.41666° W, 06 Aug 1964, L.A. Kelton, 1♂ (00111382), 1♀ (00111372), paratypes, 8♂ (00111374–00111381), 1♀ (00111383) (CNC); 14 Aug 1965, Burke and J. Meyer, 2♂ (00118380–00118381), 1♀ (00118382) (TAMU); 24 Aug 1965, W.J. Gertsch, R. Hastings, 1♂ (00107895) (AMNH).

Josephinus reinhardi (Carvalho and Schaffner), **new combination**

Figures 9–11; plate 1; map 1

Slaterocoris reinhardi Carvalho and Schaffner, 1973: 84, figs. 27–30 (orig. desc.); Schuh 1995: 198 (catalog).

DIAGNOSIS: Distinguished by the relatively large size; the variable coloration ranging from entirely pale yellowish or orange-brown to black with pale yellowish to orange-brown head; the densely distributed dorsal vestiture; and the structure of the male genitalia (fig. 10).

REDESCRIPTION: *Male:* Relatively large, obovate; length 3.05–3.80, width 1.53–1.78 (pl. 1). COLORATION: Entirely pale yellowish brown, except for darkened distal portion of antennal segment II and margin of cuneus, or with variable areas of contrasting pale orange-brown and dark brown, to entirely black with pale yellowish brown head; head pale yellowish brown, clypeus darker brown, sometimes sunken dorsomedial portion of frons diffusely black, or entire central region of frons dark brown to black; apex of labium brown to black; antenna pale yellowish brown, segment II usually distally dark, sometimes completely black; segments III and IV diffusely brown; pronotum pale yellowish brown; frequently with dark brown to black on humeral angles and usually along posterior margin or on variable portion of disc posteriorly, sometimes only calli pale; sometimes entire pronotum pale yellow brown or black; scutellum pale yellowish brown to black; hemelytra ranging from uniformly pale yellowish brown with darkened margin of cuneus or most uniformly brownish black to black; membrane dark brown. Venter from propleuron to abdomen ranging from pale yellowish brown to black; if calli pale and remainder of pronotal disc darker then posterior margin of propleuron brownish black; abdomen sometimes brownish black laterally; legs from coxa to apex of femur, tarsomere I, and II pale yellowish brown, tibia ranging from pale yellowish brown to black; tarsomere III dark brown to black. VESTITURE: Dense, long, silvery, suberect simple and some sericeous setae along claval suture (fig. 9C). DORSAL SCULPTURATION: With broad shinglelike plates predominating, minute, discrete punctures underlying plates present but difficult to discern; frons smooth. GENITALIA: **Pygophore**: Tergal process absent, only with aperture right of midline thickened (fig. 10F). **Phallotheca**: Aperture sinuate, widest at base on right side, continuing distally on right surface, reaching apex with large opening, curving ventrally on left side; apex of phallotheca with sclerotized plate. (fig. 10B). **Endosomal spicule**: Membrane attached directly to base; spicule body sinuate, thick until reaching subapex, then bifurcate, one short ramus narrow, curved, pointed, longer ramus recurved, with variable number of long, narrow spines at base, gradually decreasing in length until reaching apex; dorsal lobe present as small spine on left border of spicule (figs. 9F, 10A). **Right paramere**: C-shaped in lateral view, distal region with variable number of lateral serration and apical spines (fig. 10D, E, G–I). **Left paramere**: Attenuate distally, terminating in narrow apex (fig. 10C).

Female: Small, ovate; length 3.65–4.05, width 1.65–2.00 (pl. 1); similar to male in range of color variation, otherwise vertex wider and costal margin more arcuate. GENITALIA: See description of genus (fig. 11A–E).

HOST PLANT: The three specimens with plant records indicate that *Ambrosia* sp. (Asteraceae) may be a host.

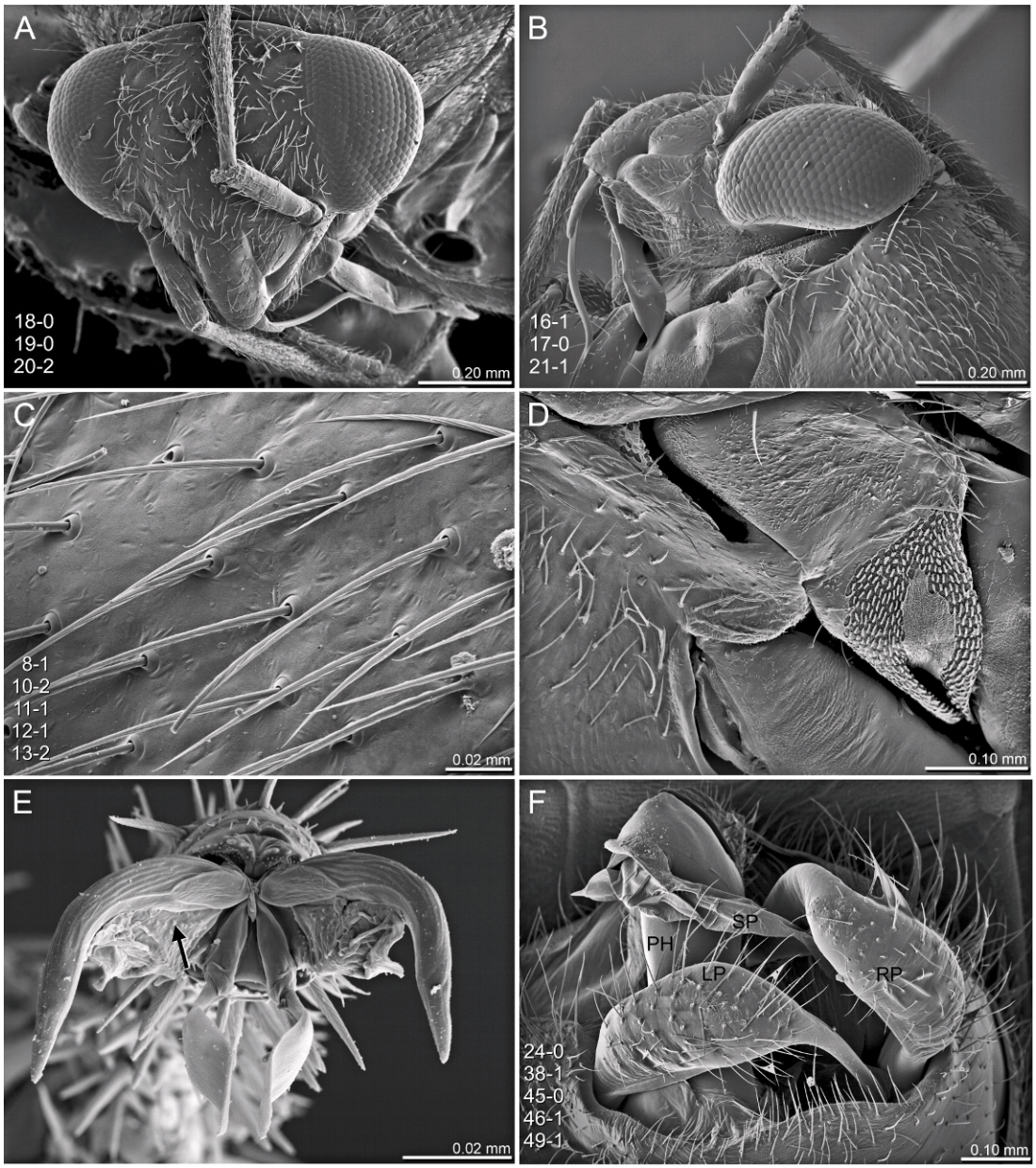


Fig. 9. *Josephinus reinhardi*, scanning electron micrographs. A, B. Head. **A**. Anterior view. **B**. Lateral view. **C**. Hemelytron, vestiture and cuticular sculpture, dorsal view. **D**. Mesothoracic spiracle and metathoracic scent-efferent system, lateral view. **E**. Pretarsus, apical view. **F**. Pygophore with endosomal spicule, left and right parameres, posterior view.

DISTRIBUTION: Collection localities in the northern portion of the range are widespread in the transition subtropical dry forest and dry forests of Sinaloa, Sonora, and Nayarit in the lowlands west of the Sierra Madre Occidental. Further south *J. reinhardi* is found in the Sierra Madre del Sur from Michoacan, Guerrero, and Oaxaca (map 1).

DISCUSSION: *Slaterocoris reinhardi* Carvalho and Schaffner is related to *J. albicornis*

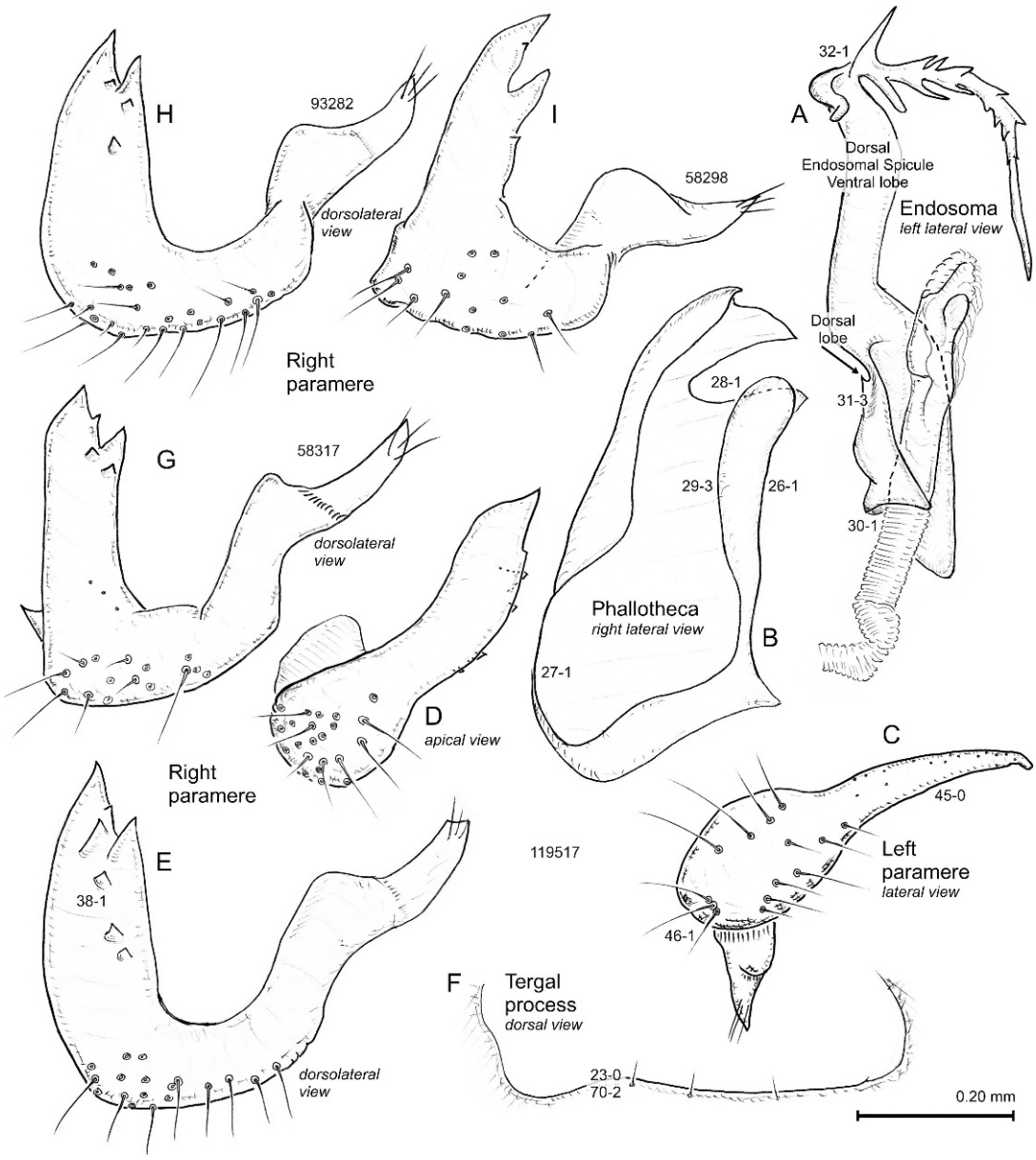


Fig. 10. *Josephinus reinhardi*, male genitalia. **A**–**F**. 3 mi E of Villa Union, SI. **G**. 32 mi SE of Petatlan, GR.H. 28.5 mi S of Nueva Italia, MI. **I**. 10 mi SE of Totolapan, OA.

and *J. capitatus*, based on the structure of the male genitalia, especially the narrow apex of the left paramere without the mittenlike structure as in *Scalponotatus*. The narrow dorsally directed apex of the right paramere in *reinhardi* is clearly unlike the structure as in all species of *Slaterocoris*, that are partially diagnosed by a variable series of strong, ventrally directed spines. Additionally, no *Slaterocoris* species has major nonblack portions of the frons, vertex, pronotum, and hemelytron as in *reinhardi*. Only two new species of *Slaterocoris* have pale markings on the frons adjacent to the eye. The black

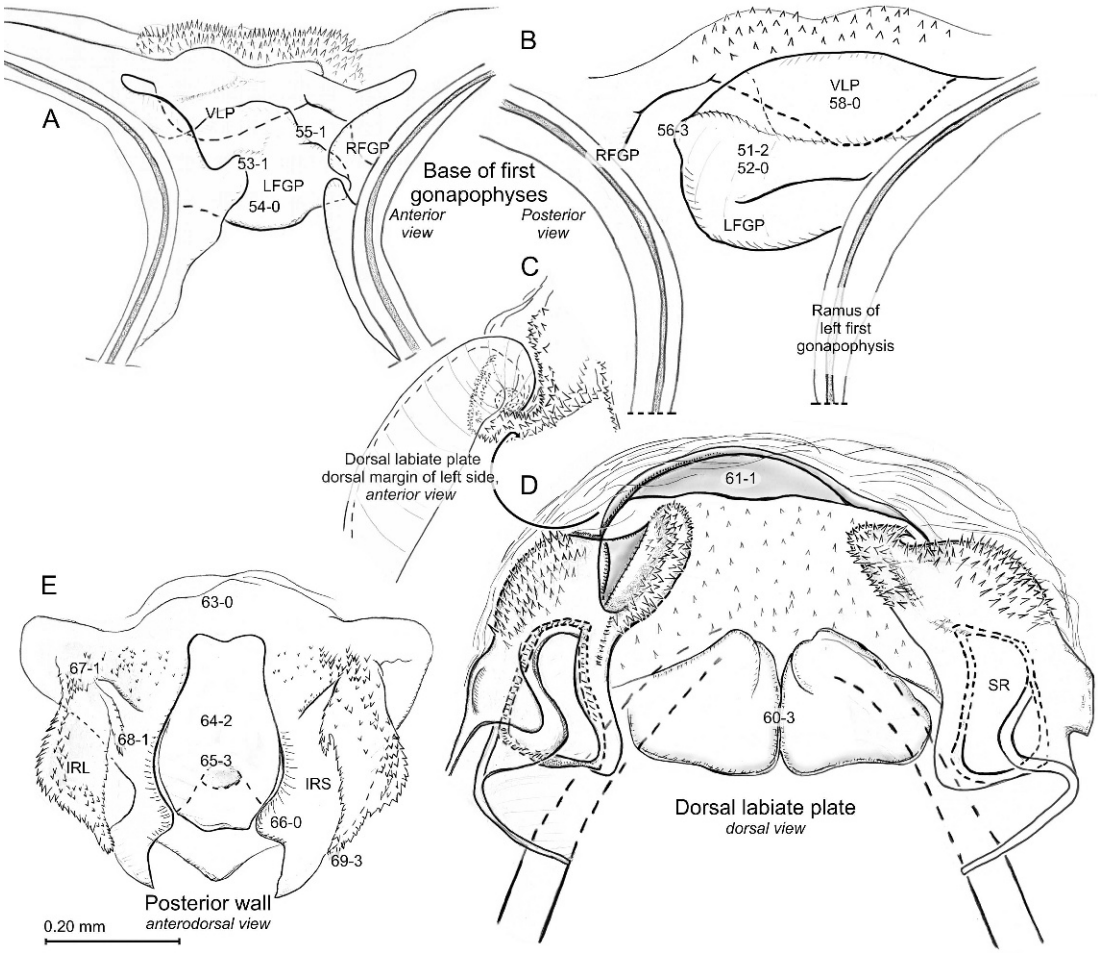
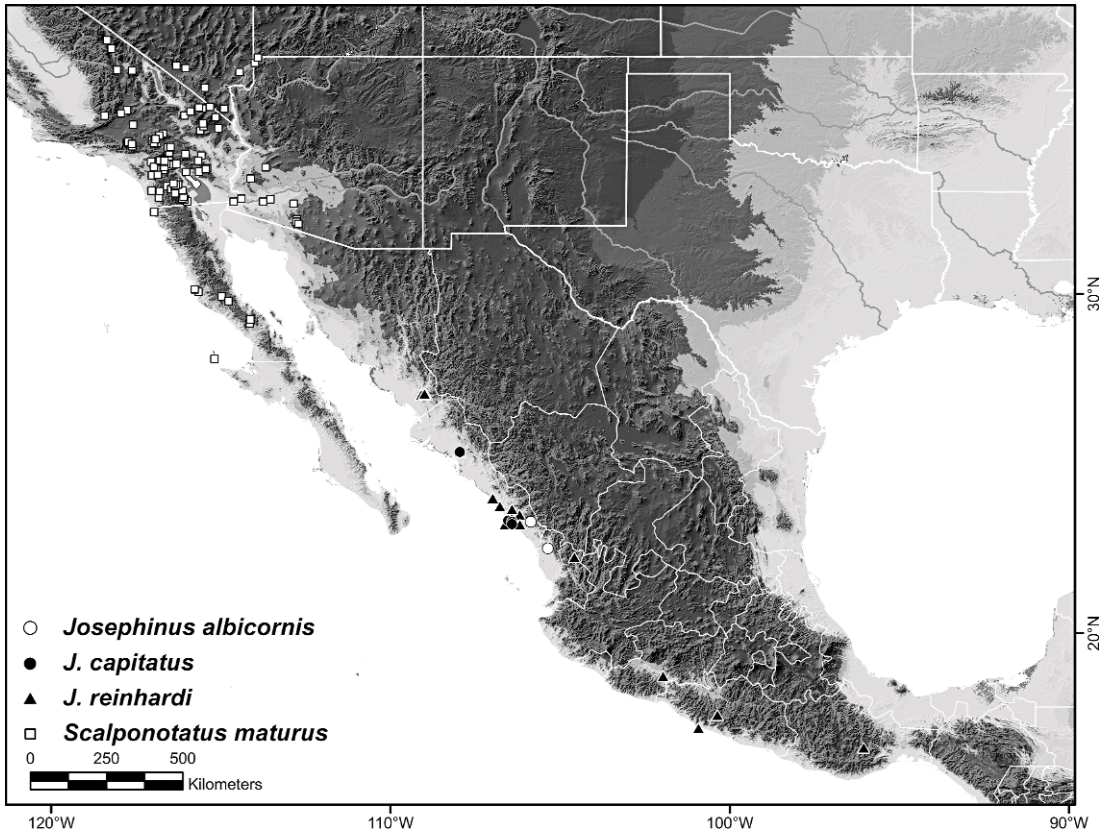


Fig. 11. *Josephinus reinhardi*, female genitalia. 32 mi SE of Petatlan, GR.

coloration and the most basic form of the genitalia in *reinhardi* are related to *Slaterocoris,* but details of vestiture, coloration, body conformation, and especially the fine structure of the genitalia require that it be removed from *Slaterocoris*. Therefore, *S. reinhardi* is transferred to *Josephinus*, new combination.

This species exhibits by far the greatest coloration range of any treated within this project. Even though specimens range from completely pale yellowish brown or entirely black with a pale head, the male genitalia across the geographical distribution of *J. reinhardi* are remarkably similar. Color variation is greatest in Sonora, where specimens from the same collection event exhibit the complete range; from Michoacan to Oaxaca specimens are either completely pale or dark. Variation in the male genitalia was noted in the number, size, and location of spines of the right paramere, or serration on the distal surface and apex, but there was no discernable geographic pattern (cf. fig. 10D, E, G–I). No specimens were collected from Jalisco State, which is located between the northern and southern populations of *J. reinhardi*.

HOLOTYPE: **MEXICO: Sinaloa:** 42 mi NW of Mazatlan [23.73473° N 106.77815° W], 9 m, 15 Aug 1965, H.R. Burke and J. Meyer, 1♂ (AMNH_PBI 00134081) (USNM).



Map 1. Localities for *Josephinus* species and *Scalponotatus maturus*.

OTHER SPECIMENS EXAMINED: 226 specimens from 17 collection events in July and August are known from: **MEXICO: Guerrero:** 18.2 mi S of Iguala, 17.5739° N 100.36666° W, 914 m, 05 Jul 1987, Kovarik and Harrison, 1♂ (00093273) (TAMU). 32 mi SE of Petatlan, 17.18734° N 100.92164° W, 10 Jul 1985, Jones and Schaffner, 1♀ (00184959) (CNC), 1♂ (00118427), 21♂ (00058317, 00290359–00290364, 00290381–00290394), 4♀ (00290395–00290397, 00290439) (TAMU). **Michoacan:** 28.5 mi S of Nueva Italia, 18.7235° N 101.96743° W, 276 m, 09 Jul 1985, Jones and Schaffner, 1♂ (00118428), 9♂ (00118388, 00290401–00290408), 28♀ (00093287, 00290409–00290435) (TAMU); 09 Jul 1985, J.B. Woolley and G. Zolnerowich, 3♂ (00093282–00093284), 6♀ (00093275, 00093285–00093286, 00290436–00290438) (TAMU). **Nayarit:** Arroyo Canaveral nr Jesus Maria, 22.23087° N 104.58245° W, 864 m, 15 Jul 1955, B. Malkin, 1♀ (00119548) (UCB). **Oaxaca:** 10 mi SE of Totolapan, 16.61774° N 96.05366° W, 2438 m, 20 Jul 1987, Kovarik and Schaffner, 2♂ (00058298–00058299) (TAMU). **Sinaloa:** 3 mi E of Villa Union, 23.19999° N 106.1859° W, 24 Jul 1972, J. and M.A. Chemsak, A. and M. Michelbacher, paratypes, 1♂ (00290398), 2♀ (00290399–00290400) (TAMU), paratype, 1♂ (00119280), 1♂ (00119517), 6♀ (00119488–00119489, 00276729–00276732), paratypes, 5♀ (00119483–00119487) (UCB). 6 mi E of Villa Union, 23.20137° N 106.62847° W, 335 m, 23 Jul 1954, M. Cazier, W. Gertsch, and Bradts, 2♂ (00108423, 00108698), 3♀ (00108699–00108701) (AMNH). 6 mi S of Culiacan, 23.97262° N 106.98723° W, 4 m, 22 Jul 1954, M. Cazier, W. Gertsch, and Bradts, 1♀ (00108424) (AMNH). 18 mi N of Mazatlan, 23.49884° N 106.48818° W, 56 m, 28 Jul 1972, J. and M.A. Chemsak, A. and

M. Michelbacher, 1♀ (00119465) (UCB). 18 mi S of Guamuchil, 23.48744° N 106.19394° W, 169 m, 07 Aug 1964, J.A. Chemsak, 1♂ (00119465) (UCB). 26 mi N of Pericos, 26.47587° N 107.46666° W, 13 Aug 1960, P.H. Arnaud Jr., E.S. Ross, D.C. Rentz, 18♂ (00121891–00121892, 00242661–00242676), 2♀ (00242659–00242660) (CAS), 5♂ (00134006–00134008, 00134011–00134012), 3♀ (00134009–00134010, 00134013) (USNM). 30 mi N of Mazatlan, 23.65261° N 106.41666° W, 18 Aug 1964, H.R. Burke and J. Apperson, *Ambrosia* sp., paratype, 1♀ (00118604) (TAMU), paratype, 1♀ (00134005) (USNM). **Sonora:** 1 mi W of Alamos, 27.01667° N 108.94963° W, 16 Jul 1964, H.R. Burke and J. Apperson, *Ambrosia* sp., paratypes, 1♂ (00118602), 1♀ (00118603) (TAMU), paratype, 1♀ (00134082) (USNM). 10 mi W of Alamos, 27.01657° N 109.09636° W, 21 Jul 1954, M. Cazier, W. Gertsch, and Bradts, 31♂ (00107892, 00108440, 00108632–00108641, 00108643–00108661), 36♀ (00108662–00108697) (AMNH). Minas Nuevas, 27.05° N 109° W, 07 Aug 1952, C. and P. Vaurie, 2♂ (00107893–00107894), 1♀ (00108133), 8♂ (00108702–00108709), 12♀ (00108710–00108721) (AMNH).

Slaterocoris Wagner

Slaterocoris Wagner: 1956: 280 (orig. desc.); Kelton, 1968, 1121 (revision); Knight, 1970: 233 (revision); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 196 (catalog); Asquith, 1991: 13, 16 (disc.); 1994: 1, 6, 8–9, 12–13 (disc.); Forero, 2008: 152, 157–158 (disc.).

TYPE SPECIES: *Capsus stygicus* Say, 1832 (orig. design.).

Amulacoris Carvalho and China, 1959: 69 (orig. desc.); Schuh, 1995: 80 (catalog). NEW SYNONYMY.

TYPE SPECIES: *Jornandes subalbicans* Distant, 1893 (orig. design.).

Guerrerocoris Carvalho and China, 1959: 70 (orig. desc.); Schuh, 1995: 114 (catalog). NEW SYNONYMY.

TYPE SPECIES: *Jornandes punctatus* Distant, 1893 (orig. design.).

REVISED DIAGNOSIS: Recognized by the entirely black head, except in *Slaterocoris clavatus* and *S. maculatus* where pale patches are usually present on the temporal areas. Thus distinguished from *Scalponotatus,* which has the lateral margins of the carina or the entire carina usually pale, except in *Scalponotatus howdeni* and *S. lagunensis*, where the entire carina is black. Also distinguished from *Josephinus*, where the frons or the entire head is usually pale; except in *J. albicornis*, in which the head is mostly black, except for the pale lateral margins of the carina. *Slaterocoris* is unequivocally recognized by the male genitalia with usually small, curved tergal process on right side of midline; left paramere with narrow distal region and small rounded apex; right paramere with large, ventrally projecting spines; endosomal spicule with large, sometimes bifurcate dorsal lobe. *Slaterocoris clavatus* is the only species that does not completely manifest all the male genitalia features (right paramere with apical spines dorsal and dorsal lobe small); however, it does have the coloration, dorsal sculpturation, vestiture, and head structure found in all other species of *Slaterocoris*. The anteromedial margin of the dorsal labiate plate in the female genitalia of *S. clavatus* is more sclerotized than in other species of *Slaterocoris*. Where known, all species feed on foliar structures of common Asteraceae and are distributed in open habitats across North America, extending to and including southern Mexico.

REDESCRIPTION: *Male:* Body moderately small to large, ovate to elongate, always macropterous; hemelytron long, costal margin nearly straight; length 2.70–7.00, width across pronotum 1.10–1.93. COLORATION: Shining black; including vertex and venter; rarely, if head pale then clypeus, frons dorsally and on posterior margin black; antenna usually with portions of segments pale, sometimes all segments variously pale yellow or entirely black; legs usually with tarsomeres pale yellow with segment III black, sometimes only apex of segment III pale or all segments black; tibia pale yellow, sometimes orange, red or black, usually with apex black; femur usually black and apically pale or with variable proportions basally pale and distally black, sometimes entirely red or black, rarely basally pale and dark apically, or femur entirely pale; coxa predominantly

black; rarely mostly or entirely pale; evaporative area and peritreme of metepisternal scent gland black; membrane of hemelytron darkly infuscate; rarely middle of membrane broadly hyaline. VESTITURE: Ranging from sparsely distributed, short and recurved dark setae, to moderately dense, long and erect black setae, to densely distributed, reclining or erect, silvery white, golden brown, or black simple setae (pl. 4); sometimes with matted setae with recurved apices; antenna with moderately densely distributed, reclining setae with length usually less than diameter of antennal segments, sometimes length greater than antennal diameter; sometimes anterior margin of pronotum with scattered, long, erect, black, bristlelike setae; tibiae with black spines, sometimes pale brown; membrane of hemelytra with densely distributed microtrichae. DORSAL SCULPTURATION: Variously rugulopunctate; calli slightly produced; scutellum transversely so; pronotal disc with discrete moderate punctures (fig. 36C); hemelytron surface of large punctures merging with rugosity or reticulation of variable intensity (figs. 31A, 36B, D). STRUCTURE: Head hypognathous, vertical, in lateral view (fig. 36A), clypeus, maxillary and mandibular plates slightly produced; frons gently rounded, in lateral view (figs. 14B, 36C), usually smooth (figs. 14A, 36A), sometimes slightly roughened (figs. 31A, 56A); vertex depressed or flattened anterior of prominent basal carina (figs. 36C, 56A); posterior margin of head on same plane with posterolateral margin of eye; anterior margin of pronotum not overlapped by posterolateral margin of eye; antenna with segments III and IV narrow; length of segment II usually longer than width of head across eyes, sometimes length less than head width; labium reaching apex of mesosternum to middle of middle coxa. Pronotum broadly trapeziform, in dorsal view; anterolateral and humeral angles and posterior margin broadly rounded; calli smooth or finely punctate, broadly rounded, slightly produced; mesoscutum obscured by pronotum. Hemelytron with deflected cuneus. Metepisternal spiracle elongate, evaporative area on tergum elongate and triangular dorsally; external metepisternal scent gland area with ostiole flattened, attenuate dorsally, and elevated; evaporative area wide, triangular, and spanning width of metepisternum, peritreme and evaporative surface with evaporative bodies (figs. 14D, 20E, 37A, 56B, 59C, 67A). Pretarsus with base of claw smooth, claw broadly curved; pulvillus moderately large, not extending beyond medial curve of claw; parempodium fleshy, apically convergent (figs. 20F, 37B, 56C). MALE GENITALIA: **Pygophore**: Dorsal margin of aperture with variously modified tergal process usually on right side of midline, sometimes just right of midline; tergal process either solitary or bifurcate, small or large; ventral margin of aperture nominally rounded in posterior view, with obvious crease or notch medially; subgenital plate (or cup-shaped sclerite of Konstantinov, 2003; Forero, 2008) with posterior edge not meeting flush with ventral margin of aperture, but ventral of it, and somewhat recessed anteriorly (fig. 39F); paramere insertions with right socket situated slightly dorsal to left socket. **Phallotheca**: Convoluted, aperture sinuously open apically, continuing basally on right side; left dorsal side with variously shaped U-shaped notch (figs. 39E, 55H), sometimes with second aperture (fig. 65F). **Endosoma**: With one bifurcate spicule situated dorsal to base of sclerotized region of ductus seminis; base of endosomal spicule attached directly to membrane; without recurved basal keel; bifurcate portions of spicule denoted as dorsal and ventral lobes; dorsal lobe shorter than ventral lobe, usually marginally serrate or bifurcate; bifurcate portions denoted as medial and lateral rami; ventral lobe longer than dorsal lobe, narrow and recurved distally, sometimes bifurcate distally (fig. 39A–D). **Left paramere**: L-shaped; basal region unmodified from remainder of paramere body, sensory lobe at most moderately produced, shaft narrowed and with broad to narrow pointed apex (fig. 39G, H), rarely bifurcated (fig. 16C, D), but never with apical cleft or mitten shaped (fig. 4C, D). **Right paramere**: Species specific, variously spinose and produced in apical, subapical or medial, and basal regions, all spines projecting from ventral margin (figs. 15, 17, 28, 32J–O, 38, 41, 51, 64I–L).

Female: Coloration, vestiture, and structure as in male, except vertex wider, eye

smaller, antennal segment II narrower, and costal margin usually more strongly convex. ABDOMEN: **Subgenital plate**: Triangular, broadly shield shaped with blunt apex; base of ovipositor located anterior to longitudinal midpoint of abdomen. GENITALIA: **First gonapophysis**: Overlap at apices variable, usually left overlaps right (fig. 23A, B), sometimes right overlaps left (fig. 40A, B); size at overlap variable. **Vestibulum**: Anteroventral margin of anterior wall sclerotized medially, spanning lateral margins of bursa copulatrix (fig. 40A), sometimes slightly incised medially (fig. 23A), or with deeper more obviously sclerotized ventral dimension (fig. 58A). **Left first gonapophysis**: Composed of two sections—anterior section strongly produced and variously modified (fig. 23B, 40B, 47B, 53B, 70B), posterior section elongate, slightly produced medial to first ramus and larger than corresponding section of right first gonapophysis; mediodistal area prominent, obviously larger than on right first gonapophysis; dorsal surface concave or protuberant; size of apex variable. **Ventral labiate plate**: Base with variable width, either moderately wide or wide; posterior margin strongly sclerotized and prominently produced into vulva (fig. 40A), sometimes cleft apically (fig. 23A). **Dorsal labiate plate**: Area ventral and anterior to rings with microtrichae; lateral margins strongly infolded, including D-shaped sclerotized rings; paired medial sclerites of greater width than length and dorsal anteromedial margin and dorsal region membranous (fig. 70A), except in *S. clavatus*. **Second gonapophysis**: Anteromedial surface slightly or strongly produced (fig. 70C). **Interramal sclerite**: Dorsomedial margin with anterior margin variably outpocketed; medial region platelike, variously overlapped by adjoining margin of lateral sclerites; posteromedial surface with variably produced sclerotization abutting ovipositor bulb (figs. 23D, 40D). **Interramal lobe**: Strongly sclerotized, broadly bulging basally (posteriorly) and tapered to single or rarely bifurcate distal (anterior) projection(s) that curve medially; margins of interramal lobe densely covered with numerous, moderately long, platelike and acute microtrichae; with dorsal (basal or posterior) insertion usually with membranous attachment; dorsomedial (posteromedial) and ventral (anterior) margins with serrate lobes of variable length and size (figs. 53D, 70D).

DISCUSSION: The type species of *Amulacoris* (*subalbicans*) and *Guerrerocoris* (*punctatus*) are herein considered to species of *Slaterocoris*, thus making both genera junior synonyms of *Slaterocoris*. See the discussions below under each nominal species treatment.

Some features of the female genitalic morphology require discussion. For the members of the *flavipes* species group the ventral labiate plate with a strongly produced and medially cleft ventral projection (59-3) was mapped on the cladogram (fig. 2) as a homoplasious synapomorphy, because one species of the group, *S. longipennis*, is polymorphic for this character. The cleft medial portion of the ventral labiate plate was not observed in any species of *Slaterocoris*. Two of the species in this group, *flavipes* and *longipennis*, also have the ventral medial margin of the anterior wall cleft (57-4). Perhaps both indentations indicate a fusion or suture of the left and right sides of the first gonapophyses.

The paired, medial sclerotized plates of the dorsal labiate plate with width greater than length (60-2) are more widely separated from each other in *Slaterocoris* than in *Jornandinus* and *Josephinus*. The ventral labiate plate in *Ficinus* and *Jornandes* sometimes has a narrow ventral projection into the vulva (Schaffner and Schwartz, 2008); in all species of *Slaterocoris* this region is always broadly projecting. The most posterior portion of the left first gonapophysis is clearly separated from the more anterior region in the former genera (cf. ibid.: 14, 41, figs. 8B, 19C), whereas in *Slaterocoris* the posterior portion is not prominent.

The asymmetrical first gonapophyses in *Slaterocoris* show some novel conditions. In the *breviatus* group and *S. tanydexios*, the right side overlaps the left. The left side overlaps the right in the rest of the species. The size of the right gonapophyses is variable for species with this latter condition. The right gonapophyses is small in the *argenteus* (except *S. digitatus*) and *hirtus* groups and *S. ambrosiae*. The right gonapophyses in the *croceipes*, *flavipes*, *punctatus* (except *S. simplex*) groups, and *S. robustus* is only slightly

smaller than the left first gonapophyses. All species of *Slaterocoris* lack an inflatable lobe on the apex of the left first gonapophysis, as seen in *Ficinus sagittarius* Distant, 1893, *Jornandes cruralis* Distant, 1893, some *Lopidella* species (personal obs.), and *Cyllecoris histrionics* (L.) (Pluot-Sigwalt and Matocq, 2006).

The anteromedial part of second gonapophyses, ventral to the ovipositor bulb, is variably developed in *Slaterocoris*. About half the species have this region strongly or very strongly produced, while in the remaining species it is slightly produced as is the case with *Josephinus* and *Scalponotatus*. Compared with *Ficinus* (cf. Schaffner and Schwartz, 2008: 14, fig. 8C) and *Jornandes* (cf. ibid.: 41, fig. 19A, B), *Slaterocoris* does not have the thickened, dorsomedial (or posteromedial) region of the interramal sclerite strongly produced anteriorly (ventrally). Only *S. simplex* (fig. 66B) with a narrow lobe (68-1) comes closest to this morphology. Otherwise the medial region of the interramal lobe is at most strongly sclerotized as a plate in the same plane as the reminder of the lobe, appearing as an outpocket (68-2; e.g., *S. tanydexios*, fig. 70D). The ventral medial portion of interramal sclerite is strongly sclerotized with an obscure junction adjacent to the lateral regions in *Jornandinus*. Although the medial region is strongly sclerotized (64-1) in *Slaterocoris*, there is always a obvious junction between the medial and lateral regions (fig. 40D).

BIOLOGY: Almost all the plant records associated with species of *Slaterocoris* are Asteraceae species, either herbaceous or woody, perennial or sometimes annual. The putative hosts gleaned from label data, previous descriptions, regional compilations (see Methods and Materials), and a few ecological studies (see below) are listed in table 4. I have distinguished two levels of host utilization on asteraceous plants. A plant species was construed as either a major or minor host plant based on the number of specimens collected on a particular plant species at a single locality as well as the preponderance of collecting events where specimens were collected from the same plant. For the major Asteraceous host plants, table 5 presents a list of the species of *Slaterocoris* and *Scalponotatus maturus* that utilize them.

The life history of *Slaterocoris pallipes* on *Baccharis halimifolia* has been studied in substantial detail, with observations from most of the distributional range of the species (Wheeler, 1981). The seasonality and feeding strategies of *S. atritibialis*, *S. breviatus*, and *S. stygicus* were ascertained in two studies investigating Miridae inhabiting goldenrod, *Solidago* spp., in southeastern Ontario (Reid et al., 1976) and central New York (Messina, 1978). The conclusions reached in the *Solidago* studies were from a limited portion of the overall range of three species. The phenology and relative abundance of these three *Slaterocoris* species were roughly similar; only the absolute dates differed (Reid et al., 1976; Messina, 1978). *Slaterocoris atritibialis* adults occurred earlier and were less abundant than the later occurring and more abundant *S. breviatus*. *Slaterocoris stygicus* was virtually absent in the Ontario study, but in New York, matched the phenology of *S. breviatus*, albeit with lower abundance. These three species of the *S. breviatus* group, although not referenced by specific name, were also included in plant-insect interactions studies of herbivore suites (Maddox and Root, 1990) and genetic variation of *Solidago* (Maddox and Root, 1987). Contrary to the previous studies, a considerable number of *S. stygicus* were taken on the annual *Ambrosia trifida* prior to bloom. Wheeler (2001) reported foliar chlorosis on this host by *S. stygicus*. The label data are the only guides to the hosts of the two remaining species of the *S. breviatus* group, *S. pallidicornis* and *S. solidaginis*, where unspecified species of *Solidago* and small herbaceous *Artemisia* species appear to be hosts (but cf. *S. pallidicornis,* below) with the bugs clearly present prior to the flowering period of the plants.

Because species of the *S. breviatus* group are distributed primarily in eastern North America, their life history information may not be entirely transferrable to the genus as a whole. The majority of the other species in the genus are predominantly inhabitants of woody asteraceous shrubs in desert and montane habitat of western North America extending from the Yukon, Canada, to

TABLE 5
Species of *Slaterocoris* and *Scalponotatus* Utilizing Major Asteraceae Host-plant Species[1]

Ambrosia

A. artemisiifolia
S. ambrosiae

A. chenopodiifolia
Sc. maturus

A. confertiflora
Sc. maturus, ***S. ambrosiae***

A. deltoidea
Sc. maturus

A. dumosa
Sc. maturus, ***S. ambrosiae***

A. eriocentra
Sc. maturus, ***S. ambrosiae***

A. psilostachya
S. ambrosiae

A. trifida:
S. breviatus, S. stygicus

Artemisia

A. cana
S. atritibialis, S. pallicornis, ***S. robustus***, *S. tibialis*

A. douglasiana
S. solidaginis

A. filifolia
S. croceipes, *S. rubrofemoratus*

A. frigida
S. pilosus, ***S. robustus***, *S. tibialis*

A. tridentata
S. apache, *S. croceipes*, *S. flavipes*, *S. fuscomarginalis*, *S. longipennis*, *S. pilosus*, ***S. robustus***, *S. rubrofemoratus*, S. stygicus, *S. tibialis*

A. vulgaris
S. solidaginis

Baccharis

B. braunii
S. pallipes

B. halimifolia
S. pallipes

Chrysothamnus

C. viscidiflorus
S. croceipes, *S. flavipes*, *S. longipennis*, ***S. robustus***, *S. rubrofemoratus*, *S. sheridani*

Encelia

E. actonii
Sc. maturus

E. farinosa
Sc. maturus, ***S. ambrosiae***

E. frutescens
Sc. maturus, ***S. ambrosiae***

E. virginensis
Sc. maturus

Ericameria

E. nauseosa
Sc. maturus, *S. apache*, *S. croceipes*, *S. flavipes*, *S. longipennis*, *S. pilosus*, *S. sheridani*, *S. sparsus*, *S. tibialis*

E. parryi
S. croceipes

Gutierrezia

G. californica
S. flavipes

G. microcephala
S. flavipes

G. sarothrae
S. flavipes, *S. fuscomarginalis*, *S. longipennis*, *S. sheridani*

Silphium perfoliatum
Slaterocoris hirtus

Solidago

S. altissima
Slaterocoris stygicus

S. canadensis
Slaterocoris atritibialis, S. breviatus, S. stygicus

S. gigantea
Slaterocoris breviatus

Tetradymia glabrata
S. longipennis

[1] *S.* = *Slaterocoris*, *Sc.* = *Scalponotatus*; *apache* group in italics, *breviatus* group underlined, *flavipes* group in italics and underlined, *hirtus* group in normal font; *Slaterocoris ambrosiae* and *S. robustus* not placed in a group in bold italics.

Oaxaca, Mexico. Cognizant of these limitations, we might nonetheless predict that the remaining species of *Slaterocoris* probably have similar life histories to those of the *S. breviatus* group. The key features are diapause in the egg stage, activity relatively early in the season, feeding apparently restricted to vegetative plant tissue, and univoltine life cycle. Kraft and Denno (1982) suggested that the strategy for the univoltine, mesophyll feeder, *S. pallipes* was to utilize the higher concentration of nitrogen in young, early season leaves of *B. halimifolia*, completing its

life cycle prior to the lower foliar nitrogen content of the host in late summer. Wheeler (1981) extended this interpretation of early season utilization of higher foliar nitrogen concentration to the *Solidago* feeders discussed above.

The life history pattern for the other species of *Slaterocoris* is roughly similar where label data documenting hosts are available. The aptly named *S. ambrosiae* utilizes herbaceous and woody perennial species of *Ambrosia* in the southwestern desert and annual species of the genus in the central plains. It apparently reaches the adult stage and completes mating and oviposition before the bloom period of the hosts. At least two species of the *S. hirtus* group are exclusively inhabitants of the herbaceous perennial, *Silphium perfoliatum*, and were collected previous to its main bloom period. Foliar chlorosis was noted on this host as the result of feeding by *S. hirtus* (Wheeler, 2001). The host(s) for the remaining species of this group, *S. alpinus*, is unknown. The species of the *S. apache* and *S. flavipes* groups (10 species) and *S. robustus* all utilize woody perennials hosts of *Artemisia*, *Chrysothamnus*, *Ericameria*, and to a lesser extent species of *Gutierrezia* and *Tetradymia* (see table 5). The bugs are active on the host species of all these genera before the late summer blooming period. The host of *S. atratus*, a putative member of the *S. apache* group, is unknown.

Beyond sporadic records noting the collection from asteraceous plants, nothing definitive in known concerning the hosts of the remaining species of *Slaterocoris*. These eight species are all distributed in Mexico, except for *S. digitatus* from the Chisos Mountains, Texas. The phenology of the adults of these species is obviously later in the season than all the previous discussed species, from late July to September. Only further investigation with documented hosts will determine whether the Mexican species have a plant-utilization pattern similar to the species distributed in the shrub lands and temperate regions in the United States.

Wheeler (2001, personal obs.) made reference to the attraction of *Slaterocoris* species to the inflorescence of poison hemlock, *Conium maculatum* L. (Apiaceae), a plant with an open floral system that does not restrict access to nectar and pollen. Reid (1974) determined that the rate of parasitism was 8%–12% in *S. atritibialis*, *S. breviatus*, and *S. stygicus* on *Solidago* in southern Ontario by *Hexamermis* species (Nematoda: Mermithidae).

SPECIES RECOGNITION: Black is the predominant color of the body and appendages. Where pale markings exist they are usually important in species recognition. Two *punctatus*-group species, *S. clavatus*, *S. maculatus*, have distinct pale markings near the medial margin of the eye. Two species from different species groups, *S. pallipes* and *S. sparsus*, have entirely pale legs. Some species are recognized by various pale markings on antennal segments I or II, as well as the coxae, femora, or tibiae. Dorsal vestiture characteristics facilitate the recognition of several species, e.g., the long, dense, erect or suberect setae of the *hirtus* group, or the short, sparse setae of the *breviatus* group.

Variation in the solitary dorsal endosomal spicule is congruent with vestiture and coloration pattern and is important for species recognition. Intraspecific variation in the endosomal spicule was observed during the course of this study in some species and is documented in the illustrations for those species. The most reliable characters for distinguishing species are located on the endosomal spicule and the right paramere. Distinctive features of the dorsal and ventral lobes of the endosomal spicule include the extent of marginal serration, whether the shaft of the distal portions are flat or rounded, and whether the dorsal lobe is further divided into medial and lateral sections. The *flavipes* group contains species that can be diagnosed based on the endosomal spicule alone, with the dorsal lobe being twisted along its long axis. Two *punctatus*-group species, *S. clavatus* (fig. 57A, B) and *S. simplex* (fig. 65C–E), have autapomorphic endosomal spicule structure. Each species group has a specific formation of the right paramere, that in combination with other characters, allow species recognition. The *apache* group has a prominent basal lobe, the *breviatus* group has a roughly radial arrangement of the apical spines, the *flavipes* group has the apical spines narrowed, and the *hirtus* group has the apical spines

elongate and parallel. Although the left paramere is relatively invariant, the obviously bifurcated apex, will unequivocally allow recognition of *S. ambrosiae*.

Features of the female genitalia tend to be significant at the generic level. For example, the strongly sclerotized anteromedial margin of the dorsal labiate plate is known only from species of *Josephinus*. Within *Slaterocoris*, the conformation of first gonapophyses, with the apex of the right side much larger and overlapping that of the left side will distinguish the *breviatus* group.

CHECKLIST OF SPECIES-GROUP NAMES PROPOSED OR CURRENTLY USED IN *SLATEROCORIS*

(valid species names in *Slaterocoris* are listed in boldface, junior synonyms are underlined, and species placed in other genera are in italics)

alpinus Kelton, 1968
ambrosiae (Knight, 1938) (*Strongylocoris* Blanchard, 1938)
apache Kelton, 1968
argenteoides, new species
argenteus Kelton, 1968
arizonensis Knight, 1970 = *ambrosiae* (Knight, 1938)
atratus (Uhler, 1894) (*Stiphrosoma* Fieber, 1861)
atritibialis (Knight, 1938) (*Strongylocoris* Blanchard, 1840)
basicornis Knight, 1970 = *sheridani* Knight, 1968
bifidus Knight, 1970 = *apache* Kelton, 1968
bispinosus Knight, 1970 = *ambrosiae* (Knight, 1938)
breviatus (Knight, 1938) (*Strongylocoris* Blanchard, 1938)
burkei Knight, 1970 = *apache* Kelton, 1968
clavatus, new species
croceipes (Uhler, 1893) (*Stiphrosoma* Fieber, 1861)
custeri Knight, 1970 = *sheridani* Knight, 1968
dakotae Knight, 1970 = *sheridani* Knight, 1968
digitatus Knight, 1970
elongatus, new species
flavipes Kelton, 1968
fuscicornis Knight, 1970 = *mohri* (Knight, 1941)
fuscomarginalis Knight, 1970
getzendaneri Knight, 1970 = *stygicus* (Say, 1932)
grandis Kelton, 1968 = *punctatus* (Distant, 1893)
hirtus (Knight, 1938) (*Strongylocoris* Blanchard, 1938)
knowltoni Knight, 1970 = *longipennis* Knight, 1968
longipennis Knight, 1968
maculatus, new species
minimus Knight, 1970 = *breviatus* (Knight, 1938)
mohri (Knight, 1941) (*Strongylocoris* Blanchard, 1938)
nevadensis Knight, 1970 = *robustus* (Uhler, 1895)
nicholi Knight, 1970 = *rubrofemoratus* Knight, 1968
ovatus Knight, 1970 = *ambrosiae* (Knight, 1938)
pallidicornis (Knight, 1938) (*Strongylocoris* Blanchard, 1938)
pallipes (Knight, 1926) (*Strongylocoris* Blanchard, 1938)
pilosus Kelton, 1968
punctatus (Distant, 1893) (*Jornandes* Distant, 1884)
rarus Knight, 1970 = *breviatus* (Knight, 1938)
reinhardi Carvalho and Schaffner, 1973, see *Josephinus*, new genus
robustus (Uhler, 1895) (*Stiphrosoma* Fieber, 1861)
rubrofemoratus Knight, 1968
schaffneri Knight, 1970 = *alpinus* Kelton, 1968
sculleni Knight, 1970 = *flavipes* Kelton, 1968
severini Knight, 1970 = *ambrosiae* (Knight, 1938)
sheridani Knight, 1968
simplex Kelton, 1968
solidaginis Kelton, 1968
sparsus Kelton, 1968
stygicus (Say, 1832) (*Capsus* Fabricius, 1803)
subalbicans (Distant, 1893) (*Jornandes* Distant, 1884)
tanydexios, new species
texanus Knight, 1970 = *sheridani* Knight, 1968
tibialis Knight, 1970
uniformis (Van Duzee, 1925) (*Strongylocoris* Blanchard, 1938) = *robustus* (Uhler, 1895)
utahensis Knight, 1968 = *longipennis* Knight, 1968
woodgatei Knight, 1970 = *sheridani* Knight, 1968

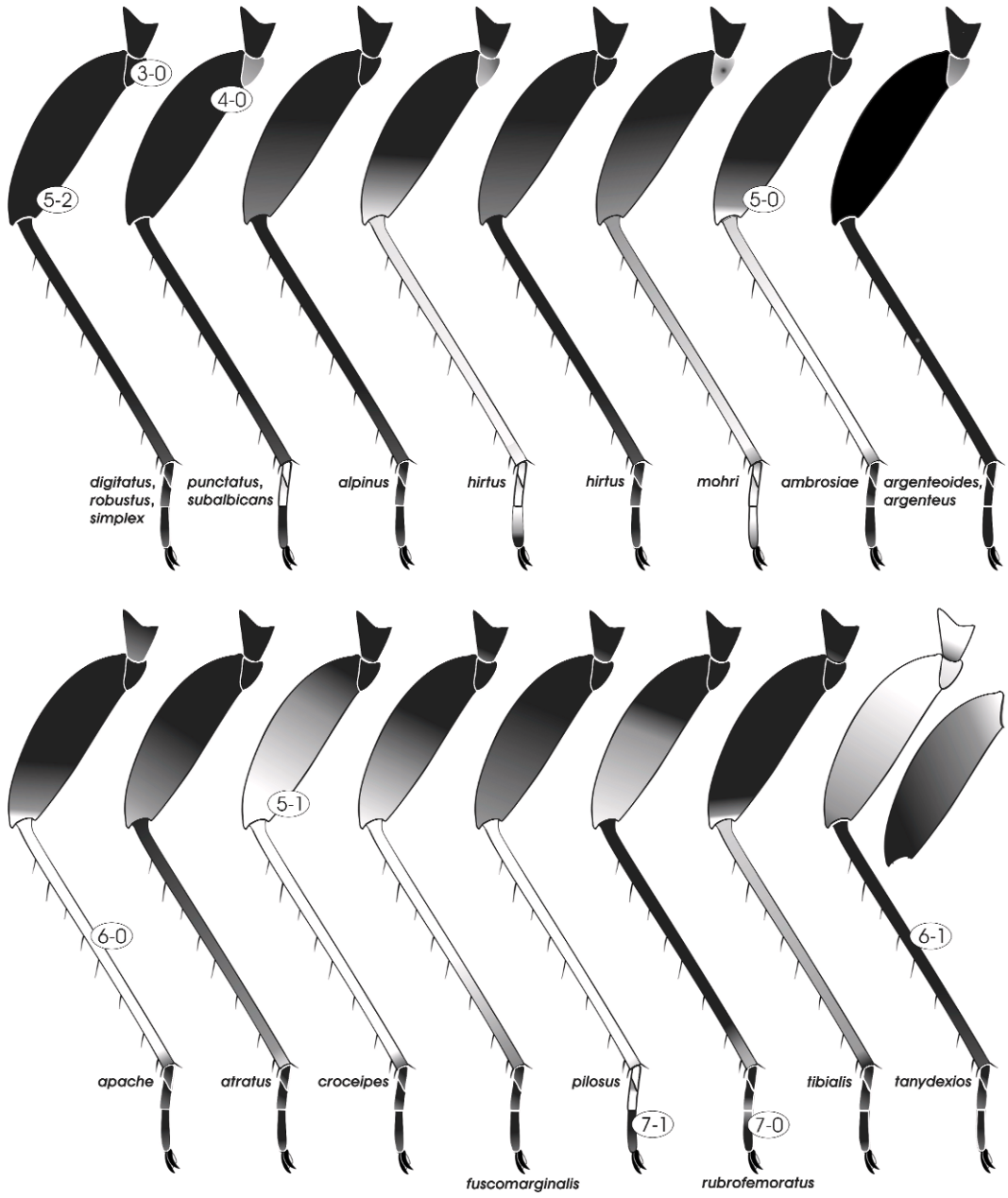


Fig. 12. Hind leg coloration for *Slaterocoris* species.

The key to the species of *Slaterocoris* utilizes coloration, dorsal vestiture, and male genitalia to separate species. Because the coloration is predominantly black, the placement of pale regions of the head (pls. 1, 2), antennal segments I and II and legs (figs. 12, 13) are significant; allowance is made for the generally more extensive pale coloration in the female. Differences in the dorsal vestiture (pl. 4) hold for both sexes and are best viewed on the corium nearest the clavus in skewed lateral view. Male genitalic diversity, accompanied by

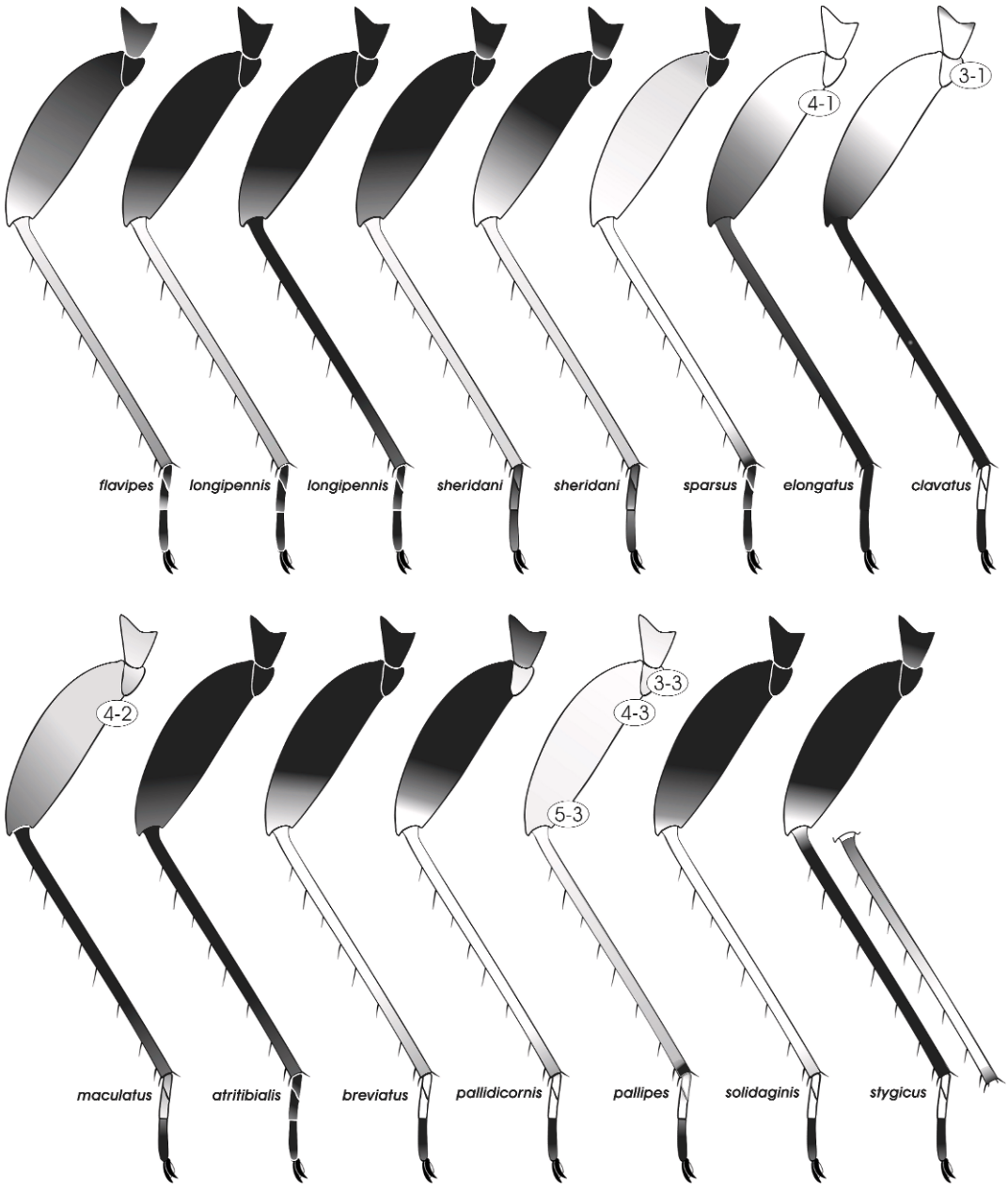


Fig. 13. Hind leg coloration for *Slaterocoris* species.

illustrations of intraspecific variation, focuses on the two lobes of the endosomal spicule. Attention is given to the ramification and serration of the distal regions. In the right paramere the number and placement of the ventral spines are significant, whereas the length and distal thickness of the left paramere only distinguishes the *breviatus* species group. As with many other plant bug genera, keys to the included species work best for males; females are sometimes only identifiable when associated with males.

KEY TO THE SPECIES OF *SLATEROCORIS* WAGNER

1. Hind coxa entirely dark; sometimes with only apices pale 2
– Hind coxa almost completely whitish yellow or yellowish brown; base sometimes dark; sometimes fore- and middle coxae pale 34
2. Legs not entirely black; femora or tibiae, or both, with extensive yellow or orange; if tarsomeres II and III pale, then dorsal vestiture short and sparse 3
– Legs entirely black; sometimes trochanters infuscate; if tarsomeres II and III pale, then dorsal vestiture long and dense 26
3. Dorsal vestiture dark brown or black 4
– Dorsal vestiture pale golden or silvery . . . 19
4. Dorsal vestiture short and sparse, almost glabrous; femora yellowish orange, except for extreme black bases 5
– Dorsal vestiture longer and denser; femora black with variable pale yellow apical regions, never black just at bases 11
5. Femora mostly pale yellow to yellowish orange (fig. 13); male genitalia as in figs. 45D, E, 48A–D . . . . . *sparsus* Kelton
– Femora mostly black, pale at apices only. . 6
6. Antennal segments I and II mostly yellow or yellowish brown; female segment II with at most with small, diffuse, dark basal annulus; male genitalia as in fig. 33A–L. . . . . *pallidicornis* (Knight)
– Antennal segments I and II mostly black; female segment II with larger, discrete or diffuse, larger dark basal annulus; male genitalia otherwise figs. 30A–J, 32A–O, 34A–I, 35A–I, 38A–M, 39A–J. 7
7. Tibiae pale. 8
– Tibiae mostly darkly infuscate or black . . 9
8. Pale yellowish white apices of femora clearly delineated from black portions; labium longer than width of head across eyes; male genitalia as in fig. 35A–I with apical spines of right paramere split into two portions (fig. 35G–I), lateral portion with fewer spines or points than medial portion; basal lobe of right paramere thick and blocky; endosomal spicule with bifurcate dorsal lobe, medial bifurcation reaching practically to tip of lateral bifurcation (fig. 35A, B); distributed in California and southern Oregon. . . . . *solidaginis* Kelton
– Pale yellowish brown apices of femora diffusely separated from black portions; labium almost equal to width of head across eyes; male genitalia as in figure 32A–O; with apical spines of right paramere not split into two portions (fig. 32I–O), but with numerous equally separated spines or points; basal lobe of right paramere clearly removed from basal region of paramere, curved; endosomal spicule with bifurcate dorsal lobe, medial bifurcation short just reaching past base of lateral bifurcation (fig. 32A–D); distributed east of 100° W latitude . . . . . *breviatus* (Knight), in part
9. Second antennal segment subequal to width of head across eyes; labium shorter than, or subequal to, width of head across eyes; hind tibia black; costal margins arcuate, especially at base in female; male genitalia as in figure 30A–J with ventral lobe of endosomal spicule long and marginally serrate (fig. 30A, B); right paramere with apical spines or points divided into two sections with a few spines of roughly equal length (fig. 30C–G) . . . . . *atritibialis* (Knight)
– Second antennal segment greater than width of head across eyes; labium longer than head width; costal margins of hemelytra only slightly arcuate; hind tibia sometimes yellowish black, becoming paler on distal half; male genitalia as in figures 32A–O, 38A–M, 39A–J, with either ventral lobe of endosomal spicule short and without marginal serrations (fig. 39A–D) and right paramere with long, curved apical points (fig. 38A–M) or ventral lobe of spicule with lateral bifurcation narrow distally (fig. 32A–D) and apical spines on right paramere short and with roughly equally length (fig. 32J–O) 10
10. Fore- and middle tibiae black; male genitalia as in figure 32A–O with apical spines of right paramere short and with roughly equal length; recurved portion of ventral endosomal spicule not expanded; female antennal segment I mostly pale with black basal annulus, segment II pale with discrete and narrow black basal and apical annuli . . . . . *breviatus* (Knight), in part
– Fore- and middle tibiae yellowish brown to yellowish black; male genitalia as in figures 38A–M and 39A–J with apical spines of right paramere long and curved; recurved portion of ventral endosomal spicule expanded; female antennal segment I black, segment II with diffuse broader and wider black basal and apical annuli . . . . . *stygicus* (Say)
11. Hind tibia black, or only partly yellow . . . 12
– Hind tibia yellow or orange. 15
12. Femora reddish orange on apical halves; male genitalia as in figure 26A–N . . . . . *rubrofemoratus* Knight
– Femora mostly black, pale at apices only. . 13
13. Dorsal vestiture erect and dense, fine; male genitalia as in figures 54A–F and 55A–I . . . . . *mohri* (Knight)

– Dorsal vestiture suberect, not so dense, coarse 14
14. Foretibia partly pale; antennal segment I pale; male genitalia as in figure 19A–E. . . . . *atratus* (Uhler)
– Foretibia black; antennal segment I black; male genitalia as in figure 49A–O. . . . . *alpinus* Kelton
15. Dorsal vestiture long and dense; male genitalia as in figures 54A–F and 55A–I . . . . . *hirtus* (Knight)
– Dorsal vestiture shorter, moderately dense to moderately sparse 16
16. Apex of hind femur (sharp delineation) and tibia yellow (fig. 12); male genitalia as in figures 15A–J and 16A–D . . . . . *ambrosiae* (Knight)
– Apex of hind femur (diffuse delineation or wide) and tibia orange 17
17. Dorsal lobe of endosomal spicule twisted at base (fig. 45A–C); antennal segment II shorter than foretibia; additional male genitalia as in figure 46A–L . . . . . *sheridani* Knight
– Dorsal lobe of endosomal spicule not twisted at base; antennal segment II longer than foretibia. 18
18. Femora with from basal quarters to halves black with remainder dark orange-red; dorsal vestiture shining golden, short, and reclining; male genitalia as in figure 21A–I . . . . . *croceipes* (Uhler)
– Femora black except for pale apices; dorsal vestiture shining dark, long, and suberect; endosoma as in figure 24C–E. . . . . *tibialis* Knight
19. Hemelytral membrane pale, apical margin bordered by a dark reddish brown band; veins narrowly bordered by dark reddish brown; endosoma as in figure 24A,B . . . . . *fuscomarginalis* Knight
– Membrane and veins uniformly infuscate. . 20
20. Femora mostly orange (black and orange portions with variable extent); antennal segment I usually pale yellowish distally; tarsomeres black; male genitalia as in figures 41A–J and 42A–E . . . . . *flavipes* Kelton
– Femora mostly black, yellow at apices; antennal segment I usually black; tarsomeres black or segment I and II pale 21
21. Male 22
– Female 24
22. Cuneus very long, almost equal to width of head; genitalia as in figures 43A–G and 44A–H . . . . . *longipennis* Knight
– Cuneus shorter, not longer than vertex plus eye 23
23. Antennal segment I mostly yellow; tarsomeres I and II pale; dorsal vestiture dense, long, suberect, silvery; genitalia as in figure 25A–N with basalmost of three distal spines of right paramere small; distal portion of ventral endosomal lobe somewhat expanded and twisted. . . . . *pilosus* Kelton
– Antennal segment I mostly black; tarsomeres I and II black; dorsal vestiture moderately dense, long, suberect, shining pale; genitalia as in figures 17A–I and 18A–E with distal spines of right paramere of roughly equal length; distal portion of ventral endosomal spicule narrow, usually attenuate, not twisted . . . . . *apache* Kelton
24. Dorsal vestiture sparse . . . . . *apache* Kelton
– Dorsal vestiture dense 25
25. Tarsomeres I and II pale . . . . *pilosus* Kelton
– Tarsomeres I and II black. . *longipennis* Knight
26. Frons smooth; dorsal vestiture relatively sparse and black, somewhat bristlelike and suberect; setae on anterolateral margin of pronotum long and erect; male genitalia as in figures 72A–F and 73A–C . . *robustus* (Uhler)
– Frons striate; dorsal vestiture dense and either brown, fine, and recurved, or with silvery sericeous setae, or with silvery pilose setae 27
27. Tarsomeres I and II pale (fig. 12). 28
– Tarsomeres I and II black (fig. 12). 29
28. Dorsal vestiture with fine brown moderately dense setae only; male genitalia as in figure 64A–L . . . . . *punctatus* (Distant)
– Dorsal vestiture with combination of silvery shining, sericeous, adpressed setae (most numerous adjacent to claval suture) and longer, silvery shining, suberect setae. . . . . *subalbicans* (Distant)
29. Dorsal vestiture brown 30
– Dorsal vestiture silvery 31
30. Dorsal vestiture with setal length shorter than diameter of antennal segment II; male with segment II shorter than width of head across eyes, female with length of segment II 0.76–0.85; male genitalia as in figure 49A–O. . . . . *alpinus* Kelton
– Dorsal vestiture with setal length longer than diameter of antennal segment II; male with segment II equal to or longer than width of head across eyes; female with length of segment II 1.30–1.50; male genitalia as in figures 51A–G and 52A–J . . . *hirtus* (Knight)
31. Coxae apically infuscate, trochanters infuscate; male genitalia as in figures 28A–H and 29A–D . . . . . *argenteoides*, new species
– Coxae and trochanters black 32
32. Dorsal vestiture with combination of sericeous, adpressed setae (most numerous adjacent to claval suture) and longer, suberect setae; male genitalia as in figure 65A–M . . . . *simplex* Kelton

– Dorsal vestiture pilose composed of long, fine, apically recurved setae. 33
33. Corium conspicuously dimorphic, longer in male than female (4.30–5.40♂, 3.40–3.95♀); length of male antennal segment II 1.15–1.40; male genitalia as in figures 28I–L and 29E–G, with basal lobe of right paramere longer, somewhat curved and with one apical point (fig. 28I–L); endosomal spicule with apex of recurved ventral lobe reaching to base of dorsal lobe (fig. 29E) . . . . *argenteus* Kelton
– Corium weakly sexually dimorphic, only somewhat longer in male than in female (3.50–3.70♂, 3.40–3.73♀); length of male antennal segment II 1.00–1.10; male genitalia as in figure 29H–K with basal lobe of right paramere shorter and with two apical points (fig. 29K); endosomal spicule with apex of recurved ventral lobe barely surpassing apex of dorsal lobe (fig. 29H) . . . . . *digitatus* Knight
34. Dorsal vestiture short, sparse, recurved, and brown; frons black; male genitalia as in figure 34A–I. . . . . *pallipes* (Knight)
– Dorsal vestiture either long, dense, suberect, and silvery or moderately long, moderately dense, recurved and golden brown; if vestiture golden brown then frons pale orange-brown. 35
35. Dorsal vestiture moderately long, moderately dense, recurved and golden brown; frons pale orange-brown; male genitalia as in figure 61A–F . . . . . *maculatus*, new species
– Dorsal vestiture long, dense, suberect and silvery; frons black 36
36. Tarsomeres I and II black; male genitalia as figures 68A–F and 69A–C. . . . . *tanydexios*, new species
– Tarsomeres I and II pale whitish yellow . . 37
37. Antennal segments I and II pale; pale band on antennal segment I basally, pale triangular mark near antennal insertion on maxillary plate, female with pale mark on frons and vertex adjacent to eye, male sometimes with pale temporal mark; male with length of cuneus shorter than width of head across eyes; male genitalia as in figure 57A–H . . . . . *clavatus*, new species
– Antennal segments I and II black; head without pale markings; male with length of cuneus longer than width of head across eyes; male genitalia as in figure 60A–F. . . . . *elongatus*, new species

Slaterocoris ambrosiae (Knight)
Figures 12, 14–16; plate 1; map 2

Strongylocoris ambrosiae Knight, 1938: 5, fig. 2 (orig. desc.); Kelton, 1968: 1134: fig. 22 (disc.); Knight, 1970: 249, fig. 29 (disc.); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 196 (catalog).

Slaterocoris ovatus Knight, 1970: 247 (orig. desc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

Slaterocoris arizonensis Knight, 1970: 248, fig. 30 (orig. desc.); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 197 (catalog). NEW SYNONYMY.

Slaterocoris bispinosus Knight, 1970: 249, fig. 25 (orig. desc.); Schuh, 1995: 197 (catalog). NEW SYNONYMY.

Slaterocoris severini Knight, 1970: 250, fig. 28 (orig. desc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog). NEW SYNONYMY.

DIAGNOSIS: Distinguished from other *Slaterocoris* species by the conspicuous pale apex of the femur, the relatively pale tibia (fig. 12), the dense, suberect, brown simple setae (fig. 14C), and the male genitalia, especially the unique subapical tubercle of the left paramere (fig. 16C, D) and the basal spur on the base of the endosomal spicule (fig. 16A).

REDESCRIPTION: *Male:* Moderately small, elongate; length 3.20–5.10, width 1.45–2.20 (pl. 1). COLORATION: Black, including antenna, coxa, femur, and tarsomeres; apex of femur narrowly, and hind tibia, pale (fig. 12); sometimes tibia black in Puebla (Mexico) specimens. VESTITURE: Dense, moderately long, suberect brown simple setae (fig. 14C). STRUCTURE: Hemelytral length variable, costal margin sublinear; frons smooth (fig. 14A, B); mesothoracic spiracle and metathoracic scent-efferent system as in figure 14D. GENITALIA: **Pygophore**: Tergal process short, bifurcate with right side point directed toward midline (fig. 14E). **Phallotheca**: Left lateral surface slightly compressed (fig. 16B). **Endosomal spicule**: Ventral lobe of uniform thickness throughout apical region with weak marginal serration; dorsal lobe bifurcate with narrow, smooth rami (fig. 16A), sometimes rami sparsely serrate; base with spur (fig. 16A, arrow). **Right paramere**: Small; apical region with variable number of ventral spines; medial region with prominent pointed or serrate spine; basal lobe prominent, pointed or serrate (fig. 15A–J); sometimes strongly produced (fig. 15C). **Left paramere**: Distal por-

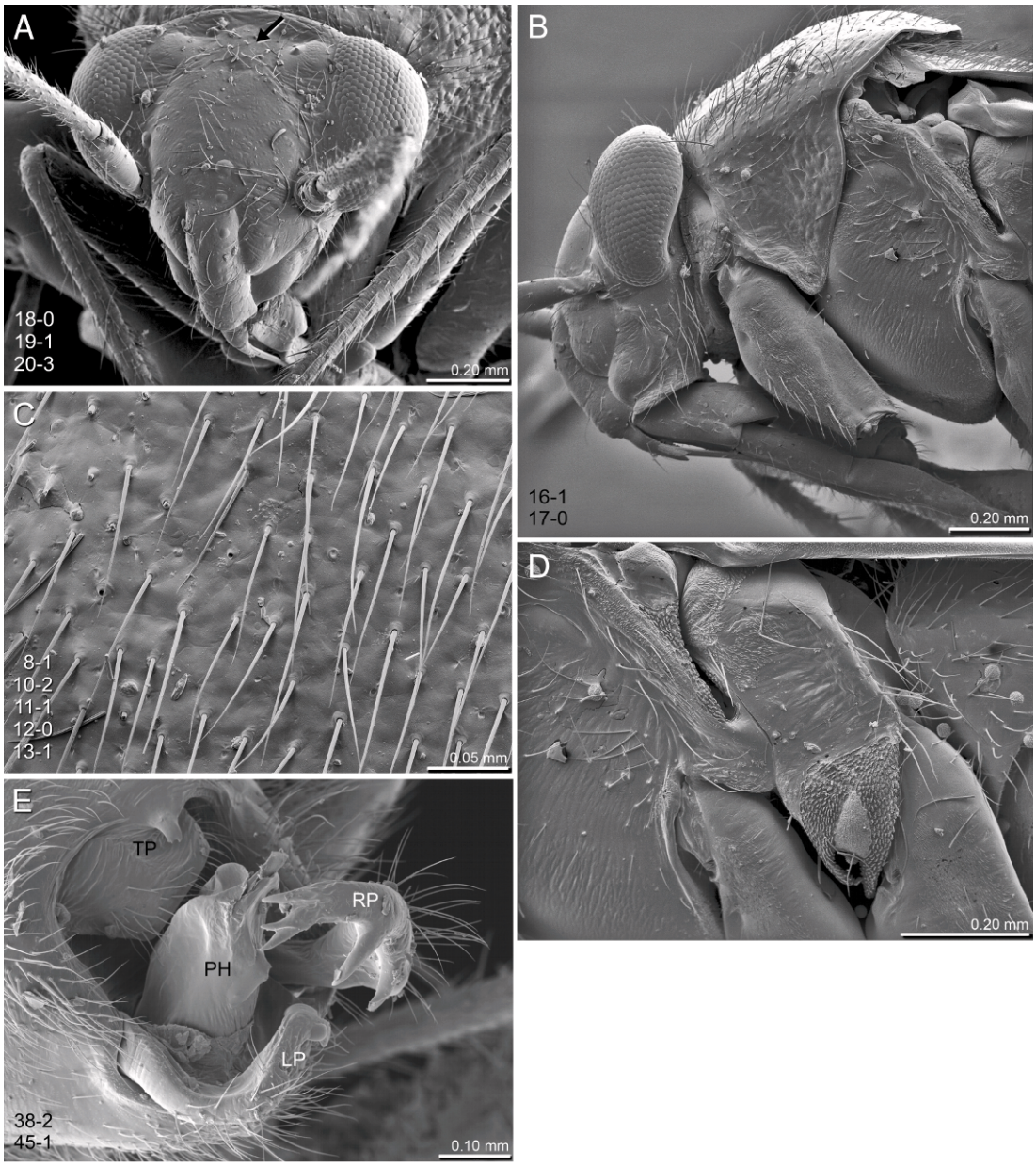


Fig. 14. *Slaterocoris ambrosiae*, scanning electron micrographs. **A**. Head and thorax, lateral view. **B**. Head and thorax, lateral view. **C**. Vestiture and cuticular sculpture of hemelytron. **D**. Mesothoracic spiracle and metathoracic scent-efferent system. **E**. Pygophore with left and right parameres, posterior view.

tion shorter than basal portion; distally with prominent subapical process (fig. 16C, D).

Female: Moderately small, obovate; Length 3.30–4.20, width 1.70–2.09 (pl. 1). STRUCTURE: Costal margin strongly convex. GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view; left greater than right at overlap; right lateral surface small. **Left first gonapophyses**: Dorsal surface concave, apex wide. **Vestibulum, anteroven-**

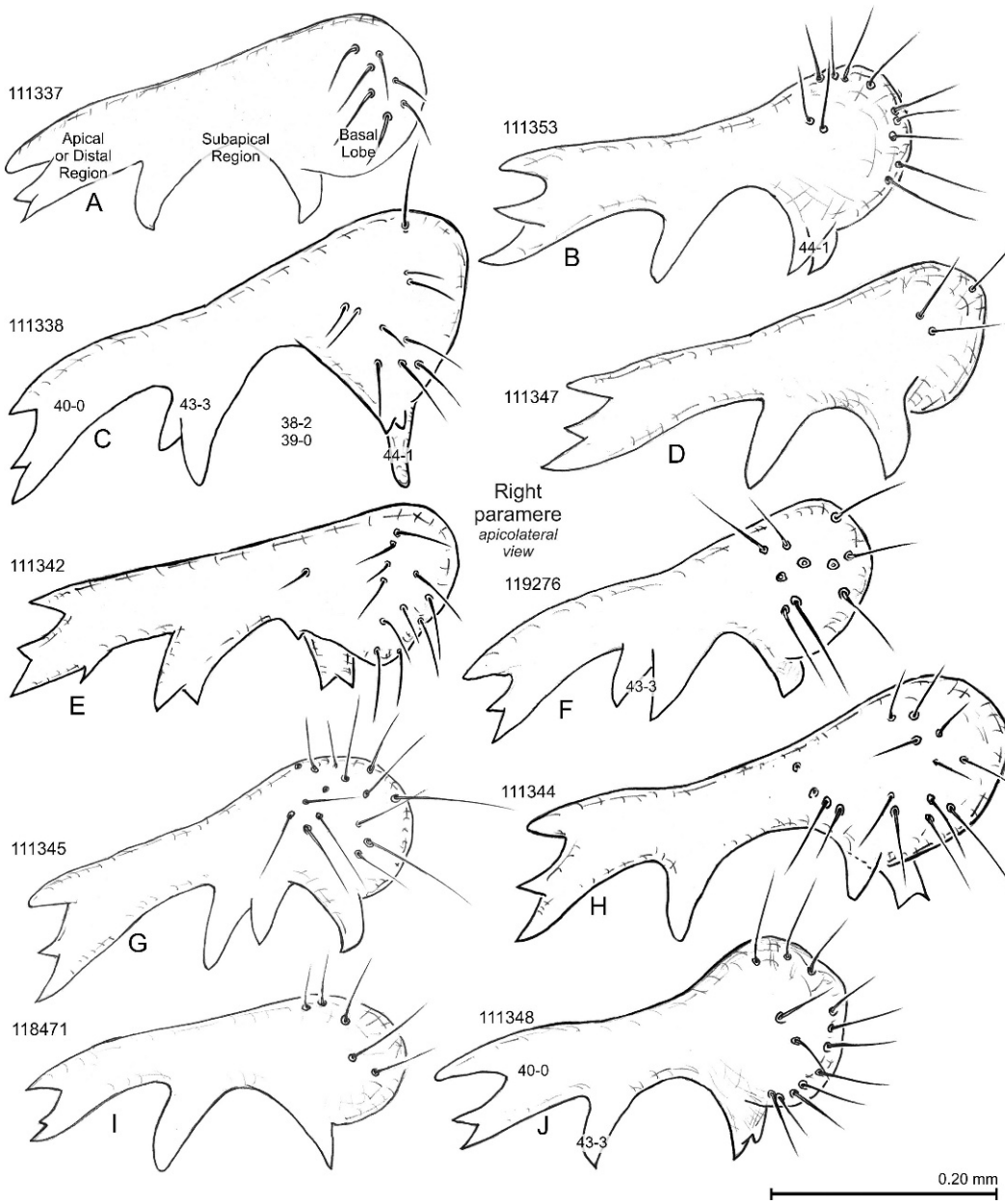


Fig. 15. *Slaterocoris ambrosiae*, right paramere. **A**. Kerrville, TX. **B**. Gallinas Cyn, NM. **C**. 6 mi E of Durango, DG. **D**. Emery, SD. **E**. Santa. Maria del Rio, SL. **F**. 4 mi W of Cercado, NL. **G**. San Luis de la Paz, GT. **H**. Ojo de Agua, GT. **I**. La Copita Res. Station, TX. **J**. Flagstaff, AZ.

tral margin of anterior wall: Sclerotized medially and sclerotized to lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced moderately, base wide, triangular. **Second gonapophyses**: Anterior medial surface strongly convex. **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly; posteromedial portion with tumid process abutting ovipositor bulb; lateral ventromedial regions overlapping ventromedial plate. **Interramal lobe**: Dorsal or basal insertion with membranous attach-

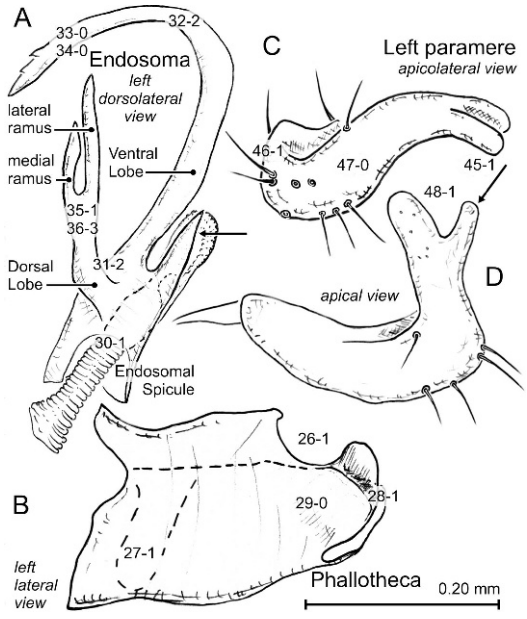


Fig. 16. *Slaterocoris ambrosiae*, male genitalia. Emery, SD.

ment; dorsomedial margin not produced as lobe; ventral projection long with concave anterior surface.

HOSTS: Records indicate that the predominant breeding hosts are species of the widespread and common genus *Ambrosia* (Asteraceae). In the southwestern portion of the range (Arizona and California), the hosts are *A. confertiflora*, *A. dumosa*, *A. eriocentra*, and *A. psilostachya*. Annual ragweed, *A. artemisiifolia*, is the only species known from the eastern portion of the range of *S. ambrosiae*. A very few specimens were taken from other Asteraceae: *Chrysothamnus* sp., *Encelia farinosa*, *E. frutescens*, *Gurierrezia* sp., *Hymenoclea salsola*, *Iva axillaris*, and *Parthenium* sp. Single specimens were found on non-Asteraceae listed in the "Specimens Examined" below; these are considered to be sitting records.

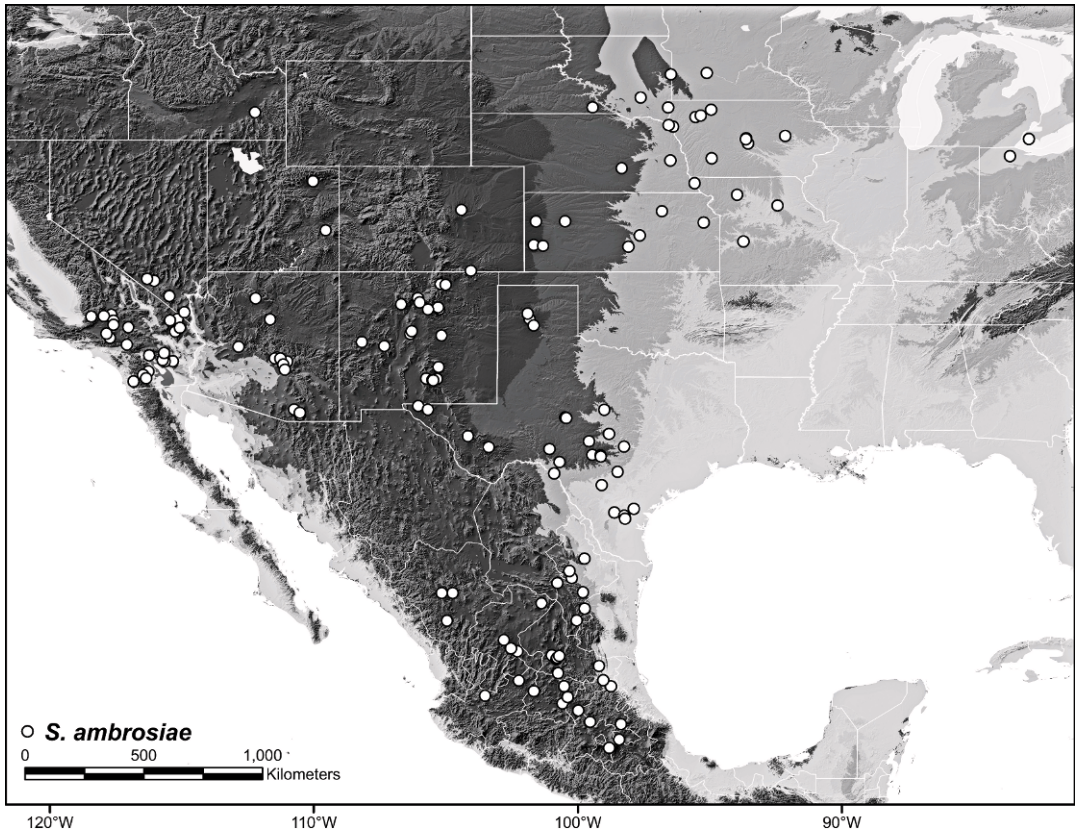
DISTRIBUTION: Widely distributed in North America, from extreme southwestern Ontario, Canada, and adjacent Michigan, west across the midwestern United States from South Dakota to Iowa, and south to Texas and California. In Mexico, *S. ambrosiae* is known from the eastern portion of the Central Plateau in Durango, south across the Sierra Madre Oriental of Nuevo Leon, and reaching its southern limit in the Sierra Transvolcanica from Jalisco to northern Puebla (map 2). The ruderal ecology of the hosts of *S. ambrosiae* certainly account for its wide habitat range in forest, grassland, and desert environs.

COLLECTION SUMMARY: 601 specimens from 167 collection events with earliest (March) and latest (December) records from Texas. The bulk of the collection events from the southern U.S. (Texas west to California) occur in April and May, with June to August dates predominating as the season progresses farther north. Collection dates from Mexico extend from July to September, with the latest (November) from Nuevo Leon.

DISCUSSION: The subapical tubercle of the left paramere and the prominent spur on the left side base of the ventral lobe of the endosomal spicule are unique to *S. ambrosiae*; however, there is no question concerning the correct generic placement of this species, as all the diagnostic characters of *Slaterocoris* are present. Based on the cladistic analysis, *S. ambrosiae* was not placed in a species group, but as the sister to a large number of species (figs. 1A–D, 2). Two characters support this arrangement: dense dorsal vestiture (10-2) and long ventral projection of the interramal lobe (69-2).

Knight (1938) described *S. ambrosiae* based on numerous males and females from Kansas, South Dakota, and Texas. Kelton (1968) and Knight (1970) distinguished it by the small body size, black antennae with short segment II, relatively long, brownish black vestiture, smooth frons, and right paramere of the male. All of these characteristics are variable throughout the range of *S. ambrosiae*. In males, the body length ranges from 3.20 to 5.10, antennal segment II length 0.70–1.20, ratio of the length of segment II to head width 0.83–1.31, and the structure of the right paramere is variable in the apical, medial, and basal spinose regions (cf. fig. 15A–J).

Based on a limited number of specimens, Knight (1970) described four nominal species, distinguished by setal color and a short antennal segment II: *S. arizonensis* (♂ holotype + 1♂, 1♀ paratypes—AZ, NM,



Map 2. Localities for *Slaterocoris ambrosiae*.

ZA), *bispinosus* (♂ holotype + 5♀ paratypes—SL), *ovatus* (♀ holotype, 1♀ paratype—CA, TX), and *severini* (♂ holotype—SD). Each typifies an extreme condition in one or more of the variable "diagnostic" features. Knight (1970) separated his nominal species and *S. ambrosiae* based on vestiture color (dark black or brown vs. pale golden or silvery) and density (dense vs. sparse), ratio of length antennal segment II and head width, and right paramere structure (basal spine bifurcate or not).

Only two structures of the male genitalia, the bifurcate apex of the left paramere (fig. 16C, D) and the prominent spur on left basal shoulder of the endosomal spicule (fig. 16A), are invariant in all specimens (the condition in *ovatus* is inferred from examination of external features). Additionally, the dorsal vestiture is relatively dense, long, suberect, and brown to black, the tibiae are yellow, the hemelytral membrane length is sexually dimorphic in some populations, and all known breeding hosts are species of *Ambrosia*. Because I cannot find constant differences in size, ratio, or genitalic structure to support the four nominal Knight (1970) species, and all fit within the variation established for these characters based on examination of specimens from throughout the range, I am treating all of them as junior synonyms of *S. ambrosiae*.

Among specimens of *S. ambrosiae* in the CNC, some from Durango, Mexico, have Kelton's manuscript name "*durangoensis*"affixed. A male from this collection event has an apparently aberrant prominent basal lobe of the right paramere (fig. 15C); others from the same population are typical of the species as in figure 15A, D. Some males with long hemelytra from San Miguel Texmelucan, Puebla, have dusky brown to black tibia, others from the same collection event have typically pale tibiae and are otherwise iden-

tical to other *S. ambrosiae*. The extremes of variation in right paramere morphology of *S. ambrosiae* are documented in figure 15A–J. In the apical region there appears to be a tendency for the ventral and medial spines of the right paramere to be smaller than the dorsal spine, and the ventral and medial spines are situated closer together and slightly removed from the dorsal spine.

HOLOTYPES: **MEXICO: San Luis Potosi:** 10 mi S of Rio Verde [1.52952° N 99.03717° W], 28 Jul 1970, Murray, Phelps, Hart, Schaffner, 1♂ (AMNH_PBI 00122240) (USNM) (*S. bispinosus*: junior synonym). **USA: Arizona:** ***Pinal Co.:*** Superior [33.29389° N 111.09556° W, 732 m], 16 Apr 1928, A.A. Nichol, 1♂ (AMNH_PBI 00133386) (USNM) (*S. arizonensis*: junior synonym). **California:** ***San Bernardino Co.:*** Barstow [34.89859° N 117.02281° W], 21 May 1938, J. Standish, 1♀ (AMNH_PBI 00122258) (USNM) (*S. ovatus*: junior synonym). **South Dakota:** ***Hanson Co.:*** Emery [43.60167° N 97.62222° W], 24 Aug 1927, H.H. Knight, 1♂ (AMNH_PBI 00134025) (USNM) (*S. ambrosiae*: senior synonym). ***Lincoln Co.:*** Newton Hills [Canton, 43.22443° N 96.58004° W], 24 Jun 1935, H.C. Severin, 1♂ (AMNH_PBI 00122265) (USNM) (*S. severini*: junior synonym).

OTHER SPECIMENS EXAMINED: **CANADA: Ontario:** Harrow, 42.03333° N 82.91666° W, 10 Aug 1997, P. Livingston, 1♂ (00329759) (DEBU); 14 Jul 1998, C. Teissen, (Fabaceae), 1♂ (00111336) (CNC). **MEXICO: Coahuila:** Cerrito, 20 mi SE of Saltillo, 25.21104° N 100.77253° W, 18 Jul 1963, H. and A. Howden, 1♂ (00111341), 1♀ (00111371) (CNC). **Durango:** 6 mi E of Durango, 24.8333° N 104.73728° W, 1981 m, 24 Jul 1964, L.A. Kelton, *Ambrosia* sp., 10♂ (00111338, 00111340, 00111437–00111444), 17♀ (00111445–00111461) (CNC), *Ambrosia* sp., 1♂ (00118605), 1♀ (00118606) (TAMU). 20 mi W of Durango, 24.83299° N 105.1535° W, 2195 m, 23 Jul 1964, L.A. Kelton, 5♂ (00111343, 00111363–00111366), 2♀ (00111367–00111368) (CNC). Navios, 26 mi E of El Salto, 23.78278° N 104.95381° W, 2438 m, 02 Aug 1964, L.A. Kelton, *Ambrosia* sp., 1♂ (00121652), 1♀ (00121653) (UCB). **Guanajuato:** 10 mi S of San Luis de la Paz, 22.06822° N 99.19916° W, 02 Sep 1962, W.F. Chamberlain, 2♂ (00118599–00118600), 1♀ (00118601), 1♂ (00118409) (TAMU). Leon, 21.1167° N 101.6667° W, 16 Aug 1953, C. and P. Vaurie, 1♀ (00108162) (AMNH). Ojo de Agua, 20.65° N 100.58333° W, 06 Sep 1969, L.A. Kelton, 35♂ (00111344, 00111351, 00111408, 00111641–00111672), 18♀ (00111623–00111640) (CNC). San Luis de la Paz, 21.3000° N 100.51666° W, 06 Sep 1969, L.A. Kelton, 1♂ (00111345), 3♀ (00111619–00111621) (CNC). **Hidalgo:** 15 mi S of Tulancingo, 19.86527° N 98.36666° W, 2591 m, 26 Aug 1962, Naumann and Roberts, 1♂ (00117798) (KU). **Jalisco:** Encarnación de Diaz, 21.5167° N 102.2333° W, 28 Jul 1951, P.D. Hurd, 1♂ (00119284) (UCB). **Mexico:** Guadalupe Hidalgo, 18.9667° N 98.8125° W, 01 Jul 1932, unknown, 1♂ (00119283) (UCB). Jilotepec, 19.95277° N 99.53472° W, 02 Sep 1969, L.A. Kelton, 2♀ (00111599–00111600) (CNC). **Nuevo Leon:** 4 mi W of El Cercado, 25.39998° N 100.23099° W, 06 Jun 1951, P.D. Hurd, 2♂ (00119276, 00119285) (UCB). 8 mi S of La Escondida, 26.13379° N 99.75° W, 24 Jul 1976, Peigler, Gruetzmacher, R. and M. Murray, Schaffner, 6♂ (00118187, 00118516–00118519, 00118596), 15♀ (00118537–00118551) (TAMU). 12.4 mi NE of Doctor Arroyo, 23.79401° N 100.04422° W, 08 Jul 1986, Kovarik and Schaffner, 2♂ (00118411, 00118598), 1♂ (00245370) (TAMU). 15 mi W of Linares, 24.85758° N 99.80795° W, 01 Jul 1973–02 Jul 1973, Mastro and Schaffner, 1♂ (00118470) (TAMU). Monterrey, 25.66666° N 100.31666° W, 22 Nov 1932, L.D. Tuthill, 2♂ (00117839–00117840) (KU). Santa Ana, 24.24166° N 99.74305° W, 08 Sep 1969, L.A. Kelton, 3♂ (00111591–00111593), 5♀ (00111594–00111598) (CNC). **Puebla:** San Martin Texmelucan, 19.28333° N 98.43333° W, 2237 m, 27 Aug 1969, L.A. Kelton, 7♂ (00111339, 00111602–00111607), 11♀ (00111608–00111618) (CNC). **Queretaro:** 20 mi N of Queretaro, 20.89072° N 100.38333° W, 31 Aug 1958, H.F. Howden, 2♂ (00111369–00111370) (CNC). 41 mi N of Queretaro, 21.29634° N 98.74755° W, 2118 m, 03 Sep 1963, Scullen and Bollinger, 1♂ (00118073) (ORSU). San Juan del Rio, 20.38333° N 99.98333° W, 03 Sep 1969, L.A. Kelton, *Parthenium* sp., 1♀ (00111622)

(CNC). **San Luis Potosi:** 10 mi S of Rio Verde, 21.52952° N 99.03717° W, 28 Jul 1970, Murray, Phelps, Hart, Schaffner, paratype of junior synonym (*S. bispinosus*), 1♀ (00113582) (CNC), paratype of junior synonym (*S. bispinosus*), 1♀ (00122241) (USNM). 22.3 mi N of San Luis de la Paz, 22.47409° N 100.98333° W, 25 Jul 1976, Peigler, Gruetzmacher, R. and M. Murray, Schaffner, 6♂ (00118188, 00118520–00118524), 3♀ (00118525–00118527) (TAMU). Hwy 57, 8 mi SW of Villa Hidalgo, 22.37906° N 100.78086° W, 1829 m, 10 Sep 1982, C.W. and L. O'Brien and G. Wibmer, 1♀ (00070076) (USNM). Santa Maria del Rio, 21.8000° N 100.75° W, 06 Sep 1969, L.A. Kelton, *Ambrosia* sp., 1♂ (00111342) (CNC). Villa Hidalgo, 22.45° N 100.7000° W, 07 Sep 1969, L.A. Kelton, *Ambrosia* sp., 6♂ (00111350, 00111673–00111677), 11♀ (00111409, 00111678–00111687) (CNC). Approx. 25 mi NE of San Luis Potosi, 22.32721° N 100.81298° W, 1853 m, 09 Sep 1972, G.F. and J.F. Hevel, 1♂ (00070074) (USNM). **Zacatecas:** 9 mi S of Fresnillo, 23.05322° N 102.8000° W, 20 Aug 1956, J.W. MacSwain, 1♀ (00119287) (UCB). 13 mi SW of Concepcion del Oro, 24.44519° N 101.37823° W, 1873 m, 09 Jul 1983, Kovarik, Harrison, and Schaffner, 1♂ (00118597) (TAMU). 14 mi N of Luis Moya, 22.62626° N 102.28961° W, 1963 m, 26 Jul 1959, R.B. Selander and J.C. Schaffner, paratype of junior synonym (*S. bispinosus*), 1♀ (00134034) (USNM). 30 mi SW of Concepcion del Oro, 20.94332° N 103.5117° W, 09 Jul 1983, Kovarik, Harrison, and Schaffner, 2♂ (00118186, 00118515) (TAMU). Guadalupe, 22.73333° N 102.53333° W, 06 Jul 1969, L.A. Kelton, 1♂ (00111346), 1♀ (00111601) (CNC). **USA: Arizona:** ***Coconino Co.:*** Flagstaff, 35.19806° N 111.65056° W, 2134 m, 20 Sep 1997, C.L. and S.L. Staines, 5♀ (00242857, 00242884–00242887) (NCSU). Flagstaff, Coconino National Forest, 35.99444° N 112.1975° W, 16 Aug 1967, L.A. Kelton, *Ambrosia* sp., 7♂ (00111348, 00111518–00111523), 14♀ (00111524–00111537) (CNC). ***Gila Co.:*** 15 mi N of Globe on Ariz. 88, 33.60532° N 111.00531° W, 914 m, 28 Apr 1981, D.A. and J.T. Polhemus, 2♂ (00116781–00116782) (JTP). ***Maricopa Co.:*** 10 mi S of Sunflower, 33.7196° N 111.46694° W, 18 Apr 1982, D.A. and J.T. Polhemus, 1♂ (00116777), 3♀ (00116778–00116780) (JTP). Four Peaks Road, mile 1, 33.71653° N 111.26467° W, 25 Apr 1983, J.T. Polhemus, 2♂ (00116769–00116770), 2♀ (00116771–00116772) (JTP). Reavis Ranch Trail, 33.49111° N 111.15472° W, 1097 m, 19 Apr 1982, D.A. and J.T. Polhemus, 3♂ (00116783–00116785) (JTP). ***Pima Co.:*** Santa Rita Mountains, 11.5 mi NW of Sonoita, 31.78666° N 110.74388° W, 1573 m, 24 Aug 2000, J.C. Schaffner, 2♂ (00244360–00244361) (TAMU). ***Pinal Co.:*** Superior, 33.29389° N 111.09556° W, 732 m, 16 Apr 1928, A.A. Nichol, 1♂ (00134602) (USNM). ***Santa Cruz Co.:*** Audubon Research Ranch, SE of Elgin, Post Canyon, 31.58075° N 110.52533° W, 1472 m, 25 Aug 2007, A.G. Wheeler, Jr., *Ambrosia psilostachya*, 1♂ (00134419), 1♀ (00134420) (USNM). Audubon Research Station, Elgin, 31.65981° N 110.52535° W, 1435 m, 14 May 2004, A.G. Wheeler, Jr., *Ambrosia* sp., 6♂ (00122143–00122148), 4♀ (00122139–00122142) (USNM). ***Yavapai Co.:*** Congress Junction, 34.16278° N 112.84417° W, 29 Apr 1981, D.A. and J.T. Polhemus, 4♂ (00116713, 00116773–00116775), 1♀ (00116776) (JTP). **California:** ***Kern Co.:*** 2 km W of Randsburg on Red Rock Randsburg Rd, near booster 3, 35.37638° N 117.66545° W, 930 m, 18 May 2000, M.D. Schwartz, *Chrysothamnus* sp., 2♀ (00108173–00108174) (AMNH). E of Caliente on Caliente Creek Rd, Twin Oaks, 35.30702° N 118.4233° W, 836 m, 22 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Iva axillaris*, det. A. Saunders UCR 140614 [PBI_CAL04-H124], 1♀ (00091703) (AM), 1♀ (00137264) (AMNH). Red Rock Canyon, 35.325° N 117.94972° W, 18 May 1937, E.P. Van Duzee, 1♂ (00121657) (CAS). ***Los Angeles Co.:*** E of Pearblossom, N of Hwy 138, T5N R9W S25, 34.4985° N 117.7209° W, 1040 m, 02 May 1995, Katryn Schiro, 1♀ (00119837) (UCR). Piute Butte, Mojave Desert, 34.65748° N 117.8506° W, 12 May 1944, A.L. Melander, 1♂ (00119831) (UCR). ***Riverside Co.:*** Chuckawalla Bench, 33.61502° N 115.33775° W, 16 Apr 1994, G.R. Ballmer, *Ambrosia dumosa*, 2♂ (00119804, 00119826), 3♀ (00119827–00119829) (UCR). Chuckawalla Bench, Bob's Cabin, 33.60722° N 115.64194° W, 21 Apr

2002, G.R. Ballmer, *Ambrosia dumosa*, 1♂ (00119817 [cat UCRC ENT 59030]), 2♀ (00119818 [cat UCRC ENT 59032], 00119819 [cat UCRC ENT 59033]) (UCR). Happy Valley, T4S R7E S2, 33.8363° N 116.2319° W, 10 Apr 1979, C.W. Melton, 1♀ (00119836) (UCR). Mariobra Valley, Chiriaco Summit, T6S R12E S22, 33.66083° N 115.72056° W, 11 Apr 1995, Katryn Schiro, 1♂ (00119830) (UCR). ***San Bernardino Co.:*** 12.5 mi SE of Ivanpah, Ivanpah Road, 35.21277° N 115.15332° W, 25 May 1977, J.D. Pinto, *Ambrosia eriocentra*, 2♀ (00119834–00119835) (UCR). 14.1 mi S of Red Mountain on Rt 395, 35.15197° N 117.5851° W, 770 m, 18 May 2000, M.D. Schwartz, *Sphaeralcea emoryi* Torr. (Malvaceae), det. Lauren Raz voucher-NYBG, 1♀ (00108172) (AMNH). Barstow, 34.89859° N 117.02281° W, 21 May 1938, J. Standish, 1♀ (00164928) (USNM). Cedar Canyon, T13N R15E S31, 35.1628° N 115.4432° W, 25 May 1971, R.D. Goeden and D.W. Ricker, *Ambrosia eriocentra* AE-71-18D, 1♂ (00119833) (UCR). Essex, T7N R17E S22, 34.7336° N 115.245° W, 05 Apr 1988, R.D. Goeden and D.W. Ricker, *Encelia frutescens* EFR-88-&M, 1♂ (00119809) (UCR). Goffs Butte, T9N R19E S7, 34.88083° N 115.06778° W, 06 Apr 1988, R.D. Goeden and D.W. Ricker, *Encelia farinosa* EF-88-33D, 1♀ (00119808) *Encelia farinosa* EF-88-33E, 2♂ (00119806–00119807) (UCR). Green Valley, San Bernardino Mountains, 34.24084° N 117.0772° W, 28 May 1980, A. Mayor, 1♂ (00119832) (UCR). Kramer Hills, T9N R6W S26, 34.99444° N 117.585° W, 19 May 1982, R.D. Goeden and D.W. Ricker, *Hymenoclea salsola* HS-82-27L, 1♂ (00119805) (UCR). Pinto Basin, Joshua Tree National Monument, 33.9247° N 115.6683° W, 670 m, 19 Apr 1995, J. Freillch, *Ambrosia* sp., 2♂ (00119822, 00119823), 1♀ (00119825) (UCR). ***San Diego Co.:*** Anza-Borrego Desert State Park, Grapevine Canyon, milepost 74 on county Rt 52, 33.22889° N 116.26028° W, 22 Apr 1980, Russell and Schwartz, *Ambrosia dumosa*, 1♂ (00111361), 2♀ (00111362, 00111399) (CNC). Anza-Borrego Desert State Park, Stag Cove, 0.2 mi W of milepost 78 on Co. Rt S2, 33.09583° N 116.46513° W, 22 Apr 1980, M.D. Schwartz, *Ambrosia dumosa*, 5♂ (00111352, 00111354–00111357), 3♀ (00111358–00111360) (CNC). McClain Valley, T14S R6E S11, 32.84866° N 116.8269° W, 510 m, 19 Apr 1994, M. Cooperband, 1♂ (00119813), 2♀ (00119814–00119815) (UCR). Vallecito Valley, Hwy S-2, T14S R6E S11, 32.9706° N 116.34779° W, 480 m, 07 Apr 1992, R. Mandala, 1♂ (00119820), 1♀ (00119821) (UCR). ***Unknown co.:*** unknown, 10 May 1941, Timberlake, *Ambrosia dumosa*, 1♀ (00119838) (UCR). **Colorado:** ***Elbert Co.:*** 3 mi E of Kiowa, 39.34722° N 104.4078° W, 1981 m, 16 Jul 1983, R.T. Schuh, D.A. and J.T. Polhemus, 1♂ (00108160) (AMNH). ***Las Animas Co.:*** NE of Trinchera, 37.04224° N 104.0474° W, 18 Sep 1979, J.T. Polhemus, *Gutierrezia* sp., 1♂ (00116786) (JTP). ***Unknown co.:*** Colo. 2234, CCC, unknown, 1♀ (00133427) (USNM). **Idaho:** ***Bingham Co.:*** 15 mi E of Fort Hall, 43.0423° N 112.2244° W, 1359 m, 22 Jun 1955, H.W. Smith, 1♀ (00122335) (UID). **Iowa:** ***Benton Co.:*** unknown [County #6], 42.14527° N 92.14463° W, 21 Jun 1932, Moore, 1♀ (00118568) (TAMU). ***Cass Co.:*** unknown [County #15], 41.2999° N 94.9335° W, 14 Jul 1933, Bill, 1♀ (00118567) (TAMU); 14 Jul 1933, V.R.S., 1♀ (00118566) (TAMU). ***Cherokee Co.:*** Larrabee, 42.86348° N 95.54372°W, 415 m, 14 Sep 1927, H.G. Johnston, 1♀ (00134605) (USNM). ***Clay Co.:*** Peterson, 42.91806° N 95.34361° W, 13 Jun 1981, D.A. Polhemus, 1♂ (00116712) (JTP). ***Palo Alto Co.:*** 5 mi NW of Ruthven, 43.13771° N 94.95289° W, 16 Jun 1949, J.A. Slater, 1♀ (00108168) (AMNH). ***Polk Co.:*** 4 mi NE of Alleman, 41.86116° N 93.55537° W, 15 Jun 1947, J.L. Laffoon, 1♀ (00108166) (AMNH). ***Story Co.:*** Ames, 42.03472° N 93.61972° W, 20 Sep 1950, D.L. Goleman, 1♂ (00108164), 1♀ (00108165) (AMNH). Pleat Bog Valley, Ames, 42.026° N 93.6326° W, 22 Jul 1928, G.S. Walley, 1♂ (00111515), 1♀ (00111514) (CNC). ***Woodbury Co.:*** Sioux City, 42.50028° N 96.39389° W, 11 Jun 1949, J.A. Slater and J. Laffoon, 1♀ (00108167) (AMNH). **Kansas:** ***Douglas Co.:*** Douglas County, no specific locality, 38.86667° N 95.23333° W, 274 m, F.H. Snow, 5♂ (00117811, 00117814–00117817), 6♀ (00117818–00117823) (KU); 22 Aug 1920, William K. Hoffmann, 1♀ (00117829) (KU). ***Gove Co.:*** Gove County, no specific locality, 38.91667° N 100.4837° W, 857 m, F.X. Williams, 1♀ (00117828) (KU). ***Hamilton***

Co.: Hamilton County, no specific locality, 38.01668° N 101.6671° W, 1021 m, F.H. Snow, 1♂ (00117824) (KU). ***Kearny Co.:*** Kearny County, no specific locality, 37.98333° N 101.31667° W, 914 m, 01 Jul 1921, unknown, 2♂ (00117825–00117826), 1♀ (00117827) (KU). ***McPherson Co.:*** McPherson, 38.3742° N 97.6532° W, 456 m, 10 Jul 1927, E.W. Davis, 3♀ (00133428–00133430) (USNM). ***Reno Co.:*** Reno County, no specific locality, 37.95° N 98.08333° W, 03 Sep 1919, Wm. E. Hoffmann, 1♂ (00117830) (KU). ***Riley Co.:*** Riley County, no specific locality, 39.29449° N 96.81672° W, 399 m, 17 Aug, G.A. Dean, paratype, 1♂ (USNM). ***Wallace Co.:*** Wallace County, no specific locality, 38.91027° N 101.58454° W, 1006 m, 31 Aug, unknown, paratype, 1♂ (USNM). **Minnesota:** ***Redwood Co.:*** Redwood Falls, 44.53333° N 95.11666° W, 313 m, 19 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, 1♂ (00069997) (USNM). **Missouri:** ***Atchison Co.:*** Langdon, 40.35639° N 95.57944° W, 08 Jul 1901, unknown, 1♀ (00122135) (USNM); 16 Aug 1901, unknown, 1♀ (00122134) (USNM). ***Daviess Co.:*** Gallatin, 39.91836° N 93.96733° W, 253 m, 21 Sep 1941, E.H. Froeschner, 1♂ (00134607) (USNM). ***Randolph Co.:*** Cairo, 39.51086° N 92.43826° W, 259 m, 20 Jul 1941, R.C. Froeschner, 1♀ (00134603) (USNM). ***St. Clair Co.:*** N of Lowry City, 38.14793° N 93.72629° W, 257 m, 09 Aug 1983, M. Higdon, (Fabaceae), 2♂ (00242853, 00242883), 1♀ (00242882) (NCSU), 1♂ (00243058) (UMRM); 15 Aug 1983, M. Higdon, 1♂ (00243057) (UMRM); 04 Aug 1988, M. Higdon, 1♂ (00243056) (UMRM). **Nebraska:** ***Hall Co.:*** Grand Island, 40.925° N 98.34167° W, 08 Jul 1964, H.H. Knight, 1♀ (00134597) (USNM). ***Saunders Co.:*** University of Nebraska Research and Development Center, SW of Mead, 41.21639° N 96.49454° W, 369 m, 17 Aug 1998, A.G. Wheeler, Jr., T.J. Henry, *Ambrosia artemisiifolia*, 1♂ (00069998) (USNM). **Nevada:** ***Clark Co.:*** 1 mi E of Searchlight on Rt 164, 35.46904° N 114.9004° W, 1065 m, 17 May 2000, M.D. Schwartz, *Ambrosia* sp., 4♀ (00108176–00108179) (AMNH). Red Rock Canyon Area, 30 km WSW of Las Vegas, 36.08333° N 115.46666° W, 1320 m, 17 May 1993, W.E. Steiner, J.M. Swearingen, J.M. Mitchell, 1♂ (00122133) (USNM). ***Nye Co.:*** Atomic Test Site, 2.6 mi W of Mercury Hwy, Cane Springs Rd (A5), 36.66056° N 116.04046° W, 1036 m, 06 Jun 1983, Schuh, Schwartz, and Stonedahl, *Ambrosia dumosa*, 2♂ (00108150–00108151), 6♀ (00108152–00108157) (AMNH). Atomic Test Site, 4.5 mi S of GS500 on Jackass Flats Rd (A25), 36.73605° N 116.3125° W, 1006 m, 06 Jun 1983, Schuh, Schwartz, and Stonedahl, *Ambrosia dumosa*, 1♂ (00108149) (AMNH). **New Mexico:** ***Catron Co.:*** 18 mi E of Quemado, 34.34389° N 108.17983° W, 15 Aug 1982, J.C. Schaffner, 1♂ (00118595) (TAMU). ***Chaves Co.:*** Elkins, 32.94306° N 105.33389° W, 20 Jul 1967, L.A. Kelton, 1♂ (00111517) (CNC). ***Colfax Co.:*** 5 mi E of Eagle Nest, 36.53744° N 105.19595° W, 2423 m, 08 Aug 1969, J.C. Schaffner, 1♂ (00134598) (USNM). 5 mi W of Cimarron, 36.51083° N 105.00521° W, 16 Jun 1992, G.M. Chamberlain, 1♂ (00118593), 1♀ (00118594) (TAMU). ***Guadalupe Co.:*** 2 mi E of Vaughn, 34.5877° N 105.1628° W, 2606 m, 11 Jul 1967, H.R. Burke, 2♀ (00133419–00133420) (USNM). ***Lincoln Co.:*** 5 mi E of Lincoln National Forest, 33.39157° N 105.2742° W, 29 Jun 1963, A.R. Moldanke and J.A. Woods, 1♀ (00010816) (AMNH). ***Otero Co.:*** Cloudcroft, 32.95722° N 105.74194° W, 2774 m, 27 Jun 1940, L.J. Lipovsky, 1♀ (00117832) (KU); 27 Jun 1940, R.H. Beamer, 1♂ (00117831) (KU); 23 Jul 1967–25 Jul 1967, L.A. Kelton, 1♀ (00111512) (CNC). James Canyon Campground, Sacramento Mountains, Lincoln Nat. For., nr Maryhill, 32.905° N 105.50416° W, 01 Sep 1998, M.D. Schwartz, *Poliomintha incana* (Torr.) A. Gray (Lamiaceae), 2♂ (00110995, 00111462), 2♀ (00111463–00111464), 1 immature (00111465) (CNC). Mayhill, 32.88944° N 105.4775° W, 23 Jul 1967, L.A. Kelton, *Ambrosia* sp., 1♂ (00242582), 1♀ (00242583) (CAS), *Ambrosia* sp., 19♂ (00111349, 00111538–00111555), 35♀ (00111556–00111590) (CNC). ***Rio Arriba Co.:*** Espanola, 36.0028°N 106.0578° W, 29 May 1940, unknown, Fabaceae, 1♂ (00119286) (UCB). ***San Miguel Co.:*** Las Vegas, 35.58355° N 105.24433° W, 2042 m, 28 Jun 1931, H.A. Scullen, 1♂ (00134599) (USNM). Las Vegas, Hot Springs, 35.65389° N 105.29111° W, 19 Aug, H.S. Barber, 1♂ (00134601) (USNM). Pecos River, Pecos,

35.5742° N 105.675° W, 20 Aug 1948, C. and P. Vaurie, 1♀ (00108161) (AMNH). ***Sandoval Co.:*** Jemez Springs, 35.76861° N 106.69167° W, 1951 m, 07 Jun 1916–17 Jun 1916, unknown, 1♀ (00133417) (USNM); 01 Aug 1916–15 Aug 1916, unknown, 1♀ (00133418), paratype of junior synonym (*S. arizonensis*), 1♂ (00134342) (USNM). ***Santa Fe Co.:*** 10 mi N of Santa Fe, 35.84016° N 105.98899° W, 17 Aug 1962, J.G. and B.L. Rozen, 1♀ (00108158) (AMNH). ***Socorro Co.:*** Gallinas Canyon, Montezuma, 34.18806° N 107.32833° W, 22 Aug 1972, L.A. Kelton, 1♂ (00111353) (CNC). Montezuma, Gallinas Canyon, 34.18806° N 107.32833° W, 22 Aug 1972, L.A. Kelton, 23♂ (00111466–00111488), 23♀ (00111489–00111511) (CNC). ***Torrance Co.:*** Manzano, 34.64667° N 106.34444° W, 26 Jun 1941, Burt Hogden, 2♂ (00117837–00117838) (KU). Tajique, 34.75167° N 106.28722° W, 25 Jun 1941, R.H. Beamer, 1♀ (00117926) (KU). **Ohio:** ***Wood Co.:*** Bowling Green, 41.3819° N 83.6332° W, 206 m, 31 Aug 1973, M.L. Youther, 1♀ (00070041) (USNM); 02 Sep 1973, M.L. Youther, 1♀ (00070040) (USNM). **South Dakota:** ***Brookings Co.:*** Lake Hendricks, 44.47981° N 96.4782° W, 539 m, 28 Jun 1925, H.C. Severin, 1♀ (00134600) (USNM). ***Gregory Co.:*** Gregory, 43.22888° N 99.43893° W, 658 m, 18 Jun 1931, H.C. Severin, 1♀ (00134608) (USNM). ***Hanson Co.:*** Emery, 43.60167° N 97.62222° W, 24 Jul 1927, H.H. Knight, paratypes, 2♂ (00118552–00118553) (TAMU); 24 Aug 1927, H.H. Knight, paratypes, 2♂ (00111347, 00111406), 1♀ (00111513), *Ambrosia psilostachya*, paratype, 1♀ (00111407) (CNC), paratype, 1♂ (00118556), 2♀ (00118554–00118555) (TAMU). ***Union Co.:*** 3 mi S of Jefferson, 42.55912° N 96.55889° W, 11 Jun 1949, Slater and Laffoon, 1♂ (00108163) (AMNH). **Texas:** ***Bexar Co.:*** San Antonio, 29.42389° N 98.49333° W, 12 Dec 1984, R.L. Blinn, 1♀ (00242858) (NCSU). ***Blanco Co.:*** Cypress Mill, 30.38103° N 98.25057° W, 299 m, Collection Chittenden, 5♀ (00133423–00133426, 00134609) (USNM). ***Brewster Co.:*** 17 mi E of Alpine, 30.35801° N 103.37455° W, 15 Aug 1992, J.C. Schaffner, 1♀ (00118591) (TAMU). ***Brown Co.:*** Brown County, no specific location, 31.7736° N 98.99894° W, 420 m, 24 May 1944, W.F. Turner, 1♀ (00070043) (USNM). ***Duval Co.:*** Freer, 27.8828° N 98.61779° W, 21 Mar 1985, W.F. Chamberlain, 1♂ (00118589) (TAMU). San Diego, 27.76391° N 98.23889° W, 12 Jun, E.A. Schwarz, paratype of junior synonym (*S. ovatus*), 1♀ (00122259) (USNM). ***Edwards Co.:*** 1 mi W of Carta Valley, 29.79333° N 100.69109° W, 13 Apr 1965, R.C. Dickson, 1♀ (00119839) (UCR). ***El Paso Co.:*** Hueco Tanks State Park, 31.91789° N 106.04442° W, 24 Aug 1970, W.F. Chamberlain, 1♀ (00118585) (TAMU). ***Frio Co.:*** 2 mi N of Pearsall, 28.92085° N 99.09472° W, 08 May 1976, J.C. Schaffner, 7♂ (00118216, 00118569–00118574), 6♀ (00118575–00118580) (TAMU). ***Hudspeth Co.:*** 12 mi W of Cornudas, 31.77955° N 105.67544° W, 26 Aug 1975, J.D. Pinto, 2♀ (00108170–00108171) (AMNH), 2♂ (00119810–00119811), 1♀ (00119812) (UCR). ***Jeff Davis Co.:*** 15 mi W of Fort Davis, 30.7754° N 104.15965° W, 23 Aug 1969, Board and Hafernik, 1♂ (00118583) (TAMU). ***Jim Wells Co.:*** La Copita Res. Sta., 8 mi W of Ben Bolt, 27.64715° N 98.21226° W, 20 May 1987–21 May 1987, J.C. Schaffner, 6♂ (00118410, 00118471, 00118528–00118531), 5♀ (00118532–00118536) (TAMU). Sandia, 28.02222° N 97.87917° W, 09 Jun 1969, Board and Hafernik, 1♀ (00133422) (USNM). ***Kerr Co.:*** Kerr Wildlife Management Area, Spring Trap, 30.0678° N 99.4496° W, 610 m, 24 Jun 2005, E.G. Riley, 1♀ (00245371) (TAMU). Kerrville, 30.04722° N 99.14° W, 19 Apr 1959, W.R.M. Mason, 1♂ (00111516) (CNC); 02 May 1997, W.F. Chamberlain, 1♀ (00118588) (TAMU); 16 Nov 1998, W.F. Chamberlain, 1♀ (00118587) (TAMU). Kerrville, 30.04722° N 99.14° W, 05 Apr 1959, W.R.M. Mason, Fabaceae, 1♂ (00111337) (CNC); 19 Apr 1999, W.F. Chamberlain, 1♂ (00118581) (TAMU). Kerrville State Park, 30.0021° N 99.1319° W, 16 Apr 1965, H.R. Burke, Light Trap, 1♂ (00118582) (TAMU). ***Kimble Co.:*** 6.5 mi S of London, Llano River crossing, 30.58316° N 99.57574° W, 13 May 1977, Gillogly and Schaffner, 1♀ (00118592) (TAMU). ***Llano Co.:*** Valley Spring, 30.85934° N 98.81727° W, 397 m, 14 May 1966, P.K. Wagner, 1♀ (00133421) (USNM). ***Potter Co.:*** Amarillo, 35.22199° N 101.8312° W, 28 Sep 1930, S.E. Jones, 1♂ (00116787) (JTP), 4♀ (00118562–00118565), paratypes, 2♂ (00118557–00118558),

3♀ (00118559–00118561) (TAMU). Potter County, 35.41671° N 101.9004° W, 07 Jul 1927, R.H. Beamer, 4♂ (00117833–00117836) (KU). ***Randall Co.:*** Hackberry Campground, Palo Duro Canyon State Park, 34.9675° N 101.67222° W, 15 May 2002, E.G. Riley, 1♀ (00118586) (TAMU). ***Tom Green Co.:*** Highland Range Park, Fisher Lake, 31.4834° N 100.483° W, 30 May 1976, M.C. Gruetzmacher, 1♀ (00118584) (TAMU). San Angelo, 31.46361° N 100.43667° W, 19 Sep 1986, W.A. Palmer, *Ambrosia confertiflora*, 1♂ (00070039) (USNM). ***Val Verde Co.:*** 46 mi N of Comstock on Hwy 163, 30.28684° N 101.0717° W, 09 May 1997, J.C. Schaffner, 1♂ (00118590) (TAMU). Del Rio, 29.3625° N 100.89639° W, 13 Apr 1949, Michener and Beamer, 1♀ (00117841) (KU). **Utah:** ***Duchesne Co.:*** Neola, 40.43276° N 110.02857° W, 1839 m, 12 Jun 1956, G.F. Knowlton, 1♀ (00070042) (USNM). ***Grand Co.:*** Moab, 38.57333° N 109.54917° W, 15 Jul 1954, G.F. Knowlton, 1♀ (00108159) (AMNH).

Slaterocoris apache species group

DIAGNOSIS: Among *Slaterocoris* species with a small right paramere, the members of this group have a prominent basal lobe or spine when compared to the *flavipes* group, where two species (*S. sheridani*, and *S. sparsus*), which closely resemble the members of the *apache* group, have the basal lobe broad. The same area in the latter species group has at most a bifurcate tubercle. The variation in the male genitalia of the *apache* group is great, but minute characteristics of the right paramere and endosomal spicule, in conjunction with coloration and vestiture differences, nevertheless allow for recognition of individual species. COLORATION: Black, including unicolorous vertex; male with antennal segment I and II usually concolorous black; segment I of female sometimes with apex and dorsal surface paler; legs predominantly black; sometimes apices and variable portions of femora paler, orange-red; hind tibia either black or pale; tarsomeres usually black, rarely with segment I and II pale; membrane of hemelytron uniformly fuscate or rarely with pale medial spot. VESTITURE: Reclining simple setae usually moderately long and with variable color and density. STRUCTURE: Body conformation usually dimorphic, male and female with arcuate costal margins; frons usually smooth; antennal segment II usually longer than length of foretibia. MALE GENITALIA: **Pygophore**: Aperture with short tergal process on right side with one or two point(s) directed toward midline (fig. 19E). **Phallotheca**: Left lateral surface slightly compressed (fig. 25H). **Endosomal spicule**: Ventral lobe of spicule with relatively uniform thickness throughout distal region (fig. 18A–E), apex with variable marginal serration (fig. 22A–H); sometimes apex flattened (fig. 26C–E) or long and attenuate (fig. 24A, B); dorsal lobe of spicule entire and flattened with narrow (fig. 19A, 22F) or wide distal region (fig. 26G). **Right paramere**: Small with variable number of apical spines, short subapical region, and erect, prominent basal lobe (figs. 17, 19D, 21, 25K–N, 27J–N). **Left paramere**: Distal portion shorter than basal portion and with scalloped ventral margin (figs. 25I, J, 26H, I). FEMALE GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view, width of left greater than right at overlap; right lateral surface moderately large (fig. 23B). **Left first gonapophyses**: Dorsal surface concave and with narrow apex (fig. 23A). **Vestibulum, anteroventral margin of anterior wall**: Sclerotized medially, and reaching lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced, base moderately wide, triangular; sometimes with apical cleft. **Second gonapophyses**: Anteromedial surface strongly convex (fig. 23D). **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly; posteromedial portion with tumid process abutting ovipositor bulb (fig. 23C); ventromedial region overlapping ventromedial plate. **Interramal lobe**: Dorsal or basal insertion with membranous attachment; dorsomedial margin variable; ventral projection short with concave anterior surface.

HOSTS: Species of this group are associated with a small number of western North American species of Asteraceae. The majority of specimens have been recorded on rubber rabbitbrush, *Ericameria nauseosa* var. *speciosa* (formerly *Chrysothamnus nauseosus* and *C. n.* var. *albicaulis*), and sagebrush, *Artemisia* species.

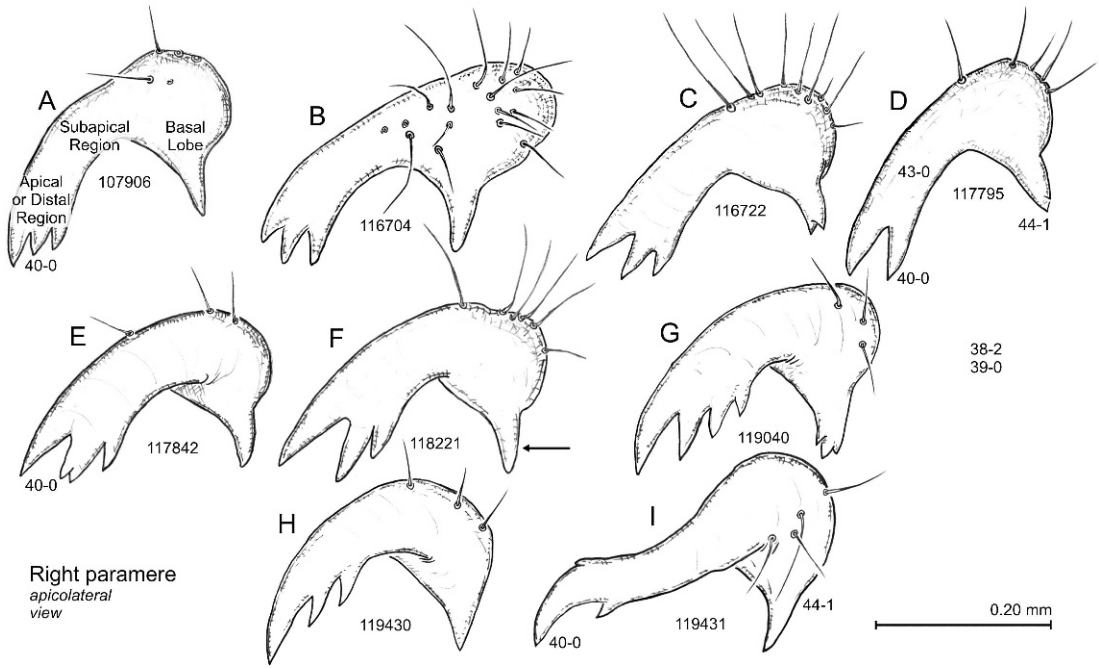


Fig. 17. *Slaterocoris apache*, right paramere. **A**. Roosevelt, UT. **B**. 29 mi SW of Norwood, CO. **C**. White Rock Overlook, NM. **D**. Berthoud Pass, CO. **E**. Taos, NM. **F**. 33 mi SW of Dulce, NM. **G**. Connors Pass, NV. **H**, **I**. Lehman Caves, NV.

Slaterocoris apache Kelton
Figures 12, 17, 18; plates 1, 4E; map 3

Slaterocoris apache Kelton, 1968: 1126, fig. 10 (orig. desc.); Knight, 1970: 253, fig. 13, (disc.); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 197 (catalog).

Slaterocoris burkei Knight, 1970: 255, fig. 26 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 197 (catalog). NEW SYNONYMY.

Slaterocoris bifidus Knight, 1970: 252, fig. 40 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 197 (catalog). NEW SYNONYMY.

DIAGNOSIS: Distinguished among members of the *apache* group by the sparse, moderately long, suberect, pale or silvery vestiture (pl. 4B); mostly black femora except for the conspicuous pale apical regions, pale yellow tibiae, and dark tarsomeres (fig. 12); and the male genitalia with the basal lobe of the right paramere usually entire (fig. 17A, B, D–F, H, I), and the endosomal spicule with the distal portion of the ventral lobe narrow, usually short and with weak marginal serration (fig. 18B, C). *Slaterocoris apache* is separated from *S. atratus* and *S. pilosus* by sparse vestiture (pl. 4B), the latter species have dense vestiture (pl. 4K). The black femora with discretely pale apices (fig. 12) and dorsum with pale or silvery vestiture (pl. 4B) will separate *S. apache* from *S. croceipes* with mostly orange-red femora (fig. 12) and dorsum with dark vestiture (fig.12). The pale yellow tibiae in *S. apache* distinguish it from *S. rubrofemoratus* with black tibiae and *S. tibialis* with dusky orange–pale brown tibiae (fig. 12); the latter species also have dark vestiture.

REDESCRIPTION: *Male:* Moderately large, elongate; length 3.53–5.50, width 1.60–2.01 (pl. 1). COLORATION: Antennal segment I black, sometimes dorsal surface pale to limited extent, antennal segment II black; legs black, femur pale apically, tibia pale yellow (fig. 12); hemelytral membrane pale

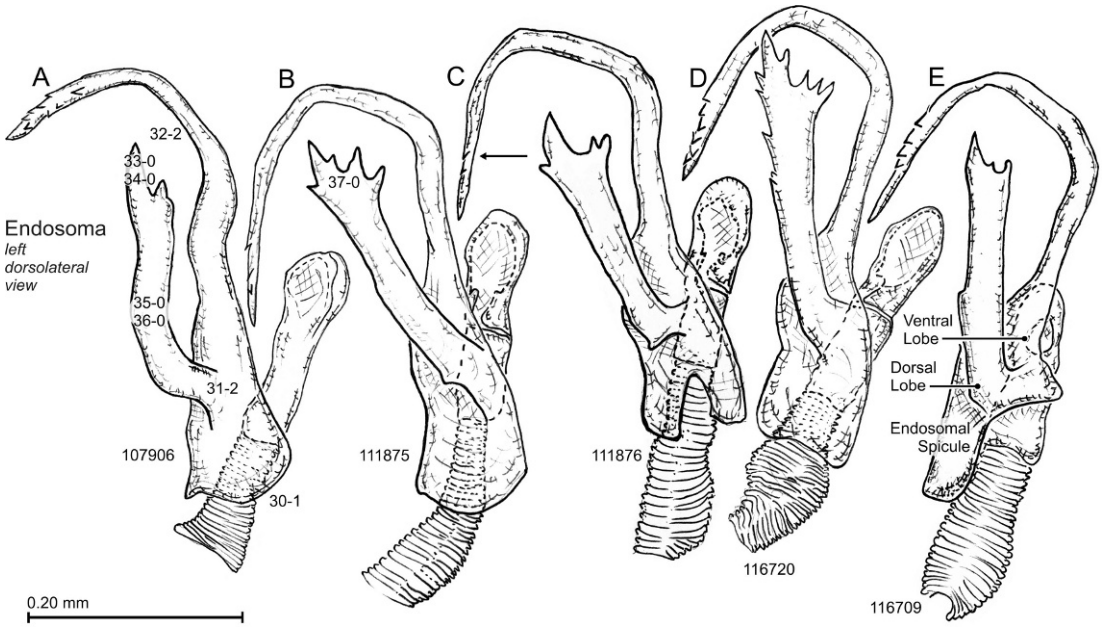


Fig. 18. *Slaterocoris apache*, endosoma. **A**. Roosevelt, UT. **B**. Eagar, AZ. **C**. Kimball Jct., UT. **D**, **E**. 12 mi W of Pueblo, CO.

(pl. 1) to infuscate. VESTITURE: Moderately sparse, suberect to reclining; moderately long, silvery simple setae (pl. 4B). STRUCTURE: Costal margins subparallel; frons smooth; antennal segment II longer than foretibia. GENITALIA: **Tergal process**: Short, with one somewhat truncate point. **Endosomal spicule**: Distal portion of ventral lobe narrow, marginal serration sparse to moderately dense, length short to moderately long; dorsal lobe parallel sided, usually wide distally, terminating with apical serration of variable number and size; lateral edge usually without conspicuous medial and basal spine (fig. 18A–E). **Right paramere**: Apical spines of variable number, basal lobe with apex entire or variably serrate (fig. 17A–I).

Female: Obovate; length 3.43–4.60, width 1.80–2.10 (pl. 1). COLORATION: Pale regions on appendages somewhat more expansive; antennal segment I and II usually pale. VESTITURE: Setae more recurved, less erect and somewhat shorter than in the male; setal structure most obvious in anterolateral view. STRUCTURE: Costal margin arcuate. GENITALIA: As in species group except: **Ventral labiate plate**: Apex entire or cleft. **Interramal lobe**: Dorsomedial margin either not produced as lobe or with narrow lobe.

HOSTS: Most frequently collected on *Ericameria nauseosa* (Asteraceae), including in Colorado, ssp. *consimilis* and ssp. *nauseosa* var. *speciosa*. A large number of specimens were recorded from unspecified species of *Chrysothamnus*. Because no captures were noted from *C. viscidiflorus*, it is probable that these records can be attributed to *Ericameria*, presumably *E. nauseosa*. A few specimens were found on other Asteraceae, *Artemisia* sp. and *Verbesina encelioides*. Non-asteraceous plants were noted for three specimens, but these are considered sitting records.

DISTRIBUTION: Usually higher elevations of the Central Rocky Mountains from Wyoming south to New Mexico and from apparently isolated populations in mountain ranges of Nevada and Arizona (map 3).

COLLECTION SUMMARY: 1010 specimens (42% with USI numbers) from 117 collection events with the majority of records from July and August.

DISCUSSION: Variation in the right paramere (cf. fig. 17A–I) occurs in the number and conformation of the apical spines and apical serration of the basal lobe. Such variable structure was noted across the distribution (Colorado, Nevada, New Mexico, and Utah) and from a single collection event at Lehman Caves, Nevada (cf. fig. 17H, I). Variable morphology is also noted in the dorsal and ventral lobes of the endosomal spicule (fig. 18A–E) with individuals from a single a collection event near Pueblo, Colorado (fig. 18D, E) as variable as specimens across the entire distribution of the species (Arizona, Colorado, and Utah).

Kelton (1968) distinguished *S. apache* from *S. croceipes* based on the vestiture and leg coloration and stated that the male genitalia of both species are similar. After an examination of the male genitalia from across the range of both species, trends in the considerable amount of variation observed indicate that there are at least two features that aid in species recognition. The right paramere of *S. croceipes* usually has the apex of the basal lobe serrate and the ventral lobe of the endosomal spicule is somewhat expanded and moderately serrate on the distal portion. As mentioned in the diagnosis, the basal lobe of the right paramere is usually entire in *S. apache* and the distal portion of the ventral lobe in the endosomal spicule is narrow, usually short, and with weak marginal serration.

There appears to be considerable overlap in the distribution of *S. apache* and *S. croceipes* in eastern Nevada, Utah, and Colorado (cf. map 3). However, if the data are critically examined, *S. apache* is found at higher elevations, whereas *S. croceipes* occurs at lower elevations. There are two localities, Salina, Utah (multiple collection events), and Lehman Caves, Nevada (single collection event), where the species are sympatric. At these sites *Slaterocoris apache* (00070122 and 00119428, 00119430–00119433) and *S. croceipes* (00070117 and 00119429) are separated on leg color and vestiture, but the endosomal spicule and right paramere morphology are not particularly indicative of one or the other species. When measurements and ratios (cf. table 3) for the two species are compared from across the total distribution of both species considerable overlap is observed. However, on average in Colorado, Nevada, and Utah, where both species occur, the overall body length of *S. apache* is greater (4.33, 3.53–5.50) than in *S. croceipes* (3.70, 3.15–4.10).

On the basis of single specimens Knight (1970) named the species from White Valley, Utah, *S. bifidus* and that from near Ridgeway, Colorado, *S. burkei*. The distinguishing characteristics of *bifidus* listed by Knight (1970) are the black antennae and legs, except for the pale apices of the femora and tibiae; the sparse, suberect pale vestiture; the bifurcate basal lobe of the right paramere; and the pale hemelytral membrane with dark veins. Knight (1970) separated *S. burkei* from congeners by the black general coloration, except for the yellow antennal segment I, apices of the femora and tibiae; the sparse, suberect, pale vestiture; and the bifurcate apex of the right paramere. The diagnostic features promoted by Knight for these nominal species fall within the variation observed in *S. apache*: the antennal segment I is sometimes pale, the apices of the femora and tibiae are always pale or yellow; the hemelytral membrane ranges from pale to infuscate; the dorsal vestiture is sparse, suberect, moderately long, and pale; the apex of the basal lobe is sometimes bifurcate and the number of apical spines is variable (one to four). The type localities of both nominal species are within the range of *S. apache*. The body measurements given by Knight (1970) for the nominal species are also within the range given in table 3 for *S. apache*, with the antennal segment lengths of *bifidus* slightly less than those measured herein. Therefore, because *bifidus* and *burkei* have all the features of *S. apache*, both are considered to be junior synonyms of the latter.

HOLOTYPES: **USA: Arizona:** ***Apache Co.:*** Eagar, Apache National Forest [34.11111° N 109.29083° W, 2286 m], 12 Aug 1967–13 Aug 1967, L.A. Kelton, *Ericameria nauseosa*, 1♂ (AMNH_PBI 00115813) (CNC) (*S. apache*: senior synonym). **Colorado:** ***Ouray:*** Ridgway [38.15278° N 107.76111° W, 2134 m], 22 Jul 1967, H.R. Burke, 1♂ (AMNH_PBI 00122242) (USNM) (*S. burkei*: junior synonym). **Utah:** ***Millard:*** White Valley [39.12556° N 113.12444° W], 19 May 1940,

R.W. Fautin, 1♂ (AMNH_PBI 00133388) (USNM) (*S. bifidus*: junior synonym).

OTHER SPECIMENS EXAMINED: **USA: Arizona:** ***Apache Co.:*** Eagar, Apache National Forest, 34.11111° N 109.29083° W, 2286 m, 12 Aug 1967–13 Aug 1967, L.A. Kelton, *Ericameria nauseosa*, paratypes, 3♂ (00242482–00242484), 3♀ (00242485–00242487) (CAS), *Ericameria nauseosa*, paratypes, 15♂ (00111875, 00115814–00115827), 61♀ (00111418, 00115097, 00115754–00115812) (CNC), *Ericameria nauseosa*, paratype, 1♂ (00290516), 1♀ (00290517) (TAMU); 12 Jul 1968, L.A. Kelton, *Chrysothamnus* sp., 2♂ (00111416, 00112046) (CNC). ***Cochise Co.:*** 11 mi NW of Fort Huachuca, 31.6134° N 110.4597° W, 1446 m, 10 Jul 1952, Beamer, LaBerge, Wolf, Liang, Weiner, *Verbesina encelioides*, 1♂ (00117843) (KU). **Colorado:** ***Alamosa Co.:*** Alamosa, 37.46945° N 105.87002° W, 2299 m, 28 Jun 1903, unknown, 1♀ (00134499) (USNM); 19 Aug 1903, unknown, 1♂ (00122275) (USNM). ***Archuleta Co.:*** Pagosa Springs, 37.26944° N 107.00917° W, 2195 m, C.H. Baker, paratype, 1♂ (00112091) (CNC). Piedra, San Juan National Forest, 37.22361° N 107.34028° W, 1920 m, 22 Jul 1968, L.A. Kelton, *Chrysothamnus* sp., 1♂ (00112087) (CNC). ***Bent Co.:*** Las Animas, 38.06667° N 103.22222° W, 06 Aug 1925, C.J. Drake, 1♀ (00134128) (USNM). ***Chaffee Co.:*** Maysville, 12 mi W of Salida, 38.53861° N 106.19029° W, 2507 m, 08 Sep 1984, D.A. and J.T. Polhemus, *Chrysothamnus* sp., 2♀ (00116951–00116952), 1♀ (00116818) (JTP). Old Midland Drive, E of Buena Vista, 38.847° N 106.1163° W, 2499 m, 01 Sep 1981, J.T. and D.A. Polhemus, 1♀ (00116792) (JTP). Salida, 38.52292° N 106.01503° W, 2181 m, 24 Jul, unknown, 1♂ (00070044) (USNM). ***Clear Creek Co.:*** Berthoud Pass, 39.7981° N 105.77806° W, 3455 m, 12 Jul 1949, J.R. White, 1♂ (00117795), 3♂ (00117844, 00117846, 00117902), 4♀ (00117903–00117906) (KU). ***Conejos Co.:*** 15 mi W of Mogote, 37.1086° N 106.31686° W, 2638 m, 15 Aug 1988, R.W. Sites, 1♀ (00243063) (UMRM). Elk Creek Recreation Area, 37.12971° N 106.36168° W, 22 Aug 1969, J.C. Schaffner, 3♀ (00291101–00291103) (TAMU), 1♂ (00070047) (USNM). ***Costilla Co.:*** Blanca, 37.43806° N 105.51584° W, 2399 m, 23 Jul 1968, L.A. Kelton, *Chrysothamnus* sp., 2♂ (00112082, 00115909), 1♀ (00318787) (CNC). Fort Garland, 37.42889° N 105.43333° W, 06 Jul 1982, D.A. and J.T. Polhemus, 1♀ (00116791) (JTP). ***Custer Co.:*** Wetmore, 38.23806° N 105.08471° W, 1859 m, 26 Jul 1968, L.A. Kelton, *Chrysothamnus* sp., 1♀ (00112083) (CNC). ***Dolores Co.:*** 29 mi SW of Norwood, 37.8341° N 108.66702° W, 07 Jul 1980, J.T. and D.A. Polhemus, 1♂ (00116704), 3♂ (00116908–00116909, 00116940), 2♀ (00116941–00116942) (JTP). ***Eagle Co.:*** McCoy, 39.915° N 106.725° W, 22 Aug 1968, L.A. Kelton, *Chrysothamnus* sp., 1♂ (00112080) (CNC). Water Wheel Ranch near Bond, 39.87444° N 106.68667° W, 24 Jun 1978, J.T. Polhemus, 1♂ (00116790), 1♀ (00116817) (JTP). Wolcott, 39.70238° N 106.67775° W, 2126 m, Aug 1932, Vasco M. Tanner, 1♀ (00242493) (CAS). ***Fremont Co.:*** Canon City, 38.44132° N 105.21602° W, 1611 m, 27 May 1987–29 May 1987, G.F. and J.F. Hevel, 1♀ (00164880) (USNM). ***Garfield Co.:*** W Evacuation Creek, 11 mi SE of Colorado state line on Rt 45, 39.77286° N 109.04835° W, 2073 m, 09 Jul 1981, M.D. Schwartz, *Ericameria nauseosa*, 1♂ (00112045) (CNC). ***Grand Co.:*** Granby, 40.08611° N 105.93889° W, 19 Aug 1968, L.A. Kelton, *Chrysothamnus* sp., 1♂ (00112079) (CNC). Parshall, 40.05694° N 106.17472° W, 17 Aug 1936, R.H. Beamer, 1♂ (00117847) (KU). ***Gunnison Co.:*** 0.5 mi up E Elk Creek, 38.46286° N 107.18294° W, 2295 m, 20 Jul 1961, Ernest Riley, *Chrysothamnus* sp., 1♂ (00134626), 1♀ (00134622) (USNM). 5 mi NE of Almont, Taylor River Bridge, 38.71572° N 106.77992° W, 2560 m, 13 Aug 1987, J.T. and D.A. Polhemus, T.J. Henry, 1♂ (00116788) (JTP). 26 mi W of Gunnison on Rt 50, 38.4827° N 107.1972° W, 2362 m, 17 Jun 1986, R.T. Schuh, *Chrysothamnus* sp., 1♀ (00108322) *Chrysothamnus* sp., 2♀ (00108838–00108839) (AMNH). Blue Mesa Reservoir, 38.2713° N 107.2004° W, 2293 m, 14 Jul 1989, T. Carlow and D. Emlen, 1♂ (00119121) (TAMU); 01 Aug 2004, R.L. Blinn, *Ericameria nauseosa*, 4♂ (00242854, 00242870–00242874), 8♀ (00242855, 00242874–0024279) (NCSU). Cebolla Creek, 38.36703° N 107.16132° W, 2384 m, 07 Jul 1961, Ernest Riley, 1♂ (00134625) (USNM). Gunnison, 38.54583° N 106.92472° W, 17 Aug 1925,

H.H. Knight, *Chrysothamnus* sp., 1♂ (00112090), 1♀ (00115749) (CNC), 1♂ (00290519) (TAMU), 1♀ (00134341) (USNM). Parlin, 38.50278° N 106.72778° W, 27 Aug 1968, L.A. Kelton, 1♂ (00112084) (CNC). Red Creek and Gunnison River, 38.46808° N 107.24034° W, 2262 m, 10 Jul 1961, E. Riley, 2♀ (00134620–00134621) (USNM). ***Jackson Co.:*** Cowdrey, 40.85972° N 106.3125° W, 2438 m, 15 Aug 1968, L.A. Kelton, *Chrysothamnus* sp., 2♂ (00112085, 00115910) (CNC). Gould, 40.52639° N 106.02611° W, 2804 m, 11 Aug 1959, Enns and Thomas, 1♀ (00243064) (UMRM). Hebron, 40.5946° N 106.40586° W, 2482 m, 01 Aug 1940, O. Bryant, 1♀ (00242494) (CAS); 17 Aug 1966, G.F. Knowlton, 1♀ (00134339) (USNM). Northgate, 40.88583° N 106.29361° W, 2415 m, 20 Aug 1931, R.H. Beamer, 2♂ (00117848, 00117907) (KU). Rt 14 and Jct. CR 11A, S of Coalmont, 40.48683° N 106.43633° W, 2525 m, 21 Aug 2005, T.J. Henry and A.G. Wheeler, Jr, *Ericameria nauseosa*, 1♂ (00134122), 1♀ (00134123) (USNM). nr Hebron, 40.5982° N 106.4165° W, 2469 m, 20 Aug 1962, P.H. Freytag, 1♂ (00119035) (TAMU), 1♂ (00070126), 3♀ (00164877–00164879) (USNM). ***La Plata Co.:*** Durango, 37.27654° N 107.87452° W, 2028 m, Aug 1885, unknown, 1♂ (00134627) (USNM); 19 Jul 1935, Dobzhansky, 1♂ (00070127) (USNM). Durango, 37.27527° N 107.88° W, 1991 m, 02 Jul 1933, P.W. Oman, paratype, 1♂ (00112042), 2♀ (00115747–00115748) (CNC); 02 Jul 1937, R.H. Beamer, 1♀ (00117908) (KU). ***Larimer Co.:*** Cameron Pass, 40.52127° N 105.89216° W, 3125 m, 10 Aug 1964, G.F. Knowlton, 1♂ (00134624) (USNM). ***Mineral Co.:*** San Juan Mountains, 37.45766° N 106.88429° W, 2597 m, 10 Jul 1935, Dobzhansky, 1♀ (00134623) (USNM). ***Moffat Co.:*** Axial, 20 mi N of Meeker on Rt 13, 40.28525° N 107.79201° W, 2012 m, 14 Aug 1986, R.T. Schuh, *Ericameria nauseosa* ssp. *nauseosa* var. *speciosa*, 1♂ (00108321) *Ericameria nauseosa* ssp. *consimilis*, 3♀ (00108840–00108842) (AMNH). Craig, 40.51528° N 107.54583° W, 14 Jul 1949, R.H. Beamer, 1♂ (00117849), 1♀ (00117849) (KU). ***Montezuma Co.:*** Dolores, 37.47389° N 108.50389° W, 15 Aug 1925, H.H. Knight, 1♀ (00119030) (TAMU). Mesa Verde National Park, 37.23333° N 108.47917° W, 2134 m, 14 Aug 1925, C.J. Drake, 1♀ (00134340) (USNM); 01 Jun 1927, V.M. Tanner, 1♀ (00134617) (USNM); 12 Jul 1930, R.L. Usinger, 8♀ (00276741–00276748), paratypes, 3♂ (00276733–00276735), 2♀ (00276736, 00276738) (UCB); 13 Jul 1930, R.L. Usinger, 5♀ (00276749–00276753), paratype, 1♀ (00276737) (UCB); 17 Jul 1968–18 Jul 1968, L.A. Kelton, *Chrysothamnus* sp., 1♂ (00112081) (CNC). ***Montrose Co.:*** 18 mi SE of Naturita, 38.03432° N 108.33444° W, 08 Jul 1980, J.T. and D.A. Polhemus, 1♂ (00116789) (JTP). ***Ouray Co.:*** 3 mi NE of Ridgway, 38.19092° N 107.74522° W, 2116 m, 22 Jul 1967, H.R. Burke, 1♀ (00134338) (USNM). ***Pitkin Co.:*** Aspen, White River National Forest, 39.19111° N 106.81694° W, 2438 m, 24 Aug 1968, L.A. Kelton, 1♂ (00112086) (CNC). ***Pueblo Co.:*** 12 mi W of Pueblo off Hwy 96, 38.25444° N 104.82952° W, 15 Jun 1980, J.T. and D.A. Polhemus, 8♂ (00116709, 00116720, 00116910–00116915), 13♀ (00116902–00116907, 00116916–00116922) (JTP). ***Rio Blanco Co.:*** 30 mi N of Rifle on Rt 13, 39.96842° N 107.7825° W, 2073 m, 14 Aug 1986, R.T. Schuh, *Ericameria nauseosa* ssp. *nauseosa* var. *speciosa* (Nutt.), 1♂ (00107912) (AMNH). Meeker, 40.0375° N 107.9125° W, 1890 m, 06 Aug 1965, W.F. Chamberlain, 2♀ (00119032, 00290441) (TAMU). White River City, 40.0908° N 108.22425° W, 1750 m, 06 Aug 1965, W.F. Chamberlain, 3♀ (00119033, 00290526–00290527) (TAMU). ***Routt Co.:*** Steamboat Springs, 40.485° N 106.83111° W, 2134 m, 22 Aug 1968, L.A. Kelton, 1♀ (00112088) (CNC). ***Saguache Co.:*** 1 mi E of North Pass, 38.21667° N 106.55659° W, 19 Aug 1969, J.C. Schaffner, 2♂ (00119029, 00290521), 4♀ (00290522–00290525) (TAMU), 1♂ (00070049) (USNM). 7 mi W of Cochetopa Pass, 38.16667° N 106.72871° W, 31 Aug 1980, D.A. and J.T. Polhemus, 2♂ (00116723, 00116943), 5♀ (00116944–00116948) (JTP). 23 mi E of Gunnison on Rt 50, 38.4108° N 106.50302° W, 2469 m, 17 Jul 1986, R.T. Schuh, *Artemisia tridentata* Nutt., 1♀ (00108409) (AMNH). Valley View Springs, ca 7 mi E of Mineral Hot Springs, on W foot of Sangre de Cristo range, 38.19123° N 105.81911° W, 2591 m, 14 Aug 1965, H.B. Leech, *Cleome* sp. (Capparaceae), 3♂ (00242488–00242490), 2♀ (00242491–00242492)

(CAS). ***Summit Co.:*** Dillon, 39.63028° N 106.04278° W, 29 Aug 1972, L.A. Kelton, *Artemisia* sp., 1♂ (00111878) (CNC). S end of Green Mountain Reservoir, 39.89056° N 106.32639° W, 12 Aug 1973, S. Szerlip, 1♀ (00119421) (UCB). **Idaho:** ***Butte Co.:*** 7 mi E of Howe, 43.78352° N 112.86345° W, 22 Jun 1966, W.F. Barr, 1♂ (00122343) (UID). ***Fremont Co.:*** Sand Dunes, 8 mi NW of Parker, T8N R39E Secs17&18, 44.03639° N 111.82785° W, 1681 m, 11 Jul 1986–12 Jul 1986, K.M. Dullum, 1♂ (00242859), 1♀ (00242881) (NCSU). **Nevada:** ***Elko Co.:*** 15 mi E of Wells, 41.112° N 114.7826° W, 2134 m, 12 Jul 1965, H.H. Knight, 1♀ (00112107) (CNC). ***White Pine Co.:*** Connors Pass, 39.03944° N 114.64611° W, 30 Jul 1975, W.F. Chamberlain, 1♂ (00119040), 3♀ (00119041–00119043) (TAMU). Lehman Caves, Great Basin National Park, 39.00555° N 114.21944° W, 24 Jun 1966, W. Gagne, J. Haddock, 3♂ (00119428, 00119430–00119431), 2♀ (00119432–00119433) (UCB). **New Mexico:** ***Catron Co.:*** Sawmill Canyon, Apache National Forest, 33.8754° N 108.6346° W, 2012 m, 26 Aug 1965, H.R. Burke, 1♀ (00290520) (TAMU), 1♂ (00070048) (USNM). ***Los Alamos Co.:*** White Rock Overlook, 35.8275° N 106.20333° W, 03 Jul 1982, J.T. Polhemus, 2♂ (00116722, 00116949), 1♀ (00116950) (JTP). ***McKinley Co.:*** Ramah, 35.13309° N 108.49174° W, 2114 m, 29 Jul 1949, L.C. Wyman, 1♂ (00112044), 4♀ (00115750–00115753) (CNC). ***Rio Arriba Co.:*** 5 mi S of Chama, 36.8525° N 106.5746° W, 2347 m, 24 Jul 1967, H.R. Burke, 1♀ (00119031) (TAMU). 33 mi SW of Dulce, 36.6921° N 107.2397° W, 2103 m, 18 Jun 1972, G.C. Gaumer, 2♂ (00118221, 00290518) (TAMU). ***San Juan Co.:*** 10 mi E of Blanco, 36.72403° N 107.64378° W, 14 Jun 1992, W.F. Chamberlain, 2♀ (00119036, 00290440) (TAMU). Navajo Reservation, Blackrock, 36.705° N 109.01089° W, 1638 m, 28 Jul 1948, L.C. Wyman, 1♂ (00070128) (USNM). ***Santa Fe Co.:*** Glorieta Pass, Santa Fe National Forest, 35.59138° N 105.77777° W, 2303 m, 03 Jul 1968, L.A. Kelton, *Chrysothamnus* sp., 2♂ (00111415, 00111877), 1♀ (00111417) (CNC). ***Taos Co.:*** 5 mi E of Taos, 36.3703° N 105.47019° W, 2414 m, 22 Jul 1968, J.C. Schaffner, 1♂ (00070050) (USNM). Penasco, 36.16944° N 105.68638° W, 2343 m, 27 Jun 1960, Burks and Kinzer, 1♂ (00070129), 1♀ (00164893) (USNM). Taos, 36.40722° N 105.5725° W, 20 Aug 1927, R.H. Beamer, 1♂ (00117842) (KU). ***Valencia Co.:*** Bluewater Lake State Park, 35.2986° N 108.1085° W, 2286 m, 12 Aug 1963, J.T. Doyen, 1♀ (00119422) (UCB). **Utah:** ***Box Elder Co.:*** Clear Creek Camp[-ground], Sawtooth National Forest, 6 mi SW of Naf, ID, Raft River Mountains, 41.95221° N 113.32636° W, 1951 m, 12 Jul 1971, Ross and Hardy, 1♀ (00120034) (UCR). Snowville, 41.96556° N 112.70889° W, 09 Jun 1969, G.F. Knowlton, paratype of *S. fuscomarginalis*, 1♂ (00111893) (CNC), 1♀ (00122276) (USNM). ***Daggett Co.:*** Manila, 40.98801° N 109.72264° W, 1933 m, 13 Aug 1964, G.F. Knowlton, 1♂ (00122274), 1♀ (00134363) (USNM). ***Duchesne Co.:*** Roosevelt, 40.29944° N 109.98806° W, 20 Jul 1954, G.F. Knowlton, 1♂ (00107906) (AMNH). ***Garfield Co.:*** Widtsoe, 37.83222° N 111.99472° W, 2320 m, V.M. Tanner, 2♂ (00070121, 00070125), 1♀ (00164895) (USNM). ***Millard Co.:*** Scipio, 39.245° N 112.10333° W, 29 Jun 1965, H.H. Knight, 1♂ (00134369) (USNM). ***Rich Co.:*** Garden City, 41.88917° N 111.385° W, 02 Jul 1954, G.F. Knowlton, 1♀ (00121914) (KU). Randolph, 41.66583° N 111.18139° W, 20 Jul 1954, G.F. Knowlton, 2♀ (00108891–00108892) (AMNH). Woodruff, 41.52189° N 111.16241° W, 1931 m, 10 Jul 1956, G.F. Knowlton, *Ericameria nauseosa*, 4♂ (00122168–00122171), 1♀ (00122172), *Chrysothamnus* sp., 2♂ (00164875–00164876) (USNM); 06 Jul 1968, G.F. Knowlton and H.H. Knight, 1♂ (00134370) (USNM). ***Sevier Co.:*** 20 mi E of Salina, 38.898° N 111.6463° W, 1890 m, 18 Aug 1957, W.F. Barr, 4♂ (00122336–00122339), 3♀ (00122340–00122342) (UID). Salina, 38.94828° N 111.85732° W, 1577 m, 25 Jun 1954, G.L. Nielsen, 1♂ (00070122) (USNM). ***Summit Co.:*** Kimball Junction, 40.72722° N 111.54333° W, 31 Aug 1967, L.A. Kelton, *Ericameria nauseosa*, paratypes, 15♂ (00111876, 00115704–00115716, 00115828), 25♀ (00115717–00115741) (CNC). ***Uintah Co.:*** 5–10 mi SW of Bonanza, T10S R24E, Sec 21 (rd to R4), 40.0216° N 109.1069° W, 1676 m, 09 Jun 1982, M.D. Schwartz, *Ericameria nauseosa*, 5♂ (00112037, 00115874–00115877), 2♀ (00115878–00115879) (CNC).

5–10 mi SW of Bonanza, T10S R24E, Sec 34 (G1), 39.9056° N 109.19999° W, 1707 m, 07 Jun 1981, M.D. Schwartz, *Ericameria nauseosa*, 1♀ (00169987) (AMNH), *Ericameria nauseosa*, 12♂ (00112093, 00115859–00115869), 4♀ (00115870–00115873) (CNC). 5–10 mi SW of Bonanza, T10S R24E Sec 17 (R2), 39.9456° N 109.2406° W, 1615 m, 03 Jun 1981, M.D. Schwartz, *Ericameria nauseosa*, 12♂ (00112038, 00115837–00115847), 11♀ (00115848–00115858) (CNC). 5–10 mi SW of Bonanza, T11S R24E Sec 6, Asphalt Wash, 39.886° N 109.2721° W, 1615 m, 09 Jun 1981, M.D. Schwartz, *Ericameria nauseosa*, 1♂ (00112094) (CNC). Dinosaur National Monument, 40.524° N 109.0197° W, 2316 m, 01 Aug 1967, S.L. Jensen, 3♂ (00122174–00122176), 2♀ (00122177–00122178) (USNM). Vernal, 40.45552° N 109.52874° W, 1624 m, 06 Jun 1940, G.F. Knowlton, *Chrysothamnus* sp., paratypes, 2♂ (00112092, 00115746) (CNC). ***Utah Co.:*** Benjamin, 40.09833° N 111.73056° W, 02 Aug 1957, G.F. Knowlton, 1♀ (00122173) (USNM). Colton, 39.85246° N 111.01294° W, 2213 m, 17 Jul 1954, G.F. Knowlton, paratypes, 4♂ (00112043, 00115742–00115744), 1♀ (00115745) (CNC). ***Wasatch Co.:*** Chipman Creek, S of Strawberry River, 40.0994° N 111.14961° W, 2349 m, 08 Aug 2001, J.R. Jones, 2♀ (00242856, 00242880) (NCSU). **Wyoming:** ***Albany Co.:*** 5 mi W of Woods Landing, 41.11056° N 106.10871° W, 15 Aug 1968, L.A. Kelton, *Chrysothamnus* sp., 1♂ (00112089) (CNC). ***Carbon Co.:*** Riverside, 41.21619° N 106.77695° W, 2178 m, 23 Aug 1951, R.R. Dreisbach, 1♂ (00127476) (UMMC). ***Sublette Co.:*** Pinedale, 42.8668° N 109.8681° W, 2134 m, 23 Jul 1953, R.R. Dreisbach, 1♀ (00127332) (UMMC). ***Sweetwater Co.:*** Farson, Big Sandy River, 41.85151° N 109.78281° W, 1906 m, Vasco M. Tanner, 2♂ (00070123–00070124) (USNM). Granger, 41.59357° N 109.96875° W, 1911 m, 05 Aug 1965, W.F. Chamberlain, 1♀ (00119034) (TAMU). Rock Springs, 41.6008° N 109.23033° W, 1909 m, 26 Jul 1947, O. Bryant, 2♀ (00242495–00242496) (CAS). ***Uinta Co.:*** Mountain View, 41.26884° N 110.33987° W, 2074 m, 22 Jul 1966, G.F. Knowlton, 1♂ (00122273) (USNM).

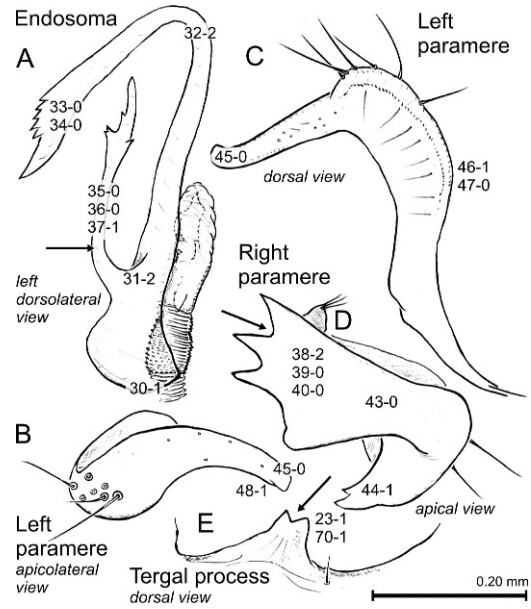


Fig. 19. *Slaterocoris atratus*, male genitalia. San Julio, BC.

Slaterocoris atratus (Uhler)
Figures 12, 19; plate 1; map 4

Stiphrosoma atrata, Uhler, 1894: 268 (orig. desc.).
Strongylocoris atratus: Van Duzee, 1921: 135 (disc., in part); Knight, 1938: 7, fig. 9 (male genit.).
Slaterocoris atratus: Kelton, 1968: 1135, fig. 23 (disc.); Knight, 1970: 246, fig. 42 (disc.); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 197 (catalog).

DIAGNOSIS: This is the only species of the *apache* group with dense, relatively long, brown vestiture and male genitalia with a bifurcate tergal process, fanlike apical region of the right paramere, and endosomal spicule with basal portion of the dorsal lobe narrow. Distinguished from non–*apache*-group species with dense brown vestiture by the completely black coloration; in *S. maculatus* the head is partially pale. The tergal process is small and bifurcate, the endosomal spicule occupies the entire base of dorsal lobe, and the basal portion of right paramere is prominent and short. The species of the *hirtus* group, containing the only other species with dense brown vestiture, differ from *S. atratus* by the board tergal process

with a solitary point, the usually bifurcate base of the dorsal lobe of the endosomal spicule, and the long basal portion of the right paramere without prominent basal lobe.

REDESCRIPTION: *Male:* Moderately large, obovate; length 4.50–4.90, width 2.13–2.40 (pl. 1). COLORATION: Pale on antennal segment I distally, femur at apex, tibia distally; hind tibia missing (fig. 12). VESTITURE: Dense, moderately long, suberect, brown to black simple setae. STRUCTURE: Frons slightly striate; antennal segment II just longer than foretibia. GENITALIA: As in species group, but differing as follows. **Pygophore**: Aperture with short, bifurcate tergal process (fig. 19E). **Endosomal spicule**: Distal portion of ventral lobe gradually expanded with some marginal serration on lateral surface; dorsal lobe narrow basally, distally flat and relatively narrow with weak marginal serration (fig. 19A). **Right paramere**: Apical region flat, fanlike with three sharp points; basal lobe bifurcate (fig. 19D).

Female: Unknown.

HOST: Unknown.

DISTRIBUTION: Known from the two specimens of the type series found in San Julio, which is apparently located in the middle of Baja California, Mexico (map 4).

DISCUSSION: Uhler (1894) described *S. atratus* based on ''several specimens'' acquired from the CAS. The introduction of his paper indicated that the ''types'' were returned to the CAS. Van Duzee (1921) provided notes on *Slaterocoris* species (as *Strongylocoris*) retained in the CAS based presumably on specimens determined by Uhler. He mentioned that an ''examination of Uhler's types [of *atratus*] show that they were males.'' Knight, during a trip to the CAS in 1931, illustrated the parameres of *S. atratus* based on observations of ''two type specimens conserved there'' (Knight, 1938: 7, fig. 9, 1970: 266, fig. 46). Kelton (1968: 1133, fig. 23B, C) illustrated the endosomal spicule and right paramere of *S. atratus* (identical to that documented by Knight) and designated the lectotype. For this current study four male syntypes of *Stiphrosoma atrata*, were located, two in the CAS and two in the CNC; no specimens of the type series were found in the USNM. The lectotype designation by Kelton (1968) was ambiguous—apparently no specimen was labeled. I have labeled the male intended by Kelton as the lectotype and returned it to the USNM. It is dissected with parts of the genitalia in a vial affixed to the pin and bears the labels: ''San Julio, Lower Cal., Mex.,'' ''PR Uhler Collection,'' ''atratus,'' ''USNM_ENT AMNH_PBI 00122271,'' ''LECTOTYPE *Stiphrosoma atrata* Uhler, 1894, desig. L.A. Kelton, 1968, labeled by M.D. Schwartz, 2010 [red label].'' The remaining three syntype males are now recognized as paralectotypes.

All California specimens in the CAS determined as *S. atratus* by Van Duzee (1921) (denoted by attached identification labels in Van Duzee's handwriting) are *S. solidaginis* (see Other Specimens Examined under *S. solidaginis*). I am in agreement with the assessment of Knight (1970) that none of the specimens (except the two former syntypes) retained in the CAS are *S. atratus*. Non-California specimens of *S. atritibialis*, *S. breviatus*, *S. pallidicornis*, and *S. stygicus* incorrectly identified as *S. atratus* by Van Duzee (1921) are housed in the CAS and several other institutions (see Other Specimens Examined under those species). Two fifth-instar nymphs (CAS) have the same locality label as the lectotype; however, I have refrained from assigning these immatures to *S. atratus* because they lack the relatively long, suberect dorsal vestiture of the adult. These glabrous nymphs are perhaps *S. solidaginis*, and would extend the range of that species 360 km further south in Baja California.

Both Kelton (1968) and Knight (1970) suggested that *S. atratus* has a relationship with *S. alpinus*, one of three species placed in the *hirtus*-species group by the phylogenetic analysis. Based strictly on external characters, where the vestiture is dense, relatively long, and brown, the frons is striate, and the tibiae are black, this would be a reasonable conclusion. However, the structure of the tergal process (small with two apical points), right paramere (with a short basal region and prominent basal lobe), and endosomal spicule (entire dorsal lobe and relatively short distal portion of the ventral lobe) are clearly of the form diagnostic for the *apache*-group species. Species of the *hirtus* group have the

tergal process with a broad base and one point, the right paramere with long, parallel apical spines and long basal region, and the dorsal lobe of the endosomal spicule bifurcate.

LECTOTYPE: **MEXICO: Baja California:** San Julio [29.65° N 114.76666° W], Apr 1889, Charles D. Haines, 1♂ (AMNH_PBI 00122271) (USNM).

ADDITIONAL SPECIMENS: Same label data as lectotype; paralectotypes, 1♂ (00122272) (USNM), 2♂ (00242726, 00242727) (CAS).

Slaterocoris croceipes (Uhler)
Figures 12, 20A, 20E, 21–23;
plates 1, 4F; map 3, cover

Stiphrosoma croceipes Uhler, 1893: 373 (orig. desc.).
Strongylocoris croceipes: Van Duzee, 1921: 136 (disc., in part).
Slaterocoris croceipes: Kelton, 1968: 1128, fig. 13 (disc.); Knight, 1970: 253, fig. 14, (disc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 197 (catalog).

DIAGNOSIS: Distinguished from other *apache*-group species by the variable bright yellowish to orange-brown distal portions of the femora, the yellowish orange tibiae (fig. 12); the sparse, recumbent, moderately long, golden brown vestiture (pl. 4F); and the male genitalia with the apex of the basal lobe in the right paramere usually serrate (fig. 21A, D–I) and the endosomal spicule with distal portion of the ventral lobe somewhat expanded and moderately serrate (fig. 22A, B, D, E, G). *Slaterocoris croceipes* differs from *S. sheridani* in antennal segment II longer than the foretibia, mostly yellowish to orange-brown femora, and untwisted dorsal lobe of the endosomal spicule. The more sparse dorsal vestiture, mostly pale antennal segment I, pale yellowish orange femur, shorter hemelytron, and the twisted dorsal lobe of the endosomal spicule (fig. 60D, E) of *S. sparsus* will distinguish it from *S. croceipes*; both species can have the femora mostly pale, although the femora in *S. sparsus* are usually more extensively pale yellowish orange than in *S. croceipes*, whose palest specimens have a more orange or reddish-brown tint. When antennal segment I is pale in the female, *S. croceipes*, *S. sheridani*, and *S. sparsus* can be difficult to separate. Antennal segment II is on average longer and the costal margin is somewhat curved, and the pale portions of the femora are pale orange-brown in *S. croceipes*. In the latter two species antennal segment II is generally shorter, the costal margin is arcuate, and the pale portions of the femora have a more yellow tint.

REDESCRIPTION: *Male:* Moderately large, elongate; length 3.15–5.28, width 1.58–1.90 (pl. 1). COLORATION: Antennal segments I and II and base of femur black, variable distal portion of femur pale orange-brown, tibia yellow (fig. 12). VESTITURE: Consisting of sparse, recumbent to suberect, moderate length, golden brown setae (pl. 4F). STRUCTURE: Costal margin of hemelytron curved to subparallel; frons smooth (fig. 20A); antennal segment II longer than foretibia; mesothoracic spiracle and metathoracic scent-efferent system as in figure 20E. GENITALIA: **Tergal process**: Short, with one sharp point. **Endosomal spicule**: Distal portion of ventral lobe variable, somewhat narrow (fig. 22F) or slightly expanded (fig. 22B), usually with moderately dense marginal serration, length short to moderately long; dorsal lobe parallel sided, predominantly wide distally (fig. 22E), sometimes narrow (fig. 22F), terminating with apical serration of variable number and size; lateral edge usually without conspicuous medial and basal spine (fig. 22A–H). **Right paramere**: Number of apical spines variable, basal lobe usually with apex serrate (fig. 21A–I).

Female: Moderately large, obovate; length 3.45–4.20, width 1.60–2.15 (pl. 1). COLORATION: Sometimes antennal segment II dusky to pale. STRUCTURE: Costal margin curved. GENITALIA: As in species group except: **Ventral labiate plate**: Strongly produced, base triangular, moderately wide, apex entire or cleft (fig. 23A, B). **Interramal lobe**: Dorsomedial margin with short process (fig. 23D, E).

HOSTS: Many specimens, from a large number of collection events, indicate that *Ericameria nauseosa* (Asteraceae) is a host plant. Other probable host plants are *E. parryi* var. *vulcanica* and *Chrysothamnus viscidiflorus*. A number of specimens were

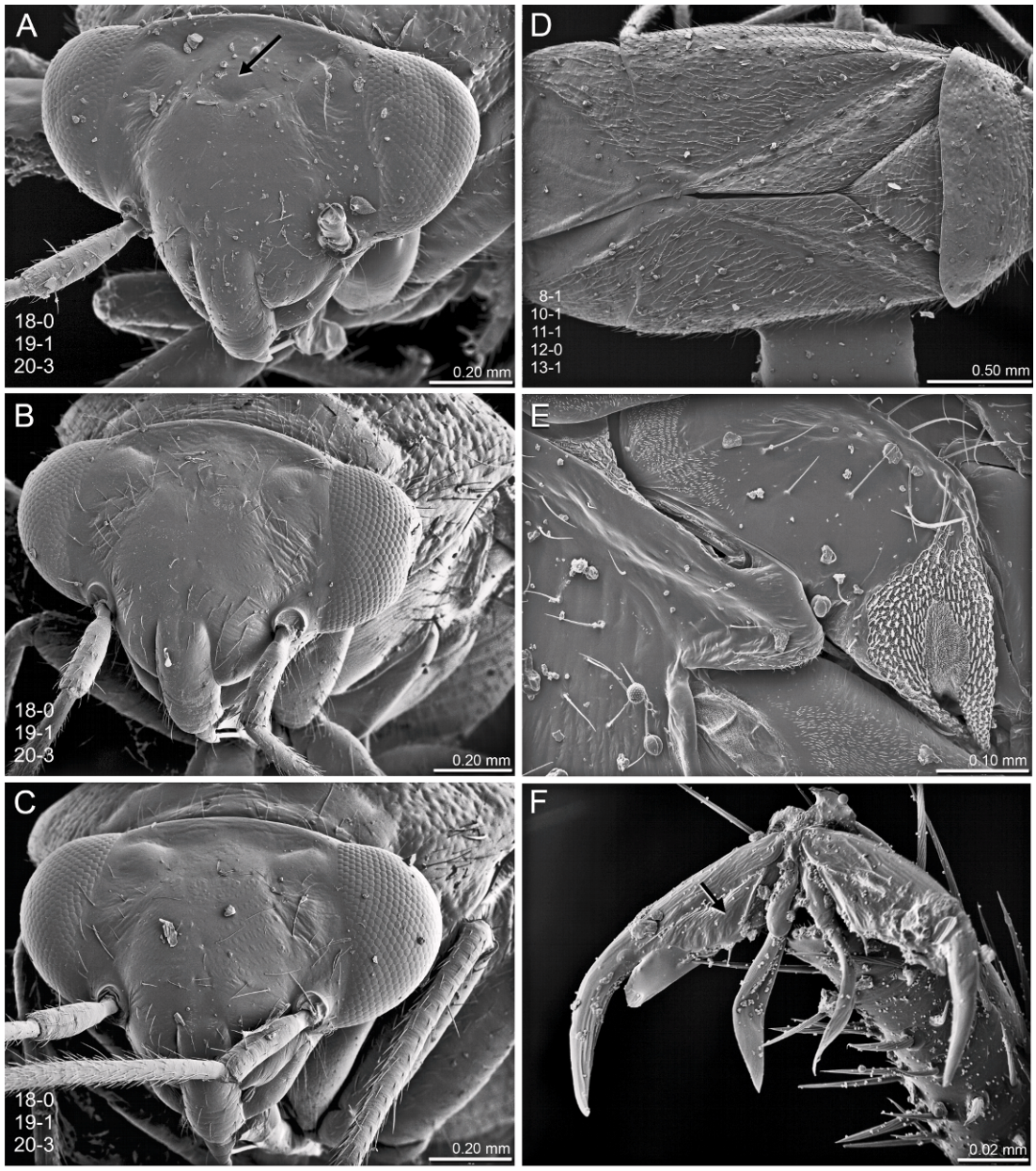


Fig. 20. *Slaterocoris* species, scanning electron micrographs. A–C. Head, anterior view. **A**. *S. croceipes*. **B**. *S. pilosus*. **C**. *S. rubrofemoratus*. **D**. *S. pilosus*, pronotum, scutellum, and hemelytra. **E**. *S. croceipes*, mesothoracic spiracle and metathoracic scent-efferent system, lateral view. **F**. *S. fuscomarginalis*, pretarsus, apical view.

also collected from species of *Artemisia* (*A. filifolia* and *A. tridentata*) and *Chrysothamnus*. The latter generic identification could pertain to either *Chrysothamnus* of *Ericameria* considering the current state of botanical taxonomy. The asteraceous genus, *Aster*, and three non-asteraceous plants are considered to be sitting records.

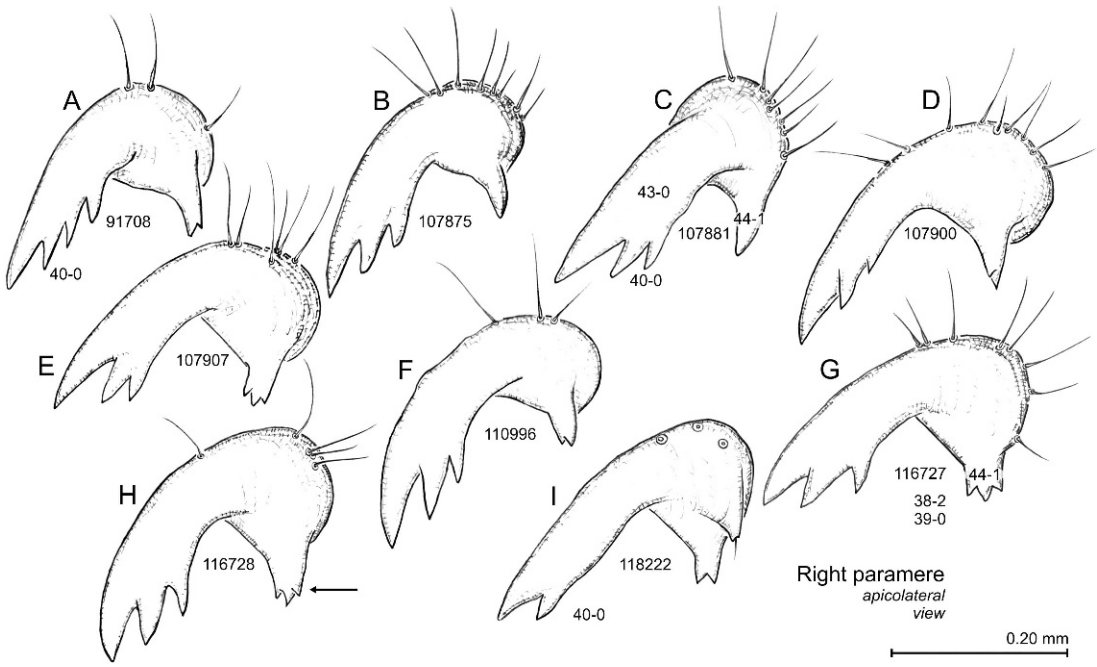


Fig. 21. *Slaterocoris croceipes*, right paramere. **A**. Willow Springs Road, CA. **B**. Phelan Road, CA. **C**. Largo Vista Road, CA. **D**. 11 mi W of Sevier, UT. **E**. Clear Creek Narrows Summit, UT. **F**. 20 km W of Wofford Heights, CA. **G**. 10 mi E of Roggen, NV. **H**. Charleston Peak, NV. **I**. 3 mi E of Lefors, TX.

DISTRIBUTION: From the mountain ranges of southern California that border the western portion of the Mojave Desert, north along the eastern foothills of the Sierra Nevada, isolated ranges of the Great Basin in Nevada and Utah, lower elevations of northwestern Colorado, and scattered populations in the Great Plains of Colorado, South Dakota, and Texas (map 3).

COLLECTION SUMMARY: 719 specimens from 112 collection events with the earliest record from April in California and the majority of specimens from June to early August.

DISCUSSION: The original description of *croceipes* (Uhler, 1893) stated that it was "based upon two males specimens from Los Angeles, Cal., which were sent to me by Mr. D.W. Coquillett." Kelton received these two males, deposited in the USNM, and designated one the lectotype (Kelton, 1968), stating that it bore the No. 69539. At the beginning of the current project both males were found at the CNC without labels indicating the lectotype designation or the USNM type number. To correct the ambiguous lectotype designation, I have chosen the male in the best condition, and applied two labels to it in order to stabilize the concept of *croceipes*: AMNH_PBI 00122110 and LECTOTYPE ♂ *Stiphrosoma croceipes* Uhler, 1893, desig. by M.D. Schwartz, 2010 [red label]. I also labeled the other syntype [right hemelytron missing] to recognize it as the paralectotype (AMNH_PBI 00070120).

In the original description, "several specimens were collected at American Fork, [UT], June 22 [91]" and included in *croceipes*, by Uhler (1893). During the course of this current project seven specimens (3♂, 4♀) fitting the original description have been located—six in the USNM and one female in the CAS. The CAS specimen has an additional printed label, "Heideman [sic] Collector"; I assume Heidemann collected all seven specimens. Van Duzee (1921) probably included the latter specimen in his treatment of the genus (see Other Specimens

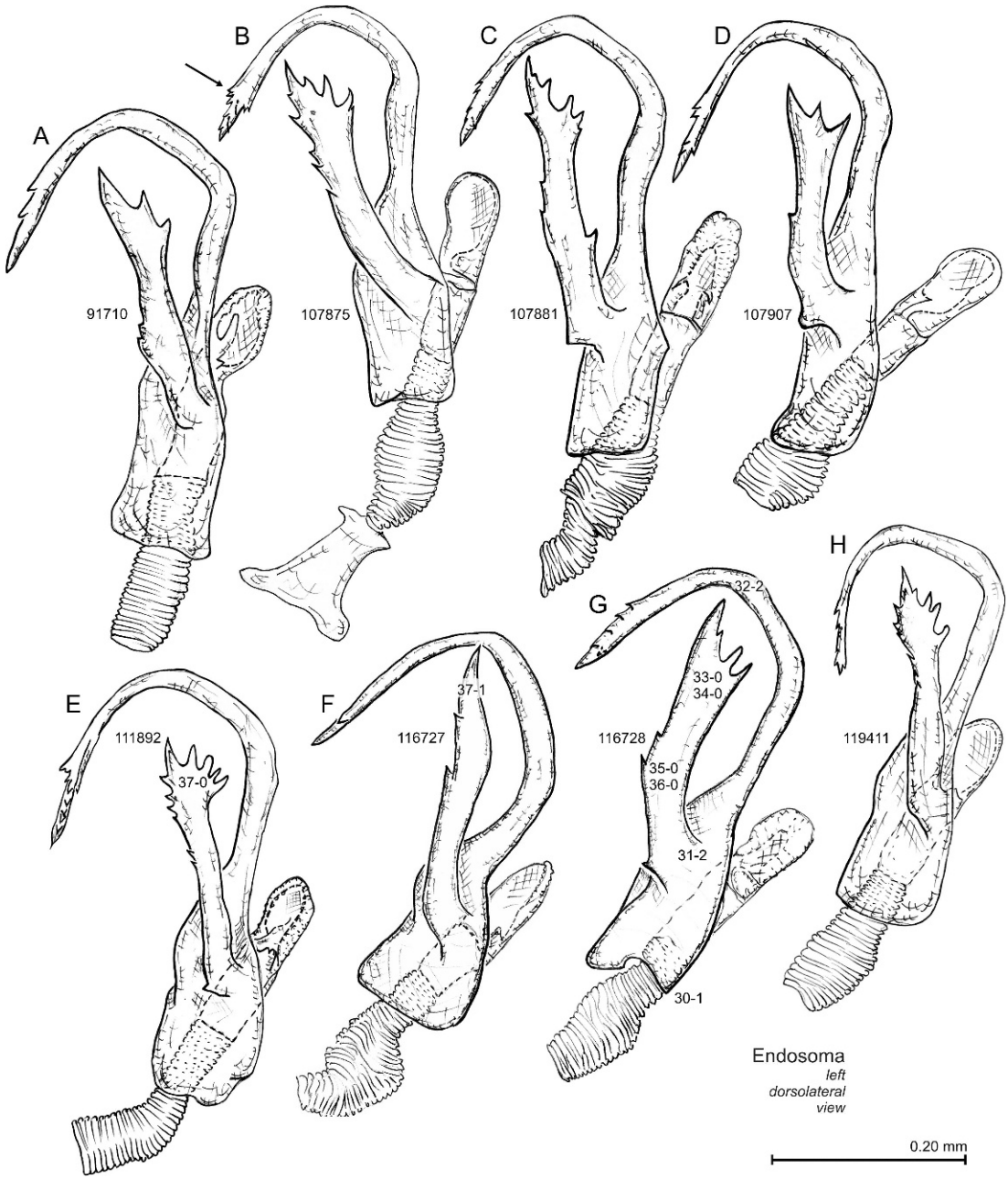


Fig. 22. *Slaterocoris croceipes*, endosoma. **A**. Tehachapi Willow Springs Road, CA. **B**. Phelan Road, CA. **C**. Largo Vista Road, CA. **D**. Clear Creek Narrows Summit, UT. **E**. American Fork, UT. **F**. 10 mi E of Roggen, CO. **G**. Charleston Peak, NV. **H**. 3 mi W of Lida, NV.

Examined). The seven Utah specimens are not considered to be syntypes and along with the lectotypes and paralectotype have been returned to the museum of provenance.

Easternmost specimens are somewhat smaller than western specimens. The size difference is easily apprehended by comparing the length of antennal segment II in both

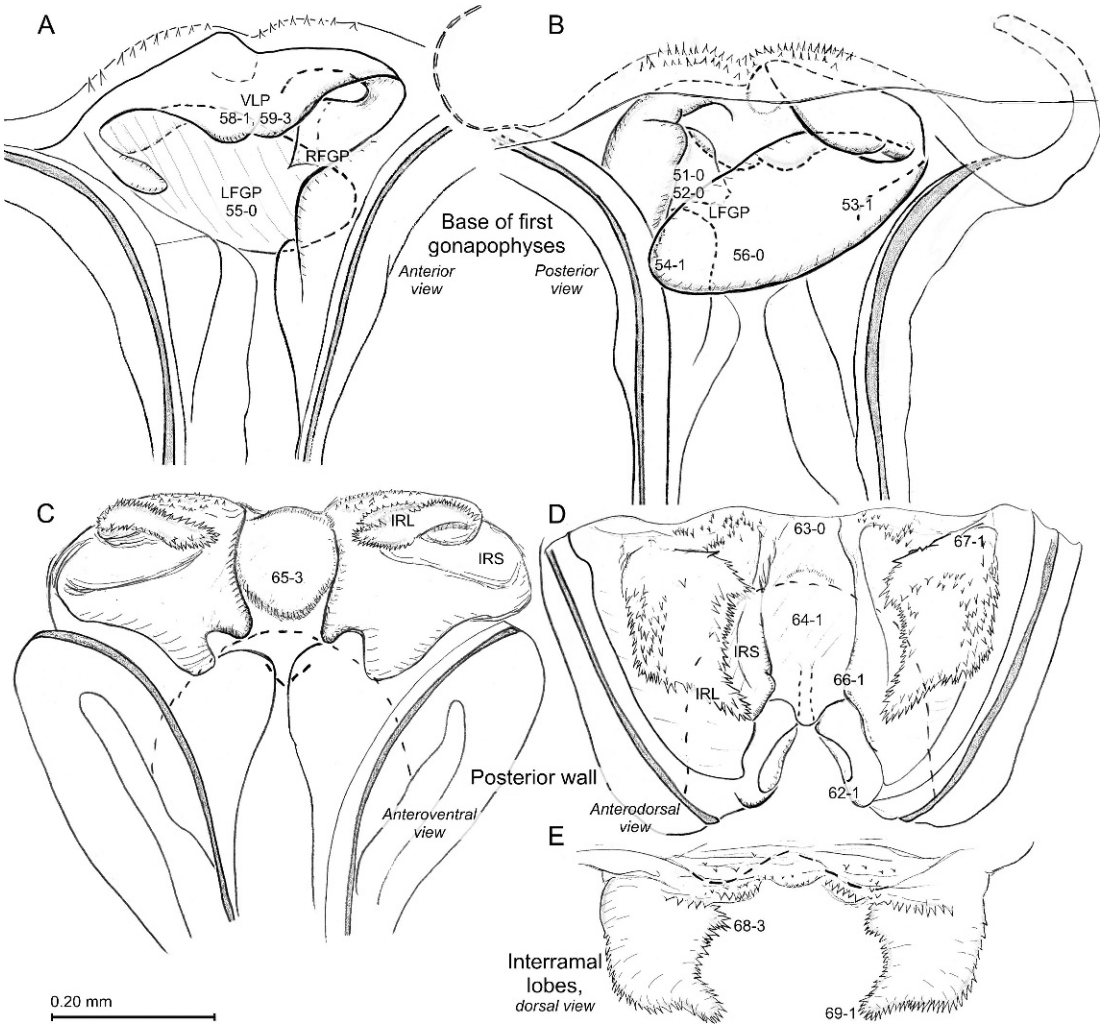
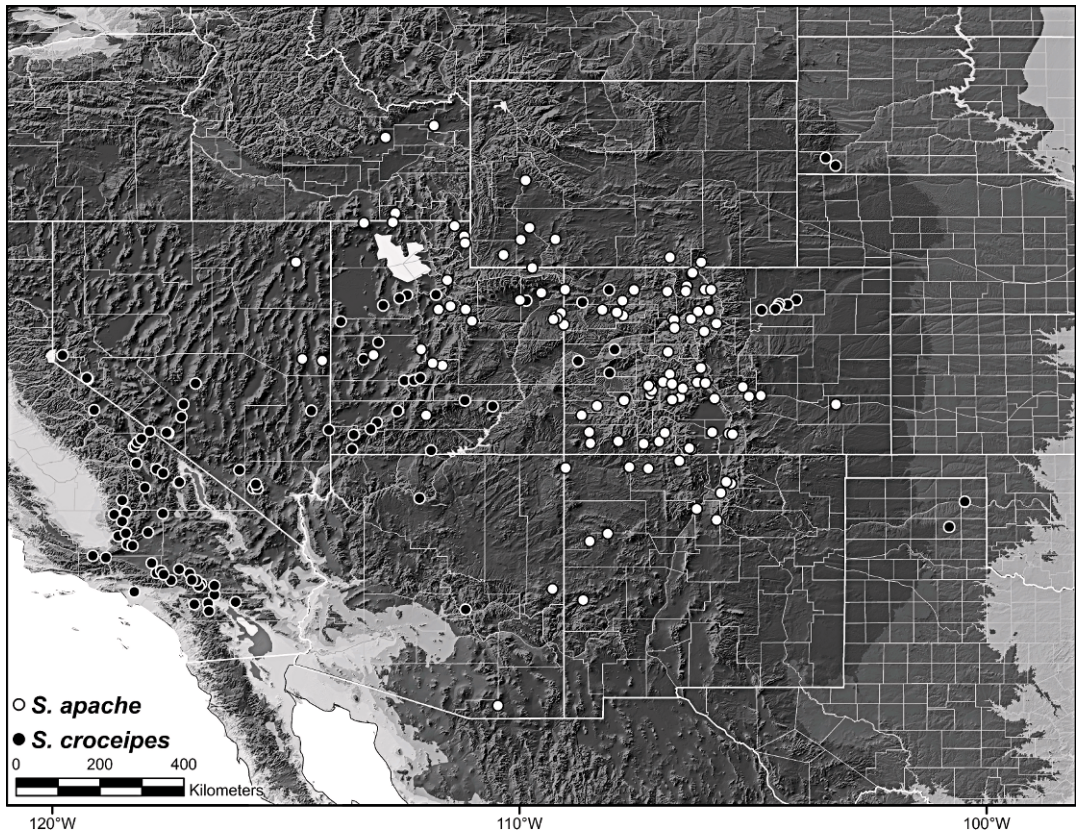


Fig. 23. *Slaterocoris croceipes*, female genitalia. Phelan Road, CA.

sexes; those from Colorado, South Dakota, and Texas are shorter (0.80–0.93♂, 0.78–0.81♀) than those from California, Nevada, and Utah (1.00–1.31♂, 1.06–1.23♀). The hemelytron length in males is conspicuously longer in California specimens (total body length 4.13–5.28) than in those from the remainder of the range (3.15–4.10).

As noted for *S. apache*, variation also occurs in the number and conformation of the apical spines and apical serration on the basal lobe of the right paramere in *S. croceipes* (cf. fig. 21A–I). Variable structure was observed during this study in specimens from California, Nevada, Texas, and Utah. The dorsal and ventral lobes of the endosomal spicule (fig. 22A–H) are also variable across the distribution of the species. The variation of the width of the dorsal lobe was deemed great enough to code *S. croceipes* as polymorphic for this character (37-0, 1; table 2).

Specimens of *S. croceipes* from Oelrich, South Dakota, and near Lefors, Texas, in the eastern reaches of the distribution, have femoral coloration as observed in the specimens from the western portion of the range in California, Nevada, and Utah. The proportions of basal black, medial orange-brown, and apical yellow coloration regions on the femora are variable across the



Map 3. Localities for *Slaterocoris apache* and *S. croceipes*.

distribution and within populations. The extent of black varies from a basal one-fourth to one-half, with the reciprocal extent of orange-brown varying from a medial three-quarters to one-half. The orange-brown color also grades from a darkest tone to apical yellow in a variable fashion.

LECTOTYPE: **USA: California:** ***Los Angeles Co.:*** Los Angeles [34.05222° N 118.24278° W], May, Coquillett Collection, 1♂ (AMNH_PBI 00122110) (USNM).

OTHER SPECIMENS EXAMINED: **USA: Arizona:** ***Coconino Co.:*** Grand Canyon, south Rim, 36.05444° N 112.13861° W, 03 Jun 1930, R.L. Usinger, *Artemisia* sp., 1♂ (00119454), 2♀ (00119455–00119456) (UCB). ***Gila Co.:*** nr Roosevelt Lake, 33.67323° N 111.14913° W, 686 m, 27 Jun 1947, H. and M. Townes, 1♀ (00134619) (USNM). **California:** ***Inyo Co.:*** 2 mi E of Big Pine, 37.165° N 118.25232° W, 03 Jun 1975, J.D. Pinto, 1♀ (00119871) (UCR). 5 mi E of Big Pine, 37.1709° N 118.2114° W, 1341 m, 11 Jun 1969, W.F. Barr, *Aster* sp., 1♀ (00122347) (UID). 9 mi NE of Big Pine, 37.257° N 118.17301° W, 1920 m, 09 Jun 1966, W. Gagne, 1♂ (00119435), 1♀ (00276763) (UCB). 10 mi NE of Big Pine, 37.2611° N 118.1508° W, 2103 m, 09 Jun 1966, C.W.O'Brien, 9♂ (00119436, 00276754–00276761), 1♀ (00276762) (UCB); 09 Jun 1966, W. Gagne, *Chrysothamnus* sp., 1♂ (00119437), *Chrysothamnus* sp., 4♂ (00276773–00276776), 3♀ (00276777–00276779) (UCB). 30 mi N of Saline Valley Lake, 36.67713° N 117.76816° W, 335 m, 04 May 1974, J.D. Pinto, 2♂ (00119865, 00120016), 1♀ (00120017) (UCR). China Lake Naval Weapons Center, Coso Mountains, Silver Peak Springs on west side, 35.73° N 117.634° W, 1996 m, 27 Jul 1999, M. Gates, 1♀ (00119866) (UCR). Deep [Spring]

Valley, Antelope Spring[s], 37.33024° N 118.09043° W, 1698 m, 02 Jun 1987, W.F. Barr, *Salix* sp. (Salicaceae), 1♀ (00122425) (UID). Independence, 36.80278° N 118.19917° W, 17 Jun 1937, Norman W. Frasier, 1♀ (00119445) (UCB). Olancha, Owens Valley, 36.2806° N 118.0169° W, 1122 m, 20 May 1937, J.W. Johnson, 1♂ (00119439) (UCB). Panamint Mountains, 36.4003° N 117.2797° W, 1512 m, 24 May 1937, Norman W. Frasier, 1♀ (00119444) (UCB). Saline Valley Road, 19.3 mi N of Hwy 190, 36.5931° N 117.6294° W, 919 m, 04 Jun 1974, J.D. Pinto, 3♂ (00119864, 00120013–00120014), 1♀ (00120015) (UCR). ***Kern Co.:*** 11 mi NW of Tehachapi on Rt 58, 35.24466° N 118.58574° W, 25 Apr 1983, G.M. Stonedahl, *Ericameria nauseosa*, 7♂ (00108331, 00170227–00170232), 3♀ (00170233–00170235), 2 immatures (00170236–00170237) (AMNH). 20 km W of Wofford Heights on Rt 155, 35.70694° N 118.6764° W, 1500 m, 26 Jul 1999, M.D. Schwartz, *Chrysothamnus viscidiflorus*, 1♂ (00110996), 2♀ (00112105–00112106) (CNC). E of Caliente on Caliente Creek Rd, Twin Oaks, 35.30702° N 118.4233° W, 836 m, 22 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Sanders UCR140644 [PBI_CAL04-H126], 10♂ (00088461–00088470), 14♀ (00088471–00088484) (AM), 1♂ (00108333), 1♀ (00322727), 3 immatures (00322728–00322730) (AMNH). Kernville, 35.75472° N 118.42444° W, 06 Jun 1952, G.L. Smith, 1♀ (00119443) (UCB); 09 Jun 1952, unknown, 1♀ (00276781) (UCB); 09 Jun 1959, G.L. Smith, 1♀ (00276782) (UCB). Mount Pinos, 34.8234° N 119.1331° W, 2438 m, 01 Jul 1965, unknown, 1♀ (00119446) (UCB). Red Rock Canyon, 35.325° N 117.94972° W, 18 May 1937, E.P. Van Duzee, Asteraceae, 1♂ (00242481) (CAS). S of Bodfish on Caliente-Bodfish Road, 35.56089° N 118.5053° W, 1094 m, 22 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Fremontodendron californicum* (Torr.) Corville (Sterculiaceae), det. Field ID, 1♀ (00322745) (AMNH). S of Tehachapi on Tehachapi Willow Springs Rd, 35.05502° N 118.3696° W, 1329 m, 21 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Saunders UCR 140653 [PBI_CAL04-H92], 8♂ (00091708, 00088439–00088445), 7♀ (00088446–00088452) (AM). S of Tehachapi on Tehachapi Willow Springs Rd, 35.06889° N 118.3959° W, 1393 m, 21 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. Field ID, 9♂ (00322736–00322744), 5♀ (00322746–00322750) (AMNH). W of Mojave on Oak Creek Road, 35.03848° N 118.2807° W, 1055 m, 21 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Sanders UCR140653, [PBI CAL04-H92], 6♂ (00137262, 00322731–00322735), 10♀ (00322751–00322760) (AMNH). ***Los Angeles Co.:*** 1 mi S of Gorman, 34.78165° N 118.85167° W, 13 Jun 1964, A.G. Raske, 3♂ (00119410, 00276769–00276770), 2♀ (00276771–00276772) (UCB). Big Rock Creek Wash, Mohave Desert, 34.6664° N 117.8726° W, 770 m, 12 May 1944, Timberlake, *Chrysothamnus* sp., 1♂ (00119862), 2♀ (00120018–00120019) (UCR). Largo Vista Rd 3.1 mi S of Rt 18, SE of Llano, 34.45251° N 117.7651° W, 1275 m, 17 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Saunders UCR 140595 [PBI_CAL04-H2], 17♂ (00088414–00088429, 00091710), 9♀ (00088430–00088438) (AM), 22♂ (00107881, 00108136, 00108853, 00137236–00137238, 00322993–00323008), 17♀ (00108135, 00108970, 00322987–00322992, 00323009–00323017) (AMNH). Los Angeles, 34.05222° N 118.24278° W, Coquillett Collection, 1♀ (00122111) (USNM); May, Coquillett Collection, 1♂ (00070119) (USNM), 1♂ paralectotype [abdomen missing] (00070120) (USNM). Rt 18 at W 263 St, 34.49833° N 117.669° W, 1033 m, 17 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa* UCR 140595 [PBI CAL04-H2], 9♂ (00137263, 00322687–00322694), 23♀ (00322695–00322717) (AMNH). SE of jct Pearblossom Hwy (Rt 18) and 263rd Street 3300N, 34.5000° N 117.66866° W, 1035 m, 19 May 2000, M.D. Schwartz, *Ericameria nauseosa*, 11♂ (00108334, 00170213–00170222), 4♀ (00170223–00170226) (AMNH). ***Mono Co.:*** Mono Lake, 1 mi S of Lee Vining, 37.94446° N 119.10214° W, 2064 m, 20 Aug 1987, D.A. Rider, 1♀ (00242954) (DAR). Oasis,

37.48771° N 117.91565° W, 1538 m, 27 May 1954, M. Cazier, 2♂ (00108332, 00170238), 1♀ (00108895) (AMNH). ***Riverside Co.:*** 2.5 mi NW of Desert Springs, 33.9886° N 116.5277° W, 408 m, 25 May 1955, Timberlake, *Ericameria nauseosa*, 7♂ (00119860 [cat UCRC ENT 32032], 00120004 [cat UCRC ENT 32025]–00120009 [cat UCRC ENT 32035]), 3♀ (00120010 [cat UCRC ENT 32026]–00120012 [cat UCRC ENT 32031]) (UCR). Round Valley, 33.80502° N 116.66279° W, 2754 m, 27 Jul 1947, R.H. Beamer, 2♀ (00117852–00117853) (KU). Upper Palm Canyon, 14 mi SE of Keen Camp Summit, 33.6377° N 116.6452° W, 1341 m, 08 Aug 1964, E.I. Schlinger, 1♂ (00119868) (UCR). Vandevanter Flat, San Jacinto Mountains, 33.78389° N 116.95778° W, 04 May 1940, unknown, Asteraceae, 1♂ (00242480),1♀ (00242479) (CAS); 04 Jun 1940, unknown, *Chrysothamnus* sp., 1♂ (00119438), *Chrysothamnus* sp., 3♀ (00276764–00276766) (UCB); 04 Jun 1940, H.T. Reynolds, *Chrysothamnus* sp., 1♀ (00276767) (UCB); 04 Jun 1940, C.D. Michener, 1♀ (00276768) (UCB); top of Berdoo Canyon, 33.8338° N 116.0733° W, 1128 m, 14 Jun 1963, E.I. Schlinger, 1♀ (00119872) (UCR). ***San Bernardino Co.:*** 1 mi N of X of FS Rd 2N93 and Hwy 38, 34.2184° N 116.8162° W, 2350 m, 24 Jun 1997, J. Heraty, 1♂ (00119870) (UCR). 5.4 mi W of Lucerne Valley, 34.44389° N 117.0616° W, 935 m, 13 May 1978, J.D. Pinto and R.T. Schuh, *Ericameria nauseosa*, 66♂ (00108329, 00170290–00170313, 00322857–00322897), 37♀ (00169981, 00322898–00322933) (AMNH); 13 May 1978, John D. Pinto, *Chrysothamnus* sp., 15♂ (00119983–00119997), 7♀ (001198756, 00119998–00120003) (UCR). Apple Valley, 34.53139° N 117.28278° W, 15 May 1955, W.R.M. Mason, 1♂ (00112099) (CNC). Barton Flats, 34.17251° N 116.86308° W, 1997 m, 22 Jul 1981, G. Gordh, 1♂ (00119863) (UCR). Cajon Pass Summit on I-15, 34.29889° N 117.45556° W, 02 Jul 1949, Flock, 1♂ (00119869) (UCR). Camp Baldy, 34.29528° N 116.91392° W, 11 Jul 1950, R. DeNoble, 2♂ (00119440, 00276780) (UCB). Ironwood Campground, 34.30416° N 117.01222° W, 2130 m, 22 Aug 1999, M. Gates, 1♂ (00119867) (UCR). NW of Pioneertown, T1N R4E S12, 34.1844° N 116.5269° W, 1280 m, 03 May 1994, M. Cooperband, 1♂ (00119861) (UCR). Phelan, Rt 138 at Phelan Road, 34.42531° N 117.6174° W, 1310 m, 16 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Saunders UCR 140595 [PBI_CAL04-H2], 3♂ (00088453–00088455), 5♀ (00088456–00088460) (AM), 23♂ (00107875, 00322718–00322721, 00322934–00322951), 41♀ (00169985, 00322722–00322726, 00322952–00322986) (AMNH). ***Tulare Co.:*** 21 mi W of Rt 395 toward Kennedy Meadows, 36.00944° N 118.50308° W, 1875 m, 01 Jul 1980, R.T. Schuh, *Ericameria parryi* var. *vulcanica*, 8♂ (00108335, 00108843–00108849), 3♀ (00108850–00108852) (AMNH). **Colorado:** ***Delta Co.:*** Delta, 38.74222° N 108.06833° W, 27 Jun 1938, R. Bauer, 2♀ (00134594–00134595) (USNM); 27 Jun 1938, U. Lanham, 1♀ (00134596) (USNM). ***Mesa Co.:*** Collbran, 39.24016° N 107.95973° W, 1829 m, 08 Aug 1922, E.R. Kalmbach, 1♀ (00164886) (USNM). Glade Park, 38.99474° N 108.74117° W, 2105 m, 09 Aug 1931, F.C. Hottes, 1♂ (00070130), 1♀ (00134615) (USNM). ***Moffat Co.:*** Massadona, 40.2528° N 108.6498° W, 1768 m, 01 Jul 1931, R.H. Beamer, 1♀ (00117855) (KU). Maybell, 40.51775° N 108.08028° W, 1805 m, 30 Jun 1931, R.H. Beamer, 1♀ (00117854) (KU). ***Morgan Co.:*** 5 mi N of Wiggins, 40.30303° N 104.07222° W, 12 Jun 1979, D.A. Polhemus, 2♂ (00116819, 00116953) (JTP). ***Weld Co.:*** 5 mi NW of Roggen, 40.21861° N 104.4386° W, 1461 m, 16 Jul 1983, D.A. and J.T. Polhemus, *Artemisia filifolia* Torr., 7♀ (00116958–00116964) (JTP). 5 mi W of Roggen, 40.1675° N 104.46626° W, 1585 m, 16 Jul 1983, R.T. Schuh, D.A. and J.T. Polhemus, *Artemisia filifolia* Torr., 1♂ (00108396), 1♀ (00108396) (AMNH). 10 mi E of Roggen along I-25, 40.2018° N 104.2549° W, 1426 m, 11 Jul 1979, D.A. Polhemus, 1♂ (00116727), 1♀ (00116965) (JTP). Fort Lupton, 40.08472° N 104.8125° W, 10 Jun, unknown, 1♂ (00134368) (USNM); 10 Jun 1910, unknown, 1♀ (00134614) (USNM). Keenesburg, 40.10833° N 104.51944° W, 11 Jun 1961, B.H. Poole, 3♀ (00112102–00112104) (CNC). ***Unknown co.:*** Colo 2304, unknown, 1♀ (00134357) (USNM). **Nevada:** ***Carson City Co.:*** 4 mi S of

Carson City, 39.1162° N 119.7815° W, 1463 m, 30 May 1930, W.F. Chamberlain, *Artemisia* sp., 2♂ (00119044–00119045), 1♀ (00119046) (TAMU). ***Clark Co.:*** Charleston Peak, 36.27222° N 115.69417° W, 2286 m, 22 Jul 1982, J.T. Polhemus, 1♂ (00116728), 3♀ (00116954–00116956) (JTP). Kyle Canyon, 36.26274° N 115.60668° W, 2090 m, 26 Jun 1966, W.F. Barr, 1♂ (00122345), 1♀ (00122346) (UID). Lee Canyon, Charleston Peak, 36.35451° N 115.6405° W, 2286 m, 20 Jul 1982, J.T. Polhemus, 1♀ (00116957) (JTP). ***Esmeralda Co.:*** 2 mi W of Lida, 37.4513° N 117.51491° W, 1935 m, 08 Jun 1966, W. Gagne, Light Trap, 1♂ (00119441), 3♂ (00276790–00276792) (UCB). 3 mi W of Lida, 37.45833° N 117.55185° W, 2073 m, 07 Jul 1966, C.W. O'Brien, 1♂ (00276783), 2♀ (00276784–00276785) (UCB); 07 Jul 1966, L. and C.W. O'Brien, 1♂ (00119411) (UCB). 6 mi N of Goldfield, 37.79535° N 117.23472° W, 1615 m, 08 Jun 1966, W. Gagne, 1♂ (00119039) (TAMU), 1♂ (00276793) (UCB). ***Lincoln Co.:*** Beaver Dam State Park, 37.51813° N 114.07636° W, 1555 m, 18 Jun 1986, J.B. Knight and K.R. Helms, 1♀ (00108896) (AMNH). Pioche, 37.92969° N 114.45221° W, 1852 m, 09 Jul 1965, W.F. Barr, *Penstemon* sp. (Scrophulariaceae), 2♂ (00122344, 00122439), 1♀ (00122440) (UID). ***Lyon Co.:*** 7 mi N of Sweetwater Summit on Rt 338, Toiyabe National Forest, 38.61362° N 119.24054° W, 1865 m, 11 Jul 1980, R.T. Schuh and G.M. Stonedahl, *Ericameria nauseosa*, 2♂ (00108336, 00170314), 9♀ (00170315–00170323) (AMNH). 8 mi N of Sweetwater summit on highway 22, Toiyabe National Forest, 38.63046° N 119.26097° W, 1811 m, 11 Jul 1980, G.M. Stonedahl, *Ericameria nauseosa*, 4♀ (00108337, 00170324–00170326) (AMNH). ***Nye Co.:*** 2 mi E of Tonopah, 38.06722° N 117.19244° W, 1890 m, 07 Jun 1966, W. Gagne, 2♂ (00119442, 00276786), 3♀ (00276787–00276789) (UCB). 5.5 mi S of Belmont on Hwy 82, 38.51401° N 116.93231° W, 1981 m, 13 Jul 1980, G.M. Stonedahl, *Artemisia tridentata*, 1♀ (00108897) (AMNH). Mercury, 18 M, 36.66056° N 115.99361° W, 20 Jun 1965, H.H. Knight and J. Merino, *Ericameria nauseosa*, 1♀ (00119067) (TAMU). Mercury, 401 M, 36.66056° N 115.99361° W, 18 Jun 1965, H.H. Knight and J. Merino, *Ericameria nauseosa*, 1♂ (00112100) (CNC), 2♂ (00119063–00119064), 2♀ (00119065–00119066) (TAMU). ***White Pine Co.:*** Lehman Caves, Great Basin National Park, 39.00555° N 114.21944° W, 24 Jun 1966, W. Gagne, J. Haddock, 1♂ (00119429) (UCB). **South Dakota:** ***Fall River Co.:*** Angostura Dam, Hot Springs, 43.34463° N 103.43939° W, 967 m, 06 Jul 1968, A.T. Howden, 1♀ (00115908) (CNC). Oelrichs, 43.17889° N 103.23028° W, 1022 m, 28 Jun 1973, L.A. Kelton, *Artemisia* sp., 2♂ (00110993, 00112135), *Artemisia* sp., 17♂ (00115880–00115896), 11♀ (00115897–00115907) (CNC). **Texas:** ***Gray Co.:*** 3 mi E of Lefors, 35.4414° N 100.7969° W, 878 m, 29 May 2002, J.C. Schaffner, 5♂ (00118222, 00119058–00119060, 00245354), 2♀ (00119061, 00245355) (TAMU). ***Hemphill Co.:*** 7.5 mi N of Canadian River on Hwy 83, 35.98361° N 100.46527° W, 18 May 2002, E.G. Riley, 1♀ (00119062) (TAMU). **Utah:** ***Beaver Co.:*** Milford, 39.39691° N 113.01789° W, 1513 m, 07 Jun 1969, W.F. Chamberlain, 1♂ (00119047) (TAMU). ***Garfield Co.:*** Capitol Reef National Park, Grand Wash, Cobab Canyon Trail, 38.15° N 111.16667° W, 1827 m, 21 Jun 1983, R.T. Schuh, M.D. Schwartz, *Ericameria nauseosa*, 2♂ (00108390–00108391), 2♀ (00108392–00108393) (AMNH). Jct. Rts 95 & 276, S of Hanksville, T32S R12E, 38.02505° N 110.57098° W, 1494 m, 18 Jun 1983, R.T. Schuh and M.D. Schwartz, *Ericameria nauseosa*, 1♂ (00108394), 1♀ (00108395) (AMNH). ***Iron Co.:*** Bear Valley, 37.92662° N 112.60734° W, 2295 m, 09 Jun 1966, G.F. Knowlton, 1♂ (00134611) (USNM). Cedar City, 37.67521° N 113.05068° W, 1798 m, 22 Jun 1933, O.H. Swezey, 5♂ (00242463–00242467), 10♀ (00242468–00242477) (CAS). Kanarraville, 37.53889° N 113.18333° W, 09 Jun 1960, G.F. Knowlton, 1♀ (00164887) (USNM). ***Juab Co.:*** Deep Creek Mountains, 39.84309° N 113.82288° W, 1753 m, Jun 1928, Vasco M. Tanner, 2♀ (00134616, 00164882) (USNM). ***Kane Co.:*** Whitehouse, Utah Exp. Sta., 37.07832° N 111.88989° W, 1316 m, 20 Jun 1933, G.F. Knowlton, 1♂ (00112036) (CNC), 1♂ (00134612) (USNM). ***Millard Co.:*** Skull Rock Pass, 53 mi WSW of Delta, 39.03329° N 113.33969° W, 1596 m, 12 Jun 1992, W.F. Chamberlain, 1♂ (00119048)

(TAMU). ***Sevier Co.:*** 11 mi W of Sevier on I-70, 38.57501° N 112.46132° W, 1999 m, 15 Jul 1980, R.T. Schuh, G.M. Stonedahl, *Chrysothamnus viscidiflorus*, 1♂ (00170271), 19♀ (00169986, 00170272–00170289) (AMNH); 15 Jul 1980, G.M. Stonedahl, *Chrysothamnus viscidiflorus*, 7♂ (00170253–00170258, 00107900), 12♀ (00170259–00170270) (AMNH). Clear Creek Narrows Summit on Rt 4, 38.58156° N 112.25678° W, 2243 m, 15 Jun 1980, R.T. Schuh and G.M. Stonedahl, 5♂ (00107907, 00170239–00170242), 10♀ (00170243–00170252) (AMNH). Monroe, 38.63° N 112.12° W, 25 Jul 1906, unknown, 1♀ (00134618) (USNM). Salina, 38.94828° N 111.85732° W, 1577 m, 28 Jun 1954, G.L. Nielsen, 1♂ (00070117) (USNM). ***Tooele Co.:*** 4 mi NE of Camel Back Mountain [Camels Back Ridge], 40.18586° N 112.91654° W, 1326 m, 07 Jun 1954, P.D. Ashlock, *Ericameria nauseosa*, 2♂ (00134373–00134374), 1♀ (00134375) (USNM). Clover Creek, 40.408° N 112.40411° W, 1516 m, 23 Jul 1954, G.F. Edmunds, 1♀ (00119434) (UCB). Fisher's Pass, 40.33796° N 112.56739° W, 1957 m, 06 Jul 1932, G.F. Knowlton and M.J. Janes, *Chrysothamnus* sp., 1♀ (00134613) (USNM). ***Uintah Co.:*** Fort Duchesne, 40.28806° N 109.85389° W, 15 Jun 1932, Lowell Cutler, 1♀ (00164881) (USNM). ***Utah Co.:*** American Fork, 40.4157° N 111.7836° W, 1475 m, 22 Jun [18]91, O. Heidemann, 1♀ (00242478) (CAS), 3♂ (00134356, 00164883–00164884), 2♀ (00134355, 00164885) (USNM); 22 Jun [18]91, P.R. Uhler Collection, 1♀ (00122112) (USNM); 24 Jun 1891, P.R. Uhler Collection, 1♀ (00122113) (USNM); 24 Jun, unknown, 1♂ (00070118) (USNM); 28 Jun 1965, H.H. Knight, 1♂ (00111892), 1♀ (00112108) (CNC). ***Washington Co.:*** 3 mi NW of Pine Valley, 37.4171° N 113.5454° W, 1890 m, 15 Jun 1967, unknown, *Ericameria nauseosa*, 1♂ (00134610) (USNM). Saint George, 37.10417° N 113.58333° W, 853 m, 30 Jun 1965, H.H. Knight, 2♂ (00134371–00134372) (USNM).

Slaterocoris fuscomarginalis Knight
Figures 12, 20F, 24A–B;
plates 2, 4H; map 4

Slaterocoris fuscomarginalis Knight, 1970: 256, fig. 35 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 198 (catalog).

DIAGNOSIS: The male is distinguished from congeners by the conspicuous central hyaline section of the hemelytral membrane; clear region somewhat obscure in the much smaller membrane of the female (pl. 2). In addition to the membrane, the pale to golden dorsal vestiture (pl. 4H), the legs with mostly darkened femora with pale apices, pale tibiae, and black tarsomeres (fig. 12), black antennal segment I, antennal segment II longer than the width of the head, and the endosomal spicule with a narrow distal portion of the ventral lobe (fig. 24A, B), will serve to separate *S. fuscomarginalis* from the other *apache*-group species.

REDESCRIPTION: *Male:* Moderately large, elongate; length 3.85–5.25, width 1.55–2.03 (pl. 2). COLORATION: Antennal segments I and II concolorous black; legs black, apices of femora and variable portions pale, tibiae yellow, distal portions variously darkened, tarsomeres black; hemelytral membrane clear with wide, darkly infuscate, peripheral band, veins and narrow adjacent portion of cells infuscate. VESTITURE: Sparse, moderately long, suberect pale to golden simple setae (pl. 4H); antennal segment II with sparse, long (just over twice as diameter of segment) setae. STRUCTURE: Costal margin of hemelytron subparallel; frons smooth; antennal segment II longer than foretibia and head width; pretarsus as in figure 20F. MALE GENITALIA: **Tergal process**: Short point directed toward midline on right side. **Endosomal spicule**: Ventral lobe with apicalmost region narrow, long, practically reaching medial curvature, marginal serrate; dorsal lobe narrow distally (fig. 24A, B). **Right paramere**: As in *S. apache* (fig. 17C) and *S. croceipes* (fig. 21D), typically with three apical spines and bifurcate, narrow basal lobe. **Left paramere**: Apex somewhat truncate and slightly expanded.

Female: Moderately small, obovate; length 3.60–4.28, width 1.75–1.90 (pl. 2). COLORATION: Hemelytral membrane with markings similar to male, but with a somewhat obscure clear medial spot, membrane much shorter than in male. STRUCTURE: Small; vertex wider and eye smaller than in male; costal margin arcuate. GENITALIA: As in species group except: **Ventral labiate plate**: Strongly produced, base moderately wide,

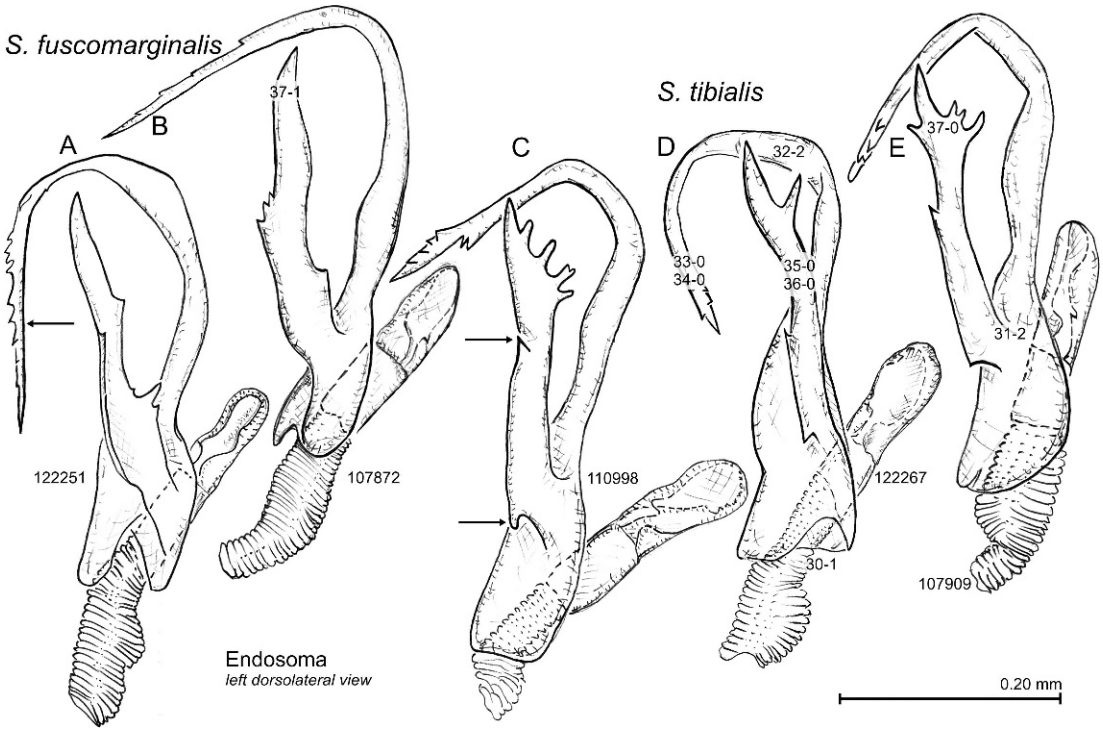


Fig. 24. *Slaterocoris* species endosoma. A, B. ***S. fuscomarginalis***. **A**. S Curlew Valley, UT. **B**. 12 mi N of Route 50 on Route 278, NV. C–E. ***S. tibialis***. **C**. Siskiyou Summit, OR. **D**. Lower Klamath Lake Hill, OR. **E**. Mitchell, OR.

triangular with apex entire. **Interramal lobe**: Narrow lobe on dorsomedial margin.

HOSTS: Most known specimens were taken on big sagebrush, *Artemisia tridentata* (Asteraceae), which is considered to be a breeding host. No specimens were associated with any of the six accepted subspecies of *A. tridentata*. *Gutierrezia sarothrae* and, perhaps, other species of *Artemisia* are probable asteraceous hosts of *S. fuscomarginalis* in southern Nevada.

DISTRIBUTION: From the eastern portion of the Snake River plain of northern Utah and southern Idaho and isolated populations in mountain ranges of the central Great Basin in Nevada (map 4).

COLLECTION SUMMARY: 32 specimens from 6 collection events from mid May to late June.

DISCUSSION: Although the male genitalia of this species are similar in form to those of other *apache*-group species, the endosomal spicule appears to have features, unknown in related species. In comparison to other *apache*-group species the distal (recurved) portion of the ventral lobe is longer, more narrow, and serrate for a greater distance, whereas the dorsal lobe is distally entire, pointed, and with little or no marginal serration (fig. 24A, B). The right paramere is similar to that of *S. apache* and *S. croceipes*, but has three apical spines and a bifurcate basal lobe. The clear medial spot on the hemelytral membrane of the male, initially noticed by Knight (1970), is absent in all other species of *Slaterocoris*. The fact that *S. fuscomarginalis* is strongly sexually dimorphic was unknown to Knight (1970).

A male paratype from Snowville, Utah (00111893) was incorrectly attributed to *S. fuscomarginalis*. The hemelytron coloration of this specimen has a diffuse central spot without an obvious dark border. The male genitalia also differ from other specimens

examined, in having the dorsal lobe of the endosomal spicule wide apically with several large apical serrations and the basal lobe of the right paramere entire. A female (00122276) from the same collection event was found in the USNM. Antennal segment I is mostly pale in both specimens whereas in *S. fuscomarginalis* segment I is black. Both specimens are actually *S. apache*.

HOLOTYPE: **USA: Utah: *Millard Co.:*** White Valley [39.12556° N 113.12444° W], 19 May 1940, R.W. Fautin, 1♂ (AMNH_PBI 00134014) (USNM).

OTHER SPECIMENS EXAMINED: **USA: Idaho: *Oneida Co.:*** 6 mi NW of Holbrook, 42.22327° N 112.73588° W, 13 Jun 1969, G.F. Knowlton, paratype, 1♂ (00122250) (USNM). **Nevada: *Eureka Co.:*** 12 mi N of Rt 50 on Rt 278, 39.71316° N 116.05967° W, 1524 m, 27 Jun 1983, R.T. Schuh, M.D. Schwartz, *Artemisia tridentata*, 10♂ (00107872, 00108218–00108226), 15♀ (00108138, 00108227–00108240) (AMNH). 30 mi W of Elko, 40.66029° N 116.24468° W, 1788 m, 18 Jun 1982, T.J. Henry, *Artemisia* sp., 1♂ (00134064) (USNM). ***Nye Co.:*** 11 mi N of Belmont, T10N R46E S26, 38.6801° N 116.7712° W, 2195 m, 29 Jun 1983, R.T. Schuh and M.D. Schwartz, *Gutierrezia sarothrae*, 3♂ (00108137, 00108241, 00108242) (AMNH). **Utah: *Box Elder Co.:*** South Curlew Valley, 41.70833° N 112.86667° W, 18 Jun 1969, G.F. Knowlton, paratype, 1♂ (00122251) (USNM).

Slaterocoris pilosus Kelton
Figures 12, 20B, 20D, 25; plates 2, 4K; map 4

Slaterocoris pilosus, Kelton, 1968: 1127, fig. 12 (orig. desc.); Knight, 1970: 252, fig. 15, (disc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog).

DIAGNOSIS: Recognized by the small size, the pale yellow coloration on antennal segment I, base of segment II, apices of femora, tibiae, and tarsomere III; the dense, suberect, moderately long silvery vestiture (pl. 4K, fig. 20D); the smooth frons (fig. 20B); and male genitalia with the right paramere and endosomal spicule relatively smaller than in other *apache*-group species. Specifically the right paramere usually has the basalmost of three apical spines small (fig. 25K–N, arrow) and the ventral lobe of the endosomal spicule is somewhat expanded, twisted, and serrate apically (fig. 25A–G). In addition to the previous attributes, the female of *S. pilosus* is distinguished from *S. flavipes*, by the discretely black apex of antennal segment II, the clearly pale tarsomeres I and II, and the moderately dense fine vestiture, in the latter the apical portion of segment II is infuscate, the tarsomeres are somewhat infuscate, and the vestiture is more dense and coarse.

REDESCRIPTION: *Male:* Body small, subparallel; length 3.35–3.65, width 1.50–1.65 (pl. 2); costal margin sublinear. COLORATION: Shining black, except for pale yellow on antennal segment I, sometimes only on dorsal surface, segment II usually on basal half, apex of femur, tibia, and tarsomeres I and II (fig. 12). VESTITURE: Densely distributed, long, suberect, silvery white setae (pl. 4K). DORSAL SCULPTURATION: Frons smooth, calli produced, finely punctate, pronotal disc rugulopunctate. STRUCTURE: Short; costal margin gently curved; frons smooth; length of antennal segment II shorter than head width and foretibia; labium reaching base of middle coxa. GENITALIA: **Tergal process**: Short point directed from right side toward midline. **Phallotheca**: Open distally and on right side; somewhat convoluted distally; left lateral surface slightly compressed (fig. 25H). **Endosomal spicule**: Ventral lobe with apical portion abruptly expanded and twisted to long axis of spicule (cf. fig. 25B–C, D–E, F–G) strongly serrate marginally; dorsal lobe narrow or pointed distally, usually with weak marginal serration. **Right paramere**: Distalmost apical spine larger than more basal spines; basal lobe entire (fig. 25M, N, arrow) or bifurcate (fig. 25K, L, arrow); sometimes with additional lateral spine (fig. 25N, arrow). **Left paramere**: Distal portion shorter than basal portion; ventral margin of distal portion somewhat scalloped (fig. 25I, J).

Female: Small obovate; length 3.30–3.70, width 1.60–1.75 (pl. 2). COLORATION: As in male except antennal segment I usually dark at base, segment II usually infuscate at base and distally, middle portion sometimes

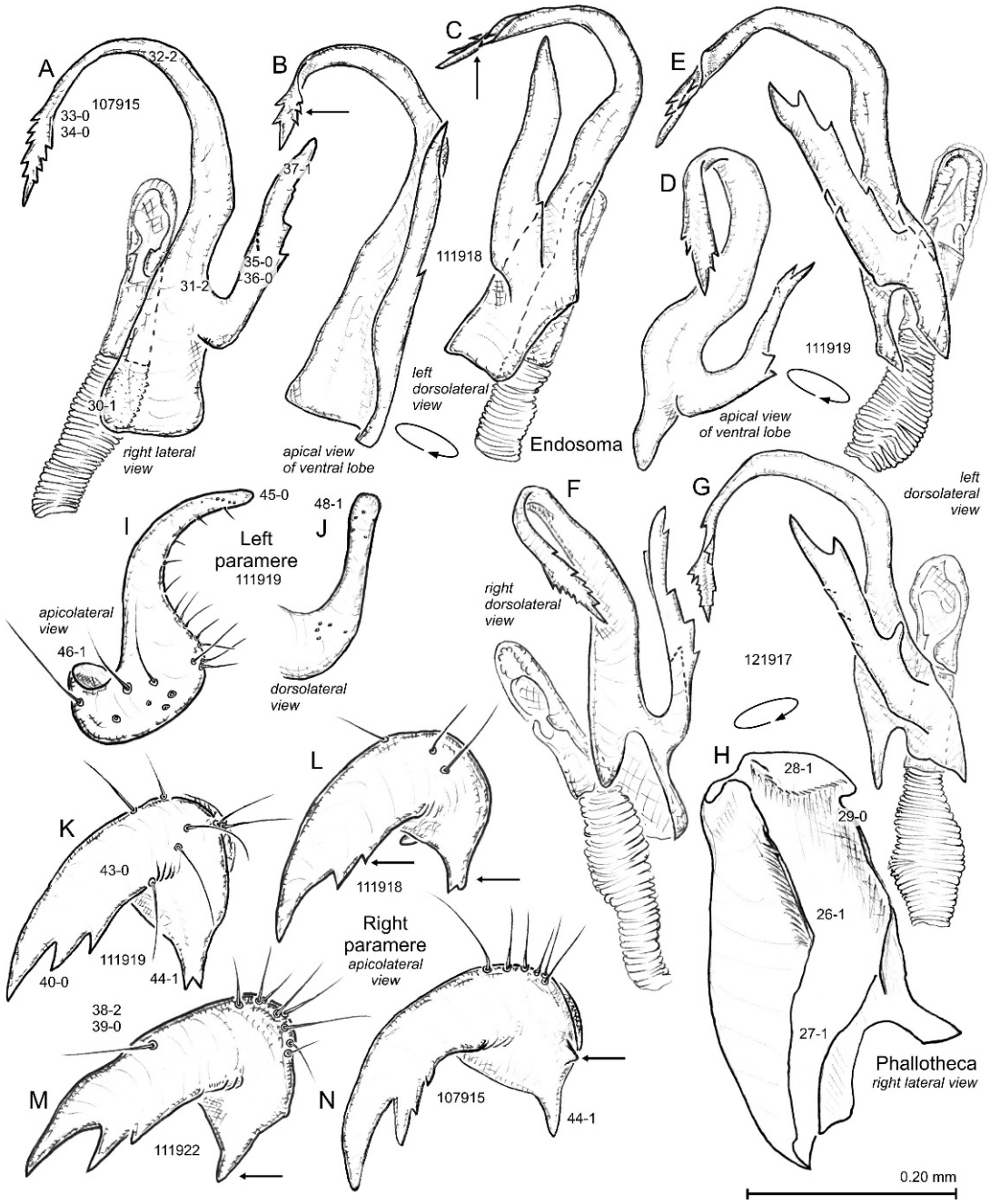


Fig. 25. *Slaterocoris pilosus*, male genitalia. **A**, **N**. Unity Lake State Park, OR. **B**–**E**, **I**–**L**. Oliver, BC. **F**–**H**. Hanford Site ALE, WA. **M**. Osoyoos Lake. Indian Reservation, BC.

dusky. STRUCTURE: Costal margin only slightly more arcuate than in male. GENITALIA: As in species group except: **Ventral labiate plate**: Strongly produced, base moderately wide, triangular. **Interramal lobe**: Dorsomedial margin not produced as lobe.

HOSTS: All plant records are from Asteraceae, with *Artemisia frigida*, *A. tridentata*,

and *Ericameria nauseosa* the predominant breeding hosts. Also taken on unspecified species of *Chrysothamnus*; however, because several species of *Chrysothamnus* are now placed in *Ericameria*, it is not possible to know if these records refer to *E. nauseosa*, *Chrysothamnus viscidiflorus*, or another common dryland component within the range of *S. pilosus*.

COLLECTION SUMMARY: 116 specimens from 11 collection events predominantly taken in June, with late May and early September outliers.

DISTRIBUTION: From the Okanagan Valley of southern British Columbia, the northern foothills of the Columbia Basin of Washington, and in eastern Oregon from scattered populations in the Strawberry Mountains, Baker County and the northern Great Basin ranges of Lake and Harney Counties (map 4).

DISCUSSION: Kelton (1968) included as paratypes of *S. pilosus* five specimens from Blaine County, Idaho. The specific locality, provenance, and identity of these specimens is problematic. The original description reported the locality of the specimens as "[Little Wood Riv.] 6 mi NW. Carey [VI–30–66]," but only one female retained in the CNC has these label data; four others, found with it, are from "Big Wood Riv. Shoshone 20 mi N, VII–1–66." All were collected by W. Gagne and J. Haddock and none had paratype labels attached. It is my conclusion that all were intended as paratypes of *S. pilosus*, but four were listed under the wrong locality. I have labeled as a paratype the one specimen correctly reported by Kelton (1968). In the PBI database the institutional depository of all these specimens is recorded as UCB. Close examination reveals that all five specimens actually belong to *S. flavipes* based on the features in the diagnosis above.

HOLOTYPE: **CANADA: British Columbia:** Oliver, 49.18333° N 119.55° W, 29 Jun 1959, L.A. Kelton, *Artemisia frigida*, 1♂ (AMNH_PBI 00111940) (CNC).

OTHER SPECIMENS EXAMINED: **CANADA: British Columbia:** Oliver, 49.18333° N 119.55° W, 26 Jun 1959, R. Madge, *Artemisia frigida*, paratypes, 2♂ (00242634–00242635), 2♀ (00242636–00242637) (CAS), 1♂ (00112003), 1♀ (00112004), paratypes, 42♂ (00111918–00111919, 00111950–00111988, 00115513), 13♀ (00111989–00112000, 00112005) (CNC), paratype, 1♂ (00119024), 1♀ (00119025) (TAMU); 29 Jun 1959, L.A. Kelton, *Artemisia frigida*, paratype, 1♂ (00242632), 1♀ (00242633) (CAS), paratypes, 3♂ (00111942–00111943, 00111949), 7♀ (00111941, 00111944–00111948, 00112006) (CNC). Oliver, Sawmill Lake, 49.19812° N 119.6000° W, 650 m, 30 Jun 1959, L.A. Kelton, paratype, 1♀ (00112002) (CNC). Osoyoos Lake Indian Reserve, south end, 49.00012°N 119.43331° W, 30 Jun 1996, G.G.E. Scudder, *Ericameria nauseosa*, 4♂ (00111421, 00111922–00111924), 16♀ (00111422, 00111925–00111939) (UBC). Richter Pass, Osoyoos, 49.06666° N 119.58333° W, 28 Jun 1959, L.A. Kelton, paratype, 1♂ (00112001) (CNC). **USA: Oregon:** ***Baker Co.:*** 2 mi NE of Rt 26 on Rt 245, Unity Lake State Park, 44.48696° N 118.19173° W, 27 Jun 1988, G.M. Stonedahl, *Artemisia tridentata*, 3♂ (00107915, 00108347–00108348) (AMNH). ***Harney Co.:*** Lawen, 43.44293° N 118.80104° W, 1252 m, 11 Jun 1992, W.F. Chamberlain, 2♂ (00119037–00119038) (TAMU). ***Lake Co.:*** Hart Mountain, 42.39944° N 119.77944° W, 1905 m, 02 Sep 1977, J. Schuh, *Chrysothamnus* sp., 1♂ (00108328) (AMNH). **Washington:** ***Benton Co.:*** Hanford Site ALE, sand dunes W of Columbia River, 46.52016° N 119.34766° W, 29 Jun 1995, R.S. Zack, *Chrysothamnus* sp., 1♂ (00121917), 5♀ (00121918–00121922) (WSU). ***Okanogan Co.:*** 0.5 mi S of Malott, 48.27555° N 119.70556° W, 06 Jul 1966, W. Gagne and J. Haddock, *Artemisia* sp., paratypes, 3♂ (00119412, 00119419–00119420), 1♀ (00119418) (UCB). ***Yakima Co.:*** Toppenish, 46.3775° N 120.3075° W, 15 May 1926, E.W. Davis, 2♂ (00164868–00164869) (USNM).

Slaterocoris rubrofemoratus Knight

Figures 12, 20C, 26; plates 3, 4N; map 4

Slaterocoris rubrofemoratus Knight, 1968: 90, fig. 111 (orig. desc.); Kelton, 1968: 1127, fig. 11 (disc.); Knight, 1970: 243, fig. 17, (disc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog).

Slaterocoris nicholi Knight, 1970: 243, fig. 16, (orig. desc.); Henry and Wheeler, 1988: 450

(catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

DIAGNOSIS: Distinguished from other *apache*-group species by the sparse, moderately long, suberect brown vestiture (pl. 4N); the mostly red femur and black tibia (pl. 3, fig. 12); and the ventral lobe of endosomal spicule with apical portion expanded but not twisted (fig. 26C–G). Females could be confused with those of *S. robustus*, both of which have black tibiae and are sympatric across the distribution of *S. rubrofemoratus*. The latter is easily segregated by the fine, dorsal vestiture and antennal segment II longer on average (0.91); *S. robustus* has dorsal vestiture of bristlelike setae (pl. 4M) and segment II is shorter on average (0.86).

REDESCRIPTION: *Male:* Moderately small, elongate; length 3.70–4.35, width 1.48–1.85 (pl. 3). COLORATION: Antenna black, sometimes segment I pale except for black basal annulus; legs with femora variable, usually basally black from one-quarter to one-half their length, with variable distal portions bright to dusky orange-red; sometimes femora entirely black; tibiae variable, usually black, often with bases reddish black; tarsomeres black (fig. 12). VESTITURE: Sparse, moderately long, brown, suberect simple setae (pl. 4N). STRUCTURE: Costal margin elongate; frons smooth (fig. 20C); antennal segment II longer than foretibia. GENITALIA: **Tergal process:** Short with single point on right directed toward midline. **Phallotheca**: Open distally and on right side; somewhat convoluted distally; left lateral surface slightly compressed (fig. 26A, B). **Endosomal spicule**: Ventral lobe with apex expanded in line with long axis of spicule and with moderate dense marginally serration; dorsal lobe variable, usually attenuate distally with large marginal serration (fig. 26E–G), sometimes smooth margined (fig. 26C, D), or with conspicuous basal spine on medial margin (fig. 26G). **Right paramere**: With either two (fis. 26K, M) or three (fig. 26L, N) apical spines and relatively long and sharply attenuate (fig. 26M) or bifurcate (fig. 26K, L, N) basal lobe. **Left paramere**: Distal portion shorter than basal portion; ventral margin of distal portion somewhat scalloped (fig. 26H, I).

Female: Moderately small, obovate; length 3.40–4.83, width 1.55–1.80 (pl. 3). COLORATION: Sometimes antennal segment I pale; sometimes femur black except for red on distal one-quarter. STRUCTURE: Costal margin arcuate. GENITALIA: As in species group except: **Ventral labiate plate**: strongly produced, base moderately wide, triangular, apex entire or cleft. **Interramal lobe**: Short process on dorsomedial margin.

HOSTS: Two species of *Artemisia* (Asteraceae), *A. filifolia*, *A. tridentata* ssp. *parishii*, have the most specimen records and are probably breeding hosts. A significant number of specimens throughout the distribution of *S. rubrofemoratus* were also taken on *A. tridentata* without the subspecies being noted, which suggests that additional subspecies of *A. tridentata* serve as breeding hosts. Another breeding host is *Chrysothamnus viscidiflorus* (Asteraceae).

DISTRIBUTION: Lower elevations and foothills of the Colorado River Basin of northwestern Colorado, southern Utah, northern Arizona, and southern Nevada. Also from apparently isolated populations in the extreme southwestern portion of the Mojave Desert, Los Angeles County, California (map 4).

COLLECTION SUMMARY: 189 specimens from 26 collection events with dates spanning from late May to late July.

DISCUSSION: Knight (1970) set apart his new species *S. nicholi* from *S. rubrofemoratus* based on the length of antennal segment II and morphology of the right paramere. As reported by Knight (1970), antennal segment II is short (0.88) and the right paramere has three apical spines in *nicholi*; in *rubrofemoratus* segment II is long (1.02) and the right paramere has two spines. A review of specimens, annotated below, demonstrates that the length of antennal segment II in the male spans a range (0.85–1.04) greater than that reported by Knight for the nominal species. Also the number of apical spines of the right paramere is variable across localities from California, Nevada, and Utah (fig. 26J–N) and from the same collection event (cf. fig. 26K–L, M–N). The dorsal lobe of the endosomal spicule, not examined by Knight, is variable (fig. 26C–G) to the same extent as that observed in the right paramere. The leg coloration in *S. rubrofemoratus* is more

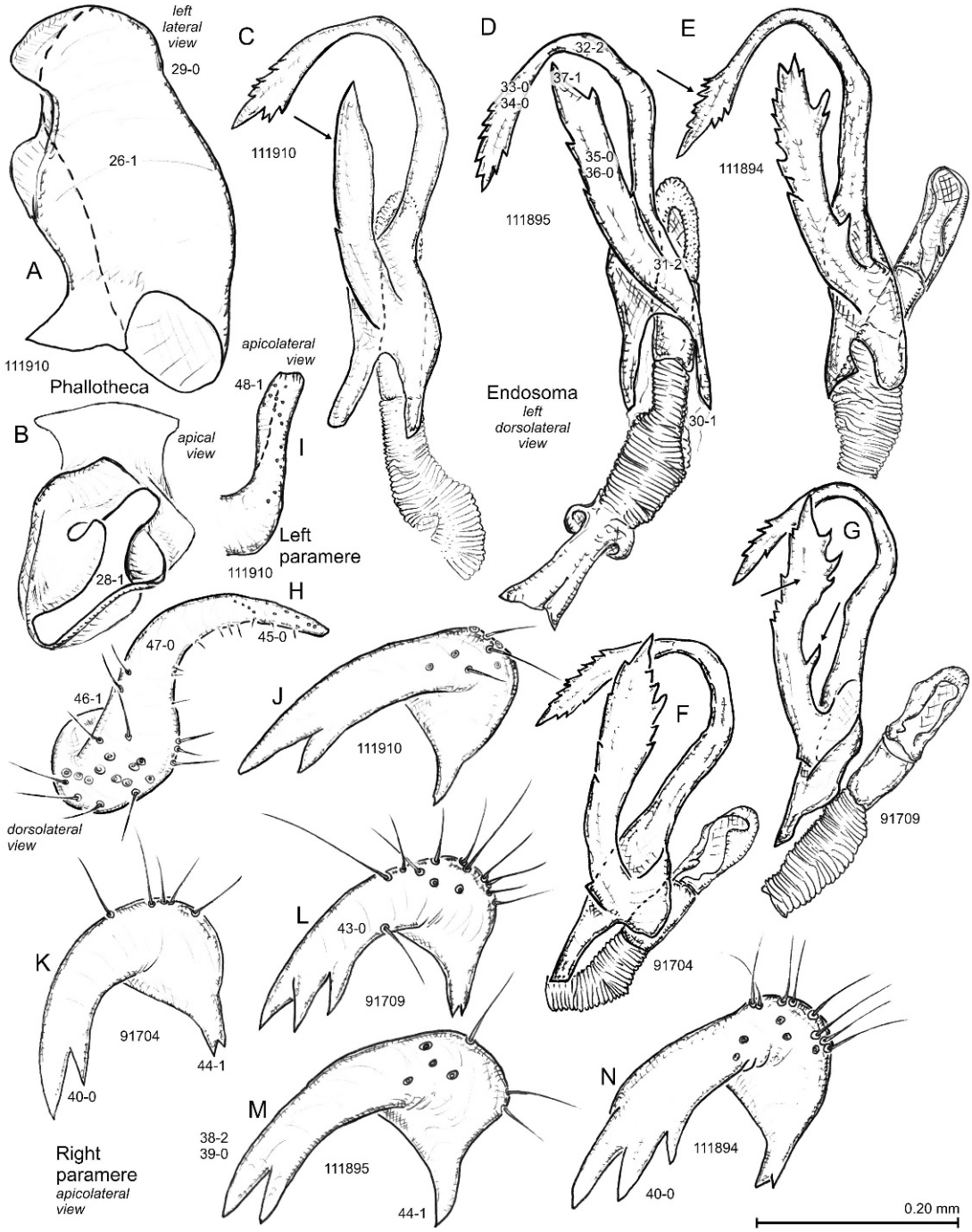
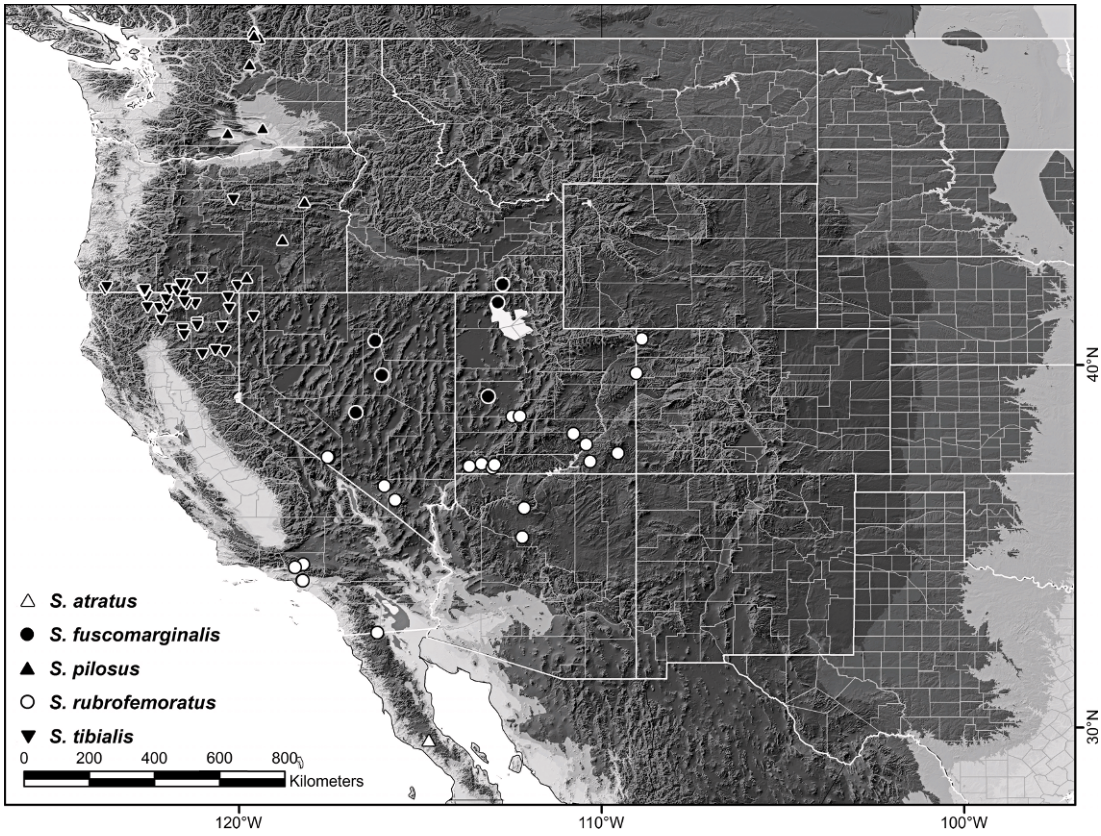


Fig. 26. *Slaterocoris rubrofemoratus*, male genitalia. **A**–**C**, **H**–**J**. Mercury, NV. **D**, **E**, **M**, **N**. 2 mi NW of Toquerville, UT. **F**, **G**, **K**, **L**. Escondido Canyon Road, CA.



Map 4. Localities for *Slaterocoris atratus*, *S. fuscomarginalis*, *S. pilosus*, *S. rubrofemoratus*, and *S. tibialis*.

variable than as documented in Knight (1968, 1970), with the extent of black color in relation to the distal orange-red color ranging from a basal one-quarter to one-half. Specimens placed in *S. rubrofemoratus* from Colorado have the femora completely black, but conform to the structure of the male genitalia attributed to this species. In light of these observations, I propose *S. nicholi* as a junior synonym of *S. rubrofemoratus*.

The untwisted, expanded, apical portion of the ventral lobe in the endosomal spicule seems to be unique to *S. rubrofemoratus*; in *S. pilosus* the expanded apex is twisted in relation to the long axis of the spicule. Specimens of *S. rubrofemoratus* from Los Angeles County, California, have a mostly pale antennal segment I and male body length shorter (3.70–3.90) than the average including other parts of the range (4.07) in response to the membrane length. Females from Sevier County, Utah, have completely black legs, sometimes with the apical portions of the femora bright red, and antennal segment II can be shorter (0.78–0.85) than in females of *S. rubrofemoratus* from outside Sevier County (0.83–1.00). The small size and coloration of these specimens would seem to correspond to females of the junior synonym, for which the female was not described (Knight, 1970).

HOLOTYPES: **USA: Arizona: *Coconino Co.:*** Grand Canyon [36.05444° N 112.13861° W, 2134 m], 22 Jun 1925, A.A. Nichol, 1♂ (AMNH_PBI 00134018) (USNM) (*S. nicholi*: junior synonym). **Nevada: *Nye Co.:*** Mercury, 401 M [36.66056° N 115.99361° W], 22 Jun 1965, H.H. Knight and J. Merino, 1♂ (AMNH_PBI 00134019) (USNM) (*S. rubrofemoratus*: senior synonym).

OTHER SPECIMENS EXAMINED: **USA: Arizona: *Coconino Co.:*** Rt 64 just SE of Grand Canyon National Park in Kaibab National

Forest, 36.05444° N 112.13861° W, 26 Jun 1980, K. and R. Schmidt, *Artemisia* sp., 5♂ (00107880, 00107882, 00107884–00107886), 1♀ (00108216) (AMNH). Williams, 35.24944° N 112.19028° W, 2134 m, 24 Jun 1925, A.A. Nichol, paratype of junior synonym, 1♂ (00122257) (USNM). **California:** ***Los Angeles Co.:*** Acton, Escondido Canyon Rd off Rt 14, 34.50288° N 118.2291° W, 950 m, 16 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Artemisia tridentata* ssp. *parishii*, det. A. Saunders UCR 140648 [PBI_CAL04-H5], 15♂ (00091704, 00091709, 00091711–00091723), 5♀ (00091724–00091728), *Chrysothamnus viscidiflorus*, det. in field, 10♂ (00088713–00088722), 16♀ (00088723–00088738) (AM), *Artemisia tridentata* ssp. *parishii*, det. A. Sanders UCR140648, 19♂ (00322797–00322815), 16♀ (00322816–00322831) (AMNH). ''Los Ang.'', 34.0548° N 118.2496° W, 122 m, unknown, 1♂ (00134359), 1♀ (00134364) (USNM). Los Angeles County, 34.05222° N 118.24278° W, Coquillett Collection, 1♂ (00134367), 3♀ (00134358, 00134365–00134366) (USNM). Mint Canyon, 34.41528° N 118.45278° W, 06 Jul 1933, R.H. Beamer, 1♀ (00117845) (KU); 26 May 1937, E.P. Van Duzee, 6♂ (00242446, 00242448, 00242450, 00242452, 00242454, 00242456), 11♀ (00121680, 00242447, 00242449, 00242451, 00242453, 00242455, 00242457–00242461) (CAS). ***San Diego Co.:*** beyond Jacumba, 32.6175° N 116.18889° W, 11 Jun 1915, Harold Morrison, 1♂ (00134407) (USNM). **Colorado:** ***Garfield Co.:*** W Evacuation Creek, 11 mi SE of Colorado state line on Rt 45, 39.77286° N 109.04835° W, 2073 m, 09 Jul 1981, M.D. Schwartz, *Artemisia tridentata*, 1♂ (00111913) (CNC). ***Moffat Co.:*** Gates of Lodore, 40.71333° N 108.89222° W, 28 Jun 1979, D.A. Polhemus, 1♂ (00116705), 1♀ (00116758), 7♂ (00116724, 00116793–00116798), 10♀ (00116799–00116808) (JTP). **Nevada:** ***Clark Co.:*** Charleston Peak, 36.27222° N 115.69417° W, 2286 m, 22 Jul 1982, J.T. Polhemus, 1♂ (00116729) (JTP). ***Esmeralda Co.:*** 2 mi W of Lida, 37.4513° N 117.51491° W, 1935 m, 08 Jun 1966, W. Gagne, 2♂ (00119288–00119289), 2♀ (00119290–00119291) (UCB). 3 mi W of Lida, 37.45833° N 117.55185° W, 2073 m, 07 Jun 1966, W. Gagne, 2♂ (00119292–00119293) (UCB). ***Nye Co.:*** Mercury, 401 M, 36.66056° N 115.99361° W, 19 Jun 1965, H.H. Knight and J. Merino, *Artemisia tridentata*, paratype, 1♀ (00111912) (CNC), paratypes, 2♂ (00119021–00119022) (TAMU), paratypes, 2♂ (00134628, 00164867) (USNM); 22 Jun 1965, H.H. Knight and J. Merino, paratype, 1♂ (00111909), *Artemisia tridentata*, paratype, 1♂ (00111910), paratype, 1♀ (00111911) (CNC), paratype, 1♀ (00119023) (TAMU). **Utah:** ***Garfield Co.:*** Lonesome Beaver, Henry Mountains, 38.09915° N 110.78015° W, 2286 m, 20 Jul 1968–21 Jul 1968, H.F. Howden, 2♀ (00111907–00111908) (CNC). ***San Juan Co.:*** 23 mi SW of I-95 and Rt 236, 37.33333° N 110.31666° W, 12 Jul 1992, G.F. Hevel, 1♀ (00134129) (USNM). Brushy Basin Rim Rd, SW of Blanding, county rd #227, 0.5 E of milepost 116, T37S R12E, 37.56624° N 109.5534° W, 1737 m, 12 Jun 1982, M.D. Schwartz, *Artemisia tridentata*, 3♂ (00111914–00111916) (CNC). White Canyon, Duckett Crossing, 37.80889° N 110.42889° W, 29 May 1985, J.T. and D.A. Polhemus, *Artemisia tridentata*, 7♂ (00116707, 00116757, 00116809–00116813), 3♀ (00116814–00116816) (JTP). ***Sevier Co.:*** 11 mi W of Sevier on I-70, 38.57501° N 112.46132° W, 1999 m, 15 Jul 1980, R.T. Schuh and G.M. Stonedahl, *Artemisia tridentata*, 5♀ (00107992–00107995, 00108217) (AMNH). Clear Creek Narrows Summit on Rt 4, 38.58156° N 112.25678° W, 2243 m, 15 Jun 1980, R.T. Schuh and G.M. Stonedahl, 1♂ (00107878) (AMNH). ***Washington Co.:*** 2 mi NW of Toquerville on Rt 17, 37.27377° N 113.30958° W, 1158 m, 25 May 1981, M.D. Schwartz, *Artemisia filifolia*, 3♂ (00111894–00111895, 00115514), 10♀ (00111896–00111905) (CNC). Snow Canyon State Park, T41S R16W, tent campground, 37.20611° N 113.64917° W, 1219 m, 22 May 1981–23 May 1981, M.D. Schwartz, *Artemisia filifolia*, 1♀ (00111906) (CNC). Zion Canyon, 37.165° N 113.01194° W, 1152 m, unknown, 1♂ (00164874) (USNM). Zion National Park, 37.24861° N 112.95583° W, D. Elden Beck, 1♀ (00164873) (USNM).

Slaterocoris tibialis Knight
Figures 12, 24C–E; plate 3; map 4

Strongylocoris robustus: Van Duzee: 1921: 136 (disc., in part).

Slaterocoris tibialis Knight, 1970: 257, fig. 27 (orig. desc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog).

DIAGNOSIS: Distinguished from *S. croceipes* and *S. apache* of the *apache* group by the suberect, dark, moderately long vestiture; black femora with yellow apices and dusky yellowish-orange tibiae (fig. 12); and dorsal lobe of the endosomal spicule with solitary basal and subapical spines (fig. 24C–E). *Slaterocoris croceipes* has shorter, reclining dark setae, femora with considerable orange-brown coloration, and pale yellow tibiae; *S. apache* has pale, somewhat shining vestiture and pale yellow tibiae. Both *S. croceipes* and *S. apache* and the other *apache*-group species usually lack the basal and subapical spine on the dorsal lobe of the endosomal spicule (cf. figs. 18, 22).

REDESCRIPTION: *Male:* Moderately small, elongate; length 3.90–5.20, width 1.54–1.75 (pl. 3). COLORATION: Antennal segments I and II black, apex of femur narrowly pale yellow; hind tibia dusky yellowish orange, apex darker, tarsomeres black (fig. 12). VESTITURE: Sparse, moderately long, suberect brown simple setae. STRUCTURE: Costal margin elongate; frons smooth; antennal segment II longer than foretibia. GENITALIA: **Tergal process**: Short point with right side directed toward midline. **Endosomal spicule**: Ventral lobe narrow, moderately long, with minimal marginal serration; dorsal lobe usually wide distally, with variable, large marginal serration, base and subapex with obvious spine (fig. 24C–E). **Right paramere**: As in *S. apache* (fig. 17A–C) and *S. croceipes* (fig. 21B–D, F), typically with three apical spines and entire or bifurcate, narrow basal lobe.

Female: Moderately small, obovate; length 3.50–4.30, width 1.75–1.95 (pl. 3). COLORATION: Antennal segment II usually with pale orange-brown medially with black at base and apex; sometimes segment II completely black. STRUCTURE: Costal margin of arcuate. GENITALIA: As in species group except: **Ventral labiate plate**: Strongly produced, base moderately wide, triangular, apex entire. **Interramal lobe**: Dorsomedial margin not produced as lobe.

HOSTS: The breeding host is unclear. Specimens were taken on four species of Asteraceae, *Artemisia cana*, *A. frigida*, *A. tridentata*, but the majority are from *Ericameria nauseosa*. However, many specimens were collected from unspecified species of *Artemisia* and *Chrysothamnus*. Considering that no bugs were taken on a plant currently placed in *Chrysothamnus* (e.g., *C. viscidiflorus*), it is likely that many of these latter specimens were collected on *E. nauseosa*, pointing to rubber rabbitbrush as the primary breeding host of *S. tibialis*.

DISTRIBUTION: Occurs in the foothills of the southern Cascade Mountains and southwestern Great Basin of southern Oregon and northern California and in central Oregon from the Blue Mountains of Wheeler County (map 4).

COLLECTION SUMMARY: 412 specimens from 49 collection events with almost all the dates from June to July, with only a couple from August.

DISCUSSION: In his key, Knight (1970) segregated *S. tibialis* from *S. apache* (including junior synonyms) and *S. croceipes* on the perceived bimodal distribution in the length of antennal segment II. There is considerable overlap in the range of segment II length (*S. apache* 1.05–1.38, *S. croceipes* 0.80–1.31, and *S. tibialis* 0.98–1.15), that limits the capacity of the measurement to discriminate species. The important diagnostic features of *S. tibialis* are the coloration of the vestiture and legs, and the structure of the endosomal spicule (see diagnosis above). Kelton (1968) included specimens from northern California and Oregon in *S. croceipes*, which I now place in *S. tibialis*. Van Duzee (1921) mentioned that the CAS retained specimens of *S. robustus* from Colestin, Oregon, and McCloud, California, are actually specimens of *S. tibialis* (see Other Specimens Examined). The distribution of *S. tibialis* appears to be allopatric in relation to *S. apache* and *S. croceipes*, which do not occur in northern California and southwestern or southcentral Oregon.

Specimens from Washoe County, Nevada, do not have the large basal and subapical spines on the dorsal lobe, the male hemelytron and antennal segment II are longer, and the female has more extensive pale coloration on the medial portion of antennal segment II than individuals from the more western

portion of the distribution. The vestiture and leg coloration in these specimens are consistent with the diagnosis of *S. tibialis*.

HOLOTYPE: **USA: Oregon:** ***Klamath Co.:*** 17 mi E of Klamath Falls [42.23007° N 121.46569° W], 17 Jun 1934, Joe Schuh, 1♂ (AMNH_PBI 00134022) (USNM).

OTHER SPECIMENS EXAMINED: **USA: California:** ***Lassen Co.:*** Litchfield, 40.38278° N 120.38611° W, 1239 m, 22 Jun 1937, B.P. Bliven, 1♀ (00242462) (CAS). Madeline, 41.05111° N 120.47444° W, 1623 m, 24 Jul 1954, Brunson P. Bliven, 1♂ (00242444), 1♀ (00242445) (CAS). Susanville, 40.41639° N 120.65194° W, 1276 m, 17 Jun 1959, Kelton and Madge, *Artemisia frigida*, 16♂ (00112035, 00124393–00124407), 12♀ (00124408–00124419) (CNC), 1♂ (00121785), 1♀ (00121786) (UCB). Westwood, 40.30611° N 121.00472° W, 17 Jun 1959, Kelton and Madge, 1♂ (00112095), 1♀ (00112096) (CNC). ***Modoc Co.:*** 2.5 mi S of Rt 139 toward Lookout, 41.17191° N 121.15417° W, 1440 m, 06 Jul 1979, R.T. and Joe Schuh, *Ericameria nauseosa*, 5♂ (00108324, 00109158–00109161), 7♀ (00108967, 00109162–00109167) (AMNH). 8 mi S of Rt 139 toward Lookout, 41.0924° N 121.15417° W, 1420 m, 06 Jul 1979, R.T. and Joe Schuh, *Chrysothamnus* sp., 1♂ (00108323), *Ericameria nauseosa*, 10♂ (00109148–00109157), 4♀ (00109144–00109147) (AMNH). 24.7 mi NW of Canby, 41.69638° N 121.20732° W, 1375 m, 01 Jul 1979, R.T. Schuh and B.M. Massie, 1♂ (00108325) (AMNH). Buck Creek, 41.87233° N 120.30103° W, 1527 m, 21 Jul 1922, C.L. Fox, 1♀ (00242441) (CAS). W of Cedarville, Cedar Pass, 41.5625° N 120.26778° W, 1850 m, 01 Jul 1979, R.T. Schuh and B.M. Massie, *Ericameria nauseosa*, 1♂ (00107916) (AMNH). ***Shasta Co.:*** 5 mi N of Cassel, 40.99145° N 121.54667° W, 15 Jul 1947, T.F. Leigh, 2♂ (00119424–00119425), 1♀ (00119426) (UCB). Hat Creek P.O., 40.83047° N 121.50891° W, 25 Jun 1955, E.E. Lindquist, 1♂ (00119423) (UCB). ***Siskiyou Co.:*** 1 mi S of Lava Beds National Monument, Lava Beds-Medicine Lake Rd, 41.6819° N 121.4424° W, 1317 m, 18 Jul 1985, G.M. Stonedahl and J.D. McIver, *Chrysothamnus* sp., 9♂ (00107888, 00108243, 00109173–00109179), 24♀ (00108968, 00109180–00109201, 00169982) (AMNH). 2 mi N of Tule Lake Refuge Headquarters, 41.93835° N 121.53194° W, 1219 m, 26 Jun 1979, M.D. Schwartz, *Ericameria nauseosa*, 1♂ (00112097), 1♀ (00318845) (CNC). 5 mi N of Gazelle, 41.59311° N 122.51917° W, 15 Jun 1959, L.A. Kelton, R. Madge, 1♀ (00112098) (JTP). 30 mi N of Weed, 41.5811° N 122.1929° W, 1433 m, 31 Aug 1963, C. O'Brian, 1♂ (00119427) (UCB). Bray, 41.64417° N 121.96972° W, 30 Jun 1935, R.H. Beamer, 2♂ (00117850–00117851) (KU). Hornbrook, 41.91028° N 122.55472° W, 666 m, 14 Jun 1959, Kelton and Madge, *Artemisia* sp., 2♂ (00112033–00112034) (CNC); 14 Jun 1959, Kelton and Madge, *Artemisia* sp., 14♂ (00124363–00124375, 00318786), 17♀ (00124376–00124392) (CNC), 1♂ (00121787), 1♀ (00121788) (UCB). Lava Beds National Monument, 41.75333° N 121.50556° W, 1524 m, 13 Aug 1961, Joe Schuh, 1♀ (00118078) (ORSU). Macdoel, 41.82694° N 122.00417° W, 04 Jul 1952, M. Cazier, W. Gertsch, and R. Schrammel, 1♂ (00108330) (AMNH). McCloud, 41.25583° N 122.13833° W, 1090 m, 23 Jul 1918, E.P. Van Duzee, 2♀ (00242442–00242443) (CAS). **Nevada:** ***Washoe Co.:*** 23.2 mi S of junction of Rts. 8A and 34A [on Rt 34A], 41.34053° N 119.60379° W, 1875 m, 02 Jul 1979, R.T. Schuh and B.M. Massie, *Chrysothamnus* sp., 29♂ (00108375–00108376, 00109202–00109228), 38♀ (00108969, 00109229–00109265) (AMNH). **Oregon:** ***Jackson Co.:*** 0.5 mi S of Siskiyou Summit on Old Rt 99, Old Siskiyou Rd, 42.06777° N 122.60583° W, 1311 m, 27 Jun 1979, M.D. Schwartz, *Artemisia cana*, 1♂ (00318806), 2♀ (00318807–00318808) (CNC). 0.5 mi S of Siskiyou Summit on Old Rt 99, Old Siskiyou Rd, 42.04699° N 122.59934° W, 1344 m, 27 Jun 1979, R.T. Schuh and Joe Schuh, *Artemisia cana*, 4♂ (00109136–00109139), 4♀ (00109140–00109143), 1♀ (00108894) (AMNH). 0.5 mi S of Siskiyou Summit on Old Rt 99, Old Siskiyou Rd, 42.06777° N 122.60583° W, 1346 m, 26 Jun 1979, R.T. and Joe Schuh, *Artemisia cana*, 1♂ (00107899) (AMNH). Colestin, 42.05323° N 122.6515° W, 1143 m, 30 Jul 1918, E.P. Van Duzee, 2♀ (00242435–00242436) (CAS); 31 Jul 1918, E.P. Van Duzee, 1♂ (00242434) (CAS). Siskiyou, 42.075° N 122.60583° W, 05 Jul 1951, Borys Malkin, 4♂ (00242437–00242440) (CAS). Siskiyou Summit, 42.04699°

N 122.59934° W, 1341 m, 29 Jun 1969, W.F. Barr, *Chrysothamnus* sp. (Asteraceae), 3♂ (00122528–00122530), 2♀ (00122526–00122527) (UID). Siskiyou Summit, Old Road, 42.075° N 122.60583° W, 1260 m, 22 Jul 1999, M.D. Schwartz, *Ericameria nauseosa*, 2♂ (00110998, 00318816) (CNC); 28 Jul 1999, M.D. Schwartz, *Ericameria nauseosa*, 4♂ (00318809–00318812), 3♀ (00318813–00318815) (CNC). Siskiyou Summit, Old Siskiyou Hwy and Frontage Rd, 42.075° N 122.60583° W, 1314 m, 01 Jul 1994, M.D. Schwartz, *Ericameria nauseosa*, 4♂ (00112041, 00318788–00318790), 6♀ (00318791–00318795, 00318805) (CNC). Siskiyou Summit on I-5, 42.075° N 122.60583° W, 1311 m, 04 Jul 1982, G.M. Stonedahl and T.J. Henry, *Artemisia tridentata*, 3♂ (00109168–00109170), 2♀ (00109171–00109172) (AMNH); 05 Jul 1982, T.J. Henry and G.M. Stonedahl, *Artemisia* sp., 7♂ (00122117–00122123), 9♀ (00122124–00122132) (USNM). ***Josephine Co.:*** 1 mi S of Rough and Ready Botanical Wayside, 42.08324° N 123.69209° W, 12 Jun 1979, M.D. Schwartz, *Ericameria nauseosa*, 7♂ (00318825–00318831), 13♀ (00318832–00318844) (CNC). Rough and Ready Wayside, S of Cave Junction, 42.16306° N 123.64694° W, 400 m, 12 Jun 1979, R.T. Schuh and M.D. Schwartz, *Ericameria nauseosa*, 1♂ (00112039) (CNC). Just S of Rough and Ready Wayside, S of Cave Junction, 42.16306° N 123.64694° W, 12 Jun 1979, R.T. Schuh, *Chrysothamnus* sp., 20♂ (00108144, 00109086–00109104), 26♀ (00108143, 00108964, 00109105–00109128) (AMNH). ***Klamath Co.:*** 17 mi E of Klamath Falls, 42.23007° N 121.46569° W, 17 Jun 1934, Joe Schuh, paratype, 1♂ (00122268) (USNM). Base of Bly Mountain, 42.39778° N 121.04056° W, 25 Jun 1961, Joe Schuh, 1♂ (00118075) (ORSU). Lower Klamath Lake Hill, NE of Worden, 42.05089° N 121.69991° W, 10 Jul 1953, J. Schuh, 4♂ (00318817–00318820) (ORSU), 1♂ (00070046) (USNM); 19 Jul 1953, Joe Schuh, paratype, 1♂ (00111917) (CNC), paratype, 1♂ (00122267) (USNM). Swan Lake, 42.22861° N 121.59889° W, 11 Jul 1954, J. Schuh, 5♀ (00118076, 00318821–00318824) (ORSU), 1♂ (00070045) (USNM). between Worden and Keno, 42.08806° N 121.90009° W, 1280 m, 27 Jun 1979, R.T. and Joe Schuh, *Ericameria nauseosa*, 1♀ (00108326) (AMNH). ***Lake Co.:*** Big Squaw Flat, 18 mi SE of Bly, 42.39778° N 121.04056° W, 25 Jul 1962, J.D. Vertress, 2♂ (00108327, 00109135), 1♀ (00108966) (AMNH). Junction of Deep Creek and Camas Creek, 8 mi W of Adel, 42.18239° N 120.03745° W, 1587 m, 09 Jul 1963, J. Schuh, 1♀ (00118077) (ORSU). ***Wheeler Co.:*** Mitchell, 44.56653° N 120.15334° W, 843 m, 22 Jun 1979, *Ericameria nauseosa*, M.D. Schwartz, 12♂ (00112040, 00318846–00318856), 9♀ (00124359–00124362, 00318785, 00318857–00318860) (CNC); R.T. Schuh, 8♂ (00109071–00109078), 8♀ (00108963, 00109079–00109085) (AMNH); G. Stonedahl, 3♂ (00107909, 00109129–00109130), 5♀ (00108965, 00109131–00109134) (AMNH).

***Slaterocoris argenteus* species group**

DIAGNOSIS: The three species of this group are recognized by black legs, matted or adpressed, fine, silvery white setae, and male genitalia having an expanded apical region of the right paramere with four or five, short, parallel spines and a prominent, bent basal lobe, and the endosomal spicule with the dorsal lobe solitary, marginally serrate, and flat. *Slaterocoris argenteus*, *S. argenteoides*, and *S. digitatus* are distinguished by comparative measurements and fine structure of the endosomal spicule and right paramere. COLORATION: Black, including head, antennal segments, and legs, sometimes trochanter infuscate (fig. 12C). VESTITURE: Dense, moderately long, suberect, silvery, matted simple setae with recurved apices (pl. 4C). STRUCTURE: Body conformation dimorphic, male parallel sided, female variously arcuate (pls. 1, 2); frons striate (fig. 27A). MALE GENITALIA: **Tergal process**: Short with right side point directed toward midline (fig. 29D). **Phallotheca**: With left lateral surface slightly compressed (fig. 29B, F, I). **Endosomal spicule**: Ventral lobe with apical region uniformly thick, distal region marginally serrate; dorsal lobe entire, flattened with narrow distal region; both dorsal and ventral lobes with variable length (fig. 29A, E, H). **Right paramere**: Small; apical region with short parallel spines, sometimes twisted to long axis of paramere (fig. 28A–H); subapical region wide; basal lobe prominent, bent distally (fig. 29K). **Left paramere**: Distal portion shorter than basal

portion; distal portion with ventral surface diameter equal throughout; subapical region with variable diameter (fig. 29C, G, J). FEMALE GENITALIA: **First gonapophyses**: In ventral view, left overlapping and larger than right at overlap. **Right first gonapophysis**: Usually with small lateral surface. **Left first gonapophysis**: Dorsal surface concave; apex narrow. **Vestibulum, anteroventral margin of anterior wall**: Widely sclerotized medially, with sclerotized reaching lateral margins of bursa copulatrix. **Second gonapophyses**: Anterior medial surface slightly or strongly convex. **Ventral labiate plate**: Strongly produced, moderately wide, base triangular. **Interramal sclerite**: Posteromedial portion with tumid process abutting ovipositor bulb; ventromedial region overlapping ventromedial plate; dorsomedial region flat, not produced anteriorly or asymmetrical. **Interramal lobe**: Dorsal or basal insertion with membranous attachment; dorsomedial margin not produced or with a short process; ventral projection with short or long concave anterior surface.

DISCUSSION: Several characters supporting the *argenteus* group are ambiguous, supporting the group only under fast or slow optimization or they are homoplastic, found in other species of *Slaterocoris*. A prominent distally bent basal lobe or region of the right paramere (44-5) uniquely defines the *argenteus* group (fig. 1A, B), but in the cladogram shown in figure 2, provides support for the group only under fast or slow optimization. In the two other most parsimonious cladograms (fig. 1A, B) three characters—concolorous black femur (5-2), vestiture of silvery setae (9-3), and dimorphic sexes with male parallel sided and female arcuate—provide homoplasious support to the *argenteus* group. Shared characters of the second gonapophysis (62-0) and interramal lobe (69-2) in the female genitalia provide weak support for a sister relationship of *S. argenteoides* to *S. argenteus* and *S. digitatus*.

Slaterocoris argenteoides, new species
Figures 12, 27, 28A–H, 29A–D;
plates 1, 4C; map 5

HOLOTYPE: MALE: "**MEXICO: Puebla** 2.1 mi. s. Coxcatlan [18.23613° N 97.15° W], July 10, 1981, Bogar, Schaffner and Friedlander" (AMNH_PBI 00118799). Holotype *Slaterocoris argenteoides* n. sp. det. M.D. Schwartz, 2010 [red label]. Deposited in the collection of the Instituto de Biologia, Universidad Nacional Autonoma de Mexico, Mexico City, D.F.

DIAGNOSIS: *Slaterocoris argenteoides* is distinguished from the other two species in the *argenteus* group by the more dorsoventrally flattened habitus, slightly more elongate costal margin of the female (pl. 1), the usually longer antennal segment II of the male (1.32, 1.21–1.43 in *S. argenteoides*; 1.20, 1.13–1.40 in *S. argenteus*; 1.06, 1.00–1.10 in *S. digitatus*), the occasionally infuscate trochanter, and the male genitalia. The right paramere is longer from the medial process to the apex and the apical spines are slightly twisted on the long axis of the paramere (cf. figs. 28A–H, I–L, *S. argenteus,* and 29K, *S. digitatus*). The dorsal lobe of the endosomal spicule is longer basally and the recurved portion of the ventral lobe is longer (cf. figs. 29A–E, *S. argenteus,* and H, *S. digitatus*). The left paramere has a more stout subdistal portion (cf. 29C–G, *S. argenteus,* and J, *S. digitatus*). The fine, matted setae will further distinguish *S. argenteoides* from *S. simplex* and *S. subalbicans*, both of which share the black leg coloration and silvery white setae of the three *argenteus*-group species but have coarser and suberect setae. The hemelytron of *S. argenteoides* is also more strongly sexually dimorphic than in *S. simplex* (pl. 3).

DESCRIPTION: *Male:* Body moderately large, elongate, length 4.40–4.90, width 1.40–1.68 (pl. 1); costal margin parallel. COLORATION: Shining black, except for variable infuscate portion of coxa apically, trochanter, and femur apically. VESTITURE: Densely distributed, moderately long, adpressed or matted, apically recurved, silvery white setae (pl. 4C, fig. 27A, B). DORSAL SCULPTURATION: Frons striate, vertex, calli, and pronotal disc slightly rugose. STRUCTURE: Labium reaching middle of forecoxa; pretarsus as in figure 27C. GENITALIA: **Pygophore**: Short, basally broad, apically pointed, triangular tergal process, reaching middle of proctiger; process situated right of midline of genital

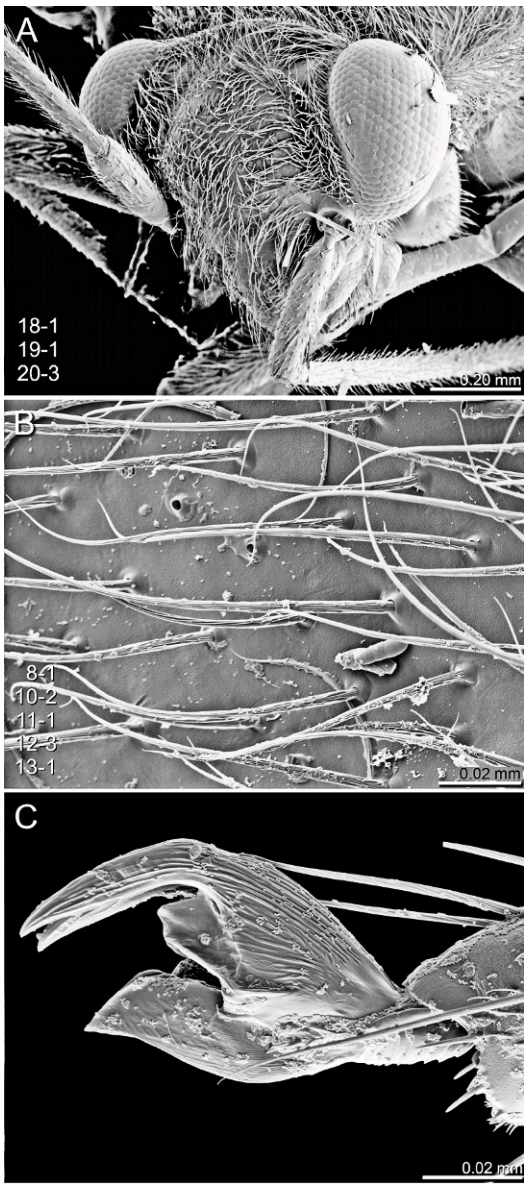


Fig. 27. *Slaterocoris argenteoides*, scanning electron micrographs. **A**. Head, anterior view. **B**. Hemelytron, setae, dorsal view. **C**. Pretarsus, lateral view.

aperture (fig. 29D). **Phallotheca**: Right ventral surface broadly protuberant; left U-shaped dorsal notch small (fig. 29B). **Endosomal spicule**: Dorsal lobe entire, marginally serrate on distal one third, distal half wider than base; ventral lobe entire, recurved distal portion about as long as basal portion; distal half expanded, marginally serrate, pointed (fig. 29A). **Right paramere**: Moderately elongate; arrangement of spines variable; medial spine sometimes serrate apically; with four or five short apical parallel spines bent dorsally and somewhat twisted in relation to body of paramere (fig. 28A–H). **Left paramere**: Shaft moderately long, in apical view, approximately of equal length to paramere body in lateral view (fig. 29C).

Female: Moderately large, ovate; length 3.70–4.30, width 1.63–1.90 (pl. 1); STRUCTURE: Costal margin moderately long, arcuate. GENITALIA: As in species group, except: **Right first gonapophysis**: Lateral surface small. **Second gonapophyses**: Anterior medial surface strongly convex. **Interramal sclerite**: Dorsomedial region asymmetrical, left side produced. **Interramal lobe**: Dorsomedial margin linear, not produced; ventral margin truncate with short projection and concave anterior surface.

ETYMOLOGY: Named for its similarity to the overall habitus of *S. argenteus*. From the Latin suffix, *-oides*, ''having the form of.''

HOSTS: The only documented host is *Viguiera dentata* (Asteraceae). Otherwise the host information is restricted to Asteraceae, ''sunflower,'' and ''large yellow composite.''

DISTRIBUTION: 344 specimens are known from 12 localities in the Sierra Madre del Sur of central Oaxaca and southern Puebla, Mexico, with collection events spanning the period from early July to early November (map 5).

DISCUSSION: Specimens retained in the CNC from Guelatao, Oaxaca, were originally identified as *S. argenteus* with others collected by Leonard Kelton in 1969. The more southern distribution of these specimens prompted testing to determine if they represented a range extension, as was noted for *S. punctatus*, another species previously known only from Durango state. Upon close examination, the Oaxaca specimens were found to belong to this new southern Mexican species.

Variation was noted in the number and size of the short, parallel apical spines and the intensity of apical serration in the medial process of the right paramere from six specimens across Oaxaca and Puebla (fig. 28A–H). Little variation was noted in

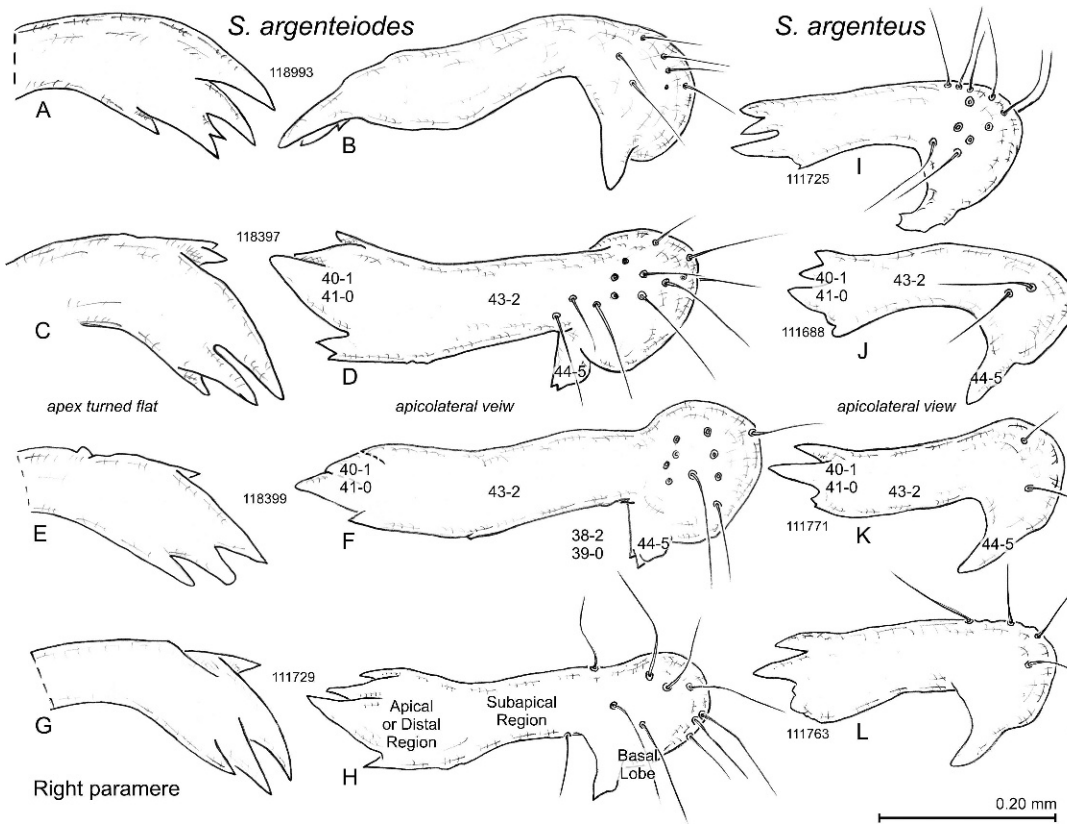


Fig. 28. *Slaterocoris* species, right paramere. A–H. ***S. argenteoides***. **A**, **B**. 3.1 mi NW of Jct. 190/135, OA. **C**, **D**. 2.1 mi S of Coxcatlan, PU. **E**, **F**. 10 mi SE of Totolapan, OA. **G**, **H**. Guelatao, OA. I–L. ***S. argenteus***. **I**. Encinillas, ME. **J**. Jilotepec, ME. **K**. 40 mi S of Durango, DG. **L**. 6 mi E of Durango, DG.

the endosomal spicule and left paramere, all having the form shown in figure 29A, C.

PARATYPES: **MEXICO: Oaxaca:** 3.1 mi NW of Jct. 190/135, 17.35203° N 96.94841° W, 1783 m, 20 Jul 1987, R. Anderson, 1♂ (00118993), 1♀ (00118994) (TAMU). 4.2 mi N of Tonaltepec, 17.12774° N 96.61666° W, 21 Jul 1987, Kovarik and Schaffner, 2♂ (00118996–00118997), 1♀ (00118998) (TAMU). 10 mi E of Totolapan, 16.66661° N 96.1482° W, 1219 m, 20 Jul 1987, Kovarik and Schaffner, 12♂ (00118999–00119010), 11♀ (00118432, 00119011–00119020) (TAMU). 10 mi SE of Totolapan, 16.61774° N 96.05366° W, 2438 m, 20 Jul 1987, Kovarik and Schaffner, 2♂ (00118919, 00118928), 2♀ (00118934, 00118967) (AMNH), 27♂ (00118399, 00118903–00118918, 00118920–00118927, 00118929–00118930), 47♀ (00118931–00118933, 00118935–00118966, 00118968–00118979) (TAMU). 10.7 mi NE of El Punto, 17.32526° N 96.46593° W, 19 Jul 1981, Bogar, Schaffner and Friedlander, 10♂ (00118431, 00118980–00118988), 4♀ (00118989–00118992), 7♀ (00093410–00093414, 00184833–00184834) (TAMU). Guelatao, 17.3000° N 96.48333° W, 18 Aug 1969, L.A. Kelton, Asteraceae, 6♂ (00111388, 00111728–00111732), 18♀ (00111389, 00111733–00111749) (CNC). Rt 175, near Guelatao, 17.31754° N 96.48997° W, 2064 m, 20 Sep 1989, E. Barrera, T.J. Henry, I.M. Kerzhner, Asteraceae, 10♂ (00122305, 00133801–00133809), 14♀ (00070073, 00122306, 00133834–00133845) (USNM). **Puebla:** 2.1 mi S of Coxcatlan, 18.23613° N 97.15° W, 10 Jul 1981, Bogar, Schaffner and Friedlander, 1♀ (00093714) (CNC), 55♂ (00118397, 00118775–00118798, 00118800–00118827, 00184624–00184625), 77♀ (00118828–00118902, 00184626–00184627) (TAMU). 5 km NE of Zinacantepec,

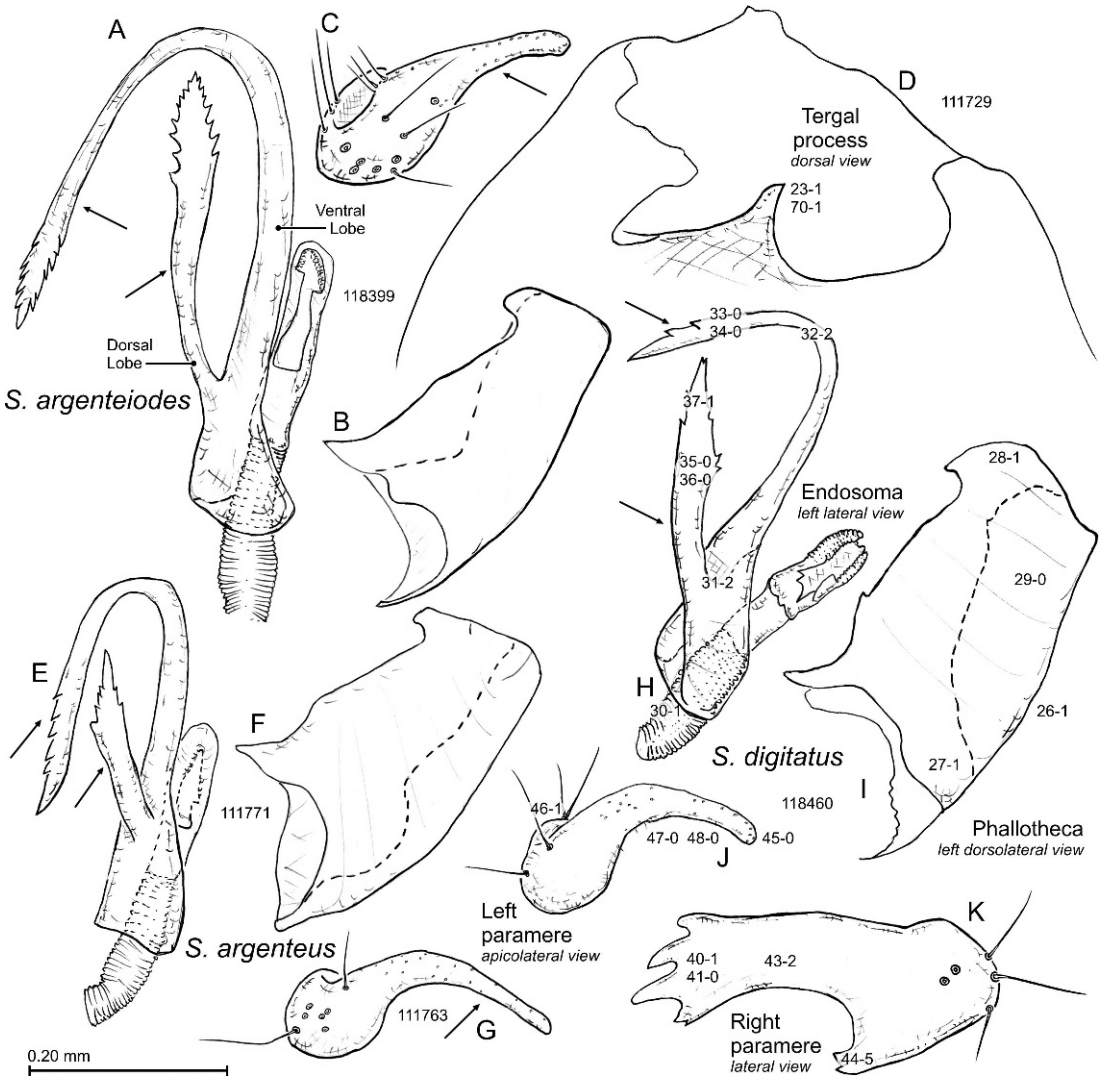


Fig. 29. *Slaterocoris* species, male genitalia. A–D. ***S. argenteoides***. **A**–**C**. 3.1 mi NW of Jct. 190/135, OA. **D**. Guelatao, OA. E–G. ***S. argenteus***. **E**, **F**. 40 mi S of Durango, DG. **G**. 6 mi E of Durango, DG. **H**–**K**. ***S. digtatus***, Big Bend National Park, TX.

18.37° N 97.21° W, 1290 m, 01 Aug 1995, T.J. Henry and E. Barrera, 2♀ (00122202–00122203) (CNC), 11♂ (00122186–00122196), 5♀ (00122197–00122201) (USNM). 6 mi SW of Tehuacan, 18.3883° N 97.44836° W, 08 Jul 1981, Bogar, Schaffner and Friedlander, 1♂ (00118995) (TAMU). 8 km NE of Zinacantepec, 18.38833° N 97.21° W, 1440 m, 01 Aug 1995, T.J. Henry and E. Barrera, 1♂ (00122180) (CNC), 3♂ (00122183–00122185), 3♀ (00122302–00122304) (USNM). 15 km N of Tehuacan, 18.59833° N 97.475° W, 1955 m, 16 Nov 2003, T.J. Henry and E. Barrera, *Viguiera dentata*, 5♂ (00070064–00070068), 4♀ (00070069–00070072) (USNM).

Slaterocoris argenteus Kelton

Figures 12, 28I–L, 29E–G; plate 1; map 5

Slaterocoris argenteus Kelton, 1968: 1134: fig. 21 (orig. desc.); Knight, 1970: 241, fig. 31 (disc.); Schuh, 1995: 197 (catalog).

DIAGNOSIS: Distinguished from *S. simplex*—a species that shares the completely black coloration, striate frons, and dense, moderately long, silvery sericeous setae—by the absence of adpressed setae near the claval suture. Within the *S. argenteus*-group, recognized by the conspicuous sexually dimorphic hemelytron (pl. 2), longer antennal segment II (1.13–1.40♂, 0.98–1.21♀) and male genitalia with a pointed medial spine of the right paramere and longer ventral lobe of the endosomal spicule (fig. 29E) as compared to *S. digitatus* with shorter male hemelytron length (pl. 2), somewhat shorter length of antennal segment II (1.00–1.10♂, 0.91–1.00♀), and shorter distal portion of the ventral lobe (fig. 29H). Although the black coxae will usually discriminate *S. argenteus* from *S. argenteoides*, where the coxae are sometimes infuscate, the shorter, untwisted body of the right paramere (fig. 28I–L) and the smaller apex of the dorsal lobe in the endosomal spicule (fig. 29E) are diagnostic. The hemelytron of the female is not as flattened and is shorter than in *S. argenteoides* (pl. 1), whereas the curvature of the costal margin is not as great as in *S. digitatus* (pl. 2).

REDESCRIPTION: *Male:* Body moderately large, elongate, length 4.30–5.40, width 1.70–2.10 (pl. 1). Coloration, vestiture, and structure as in the *S. argenteus*-group description with the following specific features: GENITALIA: **Endosomal spicule**: Dorsal lobe marginally serrate on distal one quarter, gradually attenuate distally; ventral lobe distal portion shorter than basal portion, gradually attenuate, moderately serrate, pointed (fig. 29E). **Right paramere**: Relatively short; arrangement of spines variable; medial spine sometimes pointed; with two or three short apical parallel spines on same plane with body of paramere (fig. 28I–L). **Left paramere**: Shaft long, in apical view, slightly longer than paramere body in lateral view (fig. 29G).

Female: Short, ovate, length 3.40–3.95, width 1.80–2.10 (pl. 1). STRUCTURE: Costal margin short, conspicuously curved. GENITALIA: As in species group except: **Right first gonapophyses**: Lateral surface small. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly. **Interramal lobe**: Dorsomedial margin with short process; ventral margin with long projection and concave anterior surface.

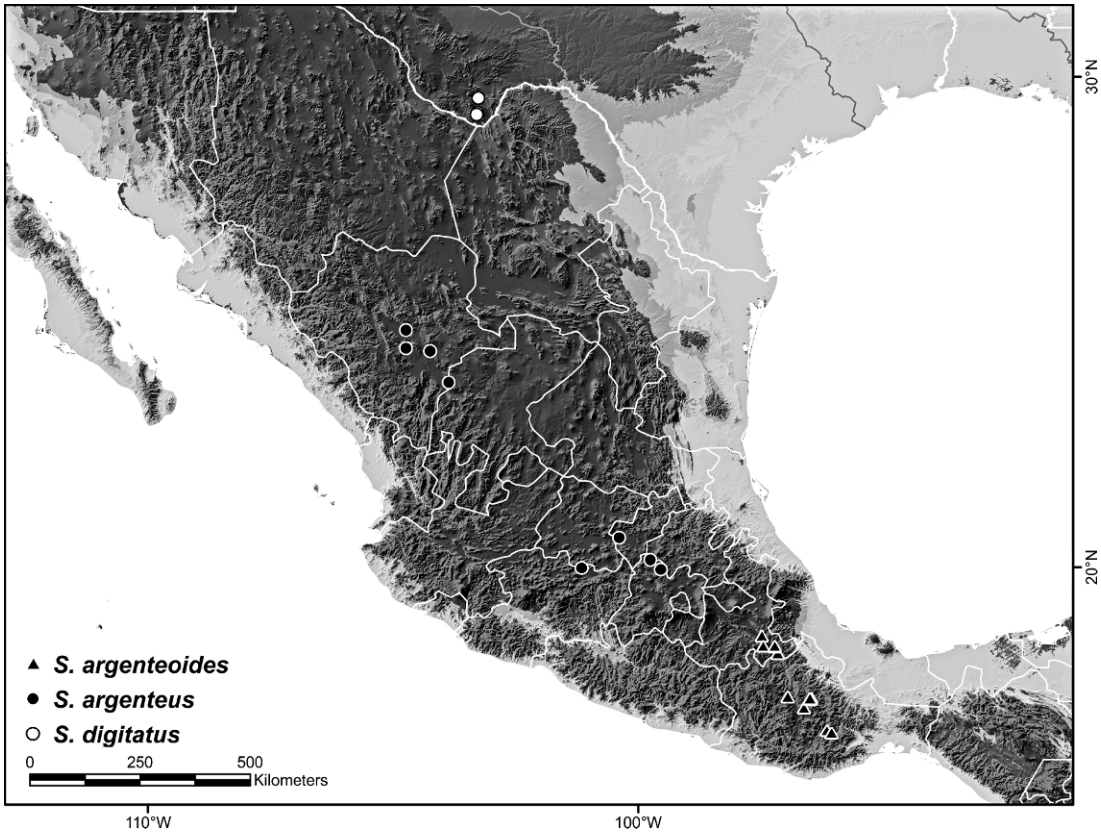
HOSTS: Beyond the notation of Asteraceae, no other host-plant information is available.

DISTRIBUTION: 69 specimens from 8 collection events with northern specimens in the Central Plateau of Durango collected in July and those from further south in the northern edge of the Sierra Transvolcanica collected in September (map 5).

DISCUSSION: The distribution as currently known appears to be separated into northern and southern populations. The male genitalia of several individuals from each end of the range showed similar variation (fig. 28I–L). Further collecting may reveal that *S. argenteus* is more widely distributed in the Central Plateau of Mexico.

HOLOTYPE: **MEXICO: Durango:** 6 mi E of Durango [24.8333° N 104.73728° W, 1981 m], 24 Jul 1964, L.A. Kelton, 1♂ (AMNH_PBI 00111760) (CNC).

OTHER SPECIMENS EXAMINED: **MEXICO: Durango:** 6 mi E of Durango, 24.8333° N 104.73728° W, 1981 m, 24 Jul 1964, L.A. Kelton, paratype, 1♂ (00121773), 1♀ (00121774) (CAS), paratypes, 5♂ (00111761–00111764, 00111766), 1♀ (00111765) (CNC), paratype, 1♂ (00118613), 1♀ (00118614) (TAMU). 25 mi S of Durango on Hwy 45, 24.46262° N 104.7383° W, 24 Jul 1964, L.A. Kelton, paratypes, 2♂ (00111767–00111768), 2♀ (00111769–00111770) (CNC). 40 mi S of Durango, 23.76619° N 103.86392° W, 30 Jul 1964, L.A. Kelton, paratype, 1♂ (00111771) (CNC). 41 mi NE of Durango, 24.40508° N 104.24352° W, 1998 m, 28 Jul 1956, R.E. Beer and party, Light Trap, 1♂ (00117800) (KU). **Mexico:** Encinillas [sic Encinello], 20.15° N 99.75° W, 2453 m, 02 Sep 1969, L.A. Kelton, 1♂ (00111725), 2♀ (00111726–00111727) (CNC). Jilotepec, 19.95277° N 99.53472° W, 02 Sep 1969, L.A. Kelton, 13♂ (00111688–00111700), 24♀ (00111701–00111724) (CNC). **Michoacan:** Lago de Cuitzeo [Cuitzeo del Porvenir], 19.9833° N 101.15° W, 1900 m, 06 Jul 1947, T.H. Hubbell, 2♀ (00127328–00127329) (UMMC). **Queretaro:** Queretaro, 20.6000° N 100.38333° W, 1868 m, 04 Sep



Map 5. Localities for *Slaterocoris argenteoides*, *S. argenteus*, and *S. digtatus*.

1969, L.A. Kelton, Asteraceae, 4♂ (00111750–00111753), 6♀ (00111754–00111759) (CNC).

Slaterocoris digitatus Knight
Figures 12, 29H–K; plate 2; map 5

Slaterocoris digitatus Knight, 1970: 242, fig. 38 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 198 (catalog).

DIAGNOSIS: Only *S. sheridani* is sympatric with *S. digitatus*; with the two species easily distinguished by the dorsal vestiture and tibial coloration: the former has sparse, short, brown setae (pls. 3, 4O) and pale tibiae (fig. 13), whereas the latter has dense, long, silvery setae (pl. 2, and as in pl. 4C for *S. argenteoides*) and black tibiae (fig. 12). In the male, and usually the female, antennal segment II is shorter in *S. digitatus* than in *S. argenteoides* or *S. argenteus* (see in above species), whereas the width of the vertex is greater (*S. digitatus* 0.54–0.60♂, 0.66–0.70♀; *S. argenteoides* 0.48–0.55♂, 0.58–0.61♀; *S. argenteus* 0.50–0.54♂, 0.60–0.65♀). In *S. digitatus*, the body of the right paramere is short (fig. 29K), as in *S. argenteus* (fig. 28I–L), in comparison to *S. argenteoides* (fig. 28B, D, F, H), but differs from *S. argenteus* by the bifid apex of the medial spine (fig. 29K); *S. argenteus* has a single point on the medial spine (fig. 28I–L). The endosomal spicule of the three species in this group differ from each other in the length of the dorsal endosomal lobe. In *S. digitatus*, it is longer and more attenuate than in *S. argenteus* (cf. fig. 29H, E); in *S. argenteoides,* the dorsal lobe is slightly more narrow basally with more marginal serration distally (cf. fig. 29A, H) than in *S. digitatus*. The ventral lobe of the endosomal spicule in *S. digitatus* also differs, with the apex not as recurved and shorter than in either *S.*

argenteoides and *S. argenteus* (cf. fig. 29H–A, E).

REDESCRIPTION: *Male:* Body short, with rounded conformation, sexes with roughly similar body length, costal margin sublinear; length 3.50–3.95, width 1.65–1.75 (pl. 2); as in the *S. argenteus*–group description with the following specific features: GENITALIA: **Endosomal spicule**: Dorsal lobe with weak marginal serration on distal one third, gradually attenuate distally; ventral lobe distal portion shorter than subequal to basal portion, not strongly recurved, sparsely serrate, pointed (fig. 29H). **Right paramere**: Relatively short; medial spine bifurcate; with four short apical parallel spines on same plane with body of paramere (fig. 29K). **Left paramere**: Shaft relatively short, in apical view, subequal to paramere body in lateral view (fig. 29J).

Female: Short, ovate, length 3.40–3.80, width 1.90–2.05 (pl. 2). STRUCTURE: Costal margin strongly curved. GENITALIA: As in species group except: **Right first gonapophyses**: Lateral surface moderately large. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly. **Interramal lobe**: Dorsomedial margin not produced; ventral margin with long projection and concave anterior surface.

HOST PLANT: Unknown.

DISTRIBUTION: Known only from the Chisos Mountains of west Texas from late August to early October. This indicates that *S. digitatus* is active after the summer rainy period common to the Chihuahuan Desert region (map 5).

DISCUSSION: The original description was based on two males and one female from Big Bend National Park, Texas. All 15 of the other specimens examined for this project are also from the Park.

HOLOTYPE: **USA: Texas: *Brewster Co.:*** South Rim Trail, Chisos Mountains, Big Bend National Park [29.22936° N 103.2954° W, 2118 m], 16 Aug 1968, J.E. Hafernik, 1♂ (AMNH_PBI 00122246) (USNM).

OTHER SPECIMENS EXAMINED: **USA: Texas: *Brewster Co.:*** Big Bend National Park, 29.56527° N 103.26055° W, 31 Aug 1986–02 Sep 1986, East, Haack, Kovarik, 1♂ (00118472) (TAMU). Big Bend National Park, Lost Mine Trail (lower), 29.27° N 103.27861° W, 1829 m, 09 Sep 1988, R. Anderson, 6♂ (00118433, 00118460–00118464), 6♀ (00118434, 00118465–00118469) (TAMU); 03 Oct 2005, Raber and Riley, 1♀ (00245372) (TAMU). South Rim Trail, Chisos Mountains, Big Bend National Park, 29.22936° N 103.2954° W, 2118 m, 16 Aug 1968, J.E. Hafernik, paratype, 1♂ (00122247), 1♀ (00134409) (USNM); 15 Aug 1969, Board and Hafernik, 1♀ (00134410) (USNM).

Slaterocoris breviatus species group

DIAGNOSIS: Among those species with a large right paramere, the members of this species group are distinguished by the radial arrangement of the apical spines of this paramere (figs. 30C–G, 32I–O, 33I–L, 34H, I, 35G–I, 38, 39I, J), the long tergal process with short opposing apical spines (figs. 30J, 32E, 33D, 34G, 35D, 39F) the strongly compressed left lateral surface of the phallotheca (figs. 35C, 39E), and the sparse, short dorsal vestiture (pl. 4D, Q). COLORATION: Black except for the apex or slightly variable apical portion of femora pale yellow, tibiae sometimes pale yellow to yellowish orange with black apex; tarsomeres I and II pale in contrast to black tarsomere III; antennal segment I sometimes pale with black base, segment II with variable pale regions basally or medially; female with more extensive pale coloration on appendages than male. VESTITURE: Sparsely distributed, reclining, short, brown simple setae (pl. 4D, Q). DORSAL SCULPTURATION: Frons faintly striate to rugose or slightly punctate; corium with moderately large, discrete punctures merging with rugosity near claval suture (fig. 36B). STRUCTURE: Length of antennal segment II greater than head width; sexually dimorphic body shape—male, ovoid, costal margin arcuate, width across hemelytra widest at level even with apex of clavus and with costal margin of female considerably more arcuate than male with wider hemelytra, somewhat pear shaped in dorsal view (pls. 1–3). MALE GENITALIA: **Pygophore**: Tergal process moderately long, usually with two small apical points (figs. 30J, 32E, 33D, 34G, 35D, 39F). **Phallotheca**: Distal portion abruptly and deeply

notched on left dorsolateral surface (figs. 35C, 39E). **Endosomal spicule**: Dorsal lobe unequally bifurcate, lateral ramus large, with variable structure and marginal serration, medial ramus smaller, narrow with smooth margins (figs. 30A, B, 32A–D, 35A, B), medial ramus sometimes absent (fig. 30B); ventral lobe with long, recurved distal portion usually reaching to base of dorsal lobe of endosomal spicule, apical region variable in length and with marginal serration; ventral lobe sometimes thickened at recurved bend in medial region (figs. 33A–C, 34A–C, 39A–D). **Right paramere**: Large; apical region with radial arrangement, with small or large spines; subapical region constricted; basal lobe broad basally (figs. 30C–G, 32I–O, 33I–L, 34H, I, 35G–I, 38, 39I, J). **Left paramere**: Distal portion longer than basal portion; apex rounded with distal portion long in *S. atritibialis* (fig. 30H, I), *S. pallidicornis* (fig. 33F, G), *S. stygicus* (figs. 37C, 39G, H), or in *S. breviatus* with short, bent distal portion (fig. 32F, G); apex pointed on ventral side with distal portion long in *pallipes* (fig. 34E, F), *S. solidaginis* (fig. 35E, F). FEMALE GENITALIA: **First gonapophyses**: Right overlapping left, in ventral view (fig. 40A, B). **Left first gonapophyses**: Dorsal surface protuberant, apex roughly confluent with distal portion. **Vestibulum, anteroventral margin of anterior wall**: Sclerotized medially, and sclerotized to lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced, base wide, triangular. **Interramal sclerite**: Dorsomedial region tumid anteriorly, ventromedial region overlapping ventromedial plate. **Interramal lobe**: Dorsal or basal insertion usually with membranous attachment; dorsomedial margin not produced as lobe; ventral projection short with concave anterior surface (fig. 40C, D).

DISCUSSION: Widely distributed in northern, eastern, and central North America as well as the north and central mountain west. One species has an exclusively eastern coastal distribution and one is strictly Californian. The predominant hosts are species of *Solidago*, with *Baccharis* sp. the exclusive host of one species, *S. pallidus*.

The apical portion of the right paramere in this species group is unique. The spines are grouped tightly at their base and fan out distally in a radial arrangement. The number of apical spines is greatly variable in this group. In *S. pallipes* and *S. stygicus*, the apical spines are long. *Slaterocoris atritibialis*, *S. pallidicornis*, and *S. solidaginis* have similar apical spine structure, being shorter than those in *S. pallipes* and *S. stygicus*. Additionally, the apical spines of *S. pallidicornis* are mostly on the same plane with the apicalmost spine the longest; in *S. atritibialis* and *S. solidaginis* the apicalmost spine is shorter and placed somewhat more medially than in *S. atritibialis*. In *S. breviatus* the apical spines are all of equal length and are the shortest in the species group.

Some genitalic features used to diagnosis this species group are found in two species of the *punctatus* group. The tergal process of *S. tanydexios* also has two apical points, albeit of large size (23-2), and the ventral lobe of the endosomal spicule is wide subapically (33-1) and short distally (34-2). Also the broad basal lobe (44-2) of the right paramere also occurs in *S. clavatus*. Both *S. clavatus* and *S. tanydexios* have a protuberant dorsal surface of the first gonapophyses (55-1); otherwise, this feature is found only in *breviatus* group.

Slaterocoris atritibialis (Knight)

Figures 13, 30; plate 1; map 6

Strongylocoris stygicus: Van Duzee: 1921: 135 (disc., in part).

Strongylocoris atratus: Van Duzee: 1921: 135 (disc., in part).

Strongylocoris atritibialis Knight, 1938: 2, fig. 6 (orig. desc.).

Slaterocoris atritibialis: Kelton, 1968: 1122 fig. 3 (disc.); Knight, 1970: 244, fig. 12, (disc.); Reid, 1974: 239 (parasit.); Reid et al., 1976: 561 (biol.); Messina, 1978: 139 (biol.); Henry and Smith, 1979: 215 (list); Wheeler et al., 1983: 142 (list); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 197 (catalog); Cappuccino 1987: 1646 (biol.); Wheeler 2001: 153, 284 (biol.); Henry et al., 2005: 62 (list); Forero, 2008: 152, 155–156 (disc.).

DIAGNOSIS: Recognized among *breviatus* group species by the arcuate costal margin of both sexes (pl. 1), the black antennal segments, hind tibia, and tarsomeres, the female usually having the fore- and middle tibiae dusky yellowish brown, the male genitalia with the tergal process truncate with

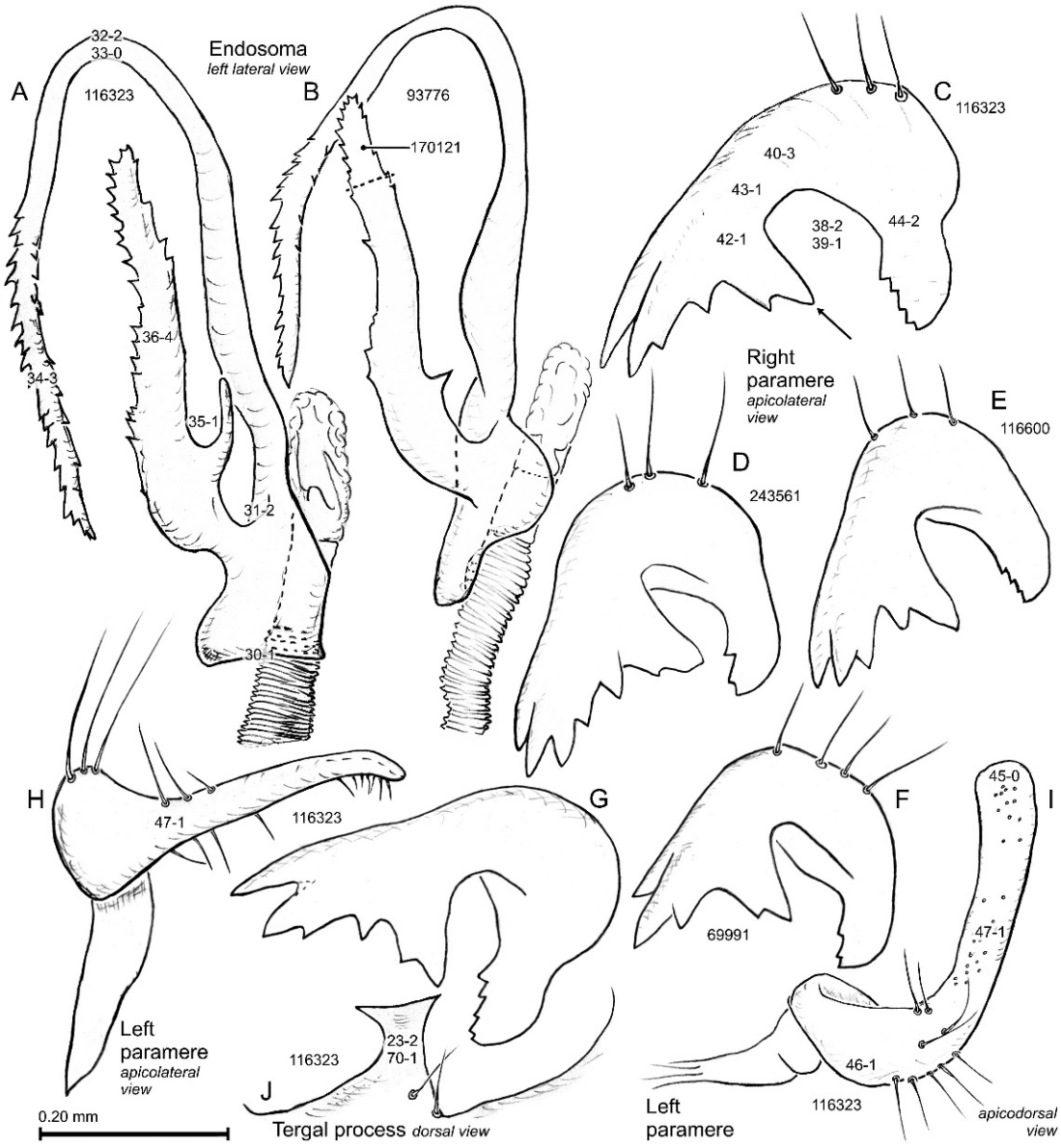


Fig. 30. *Slaterocoris atritibialis*, male genitalia. **A**, **C**, **G**–**J**. Napeaque, NY. **B**. Shoshone National Forest, WY. **D**. 6 mi NE of Cloudcroft, NM. **E**. Niobrara Co., WY. **F**. 27 mi E of Nucla, CO.

two lateral points (fig. 30J), apical spines of the right paramere tightly grouped, moderately long with basalmost apical spine stouter than in others (fig. 30C–G), dorsal lobe of endosomal spicule bifurcate, larger (lateral) ramus flattened and marginally serrate, smaller (medial) ramus usually one-fourth length of lateral ramus (fig. 30A), sometimes much smaller (fig. 30B); ventral lobe of endosomal spicule evenly curved at recurved middle region, apex reaching to base of dorsal lobe. Female with the head and vertex wider and tarsomeres usually darker than in the female of *S. stygicus* and *S. breviatus*.

REDESCRIPTION: *Male:* Large, ovate, length 4.00–4.88, width 1.85–2.38 (pl. 1). COLORATION: Shining black, including antenna and legs, except diffusely pale on

apices of femora (fig. 13); in female fore- and middle tibiae often yellowish brown to reddish black and antennal segment II pale medially. VESTITURE: Subglabrous, sparsely distributed, short, suberect, brown simple setae. STRUCTURE: Frons striate; labium reaching base of middle coxa; costal margin arcuate. GENITALIA: **Tergal process**: Apical points conspicuous (fig. 30J). **Endosomal spicule**: Ventral lobe long, marginal serration strong; dorsal lobe with lateral ramus long, flat, relatively wide, apex truncate, lateral margin strongly serrate, medial ramus short, with variable length (fig. 30A), sometimes present as large spine (fig. 30B). **Right paramere**: Apical spines tightly grouped, moderately long, discrete, splayed, with basalmost spine stouter than and slightly removed from others (fig. 30C–G); basal lobe with serrate region produced, somewhat constricted, strongly serrate on posterior surface (fig. 30C–G). **Left paramere**: Long; apex somewhat spatulate (fig. 30H, I).

Female: Large, ovate; length 4.00–4.95, width 2.03–2.63 (pl. 1). COLORATION: Antennal segment II, fore- and middle tibiae often paler than in male. STRUCTURE: Costal margin strongly arcuate than male, base of embolium wide. GENITALIA: As in species group except: **First gonapophyses**: Right greater than left at overlap. **Second gonapophyses**: Anterior medial surface strongly convex. **Interramal sclerite**: Posteromedial portion with tumid process abutting ovipositor bulb.

HOSTS: The predominance of records indicate that *Solidago* species (predominantly *S. altissima* and *S. canadensis*) are breeding hosts. Five other genera of Asteraceae are also noted from far fewer localities: *Ambrosia* sp., *Artemisia* (sp. and *A. cana*), *Aster* sp., *Eurybia macrophylla*, and *Leucanthemum vulgare*. The *Artemisia* records are from five localities in Colorado, Idaho, North Dakota, and South Dakota. Only the collection event at American Falls, Idaho (00113953) was from a series of specimens (an additional 7♂, 6♀) and may indicate that in the arid western states this unidentified species of *Artemisia* is also a breeding host or at least is a significant feeding host. Wheeler (2001) reported personal observations of foliar chlorosis on *Artemisia vulgaris* as a result of feeding by *S. atritibialis*. The scattered sampling of non-asteraceous plant occurrences are all considered to be sitting records.

DISTRIBUTION: From westcentral British Columbia spanning east across the Prairie Provinces (as far north as 56.8° N in Alberta) to the Great Lakes region, southern Quebec, and Maine. Widely distributed across the eastern and central U.S. as far south as northern Georgia and Alabama, then west to Oklahoma and in the upper Great Plains as far south as Nebraska. Widely distributed in the Rocky Mountain cordillera from Cloudcroft, New Mexico, in the south, north through Colorado to Montana, then west across the Snake River plain to eastern Oregon (map 6).

COLLECTION SUMMARY: 1760 specimens (54% with USI numbers) from 767 collection events. Phenologically suitable collection times occur in April and May for southern localities, June to August for the majority of localities, with the latest collection events in September from northern localities.

DISCUSSION: In western females, the body width is not as great and the curvature of the costal margin is not as arcuate as in eastern females of *S. atritibialis*. Such specimens can be confused with female *S. stygicus*, but ultimately distinguished by the mostly dark fore- and middle tibiae and dark antennal segment II. These appendages are usually pale in the latter species. When antennal segment II in the female of these species is partially pale, then the pale region is somewhat more diffuse in *S. atritibialis* and more starkly contrasting in *S. stygicus*. The length of segment II in the female tends to be shorter on average in *S. atritibialis* (1.09, 0.93–1.25) than in *S. stygicus* (1.16, 1.05–1.28) and the vertex of the female is wider in *S. atritibialis* (0.72, 0.62–0.78) than in *S. stygicus* (0.63, 0.58–0.66). Western specimens, especially those from Wyoming, tend to have somewhat longer, more densely distributed dorsal vestiture than eastern specimens. Some males from Alberta and British Columbia have tibial coloration more typical of *S. stygicus* with fore- and middle tibiae pale and hind tibia black; however, the male genitalia, particularly the endosomal spicule, is identical to male *S. atritibialis* with all black tibiae.

Slaterocoris atritibialis was listed as a facultative predator of *Uroleucon caligatum* (Richards) and *U. nigrotuberculatum* (Olive) (Sternorrhyncha: Aphididae) colonies feeding on *Solidago canadensis* var. (as *S. altissima*) in central New York (Cappuccino, 1987). It was the only predaceous plant bug species in *Solidago* arthropod community studies. In laboratory colonies, originating from goldenrod, *S. atritibialis* was also observed to feed on the eggs of *Ophraella sexvittata* (Leconte) (Coleoptera: Chrysomelidae) (Messina, 1978). The phenology of *S. atritibialis* in several *Solidago* studies (Reid, 1974; Reid et al., 1976; Messina, 1978) was earlier than for the sympatric *S. breviatus* and *S. stygicus*.

HOLOTYPE: **USA: New York: *Tompkins Co.:*** Ithaca [42.44056° N 76.49694° W], 23 Jun 1920, H.H. Knight, 1♂ (AMNH_PBI 00134026) (USNM).

OTHER SPECIMENS EXAMINED: **CANADA: Alberta:** Armena, 53.1229° N 112.95198° W, 750 m, 17 Aug 1920, C.E. Hendrickson, 1♀ (00134315) (USNM). Banff, 51.16666° N 115.56666° W, 1615 m, 28 Sep 1925, O. Bryant, 1♀ (00134592) (USNM). Barrhead, 54.11716° N 114.38181° W, 640 m, 11 Jul 1938, R.W. Salt, *Trifolium* sp. (Fabaceae), 1♀ (00113862) (CNC). Brooks, 50.56666° N 111.9000° W, 13 Jun 1957, Brooks and McNay, 1♂ (00113851) (CNC). Conrad, 49.52° N 111.97° W, 21 Jun 1951, L.A. Konotopetz, 1♂ (00113847) (CNC). Coutts, 49.0045° N 111.96405° W, 1073 m, 15 Jun 1952, A.R. Brooks, 2♂ (00113846, 00115511), 2♀ (00113863, 00317195) (CNC). Cypress Hills Provincial Park, Elkwater Park Campground at Horse[shoe] Canyon trailhead, 49.65989° N 110.31794° W, 1282 m, 03 Sep 1993, M.D. Schwartz, *Solidago* spp., 1♀ (00113869) (CNC). Drumheller, 51.46666° N 112.7000° W, 18 Jun 1957, Brooks and McNay, 1♂ (00242558) (CAS), 1♂ (00113853) (CNC). Elkwater Lake, Cypress Hills Provincial Park, 49.66293° N 110.30167° W, 1219 m, 19 Jul 1956, O. Peck, 1♀ (00113858) (CNC); 20 Jul 1956, O. Peck, 1♀ (00113857) (CNC). Elkwater Park, Cypress Hills Provincial Park, 49.63° N 110.2000° W, 1427 m, 07 Jul 1952, L.A. Konotopetz, *Solidago* sp., 2♂ (00113849, 00317194), 1♀ (00317197) (CNC); 14 Jul 1952, L.A. Konotopetz, 1♀ (00113865) (CNC); 29 Jul 1952, L.A. Konotopetz, 1♂ (00113845) (CNC). Grande Prairie, 55.16666° N 118.8000° W, 26 Jul 1961, A.R. Brooks, 1♀ (00113859) (CNC). Hines Creek, 56.23333° N 118.6000° W, 16 Jun 1961, A.R. Brooks, 1♂ (00113855) (CNC). Hobbema, 52.83274° N 113.42972° W, 794 m, 11 Jul 1939, R.W. Salt, *Trifolium* sp. (Fabaceae), 1♀ (00113861) (CNC). Kananaskis Hwy, 50.91555° N 115.14166° W, 25 Jul 1973, L.A. Kelton, 1♂ (00113318) (CNC). Lethbridge, 49.7000° N 112.83333° W, 28 Jul 1928, G.F. Mason, 1♀ (00113864) (CNC); 07 Jul 1956, O. Peck, 1♀ (00113868) (CNC). Medicine Hat, 50.03333° N 110.68333° W, 14 Jun 1930, J.H. Pepper, 1♀ (00113866) (CNC); 23 Jul 1930, J.H. Pepper, 1♀ (00113860) (CNC). Milk River, 49.13333° N 112.08333° W, 18 Jul 1929, J.H. Pepper, 1♀ (00113867) (CNC). Nevis, 52.33093° N 113.0369° W, 798 m, 27 Jul 1973, L.A. Kelton, 1♂ (00318771) (CNC). Nordegg, 52.46666° N 116.08333° W, 29 Jul 1921, J. McDunnough, paratype, 1♀ (00113856) (CNC); 31 Jul 1921, J. McDunnough, paratype, 1♂ (00113842) (CNC); 06 Aug 1923, J. McDunnough, paratype, 1♂ (00113843) (CNC). North Star, 56.85411° N 117.63084° W, 487 m, 17 Jul 1940, C.L. Neilson, 1♂ (00113854) (CNC). Onefour, 49.06666° N 110.45° W, 14 Jun 1952, L.A. Konotopetz, *Aster* sp., 1♂ (00113848), 1♀ (00317198) (CNC). Red Deer, 52.27024° N 113.80469° W, 856 m, 25 Jun 1957, Brooks and McNay, 1♂ (00113850) (CNC). Stettler, 52.33333° N 112.68333° W, 03 Aug 1957, A. and J. Brooks, 1♂ (00113852) (CNC). Waterton Lakes National Park, Belly River Campground, 49.0249° N 113.68673° W, 1383 m, 07 Jul 2005, D. Langor, 1♂ (00113750) (CNC). Waterton Lakes National Park, Dardanelles, 49.06672° N 113.85055° W, 1280 m, 31 Jul 1967, David J. and M.A. Larson, 1♂ (00113751) (WLNP). Waterton Park, 49.05° N 113.91666° W, 04 Jul 1970–06 Jul 1970, L.A. Kelton, 1♂ (00113844) (CNC). **British Columbia:** Anarchist Mountain, Osoyoos, 49.03333° N 119.46666° W, 13 Jul 1970, L.A. Kelton, 1♀ (00317196) (CNC). Chilcotin, 52.11549° N 122.56238° W, 1020 m, 12 Jul 1930, unknown, 1♂ (UBC); 15 Jul 1978, L.A. Kelton, 1♂ (CNC). Eastgate, 49.1375° N 120.6125° W, 15 Jul 1986, unknown, 1♂ (UBC). Fernie, 49.5000° N 115.06666° W, 16 Aug 1935, J.F.

Brimley, *Fagus* sp. (Fagaceae), 1♂ (00113840) (CNC); 23 Jul 1959, L.A. Kelton, 1♂ (00113841) (CNC). Houston, 54.4000° N 126.66669° W, 19 Aug 1967, unknown, 1♂ (UBC). Lizard Creek, Fernie, 49.46675° N 115.06667° W, 984 m, 07 Jul 1949, Hugh B. Leech, 1♂ (00121679) (CAS). Midday Val[-ley]., Merritt, 49.98333° N 120.93333° W, 736 m, 24 Jul 1923, R. Hopping, *Pinus ponderosa* Laws. (Pinaceae), 1♀ (00134295) (USNM). Nicola, 50.17° N 120.67° W, 21 Aug 1932, unknown, 1♂ (UBC). Osoyoos, Anarchist Mountain, 49.03333° N 119.33333° W, 13 Jul 1970, L.A. Kelton, *Solidago* sp., 1♂ (00113581) (CNC). Prince George, 53.91666° N 122.76666° W, 579 m, Aug 1929, unknown, 1♂ (UBC). Quesnel, 52.98333° N 122.48333° W, 07 Jul 1949, unknown, 1♂ (UBC). Rolla, 55.89199° N 120.14457° W, 664 m, 11 Jul 1927, P.N. Vroom, 1♂ (00113839) (CNC). Tyhee Lake [Park], 54.7000° N 127.03329° W, 24 Jul 1983, unknown, 1♂ (CNC). Williams Lake, 52.11666° N 122.15° W, 09 Jul 1930, unknown, 1♂ (UBC). **Manitoba:** 4.7 km E of Tolstoi off Rt 209, 49.0753° N 96.74362° W, 292 m, 07 Jul 1990, M.D. Schwartz and R.G. Foottit, 1♂ (00329797), 1♀ (00113913) (CNC). 6.4 km W of Russell on Rt 16, 50.77153° N 101.38138° W, 533 m, 18 Jul 1990, M.D. Schwartz and R.G. Foottit, *Symphoricarpos occidentalis* Hook. (Caprifoliaceae), 1♂ (00113909) (CNC). 30 mi N of Roblin, 51.66703° N 101.35° W, 13 Jul 1954, Brooks, Wallis, 1♀ (00113912) (CNC); 14 Jul 1954, A.R. Brooks, Wallis, 1♂ (00113897) (CNC). Boissevain, 49.23333° N 100.05° W, 17 Jul 1953, A.R. Brooks, L.A. Kelton, 1♂ (00113899) (CNC); 24 Jul 1953, Brooks and Kelton, 1♂ (00113898) (CNC). Brandon, 49.83333° N 99.95° W, 25 Jun 1970, unknown, 1♂ (00113910) (CNC). Carberry, 49.86666° N 99.35° W, 23 Jun 1953, Brooks and Kelton, 1♂ (00113907) (CNC); 30 Jul 1953, Brooks and Kelton, 1♂ (00113906) (CNC); 09 Aug 1953, Brooks and Kelton, 1♀ (00113916) (CNC). East Braintree, 49.61666° N 95.61666° W, 30 Jun 1972, L.A. Kelton, *Solidago* sp., 1♂ (00113911) (CNC). Oak Lake, 49.66666° N 100.75° W, 09 Jul 1953, Brooks and Kelton, 1♀ (00113915) (CNC); 11 Jul 1953, Brooks and Kelton, 1♀ (00113914) (CNC). Pembina, 49.75569° N 97.15089° W, 230 m, unknown, 1♂ (00164927) (USNM). Russell, 50.78333° N 101.28333° W, 17 Jul 1954, Brooks and Wallis, 1♂ (00113896) (CNC). Souris, 49.61666° N 100.25° W, 23 Jul 1953, A.R. Brooks, 1♂ (00113908) (CNC). Turtle Mountain, 49° N 100.33333° W, 17 Jul 1953, A.R. Brooks, L.A. Kelton, 1♂ (00113900) (CNC). Turtle Mountain Forest Reserve, International Peace Gardens, 49° N 100.33333° W, 17 Jul 1958, R.B. Madge, 1♀ (00114013) (CNC). Virden, 49.85° N 100.93333° W, 08 Jul 1953, Brooks and Kelton, 1♂ (00113905) (CNC); 09 Jul 1953, Brooks and Kelton, 1♂ (00113903) (CNC); 10 Jul 1953, Brooks and Kelton, 1♂ (00113902) (CNC); 12 Jul 1953, Brooks and Kelton, 1♂ (00113904) (CNC); 14 Jul 1953, Brooks and Kelton, 1♂ (00113901) (CNC). **Ontario:** 5 mi S of Crozier, 48.5509° N 93.51579° W, 343 m, 15 Jun 1960, Kelton and Whitney, 1♀ (00114019) (CNC). 6 mi S of Devlin, 48.53235° N 93.67325° W, 339 m, 28 Jun 1960, Kelton, Whitney, 1♂ (00113973) (CNC). 10 mi N of Emo, 48.76123° N 93.83333° W, 28 Jun 1960, Kelton, Whitney, 1♂ (00113979) (CNC). Arkell, 43.53521° N 80.15624° W, 355 m, 17 Jun 1991, J. Taylor, 2♂ (00329831–00329832) (DEBU). Ausable River, 43.0783° N 81.75848° W, 203 m, 10 Jun 1976, J.F. Fortin, 1♀ (00329818) (DEBU). Bergland, 48.95172° N 94.38686° W, 325 m, 22 Jun 1960, Kelton and Whitney, 1♂ (00113978) (CNC). Bluevale, 43.85613° N 81.25036° W, 327 m, 10 Jun 1962, Kelton and Thorpe, 1♀ (00114024) (CNC). Brockville, 44.6029° N 75.66073° W, 87 m, 18 Jun 1963, J.R. Vockeroth, 1♀ (00114047) (CNC). Bryanston, 43.12° N 81.27° W, 20 Jun 1962, Kelton and Brumpton, 1♂ (00113998) (CNC). Carp, 45.35° N 76.03333° W, 22 Jun 1981, D.J.E. Brown, (Poaceae), 1♂ (00113924), 1♀ (00113716) (CNC). Chatham, 42.4000° N 82.18333° W, 15 Jun 1928, G.M. Stirrett, 1♀ (00114046) (CNC). Clinton, 43.6000° N 81.53333° W, 09 Jun 1961, L.A. Kelton, 2♀ (00114006, 00114022) (CNC). Coldstream, 43.01915° N 81.49976° W, 248 m, 01 Jun 1922, A.A. Wood, 1♂ (00114041) (CNC). Dashwood, 43.35° N 81.63° W, 12 Jul 1962, Kelton and Thorpe, *Salix* sp. (Salicaceae), 1♂ (00113995) (CNC). Dundas, 43.26666° N 79.93333° W, 19 Jun 1978, M. Lichtenberg, 2♂ (00329822–00329823) (DEBU); 20 Jun 1979, B. Mer-

chant, 1♀ (00329824) (DEBU). Eagle, 42.56737° N 81.55828° W, 200 m, 26 Jun 1985, G.G.E. Scudder, 1♀ (00114015) (CNC). Eden, 42.8000° N 80.75° W, 02 Jul 1962, H. Blanchard, 1♀ (00114012) (CNC). Elora, 43.68242° N 80.43364° W, 384 m, 27 Jun 1975, S. Allan, 1♂ (00382310) (DEBU). Erin, 43.75° N 80.11666° W, 25 Jun 1979, J. Ernst, 1♀ (00329828) (DEBU). Fisher Glen, 45.35388° N 75.70566° W, 84 m, 16 Jun 1931, G.S. Walley, 1♀ (00113684) (CNC). Fonthill, 43.03333° N 79.28333° W, 26 Jun 1915, H.G. Crawford, 1♀ (00114011) (CNC); 08 Jun 1962, Kelton and Thorpe, 1♂ (00113971), 1♀ (00114025) (CNC). Fort Frances, 48.61666° N 93.41666° W, 28 Jun 1960–29 Jun 1960, Kelton and Whitney, 1♀ (00114023) (CNC). Foxboro, 44.24623° N 77.4339° W, 111 m, 24 Jun 1970, D.G. Reid, 1♂ (00114038) (CNC); 26 Jun 1971, D.G. Reid, *Solidago* sp., 1♂ (00114039) (CNC). Freelton, 43.40422° N 80.04035° W, 280 m, 26 May 1962, L.A. Kelton, 1♂ (00113988) (CNC). Fuller, 44.4000° N 77.42° W, 14 Jun 1968, C.C. Loan, *Solidago* sp., 1♂ (00114031) (CNC); 26 Jun 1968, C.C. Loan, *Solidago* sp., 1♂ (00114032) (CNC); 22 Jun 1970, D.G. Reid, 1♂ (00114036) (CNC); 09 Jun 1971, D.G. Reid, 1♂ (00114037) (CNC); 14 Jun 1971, D.G. Reid, 1♂ (00114033) (CNC); 16 Jun 1971, D.G. Reid, 1♂ (00114034) (CNC); 02 Jul 1971, D.G. Reid, 1♂ (00114035) (CNC). Galt, 43.36203° N 80.33208° W, 304 m, 19 Jun 1961, Kelton and Brumpton, 1♂ (00113985) (CNC). Grimsby, 43.19271° N 79.56226° W, 93 m, 19 Jun 1979, K.L. Bailey, 1♂ (00382311) (DEBU). Guelph, 43.55° N 80.25° W, 323 m, 21 Jun 1976, E.A. Innes, 1♀ (00329810) (DEBU); 30 May 1977, W.A. Attwater, 1♂ (00329800), 3♀ (00329801–00329803) (DEBU); 07 Jun 1977, K.M. Ralph, 1♀ (00329809) (DEBU); 11 Jun 1977, P.R. Heels, 1♀ (00329808) (DEBU); 01 Jun 1979, G.W. Annette, 1♂ (00329807) (DEBU); 13 Jun 1979, B. Merchant, 1♂ (00329806) (DEBU); 13 Jun 1979, D. Lewis, 1♂ (00329804), 1♀ (00329805) (DEBU). Hamilton-Wentworth Region, Flamborough, 5th Concession, Lawson Farm, 43.31611° N 80.04055° W, 251 m, 01 Jul 2003, M. Buck, 1♂ (00329798 [cat debu00224719]) (DEBU). Hanlon [Creek] Conservation Area, Guelph, 43.50262° N 80.22451° W, 320 m, 14 Jun 1984–21 Jun 1984, K. Gilbert, 1♀ (00329811) (DEBU). Harrow, 42.03333° N 82.91666° W, 09 Jun 1993, B. Larson, 1♀ (00329819) (DEBU). Hespeler, 43.43333° N 80.31666° W, 18 Jun 1961, Kelton and Brumpton, 1♂ (00113994) (CNC). Hillsdale, 44.5846° N 79.76556° W, 253 m, 29 Jun 1962, G. Thorpe, 1♀ (00114026) (CNC). Hilton Beach, 46.25° N 83.88333° W, 08 Jul 1961, G. Brumpton, 1♂ (00113986) (CNC). Ingleside, 45.00001° N 75.00005° W, 86 m, 27 Jun 1977–29 Jun 1977, L.A. Kelton, 1♂ (00114040) (CNC). Ipperwash, 43.20805° N 81.97639° W, 185 m, 11 Jul 1962, Kelton and Thorpe, *Solidago* sp., 1♀ (00114021) (CNC). Kapuskasing, 49.41666° N 82.43333° W, 18 Jul 1961, G. Brumpton, 1♂ (00113977) (CNC). Kincardine, 44.16666° N 81.63333° W, 13 Jun 1961–14 Jun 1961, Kelton and Brumpton, 1♂ (00114000) (CNC); 28 May 1962, L.A. Kelton, Thorpe, 1♂ (00113970) (CNC). Kingsville, 42.03333° N 82.75° W, 23 May 1962, L.A. Kelton, Thorpe, 1♂ (00113974) (CNC); 18 Jun 1962, Kelton and Thorpe, 1♂ (00113990) (CNC); 19 Jun 1962, Kelton and Thorpe, 1♂ (00113980) (CNC). Kirkland Lake, 48.15° N 80.05° W, 17 Jul 1961, G. Brumpton, 1♂ (00113984) (CNC). Leamington, 42.05° N 82.58333° W, 07 Jun 1929, L.J. Milne, 1♂ (00113922) (CNC); 09 Jun 1929, L.J. Milne, 1♂ (00113920) (CNC); 10 Jun 1929, L.J. Milne, 1♂ (00113921) (CNC); 10 Jun 1929, G.S. Walley, 1♂ (00113918) (CNC); 11 Jun 1929, G.S. Walley, 1♂ (00113919) (CNC); 05 Jun 1961–06 Jun 1961, L.A. Kelton, 1♂ (00113993) (CNC). London, 42.98333° N 81.25° W, 24 Jun 1985, G.G.E. Scudder, 1♂ (00114004) (CNC). Marmora, 44.48333° N 77.68333° W, 07 Jul 1952, C. Boyle, 1♀ (00114048) (CNC); 10 Jul 1952, C. Boyle, 1♂ (00114045) (CNC); 14 Jul 1952, J.R. McGillis, 1♀ (00114010) (CNC); 19 Jul 1952, J.R. McGillis, 1♂ (00114044) (CNC). Meaford, 44.6000° N 80.58333° W, 13 Jun 1962, Kelton and Thorpe, 1♂ (00113991) (CNC). Mount Pleasant, 44.23333° N 77.03333° W, 10 Jul 1958, L.A. Kelton, 1♂ (00113972) (CNC). New Glasgow, 42.51666° N 81.63305° W, 27 Jun 1961, Kelton and Brumpton, 1♂ (00111412), 2♂ (00113989, 00113999) (CNC), 1♂ (00121793) (UCB). North Bay, 46.3000° N 79.45° W, 14 Jul 1961–15 Jul 1961, G. Brumpton, 1♂

(00114017) (CNC). Norway Point, Lake of Bays, 45.25° N 79.05° W, 28 Jun 1922, J. McDunnough, 1♂ (00113923) (CNC), 1♂ (00382300), 1♀ (00382313) (DEBU); 12 Jul 1922, J. McDunnough, 1♂ (00113925) (CNC). Norwich, 42.98333° N 80.6000° W, 19 Jul 1962, Kelton and Thorpe, *Solidago* sp., 1♂ (00114020) (CNC). Ohsweken [Six Nations of the Grand River First Nation], 43.06455° N 80.11491° W, 207 m, 08 Jun 1979, D. Morris, 1♂ (00329829), 1♀ (00329830) (DEBU). Ojibway Prairie [Provincial Nature] Reserve, 42.26722° N 83.07423° W, 179 m, 17 Jun 1980, K.H. Harvey, 1♂ (00329833) (DEBU); 19 Jun 1980, J.D. Cashaback, 1♀ (00329834) (DEBU). Ottawa, 45.39079° N 75.70324° W, 71 m, 29 Jun 1912, E.P. Van Duzee, 1♂ (00242559) (CAS); 28 Jun 1951, E.H.N. Smith, (Poaceae), 1♀ (00113712) (CNC). Ottawa, [E of] Ryder St., Green Belt, 45.38305° N 75.63406° W, 83 m, 28 Jun 1999, M.D. Schwartz, *Solidago canadensis*, 1♂ (00113917) (CNC). Oxenden, 44.76493° N 81.09215° W, 212 m, 30 Jun 1962, G. Thorpe, 1♀ (00114018) (CNC). Parry Sound, 45.33333° N 80.03333° W, 10 Jul 1915, H.S. Parish, paratypes, 3♂ (00134198–00134200), 1♀ (00134201) (USNM); 10 Jul 1915, unknown, paratypes, 2♀ (00134202–00134203) (USNM); 15 Jul 1915, unknown, 3♂ (00134192–00134194), 3♀ (00134195–00134197) (USNM). Pitopiko River Picnic Area on Rt 11 between Longlac and Hearst, 49.77051° N 83.54021° W, 217 m, 21 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113926) (CNC). Point Pelee, 41.96666° N 82.51666° W, 28 Jun 1961–29 Jun 1961, L.A. Kelton, G. Brumpton, 1♂ (00113987) (CNC). Port Burwell, 42.65° N 80.81666° W, 03 Jul 1962, G. Thorpe, 1♂ (00113997) (CNC). Prince Edward County, no specific locality, 44° N 77.25° W, 20 Jul 1927, J.F. Brimley, 1♂ (00114043) (CNC); 24 Jun 1953, J.F. Brimley, 1♀ (00114049) (CNC); 15 Jun 1955, J.F. Brimley, *Solidago* sp., 1♀ (00114051) (CNC); 04 Jul 1956, J.F. Brimley, 1♀ (00114050) (CNC). Puslinch, 43.43258° N 80.08592° W, 294 m, 10 Jun 1962, L.A. Kelton, Thorpe, 1♂ (00113992) (CNC); 30 May 1982, G.M. Grant, 2♀ (00329826–00329827) (DEBU); 28 Jun 1982, G.M. Grant, 1♀ (00329825) (DEBU). Queenston, 43.16666° N 79.05° W, 24 Jun 1961, L.A. Kelton, G. Brumpton, 1♂ (00113983) (CNC). Rainy River, 48.71666° N 94.56666° W, 22 Jun 1960, Kelton and Whitney, *Solidago* sp., 1♂ (00113976) (CNC). Sault Ste. Marie, 46.52° N 84.33° W, 05 Jul 1961–06 Jul 1961, G. Brumpton, 1♂ (00113975) (CNC). Simcoe, 42.83333° N 80.3000° W, 23 Jun 1915, H.G. Crawford, 1♂ (00114001) (CNC); 02 Jul 1915, H.G. Crawford, 1♂ (00114003) (CNC); 12 Jul 1915, H.G. Crawford, 1♂ (00113969) (CNC); 13 Jun 1931, G.S. Walley, 1♂ (00113996) (CNC). Smithville, 43.1000° N 79.53333° W, 19 Jun 1979, D. Lewis, 1♂ (00329815), 2♀ (00329816–00329817) (DEBU). South Gloucester, Blossom Park, Greenbelt, 45.34379° N 75.64635° W, 105 m, 09 Jun 1991, M.D. Schwartz, *Solidago* sp., 2♂ (00318762–00318763) (CNC). St. Lawrence Islands National Park, Grenadier Island Center, 44.38913° N 75.89793° W, 73 m, 10 Jun 1975, E. Wilson, 1♂ (00114029) (CNC); 18 Jun 1975, E. Wilson, 1♂ (00114028) (CNC); 16 Jul 1975, E. Wilson, 1♂ (00114030) (CNC). Strathroy, 42.95° N 81.61666° W, 25 Jul 1917, H.G. Crawford, 1♂ (00114002) (CNC). Sundridge, 45.76666° N 79.4000° W, 13 Jul 1961, G. Brumpton, 1♂ (00113981) (CNC). Thamesford, 43.07° N 81° W, 29 Jun 1961, Kelton and Brumpton, 1♀ (00114016) (CNC). Thedford, 43.16216° N 81.86003° W, 207 m, 03 Jun 1957, D.H. Pengelly, 3♂ (00329812–00329814) (DEBU). Tillsonburg, 42.86666° N 80.73333° W, 11 Jul 1958, L.A. Kelton, 2♀ (00113717, 00114009) (CNC); 20 Jun 1962, Kelton and Thorpe, 1♀ (00114008) (CNC). Vienna, 42.68° N 80.8000° W, 15 Jul 1961, L.A. Kelton, 1♀ (00114007) (CNC). Wallbridge, 44.21415° N 77.49532° W, 116 m, 09 Jun 1957, unknown, 1♂ (00114042) (CNC). **Quebec:** Gatineau National Park, 46.5000° N 76° W, 09 Jun 1981, L.A. Kelton, (Poaceae), 1♂ (00113932) (CNC). Gatineau National Park, Harrington, 46.5571° N 75.92692° W, 172 m, 22 Jun 1954, E.E. Sterns, 1♀ (00113936) (CNC); 22 Jun 1954, H.J. Huckel, 1♀ (00113935) (CNC). Impreuil [coordinates unknown], 19 Jul 1902, unknown, 1♀ (00116333) (CUIC). Kazubazua, 45.95° N 76.02° W, 18 Aug 1927, G.S. Walley, 1♂ (00113927) (CNC). Knowlton, 45.21666° N 72.51666° W, 30 Jun 1936, G.S. Walley, 1♀ (00113933) (CNC). Lac Mondor, Ste. Flore, 46.61666° N 72.76666° W, 21 Jun

1951, E.G. Munroe, 1♂ (00113929) (CNC); 24 Jun 1951, E.G. Munroe, 1♂ (00113930) (CNC). Laniel, 47.03333° N 79.26666° W, 03 Jul 1963–04 Jul 1963, L.A. Kelton, 1♀ (00113934) (CNC). Magog, 45.26666° N 72.15° W, 02 Aug 1961, G. Brumpton, 1♀ (00114014) (CNC). Nominingue, 46.40117° N 75.03798° W, 259 m, 12 Jul 1922–22 Jul 1922, J. Ouellet, 1♀ (00291136) (TAMU); 12 Jul 1932, J. Ouellet, 1♀ (00093771) (TAMU). Quyon, 45.51666° N 76.23333° W, 22 Jul 1958, L.A. Kelton, *Salix* sp. (Salicaceae), 1♂ (00113931) (CNC). Rigaud, 45.47891° N 74.30736° W, 30 m, 26 Jul, unknown, 1♂ (00116328) (CUIC). Sainte-Agathe, 46.03333° N 74.28333° W, 09 Aug 1961, G. Brumpton, 1♂ (00113928) (CNC). Sherbrooke, 45.34733° N 71.93698° W, 306 m, 05 Jul 1916, unknown, 1♂ (00116327) (CUIC). **Saskatchewan:** Assiniboia, 49.61666° N 105.98333° W, 20 Jun 1955, A.R. Brooks, 1♂ (00113882) (CNC); 25 Jun 1955, A.R. Brooks, 1♂ (00113881) (CNC). Big River, 53.83333° N 107.03333° W, 05 Jun 1959, A. and J. Brooks, 1♂ (00113873) (CNC); 03 Jul 1959, A. and J. Brooks, 1♂ (00113874) (CNC). Broadview, 50.38333° N 102.56666° W, 10 Jul 1951, L.A. Konotopetz, 1♂ (00113872) (CNC). Buffalo Pound, 50.5833° N 105.3889° W, 29 Jun 1955, A.R. Brooks, 1♀ (00113885) (CNC). Christopher Lake, 53.56666° N 105.83333° W, 11 Jul 1959, A.R. and J.E. Brooks, 1♂ (00113883) (CNC); 15 Jul 1959, A.R. and J.E. Brooks, 1♂ (00113884) (CNC). Elbow, 51.11666° N 106.6000° W, 20 Jun 1960, A.R. Brooks, 1♂ (00113878) (CNC). Good Spirit Lake, 51.55° N 102.66666° W, 10 Jul 1954, A.R. Brooks, Wallis, 1♂ (00113876) (CNC). Indian Head, 50.53333° N 103.66666° W, 07 Jul 1957, A.R. Brooks, 1♀ (00113894) (CNC). Kandahar, 51.77° N 104.35° W, 29 Jul 1954, Brooks and Wallis, 1♂ (00113880) (CNC). McGee, 51.5000° N 108.25° W, 03 Jul 1952, L.A. Konotopetz, 1♀ (00113888) (CNC). Mossbank, 49.93333° N 105.96666° W, 23 Jun 1955, A.R. Brooks, 1♂ (00242557) (CAS). Saint Victor, 49.43305° N 105.86666° W, 25 Jun 1955, A.R. Brooks, 1♂ (00113877) (CNC). Saskatoon, 52.13333° N 106.66666° W, 26 Jun 1951, L.A. Konotopetz, 1♂ (00113870) (CNC); 06 Jul 1957, A.R. Brooks, 1♂ (00113871) (CNC). Snowden, 53.4834° N 104.68339° W, 447 m, 17 Jul 1950, L.A. Konotopetz, *Solidago* sp., 1♀ (00113895) (CNC). Torch River, 53.85° N 103.1000° W, 11 Jul 1950, L.A. Konotopetz, *Solidago* sp., 1♀ (00113886) (CNC); 20 Jul 1950, L.A. Konotopetz, *Solidago* sp., 1♀ (00113887) (CNC). Willows, 49.6000° N 105.85° W, 19 Jun 1955, A.R. Brooks, 1♂ (00113875) (CNC). **USA: Alabama:** ***Clay Co.:*** Cheaha State Park, 33.45391° N 85.82692° W, 449 m, 28 May 1984, C.B. Barr, Light Trap, 1♂ (00119542) (UCB). ***Cullman Co.:*** 1 mi S of Hwy 278 on I-65, 34.15624° N 86.87241° W, 230 m, 18 May 1983, D.A. Rider, 3♂ (00242945–00242947), 1♀ (00242948) (DAR). **Colorado:** ***Arapahoe Co.:*** Cherry Creek Reservoir, 39.6134° N 104.822° W, 1707 m, 21 Jun 1980, D.A. Polhemus, 1♂ (00116888) (JTP). Englewood, 39.64778° N 104.98722° W, 11 Jun 1978, D.A. and J.T. Polhemus, 1♂ (00116887) (JTP). ***Boulder Co.:*** 4.5 mi N of Boulder, 40.08103° N 105.28145° W, 1676 m, 10 Jun 1961, J.R. Stainer, 1♂ (00113960) (CNC); 13 Jun 1961, J.R. Stainer, 1♂ (00113961), 1♀ (00113959) (CNC). ***Costilla Co.:*** Fort Garland, Ute Creek Ranch, 37.43274° N 105.43846° W, 11 Aug 1925, H.H. Knight, paratypes, 4♂ (00134183–00134185, 00134270), 4♀ (00134186–00134189) (USNM). ***Custer Co.:*** Ophir Creek Campground, 38.1000° N 105.15° W, 29 Aug 1991, G.F. and J.F. Hevel, 1♂ (00134127) (USNM). ***Denver Co.:*** Denver, 39.73917° N 104.98417° W, 20 Jun 1969, J.T. Polhemus, 1♂ (00093784) (TAMU). Denver, 39.73917° N 104.98417° W, Jul, N. Banks, 1♀ (00108879) (AMNH). ***Dolores Co.:*** Rico, 37.69278° N 108.02972° W, Aug, E.D. Ball, 1♂ (00134483) (USNM). ***Douglas Co.:*** 3 mi E of Larkspur, 39.22861° N 104.83068° W, 03 Jul 1979, D.A. Polhemus, 1♂ (00116891) (JTP). Roxborough Park Road near Chatfield State Park, 39.47389° N 105.08472° W, 1707 m, 01 Jun 1981, J.T. Polhemus, 1♂ (00116886) (JTP). Waterton, 39.49361° N 105.08806° W, 15 Jun 1981, D.A. Polhemus, 1♂ (00116890) (JTP); 22 Jun 1981, D.A. Polhemus, 1♂ (00116889) (JTP). nr Waterton, Roxborough Road, 39.49361° N 105.08806° W, 1707 m, 04 Jun 1981, D.A. Polhemus, 1♂ (00116885) (JTP); 22 Jun 1981, D.A. Polhemus, 1♂ (00116884) (JTP). ***Jackson Co.:*** Muddy Pass, Routt National Forest, 40.37667° N 106.57917° W, 2652 m, 21 Aug

1968, L.A. Kelton, *Artemisia* sp., 1♀ (00113958) (CNC). ***Jefferson Co.:*** Indian Hills, 39.61667° N 105.23667° W, 2134 m, 15 Jul 1983, R.T. Schuh and D.A. Polhemus, 1♀ (00170126) (AMNH). ***Larimer Co.:*** Fort Collins, 40.58528° N 105.08389° W, 12 Jun, unknown, paratype, 1♂ (00134170) (USNM); 28 Jun, unknown, paratype, 1♂ (00134171) (USNM). Fort Collins, Dixon Canyon, 40.5544° N 105.148° W, 1657 m, 19 Aug 1898, E.D. Ball, paratypes, 4♂ (00134174–00134177), 5♀ (00134178–00134182) (USNM). Little Beaver [Creek], 40.62358° N 105.52388° W, 2402 m, 18 Jul 1898, unknown, 1♀ (00134296) (USNM). ***Montrose Co.:*** 27 mi E of Nucla, 38.26944° N 108.05005° W, 2804 m, 14 Aug 1987, T.J. Henry, *Ligusticum porteri* Coult and Rose (Apiaceae), 1♂ (00069991) (USNM). ***Routt Co.:*** Steamboat Springs, 40.485° N 106.83111° W, 2134 m, 22 Aug 1968, L.A. Kelton, *Solidago* sp., 2♂ (00113949–00113950) (CNC). Steamboat Springs, 40.485° N 106.83111° W, 2103 m, 15 Jul 1964, H.H. Knight, 1♂ (00093786) (TAMU), *Solidago* sp., 1♂ (00134276), 1♀ (00134277) (USNM). ***Unknown co.:*** Colo 1690, unknown, 1♂ (00134293) (USNM). **Connecticut:** ***Fairfield Co.:*** Danbury, 41.38423° N 73.45343° W, 134 m, 18 Jun 1909, C.W. Johnson, 1♂ (00170146) (AMNH). Greenwich, 41.01786° N 73.62585° W, 09 Jul 1907, Cushman, 1♂ (00170147) (AMNH). Ridgefield, 41.27983° N 73.49557° W, 219 m, 24 Jun 1916, I.N. Gabrielson, 1♂ (00134303) (USNM). ***Litchfield Co.:*** Lakeville, 41.96237° N 73.4454° W, 228 m, 22 Jun 1935, R.F. Hussey, 1♀ (00127505) (UMMC). ***Middlesex Co.:*** Killingworth, 41.35815° N 72.5637° W, 117 m, 27 Jun 1920, W.E. Britton, paratype, 1♀ (00134227) (USNM). ***New Haven Co.:*** 2 mi E of Seymour, 41.37768° N 73.05851° W, 109 m, 30 May 1965, J. and W. Ivie, 1♀ (00170182) (AMNH). Cheshire, 41.49889° N 72.90111° W, 78 m, 20 Jun 1959, J.A. Slater, 1♀ (00170160) (AMNH). Orange, 41.27975° N 73.02959° W, 55 m, 22 Jun 1920, P. Garman, paratype, 1♀ (00134235) (USNM); 30 May 1977, P.W. Kovarik, 1♂ (00093787) (TAMU). West Haven, 41.2636° N 72.9582° W, 15 m, 27 Jun 1905, H.L. Viereck, 1♀ (00242508) (CAS). ***Tolland Co.:*** Eagleville, 41.78667° N 72.27694° W, 22 Jun 1977, D. Leston, 1♂ (00170148) (AMNH). Mansfield Center, 41.76528° N 72.19861° W, 84 m, 22 Jun 1954, J.A. Slater, 1♀ (00170159) (AMNH); 21 Jun 1959, J.A. Slater, 1♂ (00170156) (AMNH). Storrs, 41.80833° N 72.25° W, 02 Jun 1954, J.A. Slater, 1♀ (00170161) (AMNH); 02 Jul 1954, J.A. Slater, 1♀ (00170165) (AMNH); 29 Jul 1954, J.A. Slater, 1♀ (00170166) (AMNH); 06 Jul 1964, unknown, 1♂ (00170153) (AMNH); 14 Jul 1977, D. Leston, 1♂ (00170149) (AMNH). Union, vicinity of Yale Forest, 41.99234° N 72.12717° W, 218 m, 01 Jun 1977, R. Veranes, 1♂ (00170150) (AMNH). ***Windham Co.:*** Bibbins Pond, 41.66259° N 72.17089° W, 90 m, 02 Jun 1974, K. Schmidt, 1♂ (00169992), 1♀ (00170163) (AMNH). ***Unknown co.:*** Conn, unknown, 1♀ (00070114) (USNM). **District of Columbia:** Brightwood, 38.95685° N 77.03889° W, 80 m, 17 May 1905, O. Heidemann, 1♂ (00116275), 1♀ (00116279) (CUIC); 12 Jun 1906, O. Heidemann, 1♂ (00242560) (CAS), 1♂ (00116273) (CUIC). Rock Creek, Washington, 38.90817° N 77.05105° W, 27 May 1891, unknown, 1♀ (00116277) (CUIC). Rock Creek Park, 38.678° N 77.0468° W, 46 m, 28 May 1905, unknown, 1♀ (00069966) (USNM). Washington DC, 38.89178° N 77.00831° W, 20 May 1888, unknown, 1♀ (00116284) (CUIC); 26 Jun 1897, unknown, 1♀ (00116281) (CUIC); 22 May, unknown, 1♂ (00116271) (CUIC); 22 Jun, unknown, 1♀ (00116285) (CUIC), 1♀ (00069967) (USNM); 04 Jun 1902, O. Heidemann, 1♀ (00116283) (CUIC); 21 May 1903, unknown, 1♀ (00116280) (CUIC); 06 Jun 1903, O. Heidemann, 1♀ (00069968) (USNM); 15 Jun 1903, O. Heidemann, 1♀ (00242561) (CAS); 05 Jun 1904, O. Heidemann, 1♂ (00116269) (CUIC); 06 Aug 1904, unknown, 1♀ (00116282) (CUIC); 18 May 1905, D.H. Clemons, 1♂ (00069927) (USNM); 25 May 1905, D.H. Clemons, 1♀ (00069964) (USNM); 08 Jun 1905, O. Heidemann, 1♂ (00116270) (CUIC); 24 Jun 1926, H.H. Knight, paratype, 1♀ (00113966) (CNC). **Georgia:** ***Baldwin Co.:*** Baldwin County, no specific locality, 33.08° N 83.232° W, 102 m, May 1979, C.L. Smith, 1♂ (USNM). ***Clarke Co.:*** Clarke County, no specific locality, 33.96° N 83.378° W, 228 m, May 1979, C.L. Smith, 1♂ (USNM). ***Jackson Co.:*** Jackson County, no specific locality, 34.116° N 83.572° W, 228 m, Apr 1979, C.L. Smith,

1♂ (USNM). ***Madison Co.:*** Madison County, no specific locality, 34.124° N 83.221° W, 220 m, Jun 1979, C.L. Smith, 1♂ (USNM). ***Rabun Co.:*** Pine Mountain, 34.94037° N 83.1871° W, 427 m, 04 May 1957, W.R.M. Mason, 1♂ (00113965) (CNC). ***Union Co.:*** Union County, no specific locality, 34.876° N 83.958° W, 574 m, May 1979, C.L. Smith, *Solidago* sp., 1♂ (USNM). **Idaho:** ***Clark Co.:*** 13 mi E of Kilgore, 44.3995° N 111.81601° W, 1949 m, 15 Jul 1956, W.F. Barr, 1♂ (00122391) (UID). ***Idaho Co.:*** Lowell, Clearwater National Forest, 46.0225° N 115.89° W, 30 Jul 1972, L.A. Kelton, 1♂ (00113955) (CNC). ***Latah Co.:*** Moscow, 46.7325° N 116.99917° W, 10 Jul 1932, T.A. Brindley, 1♂ (00134285) (USNM); 14 Jun 1936, T.A. Brindley, 1♂ (00134492) (USNM); 11 Jul 1936, T.A. Brindley, 1♂ (00134286) (USNM); 26 Jul 1936, L.A. Aitken, 1♂ (00134284) (USNM). ***Lemhi Co.:*** 9.5 mi SE of Leadore, 44.55316° N 113.31638° W, 1953 m, 13 Jul 1956, W.F. Barr, 1♂ (00122392) (UID). ***Nez Perce Co.:*** Lewiston, 46.41667° N 117.01667° W, 168 m, 13 Jul 1936, B.F. Coon, 1♀ (00134292) (USNM). ***Power Co.:*** American Falls, 42.78611° N 112.85361° W, 05 Aug 1972, L.A. Kelton, *Artemisia* sp., 1♂ (00113953) (CNC). ***Teton Co.:*** Pine Creek Pass, 43.57167° N 111.21444° W, 06 Aug 1972, L.A. Kelton, *Artemisia* sp., 1♀ (00113956) (CNC). ***Valley Co.:*** McCall, 44.91111° N 116.09861° W, 1528 m, 25 Jul 1952, S.E. Knapp, 1♂ (00122395) (UID). **Illinois:** ***Clark Co.:*** Dolson, Rocky Branch (Clarkeville), 39.46778° N 87.76528° W, 25 Jun 1932, Frison and Mohr, paratype, 1♀ (00243468) (INHS). ***Coles Co.:*** Charleston, 39.4684° N 88.1796° W, 205 m, 08 Jun 1931, Frison, paratype, 1♂ (00243494) (INHS). ***Cook Co.:*** Park Ridge, 42.01344° N 87.86184° W, 190 m, 03 Jun 1942, J.A. Slater, 1♂ (00170157) (AMNH). ***Edwards Co.:*** Browns, 38.3813° N 87.987° W, 125 m, 25 Jun 1932, Ross, Dozier, and Park, paratype, 1♂ (00243508) (INHS). ***Gallatin Co.:*** Shawneetown, 37.7131° N 88.1867° W, 122 m, 27 May 1928, T.H. Frison, paratype, 1♀ (00243495) (INHS). ***Grundy Co.:*** Morris, 41.35485° N 88.4234° W, 149 m, 28 Jun 1968, L.A. Kelton, *Solidago* sp., 1♂ (00113941) (CNC). ***Hancock Co.:*** Hamilton, 40.39639° N 91.33889° W, 27 Jun 1968, L.A. Kelton, *Ambrosia* sp., 1♂ (00113940) (CNC). ***Hardin Co.:*** Elizabethtown, 37.44583° N 88.305° W, 27 May 1932–31 May 1932, H.L. Dozier, paratype, 1♂ (00243467) (INHS). ***Iroquois Co.:*** Sheldon, 40.7692° N 87.56392° W, 208 m, 04 Jun 1932, Frison and Mohr, paratypes, 2♀ (00243496) (INHS). ***Jackson Co.:*** Fountain Bluff, 37.68139° N 89.50722° W, 15 May 1932, Frison, Ross, Mohr, paratype, 1♂ (00243497) (INHS). Giant City Park, Makanda, 37.61755° N 89.20897° W, 136 m, 21 May 1932, H.L. Dozier, paratype, 1♂ (00243486) (INHS). Giant City Park, Makanda, 37.6124° N 89.1892° W, 198 m, May 1932, H.L. Dozier, paratype, 1♀ (00243469) (INHS). ***Jo Daviess Co.:*** Elizabeth, 42.3178° N 90.2215° W, 244 m, 06 Jul 1917, unknown, paratype, 1♂ (00243466) (INHS). Galena, 42.41667° N 90.42889° W, 30 Jun 1932, Dozier and Mohr, paratype, 1♂ (00243498) (INHS); 01 Jun 1933, Ross and Townsend, paratype, 1♂ (00243459) (INHS). ***Johnson Co.:*** Cypress, 37.36505° N 89.01813° W, 119 m, 17 May 1932, H.L. Dozier, paratype, 1♂ (00243463) (INHS). ***Kankakee Co.:*** sand area east of Saint Anne, 41.02503° N 87.71392° W, 203 m, 04 Jun 1932, Frison and Mord, paratype, 1♂ (00243499) (INHS). ***Knox Co.:*** Galesburg, 40.95611° N 90.34979° W, 234 m, 07 Jul 1892, Stromberg, paratype, 1♂ (00243500) (INHS). ***Lake Co.:*** Antioch, 42.47722° N 88.09556° W, 05 Jul 1932–07 Jul 1932, T.H. Frison, paratype, 1♂ (00243501) (INHS); 05 Jul 1932–07 Jul 1932, Frison et al., paratype, 1♀ (00243574) (INHS); 10 Jul 1933, Mohr and Townsend, paratypes, 2♂ (00243460, 00243573) (INHS). Grays Lake, 42.34911° N 88.04021° W, 237 m, 10 Jun 1936, Ross and Burke, paratype, 1♂ (00243507) (INHS). Volo Bog, 42.3514° N 88.1887° W, 238 m, 15 Jul 1928, T.H. Frison, paratype, 1♀ (00243470) (INHS); 11 Jun 1936, Ross and Burks, paratype, 1♀ (00243471) (INHS). ***Macon Co.:*** Decatur, 12 Jun 1935, Frison and DeLong, 1♂ (00243472) (INHS). ***Madison Co.:*** Glen Carbon, 38.74833° N 89.98306° W, 15 Jun 1946, J.A. Slater, 1♀ (00170171) (AMNH). Godfrey Estes Kennels, 38.96013° N 90.18959° W, 182 m, 09 May 1976, D.C. Iftner, 1♂ (00243098) (UMRM). ***Mason Co.:*** Havana, 40.3000° N 90.06083° W, 31 May 1933, C.A. Mohr,

paratype, 1♀ (00243502) (INHS). ***McHenry Co.:*** Algonquin, 42.1656° N 88.2942° W, 07 Jul 1909, Nason, paratype, 1♂ (00243462) (INHS). ***Mercer Co.:*** Keithsburg, 41.09944° N 90.9425° W, 08 Jun 1932, Ross and Mohr, 1♂ (00243474) (INHS). ***Ogle Co.:*** Grand Detour, Castle Rock, 41.89667° N 89.41167° W, 02 Jul 1932, Dozier and Mohr, paratype, 1♀ (00243475) (INHS). ***Piatt Co.:*** Monticello, 40.02778° N 88.57333° W, 201 m, 28 Jun 1968, L.A. Kelton, 1♂ (00113942) (CNC). ***Pope Co.:*** Herod, 37.58028° N 88.43611° W, 29 May 1936, Ross and Mohr, paratype, 1♂ (00243503) (INHS). ***Pulaski Co.:*** Pulaski, 37.214° N 89.2058° W, 10 May 1932, H.L. Dozier, paratype, 1♂ (00243465) (INHS); 25 May 1932, H.L. Dozier, paratype, 1♂ (00243464) (INHS). ***Union Co.:*** Dongola, 37.36116° N 89.16591° W, 120 m, 12 May 1916, C.A. Hart, paratype, 1♂ (00243504), 1♀ (00243575) (INHS); 11 May 1917, unknown, paratype, 1♂ (00243461) (INHS). ***Unknown co.:*** "N. Ill.", unknown, 1♀ (00164926) (USNM). ***Vermilion Co.:*** Muncie, Stoney Creek, 40.11559° N 87.84475° W, 197 m, 24 May 1914, C.A. Hart, paratype, 1♂ (00243505) (INHS). ***Washington Co.:*** Du Bois, 38.2239° N 89.2122° W, 152 m, 22 May 1917, unknown, 1♂ (00243473) (INHS). ***Will Co.:*** Joliet, 41.525° N 88.08167° W, 09 Jun 1933, Mohr and Townsend, paratype, 1♂ (00243506) (INHS). **Indiana:** ***Brown Co.:*** Yellowwood Forest, nr Belmont, 39.1611° N 86.3425° W, 25 May 1963, F.N. Young, 1♂ (00243719), 4♀ (00243714–00243717) (FSCA). ***Clark Co.:*** Clark County, 38.29567° N 85.73149° W, 136 m, 13 Jun 1932–14 Jun 1932, B.E. Montgomery, 1♀ (00127506) (UMMC). Henryville, Clark Co. State Forest, 38.5541° N 85.83° W, 61 m, 13 Jun 1933, B.E. Montgomery, 1♂ (00127496) (UMMC). ***Lawrence Co.:*** Lawrence County, no specific location, 38.8731° N 86.4721° W, 213 m, 17 Jun 1931, Montgomery, 1♂ (00134075) (USNM). **Iowa:** ***Boone Co.:*** Ledges State Park, 41.98333° N 93.88667° W, 09 Jul 1956, J.C. Schaffner, 1♀ (00291099) (TAMU). Pilot Mound, 42.16444° N 94.01639° W, 01 Jun 1957, A.H. Barnum, 1♀ (00291100) (TAMU). ***Cerro Gordo Co.:*** Clear Lake, 43.1557° N 93.3796° W, 366 m, 30 Jun 1927, Harris and Johnston, 1♂ (00113963) (CNC). ***Clayton Co.:*** McGregor, 43.03911° N 91.12042° W, 228 m, 01 Jul 1950, Hicks and Slater, 2♀ (00170170, 00170173) (AMNH). ***Dickinson Co.:*** Cayler Prairie, 43.39639° N 95.24444° W, 09 Jun 1963, J.C. Schaffner, 1♂ (00093785) (TAMU). Iowa Lakeside Laboratory, 43.37917° N 95.18611° W, 11 Jun 1963, J.C. Schaffner, 1♂ (00093783) (TAMU). ***Henry Co.:*** 5 mi S of Mount Pleasant, 40.89428° N 91.54695° W, 186 m, 20 Jun 1966, J.C. Schaffner, 1♂ (00093774) (TAMU). Oakland Mills State Park, 40.93611° N 91.61639° W, 31 May 1963, J.C. Schaffner, 1♀ (00291098) (TAMU). ***Iowa Co.:*** Amana, 41.80326° N 91.87538° W, 251 m, 07 Jul 1927, Harris and Johnston, 1♀ (00134350) (USNM). ***Johnson Co.:*** Iowa City, 41.66111° N 91.53° W, 203 m, 17 Jun 1915, L. Stoner, 1♀ (00242507) (CAS). Lake MacBride State Park, 41.80073° N 91.57151° W, 244 m, 08 Jul 1950, Laffoon, Slater, Hicks, 1♂ (00170155) (AMNH). ***Monona Co.:*** Lewis and Clark State Park, 42.03333° N 96.16666° W, 319 m, 06 Jun 1960, N.R. Austin, 1♀ (00133820) (USNM). Turin, nr loess bluff, 42.03333° N 95.95° W, 320 m, 06 Jun 1960, J.C. Schaffner, 1♀ (00093796) (TAMU); 06 Jun 1960, J.L. Laffoon, 1♀ (00133815) (USNM). ***Story Co.:*** Ames, 42.03472° N 93.61972° W, E.D.B., 1♂ (00116330) (CUIC); 03 Jun 1886, Osborn, 1♀ (00069963) (USNM); 18 Jun 1925, H.H. Knight, paratype, 1♂ (00093779), 1♀ (00093781) (TAMU); 04 Jun 1926, H.H. Knight, paratype, 1♂ (00113962) (CNC), paratype, 1♂ (00093777), 1♀ (00093780) (TAMU); 01 Jun 1927, H.G. Johnston, 1♀ (00093795) (TAMU); 31 May 1932, Floyd Andre, 1♂ (00134491) (USNM). Doolittle Prairie [1 mi N of 150th on 560th Ave], 42.15152° N 93.58027° W, 295 m, 01 Jun 1989, M.E. Rice, 1♀ (00093794) (TAMU), 1♂ (00122393), 1♀ (00122394) (UID). ***Warren Co.:*** 3 mi NE of Hartford, 41.4901° N 93.36377° W, 03 Jun 1994, J.C. Schaffner, 1♂ (00093775) (TAMU). ***Woodbury Co.:*** Sioux City, 42.5003° N 96.3939° W, 10 Jun 1949, Slater and Laffoon, 2♂ (00002609–00002610), 1♀ (00002608) (AMNH). Sioux City, 42.50028° N 96.39389° W, 10 Jun 1949, Slater and Laffoon, 1♂ (00170151) (AMNH), 1♂ (00093782) (TAMU); 12 Jun 1949, Slater and Laffoon, 1♀ (00170169) (AMNH). **Kansas:** ***Anderson Co.:*** Garnett, 38.28056° N 95.24167° W, 16 Jun 1931, P.W.

Oman, 1♂ (00134306) (USNM); 20 Jun 1931, P.W. Oman, 1♀ (00134318) (USNM). ***Douglas Co.:*** 5 mi NE of Lawrence, 39.0114° N 95.18465° W, 254 m, 18 Jun 1971, V.P. Gapud, 1♀ (00117933) (KU). 6 mi NE of Lawrence, Rockefeller Tract, 39.033° N 95.15604° W, 05 Jun 1976, T.W. Oldham, 1♂ (00093792) (TAMU). Douglas County, no specific locality, 38.86667° N 95.23333° W, 274 m, 26 Jun 1975, T.W. Oldham, 1♀ (00291137) (TAMU). ***Neosho Co.:*** Chanute, 37.68404° N 95.47222° W, 295 m, 29 Aug 1939, J.D. Beamer, 1♀ (00117931) (KU). **Kentucky:** ***Anderson Co.:*** 1800 ft WNW of Tyrone, 38.0463° N 84.86051° W, 241 m, 24 May 2003, C. Wright, 1♂ (DBUL). ***Bullitt Co.:*** Bernheim Arboretum and Research Forest, site 11A, 37.91258° N 85.66281° W, 164 m, 03 Jun 1999, C.V. Covell and team, 3♂ (DBUL); 02 Jun 2000, S. Berla, J. Lewis, J. Bennett, 3♂ (DBUL); 09 Jun 2000, S. Berla and C.V. Covell, 1♂ (DBUL). Bernheim Arboretum and Research Forest, site 11B, 37.91179° N 85.66208° W, 170 m, 03 Jun 1999, C.V. Covell and team, 1♂ (DBUL). ***Christian Co.:*** PSF 370553 874122, 36.87227° N 87.47675° W, 160 m, 30 May 2003, C. Wright, 2♂ (DBUL). ***Fayette Co.:*** Lexington, 37.98869° N 84.47772° W, 294 m, 12 May 1921, K.S.B., paratype, 1♀ (00134252) (USNM); 13 Jun 1925, T.H. Hubbell, 1♂ (00127488) (UMMC); 07 Jun 1937, L.H. Townsend, 3♂ (UK); 01 Jun 1951, H.H.W., *Trifolium pratense* L. (Fabaceae), 1♂ (UK). ***Harlan Co.:*** Black Mountain, 36.84851° N 83.1463° W, 442 m, 06 Jun 1951, B.L. Monroe, 1♂ (DBUL). ***Jefferson Co.:*** Louisville, 38.21537° N 85.76345° W, 139 m, 10 May 1942, T. Spilman, 1♂ (DBUL); 23 Apr 1948, R. Hoskinson, 1♂ (DBUL); 02 Jun 1948, N.L. Beckman, 1♂ (DBUL); 07 May 1954, L.J. Cooper, 1♂ (DBUL); 12 Jun 1954, P.J. Christian, 1♂ (DBUL). ***Martin Co.:*** 2.6 mi SW of Davella, 37.77624° N 82.60754° W, 251 m, 02 Jun 2003, C. Wright, 1♂ (DBUL). ***Owen Co.:*** Kleber Wildlife Management Area, 38.35785° N 84.78395° W, 208 m, 26 May 2003, C. Wright, 5♂ (UK). **Maine:** ***Androscoggin Co.:*** Greene, Rt 202, 44.19123° N 70.14387° W, 98 m, 01 Jul 1989, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♀ (00069982) (USNM). Lewiston, 44.10716° N 70.20832° W, 93 m, 01 Jul 1989, A.G. Wheeler, Jr., *Solidago* sp., 1♀ (00069981) (USNM). ***Cumberland Co.:*** Pownal Center, 43.89248° N 70.18704° W, 41 m, 18 Jun 1986, Larochelle and Lariviere, 1♂ (00113937) (CNC). ***Waldo Co.:*** Rt 139, 1.5 mi W of Unity, 44.61132° N 69.33685° W, 62 m, 03 Jul 1989, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00069971) (USNM). **Maryland:** ***Allegany Co.:*** Green Ridge State Forest, 39.5988° N 78.4998° W, 415 m, 22 Jun 1985, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00069992) (USNM). Little Orleans Campground, 39.63181° N 78.39227° W, 177 m, 20 May 1995, L.L. Deitz, 1♂ (00242830) (NCSU). ***Anne Arundel Co.:*** South River, 4 mi S of Annapolis, 38.90389° N 76.5606° W, 35 m, 10 Jun 1934, H.G. Barber, 1♀ (00164924) (USNM). ***Montgomery Co.:*** Glen Echo, 38.96748° N 77.14172° W, 32 m, 24 Aug, unknown, 1♂ (00116274) (CUIC). Silver Spring, 38.99056° N 77.02639° W, 02 Jun 1967, P.W. Oman, 1♂ (00118158 [cat UCRC ENT 00035344]), 2♀ (00118143 [cat UCRC ENT 00035344], 00118144 [cat UCRC ENT 00035344]) (ORSU). nr Plummers Island, 38.97° N 77.178° W, 06 Jun 1914, R.C. Shannon, 1♂ (00134488) (USNM). ***Prince George's Co.:*** Beltsville, 39.03472° N 76.90778° W, 20 May 1941, unknown, 1♀ (00133814) (USNM). Beltsville, BARC [Beltsville Agricultural Research Center], 39.0247° N 76.9265° W, 47 m, 22 May 1982, T.J. Henry and A.G. Wheeler, Jr, 1♀ (00133740) (USNM). Bladensburg, 38.93926° N 76.93416° W, 06 Jul 1906, unknown, 1♀ (00116278) (CUIC). **Massachusetts:** ***Middlesex Co.:*** Arlington, 42.41537° N 71.15644° W, 20 m, 26 Jun 1897, C. Bullard., 1♂ (00170131) (AMNH). Framingham, 42.27917° N 71.41667° W, 01 Jun 1929, unknown, 1♂ (00244237) (SDNH). Holliston, 42.2000° N 71.425° W, 09 Jun, N. Banks, 1♂ (00170141) (AMNH); 20 Jun, N. Banks, 1♀ (00170167) (AMNH); 22 Jun, N. Banks, 1♂ (00170143) (AMNH); 03 Jul, N. Banks, 1♀ (00170168) (AMNH); 04 Jul, N. Banks, 1♂ (00170140) (AMNH); 13 Jul, N. Banks, 1♂ (00170142) (AMNH). Natick, 42.29715° N 71.34199° W, 67 m, 09 Jun 1929, unknown, 1♂ (00244235), 1♀ (00244236) (SDNH). Sherborn, 42.23888° N 71.36972° W, 61 m, 07 Jul 1928, C.A. Frost, paratype, 1♀ (00134228) (USNM). **Michigan:** ***Arenac Co.:*** Arenac County, no

specific locality, 44.00583° N 83.85764° W, 181 m, 26 Jun 1940, R.R. Dreisbach, 1♂ (00127484) (UMMC). ***Bay Co.:*** Bay County, no specific locality, 43.5979° N 83.8916° W, 178 m, 13 Jul 1940, R.R. Dreisbach, 1♀ (00133819) (USNM). ***Benzie Co.:*** Benzie County, no specific locality, 44.71833° N 86.11648° W, 184 m, 04 Jul 1957, R. and K. Dreisbach, 1♀ (00069986) (USNM). ***Berrien Co.:*** E.K. Warren Preserve, Warren Woods, 41.83599° N 86.63605° W, 195 m, 20 Jun 1919, R.F. Hussey, 1♀ (00127508) (UMMC). ***Calhoun Co.:*** Wise Lake, 42.23433° N 84.98915° W, 282 m, 06 Jun 1959, G.C. Eickwort, 1♂ (00134314) (USNM). ***Charlevoix Co.:*** Boyne City, 45.22497° N 85.03699° W, 177 m, 08 Jul 1923, T.H. Hubbell, 1♀ (00127511) (UMMC). ***Cheboygan Co.:*** Cheboygan County, no specific locality, 45.64694° N 84.47444° W, 18 Jul 1950, George Garoian, 1♀ (00170174) (AMNH). Green Timbers State Park, 45.19977° N 84.51729° W, 288 m, 12 Jun 1988, M.L. Niebylski, 1♂ (00242950) (DAR). Lancaster Lake, 45.6197° N 84.7112° W, 219 m, 03 Aug 1965, W.R. Anderson, 1♀ (00170179) (AMNH). ***Clare Co.:*** Clare County, no specific locality, 43.81944° N 84.76861° W, 01 Jul 1945, R.R. Dreisbach, 1♂ (00127490) (UMMC). ***Gladwin Co.:*** Gladwin County, no specific locality, 43.98083° N 84.48639° W, 14 Jun 1958, R. and K. Dreisbach, 1♀ (00069987) (USNM). ***Grand Traverse Co.:*** Grand Traverse County, no specific locality, 44.68334° N 85.46673° W, 285 m, 09 Jul 1960, R. and K. Dreisbach, 1♂ (00069979) (USNM). Traverse City, 44.74624° N 85.55077° W, 180 m, 14 Jun 1969, L. and C.W. O'Brien, 1♀ (00119541) (UCB). ***Huron Co.:*** Pigeon, 43.83221° N 83.27099° W, 189 m, 01 Jul 1922, R.F. Hussey, 1♂ (00127486) (UMMC); 03 Jul 1922, R.F. Hussey, 1♂ (00127494) (UMMC). Sand Point, 43.91513° N 83.40426° W, 176 m, 26 Jun 1922, R.F. Hussey, 1♀ (00127510) (UMMC). ***Ionia Co.:*** Ionia County, no specific locality, 42.98725° N 85.07112° W, 218 m, 04 Jul 1951, R.R. Dreisbach, 1♀ (00127509) (UMMC). ***Isabella Co.:*** Isabella County, no specific locality, 43.64353° N 84.99511° W, 274 m, 05 Jun 1945, R.R. Dreisbach, 1♂ (00127487) (UMMC); 07 Jun 1958, R. and K. Dreisbach, 1♂ (00069973) (USNM). ***Lake Co.:*** Lake County, no specific locality, 43.89086° N 85.84677° W, 250 m, 12 Jul 1947, R.R. Dreisbach, 1♀ (00134313) (USNM). ***Lenawee Co.:*** Lenawee County, no specific locality, 41.87774° N 84.05206° W, 231 m, 08 Jun 1952, R.R. Dreisbach, 1♀ (00127507) (UMMC). ***Livingston Co.:*** E.S. George Reserve, 42.46028° N 83.99437° W, 269 m, 29 Jun 1947, K. Bohnsack, 1♂ (00127501) (UMMC); 30 Jun 1957, T.E. Moore, 1♂ (00127504) (UMMC); 15 Jun 1961, unknown, 1♂ (00127500) (UMMC); 19 Jun 1961, unknown, 1♂ (00127502) (UMMC); 05 Jul 1961, unknown, 1♂ (00127503) (UMMC); 28 May 1964, F.C. Evans, 1♂ (00127492) (UMMC). ***Manistee Co.:*** 8 mi N of Manistee, 44.34573° N 86.26737° W, 197 m, 15 Jun 1969, L. and C.W. O'Brien, 1♂ (00119540) (UCB). Manistee County, no specific locality, 44.24447° N 86.32425° W, 202 m, 22 Jun 1957, R. and K. Dreisbach, 1♂ (00069974) (USNM); 05 Jul 1957, R. and K. Dreisbach, 1♂ (00069975) (USNM). ***Mecosta Co.:*** 2 mi W of Remus [off of] —20, 43.59698° N 85.18518° W, 309 m, 11 Jul 1953, R.F. Hussey, 1♀ (00127512) (UMMC). Mecosta County, no specific locality, 43.61536° N 85.23721° W, 291 m, 17 Jul 1950, R.R. Dreisbach, 1♂ (00127495) (UMMC); 15 Jun 1957, R. and K. Dreisbach, 1♀ (00069983) (USNM). ***Menominee Co.:*** Banat, Upper Michigan, 45.5188° N 87.6963° W, 244 m, 07 Jul 1972, W.F. Chamberlain, 1♀ (00245359) (TAMU). ***Midland Co.:*** Midland County, no specific locality, 43.61556° N 84.24722° W, 09 Jun 1939, R.R. Dreisbach, 1♀ (00133818) (USNM); 28 Jun 1958, R.R. Dreisbach, 1♀ (00069984) (USNM); 12 Jul 1960–16 Jul 1960, R.R. Dreisbach, 1♂ (00069976) (USNM). ***Missaukee Co.:*** Missaukee County, no specific locality, 44.33529° N 85.21505° W, 381 m, 11 Jul 1959, R. and K. Dreisbach, 1♂ (00069977) (USNM). T23N R6W Sec36, 44.3448° N 84.9857° W, 348 m, 20 Jun 1957, T.H. Hubbell, 1♂ (00127499) (UMMC). ***Muskegon Co.:*** Muskegon County, no specific locality, 43.29558° N 86.14413° W, 199 m, 30 Jun 1951, R.R. Dreisbach, 1♂ (00127493) (UMMC). ***Osceola Co.:*** Osceola County, no specific locality, 43.98335° N 85.33338° W, 401 m, 29 Jun 1957, R. and K. Dreisbach, 1♂ (00069978) (USNM). ***Roscommon Co.:*** Roscommon County, no specific locality, 44.33335° N 84.60002° W, 353 m, 05

Jun 1955, R.R. Dreisbach, 1♂ (00069980) (USNM). ***Tuscola Co.:*** Tuscola County, no specific locality, 43.32641° N 83.65718° W, 192 m, 22 Jun 1952, R.R. Dreisbach, 1♂ (00127489) (UMMC). ***Washtenaw Co.:*** Steere's Swamp, 42.38998° N 84.15384° W, 280 m, 28 Jun 1920, R.F. Hussey, 1♀ (00243727) (FSCA). Washtenaw County, no specific locality, 42.25059° N 83.84994° W, 286 m, 28 Jun 1920, R F. Hussey, 1♀ (00127513) (UMMC). ***Wayne Co.:*** Detroit, 42.34068° N 82.9669° W, 175 m, 26 May 1892, unknown, 1♀ (00116334) (CUIC). ***Wexford Co.:*** Wexford County, no specific locality, 44.33334° N 85.56673° W, 426 m, 30 Jun 1957, R. and K. Dreisbach, 1♂ (00069972) (USNM). **Minnesota:** ***Beltrami Co.:*** 2 mi N of Hines, Rt 71, 47.68333° N 94.63333° W, 430 m, 23 Jul 1995, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00133737) (USNM). ***Crow Wing Co.:*** 5 mi SE of Pequit Lakes, 46.62568° N 94.26841° W, 391 m, 06 Jul 1957, J.L. Laffoon, 1♂ (00133744) (USNM). ***Hennepin Co.:*** Hennepin County, no specific locality, 45.01667° N 93.45° W, 28 Jun 1921, A.T. Hertig, paratype, 1♂ (00134254), 1♀ (00134262) (USNM). Minneapolis, 44.98° N 93.26361° W, 18 Jun 1922, H.H. Knight, paratype, 1♂ (00134255) (USNM). ***Lac qui Parle Co.:*** Madison, 45.00972° N 96.19556° W, 25 Jun 1921, H.H. Knight, paratype, 1♂ (00134256) (USNM). ***Morrison Co.:*** Morrison County, no specific locality, 45.97635° N 94.3625° W, 339 m, 10 Jul 1920, A.A. Nichol, 1♂ (00134261), 1♀ (00134264) (USNM). ***Ramsey Co.:*** Mid Hills Golf Club, 44.99219° N 93.19522° W, 299 m, 25 Jun 1922, Arthur Hartig, 1♂ (00134260) (USNM). Saint Anthony Park, 44.97805° N 93.19083° W, 02 Jul 1923, H.H. Knight, paratype, 1♀ (00134257) (USNM). ***Redwood Co.:*** Redwood Falls, 44.53333° N 95.11666° W, 313 m, 19 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, 1♂ (00134067) (USNM). ***Renville Co.:*** Olivia, 44.77639° N 94.98944° W, 28 Jun 1921, H.H. Knight, paratype, 1♂ (00134229), 1♀ (00134236) (USNM). ***Rice Co.:*** Faribault, 44.295° N 93.26861° W, 12 Jun 1922, H.H. Knight, paratype, 1♂ (00134258) (USNM). Hunt Lake, 9 mi W of Faribault, 44.33246° N 93.45265° W, 332 m, 18 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00069989) (USNM). ***Roseau Co.:*** Roseau, 48.84609° N 95.76277° W, 320 m, 27 Jun 1920, J.P. Jensen, 1♀ (00134263) (USNM). ***St. Louis Co.:*** 6 mi NNW of Cook on Rt 53, 47.90012° N 92.78453° W, 411 m, 26 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, *Eurybia macrophylla*, 1♂ (00069988) (USNM). ***Steele Co.:*** Owatonna, 44.0927° N 93.2193° W, 351 m, 21 Jun 1921, A.A. Nichol, paratype, 1♀ (00134226) (USNM); 24 Jun 1921, A.A. Nichol, paratype, 1♂ (00134259) (USNM). **Missouri:** ***Adair Co.:*** Sublette, 40.30203° N 92.57307° W, 293 m, 22 Jun 1940, E. Herbold, 1♀ (00134328) (USNM). ***Bollinger Co.:*** Grassy, 37.26464° N 90.12458° W, 216 m, 30 May 1943, E.H. Froeschner, 1♂ (00134320) (USNM). ***Boone Co.:*** 1.3 mi N of Ashland Wildlife Area, 38.78058° N 92.19683° W, 247 m, 21 May 1981, R.L. Blinn, 1♂ (00243090) (UMRM). 5.5 mi N of Columbia, Wheaton's Farm, 39.03131° N 92.32236° W, 212 m, 27 May 1981, R.L. Blinn, 1♂ (00243106) (UMRM). Ashland Wildlife Area, 38.7628° N 92.2004° W, 244 m, 12 Jun 1968, unknown, 1♀ (00243116) (UMRM). Boone County, no specific locality, 39.0355° N 92.3335° W, 195 m, 08 Jun 1988, B.D. Robbins, 1♀ (00127579) (UMRM). Columbia, 38.95167° N 92.33389° W, 02 Jun 1941, R.C. Froeschner, 1♀ (00134327) (USNM); 03 Jun 1972, S.O. Swadener, 1♂ (00243562) (INHS); 07 May 1981, R.L. Blinn, 1♂ (00243105) (UMRM); 19 May 1981, R.L. Blinn, *Solidago* sp., 1♂ (00243088) (UMRM); 05 Jun 1984, R.L. Blinn, 1♂ (00243094) (UMRM). Columbia, University of Missouri Campus, 38.94274° N 92.33407° W, 225 m, 12 Jun 1993, Usmani, 1♀ (00243109) (UMRM). Entomology Farm, Columbia, 38.89504° N 92.21145° W, 266 m, 16 May 1968, unknown, 1♂ (00243093) (UMRM). Mount Hope Baptist Church, 39.02204° N 92.23122° W, 256 m, 10 May 1974, J.W. Smith, 1♂ (00243092) (UMRM). Rudolph Bennet Wildlife Area, 38.92756° N 92.30981° W, 215 m, 03 Jun 1974, Smith and Thewke, 1♂ (00243101) (UMRM). Sturgeon, 39.23036° N 92.27462° W, 246 m, 01 Jun 1973, S.E. Thewke, *Asclepias* sp. (Asclepiadaceae), 1♂ (00243091) (UMRM). Three Creeks State Forest, 38.8388°N 92.3074° W, 213 m, 14 May 1986, R.L. Blinn, 1♂ (00243102)

(UMRM). ***Butler Co.:*** 5 mi S of Qulin, 36.59413° N 90.25108° W, 94 m, 06 Jun 1973, Enns, Swadener, Thewke, 1♀ (00243113) (UMRM). ***Callaway Co.:*** Little Dixie Lake, 38.90809° N 92.12623° W, 254 m, 20 May 1975, E.G. Riley, 1♂ (00243100) (UMRM). Reform, 38.75806° N 91.79266° W, 251 m, 02 Jun 1975, D.D. Kopp, 1♂ (00243099) (UMRM). Tucker Prairie [Natural Area], 38.94826° N 91.98411° W, 264 m, 10 May 1968, unknown, 1♀ (00243120) (UMRM); 14 May 1968, unknown, 1♂ (00243082) (UMRM); 17 May 1968, unknown, 1♀ (00243121) (UMRM); 01 Jun 1968, unknown, 1♂ (00243084) (UMRM); 04 Jun 1968, unknown, 1♂ (00243083) (UMRM); 06 Jun 1968, unknown, 1♀ (00243119) (UMRM); 11 Jun 1968, unknown, 1♂ (00243086) (UMRM); 03 Jun 1969, unknown, 1♂ (00243085) (UMRM); 10 Jun 1969, unknown, 1♂ (00243087) (UMRM); 06 May 1980, E.G. Riley, 1♀ (00243112) (UMRM); 21 May 1986, R.L. Blinn, 1♀ (00243108) (UMRM). ***Cooper Co.:*** Bunceton, 38.79542° N 92.80218° W, 233 m, 18 May 1967, W.S. Craig, 1♂ (00243107) (UMRM). ***Crawford Co.:*** Steelville, 37.9681° N 91.35487° W, 13 May 1939, R.C. Froeschner, 1♂ (00134321) (USNM). ***Harrison Co.:*** New Hampton, 40.26251° N 94.19764° W, 279 m, 13 May 1968, R.E. Munson and L.R. Hanning, (Poaceae), 1♀ (00243115) (UMRM). ***Hickory Co.:*** Hermitage, 37.93371° N 93.31075° W, 227 m, 04 Jun 1968, R.E. Munson and L.R. Hanning, (Fabaceae), 1♀ (00243114) (UMRM). ***Jackson Co.:*** Atherton, 39.18611° N 94.30528° W, 223 m, 31 May 1915, unknown, paratype, 1♂ (00242640) (CAS); 13 Jun 1915, C.F. Adams, 1♂ (00242504) (CAS); 27 Jun 1915, C.F. Adams, 1♂ (00242505) (CAS). Kansas City, 39.09972° N 94.57833° W, 25 May 1975, H. Greenbaum, 1♂ (00093790) (TAMU). ***Jasper Co.:*** Carthage, 37.15711° N 94.32044° W, 317 m, 18 May 1941, R.C. Froeschner, 1♂ (00134319) (USNM). ***Macon Co.:*** La Plata, 40.023° N 92.4995° W, 274 m, 10 Jun 1968, R.E. Munson, (Fabaceae), 1♂ (00243104) (UMRM). ***Monroe Co.:*** Mark Twain State Park, 39.4878° N 91.7913° W, 198 m, 14 Jun 1984, R.L. Blinn, 1♂ (00243089) (UMRM). ***Randolph Co.:*** Moberly, 39.41362° N 92.41415° W, 259 m, 16 May 1972, T.J. Riley, 1♀ (00243117) (UMRM). ***Shelby Co.:*** 0.7 mi W of Lakenan, 39.67538° N 91.96287° W, 227 m, 22 May 1975, S.O. Swadener, 1♀ (00243563) (INHS). ***St. Louis Co.:*** Glencoe, 38.54343° N 90.62618° W, 123 m, 16 May 1937, R.C. Froeschner, 1♂ (00134322) (USNM); 23 May 1937, R.C. Froeschner, 1♀ (00134323) (USNM); 18 May 1947, R.C. Froeschner, 1♂ (00170154) (AMNH). Overland, 38.69388° N 90.37193° W, 183 m, 14 May 1938, B.H. Piaeul, 1♀ (00134305) (USNM). Ranken, 38.53487° N 90.51109° W, 128 m, 23 May 1954, E.P. Meiners, 1♀ (00243111) (UMRM). Saint Louis, 38.62722° N 90.19778° W, 19 Jun 1937, R.C. Froeschner, 1♀ (00134324) (USNM); 27 May 1939, R.C. Froeschner, 1♀ (00134326) (USNM); 25 Jun 1939, R.C. Froeschner, 1♀ (00134325) (USNM). ***Vernon Co.:*** 4 mi E of Milo, 37.75611° N 94.23268° W, 14 Jun 1966, J.C. Schaffner, 1♀ (00093797) (TAMU). **Montana:** ***Fergus Co.:*** 6 mi S of Grass Range, 46.93936° N 108.80389° W, 06 Jul 1972, G.C. Gaumer, 1♂ (00118219), 1♂ (00093773), 1♀ (00291135) (TAMU). ***Gallatin Co.:*** Montana [Range] Experimental Station, Bozeman, 45.6797° N 111.0378° W, 1467 m, 30 Jun 1922, unknown, 1♀ (00134173) (USNM). Moose Flat Campground, 26 mi S of Bozeman Hot Springs on Rt 191, 45.35527° N 111.17055° W, 1737 m, 10 Aug 1986, Schuh, Schwartz, and Stonedahl, 1♂ (00170120) (AMNH). ***Mineral Co.:*** 18 mi S of Dry Creek, 47.05165° N 114.75988° W, 914 m, 20 Jun 1919, M.A. Hanna, 1♂ (00164888) (USNM). ***Park Co.:*** Park County, 45.48333° N 110.56667° W, 1829 m, 14 Aug 1926, A.A. Nichol, 1♂ (00134283) (USNM). ***Phillips Co.:*** 1 mi W of Landusky, 47.89517° N 108.63858° W, 1277 m, 06 Jul 1972, G.C. Gaumer, 1♂ (00093772) (TAMU). ***Ravalli Co.:*** Hamilton, 46.24722° N 114.15389° W, 03 Jul 1928, unknown, 1♂ (00134294) (USNM). **Nebraska:** ***Cherry Co.:*** Valentine, 42.87278° N 100.55056° W, 10 Jun 1950, Hicks, Slater, and Laffoon, 1♀ (00170180) (AMNH). ***Cuming Co.:*** West Point, 41.845° N 96.73166° W, 397 m, Jun 1884, unknown, 1♀ (00164889) (USNM). **New Hampshire:** ***Coos Co.:*** Mount Washington, 44.29232° N 71.28082° W, 1282 m, 06 Jul 1914, C.A. Frost, 1♀ (00242497) (CAS). **New Jersey:** ***Bergen Co.:*** Campgaw, 41.05945° N 74.19866° W, 177 m, 02 Jun 1925, F.M. Schott, paratype, 1♂ (00134219) (USNM).

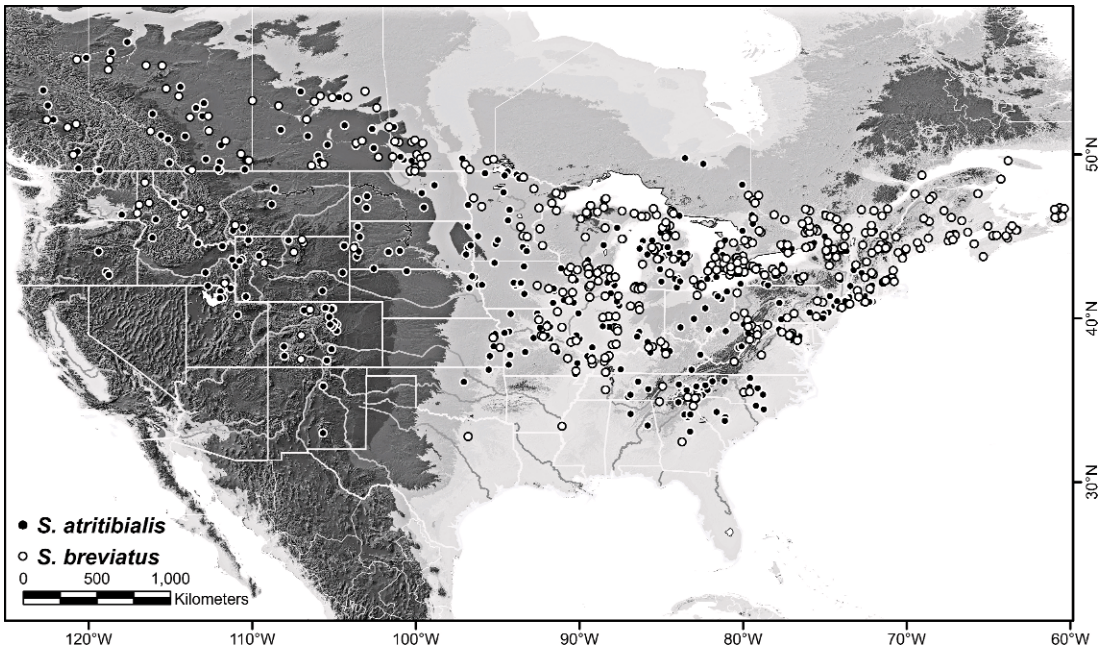
Mercer Co.: Hopewell, Stony Brook-Millstone Watershed, Adventure Trail, 40.35904° N 74.77489° W, 55 m, 28 Jun 2001, J. Lento, 1♀ (00329799) (DEBU). ***Morris Co.:*** Madison, 40.75972° N 74.4175° W, 16 Jun 1898, H.G. Barber, 1♀ (00134490) (USNM). ***Passaic Co.:*** Paterson, 40.91667° N 74.17222° W, 31 May, unknown, 1♀ (00170176) (AMNH). Ramapo, 41.04229° N 74.24921° W, 187 m, 03 Jun 1905, unknown, 1♀ (00164925) (USNM); 05 Jun 1905, unknown, 1♂ (00133810) (USNM). ***Sussex Co.:*** Duttonville, 41.35148° N 74.686° W, 148 m, 08 Jun 1910, unknown, 1♀ (00170175) (AMNH). **New Mexico:** ***Otero Co.:*** 6 mi NE of Cloudcroft, 32.99154° N 105.67213° W, 2468 m, 04 Jun 1980, D.W. Webb, 3♂ (00243561, 00243569–00243570), 1♀ (00243571) (INHS). ***San Miguel Co.:*** Panchuela Canyon [Campground], Cowles, 35.84591° N 105.65392° W, 2743 m, 01 Jul 1935, H. Ruckes, 1♀ (00134237) (USNM). **New York:** ***Cattaraugus Co.:*** Allegany State Park, 07 Jul 1936, unknown, 1♀ (00134484) (USNM); 21 Jul 1936, unknown, 1♀ (00134486) (USNM). Four Mile, 42.02024° N 78.46458° W, 713 m, 04 Jul 1916, H.H. Knight, 1♀ (00134301) (USNM). Rock City, 42.01444° N 78.47472° W, 04 Jul 1915, H.H. Knight, 1♂ (00134300) (USNM); 05 Jul 1915, H.H. Knight, 1♀ (00134316) (USNM). ***Erie Co.:*** Buffalo, 42.88639° N 78.87861° W, Jun 1886, E.P. Van Duzee, 1♂ (00170129) (AMNH), 1♂ (00116331) (CUIC); 05 Jun 1891, E.P. Van Duzee, 4♂ (00242562–00242565) (CAS). Hamburg, 42.71583° N 78.82972° W, 26 Jun 1898, E.P. Van Duzee, 1♀ (00242571) (CAS); 06 Jun 1909, E.P. Van Duzee, 3♂ (00242566–00242567, 00242569), 2♀ (00242568, 00242570) (CAS). ***Essex Co.:*** Lake Placid, 44.27944° N 73.98028° W, 610 m, 04 Jul 1991, M.D. Schwartz, *Solidago* sp., 1♀ (00111413) (CNC). Underwood, 44.08785° N 73.67627° W, 336 m, 26 Jun 1936, H. Dietrich, 1♀ (00116337) (CUIC). Wilmington, 44.38838° N 73.81542° W, 94 m, 30 Jun 1922, J.M. Aldrich, 1♀ (00134489) (USNM). ***Genesee Co.:*** Batavia, 42.99806° N 78.18778° W, 271 m, 12 Jul 1914, H.H. Knight, paratype, 1♂ (00134239) (USNM); 14 Jun 1915, H.H. Knight, paratype, 1♀ (00134216) (USNM); 25 Jun 1915, H.H. Knight, 1♂ (00242506) (CAS). ***Greene Co.:*** Freehold, 42.3581° N 74.052° W, 131 m, 09 May 1976, S.E. Thewke, 1♂ (00243103) (UMRM). ***Livingston Co.:*** Portage, 42.57667° N 78.04667° W, 27 Jun 1915, H.H. Knight, paratype, 1♂ (00134204) (USNM); 27 Jul 1915, H.H. Knight, 2♂ (00134205–00134206), 1♀ (00134207) (USNM). ***Monroe Co.:*** Charlotte, 43.25506° N 77.61695° W, 82 m, 20 Jun 1907, J.L. Zabriskie, 1♂ (00170127) (AMNH). Honeoye Falls, 42.95222° N 77.59056° W, 14 Jun 1915, M.D. Leonard, 1♀ (00116335) (CUIC). Rochester Junction, 42.99634° N 77.5638° W, 205 m, 27 Jun 1914, M.D. Leonard, 1♂ (00116319) (CUIC); 06 Jul 1914, M.D. Leonard, 1♂ (00116320) (CUIC); 07 Jul 1914, M.D. Leonard, 1♀ (00116332) (CUIC); 25 Jul 1914, M.D. Leonard, 1♂ (00116318) (CUIC). ***Richmond Co.:*** Egbertville, Staten Island, 40.58309° N 74.13111° W, 35 m, 07 Jun 1970, V. Sapienza, 1♀ (00170164) (AMNH). ***Schuyler Co.:*** Hector Land Use Area, nr Reynoldsville, 42.5021° N 76.7416° W, 395 m, 30 Jun 1982, G. and K. Eickwort, 1♂ (00116321) (CUIC). ***Suffolk Co.:*** Flanders, 40.90343° N 72.61759° W, 2 m, 11 Sep 1946, Roy Latham, 1♂ (00134485) (USNM). Napeague, Long Island, 41.00955° N 72.06813° W, 2 m, 07 Sep 1946, R. Latham, 1♂ (00116323) (CUIC). Northwest, 41.0101° N 72.2456° W, 3 m, 12 Jun 1951, Roy Latham, 1♂ (00134307) (USNM). Riverhead, 40.91704° N 72.66204° W, 3 m, 09 Jun 1946, R. Latham, 1♀ (00116336) (CUIC). Sag Harbor, 41.00063° N 72.28575° W, 2 m, 04 Apr 1946, Roy Latham, 1♂ (00134311) (USNM). ***Tompkins Co.:*** Ithaca, 42.44056° N 76.49694° W, 24 May 1977, F.J. Messina, 1♂ (00116325) (CUIC); 23 Jun 1977, F.J. Messina, 1♂ (00116324) (CUIC); 07 Jul 1977, F.J. Messina, 1♂ (00116326) (CUIC). McLean Bogs Res. [Preserve], 42.54185° N 76.29894° W, 335 m, 03 Jul 1920, H.H. Knight, paratype, 1♂ (00134238) (USNM); 21 Jul 1923, J.L. Buys, paratype, 1♀ (00134349) (USNM). Tompkins Co. Field 2, 42.35973° N 76.41194° W, 328 m, 18 Jun 1975, unknown, *Leucanthemum vulgare*, 1♂ (00116322) (CUIC). ***Westchester Co.:*** Armonk, 41.12648° N 73.71402° W, 118 m, 14 Jun 1924, unknown, 1♀ (00134224) (USNM). Armonk, Calder Ecology Study Center, 41.12639° N 73.71444° W, 11 Jun 1979–12 Jun 1979, K. Schmidt, 1♂ (00170138)

(AMNH). White Plains, 41.03389° N 73.76333° W, 14 Jun 1919, J.R. de la Torre Bueno, paratype, 1♀ (00134215) (USNM); 07 Jun 1924, J.R. de la Torre-Bueno, 1♂ (00134214) (USNM). ***Wyoming Co.:*** Wyoming, 42.82736° N 78.08992° W, 308 m, 25 Jun 1916, H.H. Knight, 1♂ (00134299) (USNM). **North Carolina:** ***Avery Co.:*** Banner Elk, 36.15733° N 81.87246° W, 1135 m, 16 Jun 1964, J.F. Cornell, 1♂ (00242825) (NCSU); 21 May 1995, C.R. Bartlett, 1♂ (00242829) (NCSU). ***Buncombe Co.:*** Swannanoa, 35.59778° N 82.4000° W, 914 m, 20 Jun 1916, R.W. Leiby, paratype, 1♀ (00134230) (USNM). ***Chatham Co.:*** Hwy 64 at Haw River, 35.73127° N 79.10817° W, 101 m, 07 May 1993, R.L. Blinn, 1♀ (00242839) (NCSU). ***Columbus Co.:*** Hwy 701 at SR 1545, 34.43875° N 78.73063° W, 20 m, 04 May 2005, P. Alvarez, 1♂ (00242833) (NCSU). ***Harnett Co.:*** Hwy 401 at Upper Little River [S of Harnett], 35.3355° N 78.7835° W, 39 m, 19 Apr 2000, R.L. Blinn, *Solidago* sp., 1♂ (00242831) (NCSU). ***Haywood Co.:*** Lake Junaluska, 35.5278° N 82.9597° W, 23 May 1954, H.V. Weems, Jr., 1♂ (00243718) (FSCA). ***Henderson Co.:*** Henderson County, no specific locality, 35.3193° N 82.475° W, 679 m, 06 May 1955, D.H. Babeck, 1♀ (00242837) (NCSU). Hendersonville, 35.31861° N 82.46111° W, 01 Jun 1907, F. Sherman, paratype, 1♂ (00134213) (USNM). ***Macon Co.:*** Highlands, 35.0525° N 83.19694° W, 1158 m, 03 Jun 1957, J.R. Vockeroth, 1♂ (00113964) (CNC). ***Madison Co.:*** Rt 209 between Trust and Hot Springs, 35.83725° N 82.85739° W, 592 m, 20 May 1979, Wygodzinsky, Schuh, and Schmidt, 1♂ (00170145) (AMNH). ***McDowell Co.:*** Old Fort E of Ashville on I-40, 35.62948° N 82.1689° W, 430 m, 22 May 1984, C.B. Barr, 1♂ (00242951) (DAR). ***Montgomery Co.:*** Dark Mountain, 35.47262° N 79.9518° W, 271 m, 16 May 2000, R.L. Blinn, 1♂ (00242832) (NCSU). Uwharrie National Forest, SR 1306 at Barnes Creek, 35.47994° N 79.9573° W, 148 m, 23 May 1995, R.L. Blinn, *Solidago* sp., 1♂ (00242828), 1♀ (00242868) (NCSU). ***Moore Co.:*** SR 1459, 35.5089° N 79.59524° W, 118 m, 30 May 1996, R.L. Blinn, *Solidago* sp., 1♂ (00242835) (NCSU). ***Randolph Co.:*** SR 2458, 35.8081° N 79.59896° W, 203 m, 30 May 2003, L.L. Deitz, 1♀ (00242840) (NCSU). ***Robeson Co.:*** Hwy 74, 3.2 km E of Hwy 71, 34.65704° N 79.20803° W, 46 m, 10 Apr 1997, L.L. Deitz, 1♂ (00242834) (NCSU). ***Rockingham Co.:*** Jct. SR 2571 and SR 2572, 36.35308° N 79.56791° W, 213 m, 16 May 1995, R.L. Blinn, *Solidago* sp., 1♂ (00242827) (NCSU). ***Swain Co.:*** Cherokee, 35.4729° N 83.3133° W, 610 m, 29 May 1957, W.R.M. Mason, 1♀ (00113968) (CNC). Great Smoky Mountain National Park, Clingmans Dome, 35.5576° N 83.4937° W, 1924 m, 21 Jun 1941, A.L. Melander, 1♂ (00119974) (UCR). Great Smoky Mountain National Park [rest area Rt 441], 35.5982° N 83.4135° W, 1250 m, 25 Jun 1940, C.T. Brues, 1♂ (00170144) (AMNH). ***Transylvania Co.:*** Brevard, 35.23603° N 82.72593° W, 644 m, 21 May 1965, R.C. Froeschner, 1♂ (00133742) (USNM). ***Wilkes Co.:*** Wilkes County, no specific locality, 36.14937° N 81.13732° W, 296 m, 15 May 1958, D.A. Young, 1♂ (00242826) (NCSU). ***Yancey Co.:*** Yancey County, without specific locality, 35.91341° N 82.29856° W, 872 m, 28 Apr 1990, T. Daggy, 1♀ (00242838) (NCSU). **North Dakota:** ***Billings Co.:*** Bad Lands [Badlands Scenic Area], 47.21779° N 103.56046° W, 713 m, 15 Jun 1920, A.A. Nichol, 2♀ (00134217–00134218) (USNM). ***Bottineau Co.:*** 3 mi NE of Bottineau, Turtle Mountain foothills, 48.85° N 100.36666° W, 594 m, 23 Jun 2000, T.J. Henry, 1♂ (00134069) (USNM). ***Cass Co.:*** Fargo, 46.87722° N 96.78944° W, 22 Jun 1923, Wm. Baker, 1♂ (00134302) (USNM). Fargo, N at 19th St. and University, 46.90588° N 96.7968° W, 272 m, 17 Jun 2000, T.J. Henry, *Solidago* sp., 1♂ (00134068) (USNM). ***Dunn Co.:*** Killdeer [Mountain State Game] Management Area, 10 mi NW of Killdeer, 47.44466° N 102.97869° W, 823 m, 24 Jun 2000, T.J. Henry, *Symphoricarpos occidentalis* Hook. (Caprifoliaceae), 1♂ (00069990) (USNM). ***Kidder Co.:*** Kidder County, no specific locality, 46.76032° N 99.50514° W, 577 m, 14 Jul 1920, A.A. Nichol, paratypes, 2♂ (00134190–00134191) (USNM). ***Ramsey Co.:*** Devils Lake, 48.11278° N 98.86472° W, 19 Jul 1920, T.H. Hubbell, 1♂ (00127491) (UMMC). ***Stark Co.:*** 127 R Ave. 4 mi N of 48 R St. SW [9 mi S of South Heart], 46.73333° N 103.01666° W, 27 Jun 2000, T.J. Henry, *Artemisia cana*, 1♀ (00133739)

(USNM). ***Wells Co.:*** Wells County, no specific locality, 47.64554° N 99.62978° W, 490 m, 03 Jul 1960, D. Kuske, 1♀ (00242952) (DAR). **Ohio:** ***Ashland Co.:*** Mohican Memorial State Forest, 40.60732° N 82.31389° W, 377 m, 30 May 1987, P.W. Kovarik, 1♂ (00093788) (TAMU). ***Ashtabula Co.:*** Crooked Creek Farm nr Hartsgrove, 41.624° N 80.979° W, 29 May 1963, J.C. and D. Pallister, 1♂ (00170136) (AMNH); 30 May 1963, J.C. and D. Pallister, 1♂ (00170137) (AMNH); 01 Jun 1963, J.C. and D. Pallister, 1♂ (00170132) (AMNH); 13 Jun 1963, J.C. and D. Pallister, 1♂ (00170133) (AMNH); 14 Jun 1963, J.C. and D. Pallister, 1♂ (00170134) (AMNH); 16 Jun 1963, J.C. and D. Pallister, 1♂ (00170135) (AMNH). ***Athens Co.:*** Athens County, no specific locality, 39.31957° N 82.09666° W, 191 m, 15 May 1955, unknown, 1♀ (00133813) (USNM). ***Clinton Co.:*** Wilmington, 39.44234° N 83.8242° W, 312 m, 17 Jul 1926, S.A. Watson, paratype, 1♂ (00134241) (USNM). ***Cuyahoga Co.:*** Bedford, 41.3931° N 81.5367° W, 10 Jun 1931, J.C. Pallister, 3♀ (00113248 [cat CMNH Acc 1906]–00113250 [cat CMNH Acc 1906]) (CMNH). Cleveland, 41.47849° N 81.69033° W, 207 m, unknown, 1♂ (00116329) (CUIC). ***Erie Co.:*** Resthaven Preserve, 41.3923° N 82.8338° W, 191 m, 06 Jun 2003, T. Pucci, 1♂ (00113253) (CMNH). Resthaven Wildlife Area, nr Herr Rd, 41.3996° N 82.8345° W, 191 m, 06 Jun 2003, T. Pucci, 1♀ (00113252) (CMNH). ***Franklin Co.:*** Columbus, 39.96111° N 82.99889° W, 29 May 1954, H.V. Weems, Jr., 1♂ (00243720) (FSCA). ***Portage Co.:*** Towner's Woods [Park], 41.171° N 81.3025° W, 335 m, 07 Jun 2003, T. Pucci, 1♂ (00113254) (CMNH). ***Summit Co.:*** Northfield, 41.3286° N 81.5391° W, 290 m, 30 May 1925, J.C. Pallister, 3♀ (00113244 [cat CMNH 36500]–00113246 [cat CMNH 36502]) (CMNH); 20 Jun 1927, J.C. Pallister, 1♀ (00113247 [cat CMNH 21850]) (CMNH). **Oklahoma:** ***Nowata Co.:*** 6 mi N of Childers, 36.85808° N 95.53977° W, 212 m, 25 Apr 1972, D.C. Arnold, (Fabaceae), 1♂ (00242309) (OSEC). ***Payne Co.:*** Stillwater, 36.11556° N 97.05806° W, 28 Apr 1954, F.A. Fenton, 1♀ (00134310) (USNM); 28 May 1954, F.A. Fenton, 1♂ (00242310), 1♀ (00242311) (OSEC); 09 May 1978, D.C. Arnold, 6♂ (00242295–00242300), 8♀ (00242301–00242308) (OSEC). **Oregon:** ***Grant Co.:*** Izee, Keerin's Ranch, 44.06722° N 119.385° W, 25 Jun 1935, Joe Schuh, 1♂ (00170158) (AMNH). ***Harney Co.:*** Frenchglen, 42.82694° N 118.91555° W, 1372 m, 21 Jun 1951, Borys Malkin, 1♂ (00242542) (CAS). Steens Mts, Loop Road (S leg) at Blitzen River Crossing, 42.63959° N 118.76409° W, 1568 m, 09 Jul 1999, J.D. Pinto, 1♂ (00119975 [cat UCRC ENT 00035344]) (UCR). **Pennsylvania:** ***Berks Co.:*** Reading, 40.35292° N 75.9306° W, 114 m, 11 Jun 1934, R.P. Seibert, 1♀ (00122396) (UID). ***Bucks Co.:*** Neshaminy Creek, E of Jamison, 40.26951° N 75.07406° W, 49 m, 03 Jul 1966, J. and W. Ivie, 1♀ (00170181) (AMNH). ***Centre Co.:*** Milesburg, Rt 144, 40.92957° N 77.78227° W, 242 m, 06 Jun 1974, T.J. Henry, 1♂ (00134076) (USNM). ***Crawford Co.:*** Hartstown Bog, 41.5471° N 80.36266° W, 309 m, 26 Jun 1919, D.M. DeLong, 1♀ (00134225) (USNM). ***Erie Co.:*** Charter Oak[s], 42.09354° N 80.15189° W, 218 m, 17 Jun 1917, J.N. Knull, 1♂ (00134212) (USNM); 11 Jul 1917, H.B. Kirk, 1♂ (00134211) (USNM). ***Franklin Co.:*** Chambersburg, 39.9375° N 77.66139° W, 14 May 1921, E.M. Craighead, 1♂ (00134220) (USNM); 08 Jun 1921, J.R. Stear, paratype, 1♂ (00134208) (USNM); 13 Jun 1921, J.R. Stear, paratype, 1♀ (00134223) (USNM); 07 Jun 1923, J.R. Stear, paratype, 1♂ (00134209), 1♀ (00134210) (USNM); 08 Jun 1923, J.R. Stear, paratype, 1♀ (00134222) (USNM); 23 Jun 1923, J.R. Stear, paratype, 1♀ (00134221) (USNM). ***Monroe Co.:*** Delaware Water Gap, 40.9675° N 75.1225° W, A.T. Slosson, 1♂ (00170128) (AMNH). ***Philadelphia Co.:*** Philadelphia, 40.0149° N 75.105° W, 24 m, 21 Jun 1926, J.C. Lutz, 1♂ (00133811) (USNM); 08 Jun 1927, J.C. Lutz, 1♀ (00133821) (USNM); 26 Jun 1927, J.C. Lutz, 1♀ (00134308) (USNM). **South Carolina:** ***Lexington Co.:*** Cayce, 33.96036° N 81.07707° W, 70 m, 13 May 1988, A.G. Wheeler, Jr., *Solidago* sp., 1♀ (00133812) (USNM). Swansea, 33.74097° N 81.10534° W, 94 m, 13 May 1988, A.G. Wheeler, Jr., 1♂ (00133741) (USNM). ***Newberry Co.:*** Newberry, 34.27444° N 81.61889° W, 15 May 1988, A.G. Wheeler, Jr., 1♀ (00133822) (USNM). ***Pickens Co.:*** Rocky Bottom, 35.04421° N 82.80469° W, 527 m, 22 May 1934, J.N. Todd, 1♂ (00134298)

(USNM). **South Dakota:** ***Brookings Co.:*** Brookings, 44.31139° N 96.79806° W, 493 m, 16 Jun 1891, unknown, 2♂ (00242502–00242503) (CAS); 12 Jun 1923, H.H. Knight, paratype, 1♂ (00134233) (USNM); 12 Jun 1923, H.C. Severin, paratype, 1♀ (00134234) (USNM); 14 Jun 1931, H.C. Severin, 1♀ (00134329) (USNM). White, 44.43472° N 96.64944° W, 26 Jul 1922, H.C. Severin, 1♀ (00134332) (USNM). ***Butte Co.:*** Castle Rock, 44.96443° N 103.42435° W, 957 m, 29 Jun 1973, L.A. Kelton, *Artemisia* sp., 1♀ (00113948) (CNC). ***Custer Co.:*** Custer, 43.76667° N 103.59833° W, 19 Aug 1927, H.H. Knight, 3♀ (00134267–00134269) (USNM); 27 Jul 1991, D.C. Arnold, 2♀ (00242312–00242313) (OSEC). ***Haakon Co.:*** Philip, 44.03943° N 101.6651° W, 660 m, 23 Jun 1923, H.C. Severin, paratype, 1♂ (00134232) (USNM). ***Harding Co.:*** Buffalo, 45.58417° N 103.54556° W, 19 Jun 1925, H.C. Severin, 1♀ (00134317) (USNM); 20 Jun 1925, H.C. Severin, 1♂ (00134312) (USNM). ***Jones Co.:*** Capa, 44.10889° N 100.97778° W, 538 m, 01 Jun 1921, H.C. Severin, 4♂ (00242498–00242501) (CAS). ***Lake Co.:*** Chester, 43.89046° N 96.9254° W, 485 m, 17 Jun 1930, G.I. Gilbertson, 1♀ (00134331) (USNM). ***Lawrence Co.:*** Black Hills, 44.41667° N 103.70833° W, 29 Jun 1973, L.A. Kelton, 1♂ (00113945) (CNC). Deadwood, 44.37638° N 103.72944° W, 1381 m, 29 Jul 1927, H.H. Knight, 1♂ (00134240), paratype, 1♀ (00134231) (USNM). Englewood, 44.29796° N 103.78357° W, 1704 m, 18 Jun 1926, H.C. Severin, 1♂ (00134333) (USNM). Englewood, Black Hills, 44.41667° N 103.70833° W, 05 Aug 1971, L.A. Kelton, 1♂ (00113944) (CNC). ***Pennington Co.:*** Pactola Lake, Black Hills, 44.073° N 103.4734° W, 1341 m, 05 Aug 1971, L.A. Kelton, 1♂ (00113943) (CNC). ***Roberts Co.:*** Browns Valley, 45.59382° N 96.83048° W, 299 m, 23 Jun 1927, H.C. Severin, 1♀ (00134330) (USNM). ***Shannon Co.:*** Pine Ridge, 43.01932° N 102.565° W, 980 m, 20 Jun 1928, H.C. Severin, 5♀ (00134271–00134275) (USNM). ***Union Co.:*** 3 mi S of Jefferson, 42.55912° N 96.55889° W, 11 Jun 1949, Slater and Laffoon, 1♂ (00170152) (AMNH). ***Unknown co.:*** Dac., P.R. Uhler, 1♀ (00069969) (USNM). **Tennessee:** ***Giles Co.:*** Pulaski, 35.1997° N 87.0308° W, 25 May 1932, H.L. Dozier, paratype, 1♂ (USNM). rest stop 3.2 mi S of Hwy 129 on I-65, 35.32728° N 86.88169° W, 254 m, 18 May 1983, D.A. Rider, 1♂ (00242949) (DAR). ***Knox Co.:*** Knoxville, 35.96056° N 83.92083° W, 15 May 1917, Geo. G. Ainslie, (Cyperaceae), paratype, 1♀ (00134253) (USNM). ***Sevier Co.:*** Gatlinburg, 35.71166° N 83.51513° W, 413 m, 15 May 1988, D.A. Dean, 1♀ (00093793) (TAMU). Great Smoky Mountains National Park, Indian Gap, 35.6111° N 83.4385° W, 1585 m, 18 Jun 1957, W.R.M. Mason, 1♂ (00113967) (CNC). ***Warren Co.:*** Warren County, no specific locality, 35.68217° N 85.78252° W, 268 m, 22 May 1940, unknown, *Solidago* sp., 1♂ (00134304) (USNM). ***Wilson Co.:***nr Gladeville, Rt 165, 36.13367° N 86.41504° W, 192 m, 29 May 1985, T.J. Henry and A.G. Wheeler, Jr, 1♂ (00133738) (USNM). **Utah:** ***Box Elder Co.:*** Snowville, 41.96556° N 112.70889° W, 09 Jun 1969, G.F. Knowlton, 1♂ (00134281) (USNM). ***Cache Co.:*** Logan, 41.73556° N 111.83361° W, 06 Jul 1955, S.L. Wood, 1♂ (00113957) (CNC); 16 Jul 1955, G.F. Knowlton, 1♂ (00134287) (USNM); 23 Jul 1963, G.F. Knowlton, 1♂ (00134288) (USNM). Wellsville, 41.63222° N 111.93444° W, 1389 m, 01 Jul 1948, R.S. Bailey, 1♂ (00134289) (USNM). ***Duchesne Co.:*** Currant Creek, 40.19668° N 110.89434° W, 2021 m, 30 Jul 1960, G.F. Knowlton, 1♂ (00134290) (USNM). ***Rich Co.:*** Garden City, 41.88917° N 111.385° W, 06 Jul 1968, G.F. Knowlton and H.H. Knight, 1♂ (00134280) (USNM). Laketown, 41.82556° N 111.32167° W, 23 Jul 1963, G.F. Knowlton, 1♀ (00134291) (USNM); 06 Jul 1968, G.F. Knowlton and H.H. Knight, 1♂ (00134279) (USNM). ***Utah Co.:*** Hwy 80, 24 Aug 1966, L. and C.W. O'Brien, 1♀ (00134282) (USNM). ***Weber Co.:*** Huntsville, 41.26083° N 111.76917° W, unknown, 1♂ (00070115) (USNM). Ogden, 41.22306° N 111.97306° W, 24 Jun 1941, W. Don Fronk, 1♂ (00164894) (USNM). **Vermont:** ***Bennington Co.:*** 5 mi N of Bennington, 42.93842° N 73.23194° W, 214 m, 25 Jun 1989, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00069970) (USNM). ***Windham Co.:*** Halifax, 42.76805° N 72.74537° W, 481 m, 03 Jul 1948, L.B. Burbank, 1♀ (00170172) (AMNH). **Virginia:** ***Arlington Co.:*** Chain Bridge, 38.92959° N 77.11684° W, 5 m, 05 Jun, N. Banks, 1♀

(00170178) (AMNH); 05 Jun 1906, D.H. Clemons, 1♂ (00069926) (USNM). Glencarlyn, 38.86167° N 77.12944° W, 30 May, N. Banks, 1♂ (00170130) (AMNH); 30 May 1906, D.H. Clemons, 1♀ (00069965) (USNM). ***Fairfax Co.:*** Annandale, off of Duncan Drive, 2 mi from Rt 236, 38.82292° N 77.23005° W, 81 m, 28 May 2004, K. Menard, 1♀ (00133931) (USNM). **Washington:** ***Columbia Co.:*** Dayton, 46.32389° N 117.97139° W, 1447 m, 06 Jul 1937, R.E. Miller, paratypes, 2♂ (00134166–00134167), 1♀ (00134168) (USNM). **West Virginia:** ***Jefferson Co.:*** Halltown, 39.3139° N 77.7977° W, 125 m, 03 Jun 1907, L.J. Condit, 1♂ (00134487) (USNM). ***Mineral Co.:*** Elk Garden, 39.3817° N 79.155° W, 701 m, 25 Jun 1968, R. and E. Froeschner, 1♂ (00133743) (USNM). ***Monongalia Co.:*** Monongalia County, no specific locality, 39.629° N 79.956° W, 275 m, 19 May 1983–17 Jul 1983, T.L. Mason, Jr., 1♂ (USNM). ***Pendleton Co.:*** Seneca Creek, 38.71589° N 79.54716° W, 1158 m, 26 Jun 1966, O.R. Taylor, 1♀ (00170162) (AMNH). ***Pocahontas Co.:*** Cranberry Glades (Visitor Center), 38.20083° N 80.26833° W, 04 Jun 1955, H.V. Weems, Jr., 1♀ (00243726) (FSCA). Edray, 38.27456° N 80.09145° W, 734 m, 04 Jul 1986, Larochelle and Lariviere, 1♂ (00113946) (CNC). ***Preston Co.:*** Preston County, no specific locality, 39.471° N 79.683° W, 552 m, 19 May 1983–17 Jul 1983, T.L. Mason, Jr., 1♂ (USNM). ***Randolph Co.:*** Dryfork, 38.96872° N 79.50283° W, 672 m, 02 Jul 1986, Larochelle and Lariviere, 1♀ (00113947) (CNC). ***Ritchie Co.:*** Ritchie County, no specific locality, 39.209° N 81.051° W, 259 m, 19 May 1983–17 Jul 1983, T.L. Mason, Jr., 1♂ (USNM). ***Tucker Co.:*** Tucker County, no specific locality, 39.096° N 79.681° W, 505 m, 19 May 1983–17 Jul 1983, T.L. Mason, Jr., 1♂ (USNM). **Wisconsin:** ***Columbia Co.:*** Columbia County, no specific locality, 43.54988° N 89.48469° W, 250 m, Jul 1963, T.R. Yonke, 1♂ (00243095) (UMRM). ***Dane Co.:*** Dane County, no specific locality, 43.07431° N 89.48423° W, 305 m, 04 Jul 1962, T.R. Yonke, 1♂ (00243097) (UMRM); 17 Jun 1970, A.E. Akingbohungbe, 1♀ (00242069) (IRCW). Madison, 43.0454° N 89.42727° W, 279 m, 03 Jun 1948, W.S. Marshall, 1♂ (00242062) (IRCW). Madison, University of Wisconsin Arboretum, Wingum Marsh - Stevens Pond, 43.0486° N 89.4366° W, 267 m, 26 Jun 1967, C.B., D.W. Schwehr, 1♂ (00242063) (IRCW). ***Jefferson Co.:*** Fort Atkinson, 42.9312° N 88.8587° W, 259 m, 17 Jun 1916, J.G. Sanders, 1♂ (00242065) (IRCW). Jefferson County, no specific locality, 43.0127° N 88.7925° W, 259 m, 14 Jun 1962, J.T. Medler, 1♂ (00242064) (IRCW). ***Kenosha Co.:*** Benedict Prairie, E of Woodworth, 42.55754° N 87.9931° W, 223 m, 16 Jun 1998, W. Suter, 2♀ (00242054–00242055) (IRCW). Chiwaukee Prairie, T1N R23E Sec32 U:5, S of Phil Sander W of 2nd Ave., 42.5057° N 87.81364° W, 176 m, 11 Jul 1996, unknown, 1♂ (00242052), 1♀ (00242053) (IRCW). Kenosha, 42.5731° N 87.8716° W, 213 m, 12 Jun 1970, A.E. Akingbohungbe, 1♀ (00242068) (IRCW). ***Outagamie Co.:*** Mack State Wildlife Area, 44.4622° N 88.5123° W, 233 m, 15 Jun 1999, K. Kirk, 2♂ (00242056–00242057) (IRCW). ***Rock Co.:*** Janesville, 42.6724° N 89.0057° W, 244 m, 17 Jun 1916, J.G. Sanders, 1♀ (00242067) (IRCW). ***Walworth Co.:*** Young Prairie, T4N R16E Sec5 NW4, 42.84702° N 88.63678° W, 246 m, 14 Jun 1995, unknown, 4♂ (00242046–00242049), 2♀ (00242050–00242051) (IRCW). ***Waukesha Co.:*** Waukesha County, no specific location, 42.98837° N 88.19392° W, 272 m, 26 Jul 1962, T.R. Yonke, 1♂ (00243096) (UMRM). **Wyoming:** ***Albany Co.:*** Albany County, no specific locality, 41.66639° N 105.70055° W, 2133 m, 12 Aug 1952, R.R. Dreisbach, 1♂ (00127497), 1♀ (00127498) (UMMC). ***Big Horn Co.:*** Big Horn Mountains, 44.75499° N 107.78239° W, 1981 m, 17 Aug 1927, H.H. Knight, 1♂ (00134266) (USNM). ***Crook Co.:*** Sundance, 44.40639° N 104.37528° W, 30 Jul 1927, H.H. Knight, 2♂ (00134248–00134249), 3♀ (00134250–00134251, 00134265) (USNM). ***Fremont Co.:*** Shoshone National Forest, 43.80913° N 109.56306° W, 14 Aug 1927, H.H. Knight, paratype, 1♂ (00093776) (TAMU), 1♂ (00134169), paratypes, 5♂ (00134242–00134246), 1♀ (00134247) (USNM). ***Lincoln Co.:*** Alpine Junction, 43.17242° N 111.01854° W, 1725 m, 08 Aug 1972, L.A. Kelton, *Solidago* sp., 1♂ (00113954) (CNC). ***Niobrara Co.:*** Niobrara Co. stop 13, 42.78033° N 104.47246° W, 1568 m, 07 Jul 1943, R.E. Pfadt, 1♂ (00116600) (ESUW).



Map 6. Localities for *Slaterocoris atritibialis* and *S. breviatus*.

Niobrara Co. stop 25, 42.78033° N 104.47246° W, 1568 m, 08 Jul 1943, R.E. Pfadt, 1♀ (00116601) (ESUW). ***Park Co.:*** Yellowstone National Park, 44.76667° N 110.23333° W, 16 Jul 1920, A.A. Nichol, paratype, 1♀ (00134172) (USNM). ***Sheridan Co.:*** Sheridan, 44.79722° N 106.95556° W, Metz, 3♂ (00121664–00121666), 1♀ (00121667) (CAS); 25 Jun 1947, O.A. Hills, 1♂ (00134297) (USNM). ***Teton Co.:*** Grand Teton National Park, Teton Science School near Kelly, 43.62306° N 110.62278° W, 24 Jul 1982–25 Jul 1982, S.C. Williams, 3♂ (00121670–00121672), 1♀ (00121673) (CAS). Jackson, 43.5000° N 110.76666° W, 1920 m, 13 Jul 1920–17 Jul 1920, unknown, 1♂ (00170121) (AMNH). ***Uinta Co.:*** Fort Bridger, 41.31662° N 110.38432° W, 2034 m, 13 Jul 1965, Harry H. Knight, 1♀ (00134278) (USNM). ***Unknown co.:*** Wyoming, 16 Jul 1949, W.F. Chamberlain, 1♂ (00093789) (TAMU).

Slaterocoris breviatus (Knight)
Figures 13, 31, 32; plates 1, 4D; map 6

Strongylocoris stygicus: Van Duzee: 1921: 135 (disc., in part).

Strongylocoris atratus: Van Duzee: 1921: 135 (disc., in part).

Strongylocoris breviatus Knight, 1938: 1, fig. 3 (orig. desc.).

Slaterocoris breviatus: Kelton, 1968: 1132, fig. 20 (disc.); Knight, 1970: 245, fig. 10 (disc.); Reid, 1974: 239 (parasit.); Reid et al., 1976: 561 (biol.); Messina, 1978: 139 (biol.); Henry and Smith, 1979: 215 (list); Snodgrass et al., 1984: 854 (list); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 197 (catalog); Henry et al., 2005: 63 (list).

Slaterocoris rarus Knight, 1970: 257, fig. 44 (orig. desc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

Slaterocoris minimus Knight, 1970: 258, fig. 46 (orig. desc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

DIAGNOSIS: Usually distinguished by the coloration of the antenna with segment I yellowish brown with black base and segment II brown to black with yellow on basal half; sometimes antennal segment II strikingly pale yellow with black basal annulus and black distal half, or sometimes western specimens with segments I and II completely

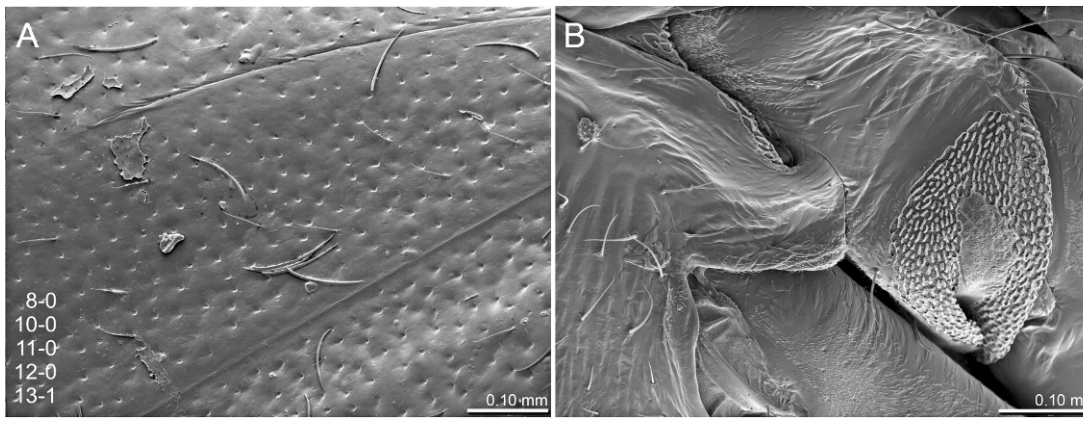


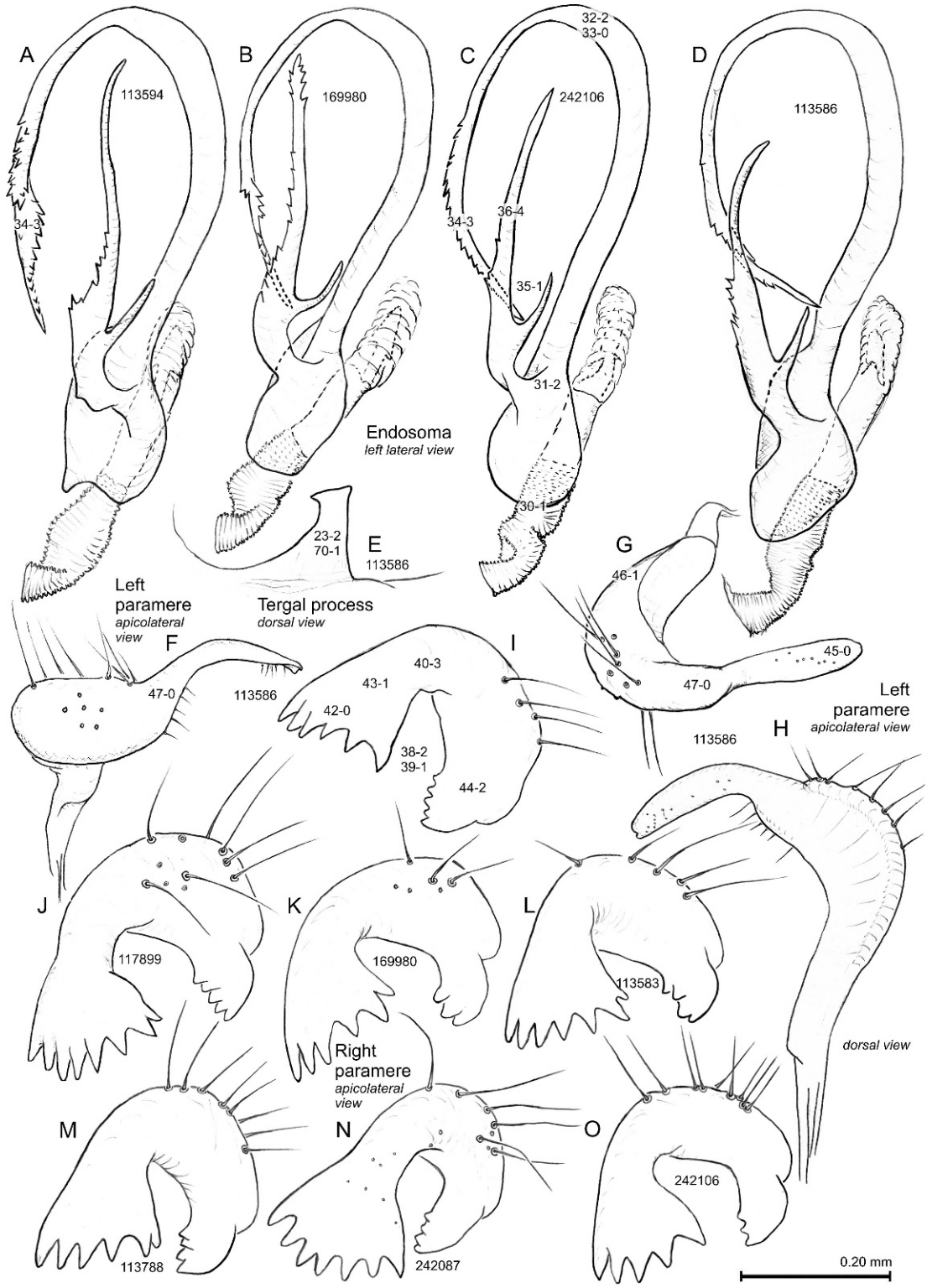
Fig. 31. *Slaterocoris breviatus*, scanning electron micrographs. **A**. Hemelytron, sculpturation and setae, dorsal view. **B**. mesothoracic spiracle and metathoracic scent-efferent system, lateral view.

black; legs black with femora pale yellow apically, tibiae yellow with black apex, tarsomeres I and II pale yellow; sometimes legs darker with apical portion of femora, tibiae, and tarsomeres dusky yellowish brown; and the male genitalia with apical region of right paramere a tightly grouped collection of short, roughly equal length spines (fig. 32I–O), endosomal spicule with dorsal lobe bifurcate, lateral ramus large, narrow distally, marginally serrate; ventral lobe narrow distally, strongly serrate and subapical region narrow (fig. 32A–D). The apical spines of the right paramere shorter than in other species in *stygicus* group (42-0).

REDESCRIPTION: *Male:* Moderately large, obovate, length 3.83–4.60, width 1.34–1.58 (pl. 1). COLORATION: Shining black, except for antennal segment I yellowish brown with black base, segment II with basal half and or narrow band at apex and base, yellowish brown; sometimes western specimens with segment I and II black; legs with femoral apices yellowish brown, tibiae yellowish brown with black apices, basal half usually reddish brown to black; especially in western specimens, tarsomeres I and II yellow (fig. 13). VESTITURE: Sparsely distributed, short, pale brown setae (pl. 4D). STRUCTURE: Frons faintly striate to rugose; labium reaching base of middle coxa; mesothoracic spiracle and metathoracic scent-efferent system as in figure 31B; costal margin slightly arcuate. GENITALIA: **Tergal process**: Short with two small apical points. **Endosomal spicule**: Distal marginal serration of ventral lobe usually wrapped around lobe from lateral to medial surface (fig. 32A, B); lateral ramus of dorsal lobe long, usually narrow, without marginal serration and attenuate distally with base slightly broad with marginal serration on lateral surface (fig. 32A, B), sometimes distal portion flattened with limited marginal serration and base not expanded or serrate (fig. 32C, D); medial ramus of dorsal lobe short, attenuate, smooth. **Right paramere**: Apical region with five to eight points of equal length; points on same plane; basal lobe with serrate region broad basally, not constricted, serrate on posterior surface (fig. 32I–O). **Left paramere**: Distal portion region relatively short and bent in comparison to other *breviatus*-group species (fig. 32F, G).

Female: Moderately large, obovate; length 3.70–4.60, width 1.86–2.30 (pl. 1). COLORATION: Antennal segment I and II more yellow than black base with black annulus; apices of femur and entire tibia usually yellow. GENITALIA: As in species group except: **First gonapophyses**: Right greater than left at overlap. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Posteromedial portion with tumid process abutting ovipositor bulb.

HOSTS: Across the range of *S. breviatus*, the predominance of records indicate that species of *Solidago*, and where specific determinations exist, *S. gigantea* and *S.*


A
113594
34-3
B
169980
C
32-2
33-0
242106
34-3
36-4
35-1
31-2
30-1
D
113586
Endosoma
left lateral view
23-2
70-1
E
113586
Tergal process
dorsal view
G
46-1
45-0
47-0
Left
paramere
apicolateral
view
F
47-0
113586
I
40-3
43-1
42-0
38-2
39-1
44-2
113586
H
Left
paramere
apicolateral view
dorsal view
J
117899
K
169980
L
113583
Right
paramere
apicolateral
view
M
113788
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242087
O
242106
0.20 mm

canadensis, are the breeding hosts. Far fewer specimens were also taken on seven other genera of Asteraceae: *Ambrosia* (an unidentified sp. and *A. trifida*), *Cirsium arvense*, *Erigeron* sp., *Eurybia macrophylla*, *Helianthus* (an unidentified sp. and *H. tuberosus*), *Polymnia canadensis*, and *Rudbeckia laciniata*. The lesser number of incidences on these other Asteraceae and the non-asteraceous plants are all considered to be sitting records.

DISTRIBUTION: From central British Columbia spanning east across the Prairie Provinces (as far north as 55.7° N in Alberta) to the Great Lakes region. Occurring in the east across New Brunswick, Gaspé, Quebec to Cape Breton Island, Nova Scotia. Widely distributed across the northeast and upper midwest in the U.S. and as far south as northern Georgia (or eastern Florida [00134591] not on map 6 because of the ambiguous label), with sporadic records west across Mississippi to east Texas. Known records are sparsely distributed in the Rocky Mountain cordillera from southern Colorado, north through Colorado to Montana, and as far west as Idaho (map 6).

COLLECTION SUMMARY: 2074 (34% with USI numbers) from 580 collection events, almost all the records being from June to August regardless of latitude or elevation.

DISCUSSION: Previous keys to *Slaterocoris* (Knight, 1941, 1970; Kelton, 1980) distinguished *S. breviatus* from *S. stygicus* by the yellow hind tibiae of the former. Sometimes the basal halves of the hind tibiae in these species are darkened or in males from the Rocky Mountains and western Canada west to the Pacific coast usually do not have any pale coloration on the tibiae as is typical of those east of approximately 100° W. The antennal coloration of *S. breviatus* is also variable. In the east, segments I and II are pale yellow with a black basal annulus and distinct black band, respectively; in a male paratype from Slave Lake, Alberta, and others from Idaho and Manitoba segments I and II are completely black.

Knight (1970) recognized two monotypic species, *S. minimus* and *S. rarus*, by the vestiture, coloration of the antennae and legs, antennal segment II length, and the structure of the right paramere. Both species are practically glabrous, with vestiture of short and purportedly pale yellowish simple setae, antennal segment I yellow with black base, segment II predominantly yellow basally with black basal annulus and distal region, and legs with femora black and apically pale yellow and tibiae pale. In *S. minimus*, antennal segment II is longer than the head width, in *S. rarus* segment II is subequal to the head. The apical region of the right paramere is fan shaped with six small spines and the basal lobe is prominent in *S. minimus*. The parameres in *S. rarus* are peculiar with the dorsal lobe of left paramere prominently produced and the right paramere with two apical spines and the prominent basal lobe with a narrow spine. Examination of the holotypes revealed that both have imperceptibly dark vestiture. All the characters listed above are well within the diagnosis of *S. breviatus*, except for the unique paramere structure of *S. rarus*. Knight waited in vain to find another specimen with similar parameres: "This specimen was taken in my first year of specialized collecting of Miridae. I eventually collected all known eastern species of *Slaterocoris*, but of *rarus* I never collected another specimen, nor have I seen a second specimen of this species." The paramere structure in my option is aberrant, a condition also known in *S. sheridani* (cf. fig. 46D, arrow). The measurements for *S. minimus* are at the minimum taken for *S. breviatus* (see table 3). Based on this discussion I consider *S. minimus* and *S. rarus* junior synonyms of *S. breviatus*.

Variation in the male genitalia of *S. breviatus* is limited to the number of apical spines, regardless of the number of spines all are short and in a fanlike conformation from across the distribution of *S. breviatus*. The

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Fig. 32. *Slaterocoris breviatus*, male genitalia. **A**. Progress, BC. **B**, **K**. Cedar Creek Recreation Area, ID. **C**, **O**. Peshtigo River, WI. **D**–**F**, **I**. Washington, DC. **J**. Pine Grove Furnace State Park, PA. **L**. Slave Lake, AB. **M**. Ingonish, NS. **N**. Chiwaukee Prairie, WI.

extent of serration on the basal lobe is also variable. Figures 32I–O provide documentation of the right paramere for individuals from Nova Scotia, District of Columbia, Pennsylvania, Wisconsin, Idaho, and Alberta. The holotype of the nominal species *minimus* from Wisconsin has six apical spines; other males from that state have five to seven spines (cf. fig. 32N, O). The endosomal spicule has variable thickness of the apical portion of the ventral lobe and density of marginal serration on the lateral ramus of the dorsal lobe (cf. fig. 32A–D).

The population dynamics of *S. breviatus* was examined in three ecological studies focused on the plant bug associates of goldenrod (Reid, 1974; Reid et al., 1976; Messina, 1978; see Biology above).

HOLOTYPES: **USA: District of Columbia:** Washington DC [38.89178° N 77.00831° W], 02 Jul 1926, H.H. Knight, 1♂ (AMNH_PBI 00134027) (USNM) (*S. breviatus*: senior synonym). ***Genesee Co.:*** Batavia [42.99806° N 78.18778° W, 271 m], 30 Jul 1915, H.H. Knight, 1♂ (AMNH_PBI 00122260) (USNM) (*S. rarus*: junior synonym). **Wisconsin:** ***Forest Co.:*** Peshtigo River [45.50464° N 88.42576° W], 29 Jun 1970, A.E. Akingbohungbe, 1♂ (AMNH_PBI 00122255) (USNM) (*S. minimus*: junior synonym).

OTHER SPECIMENS EXAMINED: **CANADA: Alberta:** 3.8 km S of Drumheller on Rt 56, 51.42762° N 112.64248° W, 677 m, 14 Jul 1990, M.D. Schwartz and R.G. Foottit, *Symphoricarpos occidentalis*, 2♂ (00113617–00113618) (CNC). 6.7 km W of Meyerthrope on Rt 43, 54.01256° N 115.25625° W, 733 m, 23 Aug 1993, M.D. Schwartz, *Solidago gigantea*, 1♂ (00113614) (CNC). Banff Springs, 51.41661° N 116.21339° W, 1710 m, 24 Jul 1923, Ralph Hopping, 1♀ (00133734) (USNM). Cypress Hills, 49.63° N 110.2000° W, 21 Jul 1936, J.H. Pepper, 1♂ (00113609) (CNC). Cypress Hills Provincial Park, Horseshoe Canyon Overlook, 49.64732° N 110.32324° W, 1433 m, 03 Sep 1993, M.D. Schwartz, *Solidago* spp., 1♂ (00113620) (CNC). Elkwater Lake, Cypress Hills Provincial Park, 49.66293° N 110.30167° W, 1219 m, 19 Jul 1956, O. Peck, 2♂ (00113602, 00113610) (CNC); 20 Jul 1956, O. Peck, 1♂ (00113603) (CNC). Elkwater Park, Cypress Hills Provincial Park, 49.63° N 110.2000° W, 1427 m, 07 Jul 1952, A.R. Brooks, *Solidago* sp., 1♂ (00113606) (CNC); 07 Jul 1952, L.A. Konotopetz, *Solidago* sp., 1♂ (00113604) (CNC); 20 Jul 1952, L.A. Konotopetz, 1♂ (00113601) (CNC); 20 Jul 1952, A.R. Brooks, 1♂ (00115515) (CNC); 29 Jul 1952, L.A. Konotopetz, *Solidago* sp., 1♂ (00113607) (CNC). Elkwater Park near campground stream, 49.66041° N 110.29433° W, 1234 m, 16 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113616) (CNC). Grande Prairie, 55.16666° N 118.8000° W, 26 Jul 1961, A.R. Brooks, 1♂ (00113605) (CNC). High Prairie, 55.43333° N 116.48333° W, 16 Jul 1961, A.R. Brooks, 1♀ (00318774) (CNC); 17 Jul 1961, A.R. Brooks, 1♂ (00113599) (CNC). Medicine Hat, 50.03333° N 110.68333° W, 10 Aug 1929, J.H. Pepper, 1♀ (00113612) (CNC). Red Deer, 52.27024° N 113.80469° W, 856 m, 25 Jun 1957, Brooks and McNay, 1♀ (00113546) (CNC). Rycroft, 55.76666° N 118.71666° W, 21 Jun 1961, A.R. Brooks, 1♀ (00113613) (CNC); 07 Aug 1961, A.R. Brooks, 1♂ (00113600) (CNC). Slave Lake, 55.41666° N 115.5000° W, 14 Aug 1924, O. Bryant, paratypes, 2♂ (00113583–00113584), 2♀ (00113587–00113588) (CNC); 17 Aug 1924, O. Bryant, 1♂ (00117893) (KU); 16 Jul 1949, unknown, *Rubus* sp. (Rosaceae), 1♂ (00113615) (CNC). Stettler, 52.33333° N 112.68333° W, 03 Aug 1957, A. and J. Brooks, 1♀ (00113611) (CNC). Steveville, 50.83° N 111.62° W, 21 Aug 1957, A.R., J.E. Brooks, 1♂ (00113608) (CNC). Wabamun, 53.55081° N 114.48771° W, 734 m, 21 Aug 1963, G.G.E. Scudder, 1♂ (00113597) (CNC). Waterton Park, Blood Indian Reserve 148A, at Belly River nr Rt 6, 49.04697° N 113.68573° W, 1373 m, 03 Aug 1994, M.D. Schwartz, *Solidago canadensis*, 1♂ (00113619) (CNC). **British Columbia:** 100 Mile House, 51.65° N 121.28333° W, 20 Jul 1978, unknown, 1♂ (CNC). Canim Lake, 51.85° N 120.75° W, 23 Jun 1938, J.K. Jacob, 1♀ (00113596) (CNC). Chilcotin, 52.11549° N 122.56238° W, 1020 m, 28 Jul 1920, E.R. Buckell, 1♀ (00133735) (USNM). Midday Creek, 49.9833° N 120.93329° W, 11 Aug 1920, unknown, 1♂ (UBC). Progress, 55.78088° N 120.71081° W, 729 m, 26 Aug 1993, M.D. Schwartz, *Solidago canadensis*, 9♂ (00113593–00113594, 00317200–00317206), 10♀ (00113595, 00317207–00317215) (CNC).

Manitoba: 2 mi N of Forrest, 49.99521° N 99.93529° W, 453 m, 19 Jul 1958, R.B. Madge, 1♂ (00113646) (CNC). 5 mi NE of Rt 59 off of Rt 209, 49.08004° N 96.7016° W, 296 m, 07 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113641) (CNC). 5 mi SW of Shilo, 49.74888° N 99.71243° W, 02 Aug 1958, R.B. Madge, 1♀ (00113658) (CNC); 11 Aug 1958, J.G. Chillcott, 1♀ (00113657) (CNC); 13 Aug 1958, J.G. Chillcott, 1♀ (00113660) (CNC). 31 km N of Tolstoi on Rt 59, 49.39163° N 96.98382° W, 239 m, 07 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113640) (CNC). Angusville, 50.73555° N 101.02055° W, 20 Jul 1954, Brooks, Wallis, 2♂ (00113651, 00113655) (CNC). Audy Lake, Riding Mountain National Park, 50.75° N 100.24972° W, 12 Aug 1958, J.G. Chillcott, 1♂ (00113647) (CNC). Boissevain, 49.23333° N 100.05° W, 17 Jul 1953, Brooks and Kelton, *Solidago* sp., 1♂ (00113652) (CNC). Carberry, 49.86666° N 99.35° W, 29 Jul 1953, Brooks and Kelton, 1♂ (00113648) (CNC). East Braintree, 49.61666° N 95.61666° W, 30 Jun 1972, L.A. Kelton, *Solidago* sp., 1♂ (00113115) (CNC). Falcon Lake, 49.7000° N 95.25° W, 04 Jul 1972, L.A. Kelton, 1♂ (00317199) (CNC). Horton, 49.16666° N 100.05° W, 28 Jul 1958, A. and J. Brooks, 2♂ (00113644, 00113654) (CNC). Ninette, 49.4000° N 99.63333° W, 15 Jul 1958, J.G. Chillcott, *Populus* sp. (Salicaceae), 1♀ (00113659) (CNC). Riding Mountain National Park, 5 mi W of Norgate, 50.67841° N 99.57626° W, 545 m, 12 Aug 1958, J.G. Chillcott, 1♂ (00113645) (CNC). Riding Mountain National Park, Boreal Island Nature Trail, 77 km N of Minnedosa on Rt 10, 50.8741° N 100.05757° W, 679 m, 20 Aug 1993, M.D. Schwartz, *Solidago* sp., 1♂ (00113639), 1♀ (00113554), 1♂ (00318777) (CNC). Russell, 50.78333° N 101.28333° W, 17 Jul 1954, Brooks and Wallis, 2♀ (00113656, 00318775) (CNC). Turtle Mountain, 49° N 100.33333° W, 17 Jul 1953, Brooks and Kelton, 1♂ (00113650), 1♀ (00318776) (CNC); 18 Jul 1953, Brooks and Kelton, 1♂ (00113649), 1♀ (00113556) (CNC); 21 Jul 1953, Brooks and Kelton, 1♂ (00113653), 1♀ (00113557) (CNC). Turtle Mountain Forest Reserve, International Peace Gardens, 49° N 100.33333° W, 17 Jul 1958, J.G. Chillcott, 1♂ (00242572) (CAS), 1♂ (00113642) (CNC); 07 Aug 1958, R.L. Hurley, 1♂ (00242573), 1♀ (00242574) (CAS), 1♂ (00113643) (CNC). **New Brunswick:** 2 km NW of Saint Jacques on Rt 2, 47.4485° N 68.41302° W, 152 m, 22 Jul 1995, M.D. Schwartz, 1♀ (00113818) (CNC). Bathurst, 47.6000° N 65.65° W, 10 Aug 1939, J. McDunnough, 2♂ (00113811, 00317217) (CNC). Berwick, 45.03333° N 64.73333° W, 02 Aug 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113809) (CNC). Chamcook, 45.11635° N 67.06281° W, 4 m, 03 Aug 1957, G.E. Shewell, 1♂ (00113812) (CNC). Fredericton, 45.95° N 66.63333° W, 01 Aug 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113810) (CNC). Fundy National Park, 45.62° N 65.03° W, 25 Aug 1976, L.A. Kelton, 1♂ (00113813) (CNC); 08 Jul 1977, L.A. Kelton, 1♀ (00113806) (CNC). Nespec Brk, 08 Aug 1953, J.F. Brimley, 1♂ (00113814) (CNC). Saint Andrews, 45.06666° N 67.03333° W, 09 Aug 1957, G.E. Shewell, 1♂ (00113808) (CNC), 1♂ (00121794) (UCB). Upper Kent, 46.56672° N 67.71666° W, 66 m, 03 Jul 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113354) (CNC). Wolf Lake, 45.25° N 66.2667° W, 13 Aug 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113352), 1♀ (00318761) (CNC). Woodman Cors., 46.15004° N 67.26657° W, 152 m, 05 Aug 1954, J.F. Brimley, 1♀ (00113817) (CNC); 06 Aug 1954, J.F. Brimley, 1♀ (00113816) (CNC). **Nova Scotia:** Barton, 44.53667° N 65.8736° W, 22 m, 18 Jul 1966, L.A. Kelton, 1♂ (00113805) (CNC). Beddeck, 46.10899° N 60.7646° W, 78 m, 17 Jul 1936, T.N. Freeman, 1♂ (00113783) (CNC). Bible Hill, 45.37° N 63.28° W, 12 Jul 1966, L.A. Kelton, Asteraceae, 1♂ (00113782) (CNC). Bible Hill, Nova Scotia Agriculture College, 45.37772° N 63.26622° W, 24 m, 03 Aug 2001, A.G. Wheeler, Jr., *Cirsium arvense*, 1♂ (00069994) (USNM). Cape Breton Highlands National Park, 46.74158° N 60.64672° W, 499 m, 22 Aug 1983, M. Sharkey, 1♂ (00113786) (CNC). Cape Breton Highlands National Park, Cheticamp River, TP67, 46.64135° N 60.95284° W, 11 m, 12 Jul 1983, L. LaSage, *Spiraea alba var. latifolia* Du Roi (Rosaceae), 1♀ (00113807) (CNC). Ingonish, 46.68333° N 60.36666° W, 02 Aug 1976, L.A. Kelton, *Solidago* sp., 1♂ (00113788) (CNC). Kentville, 45.06666° N 64.5000° W, 06 Aug 1958, J.R. Vockeroth, 1♂ (00113784) (CNC); 15 Jul 1966–17 Jul

1966, L.A. Kelton, 1♂ (00113804) (CNC); 03 Jul 1976–06 Jul 1976, L.A. Kelton, 1♂ (00113803) (CNC); 10 Jul 1976–14 Jul 1976, L.A. Kelton, 1♂ (00113789) (CNC). Middle River, 46.15703° N 60.92426° W, 31 m, G.B. Fairchild, 1♂ (00169955) (AMNH). Mount Uniacke, 44.88333° N 63.83333° W, 13 Jul 1966–14 Jul 1966, L.A. Kelton, 1♂ (00113787) (CNC). New Harris C[ape]. B[reton]. H[ighlands]., 46.23976° N 60.49829° W, 11 m, 23 Jul 1966, L.A. Kelton, Asteraceae, 1♂ (00113780) (CNC). Portapique, 45.40474° N 63.70391° W, 16 m, 30 Jul 1929, C.A. Frost, paratype, 1♀ (00134540) (USNM). Shelburne, 43.76666° N 65.31666° W, 29 m, 10 Aug 1958, J.R. Vockeroth, 1♂ (00113785) (CNC). Truro, 45.36666° N 63.3000° W, 07 Aug 1913, unknown, 1♀ (00116290) (CUIC); 16 Aug 1913, R. Matheson, 1♂ (00116287) (CUIC); 26 Aug 1913, R. Matheson, 1♀ (00116291) (CUIC); 04 Aug 1917, unknown, 1♂ (00242521) (CAS); Aug 1967, N.L.H. Krauss, 1♂ (00069943) (USNM). Wentworth, 45.63126° N 63.55485° W, 45 m, 12 Aug 1966, L.A. Kelton, 1♂ (00113781) (CNC). Woodville, 45.03° N 63.93° W, 20 Jul 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113779) (CNC). **Ontario:** Almonte, 45.21666° N 76.2000° W, 28 Jun 1974, D.J.E. Brown, 1♂ (00113726) (CNC). Belfountain, 43.79408° N 80.01232° W, 366 m, 17 Aug 1982, A.W. Schaafsma, 1♀ (00329677) (DEBU). Cambridge, 43.35909° N 80.31967° W, 279 m, 22 Jul 1975, W.J. Moolenbeck, 1♀ (00329678) (DEBU). Carp, 45.35° N 76.03333° W, 22 Jun 1981, D.J.E. Brown, (Poaceae), 1♂ (00113672) (CNC). Chalk River, 46.01666° N 77.45° W, 20 Jul 1961, G. Brumpton, 1♀ (00113697) (CNC). Chatterton, 44.25° N 77.48° W, 25 Jul 1956, J.C. Martin, 1♂ (00113710) (CNC). Coldwater, 44.70868° N 79.63792° W, 183 m, 20 Jul 1978, T. Friesen, 2♀ (00329674–00329675) (DEBU). Craighurst, 44.52923° N 79.72369° W, 279 m, 30 Aug 1963, G.G.E. Scudder, 1♀ (00113598) (CNC). Dashwood, 43.35° N 81.63° W, 12 Jul 1962, Kelton and Thorpe, *Salix* sp. (Salicaceae), 1♂ (00113706) (CNC). Delhi, 42.85° N 80.5000° W, 20 Jul 1955, L.A. Kelton, 1♂ (00113714) (CNC). Dorset, 45.24375° N 78.89502° W, 323 m, 21 Aug 1977, P. Wallis, 3♀ (00329868–00329870) (DEBU); 21 Aug 1977, P.R. Nuttall, 1♀ (00329871) (DEBU); 21 Aug 1977, M.K. Sears, 1♂ (00329867) (DEBU). Eden, 42.8000° N 80.75° W, 02 Jul 1962, G. Thorpe, 1♂ (00113670) (CNC). Edwards, Patterson's Farm, 45.31045° N 75.46232° W, 77 m, 23 Jun 1991, M.D. Schwartz, *Solidago* sp., 1♂ (00113722) (CNC); 20 Jul 1991, M.D. Schwartz, 1♀ (00317216) (CNC). Elora, 43.68242° N 80.43364° W, 384 m, 27 Jul 1975, L.A. Barlow, 1♂ (00329664) (DEBU). Essex Co., Point Pelee National Park, White Pine Trail, 41.94365° N 82.51994° W, 175 m, 05 Jun 2000, E. Reichert, 1♀ (00329683 [cat debu01002677]) (DEBU). Exeter, 43.35° N 81.48333° W, 12 Jul 1962, Kelton and Thorpe, 1♀ (00113677) (CNC). Fergus, 43.7000° N 80.36666° W, 24 Jul 1962, Kelton and Thorpe, *Erigeron* sp., 1♂ (00113664) *Erigeron* sp., 1♂ (00113707) (CNC); 01 Aug 1996, S. Marshall, 2♀ (00329670–00329671) (DEBU). Fonthill, 43.03333° N 79.28333° W, 16 Jul 1915, H.G. Crawford, 1♂ (00113701) (CNC). Fort Frances, 48.61666° N 93.41666° W, 30 Jul 1960–31 Jul 1960, Kelton and Whitney, 1♀ (00113682) (CNC). Foxboro, 44.25° N 77.43° W, 07 Jul 1970, D.G. Reid, *Solidago* sp., 1♀ (00113737) (CNC). Foxboro, 44.24623° N 77.4339° W, 111 m, 22 Jun 1970, D.G. Reid, *Solidago* sp., 1♀ (00113731) (CNC); 24 Jun 1970, D.G. Reid, *Solidago* sp., 1♂ (00113733) (CNC). Fuller, 44.4000° N 77.42° W, 18 Jul 1968, C.C. Loan, *Solidago* sp., 1♂ (00113734) (CNC); 31 Jul 1968, C.C. Loan, *Solidago* sp., 1♂ (00113738) (CNC); 02 Jul 1971, D.G. Reid, *Solidago* sp., 1♀ (00113730) (CNC); 11 Jul 1971, D.G. Reid, *Solidago* sp., 1♂ (00113735) (CNC); 12 Jul 1971, D.G. Reid, *Solidago* sp., 1♂ (00113736) (CNC); 26 Jul 1971, D.G. Reid, *Solidago* sp., 1♀ (00113732) (CNC). Goderich, 43.73333° N 81.7000° W, 02 Jul 1962, H. Blanchard, 1♂ (00113702) (CNC). Greensville, 43.2825° N 79.99361° W, 240 m, 16 Jun 1962, L.A. Kelton, G. Brumpton, 1♀ (00113688) (CNC). Grimsby, 43.19271° N 79.56226° W, 93 m, 29 Jun 1913, J.F. Brimley, 1♀ (00133736) (USNM); 11 Jul 1955, L.A. Kelton, *Solidago* sp., 1♀ (00113674), 1♂ (00113673) (CNC). Guelph, 43.53433° N 80.21791° W, 335 m, 21 Jul 1992, R.W. Burgess, 1♀ (00329865) (DEBU). Guelph, 43.55° N 80.25° W, 323 m, 12 Jul 1931, R.H. Ozburn, 5♂ (00382332–00382336), 5♀ (00382337–00382341)

(DEBU); 06 Jul 1979, K.L. Bailey, 1♀ (00329866) (DEBU); 02 Jul 1983, R.D. Smith, 1♂ (00329864) (DEBU). Guelph University, Arboretum, 43.54115° N 80.21576° W, 335 m, 17 Jul 1990, M. Montes-Castillo, 2♂ (00329862–00329863) (DEBU). Hastings County, 44.50833° N 77.475° W, 05 Jul 1954, J.F. Brimley, 1♂ (00113728) (CNC). Ipperwash, 43.20805° N 81.97639° W, 185 m, 11 Jul 1962, Kelton and Thorpe, *Solidago* sp., 1♀ (00113675) (CNC). Jordan, 43.15° N 79.38° W, 15 Jul 1915, H.G. Crawford, 1♂ (00113715) (CNC); 10 Jul 1979, K.R. Fisher, 2♀ (00329672–00329673) (DEBU). Kelso, 43.49848° N 79.94813° W, 262 m, 23 Jul 1981, C. Farivar, 1♀ (00329682) (DEBU). Kingsville, 42.03333° N 82.75° W, 19 Jun 1962, Kelton and Thorpe, 1♀ (00113686) (CNC). Lambton Co., Port Franks, Watson Property nr L-lake, 43.21741° N 81.88481° W, 189 m, 22 Jul 1996, J. Skevington, 1♂ (00329665) (DEBU). Leamington, 42.05° N 82.58333° W, 05 Jun 1961–06 Jun 1961, L.A. Kelton, 1♂ (00113667) (CNC). Marmora, 44.48333° N 77.68333° W, 10 Jul 1952, C. Boyle, 1♂ (00113665) (CNC). Mattawa, 46.31306° N 78.09693° W, 169 m, 27 Jul 1962, Kelton and Thorpe, 1♂ (00113663) (CNC). Meaford, 44.6000° N 80.58333° W, 17 Jul 1975, W.J. Moolenbeck, 1♀ (00329681) (DEBU). Midland, 44.75° N 79.9000° W, 20 Jul 1978, T.G. Friesen, 1♀ (00329680) (DEBU). Motherwell, 43.34611° N 81.18781° W, 318 m, 20 Jun 1962, L.A. Kelton, G. Brumpton, 1♂ (00113668) (CNC). Musk[oka] [District], Dwight, 45.33126° N 79.01504° W, 326 m, 13 Jul 1998, D. Tozer, 1♀ (00329676) (DEBU). New Liskeard, 47.5000° N 79.66666° W, 19 Jul 1961, G. Brumpton, 1♀ (00113676) (CNC). Newry, 43.65° N 81.03° W, 12 Jul 1962, Kelton and Thorpe, 1♀ (00113683) (CNC). Norwich, 42.98333° N 80.6000° W, 19 Jul 1962, Kelton and Thorpe, 1♂ (00113662) (CNC). Orillia, 44.6000° N 79.41666° W, 26 Jul 1924, H.L. Viereck, 1♂ (00113671) (CNC). Ottawa, 45.39079° N 75.70324° W, 71 m, 28 Jun 1919, J. McDunnough, 1♂ (00114005) (CNC); 22 Aug 1958, L.A. Kelton, 1♂ (00113699) (CNC); 02 Jul 1989, G.G.E. Scudder, 1♂ (00113727) (CNC). Ottawa, Chapel Hill, 45.43427° N 75.51638° W, 87 m, 06 Jul 1993, M.D. Schwartz, *Solidago canadensis*, 2♂ (00113721, 00329796) (CNC). Petrolia, 42.88611° N 82.14417° W, 199 m, 21 Jun 1962, L.A. Kelton, G. Brumpton, 1♀ (00113687) (CNC). Point Pelee, 41.96666° N 82.51666° W, 29 Jun 1931, G.S. Walley, 1♀ (00113692) (CNC); 08 Jul 1931, G.S. Walley, 1♀ (00113690) (CNC); 09 Jul 1931, G.S. Walley, 1♀ (00242577) (CAS), 1♀ (00113691) (CNC); 28 Jun 1961–29 Jun 1961, L.A. Kelton, G. Brumpton, 1♂ (00113704) (CNC). Port Burwell, 42.65° N 80.81666° W, 03 Jul 1962, G. Thorpe, 1♂ (00113669) (CNC). Powassan, 46.08336° N 79.36174° W, 250 m, 11 Jul 1978, J. Cappleman, 2♀ (00329668–00329669) (DEBU). Prince Edward County, no specific locality, 44° N 77.25° W, 22 Aug 1928, J.F. Brimley, 1♀ (00113694) (CNC); 23 Aug 1932, J.F. Brimley, 1♀ (00115105) (CNC); 13 Aug 1947, J.F. Brimley, 1♀ (00113695) (CNC); 30 Jul 1950, J.F. Brimley, 1♀ (00113696) (CNC); 24 Jul 1952, J.F. Brimley, *Solidago canadensis*, 1♂ (00113724) (CNC); 15 Jul 1953, J.F. Brimley, *Solidago canadensis*, 1♂ (00113723) (CNC); 17 Jul 1957, J.F. Brimley, 1♂ (00113725) (CNC). Putnam, 42.98983° N 80.95398° W, 267 m, 26 Jun 1925, G.S. Walley, 1♂ (00113661) (CNC). Sault Ste. Marie, 46.52° N 84.33° W, 27 Jul 1960, Kelton and Whitney, 1♀ (00113685) (CNC). Selkirk, 42.82° N 79.93° W, 09 Jul 1962, Kelton and Brumpton, *Rubus* sp. (Rosaceae), 1♂ (00113709) (CNC). Simcoe, 42.83333° N 80.3000° W, 15 Jul 1915, H.G. Crawford, 1♂ (00113591) (CNC). Southampton, 44.4887° N 81.37732° W, 187 m, 19 Aug 1928, G.S. Walley, 1♀ (00113678) (CNC). St. Lawrence Islands National Park, Adelaide Island, 44.43574° N 75.83814° W, 75 m, 16 Jul 1975, R.J. McMillan, 1♀ (00113747) (CNC). St. Lawrence Islands National Park, Grenadier Island, S of boat dock at campground, 44.38805° N 75.89982° W, 73 m, 16 Aug 1994, M.D. Schwartz, *Solidago canadensis*, 2♂ (00113720, 00113729) (CNC). St. Lawrence Islands National Park, Grenadier Island Center, 44.38913° N 75.89793° W, 73 m, 25 Jun 1975, P. Hammond, 1♂ (00113743) (CNC); 08 Jul 1975, E. Wilson, 1♂ (00113742) (CNC); 15 Jul 1975, R.J. McMillan, 1♂ (00113744) (CNC); 16 Jul 1975, E. Wilson, 2♂ (00113741, 00113745) (CNC); 26 Jul 1975, E. Wilson, 1♂ (00113746) (CNC). St. Lawrence Islands National Park, McDon-

ald Island, 44.31386° N 76.17061° W, 75 m, 14 Jul 1976, A. Carter, 1♂ (00113740) (CNC). St. Lawrence Islands National Park, Thwartway Island, 44.30175° N 76.15152° W, 75 m, 10 Jul 1975, R.J. McMillan, 1♂ (00113739) (CNC). Stittsville, 45.25° N 75.91666° W, 04 Jul 1973, D. Brown, 1♂ (00113719) (CNC). Strathroy, 42.95° N 81.61666° W, 25 Jul 1917, H.G. Crawford, 1♂ (00113700) (CNC). Tillsonburg, 42.86666° N 80.73333° W, 11 Jul 1958, L.A. Kelton, *Salix* sp. (Salicaceae), 1♀ (00113689) (CNC); 03 Jul 1962, H. Blanchard, 1♂ (00113703) (CNC); 18 Jul 1962, Kelton and Thorpe, 1♂ (00113666) (CNC). Tweed, 44.47477° N 77.28576° W, 137 m, 12 Jul 1944, G.S. Walley, 1♀ (00113693) (CNC). Vineland, 43.15° N 79.4° W, 03 Jul 1930, W.L. Putman, 1♀ (00382331) (DEBU). Vineland Station, 43.16862° N 79.3889° W, 91 m, 28 Jun 1939, D.F. Patterson, 1♂ (00382330) (DEBU); 20 Aug 1940, W.L. Putman, 1♂ (00382329) (DEBU). Waterford, 42.93333° N 80.28333° W, 17 Jul 1962, Kelton and Thorpe, *Salix* sp. (Salicaceae), 1♂ (00113705) (CNC). Waterloo Reg., Blair RARE Resource House, 43.38138° N 80.35777° W, 277 m, 07 Jul 2006, M.D. Bergeron, 1♀ (00329667 [cat debu00270608]) (DEBU). Welland, 42.99431° N 79.21885° W, 177 m, 21 Jun 1977, R.G. Bennett, 1♂ (00329666) (DEBU). Windsor, 42.33333° N 83.03333° W, 27 Jul 1976, J.F. Fortin, 1♀ (00329679) (DEBU). Woodstock, 43.13333° N 80.75° W, 10 Jul 1962, Kelton and Thorpe, *Salix* sp. (Salicaceae), 1♂ (00113708) (CNC). **Quebec:** Cap-Rouge, 48.49198° N 64.245° W, 85 m, 14 Jul 1933, O. Peck, 1♂ (00113758) (CNC); 04 Jul 1953, R. Lambert, 1♂ (00113752) (CNC); 04 Jul 1953, O. Peck, 1♂ (00113753) (CNC); 07 Jul 1953, R. Lambert, 1♂ (00113754) (CNC); 09 Jul 1953, O. Peck, 1♂ (00113756) (CNC); 09 Jul 1953, R. Lambert, 1♂ (00113755) (CNC); 10 Jul 1953, R. Lambert, 1♂ (00113757) (CNC). Covey Hill, 45.01914° N 73.77288° W, 226 m, 30 Jun 1927, G.S. Walley, 1♀ (00113800) (CNC). Fabre, 47.2000° N 79.36666° W, 05 Jul 1963, L.A. Kelton, 1♀ (00113770) (CNC); 12 Jul 1963, W. Gagne, 1♂ (00113765) (CNC). Forestville, 48.73333° N 69.06666° W, 11 Aug 1950, R. de Ruette, 1♂ (00113791) (CNC). Gatineau National Park, Harrington, 46.5571° N 75.92692° W, 172 m, 02 Jul 1981, D.J.E. Brown, (Poaceae), 1♂ (00113792) (CNC). Gatineau National Park, Lac Brown, 45.61044° N 75.92526° W, 198 m, 30 Jun 1981, D.J.E. Brown, 1♂ (00113794) (CNC). Gatineau National Park, North End, 46.64952° N 76.17963° W, 196 m, 25 Jun 1981, D.J.E. Brown, (Poaceae), 1♂ (00113793) (CNC). Hudson Heights, 45.45° N 74.15° W, 24 Jul 1956–30 Jul 1956, Lindberg, 1♂ (00113778) (CNC). Kamouraska, Parke Reserve, 47.59252° N 69.48782° W, 290 m, 13 Aug 1957, W.R.M. Mason, 1♀ (00113801) (CNC). Kazabazua, 45.95° N 76.02° W, 17 Aug 1927, G.S. Walley, 1♀ (00113796) (CNC). Knowlton, 45.21666° N 72.51666° W, 26 Jun 1929, G.S. Walley, 1♂ (00113761) (CNC); 22 Jul 1929, L.J. Milne, 1♀ (00113763) (CNC); 03 Aug 1929, L.J. Milne, 1♂ (00113762) (CNC); 12 Aug 1929, G.S. Walley, 1♀ (00113764) (CNC); 13 Aug 1929, G.S. Walley, 1♂ (00113759) (CNC); 30 Jun 1936, G.S. Walley, 1♂ (00113760) (CNC). La Minerve, 46.27° N 74.93° W, 28 Aug 1956, Lindberg, 1♂ (00113777) (CNC). Lac Megantic, 46.25° N 71.5000° W, 03 Aug 1961, G. Brumpton, 1♂ (00113772) (CNC). Lac Mercier, 46.19845° N 74.64682° W, 238 m, 14 Aug 1937, G.S. Walley, 1♀ (00113798) (CNC). Lac Mondor, Ste. Flore, 46.61666° N 72.76666° W, 03 Aug 1951, E.G. Munroe, 1♀ (00113802) (CNC). Lac des Quinze, 47.5000° N 79.05° W, 18 Aug 1907, W.J. Palmer, 1♀ (00242578) (CAS). Ladysmith, 45.77° N 76.38° W, 06 Aug 1931, G.S. Walley, 1♂ (00113776) (CNC). Laniel, 47.03333° N 79.26666° W, 23 Aug 1932, W.J. Brown, 1♂ (00113769) (CNC); 01 Aug 1935, H.S. Fleming, 1♀ (00113795) (CNC); 04 Jul 1963, W. Gagne, 1♂ (00113766) (CNC); 10 Jul 1963–11 Jul 1963, L.A. Kelton, 1♂ (00113767) (CNC); 20 Jul 1963–21 Jul 1963, W. Gagne, 1♂ (00113768) (CNC). Leclercville, 46.56666° N 72° W, 07 Aug 1961, G. Brumpton, 1♀ (00113799) (CNC). Levis, 46.66666° N 71.16666° W, 06 Aug 1961, G. Brumpton, 1♂ (00113774) (CNC). Magog, 45.26666° N 72.15° W, 216 m, 02 Aug 1961, G.P. Brumpton, 1♂ (00113773) (CNC), 1♀ (00329684) (DEBU); 05 Aug 1961, G.P. Brumpton, 1♀ (00329685) (DEBU). Mont-Royal, 45.50921° N 73.59139° W, 209 m, 26 Jul, J. Ouellet, 1♂ (00134574) (USNM). Montreal, 45.5000° N 73.58333° W, 09 Aug

1902, unknown, 1♀ (00116292) (CUIC). Otter Lake, 49.61666° N 63.8000° W, 06 Aug 1931, G.S. Walley, 1♀ (00113797) (CNC); 24 Jul 1958, L.A. Kelton, 1♂ (00113790) (CNC). Richmond, 45.66687° N 72.14991° W, 187 m, 04 Aug 1961, G. Brumpton, 1♂ (00113775) (CNC). Sainte-Agathe, 46.03333° N 74.28333° W, 09 Aug 1961, G. Brumpton, 1♂ (00113771) (CNC). **Saskatchewan:** Christopher Lake, 53.56666° N 105.83333° W, 11 Jul 1950, A. and J. Brooks, 1♂ (00113624) (CNC); 15 Jul 1959, A. and J. Brooks, 1♂ (00113625) (CNC). Foxford on Rt 55, 53.47255° N 105.10549° W, 493 m, 12 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113621) (CNC). Holbein, 53.23333° N 106.2000° W, 03 Sep 1954, A.R. Brooks, Wallis, 1♂ (00113626), 2♀ (00113146, 00113890) (CNC). Hudson Bay, 52.85° N 102.38333° W, 06 Sep 1959, A. and J. Brooks, 1♂ (00113631) (CNC). Katepwa, 50.69384° N 103.64649° W, 477 m, 11 Aug 1954, Brooks and Wallis, 2♂ (00113630, 00113633), 1♀ (00113889) (CNC). Kenosee Park, 49.83333° N 102.28333° W, 19 Jul 1958, A. and J. Brooks, 1♂ (00113629) (CNC). Lake Madge, 51.66666° N 101.63333° W, 12 Jul 1954, Brooks and Wallis, 1♀ (00113636) (CNC). Lloydminster, 53.2774° N 109.98253° W, 639 m, 20 Jul 1946–30 Jul 1946, R.J. Fitch, 1♀ (00243075) (UMRM). Lorlie, 50.83343° N 103.28321° W, 586 m, 04 Aug 1950, A.R. Brooks, 1♂ (00113632) (CNC). Love, 53.48° N 104.17° W, 11 Jul 1950, L.A. Konotopetz, *Solidago* sp., 1♂ (00113623) (CNC). Pipestone Creek, 49.84997° N 101.41702° W, 533 m, 16 Jul 1958, A. and J. Brooks, 1♂ (00113627) (CNC). Prince Albert, 52.96666° N 108.38333° W, 23 Jul 1959, A. and J. Brooks, 1♂ (00113628) (CNC). Saskatoon, 52.13333° N 106.66666° W, 06 Jul 1957, A.R. Brooks, 1♀ (00242589) (CAS) 2♀ (00113638, 00115519) (CNC). Torch River, 53.85° N 103.1000° W, 20 Jul 1950, L.A. Konotopetz, *Solidago* sp., 1♂ (00113622) (CNC). Willow Bunch, 49.4000° N 105.63333° W, 30 Jul 1955, C.D. Miller, 1♀ (00318773) (CNC). Wood Mountain, 49.31667° N 106.37493° W, 876 m, 03 Aug 1955, C.D.F. Miller, 1♀ (00113635) (CNC); 05 Aug 1955, A.R. Brooks, 1♀ (00113634) (CNC). **USA: Colorado:** ***Archuleta Co.:*** 16 mi N of Pagosa Springs, 37.50074° N 107.00917° W, 24 Jun 1964, H.R. Burke, 1♀ (00134573) (USNM). ***Gunnison Co.:*** Gothic, 38.95917° N 106.98917° W, 2896 m, 19 Jul 1963, O.R. Taylor, 1♀ (00108485) (AMNH). ***Routt Co.:*** Steamboat Springs, 40.5241° N 106.4628° W, 2743 m, 30 Jul 1953, R.R. Dreisbach, 1♀ (00127383) (UMMC). **Connecticut:** ***Litchfield Co.:*** Terryville, 41.67815° N 73.01094° W, 191 m, 22 Jun 1957, R.I. Sailer, 1♂ (00069938) (USNM). ***New Haven Co.:*** New Haven, 41.30806° N 72.92861° W, 26 Jun 1905, B.H. Walden, 1♂ (00242513) (CAS). ***Tolland Co.:*** Storrs, 41.80833° N 72.25° W, 16 Jul 1954, J.A. Slater, 1♀ (00108880) (AMNH); 23 Jul 1954, J.A. Slater, 1♂ (00169952) (AMNH). **District of Columbia:** Washington, 38.90817° N 77.05105° W, 02 Jul 1926, H.H. Knight, paratype, 1♂ (00111410) (CNC). Washington DC, 38.89178° N 77.00831° W, 20 Jun, unknown, 1♀ (00116289) (CUIC); 24 Jun 1926, H.H. Knight, paratypes, 2♂ (00113585–00113586), 2♀ (00113589–00113590) (CNC); 02 Jul 1926, H.H. Knight, paratype, 1♂ (00093991), 1♀ (00093992) (TAMU); 08 Jul 1926, H.H. Knight, paratype, 1♂ (00134560) (USNM). **Florida:** ***Unknown co.:*** E. Fla., Ashmead, 1♀ (00134591) (USNM). **Georgia:** ***Catoosa Co.:*** Ringgold, 34.91249° N 85.11342° W, 227 m, 31 May 1947, P.W. Fattig, 1♀ (00134353) (USNM). ***Houston Co.:*** Houston County, no specific locality, 32.458° N 83.731° W, 111 m, May 1979, C.L. Smith, 1♂ (USNM). **Idaho:** ***Bonner Co.:*** Sandpoint, 48.28547° N 116.55321° W, 636 m, 08 Jul 1966, L.S. Hawkins, 2♂ (00122383–00122384) (UID). ***Franklin Co.:*** Cub River, 42.13896° N 111.67532° W, 1661 m, 30 Aug 1953, G.F. Knowlton, 1♀ (00164902) (USNM). ***Latah Co.:*** Potlatch, 46.91609° N 116.90313° W, 759 m, 23 Jul 1938, J.W. Zukel, 1♂ (00122386), 4♀ (00122387–00122390) (UID). ***Nez Perce Co.:*** Lewiston, 46.41667° N 117.01667° W, 168 m, 10 Jul 1936, B.F. Coon, 1♂ (00122385) (UID). ***Shoshone Co.:*** 3 mi NW of Clarkia on Rt 3, Cedar Creek Recreation Area, 47.04167° N 116.29708° W, 823 m, 06 Aug 1986, Schuh, Schwartz, and Stonedahl, *Senecio* sp., 1♂ (00170119), 1♀ (00170183) *Senecio* sp., 5♂ (00108900, 00169977–00169980), 1♀ (00108901) *Solidago* sp., 1♂ (00107889) (AMNH). **Illinois:** ***Boone***

Co.: Belvidere, 42.26389° N 88.84417° W, 27 Jun 1955, J.A. Slater, 1♂ (00169956) (AMNH). ***Bureau Co.:*** Bureau, 41.28664° N 89.37233° W, 141 m, 12 Jun 1933, Mohr and Townsend, paratype, 1♂ (00243476) (INHS). ***Champaign Co.:*** Champaign, 40.11639° N 88.24333° W, 05 Jun 1889, C.A. Hart, paratype, 1♂ (USNM). Urbana, 40.11056° N 88.20722° W, 09 Jun 1885, C.A. Hart, *Helianthus* sp., paratype, 1♂ (USNM). ***Clark Co.:*** Dolson, 39.42594° N 87.83667° W, 192 m, 14 Jun 1933, Frison and Ross, paratype, 1♀ (00243489) (INHS). Marshall, 39.39139° N 87.69361° W, 14 Jun 1933, Frison and Ross, paratype, 1♂ (00243477) (INHS). West Union, 39.21583° N 87.66611° W, 26 Jun 1932, Ross and Dozier, paratype, 1♀ (00243488) (INHS). ***Edwards Co.:*** Browns, 38.3813° N 87.987° W, 125 m, 25 Jun 1932, Ross, Dozier, and Park, *Solidago* sp., paratype, 1♂ (00243482) (INHS). ***Gallatin Co.:*** Pounds Hollow Recreation Area, 37.61755° N 88.27146° W, 180 m, 30 May 1965, J.D. and D.G. Pinto, 1♀ (00119972) (UCR). Shawneetown, 37.7131° N 88.1867° W, 122 m, 25 Jun 1932, Ross and Dozier, paratype, 1♂ (00243478) (INHS). ***Grundy Co.:*** Morris, 41.35485° N 88.4234° W, 149 m, 28 Jun 1968, L.A. Kelton, *Solidago* sp., 1♂ (00113821) (CNC). ***Hancock Co.:*** Hamilton, 40.39639° N 91.33889° W, 27 Jun 1968, L.A. Kelton, *Ambrosia* sp., 1♂ (00113819) (CNC). ***Jo Daviess Co.:*** Galena, 42.41667° N 90.42889° W, 30 Jun 1932, Dozier and Mohr, paratype, 1♂ (00243481) (INHS). ***Lake Co.:*** Antioch, 42.47722° N 88.09556° W, 05 Jul 1932, Frison, paratype, 1♂ (00243485) (INHS). ***Mercer Co.:*** Norwood, 41.08917° N 90.63806° W, 16 Jul 1967, L.A. Kelton, 1♂ (00113834) (CNC). ***Ogle Co.:*** Grand Detour, Castle Rock, 41.89667° N 89.41167° W, 02 Jul 1932, Dozier and Mohr, paratype, 1♂ (00243484) (INHS). Oregon, 42.01472° N 89.33222° W, 09 Jul 1925, Frison, paratype, 1♀ (00243487) (INHS). ***Piatt Co.:*** Monticello, 40.02778° N 88.57333° W, 201 m, 28 Jun 1968, L.A. Kelton, 1♂ (00113820) (CNC). Monticello, Sangamon River, 40.0452° N 88.5708° W, 198 m, 28 Jun 1914, unknown, 1♀ (00243490) (INHS). ***Pope Co.:*** Golconda, 37.36722° N 88.48638° W, 108 m, 22 Jun 1932, Ross and Dozier, paratype, 1♂ (00243483) (INHS). Herod, 37.58028° N 88.43611° W, 24 Jun 1932, Ross, Dozier, and Park, paratype, 1♀ (USNM). ***Pulaski Co.:*** Pulaski, 37.214° N 89.2058° W, 26 May 1907, unknown, paratype, 1♀ (00243492) (INHS). ***Union Co.:*** Anna, 37.4594° N 89.2572° W, 183 m, 17 Jul 1883, unknown, paratype, 1♂ (00243493) (INHS). ***Vermilion Co.:*** Oakwood, 40.11611° N 87.77833° W, 14 Jun 1930, Frison, paratype, 1♂ (00243480) (INHS). ***Wabash Co.:*** Mount Carmel, 38.4199° N 87.755° W, 122 m, 02 Jul 1906, C.A. Hart, paratype, 1♂ (00243479) (INHS). ***Will Co.:*** Beech, 41.3532° N 87.6282° W, 219 m, 25 Aug 1925–27 Aug 1925, T.H. Frison, paratype, 1♀ (00243491) (INHS). **Indiana:** ***Cass Co.:*** Logansport, 40.75444° N 86.35667° W, 05 Jul 1979–06 Jul 1979, T.J. Henry, *Polymnia canadensis*, 1♂ (00069944) (USNM). ***Clark Co.:*** Clark County, 38.29567° N 85.73149° W, 136 m, 13 Jun 1932–14 Jun 1932, B.E. Montgomery, 1♂ (00127456) (UMMC), 1♀ (00134078) (USNM). ***Howard Co.:*** NW Howard County, 40.52167° N 86.3252° W, 23 Jun 1986–24 Jun 1986, D.A. Rider, 2♀ (00242982, 00242984) (DAR). ***White Co.:*** White County, no specific location, 40.7464° N 86.8737° W, 213 m, 29 Jul 1935, G.E. Gould, 1♀ (00134077) (USNM). **Iowa:** ***Iowa Co.:*** Amana, 41.80326° N 91.87538° W, 251 m, 26 Aug 1927, H.G. Johnston, 1♀ (00134351) (USNM). ***Muscatine Co.:*** Wilton, 41.58889° N 91.01667° W, 08 Jul 1927, Harris, Johnston, *Ambrosia* sp., 1♂ (00113577) (CNC). ***Scott Co.:*** Pleasant Valley, 41.56972° N 90.42306° W, 05 Jul 1928, G.S. Walley, 1♂ (00113832) (CNC). ***Tama Co.:*** Toledo, 41.99555° N 92.57686° W, 276 m, 30 Jul 1927, Harris and Johnston, 1♂ (00113592) (CNC). **Kansas:** ***Douglas Co.:*** Douglas County, no specific locality, 38.86667° N 95.23333° W, 274 m, F.H. Snow, 1♂ (00117897) (KU). US Hwy 59, 1.8 mi N of jct US Hwy 56, 38.80854° N 95.27013° W, 317 m, 23 May 1986, C.B. Barr, 1♀ (00119538) (UCB). ***Linn Co.:*** Linn County, no specific locality, 38.21667° N 94.85° W, 263 m, R.H. Beamer, 1♂ (00117898) (KU); 1915, R.H. Beamer, 1♂ (00117911) (KU). **Kentucky:** ***Calloway Co.:*** Kirksey, 36.70088° N 88.3952° W, 169 m, 08 Jun 1966, B.L. Monroe, 1♂ (DBUL). ***Jefferson Co.:*** Anchorage, 38.26291° N 85.53547° W, 219 m, 12

Jun 1966, B.L. Monroe, 2♂ (DBUL). Louisville, 38.21537° N 85.76345° W, 139 m, 06 Jun 1937, unknown, 1♂ (DBUL); 23 Jun 1954, P.J. Christian, 1♂ (DBUL); 13 Jun 1966, K. Groeppe, 1♂ (DBUL). ***Jessamine Co.:*** Brooklyn Bridge, 37.8182° N 84.7191° W, 190 m, 23 Jun 1893, unknown, 1♂ (UK). ***Owen Co.:*** Kleber Wildlife Management Area, 38.35785° N 84.78395° W, 208 m, 26 May 2003, C. Wright, 2♂ (UK). Twin Eagle Wildlife Management Area, 38.57404° N 85.03221° W, 141 m, 26 May 2003, C. Wright, 2♂ (UK). **Maine:** ***Androscoggin Co.:*** Wales, 44.1847° N 70.0646° W, 122 m, 16 Jul 1915, C.A. Frost, paratype, 1♀ (00242641) (CAS). ***Aroostook Co.:*** Fort Kent, 47.25861° N 68.59° W, 170 m, 17 Aug 1910, H.M. Parshley, 1♀ (00169960) (AMNH); 19 Aug 1910, C.W. Johnson, 1♂ (00242510) (CAS). ***Cumberland Co.:*** Casco, 44.00658° N 70.51607° W, 141 m, 02 Aug 1944–05 Aug 1944, J.C. Bradley, 1♀ (00116276) (CUIC). Portland, 43.66139° N 70.25583° W, 09 Jul 1909, E.P. Van Duzee, 1♂ (00242575), 1♀ (00242576) (CAS). ***Franklin Co.:*** Rangeley, 44.96711° N 70.64278° W, 468 m, 05 Aug 1925, unknown, 1♂ (00069940) (USNM). ***Kennebec Co.:*** Monmouth, 44.23861° N 70.03611° W, 83 m, 16 Jul 1914, C.A. Frost, 1♂ (00242511) (CAS). ***Knox Co.:*** Hope, 44.26508° N 69.15893° W, 108 m, 19 Jun 1986, Larochelle and Lariviere, 1♂ (00113829) (CNC). ***Penobscot Co.:*** Camp Lunksoos, Staceyville, 45.90926° N 68.61255° W, 134 m, Aug 1902, unknown, 1♂ (00069947) (USNM). Orono, 44.88306° N 68.6725° W, 15 Jun 1922, M.R. and R.J. Sim, 1♀ (00134590), paratype, 1♀ (USNM). ***Piscataquis Co.:*** Baxter State Park, 46.09111° N 68.95694° W, 25 Aug 1951, The Dietrichs, 1♀ (00116309) (CUIC). ***Waldo Co.:*** Rt 139, 1.5 mi W of Unity, 44.61132° N 69.33685° W, 62 m, 03 Jul 1989, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00069930) (USNM). ***Washington Co.:*** Machias, 44.715° N 67.46111° W, 26 m, 22 Jul 1909, C.W. Johnson, 1♂ (00242509) (CAS). Meddybemps, 45.03833° N 67.35639° W, 53 m, 16 Jul 1922, M.B. and R.J. Sim, 1♀ (00134588) (USNM); 20 Aug 1922, M.R. and R.J. Sim, 1♀ (00134589) (USNM). Whiting, 44.79083° N 67.17611° W, 18 Jul 1958, J.A. Slater, 1♀ (00108883) (AMNH). **Maryland:** ***Allegany Co.:*** Green Ridge State Forest, 39.5988° N 78.4998° W, 415 m, 22 Jun 1985, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♀ (00133730) (USNM). ***Garrett Co.:*** Fort Pendleton, 39.29348° N 79.3782° W, 788 m, 08 Jul, unknown, 1♂ (00116288) (CUIC). ***Montgomery Co.:*** 4 mi SW of Ashton, 39.09134° N 77.01278° W, 30 Jul 1991, G.F. and J.F. Hevel, *Helianthus tuberosus*, 1♂ (00069932) (USNM). Bethesda, 38.9806° N 77.1006° W, 94 m, 03 Jun 1972, G.C. Steyskal, 1♂ (00069935) (USNM). Glen Echo, 38.96748° N 77.14172° W, 32 m, 17 Jul 1926, H.H. Knight, paratype, 1♀ (USNM). nr Plummers Island, 38.97° N 77.178° W, 23 Jun 1917, G.M. Greene, 2♀ (00164936–00164937) (USNM). ***Prince George's Co.:*** Marlboro, 38.65612° N 76.68248° W, 4 m, 19 Jun 1916, R.C. Shannon, 1♀ (00069959) (USNM). **Massachusetts:** ***Essex Co.:*** Beach Bluff, 42.47917° N 70.88611° W, 04 Aug 1916, H.M. Parshley, 1♀ (00242546) (CAS). Swampscott, 42.47083° N 70.91806° W, 7 m, 01 Aug 1914, H.M. Parshley, 1♂ (00242514) (CAS); 13 Jul 1915, H.M. Parshley, 1♂ (00242515) (CAS). ***Franklin Co.:*** Mount Toby, Sunderland, 42.48774° N 72.53748° W, 384 m, 06 Jul 1918, H.M. Parshley, 2♂ (00242516–00242517) (CAS). ***Middlesex Co.:*** Holliston, 42.2000° N 71.425° W, 29 Jun, N. Banks, 1♀ (00169962) (AMNH); 04 Jul, N. Banks, 1♀ (00169963) (AMNH); 06 Jul, N. Banks, 1♀ (00169964) (AMNH); 13 Jul, N. Banks, 1♀ (00169967) (AMNH); 16 Jul, N. Banks, 1♂ (00169948) (AMNH); 07 Aug, N. Banks, 1♀ (00169965) (AMNH); 12 Aug, N. Banks, 1♀ (00169966) (AMNH). Newton, 42.3279° N 71.21038° W, 32 m, 16 Jun 1926, J.R. de la Torre-Bueno, 1♀ (00242545) (CAS). Sherborn, 42.23888° N 71.36972° W, 61 m, 07 Jul 1928, C.A. Frost, paratype, 1♂ (00134559) (USNM). ***Norfolk Co.:*** Wellesley, 42.29639° N 71.29306° W, 11 Jul 1909, E.P. Van Duzee, 1♂ (00169945) (AMNH). ***Plymouth Co.:*** Minot, 42.24002° N 70.76196° W, 2 m, 10 Jul–14 Jul, N. Banks, 1♂ (00169949) (AMNH). ***Worcester Co.:*** Winchendon, 42.68673° N 72.03874° W, 312 m, 01 Jul 1892, A.P. Morse, 1♂ (00169950) (AMNH). **Michigan:** ***Alger Co.:*** Alger County, no specific locality, 46.3943° N 86.65039° W, 193 m, 14 Aug 1953, R.R. Dreisbach, 1♂ (00127462) (UMMC). ***Baraga Co.:*** Baraga

County, no specific locality, 46.76147° N 88.50053° W, 189 m, 09 Aug 1953, R.R. Dreisbach, 1♀ (00127521) (UMMC). ***Berrien Co.:*** Bridgeman, 41.94105° N 86.55213° W, 208 m, 12 Jul 1920, R.F. Hussey, 1♀ (00127477) (UMMC). E.K. Warren Preserve, Sawyer Dunes, 41.91465° N 86.59534° W, 215 m, 27 Jul 1920, R.F. Hussey, 1♂ (00127517) (UMMC). E.K. Warren Preserve, Warren Woods, 41.83599° N 86.63605° W, 195 m, 25 Jun 1919, R.F. Hussey, 1♂ (00127518) (UMMC); 05 Jul 1919, R.F. Hussey, 1♀ (00127519) (UMMC). T7S R18W Sec34, 41.8207° N 86.3885° W, 226 m, 27 Jun 1994, Jon Bedick, 1♂ (00127526) (UMMC). T8S R18W Sec16, 41.7764° N 86.4068° W, 221 m, 01 Jul 1995, Tara Fletcher, 1♂ (00127525) (UMMC). ***Cass Co.:*** T6S R16W Sec22, 41.9347° N 86.1569° W, 232 m, 15 Jul 1994, Jon Bedick, 1♂ (00127527) (UMMC). T6S R16W Sec32, 41.8186° N 86.1996° W, 229 m, 11 Aug 1993, unknown, 1♀ (00127479) (UMMC). ***Cheboygan Co.:*** Burt Lake Bog, 45.54363° N 84.67566° W, 188 m, 06 Jul 1919, E.P. Butler, 1♀ (00127520) (UMMC). Cheboygan County, no specific locality, 45.64694° N 84.47444° W, 18 Jul 1923, unknown, 1♂ (00127465) (UMMC); 14 Jul 1938, Don P. Duncan, 1♂ (00243067) (UMRM). Douglas Lake, 45.58111° N 84.69694° W, 24 Jun 1918, E.P. Butler, 1♂ (00127464) (UMMC); 18 Jul 1918, R.F. Hussey, 1♂ (00127515) (UMMC); 20 Jul 1926, C.D. Lyman, 1♀ (00127524) (UMMC). Douglas Lake, Bessey Creek, 45.57966° N 84.74119° W, 216 m, 13 Jul 1927, T.H. Hubbell, 1♀ (00127522) (UMMC). ***Chippewa Co.:*** Sault Saint Marie, 46.49011° N 84.36335° W, 198 m, 27 Jul 1960, Kelton and Whitney, 1♀ (00113837) (CNC). Six Mile Road at Scenic Drive, SE of Sault Saint Marie, 46.39034° N 84.25275° W, 176 m, 21 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♀ (00069953) (USNM). ***Emmet Co.:*** Emmet County, no specific locality, 45.53333° N 84.91667° W, 15 Aug 1918, R.F. Hussey, 1♀ (00127523) (UMMC). ***Gogebic Co.:*** 5.6 km N of Wakefield on Rt 519, 46.0674° N 89.92805° W, 402 m, 18 Aug 1993, M.D. Schwartz, *Solidago* sp., 1♂ (00113825) (CNC). Gogebic County, no specific location, 46.35245° N 89.50265° W, 467 m, 03 Aug 1937, R.R. Dreisbach, 1♂ (00069942) (USNM). Rte. 28 E of Kenton, 46.48608° N 88.90154° W, 369 m, 24 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♀ (00069955) (USNM). Rte 64 nr Lake Gogebic State Park, 46.45662° N 89.56979° W, 401 m, 24 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♀ (00069954) (USNM). ***Houghton Co.:*** Osceola, 47.23422° N 88.46327° W, 365 m, 24 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, 1♀ (00069962) (USNM). Osceola, Rt 41, 47.23139° N 88.45361°W, 23 Jul 1991, T.J. Henry and A.G. Wheeler, Jr., *Solidago* sp., 1♂ (00069929) (USNM). ***Ingham Co.:*** East Lansing, 42.73694° N 84.48389° W, 22 Jul 1889, unknown, 1♂ (00116286) (CUIC). ***Keweenaw Co.:*** Cliff Drive NE of Mohawk, 47.30886° N 88.38217° W, 294 m, 23 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00069936) (USNM). ***Luce Co.:*** 91 km W of Sault Saint Marie at reststop on Rt 28, 46.30427° N 85.28815° W, 233 m, 17 Aug 1993, M.D. Schwartz, *Solidago gigantea*, 1♂ (00113824) (CNC). ***Mackinac Co.:*** Saint Ignace, 45.85091° N 84.71839° W, 194 m, 25 Jul 1921, S. Moore, 1♀ (00127478) (UMMC). ***Marquette Co.:*** Marquette, 46.54361° N 87.39528° W, 25 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, 2♂ (00069933, 00164960) (USNM). ***Mecosta Co.:*** 2 mi W of Remus [off of] —20, 43.59698° N 85.18518° W, 309 m, 11 Jul 1953, R.F. Hussey, 1♂ (00127516) (UMMC). Big Rapids, Ferris State University, 46.6871° N 85.4761° W, 274 m, 18 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, 1♂ (00069934) (USNM). Mecosta County, no specific locality, 43.61536° N 85.23721° W, 291 m, 17 Jul 1950, R.R. Dreisbach, 1♀ (00069961) (USNM). ***Midland Co.:*** Midland County, no specific locality, 43.61556° N 84.24722° W, 27 Jun 1944, R.R. Dreisbach, 1♂ (00169958) (AMNH). ***Missaukee Co.:*** Missaukee County, no specific locality, 44.33529° N 85.21505° W, 381 m, 30 Jun 1957, R. and K. Dreisbach, 1♀ (00069985) (USNM). ***Montmorency Co.:*** Montmorency County, no specific locality, 45.03334° N 84.13334° W, 333 m, 12 Jul 1923, T.H. Hubbell, 1♂ (00127463) (UMMC). ***Muskegon Co.:*** Muskegon County, no specific locality, 43.29558° N 86.14413° W, 199 m, 05 Jul 1958, R. and K. Dreisbach, 1♀ (00069960) (USNM). ***Ontonagon Co.:*** 4 mi

W of Ontonagon, Rte. 64, 46.86544° N 89.33095° W, 188 m, 24 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, 1♂ (00069931) (USNM). Ontonagon County, 46.87111° N 89.31389° W, 10 Aug 1953, R.R. Dreisbach, 1♀ (00127480) (UMMC). ***Otsego Co.:*** Otsego County, no specific locality, 44.9664° N 84.69975° W, 390 m, 11 Jul 1923, T.H. Hubbell, 1♂ (00127514) (UMMC). ***Schoolcraft Co.:*** 4 mi S of Germfask, 46.21666° N 85.91666° W, 17 Aug 1992, S. Geohegan, 1♀ (00134131) (USNM). Schoolcraft County, no specific locality, 46.21667° N 86.2000° W, 05 Aug 1959, R. and K. Dreisbach, 1♂ (00069950) (USNM). ***Tuscola Co.:*** Fish Point State Wildlife Area [FPWA], Thomas Road Site, T15N R8E Sec 16SW, 43.69903° N 83.54253° W, 178 m, 06 Jul 1995, Daria Hyde, 1♂ (00127532) (MSU). ***Wexford Co.:*** Rte 131 rest area N of Osceola Co. line, 44.16773° N 85.43593° W, 387 m, 18 Jul 1991, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00069939) (USNM). Wexford County, no specific locality, 44.33334° N 85.56673° W, 426 m, 07 Jul 1944, R.R. Dreisbach, 1♂ (00169957) (AMNH). **Minnesota:** ***Becker Co.:*** Minnetonka Lake, 46.8115° N 95.9657° W, 422 m, 21 Jul 1922, unknown, paratype, 1♂ (00134554) (USNM). ***Carlton Co.:*** Cloquet, 46.72203° N 92.47271° W, 372 m, 02 Aug 1921, A.A. Nichol, paratype, 1♀ (00134551) (USNM). ***Hennepin Co.:*** Hennepin County, no specific locality, 45.01667° N 93.45° W, 28 Jun 1921, A.T. Hertig, paratype, 1♂ (00134548) (USNM). ***Koochiching Co.:*** International Falls, 48.6000° N 93.41666° W, 337 m, 26 Jun 1995, T.J. Henry and A.G. Wheeler, Jr., *Solidago* sp., 1♂ (00069993) (USNM). ***Lake Co.:*** Cramer, 47.52722° N 91.09° W, 10 Aug 1922, H.H. Knight, paratype, 1♀ (USNM). Isabella River, 47.6474° N 91.4246° W, 555 m, 15 Aug 1922, unknown, paratype, 1♂ (00134564) (USNM). Two Harbors, 47.0247° N 91.6817° W, 213 m, 20 Aug 1920, H.H. Knight, paratype, 1♂ (USNM); 09 Aug 1922, H.B. Hungerford, paratype, 1♂ (00134553) (USNM). ***Mille Lacs Co.:*** Princeton, 45.5741° N 93.5961° W, 299 m, 19 Jul 1921, W.E. Hoffmann, paratype, 1♀ (00134549) (USNM). ***Norman Co.:*** Norman County, 47.33333° N 96.46667° W, 20 Jun 1923, unknown, paratype, 1♀ (00134550) (USNM). ***Ramsey Co.:*** Saint Anthony Park, 44.97805° N 93.19083° W, 02 Jul 1923, H.H. Knight, paratype, 1♂ (00134547) (USNM). ***St. Louis Co.:*** 6 mi NNW of Cook on Rt 53, 47.90012° N 92.78453° W, 411 m, 26 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, *Eurybia macrophylla*, 1♂ (00069928) (USNM). ***Wabasha Co.:*** Lake City, 44.4354° N 92.25254° W, 204 m, 08 Jul 1921, A.A. Nichol, paratype, 1♂ (00134552) (USNM). **Mississippi:** ***Washington Co.:*** Washington County, no specific locality, 33.41° N 91.061° W, 40 m, May 1984, T.J. Henry and G.L. Snodgrass, *Ambrosia trifida*, 1♂ (USNM). **Missouri:** ***Boone Co.:*** Columbia, 38.95167° N 92.33389° W, 12 Jun 1966, W.R. Enns, *Alcea* sp. (Malvaceae), 1♀ (00243073) (UMRM). Entomology Farm, Columbia, 38.89504° N 92.21145° W, 266 m, 04 May 1968, unknown, 1♀ (00243078) (UMRM); 21 May 1985, R.L. Blinn, 1♀ (00243079) (UMRM). ***Butler Co.:*** Fisk, 36.78093° N 90.21003° W, 99 m, 14 Jul 1940, R.C. Froeschner, 1♀ (00134585) (USNM). ***Gasconade Co.:*** Mint Spring [Seep] Natural Area, 38.20082° N 91.53728° W, 250 m, 29 May 1986, R.L. Blinn, 1♀ (00243081) (UMRM). ***Iron Co.:*** Taum Sauk [Mountain] State Park, Wiemer Hill Glade, 37.5534° N 90.7174° W, 457 m, 16 May 2000, D.G. LeDoux, 1♀ (00243072) (UMRM). ***Macon Co.:*** Atlanta, 39.89938°N 92.48602° W, 265 m, 08 Jun 1941, R.C. Froeschner, 1♀ (00134586) (USNM). ***Monroe Co.:*** Union Covered Bridge State Historic Site, Monroe County, 39.50028° N 91.98333° W, 14 Jun 1984, R.L. Blinn, 1♂ (00243069) (UMRM). ***Pike Co.:*** Louisiana, 39.44466° N 91.0653° W, 183 m, 10 Jun 1940, R.C. Froeschner, 1♀ (00134587) (USNM). ***St. Louis Co.:*** Ranken, 38.53487° N 90.51109° W, 128 m, 23 May 1954, E.P. Meiners, 1♀ (00243070) (UMRM). Saint Louis, 38.62722° N 90.19778° W, 14 Jun 1938, R.C. Froeschner, 1♂ (00134580), 1♀ (00134581) (USNM); 12 Jun 1973, M. Haas, 1♀ (00243080) (UMRM). **Montana:** ***Gallatin Co.:*** Bozeman, 45.67972° N 111.03778° W, 23 Jul 1912, unknown, paratype, 1♂ (00134563) (USNM). ***Granite Co.:*** Drummond, 46.66667° N 113.14444° W, 11 Aug 1931, R.H. Beamer, 1♂ (00117892) (KU). ***Ravalli Co.:*** Victor, 46.41527° N 114.13488° W, 1024 m, unknown, *Verbascum*

sp. (Scrophulariaceae), 1♀ (00164901) (USNM). **New Hampshire:** ***Cheshire Co.:*** Fitzwilliam, 42.78064° N 72.14175° W, 349 m, Jul 1907, J.H. Emerton, 1♀ (00108479) (AMNH). ***Coos Co.:*** Bretton Woods, 44.25806° N 71.44167° W, 30 Jun 1909, E.P. Van Duzee, 1♂ (00242579) (CAS); 31 Aug 1934, J.D. Beamer, 1♂ (00117895) (KU). Crawfords, 44.2667° N 71.39952° W, 602 m, 12 Aug 1929, H.M. Parshley, 1♂ (00242520) (CAS). Glen House, 44.28833° N 71.22583° W, 20 Jul 1915, H.M. Parshley, 1♂ (00169953) (AMNH); 24 Jul 1915, C.W. Johnson, 1♀ (00242547) (CAS). Gorham, 44.38778° N 71.17361° W, 18 Jul 1929, G.S. Walley, 1♂ (00113831) (CNC); 20 Jul 1929, G.S. Walley, 1♂ (00113830) (CNC). Lancaster, 44.49074° N 71.57947° W, 268 m, 07 Jul 1908, Timberlake, 1♂ (00119968) (UCR); 13 Jul 1908, Timberlake, 1♀ (00119969) (UCR); 27 Aug 1928, Timberlake, 1♂ (00119967) (UCR). Mount Washington, 44.29232° N 71.28082° W, 1282 m, 14 Aug 1958, J.R. Vockeroth, 1♂ (00113833) (CNC). Pittsburg (on Rt 3), 45.0511° N 71.3919° W, 07 Sep 1986, Larochelle and Lariviere, 1♂ (00113828) (CNC). ***Grafton Co.:*** Franconia, 44.22694° N 71.74833° W, A.T. Slosson, 1♂ (00169943) (AMNH). ***Rockingham Co.:*** Hampton, 42.91202° N 70.82213° W, 30 Jun 1929, S.A. Shaw, paratype, 1♂ (00134561) (USNM). **New York:** ***Albany Co.:*** Huyck Preserve, Rensselaerville, 42.5201° N 74.1442° W, 10 Jul 1978, J.G. and B.L. Rozen, 1♀ (00108477) (AMNH). ***Erie Co.:*** Colden, 42.64082° N 78.68195° W, 340 m, Jul 1885, E.P. Van Duzee, 1♂ (00069951) (USNM). ***Essex Co.:*** Heart Lake, 44.1833° N 73.96567° W, 664 m, 30 Jul 1946, R.H. Beamer, 1♂ (00117894) (KU). Lake Placid, 44.27944° N 73.98028° W, 610 m, 04 Jul 1991, M.D. Schwartz, *Solidago* sp., 1♂ (00115911) *Solidago* sp., 1♂ (00113823) (CNC). Wilmington, 44.38838° N 73.81542° W, 94 m, 30 Jun 1922, J.M. Aldrich, 1♂ (00134479) (USNM). ***Franklin Co.:*** Tupper Lake, 44.2184° N 74.4663° W, 479 m, 19 Aug 1941, A.L. Melander, 1♀ (00119973) (UCR). ***Genesee Co.:*** Batavia, 42.99806° N 78.18778° W, 271 m, 28 Jun 1914, H.H. Knight, paratype, 1♂ (00134543), 1♀ (00134565) (USNM); 26 Jul 1914, H.H. Knight, paratype, 1♂ (00134542), 1♀ (00134566) (USNM); 06 Aug 1914, H.H. Knight, 1♀ (00134569) (USNM); 27 Jul 1915, H.H. Knight, 1♂ (00242518) (CAS); 29 Jul 1915, H.H. Knight, 1♂ (00242519) (CAS); 05 Aug 1915, H.H. Knight, paratype, 1♂ (00134541) (USNM); 12 Aug 1915, H.H. Knight, paratype, 1♂ (00134544) (USNM); 13 Aug 1915, H.H. Knight, paratype, 1♂ (00134545) (USNM); 19 Aug 1915, H.H. Knight, paratype, 1♂ (00134546) (USNM); 20 Aug 1915, H.H. Knight, 1♀ (00134568) (USNM); 01 Aug 1916, H.H. Knight, 1♀ (00134571) (USNM). ***Hamilton Co.:*** 7 mi S of Long Lake (town), 43.21269° N 74.71861° W, 26 Aug 1956, J.C. Schaffner, 1♂ (00134576) (USNM). Adirondack Mountains, Cascade Lake, 43.79296° N 74.80077° W, 557 m, 15 Aug 1908, H.G. Barber, 1♀ (00069956) (USNM); 16 Aug 1908, H.G. Barber, 1♀ (00069957) (USNM). Indian Lake, Sabael, 43.72838° N 74.30568° W, 530 m, 01 Aug 1921, unknown, 1♂ (00069946) (USNM); 25 Aug 1927, unknown, 1♂ (00069945) (USNM). ***Kings Co.:*** Flatbush (Long Island), 40.65194° N 73.95944° W, 28 Jun 1893, J.L. Zabriskie, 1♂ (00169938), 1♀ (00169938) (AMNH); 06 Jul 1893, J.L. Zabriskie, 1♂ (00169939), 1♀ (00169939) (AMNH). ***Livingston Co.:*** Letchworth State Park, 42.685° N 77.95944° W, 19 Jun 1981–21 Jun 1981, E.R. Hoebeke and M.E. Carter, 1♂ (00116305) (CUIC). ***Monroe Co.:*** Rochester Junction, 42.99634° N 77.5638° W, 205 m, 23 Jun 1914, M.D. Leonard, 1♂ (00116297) (CUIC); 27 Jun 1914, M.D. Leonard, 1♂ (00116294) (CUIC); 28 Jun 1914, M.D. Leonard, 1♂ (00116296) (CUIC); 30 Jun 1914, M.D. Leonard, 1♀ (00116307) (CUIC); 05 Jul 1914, M.D. Leonard, *Solidago* sp., 1♂ (00116298) (CUIC); 06 Jul 1914, M.D. Leonard, *Solidago* sp., 1♂ (00116295) (CUIC); 07 Jul 1914, M.D. Leonard, *Solidago* sp., 1♀ (00116308) (CUIC); 25 Jul 1914, M.D. Leonard, 1♂ (00116293) (CUIC). ***Nassau Co.:*** Mill Neck, 40.887° N 73.55512° W, 43 m, 19 Jun, N. Banks, 1♀ (00169959) (AMNH). ***St. Lawrence Co.:*** Cranberry Lake, 44.2225° N 74.83667° W, 28 Jul 1919, C.J. Drake, 1♂ (00134132), 1♀ (00134133) (USNM). Parishville, 44.6278° N 74.81777° W, 264 m, 09 Jul 1987, M. and A. O'Brien, 1♂ (00127474) (UMMC). The Plains, Wanakena, 44.08086° N 74.90764°W, 492 m, 03 Aug

1920, C.J. Drake, 1♀ (00134135) (USNM). Wanakena, 44.13389° N 74.92139° W, 15 Jul 1920, C.J. Drake, 1♂ (00134134) (USNM). ***Suffolk Co.:*** Cold Spring Harbor, Long Island, 40.87678° N 73.47043° W, 12 Jul 1902, H.G. Barber, 1♀ (00069958) (USNM); 30 Jul 1902, unknown, 1♂ (00069948) (USNM). Mattituck, Long Island, 40.99121° N 72.5342° W, 11 Jun 1934, Roy Latham, 1♀ (00116314) (CUIC). ***Tioga Co.:*** North Spencer, 42.25591° N 76.50744° W, 318 m, 11 Jul 1978, E.R. Hoebeke, 1♂ (00116299) (CUIC). ***Tompkins Co.:*** 1 mi S of McLean, 42.53931° N 76.28202° W, 353 m, 09 Jul 1976, M.J. and C.A. Tauber, 1♂ (00116300) (CUIC). Beaver Creek, McLean Res. [Preserve], 42.54375° N 76.29219° W, 335 m, 01 Aug 1924, unknown, 1♀ (00116311) (CUIC). Bog B, McLean Res. [Preserve], 42.5444° N 76.29147° W, 513 m, 30 Aug 1924, unknown, 1♀ (00116310) (CUIC). Ithaca, 42.44056° N 76.49694° W, 21 Aug 1884, J.M. Stedman, 1♀ (00116315) (CUIC); 03 Sep 1884, J.M. Stedman, 1♀ (00116317) (CUIC); 16 Jul 1885, H.E. Grotecloss, 1♀ (00116316) (CUIC); 06 Aug 1885, T.L. Brunk, 1♂ (00116306) (CUIC); Jul, N. Banks, 1♂ (00169951) (AMNH); 23 Jul 1904, unknown, 1♂ (00119970), 1♀ (00119971) (UCR); 24 Jul 1916, H.H. Knight, 1♀ (00134570), paratype, 1♂ (00134557) (USNM); 26 Jul 1916, H.H. Knight, 1♂ (00134567), paratype, 1♂ (00134555) (USNM); 08 Jul 1920, H.H. Knight, paratype, 1♂ (00134556) (USNM); 04 Sep 1973, M.D. Schwartz, *Solidago* sp., 1♀ (00113459) (CNC); 23 Jun 1977, F.J. Messina, 1♂ (00116303) (CUIC); 10 Jul 1977, F.J. Messina, 1♂ (00116304) (CUIC); 05 Aug 1977, F.J. Messina, 1♀ (00116313) (CUIC). McLean, 42.55194° N 76.29139° W, 27 Jul 1916, H.H. Knight, paratype, 1♀ (00093993) (TAMU), paratype, 1♂ (00134558) (USNM). McLean Bogs Res. [Preserve], 42.54185° N 76.29894° W, 335 m, 19 Aug 1925, unknown, 1♂ (00116301) (CUIC). Sphaerium Brook, McLean Res. [Preserve], 42.54494° N 76.29003° W, 335 m, 12 Jul 1924, unknown, 1♀ (00116312) (CUIC). West Ridge, McLean Res. [Preserve], 42.54272° N 76.30637° W, 336 m, 25 Jul 1924, unknown, 1♂ (00116302) (CUIC). ***Wyoming Co.:*** LaGrange, 6 mi N of Perry Center, 42.801° N 78.0124° W, 396 m, 25 Jul 1975, S.E. Thewke, 1♂ (00243076) (UMRM). **North Carolina:** ***Macon Co.:*** Franklin, 35.18222° N 83.38167° W, 610 m, 10 Jun 1957, J.R. Vockeroth, 1♂ (00113822) (CNC). ***Montgomery Co.:*** Dark Mountain, 35.47262° N 79.9518° W, 271 m, 16 May 2000, R.L. Blinn, *Solidago* sp., 1♂ (00242848) (NCSU). Uwharrie National Forest, SR 1306 at Barnes Creek, 35.47994° N 79.9573° W, 148 m, 23 May 1995, R.L. Blinn, *Solidago* sp., 1♂ (00242851) (NCSU); 30 May 1996, R.L. Blinn, *Solidago* sp., 1♀ (00242869) (CNC). ***Moore Co.:*** SR 1459, 35.5089° N 79.59524° W, 118 m, 30 May 1996, R.L. Blinn, *Solidago* sp., 1♂ (00242850) (NCSU). ***Transylvania Co.:*** L[ake]. Toxaway, 35.13232° N 82.934° W, 918 m, A.T. Slosson, 1♂ (00169944) (AMNH). **North Dakota:** ***Rolette Co.:*** Turtle Mountains, 48.9861° N 100.0619° W, 213 m, 06 Aug 1920, T.H. Hubbell, 1♂ (00127458) (UMMC). **Ohio:** ***Erie Co.:*** Castalia, 41.40005° N 82.80852° W, 193 m, 08 Jul 1963, R.H. Davidson, 1♂ (00093994) (TAMU). **Pennsylvania:** ***Allegheny Co.:*** nr West Mifflin, Coal Valley Road No. 2, 40.32237° N 79.92567° W, 330 m, 06 Jul 1995, C.R. Bartlett, *Solidago* sp., 1♀ (00242852) (NCSU). ***Chester Co.:*** Pickering Creek [Preserve], Charlestown Twp., 40.11014° N 75.52264° W, 35 m, 19 Jun 1938, unknown, 1♂ (00134352) (USNM). ***Crawford Co.:*** Hartstown Bog, 41.5471° N 80.36266° W, 309 m, 28 Jun 1919, D.M. DeLong, 1♂ (00134572), paratype, 1♂ (USNM). ***Cumberland Co.:*** Pine Grove Furnace State Park, 40.03033° N 77.29762° W, 259 m, 09 Jul 1967, unknown, 1♂ (00117899) (KU). ***Dauphin Co.:*** Harrisburg, 40.27361° N 76.88472° W, 05 Jul 1978, E.U. Balsbaugh, Jr., 1♀ (00242953) (DAR). Harrisburg, 2301 North Cameron Street (Agric. Bldg), 40.28673° N 76.88147° W, 105 m, 29 Jun 1975, A.G. Wheeler, Jr., *Solidago* sp., 1♀ (00069952) (USNM). ***Fayette Co.:*** Uniontown, 39.89034° N 79.70641° W, 330 m, 27 Jun 1982–28 Jun 1982, Scott W. Gross, 1♂ (00069941) (USNM). ***Monroe Co.:*** Delaware Water Gap, 40.9675° N 75.1225° W, A.T. Slosson, 2♂ (00169941–00169942) (AMNH). Long Pond, Scrub Oak-Pitch Pine Barrens, 41.05333° N 75.46333° W, 18 Jul 1998, M.D. Schwartz, *Solidago* sp., 1♀ (00111411) *Solidago* sp., 1♂ (00113826) (CNC). ***Washington***

Co.: West Alexander, 40.10497° N 80.50652° W, 403 m, 07 Jul 1966, J. and W. Ivie, 1♂ (00169954) (AMNH). **South Carolina:** ***Oconee Co.:*** 3 mi N of Walhalla, 34.65° N 83.05° W, 305 m, 27 Jun 1958, J.L. Laffoon, 1♀ (00133816) (USNM). **South Dakota:** ***Lawrence Co.:*** Englewood, 44.29796° N 103.78357° W, 1704 m, 30 Aug 1924, H.C. Severin, 2♂ (00134578–00134579) (USNM). **Tennessee:** ***Cumberland Co.:*** Grassy Cove, 35.84546° N 84.91878° W, 469 m, 10 Jul 1922, T.H. Hubbell, 1♂ (00127475) (UMMC). ***Henderson Co.:*** Lexington, Rt 22 at Beech River, 35.6323° N 88.40479° W, 130 m, 30 May 1985, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 2♀ (00133731–00133732) (USNM). **Texas:** ***Dallas Co.:*** Dallas County, 32.78333°N 96.8000° W, 23 Apr 1951, H. Daly, 1♀ (00119539) (UCB). **Vermont:** ***Bennington Co.:*** Dorset, 43.25475° N 73.09909° W, 292 m, 25 Jul 1948, L.A. Lacey, 1♀ (00108478) (AMNH). ***Lamoille Co.:*** Stowe, 44.46533° N 72.68456° W, 221 m, 22 Jul 1919–01 Aug 1919, unknown, 1♀ (00108881) (AMNH). ***Orange Co.:*** Bradford, 43.9925° N 72.12944° W, 23 Jul 1973–29 Jul 1973, J. Amaral, 1♀ (00093995) (TAMU). ***Windsor Co.:*** Mount Ascutney, 43.43956° N 72.45222° W, 849 m, 11 Jun 1908, C.W. Johnson, 1♂ (00242512) (CAS). **Virginia:** ***Giles Co.:*** Mountain Lake, 37.35541° N 80.53783° W, 1194 m, 15 Jul 1938, L.J. and M.J. Milne, 1♂ (00113835) (CNC). ***Loudoun Co.:*** Paeonian Springs, 39.14932° N 77.61924° W, 161 m, 28 Jun, N. Banks, 1♀ (00169961) (AMNH). ***Nelson Co.:*** Nelson County, no specific locality, 37.75617° N 78.87139° W, 224 m, 30 Jun 1924, W. Robinson, 1♀ (00164938) (USNM); 03 Jul 1924, W. Robinson, 1♀ (00164939) (USNM). **West Virginia:** ***Grant Co.:*** 7 mi E of Mount Storm, 39.31986° N 79.14508° W, 859 m, 03 Aug 1950, R.I. Sailer, 1♂ (00069949) (USNM). Grant County, no specific locality, 38.992° N 79.124° W, 283 m, 08 Jul 1983–13 Jul 1983, T.L. Mason, Jr., 1♂ (USNM). ***Preston Co.:*** Cranesville Swamp, 39.5472° N 79.48113° W, 781 m, 29 Jul 1989, A.G. Wheeler, Jr., 1♂ (00069937) (USNM). Preston County, no specific locality, 39.471° N 79.683° W, 552 m, 08 Jul 1983–13 Jul 1983, T.L. Mason, Jr., 1♂ (USNM). ***Randolph Co.:*** Spruce Knob Lake, 38.70761° N 79.58783° W, 1224 m, 23 Jul 1986, Larochelle and Lariviere, 1♂ (00113827) (CNC). **Wisconsin:** ***Bayfield Co.:*** Dietz farm, 46.56708° N 91.40383° W, 336 m, 18 Jul 1965, J.T. Medler, 1♀ (00242095) (IRCW). ***Dane Co.:*** Dane County, no specific locality, 43.07431° N 89.48423° W, 305 m, 06 Jul 1962, T.R. Yonke, 1♀ (00243077) (UMRM); 23 Jun 1971, A.E. Akingbohungbe, 1♀ (00242092) (IRCW). Hawkhill, T9N R8E Sec5/SE, 43.2806° N 89.55938° W, 296 m, 21 Jul 1995, Miller, 1♀ (00242089) (IRCW). Madison, 43.0454° N 89.42727° W, 279 m, 25 Jul 1918, S.B. Fracker, 1♂ (00242084) (IRCW); 26 Jul 1965, T.R. Yonke, 1♀ (00243074) (UMRM); 02 Jul 1977, unknown, 1♂ (00242085) (IRCW). Madison, Dunns Marsh Area, 43.02694° N 89.45705° W, 301 m, 24 Jul 1967, D.W. Schwehr, *Monarda* sp. (Lamiaceae), 1♂ (00242080) (IRCW). Nevin Marsh, 43.01702° N 89.41779° W, 263 m, 16 Jul 1974, D. Bach, 1♂ (00242086) (IRCW). University of Wisconsin, University Arboretum, 43.03198° N 89.4396° W, 304 m, 25 Jun 1964, T.R. Yonke, 1♂ (00243068) (UMRM). ***Door Co.:*** Door County, no specific locality, 44.83514° N 87.37028° W, 185 m, 30 Jun 1971, A.E. Akingbohungbe, 1♀ (00242093) (IRCW). Sturgeon Bay, 44.83507° N 87.39318° W, 183 m, 19 Jun 1921, C.L. Fluke, 2♂ (00242058–00242059), 2♀ (00242060–00242061) (IRCW). ***Forest Co.:*** Peshtigo River, 45.50464° N 88.42576° W, 29 Jun 1970, A.E. Akingbohungbe, 1♂ (00242074) (IRCW); 15 Aug 1971, S. Billmeyer, 2♂ (00242079, 00242106) (IRCW). ***Grant Co.:*** Grant County, no specific locality, 42.8418° N 90.7006° W, 305 m, 13 Jun 1963, T.R. Yonke, 1♂ (00243065) (UMRM). Thomas Wet Prairie, T7N R1W Sec7, 43.09636° N 90.53812° W, 219 m, 25 Jun 1992, Andrew H. Williams, *Solidago canadensis*, 1♂ (00242081), *Solidago gigantea*, 1♂ (00242082), *Rudbeckia laciniata*, 1♂ (00242083) (IRCW). ***Green Co.:*** Albany, Wisconsin Conservation District Area, 42.7038° N 89.4347° W, 244 m, 19 Jul 1961, J.T. Medler, 1♂ (00242088) (IRCW). ***Iowa Co.:*** Iowa County, no specific locality, 42.9568° N 90.123° W, 351 m, 29 Jul 1963, T.R. Yonke, 1♂ (00243066) (UMRM). ***Kenosha Co.:*** Carol Beach, Chiwaukee Prairie, 42.51403° N 87.81048° W, 176 m, 28 Jun 1998, W. Suter, 1♂ (00242087) (IRCW).

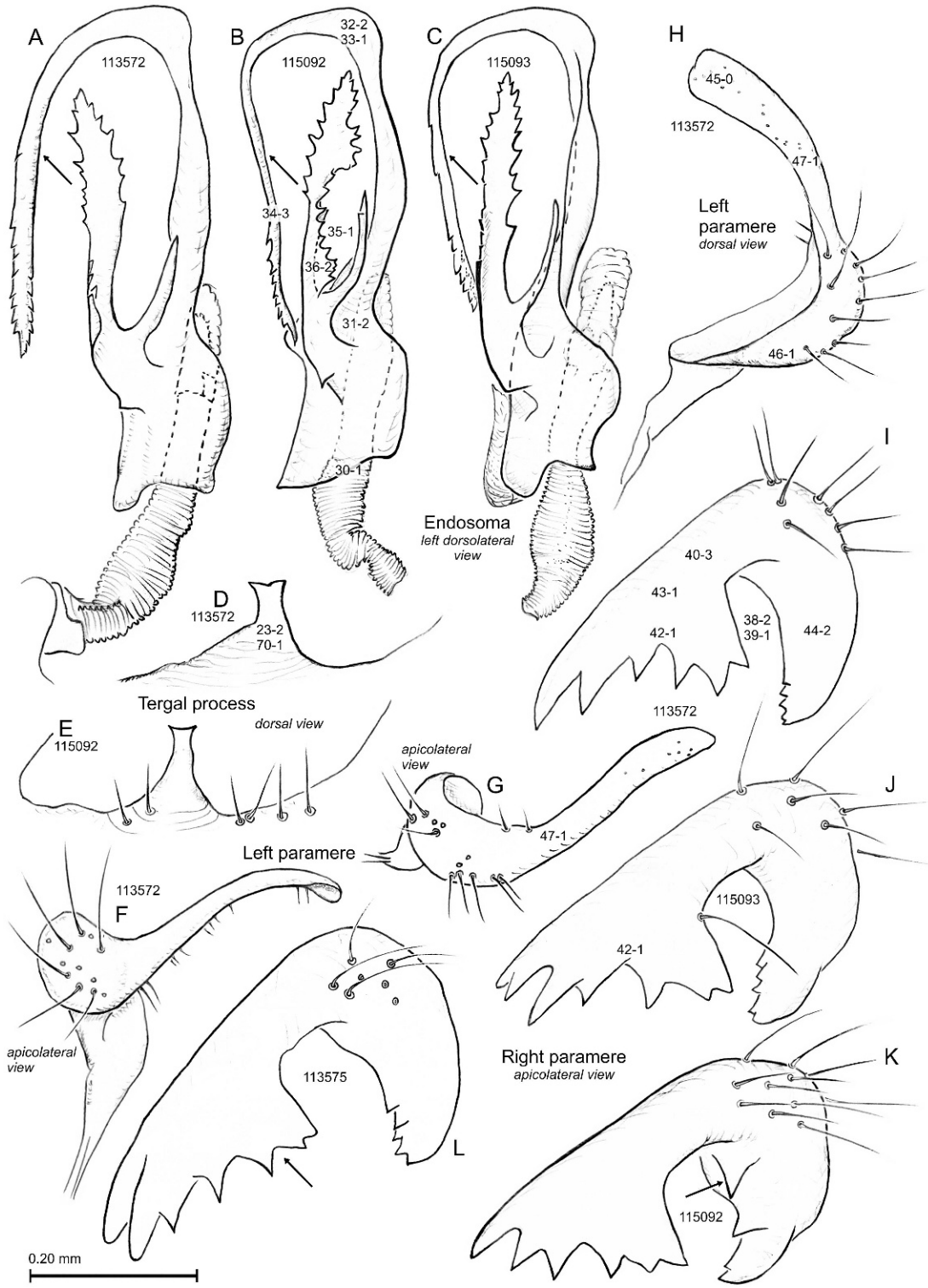
Marathon Co.: Marathon County, no specific locality, 44.95329° N 89.63343° W, 356 m, 20 Jul 1971, A.E. Akingbohungbe, 1♀ (00242091) (IRCW). ***Polk Co.:*** Polk County, no specific locality, 45.45° N 92.41667° W, unknown, 1♂ (00242430) (CAS). ***Rock Co.:*** T4N R13E Sec25, 42.781° N 88.9062° W, 265 m, 06 Jul 1976–13 Jul 1976, unknown, 1♀ (00242090) (IRCW). ***Waukesha Co.:*** Dousman, 43.01425° N 88.46786° W, 263 m, 07 Jul 1959, unknown, 1♂ (00119537) (UCB). Waukesha County, no specific location, 42.98837° N 88.19392° W, 272 m, 26 Jul 1962, T.R. Yonke, 1♀ (00243071) (UMRM). **Wyoming:** ***Fremont Co.:*** Burris, 43.37003° N 109.26865° W, 1829 m, 22 Jul 1953, R.R. Dreisbach, 1♀ (00127530) (UMMC). ***Sheridan Co.:*** Banner, 44.6004° N 106.8661° W, 1402 m, Metz, 1♂ (00121669) (CAS). Sheridan, 44.79722° N 106.95556° W, Metz, 1♂ (00121668) (CAS). ***Washakie Co.:*** Ten Sleep, 44.03043° N 107.4573° W, 1348 m, 17 Aug 1927, H.H. Knight, paratype, 1♂ (00134562) (USNM).

Slaterocoris pallidicornis (Knight)
Figures 13, 33; plate 2; map 7

Strongylocoris atratus: Van Duzee: 1921: 135 (disc., in part).
Strongylocoris pallidicornis Knight, 1938: 4, fig. 5 (orig. desc.).
Slaterocoris pallidicornis: Kelton, 1968: 1123, fig. 4 (disc.); Knight, 1970: 245, fig. 8, (disc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog).

DIAGNOSIS: Distinguished by the mostly yellow coloration of the appendages. Antennal segments I and II are pale, except for the brown base of segment I and apical one-fifth of segment II. The legs are predominantly pale yellow with dark brown to black on most of the basal portions of the femora, apices of the tibiae and distal tarsomeres (fig. 13). The structure of the right paramere and endosomal spicule will unequivocally distinguish the male (fig. 33A–C, I–L). The female of *S. pallidicornis* is difficult to separate from female *S. breviatus* with extensive pale coloration in antennal segment II. Additionally, the base of segment II in the female of *S. pallidicornis* is pale as compared to those of *S. breviatus* which often have segment II pale, but the extreme base and apex are black. Usually the pale portion of the appendages of the latter species are more orange-yellow as compared to the pale yellow of the former. Typically the trochanter and antennal segment I are pale in *S. pallidicornis*, the trochanter is dark and segment I has a black basal annulus in *S. breviatus*. Sometimes the distal portion of antennal segment II is diffusely darkened in female *S. pallidicornis*, the extreme base is not narrowly darkened; in female *S. stygicus*, segment II is pale yellow medially, with dark base and distal region. Additionally, the hemelytron in female *S. pallidicornis* is shorter anterior to the cuneal fracture and the width of the corium is somewhat narrower, as compared to female *S. stygicus* where the anterior portion of the hemelytron is longer and with of the corium is wider.

REDESCRIPTION: *Male:* Large, obovate, length 4.10–4.75, width 1.81–2.10 (pl. 2). COLORATION: Shining black; except pale yellow on antennal segments I (except for extreme base) and II, (except variable distal region), apex of coxa, trochanter, apical portion of femur, tibia except apex, and tarsomeres I and II. (fig. 13). VESTITURE: Sparsely distributed, short, suberect, brown setae. STRUCTURE: Frons striate; labium reaching middle of middle coxa; antennal segment II longer than head width; costal margin arcuate. GENITALIA: **Tergal process**: Long, basal width and apical points variable (fig. 33D, E). **Endosomal spicule**: Ventral lobe long, somewhat flattened (fig. 33A, arrow) or narrow (fig. 33B, C, arrow) marginal serration strong, restricted to apical region; dorsal lobe with lateral ramus long, flat distally, relatively wide, attenuate apically, marginal serration strong; base of lateral ramus sometimes curved (fig. 33A, B); medial ramus moderately long, marginally smooth (fig. 33A–C). **Right paramere**: Apical spines tightly grouped, moderately long, discrete, splayed, with basalmost spine about same width as others, not separated (fig. 33I–L, arrow); basal lobe with serrate region produced, not particularly constricted, strongly serrate on posterior surface (fig. 33I–L); sometimes basal lobe with several large basal spines (fig. 33K, arrow). **Left paramere**: Long; apex smoothly attenuate (fig. 33F–H).


A
113572
B
115092
32-2
33-1
34-3
35-1
36-2
31-2
30-1
C
115093
Endosoma
left dorsolateral
view
H
45-0
113572
47-1
Left
paramere
dorsal view
46-1
I
40-3
43-1
42-1
38-2
39-1
44-2
113572
D
113572
23-2
70-1
Tergal process
E
115092
dorsal view
apicolateral
view
G
47-1
J
115093
42-1
Left paramere
F
113572
apicolateral
view
113575
L
Right paramere
apicolateral view
K
115092
0.20 mm

Female: Large, ovate; length 4.20–4.60; width 2.00–2.24; costal margin strongly arcuate (pl. 2). COLORATION: Antennal segments I and II almost completely yellow, but with extreme base of segment I and extreme base and apex of segment II black. GENITALIA: As in species group except: **First gonapophyses**: Right greater than left at overlap. **Second gonapophyses**: Anterior medial surface strongly convex. **Interramal sclerite**: Posteromedial portion with flat plate abutting ovipositor bulb.

HOSTS: The majority of host records are from Asteraceae or Caprifoliaceae. *Artemisia* (with *A. cana* the only species-level record), *Aster* sp., and especially species of *Solidago* are probably the breeding hosts for this species. However many specimens were collected on honeysuckle, *Lonicera* sp. and *Symphoricarpos* species (common snowberry, *S. albus* (L.) Blake, western snowberry, *S. occidentalis* Hook., and coralberry, S. *orbiculatus* Moench) across the northern portion of the distributional range of *S. pallidicornis*. I hesitate to suggest that the large number of occurrences on these woody perennials are just sitting records as the detailed biology of this species is essentially unknown; perhaps species of Caprifoliaceae are an essential component of its life cycle. Plant bugs are known to feed on flowers and pollen of nonbreeding hosts (Wheeler, 2001); the single instance of *Yucca glauca* Nutt. (Agavaceae) is considered to be a sitting record.

DISTRIBUTION: A species of the Prairie Provinces and the upper Great Plains with a significant number of records in the Rocky Mountain cordillera of Colorado and an apparently isolated population in maritime Canada. Occurs as far north and west as the Peace River region of Alberta then east spanning the Prairie Provinces to western Ontario. In the upper Great Plains, it extends from the Canadian border south to Iowa, Nebraska, and Wyoming, and is found on the eastern front of the Rockies from Colorado north to Alberta. Known from only one locality (22 specimens, 2 collection events) in Cape Breton Island, Nova Scotia (map 7).

COLLECTION SUMMARY: 439 specimens (58% with USI numbers) from 191 collection events, with June records found in the southern plains localities and the remainder of specimens collected in July to August, as the latest record is from early September.

DISCUSSION: Variation was noted in the male genitalia of some males from Nova Scotia. In the endosomal spicule the lateral ramus in the dorsal lobe is sometimes twisted (cf. fig. 33B, C) and right paramere sometimes has accessory spines basal to the apex of the basal lobe (cf. fig. 33J, K). The structure of the tergal process in some males from Nova Scotia was more narrow basally and with small apical points than in other males (cf. fig. 33D, E). Such variation was not noted in specimens in the remaining distribution of *S. pallidicornis*. The apical spines of the right paramere in some *S. pallidicornis* are reminiscent of the condition found in *S. breviatus*, but upon close comparison the individual spines of *S. breviatus* are smaller, more distinct and more equal in length than those of *S. pallidicornis*.

HOLOTYPE: **South Dakota:** ***Custer Co.:*** Custer [43.76667° N 103.59833° W], 19 Aug 1927, H.H. Knight, 1♂ (AMNH_PBI 00134029) (USNM).

OTHER SPECIMENS EXAMINED: **CANADA: Alberta:** 1.9 km W of Tyrrell Museum on Rt 838, W of Drumheller, 51.47034° N 112.73737° W, 684 m, 14 Jul 1990, M.D. Schwartz, *Symphoricarpos occidentalis*, 1♂ (00113540) (CNC). 3.8 km S of Drumheller on Rt 56, 51.42762° N 112.64248° W, 677 m, 14 Jul 1990, M.D. Schwartz and R.G. Foottit, *Symphoricarpos occidentalis*, 1♂ (00113541) (CNC). Calgary, 51.08333° N 114.08333° W, 19 Jul 1924, R.W. Salt, 1♂ (00085378) (BMNH); 26 Jul 1924, R.W. Salt, 1♂ (00085380) (BMNH); 05 Aug 1924, R.W. Salt, 1♂ (00085381) (BMNH); 10 Aug 1924, R.W. Salt, 1♂ (00085382) (BMNH); 27 Aug

←

Fig. 33. *Slaterocoris pallidicornis*, male genitalia. **A**, **D**, **F**–**I**. Theodore Roosevelt National Park, ND. **B**, **C**, **E**, **J**, **K**. Beddeck, NS. **L**. Pingree Park, CO.

1924, R.W. Salt, 1♂ (00085379) (BMNH); 08 Jul 1961, Carr, 1♂ (00113508) (CNC). Castor, 52.21666° N 111.9000° W, 07 Aug 1957, A.R. and J.E. Brooks, 1♂ (00113505) (CNC). Crowsnest Pass, 49.64967° N 114.69953° W, 1366 m, 29 Aug 1930, J.H. Pepper, 1♀ (00113535) (CNC). Drumheller, 51.46666° N 112.7000° W, 11 Aug 1957, A.R., J.E. Brooks, 1♂ (00113522) (CNC). Elkwater Lake, Cypress Hills Provincial Park, 49.66293° N 110.30167° W, 1219 m, 19 Jul 1956, O. Peck, 1♀ (00113529) (CNC). Elkwater Park, Cypress Hills Provincial Park, 49.63° N 110.2000° W, 1427 m, 20 Jul 1952, A.R. Brooks, 1♀ (00113524) (CNC); 20 Jul 1952, L.A. Konotopetz, 1♂ (00113504) (CNC). Head Smashed-in Buffalo Jump Interpretive Park, 49.7051° N 113.65383° W, 1099 m, 01 Sep 1993, M.D. Schwartz, *Artemisia cana*, 1♂ (00113542) (CNC). High Prairie, 55.43333° N 116.48333° W, 16 Jul 1961, A.R. Brooks, 1♂ (00113520) (CNC); 17 Jul 1961, A.R. Brooks, 1♂ (00113521) (CNC). Hotchkiss, 57.06666° N 117.55° W, 17 Jul 1940, C.L. Neilson, 1♂ (00113527) (CNC). Irvine, 49.95° N 110.26666° W, 09 Jul 1952, A.R. Brooks, 2♂ (00113506, 00113525) (CNC). Lethbridge, 49.7000° N 112.83333° W, 04 Jul 1929, J.H. Pepper, 1♂ (00113511) (CNC); 13 Aug 1929, J.H. Pepper, 1♂ (00113513) (CNC); 05 Jun 1930, J.H. Pepper, 1♀ (00113538) (CNC); 06 Jul 1930, J.H. Pepper, 1♀ (00113537) (CNC); 07 Jul 1930, J.H. Pepper, 2♂ (00113512, 00113514) (CNC); 18 Jul 1930, J.H. Pepper, 1♂ (00113515), 1♀ (00113536) (CNC); 29 Jul 1930, J.H. Pepper, 1♂ (00113516), 1♀ (00317191) (CNC); 01 Aug 1930, J.H. Pepper, 1♀ (00113539) (CNC); 20 Jun 1952, L.A. Konotopetz, 1♀ (00113526) (CNC). Lundbreck, 49.58° N 114.17° W, 07 Jul 1970, L.A. Kelton, 1♀ (00111414), 1♂ (00113543), 1♀ (00113528) (CNC); 20 Jul 1973, L.A. Kelton, 1♂ (00113317) (CNC). Medicine Hat, 50.03333° N 110.68333° W, 06 Aug 1929, J.H. Pepper, 1♀ (00113531) (CNC); 07 Aug 1929, J.H. Pepper, 1♀ (00113530) (CNC); 08 Aug 1929, J.H. Pepper, 1♀ (00113532) (CNC); 22 Aug 1930, J.H. Pepper, 1♀ (00113533) (CNC); 12 Jul 1939, J.H. Pepper, 1♂ (00113517) (CNC); 14 Jul 1956, E.E. Sterns, 1♂ (00113509) (CNC). Medicine Hat, Ross Creek, 50.0333° N 110.6333° W, 705 m, 13 Jul 1929, J.H. Pepper, 1♂ (00113510) (CNC). Milk River, 49.13333° N 112.08333° W, 22 Aug 1929, J.H. Pepper, 1♀ (00113534) (CNC); 09 Jul 1930, J.H. Pepper, 1♂ (00113518) (CNC). Nevis, 52.33093° N 113.0369° W, 798 m, 27 Jul 1973, L.A. Kelton, 3♂ (00113320, 00318772, 00318778), 1♀ (00318770) (CNC). Onefour, 49.06666° N 110.45° W, 17 Jul 1952, A.R. Brooks, 1♀ (00113523) (CNC); 17 Jul 1952, L.A. Konotopetz, *Symphoricarpos occidentalis*, 1♂ (00113507) (CNC). Peace River, 56.23333° N 117.28333° W, 10 Jul 1961, A.R. Brooks, 2♂ (00113519, 00317189), 1♀ (00317188) (CNC). Stettler, 52.33333° N 112.68333° W, 03 Aug 1957, A. and J. Brooks, 1♀ (00113544) (CNC). Wainwright, 52.83333° N 110.86666° W, 27 Jul 1957, A. and J. Brooks, 1♂ (00113545) (CNC). Waterton Park, 49.05° N 113.91666° W, 26 Jul 1972, L.A. Kelton, 1♂ (00113319) (CNC). **Manitoba:** 5 km N of Spirit Sands, Spruce Wood Provincial Park, 15 km S of Carberry, 49.71498° N 99.28301° W, 360 m, 08 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113548) (CNC). 6.4 km W of Russell on Rt 16, 50.77153° N 101.38138° W, 533 m, 18 Jul 1990, M.D. Schwartz and R.G. Foottit, *Symphoricarpos occidentalis*, 1♂ (00113547) (CNC). 10 mi W of Roblin on Rt 5, 51.23333° N 101.58088° W, 15 Jul 1954, Brooks and Wallis, 1♂ (00113563) (CNC). Assiniboine River Valley at Rt 16, 49.88333° N 97.13333° W, 18 Jul 1990, M.D. Schwartz, *Symphoricarpos occidentalis*, 2♀ (00113553, 00317192) (CNC). Boissevain, 49.23333° N 100.05° W, 20 Jul 1953, Brooks and Kelton, 1♂ (00113567) (CNC). Carberry, 49.86666° N 99.35° W, 29 Jul 1953, Brooks and Kelton, 1♂ (00242588) (CAS), 1♂ (00113551) (CNC); 09 Aug 1953, Brooks and Kelton, 1♀ (00113555) (CNC). Millwood, 50.7000° N 101.4000° W, 19 Jul 1954, Brooks and Wallis, 1♂ (00113562) (CNC). Morris, 49.35° N 97.36666° W, 15 Aug 1953, A.R. Brooks, 1♂ (00113560) (CNC). Ninette, 49.4000° N 99.63333° W, 28 Jul 1958, R.B. Madge, 1♀ (00113568) (CNC); 05 Aug 1958, R.B. Madge, 1♀ (00113569) (CNC). Pilot Mound, 49.2000° N 98.9000° W, 31 Jul 1958, A. and J. Brooks, 1♂ (00113561) (CNC). Russell, 50.78333° N 101.28333° W, 17 Jul 1954, Brooks and Wallis, 1♂ (00113559) (CNC); 21

Jul 1954, Brooks and Wallis, 1♂ (00113558) (CNC). Souris, 49.61666° N 100.25° W, 23 Jul 1953, A.R. Brooks, 1♂ (00113565) (CNC). Turtle Mountain, 49° N 100.33333° W, 17 Jul 1953, Brooks and Kelton, *Solidago* sp., 1♂ (00113549) (CNC). Virden, 49.85° N 100.93333° W, 10 Jul 1953, Brooks and Kelton, 1♂ (00113552) (CNC); 14 Jul 1953, Brooks and Kelton, 1♂ (00113550) (CNC). Westbourne, 50.13333° N 98.56666° W, 25 Jul 1954, Brooks and Wallis, 1♂ (00113564) (CNC). **Nova Scotia:** Beddeck, 46.10899° N 60.7646° W, 78 m, 23 Jul 1936, J. McDunnough, *Lonicera* sp., 3♂ (00113456, 00115092–00115093) (CNC); 01 Aug 1941, J. McDunnough, *Aster* sp., 1♂ (00113457) (CNC). **Ontario:** Black Sturgeon Lake, 49.82412° N 94.43406° W, 326 m, 01 Aug 1956–15 Aug 1956, H. Lindberg, 2♂ (00318764–00318765), 1♀ (00318766) (CNC). **Saskatchewan:** 4.9 km SE of North Battleford on Rt 16, 52.72884° N 108.20706° W, 511 m, 22 Aug 1993, M.D. Schwartz, *Solidago* sp., 1♀ (00113467) (CNC). 5 km E of Melville on Rt 15, 50.91564° N 102.68424° W, 543 m, 18 Jul 1990, M.D. Schwartz, *Symphoricarpos occidentalis*, 1♀ (00113464) (CNC). 7 km W of Fairlight on Rt 48, 49.88654° N 101.77546° W, 598 m, 09 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♀ (00113465) (CNC). 10.8 km E of Maidstone on Hwy 16, 53.08333° N 109.13857° W, 22 Aug 1993, M.D. Schwartz, *Solidago* sp., 1♀ (00113468) (CNC). 40.0 km SW of Saskatoon on Rt 7, 3.5 km [SW] of Delisle, 51.89674° N 107.17894° W, 537 m, 13 Jul 1990, M.D. Schwartz, *Symphoricarpos occidentalis*, 1♂ (00113462) (CNC). 45.8 km N of Stoughton on Rt 47, 50.0945° N 103.01666° W, 09 Jul 1990, M.D. Schwartz, *Symphoricarpos occidentalis*, 3♂ (00113460–00113461, 00317190), 2♀ (00113202, 00317193), (CNC). 186 km N of Regina on Rt 11, 3.3 km E of 11, 52.11983° N 104.61666° W, 10 Jul 1990, M.D. Schwartz, *Symphoricarpos occidentalis*, 1♂ (00113463), 1♀ (00113466) (CNC). Amsterdam, 51.75° N 102.47° W, 22 Aug 1954, Brooks and Wallis, 1♂ (00113470) (CNC). Attons Lake, Cut Knife, 52.75° N 109.01666° W, 03 Jul 1940, A.R. Brooks, 1♂ (00113491) (CNC). Elbow, 51.11666° N 106.6000° W, 02 Aug 1951, A.R. Brooks, 1♂ (00113492) (CNC), *Solidago* sp., 1♂ (00121789), 1♀ (00121790) (UCB); 12 Jul 1960, A.R. Brooks, 1♂ (00113493) (CNC). Esterhazy, 50.65° N 102.08333° W, 14 Aug 1954, Brooks and Wallis, 1♂ (00113469) (CNC). Great Sand Hills, 50.5000° N 109.08333° W, 04 Jul 1952, A.R. Brooks, *Symphoricarpos occidentalis*, 1♂ (00113502) (CNC). Harris, 51.73° N 107.58° W, 03 Jul 1952, L.A. Konotopetz, 1♂ (00113471) (CNC). Indian Head, 50.53333° N 103.66666° W, 10 Jul 1954, Brooks and Wallis, 1♂ (00113497) (CNC). Kandahar, 51.77° N 104.35° W, 29 Jul 1954, Brooks and Wallis, 1♂ (00113479) (CNC). Katepwa, 50.69384° N 103.64649° W, 477 m, 11 Aug 1954, Brooks and Wallis, 1♀ (00113472) (CNC). Killdeer, 49.11336° N 106.34801° W, 896 m, 01 Aug 1955, A.R. Brooks, 1♂ (00113478) (CNC). Krydor, 52.78333° N 107.06666° W, 08 Jul 1950, A.R. Brooks, 1♂ (00113476) (CNC). Leask, 53.02142° N 106.75319° W, 515 m, 08 Jul 1950, A.R. Brooks, 1♂ (00113477) (CNC). Lorlie, 50.83343° N 103.28321° W, 586 m, 04 Aug 1950, A.R. Brooks, 1♂ (00113480) (CNC). Lumsden, 50.65° N 104.86666° W, 07 Aug 1954, Brooks and Wallis, 1♀ (00113482) (CNC); 12 Jul 1958, A. and J. Brooks, 1♂ (00113473) (CNC). Neilburg, 52.8381° N 109.62832° W, 675 m, 24 Jul 1957, A.R. and J.E. Brooks, 1♀ (00113481) (CNC). Rockglen, 49.18333° N 105.95° W, 02 Aug 1955, A.R. Brooks, 1♂ (00113474), 1♀ (00113503) (CNC). Saskatoon, 52.13333° N 106.66666° W, 14 Jul 1927, Kenneth M. King, 1♂ (00113486) (CNC); 21 Jul 1927, Kenneth M. King, 3♂ (00113483–00113485) (CNC); 08 Aug 1927, Kenneth M. King, 1♂ (00113487) (CNC); 22 Aug 1927, Kenneth M. King, 1♂ (00113488) (CNC); 18 Jul 1928, Kenneth M. King, 1♂ (00113490) (CNC); 18 Jul 1928, Kenneth M. King, 1♂ (00113489) (CNC); 05 Jul 1949, A.R. Brooks, 1♂ (00113496) (CNC); 05 Jul 1949, L.A. Konotopetz, 1♂ (00121791), 1♀ (00121792) (UCB); 21 Jul 1950, A.R. Brooks, 1♂ (00113494) (CNC); 06 Jul 1956, A.R. Brooks, 1♂ (00113495) (CNC). Stockholm, 50.65° N 102.3000° W, 27 Jul 1954, Brooks and Wallis, 1♂ (00113475) (CNC). Willow Bunch, 49.4000° N 105.63333° W, 26 Jul 1955, C.D.F. Miller, *Symphoricarpos occidentalis*, 1♂ (00113501) (CNC); 27 Jul 1955, A.R. Brooks, 1♂ (00242587) (CAS), *Symphoricar-*

pos occidentalis, 1♂ (00113498) (CNC); 29 Jul 1955, A.R. Brooks, *Symphoricarpos occidentalis*, 1♂ (00113499) (CNC); 30 Jul 1955, A.R. Brooks, *Symphoricarpos occidentalis*, 1♂ (00113500) (CNC). **USA: Colorado:** ***Boulder Co.:*** Boulder, 40.015° N 105.27° W, 1676 m, 08 Jul 1949, R.H. Beamer, 1♀ (00117900) (KU). ***Costilla Co.:*** Fort Garland, Ute Creek Ranch, 37.43274° N 105.43846° W, 11 Aug 1925, H.H. Knight, paratype, 1♂ (00134380) (USNM). ***Denver Co.:*** Denver, 39.73917° N 104.98417° W, 20 Jun 1969, J.T. Polhemus, 1♂ (00134395) (USNM). Denver, 39.73917° N 104.98417° W, N. Banks, 1♀ (00108482) (AMNH). ***Douglas Co.:*** Chatfield State Park, 39.53666° N 105.06888° W, 15 Jun 1977, D.A. and J.T. Polhemus, 1♂ (00116981) (JTP); 08 Jul 1977, D.A. and J.T. Polhemus, 1♂ (00116975) (JTP); 12 Jul 1979, J.T. Polhemus, 2♂ (00108475, 00108898), 1♀ (00108899) (AMNH), 2♂ (00116976, 00116982) (JTP). Indian Creek Campground, Pike National Forest, 39.37898° N 105.10117° W, 2271 m, 03 Aug 2004, R.L. Blinn, 1♂ (00242847) (NCSU). Perry Park, 39.25667° N 104.99194° W, 13 Jul 1977, D.A. and J.T. Polhemus, 1♀ (00108481) (AMNH), 1♂ (00116980) (JTP); 19 Aug 1977, D.A. and J.T. Polhemus, 1♀ (00108480) (AMNH); 08 Jul 1982, J.T. Polhemus, 1♂ (00116983) (JTP). Waterton, 39.49361° N 105.08806° W, 12 Jul 1982, D.A. Polhemus, 1♂ (00116984) (JTP); 07 Jul 1983, D.A. Polhemus, 1♂ (00116978) (JTP); 11 Jul 1983, D.A. Polhemus, 1♂ (00116979) (JTP); 08 Aug 1987, T.J. Henry, *Symphoricarpos* sp., 1♂ (00133719) (USNM). Waterton, Head of Hiline, 39.49361° N 105.08806° W, 18 Jul 1979, J.T. Polhemus, 1♂ (00116977) (JTP). ***Eagle Co.:*** Woody Creek, 39.27592° N 106.88972° W, 2227 m, 27 Jul 1992, W.A. Jones, 1♂ (00069996) (USNM). ***El Paso Co.:*** Colorado Springs, 38.83389° N 104.82083° W, 1803 m, 27 Jun 1966, J.A. Slater, 1♀ (00169947) (AMNH). ***Jefferson Co.:*** Waterton, Platte River, 39.40808° N 105.17074° W, 1631 m, 11 Jul 1986, R.T. Schuh and J.T. Polhemus, *Symphoricarpos* sp., 2♀ (00108483–00108484) (AMNH). ***Larimer Co.:*** Fort Collins, 40.58528° N 105.08389° W, 13 Jul, E.P. Van Duzee, 1♂ (00242544) (CAS); 16 Jul, E.P. Van Duzee, 1♂ (00242584), 2♀ (00242585–00242586) (CAS). Fort Collins, 40.58528° N 105.08389° W, 1525 m, 08 Jul 1898, unknown, 1♂ (00134390), 1♀ (00134389) (USNM). Fort Collins, Dixon Canyon, 40.5544° N 105.148° W, 1657 m, 19 Aug 1898, E.D. Ball, paratype, 1♀ (00113579) (CNC). Little Beaver [Creek], 40.62358° N 105.52388° W, 2402 m, 16 Jul 1898, unknown, 1♂ (00134497) (USNM). Pingree Park, 40.56111° N 105.59722° W, 03 Sep 1972, L.A. Kelton, 2♂ (00113575, 00318782) (CNC). ***Las Animas Co.:*** Stonewall nr Trinidad, 37.16944° N 104.5000° W, 2591 m, 07 Aug 1925, C.J. Drake, paratype, 1♂ (00134343), 2♀ (00134344–00134345) (USNM); 07 Aug 1925, H.H. Knight, paratype, 1♂ (00113578) (CNC). ***Pitkin Co.:*** Aspen, 39.19111° N 106.81694° W, 2438 m, 24 Jul 1919–27 Jul 1919, unknown, 1♂ (00108472) (AMNH). Avalanche Creek, White River National Forest, 39.2471° N 107.23371° W, 23 Aug 1968, L.A. Kelton, 1♂ (00113576) (CNC). ***Routt Co.:*** Steamboat Springs, 40.5241° N 106.4628° W, 2743 m, 30 Jul 1953, R.R. Dreisbach, 1♂ (00127453) (UMMC). ***Unknown co.:*** "'Col.", unknown, 1♀ (00164930) (USNM). **Iowa:** ***Woodbury Co.:*** 3 mi SE of Holly Springs, 42.25847° N 96.02309° W, 352 m, 12 Jun 1949, Slater and Laffoon, 2♂ (00108474, 00169976) (AMNH). Sioux City, 42.50028° N 96.39389° W, 10 Jun 1949, Slater and Laffoon, 1♂ (00108473) (AMNH); 12 Jun 1950, J.A. Slater and J. Laffoon, 1♀ (00108476) (AMNH). **Kansas:** ***Douglas Co.:*** Douglas County, no specific locality, 38.86667° N 95.23333° W, 274 m, F.H. Snow, 1♀ (00117910) (KU). **Minnesota:** ***Brown Co.:*** New Ulm, 44.3125° N 94.46028° W, 20 Jun 1920, H.H. Knight, paratype, 1♂ (00134381) (USNM). ***Norman Co.:*** Norman County, 47.33333° N 96.46667° W, 21 Jun 1923, A.A. Nichol, paratype, 1♂ (00134386) (USNM); 25 Jun 1923, A.A. Nichol, paratype, 1♀ (00134387) (USNM); 20 Jul 1923, A.A. Nichol, paratype, 1♂ (00134382) (USNM). ***Todd Co.:*** Eagle Bend, 46.16496° N 95.03919° W, 417 m, 25 Jul 1921, A.A. Nichol, paratype, 1♀ (00094046) (TAMU). **Montana:** ***Phillips Co.:*** 1 mi W of Landusky, 47.89517° N 108.63858° W, 1277 m, 06 Jul 1972, G.C. Gaumer, 1♀ (00291104) (TAMU). ***Roosevelt Co.:*** Poplar, 48.1137° N 105.20863° W, 594 m, 13 Jul 1922, C.C. Sperry, 3♀ (00164945–00164947) (USNM).

Teton Co.: 6 mi NW of Choteau on Canyon Road off Rt 89, Eureka Reservoir Fishing Access Site, 47.85975° N 112.27421° W, 1219 m, 02 Aug 1994, M.D. Schwartz, *Symphoricarpos albus*, 2♀ (00113458, 00318743) (CNC). **Nebraska:** ***Burt Co.:*** Oakland, 41.83583° N 96.46697° W, 394 m, 05 Jul 1940, W.W. Wirth, *Symphoricarpos orbiculatus*, 2♂ (00134391–00134392), 1♀ (00134393) (USNM). ***Cass Co.:*** Murdock, 40.92556° N 96.28001° W, 119 m, 26 Jun 1940, W.W. Wirth, flax, 1♂ (00134394) (USNM). ***Cherry Co.:*** Crookston, 42.92795° N 100.75804° W, 814 m, 27 Jun 1973, L.A. Kelton, *Symphoricarpos* sp., 2♂ (00113573, 00318779), 1♀ (00318780) (CNC). ***Sheridan Co.:*** Hay Springs, 42.68389° N 102.68944° W, 28 Jun 1973, L.A. Kelton, *Symphoricarpos* sp., 1♂ (00113571) (CNC). ***Sioux Co.:*** Glen, 42.6075° N 103.58388° W, 1237 m, Aug 1903, unknown, 1♀ (00164934) (USNM); Aug 1906, unknown, 4♀ (00133720, 00164931–00164933) (USNM). ***Unknown co.:*** Neb., unknown, 1♀ (00164935) (USNM). **North Dakota:** ***Billings Co.:*** 3 mi S of Medora, 46.87398° N 103.51992° W, 757 m, 25 Jun 2000, T.J. Henry, *Yucca glauca*, 1♂ (00069995) (USNM). ***Bottineau Co.:*** Bottineau, 48.82723° N 100.44569° W, 499 m, 01 Aug 1920, T.H. Hubbell, 1♂ (00127457) (UMMC). ***Burleigh Co.:*** Bismarck, 46.8083° N 100.7833° W, 21 Jul 1918, I.N. Gabrielson, 1♂ (00134471), 2♀ (00134472–00134473) (USNM). ***Cass Co.:*** Cass County, no specific locality, 46.90111° N 97.21938° W, 284 m, 12 Jul 1920, A.A. Nichol, paratype, 1♂ (00134383) (USNM). ***McKenzie Co.:*** 146-98-16-110, 13 Jul 1976, Lago and Kurtz, 1♂ (00242959) (DAR). Theodore Roosevelt National Memorial Park, North Unit, 47.57091° N 103.27139° W, 707 m, 21 Jul 1965, L. Grochowski, 1♂ (00242958) (DAR); 30 Jun 1973, L.A. Kelton, *Artemisia* sp., 1♂ (00113572), *Symphoricarpos* sp., 1♂ (00318781) (CNC). ***Ramsey Co.:*** Devils Lake, 48.11278° N 98.86472° W, 20 Jul 1920, T.H. Hubbell, 1♀ (00127460) (UMMC); 22 Jul 1920, T.H. Hubbell, 1♂ (00127459) (UMMC); 28 Jul 1920, T.H. Hubbell, 1♀ (00127461) (UMMC). ***Slope Co.:*** 1 mi N of Marmarth, 46.30574° N 103.93418° W, 887 m, 26 Jun 2000, T.J. Henry, *Symphoricarpos occidentalis*, 1♂ (00133717) (USNM). ***Stark Co.:*** 127 R Ave. 4 mi N of 48 R St. SW [9 mi S of South Heart], 46.73333° N 103.01666°W, 27 Jun 2000, T.J. Henry, *Symphoricarpos occidentalis*, 1♂ (00133718) (USNM). ***Traill Co.:*** Traill County, 47.44444° N 97.16667° W, 19 Jul 1923, A.A. Nichol, paratype, 1♀ (00134384) (USNM); 04 Aug 1923, A.A. Nichol, paratype, 1♀ (00134388) (USNM). **South Dakota:** ***Brookings Co.:*** Warrens Woods, White, 44.43924° N 96.65302° W, 536 m, 10 Aug 1927, H.C. Severin, 2♂ (00134397–00134398), 2♀ (00134399–00134400) (USNM). ***Butte Co.:*** Castle Rock, 44.96443° N 103.42435° W, 957 m, 29 Jun 1973, L.A. Kelton, *Artemisia* sp., 1♀ (00113580) (CNC). ***Clay Co.:*** Vermillion, 42.7749° N 96.93635° W, 343 m, 16 Jun 1960, D.D. Walgenbach, 1♂ (00242075), 1♀ (00242076) (IRCW); 17 Jun 1960, D.D. Walgenbach, 1♀ (00242077) (IRCW); 20 Jun 1960, D.D. Walgenbach, 1♀ (00242078) (IRCW). ***Custer Co.:*** Custer, 43.76667° N 103.59833° W, 27 Jul 1927, H.H. Knight, paratype, 1♂ (00118454) (TAMU); 19 Aug 1927, H.H. Knight, paratype, 1♂ (00094044), 1♀ (00094045) (TAMU), 2♂ (00134469–00134470) (USNM). ***Day Co.:*** Waubay, 45.34281° N 97.31037° W, 555 m, 26 Jul 1927, H.C. Severin, 1♂ (00134405) (USNM). ***Fall River Co.:*** Edgemont, 43.30575° N 103.82665° W, 1049 m, 30 Jul 1935, H.C. Severin, 1♀ (00134406) (USNM). Oelrichs, 43.17889° N 103.23028° W, 1022 m, 28 Jun 1973, L.A. Kelton, *Symphoricarpos* sp., 1♂ (00113570) (CNC). ***Gregory Co.:*** Bonesteel, 43.07755° N 98.93532° W, 585 m, 28 Jun 1937, H.C. Severin, 1♀ (00134401) (USNM). Gregory, 43.22888° N 99.43893° W, 658 m, 18 Jun 1931, H.C. Severin, 1♀ (00134403) (USNM). ***Haakon Co.:*** Milesville, 44.46032° N 101.66888° W, 709 m, 23 Jun 1931, H.C. Severin, 1♀ (00134402) (USNM). ***Pennington Co.:*** Pactola Lake, Black Hills, 44.073° N 103.4734° W, 1341 m, 05 Aug 1971, L.A. Kelton, 1♂ (00113574) (CNC). ***Yankton Co.:*** Yankton, 42.87375° N 97.41263° W, 389 m, 25 Jun 1934, H.C. Severin, 1♀ (00134404) (USNM). **Wyoming:** ***Albany Co.:*** 40 mi NE of Laramie, 41.80783° N 105.28074° W, 13 Jul 1937, R.H. Beamer, 1♂ (00117896) (KU). ***Fremont Co.:*** Burris, 43.37003° N 109.26865° W, 1829 m, 22 Jul 1953, R.R. Dreisbach, 1♂ (00127454) (UMMC). ***Natrona Co.:*** Alcova, 42.55327° N 106.71299° W, 1634 m, 08 Jul

1907, unknown, 1♀ (00134396) (USNM). ***Park Co.:*** Yellowstone National Park, 44.76667° N 110.23333° W, 20 Jul 1920, A.A. Nichol, paratype, 1♂ (00134385) (USNM).

Slaterocoris pallipes (Knight)
Figures 13, 34; plate 2; map 7

Strongylocoris pallipes Knight, 1926: 254 (orig. desc.).
Slaterocoris pallipes: Kelton, 1968: 1122, fig. 2 (disc.); Knight, 1970: 242, fig. 9, (disc.); Wheeler, 1981: 520 (biol.); Kraft and Denno, 1982: 156 (biol.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog); Palmer, 1993: 640 (biol.); Wheeler 2001: 135, 153 (biol.).

DIAGNOSIS: Recognized by the entirely pale orange-yellow legs, including the coxae, except for the distal tarsomere (fig. 13); antennal segment II usually pale yellowish brown on basal half; and the large apical spines of the right paramere (fig. 34H, I). The right paramere of *S. pallipes* is most similar to *S. stygicus*, but the pale femora of the former species and dark brown to black femora of the latter species are diagnostic.

REDESCRIPTION: *Male:* Large, obovate; length 4.23–5.30, width 1.94–2.20 (pl. 2). COLORATION: Shining black; leg pale orange-yellow except for distal tarsomere; apical portion of femur slightly yellowish brown, apex of tibia dark (fig. 13); antennal segment II pale on basal half. VESTITURE: Sparsely distributed, short, suberect, brown setae. STRUCTURE: Frons punctate or weakly slightly striate; labium reaching base of middle coxa; costal margin slightly arcuate. GENITALIA: **Tergal process**: Long, apical points conspicuous (fig. 34G). **Endosomal spicule**: Ventral lobe narrow distally, marginal serration minimal, recurved angle flat, wide (fig. 34A–C); dorsal lobe with lateral ramus long, flat, attenuate apically, marginal serration variable, usually minimal; base of lateral ramus usually curved (fig. 34A, B), sometimes with narrow spine (fig. 34B, arrow); medial ramus short, marginally smooth (fig. 34A–C). **Right paramere**: Apical spines wide basally, long; basal lobe with serrate region reaching apex, not restricted to posterior surface, not constricted basally (fig. 34H, I). **Left paramere**: Long; apex truncate (fig. 34D–F).

Female: Large, ovate; length 4.60–5.00, width 2.19–2.40 (pl. 2). GENITALIA: As in species group except: **First gonapophyses**: Right greater than left at overlap. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Posteromedial portion with flat plate abutting ovipositor bulb.

HOSTS: This species breeds almost exclusively on species of *Baccharis* (Asteraceae). Based on the number of specimens and localities, and biological investigations (Wheeler, 1981; Kraft and Denno, 1982; Palmer, 1993), *B. halimifolia*, a tree shrub, is the predominant host. The only other species-level records for Asteraceae species are *B. braunii* and *Eupatorium capillifolium*. *Spartina* sp. (Poaceae) is considered a sitting record. In caged experiments Palmer (1993) reported that *S. pallipes* mainly utilized *B. halimifolia* and Rooseveltweed, *B. neglecta* Britton; the latter species is not within the known range of *S. pallipes*. Wheeler (1981) studied the biology of *S. pallipes* and documented injury to foliage. He concluded that it was univoltine, fed strictly on vegetative tissue, and completed mating and oviposition prior to flowering of its host. In Maryland, Kraft and Denno (1982) noted that *S. pallipes* was most abundant on *B. halimifolia* in April, being associated with the development of new leaves, with its feeding restricted to spring and early summer.

DISTRIBUTION: From Block Island, Rhode Island, south along the eastern coastal plain and piedmont to Gainesville, Florida, to the eastern border of Alabama (map 7). A male, clearly of this species, was collected on *B. braunii* in Costa Rica and sent to the USNM for identification. Wheeler (1981) stated that the distribution of the host, *B. halimifolia*, which reaches along the Gulf Coast as far south as Mexico was greater than the known distribution of *S. pallipes*. With the collection of a Costa Rican specimen, with renewed efforts the range of *S. pallipes* might perhaps reach into coastal Mexico. Currently only *S. stygicus* occurs near the Gulf Coast (cf. map 8). Alternatively, the absence of *S. pallipes* records from the wide intervening stretch of potential habitat along the Gulf Coast may indicate that the apparent disjunct distribution is the result of a recent introduc-

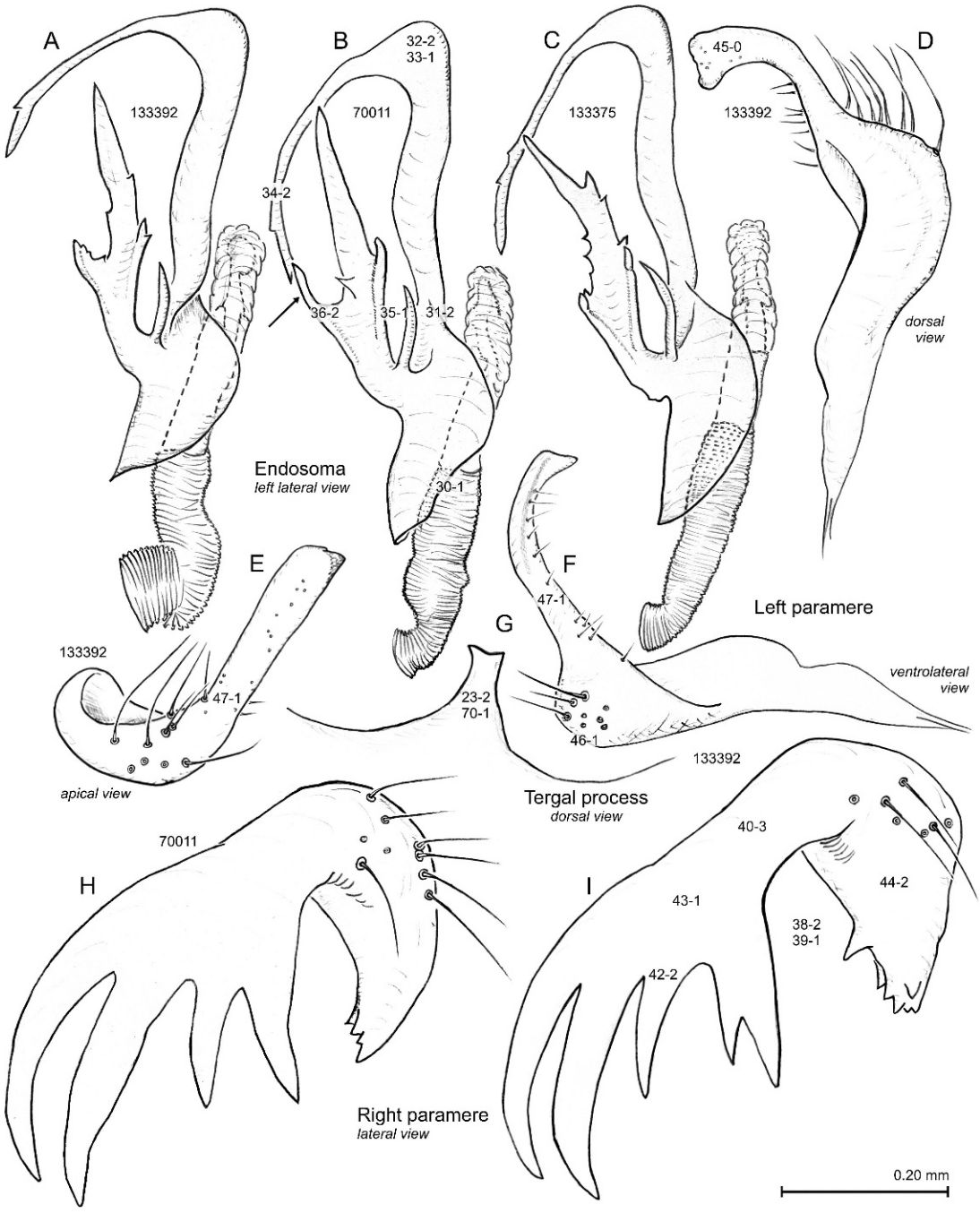


Fig. 34. *Slaterocoris pallipes*, male genitalia. **A**, **D**, **E**–**G**, **I**. North Beach, MD. **B**, **H**. San Jose, CR. **C**. S of Columbia, SC.

tion of this specialist species to Costa Rica. Many examples of nonnative introductions of Miridae are discussed in Wheeler and Henry (1998).

COLLECTION SUMMARY: 168 specimens from 59 collection events spanning dates from April to August. The Costa Rican specimen was collected in September.

DISCUSSION: The long distal spines of the right paramere and ventral lobe of the endosomal spicule with a smooth, short apex and expanded subapical portion reveals a close relationship with *S. stygicus*. Variation was noted in the lateral ramus of the dorsal lobe in the endosomal spicule; the Costa Rican male has a narrow, elongate basal spine (fig. 34B). Late instars of *S. pallipes* are shining black, as are those of the other eastern species (*atritibialis*, *breviatus*, and *stygicus*), but can be distinguished in the same manner as the adult, by the yellowish-orange legs (Wheeler, 1981).

HOLOTYPE: **Virginia:** ***Accomack Co.:*** Battle Point [Baylys Neck, Metompkin Inlet, 37.7152° N 75.6016° W, 2 m], 22 Jun 1918, J.G. Sanders, 1♂ (AMNH_PBI 00134030) (USNM).

OTHER SPECIMENS EXAMINED: **COSTA RICA: San Jose:** Route 4, km 17, 10.13908° N 83.92427° W, 1042 m, 09 Sep 1984, V. Krischik, *Baccharis braunii*, 1♂ (00070011) (USNM). **USA: Alabama:** ***Barbour Co.:*** Eufaula Lake, Rt 431, nr Eufaula, 31.869° N 85.1604° W, 61 m, 12 May 1982, T.J. Henry, *Baccharis halimifolia*, 5♂ (00122310–00122314), 8♀ (00122315, 00122317, 00133329–00133332, 00133334–00133335), *Baccharis halimifolia*, 2♀ (00122316, 00133333) (USNM). ***Lee Co.:*** Auburn, Donald E. Davis Arboretum, Auburn University, 32.5954° N 85.48308° W, 201 m, 30 Jun 2001, A.G. Wheeler, Jr., *Baccharis halimifolia*, 1♂ (00134066) (USNM). **Delaware:** ***Kent Co.:*** 4 mi S of Dover at Saint Jones River, 39.1063° N 75.4577° W, 1 m, 24 Jun 1982, T.J. Henry and A.G. Wheeler, Jr., *Spartina* sp. (Poaceae), 4♀ (00133347–00133350) (USNM). **Florida:** ***Alachua Co.:*** Gainesville, 29.63527° N 82.37111° W, 24 m, 20 May 1983, S. Passoa, *Baccharis halimifolia*, 1♂ (00070000) (USNM). nr Gainesville, 29.6096° N 82.3389° W, 23 m, 30 Jun 1983, W.A. Palmer, *Baccharis halimifolia*, 1♂ (USNM). ***Calhoun Co.:*** 3 mi N of Blountstown, 30.4893° N 85.0441° W, 20 m, 05 May 1982, T.J. Henry, *Baccharis halimifolia*, 3♂ (00133339–00133341), (USNM). 3 mi N of Blountstown along Stafford Creek, 30.4984° N 85.0418° W, 15 m, 08 May 1981, T.J. Henry, *Baccharis halimifolia*, 6♂ (00133355–00133360), 2♀ (00133361–00133362) (USNM). 5 mi S of Blountstown, 30.3792° N 85.0685° W, 12 m, 06 May 1982, T.J. Henry, *Baccharis* sp., 3♂ (00133352–00133354), *Baccharis halimifolia*, 1♂ (00133363) (USNM). Rt 69, 4 mi N of Blountstown nr Stafford Creek, 30.4987° N 85.043° W, 18 m, 30 Apr 1984, T.J. Henry and A.G. Wheeler, Jr, *Baccharis* sp., 4♂ (00133364–00133367), 3♀ (00133368–00133370) (USNM). ***Jackson Co.:*** Rt 71 at I-10, SW of Marianna, 30.72133° N 85.1814° W, 29 m, 20 Apr 2001, A.G. Wheeler, Jr., *Baccharis halimifolia*, 1♂ (00134065) (USNM). **Maryland:** ***Anne Arundel Co.:*** Chalk Point, 38.83623° N 76.53857° W, 13 Jul 1926, H.S. Barber, 2♂ (00134476–00134477) (USNM). ***Calvert Co.:*** Chesapeake Beach, 38.6854° N 76.5386° W, 6 m, 27 Jul 1913, Fredk. Knab, 1♀ (00070008) (USNM); 25 Jun 1914, R.C. Shannon, 1♀ (00070007) (USNM); 30 Jun 1924, W.L. Malloch, 1♂ (00070003) (USNM); 02 Jul 1924, W.L. Malloch, 1♀ (00070009) (USNM); 05 Jul 1924, W.L. Malloch, 1♂ (00070001) (USNM). North Beach, 38.71132° N 76.53011° W, 27 Jun 1926, H.H. Knight, *Baccharis halimifolia*, paratypes, 2♂ (00242628–00242629), 2♀ (00242630–00242631) (CAS), *Baccharis halimifolia*, paratypes, 2♂ (00112071–00112072), 6♀ (00112073–00112078) (CNC), *Baccharis halimifolia*, paratype, 1♂ (00116182), 1♀ (00116183) (CUIC), *Baccharis halimifolia*, paratypes, 3♂ (00118452, 00118607–00118608), 3♀ (00118453, 00118609–00118610) (TAMU), *Baccharis halimifolia*, paratypes, 5♂ (00133390–00133394), 5♀ (00133395–00133399) (USNM). Plum Point, 38.61417° N 76.5125° W, 20 Jun 1914, W.L. McAtee, 1♂ (00070002) (USNM); 05 Jul 1931, Mrs. Blake, 1♀ (00070010) (USNM). ***Dorchester Co.:*** nr Lloyds, 38.58984° N 76.183° W, 10 Jul 1907, H.S. Barber, 1♀ (00116192) (CUIC). ***St. Mary's Co.:*** 2.3 mi E of Piney Point, 38.15802° N 76.51925° W, 1 m, 12 Jul 1931, P.W. Oman, *Baccharis* sp., 1♂ (00069999) (USNM). Piney Point, 38.13535° N 76.52927° W, unknown, 1♂ (USNM); 10 Jul 1954, R.I. Sailer, 1♂

(00134474), 1♀ (00134475) (USNM). ***Unknown co.:*** "Md.", 260, 01 Apr 1888, unknown, 1♀ (00116184) (CUIC). **New Jersey:** ***Cape May Co.:*** near Goshen, 39.1375° N 74.8554° W, 2 m, May 1979–Jun 1979, A.G. Wheeler, Jr., *Baccharis halimifolia*, 1♂ (PDA). ***Ocean Co.:*** Island Beach [State Park], 39.85241° N 74.08873° W, 1 m, 11 Jul 1951, P.P. Burbutis, 1♂ (00134130) (USNM). Mystic Island, Radio Road on Bay, 39.5394° N 74.3883° W, 1 m, 04 Jul 1977, T.J. Henry, *Baccharis* sp., 2♀ (00133345–00133346) (USNM). Seaside Park, 39.92679° N 74.07708° W, 01 Jul 1915, Weiss and West, 1♂ (00134478) (USNM). **New York:** ***Kings Co.:*** Flatbush (Long Island), 40.65194° N 73.95944° W, 01 Aug 1891, J.L. Zabriskie, 1♀ (00169940) (AMNH). ***Queens Co.:*** Bergen Island, Long Island, 40.65955° N 73.82226° W, 1 m, 20 Jul, J.L. Zabriskie, 1♂ (00133337), 1♀ (00133338) (USNM). ***Suffolk Co.:*** East Quogue, Ice Pond Road, 40.83602° N 72.61546° W, 1 m, 18 Jul 1988, M.D. Schwartz, *Baccharis halimifolia*, 3♂ (00108310–00108312), 8♀ (00108313–00108320) (AMNH). Napeague, Long Island, 41.00955° N 72.06813° W, 2 m, 06 Sep 1946, Roy Latham, 1♀ (00116191) (CUIC). Northwest, 41.0101° N 72.2456° W, 3 m, 12 Jun 1951, Roy Latham, 1♂ (00070004) (USNM). Orient, Long Island, 41.13899° N 72.30342° W, 3 m, 01 Jun 1932, Roy Latham, 1♀ (00116186) (CUIC); 06 Jun 1935, Roy Latham, 1♀ (00116188) (CUIC); 02 Jul 1935, Roy Latham, 1♀ (00070005) (USNM); 02 Apr 1939, Roy Latham, 1♀ (00116187) (CUIC); 06 Apr 1939, Roy Latham, 1♂ (00116185) (CUIC). Riverhead, 40.91704° N 72.66204° W, 3 m, 11 Jun 1934, Roy Latham, 1♀ (00116190) (CUIC); 02 Aug 1934, R. Latham, 1♂ (00070006) (USNM); 04 Aug 1934, Roy Latham, 1♀ (00116189) (CUIC). **North Carolina:** ***Beaufort Co.:*** Hwy 306 at Free Aurora Ferry, 35.37676° N 76.74906° W, 23 May 2000, L.L. Deitz, 1♂ (00242845), 1♀ (00242846) (NCSU). ***Brunswick Co.:*** Calabash, 33.88689° N 78.57397° W, 11 m, 07 Jun 1939, C.S. Brimley, 1♀ (00242864) (NCSU). ***Carteret Co.:*** Beaufort, 34.71822° N 76.66382° W, 2 m, 09 Jun 1903, F. Sherman, 1♀ (00119859) (UCR). ***Mecklenburg Co.:*** Pineville, 35.08306° N 80.8925° W, 26 May 1980, A.G. Wheeler, Jr., *Baccharis halimifolia*, 1♂ (PDA). ***New Hanover Co.:*** Fort Fisher, 33.95555° N 77.925° W, 14 May 2001–18 May 2001, J. Lento, 1♀ (00329760) (DEBU). ***Onslow Co.:*** Ashe Island, 34.47819° N 77.46627° W, 04 May 1975, J.C. Dukes, *Eupatorium capillifolium*, 1♂ (00242843), 1♀ (00242844) (NCSU). ***Sampson Co.:*** Hwy 242 and SR 1634, 35.05395° N 78.49544° W, 55 m, 27 May 2004, R.L. Blinn, 1♂ (00242841), 1♀ (00242842) (NCSU). ***Union Co.:*** Monroe, 34.98528° N 80.54972° W, 10 May 1987, A.G. Wheeler, Jr., *Baccharis halimifolia*, 1♂ (PDA). **Rhode Island:** ***Washington Co.:*** Crescent Beach, Block Island, 41.1926° N 71.5673° W, 12 m, 24 Jun 2001, E.G. Riley, 2♂ (00118224, 00119027) (TAMU). **South Carolina:** ***Allendale Co.:*** Allendale, 33.00793° N 81.30844° W, 56 m, 15 Apr 1990, A.G. Wheeler, Jr., *Baccharis halimifolia*, 1♂ (00122309) (USNM). ***Dillon Co.:*** Dillon, 34.41655° N 79.37116° W, 34 m, 22 May 1984, S.W. Scott, *Baccharis halimifolia*, 3♂ (00133342–00133344) (USNM). ***Dorchester Co.:*** Saint George, 33.186° N 80.57565° W, 32 m, 27 May 1950, O.L. Cartwright, 1♂ (00133336) (USNM). ***Georgetown Co.:*** Georgetown, 33.37683° N 79.2945° W, 4 m, 25 Apr 1988, A.G. Wheeler, Jr., *Baccharis halimifolia*, 1♀ (00133351) (USNM). ***Lancaster Co.:*** Wateree Reservoir, Great Falls Stumpy Pond Boat Access Area, 34.6076° N 80.8819° W, 131 m, 18 May 1979, Wygodzinsky, Schuh, and Schmidt, 5♂ (00108296–00108300), 9♀ (00108301–00108309) (AMNH). ***Newberry Co.:*** Newberry, 34.27444° N 81.61889° W, 15 May 1988, A.G. Wheeler, Jr., *Baccharis halimifolia*, 2♂ (00133373–00133374) (USNM). ***Richland Co.:*** S of Columbia, 33.9155° N 81.0653° W, 46 m, 03 May 1988, A.G. Wheeler, Jr., *Baccharis halimifolia*, 3♂ (00133375–00133377), 8♀ (00133378–00133385) (USNM). ***York Co.:*** Southland Park, Rock Hill, 34.89403° N 81.02119° W, 174 m, 02 Jul 1988, A.G. Wheeler, Jr., *Baccharis* sp., 2♀ (00133371–00133372) (USNM).

Slaterocoris solidaginis Kelton
Figures 13, 35; plate 3; map 7

Strongylocoris atratus: Van Duzee: 1921: 135 (disc., in part).

Slaterocoris solidaginis Kelton, 1968: 1131, fig. 18 (orig. desc.); Knight, 1970: 239, fig. 43 (disc.);

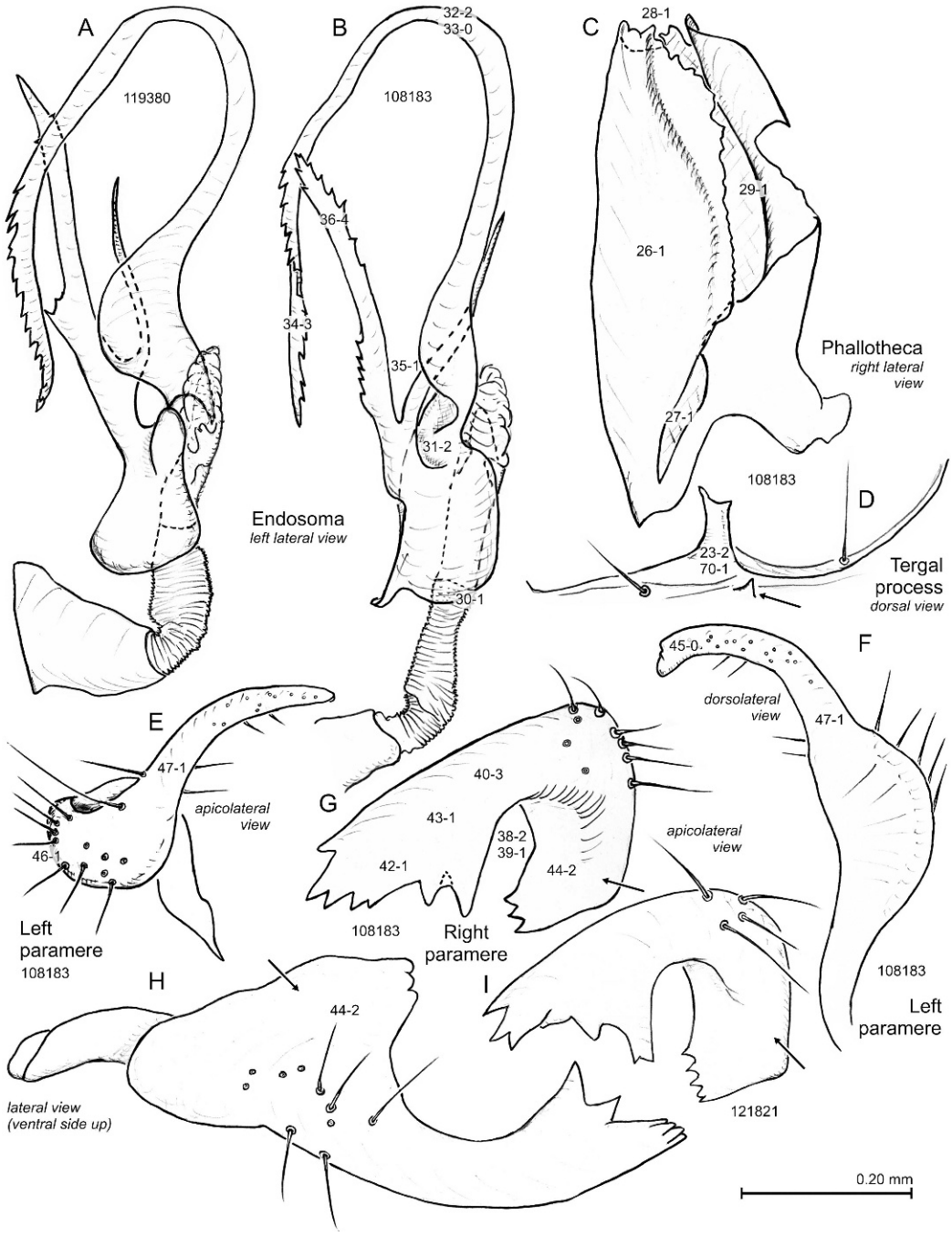
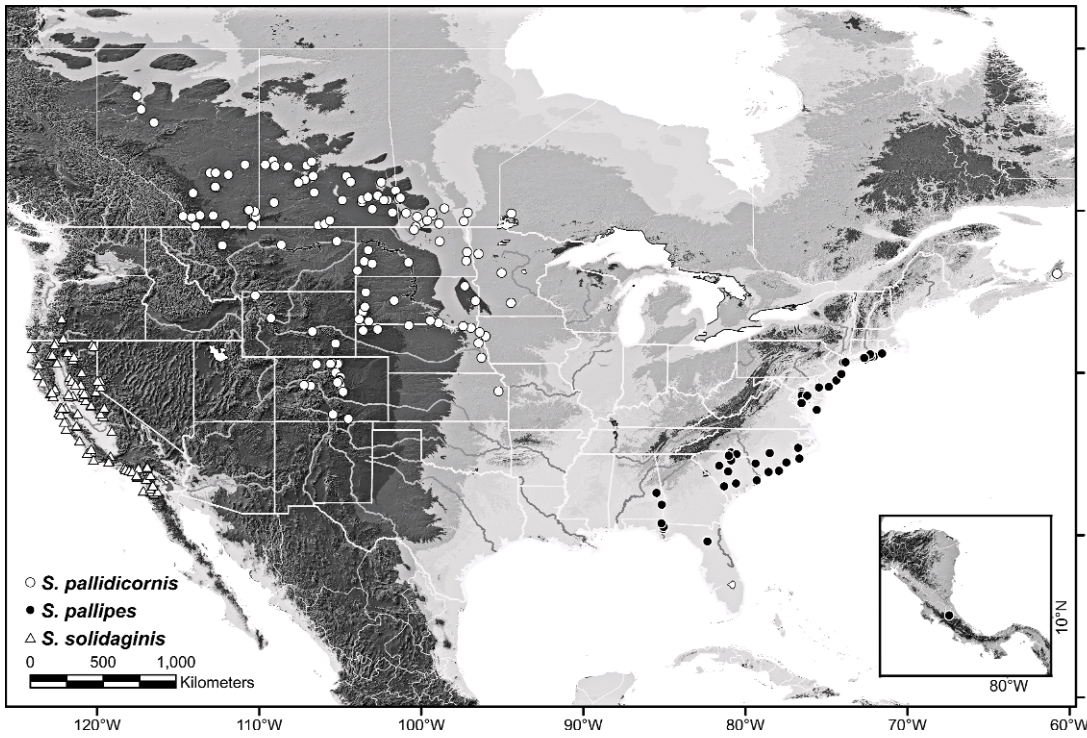


Fig. 35. *Slaterocoris solidaginis*, male genitalia. **A**. Dune Lakes, CA. **B**–**H**. 1.5 mi E of San Juan Cmpgrd, CA. **I**. San Diego Co., CA.



Map 7. Localities for *Slaterocoris pallidicornis*, *S. pallipes*, and *S. solidaginis*.

Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog); Forero, 2008: 93 (distr.).

DIAGNOSIS: The only member of the *breviatus* group known from California with the following diagnostic features: the more or less arcuate costal margin of both sexes, the sparse, reclining, short, brown simple setae, the pale yellow coloration on the apical portion of the femur, the entire tibia, and tarsomeres I and II (fig. 13), the relatively long labium, and the male with the broad basal process of right paramere (fig. 35G–I, arrow). As currently known *S. solidaginis* is sympatric with only two other *breviatus*-group species in Oregon. The blocky basal process of the right paramere will easily distinguish males from *S. atritibialis* and *S. stygicus*. Additionally, coloration of the appendages will distinguish both sexes: antennal segment I is usually pale distally and the tibiae are pale yellow in *S. solidaginis*; segment I and the tibiae are black in *S. atritibialis* and *S. stygicus*. Six other *Slaterocoris* species also occur with *S. solidaginis* in California. The subglabrous dorsum will separate it from *S. ambrosiae*, *S. flavipes*, and *S. robustus* each has various types of denser and longer dorsal vestiture. The mostly black femora will separate it from *S. croceipes*, *S. rubrofemoratus*, and *S. sparsus*; these species have various portions of the femora yellowish orange or reddish brown.

REDESCRIPTION: *Male:* Large, elongate ovoid, length 4.10–4.80, width 1.85–2.30 (pl. 3). COLORATION: Shining black with antennal segment I gradually more pale yellowish orange apically; femora black except apices yellow, tibiae pale yellow (fig. 13). VESTITURE: Nearly glabrous, sparsely distributed, short, suberect, brown setae. STRUCTURE: Frons faintly striate; labium reaching base or middle of middle coxa; costal margin arcuate. GENITALIA: **Tergal process**: Long, apical points conspicuous, right side point larger; sometimes with minute basal tubercle (fig. 35D, arrow). **Phallotheca:** Distal margin somewhat serrate

or scalloped (fig. 35C). **Endosomal spicule**: Ventral lobe long. attenuate distally, marginal serration strong (fig. 35A, B); sometimes slightly twisted (fig. 47B); dorsal lobe with lateral ramus long, relatively narrow, flat, pointed, marginal serration variable; medial ramus long, narrow, marginally smooth (fig. 35A, B). **Right paramere**: Apical spines tightly grouped, of moderate length, small discrete, splayed, with distalmost spines longer than basalmost spines (fig. 35G–I, arrow); basal lobe large, wide, blocky with serrate region on posterior surface (fig. 35G–I). **Left paramere**: Moderately long; apex somewhat, slightly attenuate (fig. 35E, F).

Female: Large, ovate; length 3.70–4.90; width 2.00–2.40 (pl. 3). COLORATION: antennal segment I apically and segment II mostly yellow, except for apex. GENITALIA: As in species group except: **First gonapophyses**: Left greater than right at overlap. **Second gonapophyses**: Anterior medial surface strongly convex. **Interramal sclerite**: Posteromedial portion with flat plate abutting ovipositor bulb.

HOSTS: Apparently breeds on unspecified *Solidago* species and three species of *Artemisia* (*A. douglasiana*, *A. furcata*, and *A. vulgaris*). The *A. furcata* record is probably based on a missidentication (labeled as *A. heterophylla*); current botanical sources place the distribution of this species (Washington and Alaska) beyond the range of *S. solidaginis*. The specimens taken on *Salix* are considered to be sitting records.

DISTRIBUTION: A Californian endemic, known from 70% of the state's counties (map 7). Collection data indicate that it is sporadically found in the Central Valley and desert regions east of the Sierra Nevada Mountains. Northern Baja California is the southernmost locality record. Known from counties adjacent to California in southern Oregon and the Carson Range in western Nevada.

COLLECTION SUMMARY: 404 specimens from 127 collection events with records in April from southern California counties and then spanning May to July throughout the state, with August records mostly at higher elevations or latitudes.

DISCUSSION: Clearly a member of the *breviatus* group based on the ovoid and sexually dimorphic body, and the sparse, sort, reclining brown vestiture. Within this group the male genitalia with the apical spines of the right paramere relatively short and splayed indicates a relationship to *S. atritibialis* and *S. pallidicornis*. The large base of the right paramere (fig. 35G–I) distinguishes this species from the other *breviatus*-group species. Van Duzee (1921) provided a key to some species of *Slaterocoris*. The couplet to separate *S. atratus* from *S. stygicus* will actually distinguish *S. solidaginis* from the latter species. All specimens from California previously labeled as *S. atratus* in the CAS are correctly identified as *S. solidaginis*.

HOLOTYPE: **USA: California: *Siskiyou Co.:*** Yreka [41.73556° N 122.63333° W], 15 Jun 1959, Kelton and Madge, *Solidago* sp., 1♂ (AMNH_PBI 00111858) (CNC).

OTHER SPECIMENS EXAMINED: **MEXICO: Baja California:** 8 mi E of Tecate, Highway 2, 32.53333° N 116.49615° W, 29 May 1980, Faulkner and Brown, 1♀ (00244230) (SDNH). **USA: California: *Alameda Co.:*** Berkeley, 37.87167° N 122.27167° W, 05 May 1951, M. Sakamoto, 1♀ (00119399) (UCB). Niles Canyon, 37.83167° N 122.18667° W, May 1916, W.M. Giffard, 1♀ (00121725) (CAS). Oakland Hills, 37.7581° N 122.1204° W, 23 Jun 1927, R.L. Usinger, 1♂ (00119390) (UCB). ***Amador Co.:*** 5 mi N of Plymouth, Hwy 49, 38.4818° N 120.8447° W, 15 Jun 1962, unknown, 2♀ (00119396–00119397) (UCB). ***Butte Co.:*** 5 mi W of Paradise, 39.71734° N 121.70502° W, 251 m, 13 May 1961, G.W. Frankie, 1♀ (00119398) (UCB). Oroville, 39.51389° N 121.55528° W, 30 Apr 1927, H.H. Keifer, *Artemisia furcata*, 4♂ (00121754–00121757), 2♀ (00121758–00121759), 2 immature (00121760–00121761), paratypes, 2♂ (00121861–00121862) (CAS); 24 Jun 1927, H.H. Keifer, *Artemisia furcata*, 1♂ (00121762), 4♀ (00121763–00121766) (CAS), *Artemisia furcata*, 1♂ (00133413) (USNM). ***Calaveras Co.:*** Mokelumne Hill, 38.30056° N 120.70528° W, 18 May 1931, R.L. Usinger, 8♀ (00119316–00119323), paratypes, 6♂ (00119281, 00119309–00119313), 2♀ (00119314–00119315) (UCB); 20 May 1931, R.L. Usinger, 2♂ (00119306–00119307), 1♀ (00119308), paratypes, 6♂ (00119294–00119299), 6♀ (00119300–00119305) (UCB). ***Contra Costa Co.:*** Mount Diablo,

37.835° N 121.95694° W, 14 Jul 1916, E.P. Van Duzee, 1♂ (00121883) (CAS). ***Del Norte Co.:*** Terwer, 3 mi E of Requa, bed of Klamath River, 41.521° N 124.0016° W, 3 m, 11 Jul 1979, R.T. and Joe Schuh, 1♀ (00108207) (AMNH). ***El Dorado Co.:*** 2 mi N of Placerville, 38.75863° N 120.7975° W, 07 Jun 1962, John T. Doyen, 1♀ (00119401) (UCB). 3 mi S of Camino, 38.69495° N 120.67389° W, 23 Jun 1948, K.W. Tucker, 1♂ (00119332), 1♀ (00119333) (UCB). Chile Bar Slate Mine, 38.76556° N 120.81917° W, 05 Jul 1948, K.W. Tucker, 1♂ (00119372) (UCB); 05 Jul 1948, R.C. Bynum, 3♂ (00119373–00119375), 1♀ (00119376) (UCB). Greenwood, 38.89667° N 120.91167° W, 21 Jun 1967, J. Powell, 6♂ (00119360–00119365), 5♀ (00119366–00119370) (UCB); 21 Jun 1967, R.L. Stoltz, 1♂ (00122422) (UID); 21 Jun 1967, W. Turner, 1♀ (00119371) (UCB). Phillips, 38.81777° N 120.0775° W, 24 Aug 1968, W.F. Chamberlain, 2♀ (00118617–00118618) (TAMU). Placerville, 38.72962° N 120.79854° W, 568 m, 02 Apr 1966, C.W. O'Brien, 1♀ (00119400) (UCB). ***Humboldt Co.:*** Dinsmores, 40.49167° N 123.60583° W, 18 Jun 1939, Brunson P. Bliven, 1♂ (00121869) (CAS); 11 Jun 1939, B.P. Bliven, 1♀ (00242701) (CAS); 09 Jul 1939, B.P. Bliven, 1♀ (00242702) (CAS); 25 Jun 1939, B.P. Bliven, 1♂ (00121870), 5♀ (00242703–00242707) (CAS). Laribee Valley, 32.65306° N 116.70639° W, 03 Jul 1938, B.P. Bliven, 1♂ (00121871), 7♀ (00242692–00242698) (CAS); 26 Jun 1938, B.P. Bliven, 2♀ (00242699–00242700) (CAS). ***Kern Co.:*** Mil Potrero, 34.8526° N 119.1829° W, 1696 m, 06 Jul 1959, R.W. Spore, 1♀ (00119402) (UCB). ***Lake Co.:*** Cache Creek, 38.92575° N 122.62108° W, 404 m, 29 May 1960, Brunson P. Bliven, 3♂ (00121874, 00242647, 00242710), 4♀(242711–00242714) (CAS). E of Clear Lake on State Hwy, 39.00893° N 122.61215° W, 510 m, 16 Jun 1936, Brunson P. Bliven, 1♀ (00121873) (CAS). ***Los Angeles Co.:*** Burbank, 34.18083° N 118.30806° W, 10 May 1930, C.H. Hicks, 1♂ (00134047), 3♀ (00134048–00134050) (USNM); 24 May 1930, C.H. Hicks, 1♀ (00134051) (USNM); 18 Apr 1931, C.H. Hicks, 1♀ (00134052) (USNM). Los Ang, 34.0548° N 118.2496° W, 122 m, unknown, 1♂ (00133415) (USNM). Los Angeles County, 34.05222° N 118.24278° W, Coquillett Collection, 1♂ (00134354), paratype, 1♂ (00134348) (USNM). Tanbark Flat, 33.69111° N 116.67056° W, 23 May 1950, W.C. Bentinck, paratype, 1♀ (00119282) (UCB); 20 Jun 1950, H.L. Hansen, paratypes, 3♂ (00119350–00119352), 3♀ (00119353–00119355) (UCB); 22 Jun 1950, W.C. Bentinck, paratype, 1♀ (00119356) (UCB); 22 Jun 1950, F.X. Williams, 1♀ (00242607) (CAS), 1♀ (00133414) (USNM); 23 Jun 1950, T.R. Haig, 1♂ (00119336), paratypes, 4♂ (00119344–00119347), 2♀ (00119348–00119349) (UCB); 24 Jun 1950, W.C. Bentinck, paratype, 1♀ (00119357) (UCB); 25 Jun 1952, J.J. Menn, 1♂ (00119338), 1♀ (00119339), paratypes, 2♀ (00119358–00119359) (UCB); 18 Jun 1956, C.L. Wiley, 1♀ (00119337), paratypes, 2♂ (00119340–00119341), 2♀ (00119342–00119343) (UCB); 18 Jun 1956, J.I. Stage, 1♂ (00119334) (UCB); 21 Jun 1956, J.I. Stage, 1♀ (00119335) (UCB). Turnbull Canyon, 33.98472° N 118.03139° W, 07 Apr 1936, E.L. Paddock, *Artemisia vulgaris*, 1♂ (00111868) (CNC), *Artemisia vulgaris*, 1♀ (00245377) (TAMU). Whittier, 33.97917° N 118.03194° W, 14 Apr 1935, E.L. Paddock, *Artemisia douglasiana*, 1♂ (00070038) (USNM). ***Madera Co.:*** 4 mi W of Bass Lake, 37.32472° N 119.63799° W, 914 m, 01 Jul 1946, H.P. Chandler, 1♂ (00121882) (CAS). ***Mariposa Co.:*** Oliver Creek, on Rt 49, E of Usona, 37.46256° N 119.79566° W, 900 m, 24 Jul 1999, M.D. Schwartz, *Artemisia* sp., 4♀ (00111871–00111874) (CNC). Yosemite National Park, 37.85° N 119.56667° W, 1201 m, 29 May 1931, E.O. Essig, 1♂ (00119389) (UCB). ***Mendocino Co.:*** Cummings, 39.83322° N 123.63197° W, 393 m, 19 Jun 1960, B.P. Bliven, 2♂ (00121878, 00242715) (CAS). Willits, 39.40972° N 123.35444° W, 03 Jul 1948, W.F. Chamberlain, 2♀ (00118611–00118612) (TAMU). ***Modoc Co.:*** Davis Creek, Warner Mountains, 41.73619° N 120.34146° W, 13 Jul 1922, C.L. Fox, 1♂ (00121733), 9♀ (00121734–00121742), paratypes, 2♂ (00121854–00121855) (CAS). Lake City, Warner Mountains, 41.64269° N 120.21691° W, 1409 m, 01 Aug 1922, C.L. Fox, 1♀ (00121877) (CAS). ***Monterey Co.:*** Bryson, 35.80667° N 121.08944° W, 18 May 1920, E.P. Van Duzee, 1♂ (00121743),

5♀ (00121744–00121748), paratypes, 2♂ (00121846–00121847) (CAS); 19 May 1920, E.P. Van Duzee, 5♀ (00121749–00121753) (CAS). Carmel River, Hwy 101, 36.5365° N 121.9125° W, 8 m, 14 May 1966, C.W. O'Brien, *Salix* sp. (Salicaceae), 1♀ (00119403) (UCB). ***Nevada Co.:*** Nevada City, 39.26167° N 121.015° W, 17 Jun 1936, B.P. Bliven, 1♀ (CAS); 19 Jun 1936, B.P. Bliven, 1♂ (00121872), 2♀ (00242648, 00242708) (CAS). ***Orange Co.:*** Cleveland National Forest, 1.5 mi E of San Juan Campground, 33.59465° N 117.50565° W, 500 m, 12 May 1978, J.D. Pinto and R.T. Schuh, *Artemisia douglasiana*, 19♂ (00108183–00108201), 5♀ (00108202–00108206) (AMNH). Cleveland National Forest, Lower San Juan Campground on Hwy 74, 33.59889° N 117.46° W, 405 m, 12 May 1978, J.D. Pinto and R.T. Schuh, *Artemisia douglasiana*, 1♂ (00119843), 1♀ (00119844) (UCR). NW/S Upper Carbon Canyon, 33.91885° N 117.83506° W, 140 m, 03 May 1976, D.H. Byers, *Artemisia douglasiana*, 1♂ (00134043) (USNM). Trabuco Canyon, 33.66722° N 117.56556° W, 10 May 1960, E.L. Sleeper and M.L. West, 2♀ (00121802–00121803) (CAS). ***Plumas Co.:*** Keddie, 40.015° N 120.96° W, 03 Jul 1949, W.F. Chamberlain, 1♀ (00245378) (TAMU). ***Riverside Co.:*** Banning, 33.92737° N 116.8737° W, 716 m, 18 Apr 1930, C.H. Hicks, 1♂ (00134053) (USNM). Bautista Canyon, T6S R2E S20, San Bernardino National Forest, 33.69778° N 116.85194° W, 940 m, 11 May 1993, Ali Al-Wahaibi, 1♀ (00119858) (UCR). Dripping Springs, 33.45° N 116.96666° W, 677 m, 13 May 1999, unknown, 1♂ (00119857) (UCR). Keen Camp, 33.70194° N 116.71139° W, 06 Jun 1917–12 Jun 1917, E.P. Van Duzee, 1♂ (00133412), 1♀ (00133745) (USNM). ***Sacramento Co.:*** Sacramento, 38.58167° N 121.49333° W, 03 Jun 1920, E.P. Van Duzee, 2♂ (00121726–00121727), 5♀ (00121728–00121732), paratypes, 6♂ (00121848–00121853) (CAS). ***San Benito Co.:*** Paicines, 36.73373° N 121.27791° W, 198 m, 09 Jul 1933, L.S. Slevin, 1♀ (00121879) (CAS). ***San Bernardino Co.:*** Camp Baldy, 34.29528° N 116.91392° W, 12 Jun 1917, L.L. Muchmore, 1♂ (00111869) (CNC), 1♂ (00245379) (TAMU). Forest Home, 34.08897° N 116.9203° W, 1626 m, 12 Jun 1924, E.C. Van Dyke, paratype, 1♂ (00121863) (CAS); 13 Jun 1928, E.C. Van Dyke, 1♀ (00242617) (CAS). Seven Oaks, 34.1864° N 116.91419° W, 30 May 1936, Reeves, 2♀ (00119394–00119395) (UCB); 07 Jun 1984, D.A. La Rue, 2♀ (00242955–00242956) (DAR). Tetley Park [Tetley's Camp], San Bernardino Mountains, 14 Jul 1948, R.A. Flock, 1♂ (00119856) (UCR). ***San Diego Co.:*** Boulevard, 32.66367° N 116.27362° W, 1019 m, 24 Jun 1969, W.F. Chamberlain, 1♀ (00118619) (TAMU). San Diego County, 32.71528° N 117.15639° W, 07 May 1913, E.P. Van Duzee, 1♂ (00121707) (CAS); 24 May 1913, E.P. Van Duzee, 1♂ (00121713), 1♀ (00121714), paratypes, 3♂ (00121821–00121822, 00121824), 1♀ (00121823) (CAS); 08 Jun 1913, E.P. Van Duzee, 1♂ (00121704), 3♀ (00121703, 00121705–00121706), paratypes, 3♂ (00121830–00121832), 1♀ (00121829) (CAS); 11 Apr 1914, E.P. Van Duzee, 2♀ (00121710–00121711), paratypes, 3♂ (00121825, 00121827–00121828), 1♀ (00121826) (CAS); 12 Apr 1914, E.P. Van Duzee, paratypes, 1♂ (00121819), 1♀ (00121820) (CAS); 13 Apr 1914, E.P. Van Duzee, 1♀ (00121712) (CAS). Viejas Creek at the Willows, 32.8359° N 116.7199° W, 671 m, 03 Jun 1953, R.R. MacRic, 1♀ (00244231) (SDNH). Wm. Heise County Park, 3 mi S of Julian, 33.0502° N 116.5688° W, 1329 m, 19 Jun 1978, J.D. Pinto, *Artemisia douglasiana*, 3♂ (00119840–00119842) (UCR). ***San Luis Obispo Co.:*** 12.3 mi E of Arroyo Grande, Huasna Valley, 35.11841° N 120.37158° W, 310 m, 09 May 1985, R.T. Schuh and B.M. Massie, 1♂ (00108211) (AMNH). Dune Lakes, 3 mi S of Oceano, 35.06806° N 120.60833° W, 02 May 1974, J. Powell, 1♂ (00119226), *Artemisia* sp., 6♂ (00119380–00119385), 2♀ (00119386–00119387) (UCB). Pozo, 35.30361° N 120.37556° W, 27 Apr 1962, C.A. Toschi, 1♀ (00119404) (UCB). ***San Mateo Co.:*** San Mateo, 37.56444° N 122.35056° W, 229 m, 20 Jun 1917, W.M. Giffard, 2♀ (00121876, 00242720) (CAS). Woodside, 37.4296° N 122.2491° W, 124 m, 05 Jul 1958, W.J. Gertsch, 1♂ (00108208), 1♀ (00108209) (AMNH). ***Santa Barbara Co.:*** 13 mi E of Lompoc, 34.63917° N 120.22851° W, 21 Apr 1932, E.P. Van Duzee, *Artemisia* sp., paratypes, 2♂ (00121840, 00121842), 2♀ (00121841, 00121843), *Artemisia* sp., 4♀ (00121721–00121724) (CAS). ***Santa Cruz***

Co.: Aptos, 36.97763° N 121.90203° W, 18 m, 29 May 1932, E.S. Ross, 1♀ (00121880) (CAS). Santa Cruz County, 36.97696° N 122.02342° W, 3 m, 07 Jun 1917, W.M. Giffard, 5♂ (00121767–00121769, 00121844–00121845), 2♀ (00121770–00121771) (CAS). ***Shasta Co.:*** 8 mi W of Fall River Mills, 41.09765° N 121.55107° W, 845 m, 07 Jul 1979, R.T. and Joe Schuh, 1♂ (00108212) (AMNH). Hat Creek P.O., 40.83047° N 121.50891° W, 02 Jul 1955, E.E. Lindquist, 1♂ (00119377), 1♀ (00119378) (UCB). Hat Creek R.S., 41.00377° N 121.4372° W, 987 m, 26 Jun 1945, R.L. Usinger, *Artemisia vulgaris*, 1♂ (00119329), 2♀ (00119330–00119331) (UCB); 25 Jun 1947, H.P. Chandler, 1♂ (242717) (CAS); 23 Jun 1947, E.E. Seibert, 1♀ (00119379) (UCB). Shasta County, 40.6014° N 122.4924° W, 335 m, 01 Jul 1921, J.A. Kusche, 1♀ (00242611), paratype, 1♂ (00121864) (CAS). ***Siskiyou Co.:*** 1 mi NW of Bartle, 41.268° N 121.8336° W, 20 Jul 1966, J. Powell, 1♀ (00119406) (UCB). Big Flat Campground, 41.06806° N 122.93361° W, 04 Aug 1931, R.L. Usinger, 1♀ (00119405) (UCB). Hornbrook, 41.91028° N 122.55472° W, 666 m, 14 Jun 1959, Kelton and Madge, 1♀ (00111870) (CNC). Yreka, 41.73556° N 122.63333° W, 15 Jun 1959, Kelton and Madge, *Solidago* sp., paratypes, 1♂ (00121865), 1♀ (00121866) (CAS), *Solidago* sp., paratypes, 3♂ (00111860–00111862), 4♀ (00111863–00111866), *Solidago* sp., paratype, 1♀ (00111867) (CNC), Asteraceae, paratypes, 2♂ (00121777–00121778), 1♀ (00121779) (UCB). ***Sonoma Co.:*** Geyserville, 38.70769° N 122.90249° W, 64 m, 08 Jun 1949, Timberlake, *Salix lasiolepis* Benth. (Salicaceae), 1♂ (00119854), 1♀ (00119855) (UCR). Mark West Springs, 38.54917° N 122.71917° W, 137 m, 10 May 1930, E.P. Van Duzee, 1♂ (00121875), 4♀ (00242721–002424723) (CAS). The Geysers, 38.8023° N 122.8049° W, 488 m, unknown, 1♂ (00108213), 2♀ (00108214–00108215) (AMNH). ***Stanislaus Co.:*** Del Puerto Canyon, Frank Raines Park, 37.48833° N 121.20583° W, 366 m, 20 May 1972, P.C. Davidson, 1♀ (00119407 [cat UCIS 127416]) (UCB). ***Trinity Co.:*** Coffee Creek, 41.10157° N 122.77786° W, 30 Jul 1931, R.L. Usinger, *Artemisia douglasiana*, 2♀ (00119327–00119328), paratypes, 2♂ (00119324–00119325), 1♀ (00119326) (UCB); G. and R. Bohart, 17 May 1934, 1♀ (00242718) (CAS). ***Tulare Co.:*** Woodlake, 36.41361° N 119.09778° W, 24 Apr 1932, E.P. Van Duzee, 1♂ (00121717), 3♀ (00121715–00121716, 00121718), 2 immatures (00121719–00121720), paratypes, 6♂ (00121833, 00121835–00121839), 1♀ (00121834) (CAS). ***Tuolumne Co.:*** Browns Flat, 38.0066° N 120.3883° W, 610 m, 10 Aug 1958, M. Knox and E. Sleeper, 1♀ (00121801) (CAS). Sonora, 37.98417° N 120.38111° W, 23 May 1930, E.P. Van Duzee, 3♀ (00242608–00242610), paratypes, 3♂ (00121856–00121858) (CAS), 1♂ (00133411) (USNM). ***Ventura Co.:*** Sespe Canyon, 34.5786° N 119.259° W, 1076 m, 10 Jul 1959, C.A. Campbell, 1♀ (00119408 [cat UCIS 127416]) (UCB). Wheeler Springs, 34.50805° N 119.29154° W, 452 m, 24 Jun 1952, M. Cazier, W. Gertsch, and R. Schrammel, 1♂ (00108210) (AMNH). ***Yolo Co.:*** Davis, 38.545° N 121.73944° W, 13 May 1933, E.C. Zimmerman, 1♀ (00121881) (CAS). Putah Canyon, 37.83167° N 122.18667° W, 04 Jun 1936, M.A. Embury, 1♂ (00119388) (UCB). Woodland, 38.67861° N 121.77222° W, 14 Jun 1933, E.C. Zimmerman, 1♀ (00121884) (CAS). ***Yuba Co.:*** Dry Creek, 4 miles NW Smartville, 39.25036° N 121.35185° W, 08 May 1980, J.A. Powell, 1♀ (00119409 [cat UCIS 127416]) (UCB). ***Unknown co.:*** "Cal", unknown, 1♂ (00164929) (USNM). Southern California, 01 May 1908, R. Woglum, *Artemisia douglasiana*, 3♂ (00119845–00119847), 6♀ (00119848–00119853) (UCR). **Nevada:** ***Carson City Co.:*** Ormsby Co., 39.1138° N 119.7802° W, Jul [no year], Baker, 1♂ (00242716), 4♀ (00242613–00242616) (CAS), 1♂ (00119391) (UCB). ***Washoe Co.:*** Reno, 39.52972° N 119.81278° W, 27 Jun 1927, E.P. Van Duzee, 1♂ (00121860), 1♀ (00242612), paratype, 1♂ (00121859) (CAS). Verdi, 39.51833° N 119.98778° W, 09 Jul 1967, W. Gagne, *Artemisia* sp., 1♂ (00119392), 1♀ (00119393) (UCB), *Solidago* sp., paratypes, 2♀ (00134346–00134347) (USNM); C.N. Slobodchikoff, 18 Jun 1964, 1♀ (00242719) (CAS). **Oregon:** ***Douglas Co.:*** Kelsay Valley Guard Station, 43.32533° N 122.1986° W, 1250 m, 17 Aug 1935, H.A. Scullen, 1♂ (00134046) (USNM). ***Klamath Co.:*** Penny Springs, Green Springs Hwy, 42.11764° N 122.09779° W, 04 Aug 1956, Joe Schuh, *Artemisia* sp., 1♀ (00118074) (ORSU).

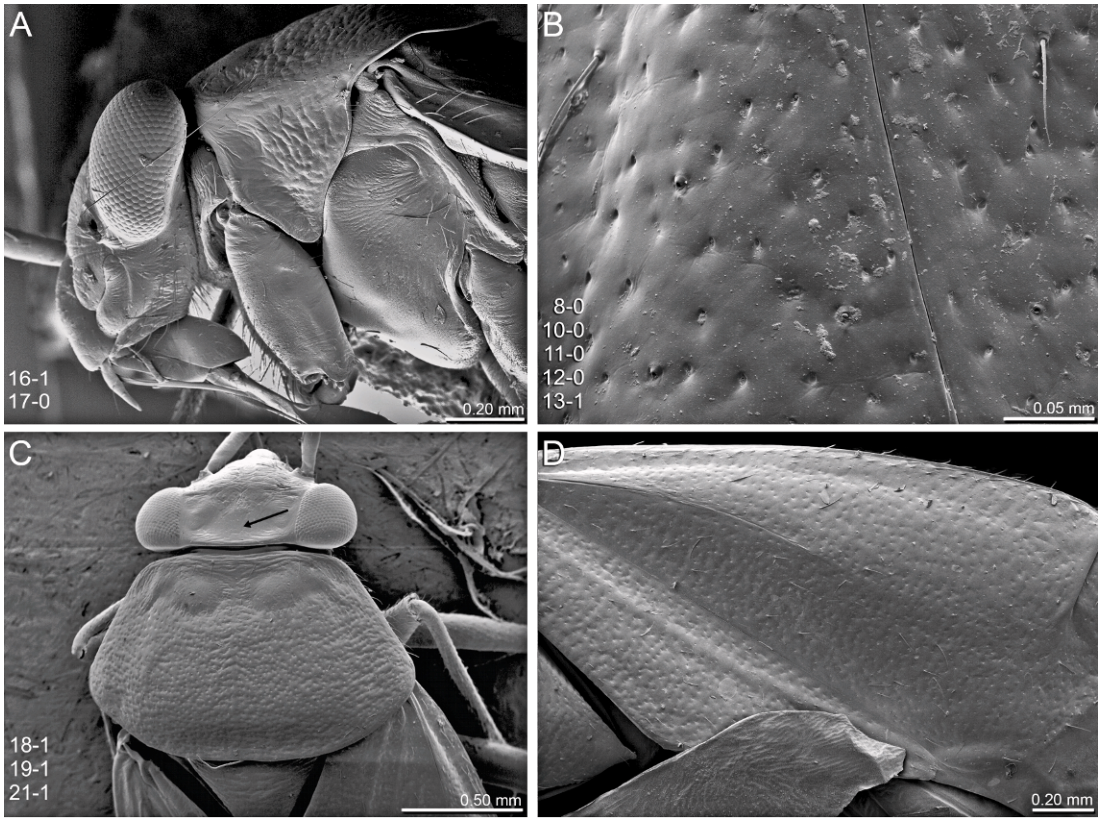


Fig. 36. *Slaterocoris stygicus*, scanning electron micrographs. **A**. Head and thorax, lateral view. **B**. Hemelytron, vestiture and cuticular sculpture. **C**. Head and pronotum, dorsal view. **D**. Hemelytron, dorsal view.

Slaterocoris stygicus (Say)
Figures 13, 36–40; plates 3, 4Q; map 8

Capsus stygicus Say, 1832: 24 (orig. desc.).
Strongylocoris stygica: Leonard, 1919: 178 (immature disc., illus.).
Strongylocoris stygicus: Van Duzee, 1921: 135 (disc., in part); Knight, 1938: 7, fig. 1 (male genit.); Slater, 1950: 53, pl. 6, fig. 18 (fem. genit.).
Strongylocoris atratus: Van Duzee: 1921: 135 (disc., in part).
Slaterocoris stygicus: Kelton, 1959: 30, fig. 67 (male genit.); 1968: 1121, fig. 1 (disc.); Knight, 1970: 237, fig. 7 (disc.); Reid, 1974: 239 (parasit.); Reid et al., 1976: 561 (biol.); Messina, 1978: 139 (biol.); Henry and Smith, 1979: 215 (list); Wheeler et al., 1983: 142 (list); Snodgrass et al., 1984: 854 (list); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog); Wheeler 2001: 153 (biol.); Henry et al., 2005: 63 (list).
Slaterocoris getzendaneri Knight, 1970: 251, fig. 11 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

DIAGNOSIS: Recognized by the sparse, short, brown vestiture (fig. 36B); the black femora with yellow apical portions, the pale yellow fore- and middle tibiae and brown to black hind tibia, all tibiae usually grading paler on distal half, the pale tarsomeres I and II (fig. 13); the male with antennal segments I and II black and the female with apex of segment I and middle of segment II often pale yellow. The following features of the male genitalia alone will distinguish this species: long, curved apical spines of the right paramere (figs. 37C, 38, 39I, J) the elongate curved distal portion of the left paramere (fig. 39G, H), the ventral lobe of

the endosomal spicule proximal to the recurved distal region broad, flattened, and triangular, with narrow apex, reaching to middle of dorsal lobe only and the basal lateral portion of dorsal lobe with small inwardly turned spine (fig. 39A–D). Sometimes the spine is only faintly indicated, as the entire serrate basolateral portion is turned inwardly (fig. 39C, arrow). Accurate identification of the female is facilitated by the glabrous dorsum, arcuate costal margin, usually black antennal segments I and II, black femur except for the diffuse and variable pale apex, usually pale fore- and middle tibiae, and black hind tibia.

REDESCRIPTION: *Male:* Large, elongate ovoid; length 3.70–4.90, width 1.73–2.10 (pl. 3). COLORATION: Shining black; except for apex of femur yellowish brown to pale yellowish brown; fore- and middle tibiae pale yellowish brown; hind tibia yellowish brown to black, paler on distal half; tarsomeres I and II pale (fig. 13); sometimes male with antennal segment I mostly pale and female with middle or most of segment II pale; sometimes pale apex of femur minimal. VESTITURE: Nearly glabrous, sparsely distributed, short, suberect, brown setae (pl. 4Q). STRUCTURE: Frons slightly striate; labium reaching base or middle of middle coxa and longer than head width; mesothoracic spiracle and metathoracic scent-efferent system as in figure 37A; pretarsus as figure 37B. costal margin slightly arcuate. GENITALIA: **Tergal process**: Long, apical points conspicuous (fig. 39F). **Phallotheca**: Aperture convoluted, open dorsally and on right side; distal margin smooth margined; left lateral surface strongly compressed (fig. 39E). **Endosomal spicule**: Ventral lobe relatively short, narrow distally, smooth marginally, sometimes with sparse serration (fig. 39A, arrow), recurved angle flat, wide (fig. 39A–D); dorsal lobe with lateral ramus long, flat, attenuate apically, marginal serration prominent; base of lateral ramus with inwardly curved spine (fig. 39A–D); medial ramus with variable length, marginally smooth (fig. 39A–D). **Right paramere**: Apical spines highly variable in arrangement and size; usually long with basalmost spines joined basally (figs. 37C, 38A, E, G, I, J, L, M, 39I); sometimes distalmost spines with points not much longer than basalmost points (figs. 38B–D, 39J, arrow); basal lobe variably serrate; serration of posterior surface reaching apex, not constricted basally

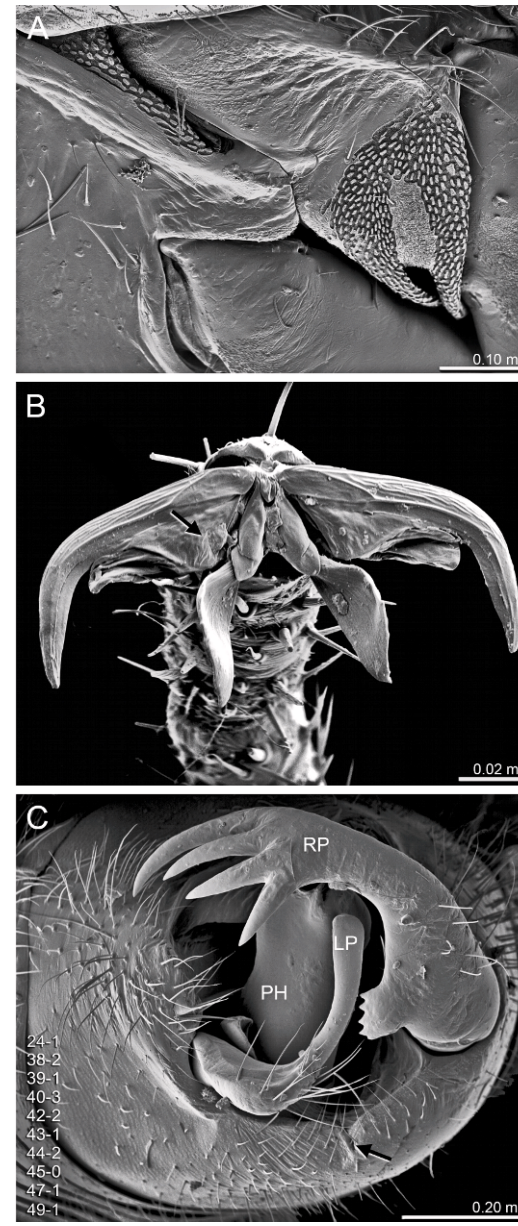


Fig. 37. *Slaterocoris stygicus*, scanning electron micrographs. **A**. Mesothoracic spiracle and metathoracic scent-efferent system, lateral view. **B**. Pretarsus, apical view. **C**. Pygophore with left and right parameres, posterior view.

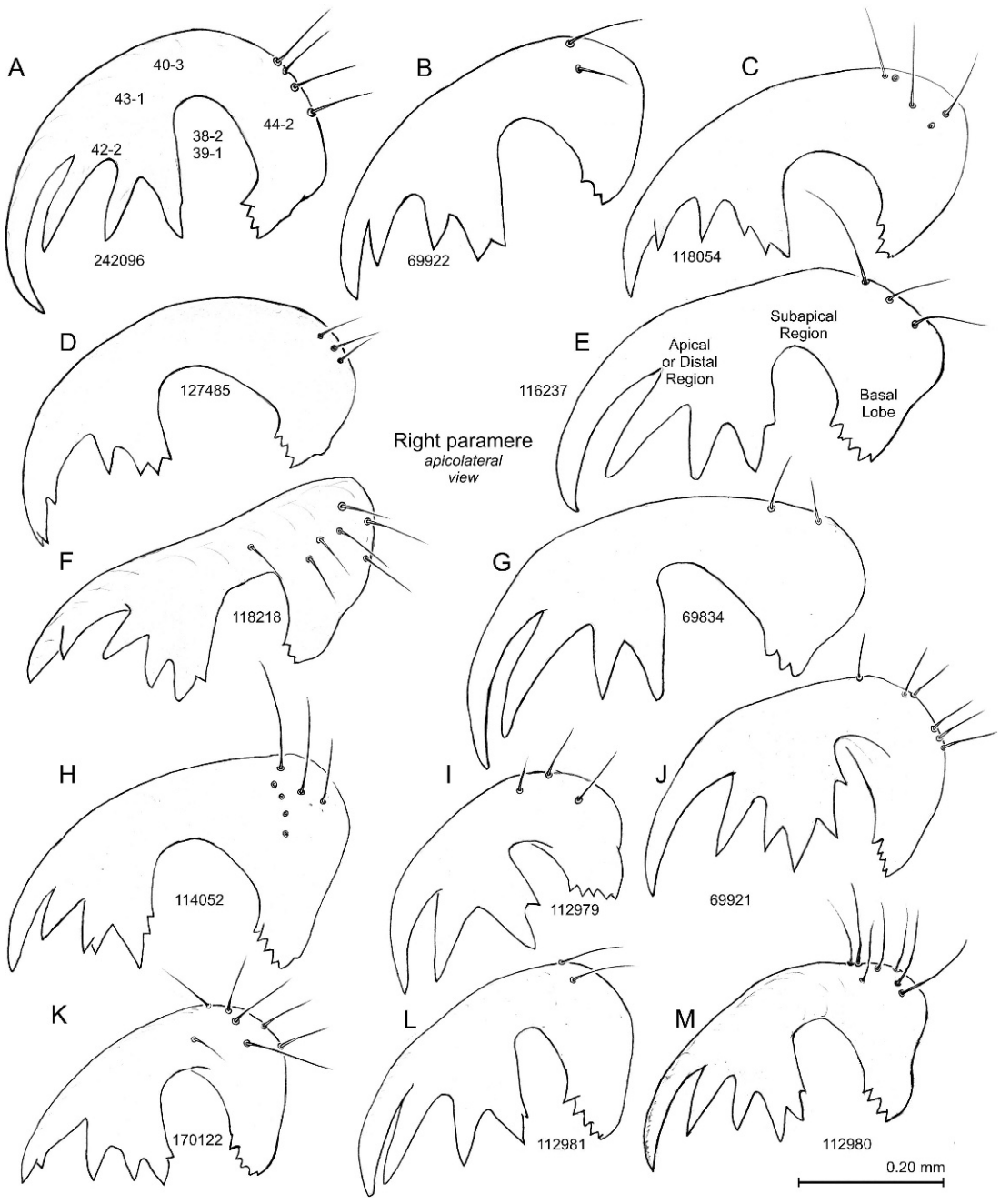


Fig. 38. *Slaterocoris stygicus*, right paramere. **A**. Wyalusing State Park, WI. **B**. 27 mi E of Nucla, CO. **C**. Pioneer Ford Forest Campground, OR. **D**. Lake Cushman, WA. **E**. Orient, NY. **F**. 2 mi E of Cloudcroft, NM. **G**. 4 mi S of Fort Gibson, MS. **H**. Fernie, BC. **I**. Ft. Norman, NWT. **J**. Franklin Basin Rd, UT. **K**. Jackson, WY. **L**. 4 mi E of Cawston, BC. **M**. 10 mi S of Merritt, BC.

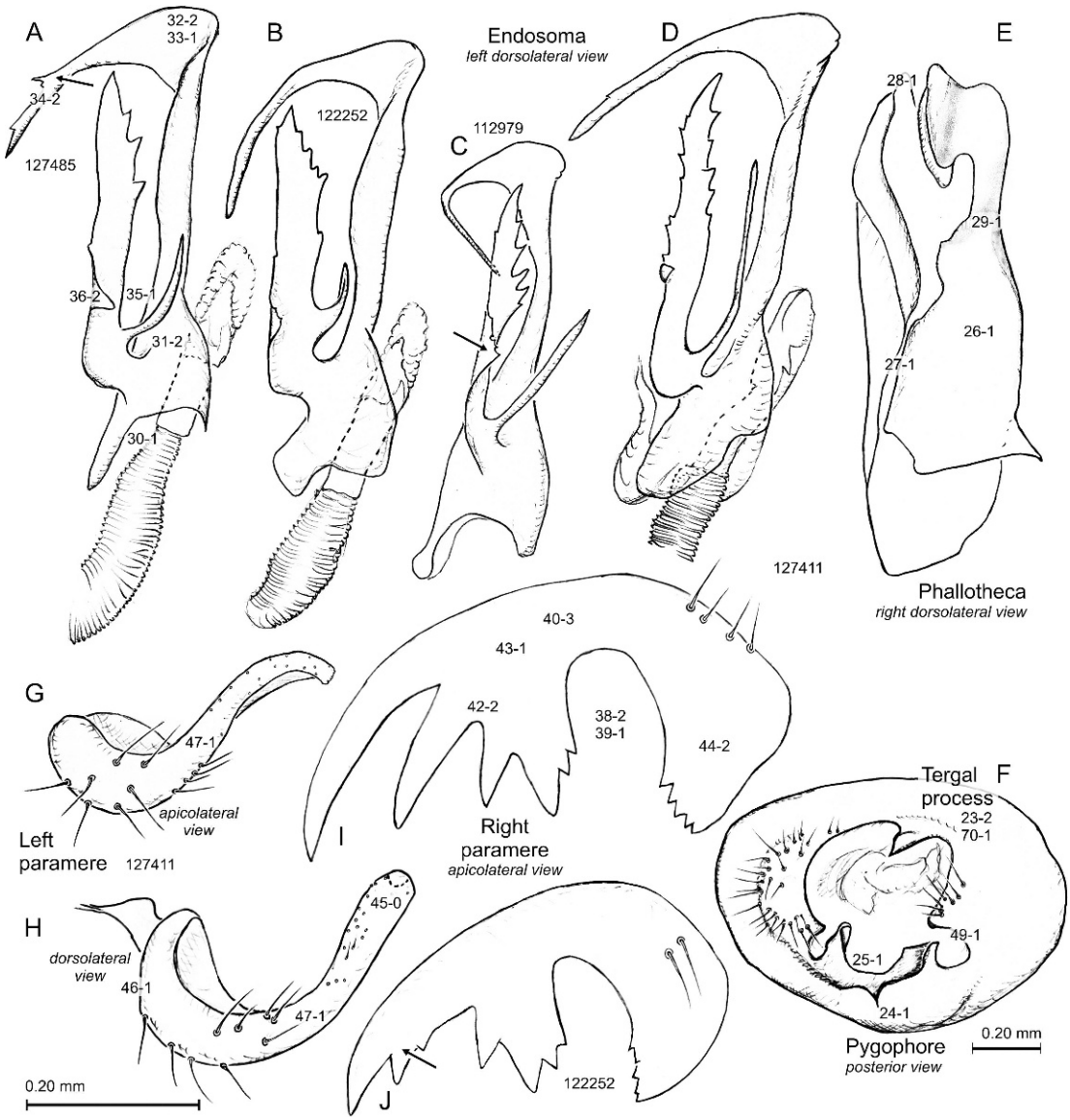


Fig. 39. *Slaterocoris stygicus*, male genitalia. **A**. Lake Cushman, WA. **B**, **J**. Orting, WA. **C**. Ft. Norman, NWT. **D**–**I**. Henryville, IN.

(figs. 38A–M, 39I, J). **Left paramere**: Long; apex rounded (figs. 37C, 39G, H).

Female: Large, ovate; length 3.70–5.00; width 1.83–2.35 (pl. 3). COLORATION: As in male but antennal segments I often dark basally and dusky to pale yellow distally and segment II dark on both ends and broadly pale medially; sometimes all tibia dusky pale yellow. GENITALIA: As in species group except: **First gonapophyses**: Right greater than left at overlap (fig. 40A, B). **Second gonapophyses**: Anterior medial surface slightly convex (fig. 40D). **Interramal sclerite**: Posteromedial portion with flat plate abutting ovipositor bulb (fig. 40D).

HOSTS: Two genera, *Ambrosia* and *Solidago*, with *A. trifida* and *S. canadensis*, the only species-level identifications, probably contain

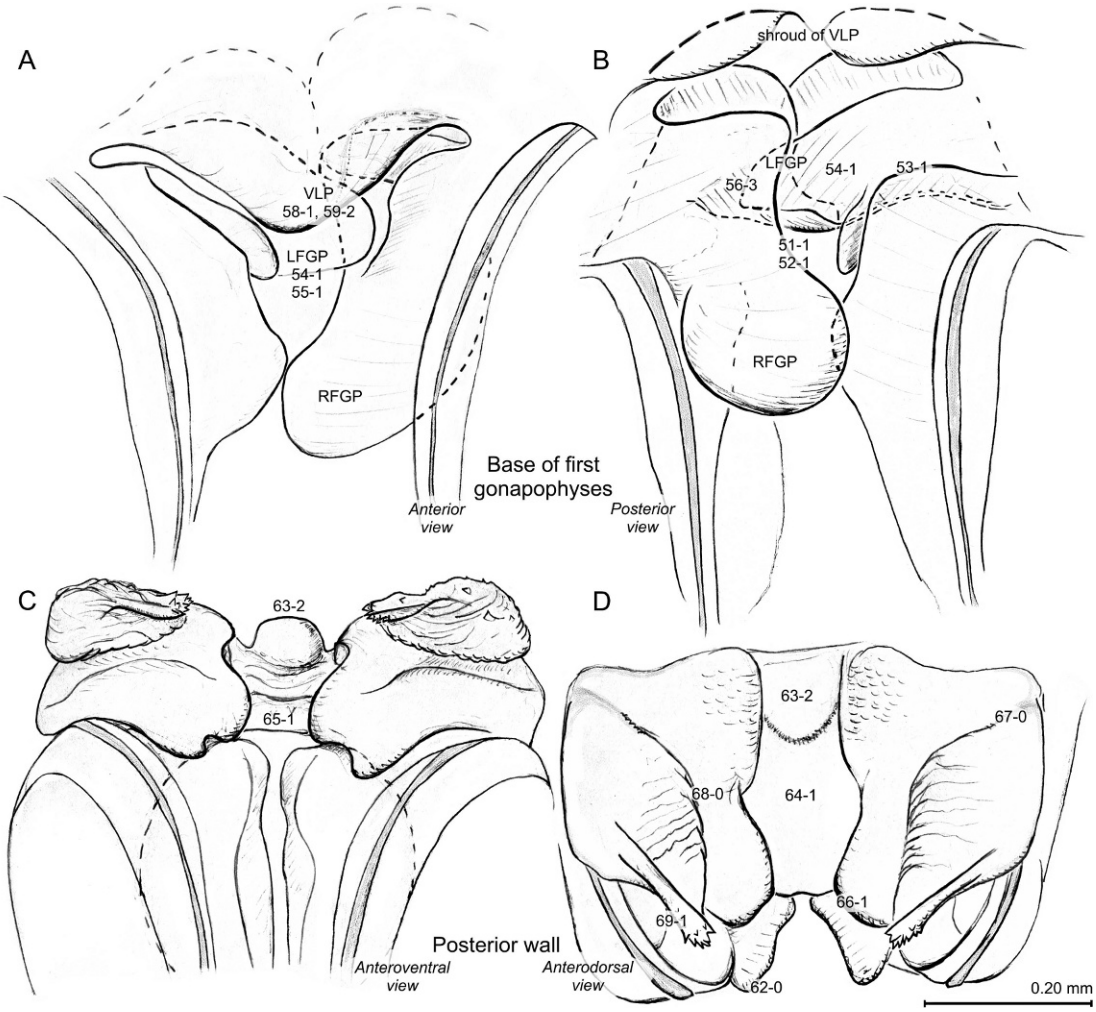
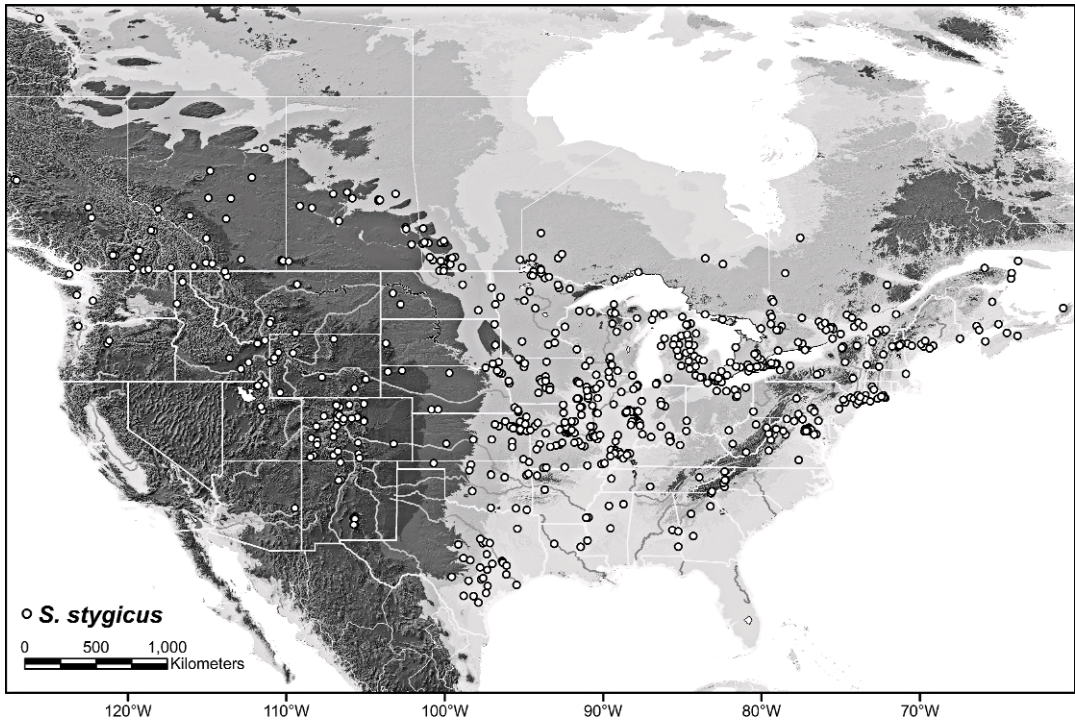


Fig. 40. *Slaterocoris stygicus*, female genitalia. Amherst, OH.

the majority of breeding hosts based on the number of specimens and localities. Additionally, across the range of *S. stygicus*, host records for eight other genera of Asteraceae are known: *Achillea millefolium* var. *occidentalis*, *Artemisia* (an unidentified sp. and *A. tridentata*), *Conyza canadensis*, *Eurybia macrophylla*, *Helianthus* sp., *Leucanthemum vulgare*, *Polymnia canadensis*, and *Rudbeckia laciniata*. These Asteraceae and certainly the many incidences of non-asteraceous plants can be considered sitting records. Feeding by *S. stygicus* was reported by Wheeler (2001) to cause foliar chlorosis on *Ambrosia trifida*.

DISTRIBUTION: The most wide-ranging and well-collected species of the genus (map 8). Occurring from west-central British Columbia to as far north as 64.90° N in the Northwest Territories, spanning east from Alberta across the Prairie Provinces to the entire Great Lakes Region, southern and Gaspé, Quebec, reaching to Cape Breton, Nova Scotia; not known from Newfoundland. Widely distributed across the northeastern and entire midwestern United States as far south and apparently mostly west of, or within, the Appalachian Mountains to southern Georgia and Florida. West across the entire country,



Map 8. Localities for *Slaterocoris stygicus*.

including eastern Texas, to the eastern front and within the Rocky Mountain cordillera from New Mexico north to Montana. Apparently absent from the interior basin region of the west, but present in the Puget trough area of Oregon and Washington with a single record from central eastern Oregon.

COLLECTION SUMMARY: 2431 specimens (50% with USI numbers) from 945 collection events, with earliest dates from Texas in March–April and the latest dates in early September sporadically from Saskatchewan, Montana, New York, and the District of Columbia. Throughout the entire distribution the majority of records are from May to August.

DISCUSSION: Henry (1976) discussed his failed attempts to locate the heteropteran specimens of Thomas Say. He concluded that all the Say material in the Harris collection was destroyed; therefore, it is certain that the primary types (syntypes) of *Capsus stygicus* Say are also lost. Van Duzee (1921) provided notes on four species of *Slaterocoris* (as *Strongylocoris*) he presumably identified and that are retained in the CAS. Van Duzee commented that there can "be no question as to the identity of Say's species [*stygicus*]." However, his determinations on specimens from some of the eastern North America localities included in Van Duzee (1921) are correctly attributed to other species of *Slaterocoris* (*atritibialis* and *breviatus*—see Other Specimens Examined for those species). To preserve the concept of *S. stygicus* as interpreted by Knight (1938, 1941, 1970) and Kelton (1968, 1980), it is prudent to designate a neotype. I have selected a male from NW Howard County, Indiana, as the **neotype** of *Capsus stygicus* Say and deposited it in the U.S. National Museum of Natural History collection (USNM).

Although the structure of the apical spines in the right paramere is extremely variable in *S. stygicus*, a clear pattern in morphology was recognized after many males from across the range of the species were examined. Eastern specimens, including a typotypical

example from Indiana (fig. 39I), have four long apical spines also documented from Mississippi (fig. 38G), New York (fig. 38E), and Wisconsin (fig. 38A). Those from New Mexico usually have long apical spines typical in the east restricted to the distalmost spine (fig. 38F). In slightly modified form, males from Oregon (fig. 38C), Washington (fig. 38D), and Wyoming (fig. 38K) have this type of structure. Other western specimens found in British Columbia (fig. 38H, L, M), Northwest Territories (fig. 38I), Colorado (fig. 38B), and Utah (fig. 38J) have two long apical spines. Even though the range in structure of the right paramere in these exemplar specimens is great, all have similar form in the endosomal spicule. Variation was only noted in the marginal serration of the distal portion of the ventral lobe and the length of the medial ramus of the dorsal lobe (cf. fig. 39A–D).

The long apical spines of the right paramere, the expanded triangular-shaped subapical portion of the ventral lobe of the endosomal spicule, and the inwardly turned basolateral spine of the dorsal lobe are diagnostic for *S. stygicus*. Morphology similar to the right paramere of *S. stygicus* is known only in *S. pallipes*. *Slaterocoris pallidicornis* and *S. tanydexios* have the flattened subapical portion of the ventral lobe, but the apical region is either much longer (*S. pallidicornis*) or much shorter (*S. tanydexios*) and neither has the inwardly turned basal spine of the dorsal lobe.

In his key, Knight (1970) separated *S. getzendaneri* from *S. stygicus* by dorsal vestiture coloration, being golden in the former and dark in the latter. Examination of the only known specimen, the glabrous male holotype of *S. getzendaneri*, revealed barely perceptible dark vestiture. In the original description of this nominal species Knight (1970) noted a distinctly arcuate costal margin, antennal segment II longer than the head length, black coloration, including the antenna and legs, with the apices of the femora and tibiae pale, sparse, short vestiture, and a distinctive right paramere. Assessing the right paramere of *S. getzendaneri* in light of the large variability documented (figs. 37C, 38A–M, 39I, J) from across the transcontinental distribution of *S. stygicus*, it is apparent that Knight's species is included within the structural variation encountered in western specimens of *S. stygicus* (cf. figs. 39J and 38B–D, F, H–M). All the features presented in the original description of *S. getzendaneri* are as in *S. stygicus*. Despite the observed variation in the number, size, and spacing of the apical spines in the right paramere of far western specimens, the overall size, length of the lobes, the density of the marginal serration in the endosomal spicule, especially the inwardly turned basal spine of the dorsal lobe, and the curved thickened subapical portion of the ventral lobe are relatively invariant and diagnostic for *S. stygicus* (cf. fig. 39B, D). I am treating *S. getzendaneri* as a junior synonym of *S. stygicus* as none of its characteristics are unique and all are clearly contained within the diagnosis of the senior synonym.

Females without associated males, with missing appendages or aberrant coloration are difficult to identify. However, the vertex of female *S. stygicus* (0.58–0.66) is narrower than in *S. atritibialis* (0.62–0.78).

Females from Texas usually have pale tibiae, including the hind tibia, but antennal segment I is mostly dark and segment II is pale medially. Such coloration differs from *S. breviatus* and *S. pallidicornis* where the antennal segment II is completely pale. Some eastern females with pale antennal segment II, with the base more or less distinctly marked with a black annulus, and segment I predominantly black are distinguished from female *S. breviatus* by the distinct black annulus on segment II and the mostly pale segment I, except for the extreme base, of the latter.

Slaterocoris stygicus was mentioned in three ecological studies concerned with plant bug associates of goldenrod (Reid, 1974; Reid et al., 1976; Messina, 1978; see Biology above).

NEOTYPE: USA: Indiana: ***Howard Co.:*** NW Howard County [40.52167° N 86.3252° W], 23 Jun 1986–24 Jun 1986, D.A. Rider, 1♂ (AMNH_PBI 00242967); Neotype *Capsus stygicus* Say, 1832, desig. M.D. Schwartz, 2010 [red label]. Deposited in the collection of the U.S. National Museum of Natural History (USNM), Washington, D.C.

HOLOTYPE: **USA: Washington:** ***Pierce Co.:*** Orting [47.09787° N 122.20428° W], 08 Jul 1929, C.W. Getzendaner, 1♂ (AMNH_PBI 00122252) (USNM) (*S. getzendaneri*: junior synonym).

OTHER SPECIMENS EXAMINED: **CANADA: Alberta:** 3 mi E of Evansburg, 53.58553° N 114.91841° W, 772 m, 09 Aug 1966, D.S. Horning, Jr., 1♂ (00122375), 1♀ (00122381) (UID). Edmonton, 53.55° N 113.5000° W, 15 Jul 1929, E.H. Strickland, 2♀ (00134124–00134125) (USNM). Elkwater Lake, Cypress Hills Provincial Park, 49.66293° N 110.30167° W, 1219 m, 19 Jul 1956, O. Peck, 1♂ (00113312) (CNC); 20 Jul 1956, O. Peck, 1♂ (00113311) (CNC). Elkwater Park, Cypress Hills Provincial Park, 49.63° N 110.2000° W, 1427 m, 07 Jul 1952, L.A. Konotopetz, *Solidago* sp., 1♂ (00113310) (CNC); 07 Jul 1952, A.R. Brooks, *Solidago* sp., 1♂ (00113306), 1♀ (00113304) (CNC); 20 Jul 1952, L.A. Konotopetz, 1♂ (00113309) (CNC). Elkwater Park near campground stream, 49.66041° N 110.29433° W, 1234 m, 15 Jul 1990, M.D. Schwartz, *Solidago* sp., 2♂ (00318748–00318749), 5♀ (00318751–00318755) (CNC); 16 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113305) (CNC). Jasper, 52.88333° N 118.08333° W, 08 Aug 1930, C.T. Parsons, 1♂ (00170100) (AMNH). Lac la Biche, 54.88222° N 112.16861° W, 25 Jun 1961, A.R. Brooks, 1♂ (00113315) (CNC). Lesser Slave Lake, 55.29158° N 114.79471° W, 579 m, 29 Jul 1931, E.H. Strickland, 1♀ (00164900) (USNM). Lethbridge, 49.7000° N 112.83333° W, 20 Jun 1952, A.R. Brooks, 1♂ (00113313) (CNC). McMurray, 56.73333° N 111.38333° W, 06 Jul 1953, W.J. Brown, 1♀ (00113321) (CNC); 16 Aug 1953, G.E. Ball, 1♂ (00113316) (CNC). Nordegg, 52.46666° N 116.08333° W, 06 Aug 1921, J. McDunnough, 1♂ (00134429) (USNM). Red Deer, 52.27024° N 113.80469° W, 856 m, 22 Jul 1926, E.H. Strickland, 1♀ (00134126) (USNM); 25 Jun 1957, Brooks and McNay, 1♂ (00113314) (CNC). University of Calgary Kananaskis Field Station, 51.03027° N 115.03361° W, 09 Aug 2002, S. Andrews, 1♀ (BDUC); 10 Aug 2002, S. Andrews, 1♂ (BDUC). **British Columbia:** 3 km W of Myncaster, nr lake, 49.03333° N 119° W, 11 Aug 2002, unknown, 1♂ (CNC). 4 mi E of Cawston, 49.19175° N 119.7237° W, 09 Jul 1959, L.A. Kelton, Asteraceae, 1♂ (00112981) (CNC). 10 mi S of Merritt, 49.97209° N 120.78333° W, 19 Jul 1959, L.A. Kelton, 1♂ (00112980) (CNC). Downie Creek, Selkirk Mountains, 51.49984° N 118.36688° W, 722 m, 09 Aug 1905, J.C. Bradley, 1♂ (00116258) (CUIC). Duncan, 48.78333° N 123.7000° W, 04 Aug 1921, unknown, 1♂ (UBC). Fernie, 49.5000° N 115.06666° W, 23 Jul 1959, L.A. Kelton, 8♂ (00114052, 00115516, 00317218–00317222, 00318744), 4♀ (00112969, 00318745–00318747) (CNC). Flathead Lake, 49.45° N 114.66666° W, 09 Jul 1980, unknown, 1♂ (UBC). Goldstream to Downie Creek, Selkirk Mountains, 51.55101° N 118.53942° W, 608 m, 07 Aug 1905–11 Aug 1905, unknown, 1♂ (00133733) (USNM). Greenwood, 49.09574° N 118.69942° W, 830 m, 20 Jul 1959, L.A. Kelton, Asteraceae, 1♀ (00112982) (CNC). Kelowna, 49.86299° N 119.44322° W, 358 m, 27 Jun 1949, unknown, 1♂ (UBC). Midday Val[ley]., Merritt, 49.98333° N 120.93333° W, 736 m, 28 Jul 1923, Ralph Hopping, 1♂ (00133723) (USNM). Moyie, 49.28844° N 115.83284° W, 339 m, 09 Jul 1970, L.A. Kelton, 1♂ (00112968) (CNC). Salmon Arm, 49.2000° N 117.28333° W, 24 Jul 1925, unknown, 1♂ (UBC); 29 Jul 1925, unknown, 1♂ (UBC). Smithers, 54.76666° N 127.16666° W, 475 m, 05 Jul 1924, unknown, 1♂ (UBC). Soda Creek, 52.34535° N 122.28629° W, 479 m, 04 Jul 1950, G.J. Spencer, (Solanaceae), 1♀ (00112983) (CNC). Tyhee Lake [Park], 54.7000° N 127.03329° W, 24 Jul 1983, unknown, 1♂ (CNC). Vancouver, 49.25° N 123.13333° W, 15 Jul 1955, unknown, 1♂ (UBC). Vernon, 50.26666° N 119.26666° W, 27 Jul 1920, unknown, 1♂ (UBC). West Quesnel, 53° N 122.5000° W, 20 Jul 1947, unknown, 1♂ (UBC); 30 Jul 1947, unknown, 2♂ (UBC). **Manitoba:** 5 mi SW of Shilo, 49.74888° N 99.71243° W, 04 Jul 1958, C.D.F. Miller, 3♂ (00113105) (CNC); 22 Jul 1958, J.G. Chillcott, 1♂ (00113106) (CNC); 02 Aug 1958, R.B. Madge, 4♂ (00113107) (CNC). 30 mi N of Roblin, 51.66703° N 101.35° W, 14 Jul 1954, Brooks and Wallis, 1♂ (00113104) (CNC). Angusville, 50.73555° N 101.02055° W, 20 Jul 1954, Brooks, Wallis, 1♀ (00113108) (CNC). Audy Lake, Riding Mountain National Park, 50.75° N

100.24972° W, 12 Aug 1958, J.G. Chillcott, 1♀ (00113109) (CNC). Aweme, 49.72° N 99.6000° W, 30 Jun 1922, B.M. White, 1♂ (00113110) (CNC); 11 Jul 1930, B.M. White, 1♂ (00113111) (CNC); 14 Jul 1930, B.M. White, 1♂ (00113112) (CNC). Boissevain, 49.23333° N 100.05° W, 17 Jul 1953, Brooks and Kelton, 1♂ (00113113) (CNC). Carberry, 49.86666° N 99.35° W, 29 Jul 1953, Brooks and Kelton, 1♂ (00113114) (CNC). Falcon Lake, 49.7000° N 95.25° W, 04 Jul 1972, L.A. Kelton, 1♂ (00113116) (CNC). Horton, 49.16666° N 100.05° W, 25 Jul 1953, Brooks and Kelton, 1♀ (00113297) (CNC); 28 Jul 1958, A. and J. Brooks, 1♂ (00113117) (CNC). Millwood, 50.7000° N 101.4000° W, 19 Jul 1954, Brooks and Wallis, 1♂ (00113118) (CNC). Ninette, 49.4000° N 99.63333° W, 05 Aug 1958, R.B. Madge, 1♂ (00113120) (CNC). Oak Lake, 49.66666° N 100.75° W, 11 Jul 1953, Brooks and Kelton, 1♂ (00113121) (CNC). Onah, 49.80754° N 99.52141° W, 375 m, 09 Jul 1916, J.B. Wallis, 1♂ (00134428) (USNM). Pilot Mound, 49.2000° N 98.9000° W, 31 Jul 1958, A. and J. Brooks, 1♀ (00113122) (CNC). Riding Mountain National Park, 50.75° N 100° W, 20 Jul 1972, L.A. Kelton, *Solidago* sp., 1♂ (00113124), 1♀ (00113123), 1♂ (00318750) (CNC); 21 Jul 1972, L.A. Kelton, *Symphoricarpos* sp., 1♂ (00113126), 1♀ (00113125) (CNC). Riding Mountain National Park, Boreal Island Nature Trail, 77 km N of Minnedosa on Rt 10, 50.8741° N 100.05757° W, 679 m, 20 Aug 1993, M.D. Schwartz, *Solidago* sp., 1♂ (00113307) (CNC). Russell, 50.78333° N 101.28333° W, 21 Jul 1954, Brooks and Wallis, 1♀ (00113127) (CNC). Souris, 49.61666° N 100.25° W, 27 Jul 1953, A.R. Brooks, 1♀ (00113296) (CNC). Turtle Mountain, 49° N 100.33333° W, 17 Jul 1953, Brooks and Kelton, 1♂ (00113128) (CNC); 18 Jul 1953, Brooks and Kelton, 1♂ (00113129) (CNC). Turtle Mountain Forest Reserve, International Peace Gardens, 49° N 100.33333° W, 17 Jul 1958, J.G. Chillcott, 1♂ (00113130) (CNC). Virden, 49.85° N 100.93333° W, 08 Jul 1953, Brooks and Kelton, 2♀ (00242555–00242556) (CAS), 1♂ (00113136), 1♀ (00113298) (CNC); 09 Jul 1953, Brooks and Kelton, 1♂ (00113131) (CNC); 10 Jul 1953, Brooks and Kelton, 1♂ (00113133), 1♀ (00113132) (CNC); 12 Jul 1953, Brooks and Kelton, 1♂ (00113134) (CNC); 13 Jul 1953, Brooks and Kelton, 1♂ (00113135) (CNC). **New Brunswick:** Chatham, 47.03333° N 65.43333° W, 27 Jun 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113353) (CNC). Fundy National Park, 45.62° N 65.03° W, 06 Jul 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113351) (CNC). Petersville, 45.5000° N 66.42° W, 05 Jul 1966, L.A. Kelton, *Solidago* sp., 1♂ (00113355) (CNC). Wolf Lake, 45.25° N 66.2667° W, 13 Aug 1966, L.A. Kelton, *Solidago* sp., 1♂ (00318760) (CNC). **Northwest Territories:** Fort Norman, McKenzie River, 64.90265° N 125.56903° W, 17 m, 06 Aug 1922, C.H. Crickmay, 1♂ (00112979) (CNC). **Nova Scotia:** Barton, 44.53667° N 65.8736° W, 22 m, 18 Jul 1966, L.A. Kelton, 1♂ (00113348) (CNC). Cape Breton Highlands National Park, Cheticamp River, TP67, 46.64135° N 60.95284° W, 11 m, 12 Jul 1983, L. LaSage, *Spiraea alba var. latifolia* Du Roi (Rosaceae), 1♂ (00113350) (CNC). Kentville, 45.06666° N 64.5000° W, 15 Jul 1966–17 Jul 1966, L.A. Kelton, 1♂ (00318758) (CNC); 15 Jul 1966–17 Jul 1966, L.A. Kelton, 1♂ (00113349) (CNC). Mount Uniacke, 44.88333° N 63.83333° W, 13 Jul 1966–14 Jul 1966, L.A. Kelton, 1♂ (00113356) (CNC). **Ontario:** 6 mi S of Devlin, 48.53235° N 93.67325° W, 339 m, 28 Jun 1960, Kelton, Whitney, 1♀ (00113446) (CNC). 10 mi N of Emo, 48.76123° N 93.83333° W, 28 Jun 1960, Kelton, Whitney, 1♀ (00113447) (CNC). 20 mi N of Red Lake, 51.37246° N 93.91666° W, 11 Aug 1960, Kelton and Whitney, 1♂ (00113430) (CNC). Algonquin [Provincial] Park, Swan Lake Stn, Scott Lake Survey, 45.4875° N 78.72222° W, 471 m, 02 Aug 1993–15 Aug 1993, B. Larson, 1♂ (00329856) (DEBU). Ancaster, 43.22° N 79.98° W, 10 Jul 1965, J.E.H. Martin, 1♂ (00113396) (CNC). Belwood, 43.78708° N 80.31023° W, 454 m, 05 Jul 1972, D.H. Pengelly, 1♂ (00329850), 1♀ (00329851) (DEBU). Bergland, 48.95172° N 94.38686° W, 325 m, 22 Jun 1960, Kelton and Whitney, 1♀ (00113711) (CNC). Black Sturgeon Lake, 49.82412° N 94.43406° W, 326 m, 01 Aug 1956–15 Aug 1956, H. Lindberg, 1♂ (00112918) (CNC). Brooklin, 43.95869° N 78.95919° W, 155 m, 06 Jul 1979, D. Lewis, 1♂ (00329852), 1♀ (00329853) (DEBU).

Burks Falls, 45.62352° N 79.41253° W, 324 m, 12 Jul 1926, F.P. Ide, 1♂ (00113398), 1♀ (00113713) (CNC). Cayuga, 42.93° N 79.85° W, 26 Jun 1961, L.A. Kelton, G. Brumpton, 1♂ (00113433) (CNC). Centreville, 43.05566° N 80.85384° W, 316 m, 25 Jun 1925, G.S. Walley, 1♂ (00113395) (CNC). Chalk River, 46.01666° N 77.45° W, 20 Jul 1961, G. Brumpton, 1♀ (00113453) (CNC). Chatham, 42.4000° N 82.18333° W, 1941, G.M. Stirrett, 1♂ (00113411) (CNC). Delhi, 42.85° N 80.5000° W, 12 Jul 1958, L.A. Kelton, 1♀ (00113442) (CNC). Dorset, 45.24375° N 78.89502° W, 323 m, 21 Aug 1977, P. Wallis, 1♂ (00329857) (DEBU). Dryden, 49.78333° N 92.83333° W, 12 Aug 1960, Kelton and Whitney, 1♀ (00113454) (CNC). Dundas, 43.26666° N 79.93333° W, 19 Jun 1978, M. Lichtenberg, 1♀ (00329844) (DEBU); 22 Jun 1978, D. Morris, 1♀ (00329845) (DEBU); 20 Jun 1979, D.L. Krailo, 1♀ (00329843) (DEBU); 20 Jun 1979, B. Merchant, 1♂ (00329842) (DEBU); 11 Jun 1980, C. Bolter, 1♂ (00329841) (DEBU); 25 Jun 1980, S. Beierl, 1♂ (00329847), 1♀ (00329846) (DEBU). Edwards, Patterson's Farm, 45.31045° N 75.46232° W, 77 m, 23 Jun 1991, M.D. Schwartz, *Solidago* sp., 1♂ (00113406) (CNC). Essex Co., Windsor, Ojibway Prairie [Provincial Park], 42.26517° N 83.07563° W, 178 m, 25 Jun 2001, S. Paiero, 1♀ (00329838 [cat debu01103624]) (DEBU); 18 Jun 2002–19 Jun 2002, O. Lonsdale, 2♂ (00329836 [cat debu01114408], 00329837 [cat debu01114275]) (DEBU). Essex Co., Windsor, ~1.5 km S of Ojibway Prairie, private property, 42.25074° N 83.06951° W, 178 m, 19 Jun 2001–30 Jun 2001, P. Pratt, 1♀ (00329840 [cat debu01115348]) (DEBU). Finland, 48.85° N 93.91666° W, 11 Jul 1960, S.M. Clark, 1♀ (00113443) (CNC). Fonthill, 43.03333° N 79.28333° W, 26 Jun 1915, H.G. Crawford, 1♂ (00113394) (CNC); 08 Jun 1962, Kelton and Thorpe, *Solidago* sp., 1♂ (00113426), 1♀ (00318757) (CNC), *Solidago* sp., 1♂ (00121783) (UCB). Foxboro, 44.24623° N 77.4339° W, 111 m, 22 Jun 1970, D.G. Reid, *Solidago* sp., 1♂ (00113420) (CNC). Freelton, 43.40422° N 80.04035° W, 280 m, 15 Jul 1972, B.D. Beam, 1♂ (00329858) (DEBU). Fuller, 44.4000° N 77.42° W, 26 Jun 1968, C.C. Loan, *Solidago* sp., 1♂ (00113421) (CNC); 02 Jul 1971, D.G. Reid, *Solidago* sp., 1♂ (00113409) (CNC). Gore Bay, 45.91666° N 82.46666° W, 10 Jul 1961, G. Brumpton, 1♂ (00113437) (CNC). Gravel River nr, 48.91658° N 87.76741° W, 187 m, 08 Aug 1956, H. Lindberg, 1♂ (00113391), 1♀ (00113391) (CNC). Guelph, 43.55° N 80.25° W, 323 m, 08 Jun 1981, J. Cairns, 1♂ (00329848) (DEBU); 05 Jul 1982, R. Young, 1♀ (00329849) (DEBU). Hagersville, 42.95° N 80.05° W, 09 Jul 1962, Kelton and Thorpe, 1♂ (00113438) (CNC). Harrow, 42.03333° N 82.91666° W, 20 Jul 1976, E.A. Innes, 2♀ (00329820–00329821) (DEBU). Huntley, 45.3000° N 75.97° W, 14 Jul 1960, D.J.E. Brown, 1♀ (00113455) (CNC). Ingleside, 45.00001° N 75.00005° W, 86 m, 27 Jun 1977–29 Jun 1977, L.A. Kelton, 1♂ (00113410) (CNC). Ipperwash, 43.20805° N 81.97639° W, 185 m, 11 Jul 1962, Kelton and Thorpe, *Solidago* sp., 1♂ (00113427) (CNC). Jordan, 43.15° N 79.38° W, 15 Jul 1915, H.G. Crawford, 1♂ (00113392) (CNC); 17 Jul 1961, L.A. Kelton, 1♀ (00113450) (CNC). Kapuskasing, 49.41666° N 82.43333° W, 18 Jul 1961, G. Brumpton, 1♀ (00113681) (CNC). Kincardine, 44.16666° N 81.63333° W, 28 May 1962, L.A. Kelton, Thorpe, 1♀ (00113445) (CNC). Kingsville, 42.03333° N 82.75° W, 18 Jun 1962, Kelton and Thorpe, 1♀ (00113452) (CNC); 19 Jun 1962, Kelton and Thorpe, 1♂ (00113423) (CNC). Lambeth, 42.9000° N 81.3000° W, 29 Jul 1961, Kelton and Brumpton, 1♀ (00113444) (CNC). Leamington, 42.05° N 82.58333° W, 26 Jun 1931, G.S. Walley, 1♂ (00113400) (CNC). Marmora, 44.48333° N 77.68333° W, 26 Jun 1952, C. Boyle, 1♂ (00113401) (CNC); 27 Jun 1952, C. Boyle, 1♂ (00113402) (CNC). Nestor Falls, 49.11214° N 93.93023° W, 341 m, 25 Jun 1960, Kelton and Whitney, 1♂ (00113434) (CNC). Niagara Falls, 43.13648° N 79.05642° W, 174 m, 07 Jul 1955, L.A. Kelton, 1♂ (00113399) (CNC). North Bay, 46.3000° N 79.45° W, 14 Jul 1961–15 Jul 1961, G. Brumpton, 1♂ (00113435), 1♀ (00113680) (CNC). Norway Point, Lake of Bays, 45.25° N 79.05° W, 28 Jul 1922, J. McDunnough, 1♂ (00382320) (DEBU). Ojibway Prairie [Provincial Nature] Reserve, 42.26722° N 83.07423° W, 179 m, 18 Jun 1980, S. Beierl, 1♀ (00329839) (DEBU); 19 Jun 1980, J.D. Cashaback, 1♂ (00329835) (DEBU). One Sided Lake, 49.05° N

93.91666° W, 29 Jun 1960, Kelton and Whitney, 1♂ (00113429) (CNC); 01 Aug 1960, Kelton and Whitney, 1♀ (00113440) (CNC); 02 Aug 1960, Kelton and Whitney, 1♂ (00113428) (CNC). Ottawa, 45.39079° N 75.70324° W, 71 m, 02 Jul 1912, E.P. Van Duzee, 2♂ (00242537, 00242540), 2♀ (00242538–00242539) (CAS); 20 Jul 1914, G. Beaulieu, 1♀ (00134480) (USNM); 28 Jun 1919, J. McDunnough, 1♂ (00113393) (CNC); 06 Aug 1939, E.G. Lester, 1♀ (00329860) (DEBU). Ottawa, Chapel Hill, 45.43427° N 75.51638° W, 87 m, 06 Jul 1993, M.D. Schwartz, *Solidago canadensis*, 1♀ (00113718) (CNC). Parry Sound, 45.33333° N 80.03333° W, 27 Jul 1915, unknown, paratype, 1♂ (00134496) (USNM). Pitopiko River Picnic Area on Rt 11 between Longlac and Hearst, 49.77051° N 83.54021° W, 217 m, 21 Jul 1990, M.D. Schwartz, *Solidago* sp., 1♂ (00113408) (CNC). Point Pelee, 41.96666° N 82.51666° W, 28 Jun 1961–29 Jun 1961, L.A. Kelton, G. Brumpton, 1♂ (00113432), 1♀ (00318767) (CNC); 06 Jul 1962, Kelton and Thorpe, 1♂ (00113439) (CNC). Port Arthur, 48.42458° N 89.26285° W, 212 m, 15 Aug 1960–16 Aug 1960, Kelton and Whitney, 1♂ (00113424), 1♀ (00113679) (CNC). Port Burwell, 42.65° N 80.81666° W, 03 Jul 1962, G. Thorpe, 1♀ (00113448) (CNC). Powassan, 46.08336° N 79.36174° W, 250 m, 11 Jul 1978, J. Cappleman, 1♂ (00329859) (DEBU). Prescott, 44.71565° N 75.50404° W, 82 m, 19 Jun 1963, J.R. Vockeroth, 1♂ (00113403) (CNC). Prince Edward County, no specific locality, 44° N 77.25° W, 25 Jun 1952, J.F. Brimley, 1♂ (00113414) (CNC); 04 Jul 1956, J.F. Brimley, 1♂ (00113413) (CNC). Rainy River, 48.71666° N 94.56666° W, 27 Aug 1924, J.F. Brimley, 1♂ (00113405) (CNC); 03 Aug 1950, L.A. Kelton, Whitney, 1♂ (00113425) (CNC). Rockaway, 50.05° N 92.6000° W, 21 Jun 1962, Kelton and Thorpe, 1♀ (00113441) (CNC); 21 Jul 1962, Kelton and Thorpe, 1♀ (00121784) (UCB). Saint Ann's, 43.05° N 79.5000° W, 09 Jun 1962, L.A. Kelton, Thorpe, 1♂ (00113422) (CNC). Saint Davids, 43.15766° N 79.10661° W, 121 m, 25 Jun 1932, W.L. Putman, 4♂ (00382323–00382326), 2♀ (00382327, 00382328) (DEBU). South Gloucester, Blossom Park, Greenbelt, 45.34379° N 75.64635° W, 105 m, 09 Jun 1991, M.D. Schwartz, *Solidago* sp., 1♂ (00113407) (CNC). Stamford, 43.09953° N 79.11967° W, 167 m, 12 Jul 1961, L.A. Kelton, 1♂ (00113431), 1♀ (00113451) (CNC). Stittsville, 45.25° N 75.91666° W, 04 Jul 1973, D. Brown, 1♂ (00113412) (CNC). Strathroy, 42.95° N 81.61666° W, 25 Jul 1917, H.G. Crawford, 1♂ (00113397) (CNC). Thessalon, 46.25° N 83.55° W, 12 Jul 1965, W. Gagne, 1♂ (00119526) (UCB). Tillsonburg, 42.86666° N 80.73333° W, 12 Jun 1962, H. Blanchard, 1♂ (00113436) (CNC); 20 Jun 1962, Kelton and Thorpe, 1♀ (00113449) (CNC). Vineland, 43.15° N 79.4° W, 05 Jul 1929, W.L. Putman, 1♀ (00382319) (DEBU); 23 Jun 1930, W.L. Putman, 1♂ (00382314) (DEBU); 28 Jun 1930, W.L. Putman, 1♀(00382318) (DEBU); 03 Jul 1930, W.L. Putman, 1♀ (00382317) (DEBU); 15 Jun 1934, W.L. Putnam, 1♂ (00382315), 1♀ (00382316) (DEBU). Vineland Station, 43.16862° N 79.3889° W, 91 m, 08 Jul 1943, W.L. Putman, *Solidago altissima* L. (Asteraceae), 1♂ (00382321), 1♀ (00382322) (DEBU). Waterford, 42.93333° N 80.28333° W, 17 Jul 1962, Kelton and Thorpe, *Solidago* sp., 1♀ (00114027) (CNC). Wellington, 43.74131°N 80.43239° W, 416 m, 28 Aug 1954, C.D. Miller, 1♂ (00113404) (CNC). Windsor, 42.33333° N 83.03333° W, 08 Jun 1976, J.F. Fortin, 1♂ (00329854) (DEBU); 04 Jul 1984, M.T. Kasserra, 1♂ (00329855) (DEBU). Woodslee, 42.2000° N 82.72° W, 186 m, 07 Jun 1976, J.M. Heraty, 1♀ (00329861) (DEBU). **Quebec:** Cap-Rouge, 48.49198° N 64.245° W, 85 m, 14 Jul 1933, O. Peck, 1♂ (00113359) (CNC); 04 Jul 1953, O. Peck, 1♂ (00113360) (CNC); 07 Jul 1953, R. Lambert, 1♂ (00113358) (CNC); 08 Jul 1953, R. Lambert, 1♂ (00113357) (CNC); 10 Jul 1953, O. Peck, 1♀ (00113379) (CNC); 11 Jul 1953, O. Peck, 1♀ (00113378) (CNC). Duchesnay, 49.16666° N 65.91666° W, 05 Jul 1953, O. Peck, 1♂ (00113361) (CNC). Fabre, 47.2000° N 79.36666° W, 12 Jul 1963, W. Gagne, 1♂ (00113388) (CNC). Georgeville, 45.13889° N 72.2525° W, 232 m, 28 Jul 1936, G.S. Walley, 1♂ (00113376) (CNC). Hudson Heights, 45.45° N 74.15° W, 24 Jul 1956–30 Jul 1956, Lindberg, 1♀ (00113387) (CNC). Ile Jesus, 20 mi NW Montreal, near Saint Rose, 45.70444° N 73.87608° W, 19 Aug 1956, John D. Lattin, 1♀ (00118154) (ORSU). Knowlton, 45.21666° N 72.51666° W, 11 Jul 1929,

L.J. Milne, 1♂ (00113367) (CNC). Lac Chicobi, 48.84241° N 78.50021° W, 309 m, 18 Aug 1971, A. Sauve, 1♂ (00113368) (CNC). Lac Megantic, 46.25° N 71.5000° W, 03 Aug 1961, G. Brumpton, 1♂ (00113366) (CNC). Lac Minerve, 48.09291° N 72.06352° W, 453 m, 28 Aug 1956, H. Lindberg, 1♂ (00113389), 1♀ (00113389) (CNC). Lac Mondor, Ste. Flore, 46.61666° N 72.76666° W, 20 Jun 1951, E.G. Munroe, 1♂ (00113373) (CNC); 21 Jun 1951, E.G. Munroe, 1♂ (00113372) (CNC); 24 Jun 1951, E.G. Munroe, 1♂ (00113371) (CNC); 25 Jul 1951, E.G. Monroe, 1♀ (00113381) (CNC). Lac Tremblant, 46.21695° N 74.60969° W, 243 m, 29 Aug 1956, H. Lindberg, 1♀ (00113390) (CNC). Ladysmith, 45.77° N 76.38° W, 23 Jul 1958, L.A. Kelton, *Picea* sp. (Pinaceae), 1♂ (00113375) (CNC); 24 Jul 1958, L.A. Kelton, 1♀ (00113386) (CNC). Laniel, 47.03333° N 79.26666° W, 16 Jun 1963–17 Jun 1963, W. Gagne, 1♂ (00113362) (CNC); 03 Jul 1963–04 Jul 1963, L.A. Kelton, 1♂ (00113365) (CNC); 04 Jul 1963, W. Gagne, 1♂ (00113364) (CNC); 10 Jul 1963–11 Jul 1963, L.A. Kelton, 1♂ (00113363) (CNC); 20 Jul 1963–21 Jul 1963, W. Gagne, 1♀ (00113383) (CNC). Magog, 45.26666° N 72.15° W, 02 Aug 1961, G. Brumpton, 1♀ (00113384) (CNC). Missisquoi, Mount Pinacle, 8 km E of Frelighsburg, 45.05° N 72.73° W, 427 m, 20 Jun 1991, M.D. Schwartz, *Solidago* sp., 1♂ (00113377) (CNC). Montreal, 45.5000° N 73.58333° W, 08 Jul 1912, E.P. Van Duzee, 2♂ (00242535–00242536), 1♀ (00242581) (CAS). Otter Lake, 49.61666° N 63.8000° W, 24 Jul 1958, L.A. Kelton, 1♂ (00113370) (CNC). Petit-Gaspe beach, Cap-des-Rosiers, Forillon National Park, 48.85707° N 64.20301° W, 5 m, 20 Jul 1995, M.D. Schwartz, *Solidago* sp., 1♂ (00113369) (CNC). Quyon, 45.51666° N 76.23333° W, 22 Jul 1958, L.A. Kelton, *Salix* sp. (Salicaceae), 1♂ (00113374) (CNC). Rupert, 45.69002° N 75.98971° W, 170 m, 31 Jul 1973, D. Brown, 1♀ (00113385) (CNC). Sainte-Agathe, 46.03333° N 74.28333° W, 09 Aug 1961, G. Brumpton, 1♀ (00113382) (CNC). **Saskatchewan:** 10.8 km E of Maidstone on Hwy 16, 53.08333° N 109.13857° W, 22 Aug 1993, M.D. Schwartz, *Solidago* sp., 1♀ (00113308) (CNC). Amsterdam, 51.75° N 102.47° W, 11 Jul 1954, Brooks and Wallis, 1♂ (00113137), 1♀ (00113892) (CNC). Big River, 53.83333° N 107.03333° W, 05 Jun 1959, A. and J. Brooks, 1♀ (00113139) (CNC); 03 Jul 1959, A. and J. Brooks, 1♂ (00113138) (CNC). Canora, 51.63333° N 102.43333° W, 06 Sep 1959, A. and J. Brooks, 1♀ (00113140) (CNC). Cherry Ridge, 53.39999° N 104.16661° W, 392 m, 07 Aug 1950, J.C. Arrand, *Solidago canadensis*, 1♀ (00113299) (CNC). Christopher Lake, 53.56666° N 105.83333° W, 08 Jul 1959, A. and J. Brooks, 1♂ (00113144) (CNC); 11 Jul 1959, A.R. and J.E. Brooks, 1♂ (00113141) (CNC); 15 Jul 1959, A.R. and J.E. Brooks, 1♂ (00113142) (CNC); 18 Jul 1959, A. and J. Brooks, 1♂ (00113143) (CNC). Cypress Hills Provincial Park, 49.58333° N 109.83333° W, 05 Sep 1927, H. Richmond, 1♀ (00113145) (CNC). Esterhazy, 50.65° N 102.08333° W, 14 Aug 1954, Brooks and Wallis, 2♀ (00113637, 00113893) (CNC). Love, 53.48° N 104.17° W, 11 Jul 1950, L.A. Konotopetz, 1♂ (00113147) (CNC). Prince Albert, 52.96666° N 108.38333° W, 02 Sep 1954, Brooks and Wallis, 1♂ (00113149), 1♀ (00113891) (CNC); 23 Jul 1959, A. and J. Brooks, 1♂ (00113148) (CNC). Saskatoon, 52.13333° N 106.66666° W, 26 Jun 1951, L.A. Konotopetz, 1♀ (00113150) (CNC); 15 Jun 1956, A.R. Brooks, 1♀ (00113301) (CNC); 06 Jul 1957, A.R. Brooks, 1♂ (00113151) (CNC). Torch River, 53.85° N 103.1000° W, 11 Jul 1950, L.A. Konotopetz, *Solidago* sp., 1♀ (00113300) (CNC); 03 Aug 1950, L.A. Konotopetz, *Rubus strigosus* (Rosaceae), 1♀ (00113153) (CNC); 14 Aug 1950, L.A. Konotopetz, 1♂ (00113152) (CNC). Waskesiu Lake, 53.95° N 106.16666° W, 21 Jul 1939, A.R. Brooks, 1♂ (00113154) (CNC). White Fox, 53.45° N 104.08333° W, 24 Jul 1950, L.A. Konotopetz, 1♀ (00113303) (CNC); 26 Jun 1951, L.A. Konotopetz, 1♂ (00113155) (CNC). **USA: Alabama:** ***Henry Co.:*** 10 mi W of Abbeville, 31.57175° N 85.25061° W, 128 m, 11 May 1982, T.J. Henry, *Solidago* sp., 1♀ (00069870) (USNM). ***Lee Co.:*** 2 mi N of Loachapoka, 32.62069° N 85.6209° W, 181 m, 15 May 1965, E.U. Balsbaugh, Jr., 1♂ (00245182) (TAMU). Meadows Mill, 32.5308° N 85.2547° W, 152 m, 14 May 1964, E.U. Balsbaugh, Jr., 1♀ (00245369) (TAMU). **Arizona:** ***Apache Co.:*** Greer, 34.01° N 109.45806° W, 2562 m, 01 Aug 1941, L.L.

Stitt, 2♂ (00134445–00134446), 1♀ (00134447) (USNM); 06 Jul 1953, A. and H. Dietrich, 1♀ (00116350) (CUIC). **Arkansas:** ***Logan Co.:*** Magazine Mountain Electronics site, 35.16398° N 93.68128° W, 811 m, 14 May 1994, D.G. LeDoux, 1♂ (00243122) (UMRM). ***Washington Co.:*** Fayetteville, 36.0625° N 94.15722° W, 15 Jun 1987, T.J. Henry and A.G. Wheeler, Jr., *Ambrosia trifida*, 1♂ (00069839) (USNM). **Colorado:** ***Archuleta Co.:*** Rt 160, 5 mi N of Pagosa Springs, 37.34172° N 107.00917° W, 27 Jun 1980, K. and R. Schmidt, 1♀ (00169946) (AMNH). ***Bent Co.:*** Las Animas, 38.06667° N 103.22222° W, 06 Aug 1925, C.J. Drake, 1♂ (00134140) (USNM). ***Clear Creek Co.:*** Chicago Creek, 39.73999° N 105.52125° W, 2682 m, 05 Aug 1961, B.H. Poole, 1♂ (00113334) (CNC). ***Costilla Co.:*** Fort Garland, Ute Creek Ranch, 37.43274° N 105.43846° W, 11 Aug 1925, C.J. Drake, 1♀ (00134141) (USNM). ***Custer Co.:*** Westcliffe, 38.13357° N 105.47443° W, 2377 m, unknown, 1♂ (00164896) (USNM). ***Douglas Co.:*** Chatfield State Park, 39.53666° N 105.06888° W, 02 Jun 1977, D.A. and J.T. Polhemus, 1♀ (00116877) (JTP); 10 Jun 1977, D.A. and J.T. Polhemus, 2♂ (00108940–00108941), 2♀ (00108942–00108943) (AMNH), 1♂ (00116866) (JTP); 13 Jun 1977, D.A. and J.T. Polhemus, 2♂ (00108937–00108938), 1♀ (00108939) (AMNH), 1♂ (00116869) (JTP); 15 Jun 1977, D.A. and J.T. Polhemus, 1♀ (00108944) (AMNH), 1♂ (00116870) (JTP). Waterton, 39.49361° N 105.08806° W, 08 Aug 1987, T.J. Henry, *Symphoricarpos* sp., 1♂ (00069924) (USNM). nr Waterton, Roxborough Road, 39.49361° N 105.08806° W, 1707 m, 22 Jun 1981, D.A. Polhemus, 1♂ (00116872) (JTP). ***Eagle Co.:*** 5 mi NW of McCoy, 39.9681° N 106.76288° W, 2316 m, 13 Jul 1938, U. Lanham, 1♂ (00134451), 1♀ (00164940) (USNM). 9.2 mi S of Minturn, White River National Forest, 39.45338° N 106.43028° W, 2768 m, 19 Jul 1990, Zolnerowich, 1♂ (00093727) (TAMU). Eagle, 39.65244° N 106.80244° W, 2177 m, 13 Aug 1973, J.C. Schaffner, 1♂ (00093791) (TAMU). State Bridge, nr Bond, 39.85778° N 106.64917° W, 2134 m, 24 Jun 1961–25 Jun 1961, J.R. Stainer, 2♂ (00113332, 00113951) (CNC). Vail, 39.64028° N 106.37361° W, 26 Jun 1977, J.T. Polhemus, 1♂ (00116876) (JTP). ***Gunnison Co.:*** Cooper Ranch Access, Curecanti Recreation Area, 38.50743° N 107.02538° W, 2297 m, 12 Aug 1987, T.J. Henry, 1♀ (00134063) (USNM). Gothic, 38.95917° N 106.98917° W, 2896 m, 30 Jul 1952, C.V. Reichart, 8♀ (00164908–00164915) (USNM); 19 Jul 1963, O.R. Taylor, 1♀ (00170125) (AMNH); 15 Aug 1963, O.R. Taylor, 2♀ (00170109, 00170124) (AMNH). RMBL [Rocky Mountains Biological Laboratory] Research Meadow, Gothic, 38.95705° N 106.9878° W, 2889 m, 23 Jul 2001, M.L. Buffington, 1♀ (00245407) (TAMU). ***Huerfano Co.:*** Chama, 37.16136° N 105.37752° W, 2493 m, 04 Aug, E.D. Ball, 1♂ (00134444) (USNM). ***Jackson Co.:*** Gould, 40.52639° N 106.02611° W, 2804 m, 10 Aug 1965, J.T. Medler, 1♀ (00121813) (IRCW). Rabbit Ears Pass, 40.38472° N 106.61111° W, 2896 m, 03 Aug 1947, R.H. Beamer, 1♀ (00117930) (KU); 17 Aug 1966, G.F. Knowlton, 1♂ (00134501), 1♀ (00134482) (USNM). ***Larimer Co.:*** Fort Collins, 40.58528° N 105.08389° W, 13 Jul, E.P. Van Duzee, 1♂ (00242543) (CAS). ***Mesa Co.:*** Mesa, 39.17717° N 108.09944° W, 1664 m, 05 Aug 1931, F.C. Hottes, 2♂ (00070085, 00134443) (USNM). ***Mineral Co.:*** Park Creek Campground, 37.59168° N 106.7292° W, 2589 m, 20 Aug 1984, R.L. Blinn, *Salix* sp. (Salicaceae), 1♀ (00242866) (NCSU). ***Montezuma Co.:*** Mancos, 37.345° N 108.28861° W, 2134 m, 03 Jul 1919–07 Jul 1919, unknown, 1♀ (00170139) (AMNH). Mesa Verde National Park, 37.23333° N 108.47917° W, 13 Jul 1930, R.L. Usinger, 1♂ (00119523) (UCB). Mesa Verde National Park, 37.23333° N 108.47917° W, 2134 m, 12 Jul 1930, R.L. Usinger, 1♂ (00119556) (UCB). ***Montrose Co.:*** 25 mi E of Nucla on Uncompahgre Plateau, 38.4255° N 108.4222° W, 2804 m, 14 Aug 1987, J.T. and D.A. Polhemus, 2♂ (00116714, 00116730), 1♀ (00116878) (JTP). 27 mi E of Nucla, 38.26944° N 108.05005° W, 2804 m, 14 Aug 1987, T.J. Henry, *Ligusticum porteri* (Apiaceae), 1♀ (00133729), *Ligusticum porteri* Coult and Rose (Apiaceae), 1♂ (00069922) (USNM). ***Pitkin Co.:*** Aspen, 39.19111° N 106.81694° W, 2438 m, 24 Jul 1919–27 Jul 1919, unknown, 1♀ (00170113) (AMNH). ***Rio Blanco Co.:*** South Fork Campground, 12 mi S of Buford, 39.81373° N 107.61611° W, 06 Aug 1978, J.T. Polhe-

mus, 2♂ (00116873, 00117205) (JTP). ***Routt Co.:*** Fish Creek Falls [Picnic Area], Routt National Forest, 40.48192° N 106.77504° W, 2275 m, 20 Aug 1968, L.A. Kelton, 1♂ (00113328) (CNC). Rabbit Ears Pass, 40.38472° N 106.61111° W, 2865 m, 04 Jul 1978, J.T. Polhemus, 1♂ (00116874) (JTP). Steamboat Springs, 40.485° N 106.83111° W, 2042 m, 15 Jul 1964, H.H. Knight, 1♀ (00291118) (TAMU). Steamboat Springs Strawberry Park nr Hot Springs, 40.485° N 106.83111° W, 05 Aug 1978, J.T. Polhemus, 1♂ (00116875) (JTP). ***San Miguel Co.:*** Placerville, 38.01667° N 108.05278° W, 16 Aug 1925, H.H. Knight, 1♂ (00134442) (USNM). ***Summit Co.:*** Loveland Pass, W slope, 39.66361° N 105.87861° W, 3002 m, 28 Jul 1961, B.H. Poole, 1♂ (00113335) (CNC). ***Unknown co.:*** Colo, 1887, unknown, 1♂ (00116247) (CUIC). **Connecticut:** ***Fairfield Co.:*** Roten Point, 41.05621° N 73.44012° W, 1 m, 15 Jul 1902, H.G. Barber, 1♀ (00069884) (USNM). Winnipauk, 41.1441° N 73.4251° W, 46 m, 16 Jun 1909, A.P. Morse, 1♂ (00170098) (AMNH). ***Litchfield Co.:*** Terryville, 41.67815° N 73.01094° W, 191 m, 22 Jun 1957, R.I. Sailer, 1♂ (00069847) (USNM). ***New Haven Co.:*** Cheshire, 41.49889° N 72.90111° W, 78 m, 20 Jun 1959, J.A. Slater, 1♀ (00108923) (AMNH). ***Unknown co.:*** Conn, unknown, 1♂ (00069916) (USNM). **District of Columbia:** Brightwood, 38.95685° N 77.03889° W, 80 m, 12 Jun 1906, O. Heidemann, 1♂ (00116249) (CUIC). National Arboretum, Washington, 38.90817° N 77.05105° W, 23 May 1982, T.J. Henry and A.G. Wheeler, Jr., *Ambrosia trifida*, 1♂ (00069831) (USNM). Rock Creek, Washington, 38.90817° N 77.05105° W, 27 May 1891, unknown, 1♀ (00116268) (CUIC). Washington DC, 38.89178° N 77.00831° W, 08 Sep 1884, unknown, 1♀ (00069919) (USNM); 04 Jun 1887, unknown, 1♂ (00069914) (USNM); 12 Jun 1888, unknown, 1♂ (00116246) (CUIC); 05 Jun 1891, unknown, 1♂ (00116243), 1♀ (00116243), 1 immature (00116243) (CUIC); 12 Jun 1892, unknown, 1♀ (00069881) (USNM); 20 Jun, unknown, 1♀ (00108955) (AMNH); 22 Jun, unknown, 1♂ (00116252) (CUIC). **Georgia:** ***Fulton Co.:*** near Atlanta, 33.65344° N 84.44937° W, 320 m, 06 May 1899–18 May 1899, J.H. Emerton, 1♂ (00170102) (AMNH). ***Madison Co.:*** Madison County, no specific locality, 34.124° N 83.221° W, 220 m, May 1979, C.L. Smith, 1♂ (USNM). ***Rabun Co.:*** Pine Mountain, 34.94037° N 83.1871° W, 427 m, 15 May 1957, W.R.M. Mason, 1♂ (00113343) (CNC); 25 May 1957, W.R.M. Mason, 1♀ (00113347) (CNC). ***Schley Co.:*** Schley County, no specific locality, 32.238° N 84.309° W, 174 m, May 1979, C.L. Smith, 1♂ (USNM). **Idaho:** ***Bingham Co.:*** Collins, 43.20112° N 112.36674° W, 1366 m, 27 Jul 1898, C.V. Piper, 1♀ (00164905) (USNM). ***Bonner Co.:*** Sandpoint, 48.28547° N 116.55321° W, 636 m, 01 Jul 1932, W. Virgin, 1♀ (00122379) (UID). ***Butte Co.:*** Craters of the Moon National Monument, Little Cottonwood Creek, 43.47618° N 113.58981° W, 1833 m, 27 Aug 1965, D.S. Horning, Jr., 1♀ (00122378) (UID). ***Clark Co.:*** 13 mi E of Kilgore, 44.3995° N 111.81601° W, 1949 m, 15 Jul 1956, W.F. Barr, 1♀ (00122382) (UID). ***Fremont Co.:*** Henrys Lake, 44.59722° N 111.3525° W, 2134 m, 16 Jul 1956, W.F. Barr, 1♀ (00122380) (UID). ***Latah Co.:*** Potlatch, 46.91609° N 116.90313° W, 759 m, 23 Jul 1938, J.W. Zukel, 1♀ (00122376) (UID). ***Power Co.:*** American Falls, 42.78611° N 112.85361° W, 05 Aug 1972, L.A. Kelton, *Artemisia* sp., 2♂ (00113329, 00113952) (CNC). **Illinois:** ***Adams Co.:*** Grandview, 39.544° N 87.843° W, 69 m, 24 Jun 1932, Frison and Mohr, 1♂ (00243549) (INHS). Quincy, 39.8886° N 91.36° W, 189 m, 23 May 1948, J.P. Nielson, 1♂ (00243519) (INHS); 30 May 1949, G.L. Nielson, 1♀ (00243520) (INHS); 03 Jun 1950, J.P. Nielson, 1♂ (00243518) (INHS). ***Calhoun Co.:*** Hardin, 39.15667° N 90.61778° W, 05 Jun 1932–09 Jun 1932, H.L. Dozier, 1♀ (00243560) (INHS). ***Cass Co.:*** Beardstown, 40.0221° N 90.4289° W, 137 m, 10 Jun 1932, Ross and Mohr, 1♂ (00243544) (INHS). Bluff Springs, 39.98783° N 90.34596° W, 150 m, 10 Jun 1932, Ross and Mohr, 1♂ (00170097) (AMNH), 1♂ (00243516) (INHS). ***Champaign Co.:*** 3.5 mi NE of Mahomet, Nettie Hart Memorial Woods, 40.2057° N 88.366° W, 227 m, 15 Jun 1960, M.W. Sanderson, 1♂ (00243509), 1♀ (00243567) (INHS). Homer, 40.0376° N 87.9496° W, 203 m, 10 Jun 1926, T.H. Frison, 1♂ (00243553) (INHS). St. Joseph, 40.1117° N 88.0417° W, 21 Jun

1930, H.H. Ross, 1♂ (00243531) (INHS). Urbana, 40.11056° N 88.20722° W, 20 Jun 1940, W.V. Balduf, 1♀ (00243511) (INHS); 25 Jun 1940, W.V. Balduf, 1♂ (00243510), 1♀ (00243568) (INHS). Urbana, University Woods, 40.0956° N 88.2255° W, 229 m, 01 Jun 1934, unknown, 1♂ (00243536) (INHS). ***Clark Co.:*** Dolson, Rocky Branch (Clarkeville), 39.46778° N 87.76528° W, 25 Jun 1932, Frison and Mohr, 1♂ (00243528) (INHS); 14 Jun 1933, Frison and Ross, 2♀ (00243525, 00243579) (INHS). Marshall, 39.39139° N 87.69361° W, 14 Jun 1933, Frison and Ross, 1♂ (00243551), 1♀ (00243559) (INHS). West Union, 39.21583° N 87.66611° W, 26 Jun 1932, Ross, Dozier, Park, 1♂ (00243534) (INHS). ***Coles Co.:*** Charleston, 39.4684° N 88.1796° W, 205 m, 19 Jun 1930, H.H. Ross, 1♂ (00243548) (INHS); 07 Jun 1931, T.H. Frison, 1♂ (00243550) (INHS). ***Cook Co.:*** Argo, 41.77407° N 87.81184° W, 184 m, 18 Jul 1920, W.J. Gerhard, 1♂ (00134439) (USNM). Palos Park, 41.6764° N 87.8417° W, 198 m, 25 Jun 1916, W.J. Gerhard, 1♀ (00243522) (INHS); 19 Jun 1936, Ross and Mohr, 1♀ (00243521) (INHS). Willow Springs, 41.7287° N 87.87271° W, 213 m, 07 Jun 1903, W.J. Gerhard, 3♂ (00242531–00242533) (CAS), 1♂ (00116244) (CUIC); 24 May 1906, E. Liljeblad, 1♀ (00127437) (UMMC). ***Cumberland Co.:*** Toledo, 39.2632° N 88.23789° W, 171 m, 07 Jul 1950, Ross and Sanderson, 1♀ (00243566) (INHS). ***Hancock Co.:***Hamilton, 40.39639° N 91.33889° W, 16 Jul 1967–17 Jul 1967, L.A. Kelton, 1♂ (00113338) (CNC); 27 Jun 1968, L.A. Kelton, *Ambrosia* sp., 2♂ (00113322, 00114054) (CNC). Warsaw, 40.3651° N 91.4357° W, 168 m, 09 Jun 1932, Ross and Mohr, *Salix* sp. (Salicaceae), 1♂ (00243512) (INHS). ***Hardin Co.:*** Eichorn, Hick's Branch, 37.49111° N 88.40528° W, 13 Jun 1934, DeLong and Ross, 1♀ (00243556) (INHS). Elizabethtown, 37.44583° N 88.305° W, 27 May 1932–31 May 1932, H.L. Dozier, *Robinia pseudoacacia* L. (Fabaceae), 1♂ (00243540), 2♂ (00243515, 00243577) (INHS). ***Henderson Co.:*** Oquawka, 40.93194° N 90.94694° W, 13 Jun 1932, H.L. Dozier, 1♀ (00243557) (INHS). ***Iroquois Co.:*** Sheldon, 40.7692° N 87.56392° W, 208 m, 04 Jun 1932, Frison and Mohr, 2♂ (00243513, 00243576), 1♀ (00243578) (INHS). ***Jackson Co.:*** Carbondale, 37.692° N 89.2395° W, 137 m, 15 May 1910, unknown, 1♂ (00243535) (INHS). Fountain Bluff, 37.68139° N 89.50722° W, 15 May 1932, Frison, Ross, Mohr, 1♂ (00243537) (INHS). Giant City Park, Makanda, 37.6124° N 89.1892° W, 198 m, May 1932, H.L. Dozier, 1♀ (00243558) (INHS). ***Jo Daviess Co.:*** Galena, 42.41667° N 90.42889° W, 30 Jun 1932, Dozier and Mohr, 1♂ (00243554), paratype, 1♀ (00243572) (INHS). ***Johnson Co.:*** Cypress, 37.36505° N 89.01813° W, 119 m, 17 May 1932, H.L. Dozier, 1♂ (00170096) (AMNH), 1♂ (00243514) (INHS). Goreville, 37.5528° N 88.9756° W, 198 m, 13 May 1932, H.L. Dozier, 1♂ (00243529) (INHS). Vienna, 37.4214° N 88.8919° W, 119 m, 18 May 1932, H.L. Dozier, 1♂ (00243517) (INHS). ***Knox Co.:*** Galesburg, 40.95611° N 90.34979° W, 234 m, 07 Jul 1892, Stromberg, 1♂ (00243539) (INHS). ***LaSalle Co.:*** Ottawa, 41.34556° N 88.8425° W, 10 Jun 1942, F.G. Werner, 1♂ (00108921), 1♀ (00108920) (AMNH). ***Lake Co.:*** Ingleside, 42.38002° N 88.1394° W, 230 m, 19 Jun 1973, G. Moinar, 1♀ (00242334) (OSEC). ***Marion Co.:*** Odin, 38.6179° N 89.0606° W, 160 m, 28 May 1910, unknown, 1♂ (00243533) (INHS). ***Massac Co.:*** Metropolis, 37.143° N 88.7117° W, 98 m, 18 May 1932, H.L. Dozier, 1♂ (00243543) (INHS). ***McDonough Co.:*** Macomb, 40.46836° N 90.67307° W, 201 m, 01 Jun 1971, unknown, 1♀ (00242865) (NCSU). ***Mercer Co.:*** Keithsburg, 41.09944° N 90.9425° W, 15 Jun 1932, H.L. Dozier, 1♂ (00243545) (INHS). ***Ogle Co.:*** Grand Detour, Castle Rock, 41.89667° N 89.41167° W, 02 Jul 1932, Dozier and Mohr, 1♂ (00243538) (INHS). ***Piatt Co.:*** 1 mi N of White Heath, 40.08614° N 88.51284° W, 220 m, 16 Jun 1963, D.R. Smith, 1♂ (00118149) (ORSU). Monticello, 40.02778° N 88.57333° W, 201 m, 28 Jun 1932, T.H. Frison, *Ambrosia* sp., 1♂ (00243530) (INHS); 28 Jun 1968, L.A. Kelton, 1♂ (00113323) (CNC). White Heath, 40.0873° N 88.5057° W, 213 m, 29 May 1933, H.H. Ross, 1♂ (00243552) (INHS). ***Pope Co.:*** Golconda, 37.36722° N 88.48638° W, 108 m, 22 Jun 1932, Ross, Dozier, Park, 1♂ (00243546) (INHS). ***Rock Island Co.:*** Rock Island, 41.51027° N 90.55814° W, 170 m, Walsh, 1♀ (00069918) (USNM). ***Stephenson Co.:*** Freeport, 42.29667° N 89.62111° W, 04 Jul 1917, unknown, 1♂ (00243542) (INHS).

Tazewell Co.: 3 mi N of Mackinaw along Pather Creek, 40.56203° N 89.3325° W, 179 m, 10 Jun 1969, Webb and Marlin, 1♂ (00243564) (INHS). ***Union Co.:*** Anna, 37.4594° N 89.2572° W, 183 m, 06 May 1925, T.H. Frison, 1♂ (00243541) (INHS). Jonesboro, 37.45172° N 89.26814° W, 19 May 1932, H.L. Dozier, 1♂ (00243532) (INHS). ***Vermilion Co.:*** Muncie, cattail bog, 40.1181° N 87.848° W, 198 m, 27 Jun 1937, B.D. Burks, 1♀ (00243524) (INHS). Oakwood, 40.11611° N 87.77833° W, 27 Jun 1937, B.D. Burks, 1♀ (00243523) (INHS). ***Washington Co.:*** Du Bois, 38.2239° N 89.2122° W, 152 m, 22 May 1917, unknown, 1♀ (00243526) (INHS). ***Will Co.:*** Joliet, 41.525° N 88.08167° W, 09 Jun 1933, Mohr and Townsend, 1♀ (00170117) (AMNH). **Indiana:** ***Brown Co.:*** Yellowwood Forest, nr Belmont, 39.1611° N 86.3425° W, 25 May 1963, F.N. Young, 5♂ (00243728–00243732), 3♀ (00243733–00243735) (FSCA). ***Cass Co.:*** Logansport, 40.75444° N 86.35667° W, 05 Jul 1979–06 Jul 1979, T.J. Henry, *Polymnia canadensis*, 1♂ (00069846) (USNM). ***Clark Co.:*** Clark County, 38.29567° N 85.73149° W, 136 m, 13 Jun 1932–14 Jun 1932, B.E. Montgomery, 1♂ (00127389) (UMMC). Henryville, 38.5417° N 85.7677° W, 58 m, 15 Jul 1931, unknown, 1♀ (00127443) (UMMC). Henryville, Clark Co. State Forest, 38.5541° N 85.83° W, 61 m, 12 Jun 1933, B.E. Montgomery, 1♂ (00127411), 1♀ (00127444) (UMMC). ***Dubois Co.:*** Portersville, East Fork River, 38.5009° N 86.9742° W, 137 m, 02 Jun 1936, Mohr and Burke, 1♂ (00243547) (INHS). ***Howard Co.:*** Howard County, no specific locality, 40.43906° N 86.09292° W, 251 m, 16 Jun 1981, D.A. Rider, 1♀ (00242995) (DAR). NW Howard County, 40.52167° N 86.3252° W, 23 Jun 1986–24 Jun 1986, D.A. Rider, 16♂ (00242964–0024966, 00242968–00242980), 12♀ (00242981, 00242983, 00242985–00242994) (DAR). ***Knox Co.:*** Knox County, 38.67833° N 87.51607°W, 128 m, 11 Jul 1929, B.E. Montgomery, 1♀ (00127442) (UMMC). **Iowa:** ***Boone Co.:*** Boone County, 42.05972° N 93.88° W, 22 Jun 1962, J.C. Schaffner, 1♀ (00291130), 1♂ (00093815) (TAMU). Fraser, 42.13031° N 93.97858° W, 274 m, 12 Jul 1957, J.C. Schaffner, 1♀ (00291132) (TAMU). Ledges State Park, 41.98333° N 93.88667° W, 26 Jun 1951, J.A. Slater, 1♂ (00108946), 1♀ (00108947) (AMNH); 26 Jun 1953, J.C. Schaffner, 1♀ (00291131) (TAMU); 04 Jul 1953, J.C. Schaffner, 1♂ (00291114) (TAMU); 14 Jun 1960, M.C. Cord, Jr., 1♀ (00069871) (USNM); 31 May 1962, J.C. Schaffner, 1♀ (00291133) (TAMU). ***Cedar Co.:*** 5 mi N of Wilton, 41.66227° N 91.03541° W, 233 m, 10 Jun 1981, D.R. Smith, 1♂ (00069830) (USNM). ***Clay Co.:*** nr Peterson, Wanata State Park, 42.9114° N 95° W, 372 m, 14 Jun 1981, J.T. Polhemus, 1♂ (00116861) (JTP). ***Clinton Co.:*** Clinton, 41.84444° N 90.18861° W, 25 May 1955, R. Frye, 1♂ (00242960) (DAR). Dewitt Park, 41.83944° N 90.19111° W, 21 Jun 1928, G.S. Walley, 1♀ (00113838) (CNC). ***Dickinson Co.:*** 5 mi W of Milford, 43.32472° N 95.24908° W, 18 Jun 1963, J.C. Schaffner, 1♂ (00291113) (TAMU). Iowa Lakeside Laboratory, 43.37917° N 95.18611° W, 15 Jun 1963, J.C. Schaffner, 1♀ (00093750) (TAMU); 17 Jun 1963, J.C. Schaffner, 1♀ (00093751) (TAMU). Silver Lake, T100N R38W, 43.44849° N 95.34499° W, 457 m, 08 Jul 1963, J.C. Schaffner, 1♀ (00093737) (TAMU). ***Hamilton Co.:*** Jewell, 42.3093° N 93.6323° W, 317 m, 10 Jul 1926, H.M. Harris, 2♀ (00069900–00069901) (USNM). ***Hancock Co.:*** Pilot Knob State Park, Deadmans Lake, 43.24889° N 93.56349° W, 414 m, 15 Jun 1960, S. Madina Gaud, 1♂ (00069842) (USNM). ***Henry Co.:*** 4 mi S of Mount Pleasant, 40.9309° N 91.5387° W, 213 m, 21 Jun 1966, J.C. Schaffner, 1♂ (00291108), 1♀ (00291121) (TAMU). 5 mi SW of Mount Pleasant, 40.91249° N 91.62541° W, 30 Jun 1976, J.C. Schaffner, 1♂ (00093730) (TAMU). 5 mi S of Mount Pleasant, 40.89428° N 91.54695° W, 186 m, 20 Jun 1966, J.C. Schaffner, 1♀ (00291119) (TAMU). 7 mi SW of Mount Pleasant, 40.89205° N 91.65243° W, 04 Jul 1964, J.C. Schaffner, 1♂ (00291109), 1♀ (00291122) (TAMU); 19 Jun 1966, J.C. Schaffner, 1♂ (00291107), 1♀ (00291123) (TAMU). Big Cedar Creek, 40.95281° N 91.58738° W, 198 m, 03 Jun 1964, J.C. Schaffner, 1♀ (00093766) (TAMU). Oakland Mills State Park, 40.93611° N 91.61639° W, 31 May 1963, J.C. Schaffner, 1♂ (00291110), 1♀ (00291129) (TAMU). ***Linn Co.:*** Cedar Rapids, 42.00833° N 91.64389° W, 18 Jun 1966, J.C. Schaffner, 1♂ (00291111), 1♀

(00291124) (TAMU). Cedar Rapids, Arboretum, 41.99172° N 91.63876° W, 244 m, 15 Jun 1995, G.P. Frostad, 1♀ (00127572) (UMRM). Cedar Rapids, Sac and Fox Trail, 41.99013° N 91.59377° W, 224 m, 14 Jun 1995, G.P. Frostad, 1♂ (00243123) (UMRM). Palisades-Kepler State Park, 41.90751° N 91.50629° W, 08 Jul 1950, Laffoon, Slater, Hicks, 3♀ (00108882, 00108932–00108933) (AMNH). ***Madison Co.:*** Pammel State Park, 41.29045° N 94.07014° W, 314 m, 04 Jul 1950, J. Laffoon and E. Hicks, 1♀ (00108936) (AMNH). ***Monona Co.:*** Preparation Canyon State Park, 41.88333° N 95.91666° W, 400 m, 06 Jun 1960, J.C. Schaffner, 1♀ (00069876) (USNM). Turin, nr loess bluff, 42.03333° N 95.95° W, 320 m, 06 Jun 1960, J.C. Schaffner, 1♀ (00291120) (TAMU); 06 Jun 1960, N. Austin, 1♂ (00069840) (USNM). ***Muscatine Co.:*** Muscatine, 41.44027° N 91.01887° W, 189 m, 14 Jun 1910, W.D. Mecum, *Conyza canadensis*, 2♀ (00164917–00164918) (USNM). ***Palo Alto Co.:*** 5 mi NW of Ruthven, 43.13771° N 94.95289° W, 16 Jun 1949, J.A. Slater, 2♂ (00108928–00108929), 2♀ (00108930–00108931) (AMNH). ***Polk Co.:*** Des Moines, 41.60054° N 93.60911° W, 266 m, 04 Jul 1971, B.M. O'Connor, 1♀ (00127481) (UMMC). Mitchellville, Thomas Mitchell County Park, 41.66861° N 93.3575° W, 29 Jun 1980, K. and R. Schmidt, 1♂ (00107890), 1♂ (00170093) (AMNH). ***Scott Co.:*** Pleasant Valley, 41.56972° N 90.42306° W, 05 Jul 1928, G.S. Walley, 1♀ (00113344) (CNC). ***Story Co.:*** Ames, 42.03472° N 93.61972° W, 25 May 1925, H.H. Knight, 1♂ (00118455) (TAMU); 17 Jun 1925, W.E. Shull, 2♂ (00122373–00122374) (UID); 19 Jun 1925, G.H., 1♂ (00113341) (CNC); 05 Jun 1926, H.M. Harris, 1♀ (00069899) (USNM); 14 Jun 1926, H.M. Harris, 1♂ (00069898) (USNM); 03 Jun 1927, H.G. Johnston, 1♂ (00093740) (TAMU); 04 Jun 1927, H.M. Harris, 1♂ (00093741) (TAMU); 14 Jun 1927, S.C.V., 1♂ (00113342) (CNC); 17 Jun 1927, H.M. Harris, 1♂ (00093809) (TAMU); 21 Jun 1927, H.H. Knight, 1♂ (00093811) (TAMU); 24 Jun 1927, H.M. Harris, 1♂ (00093812) (TAMU); 25 Jun 1927, H.G. Johnston, 1♂ (00093813) (TAMU); 13 Jul 1927, H.H. Knight, 1♂ (00133721) (USNM); 18 Jul 1927, H.H. Knight, 1♂ (00093810) (TAMU); 25 May 1928, G.S. Walley, 1♂ (00113340) (CNC); 18 Jun 1928, H.H. Knight, 1♂ (00113156) (CNC); 30 May 1929, Hastabe, 1♂ (00113339) (CNC); 16 Jun 1930, H.G. Johnston, 1♀ (00116867) (JTP), 1♂ (00093743) (TAMU); 05 Jun 1949, W.L. Downes, 1♂ (00118150) (ORSU); 25 Jun 1950, J.A. Slater, 1♀ (00108949) (AMNH); 22 Jun 1951, J.F. Kagy, 1♀ (00121809) (CAS); 29 Jun 1951, J.F. Kagy, 1♀ (00121810) (CAS); 08 Aug 1952, Jean Laffoon, 2♀ (00108951–00108952) (AMNH); 17 Jun 1953, J.A. Slater, 1♀ (00108950) (AMNH); 13 Jun 1954, J.A. Slater, 1♂ (00108948) (AMNH); 25 Jun 1962, J.C. Schaffner, *Ambrosia trifida*, 1♀ (00291125) (TAMU); 03 Jul 1962, J.C. Schaffner, *Ambrosia trifida*, 1♀ (00291126) (TAMU). Ames, 42.03472° N 93.61972°W, 05 Jun 1949, J.A. Slater, 1♂ (00291105), *Ambrosia trifida*, 1♂ (00291106) (TAMU). Ames, Exp. Station, 42.03472° N 93.61972° W, 23 Jun 1892, J.T.R., 1♀ (00069869) (USNM). ***Warren Co.:*** 1.5 mi E of Hartford, 41.45944° N 93.37578° W, 05 Jul 1976–06 Jul 1976, J.C. Schaffner, 2♀ (00093738, 00093767) (TAMU). 3 mi NE of Hartford, 41.4901° N 93.36377° W, 03 Jun 1994, J.C. Schaffner, 1♂ (00291112), 1♂ (00093814), 1♀ (00291138) (TAMU). ***Woodbury Co.:*** Sioux City, 42.50028° N 96.39389° W, C.N. Ainslie, 1♀ (00134494) (USNM); 11 Jun 1949, Slater and Laffoon, 1♀ (00108953) (AMNH). **Kansas:** ***Atchison Co.:*** Cummings, 39.46274° N 95.24207° W, 298 m, Jun 1931, Beck and Call, 1♀ (00069874) (USNM). ***Clark Co.:*** 12 mi W and 5 mi S of Columbus, 37.09409° N 95.03191° W, 240 m, 08 Jun 1976–09 Jun 1976, G.F. Hevel, 1♂ (00069828) (USNM). ***Coffey Co.:*** Coffey County, no specific locality, 38.19447° N 95.74276° W, 315 m, 19 Jun 1933, Herbert Darby, 1♀ (00117890) (KU). ***Douglas Co.:*** 6 mi NE of Lawrence, Rockefeller Tract, 39.033° N 95.15604° W, 05 Jun 1976, T.W. Oldham, 1♀ (00291134), 1♂ (00093734) (TAMU). Douglas County, no specific locality, 38.86667° N 95.23333° W, 274 m, 21 Jun 1924, P.B. Lawson, 1♂ (00117878) (KU); 06 Jun 1944, R.H. Beamer, *Ambrosia trifida*, 1♂ (00117875) (KU); 26 Jun 1975, T.W. Oldham, 1♂ (00093765) (TAMU). Lawrence, 38.97167° N 95.235° W, 04 Jun 1951, Paul P. Cook, 1♂ (00119525)

(UCB). ***Hodgeman Co.:*** Hodgeman County, no specific locality, 38.08444° N 99.89305° W, 703 m, 17 Jul 1917, unknown, 1♂ (00117879) (KU). ***Johnson Co.:*** Johnson County, no specific locality, 38.8814° N 94.81913° W, 315 m, 1915, R.H. Beamer, 1♀ (00117890) (KU). ***Leavenworth Co.:*** Leavenworth County, 39.31111° N 94.92222° W, 30 Jun 1924, R.H. Beamer, 1♂ (00117883) (KU). ***Marion Co.:*** Marion County, no specific locality, 38.34835° N 97.01725° W, 400 m, 21 Jun 1923, Clarence Bare, 1♀ (00117932) (KU). ***Pottawatomie Co.:*** Onaga, 39.48889° N 96.16972° W, 20 May 1902, unknown, 2♀ (00069920–00164921) (USNM). ***Rice Co.:*** Rice County, 38.35° N 98.2000° W, 03 Jul 1923, L.C. Woodruff, 1♂ (00117884) (KU). ***Riley Co.:*** Manhattan, 39.18361° N 96.57139° W, 22 Jun 1968, G.F. Hevel, 1♂ (00069895) (USNM). Riley County, no specific locality, 39.29449° N 96.81672° W, 399 m, May, F. Marlatt, 2♀ (00164944, 00164948) (USNM); 24 May, E.A. Popenoe, 1 immature (00164959) (USNM); 25 May, Kimball, 1♀ (00164942) (USNM); Jun, F. Marlatt, 1♀ (00164950) (USNM); Jun, E.A. Popenoe, 1♀ (00164949) (USNM); 10 Jun, F. Marlatt, 1♀ (00164956) (USNM); 15 Jun, F. Marlat, 2♀ (00164941, 00164943) (USNM); 18 Jun, F. Marlatt, 1♀ (00164952) (USNM); 22 Jun, F. Marlatt, 1♀ (00164958) (USNM); 29 Jun, Kimball, 1♀ (00164951) (USNM); 07 Jul, E.A. Popenoe, 1♀ (00164954) (USNM); 17 Jul, E.A. Popenoe, 2♀ (00164955, 00164957) (USNM). ***Shawnee Co.:*** 11 mi E of Grove, 39.15808° N 95.6639° W, 308 m, 16 May 1940, R.H. Beamer, 1♂ (00117877) (KU). Grove, 39.1675° N 95.85915° W, 287 m, 16 May 1940, R.H. Beamer, 1♂ (00117876) (KU). Topeka, 39.04833° N 95.67804° W, 288 m, 04 Jun, E.A. Popenoe, 1♀ (00164953) (USNM). ***Woodson Co.:*** Yates Center, 37.86908° N 95.74181° W, 324 m, 16 May 1989, W.F. Barr, 1♀ (00122377) (UID). **Kentucky:** ***Anderson Co.:*** Rt 248, 2.8 mi N of Rt 62, Taylorville Lake, 37.98578° N 85.13851° W, 232 m, 06 Jun 1985, T.J. Henry and A.G. Wheeler, Jr., *Ambrosia trifida*, 1♂ (00134054) (USNM). ***Boone Co.:*** Big Bone Lick State Park, 38.88861° N 84.75194° W, 22 Jun 1982, R. Wharton, 1♂ (00093732) (TAMU). ***Jefferson Co.:*** Louisville, 38.21537° N 85.76345° W, 139 m, 22 May 1948, C. Irvin, 1 immature (UK); 19 Jul 1966, K. Groeppe, 1 immature (DBUL). **Louisiana:** ***Natchitoches Co.:*** Natchitoches Parish, no specific locality, 31.75576° N 93.08829° W, 30 m, 08 May 1915, K.P. Schmidt, 2♂ (00134421–00134422) (USNM). **Maine:** ***Kennebec Co.:*** Pittston, 44.22174° N 69.7556° W, 25 m, 11 Jul, N. Banks, 1♂ (00170103) (AMNH). Rt 135 nr Readfield, 44.36285° N 69.91664° W, 125 m, 01 Jul 1989, T.J. Henry and A.G. Wheeler, Jr., *Solidago* sp., 1♂ (00069827) (USNM). Waterville, Colby College, 44.56477° N 69.6648° W, 80 m, 02 Jul 1989, T.J. Henry and A.G. Wheeler, Jr., *Solidago* sp., 1♂ (00069896) (USNM). ***Knox Co.:*** Hope, 44.26508° N 69.15893° W, 108 m, 19 Jun 1986, Larochelle and Lariviere, 1♂ (00113327) (CNC). ***Lincoln Co.:*** Waldoboro, 44.09599° N 69.37846° W, 6 m, Stover, 1♂ (00242524) (CAS). ***Oxford Co.:*** Paris, 44.25972° N 70.50055° W, 246 m, 04 Jul 1915, C.A. Frost, 1♂ (00242523) (CAS); 03 Jul 1933, unknown, 1♀ (00164907) (USNM). nr Bethel, 44.40417° N 70.79111° W, 07 Jul, B. Banks, 1♂ (00170101) (AMNH). ***Washington Co.:*** Machias, 44.715° N 67.46111° W, 26 m, 26 Jul 1906, A.P. Morse, 1♂ (00170104) (AMNH); 22 Jul 1909, C.W. Johnson, 1♂ (00242522) (CAS). **Maryland:** ***Allegany Co.:*** Little Orleans Campground, 39.63181° N 78.39227° W, 177 m, 06 Jun 1998, C.R. Bartlett, 1♂ (00242863) (NCSU). ***Calvert Co.:*** Chesapeake Beach, 38.6854° N 76.5386° W, 6 m, 24 Jun 1923, J.R. Mallock, 1♀ (00164923) (USNM). ***Frederick Co.:*** Thurmont, 39.62025° N 77.40834° W, 146 m, 20 Jun 1926, H.H. Knight, 1♂ (00134440), 1♀ (00134441) (USNM). ***Harford Co.:*** Fallston, 39.51434° N 76.41119° W, 142 m, 27 Jun 1965, L.L. Deitz, 1♂ (00242862) (NCSU). ***Montgomery Co.:*** 4 mi SW of Ashton, 39.09134° N 77.01278° W, 19 May 1985, G.F. and J.F. Hevel, 2♂ (00069844, 00134438) (USNM); 24 May 1985, G.F. and J.F. Hevel, 1♀ (00069879) (USNM); 23 May 1986, G.F. and J.F. Hevel, 1♂ (00069843) (USNM); 17 Jun 1986, G.F. and J.F. Hevel, 1♀ (00069878) (USNM). Cabin John Bridge, 38.97528° N 77.15833° W, 25 Jul, unknown, 1♀ (00116260) (CUIC). Forest Glen, 39.01455° N 77.0547° W, 96 m, 06 Jun 1914, O. Heidemann, Light Trap, 1♀ (00116261) (CUIC). Great Falls, 39.00222° N

77.24639° W, 11 Jun 1904, unknown, 1♂ (00116250) (CUIC). Kensington, 39.02567° N 77.07637° W, 87 m, 17 Jun 1961, J.W. Fitzgerald, 1♀ (00069877) (USNM). Plummers Island, 38.97049° N 77.1763° W, 15 Jun 1902, H.S. Barber, 1♂ (00069903) (USNM); 06 Jun 1905, D.H. Clemons, 1♀ (00069906) (USNM); 08 Jun 1905, unknown, 1♂ (00116248) (CUIC); 15 Jun 1905, H.S. Barber, 1♀ (00069908) (USNM); 23 Jun 1905, H.S. Barber, 1♀ (00069905) (USNM); 27 Jun 1905, E.A. Schwarz, 1♂ (00069902) (USNM); 27 Jun 1905, D.H. Clemons, 1♀ (00069907) (USNM); 17 Jun 1906, W.L. McAtee, 1♂ (00069904) (USNM); 20 Jun 1907, A.K. Fisher, 1♀ (00069910) (USNM); 02 Jun 1908, E.A. Schwarz, 1♀ (00069909) (USNM). Silver Spring, 38.99056° N 77.02639° W, 02 Jun 1967, P.W. Oman, 1♂ (00118151) (ORSU). ***Prince George's Co.:*** Bladensburg, 38.93926° N 76.93416° W, 06 Jul 1906, unknown, 1♂ (00116254) (CUIC); 06 Jul 1907, unknown, 1♂ (00116253) (CUIC). Hyattsville, 38.95594° N 76.94553° W, 32 m, 02 Aug 1907, unknown, 1♂ (00116255) (CUIC). Lanham, 38.96694° N 76.86222° W, 25 Jun 1967, Paul Oman, 1♂ (00118153) (ORSU). Marlboro, 38.65612° N 76.68248° W, 4 m, 19 Jun 1916, R.C. Shannon, 1♂ (00134437) (USNM). **Massachusetts:** ***Essex Co.:*** Beach Bluff, 42.47917° N 70.88611° W, 14 Jul 1914, H.M. Parshley, 2♀ (00242551–00242552) (CAS). **Michigan:** ***Alger Co.:*** Autrain, 46.29495° N 86.7546° W, 270 m, 28 Jul 1960, L.A. Kelton, Whitney, 1♀ (00113157) (CNC). ***Antrim Co.:*** Antrim County, no specific locality, 44.89001° N 85.07394° W, 340 m, 04 Jul 1950, R.R. Dreisbach, 1♀ (00127431) (UMMC). Antrim County, no specific locality, 44.89001° N 85.07394° W, 340 m, 04 Jul 1959, R. and K. Dreisbach, 1♀ (00069887) (USNM). ***Benzie Co.:*** Benzie County, no specific locality, 44.71833° N 86.11648° W, 184 m, 04 Jul 1957, R. and K. Dreisbach, 1♂ (00069857) (USNM). ***Berrien Co.:*** E.K. Warren Preserve, Sawyer Dunes, 41.91465° N 86.59534° W, 215 m, 09 Jul 1920, R.F. Hussey, 1♀ (00127416) (UMMC); 11 Jul 1920, R.F. Hussey, 1♂ (00127392) (UMMC); 12 Jul 1920, R.F. Hussey, 1♀ (00127417) (UMMC); 29 Jul 1920, R.F. Hussey, 1♀ (00127418) (UMMC). E.K. Warren Preserve, Warren Woods, 41.83599° N 86.63605° W, 195 m, 19 Jun 1919, R.F. Hussey, 1♀ (00127414) (UMMC); 20 Jun 1919, R.F. Hussey, 1♂ (00127390) (UMMC); 21 Jun 1919, R.F. Hussey, 1♂ (00127391) (UMMC); 26 Jun 1919, R.F. Hussey, 1♀ (00127419) (UMMC); 29 Jun 1919, R.F. Hussey, 1♀ (00127415) (UMMC). Lakeside, 41.84915° N 86.6678° W, 194 m, 13 Jul 1920, R.F. Hussey, 1♂ (00127393) (UMMC). ***Cheboygan Co.:*** Burt Lake Bog, 45.54363° N 84.67566° W, 188 m, 06 Jul 1919, E.P. Butler, 1♂ (00127404) (UMMC). Cheboygan County, no specific locality, 45.64694° N 84.47444° W, 25 Jul 1932, J. Leonard, 1♀ (00127435) (UMMC); 23 Jul 1955, R.R. Dreisbach, 1♂ (00069858) (USNM). Douglas Lake, 45.58111° N 84.69694° W, 24 Jul 1926, H.B. Hungerford, 1♂ (00117801) (KU). Douglas Lake, Bessey Creek, 45.57966° N 84.74119° W, 216 m, 29 Jul 1925, H.B. Hungerford, 1♂ (00117885) (KU). ***Clare Co.:*** Clare County, no specific locality, 43.81944° N 84.76861° W, 01 Jul 1945, R.R. Dreisbach, 1♂ (00127401) (UMMC); 08 Jul 1950, R.R. Dreisbach, 1♀ (00127425) (UMMC). ***Clinton Co.:*** Clinton County, no specific locality, 42.79587° N 84.53137° W, 265 m, 21 Jun 1952, R.R. Dreisbach, 1♀ (00127433) (UMMC). ***Crawford Co.:*** Crawford County, No specific locality, 44.66° N 84.6000° W, 10 Jul 1959, R. and K. Dreisbach, 1♂ (00069859) (USNM). ***Delta Co.:*** Delta County, No specific locality, 45.9000° N 86.91° W, 08 Aug 1953, R.R. Dreisbach, 1♂ (00127407) (UMMC); 02 Jul 1955, R.R. Dreisbach, 1♂ (00069861) (USNM); 03 Jul 1955, R.R. Dreisbach, 1♀ (00069889) (USNM). ***Dickinson Co.:*** Dickinson County, 46.00051° N 87.8668° W, 391 m, 01 Jul 1955, R.R. Dreisbach, 1♂ (00069860) (USNM). ***Gladwin Co.:*** Gladwin County, no specific locality, 43.98083° N 84.48639° W, 25 Jun 1959, R.R. Dreisbach, 1♂ (00127406) (UMMC). ***Gogebic Co.:*** Gogebic County, no specific location, 46.35245° N 89.50265° W, 467 m, 29 Jun 1955, R.R. Dreisbach, 1♂ (00069862) (USNM). Sucker Lake, 46.3174° N 89.23928° W, 486 m, 14 Jul 1938, J.R. Bailey, 1♂ (00127395) (UMMC). ***Grand Traverse Co.:*** Grand Traverse County, no specific locality, 44.68334° N 85.46673° W, 285 m, 14 Jun 1940, R.R. Dreisbach, 1♂ (00127399) (UMMC). ***Gratiot Co.:*** Gratiot

County, no specific locality, 43.28336° N 84.6000° W, 235 m, 21 Jun 1952, R.R. Dreisbach, 1♂ (00127397) (UMMC). ***Ionia Co.:*** Ionia County, no specific locality, 42.98725° N 85.07112° W, 218 m, 12 Jul 1952, R.R. Dreisbach, 1♀ (00127428) (UMMC); 14 Jul 1957, R. and K. Dreisbach, 1♂ (00069865) (USNM). ***Mackinac Co.:*** Mackinac County, no specific locality, 46.08335° N 85.00062° W, 232 m, 04 Jul 1955, R.R. Dreisbach, 1♂ (00069854) (USNM). ***Manistee Co.:*** Manistee County, no specific locality, 44.24447° N 86.32425° W, 202 m, 22 Jun 1957, R. and K. Dreisbach, 1♀ (00069886) (USNM); 05 Jul 1957, R. and K. Dreisbach, 1♂ (00069852) (USNM). ***Mecosta Co.:*** 2 mi W of Remus [off of] — 20, 43.59698° N 85.18518° W, 309 m, 02 Jul 1957, T.E. Moore, *Alnus incana* ssp. *rugosa* (Du Roi) Clausen (Betulaceae), 1♀ (00127420) (UMMC). Mecosta County, no specific locality, 43.61536° N 85.23721° W, 291 m, 25 Jul 1951, R.R. Dreisbach, 1♂ (00127405) (UMMC). ***Midland Co.:*** Midland County, no specific locality, 43.61556° N 84.24722° W, 29 Jun 1941, R.R. Dreisbach, 1♀ (00133817) (USNM); 05 Jul 1953, R.R. Dreisbach, 1♀ (00127445) (UMMC); 09 Jul 1957, R. and K. Dreisbach, 1♂ (00069851) (USNM); 28 Jun 1958, R.R. Dreisbach, 1♂ (00069850) (USNM). ***Missaukee Co.:*** Missaukee County, no specific locality, 44.33529° N 85.21505° W, 381 m, 11 Jul 1959, R. and K. Dreisbach, 1♂ (00069853) (USNM). ***Monroe Co.:*** Monroe County, no specific locality, 41.91851° N 83.39853° W, 179 m, 08 Jun 1952, R.R. Dreisbach, 1♂ (00127402) (UMMC); 12 Jun 1957, R. and K. Dreisbach, 1♂ (00069855) (USNM). ***Montmorency Co.:*** Montmorency County, no specific locality, 45.03334° N 84.13334° W, 333 m, 12 Jul 1923, T.H. Hubbell, 1♂ (00127394), 1♀ (00127421) (UMMC). ***Ogemaw Co.:*** Ogemaw County, no specific locality, 44.29002° N 84.28362° W, 317 m, 26 Jun 1941, R.R. Dreisbach, 1♀ (00127432) (UMMC). ***Ontonagon Co.:*** Ontonagon County, 46.87111° N 89.31389° W, 28 Jun 1955, R.B. Dreisbach, 1♀ (00069888) (USNM). ***Osceola Co.:*** Osceola County, no specific locality, 43.98335° N 85.33338° W, 401 m, 29 Jun 1957, R. and K. Dreisbach, 1♂ (00069856) (USNM). ***Otsego Co.:*** Otsego County, no specific locality, 44.9664° N 84.69975° W, 390 m, 07 Jul 1959, R. and K. Dreisbach, 1♂ (00069863) (USNM). ***Roscommon Co.:*** Roscommon County, no specific locality, 44.33335° N 84.60002° W, 353 m, 22 Jun 1958, R. and K. Dreisbach, 1♂ (00069864) (USNM). ***Saginaw Co.:*** Saginaw County, no specific locality, 43.41946° N 83.95081° W, 176 m, 18 Jun 1952, R.R. Dreisbach, 1♂ (00127408) (UMMC). ***Schoolcraft Co.:*** Schoolcraft County, no specific locality, 46.21667° N 86.2000° W, 18 Jun 1955, R.R. Dreisbach, 1♂ (00069866) (USNM). ***Shiawassee Co.:*** Shiawassee County, no specific locality, 42.95003° N 84.14997° W, 231 m, 21 Jun 1952, R.R. Dreisbach, 1♂ (00127403), 1♀ (00127427) (UMMC). ***St. Clair Co.:*** Algonac State Park, T3N R16E Sec 34NE, 42.6506° N 82.53071° W, 176 m, 05 Jul 1995, Daria Hyde, 1♀ (00127531) (MSU). ***Tuscola Co.:*** Tuscola County, no specific locality, 43.32641° N 83.65718° W, 192 m, 27 Jun 1940, R.R. Dreisbach, 1♂ (00127398) (UMMC). ***Van Buren Co.:*** Paw Paw Lake, 42.21641° N 85.896° W, 216 m, 06 Jul 1906, E. Liljeblad, 1♂ (00127396) (UMMC); 07 Jul 1906, E. Liljeblad, 1♀ (00127423) (UMMC); 08 Jul 1906, E. Liljeblad, 1♀ (00127424) (UMMC). ***Washtenaw Co.:*** Ann Arbor, 42.27793° N 83.73059° W, 273 m, 27 Jun 1921, R.F. Hussey, Light Trap, 1♀ (00127429) (UMMC); 12 Jul 1982–21 Jul 1982, R. Wharton, 1♂ (00093729) (TAMU). Steere's Swamp, 42.38998° N 84.15384° W, 280 m, 15 Jun 1918, R.F. Hussey, 1♀ (00127434) (UMMC); 28 Jun 1920, R.F. Hussey, 1♀ (00127426) (UMMC). Washtenaw County, no specific locality, 42.25059° N 83.84994° W, 286 m, 10 Jun 1919, R.F. Hussey, 1♀ (00127422) (UMMC); 12 Jun 1957, R.R. Dreisbach, 1♂ (00069868) (USNM). ***Wexford Co.:*** Wexford County, no specific locality, 44.33334° N 85.56673° W, 426 m, 17 Jul 1940, R.R. Dreisbach, 1♂ (00127400) (UMMC); 30 Jun 1957, R. and K. Dreisbach, 1♂ (00069867) (USNM). **Minnesota:** ***Beltrami Co.:*** 2 mi N of Hines, Rt 71, 47.68333° N 94.63333° W, 430 m, 23 Jul 1995, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 2♂ (00069829, 00134055) (USNM). ***Crow Wing Co.:*** 5 mi SE of Pequit Lakes, 46.62568° N 94.26841° W, 391 m, 06 Jul 1957, J.L. Laffoon, 1♂ (00069841)

(USNM). ***Hubbard Co.:*** 9 mi S of Lake George on Rt 3, 47.10294° N 94.98039° W, 475 m, 22 Jun 1995, T.J. Henry and A.G. Wheeler, Jr., 1♂ (00069892) (USNM). ***Koochiching Co.:*** International Falls, 48.6000° N 93.41666° W, 337 m, 26 Jun 1995, T.J. Henry and A.G. Wheeler, Jr., *Solidago* sp., 1♂ (00134056) (USNM). ***Lake of the Woods Co.:*** Koochiching Co. line, Rapid River, Rt 11, 48.68333° N 94.43333° W, 330 m, 25 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00134058) (USNM). ***Norman Co.:*** Norman County, 47.33333° N 96.46667° W, 19 Jun 1920, unknown, 1♂ (00134448) (USNM); 20 Jun 1922, A.A. Nichol, 1♂ (00134450) (USNM). ***Ramsey Co.:*** White Bear, 45.07039° N 93.00824° W, 283 m, 10 Jul 1921, Wm. E. Hoffmann, 1♂ (00134449) (USNM). ***Redwood Co.:*** Redwood Falls, 44.53333° N 95.11666° W, 313 m, 19 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♂ (00134057) (USNM). ***Rice Co.:*** Hunt Lake, 9 mi W of Faribault, 44.33246° N 93.45265° W, 332 m, 18 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, *Solidago* sp., 1♀ (00133728) (USNM). Northfield, Carleton College, 44.45° N 93.05° W, 293 m, 17 Jun 1995, T.J. Henry and A.G. Wheeler, Jr., *Helianthus* sp., 1♂ (00134059) (USNM). ***St. Louis Co.:*** 6 mi NNW of Cook on Rt 53, 47.90012° N 92.78453° W, 411 m, 26 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, *Eurybia macrophylla*, 1♂ (00069890) (USNM). Eagles Nest, 47.8395° N 92.0952° W, 454 m, 20 Aug 1958, W.V. Balduf, 1♀ (00243527) (INHS). Rt 53, 2 mi N of Cusson, 48.1000° N 92.85° W, 400 m, 26 Jun 1995, T.J. Henry and A.G. Wheeler, Jr, 1♀ (00134062) (USNM). ***Traverse Co.:*** Lake Traverse, 1 mi NW of Browns Valley, 45.6148° N 96.8444° W, 301 m, 20 Jun 1974, Blair Tollefson, 1♂ (00119524) (UCB). ***Winona Co.:*** Winona, 44.03774° N 91.64992° W, 200 m, 21 May 1931, H.G. Johnston, 1♂ (00093817) (TAMU). **Mississippi:** ***Adams Co.:*** Natchez, 31.56171° N 91.40753° W, 43 m, 15 May 1931, H.G. Johnston, 1♂ (00116865) (JTP), *Solidago* sp., 1♂ (00093816) (TAMU), 1♂ (00134423) (USNM). ***Claiborne Co.:*** 4 mi S of Fort Gibson on Rt 61, 31.96801° N 90.98119° W, 27 m, 10 May 1983, T.J. Henry and G.L. Snodgrass, *Ambrosia trifida*, 1♂ (00069834) (USNM). Claiborne County, no specific locality, 31.96° N 90.983° W, 37 m, May 1984, T.J. Henry and G.L. Snodgrass, *Ambrosia trifida*, 1♂ (USNM). ***Leake Co.:*** Carthage, 32.7325° N 89.53611° W, 02 May 1931, H.G. Johnston, 1♀ (00093754) (TAMU). ***Tupelo Co.:*** Tupelo, 34.2575° N 88.70333° W, 26 May 1931, H.G. Johnston, 1♀ (00093752) (TAMU). ***Washington Co.:*** Stoneville, 33.42401° N 90.9151° W, 17 May 1983, G.L. Snodgrass, *Ambrosia trifida*, 1♂ (00070035) (USNM). Washington County, no specific locality, 33.41° N 91.061° W, 40 m, May 1984, T.J. Henry and G.L. Snodgrass, *Ambrosia trifida*, 1♂ (USNM). ***Yalobusha Co.:*** W[ater] Valley, 34.15138° N 89.63136° W, 90 m, 12 May 1931, H.G. Johnston, 1♀ (00093753) (TAMU), 1♂ (00134427) (USNM). **Missouri:** ***Atchison Co.:*** Langdon, 40.35639° N 95.57944° W, 06 Jul 1904, unknown, 1♂ (00069848), 1♀ (00069882) (USNM); 17 Jul 1904, unknown, 1♀ (00069883) (USNM). ***Barry Co.:*** Roaring River State Park, 36.55091° N 93.75641° W, 08 Jun 1979–09 Jun 1979, E.G. Riley, 1♂ (00127559) (UMRM). ***Boone Co.:*** 1.3 mi N of Ashland Wildlife Area, 38.78058° N 92.19683° W, 247 m, 06 May 1981, R.L. Blinn, 1♂ (00243135) (UMRM). 1.5 mi E of Englewood, 38.81727° N 92.16123° W, 247 m, 19 May 1982, R.L. Blinn, 1♂ (00127553) (UMRM). 15 mi NW of Columbia along Hwy 40, 39.0017° N 92.69236° W, 178 m, 16 May 1981, R.L. Blinn, 1♂ (00127534) (UMRM). Ashland, 38.77408° N 92.24965° W, 259 m, 27 Jun 1968, D.D. Kopp, 1♂ (00127560) (UMRM). Columbia, 38.95167° N 92.33389° W, 26 May 1906–08 Jun 1906, C.R. Crosby, 1♂ (00116241) (CUIC); 27 Jun 1935, T.E. Birkett, 1♂ (00127550) (UMRM); 04 Jun 1941, W.R. Enns, 1♀ (00127563) (UMRM); 28 May 1947, G.W. Thomas, 1♀ (00127564) (UMRM); 22 May 1959, A. Buehler, 1♂ (00127548) (UMRM); 27 Jun 1966, W.S. Craig, 1♂ (00127542) (UMRM); 23 May 1976, D.D. Kopp, 1♂ (00127549) (UMRM); 15 Jun 1976, C. Morgner, 1♀ (00127565) (UMRM); 30 Jun 1976, W.S. Craig, 1♂ (00127538) (UMRM); 04 Jun 1980, R.L. Blinn, 1♂ (00127547) (UMRM); 07 May 1981, R.L. Blinn, 1♂ (00127546) (UMRM); 24 May 1981, W.S. Craig, 1♂ (00127540) (UMRM); 27 May 1981, W.S.

Craig, 1♂ (00127539) (UMRM); 12 Jun 1984, R.L. Blinn, *Ambrosia trifida*, 1♂ (00127544) (UMRM); 21 May 1985, R.L. Blinn, 1♂ (00127543) (UMRM). Columbia, Research Park [University of Missouri-Columbia], 38.93388° N 92.34063° W, 203 m, 29 May 1966, D.M. Daugherty, 1♂ (00069838) (USNM); 13 Jun 1966, L.D. Lewis, 1♂ (00069837) (USNM). Columbia, University of Missouri Campus, 38.94274° N 92.33407° W, 225 m, 19 Jul 1993, W. Liu, 1♀ (00127570) (UMRM). Easley, 38.80173° N 92.37747° W, 171 m, 24 May 1939, A.G. Peterson, 1♂ (00127557) (UMRM). Entomology Farm, Columbia, 38.89504° N 92.21145° W, 266 m, 04 May 1968, unknown, 1♀ (00127567) (UMRM); 02 Jul 1968, unknown, 1♀ (00127568) (UMRM). Grindstone Natural Area, 38.92973° N 92.31811° W, 198 m, 15 Jun 1981, R.L. Blinn, 1♂ (00243128) (UMRM). Hinton, 39.06245° N 92.33391° W, 224 m, 13 Jun 1988, O.R. Edwards, 1♀ (00243110) (UMRM). Rt 1, 0.6 mi S of jct of Hwy N, Boone County, 39.02465° N 92.33333° W, 19 May 1982, R.L. Blinn, 1♂ (00243136) (UMRM); 06 Jun 1982, R.L. Blinn, *Ambrosia* sp., 1♂ (00243138) (UMRM); 13 Jun 1982, R.L. Blinn, *Ambrosia trifida*, 1♂ (00127385), 1♀ (00127384), *Ambrosia trifida*, 1♂ (00243137) (UMRM). Sturgeon, 39.23036° N 92.27462° W, 246 m, 01 Jun 1973, S.E. Thewke, *Asclepias* sp. (Apocynaceae), 1♂ (00127555) (UMRM). The Pinnacles, 39.1337° N 92.3227° W, 213 m, 30 May 1988, O.R. Edwards, 1♂ (00243129) (UMRM). ***Buchanan Co.:*** Saint Joseph, 39.76861° N 94.84639° W, 28 Jun 1943, R.C. Froeschner, 1♀ (00134583) (USNM). ***Callaway Co.:*** Reform, 38.75806° N 91.79266° W, 251 m, 02 Jun 1975, D.D. Kopp, 1♂ (00127562) (UMRM). Tucker Prairie [Natural Area], 38.94826° N 91.98411° W, 264 m, 13 Jun 1968, unknown, 1♂ (00243130) (UMRM). ***Camden Co.:*** Camdenton, 38.00805° N 92.74444° W, 318 m, 01 Jun 1947, T.H. Hubbell, 1♀ (00127436) (UMMC); 29 May 1960, J.C. Schaffner, 1♀ (00069873) (USNM). Macks Creek, 37.96368° N 92.97145° W, 274 m, 16 Jun 1961, C.V. Reichart, 1♀ (00164919) (USNM). ***Cape Girardeau Co.:*** Cape Girardeau, 37.29321° N 89.54341° W, 110 m, 23 May 1941, C. Wingo, 1♀ (00127577) (UMRM). ***Cooper Co.:*** Boonville, Bell Orchard, 38.96319° N 92.74474° W, 213 m, 01 Jun 1960, W.R. Enns, 1♀ (00127576) (UMRM). ***Crawford Co.:*** Huzzah State Forest, 37.9182° N 91.1725° W, 219 m, 19 Jun 1980, R.L. Blinn, *Toxicodendron radicans* (L.) Kuntze (Anacardiaceae), 1♂ (00243131), *Helianthus* sp., 1♂ (00243132) (UMRM). Steelville, 37.9681° N 91.35487° W, 15 May 1982, R.L. Blinn, 1♂ (00127537) (UMRM). ***Franklin Co.:*** Gray Summit, 38.49013° N 90.82155° W, 195 m, 24 May 1942, R.C. Froeschner, 1♀ (00134582) (USNM). ***Gasconade Co.:*** Mint Spring [Seep] Natural Area, 38.20082° N 91.53728° W, 250 m, 29 May 1986, R.L. Blinn, 1♂ (00243133) (UMRM). ***Hickory Co.:*** Pomme de Terre, 37.87635° N 93.32462° W, 271 m, 01 Jun 1979, W.P. Foerster, 1♀ (00093721) (TAMU). ***Holt Co.:*** Big Lake State Park, 40.0725° N 95.34472° W, 17 Apr 1983, R.L. Blinn, 1♀ (00127571) (UMRM). Craig, 40.18929° N 95.37884° W, 262 m, 08 Jun 1950, R.C. Froeschner, 1♂ (00134459) (USNM). ***Jackson Co.:*** Atherton, 39.18611° N 94.30528° W, 223 m, 28 May 1922, C.F. Adams, 1♀ (00117934) (KU); 04 Jun 1922, C.F. Adams, 1♂ (00117880) (KU). Kansas City, Willow Creek, I-435 and Wornall Road, 38.94288° N 94.59373° W, 243 m, 11 Jun 1977, H.N. Greenbaum, 1♀ (00093720) (TAMU). ***Jefferson Co.:*** Kimmswick, 38.36528° N 90.36278° W, 07 Jun 1942, R.C. Froeschner, 1♂ (00134463) (USNM). ***Johnson Co.:*** Knob Noster State Park, 38.73592° N 93.6162° W, 251 m, 06 Jun 1980, E.G. Riley, 1♂ (00127533) (UMRM). ***Lincoln Co.:*** Elsberry, 39.17039° N 90.79045° W, 149 m, 25 May 1938, H.E. Brown, 1♀ (00127573) (UMRM). ***Macon Co.:*** La Plata, 40.023° N 92.4995° W, 274 m, 10 Jun 1968, R.E. Munson, 1♂ (00127551) (UMRM). ***Maries Co.:*** Spring Creek Gap Conservation Area, 38.14337° N 91.80729° W, 324 m, 29 May 1986, R.L. Blinn, 1♂ (00127552) (UMRM). ***Miller Co.:*** Kaiser, 38.13473° N 92.58426° W, 247 m, 14 Jun 1939, D. Damon, 1♂ (00127554) (UMRM). ***Monroe Co.:*** Mark Twain State Park, 39.4878° N 91.7913° W, 198 m, 14 Jun 1984, R.L. Blinn, 1♂ (00243134) (UMRM). Union Covered Bridge State Historic Site, Monroe County, 39.50028° N 91.98333° W, 14 Jun 1984, R.L. Blinn, *Leucanthemum vulgare*, 1♂

(00127558) (UMRM). ***Ozark Co.:*** Ozark County, no specific locality, 36.59908° N 92.42963° W, 256 m, 12 Jun 1969, D.D. Kopp, 1♀ (00127574) (UMRM). ***Randolph Co.:*** 1 mi E of Moberly, 39.41833° N 92.41934° W, 17 May 1976, E.G. Riley, 1♂ (00127536) (UMRM); 04 Jul 1984–05 Jul 1984, E.G. Riley, 1♀ (00242996) (DAR). ***Ray Co.:*** Foxglove Conservation Area, 39.39232° N 94.11983° W, 281 m, 10 Jun 1994, D.G. LeDoux, 1♂ (00243126) (UMRM). ***Ripley Co.:*** 5.5 mi N of Ripley, 36.7031° N 90.98643° W, 179 m, 20 May 1976, Joe Schuh, 2♂ (00108905, 00108907), 1♀ (00108906) (AMNH). ***Schuyler Co.:*** Lancaster, 40.52128° N 92.5227° W, 283 m, 26 Jun 1951, R.C. Froeschner, 1♂ (00134464) (USNM). ***St. Charles Co.:*** Weldon Springs, 38.71364° N 90.68407° W, 164 m, 04 Jun 1974, C. Wingo, 1♂ (00127556) (UMRM). ***St. Clair Co.:*** Taberville Prairie Conservation Area, 1.5 mi E of Appleton, 38.0551° N 93.98993° W, 250 m, 10 Jun 1979, E.G. Riley, 1♂ (00127535) (UMRM). ***St. Francois Co.:*** Saint Francois State Park, 38.96319° N 92.74474° W, 213 m, 13 Jun 1975, D.D. Kopp, 1♀ (00127578) (UMRM). ***St. Louis Co.:*** Fern Glen, 38.55219° N 90.53056° W, 168 m, 06 Jun 1950, W.L. Downes, 1♂ (00134461) (USNM). Glencoe, 38.54343° N 90.62618° W, 123 m, 08 May 1937, R.C. Froeschner, 1♂ (00134462) (USNM). Ranken, 38.53487° N 90.51109° W, 128 m, 05 May 1946, E.P. Meiners, *Ambrosia* sp., 1♂ (00243139) (UMRM). Saint Louis, 38.62722° N 90.19778° W, 04 Jun 1939, R.C. Froeschner, 1♂ (00134465) (USNM). ***Stoddard Co.:*** Dudley, 36.78783° N 90.09877° W, 101 m, 09 May 1942, R.C. Froeschner, 1♂ (00134460) (USNM). Holly Gap Conservation Area, 2.8 mi NE of Dexter, 36.8281° N 89.92728° W, 118 m, 12 Jun 1975, S.O. Swadener, N.D. Epsky, E.G. Riley, D.D. Kopp, 1♂ (00127561) (UMRM). Holly Ridge Conservation Area, 36.84096° N 89.90811° W, 103 m, 03 Jun 1999, D.G. LeDoux, 1♂ (00243127) (UMRM). ***Stone Co.:*** Viola, 36.5722° N 93.5834° W, 335 m, 29 May 1947, R.C. Froeschner, 1♂ (00134466) (USNM). ***Vernon Co.:*** 4 mi W of Montevallo, 37.72611° N 94.18117° W, 14 Jun 1966, J.C. Schaffner, 1♀ (00118456), 1♂ (00093818) (TAMU), 1♂ (00134575) (USNM). **Montana:** ***Blaine Co.:*** Bear Paw Mountains, 48.12298° N 109.31035° W, 1218 m, 03 Sep 1892, O. Heidemann, 1♀ (00116259) (CUIC). ***Carbon Co.:*** 11 mi S of Red Lodge, Parkside Campground, 45.06189° N 109.41061° W, 2210 m, 12 Aug 1986, M.D. Schwartz and G.M. Stonedahl, *Artemisia tridentata*, 1♀ (00170111) (AMNH). ***Flathead Co.:*** Glacier National Park, 48.63333° N 113.75028° W, 01 Aug 1947, G.F. Edmunds, 1♀ (00164916) (USNM). ***Gallatin Co.:*** Fairly Lake Road, 45.90722° N 110.96094° W, 2326 m, 16 Aug 1986, R.S. Miller, 1♂ (00093728) (TAMU). Montana [Range] Experimental Station, Bozeman, 45.6797° N 111.0378° W, 1467 m, 30 Jun 1922, unknown, 1♂ (00134455) (USNM). ***Glacier Co.:*** Waterton Lake, 48.95689° N 113.88742° W, 1372 m, 25 Aug 1923–26 Aug 1923, R.F. Hussey, 1♀ (00127438) (UMMC). **Nebraska:** ***Brown Co.:*** Long Pine, 42.53639° N 99.70028° W, 27 Jun 1973, L.A. Kelton, 1♂ (00113325) (CNC). ***Hitchcock Co.:*** Culbertson, 40.22972° N 100.83849° W, 794 m, 30 Jun, A.P. Morse, 1♀ (00170114) (AMNH). ***Red Willow Co.:*** Indianola, 40.23444° N 100.41694° W, 03 Jun, unknown, 1♂ (00170108) (AMNH). ***Sheridan Co.:*** Hay Springs, 42.68389° N 102.68944° W, 28 Jun 1973, L.A. Kelton, *Symphoricarpos* sp., 1♂ (00113324) (CNC). ***Sioux Co.:*** Glen, 42.6075° N 103.58388° W, 1237 m, Aug 1908, unknown, 1♀ (00069885) (USNM). ***Unknown co.:*** Neb., unknown, 1♂ (00069915) (USNM). **New Hampshire:** ***Coos Co.:*** Crawford House, White Mountains, 44.2193° N 71.41332° W, 579 m, 19 Jul 1944, J.A. Slater, 1♂ (00108926) (AMNH). Crawfords, 44.2667° N 71.39952° W, 602 m, 03 Aug 1929, H.M. Parshley, 1♂ (00242534) (CAS). Gorham, 44.38778° N 71.17361° W, 22 Jul 1929, G.S. Walley, 1♀ (00113346) (CNC); 30 Aug 1958, J.A. Slater, 1♀ (00108925) (AMNH). Mount Washington, 44.29232° N 71.28082° W, 1282 m, 14 Aug 1958, J.R. Vockeroth, 1♂ (00113333) (CNC). ***Grafton Co.:*** Franconia, 44.22694° N 71.74833° W, A.T. Slosson, 1♀ (00170112) (AMNH). **New Jersey:** ***Morris Co.:*** Kinnelon, 40.98606° N 74.38654° W, 218 m, 12 Jun 1965, J. and W. Ivie, 1♂ (00108917) (AMNH). ***Passaic Co.:*** Paterson, 40.91667° N 74.17222° W, 31 May, unknown, 1♀ (00170116) (AMNH). ***Somerset Co.:*** Lamington River, 40.66815° N

74.72404° W, 41 m, 10 Jun 1990, Michalski, 2♂ (00108918–00108919) (AMNH). ***Warren Co.:*** Hackettsville, 40.85399° N 74.82906° W, 174 m, 20 Jun 1965, J. and S. Cornell, 3♂ (00118152, 00118155–00118156), 1♀ (00118157) (ORSU). **New Mexico:** ***Lincoln Co.:*** 12 mi N of Ruidoso, 33.47393° N 105.66973° W, 2176 m, 29 Jun 1968, J. Oswald, 1♀ (00120020) (UCR). Lincoln National Forest, Oak Grove Campground, nr Alto, 33.39777° N 105.74944° W, 2497 m, 29 Jun 1998–30 Jun 1998, E.G. Riley, 1♀ (00245406) (TAMU). Ruidoso, 33.33166° N 105.67277° W, 26 Jun 1940, D.E. Hardy, 1♂ (00117888) (KU); 20 Jun 1958, J.T. Medler, 1♂ (00121811) (IRCW); 30 Jul 1965, J.T. Medler, 1♀ (00121812) (IRCW). ***Otero Co.:*** 2 mi E of Cloudcroft, 32.95722° N 105.70748° W, 17 Jul 1979, Delorme, Mc Hugh, Schaffner, 1♂ (00118218), 1♂ (00093718) (TAMU). 4 mi E of Cloudcroft, 32.95722° N 105.67302° W, 17 Jul 1979, Delorme, McHugh, Schaffner, *Rudbeckia laciniata*, 2♂ (00093719, 00093821) (TAMU). Cloudcroft, 32.95722° N 105.74194° W, 2774 m, 16 Jun 1902, unknown, 1♀ (00242433) (CAS); 14 Jul 1936, R.H. Beamer, 1♂ (00117887) (KU); 27 Jun 1940, D.E. Hardy, 1♂ (00117886) (KU); 24 Jun 1941, unknown, 1♀ (00164906) (USNM); 23 Jul 1967–25 Jul 1967, L.A. Kelton, 1♂ (00113336), 1♀ (00318756) (CNC). ***Rio Arriba Co.:*** Chama, 36.90306° N 106.57889° W, 17 Aug 1987, R.S. Peigler, 1♀ (00093722) (TAMU). ***Sandoval Co.:*** East Fork Jemez River, La Concha Campground, 35.82804° N 106.64417° W, 2530 m, 14 Aug 1972, R.E. Orth, 1♂ (00119966) (UCR). Jemez Springs, 35.76861° N 106.69167° W, 1951 m, 12 Jul 1915, Woodgate, 1♂ (00134452) (USNM). **New York:** ***Bronx Co.:*** Pelham Bay Park, 40.87382° N 73.8125° W, 2 m, 17 Jul 1960, T. Gidaspow, 1♀ (00108927) (AMNH). ***Erie Co.:*** Hamburg, 42.71583° N 78.82972° W, 03 Jul 1904, E.P. Van Duzee, 1♀ (00242580) (CAS). ***Essex Co.:*** Lake Placid, 44.27944° N 73.98028° W, 610 m, 19 Jul 1962, J.R. Vockeroth, 1♂ (00113326) (CNC). ***Genesee Co.:*** Batavia, 42.99806° N 78.18778° W, 271 m, 28 Jun 1914, H.H. Knight, 1♀ (00134495) (USNM); 24 Jun 1915, H.H. Knight, 1♂ (00093819) (TAMU); 30 Jul 1915, H.H. Knight, 1♀ (00242553) (CAS). ***Greene Co.:*** Greene County, no specific locality, 42.2048° N 74.22514° W, 762 m, L.O. Howard, 1♀ (00164920) (USNM). ***Hamilton Co.:*** 7 mi S of Long Lake (town), 43.21269° N 74.71861° W, 26 Aug 1956, J.C. Schaffner, 1♂ (00093820) (TAMU). ***Kings Co.:*** Coney Island, Long Island, 40.5792° N 73.9867° W, 1 m, 13 Jul 1894, J.L. Zabriskie, 1♂, 3♀ [all on same pin] (00170105) (AMNH). ***Nassau Co.:*** Roslyn, Cemetery on Rt 25A, 40.80902° N 73.63199° W, 60 m, 23 Jun 1986, M.D. Schwartz, 1♂ (00170095) (AMNH). Sea Cliff, Long Island, 40.84889° N 73.64528° W, N. Banks, 1♂ (00170099) (AMNH). ***Queens Co.:*** Kissena Park, 40.74593° N 73.80809° W, 2 m, 20 Jun 1912, C.E. Olsen, 1♀ (00242550) (CAS). North Beach, 40.76583° N 73.87639° W, 01 Jun 1910, C.E. Olsen, 1♀ (00164922) (USNM); 18 Jun 1910, C.E. Olsen, 1♀ (00242554) (CAS). ***Rockland Co.:*** Rockland Lake State Park, 41.13833° N 73.9225° W, 26 Jun 1988, M.D. Schwartz, *Rosa* sp. (Rosaceae), 1♂ (00170094) (AMNH). ***St. Lawrence Co.:*** Cranberry Lake, 44.2225° N 74.83667° W, 28 Jul 1919, C.J. Drake, 1♂ (00308358) (ZISP); 03 Jul 1920, C.J. Drake, 1♂ (00134145) (USNM); 13 Jul 1920, C.J. Drake, 1♀ (00116866) (JTP), 1♀ (00093755) (TAMU); 30 Jul 1930, H. Osborn, 1♀ (00134493) (USNM). The Plains, Wanakena, 44.08086° N 74.90764° W, 492 m, 25 Aug 1920, C.J. Drake, 1♀ (00134144) (USNM). The Plains, Wanakena, 43.05° N 73.35° W, 15 Jul 1920, C.J. Drake, 1♀ (00308360) (ZISP). Wanakena, 44.13389° N 74.92139° W, 15 Jul 1920, C.J. Drake, 1♂ (00134142), 1♀ (00134143) (USNM), 1♀ (00308359) (ZISP). ***Suffolk Co.:*** Cold Spring Harbor, Long Island, 40.87678° N 73.47043° W, 02 Jul 1902, H.G. Barber, 1♂ (00069849) (USNM); 09 Jul 1902, H.G. Barber, 1♀ (00069880) (USNM); 12 Jul 1919, H.M. Parshley, 1♀ (00242548) (CAS); 04 Jul 1920, H.M. Parshley, 1♀ (00242549) (CAS); 17 Jun 1930, C.H. Curran, 1♂ (00108902) (AMNH). East Hampton, 40.96343° N 72.1848° W, 10 m, 06 Sep 1950, Roy Latham, 1♂ (00116239) (CUIC). Greenport, Long Island, 41.10333° N 72.35972° W, 06 May 1952, Roy Latham, 1♂ (00134435) (USNM). Mattituck, Long Island, 40.99121° N 72.5342° W, 06 Jul 1934, Roy Latham, 1♂ (00116251) (CUIC). Oakdale, 40.74283° N 73.12744° W, 4 m, 10

Jul 1930, C.H. Curran, 1♂ (00108903), 1♀ (00108904) (AMNH). Orient, Long Island, 41.13899° N 72.30342° W, 3 m, 09 Jul 1908, J.L. Zabriskie, 1♂, 2♀ [all on same pin] (00170106) (AMNH); 11 Jul 1908, J.L. Zabriskie, 1♂, 3♀ [all on same pin] (00170107) (AMNH); 19 Jul 1939, Roy Latham, 1♂ (00116238) (CUIC); 10 Sep 1955, Roy Latham, 1♂ (00116237) (CUIC). Riverhead, 40.91704° N 72.66204° W, 3 m, 11 Jun 1950, Roy Latham, 1♂ (00134436) (USNM). Sag Harbor, 41.00063° N 72.28575° W, 2 m, 04 Sep 1946, Roy Latham, 1♂ (00134467), 1♀ (00134468) (USNM). Southold, 41.06482° N 72.4262° W, 7 m, 08 Aug 1934, Roy Latham, 1♂ (00116240) (CUIC). ***Tompkins Co.:*** 1 mi S of McLean, 42.53931° N 76.28202° W, 353 m, 09 Jul 1976, M.J. and C.A. Tauber, 1♀ (00116266) (CUIC). Ithaca, 42.44056° N 76.49694° W, 16 Jul 1885, H.E. Grotecloss, 1♀ (00116262) (CUIC); 06 Aug 1895, L.J. Martin, 1♀ (00116263) (CUIC); 23 Jul 1982, E.R. Hoebeke, 1♀ (00116264) (CUIC); 01 Aug 1982, E.R. Hoebeke, 1♀ (00116265) (CUIC). ***Westchester Co.:*** White Plains, 41.03389° N 73.76333° W, 28 Jun 1919, J.R. de la Torre Bueno, 2♂ (00242527–00242528) (CAS). **North Carolina:** ***Buncombe Co.:*** Swannanoa, 35.59778° N 82.4000° W, 914 m, 22 Jun 1917, R.W. Leiby, 1♂ (00134432) (USNM). ***Jackson Co.:*** 3 mi SW of Cashiers, 35.065° N 83.12333° W, 823 m, 23 Jun 1958, J.L. Laffoon, 1♀ (00069872) (USNM). ***Yancey Co.:*** Black Mountains, 35.79361° N 82.25667° W, Jun 1912, Beutenmuller, 1♂ (00116256) (CUIC). Valley of Black Mountains, 35.79227° N 82.31012° W, 20 Jun 1930–30 Jun 1930, W. Beutenmuller, 1♀ (00170115) (AMNH). **North Dakota:** ***Cass Co.:*** Fargo, 46.87722° N 96.78944° W, 13 Jun 1932, L.A. Carruth, 1♂ (00116257) (CUIC). ***Grand Forks Co.:*** Grand Forks County, 47.92528° N 97.0325° W, 03 Jul 1941, Entomology Staff, 1♀ (00242962) (DAR). ***McKenzie Co.:*** Theodore Roosevelt National Memorial Park, North Unit, 47.57091° N 103.27139° W, 707 m, 25 Jun 1965, L. Grochowski, 1♀ (00242963) (DAR). ***Ramsey Co.:*** Devils Lake, 48.11278° N 98.86472° W, 22 Jul 1920, T.H. Hubbell, 1♂ (00127410), 1♀ (00127441) (UMMC). ***Ransom Co.:*** Sheyenne State Forest, Valley Road, 14 mi S of Hwy 46, 46.50444° N 97.87888° W, 349 m, 19 Jun 2000, T.J. Henry and D.A. Rider, 1♂ (00069891) (USNM). ***Rolette Co.:*** Turtle Mountains, 48.9861° N 100.0619° W, 213 m, 30 Jul 1920, T.H. Hubbell, 1♂ (00127409) (UMMC); 06 Aug 1920, T.H. Hubbell, 1♀ (00127440) (UMMC). ***Stark Co.:*** Dickinson, 46.87917° N 102.78917° W, H.T. Osborn, 1♀ (00116267) (CUIC). **Ohio:** ***Ashtabula Co.:*** Crooked Creek Farm nr Hartsgrove, 41.624° N 80.979° W, 13 Jun 1963, J.C. and D. Pallister, 1♀ (00108945) (AMNH). ***Butler Co.:*** Oxford, 39.51626° N 84.72564° W, 273 m, 18 May 1949, D.M. Weisman, 1♂ (00242860) (NCSU). ***Cuyahoga Co.:*** Bedford, 41.3931° N 81.5367° W, 24 Jun 1923, J.C. Pallister, 1♀ (00113204 [cat CMNH 20391]) (CMNH). Cleveland, 41.47849° N 81.69033° W, 207 m, unknown, 1♂ (00116242) (CUIC), 1♂ (00069917) (USNM). ***Erie Co.:*** Resthaven Wildlife Area, nr Oxbo Rd, 41.4082° N 82.826° W, 189 m, 06 Jun 2003, T. Pucci, 1♀ (00113251) (CMNH). ***Lorain Co.:*** Amherst, 41.39778° N 82.2225° W, 01 Jul 1933, H.J. Reinhard, 1♂ (00093739), 1♀ (00291081) (TAMU). ***Summit Co.:*** Barberton, 41.01278° N 81.60528° W, 22 Jun 1936, L.J. Lipovsky, 1♂ (00117881) (KU). Summit County, 41.11667° N 81.53333° W, 1937, L.J. Lipovsky, 1♂ (00117882) (KU). **Oklahoma:** ***Alfalfa Co.:*** Cherokee, 36.75602° N 98.34527° W, 354 m, 04 Jun 1937, Standish-Kaiser, 1♂ (00242314) (OSEC). ***Beaver Co.:*** Beaver State Park, 36.8417° N 100.69629° W, 774 m, 06 Jul 1983, H.C. Read and J. Nelson, 1♂ (00242320) (OSEC). ***Caddo Co.:*** Anadarke, 35.07398° N 98.25928° W, 361 m, 21 May 2001, A.G. Wheeler, Jr. (Ulmaceae), 1♂ (00134060) (USNM). ***Cherokee Co.:*** 1 mi NE of Scraper, 36.09436° N 94.834° W, 249 m, 07 May 1974, G.F. and S. Hevel, 1♂ (00069836) (USNM). ***Choctaw Co.:*** Hugo, 33.99736° N 95.50238° W, 169 m, 13 Jun 1931, D.C. Arnold, 1♀ (00242336) (OSEC). ***Creek Co.:*** 1 mi NE of Kellyville, 35.95505° N 96.20758° W, 239 m, 09 May 1984–17 May 1984, unknown, 1♀ (00242331) (OSEC). ***Delaware Co.:*** Flint, 36.18504° N 94.70694° W, 265 m, 19 Jun 1937, Standish-Kaiser, 1♀ (00242333) (OSEC). ***Love Co.:*** Lake Murray, 34.03643° N 97.07658° W, 243 m, 20 May 1971, V.V. Board, 1♂ (00093763) (TAMU). ***Major Co.:*** Cleo Springs, 36.40195° N 98.44243° W, 383

m, 05 Jun 1937, Standish-Kaiser, 1♀ (00242335) (OSEC). ***McCurtain Co.:*** Idabel, 33.89701° N 94.82088° W, 137 m, 10 Jun 1931, D.C. Arnold, 1♀ (00242337) (OSEC). ***Ottawa Co.:*** Peoria, 36.91322° N 94.67684° W, 278 m, 01 Jun 1983, H.C. Read and J. Nelson, 2♂ (00242318–00242319), 1♀ (00242332) (OSEC). ***Payne Co.:*** 1 mi NW of Stillwater, 36.14204° N 97.0821° W, 288 m, 21 May 1984–24 May 1984, unknown, 1♂ (00242324) (OSEC). Payne County, no specific locality, 36.12021° N 97.07055° W, 270 m, 1962, John F. Reinert, 1♀ (00069897) (USNM). Stillwater, 36.11556° N 97.05806° W, 29 Apr 1925, unknown, sunflower, 1♀ (00242329) (OSEC); 11 May 1981, D.C. Arnold, 3♂ (00242315–00242317) (OSEC); 14 Jun 1984, J.T. Criswell, 1♂ (00242323) (OSEC); 18 May 1985, D.C. Arnold, 2♀ (00242325–00242326), sunflower, 1♀ (00242330) (OSEC); 25 May 1986, D.C. Arnold, Asteraceae, 2♂ (00242321–00242322), 2♀ (00242327–00242328) (OSEC). **Oregon:** ***Deschutes Co.:*** Pioneer Ford FC Metolius River, 44.38669° N 121.28962° W, 07 Jul 1959, K.M. Fender, 1♂ (00118054) (ORSU). ***Jefferson Co.:*** Allen Spring, Metolius River, 44.58667° N 121.17722° W, 26 Jul 1960, K.M. Fender, 1♂ (00134042) (USNM). ***Washington Co.:*** Dilley, 45.49062° N 123.12411° W, 61 m, unknown, 1♀ (00134117) (USNM). **Pennsylvania:** ***Bucks Co.:*** Horseshoe Bend, Neshaminy Creek NE of Jamison, 40.27394° N 75.09222° W, 08 Jun 1963, Wilton Ivie, 2♂ (00108911, 00108912), 4♀ (00108913–00108916) (AMNH). ***Centre Co.:*** Milesburg, Rt 144, 40.92957° N 77.78227° W, 242 m, 06 Jun 1974, T.J. Henry, 1♂ (00134004) (USNM). ***Dauphin Co.:*** Conewago Township, Cedar Road, Brandt Farm, 40.15806° N 76.66056° W, 04 Jun 1974, T.J. Henry, 1♂ (00134003) (USNM). Devonshire Heights, 40.31278° N 76.77667° W, 26 May 1959, E.U. Balsabaugh, 1♂ (00134002) (USNM). Harrisburg, 40.27361° N 76.88472° W, 05 Jul 1978, E.U. Balsbaugh, Jr., 1♀ (00242961) (DAR). ***Franklin Co.:*** Chambersburg, 39.9375° N 77.66139° W, 07 Jun 1923, J.R. Stear, 1♂ (00134454) (USNM). ***Lancaster Co.:*** Bainbridge, 40.09093° N 76.66747° W, 94 m, 25 May 1986, G.F. and J.F. Hevel, 1♂ (00069845) (USNM). ***Washington Co.:*** West Alexander, 40.10497° N 80.50652° W, 403 m, 07 Jul 1966, J. and W. Ivie, 3♂ (00108908–00108910) (AMNH). **South Dakota:** ***Brookings Co.:*** Brookings, 44.31139° N 96.79806° W, 493 m, 17 Jun 1921, H.C. Severin, 1♂ (00242529), 1♀ (00242530) (CAS). ***Lawrence Co.:*** Black Hills, 44.41667° N 103.70833° W, 1524 m, 20 Jul 1928, A.A. Nichol, 1♂ (00134456), 1♀ (00134457) (USNM). ***Lincoln Co.:*** Newton Hills, Canton, 43.22443° N 96.58004° W, 24 Jun 1935, H.C. Severin, 1♂ (00134430) (USNM). ***Turner Co.:*** Centerville, 43.11943° N 96.96144° W, 373 m, 14 Jun 1928, H.C. Severin, 1♀ (00133727) (USNM). ***Union Co.:*** 3 mi S of Jefferson, 42.55912° N 96.55889° W, 11 Jun 1949, Slater and Laffoon, 1♂ (00108934), 2♀ (00108878, 00108935) (AMNH), 1♀ (00094043) (TAMU). Elk Point, 42.68333° N 96.68333° W, 345 m, 16 Jun 1924–19 Jun 1924, H.C. Severin, 1♀ (00069875) (USNM); 12 Jun 1925, H.C. Severin, 2♂ (00133722, 00134431), 1♀ (00134584) (USNM). ***Yankton Co.:*** Yankton, 42.87375° N 97.41263° W, 389 m, 15 Jun 1928, H.C. Severin, 1♀ (00133726) (USNM); 18 Jun 1930, G.I. Gilbertson, 1♂ (00134458) (USNM). **Tennessee:** ***Giles Co.:*** Waco, 35.3759° N 87.0319° W, 226 m, 25 May 1954, P.B. Kannowski, 1♂ (00127412), 1♀ (00127439) (UMMC). ***Knox Co.:*** Knoxville, 35.96056° N 83.92083° W, H.E. Summers, 1♀ (00243555) (INHS); 27 May 1919, W.B. Cartwright, 1♀ (00134481) (USNM). ***Lauderdale Co.:*** Nankipoo, 35.87529° N 89.47593° W, 121 m, 02 Jun 1985, T.J. Henry and A.G. Wheeler, Jr, *Ambrosia trifida*, 1♂ (00134061) (USNM). ***Washington Co.:*** East Ridge, 36.31927° N 82.32958° W, 543 m, 09 May 1952, G.S. Walley, 1♂ (00113337) (CNC). **Texas:** ***Austin Co.:*** Stephen F. Austin State Park, 29.81436° N 96.10907° W, 34 m, 09 Apr 1966, J.C. Schaffner, 1♂ (00093748) (TAMU). ***Bastrop Co.:*** Bastrop State Park, 30.11028° N 97.315° W, 08 May 1966, J.C. Schaffner, 1♂ (00093744) (TAMU). ***Bell Co.:*** Temple, 31.09823° N 97.34278° W, 219 m, 25 Apr 1933, S.E. McGregor, 1♀ (00134045) (USNM). ***Bexar Co.:*** San Antonio, 29.42389° N 98.49333° W, Feb 1981, J. Maldonado C., 1♂ (00070036) (USNM). ***Bosque Co.:*** 1 mi N of Clifton, 31.79812° N 97.59448° W, 208 m, 30 Apr 1968, J.C. Schaffner, 1♂ (00093747) (TAMU). 3 mi W

of Laguna Park, 31.85917° N 97.4305° W, 28 Apr 1971, J.C. Schaffner, 1♀ (00093769) (TAMU). Walnut Springs, 32.0575° N 97.74917° W, 02 May 1975, J.C. Schaffner, 1♂ (00116862) (JTP), 1♂ (00093736) (TAMU), 1♀ (00134498) (USNM). ***Brazoria Co.:*** 1 mi W of Angleton, 29.16126° N 95.46217° W, 7 m, 25 Apr 1983, T.J. Henry and A.G. Wheeler, Jr., 1♂ (00069835) (USNM). ***Brazos Co.:*** Bryan, 30.67417° N 96.36972° W, 13 Apr 1965, J.C. Schaffner, *Solidago* sp., 1♂ (00245357) (TAMU); 14 Apr 1965, J.C. Schaffner, *Solidago* sp., 1♂ (00245356) (TAMU); 18 Apr 1965, J.C. Schaffner, 2♀ (00093756, 00245358) (TAMU); 02 May 1965, J.C. Schaffner, 1♂ (00116863) (JTP), 1♀ (00093757) (TAMU). College Station, 30.62778° N 96.33417° W, 13 Apr 1964, S.G. Wellso, 1♀ (00093770) (TAMU). Koppe Bridge, 30.57222° N 96.32611° W, 20 Apr 1966, J.C. Schaffner, 1♂ (00116864) (JTP), 1♂ (00291117), 1♂ (00093749) (TAMU), 1♂ (00134425) (USNM). ***Brown Co.:*** Bangs, 31.71694° N 99.13222° W, 04 May 1938, unknown, 1♂ (00134424) (USNM). ***Burnet Co.:*** Inks Lake State Park, 30.73083° N 98.38444° W, 28 Apr 1968, J.C. Schaffner, 1♂ (00093764) (TAMU). ***DeWitt Co.:*** 3 mi S of Cuero, 29.09387° N 97.28916° W, 56 m, 22 Apr 2001, J.C. Schaffner, 1♀ (00093768) (TAMU). ***Goliad Co.:*** Goliad State Park, 28.65555° N 97.38499° W, 43 m, 02 May 1989, E.G. Riley, 1♂ (00093733) (TAMU). ***Gonzales Co.:*** 7 mi N of Leesville, 29.50072° N 97.70385° W, 133 m, 06 Apr 1986, D.D. Dean, 1♀ (00093725) (TAMU). Palmetto State Park, 29.58694° N 97.58194° W, 17 Apr 1965, J.C. Schaffner, 1♂ (00118220), 2♂ (00093746, 00245353) (TAMU); 19 Apr 1969, J.C. Schaffner, 1♂ (00093745) (TAMU); 18 Apr 1970, J.C. Schaffner, 1♂ (00291116), 1♀ (00291127), 1♂ (00093731) (TAMU); 04 May 1970, Board and Schaffner, 1♂ (00291115), 1♀ (00291128) (TAMU). ***Grimes Co.:*** Navasota, 30.38778° N 96.0875° W, 07 Apr 1959, W.R.M. Mason, 1♀ (00113345) (CNC). ***La Salle Co.:*** Fowlerton County Park on Frio River, 28.47363° N 98.797° W, 91 m, 23 Mar 1990, E.G. Riley, 1♀ (00093726) (TAMU). ***Lee Co.:*** 6.5 mi NE of Lexington, 30.50105° N 96.98572° W, 138 m, 15 Apr 2001, J.C. Schaffner, 1♂ (00093762) (TAMU). ***Live Oak Co.:*** Three Rivers, 28.46027° N 98.18251° W, 44 m, 03 Mar 1975, B.T. Vincent, 2♀ (00093723–00093724) (TAMU). ***Llano Co.:*** Valley Spring, 30.85934° N 98.81727° W, 397 m, 14 May 1966, P.K. Wagner, 1♀ (00093758) (TAMU), 1♀ (00134577) (USNM). ***McLennan Co.:*** 3 mi W of West, 31.8041° N 97.14456° W, 170 m, 03 May 1971, J.C. Schaffner, 1♂ (00093760) (TAMU). ***San Patricio Co.:*** 4 mi SW of Mathis, 19 Apr 1964, H.R. Burke, 1♂ (00134426) (USNM). ***Travis Co.:*** Zilker Park, 30.26722° N 97.76972° W, 03 Apr 1985, P.W. Kovarik, 1♂ (00093759) (TAMU). ***Uvalde Co.:*** 5 mi N of Utopia, 29.66978° N 99.54547° W, 441 m, 22 Jun 1994, W.F. Chamberlain, 1♂ (00093735) (TAMU). ***Wood Co.:*** Godwin Woods, 3.5 mi SW of Hainsville, 32.70833° N 95.41° W, 100 m, 06 May 2001, W.B. Godwin, 1♂ (00093761) (TAMU). **Utah:** ***Cache Co.:*** 0.4 mi off Rt 89 along Franklin Basin Rd, 41.93555° N 111.57222° W, 2004 m, 17 Jul 2001–18 Jul 2001, T.J. Henry and A.G. Wheeler, Jr., *Achillea millefolium* var. *occidentalis*, 1♂ (00069921) (USNM). Blacksmith Fork Canyon, 41.70405° N 111.85047° W, 17 Jun 1966, W.J. Hanson, 1♂ (00134453) (USNM). Logan, 41.73556° N 111.83361° W, 12 Jul 1906, unknown, 1♀ (00133724) (USNM); 13 Jul 1922, E.P. Van Duzee, 1♀ (00242432) (CAS); 06 Jul 1955, S.L. Wood, 1♂ (00113331) (CNC). Logan Canyon, 41.7402° N 111.79383° W, 18 Jul 1958, G.F. Knowlton, 3♀ (00164897–00164899) (USNM). Logan Canyon site, 41.74027° N 111.79305° W, 1981 m, 15 Jul 1958, G.F. Knowlton, 1♀ (00069925) (USNM). ***Rich Co.:*** Laketown, 41.82556° N 111.32167° W, 23 Jul 1963, G.F. Knowlton and W.J. Hanson, 1♀ (00164903) (USNM). ***Utah Co.:*** Hobble Creek Canyon, 40.16444° N 111.49895° W, 1548 m, 01 Jul 1954, G.L. Nielsen, 1♀ (00164904) (USNM). Rt 92, Theater-in-the-Pines, N of Aspen Grove, 40.41027° N 111.60888° W, 2042 m, 20 Jul 2001, T.J. Henry and A.G. Wheeler, Jr., 1♂ (00164974) (CNC), 1♂ (00069923) (USNM). **Vermont:** ***Chittenden Co.:*** Jericho, 43 Sunnyview Drive, 44.50289° N 72.9889° W, 187 m, 22 Aug 1997–25 Aug 1997, C.R. Bartlett, 1♀ (00242867) (NCSU). ***Windham Co.:*** Dummerston, 42.93691° N 72.57148° W, 225 m, 14 Jul 1908, unknown, 1♂ (00242525) (CAS). ***Windsor Co.:*** Norwich, 43.71528° N 72.30833° W, 08 Jul 1908, C.W.

Johnson, 1♂ (00242526) (CAS). **Virginia:** ***Arlington Co.:*** Chain Bridge, 38.92959° N 77.11684° W, 5 m, 02 Jul 1905, Fredk. Knab, 1♀ (00069913) (USNM); 05 Jun 1906, D.H. Clemons, 1♂ (00069912) (USNM). Glencarlyn, 38.86167° N 77.12944° W, 01 Jul 1906, D.H. Clemons, 1♀ (00069911) (USNM). ***Dinwiddie Co.:*** DeWitt, 37.03861° N 77.64361° W, 02 Jun 1917, H.H. Knight, 1♂ (00134433) (USNM). ***Fairfax Co.:*** Fairfax, 38.85129° N 77.28895° W, 102 m, 24 Jun 1889, unknown, 1♂ (00116245) (CUIC). Rosslyn, 38.89903° N 77.06929° W, 8 m, 08 Jun, T. Pergande, 1♂ (00134434) (USNM). ***Falls Church Co.:*** Falls Church, 38.88222° N 77.17138° W, 24 Jun, unknown, 1♀ (00108954) (AMNH). ***Highland Co.:*** Rt 250, Head Waters (shale barrens), 38.32603° N 79.41287° W, 625 m, 09 Jun 1984, T.J. Henry and A.G. Wheeler, Jr., 1♂ (00069893) (USNM). ***Page Co.:*** Page County, no specific locality, 38.66079° N 78.47579° W, 269 m, 17 Jun 1965, J.F. Cornell, 1♂ (00242861), 1♀ (00242836) (NCSU). ***Rockbridge Co.:*** Natural Bridge, 37.63111° N 79.54431° W, 355 m, 27 May 1956, J.F. Hanson, 1♂ (00134138), 1♀ (00134139) (USNM). ***Shenandoah Co.:*** Columbia Furnace, 38.87801° N 78.62241° W, 313 m, 11 Jun 1986, T.J. Henry, *Alnus* sp. (Betulaceae), 1♂ (00069894) (USNM). **Washington:** ***Mason Co.:*** Lake Cushman, 47.46426° N 123.21904° W, 229 m, 06 Aug 1919, F.M. Gaige, 1♂ (00127485), 1♀ (00127430) (UMMC). **West Virginia:** ***Berkeley Co.:*** Berkeley County, 39.50306° N 77.9275° W, 01 Jun 1983–17 Jul 1983, T.L. Mason, Jr., *Ambrosia trifida*, 1♂ (USNM). ***Boone Co.:*** Boone County, no specific locality, 38.066° N 81.819° W, 215 m, 01 Jun 1983–17 Jul 1983, T.L. Mason, Jr., *Ambrosia trifida*, 1♂ (USNM). ***Grant Co.:*** 2 mi E of Petersburg on Rt 220, 39.00209° N 79.07817° W, 290 m, 15 Jun 1983, T.J. Henry, *Solidago* sp., 1♂ (00069832) (USNM); 15 Jun 1983, T.J. Henry, 1♀ (00164961) (USNM). ***Harrison Co.:*** Harrison County, no specific locality, 39.28° N 80.344° W, 305 m, 01 Jun 1983–17 Jul 1983, T.L. Mason, Jr., *Ambrosia trifida*, 1♂ (USNM). ***Mason Co.:*** Clifton F. McClintic State Wildlife Station, 38.91469° N 82.06896° W, 184 m, 11 Jul 1986, Larochelle and Lariviere, 1♀ (00113829) (CNC). ***Pendleton Co.:*** Seneca Creek, 38.71589° N 79.54716° W, 1158 m, 26 Jun 1966, O.R. Taylor, 1♂ (00108924) (AMNH). ***Summers Co.:*** Pipestem, 37.54445° N 80.96027° W, 727 m, 18 Jun 1970, G.C. Steyskal, 1♂ (00069833) (USNM). ***Tucker Co.:*** Tucker County, no specific locality, 39.096° N 79.681° W, 505 m, 01 Jun 1983–17 Jul 1983, T.L. Mason, Jr., *Ambrosia trifida*, 1♂ (USNM). **Wisconsin:** ***Ashland Co.:*** Marengo River, 15 mi SE of Ashland, 46.41286° N 90.80933° W, 235 m, 08 Aug 1976, N.L. Herman, 1♀ (00108922) (AMNH). ***Bayfield Co.:*** T46N R9W Sec16, 46.4677° N 91.4984° W, 387 m, 29 Jun 1976–06 Jul 1976, unknown, 1♂ (00242099) (IRCW). ***Columbia Co.:*** Gibraltar Rock County Park, 43.3378° N 89.60099° W, 258 m, 26 Jun 1965, J.T. Medler, 1♀ (00242101) (IRCW). ***Crawford Co.:*** Gays Mill, 43.3201° N 90.8404° W, 213 m, 04 Aug 1917, E.D. Ball, 1♀ (00242102) (IRCW). ***Dane Co.:*** Dane County, no specific locality, 43.07431° N 89.48423° W, 305 m, 10 Jul 1937, W.S. Marshall, 1♀ (00242105) (IRCW); 04 Jun 1964, T.R. Yonke, 1♂ (00243124) (UMRM); 19 Jun 1971, A.E. Akingbohungbe, 1♀ (00242103) (IRCW). University of Wisconsin, University Arboretum, 43.03198° N 89.4396° W, 304 m, 25 Jun 1964, T.R. Yonke, 1♂ (00243125) (UMRM). ***Forest Co.:*** Peshtigo River, 45.50464° N 88.42576° W, 29 Jun 1970, A.E. Akingbohungbe, 1♀ (00242100) (IRCW). ***Grant Co.:*** Wyalusing State Park, 42.97199° N 91.11544° W, 320 m, 12 Jun 1962, J.T. Medler, 1♂ (00242096) (IRCW). ***Green Co.:*** Green County, no specific locality, 42.60654° N 89.64416° W, 315 m, 09 Aug 1963, T.R. Yonke, 1♀ (00127575) (UMRM). ***Langlade Co.:*** Antigo, 45.1462° N 89.1446° W, 454 m, 20 Jul 1971, A.E. Akingbohungbe, 1♀ (00242104) (IRCW). ***Oneida Co.:*** Rhinelander, 45.6468° N 89.4049° W, 472 m, 30 Jun 1944, C.L. Fluke, 1♀ (00242066) (IRCW). ***Polk Co.:*** Polk County, no specific locality, 45.45° N 92.41667° W, 01 Jul, Baker, 5♂ (00242425–00242427, 00242618–00242619), 2♀ (00242428–00242429) (CAS). ***Rock Co.:*** Rock County, no specific locality, 42.67186° N 89.0703° W, 252 m, 02 Jul 1971, A.E. Akingbohungbe, 1♂ (00242097) (IRCW). ***Sauk Co.:*** Leopold [Memorial] Reserve, Coleman Trail, 43.5371° N 89.54479° W, 241 m, 03 Jun 1987, L.F. Goodman, 1♂

(00242098) (IRCW). **Wyoming:** ***Albany Co.:*** Bosler, 41.57608° N 105.69527° W, 2158 m, 13 Jul 1937, C.L. Johnston, 1♂ (00117889) (KU). ***Fremont Co.:*** Shoshone National Forest, 43.80913° N 109.56306° W, 14 Aug 1927, H.H. Knight, paratype, 1♀ (00093778) (TAMU). ***Lincoln Co.:*** Alpine Junction, 43.17242° N 111.01854° W, 1725 m, 08 Aug 1972, L.A. Kelton, *Solidago* sp., 1♂ (00113330) (CNC). ***Platte Co.:*** Guernsey, 42.2697° N 107.7416° W, 1327 m, 01 Aug 1950, R.R. Dreisbach and R.K. Schwab, 1♂ (00127413) (UMMC). Platte County, 42.13333° N 104.96667° W, 30 Jun 1950, D.G. Denning, 1♀ (00116599) (ESUW). ***Sheridan Co.:*** Big Horn, 44.6833° N 106.9922° W, 1240 m, Metz, 1♂ (00242541) (CAS). ***Teton Co.:*** Grand Teton National Park, Teton Science School near Kelly, 43.62306° N 110.62278° W, 24 Jul 1982–25 Jul 1982, S.C. Williams, 1♂ (00121663), 5♀ (00121674–00121678) (CAS). Hoback, 43.28515° N 110.77182° W, 1981 m, 24 Jul 1953, R.R. Dreisbach, 2♀ (00127482–00127483) (UMMC). Jackson, 43.5000° N 110.76666° W, 1920 m, 13 Jul 1920–17 Jul 1920, unknown, 1♂ (00170122), 2♀ (00170110, 00170123) (AMNH). Moran, 43.84473° N 110.49477° W, 2225 m, 23 Jul 1953, R.R. Dreisbach, 1♂ (00127455) (UMMC). ***Uinta Co.:*** Fort Bridger, 41.31662° N 110.38432° W, 2034 m, 13 Jul 1965, Harry H. Knight, 1♀ (00133725) (USNM).

Slaterocoris flavipes species group

DIAGNOSIS: Among *Slaterocoris* species with a small right paramere and undivided dorsal lobe of the endosomal spicule, the members of this group have a narrow anterior region and round basal lobe of the right paramere and the endosomal spicule with a smooth distal region of the ventral lobe and a rolled dorsal lobe. COLORATION: Black with variable coloration on appendages. VESTITURE: Variable simple setae; either dense, suberect, moderately long, and silvery, or sparse, reclining, short, and dark. STRUCTURE: Body conformation variable, sometimes sexes dimorphic with hemelytron of male elongate; frons smooth. MALE GENITALIA: **Pygophore**: Tergal process short projecting from right side, point directed toward midline. **Phallotheca**: Left lateral surface slightly compressed (fig. 44A, B). **Endosomal spicule**: Ventral lobe with apex of uniform thickness throughout apical region and distal portion smooth; dorsal lobe entire and rolled or slightly twisted along axis of lobe; dorsal lobe with portion dorsal to basal region with variable length. **Right paramere**: Small, apical region narrowed, basal lobe rounded, not prominent. **Left paramere**: Distal portion shorter than basal portion, junction between basal and distal region abruptly attenuate; ventral surface with diameter equal throughout (fig. 43A). FEMALE GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view, left side greater than right at overlap. **Left first gonapophyses**: Dorsal surface concave with wide apex. **Interramal sclerite**: Ventromedial region overlapping ventromedial plate. **Interramal lobe**: Ventral projection short with concave anterior surface.

DISCUSSION: The *flavipes* group is the only species group not recovered from all the analyses. It is reported from two of the three most parsimonious cladograms in the 40-taxa analysis (figs. 1B, 2), the successive approximations weighting of these cladograms, as well as the 38-taxa analyses employing equal weighted and successive approximations weighting (fig. 1D). Genitalic characters (34-1, 35-0, 36-1, 47-2, 59-3) support the node containing the *flavipes* group.

One of the three most parsimonious cladograms presented a polyphyletic arrangement for the four species of the *flavipes* group (fig. 1A). Characters for color of antennal segments I and II (2); color of femur (5); vestiture length (8), coloration (9), density (10), and angle (11); and the curvature of the female costal margin (15) took precedence over the genitalic features, resulting in *S. sheridani* and *S. sparsus* being separated from *S. flavipes* and *S. longipennis*. The sister-group relationship for *S. sheridani* and *S. sparsus* is also supported by the notched medial margin of the anterior wall (57-4; cf. fig. 47B), unique to these two species, and a short point on the dorsomedial margin of the interramal lobe (68-3; cf. fig. 47D), a homoplasious character state.

Slaterocoris robustus is placed as the sister to the *flavipes* group in some cladograms

(fig. 1B, D). This relationship is based on the shared narrow apical region of the right paramere found in all five species. However, I exclude *S. robustus* from the *flavipes* group because the endosomal spicule of this species does not have the same structure of the dorsal and ventral lobes (34-1, 35-1, 36-1; cf. figs. 42, 44, 45) as in the endosoma of the members of the *flavipes* group.

The male genitalia have particularly uniform structure in this species group. The length of distal portion of the left paramere is slightly shorter and the junction between the paramere body to the distal portion is more sharply attenuate (47-2, cf. fig. 43A) than in other *Slaterocoris* species. Variation in the right paramere seems to be limited to the length of the body and the presence of a medial lobe. Unique morphology of the right paramere is found in *S. sheridani* which has a conspicuous and variable medial process (43), being entire (fig. 46A–E), or bifurcate (fig. 46F, I–K) and the paramere length is somewhat narrower, with an extended region distal to the medial process (fig. 46A–L). Variation of the endosomal spicule is limited to the length of the dorsal portion of the dorsal lobe; it is somewhat shorter in *S. longipennis* (fig. 44C–H) than in the other three species (figs. 42, 45). In the species of the *flavipes* group the costal margin of the female is more arcuate than in the females of the *apache* group.

The females of *S. flavipes*, *S. longipennis*, and *S. pilosus* (of the *apache* group) can be roughly similar in size, coloration, and vestiture. Identification of each species is facilitated by characters of associated males; however, details of female coloration and vestiture can also distinguish the species as follows. *Slaterocoris flavipes* is distinguished from *S. pilosus* by the infuscate apical portion of segment II, the somewhat infuscate tarsomeres I and II, and the more dense and coarse vestiture. The latter species has the apex of antennal segment II discretely black, tarsomeres I and II clearly pale, and the vestiture moderately dense and fine. Female *S. flavipes* is distinguished from *S. longipennis* by the somewhat shorter and more reclined dorsal vestiture, antennal segment I and II are usually pale, the length of the setae on antennal segment II are shorter than the diameter of the segment, and the pale portions of the femora can be extensively pale orange-brown. In *S. longipennis* the vestiture is longer, erect, and wavy, antennal segment I and II are black with the length of the setae longer than the diameter of segment II, and the femora are almost entirely black with only the apices paler yellow.

Slaterocoris flavipes Kelton
Figures 13, 41, 42; plate 2; map 9

Strongylocoris croceipes: Van Duzee, 1921: 136 (disc., in part).

Slaterocoris flavipes Kelton, 1968: 1126, fig. 9 (orig. desc.); Knight, 1970: 251, fig. 19, (disc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 198 (catalog).

Slaterocoris sculleni Knight, 1970: 257, fig. 23 (orig. desc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog). NEW SYNONYMY.

DIAGNOSIS: Distinguished among species with dense, suberect, moderately long, silvery vestiture by the black head, the variable reddish orange distal portions of the femora (northern specimens with femora extensive black basally, those from southern California have limited black color basally), the pale yellowish-orange tibiae with black apices (pl. 2), the usually brownish-orange distal portion of antennal segment I with black base (in northerly specimens segment I is mostly dark), the short hemelytral membrane of the male, and the male genitalia with the relatively long dorsal portion of the dorsal lobe (fig. 42A–E). *Slaterocoris flavipes* can potentially be confused with the following taxa: *S. longipennis*, but the latter species has the hemelytral membrane long in the male (pl. 2) and the femora are almost completely black (fig. 13); species of the *argenteus* group have completely black legs (fig. 12); species of the *hirtus* group have longer, more erect dark vestiture (pl. 4C); some species of the *punctatus* group have pale head markings (pls. 1, 2) and no member of the *flavipes* group is distributed north of central Mexico (maps 9, 10).

REDESCRIPTION: *Male:* Small, subparallel; length 3.00–4.55, width 1.45–1.75 (pl. 2). COLORATION: Black; antennal segment I brownish orange, black basally, sometimes mostly dark; segment II usually dark, some-

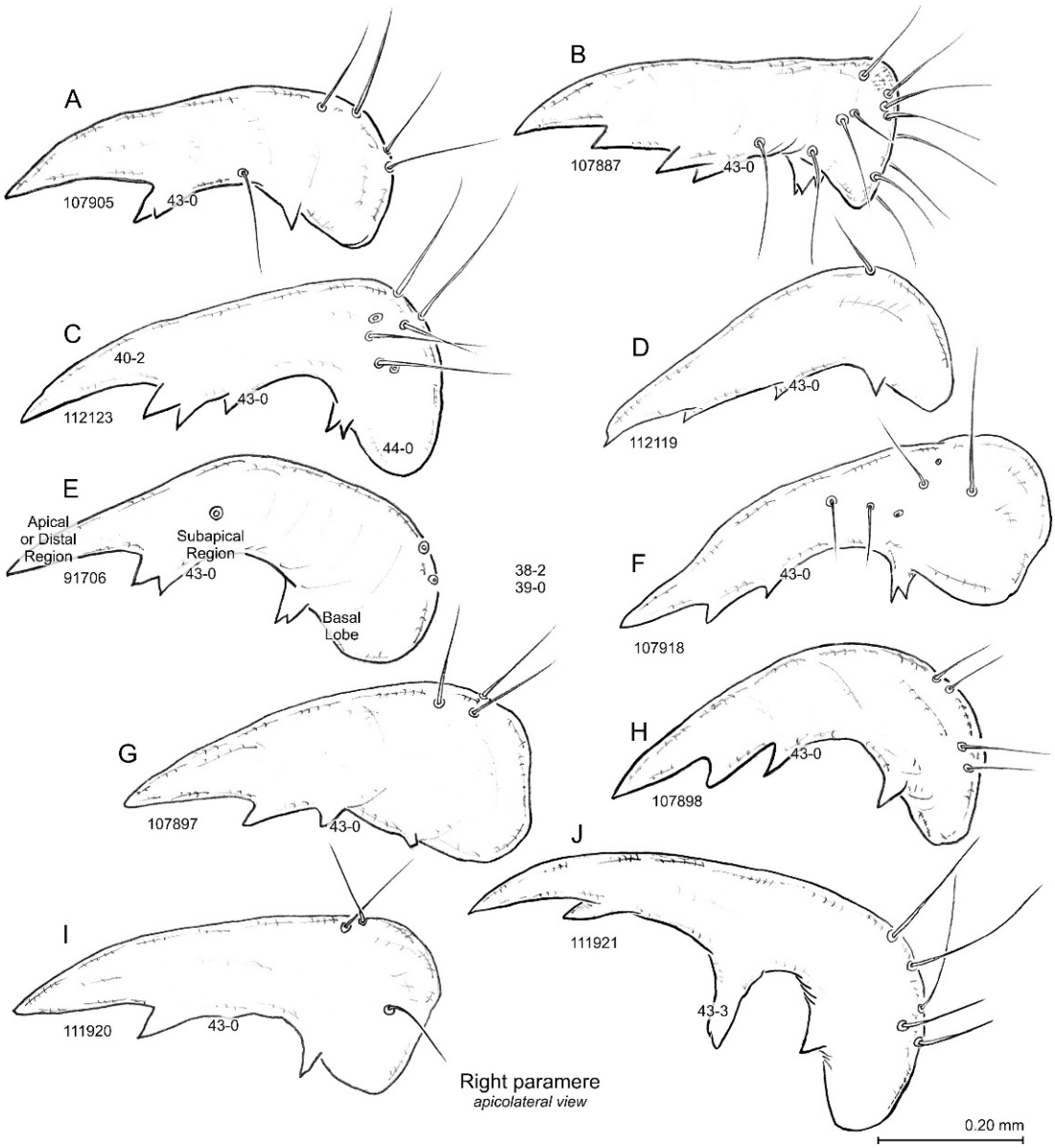


Fig. 41. *Slaterocoris flavipes*, right paramere. **A**, **B**. Powder Hill Road, OR. **C**. Carrizo Creek, CA. **D**. 15 mi NW of Hog Springs, UT. **E**. Phelan, CA. **F**. S of Hanksville, UT. **G**. Sheldon National Wildlife Refuge, NV. **H**–**J**. 1 mi S of Millican, OR.

times paler medially; legs black or reddish brown to orange-yellow; femora variably black basally (30% to 88%), remainder orange-brown, tibiae orange to pale yellow with variable black apices; tarsomeres black (fig. 13). VESTITURE: Dense, moderately long, suberect, silvery simple setae. STRUCTURE: Body conformation both sexes roughly similar; costal margin subparallel. MALE GENITALIA: As in species group except: **Endosomal spicule**: Dorsal lobe with narrow dorsal portion as long or longer than wide basal portion; serration of basal portion variable (fig. 42). **Right paramere**: Subapical

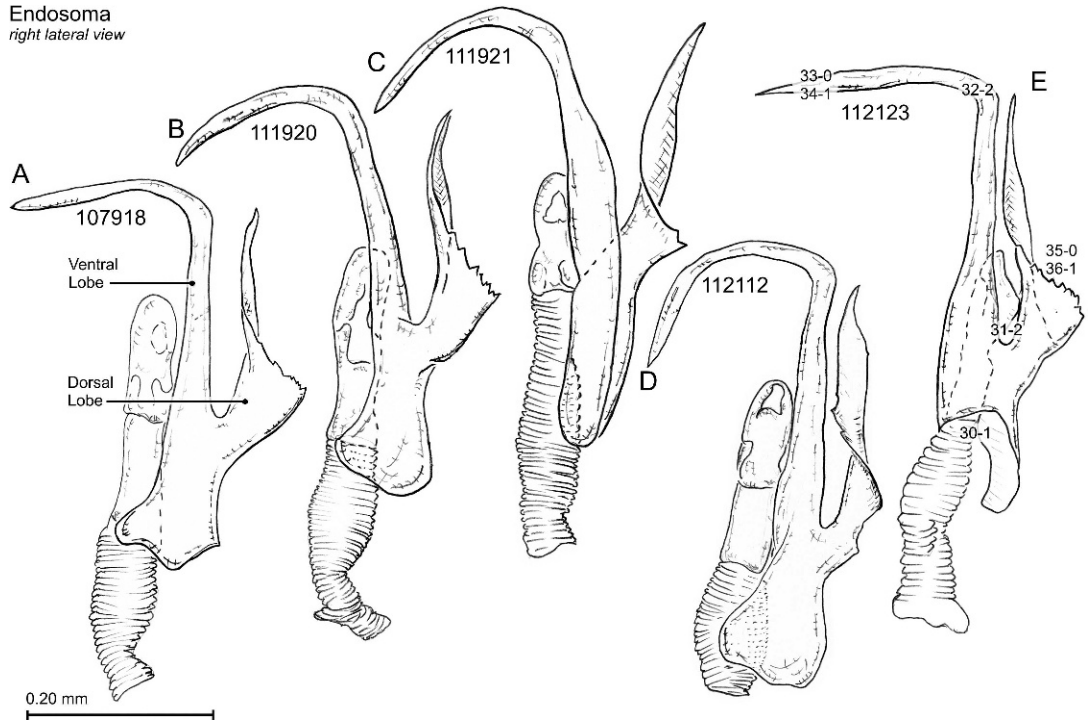


Fig. 42. *Slaterocoris flavipes*, endosoma. **A**. S of Hanksville, UT. **B**, **C**. 1 mi S of Millican, OR. **D**. Indio, CA. **E**. Carrizo Creek, CA.

region short with variable number of small spines (fig. 41); sometimes medial process present (fig. 41J).

Female: Small, obovate; length 3.45–4.20, width 1.50–2.05 (pl. 2). COLORATION: Antennal segment II pale to dusky yellow with apical portion infuscate; sometimes completely dark. STRUCTURE: Costal margin arcuate (pl. 2). GENITALIA: As in species group except: **Vestibulum, anteroventral margin of anterior wall**: Sclerotized medially, and sclerotized to lateral margins. **Ventral labiate plate**: Strongly produced, base moderately wide, triangular, apex cleft. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Dorsomedial region convex anteriorly, posteromedial portion with tumid process abutting ovipositor bulb. **Interramal lobe**: Basal (dorsal) insertion with membranous attachment; dorsomedial margin not produced as lobe.

HOSTS: The predominant breeding hosts in northern California, Idaho, and Oregon, are *Chrysothamnus viscidiflorus* and *Ericameria nauseosa*. A large number of occurrences are reported from ''*Chrysothamnus* spp.'' It is impossible to determine which (if any) of these records refer to *C. viscidiflorus* or *E. nauseosa*. Specimens were also found on *Achillea* and *Artemisia tridentata* in this region. In southern California, Utah, and eastern Nevada, the predominant breeding hosts are *Gutierrezia microcephala* and *G. sarothrae*. A couple of specimens were also taken on *G. californica* and *Hymenoclea salsola* in the desert habitat of southern California. The remaining records are either ''Asteraceae'' or a small number of occurrences on non-asteraceous plants that are considered to be sitting records.

DISTRIBUTION: The southern portion of the range occurs on the southern boundary of the Mojave Desert with chaparral habitats in southern California. Northeast of these populations the range continues to shrub lands of the Colorado Plateau in southern Utah. The rest of the distribution of *S.*

flavipes extends from northern Utah west across Idaho to the eastern border of the Cascade Mountains of northern California and Oregon, generally shirting the northern and western boundary of the Great Basin (map 9).

COLLECTION SUMMARY: 272 specimens from 70 collection events, with earliest records in April and May from southern California and Utah. Further north the collection dates range from June to July, with a few August dates and one September date from Oregon.

DISCUSSION: The number and conformation of the apical spines of the right paramere (cf. fig. 41A–J) varies across the range of *S. flavipes*. Individuals from two different collection events (Powder Hill Rd, Oregon [cf. fig. 41A, B], and 1 mi S of Millican, Oregon [cf. fig. 41H–J]) document novel variation. A male (0111921) from the latter collection event has a medial lobe (fig. 41J), unusual for *S. flavipes*, whereas two other specimens from the same event have typical conformation (cf. fig. 41H, I). Minor variation in the intensity of marginal serration was observed in the dorsal lobe of the endosomal spicule in the same two specimens from the Powder Hill Road collection event as well as from those across the range of *S. flavipes* (cf. fig. 42A–E).

Knight (1970) described *S. sculleni* from four males taken in Klamath County, Oregon. He distinguished it from congeners by the black femora with pale yellow apices, the pale yellow tibiae, the infuscate tarsomeres, the dense, suberect, long, recumbent golden yellow vestiture, antennal segment II not much longer than the head width, and the form of the right paramere. In Knight's (1970) key, the nominal species *S. sculleni* and *S. flavipes* were separated by the comparative length of antennal segment II and width of the head. Segment II was purported to be subequal to head width in *S. sculleni* and shorter than the head in *S. flavipes*. Measurements of males from throughout range of both nominal species (table 3) indicates that the length of segment II and the ratio of the head width to segment II are not discrete, negating the utility of the comparison. Segment II measurements and ratios to the head width from southern California specimens, fitting the description of *S. flavipes*, are 0.80–0.88 and 1.24–1.25 respectfully. Measurement and ratio metrics for northern California, Idaho, Nevada, Oregon, and Utah males are 0.75–1.13 and 0.91–1.37, thus encompassing the range of the southern California specimens. Leg coloration does not discriminate the two nominal species because southern California specimens are variable in the extent of orange coloration on the femora and the tibial coloration is pale yellow in both nominal species regardless of distribution. I treat *S. sculleni* as a junior synonym of *S. flavipes* because the length of antennal segment II can be greater or less than the head width, the proportion of black and orange femoral coloration appears to be clinal in relation to latitude, and all the male genitalic characters are identical for the nominal species.

Van Duzee (1921) included a couple of specimens from San Diego County, California, identified as *S. croceipes* in his treatment of the genus; these are correctly identified as *S. flavipes* (see Other Specimens Examined).

HOLOTYPES: **USA: California:** ***Riverside Co.:*** Indio [33.72056° N 116.21472° W], 01 Jun 1955, W.R. Richards, 1♂ (AMNH_PBI 00112112) (CNC) (*S. flavipes*: senior synonym). **Oregon:** ***Klamath Co.:*** Crater Lake National Park, south rim [42.89811° N 122.10417° W, 2164 m], 19 Aug 1930, H.A. Scullen, 1♂ (AMNH_PBI 00122264) (USNM) (*S. sculleni*: junior synonym).

OTHER SPECIMENS EXAMINED: **MEXICO: Baja California:** 6 mi E of Ojos Negros, 31.91744° N 116.18529° W, 775 m, 13 May 1982, Faulkner and Brown, 1♂ (00244232) (SDNH). 7.6 mi S of Tecate, 32.47472° N 116.72204° W, 811 m, 31 May 1980, Brown and Faulkner, 1♀ (00244233) (SDNH). La Zapopita, 31.39986° N 115.78319° W, 786 m, 14 Jun 1960, E.L. Sleeper, 2♀ (00121807–00121808) (CAS). **USA: California:** ***Imperial Co.:*** 1.5 mi W of Glamis, 32.9949° N 115.0898° W, 91 m, 12 May 1950, Timberlake, *Gutierrezia californica*, 1♀ (00119890) (UCR). ***Los Angeles Co.:*** Largo Vista Rd 3.1 mi S of Rt 18, SE of Llano, 34.45251° N 117.7651° W, 1275 m, 17 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Gutierrezia microcephala*, det. A. Saunders

UCR 140675 [PBI_CAL04-H18], 4♀ (00108358–00108361) (AMNH). T5N R10W S35, 34.4774° N 117.8968° W, 1097 m, 23 Apr 1985, Marcia Narog, 1♂ (00119877) (UCR). ***Modoc Co.:*** 1 mi S of Lava Beds National Monument on Hill Rd, Modoc National Forest, 41.48582° N 121.00028° W, 17 Jul 1985, G.M. Stonedahl and J.D. McIver, *Chrysothamnus* sp., 1♂ (00108351) (AMNH). ***Riverside Co.:*** 2.5 mi NW of Desert Springs, 33.9886° N 116.5277° W, 408 m, 25 May 1955, Timberlake, *Ericameria nauseosa*, 1♂ (00119876 [cat UCRC ENT 00032033]) (UCR). 3 km W of Aguanga, 33.4474° N 116.8908° W, 543 m, 11 May 1982, Kevin Grangetto, 1♀ (00119888) (UCR). 8 km N of Moreno Badlands, 33.98932° N 117.15694° W, 366 m, 19 May 1981, N.J. Gunther, 1♀ (00119889) (UCR). Bautista Canyon, 33.61666° N 116.78333° W, 862 m, 25 May 1999, unknown, 1♂ (00119878) (UCR). Indio, 33.72056° N 116.21472° W, 01 Jun 1955, W.R. Richards, paratype, 1♀ (00242639) (CAS), paratypes, 3♀ (00112113–00112115) (CNC), paratype, 1♀ (00119053) (TAMU). Menifee Valley, 33.72833° N 117.14556° W, 16 Jun 1975, J.D. Pinto, 3♀ (00119885–00119887) (UCR). Pinyon Flat, San Jacinto Mountains, 33.78389° N 116.95778° W, 21 May 1940, R.L. Usinger, 1♀ (00119447) (UCB). Ribbonwood, San Jacinto Mountains, 33.57028° N 116.49806° W, 21 May 1940, R.L. Usinger, 1♀ (00112116) (CNC), 1♀ (00119448) (UCB). Wilson Valley Road, 1 mi N of Hemet, 33.762° N 116.97111° W, 21 Apr 1980, L. Russell and M.D. Schwartz, Asteraceae, 2♂ (00108341–00108342), 3♀ (00108343–00108345) (AMNH). ***San Bernardino Co.:*** Joshua Tree National Monument, Lower Covington Flat, 34.03779° N 116.30889° W, 28 May 1960, M. Knox and E. Sleeper, 1♀ (00121806) (CAS); 19 May 1962, E.L. Sleeper, 1♂ (00121804), 1♀ (00121805) (CAS). March's Ranch Road, 2 mi NE of Baldwin Lake, 34.27242° N 116.77976° W, 2164 m, 25 May 1968, L.O. Tejada, 3♂ (00119880–00119882), 2♀ (00119883–00119884) (UCR). NW of Pioneertown T1N R5E S19, 34.157° N 116.5022° W, 1280 m, 05 May 1992, R. Mandala, 1♂ (00119879) (UCR). Phelan, Rt 138 at Phelan Road, 34.42531° N 117.6174° W, 1310 m, 16 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Gutierrezia microcephala*, det. A. Saunders UCR 140675 [PBI_CAL04-H18], 1♂ (00091706), 2♀ (00109060–00109061) (AM), 3♂ (00322762–00322764), 5♀ (00322766–00322770), *Hymenoclea salsola*, det. A. Sanders UCR140682, 1♀ (00322772), *Mirabilis laevis* (Benth.) Curran (Nyctaginaceae), det. A. Sanders UCR140678, 1♂ (00322761), *Galium angustifolium* Nutt. ex Gray (Rubiaceae), det. A. Sanders UCR140677, 1♂ (00322765), 1♀ (00322771) (AMNH). ***San Diego Co.:*** Boulder Oaks Campground on Old Hwy 80, 32.72966° N 116.4825° W, 970 m, 21 May 2000, M.D. Schwartz, *Chrysothamnus* sp., 1♀ (00108346) (AMNH). Carrista Creek, Morettis Junction, 33.20514° N 116.71795° W, 13 May 1980, Brown and Faulkner, 1♀ (00244234) (SDNH). Carrizo Creek, intersection with Rt 79, 7 mi S of Warner Springs, 33.19988° N 116.71081° W, 16 May 1982, M.D. Schwartz, *Gutierrezia sarothrae*, 4♂ (00111419, 00112123–00112125), 7♀ (00111420, 00112126–00112131) (CNC). Mount Laguna, 33.97667° N 118.13889° W, 1524 m, 04 Jun 1971, M.H. Sweet, 1♀ (00119049) (TAMU). San Diego County, 33.03333° N 116.8000° W, 13 May 1914, E.P. Van Duzee, 1♀ (00112117) (CNC). San Diego County, 32.71528° N 117.15639° W, 05 Jun 1913, E.P. Van Duzee, paratype, 1♂ (00242638) (CAS). ***Siskiyou Co.:*** 1 mi S of Lava Beds National Monument, Lava Beds–Medicine Lake Rd, 41.6819° N 121.4424° W, 1317 m, 18 Jul 1985, G.M. Stonedahl and J.D. McIver, *Chrysothamnus* sp., 1♀ (00108996) (AMNH). 1 mi W of Bartle, 41.25778° N 121.83923° W, 1220 m, 07 Jul 1979, R.T. and Joe Schuh, 1♀ (00108889) (AMNH). 2.5 mi N of Medicine Lake on Medicine Lake Rd, 41.61781° N 121.59778° W, 750 m, 18 Jul 1985, G.M. Stonedahl and J.D. McIver, *Chrysothamnus* sp., 2♂ (00108349–00108350), 4♀ (00108992–00108995) (AMNH). 12.3 mi N of St. Hwy 89 on Powder Hill Road, 41.6542° N 121.62556° W, 19 Jul 1985, G.M. Stonedahl and J.D. McIver, *Chrysothamnus viscidiflorus*, 3♂ (00107887, 00107905, 00108971), 22♀ (00108957–00108958, 00108972–00108991), *Gutierrezia sarothrae*, 1♀ (00108959) (AMNH). Lava Beds National Monument, 41.75333° N 121.50556° W, 1524 m, 13 Aug 1961, Joe Schuh, 1♀ (00121924) (ORSU). **Idaho: *Blaine Co.:*** 6 mi NW of Carey, Little Wood River, 43.37891° N 113.99758° W, 30 Jun 1966, W.

Gagne, J. Haddock, paratype, 1♀ (00119417) (UCB). 20 mi N of Shoshone, Big Wood River, 43.22053° N 114.35888° W, 01 Jul 1966, W. Gagne, J. Haddock, 4♀ (00119413–00119416) (UCB). ***Butte Co.:*** 6 mi S of Howe, 43.72439° N 113.00271° W, 1482 m, 08 Jul 1982, M. Stafford, *Chrysothamnus viscidiflorus*, 1♂ (00122350) (UID). Craters of the Moon National Monument, 43.42972° N 113.53056° W, 14 Aug 1964, D.S. Horning Jr., 1♀ (00122356) (UID). ***Elmore Co.:*** 5 mi S of Mountain Home, 43.05668° N 115.63642° W, 938 m, 16 Jun 1954, W.F. Barr, *Chrysothamnus* sp., 1♂ (00122351), 2♀ (00122352–00122353) (UID). 8 mi S of Mountain Home, 43.02589° N 115.61613° W, 942 m, 16 Jun 1955, W.F. Barr, 1♂ (00122354) (UID). ***Gooding Co.:*** 6 mi E of Gooding, 42.92762° N 114.59498° W, 1129 m, 19 Jun 1965, R.L. Westcott, *Ericameria nauseosa*, 1♀ (00122426) (UID); 19 Jun 1965, L.S. Hawkins, *Chrysothamnus viscidiflorus*, 1♀ (00122427) (UID). ***Lincoln Co.:*** 5 mi NE of Shoshone, 42.95344° N 114.31706° W, 1232 m, 17 Jun 1961, W.F. Barr, *Artemisia tridentata*, 1♀ (00122428), *Ericameria nauseosa*, 1♀ (00122429) (UID). ***Valley Co.:*** Donnelly, 44.7316° N 116.081° W, 1481 m, 28 Aug 1952, S.E. Knapp, 1♀ (00122355) (UID). **Montana:** ***Beaverhead Co.:*** Dillon, 45.22237° N 112.63789° W, 1550 m, 05 Aug 1908, unknown, 1♀ (00164872) (USNM). **Nevada:** ***Elko Co.:*** 2.2 mi NE of Cobre on state Rt 233, 41.13442° N 114.37014° W, 1798 m, 25 Jun 1983, R.T. Schuh and M.D. Schwartz, 1♀ (00108357) (AMNH). Utah state line on Utah Rt 30, 41.3782° N 114.0026° W, 1451 m, 25 Jun 1983, R.T. Schuh and M.D. Schwartz, *Gutierrezia sarothrae*, 3♀ (00108355, 00109006–00109007) (AMNH). ***Humboldt Co.:*** 5 mi S of Jct. of Rts 8A and 34A, Sheldon National Wildlife Refuge, 41.72771° N 119.2000° W, 1900 m, 02 Jul 1979, R.T. Schuh and B.M. Massie, *Chrysothamnus* sp., 24♂ (00107897, 00108956, 00109013–00109034), 26♀ (00108961, 00109035–00109059) (AMNH). ***Washoe Co.:*** 6 mi W of Vya toward Cedarville, 41.59137° N 119.90651° W, 1810 m, 02 Jul 1979, R.T. Schuh, B.M. Massie, *Chrysothamnus* sp., 1♂ (00108352) *Chrysothamnus* sp., 2♀ (00109009–00109010) (AMNH). **Oregon:** ***Crook Co.:*** 0.5 mi W of Ochoco National Forest on Rt 26, T14S R18E Sec 11, 44.3708° N 120.5348° W, 1129 m, 22 Jun 1979, R.T. Schuh, *Chrysothamnus viscidiflorus*, 3♂ (00108353, 00109011–00109012) (AMNH). ***Deschutes Co.:*** 1 mi S of Millican, 43.86471° N 120.91889° W, 1335 m, 21 Jun 1979, M.D. Schwartz, *Ericameria nauseosa*, 2♂ (00111920–00111921) (CNC); 21 Jun 1979, R.T. Schuh, *Chrysothamnus viscidiflorus*, 6♂ (00107898, 00108997–00109001), 5♀ (00108960, 00109002–00109005) (AMNH). 1 mi S of Millican on Pine Mountain Road, 43.86471° N 120.91889° W, 1335 m, 21 Jun 1979, G.M. Stonedahl, *Chrysothamnus viscidiflorus*, 1♂ (00109008) (AMNH); 21 Jun 1979, M.D. Schwartz, *Ericameria nauseosa*, 5♂ (00318796–00318800), 4♀ (00318801–00318804) (CNC). 2 mi E of Redmond, 44.27278° N 121.13239° W, 25 Jun 1939, J. Schuh, Gray, 4♂ (00108362–00108365), 7♀ (00108366–00108372) (AMNH), 3♂ (00243708–00243710), 3♀ (00243711–00243713) (FSCA). 13 mi SE of Sisters, 44.15783° N 121.36206° W, 11 Jul 1963, C.W. Baker and P.O. Ritcher, *Achillea* sp., 1♀ (00121923) (ORSU). ***Jefferson Co.:*** Culver, 44.52583° N 121.21194° W, 02 Jul 1935, R.H. Beamer, 2♀ (00117924–00117925) (KU). ***Klamath Co.:*** above Algoma Hill, 42.3417° N 121.8033° W, 1433 m, 07 Sep 1965, J. Schuh and E. Hansen, *Chrysothamnus* sp., 1♀ (00108354) (AMNH). ***Lake Co.:*** 60 mi W of Burns, 43.59129° N 120.0588° W, 1393 m, 02 Jul 1960, W.E. Ferguson, *Artemisia* sp., 1♂ (00112118) (CNC). **Utah:** ***Box Elder Co.:*** Bothwell, 41.71063° N 112.25753° W, 1317 m, 25 Jun 1964, G.F. Knowlton, 1♂ (00164870) (USNM). ***Garfield Co.:*** 8.7 mi S of Rt 95 on Rt 276, Maidenwater Spring, 37.76959° N 110.64457° W, 1524 m, 19 Jun 1983, R.T. Schuh and M.D. Schwartz, *Gutierrezia sarothrae*, 1♀ (00108890) (AMNH). 15 mi NW of Hog Springs at junction 95 and 276 (E side of road), T32S R12E, 38.02488° N 110.5675° W, 1404 m, 12 Jun 1982, M.D. Schwartz, *Gutierrezia sarothrae*, 4♂ (00112119–00112122) (CNC). Jct. Rts 95 and 276, S of Hanksville, T32S R12E, 38.02505° N 110.57098° W, 1494 m, 18 Jun 1983, R.T. Schuh and M.D. Schwartz, *Gutierrezia sarothrae*, 1♂ (00107918) (AMNH). ***San Juan Co.:*** 7.7 mi N of Mexican Hat on Rt 261, T41S R18E, 37.26655° N 109.93422° W, 1524 m, 17 Jun 1983, R.T. Schuh and M.D. Schwartz, *Chrysothamnus* sp., 1♀ (00108373)

Purshia stansburiana (Torr.) Henrickson (Rosaceae), 1♀ (00108356) (AMNH). Grand Flat near Collins Canyon, 37.42167° N 110.16056° W, 1707 m, 28 May 1978, D.A. and J.T. Polhemus, 1♂ (00116821), 1♀ (00117233) (JTP); 01 Jun 1982, D.A. and J.T. Polhemus, 5♀ (00116823, 00117229–00117232) (JTP); 28 May 1985, D.A. and J.T. Polhemus, 3♂ (00116822, 00117227–00117228) (JTP); 26 May 1986, D.A. and J.T. Polhemus, 9♂ (00116706, 00117208–00117215), 12♀ (00117206, 00117216–00117226) (JTP). ***Washington Co.:*** Snow Canyon State Park, T41S R16W, tent campground, 37.20611° N 113.64917° W, 1219 m, 22 May 1981–23 May 1981, M.D. Schwartz, *Gutierrezia sarothrae*, 1♀ (00112136) (CNC). **Washington:** ***Adams Co.:*** Lind, 46.97323° N 118.60779° W, 424 m, 01 Jun 1919, F.W. Carlson, 1♂ (00164871) (USNM).

Slaterocoris longipennis Knight
Figures 13, 43, 44; plate 2; map 10

Slaterocoris longipennis Knight, 1968: 90, fig. 114 (orig. desc.); Kelton, 1968: 1123, fig. 6 (disc.); Knight, 1970: 250, fig. 24 (disc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog).

Slaterocoris utahensis Knight, 1968: 92, fig. 113 (orig. desc.); Kelton, 1968: 1123, fig. 5 (disc.); Knight, 1970: 256, fig. 22 (disc.); Henry and Wheeler, 1988: 452 (catalog); Schuh, 1995: 199 (catalog). NEW SYNONYMY.

Slaterocoris knowltoni Knight, 1970: 240, fig. 18, (orig. desc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

DIAGNOSIS: Distinguished from other *flavipes*-group species by the strong sexual dimorphism, the male subparallel sided and distinctly elongate posterior of the costal fracture and the female shorter with slightly arcuate costal margins (pl. 2); the completely black appendages including the antennal segments and femora, except for the pale yellow apices (fig. 13); the dense, long, suberect, silvery or golden vestiture; and the short dorsal portion of the dorsal lobe of the endosomal spicule (fig. 44C–H, arrow). The female of *S. longipennis* can usually be discriminated from female *S. flavipes* and *S. pilosus* by the yellowish pale apex of the femur, the yellowish or black tibia, and the black antenna and tarsomeres. In *S. flavipes* the tibiae and apices of the femora are more pale orange than yellow and antennal segments I and II are mostly pale yellow; in *S. pilosus* antennal segment I and II are mostly pale and tarsomeres I and II are pale.

REDESCRIPTION: *Male:* Large, elongate; length 4.80–6.00, width 1.63–2.10 (pl. 2). COLORATION: Black; including antenna, femur except for narrowly pale yellow apex, tibia pale or dusky yellow to black (fig. 13). VESTITURE: Dense, moderately long, suberect, silvery simple setae; sometimes vestiture somewhat golden. STRUCTURE: Hemelytron elongate, costal margin subparallel. GENITALIA: As in species group except: **Phallotheca**: As in figure 44A, B. **Endosomal spicule**: Dorsal lobe with narrow dorsal portion usually as long or shorter than wide basal portion; serration of basal portion variable (fig. 44C–H). **Right paramere**: Subapical region short with variable number of small spines (fig. 43B–G). **Left paramere**: Distal portion short, with abrupt contraction at junction with paramere body (fig. 43A).

Female: Moderately large, obovate; length 3.50–4.50, width 1.60–2.08 (pl. 2). COLORATION: Tibia always pale yellow to pale yellowish brown. STRUCTURE: Costal margin slightly arcuate. GENITALIA: As in species group except: **Vestibulum, anteroventral margin of anterior wall**: Sclerotized medially, and sclerotized to lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced, moderately wide, triangular at base sometimes apex cleft. **Second gonapophyses**: Anterior medial surface strongly convex. **Interramal sclerite**: With dorsomedial region convex anteriorly and posteromedial portion with flat plate abutting ovipositor bulb. **Interramal lobe**: Basal (dorsal) insertion with membranous attachment, dorsomedial margin not produced as lobe.

HOSTS: The predominant breeding hosts can be adduced from sites in Nye County, Nevada, where intensive collecting was undertaken by R.T. Schuh and colleagues. In the southernmost portion of the range, specimens were taken in relatively large numbers from *Ericameria nauseosa*, *Gutierrezia sarothrae*, and *Tetradymia glabrata*. This is the only species of *Slaterocoris* taken on

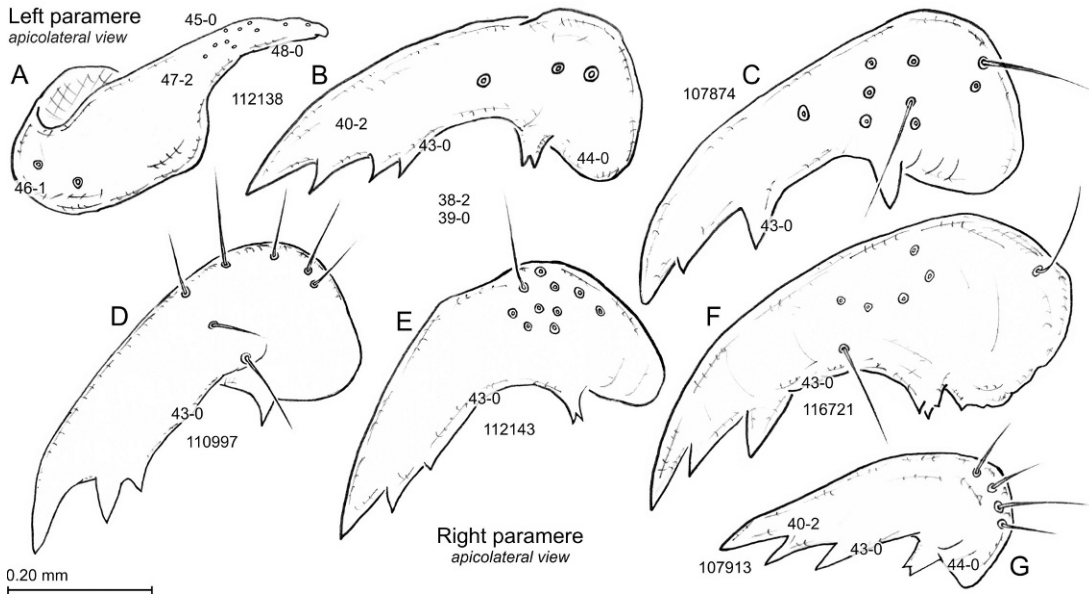


Fig. 43. *Slaterocoris longipennis*, parameres. **A**, **B**. Kelton, Pass, UT **C**. Stockade Wash, NV. **D**. 2 km W of Kaiser Pass, CA. **E**. 4 mi NW of Frontier, WY. **F**. Steamboat Springs, CO. **G**. Westgard Pass, CA.

Tetradymia. Other Orthotylini to partially utilize species of this widespread western plant genus are *Lopidea bullata* Knight, 1923, and *Aoplonema rubrum* Forero, 2008. Schuh (2008) discussed the host associations of *Beckocoris* Knight, 1968, and *Nevadocoris* Knight, 1968, two phyline plant bug genera that are more closely tied to *Tetradymia* species, than these Orthotylini. Host records from more northern portions of the range indicate that *Artemisia tridentata* is probably the breeding host. Some specimens were taken on *Chrysothamnus viscidiflorus* throughout the distribution of *S. longipennis*. Only two specimens occurred on non-asteraceous plants, and these are considered to be sitting records.

DISTRIBUTION: This species is predominantly an inhabitant of the scattered ranges of the Great Basin in Nevada and the intermountain west of Colorado and Utah. The western limit borders the basin at the eastern slope of the Sierra Nevada Mountains of California, stretching from Fresno to Shasta Counties. The northern limit of the range of *S. longipennis* is apparently the northern extent of the Snake River Plain in Idaho. The eastern limit is found in the northwest quadrant of the Colorado Rocky Mountain cordillera (map 10).

DISCUSSION: The right paramere shows limited variation from across the distribution of *S. longipennis*. Minor differences in the conformation of the apical spines exist in males from California, Colorado, Nevada, Utah, and Wyoming (cf. fig. 43B–G). The structure of the dorsal lobe in the endosomal spicule is remarkably uniform, only the intensity of the marginal serration being variable. All individuals are recognizable by the relatively short region dorsal to the expanded base (fig. 44C–H).

Knight (1968) described *S. longipennis* and *S. utahensis* consecutively, discriminating between them by overall size, coloration of the vestiture and tibiae, comparison of antennal segment II length to head width, and the structure of the right paramere. Examination of the holotypes demonstrated that *S. longipennis* has greater body length (5.60), pale vestiture and tibiae, longer antennal segment II (1.19), and the right paramere with four apical spines, while *S. utahensis* has shorter overall length (4.80), dark vestiture and tibia, shorter segment II (1.02), and three spines on the right para-

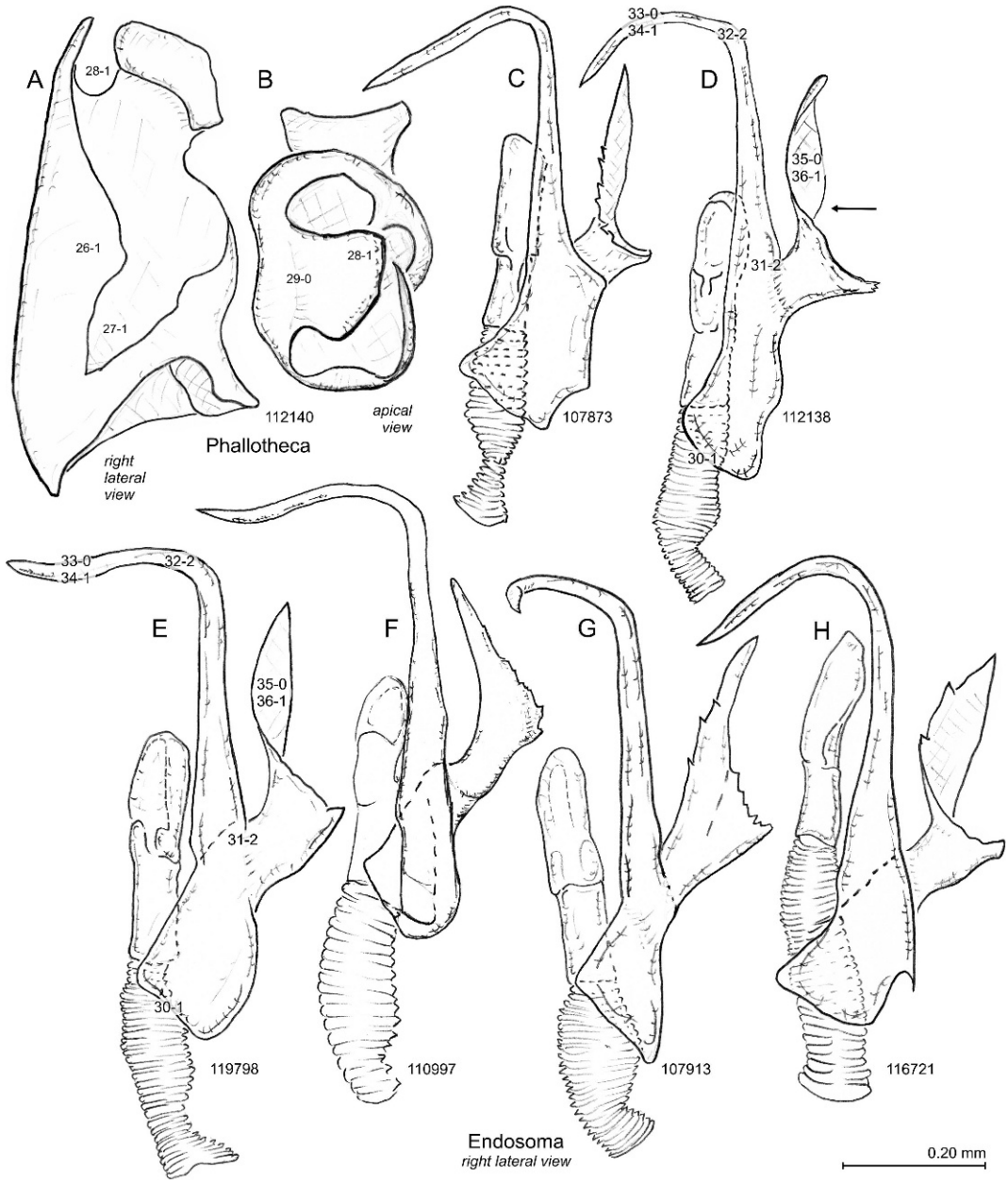


Fig. 44. *Slaterocoris longipennis*, male genitalia. **A**, **B**. Baxter Pass, CO. **C**. 11 mi N of Belmont, NV. **D**. Kelton Pass, UT. **E**. Fish Lake Valley, CA. **F**. 2 km W of Kaiser Pass, CA. **G**. Westgard Pass, CA. **H** Steamboat Springs, CO.

mere. Kelton (1968) followed Knight and recognized *S. longipennis* and *S. utahensis* on the same features, giving weight to overall size and coloration of the tibiae and vestiture. Another species, *S. knowltoni*, was described by Knight (1970) based on three males from Box Elder County, Utah, without reference to either of the former species; it was distinguished by black legs, moderately dense, suberect, brown vestiture, antennal segment II not longer than the head width, and structure of the right paramere. The

holotype and a paratype of *S. knowltoni* have body length of 3.98 and 4.80, antennal segment II length of 0.93 and 1.03, and right paramere with three and four spines, respectively. Examination of paratypes of *S. longipennis*, the only one of these three species founded on a relatively large number of specimens, taken from one collection event, revealed variation in the tibial coloration, ranging from pale yellow, yellowish brown to brown. Specimens that fit the diagnosis of the three nominal species showed variability in overall size (4.80–6.00), antennal segment II length (1.03–1.30), tibial coloration, and number of apical spines of the right paramere (fig. 43B–G). The color of the dorsal vestiture ranges from pale silvery to darker golden. None of these characters are tied to a particular geographic region. In light of these observations, I propose treating *S. knowltoni* and *S. utahensis* as junior synonyms of *S. longipennis*.

HOLOTYPES: **USA: Nevada:** ***Nye Co.:*** Mercury, 19 M [36.66056° N 115.99361° W], 24 Jun 1965, H.H. Knight and J. Merino, 1♂ (AMNH_PBI 00134015) (USNM) (*S. longipennis*: senior synonym). **Utah:** ***Box Elder Co.:*** Cedar Creek [41.96436° N 113.15638° W], 20 Jun 1963, G.F. Knowlton, 1♂ (AMNH_PBI 00122253) (USNM) (*S. knowltoni*: junior synonym). ***Millard Co.:*** Scipio [39.245° N 112.10333° W], 29 Jun 1965, H.H. Knight, 1♂ (AMNH_PBI 00134016) (USNM) (*S. utahensis*: junior synonym).

COLLECTION SUMMARY: 242 specimens from 47 collection events, with earliest records in May from Utah; throughout the range the majority of specimens were taken in June to July, and the latest date is August.

OTHER SPECIMENS EXAMINED: **USA: California:** ***Fresno Co.:*** 2 km W of Kaiser Pass on USFS 80, 37.29139° N 119.1245° W, 2599 m, 25 Jul 1999, M.D. Schwartz, *Artemisia* sp., 7♂ (00110997, 00115829–00115834), 2♀ (00115835–00115836) (CNC). ***Inyo Co.:*** 2 mi W of Westgard Pass, 37.30028° N 118.1894° W, 2134 m, 10 Jun 1976, J.D. Pinto, 1♀ (00119555) (UCR). Westgard Pass summit, White Mountains, 37.30028° N 118.15306° W, 2249 m, 02 Jul 1980, R.T. Schuh, *Artemisia tridentata*, 1♂ (00108832), 5♀ (00108833–00108837), *Chrysothamnus* sp., 1♂ (00107913) (AMNH). ***Modoc Co.:*** Hackamore, 41.55194° N 121.1225° W, 12 Jul 1947, R.L. Usinger, *Chrysothamnus* sp., 3♂ (00119450–00119452) (UCB). ***Mono Co.:*** 4 mi SE of Oasis, Fish Lake Valley, 37.4706° N 117.8423° W, 1573 m, 10 Jun 1976, J.D. Pinto, *Gutierrezia* sp., 2♂ (00119549–00119550, 00119798), 4♀ (00119551–00119554) (UCR). ***Plumas Co.:*** near Chester, 40.30639° N 121.23083° W, 05 Jul 1932, R.L. Usinger, 1♂ (00121867), 1♀ (00121868) (CAS), 1♀ (00112145) (CNC). ***Shasta Co.:*** Burney, 40.8824° N 121.6608° W, 952 m, 08 Jul 1956, A.E. Michelbacher, 1♀ (00119453) (UCB). ***Tuolumne Co.:*** Blue Canyon, Sonora Pass, 38.318° N 119.6635° W, 2682 m, 30 Aug 1960, P.D. Hurd, 1♀ (00112146) (CNC). **Colorado:** ***Eagle Co.:*** Minturn, 39.58637° N 106.43086° W, 2391 m, 23 Jun 1981, J.T. Polhemus, 1♂ (00116824) (JTP). S of Wolcott, 39.70278° N 106.67806° W, 22 Jun 1980, J.T. Polhemus, 1♀ (00116830) (JTP). Vail, 39.64028° N 106.37361° W, 2591 m, 27 Jun 1978, J.T. Polhemus, 1♂ (00116825) (JTP); 24 Jun 1979, J.T. Polhemus, 4♀ (00116826–00116829) (JTP). ***Garfield Co.:*** Baxter Pass (Radio Tower), 14 mi SE of CO State Border, 39.58194° N 108.95194° W, 2499 m, 09 Jul 1981, M.D. Schwartz, *Artemisia tridentata*, 1♂ (00112140), 1♀ (00112141) (CNC). ***Moffat Co.:*** Hamilton, 40.36719° N 107.61312° W, 2141 m, 03 Jul 1928, unknown, 1♀ (00134500) (USNM). ***Routt Co.:*** Steamboat Springs, 40.485° N 106.83111° W, 2134 m, 27 Jun 1982, J.T. and D.A. Polhemus, 1♂ (00116756), 1♀ (00116755), 2♂ (00116721, 00116987), 1♀ (00117196) (JTP). **Idaho:** ***Boise Co.:*** Mores Mountain, 43.78431° N 116.08616° W, 2103 m, 09 Jul 2006, A.R. Gillogly, 1♂ (00094015 [cat TAMU-ENTO X0283497]) (TAMU). ***Butte Co.:*** 6 mi S of Howe, 43.72439° N 113.00271° W, 1482 m, 16 Jun 1981, M. Stafford, *Chrysothamnus viscidiflorus*, 2♂ (00122357–00122358), 1♀ (00122359) (UID); 17 Jun 1981, M. Stafford, 3♂ (00122360–00122362) (UID); 02 Jul 1981, M. Stafford, 1♀ (00122363) (UID). 7.2 mi E of Howe, 43.80152° N 112.86416° W, 1463 m, 23 Jun 1965, W.F. Barr, 1♀ (00122430) (UID). 10 mi E of Howe, 43.8061° N 112.8411° W, 1475 m, 04 Jun 1969, W.F. Barr, 1♀ (00122334) (UID). ***Caribou Co.:*** Bancroft, 42.7202° N 111.88579° W, 1653 m, 23 Jun 1937, C. Wakeland, *Triticum* sp.

(Poaceae), paratype of junior synonym (*S. utahensis*), 1♂ (00112139) (CNC), (Poaceae), paratype of junior synonym (*S. utahensis*), 1♂ (00070078) (USNM). ***Cassia Co.:*** 5 mi W of Raft River, 42.5889° N 113.3278° W, 1347 m, 04 Jun 1981, R.P. Wight, 1♀ (00122364) (UID). ***Custer Co.:*** Mackay, 43.91463° N 113.61335° W, 1800 m, 06 Jun 1953, W.F. Barr, 1♂ (00122365), 3♀ (00122366–00122368) (UID). ***Jefferson Co.:*** 12.2 mi NW of Terreton Post Office on Rt 28, E side of rd 0.2 m N of milepost 178, Range Plot 29, 43.93701° N 112.63617° W, 1462 m, 20 Jun 1978, S.T. Rose, 1♂ (00122369) (UID). ***Oneida Co.:*** Holbrook, 42.16194° N 112.65306° W, 13 Jun 1969, G.F. Knowlton, 1♀ (00133543) (USNM). ***Power Co.:*** American Falls, 42.78611° N 112.85361° W, 05 Aug 1972, L.A. Kelton, *Artemisia* sp., 1♀ (00112137) (CNC). **Nevada:** ***Elko Co.:*** 15 mi SE of Elko on Rt 227, 40.67916° N 115.56002° W, 1707 m, 26 Jun 1983, R.T. Schuh and M.D. Schwartz, *Gutierrezia sarothrae*, 1♂ (00108379), 8♀ (00108380–00108387) (AMNH). ***Eureka Co.:*** 28 mi W of Eureka on Rt 50, 39.51278° N 116.4844° W, 1829 m, 27 Jun 1983, R.T. Schuh and M.D. Schwartz, *Gutierrezia sarothrae*, 2♀ (00108388–00108389) (AMNH). Eureka, 39.5127° N 115.96061° W, 25 Jun 1939, C.J.D. Brown, 1♀ (00127333) (UMMC). ***Lander Co.:*** Smith Creek Valley, 9.5 mi S of Rt 2, T15N R39E, 39.34156° N 117.50131° W, 1920 m, 30 Jun 1983, R.T. Schuh and M.D. Schwartz, 1♂ (00108377), 1♀ (00108378) (AMNH). ***Nye Co.:*** 11 mi N of Belmont, T10N R46E S26, 38.6801° N 116.7712° W, 2195 m, 29 Jun 1983, R.T. Schuh and M.D. Schwartz, *Chrysothamnus viscidiflorus*, 2♂ (00108830–00108831), *Gutierrezia sarothrae*, 47♂ (00107873, 00108139, 00108487, 00108786–00108829), 31♀ (00108488, 00108756–00108785) (AMNH). Atomic Test Site, 1.5 mi W of Area 12 camp on Stockade Wash Rd, 37.15941° N 116.21037° W, 07 Jun 1983, Schuh, Schwartz, and Stonedahl, *Ericameria nauseosa*, 25♂ (00107874, 00108732–00108755), 12♀ (00108140, 00108722–00108731, 00169983) (AMNH). Mercury, 19 M, 36.66056° N 115.99361° W, 24 Jun 1965, H.H. Knight and J. Merino, *Tetradymia glabrata*, paratypes, 2♂ (00112150–00112151), 2♀ (00112148–00112149) (CNC), paratypes, 2♂ (00119054–00119055), 2♀ (00119056–00119057) (TAMU), paratypes, 5♂ (00070015–00070018, 00070022), 12♀ (00070023–00070034) (USNM). ***White Pine Co.:*** 6 mi SW of Ely, 39.18616° N 114.96691° W, 2073 m, 23 Jun 1966, W. Gagne and J. Haddock, 1♂ (00112147) (CNC); 24 Jun 1966, W. Gagne, 1♂ (00119449) (UCB). **Utah:** ***Box Elder Co.:*** Cedar Creek, 41.96436° N 113.15638° W, 27 May 1969, G.F. Knowlton, 1♀ (00133541) (USNM). Hardup, 41.89556° N 113.15083° W, 03 Jul 1969, G.F. Knowlton, 1♀ (00133542) (USNM). Kelton Pass, 41.74611° N 113.10556° W, 27 May 1969, G.F. Knowlton, paratype of junior synonym (*S. knowltoni*), 1♂ (00112138) (CNC), paratype of junior synonym (*S. knowltoni*), 1♂ (00122254), 3♀ (00133537–00133539) (USNM); 13 Jun 1969, G.F. Knowlton, 1♀ (00133540) (USNM). ***Rich Co.:*** Allen Canyon, 41.62556° N 111.24944° W, 15 Jun 1966, G.F. Knowlton, 1♂ (00070081) (USNM). Bear Lake area, 41.92° N 111.4624° W, 2316 m, 22 Jun 1986–27 Jun 1986, C. and A. von Nidek, 1♂ (00190088) (ZMAN). ***Sanpete Co.:*** Log Canyon Road, 39.662° N 111.6828° W, 2012 m, 27 Jun 1964, A.T. Whitehead, 1♂ (00112144), 1♀ (00112142) (CNC). ***Sevier Co.:*** Clear Creek Narrows Summit on Rt 4, 38.58156° N 112.25678° W, 2243 m, 15 Jun 1980, R.T. Schuh and G.M. Stonedahl, 1♂ (00108374) (AMNH). ***Washington Co.:*** Hurricane, 37.17528° N 113.28917° W, 22 May 1963, G.F. Knowlton, 1♀ (00134593) (USNM). **Wyoming:** ***Lincoln Co.:*** 4 mi NW of Frontier, 41.85505° N 110.59128° W, 26 Jun 1966, W. Gagne, J. Haddock, 1♂ (00112143) (CNC).

Slaterocoris sheridani Knight
Figures 13, 45A–C, 46, 47; plates 3, 4O; map 9

Strongylocoris robustus: Van Duzee, 1921: 136 (disc. in part).

Slaterocoris sheridani Knight, 1968: 92, fig. 113 (orig. desc.); Kelton, 1968: 1125, fig. 8 (disc.); Knight, 1970: 255, fig. 2, (disc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog).

Slaterocoris dakotae Knight, 1970: 243, fig. 4 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 197 (catalog). NEW SYNONYMY.

Slaterocoris texanus Knight, 1970: 252, fig. 39 (orig. desc.); Henry and Wheeler, 1988: 451

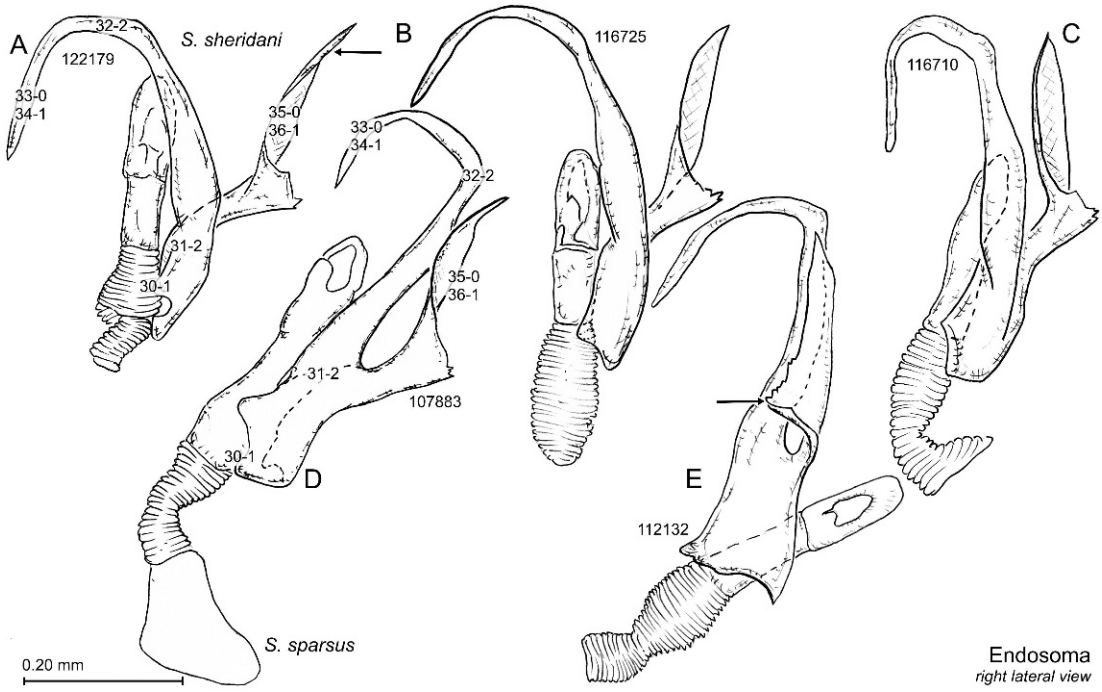


Fig. 45. *Slaterocoris* species, endosoma. A–C. *S. sheridani*. **A**. 8 mi W of Belfield, ND. **B**. Englewood, CO. **C**. 12 mi W of Pueblo, CO. D, E. *S. sparsus*. **D**. Caliente Creek Road, CA. **E**. Sespe Canyon, CA.

(catalog); Schuh, 1995: 199 (catalog). NEW SYNONYMY.

Slaterocoris basicornis Knight, 1970: 254, fig. 6 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 197 (catalog). NEW SYNONYMY.

Slaterocoris custeri Knight, 1970: 254, fig. 3 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 197 (catalog). NEW SYNONYMY.

Slaterocoris woodgatei Knight, 1970: 254, fig. 5 (orig. desc.); Henry and Wheeler, 1988: 452 (catalog); Schuh, 1995: 200 (catalog). NEW SYNONYMY.

DIAGNOSIS: Distinguished from other *Slaterocoris* species by the following combination of characters: coxae and trochanters black, femora black except for pale yellowish orange apical regions, tibiae pale yellowish orange or brown, tarsomeres black (fig. 13); vestiture of sparse, moderately short, reclining, dark simple setae (pl. 4O); antennal segments I and II usually black, sometimes segment I pale or dusky yellow (pl. 3); right paramere with entire (fig. 43C, D) or bifurcate (fig. 43B, E–G) medial process; twisted or concave dorsal lobe of endosomal spicule somewhat broad and gradually attenuate (fig. 44C–H). The proceeding features will also distinguish *S. sheridani* from other *flavipes*-group species, as *S. sparsus* has entirely pale yellowish femora (fig. 13) and *S. flavipes* and *S. longipennis* have dense and pale vestiture. *Slaterocoris sheridani* could be confused with members of the *breviatus* group, but these latter species are practically glabrous and tarsomeres I and II are pale (fig. 13). From *apache*-group species, the more sharply contrasting pale apical and dark portions of the femora will help discriminate *S. sheridani* (fig. 13) from *S. croceipes*, which has variable width orange-brown medial regions between the black bases and pale yellow apices (fig. 12). *Slaterocoris apache* has similar femoral coloration to *S. sheridani*, but has suberect, longer, pale dorsal vestiture (pl. 4B). In the female the shorter average antennal segment II of *S. sheridani* (0.82, 0.78–0.93) will further distinguish it from these *apache*-group species with longer average segment II (1.05, 0.96–1.13 *apache*; 1.02, 0.78–1.23 *croceipes*).

Fig. 46. *Slaterocoris sheridani*, right paramere. **A**. Near Fish Creek, AZ. **B**. Sunflower, AZ. **C**, **D**. 1 mi E of Stoneman Lake, AZ. **E**. Temple Wash, UT. **F**. 8 mi W of Belfield, ND. **G**. 5 mi S of Clarkdale, AZ. **H**. Pueblo, CO. **I**. Englewood, CO. **J**. 36 mi SE of Globe, AZ. **K**. Mazatzal Wilderness Area, AZ. **L**. Tajique, NM.

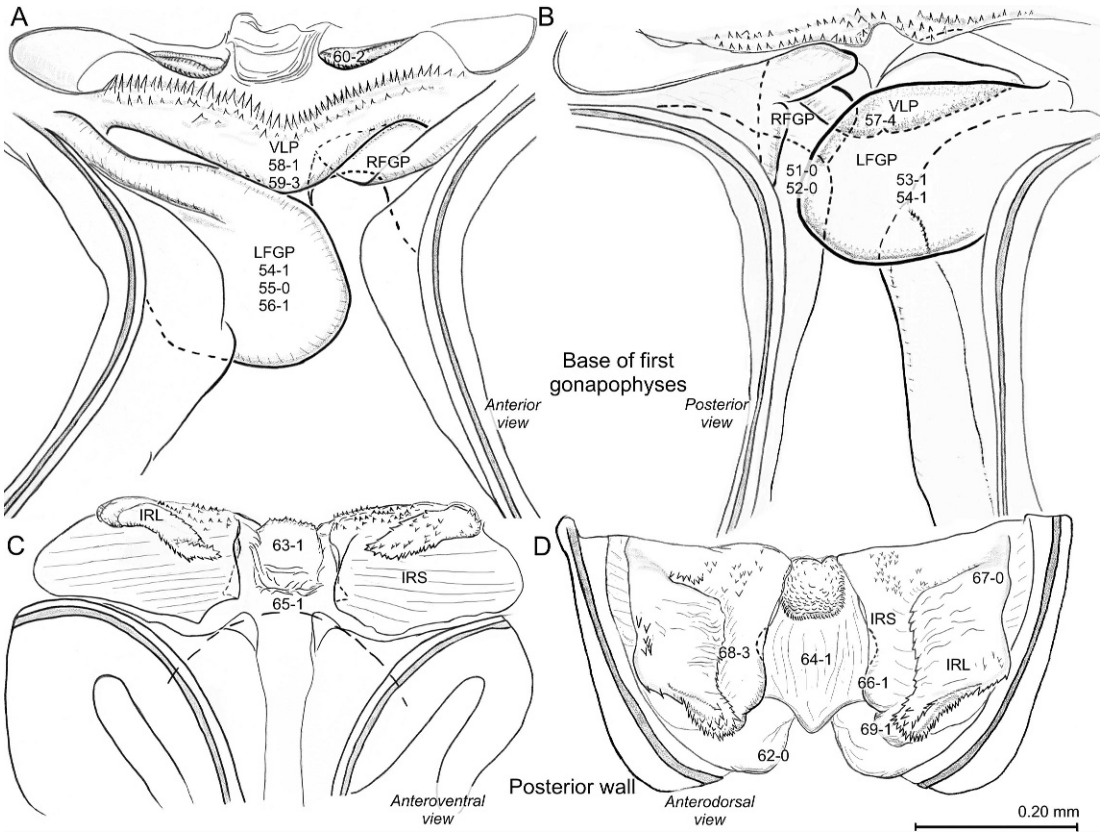


Fig. 47. *Slaterocoris sheridani*, female genitalia, 8 mi W of Belfield, ND.

REDESCRIPTION: *Male:* Moderately small, subovate; length 3.35–4.19, width 1.60–1.81 (pl. 3). COLORATION: Black; including antennal segments I and II, sometimes segment I and II mostly dusky pale yellowish to orange-brown basally; leg black, apical region of femur and tibia pale yellowish to orange-brown, distal region of femur without gradual tint progression from black to orange to yellow, color changes sharply from black to yellow (fig. 13). VESTITURE: Sparse, reclining, moderately short, brown to golden brown simple setae (pl. 4O). STRUCTURE: Body conformation roughly similar in both sexes; costal margin slightly curved; antennal segment II shorter than foretibia. MALE GENITALIA: As in species group except: **Endosomal spicule**: Dorsal lobe with narrow dorsal portion longer than wide basal portion; serration of basal portion sparse; apex of dorsal portion somewhat narrow (fig. 45A–C, arrow). **Right paramere**: Subapical region long with variable number of small spines and prominent and variable medial lobe, medial lobe either entire (fig. 46A–E, G, H arrow, L) or bifurcate (fig. 46F arrow, I–K).

Female: Moderately small, ovate; length 3.45–4.15, width 1.70–2.13 (pl. 3). COLORATION: As in the male, but antenna usually paler, antennal segment I extensively dusky pale basally, segment II widely pale medially, darker basally and distally; III and IV black; apices of femur with narrow orange-brown area between black basal and pale yellow apical regions. STRUCTURE: Costal margin arcuate. GENITALIA: As in species group except: **Vestibulum, anteroventral margin of anterior wall**: Sclerotized and incised medially, sclerotization reaching to lateral margins of bursa copulatrix (fig. 47B). **Ventral labiate plate**: Strongly produced, base

moderately wide, triangular, apex cleft (fig. 47A). **Second gonapophyses**: Anterior medial surface slightly convex (fig. 47C). **Interramal sclerite**: Dorsomedial region convex anteriorly, and posteromedial portion with flat plate abutting ovipositor bulb (fig. 47D). **Interramal lobe**: Basal (dorsal) insertion with sclerotized attachment, dorsomedial margin with short process (fig. 47D).

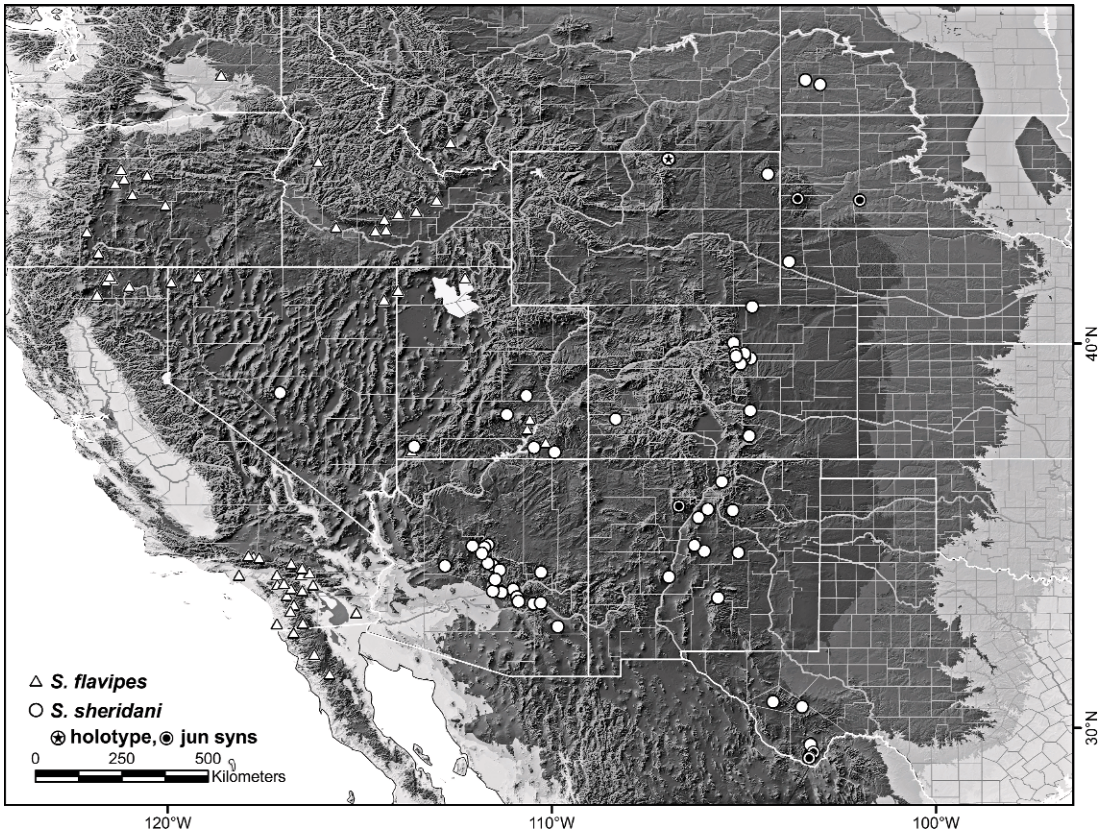
HOSTS: Specimens taken from these Asteraceae: an unidentified genus and species (2 specimens, 1 collection event), an unidentified species of *Artemisia* (15 specimens, 1 collection event), *Chrysothamnus* (one or more unidentified species [30 specimens, 3 collection events] and *C. viscidiflorus* [4 specimens, 1 collection event]), *Ericameria nauseosa* (6 specimens, 2 collection events), and *Gutierrezia sarothrae* (15 specimens, 2 collection events). Large numbers of specimens were taken from *G. sarothrae* at localities in Utah (7 specimens) and Nebraska (8 specimens). Even more specimens were collected from unspecified species of *Chrysothamnus* at Arizona (29 specimens) and Utah (3 specimens) sites; however, it is not possible to determine whether these occurrences should be attributed to *C. viscidiflorus* (or a congener) or *E. nauseosa*, or both. Based on the number of specimens and collecting events it is probable, as in other western species of *Slaterocoris*, that both rabbitbrush species and at least one species of *Artemisia* are breeding hosts. *Fraxinus cuspidata* Torr. (Oleaceae) (15 specimens, 1 collection event) is probably not a breeding host, but may prove to be a factor to the biology of *S. sheridani* in the same manner that species of *Lonicera* and *Symphoricarpos* (Caprifoliaceae) are to *S. pallidicornis*. Only two specimens are recorded from non-asteraceous plants; these are considered to be sitting records.

DISTRIBUTION: The southern extent is in west Texas, reaching west to the Mogollon Rim of east and central Arizona, north through the Rocky Mountain cordillera of New Mexico to the front range of Colorado, extending to the northern Great Plains from northern Colorado, to Wyoming, and southern North Dakota. Sporadic localities occur in the intermountain west of Colorado and Utah with the westernmost sites in the isolated ranges of Nevada and southern Utah (map 9).

COLLECTION SUMMARY: 335 specimens from 75 collection events, with the earliest records in April and May from the southern portion of the range in Arizona. Throughout the remaining distribution, collection dates cover June and July with August dates known from New Mexico and west Texas, as well as in the northern localities of South Dakota and Wyoming.

DISCUSSION: Knight (1968) described *S. sheridani* from Sheridan, Wyoming, based on two males taken in the same collection event. Subsequently, he similarly founded five additional species on a few specimens (Knight,1970) as follows: *S. basicornis*—male holotype from Big Bend, Texas; *S. custeri*—male holotype and male paratype (same collection event) from Custer, South Dakota, and female paratype from nearby Sundance, Wyoming; *S. dakotae*—male holotype from Interior, South Dakota, *S. texanus*—male holotype from Big Bend, Texas; and *S. woodgatei*—male holotype and two male paratypes from Jemez Springs, New Mexico (same collection event). The six nominal species were purportedly distinguished from each other by the vestiture coloration, body size, coloration of antennal segment I, comparative length of antennal segment II to head width or foretibia, and structure of the right paramere. All the proposed discriminating features have proven inadequate after examining the holotypes and other specimens fitting the diagnoses of the six nominal species.

Knight (1968, 1970) variously described the vestiture for these taxa as pallid (*basicornis*), pale yellowish to golden (*custeri*), pale to golden (*texanus*), golden yellow (*sheridani*), golden (*woodgatei*), and brownish (*dakotae*). Kelton (1968) characterized the coloration of *sheridani* as brownish. Accurately determining the coloration of the dorsal vestiture is difficult because of its sparse distribution, short length, and the vagaries of illumination. I can find no clear-cut geographically significant difference in the vestiture coloration; all are brown or golden brown. Body length in males spans 3.35 to 4.19 mm, encompassing the range of the holotypes of all the nominal species. Actually, the range (0.84) of the body length



Map 9. Localities for *Slaterocoris flavipes* and *S. sheridani*.

is smaller than in the related species *S. sparsus* (1.20), which is known only from southern California. The coloration of antennal segment I is variable across the distribution and within a collection event, ranging from pale yellow to black, with most specimens dusky yellowish brown; sometimes the dorsal aspect of the segment is paler than the ventral aspect. The length of antennal segment II is always shorter than the head width, but ranges from just shorter to almost one-third shorter.

The suggested structural differences in the right paramere (cf. Knight, 1970: 259, 265, figs. 2–6, 39) of the nominal species is actually less than the variation in the number and conformation actually documented (cf. fig. 47A–L) during the course of this study from across the distribution of the nominal species from North Dakota to New Mexico and Colorado to Utah. The medial process is entire (fig. 46A–E, G, H, L) or bifurcate (fig. 46F, I, J, K) and the tubercle on the basal region is entire (figs. 46E, F) or serrate (fig. 46A–C, G–L). A male with a large basal process (cf. fig. 46D) is apparently aberrant as a another male from the same collection event has more typical morphology (fig. 46C). Compared with the right paramere the structural variation it the endosomal spicule is minor, limited to the intensity of minute serration on the base of the dorsal lobe (fig. 45A–C).

The type localities of three of the nominal species in the northern Great Plains of North Dakota and Wyoming are within 500 km of each other, whereas the two nominal species from Texas are from Big Bend National Park having been collected on consecutive days, with one species collected in north-central New Mexico. A female, in the CNC, from the same collection event as the holotype and

paratype of *S. woodgatei*, has a Knight identification label of *S. sheridani* attached. Only minor differences are noted between the nominal species and all are well within the range incorporated in the reformed diagnosis of *S. sheridani* provided above. I am therefore treating *S. basicornis*, *S. custeri*, *S. dakotae*, *S. texanus*, and *S. woodgatei* as junior synonyms of *S. sheridani*.

Van Duzee (1921) mentioned that the CAS retained specimens of *S. robustus* from Boulder and Denver, Colorado. These are correctly identified as *S. sheridani* (see Other Specimens Examined).

HOLOTYPES: **USA: New Mexico: *Sandoval Co.:*** Jemez Springs [35.76861° N 106.69167° W, 1951 m], 07 Jun 1916–17 Jun 1916, unknown, 1♂ (AMNH_PBI 00134023) (USNM) (*S. woodgatei*: junior synonym). **South Dakota: *Custer Co.:*** Custer [43.76667° N 103.59833° W], 19 Aug 1927, H.H. Knight, 1♂ (AMNH_PBI 00122243) (USNM) (*S. custeri*: junior synonym). ***Jackson Co.:*** Interior [43.72694° N 101.98361° W], 28 Jun 1924, H.C. Severin, 1♂ (AMNH_PBI 00122245) (USNM) (*S. dakotae*: junior synonym). **Texas: *Brewster Co.:*** Big Bend National Park, Green Gulch [29.3321° N 103.2418° W, 1200 m], 14 Aug 1969, Board and Hafernik, 1♂ (AMNH_PBI 00133387) (USNM) (*S. basicornis*: junior synonym). South Rim Trail, Chisos Mountains, Big Bend National Park [29.22936° N 103.2954° W, 2118 m], 15 Aug 1969, Board and Hafernik, 1♂ (AMNH_PBI 00122266) (USNM) (*S. texanus*: junior synonym). **Wyoming: *Sheridan Co.:*** Sheridan [44.79722° N 106.95556° W], 03 Aug 1927, H.H. Knight, 1♂ (AMNH_PBI 00134021) (USNM) (*S. sheridani*: senior synonym).

OTHER SPECIMENS EXAMINED: **USA: Arizona: *Gila Co.:*** 2 mi W of Miami, 33.39917° N 110.90269° W, 1158 m, 04 May 1979, J.D. Pinto, E.M. Fisher, 1♂ (00119797) (UCR); 04 May 1979, J.D. Pinto, E.M. Fisher, 1♂ (00119891) (UCR). 12 mi W of Payson, 34.23083° N 111.53426° W, 975 m, 01 May 1981, D.A. and J.T. Polhemus, 7♂ (00116717, 00117259–00117264), 6♀ (00117207, 00117254–00117258) (JTP). 15 mi N of Globe on Ariz. 88, 33.60532° N 111.00531° W, 914 m, 28 Apr 1981, D.A. and J.T. Polhemus, 1♂ (00116716) (JTP). Globe, 33.2339° N 110.4711° W, 1074 m, 09 May 1931, D.K. Duncan, Asteraceae, 1♂ (00242642), 1♀ (00242643) (CAS), 5♂ (00112158, 00112160–00112163), 9♀ (00112159, 00112164–00112171) (CNC), 1♀ (00164892) (USNM). Mazatzal Wild[erness Reserve] along E Verde River, 34.28639° N 111.66417° W, 30 Apr 1981, D.A. and J.T. Polhemus, 6♂ (00116715, 00117265–00117269), 3♀ (00117270–00117272) (JTP). Rye, 34.10944° N 111.35306° W, 1067 m, 01 May 1981, D.A. and J.T. Polhemus, 19♂ (00116718, 00117197, 00117285–00117301), 11♀ (00117198, 00117275–00117284) (JTP). base of Pinal Mountains, 33.289° N 110.868° W, 1219 m, 30 May 1930, Parker and Duncan, *Prosopis* sp. (Fabaceae), 2♀ (00164890–00164891) (USNM). ***Graham Co.:*** 36 mi SE of Globe on I-70, 33.25239° N 110.28234° W, 853 m, 28 Jun 1981, D.A. and J.T. Polhemus, 1♀ (00116985) (AMNH), 1♀ (00116759), 11♂ (00116708, 00117330–00117339), 23♀ (00117199, 00117308–00117329) (JTP). Stockton Pass, Pinaleno Mountains, 32.64083° N 109.84306° W, 1631 m, 01 Jun 1983–02 Jun 1983, R.T. Schuh, G.M. Stonedahl, *Fraxinus cuspidata* Torr. (Oleaceae), 10♂ (00107902, 00169995–00170003), 6♀ (00108420, 00108854, 00170004–00170007) (AMNH). ***Maricopa Co.:*** Fish Creek, Tonto National Forest, 33.5352° N 111.306° W, 671 m, 09 May 1918–10 May 1918, J.C. Bradley, 6♂ (00116193 [cat Cornell Univ. Lot 542 Sub 130]–00116198 [cat Cornell Univ. Lot 542 Sub 130]), 13♀ (00116199 [cat Cornell Univ. Lot 542 Sub 130]–00116211 [cat Cornell Univ. Lot 542 Sub 130]) (CUIC). Salt River Canyon at Apache Lake, 33.55811° N 111.53153° W, 610 m, 28 Apr 1981, D.A. and J.T. Polhemus, 1♀ (00116832) (JTP). Sunflower, 33.8642° N 111.46763° W, 02 Jun 1981, J.T. Polhemus, 1♀ (00116831) (JTP); 23 May 1982, D.A. and J.T. Polhemus, Light Trap, 1♂ (00117273), 1♀ (00117274), 2♂ (00116726, 00116820) (JTP). nr Fish Creek on Rt 88, 33.525° N 111.3071° W, 800 m, 29 Apr 1981, D.A. and J.T. Polhemus, 1♂ (00116731) (JTP). ***Navajo Co.:*** 15–20 mi SW of Show Low, 34.04972° N 110.27592° W, 1707 m, 30 May 1983, Schuh, Stonedahl, and Massie, *Chrysothamnus* sp., 12♂ (00107903, 00108145, 00170008–00170017), 8♀ (00108962, 00170018–00170024) (AMNH). ***Yavapai Co.:*** 1 mi E of Stoneman Lake, interchange on I-70, T16E R7E Sec19, 34.76446° N 111.65654° W, 15

Jun 1983, R.T. Schuh and M.D. Schwartz, *Chrysothamnus* sp., 2♂ (00107901, 00107914), 6♀ (00108414–00108419) (AMNH), 1♀ (00119892) (UCR). 1 mi N of I-17 on Rt 179, T15N R6E Sec 18, 34.69423° N 111.75238° W, 1158 m, 15 Jun 1983, R.T. Schuh and M.D. Schwartz, 1♀ (00108413) (AMNH). 5 mi E of Camp Verde, 34.5373° N 111.8193° W, 975 m, 30 Apr 1981, J.T. Polhemus, 1♀ (00116833) (JTP). 5 mi S of Clarkdale, 34.736° N 112.0661° W, 1158 m, 30 Apr 1981, D.A. and J.T. Polhemus, 3♂ (00116719, 00117302–00117303), 4♀ (00117304–00117307) (JTP). Yarnell, Weaver Mountains, 34.21583° N 112.77778° W, 22 May 1937, L.K. Gloyd, 1♂ (00127469), 1♀ (00127470) (UMMC); 23 May 1937, L.K. Gloyd, 1♂ (00127471) (UMMC); 24 May 1937, L.K. Gloyd, 1♂ (00127472) (UMMC); 27 May 1937, L.K. Gloyd, 1♂ (00127466), 2♀ (00127467–00127468) (UMMC). **Colorado:** ***Arapahoe Co.:*** Cherry Creek Reservoir, 39.6134° N 104.822° W, 1707 m, 21 Jun 1980, D.A. Polhemus, 1♀ (00116835) (JTP). Englewood, 39.64778° N 104.98722° W, 11 Jun 1978, D.A. and J.T. Polhemus, 1♀ (00116761), 4♂ (00116725, 00117235–00117237), 8♀ (00117200, 00117238–00117244) (JTP). ***Boulder Co.:*** Boulder, 40.015° N 105.27° W, 1676 m, 21 Jul 1903, E.P. Van Duzee, 3♀ (00242644–00242646) (CAS). ***Denver Co.:*** Denver, 39.73917° N 104.98417° W, 12 Jul 1903, E.P. Van Duzee, 1♀ (00242725) (CAS). ***Douglas Co.:*** Roxborough Park Road near Chatfield State Park, 39.47389° N 105.08472° W, 1707 m, 04 Jun 1981, D.A. Polhemus, 1♂ (00116834) (JTP). nr Waterton, Roxborough Road, 39.49361° N 105.08806° W, 1707 m, 04 Jun 1981, D.A. Polhemus, 1♀ (00117246) (JTP); 22 Jun 1981, D.A. Polhemus, 1♀ (00117245) (JTP). ***Huerfano Co.:*** 5 mi W of Walsenburg, 37.5981° N 104.8581° W, 1981 m, 06 Jul 1982, D.A. and J.T. Polhemus, 1♀ (00116841) (JTP). ***Jefferson Co.:*** Golden, 39.75556° N 105.22056° W, 1829 m, 21 Jun 1961, W.R.M. Mason, 1♂ (00112156), 1♀ (00112156) (CNC). Red Rocks Park, 39.66972° N 105.20278° W, 23 Jun 1982, D.A. Polhemus, 1♂ (00116760) (JTP); 21 Jun 1988, D.A. Polhemus, 1♂ (00116838), 1♀ (00116839) (JTP). ***Montrose Co.:*** 18 mi SE of Naturita, 38.03432° N 108.33444° W, 08 Jul 1980, J.T. and D.A. Polhemus, 1♂ (00116840) (JTP). ***Pueblo Co.:*** 12 mi W of Pueblo off Hwy 96, 38.25444° N 104.82952° W, 15 Jun 1980, J.T. and D.A. Polhemus, 1♀ (00116986) (AMNH), 3♂ (00116710, 00116836–00116837), 10♀ (00116842–00116844, 00117247–00117253) (JTP). ***Weld Co.:*** 17.5 mi N of Nunn, Pawnee National Grassland, 40.9566° N 104.78028° W, 08 Jul 1973–09 Jul 1973, J.A. Slater and R. Baranowski, 1♂ (00107917), 2♀ (00108411–00108412) (AMNH). **Nebraska:** ***Sioux Co.:*** 13 mi N of Mitchell on Rt 29, 42.12708° N 103.81981° W, 1387 m, 17 Jun 1998, A.G. Wheeler, Jr., *Gutierrezia sarothrae*, 5♂ (00133545, 00164966–00164969), 3♀ (00164970–00164972) (USNM). **Nevada:** ***Nye Co.:*** Round Mountain, 38.71776° N 117.07025° W, 1920 m, 20 Apr 1915, E.G. Holt, 1♂ (00070116) (USNM). **New Mexico:** ***Guadalupe Co.:*** Milagro, 34.5618° N 105.1421° W, 1767 m, 23 Jun 1941, Burt Hogden, 2♂ (00117909, 00117927), 2♀ (00169993–00169994) (KU). ***Lincoln Co.:*** 5 mi N of Ruidoso, 33.3824° N 105.6729° W, 2225 m, 16 Aug 1970, J.R. and M.H. Sweet, 1♂ (00118223), 1♀ (00119073) (TAMU). ***San Miguel Co.:*** Las Vegas, Hot Springs, 35.65389° N 105.29111° W, H.S. Barber, 1♂ (00134360) (USNM). ***Sandoval Co.:*** Bandelier National Monument, 35.4718° N 106.181° W, 2071 m, 23 Jun 1964, H.R. Burke, 1♂ (00134362) (USNM); 02 Jun 1969, W.F. Chamberlain, 3♂ (00119070–00119072) (TAMU). Jemez Springs, 35.76861° N 106.69167° W, 15 Jun 1915, Woodgate, 1♀ (00119069) (TAMU). Jemez Springs, 35.76861° N 106.69167° W, 1951 m, 07 Jun 1916–17 Jun 1916, unknown, 1♀ (00112154), paratype of junior synonym (*S. woodgatei*), 1♂ (00112153) (CNC), 1♂ (00119068) (TAMU), paratype of junior synonym (*S. woodgatei*), 1♂ (00122269) (USNM). ***Santa Fe Co.:*** Santa Fe, 35.68694° N 105.93722° W, 21 Jul 1926, E.C. Van Dyke, 1♀ (00242431) (CAS). ***Socorro Co.:*** Socorro County, 33.93194° N 106.94889° W, 18 Aug 1927, P.A. Readio, 1♂ (00112155) (CNC). ***Taos Co.:*** Taos, 36.40722° N 105.5725° W, 20 Aug 1927, P.A. Readio, 1♀ (00133546) (USNM). ***Torrance Co.:*** Moriarty, 34.5924° N 106.0257° W, 1896 m, 23 Jun 1941, L.H. Banker, 2♂ (00117922, 00117928), 3♀ (00109068–00109070) (KU). Tajique, 34.75167° N 106.28722° W, 25 Jun 1941, E.L. Todd, 3♂ (00117919–00117921), 1♀ (00109064) (KU); 25

Jun 1941, R.H. Beamer, 1♂ (00117794), 2♂ (00117917–00117918), 3♀ (00109065–00109067) (KU); 25 Jun 1941, Burt Hogden, 5♂ (00117912–00117916), 2♀ (00109062–00109063) (KU). **North Dakota:** ***Billings Co.:*** 8 mi W of Belfield at Fryburg Oil Field, 46.8499° N 103.4000° W, 776 m, 28 Jun 2000, T.J. Henry, *Ericameria nauseosa*, 3♂ (00122179, 00164962–00164963), 2♀ (00134116, 00164964) (USNM). ***Stark Co.:*** 127 R Ave. 4 mi N of 48 R St. SW [9 mi S of South Heart], 46.73333° N 103.01666° W, 27 Jun 2000, T.J. Henry, *Ericameria nauseosa*, 1♂ (00164965) (USNM). **South Dakota:** ***Custer Co.:*** Custer, 43.76667° N 103.59833° W, 19 Aug 1927, H.H. Knight, paratype of junior synonym (*S. custeri*), 1♂ (00112152) (CNC), 1♀ (00134379) (USNM). **Texas:** ***Brewster Co.:*** Big Bend National Park, 29.56527° N 103.26055° W, 31 Aug 1986–02 Sep 1986, East, Haack, Kovarik, 1♀ (00119077) (TAMU). Big Bend National Park, Lost Mine Trail (lower), 29.27° N 103.27861° W, 1829 m, 09 Sep 1988, R. Anderson, 1♀ (00119078) (TAMU). Big Bend National Park, Pinnacles Trail (upper), 29.25166° N 103.29666° W, 2103 m, 21 Jun 2004, E.G. Riley, 1♀ (00245405) (TAMU). ***Jeff Davis Co.:*** H.O. Canyon, Davis Mountains, 30.6832° N 104.2432° W, 1890 m, 23 Aug 1968, J.E. Hafernik, 1♀ (00133547) (USNM). Madera Canyon, 30.5544° N 103.4849° W, 1031 m, 06 Aug 2000, E.G. Riley, 3♀ (00119074–00119076) (TAMU). **Utah:** ***Emery Co.:*** 6.2 mi W of Rt 24 in Temple Wash (on Goblin Valley Rd), 38.64044° N 110.66253° W, 1602 m, 19 Jun 1983, R.T. Schuh and M.D. Schwartz, *Gutierrezia sarothrae*, 2♂ (00107908, 00108398), 5♀ (00108399–00108403) (AMNH). ***Garfield Co.:*** Capitol Reef National Park, Grand Wash, Cobab Canyon Trail, 38.15° N 111.16667° W, 1827 m, 21 Jun 1983, R.T. Schuh, M.D. Schwartz, *Chrysothamnus viscidiflorus*, 1♂ (00107911), 3♀ (00108404–00108406) (AMNH). ***San Juan Co.:*** 3 mi W of Clay Hills Crossing Road on Rt 263, T39S R15E, 37.29533° N 110.45878° W, 1524 m, 18 Jun 1983, R.T. Schuh and M.D. Schwartz, 1♀ (00108407), 1♂ (00107910) (AMNH). Goosenecks Overlook, Goosenecks State Park, 37.17778° N 109.92556° W, 1524 m, 17 Jun 1983, R.T. Schuh and M.D. Schwartz, *Chrysothamnus* sp., 3♂ (00107904, 00108408, 00108410) (AMNH). ***Washington Co.:*** 15 mi N of Saint George, 37.32° N 113.58° W, 13 Jun 1935, Dobzhansky, 1♂ (00133544) (USNM). **Wyoming:** ***Crook Co.:*** Sundance, 44.40639° N 104.37528° W, 20 Jul 1927, H.H. Knight, paratype of junior synonym (*S. custeri*), 1♀ (00122244) (USNM). ***Sheridan Co.:*** Sheridan, 44.79722° N 106.95556° W, 03 Aug 1927, H.H. Knight, paratype, 1♂ (00134361) (USNM).

Slaterocoris sparsus Kelton

Figures 13, 45D–E, 48; plate 3; map 10

Slaterocoris sparsus Kelton, 1968: 1125, fig. 7 (orig. desc.); Knight, 1970: 251, fig. 21, (disc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog).

DIAGNOSIS: Distinguished among *flavipes*-group species by the obviously pale yellow antennal segment I with black basal annulus, the yellowish-orange femora except for the black bases (fig. 13), the sparse, almost glabrous, short, dark vestiture, and the right paramere without a medial lobe (fig. 48, arrow). The femora in *S. sheridani* are black with a pale yellow apical regions; in *S. longipennis*, the femora are almost entirely pale; both species have antennal segment I black. The vestiture of *S. flavipes* is dense, long, and pale.

REDESCRIPTION: *Male:* Moderately small, subovate; length 3.10–4.30, width 1.45–2.05 (pl. 3). COLORATION: Black; antennal segment I pale yellow to yellowish orange, black basally, segment II black, sometimes with diffuse, dusky pale yellowish brown basally and toward middle; leg yellowish orange, black coxa, trochanter, on base of femur, apex of tibia, and tarsomeres. VESTITURE: Sparse, reclining, short, brown simple setae. STRUCTURE: Body conformation both sexes similar. MALE GENITALIA: As in species group except: **Endosomal spicule**: Dorsal lobe with narrow dorsal portion longer than wide basal portion; serration of basal portion sparse (fig. 45E, arrow); apex of dorsal portion slightly expanded (fig. 45D, E). **Right paramere**: Subapical region short with variable number of small spines (fig. 48A–D).

Female: Moderately small, ovate; length 3.75–4.30, width 1.70–2.08 (pl. 3). COLOR-

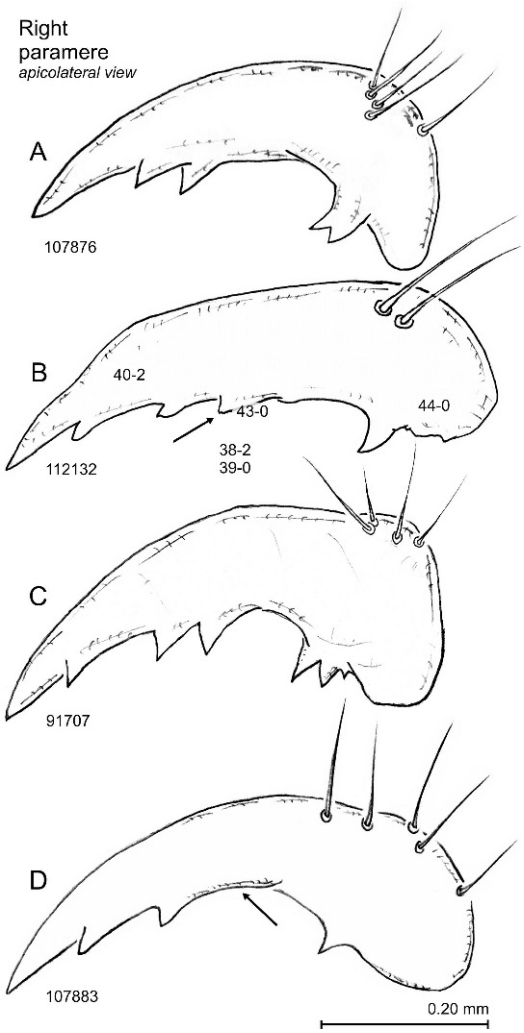


Fig. 48. *Slaterocoris sparsus*, right paramere. **A**. Phelan, CA. **B**. Sespe Canyon, CA. **C**, **D**. Caliente Creek Road, CA.

ATION: As in male except antennal segment II usually paler medially. STRUCTURE: Costal margin strongly curved. GENITALIA: As in species group except: **Vestibulum, anteroventral margin of anterior wall**: Sclerotized and incised medially, sclerotization reaching to lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced, base moderately wide, triangular, apically cleft. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly, posteromedial portion with tumid process abutting ovipositor bulb. **Interramal lobe**: Basal (dorsal) insertion with membranous attachment, dorsomedial margin with short process.

HOSTS: *Ericameria nauseosa* (Asteraceae) (118 specimens, 6 collection events) is the only known breeding host. A native California species of Asteraceae, *Hymenoclea salsola* (1 specimen, 1 collection event), upon more collecting may eventually prove to be a breeding host, but three non-asteraceous plants are considered to be sitting records.

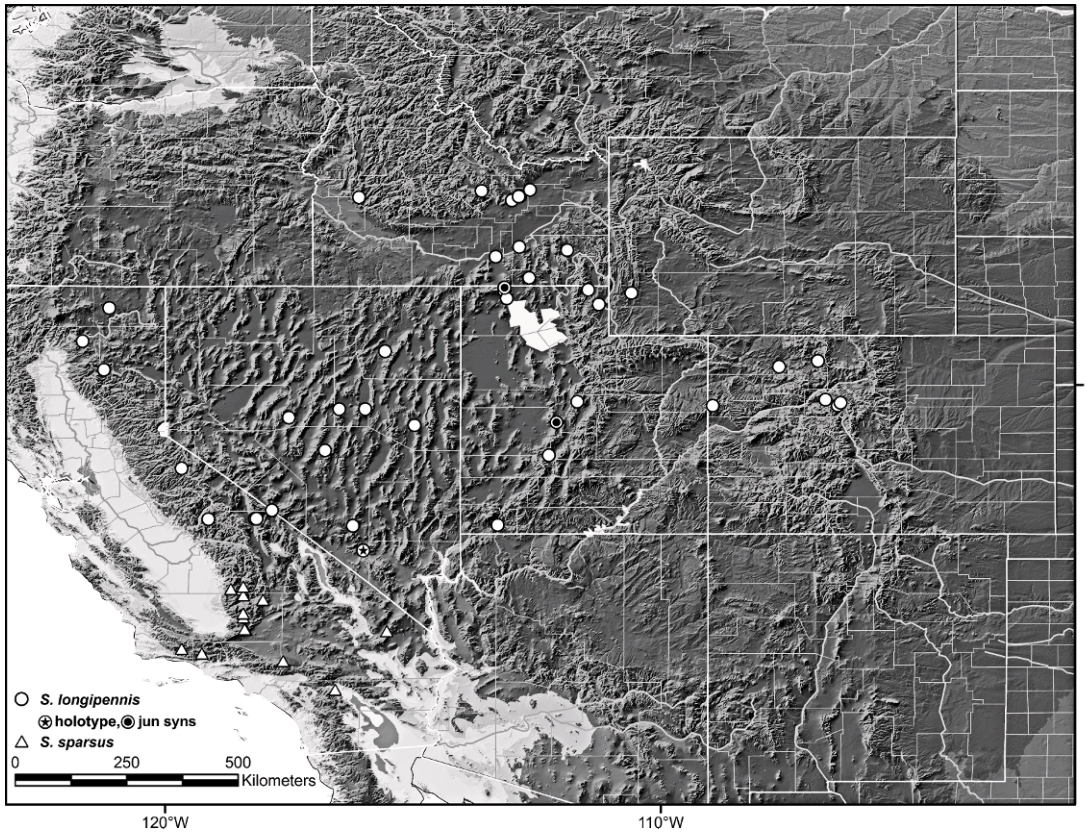
DISTRIBUTION: Apparently limited to montane chaparral and woodland habitats of southern California in the transverse ranges and the southern extent of the Sierra Nevada Mountains bordering the western and southern boundary of the Mojave Desert. The western and easternmost localities are in Ventura County and the Providence Mountains, respectively (map 10).

COLLECTION SUMMARY: Known from 133 specimens from 14 collection events with almost all the specimens collected in May; some from early July in Ventura County are outliers.

DISCUSSION: Some specimens of *S. sheridani* from Arizona and Nevada have antennal segment I pale to dusky pale yellow, but black occupies more of the femora basally in these specimens and the antennal segment I is not clearly pale yellow with a black basal annulus as in *S. sparsus*. Additionally, the male of *S. sheridani* has a medial lobe in the right paramere, a feature not known in *S. sparsus*.

HOLOTYPE: **USA: California: *Tulare Co.:*** California Hot Springs [35.88028° N 118.67278° W], 23 May 1940, C.G. Lewis, (Poaceae), 1♂ (AMNH_PBI 00112133) (CNC).

OTHER SPECIMENS EXAMINED: **USA: California: *Kern Co.:*** 12 mi N of Kernville, 35.8723° N 118.4547° W, 975 m, 10 May 1997, W.F. Chamberlain, 1♂ (00245374) (TAMU). E of Caliente on Caliente Creek Rd, Twin Oaks, 35.30702° N 118.4233° W, 836 m, 22 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Saunders UCR 140644 [PBI_CAL04-H126], 15♂ (00091707, 00092015–00092027, 00371989), 8♀ (00092028–00092035) (AM), 12♂ (00107883, 00108621–00108631),



Map 10. Localities for *Slaterocoris longipennis* and *S. sparsus*.

12♀ (00108142, 00108611–00108620, 00322851) (AMNH). E of Caliente on Walker Basin Road, 35.38774° N 118.425° W, 1220 m, 22 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. Field ID, 14♂ (00322832–00322845), 5♀ (00322846–00322850), *Lupinus albifrons* Benth. (Fabaceae), det. A. Sanders UCR 140627 [PBI CAL04-H129], 1♂ (00137232) (AMNH). S of Tehachapi on Tehachapi Willow Springs Rd, 35.05502° N 118.3696° W, 1329 m, 21 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Saunders UCR 140653 [PBI_CAL04-H92], 20♂ (00092051–00092069, 00371990), 11♀ (00092041–00092050, 00371991) (AM). S of Tehachapi on Tehachapi Willow Springs Rd, 35.06889° N 118.3959° W, 1393 m, 21 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. Field ID, 4♂ (00322852–00322855), 1♀ (00322856) (AMNH). Walker Pass on Rt 178, 35.6625° N 118.02583° W, 1600 m, 18 May 2000, M.D. Schwartz, *Ericameria nauseosa*, 1♀ (00108642) (AMNH). nr Kernville, Headquarters Camp, Sequoia National Forest, 35.75472° N 118.42444° W, 18 Jun 1993, W.F. Chamberlain, 1♂ (00119050), 1♂, 1♀ [in copulo] (00119051) (TAMU). ***Riverside Co.:*** Chino Canyon, mouth of, T4S R4E S7, 33.8488° N 116.5705° W, 680 m, 23 Apr 1996, M. Swearingen, 1♂ (00119799) (UCR). ***San Bernardino Co.:*** Phelan, Rt 138 at Phelan Road, 34.42531° N 117.6174° W, 1310 m, 16 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Ericameria nauseosa*, det. A. Saunders UCR 140595 [PBI_CAL04-H2], 1♂ (00092036), 3♀ (00092038–00092040), *Hymenoclea salsola*, det. A. Saunders UCR 140682 [PBI_CAL04-H11], 1♀ (00092037) (AM), *Ericameria nauseosa*, det. A. Saunders UCR 140595 [PBI_CAL04-H2], 6♂ (00107876, 00108606–00108610), 4♀ (00108603–00108605, 00169984), (AMNH). Providence Mountains

State Recreation Area, 35.03028° N 115.52722° W, 1311 m, 18 May 1982, M.D. Schwartz, *Rhamnus ilicifolia* Kellogg (Rhamnaceae), 1♂ (00112032) (CNC). ***Santa Barbara Co.:*** Bluff Campground, San Rafael Mountains, 34.67388° N 119.66652° W, 1356 m, 29 May 1959, unknown, 1♂ (00119874) (UCR). ***Tulare Co.:*** 12 mi N of Kernville, 35.92877° N 118.42444° W, 10 May 1997, W.F. Chamberlain, 1♂ (00119052), 1♀ (00291139) (TAMU). California Hot Springs, 35.88028° N 118.67278° W, 23 May 1940, C.G. Lewis, (Poaceae), paratype, 1♀ (00112134) (CNC). ***Ventura Co.:*** Sespe Canyon, 34.5786° N 119.259° W, 1076 m, 10 Jul 1959, C.A. Campbell, paratypes, 2♀ (00121701–00121702) (CAS), paratype, 1♂ (00112132) (CNC).

Slaterocoris hirtus species group

DIAGNOSIS: *Slaterocoris alpinus*, *S. hirtus*, and *S. mohri* are distinguished by body conformation, overall size, vestiture color, angle, and length, and features of the male genitalia. COLORATION: Antennal segment I and II black; legs black, except apices of femora narrowly pale; sometimes pale on tibiae and antennal segment I distally and segment II at base. VESTITURE: With dense, long, suberect or erect, brown simple setae (pl. 4A, I, J, fig. 50B, C). STRUCTURE: Body conformation variable; frons striate (fig. 50A). MALE GENITALIA: **Pygophore**: Tergal process short with broad base and one apical point (figs. 49F, 52D, E, 55I). **Phallotheca**: Left lateral surface slightly compressed (figs. 49D, E, 52I, J, 55H). **Endosomal spicule**: Ventral lobe with uniform thickness throughout apical region, distal portion with variable marginally serration (figs. 49A–C, 52A–C, 55A–C). **Right paramere**: Large, apical region usually with three narrow parallel spines, subapical region wide with variable process, basal lobe narrow and elongate (figs. 49I–O, 51, 52H, 54, 55G). **Left paramere**: Distal portion shorter than basal portion with ventral surface diameter equal throughout (figs. 49G, H, 52F, G, 55E, F). FEMALE GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view (fig. 53B), right lateral surface small, comparative size at overlap with left greater than right (fig. 53A, B). **Left first gonapophyses**: Dorsal surface concave, apex wide (fig. 53B). **Vestibulum, anteroventral margin of anterior wall**: Widely sclerotized medially, with sclerotized reaching lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced, with moderately wide, triangular base (fig. 53A). **Second gonapophyses**: Anterior medial surface moderately to strongly convex (fig. 53D). **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly, posteromedial portion with tumid process abutting ovipositor bulb, ventromedial region overlapping second gonapophysis basally and ventromedial plate of interramal sclerite (fig. 53C, D). **Interramal lobe**: Dorsal or basal insertion with membranous attachment, dorsomedial margin with narrow lobe, ventral projection short with concave anterior surface (fig. 53D).

Features of the male genitalia will distinguish all the species of the *hirtus* group from one another. The base of the dorsal lobe in the endosomal spicule in *S. alpinus* is entire and marginal serrations are small (fig. 49A–C, arrow); in *S. hirtus*, the dorsal lobe is either bifurcate (fig. 52A arrow, C) or entire (fig. 52B, arrow) and marginal serrations are prominent (fig. 52A–C); in *S. mohri*, it is bifurcate and generally lacking serration (fig. 55A–D, arrow). Significant species-specific variation is found in the right paramere, particularly in the size of the tubercle adjacent to the parallel apical spines, the distance between the medial process and the apical spines, and the size and attenuation of the medial process. In *S. alpinus*, the tubercle is small, the distance is short, and the process is truncate with terminal spines (fig. 49I–O, arrow); in *S. hirtus*, the tubercle is removed from the apical spines and prominent, the distance is long, and the process is prominent and sharply attenuate (figs. 51A–G, 52H, arrow); and in *S. mohri*, the tubercle is prominent and sometimes merging with the base of the apical spines, the distance is long and the process is somewhat thick apically (figs. 54A–F arrow, 55G).

DISCUSSION: Two characters contribute unique, but ambiguous, support to the *hirtus* group. Under slow optimization the tergal process with a broad base and one apical point (23-4) and a narrow right paramere with an elongate basal lobe (44-3) support this species group. Brown vestiture (9-2)

present on all species of the *hirtus* group, occurs widely in the genus and the ventromedial portion of the interramal sclerite overlapping the second gonapophysis (66-2) supports the *hirtus* group under slow or fast optimization is also present in *S. clavatus*.

Slaterocoris alpinus Kelton
Figures 1, 12, 49; plates 1, 4A; map 11

Slaterocoris alpinus Kelton, 1968: 1128, fig. 14 (orig. desc.); Knight, 1970: 239, fig. 41 (disc.); Henry and Wheeler, 1988: 448 (catalog); Schuh, 1995: 196 (catalog).

Slaterocoris schaffneri Knight, 1970: 240, fig. 37 (orig. desc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog). NEW SYNONYMY.

DIAGNOSIS: External characters will distinguish *S. alpinus* from other completely black species. The striate frons and dense, fine, brown vestiture of *S. alpinus* are distinct from the smooth frons and sparse, bristlelike, black vestiture in *S. robustus*; its brown dorsal setae differ from the silvery dorsal setae in *S. argenteoides*, *S. argenteus*, *S. digitatus*, and *S. simplex*. Within the *hirtus* group, united by the large medial process and long basal region of the right paramere, all the antennal segments of *alpinus* are shorter than in *S. hirtus* and *S. mohri* (e.g., segment II in *S. alpinus* 0.75–0.90♂, 0.76–0.85♀; in *S. hirtus* 1.30–1.50♂, 1.20–1.33♀; in *mohri* 1.09–1.20♂, 1.03–1.20♀). The labium is also shorter in *S. alpinus* (0.83–0.93♂, 0.89–1.03♀) than in *S. hirtus* (1.05–1.18♂, 1.05–1.19♀) or *S. mohri* (1.00–1.13♂, 1.10–1.20♀). All species of the *hirtus* group have long brown vestiture (cf. pl. 4A, I, J), in *S. alpinus* the setae are slightly shorter than in the other two species.

REDESCRIPTION: *Male:* Moderately large, subovate; length 3.50–4.10, width 1.65–1.83 (pl. 1). COLORATION: Completely black including all appendages (fig. 12). VESTITURE: With dense, long to moderately long, suberect, fine, brown simple setae (pl. 4A). STRUCTURE: Body conformation in both sexes similar, costal margin slightly curved. GENITALIA: As in species group, but modified as follows. **Endosomal spicule**: Distal portion of ventral lobe moderately long and moderately serrate marginally; dorsal lobe with base entire and small marginal serration (fig. 49A–C, arrow). **Right paramere**: Medial process situated near parallel apical spines, bent distally, truncate with strong apical serration; tubercle basal to parallel spines, barely separated from parallel spines (fig. 49M, arrow), small with broad base and serrations (fig. 49I–O, arrow).

Female: Moderately small, obovate; length 3.90–4.30, width 1.84–2.05 (pl. 1). STRUCTURE: Costal margin curved. GENITALIA: As in species group except: **Second gonapophyses**: With anterior medial surface moderately slightly convex.

HOSTS: Unknown. The only plant record is from one specimen on mountain mahogany, *Cercocarpus montanus* Raf. (Rosaceae); this is considered a sitting record. The presumed host of *S. alpinus* would certainly be asteraceous as known for all *Slaterocoris* species. Focused collecting will be required to determine whether the host(s) is (are) species of *Silphium* or *Helianthus* as is known for the two most closely related species, *S. hirtus* and *S. mohri*. The known range of *S. alpinus* is predominantly in drier habitats, so presumably the eventual breeding host would be a plant adapted for arid conditions.

DISTRIBUTION: Western Great Plains from southern North Dakota south to mid-Texas, easternmost record from eastern Kansas, the westernmost from southcentral Montana (map 11).

COLLECTION SUMMARY: 79 specimens from 29 collection events. Earliest date in late April from Texas, latest date in mid-August from South Dakota, main phenology from May to July.

DISCUSSION: Kelton (1968) based *S. alpinus* on three specimens from the same collection event, distinguishing it from congeners by the coloration, vestiture, and male genitalia. Knight (1970) recognized *S. schaffneri* utilizing the same suite of diagnostic features. In his key to species, Knight (1970) separated these nominal species based on femoral coloration, attributing more pale coloration to *S. alpinus* than in those specimens examined by Kelton (1968). The femora are completely black in the holotypes of *S. alpinus* and *S. schaffneri* and all other specimens examined. Based on identical coloration, vestiture, and male genitalia, noting a negligible amount of variation in

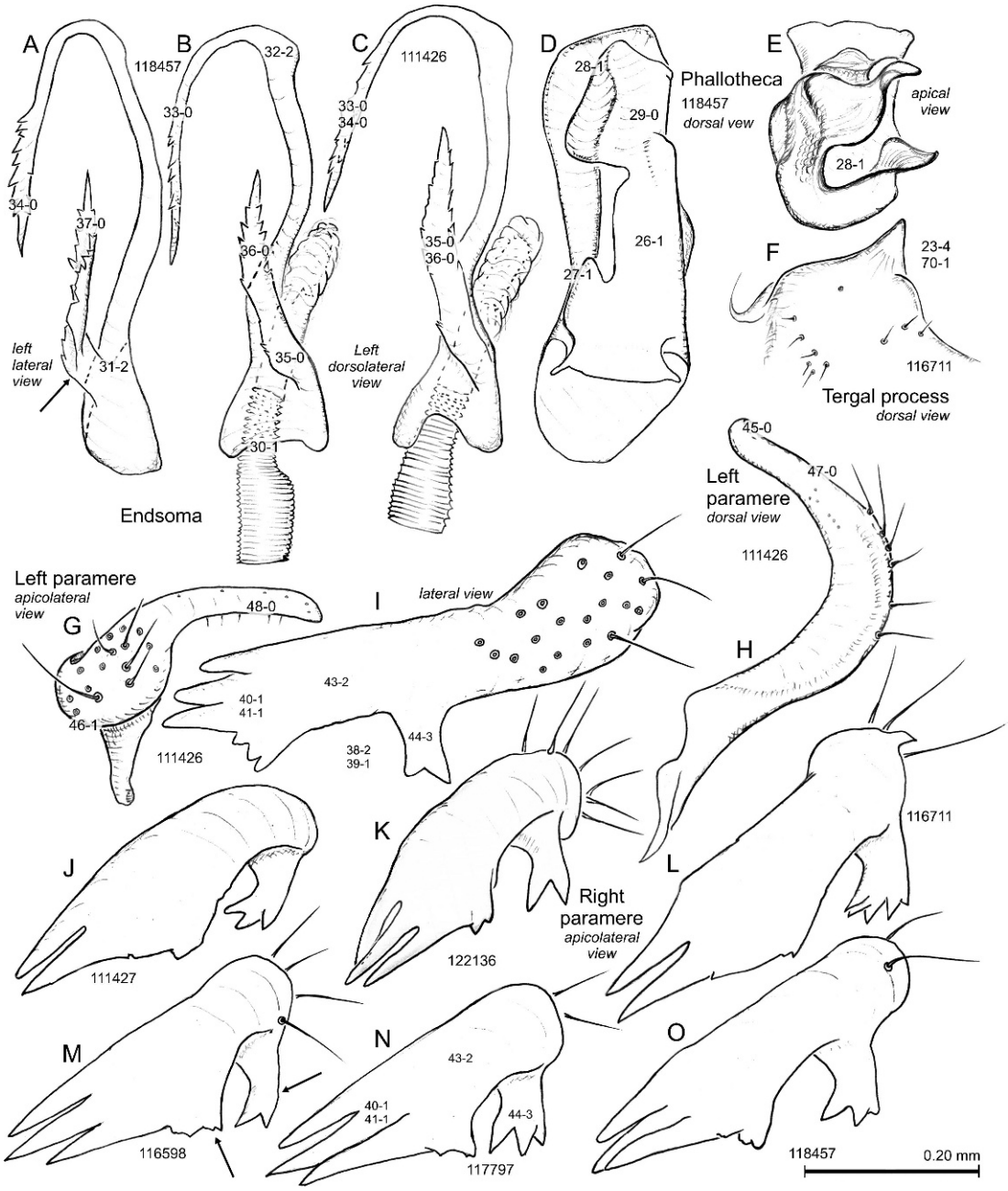


Fig. 49. *Slaterocoris alpinus*, male genitalia. **A**, **B**, **D**, **E**, **O**. 2 mi W of Iredell, TX. **C**, **G**–**I**. Flagstaff Canyon, CO. **F**, **L**. Red Rocks Park, CO. **J**. Wood Lake, NE. **K**. Pope Bend Road, TX. **M**. Goshen Co., WY. **N**. Linn Co., KS.

the endosomal spicule and right paramere, I treat *S. schaffneri* as a junior synonym of *S. alpinus*. In the endosomal spicule the distal region of the ventral lobe is variable in the size and density of the marginal serration but the base of the dorsal lobe is uniformly entire, not showing the variation in structure as noted in *S. hirtus* (fig. 52A–C). The structure

of the right paramere is slightly more variable in the size and number of apical spines, prominence of the nearby tubercle, and number of apical spines on the medial process as documented in specimens from Colorado, Kansas, Nebraska, Texas, and Wyoming (fig. 49I–O).

HOLOTYPES: **USA: Colorado:** ***Boulder Co.:*** Boulder, Flagstaff Canyon [40.00165° N 105.3074° W, 1768 m], 30 Jun 1961, B.H. Poole, 1♂ (AMNH_PBI 00111423) (CNC) (*S. alpinus*: senior synonym). **Texas:** ***Bosque Co.:*** 2 mi W of Iredell [31.985° N 97.90575° W], 12 May 1971, J.C. Schaffner, 1♂ (AMNH_PBI 00134020) (USNM) (*S. schaffneri*: junior synonym).

OTHER SPECIMENS EXAMINED: **USA: Colorado:** ***Boulder Co.:*** Boulder, 40.015° N 105.27° W, 1676 m, 20 Jul 1953, R.R. Dreisbach, 1♀ (00127331) (UMMC). Boulder, Flagstaff Canyon, 40.00165° N 105.3074° W, 1768 m, 30 Jun 1961, B.H. Poole, paratype, 1♂ (00111426) (CNC). ***Douglas Co.:*** Perry Park, 39.25667° N 104.99194° W, 08 Jul 1982, J.T. Polhemus, 1♀ (00116768) (JTP). ***Elbert Co.:*** 3 mi E of Kiowa, 39.34722° N 104.4078° W, 1981 m, 16 Jul 1983, R.T. Schuh, D.A. and J.T. Polhemus, *Cercocarpus montanus*, 1♂ (00108146) (AMNH). ***Jefferson Co.:*** Lookout Mountain, 39.7324° N 105.238° W, 2134 m, 03 Jul 1922, unknown, 1♀ (00111428) (CNC). Red Rocks Park, 39.66972° N 105.20278° W, 23 Jun 1982, D.A. Polhemus, 2♀ (00116766–00116767), 1♂ (00116711) (JTP). **Kansas:** ***Linn Co.:*** Linn County, no specific locality, 38.21667° N 94.85° W, 263 m, R.H. Beamer, 1♂ (00117797) (KU); 01 Jul 1915, R.H. Beamer, 1♂ (00117813) (KU). ***Scott Co.:*** Lake Scott State Park, 38.67461° N 100.91562° W, 26 Jul 1992, E.G. Riley, 1♀ (00118474) (TAMU). **Montana:** ***Yellowstone Co.:*** Huntley Experimental Station [Montana State University Southern Agricultural Research Center], 45.92414° N 108.24401° W, 912 m, 18 Jun 1931, unknown, 1♂ (00070051) (USNM). **Nebraska:** ***Cherry Co.:*** [Fort] Niobrara [National Wildlife] Refuge, Valentine, 42.91066° N 100.48272° W, 768 m, 24 Jul 1945, unknown, 1♂ (00134604) (USNM). ***Garden Co.:*** Wood Lake, 41.91664° N 102.3501° W, 27 Jun 1973, L.A. Kelton, 1♂ (00111427) (CNC). ***Sioux Co.:*** Warbonnet [Battlefield Monument], Oglala National Grassland, 42.92743° N 103.72861° W, 1119 m, unknown, 1♂ (00134413) (USNM). **North Dakota:** ***Kidder Co.:*** Kidder County, no specific locality, 46.76032° N 99.50514° W, 577 m, 14 Jul 1920, A.A. Nichol, 1♂ (00134412) (USNM). **South Dakota:** ***Custer Co.:*** Custer, 43.76667° N 103.59833° W, 19 Aug 1927, H.H. Knight, 1♂ (00134606), paratype of junior synonym, 1♂ (00134414), 4♀ (00134415–00134418) (USNM). **Texas:** ***Anderson Co.:*** Salmon, 31.57278° N 95.49806° W, 27 Apr 1985, P.W. Kovarik, 1♀ (00118473) (TAMU). ***Bastrop Co.:*** Pope Bend Road, 1 mi N of Rt 71, 3.7 mi E of Travis Co. line, 30.15527° N 97.45083° W, 168 m, 10 May 2002, T.J. Henry and P.S.F. Ferreira, 1♂ (00122136) (USNM). ***Bosque Co.:*** 2 mi W of Iredell, 31.985° N 97.90575° W, 29 May 1969, J.C. Schaffner, paratype of junior synonym, 1♂ (00111424) (CNC), paratypes of junior synonym, 3♂ (00122261–00122263) (USNM); 06 May 1970, J.C. Schaffner, paratype of junior synonym, 1♀ (00111425) (CNC), paratypes of junior synonym, 1♀ (00116763) (JTP), 4♀ (00118484–00118487), paratypes of junior synonym, 7♂ (00118448, 00118457–00118458, 00118477–00118480), 4♀ (00118449, 00118481–00118483), paratype of junior synonym, 1♀ (00118459) (TAMU); 09 May 1970, J.C. Schaffner, paratype of junior synonym, 1♀ (00118495) (TAMU); 22 May 1970, J.C. Schaffner, paratype of junior synonym, 1♂ (00116762) (JTP), paratypes of junior synonym, 4♂ (00118488–00118491), 3♀ (00118492–00118494) (TAMU); 03 May 1971, J.C. Schaffner, 2♂ (00118501–00118502), 1♀ (00118503) (TAMU); 12 May 1971, J.C. Schaffner, 1♂ (00118504) (TAMU); 20 May 1971, J.C. Schaffner, 2♀ (00118506–00118507) (TAMU); 28 May 1971, J.C. Schaffner, 1♂ (00118505) (TAMU); 21 Apr 1972, J.C. Schaffner, 1♂ (00116764), 1♀ (00116765) (JTP), 3♂ (00118496–00118498), 2♀ (00118499–00118500) (TAMU). ***Randall Co.:*** Palo Duro Canyon State Park, 34.95033° N 101.66578° W, 860 m, 19 Jul 1968, J.C. Schaffner, 1♂ (00134411) (USNM). ***Unknown co.:*** "Tex", "333", unknown, 1♀ (00111429) (CNC). **Wyoming:** ***Goshen Co.:*** Goshen County, no specific locality, 42.08333° N 104.35° W, 02 Jul 1943, R. Pfadt, 1♂ (00116598) (ESUW).

Slaterocoris hirtus (Knight)
Figures 12, 50A–B, 51–53; plates 2, 4I; map 11

Strongylocoris hirtus Knight, 1938: 4, fig. 4 (orig. desc.).

Slaterocoris hirtus: Kelton, 1959: 30, fig. 68 (male genit.); 1968: 1130, fig. 15 (disc.); Knight, 1970: 248, fig. 45 (disc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog); Wheeler 2001: 153 (biol.).

DIAGNOSIS: Distinguished among the *hirtus*-group species by the dimorphic body conformation with the male long (4.70–5.60), elongate, and parallel sided (fig. 50B) and the female ovoid (pl. 2). In contrast, the sexes are similar in *S. alpinus*, with the male short (3.50–4.10) and the female costal margin only slightly curved (pl. 1); in *S. mohri*, the male is moderately long (3.80–4.50) and both sexes have curved costal margins, with those in the female conspicuously arcuate (pl. 2). The mostly pale appendages and black head will distinguish *S. hirtus* from the large *punctatus*-group species with long, dense vestiture. The species-specific features of the male genitalia in the *hirtus* group are presented above in the diagnosis of that group.

REDESCRIPTION: *Male:* Large, elongate; length 4.70–5.60, width 2.10–2.30 (pl. 2, fig. 50B); COLORATION: Black; antennal segment I mostly pale basally, II yellow basally, femur pale apically, tibia pale, tarsomeres pale, except for darkened terminal segment (fig. 12); rarely antenna and legs completely black. VESTITURE: Dense, long, suberect, brown simple setae (pl. 4I, fig. 50A, B). STRUCTURE: Hemelytra elongate, costal margin subparallel. GENITALIA: As in species group, but modified as follows. **Pygophore**: Tergal process with relatively long point, sometimes point short (fig. 52D, E). **Phallotheca**: Left lateral surface sometimes roughened (fig. 52J, arrow). **Endosomal spicule**: Distal portion of ventral lobe long and strongly serrate marginally; dorsal lobe with base usually bifurcate with large, flat, strongly marginally serrate lateral ramus, medial ramus short and sometimes serrate (fig. 52A, C); sometimes base entire with small marginal serration (fig. 52B). **Right paramere**: Medial process removed from parallel apical spines, prominent, conical, slightly bent distally, with strong serration mostly on distal surface (figs. 51A–E, 52H, arrow); sometimes medial process without serration (fig. 51F, arrow, G); tubercle basal to parallel spines, clearly separated

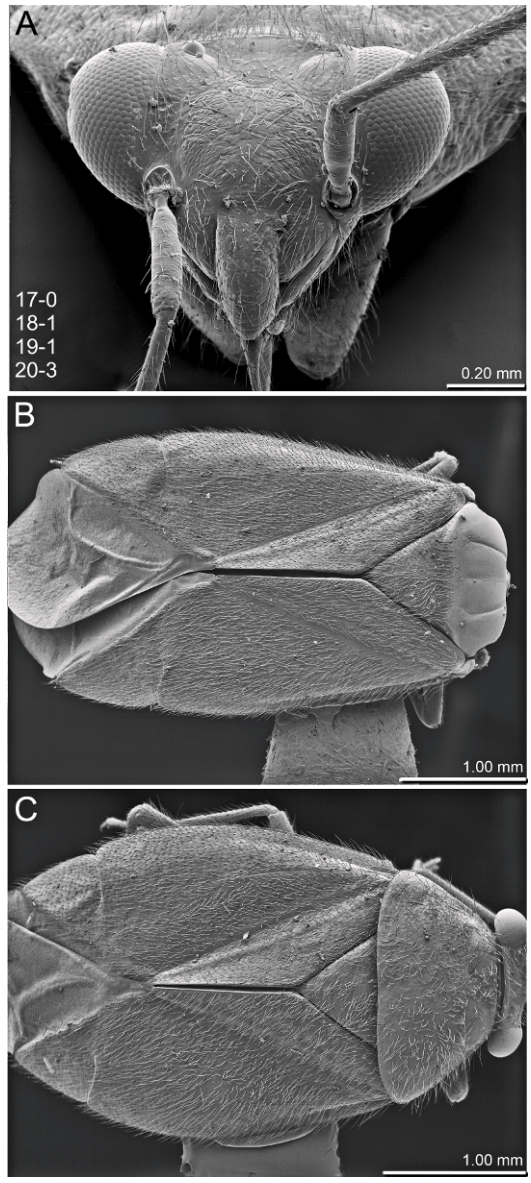


Fig. 50. *Slaterocoris* species, scanning electron micrographs. A, B. *S. hirtus*. **A**. Head, anterior view. **B**. Scutellum and hemelytra, dorsal view. **C**. *S. mohri*, body, dorsal view.

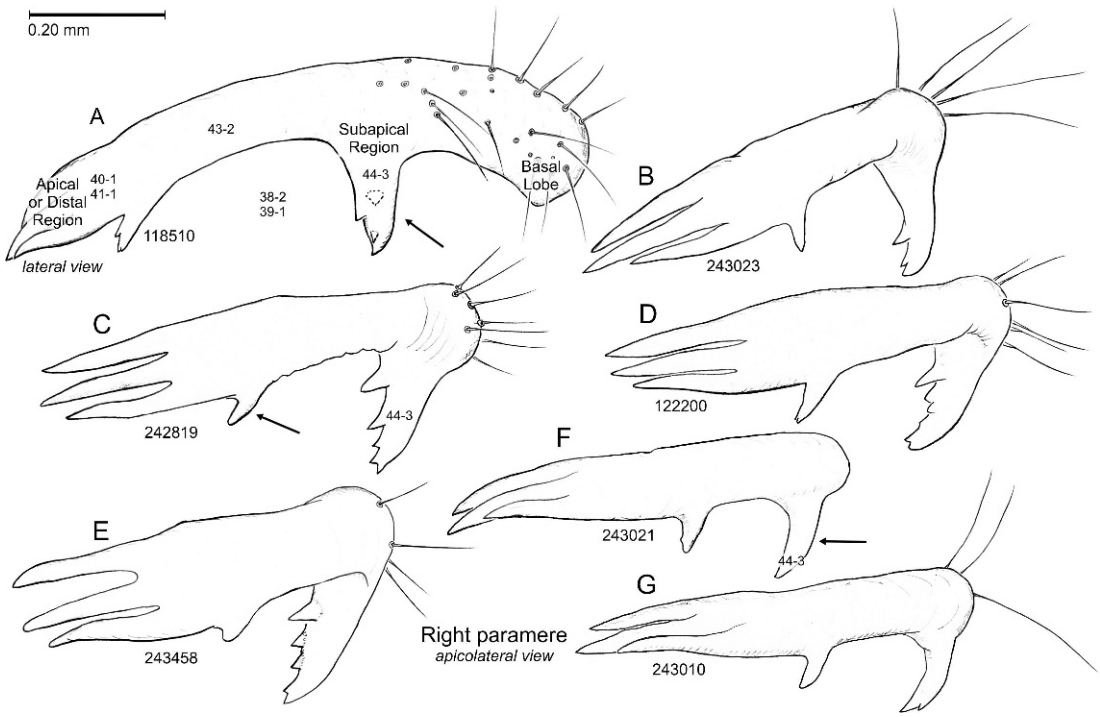


Fig. 51. *Slaterocoris hirtus*, right paramere. **A**. 6 mi SE of Mt. Pleasant, IA. **B**. The Pinnacles, MO. **C**. Huzzah State Forest, MO. **D**. 4 mi S of Moko, AR. **E**. West Union, IL. **F**. 1 mi E of jct. 160 and 248, MO. **G**. Taum Sauk Mt. State Park, MO.

from parallel spines, prominent usually without serration (fig. 51B–G, arrow).

Female: Large, ovate; length 4.00–4.50, width 2.05–2.35 (pl. 2). STRUCTURE: Costal margin strongly curved, arcuate. GENITALIA: As in species group except: **Second gonapophyses**: With anterior medial surface strongly convex (fig. 53A–D).

HOSTS: *Silphium perfoliatum* (Asteraceae) is the only recorded plant association with a species-level determination and is the presumed breeding host. It prefers moist soil in low woodland situations. Unidentified species of *Helianthus* (Asteraceae) and *Silphium* are the only other plant records. Foliar chlorosis was observed on *S. perfoliatum* in Arkansas as a result of feeding by *S. hirtus* (Wheeler, 2001).

DISTRIBUTION: In the Eastern Great Plains from northern Iowa and eastern Illinois south through Missouri and Arkansas to mid-Texas in transitional grassland and forest habitats (map 11).

COLLECTION SUMMARY: 160 specimens from 43 collection events. Earliest date in early April from east Texas, main phenology from May to July.

DISCUSSION: Three males from two localities in Missouri (243010, 243011, 243021, listed below) differ from the holotype and typical specimens of *S. hirtus* as follows: dorsal vestiture of erect, long, fine, and black simple setae (as in *S. mohri*); antenna, labium, and legs black, except apices of femora, distal one-third of tibiae, and sometimes tarsomeres pale (typically these structures are more extensively pale); tergal process has a short spine (cf. fig. 52D–E); dorsal lobe of endosomal spicule entire, not bifurcate (as typically), attenuate, with minute marginal serration (cf. fig. 52B to A, C; features known in *S. alpinus*, fig. 49A–C); notch on left dorsal side of phallotheca aperture deeper than in more typical *S. hirtus* (cf. fig. 52J to I); and right paramere long, with smooth basal spine and smooth spine

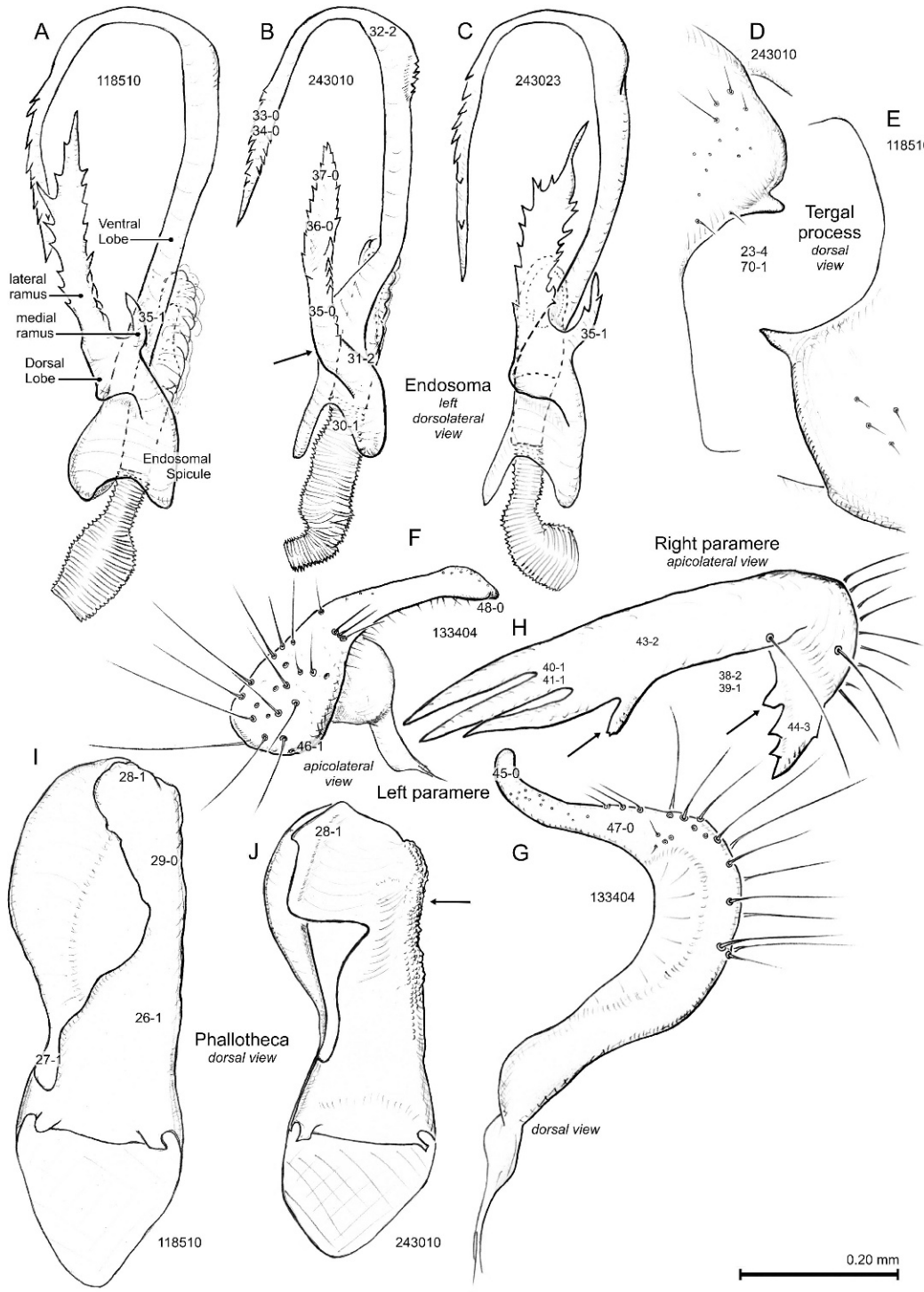


Fig. 52. *Slaterocoris hirtus*, male genitalia. **A**, **E**, **I**. 6 mi SE of Mt. Pleasant, IA. **B**, **D**, **J**. Taum Sauk Mt. State Park, MO. **C**. The Pinnacles, MO. **F**–**H**. Ames, IA.

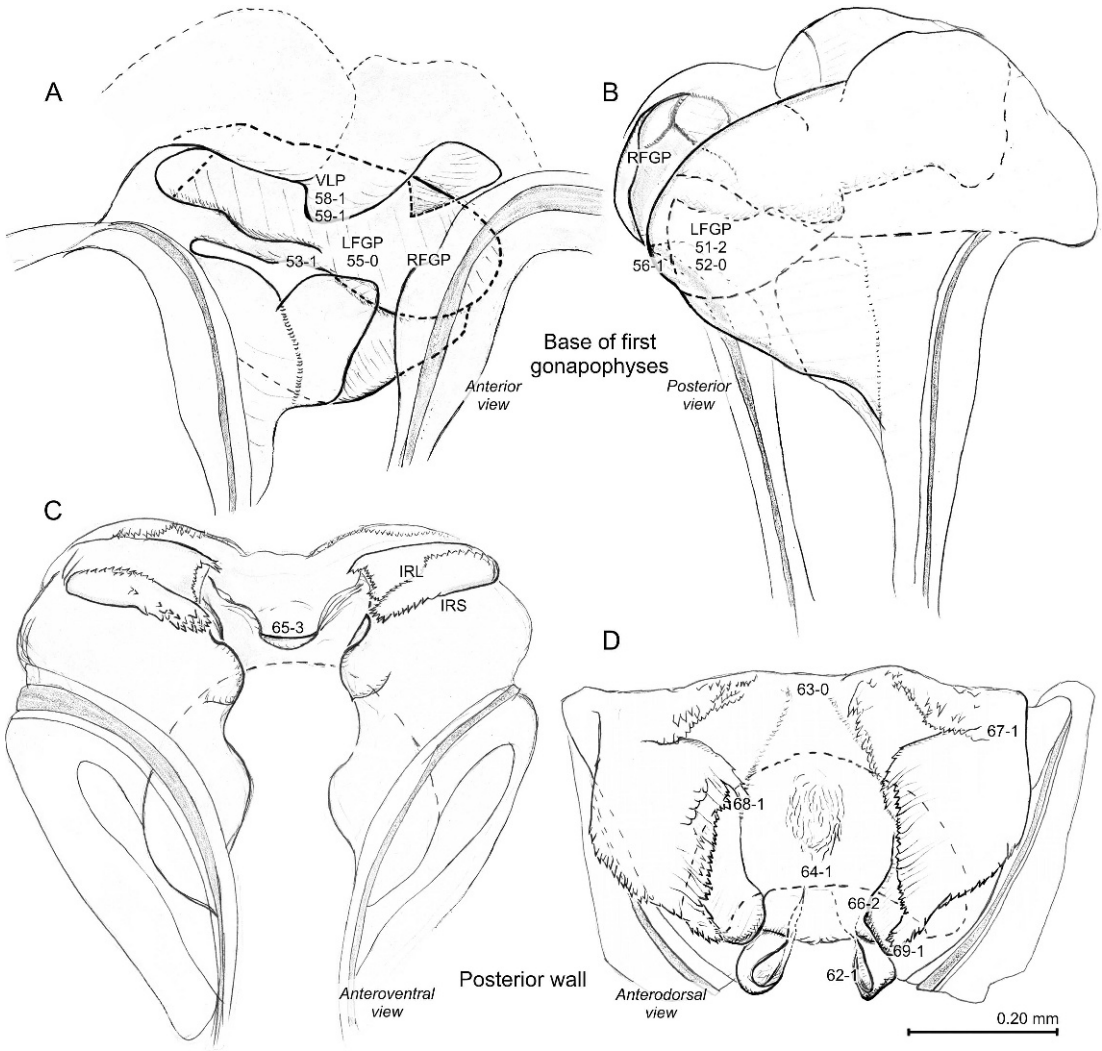


Fig. 53. *Slaterocoris hirtus*, female genitalia. 4 mi S of Moko, AR.

adjacent to three parallel apical spines (cf. fig. 51F, G to 51A–E, 52H). Typical *S. hirtus* have the dorsal vestiture of suberect, slightly shorter, fine, and golden brown simple setae; antenna black with segment I, except for base, pale, segment II pale basally; labium with segment II pale; legs black, except femora pale apically, tibiae pale except for apex, and tarsomeres pale except for III apically; dorsal lobe of endosomal spicule bifurcate, medial ramus attenuate, sometimes serrate marginally, lateral ramus with a few large marginal serrations; right paramere long, with medially serrate basal spine and shorter smooth spine adjacent to parallel apical spines. In light of the far greater range of intraspecific variation encountered in some species of the genus, I consider the features of the Missouri specimens to represent variation in appendage color and male genitalia of *S. hirtus* and not that of a new species of *Slaterocoris*.

HOLOTYPE: **USA: Iowa:** ***Story Co.:*** Ames [42.03472° N 93.61972° W], 01 Jul 1929, H.H. Knight, 1♂ (AMNH_PBI 00134028) (USNM).

OTHER SPECIMENS EXAMINED: **USA: Arkansas:** ***Fulton Co.:*** Rt 395, 4 mi S of Moko, 36.40866° N 91.81816° W, 213 m, 13 Jun 2004, T.J. Henry and A.G. Wheeler, Jr., *Silphium perfoliatum*, 3♂ (00122204–00122206), 8♀ (00122207–00122214) (USNM). ***Newton Co.:*** Pruitt Access at Buffalo River, Rt 7, 36.0623° N 93.13684° W, 253 m, 16 Jun 1987, T.J. Henry and A.G. Wheeler, Jr, *Silphium perfoliatum*, 1♂ (00122215), 6♀ (00122216–00122221) (USNM). ***Washington Co.:*** Fayetteville, 36.0625° N 94.15722° W, 15 Jun 1987, T.J. Henry and A.G. Wheeler, Jr., *Silphium perfoliatum*, 19♂ (00122222–00122239, 00122279), 22♀ (00122280–00122301) (USNM). **Illinois:** ***Calhoun Co.:*** Hardin, 39.15667° N 90.61778° W, 05 Jun 1932, H.L. Dozier, paratype, 1♂ (USNM); 05 Jun 1932–09 Jun 1932, H.L. Dozier, paratype, 1♂ (00243457) (INHS). ***Clark Co.:*** West Union, 39.21583° N 87.66611° W, 26 Jun 1932, Ross and Dozier, paratypes, 2♂ (USNM); 26 Jun 1932, Ross, Dozier, Park, paratype, 1♂ (00243458), 1♀ (00243455) (INHS). ***Coles Co.:*** Charleston, 39.4684° N 88.1796° W, 205 m, 14 Jun 1931, H.H. Ross, paratype, 1♂ (00243456) (INHS), paratype, 1♂ (USNM). ***Vermilion Co.:*** Oakwood, 40.11611° N 87.77833° W, 14 Jun 1930, Frison, *Silphium* sp., 1♂, 2 immatures (00243453–00243454), paratypes, 4♂ (00243448–00243451), 1♀ (00243452) (INHS). **Iowa:** ***Henry Co.:*** 5 mi SW of Mount Pleasant, 40.91249° N 91.62541° W, 19 Jun 1966, J.C. Schaffner, 5♂ (00291082–00291086), 6♀ (00291087–00291092) (TAMU); 30 Jun 1976, J.C. Schaffner, 3♀ (00245332–00245334) (TAMU). 6 mi SE of Mount Pleasant, T71N R7W Sec. 28, 40.90227° N 91.47663° W, 16 Jun 1962, J.C. Schaffner, 1♂ (00118510), 3♀ (00118511–00118513) (TAMU). 6 mi SE of Mount Pleasant, T71N R7W Sec. 28, 40.90227° N 91.47663° W, 16 Jun 1962, J.C. Schaffner, 1♂ (00118450) (TAMU). 7 mi SW of Mount Pleasant, 40.89205° N 91.65243° W, 16 Jun 1966, J.C. Schaffner, 1♂ (00118514) (TAMU); 19 Jun 1966, J.C. Schaffner, 5♂ (00291093–00291097), 2♀ (00291096–00291097) (TAMU). ***Humboldt Co.:*** unknown (only County #46), Humboldt County, 42.76477° N 94.20963° W, 02 Jul 1932, Barker, 1♀ (00118509) (TAMU). ***Story Co.:*** Ames, 42.03472° N 93.61972° W, 13 Jul 1927, H.H. Knight, paratype, 1♂ (00111431), 1♀ (00111434) (CNC); 21 Jun 1928, H.H. Knight, paratype, 1♂ (00111430) (CNC); 21 Jun 1928, H.H. Knight, *Silphium perfoliatum*, paratype, 1♂ (00133404) (USNM); 01 Jul 1929, H.H. Knight, *Silphium perfoliatum*, paratypes, 3♂ (00133401–00133403) (USNM); 01 Jul 1929, H.H. Knight, paratype, 1♂ (00118508), 1♀ (00118451) (TAMU); 17 Jun 1930, E.T., *Silphium perfoliatum*, paratype, 1♂ (00133405) (USNM); 02 Jul 1930, H.H. Knight, paratype, 1♀ (00108148) (AMNH), paratype, 1♂ (00111432), 1♀ (00111433) (CNC); 02 Jul 1930, H.H. Knight, *Silphium perfoliatum*, paratypes, 5♀ (00133406–00133410) (USNM); 01 Jul 1932, B.V. Travis, 1♀ (00111435) (CNC). ***Winneshiek Co.:*** Decorah, 43.3033° N 91.7857° W, 02 Jul 1950, Hicks and Slater, 1♂ (00108147) (AMNH). **Kansas:** ***Shawnee Co.:*** Topeka, 39.04833° N 95.67804° W, 288 m, 01 Jul 1930, Popenoe, 1♀ (00134376), paratype, 1♂ (00134377) (USNM). **Missouri:** ***Boone Co.:*** Boone County, no specific locality, 39.0355° N 92.3335° W, 195 m, 16 Jun 1972, D.D. Koop, 1♂ (00243022), 6♀ (00243048–00243053) (UMRM). Columbia, 38.95167° N 92.33389° W, 10 Jun 1941, R.C. Froeschner, 1♂ (00134378) (USNM); 11 Jun 1958, W.R. Enns, 1♂ (00243019), 1♀ (00243055) (UMRM); 20 Jul 1982, R.L. Blinn, *Silphium* sp., 1♀ (00242824) (NCSU). Grindstone Natural Area, 38.92973° N 92.31811° W, 198 m, 15 Jun 1981, R.L. Blinn, 1♂ (00243020), 1♀ (00243054) (UMRM). Rock Bridge [Memorial] State Park, 4.5 mi S of Columbia, 38.8779° N 92.3302° W, 186 m, 01 Jun 1975, S.E. Thewke, 2♂ (00243018, 00243044), 3♀ (00243045–00243047) (UMRM). The Pinnacles, 39.1337° N 92.3227° W, 213 m, 30 May 1988, O.R. Edwards, 1♂ (00243023) (UMRM). ***Crawford Co.:*** Huzzah State Forest, 37.9182° N 91.1725° W, 219 m, 19 Jun 1980, R.L. Blinn, *Helianthus* sp., 1♂ (00242819), 4♀ (00242820–00242823) (NCSU). ***Gasconade Co.:*** Gasconade County, no specific locality, 38.6734° N 91.5629° W, 165 m, 17 Jun 1971, T.R. Yonke, 1♀ (00243025) (UMRM). ***Iron Co.:*** Taum Sauk [Mountain] State Park, Wiemer Hill Glade, 37.5534° N 90.7174° W, 457 m, 15 May 2000, D.G. LeDoux, 2♂ (00243010–00243011) (UMRM). ***Jefferson Co.:*** Kimmswick, 38.36528° N 90.36278° W, 07 Jun 1942, R.C. Froeschner, 1♀ (00134039) (USNM); 30 May 1944, E.H. Froeschner, 1♀

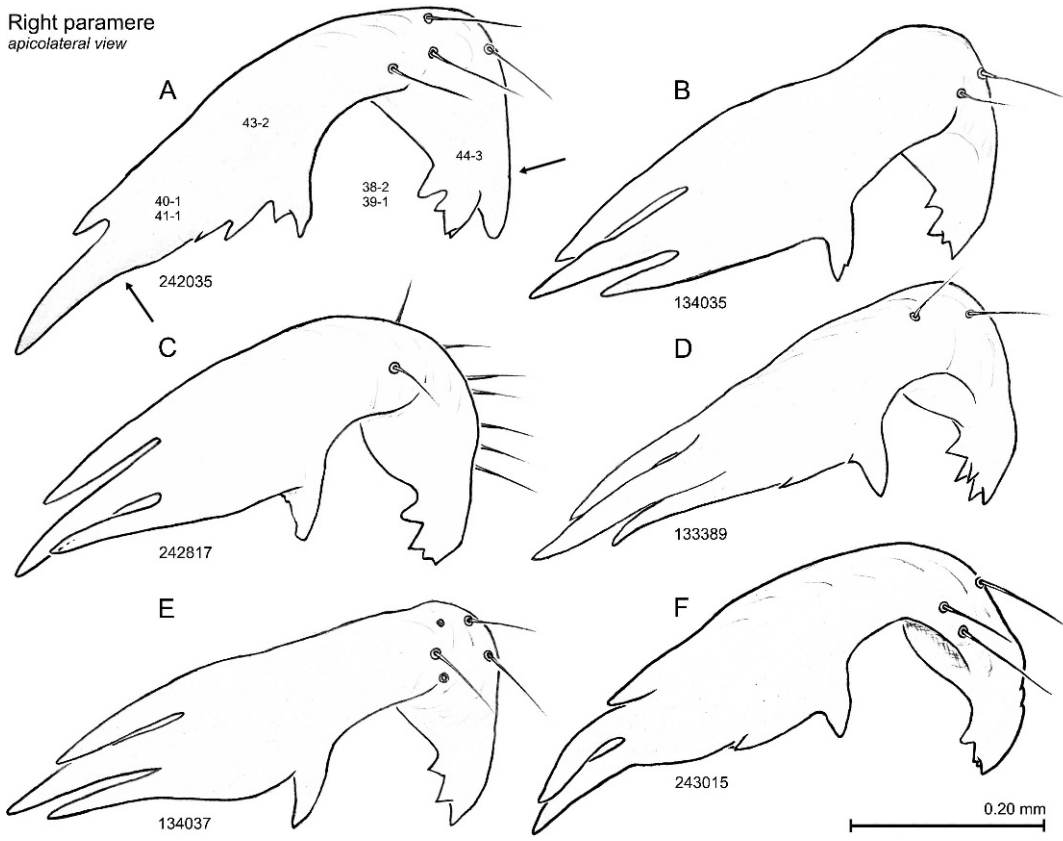


Fig. 54. *Slaterocoris mohri*, right paramere. **A**. Rindy Prairie, WI. **B**. Queen Wilhelmina State Park, AR. **C**. Roaring River State Park, MO. **D**. Unknown, MO. **E**. Devil's Elbow, MO. **F**. Paint Brush Prairie Natural Area, MO.

(00134040) (USNM). ***Montgomery Co.:*** Graham Cave State Park, 38.9082° N 91.5773° W, 226 m, 06 Jul 1973, unknown, 1♀ (00243024) (UMRM). ***St. Louis Co.:*** Glencoe, 38.54343° N 90.62618° W, 123 m, 14 Jun 1942, R.C. Froeschner, 1♂ (00134041) (USNM). ***Stone Co.:*** 1 mi E of jct. 160 and 248, 36.76056° N 93.35839° W, 397 m, 07 Jun 1975, unknown, 1♂ (00243021) (UMRM). **Texas:** ***Anderson Co.:*** Salmon, 31.57278° N 95.49806° W, 12 Apr 1974–13 Apr 1974, H.R. Burke, 1♂ (00118475), 1♀ (00118476) (TAMU).

Slaterocoris mohri (Knight)

Figures 12, 50C, 54, 55; plates 2, 4J; map 11

Strongylocoris mohri Knight, 1941: 78. fig. 115 (orig. desc.).

Slaterocoris mohri: Kelton, 1968: 1130, fig. 16 (disc.); Knight, 1970: 247, fig. 34, (disc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog).

Slaterocoris fuscicornis Knight, 1970: 246, fig. 36 (orig. desc.); Henry and Wheeler, 1988: 449 (catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

DIAGNOSIS: This the only species of *Slaterocoris* with dense, long, erect, brown dorsal vestiture. Distinguished from *S. alpinus* and *S. hirtus* by the arcuate costal margins of both sexes, particularly in the ovoid female, the erect dorsal vestiture, and the male genitalia with predominantly smooth margins of the endosomal spicule (also see Diagnosis under *hirtus* group).

REDESCRIPTION: *Male:* Moderately large, ovate; length 3.80–4.50, width 2.10–2.30 (pl. 2, fig. 50C). COLORATION: Black; antennal segment II dusky brownish yellow; femur

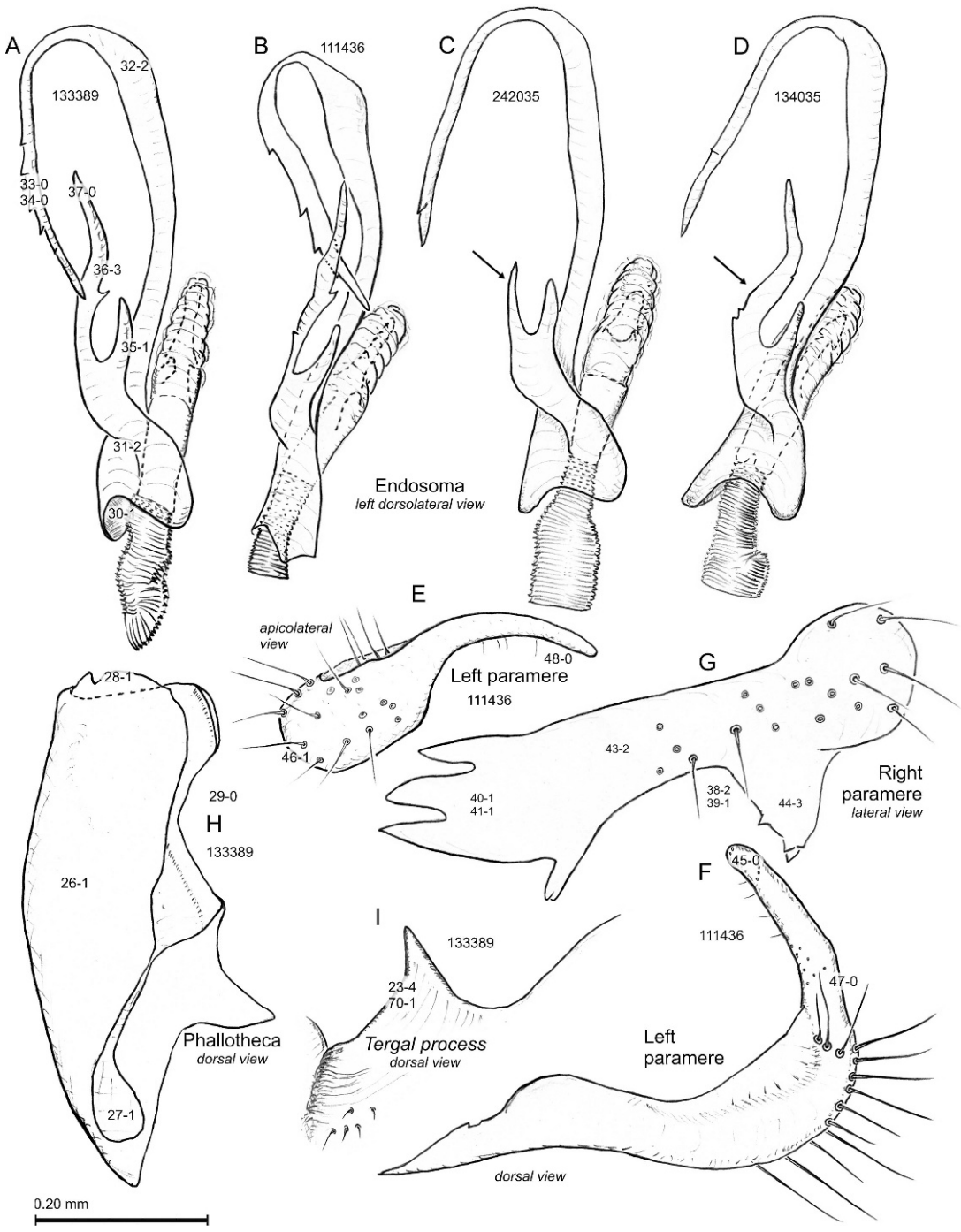
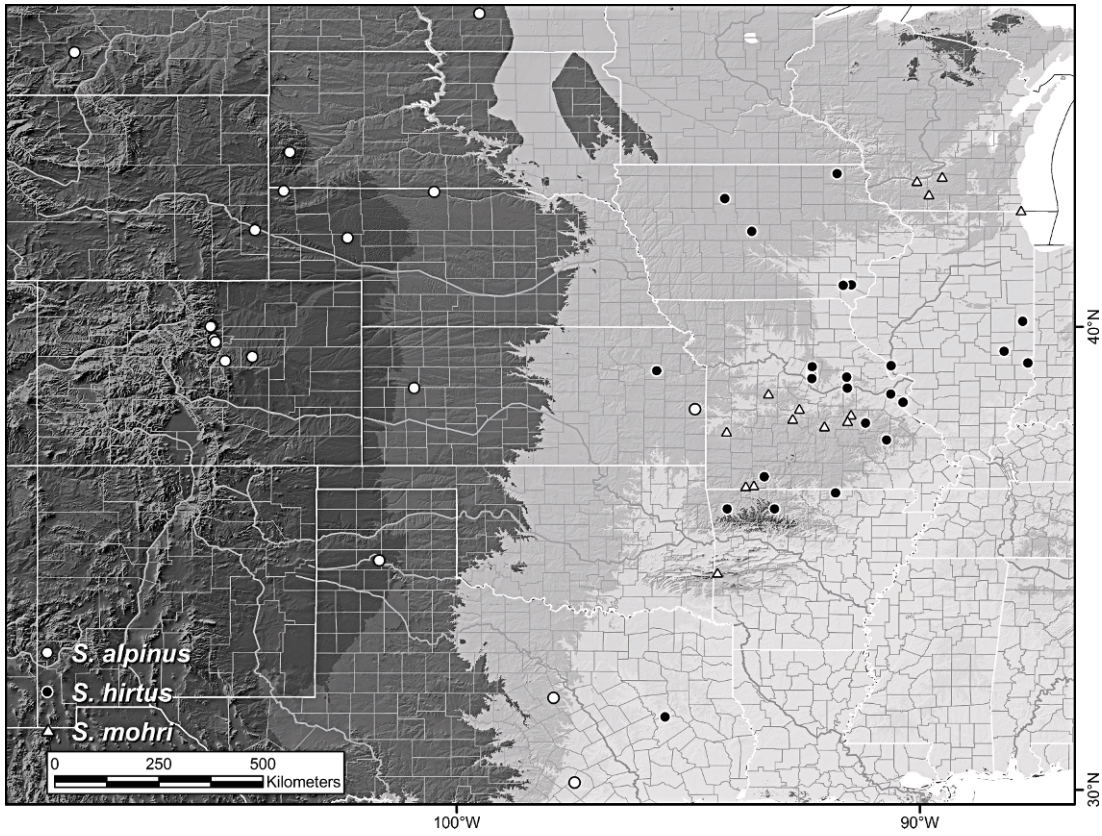


Fig. 55. *Slaterocoris mohri*, male genitalia. **A**, **H**. Unknown, MO. **B**, **E**–**G**, **I**. "C. Ill.," IL. **C**. Rindy Prairie, WI. **D**. Queen Wilhelmina State Park, AR.



Map 11. Localities for *Slaterocoris alpinus*, *S. hirtus*, and *S. mohri*.

with apex pale, tibia dusky yellowish brown, paler distally, sometimes hind tibia mostly black, but median surface always paler, tarsomeres pale, except for terminal segment distally darkened (fig. 12). VESTITURE: Dense, long, erect, brown simple setae; setae somewhat unkempt (pl. 4J, 50C). STRUCTURE: Costal margin slightly arcuate (fig. 50C). GENITALIA: **Endosomal spicule**: Distal portion of ventral lobe long, narrow, with sparse or absent marginal serration (fig. 55D); dorsal lobe with base bifurcate with larger, flat, marginally smooth lateral ramus and short and marginally smooth medial ramus (fig. 55A, B, D arrow); rami narrow and sometimes of similar length (fig. 55C, arrow). **Right paramere**: Medial process removed from parallel apical spines, prominent, broad basally, slightly bent distally, with strong serration mostly on distal surface; tubercle basal to parallel spines, clearly separated from parallel spines, prominent, without serration (figs. 54B–E, 55G); sometimes parallel apical spines reduced and attenuate (fig. 54A, F).

Female: Moderately large, ovate; length 3.90–4.60, width 2.25–2.58 (pl. 2). STRUCTURE: Costal margin convex. GENITALIA: As in species group except: **Second gonapophyses**: With anterior medial surface strongly convex.

HOSTS: Unknown, although rosinweed, *Silphium* sp. (Asteraceae), is the breeding host of the related species *S. hirtus*.

DISTRIBUTION: As currently known not as widely distributed as *S. alpinus* and *S. hirtus*, extending from southern Wisconsin south through Missouri to western Arkansas inhabiting transitional prairie (grassland or savanna) and forest habitats (map 11).

COLLECTION SUMMARY: 45 specimens from 21 collection events. The phenology ranges from May through July.

DISCUSSION: Knight (1970) described *S. fuscicornis* based on the female holotype and single male and female paratypes from Missouri, suggesting that antennal segment II was longer (exceeding the head width) than in *S. mohri* and that the structure of the right paramere was species specific. My examination of the type material, particularly the male paratype (allotype) of *S. fuscicornis*, indicates that it is identical to a male *S. mohri* examined by Kelton (1968). Antennal segment II is not longer than head width as claimed by Knight (1970) and although the right paramere is slightly different, it is well within the boundaries of infraspecific variation (cf. figs. 54D to 54A–C, E, F, 55G) of those specimens I consider to be *S. mohri*. Based on measurements from across the range of *S. mohri* antennal segment II length (1.09–1.20) in the male is usually longer than the head width (1.04–1.12); in the female antennal segment II is variable, either shorter or just longer than the head width (ratio HW/AII, 0.98–1.07). Variation in the size and serration of the tubercle adjacent to the parallel apical spines of the right paramere accounts for the structure indicated by Knight (1970) as distinctive for *S. fuscicornis*. The structure of the endosomal spicule in the nominal species *S. fuscicornis* is identical to other specimens of *S. mohri* (cf. fig. 55A, B–D). Based on my observations of the length of antennal segment II and the variation of the male genitalia, I consider *S. fuscicornis* a junior synonym of *S. mohri*. A male from Wisconsin, at the known northern limit of the species, has the most divergent structure examined of the right paramere (fig. 54A) and endosomal spicule (fig. 55C).

HOLOTYPES: **USA: Illinois: *Hancock Co.:*** Hamilton, 09 Jun 1932, Ross and Mohr, 1♀ not examined (USNM) (*S. mohri*: senior synonym). **Missouri: *Camden Co.:*** Camdenton [38.00805° N 92.74444° W, 318 m], 29 May 1960, J.C. Schaffner, 1♀ (AMNH_PBI 00122248) (USNM) (*S. fuscicornis*: junior synonym).

OTHER SPECIMENS EXAMINED: **USA: Arkansas: *Polk Co.:*** Queen Wilhelmina State Park, 34.6844° N 94.36751° W, 770 m, 04 Jun 1987, G.F. and J.F. Hevel, 1♂ (00134035) (USNM). **Illinois: *Unknown co.:*** ''C. Ill.'', unknown, 1♂ (00111436) (CNC). ''Central Ill'', unknown, paratype, 1♀ (00133400) (USNM). **Missouri: *Barry Co.:*** Roaring River State Park, 36.55091° N 93.75641° W, 08 Jun 1979–09 Jun 1979, E.G. Riley, 1♀ (00243017) (UMRM); 09 Jun 1980, R.L. Blinn, 1♂ (00242817) (NCSU). ***Crawford Co.:*** 2 mi N of Rosati, 38.0998° N 91.4858° W, 274 m, 19 Jun 1980, R.L. Blinn, 1♀ (00242818) (NCSU). ***Miller Co.:*** Bagnell, 38.22453° N 92.59961° W, 173 m, 17 May 1941, R.C. Froeschner, 1♀ (00134044) (USNM). ***Pettis Co.:*** Paint Brush Prairie Natural Area [T44N R21W Sec 29 S1/2, SW1/4], 38.553° N 93.2668° W, 305 m, 05 Jun 1983, R.L. Blinn, 1♂ (00242815) (NCSU), 1♂ (00243015) (UMRM); 27 Jun 1984, R.L. Blinn, 1♀ (00242816) (NCSU), 4♂ (00243014, 00243027–00243029), 13♀ (00243026, 00243030–00243041) (UMRM); 13 Jun 1986, R.L. Blinn, 1♂ (00243013) (UMRM). ***Phelps Co.:*** 4 mi S of Saint James, 37.95809° N 91.55827° W, 322 m, 20 Jun 1973, Wilbur R. Enns, S.E. Thewke, 2♀ (00243016, 00243043) (UMRM). ***Pulaski Co.:*** Devil's Elbow, 37.84567° N 92.05967° W, 217 m, 31 May 1947, R.C. Froeschner, 2♂ (00134036–00134037) (USNM). ***Stone Co.:*** Viola, 36.5722° N 93.5834° W, 335 m, 29 May 1947, R.C. Froeschner, 1♀ (00134038) (USNM). ***Unknown co.:*** ''Me.'' [sic ''Mo.''], C.V. Riley, 1♂ (00122270) (USNM). ''Mo.'', 01 May, C.V. Riley, paratype of junior synonym, 1♂ (00133389) (USNM); 01 May, C.V. Riley, paratype of junior synonym, 1♀ (00122249) (USNM). ***Vernon Co.:*** Gay Feather Prairie [T34N R30W SW corner of S1], 37.7325° N 94.1717° W, 274 m, 08 Jun 1980, E.G. Riley, 1♂ (00243012) (UMRM). **Wisconsin: *Dane Co.:*** Goeden Prairie, T9N R8E Sec 26/NW, 43.2326° N 89.5169° W, 305 m, 28 Jun 1996, unknown, 1♂ (00242039), *Silphium* sp., 1♂ (00242040), 1♀ (00242041) (IRCW). ***Green Co.:*** Rindy Prairie, T4N R6E Sec5/NE, 42.8533° N 89.8032° W, 305 m, 10 Jul 1985, unknown, 1♂ (00242035) (IRCW). ***Iowa Co.:*** Drachenberg Prairie Unit, T8N R5E Sec30/N, 43.1411° N 90.0612° W, 244 m, 22 Jul 1997, unknown, 1♂ (00242036) (IRCW). ***Kenosha Co.:*** Chiwaukee Prairie, T1N R23E Sec32 U: 5, S of Phil Sander W of 2nd Ave., 42.5057° N 87.81364° W, 176 m, 01 Jul 1996, unknown, 2♂ (00242037–00242038) (IRCW).

***Slaterocoris punctatus* species group**

DIAGNOSIS: Distinguished by the black apices of the femora (figs. 12, 13), the usually mixed vestiture of simple and some sericeous silvery setae (fig. 63B, C, pl. 4R) or with vestiture of only simple dense silvery (fig. 59B, pl. 4G), or moderately dense brown setae (pl. 4L), the usually medial, long, pointed, and undivided tergal process (figs. 57H, 60F, 64M, N, 65G), and the produced, rounded, medial surface of the interramal lobe usually with a relatively long, ventral projection (figs. 58D, 62B, 66B, 70D). The structure of the endosomal spicule is unique to this species group, particularly the basal origin of the dorsal lobe on the far left margin of the ventral lobe and the widely separated bifurcate rami of the dorsal and ventral lobes (figs. 60A, 64A–C, 65C–F). In comparison to other *Slaterocoris* species the costal margins of both sexes of most of the species are usually more elongate and parallel sided (pls. 1–3) (except *S. punctatus* and *S. simplex*); the hemelytron of the female is more arcuate than in the male. All the species contained in this group have exclusively Mexican distributions (map 12).

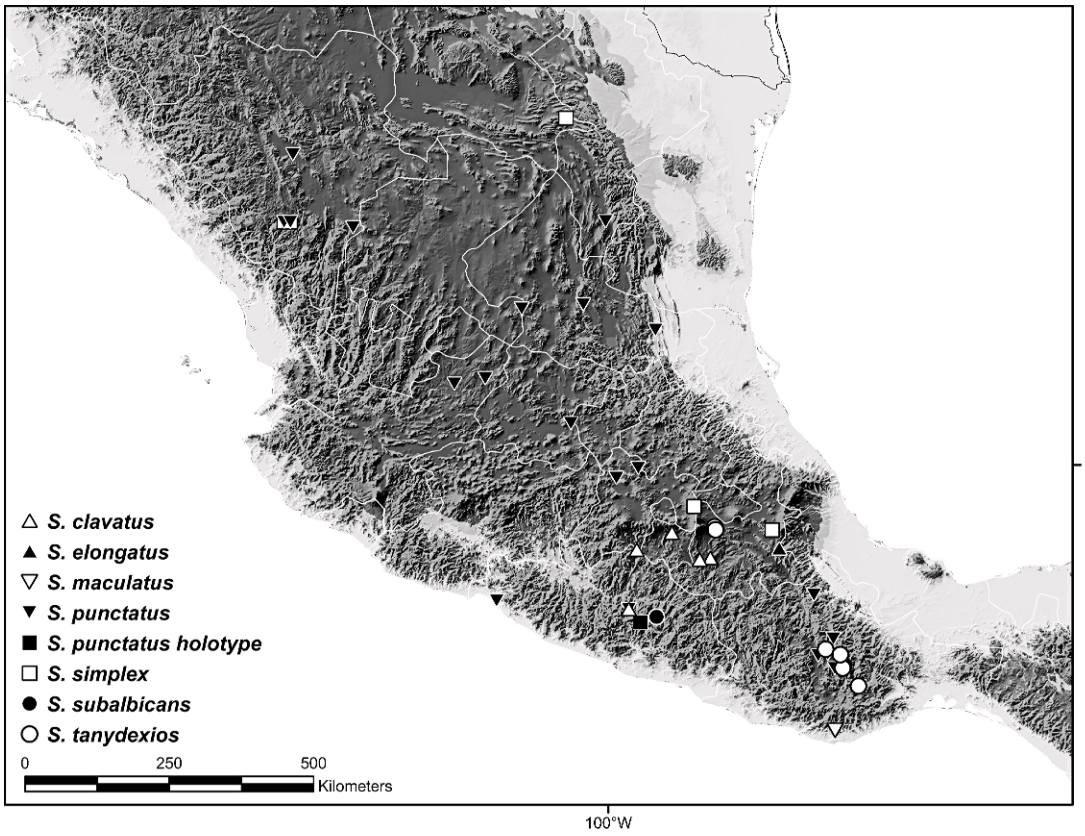
DISCUSSION: Two ambiguous characters—the tergal process long and usually undivided (23-3) and the basal lobe of the right paramere with a short serrate process (44-4)—support the *punctatus* group on figure 2. Three characters provide unambiguous, homoplasious support to the species of the *punctatus* group when two of the three most parsimonious cladograms (fig. 1A, B) are considered. The apical portion of the femur in all species is black (5-1). Such femoral coloration is also found in species of the *argenteus* group and in *S. robustus*. The slightly convex anteromedial surface of the second gonapophyses (62-0) seen in this group, also occurs elsewhere in the genus and several outgroup taxa. The interramal lobe with a concave medial surface and a long, ventral projection (69-2), found in the *punctatus* group also occurs in several other *Slaterocoris* species. Mixed vestiture with simple and some sericeous setae (12-1), seen on most of the *punctatus*-group species, is common in the Orthotylini and occurs on *Josephinus reinhardi*. A medially located tergal process (70-2) supports the *punctatus* group but is homoplastic, as the same state occurs in the species of *Josephinus* and is reversed in *S. tanydexios* (70-1). In three *S. punctatus*-group species, *S. maculatus*, *S. punctatus*, and *S. clavatus*, the height of the ventroanterior margin of the vestibulum is somewhat deeper (57-5) than in other *Slaterocoris* species. This character state contributes support to a sister-group relationship between the former two species and is autapomorphic in the latter species. The sister-group relationship of *S. maculatus* and *S. punctatus* receives additionally support from moderately dense dorsal vestiture (10-1).

Slaterocoris clavatus, new species
Figures 13, 56–58; plates 1, 4E; map 12

HOLOTYPE: MALE: "**MEXICO: Guerrero** 2.1 mi northwest of Cacahuamilpa [18.67484° N 99.5602° W], July 27,1983, Kovarik, Harrison, and Schaffner" (AMNH_PBI 00118436). Holotype *Slaterocoris clavatus* n. sp. det. M.D. Schwartz, 2010 [red label]. Deposited in the collection of the Instituto de Biologia, Universidad Nacional Autonoma de Mexico, Mexico City, D.F.

DIAGNOSIS: The genitalia of both sexes will distinguish this species from all other congeners. In the male the apex of the right paramere is club-shaped, with several dorsally directed spines (fig. 57F, G); in the female the dorsomedial portion of the posterior wall is large and tumid (fig. 58C, D). Neither feature is found in any other species of *Slaterocoris*. The minimal extent of pale whitish yellow markings on the head near the eye (pl. 1) and the discretely delineated pale regions of the legs (fig. 13) will further distinguish *S. clavatus* from *S. maculatus*, the only other species with pale head marking. The latter taxon has a more extensive brownish orange pattern on the head (pl. 2), diffusely delineated border between the pale and dark colored areas of the legs (fig. 13), and the male genitalia are unlike those of *S. clavatus* (cf. fig. 61A–F).

DESCRIPTION: *Male:* Large, elongate; length 5.25–6.00, width 1.90–2.23; costal margin subparallel (pl. 1). COLORATION: Shining black; except for pale yellowish white usually on medial and posterior margin of



Map 12. Localities for *Slaterocoris clavatus*, *S. elongatus*, *S. maculatus*, *S. punctatus*, *S. simplex*, *S. subalbicans*, and *S. tanydexios*.

eye, base or entire maxillary plate, base of antennal segment I, basal two-thirds of III and IV; orange-yellow on coxa, trochanter, variable basal portion femur (usually basal one third), and tarsomeres I and II; sometimes pale on extreme base of femur (fig. 13). VESTITURE: Densely distributed, long, suberect to practically erect silvery white setae (pl. 4E); tibia with simple setae longer than tibial bristles, especially at base. DORSAL SCULPTURATION: Frons striate, vertex rugose; calli rugose, pronotal disc deeply rugulopunctate. STRUCTURE: Labium reaching from posterior margin of mesosternum to middle of forecoxa. GENITALIA: **Pygophore**: Broad, basally wide, apically serrate medial tergal process, reaching to middle of proctiger length (fig. 57H). **Phallotheca**: Left dorsal surface entire (fig. 57C). **Endosomal spicule**: Dorsal lobe unbranched, sinuate, smooth, pointed, length reaching to half of ventral spicular lobe; ventral lobe sinuate and recurved distal region marginally serrate; with recurved apically rounded subapical tubercle (fig. 57A, B). **Right paramere**: Basal and apical portions of paramere expanded, middle region much narrower; with prominently developed ventrally directed sensory lobe; apical region expanded with seven large spines, most directed dorsally, two spines each on lateral and medial surface (fig. 57F, G). **Left paramere**: Shaft moderately short, in apical view one half length of paramere body in lateral view, apical portion gently sinuate in apical view, apex truncate and slightly serrate (fig. 57 D, E); sometimes junction of apical region and body of paramere with small setose tubercle.

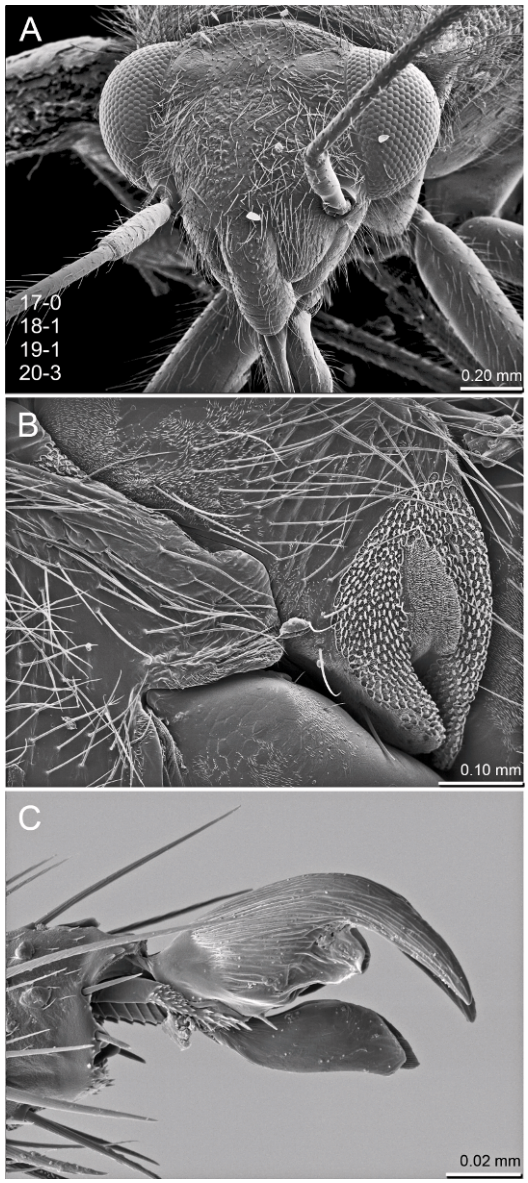


Fig. 56. *Slaterocoris clavatus*, scanning electron micrographs. **A**. Head, anterior view. **B**. mesothoracic spiracle and metathoracic scent-efferent system, lateral view. **C**. Pretarsus, apical view.

Female: Large, elongate ovoid; length 4.60–5.35, width 1.98–2.35 (pl. 1). COLORATION: As in male except pale marking on head more restricted to base of maxillary plate and antennal segments III and IV with pale markings more extensive, extreme base of segment III black. GENITALIA: **Left first gonapophysis**: Large with quadrate ventral surface greatly overlapping small right first gonapophysis (fig. 58A, B). **Ventral labiate plate**: Large, bilateral concave anteroventral surface fitting around anterodorsal surface of large left first gonapophyses (fig. 58B); posteromedial surface of ventral labiate plate strongly and broadly produced ventrally into vulva (fig. 58A). **Dorsal labiate plate**: Strongly sclerotized with obvious bilateral construction; each side U-shaped, opened posteriorly, periphery densely covered with microtrichae, lateral region supporting sclerotized rings strongly folded; paired medial plates obviously confluent with medial portion of ventrally sunken U-shaped sclerotized surface. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Dorsal margin of medial region strongly produced anteriorly, tumid with surface of microtrichae (fig. 58C, D). **Interramal lobe**: Broad, with broadly protruding curved medial margin and short attenuate ventral apex.

ETYMOLOGY: From the Latin *clava* for "club," recognizing the club-shaped, strongly spined apex of the right paramere.

HOSTS: Unknown.

DISTRIBUTION: From the northeastern Sierra Madre del Sur of northcentral Guerrero and westcentral Puebla, Mexico (map 12).

COLLECTION SUMMARY: 24 specimens are known from six collection events during July and August.

DISCUSSION: There are several morphological features of this new species that are either rare or unique in *Slaterocoris*. The pale coloration of the head, restricted to the frons adjacent to the eye and base of the maxillary plate (1-2), is less extensive than in *S. maculatus*, the only other species of *Slaterocoris* with pale marking on the head. Initially the structure of the male genitalia did not appear to be congeneric with the type species, *S. stygicus*. The clublike apical portion of the right paramere with dorsally directed spines (fig. 57F, G) (40-5) and the solitary, small, sinuate dorsal lobe of the endosomal spicule (fig. 57A, B) (36-6) are autapomorphic. However, similar structures can be found in corresponding regions of *S. simplex* (fig. 65C–E, J–M). The three terminalmost spines in the clublike apex of the

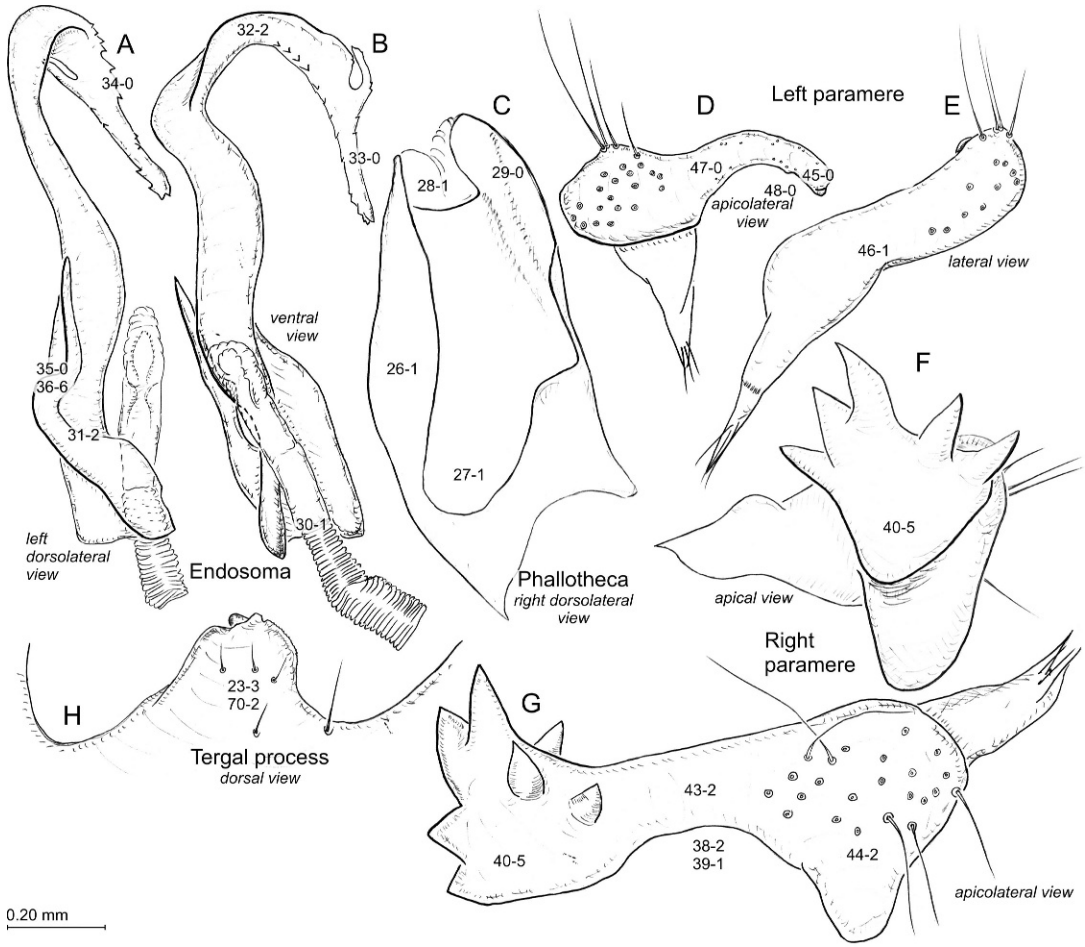


Fig. 57. *Slaterocoris clavatus*, male genitalia. 2.1 mi NW of Cacahuamilpa, GR.

right paramere in *S. clavatus* are essentially parallel to each other. Several other species of *Slaterocoris* have parallel terminal spines, and those in *S. simplex* (fig. 65J–M) are especially reminiscent of the arrangement in *S. clavatus*. All species of *Slaterocoris* have ventrally directed spines and *S. clavatus* is no exception, in having the large basal process or sensory lobe area clearly projecting ventrally (fig. 57F, G). The dorsal lobe of the endosomal spicule in all species of *Slaterocoris* is of the same form, projecting basally from the left side, the region of the spicule that shields the dorsal left side of the ductus seminis. In most species, including *S. stygicus* (fig. 39A–D), the dorsal lobe is slightly shifted medial to the left side of the spicule; however, in *S. clavatus* (fig. 57A, B) and *S. simplex* (fig. 65C–F), the dorsal lobe practically arises from the left side margin. The left paramere, sometimes has a tubercle at the base of the attenuate distal region and the sinuate main body (ventral lobe) of the endosomal spicule, occurs only in *S. clavatus*.

A protuberant (63-2) dorsomedial region of the interramal sclerite in the posterior wall of the female genitalia is a feature found in the *breviatus* group (cf. *S. stygicus*, fig. 40C), but this structure is exceptionally developed in *S. clavatus* (fig. 58C, D). The strongly sclerotized medial region of the dorsal labiate plate projecting ventrally and clearly confluent with

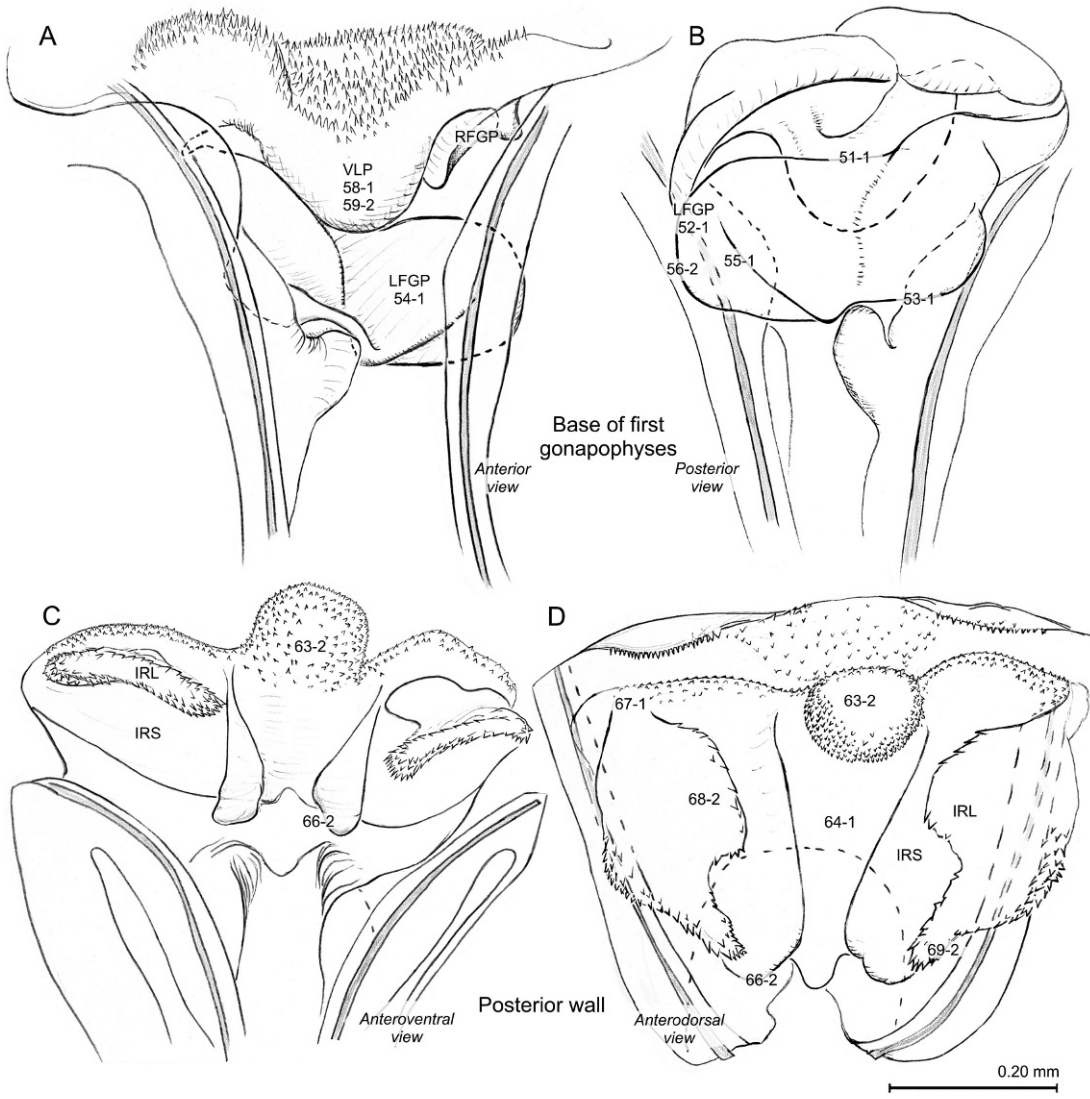


Fig. 58. *Slaterocoris clavatus*, female genitalia. 7.3 mi SW of Izucar de Matamoros, PU.

the paired medial plates shows the greatest sclerotization of these structures in the genus.

PARATYPES: **MEXICO: Guerrero:** 2.1 mi NW of Cacahuamilpa, 18.67484° N 99.5602° W, 10 Aug 1980, Schaffner, Weaver, Friedlander, 1♀ (00093301) (TAMU); 27 Jul 1983, Kovarik, Harrison, and Schaffner, 1♂ (00118189), 1♀ (00093298) (CNC), 1♀ (00118435), 1♂ (00093297), 2♀ (00093299–00093300) (TAMU). 6.2 mi SW of Xochipala, 17.75291° N 99.68363° W, 1728 m, 13 Jul 1985, Jones, Schaffner, 1♀ (00093260) (AMNH), 1♂ (00093310) (CNC), 2♂ (00093309, 00093311) (TAMU). **Puebla:** 5 mi SE of Izucar de Matamoros, 18.54858° N 98.41242° W, 20 Jul 1984, Carroll, Schaffner, Friedlander, 2♂ (00093302, 00118402), 1♀ (00093303) (TAMU). 7.3 mi SW of Izucar de Matamoros, 18.52184° N 98.57917° W, 01 Aug 1976, Peigler, Gruetzmacher, R. and M. Murray, Schaffner, 2♀ (00093258–00093259) (TAMU); 22 Jul 1981, Bogar, Schaffner and Friedlander, 1♂ (00093304) (AMNH), 1♂ (00118403), 1♀

(00093307) (CNC), 4♀ (00093305–00093306, 00093308, 00184821) (TAMU).

Slaterocoris elongatus, new species
Figures 13, 59, 60; plates 2, 4G; map 12

HOLOTYPE: MALE: "**MEXICO: Puebla** 4 mi east of Azumbilla [18.69783° N 97.34019° W, 2113 m], July 22, 1984, Carroll, Schaffner, Friedlander; taken on *Montanoa* sp. [Asteraceae], det. Oswaldo Tellez '97" (AMNH_PBI 00184691). Holotype *Slaterocoris elongatus* n. sp. det. M.D. Schwartz, 2010 [red label]. Deposited in the collection of the Instituto de Biologia, Universidad Nacional Autonoma de Mexico, Mexico City, D.F.

DIAGNOSIS: Distinguished from all other *Slaterocoris* species by the large size and conspicuous sexually dimorphic hemelytron, with male elongate with parallel-sided costal margin and female obovate (pl. 2); black except for pale whitish yellow on the coxae, except basally, trochanters, femora, except for the sharply delineated black apical halves, and tarsomeres I and II (fig. 13); the vestiture of silvery white, long, practically erect setae (pl. 4G, fig. 59B); and the right paramere with five large, ventrally directed spines (fig. 60E), endosomal spicule with ventral lobe bifurcate and dorsal lobe trifurcate (fig. 60A), and a large, medial, tergal process with slightly twisted, serrate apex (fig. 60F).

DESCRIPTION: *Male:* Large, elongate, length 6.80–7.10, width 1.88–2.25 (pl. 2); hemelytron elongate, costal margin parallel. COLORATION: Shining black, except for pale whitish yellow on coxa, except for base, trochanter, basal one half of femur, and tarsomeres I and II (fig. 13). VESTITURE: Densely distributed, long, practically erect silvery white setae (pl. 4G; fig. 59B); setae on antenna long, about three times as long as segment II at base; tibia with setae longer than tibial bristles. DORSAL SCULPTURATION: Frons striate, vertex rugose (fig. 59A); calli rugose, pronotal disc deeply rugulopunctate. STRUCTURE: Labium reaching posterior margin of mesosternum; metepisternal scent gland as figure 59C; length of abdomen including parameres extending to even with base of cuneus, in lateral view. GENITALIA: **Pygophore**: Moderately broad, medial tergal process, apex sparsely serrate, slightly twisted in relation to aperture margin, and reaching apex of proctiger (fig. 60F). **Phallotheca**: Left dorsal notch shallowly U-shaped (fig. 60). **Endosomal spicule**: Dorsal lobe of spicule trifurcate with terminal process serrate, remaining

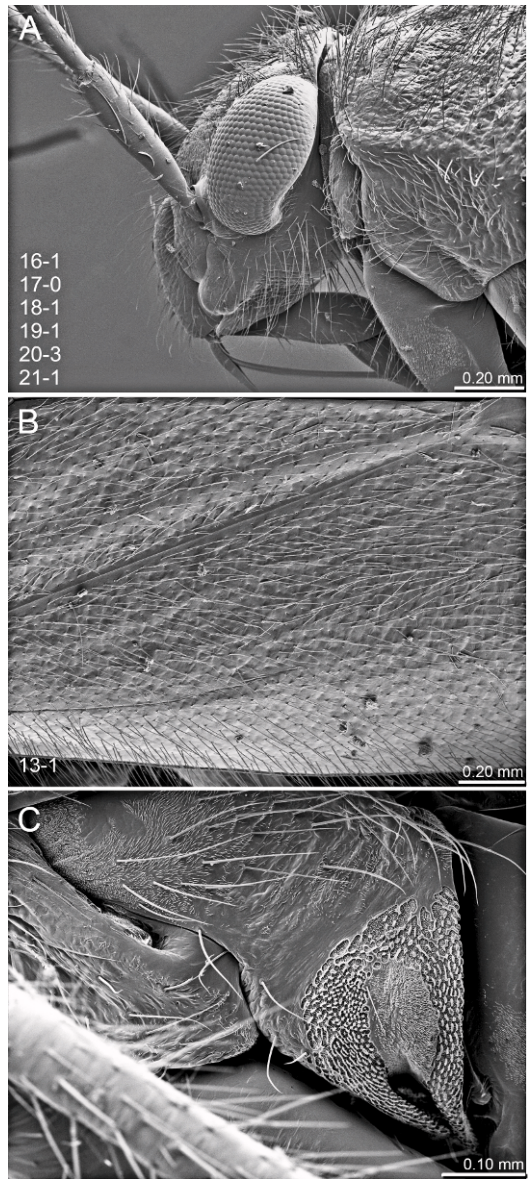


Fig. 59. *Slaterocoris elongatus*, scanning electron micrographs. **A**. Head and pronotum, lateral view. **B**. Hemelytron, dorsal view. **C**. Mesothoracic spiracle and metathoracic scent-efferent system, lateral view.

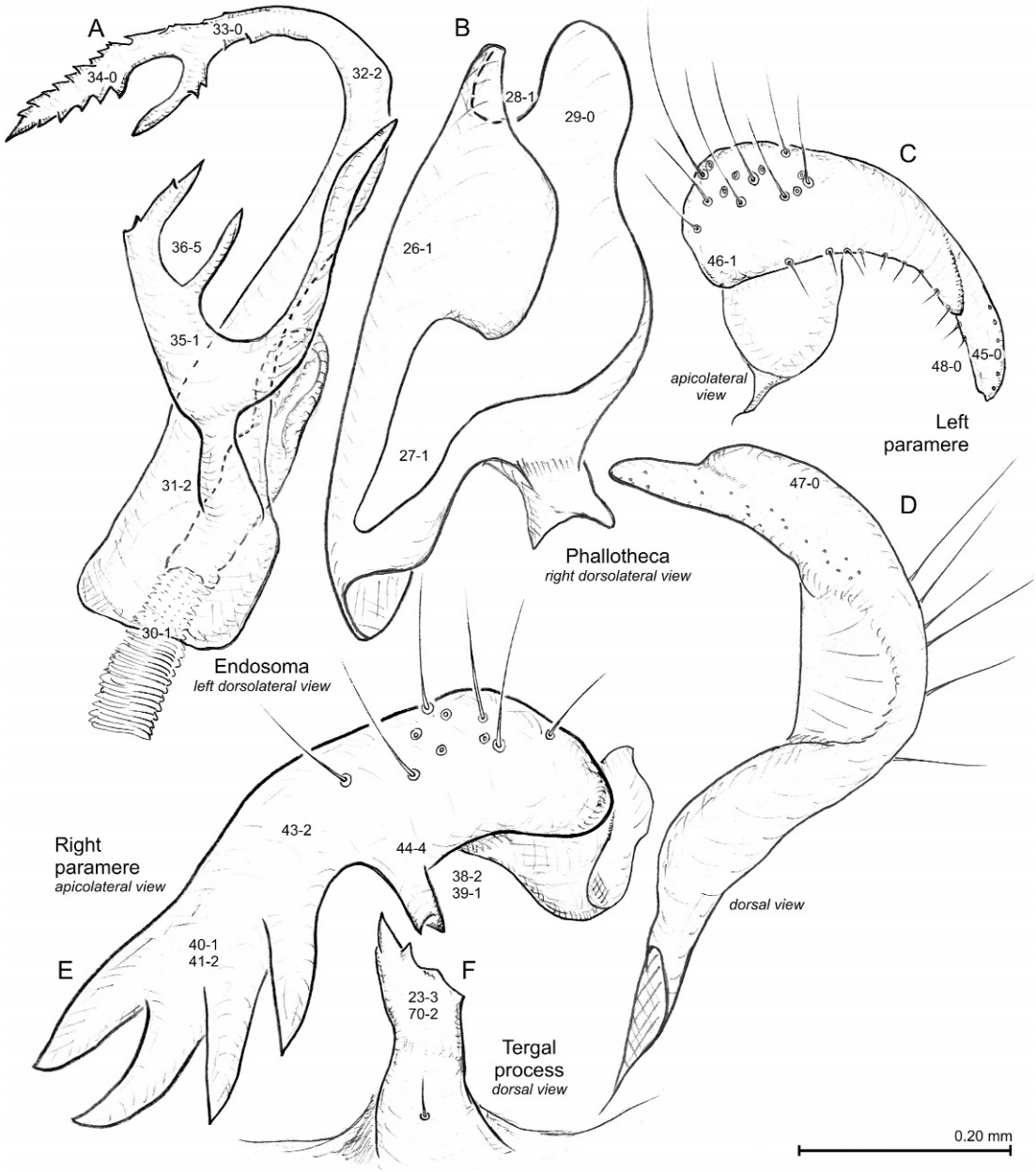


Fig. 60. *Slaterocoris elongatus*, male genitalia. 4 mi E of Azumbilla, PU.

processes smooth margined of unequal length; ventral lobe recurved, bifurcate with serrate margined processes (fig. 60A). **Right paramere**: With three or four large ventrally directed spines, basalmost spine apically serrate, length subequal to length of paramere apical to spine; apical region bifid, with large terminal spines (fig. 60E). **Left paramere**: Shaft moderately long, in apical view approximately equal to length of paramere body in lateral view; apical portion slightly constricted subapically (fig. 60C, D).

Female: Large, elongate ovoid, length 5.90–6.25, width 2.00–2.20 (pl. 2). GENITA-

LIA: GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view, comparative size at overlap with left greater than right. **Left first gonapophyses**: Dorsal surface concave, apex broadly convoluted. **Vestibulum, anteroventral margin of anterior wall**: Widely sclerotized medially, with sclerotized reaching lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced ventrally with right side somewhat more produced than left, moderately wide and triangular at base. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly; medial sclerite with posterior surface tumid, abutting ovipositor bulb, and not greatly overlapped by lateral sections of interramal sclerite. **Interramal lobe**: Broad, with broadly protruding, curved medial margin and with short, narrow, more dorsal lobe; ventral apex short, practically truncate, nominally attenuate, with strong marginal serration.

ETYMOLOGY: From the Latin *elongatus*, "prolonged," for the long, parallel-sided body of the male.

HOSTS: All known specimens were taken from a species of *Montanoa* Llave and Lex. (Asteraceae). Further collecting is needed to determine which species of *Montanoa* serve as the breeding host. Comprising approximately 25 species, *Montanoa* is widespread in the New World and contains forms ranging from small shrubs in semixeric habitats to large cloud forest trees (Funk and Raven, 1980).

DISTRIBUTION: 15 specimens are known from the single collection event in July at the type locality in the Sierra Madre de Oaxaca of southeastern Puebla, Mexico (map 12).

DISCUSSION: Within the *punctatus* group, the cladistic analysis places *S. elongatus* in an clade with *S. clavatus* and *S. tanydexios*. This group of three species is supported by two nonhomoplasious states of leg coloration (coxa and base of femur pale; 3-1, 4-1), and one homoplasious character (vestiture long, 8-2). The sublinear or obovate costal margin of the female (15-0) is a homoplastic character shared by *S. elongatus* and *S. maculatus*. Although placed in a clade with *S. clavatus* and *S. tanydexios*, the male genitalia of *S. elongatus* show affinity with two other species in the *punctatus* group, *S. maculatus* and *S. punctatus*. These two species and *S. elongatus* share the bifurcate ventral lobe of the endosomal spicule and dorsal lobe of the right paramere with widely separated spines and large, parallel apical spines.

PARATYPES: **MEXICO: Puebla:** 4 mi E of Azumbilla, 18.69783° N 97.34019° W, 2113 m, 22 Jul 1984, Carroll, Schaffner, Friedlander, *Montanoa* sp., det. Oswaldo Tellez 1997, 1♂ (00184693), 1♀ (00184702) (AMNH), 1♂ (00184694), 3♀ (00184700–00184701, 00184703), 1♂ (00118447) (CNC), 1♂ (00184692), 5♀ (00184695–00184699), 1♂ (00094245) (TAMU).

Slaterocoris maculatus, new species
Figures 13, 61, 62; plate 2; map 12

HOLOTYPE: MALE: "**MEXICO: Oaxaca** 9 mi. n. C. Loxicha [15.86763° N 96.46893° W, 1324 m], July 15–16, 1973, Mastro and Schaffner" (AMNH_PBI 00118408). Holotype *Slaterocoris maculatus* n. sp. det. M.D. Schwartz, 2010 [red label]. Deposited in the collection of the Instituto de Biologia, Universidad Nacional Autonoma de Mexico, Mexico City, D.F.

DIAGNOSIS: Recognized by the brownish-orange coloration on the head (pl. 2) and legs (fig. 13), particularly on the frons, mandibular and maxillary plates, the basolateral half of antennal segment I, coxae, trochanters, femora, except for diffusely delineated darker brown apices, and mostly dark brown tarsomeres I and II; the vestiture of golden brown, moderately long, suberect simple setae; and the male genitalia consisting of right paramere with long basal spine and three large terminal spines (fig. 61E), endosomal spicule with ventral and dorsal lobes bifurcate (fig. 61A), and the large medial tergal process (fig. 61F). Distinguished from *S. clavatus*, the only other *Slaterocoris* species with pale markings on the frons, by the diffusely delineated pale coloration of the femora (fig. 13); in *S. clavatus*, the pale markings on the head are restricted to the medial margin of the eye and base of the maxillary plate, and the femora are whitish yellow and sharply delineated (fig. 13).

DESCRIPTION: *Male:* Large, elongate, length 5.30, width 2.05; costal margin subparallel (pl. 2). COLORATION: Shining black; brown to brownish orange on head

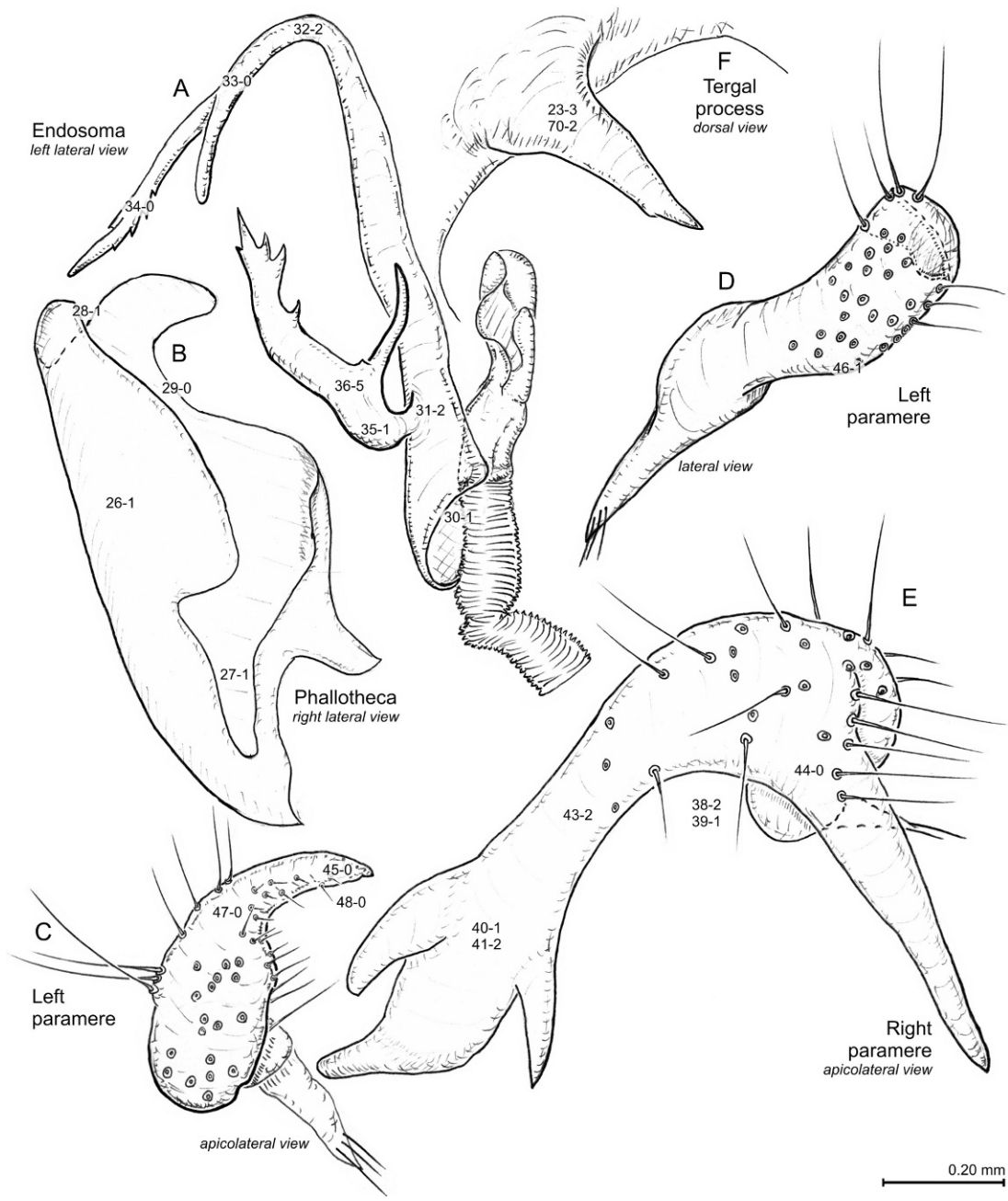


Fig. 61. *Slaterocoris maculatus*, male genitalia. 9 mi N of Candelaria Loxicha, OA.

except black on basal carina, vertex, and clypeus; brownish orange on labium and antennal segment I, laterobasally; orange yellow; on coxae, trochanters, most of femora, except for apices, and tarsomeres I and II; dusky yellowish brown on tibiae (fig. 13). VESTITURE: Moderately distributed, moderately long, suberect, golden

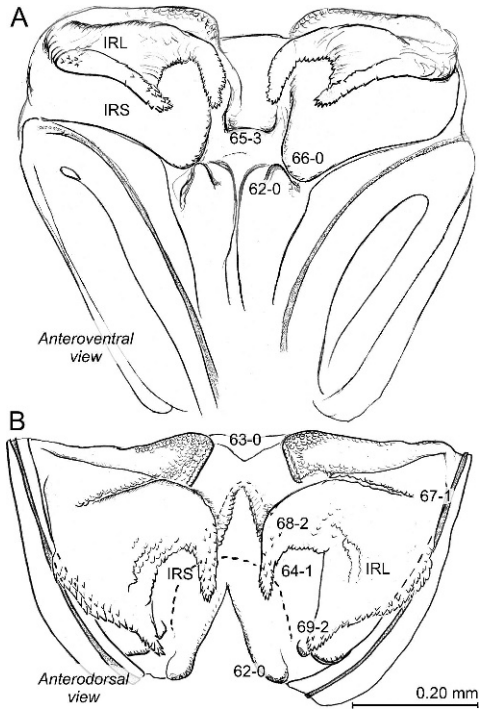


Fig. 62. *Slaterocoris maculatus*, female genitalia, posterior wall. 9 mi N of Candelaria Loxicha, OA.

brown simple setae. DORSAL SCULPTURATION: Frons striate, vertex faintly rugose; calli faintly rugose, pronotal disc deeply rugulopunctate. STRUCTURE: Eye large, interocular distance of vertex narrow; labium reaching posterior margin of mesosternum. GENITALIA: **Pygophore**: Narrow, medial tergal process, reaching just beyond apex of proctiger (fig. 61F). **Phallotheca**: Left dorsal notch broadly U-shaped (fig. 61B). **Endosomal spicule**: Dorsal lobe bifurcate with serrate and smooth margined processes; ventral lobe recurved, bifurcate with serrate margined processes (fig. 61A). **Right paramere**: With long basal spine, length subequal to length of paramere apical to spine; apical region trifid, with large dorsal and ventral spines (fig. 61E). **Left paramere**: Shaft short, in apical view approximately one-half length of paramere body in lateral view (fig. 61C, D).

Female: Large, obovate, length 5.18–5.40, width 2.08–2.35 (pl. 2); otherwise similar to male, except for vertex distance shorter and eye small. COLORATION: Sometimes black on head restricted to clypeus and triangular patch on vertex. GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view, comparative size at overlap with left greater than right. **Left first gonapophyses**: Dorsal surface concave, apex broadly convoluted. **Vestibulum, anteroventral margin of anterior wall**: Widely sclerotized medially, with sclerotized reaching lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced ventrally into vulva, moderately wide and triangular at base. **Second gonapophyses**: Anterior medial surface sclerotized and convex anteriorly (fig. 62A, B). **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly, medial sclerite with narrowly tumid process abutting ovipositor bulb, and ventromedial region weakly overlapped by lateral sclerites of interramal sclerite and second gonapophysis basally (fig. 62A, B). **Interramal lobe**: Broad, with broadly protruding, curved medial margin and with moderately long, narrow, more dorsal lobe; ventral (anterior) margin with moderately long, attenuate, marginal serrate apex; median and ventral apices approximately equal in length (fig. 62A, B).

ETYMOLOGY: From the Latin *macula*, "spot," for the conspicuous pale portions of the head.

HOSTS: Unknown.

DISTRIBUTION: Five specimens are known from a July collection event at the type locality on the west end of the Sierra Madre del Sur in southern Oaxaca, Mexico (map 12).

DISCUSSION: Leg coloration is somewhat similar in *S. pallipes* (3-3, 4-3, 5-3) and *S. maculatus* (3-3, 4-2, 5-2), although the tibiae of the latter are more darkened. Within the *punctatus* group, *S. maculatus* and *S. punctatus* are hypothesized to be sister species with homoplasious support contributed by the moderate densely distributed dorsal vestiture (10-1) and the strongly sclerotized and wide anterior wall of the vestibulum (57-5) (also present in *S. clavatus*) in the female genitalia; under fast optimization, the brown dorsal vestiture (9-2) also provides ambiguous support.

PARATYPES: **MEXICO: Oaxaca:** 9 mi N of Candelaria Loxicha, 15.86763° N 96.46893° W, 1324 m, 15 Jul 1973–16 Jul 1973, Mastro

and Schaffner, 1♀ (00093262) (CNC), 3♀ (00093261, 00093263–00093264) (TAMU).

Slaterocoris punctatus (Distant), **new combination**

Figures 12, 63A, 64; plates 3, 4L; map 12

Jornandes punctatus Distant, 1893: 448, pl. 39, fig. 9 (orig. desc.); Carvalho and Dolling, 1976: 805 (desc. holotype); Carvalho 1981: 3 (diag. type).

Guerrerocoris punctatus: Carvalho and China, 1959: 71, fig. 2 (n. comb.).

Slaterocoris grandis Kelton, 1968: 1131, fig. 71 (orig. desc.); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

DIAGNOSIS: Distinguished from other *punctatus*-group species by the large, wide, predominantly black body, completely black head and legs, except for tarsomeres I and II (fig. 12), and dorsal vestiture of moderately dense, brown setae (see pl. 4, cf. L with E, G, P, R). The male is unequivocally recognized by the more or less medially situated, large bifurcate tergal process with perpendicular rami (fig. 64F, M, N). The tergal process in all other *punctatus*-group species are long, and apically pointed (*elongatus* [fig. 60F], *maculatus* [fig. 61F], *simplex* [fig. 65G]), bifurcate with parallel rami (*tanydexios*, fig. 69C), or broad and rounded (*clavatus*, fig. 57H).

REDESCRIPTION: *Male:* Large, elongate, ovoid; length 5.10–5.80, width 2.18–2.50 (pl. 3). COLORATION: Black, including vertex, antennal segments I and II and legs, except for pale tarsomeres I and II (fig. 12); sometimes antennal segment II with small pale basal region (subequal to length of segment I). VESTITURE: Moderately dense, moderately long, suberect, brown simple setae (pl. 4L). DORSAL SCULPTURATION: Frons striate; corium with moderately large, discrete punctures merging with rugosity near claval suture (fig. 63A). STRUCTURE: Costal margin subparallel. GENITALIA: **Pygophore**: Solitary tergal process situated on aperture right of midline, long, reaching apex of proctiger, with strongly bifurcate, serrate apex, bifurcate rami perpendicular to axis of process (fig. 64M, N); subgenital plate removed from ventral margin of aperture (fig. 64F). **Phallotheca**: Aperture of sinuate, open on dorsal, distal, and ventral left distal surfaces; left lateral surface slightly compressed (fig. 64D, E). **Endosomal spicule**: Ventral lobe of uniform thickness throughout apical region, distal portion with

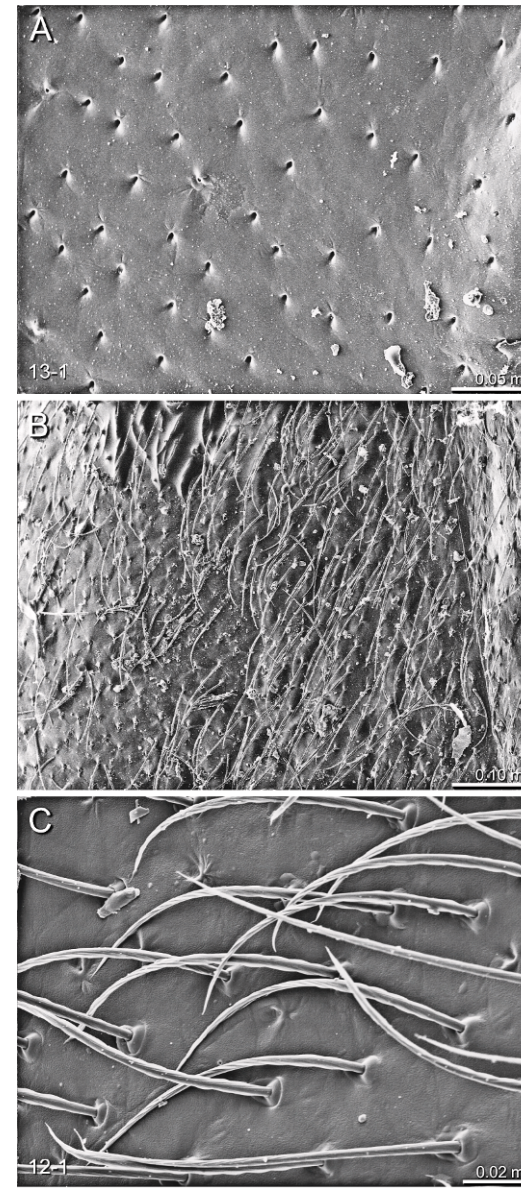


Fig. 63. *Slaterocoris* species, scanning electron micrographs. **A**. *S. punctatus*, hemelytron, sculpturation and setae (setae rubbed), dorsal view. **B**. *S. subalbicans*, hemelytron, sculpturation on corium medially, dorsal view. **C**. *S. simplex*, hemelytron, setae, dorsal view.

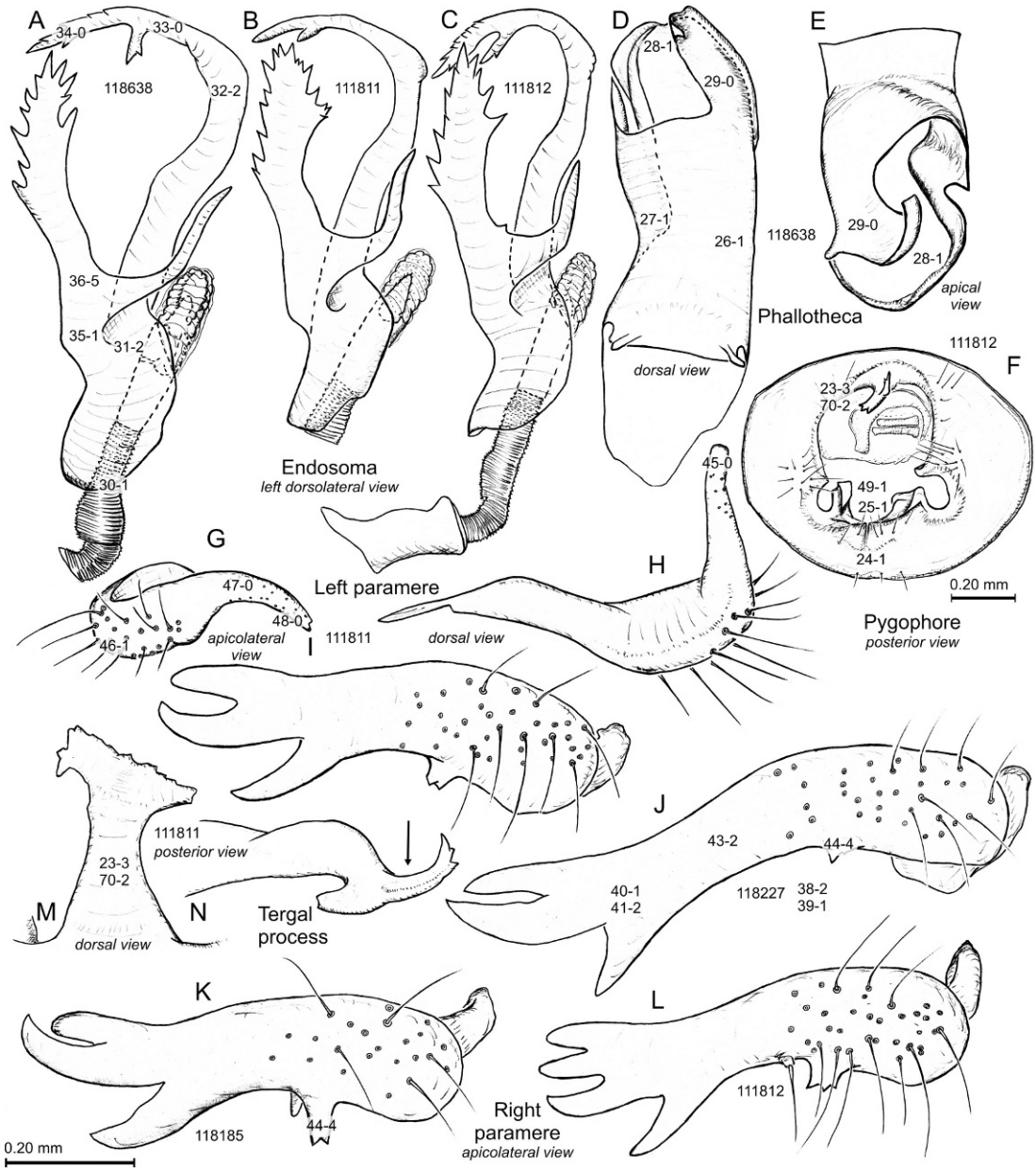


Fig. 64. *Slaterocoris punctatus*, male genitalia. **A**, **D**, **E**. 16.1 mi NW of Totolapan, OA. **B**, **G**–**I**. 26 mi E of El Salto, DG. **C**, **F**, **L**. 5 mi W of Durango, DG. **D**, **E**. Phallotheca, 118638. **J**. 6.7 mi SW of El Camaron, OA. **K**. 1 mi S of San Lorenzo, SL.

variable marginally serration, bifurcate; dorsal lobe bifid, flattened, with wide separation between bifid sections and variable marginal serration (fig. 64A–C). **Right paramere**: Variable overall length; apical region with large parallel spines; subapical region wide; basal lobe with variable, short, truncate, serrate process; sometimes with additional small tubercle (fig. 64I–L). **Left paramere**: Shaft short, in apical view approximately one half length of paramere body in lateral view (fig. 64G, H).

Female: Large, ovate, costal margin convex; length 4.40–5.60, width 2.10–2.58 (pl. 3). COLORATION: Antennal segment II black, sometimes basal half, except for basal annulus pale. STRUCTURE: Vertex wide, eye small, costal margin strongly curved, otherwise as in male. GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view, comparative size at overlap with left greater than right. **Left first gonapophyses**: Dorsal surface concave, apex broadly convoluted. **Vestibulum, anteroventral margin of anterior wall**: Widely sclerotized medially, and sclerotized to lateral margins. **Ventral labiate plate**: Strongly produced, wide, triangular at base. **Second gonapophyses**: Anterior medial surface very strongly protuberant. **Interramal sclerite**: Dorsomedial region strongly narrowly convex, posteromedial portion with tumid process abutting ovipositor bulb, and ventromedial region overlapping ventromedial plate of IRS. **Interramal lobe**: Dorsomedial margin with broad prominence with narrow lobe.

HOST: Uncertain. Kelton (1968) mentioned that *S. punctatus* (as *S. grandis*) was collected on species of *Helianthus* (Asteraceae). However, labels noting this plant association were not found attached to any specimen of the junior synonym held in the CNC. There are some specimens with the handwritten word ''pirule'' on a label which may be a colloquial plant name, perhaps for *Sechium edule* (Jacq.) Swartz (Cucurbitaceae), which would certainly be a sitting record.

DISTRIBUTION: Widely distributed in Mexico, from the Sierra Madre Occidental-Central Plateau of Durango, Jalisco, Nuevo Leon, and San Luis Potosi, the Sierra Transvolcanica of Guanajuato and Mexico, the Sierra Madre de Oaxaca in Oaxaca, and the Sierra Madre del Sur of Guerrero (map 12).

COLLECTION SUMMARY: 154 specimens from 26 collection events spanning July to September.

DISCUSSION: The decision to reassign nominal species *punctatus* to *Slaterocoris* and then propose that it is conspecific with *S. grandis* was confounded by character variation. Specimens from Guerrero, including, the holotype of *J. punctatus*, have discrete punctures on the pronotum as well as on the hemelytron (fig. 63A), whereas those from Durango have more rugulopunctate sculpturation (discrete punctures on a rugose surface, pl. 4L). The dorsal vestiture of the female holotype of *J. punctatus* is rubbed off; however, its venter has sparsely distributed brown setae, as do female paratypes of *S. grandis*. Antennal segment II coloration in females is variable; those from Guerrero, including the type of *punctatus*, have segment II completely black, but sometimes the middle is broadly pale as in some specimens from Oaxaca and Guanajuato.

The original description of *Guerrerocoris* (Carvalho and China, 1959), a new genus erected to contain *Jornandes punctatus*, mentions that the body coloration is shining black, the vestiture is adpressed (although the setae are reclining where they remain on the venter), the dorsal surface is finely punctate, and the vertex is carinate and smooth. All these characters are found in at least some species of *Slaterocoris*. Given the range in hemelytral punctation encountered in black North American orthotylines with one endosomal spicule, a more accurate description of the dorsal puncture size in nominal species *punctatus* would be moderately large, as fine punctures are more likely encountered in species of *Jornandes*, *Josephinus*, and *Scalponotatus*. The only nonblack parts of *punctatus* are the white tarsomeres I and II, a coloration not noted by Carvalho and China (1959). The tarsomeres of all the species of the *breviatus* group have such pale markings. Although no information of the male genitalia is available for the nominal species *punctatus*, the previous discussion of character variation and ease with which specimens from southern Mexico can be placed in *S. grandis*, I am confident that *Jornandes punctatus* belongs in *Slaterocoris* and that it is the senior synonym of *S. grandis* new synonym. Thus, the new combination *S. punctatus* is created and *Guerrerocoris* becomes a junior synonym of *Slaterocoris*.

Slaterocoris punctatus is the most widely distributed species of the *punctatus* group (map 12) and some variation in male genitalic features are seen across its range. The endosomal spicule of specimens from Durango and Oaxaca has the identical form, but differs in the number and placement of

marginal serrations of the dorsal and ventral lobes (cf. fig. 64A–C). Similarly, the right paramere in specimens from Durango, Oaxaca, and San Luis Potosi is of similar structure, but the number, orientation, and size of the apical spines and basal tubercle are variable. *Slaterocoris ambrosiae*, not part of the *punctatus* group, is also widely distributed in Mexico, but is also found across the southwest and central United States to southern Ontario. This latter species also has variable apical spines of the right paramere (cf. fig. 15A–J).

HOLOTYPES: **MEXICO: Guerrero:** Chilpancingo [17.55° N 99.5000° W, 1402 m], Jun 1890, H.H. Smith, 1♀ (AMNH_PBI 00085372) (BMNH) (*S. punctatus* [*Jornandes*]: senior synonym). **Durango:** Navajos, 20 mi E of El Salto [23.78333° N 105.05069° W, 2438 m, 8000 ft], 27 Jul 1964, L.A. Kelton, 1♂ (AMNH_PBI 00111795) (*S. grandis*: junior synonym).

OTHER SPECIMENS EXAMINED: **MEXICO: Durango:** 5 mi W of Durango, 24.83333° N 104.91298° W, 1981 m, 29 Jul 1964, L.A. Kelton, paratypes, 3♂ (00111810, 00111812–00111813), 4♀ (00111819–00111822) (CNC), paratype, 1♀ (00121776) (UCB). Navajos, 20 mi E of El Salto, 23.78333° N 105.05069° W, 2438 m, 27 Jul 1964, L.A. Kelton, paratypes, 5♂ (00111796–00111800) (CNC). Navios, 26 mi E of El Salto, 23.78278° N 104.95381° W, 2438 m, 02 Aug 1964, L.A. Kelton, paratypes, 10♂ (00111801–00111809, 00111811), 5♀ (00111814–00111818) (CNC), paratype, 1♂ (00118615), 1♀ (00118616) (TAMU), paratype, 1♂ (00121775) (UCB). Vicente Guerrero, 23.69919° N 103.97716° W, 1924 m, 17 Sep 1976, J. Carayon, 1♂ (00243977), 1♀ (00243978) (MNHN). **Guanajuato:** Ojo de Agua, 20.65° N 100.58333° W, 06 Sep 1969, L.A. Kelton, 6♂ (00111778–00111783), "pirule" [*Sechium edule* (Jacq.) Swartz (Cucurbitaceae)?], 9♀ (00111784–00111792) (CNC). **Guerrero:** 1 mi NE of La Laguna, 17.88811° N 101.73943° W, 61 m, 17 Jul 1984, Carroll, Schaffner, Friedlander, 1♂ (00118635) (TAMU). 6.2 mi SW of Xochipala, 17.75291° N 99.68363° W, 1728 m, 06 Jul 1987, Kovarik and Schaffner, 2♀ (00118644–00118645) (TAMU). 6.2 mi SW of Xochipala, 17.75291° N 99.68363° W, 1728 m, 13 Jul 1985, Jones, Schaffner, 1♀ (00118643) (TAMU); 13 Jul 1985, J.B. Woolley and G. Zolnerowich, 2♂ (00118632–00118633) (TAMU). **Jalisco:** 10 km NE of Jalostotitlan, 21.26381° N 102.3982° W, 30 Jul 1978, Plitt and Schaffner, 1♀ (00118665) (CNC), 13♂ (00118184, 00118445, 00118634, 00118646–00118655), 14♀ (00118446, 00118656–00118664, 00118666–00118669) (TAMU). Lagos de Moreno, 21.35° N 101.9167° W, 1873 m, 17 Aug 1953, C. and P. Vaurie, 1♀ (00108182) (AMNH). **Mexico:** Atlacomulco, 19.7989° N 99.8744° W, 2591 m, 18 Aug 1954, R.R. Dreisbach, 1♀ (00127330) (UMMC). Jilotepec, 19.95277° N 99.53472° W, 02 Sep 1969, L.A. Kelton, 1♂ (00111794), 7♀ (00111772–00111777, 00111793) (CNC). **Nuevo Leon:** 12.4 mi NE of Doctor Arroyo, 23.79401° N 100.04422° W, 08 Jul 1986, Kovarik and Schaffner, 4♂ (00118620–00118623), 5♀ (00118624–00118628), 6♂ (00245360–00245365), 3♀ (00245366–00245368) (TAMU). **Oaxaca:** 3 mi SE of Matatlan (Microondas road), 16.83581° N 96.35109° W, 2027 m, 17 Jul 1987, Kovarik and Schaffner, 7♂ (00118672–00118678), 8♀ (00118679–00118686) (TAMU). 6 mi NE of Mitla, 16.55561° N 96.10588° W, 20 Jul 1985, Jones and Schaffner, paratype, 1♀ (00118774) (TAMU). 6.7 mi SW of El Camaron, 17.97946° N 96.79735° W, 1311 m, 19 Jul 1987, Kovarik and Schaffner, 2♂ (00118227, 00118687), 5♀ (00118688–00118692) (TAMU). 8 mi NE of El Punto, 17.29752° N 96.49499° W, 1556 m, 18 Jul 1985, Jones and Schaffner, 1♂ (00118636), 1♀ (00118637) (TAMU). 10.8 mi S of El Punto, 17.05823° N 96.58111° W, 1859 m, 19 Jul 1987, R. Wharton, 1♂ (00118641), 1♀ (00118642) (TAMU). 16.1 mi NW of Totolapan, 16.83215° N 96.47281° W, 21 Jul 1974, Clark, Murray, Ashe, Schaffner, 1♂ (00113203) (CNC), 3♂ (00118638–00118640) (TAMU). Oaxaca, 17.03333° N 96.73333° W, 20 Jul 1947–24 Jul 1947, B. Malkin, 2♀ (00108180–00108181) (AMNH). **San Luis Potosi:** 1 mi S of San Lorenzo, 22.10213° N 99.26666° W, 25 Jul 1976, Peigler, Gruetzmacher, R. and M. Murray, Schaffner, 2♂ (00118185, 00118670), 1♀ (00118671) (TAMU). 7 mi E of San Luis Potosi, 22.49996° N 100.38988° W, 07 Jul 1986, Kovarik and Schaffner, 1♂ (00118629), 2♀ (00118630–00118631), 1♀ (00093036) (TAMU). 7 mi E of San Luis

Potosi, 22.4999° N 100.38988° W, 1897 m, 03 Jul 1987, Kovarik and Schaffner, 1♂ (00118693) (TAMU). 19 mi N of San Luis Potosi, 22.43272° N 101.34991° W, 01 Sep 1958, H.F. Howden, paratype, 1♀ (00111823) (CNC).

Slaterocoris simplex Kelton

Figures 12, 63C, 65, 66; plates 3, 4P; map 12

Slaterocoris simplex Kelton, 1968: 1135, fig. 24 (orig. desc.); Knight, 1970: 241, fig. 32 (disc.); Schuh, 1995: 199 (catalog).

DIAGNOSIS: One of five species with completely black legs, *Slaterocoris simplex* can be distinguished from *S. argenteoides*, *S. argenteus*, *S. digitatus*, and *S. robustus* by the mixed dorsal vestiture of silvery shining, sericeous, adpressed setae (most numerous adjacent to claval suture) and the longer, silvery shining, suberect setae (pl. 4P, fig. 63B). The first three species mentioned above all have pilose vestiture composed of long, fine, apically recurved setae and the last has relatively sparse, black vestiture with somewhat bristlelike, suberect simple setae. The frons of *S. robustus* is smooth (fig. 71A), whereas the frons is slightly striate in the other species. The basally twisted dorsal lobe of the endosomal spicule and the phallotheca with an additional aperture on the left lateral surface (fig. 65F) will unequivocally separate *S. simplex* from all congeners.

REDESCRIPTION: *Male:* Moderately small, subparallel; length 3.90–4.30, width 1.75–2.00 (pl. 3). COLORATION: Black including vertex, antennal segments I and II, coxa, femur, and all tarsomeres (fig. 12). VESTITURE: With mixture of long, suberect, silvery, dense simple setae and some sericeous setae near claval suture (pl. 4P). DORSAL SCULPTURATION: Frons striate. STRUCTURE: Body conformation in both sexes similar. GENITALIA: **Pygophore**: Tergal process somewhat elongate, triangular, slightly distally serrate, situated medially on dorsal aperture (fig. 65G); subgenital plate removed from ventral margin of aperture. **Phallotheca**: With two apertures, one distal extending basally on right side, the other on left surface on distal end of lateral prominence (fig. 65A, B, F). **Endosomal spicule**: Ventral lobe entire, apex thickened, distal portion with variable marginal serration; dorsal lobe twisted at base and situated on far left side of spicule base, bifurcate; lateral and medial rami variably serrate and widely separated; lateral ramus of bifurcate dorsal lobe projecting through left side aperture of phallotheca; ventral lobe and medial ramus of dorsal lobe project through large distal aperture of phallotheca (fig. 65C–F). **Right paramere**: Apical region with short, narrow parallel spines; subapical region wide; basal lobe with short, variable serrate process (fig. 65J–M). **Left paramere**: Shaft short, broadly attenuate, in apical view; distal region approximately one-half length of paramere in lateral view (fig. 65H, I).

Female: Moderately small, ovate; length 3.80–4.40, width 1.85–2.15 (pl. 3). STRUCTURE: vertex wider, eyes smaller, costal margin strongly curved otherwise as in male. GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view, right lateral surface small, comparative size at overlap with left greater than right. **Left first gonapophyses**: Dorsal surface concave, apex broadly convoluted. **Vestibulum, anteroventral margin of anterior wall**: Sclerotized medially and to lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced, moderately wide, triangular at base. **Second gonapophyses**: Anterior medial surface strongly sclerotized, slightly convex. **Interramal sclerite**: Dorsomedial region strongly and narrowly convex, posteromedial portion with narrow sclerotized fold abutting ovipositor bulb (fig. 66A), ventromedial region not greatly overlapped by lateral interramal sclerites. **Interramal lobe**: Dorsomedial margin not broadly produced; with narrow lobe posterodorsal to medial margin; anteroventral margin with short gradually attenuate apex (fig. 66B).

HOST: Kelton (1968) stated that *S. simplex* was collected on *Helianthus*. Two genera of Asteraceae, *Artemisia* and *Helianthus*, are the only plant records. Both could conceivably be breeding hosts.

DISTRIBUTION: Previously known only from Durango, this Mexican species is now known to be widely distributed in northern Mexico from the Sierra Madre Occidental–Central Plateau of Durango and Coahuila and in the south from the Sierra Transvolcanica of Mexico and Puebla states (map 12).

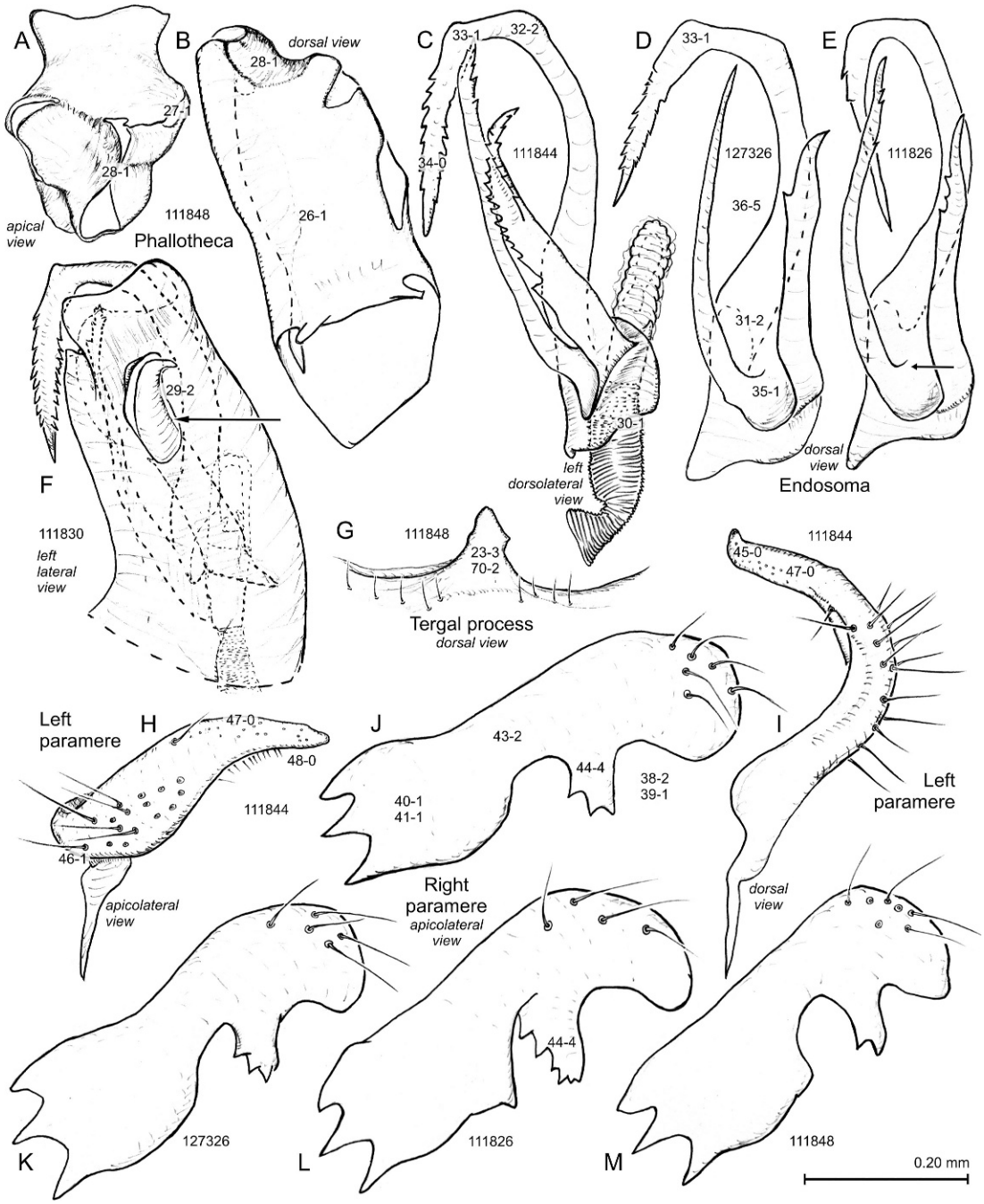


Fig. 65. *Slaterocoris simplex*, male genitalia. **A**, **B**, **G**, **M**. Navajos, DG. **C**, **H**–**J**. Navios, DG. **D**, **K**. Xometla, PB. **E**, **L**. Rio Frio, ME. **F**. Rio Frio, ME.

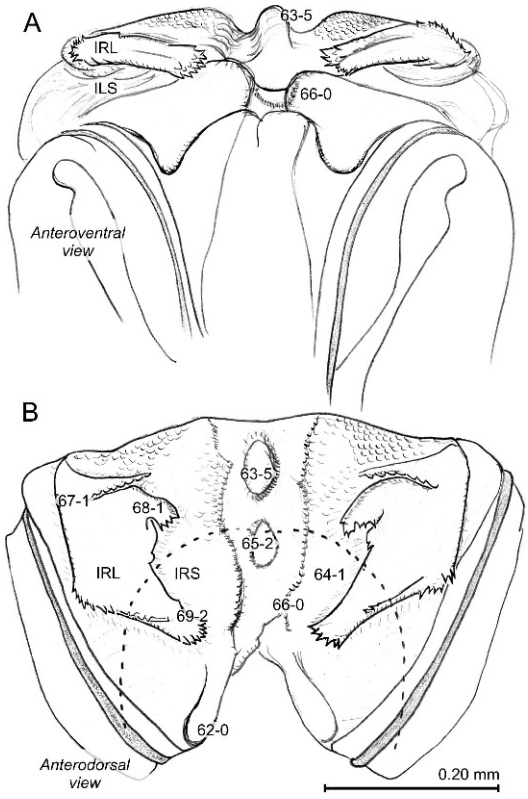


Fig. 66. *Slaterocoris simplex*, female genitalia, posterior wall. Navios, DG.

COLLECTION SUMMARY: 44 specimens from six collection events spanning the dates of July and August are known for this sparsely collected but widespread Mexican species.

DISCUSSION: *Slaterocoris simplex* and *S. clavatus* are the only species that have the dorsal lobe of the endosomal spicule clearly attached to the far left basal margin of the spicule. Such formation of the dorsal lobe is observed in species of *Jornandinus*, *Josephinus*, and *Scalponotatus*, whereas all other *Slaterocoris* species have the dorsal lobe shifted medially on the shaft of the ventral endosomal lobe. Unique to *S. simplex* is the second aperture on the left side of the phallotheca. The lateral ramus of the endosomal dorsal lobe projects from this opening in repose and when the spicule is extended. The narrowly folded structure of the dorsomedial margin in the interramal sclerite of *S. simplex* is also present in *S. punctatus*. The marginal serration of the endosomal lobe (fig. 65C–F) and the large serrate tubercle on the basal lobe of the right paramere (fig. 65J–M) in specimens from Durango and Puebla, Mexico, show variability to that seen in other widely distributed *Slaterocoris* species.

HOLOTYPE: **MEXICO: Durango:** Navios, 26 mi E of El Salto [23.78278° N 104.95381° W, 2438 m], 11 Aug 1964, L.A. Kelton, 1♂ (AMNH_PBI 00111833) (CNC).

OTHER SPECIMENS EXAMINED: **MEXICO: Coahuila:** 33 mi SE of Saltillo, near Jame, 25.39796° N 100.66195° W, 2286 m, 10 Jul 1963, H. and A. Howden, paratype, 1♀ (00111859) (CNC). **Durango:** Navajos, 20 mi E of El Salto, 23.783° N 105.04908° W, 2438 m, 27 Jul 1964, L.A. Kelton, Asteraceae, paratype, 1♀ (00111405), *Helianthus* sp. (Asteraceae), paratypes, 4♂ (00111847–00111850), 7♀ (00111851–00111857) (CNC). Navios, 26 mi E of El Salto, 23.78278° N 104.95381° W, 2438 m, 02 Aug 1964, L.A. Kelton, paratypes, 4♂ (00111404, 00111842–00111844), 2♀ (00111845–00111846) (CNC), paratype, 1♂ (00245375) (TAMU), paratype, 1♂ (00121780), 1♀ (00121781) (UCB); 11 Aug 1964, L.A. Kelton, paratypes, 3♂ (00111834–00111836), 5♀ (00111837–00111841) (CNC), paratype, 1♀ (00245376) (TAMU). **Mexico:** Rio Frio, 19.35° N 98.6667° W, 3026 m, 28 Aug 1969, L.A. Kelton, *Artemisia* sp. (Asteraceae), 8♂ (00111824–00111831), 1♀ (00111832) (CNC). **Puebla:** Xometla, 1 mi E of Chalchicomula [Cuidad Serdan], 18.9833° N 97.45° W, 2438 m, 28 Aug 1951, Uzzell and Mosimann, 2♂ (00127325–00127326), 1♀ (00127327) (UMMC).

Slaterocoris subalbicans (Distant), **new combination**

Figures 12, 63B; plate 3; map 12

Jornandes subalbicans Distant: 1893: 448, pl. 39, fig. 10 (orig. desc.); Carvalho and Dolling, 1976: 808 (desig. lectotype).

Amulacoris subalbicans: Carvalho and China, 1959: 71, fig. 1 (n. comb.).

DIAGNOSIS: *Slaterocoris subalbicans* is closest to *S. simplex* in having a similar mixture of long, simple and some sericeous setae (cf. fig. 63B, C). The two species can be

separated on vertex width and antennal length. In the female lectotype of *S. subalbicans*, the vertex is shorter (0.54) and antennal segments II and III are longer (1.18, 0.79) than in the female of *S. simplex* (0.60–0.65 for vertex; 0.90–0.95, 0.63–0.70 for I and II). The coloration of tarsomeres I and II is also different: pale in *S. subalbicans* and black in *S. simplex*. The distributions of the two species are allopatric; the nearest locality of the widespread *S. simplex* to the type locality of *S. subalbicans* in Guerrero, is about 200 km to the northeast, in Puebla state. The long vestiture in *S. subalbicans* is reminiscent of *S. argenteoides* and *S. argenteus*, but the setae of the latter two species are recurved apically (pl. 4C), whereas the sericeous setae in the former species are gently curved (fig. 63B). Additionally, the shorter head (0.95) and vertex width and pale tarsomeres I and II distinguish *S. subalbicans* from *S. argenteoides* and *S. argenteus* (1.00–1.06 for head; 0.58–0.65 vertex; black tarsomeres).

REDESCRIPTION: *Male:* Unknown.

Female: Moderately small, obovate; length 3.70–3.75, width 1.75–1.90 (pl. 3). COLORATION AND VESTITURE: Vertex black; coxa and femur black, tarsus pale, except for segment III black. Dorsal vestiture of moderately long, suberect, silvery, dense simple setae with some sericeous setae readily seen near claval suture (fig. 70B). STRUCTURE: Costal margin curved. GENITALIA: Unknown.

HOST: Unknown.

DISTRIBUTION: Known from the two specimens collected in August and September from the Sierra Madre del Sur of Guerrero (map 12).

DISCUSSION: Distant (1893) described *Jornandes subalbicans* based on two specimens from Guerrero, Mexico. He stated that it has overall black coloration, including the legs and antenna and indicated that the vestiture consisted of "thickly greyish-pilose" setae. My observations show that the two specimens are entirely black with pale coloration on tarsomeres I and II. Carvalho and China (1959) based their new genus *Amulacoris* on three specimens—the syntypes of *J. subalbicans* and the female holotype of *J. dissimulans* Distant which they considered to be a junior synonym of *J. subalbicans*. In the generic description of *Amulacoris*, they stated that the type specimen was a male. Examination of the syntypes held in the Natural History Museum (BMNH) clearly reveal that both specimens of *J. subalbicans* are female (personal obs.). When Carvalho and Dolling (1976) designated the same specimen as the lectotype of *J. subalbicans* they also noted that it was a female. Subsequently, *J. dissimulans* was removed from synonymy with *J. subalbicans* (Carvalho, 1981) and then removed from *Amulacoris* (Carvalho, 1988; see discussion of *J. dissimulans* above).

The absence of males, the rarity and poor condition of the two known females made it impossible to describe the genitalia of either sex. Several features of *A. subalbicans* argue for placement in *Slaterocoris*. The dorsal sculpturation is formed by moderate-sized punctures that merge with rugosity giving an almost platelike appearance and the transverse basal carina is also sharply declivous anteriorly; both of these features are found in *Slaterocoris*. The dorsal vestiture of both long, silvery simple and sericeous setae is similar to that in *S. simplex*. Based on vestiture, *A. subalbicans* is also similar to *S. argenteoides* and *S. argenteus*. No features in the original description of *Amulacoris* (Carvalho and China, 1959) will distinguish that genus from *Slaterocoris*. They mentioned its small body, rugose dorsum, dense, long, silvery vestiture, and carinate vertex, all features found in species of *Slaterocoris*. The preponderance of morphological evidence supports placement of *A. subalbicans* in *Slaterocoris*, thus providing the new combination, *S. subalbicans,* and relegating *Amulacoris* as a junior synonym of *Slaterocoris*.

LECTOTYPE: **MEXICO: Guerrero:** Amula, [17.63333° N 99.25° W, 1829 m], Sep 1890, H.H. Smith, 1♀ (AMNH_PBI 00085373) (BMNH).

OTHER SPECIMEN EXAMINED: Paralectotype with same label information as lectotype but date Aug 1890, 1♀ (00085374) (BMNH).

***Slaterocoris tanydexios*,** new species
Figures 12, 67–70; plates 3, 4R; map 12

HOLOTYPE: MALE: "**MEXICO: Oaxaca** 3 mi se. [of] Matatlan (Microondas road)

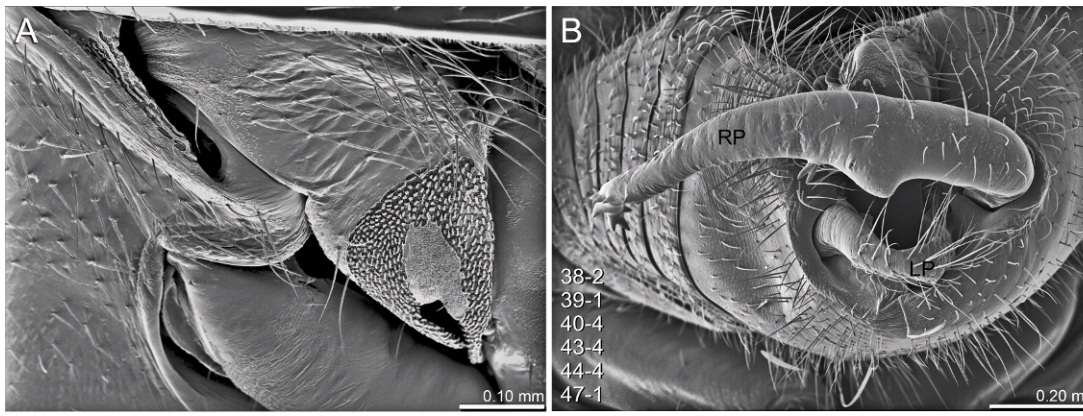


Fig. 67. *Slaterocoris tanydexios*, scanning electron micrographs. **A**. Mesothoracic spiracle and metathoracic scent-efferent system, lateral view. **B**. Pygophore with left and right parameres, posterior view.

[16.83581° N 96.35109° W, 2027 m,] elev. 6650 ft., July 17, 1987, Kovarik and Schaffner'' (AMNH_PBI 00118717). Holotype *Slaterocoris tanydexios* n. sp. det. M.D. Schwartz, 2010 [red label]. Deposited in the collection of the Instituto de Biologia, Universidad Nacional Autonoma de Mexico, Mexico City, D.F.

DIAGNOSIS: Distinguished from other species of *Slaterocoris* by the brown to yellowish-brown evaporative area and peritreme of the metepisternal scent gland. The adjacent portions of the meso- and metacoxae are colored similarly to the scent gland. The unusually long and narrow right paramere (figs. 67B, 68A–E) and the large bifurcate tergal process (fig. 69C) are unique to this species and are sufficient to distinguish it from other *Slaterocoris*. The wide apicalmost portion of the ventral endosomal lobe, basal to the recurved distal region (fig. 69A), is reminiscent of the same region in *S. pallidicornis* (fig. 33A–C), *S. pallipes* (fig. 34A–C), and *S. stygicus* (fig. 39A–D) of the *breviatus* group.

DESCRIPTION: *Male:* Large, elongate; length 4.73–5.73, width 1.63–1.88; costal margin parallel (pl. 3). COLORATION: Shining black; metepisternal scent gland yellowish brown to brown; if brown then posterior margin of evaporative area always paler; usually coxa, except for base, trochanter, and basal one-third of femur pale whitish yellow to yellowish brown; sometimes only middle and hind legs with pale coloration and foreleg completely black; sometimes only apex of coxa and trochanter pale (fig. 12); if legs with pale coloration then metepisternal scent gland usually with similarly coloration. VESTITURE: Densely distributed, long, suberect silvery white setae (pl. 4R). DORSAL SCULPTURATION: Frons striate, vertex rugose; calli rugose, pronotal disc rugulopunctate. STRUCTURE: Labium practically reaching posterior margin of mesosternum. GENITALIA: **Pygophore**: Tergal process large, widely bifurcate, reaching apex of proctiger, process situated roughly in middle of aperture, bifurcate rami parallel to axis of process (fig. 69C). **Phallotheca**: Apex broadly truncate, ventral to aperture; left U-shaped dorsal notch small (fig. 69B). **Endosomal spicule**: Dorsal lobe bifurcate with smooth-margined processes, medial ramus straight, lateral ramus curved; ventral lobe with broad expanded apical region, terminating in sharply attenuate pointed apex (fig. 69C). **Right paramere**: Elongate, apex reaching beyond left lateral surface of pygophore (fig. 67B); serrate tubercle usually present (absent in fig. 68A, arrow) distal to base of paramere, often ventralmost project from body of paramere; all spines distal to serrate tubercle with variable arrangement; apex pointed (figs. 67B; 68A–E). **Left paramere**: Shaft sinuate, moderately long, in apical view, approximately of equal length to paramere body in lateral view (fig. 68F).

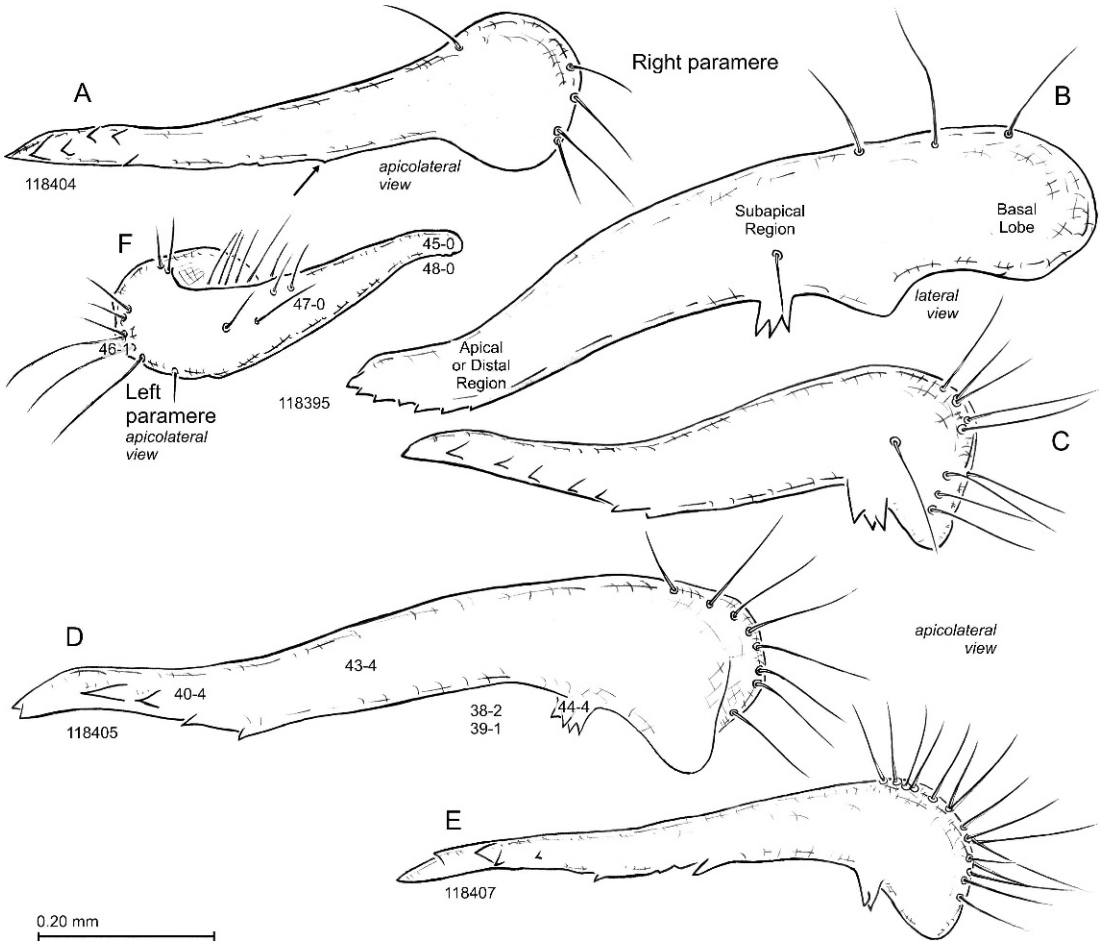


Fig. 68. *Slaterocoris tanydexios*, parameres. **A**. 2.8 mi E of Matatlan, OA. **B**, **C**, **F**. 4.4 mi SW of Acatepec, PU. **D**. 4 mi W of Acatepec, PU. **E**. 3 mi SE of Matatlan, OA.

Female: Large, elongate ovoid, length 4.00–5.20, pronotal width 1.80–2.31 (pl. 3); except for the more arcuate costal margin, wider vertex, and smaller eye, the coloration and vestiture are as in the male. GENITALIA: **First gonapophyses**: Right overlapping left in ventral view; comparative size at overlap with left greater than right, although first gonapophyses wide in anterior/posterior axis (fig. 70A, B). **Left first gonapophyses**: Dorsal surface protuberant, apex broadly convoluted. **Vestibulum, anteroventral margin of anterior wall**: Sclerotized medially and sclerotization reaching to lateral margins bursa copulatrix. **Ventral labiate plate**: Strongly sclerotized broadly produced ventrally. **Second gonapophyses**: Anterior medial surface slightly convex (fig. 70C). **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly; medial sclerite with broad tumid surface abutting ovipositor bulb; medial sclerite overlapped by lateral plates of interramal sclerite. **Interramal lobe**: Broad, with broadly protruding curved medial margin and moderately long attenuate ventral apex (fig. 70D).

ETYMOLOGY: From the Greek, *tany-,* "long," and *dexios,* "on the right," for the exceptionally long right paramere of the male.

HOSTS: Unknown.

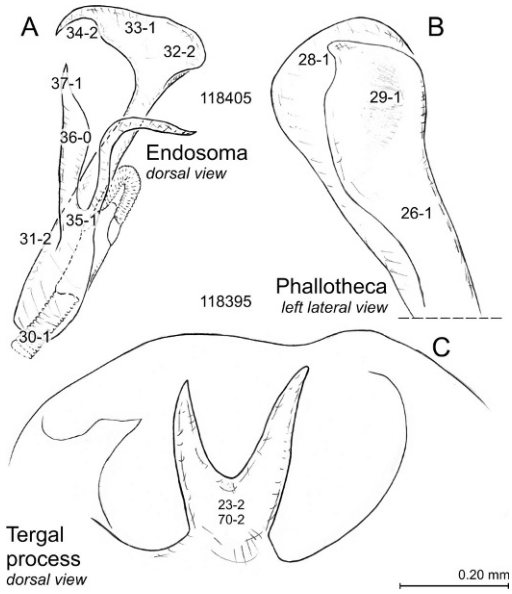


Fig. 69. *Slaterocoris tanydexios*, male genitalia. **A**, **B**. 4 mi W of Acatepec, PU. **C**. 4.4 mi SW of Acatepec, PU.

DISTRIBUTION: From the western slopes of the southern Sierra Madre de Oaxaca in central Oaxaca and eastern end of the Sierra Transvolcanica in northwestern Puebla (map 12).

COLLECTION SUMMARY: 96 specimens are known from nine collection events in July.

DISCUSSION: As mentioned above, the ventral endosomal spicule (33-1) of this *punctatus*-group species is similar in form to three species of the *breviatus* group, particularly *S. stygicus*, the type species (see citations to figures in Diagnosis, above). Other features of the male genitalia show little similarity to the *breviatus* group, only the elaborate, bifurcate tergal process hints at the condition in the *breviatus* group, in which the bifurcate apices of the tergal process (23-2) are minute in comparison (cf. figs. 32E; 33D, E; 34G; 35D).

One character of the female genitalia (51-1), the large right first gonapophysis overlapping the left (fig. 70A, B), also occurs only in the *breviatus* group. As a result of the phylogenetic analysis, *S. tanydexios* is placed in the *punctatus* group by virtue of the black apices of the femora, the medially situated long tergal process, and homoplasious structure of the dorsal lobe of the endosomal spicule, the right paramere, and the interramal lobe. The *breviatus*-group species have the apices of the femora pale, the tergal process is smaller and emanates from the genital aperture on the right side of midline, and different features of the genitalia.

In the right paramere, the overall length, number, and arrangement of the apical spines, and presence of the medial or subbasal serrate tubercle are variable (cf. figs. 67B; 68A–E) across the distributional range and at any particular locality. Similar variation is the norm for the genus, regardless of the fine structure of the right paramere and dorsal coloration, all examined specimens had similar structure in the endosomal spicule and tergal process.

PARATYPES: **MEXICO: Oaxaca:** 2.8 mi E of Matatlan, 16.86666° N 96.34078° W, 24 Jul 1974, Clark, Murray, Ashe, Schaffner, 2♂ (00118404, 00118695), 1♀ (00118707) (CNC), 8♂ (00118694, 00118696–00118702), 4♀ (00118703–00118706) (TAMU). 3 mi SE of Matatlan (Microondas road), 16.83581° N 96.35109° W, 2027 m, 17 Jul 1987, Kovarik and Schaffner, 1♂; (00118722), 2♀; (00118739, 00118746) (AMNH), 1♂; (00118407), 3♀; (00118725–00118726, 00118744) (CNC), 14♂; (00118708–00118716, 00118718–00118721, 00118723), 18♀; (00118724, 00118727–00118738, 00118740–00118743, 00118745), 1♂ (00118226) (TAMU). 4.2 mi N of Tonaltepec, 17.12774° N 96.61666° W, 21 Jul 1987, Kovarik and Schaffner, 1♂ (00184629) (TAMU). 6 mi NE of Mitla, 16.55561° N 96.10588° W, 20 Jul 1985, Jones and Schaffner, 1♂ (00118406) (CNC). 9 mi NE of Mitla, 17.04558° N 96.38786° W, 2409 m, 20 Jul 1985, Jones and Schaffner, 1♂ (00093266) (TAMU). **Puebla:** 4 mi W of Acatepec, 19.03332° N 98.34485° W, 26 Jul 1973, Mastro and Schaffner, 1♂ (00118405), 1♀ (00118765) (CNC), 13♂ (00118429, 00118747–00118758), 7♀ (00118430, 00118759–00118764), 1♀ (00093415) (TAMU). 4.4 mi SW of Acatepec, 18.98809° N 98.33118° W, 26 Jul 1974, Clark, Murray, Ashe, Schaffner, 1♂ (00118766) (AMNH), 1♀ (00118773) (CNC), 2♂ (00118767–00118768), 3♀ (00118770–00118772), 2♂ (00118395, 00245419) (TAMU). 4.4 mi SW of Acatepec, 18.98809° N 98.33118° W, 09 Jul 1977, J.C. Schaffner, 1♀ (00094256) (AMNH), 1♀ (00094255) (CNC), 1♂ (00118769), 1♀

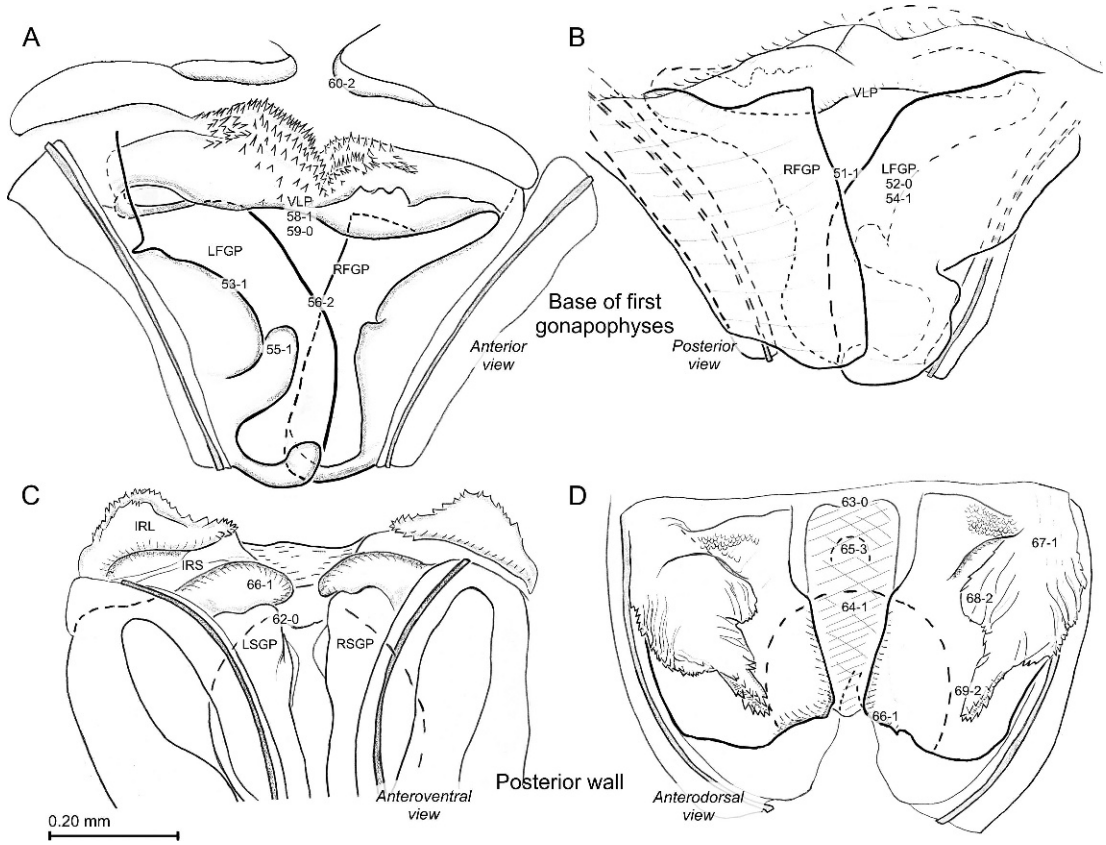


Fig. 70. *Slaterocoris tanydexios*, female genitalia. 4.4 mi SW of Acatepec, PU.

(00094254) (TAMU); 4.4 mi SW of Acatepec, 18.98809° N 98.33118° W, 09 Jul 1981, Bogar, Schaffner and Friedlander, 1♂ (00184628) (TAMU).

Slaterocoris robustus (Uhler)

Figures 12, 71–73; plates 3, 4M; map 13

Stiphrosoma robusta Uhler, 1895: 45 (orig. desc.).
Strongylocoris robustus: Van Duzee: 1921: 136 (disc., in part).
Strongylocoris uniformis Van Duzee, 1925: 396 (orig. desc.); Kelton, 1968: 1132 (n. syn.).
Slaterocoris robustus: Kelton, 1968: 1132, fig. 19 (disc.); Knight, 1970: 238, fig. 1 (disc.); Henry and Wheeler, 1988: 451 (catalog); Schuh, 1995: 199 (catalog).
Slaterocoris nevadensis Knight, 1970: 239, fig. 20 (disc.); Henry and Wheeler, 1988: 450 (catalog); Schuh, 1995: 198 (catalog). NEW SYNONYMY.

DIAGNOSIS: Recognized by the uniform black coloration (pl. 3), except rarely for the pale apices of the femora (fig. 12); the sparse, or moderately sparse, long, erect, somewhat thickened, black vestiture (pl. 4M, fig. 71B); the relatively wide vertex (fig. 71A); and the male genitalia with the dorsal lobe of the endosomal spicule bifurcate and smooth marginally, the ventral lobe of the endosomal spicule smooth marginally (fig. 73A), and the relatively long, strongly (fig. 72B) or faintly bifurcate (fig. 72A) apex of the right paramere (fig. 72). The relatively stiff black vestiture (pl. 4M, fig. 71B) and smooth frons (fig. 73A) will easily distinguish *S. robustus* from all other congeners with completely black legs.

REDESCRIPTION: *Male:* Moderately small, obovate, length 3.35–5.13, width 1.65–2.18 (pl. 3). COLORATION: Shining black, including antenna and legs, except apex of femur rarely pale (fig. 12). VESTITURE: Sparse to moderately sparse, moderately long, erect, black bristlelike simple setae (pl.

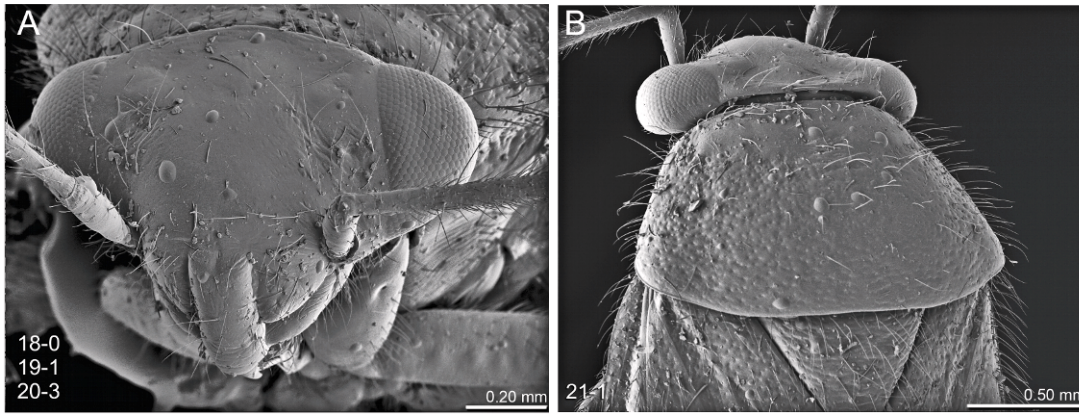


Fig. 71. *Slaterocoris robustus*, scanning electron micrographs. **A**. Head, anterior view. **B**. Head and pronotum, dorsal view.

4M, fig. 71B); antennal segments II to IV with erect, black setae. STRUCTURE: Body conformation in both sexes roughly similar; frons smooth (fig. 71A); labium reaching base of middle coxa; calli slightly produced, smooth, pronotal disc sparsely and shallowly punctate (fig. 71B); costal slightly arcuate. GENITALIA: **Pygophore**: Tergal process short with right side point, entire, directed toward midline. **Phallotheca**: Left lateral surface slightly compressed (fig. 73B). **Endosomal spicule**: Apical region of ventral lobe with uniform thickness throughout, distal to recurved angle smooth, long; dorsal lobe bifid with narrow lobes (fig. 73A). **Right paramere**: Small, apical region narrowed, medial region with prominent solitary spine (fig. 72A, arrow), basal lobe rounded with single (fig. 72A) or bifurcate (fig. 72B) spine, distal to basal lobe (fig. 72). **Left paramere** distal portion shorter than basal portion; ventral surface of equal diameter throughout (fig. 73C).

Female: Moderately small, ovate; length 3.40–4.35, width 1.70–2.40 (pl. 3). STRUCTURE: Costal margin strongly curved. GENITALIA: **First gonapophyses**: Left overlapping right, in ventral view, left greater than right at overlap; right lateral surface small. **Left first gonapophyses**: Dorsal surface concave, apex wide. **Vestibulum, anteroventral margin of anterior wall**: Sclerotized medially and sclerotized to lateral margins of bursa copulatrix. **Ventral labiate plate**: Strongly produced moderately, base wide, triangular. **Second gonapophyses**: Anterior medial surface slightly convex. **Interramal sclerite**: Dorsomedial region flat, not produced anteriorly, posteromedial portion with tumid process abutting ovipositor bulb, lateral ventromedial regions overlapping ventromedial plate. **Interramal lobe**: Dorsal or basal insertion with membranous attachment; dorsomedial margin not produced as lobe; ventral projection long with concave anterior surface.

HOSTS: The breeding host for *S. robustus* is *Artemisia tridentata* (Asteraceae), including *A. tridentata* ssp. *parishii*, in California, and the widely distributed nominal subspecies. Many specimens were also collected from unidentified species of *Artemisia* throughout the distributional range of *S. robustus*. Fewer specimens were taken on five other Asteraceae: *Achillea millefolium*, *Artemisia cana*, *A. frigida*, *Chrysothamnus viscidiflorus*, and unknown species of *Chrysothamnus*. The limited number of non-Asteraceae records are considered sitting records and not indicative of breeding hosts.

In central Oregon, *S. robustus* (identified as *S. nevadensis*) was collected along with three phyline plant bugs from *Artemisia tridentata* as part of a study of the effects of secondary plant chemistry and bird predation on the sagebrush arthropods (Wiens et al., 1991).

DISTRIBUTION: Western North America from the Okanagan Valley of southern British Columbia southeast to the central Rocky Mountains of Colorado and south-

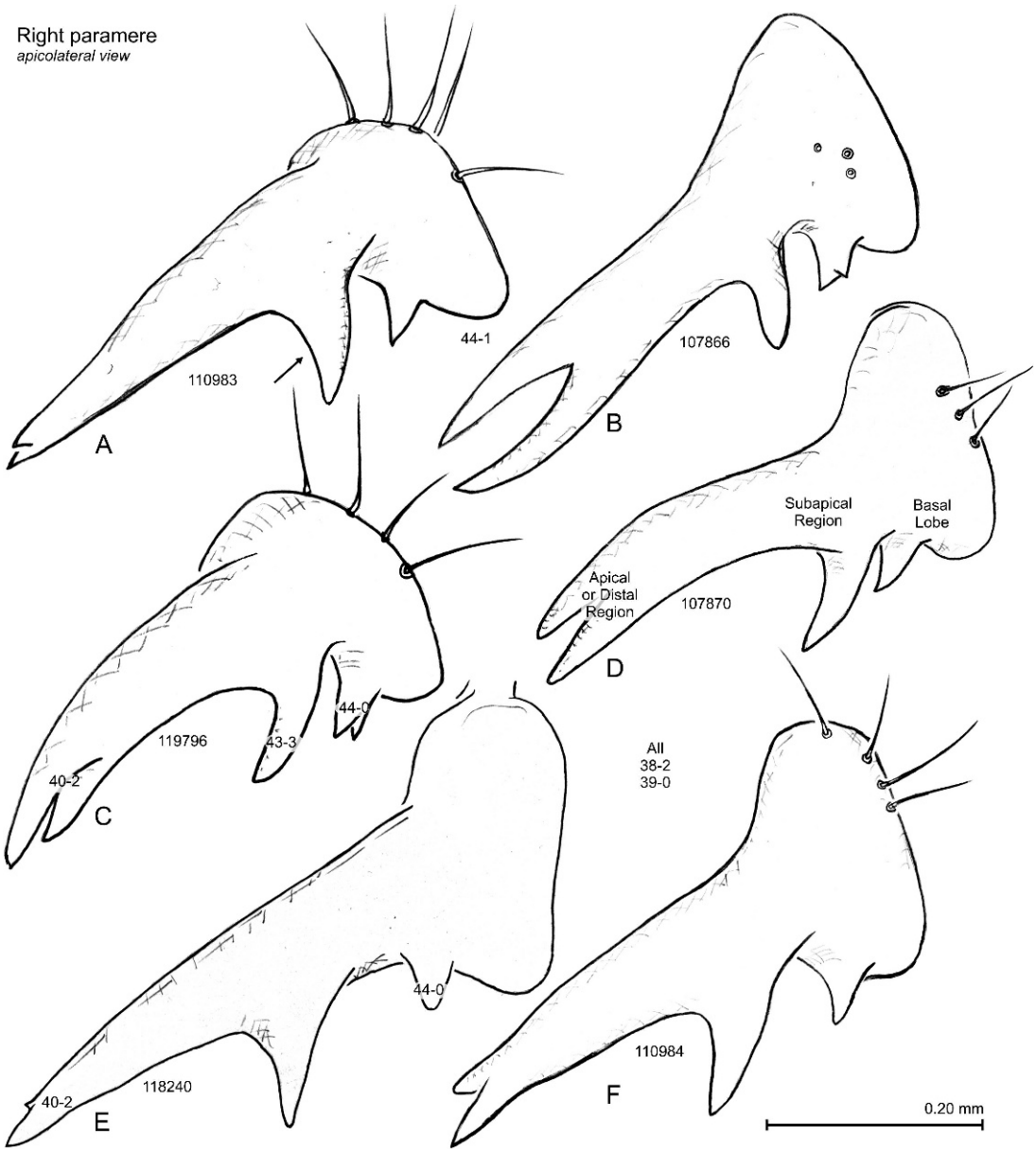


Fig. 72. *Slaterocoris robustus*, right paramere. **A**. Gould, CO. **B**. 3.5 mi SE of Manhattan, NV. **C**. 10 km SE of Hesperia, CA. **D**. 35 mi E of Gunnison, CO. **E**. Steamboat Springs, CO. **F**. Baxter Pass, CO.

west to southern California (map 13). Although widely cited (e.g., Kelton, 1968; Knight, 1970; Henry and Wheeler, 1988), I have not located specimens of *S. robustus* from Texas.

COLLECTION SUMMARY: 985 from 226 collection events. Earliest collections in May are from California and the Columbia Basin of Washington. Most collection events are from June and July with August dates predominating at higher latitude and elevation.

DISCUSSION: Kelton (1968) designated a specimen with the labels "*Stiphrosoma robus-*

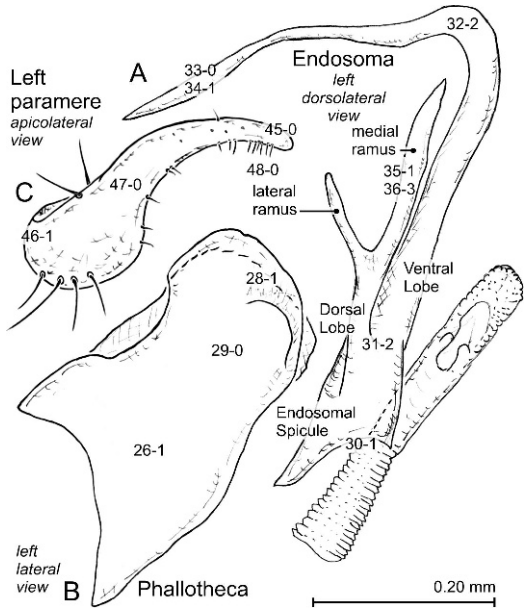
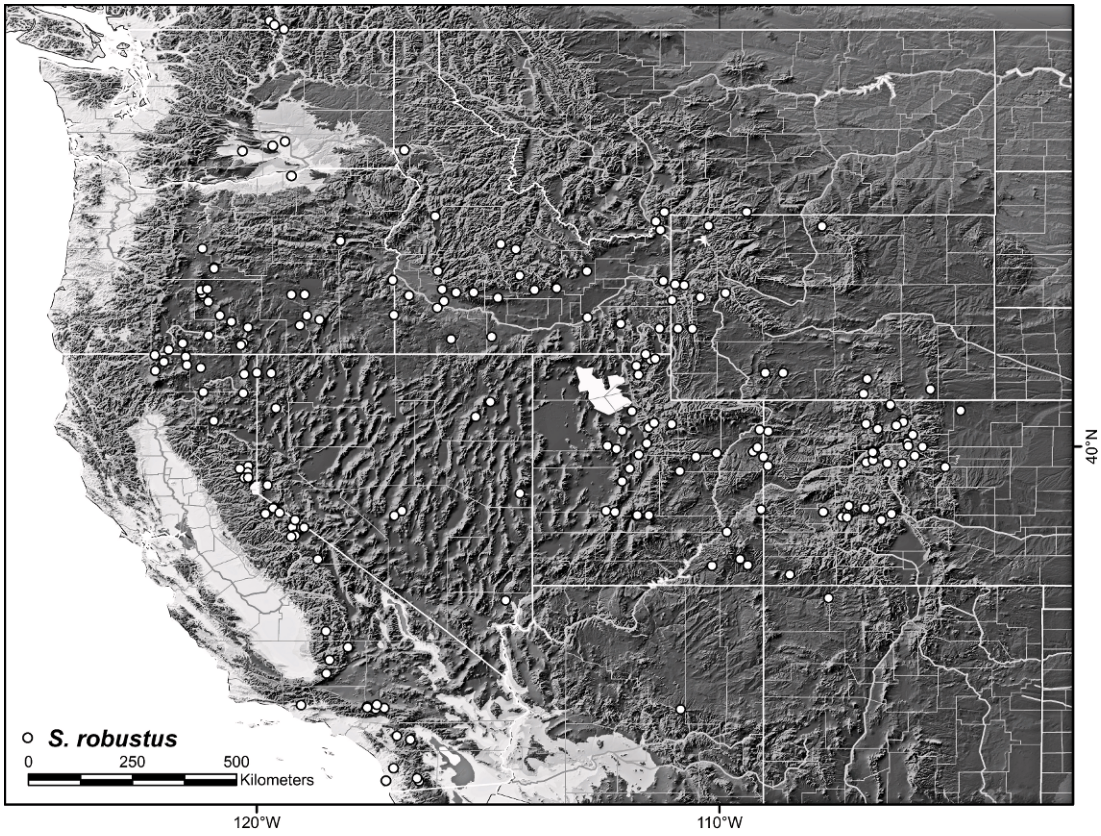


Fig. 73. *Slaterocoris robustus*, male genitalia. Gould, CO.

ta Uhl., Colo. 191; P.R. Uhler Collection; No. 69538'' as the lectotype of *Stiphrosoma robusta* (USNM). This specimen could not be found in the holdings of the CNC or the running and type collections of the USNM. Uhler (1895) described *Stiphrosoma robusta* based on two females from Colorado. There are several specimens in the USNM with a least these two labels: ''Colo [printed] ###(#) [handwritten]'' and ''PR Uhler Collection'' (#191 [♀], #1329 [♂], #1332 [♂],#1412 [2♀], #1581 [9♂, 13♀], #1686 [♂, ♀], #2010 [♀], #2012 [♂, 4♀], #2158 [4♂, 3♀], #2193 [2♂,3♀]). The #191 female has three additional labels: ''*Stiphrosoma robusta* Uhler'' in Uhler's handwriting; ''*Stiphrosoma robusta* Uhler'' [handwritten] and ''Det UHLER'' [printed]; and a red label. This is probably the specimen designated by Kelton (1968), although in the note book of Gillette and Baker collection codes held in the USNM, #191 references a specimen from ''M.A.C.'' [Michigan Agriculture College ?], ''breeding cage,'' ''5–20–90, ''C.F. B[aker].'' None of the specimens numbers listed above exactly matches the original description of ''Steamboat Springs, July 26th (Gillette).'' As #191 agrees with the original description and concept of *robusta*, I have applied two labels to it in order to stabilize the intent of Uhler and clarify the ambiguous lectotype designation of Kelton: AMNH_PBI 00134033 and LECTOTYPE ♀ *Stiphrosoma robusta* Uhler, 1895, desig. by M.D. Schwartz, 2010 [red label].

Knight (1970) described the nominal species *S. nevadensis* from two males collected near Las Vegas, Nevada. In his key *S. nevadensis* and *S. robustus* are separated by a comparison of antennal segment II length to vertex and eye width and male body length. The segment is subequal to the width of the vertex and an eye and the body is 4.20 in *S. robustus*; in *S. nevadensis* the segment is not equal to the combined width and the length is 3.20. The form of the right paramere was also presumed to be diagnostic for the two nominal species. Having examined large numbers of specimens, including the types and associated material, from a variety of localities and hosts, I cannot find constant differences in body length, ratio of antennal segment II to head, or genitalic structure to support the distinction. My observations show that *S. robustus* has great size variation. The male body length ranges from 3.35 to 5.13 and the ratio of the head width to length of antennal segment II is from 1.12 to 1.63. Even though Knight (1970) illustrated the right paramere of the two nominal species, my comparisons suggest that these renderings do not document the variation that actually exists (cf. fig. 72A–F). There are no discrete differences in body size, head, vertex, and pronotal width, antennal segment II length, and structure of the right paramere that are correlated or tied to a particular geographical region. Short body length is found in specimens from southern Nevada as well as central Oregon (Silver and Summer lakes). Generally smaller specimens occur at lower elevations (approx. 1300 m) in and around the Great Basin whereas larger specimens are found at higher elevation (approx. 2700 m) and higher latitude (approx. 44° N). The long, moderately sparse, black vestiture of the dorsum, black body and appendages, relatively short antennal segment II, and the structure of the endosomal spicule as in figure 73A are unique and sufficient to diagnose this species. I therefore treat *S.*



Map 13. Localities for *Slaterocoris robustus*.

nevadensis as a junior synonym of *S. robustus*.

There is variation in the shape of the right paramere, especially in the number of apical spines and apical structure of the spine adjacent to the basal lobe. The apical region can be entire (fig. 72E) or with bifurcate spines of variable size and separation (fig. 72A–D, E). Neither Kelton (1968) or Knight (1970) documented the two small apical spines as shown in figure 72A, E, from Gould and Steamboat Springs, Colorado, respectively. Two large apical spines, as seen in figure 72B for a Nevada specimen, were also found in some specimens from British Columbia. The basal spine can also be entire (fig. 72A, D–F) or bifurcate (fig. 72B, C). Nonetheless, the structure of the endosomal spicule is consistent in all specimens examined from across the range of *robustus*; all are nearly identical to figure 73A. I do note that the curvature of the long ventral lobe can change depending on the storage medium.

Based on the cladistic analysis, *S. robustus* was not placed in a species group, but either as the sister to the *flavipes* group (fig. 1B, D) or as the sister to a large number of species (fig. 2), sometimes including *S. ambrosiae* (fig. 1A). Different sets of character pairs unambiguously support each of these arrangements of species. Black legs (5-2, homoplasious; 6-1, nonhomoplasious) partially define the node containing *S. robustus* and the *argenteus*, *hirtus*, and *punctatus* groups (fig. 2). Ambiguous support for this arrangement is provided by vestiture coloration (9-0) and the structure of the anterior portion of the right paramere (40-1).

The smooth distal portion of the ventral lobe of endosomal spicule (34-1) and the left first gonapophysis overlapping the right (51-0) gives nonhomoplasious support to the

sister relationship of *S. robustus* and the *flavipes* group (fig. 1B). Additionally, vestiture coloration (9-0) and the structure of the anterior portion of the right paramere (40-2) provide ambiguous support to this arrangement. An arrangement (fig. 1A) where *S. robustus* is the sister to *S. ambrosiae* and the *apache*, *argenteus*, *hirtus*, and *punctatus* groups receives homoplasious support from the structure of the dorsal lobe of the endosomal spicule (36-3) and the ventral labiate plate (59-1). Depending on the optimization, ambiguous support for this arrangement is provided by two to five additional characters.

LECTOTYPE: **USA: Colorado:** ***Unknown co.:*** "Colo 191," unknown, 1♀ (AMNH_PBI 00134033) (USNM).

HOLOTYPES: **Nevada:** ***Clark Co.:*** Moapa [36.67555° N 114.62055° W], 25 May 1963, R.C. Bechtel, 1♂ (AMNH_PBI 00122256) (USNM) (*S. nevadensis*: junior synonym); **Utah:** ***Wasatch Co.:*** Heber [City] [40.50694° N 111.4125° W], 05 Jul 1922, E.P. Van Duzee 1♂, not examined (CAS) (*S. uniformis*: junior synonym).

OTHER SPECIMENS EXAMINED: **CANADA: British Columbia:** 4 mi E of Cawston, 49.19175° N 119.7237° W, 09 Jul 1959, L.A. Kelton, 1♂ (00111004) (CNC). Mount Kobau, 11 km NW of Osoyoos, 15 km SE of Summit, 49.10197° N 119.61409° W, 964 m, 30 Aug 1993, M.D. Schwartz, *Artemisia tridentata*, 4♂ (00110982, 00111005–00111006, 00115512) 3♀ (00111007–00111009) (CNC). Osoyoos [on Rt 3], 49.00845° N 119.40987° W, 560 m, 08 Jul 1991–3 Jul 1991, unknown, 1♂ (RBCM). **USA: Arizona:** ***Coconino Co.:*** Jacob Lake, 34.32111° N 110.84° W, 05 Jun 1969, W.F. Chamberlain, 1♀ (00118262) (TAMU). **California:** ***Alpine Co.:*** Ebbetts Pass, Pacific Crest National Scenic Trail, Toiyabe National Forest on Rt 4, 38.54444° N 119.81083° W, 2661 m, 05 Jul 1994, M.D. Schwartz, *Artemisia* sp., 2♀ (00111012, 00111013) (CNC). Monitor Pass, 38.67556° N 119.61944° W, 06 Aug 1962, D.R. Smith, 1♂ (00118068) (ORSU). Monitor Pass, just W of, on Rt 89, 38.66533° N 119.64116° W, 2550 m, 27 Jul 1999, M.D. Schwartz, *Chrysothamnus viscidiflorus*, 2♂ (00111010–00111011) (CNC). ***Kern Co.:*** E of Caliente on Walker Basin Road, 35.38774° N 118.425° W, 1220 m, 22 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Artemisia tridentata* ssp. *parishii*, det. A. Sanders UCR 140648, 4♂ (00108002–00108005) (AM), *Artemisia tridentata* ssp. *parishii*, det. A. Sanders UCR 140648, 2♂ (00107999–00108000), 1♀ (00108001) (AMNH). S of Tehachapi on Water Canyon Rd, 35.09563° N 118.4909° W, 1445 m, 21 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Artemisia tridentata* ssp. *parishii*, det. A. Sanders UCR 140648 [PBI CAL04-H5], 1♂ (00137233) (AMNH). nr Walker Pass, 35.6625° N 118.02583° W, 1524 m, 30 May 1981, J.T. Polhemus, 1♀ (00116754) (JTP). ***Lassen Co.:*** Blue Lake, 41.14889° N 120.28972° W, 19 Jun 1947–20 Jun 1947, R.L. Usinger, 1♂ (00119265) (UCB). Martin Springs, T31N R9E Sec 14, 40.55181° N 120.92631° W, 1830 m, 23 Jul 1922, J.O. Martin, 1♀ (00242622) (CAS). ***Modoc Co.:*** 2.5 mi S of Rt 139 toward Lookout, 41.17191° N 121.15417° W, 1440 m, 06 Jul 1979, R.T. and Joe Schuh, *Artemisia tridentata*, 2♂ (00107862, 00108014), 7♀ (00108015–00108021), *Lupinus* sp. (Fabaceae), 1♂ (00108013) (AMNH). 24.7 mi NW of Canby, 41.69638° N 121.20732° W, 1375 m, 01 Jul 1979, R.T. Schuh and B.M. Massie, 1♀ (00108032) (AMNH). W of Cedarville, Cedar Pass, 41.5625° N 120.26778° W, 1850 m, 01 Jul 1979, R.T. Schuh and B.M. Massie, *Artemisia tridentata*, 3♂ (00108008–00108010), 2♀ (00108011–00108012) (AMNH). ***Mono Co.:*** Bridgeport, 38.25583° N 119.23028° W, 28 Jul 1963, W.F. Chamberlain, 1♀ (00118231) (TAMU). Coleville, 38.56639° N 119.50611° W, 1585 m, 10 Jun 1966, W. Gagne, 3♂ (00119230–00119232), 2♀ (00119233–00119234) (UCB); 06 Jul 1966, C.W. O'Brien, 1♀ (00119267) (UCB). Conway Pass, 38.08806° N 119.18083° W, 18 Jun 1959, Frank M. Beer, 1♀ (00118072) (ORSU). Devils Gate Summit, 38.41417° N 119.16972° W, 2292 m, 06 Jul 1966, L. and C.W. O'Brien, 3♂ (00119225, 00119235–00119236), 3♀ (00119237–00119239) (UCB). Mono Lake, N edge at Rt 395, 38.07315° N 119.16745° W, 2187 m, 11 Jul 1980, R.T. Schuh and G.M. Stonedahl, *Artemisia tridentata*, 3♀ (00108027–00108029) (AMNH). Toms Place, 37.56139° N 118.68028° W, 09 May 1966, unknown, 2♂ (00119240–00119241), 5♀ (00119242–00119246) (UCB). Virginia Lakes, 38.05012° N 119.25654°

W, 2972 m, 15 Aug 1962, H.B. Leech, 1♂ (00242620) (CAS). ***Nevada Co.:*** 7 mi N of Truckee, Sagehen Creek, 39.43854° N 120.19337° W, 29 Jul 1962, J.T. Doyen, 1♂ (00119264) (UCB). 17 mi N of Truckee, 39.57448° N 120.18222° W, 21 Jul 1970, H.D. Hertert, 1♂ (00122330) (UID). Donner Lake, 39.3225° N 120.26528° W, 28 Jul 1932, R.L. Usinger, *Artemisia tridentata*, 1♂ (00119247), 10♀ (00119248–00119257) (UCB). Truckee, Tahoe National Forest, 39.32806° N 120.18222° W, 29 Aug 1967, L.A. Kelton, *Artemisia* sp., 9♀ (00111014–00111022) (CNC). ***Riverside Co.:*** Hemet Reservoir, San Jacinto Mountains, 33.7475° N 116.97111° W, 22 May 1940, C.D. Michener, *Artemisia tridentata*, 2♂ (00119224, 00119260), 1♀ (00119261) (UCB). Herkey Creek, San Jacinto Mountains, 33.66917° N 116.68028° W, 04 Jun 1940, unknown, *Adenostoma* sp. (Rosaceae), 1♀ (00242621) (CAS); 04 Jun 1940, C.D. Michener, 1♀ (00119262) (UCB); 04 Jun 1940, R.L. Usinger, *Arctostaphylos* sp. (Ericaceae), 1♀ (00119263) (UCB). ***San Bernardino Co.:*** Cajon Pass, 34.32645° N 117.42869° W, 1177 m, 06 Jun 1935, P.W. Oman, 1♀ (00134528) (USNM). E of Wrightwood on Rt 2, 2 km W of Rt 138, Los Angeles National Forest, 34.37824° N 117.6117° W, 1556 m, 18 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, 1♂ (00091705) (AM). Mojave River Forks, 10 km SE of Hesperia, 34.34927° N 117.24064° W, 901 m, 14 May 1985, M. Clement, 1♂ (00119803) (UCR); 06 May 1986, Anja Lachmann (for Ent. 109), 1♂ (00119796) (UCR). Oro Grande Wash, 11 mi S of Adelanto, 34.42133° N 117.40391° W, 26 May 1941, Timberlake, *Artemisia tridentata*, 2♂ (00119801–00119802) (UCR). Just E of Wrightwood on Rt 2, 34.35774° N 117.6105° W, 1700 m, 18 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Artemisia tridentata* ssp. *parishii*, det. A. Sanders UCR 140648, 1♂ (00108006), 1♀ (00108007) (AM), *Artemisia tridentata* ssp. *parishii*, det. Field ID, 19♂ (00322776, 00322777, 00322780–00322796), 5♀ (00322773–00322775, 00322778, 00322779) (AMNH). ***San Diego Co.:*** Buckmans Springs, 32.77152° N 116.492° W, 1021 m, 06 Jun 1928, C.C. Searl, *Arctostaphylos*sp. (Ericaceae), 1♀ (00244260) (SDNH); 19 Jun 1951, C.F. Harbison, 1♀ (00244259) (SDNH). Morena Dam, 32.78083° N 117.20694° W, 26 May 1929, C.C. Searl, 3♂ (00244245–00244247), 4♀ (00244248–00244251) (SDNH). Pine Valley, 32.83583° N 116.53361° W, 1190 m, 13 Jun 1927, C.C. Searl, 2♂ (00244252–00244253), 4♀ (00244254–00244257) (SDNH); 04 Jun 1928, C.C. Searl, 1♀ (00244261) (SDNH); 11 Jun 1953, C.F. Harbison, 1♀ (00244258) (SDNH). Warner Springs, 33.04969° N 117.04233° W, 29 May 1978, Brown and Faulkner, 7♂ (00244238–00244244) (SDNH). ***Sierra Co.:*** 5 mi S of Sierraville, 39.51724° N 120.36639° W, 18 Jun 1966, C.W. O'Brien, *Artemisia tridentata*, 1♂ (00119258), 1♀ (00119259) (UCB). ***Siskiyou Co.:*** 2 mi N of Tule Lake Refuge Headquarters, 41.93835° N 121.53194° W, 1219 m, 26 Jun 1979, G.M. Stonedahl, *Artemisia tridentata*, 1♀ (00108031) (AMNH). Grass Lake, 41.635° N 122.19028° W, 1524 m, 04 Jul 1952, M.A. Cazier, W. Gertsch, and R. Schrammel, 1♂ (00108033) (AMNH). Lava Beds National Monument near Headquarters, 41.75333° N 121.50556° W, 1560 m, 26 Jun 1979, R.T. and Joe Schuh, *Artemisia tridentata*, 1♀ (00108030) (AMNH). Macdoel, 41.82694° N 122.00417° W, 01 Jul 1935, P.W. Oman, 1♂ (00134539) (USNM). Shovel Creek Meadow, Willow Creek Mountain, 41.97111° N 122.20141° W, 10 Aug 1962, W. Peters and J. Schuh, 1♂ (00118069), 2♀ (00118070–00118071) (ORSU). ***Tulare Co.:*** 21 mi W of Rt 395 toward Kennedy Meadows, 36.00944° N 118.50308° W, 1875 m, 01 Jul 1980, R.T. Schuh, *Artemisia tridentata*, 5♀ (00108022–00108026) (AMNH). ***Ventura Co.:*** 18 mi E of Camp Ozena, 34.41237° N 119.03957° W, 02 Jul 1965, E.M. Omi, 1♀ (00119266) (UCB). **Colorado:** ***Boulder Co.:*** Bald Mountain, Boulder, 39.99444° N 105.61028° W, 2134 m, 17 Jun 1961, J.E.R. Stainer, 1♀ (00111243) (CNC). ***Clear Creek Co.:*** Berthoud Pass, 39.7981° N 105.77806° W, 3455 m, 12 Jul 1949, J.R. White, 1♀ (00117810) (KU). ***Eagle Co.:*** 22 km N of Wolcott, Big Piney Creek, 39.90028° N 106.67806° W, 27 Jun 1989, D.A. Polhemus, *Artemisia tridentata*, 3♂ (00116703, 00116737–00116738), 1♀ (00116739) (JTP). N of Eagle, 39.65528° N 106.82806° W, 24 Jun 1979, J.T. Polhemus, 3♀ (00116742–00116744) (JTP). Shrine Pass Road, nr Vail, 39.64028° N 106.37361° W, 12 Aug 1987, D.A. Rider, 1♀

(00242957) (DAR). S of Wolcott, 39.70278° N 106.67806° W, 22 Jun 1980, J.T. Polhemus, 2♂ (00116740–00116741) (JTP). State Bridge, nr Bond, 39.85778° N 106.64917° W, 2134 m, 24 Jun 1961–25 Jun 1961, J.R. Stainer, 16♂ (00110985, 00111220–00111233, 00111235), 2♀ (00111234, 00111236) (CNC), 1♂ (00121782) (UCB). Vail, 39.64028° N 106.37361° W, 2591 m, 23 Jun 1986, J.T. Polhemus, *Artemisia tridentata*, 4♂ (00116732–00116734, 00116736), 1♀ (00116735) (JTP). Water Wheel Ranch near Bond, 39.87444° N 106.68667° W, 24 Jun 1978, J.T. Polhemus, 1♂ (00116747) (JTP). ***Garfield Co.:*** Baxter Pass (Radio Tower), 14 mi SE of CO State Border, 39.58194° N 108.95194° W, 2499 m, 09 Jul 1981, M.D. Schwartz, *Artemisia tridentata*, 8♂ (00110984, 00111026, 00111263–00111268), 13♀ (00111030–00111032, 00111269–00111278) (CNC). W Evacuation Creek, 11 mi SE of Colorado state line on Rt 45, 39.77286° N 109.04835° W, 2073 m, 09 Jul 1981, M.D. Schwartz, *Artemisia tridentata*, 3♀ (00111282–00111284) (CNC). ***Grand Co.:*** Granby, 40.08611° N 105.93889° W, 12 Jun 1963, H.F. Howden, 1♂ (00111172) (CNC). Grand Lake Entrance, Rocky Mountains National Park, 40.25222° N 105.8225° W, 18 Aug 1968, L.A. Kelton, *Artemisia* sp., 8♂ (00111173–00111180), 39♀ (00111181–00111219) (CNC). Tabernash, 40.01014° N 105.92071° W, 2613 m, 08 Aug 1973, D. Kopp and J. Aldrich, 1♂ (00243060), 1♀ (00243061) (UMRM). [Big] Muddy Pass, US Rt 40, 40.3786° N 106.579° W, 2652 m, 12 Aug 1973, T.R. Yonke, 1♂ (00243059) (UMRM). ***Gunnison Co.:*** 28 mi E of Montrose on Rt 50, 38.47718° N 107.35701° W, 2621 m, 17 Jul 1986, R.T. Schuh, *Artemisia tridentata*, 2♂ (00107929–00107930) (AMNH). 35 mi E of Gunnison on Rt 50, 38.54583° N 106.27777° W, 2591 m, 17 Jul 1986, R.T. Schuh, *Artemisia tridentata*, 4♂ (00107870, 00107935–00107937), 3♀ (00107938–00107940) (AMNH). Almont, 38.66444° N 106.84611° W, 2743 m, 19 Jun 1925, A.W. Lindsey, 9♂ (00122149–00122157) (USNM). Red Creek and Gunnison River, 38.46808° N 107.24034° W, 2262 m, 29 Jun 1961, E. Riley, 1♂ (00134531) (USNM). West Elk Creek Junction, 38.71527° N 107.20588° W, 2256 m, 03 Jul 1961, E. Riley, 1♂ (00134518) (USNM). ***Jackson Co.:*** 4 mi N of Gould, 40.58421° N 106.02611° W, 05 Aug 1975, J.C. Schaffner, 2♀ (00116748–00116749) (JTP), 11♂ (00118242–00118245, 00118282–00118288), 20♀ (00118246, 00118263–00118281), *Artemisia cana*, 11♂ (00118217, 00118228–00118230, 00245339–00245345), *Artemisia frigida*, 1♀ 26♂ (00094016–00094041), 55♀ (00093716–00093717, 00093798–00093808, 00094047–00094087, 00245338) (TAMU). 7 mi NE of Rand, 40.52544° N 106.08669° W, 14 Aug 1969, J.C. Schaffner, 2♂ (00245348–00245349), 2♀ (00245350–00245351) (TAMU). Cowdrey, 40.85972° N 106.3125° W, 2438 m, 15 Aug 1968, L.A. Kelton, *Chrysothamnus* sp., 1♂ (00111171) (CNC). Gould, 40.52639° N 106.02611° W, 2804 m, 12 Aug 1968–13 Aug 1968, L.A. Kelton, *Artemisia* sp., 16♂ (00110983, 00110990, 00111133, 00111158–00111170) (CNC). Muddy Pass, Routt National Forest, 40.37667° N 106.57917° W, 2652 m, 19 Aug 1968, L.A. Kelton, *Artemisia* sp., 5♂ (00111124–00111128) (CNC); 21 Aug 1968, L.A. Kelton, *Artemisia* sp., 11♂ (00111100–00111110), 13♀ (00111111–00111123) (CNC). North Park, 40.9000° N 106.30833° W, Jul 1926–Aug 1926, F.C. Hottes, 1♀ (00134136) (USNM). Rand, 40.45356° N 106.17906° W, 2627 m, 26 Aug 1940, H.C. Severin, 1♀ (00134519) (USNM). nr Cowdrey, Colorado-Wyoming state line on Rt 125, 40.85972° N 106.3125° W, 04 Aug 1979, J.T. Polhemus, 1♂ (00116745), 1♀ (00116746) (JTP). ***Jefferson Co.:*** Deer Creek Canyon, 39.55265° N 105.12084° W, 1981 m, 11 Jul 1986, R.T. Schuh, J.T. Polhemus, *Artemisia tridentata*, 1♀ (00107941) (AMNH). ***Moffat Co.:*** Escalante Overlook on Harpers Corner Road, 8.1 miles N route 40, 40.32611° N 108.945° W, 2350 m, 08 Jul 1982, M.D. Schwartz, *Artemisia tridentata*, 3♂ (00111279–00111281) (CNC). ***Montezuma Co.:*** Mesa Verde National Park, 37.23333° N 108.47917° W, 2134 m, 01 Jun 1927, V.M. Tanner, 1♂ (00134511) (USNM). ***Montrose Co.:*** Black Canyon of Gunnison, 38.58° N 107.75° W, 18 Aug 1984, R.L. Blinn, *Artemisia* sp., 1♀ (00242849) (NCSU). Black Canyon of the Gunnison Wilderness, 38.58444° N 107.75666° W, 15 Aug 1973, J.C. Schaffner, 1♂ (00118292), 3♀ (00118289–00118291) (TAMU). ***Routt Co.:*** Steamboat Springs, 40.485° N 106.83111° W, 2134 m, 30 Jun 1931, R.H. Beamer, 4♂ (00117803–00117806) (KU); 15 Jul 1964, H.H. Knight, 1♂ (00111130), 1♀

(00111132) (CNC); 16 Jul 1964, H.H. Knight, 1♂ (00111129), 1♀ (00111131) (CNC), 1♂ (00118236), 2♀ (00118237–00118238) (TAMU). Steamboat Springs, 40.485° N 106.83111° W, 2103 m, 11 Jul 1964, H.H. Knight, 3♂ (00134502–00134504) (USNM). Steamboat Springs, 40.485° N 106.83111° W, 2042 m, 11 Jul 1964, H.H. Knight, 1♂ (00118241) (TAMU); 15 Jul 1964, H.H. Knight, 2♂ (00118239–00118240) (TAMU). ***Saguache Co.:*** 23 mi E of Gunnison on Rt 50, 38.4108° N 106.50302° W, 2469 m, 17 Jul 1986, R.T. Schuh, *Artemisia tridentata*, 1♂ (00107931), 3♀ (00107932–00107934) (AMNH). ***Summit Co.:*** Dillon, 39.63028° N 106.04278° W, 29 Aug 1972, L.A. Kelton, *Artemisia* sp., 3♂ (00111237–00111239), 3♀ (00111240–00111242) (CNC). ***Weld Co.:*** 5 mi N of Nunn, 40.77457° N 104.78963° W, 1629 m, 09 Aug 1973, T.R. Yonke, 1♀ (00243062) (UMRM). **Idaho:** ***Ada Co.:*** Regina, 43.3921° N 115.99° W, 1036 m, 18 Jun 1962, W.F. Chamberlain, 3♂ (00245335–00245337), 2♀ (00245346–00245347) (TAMU). ***Adams Co.:*** 7 mi E of New Meadows, 44.9713° N 116.13977° W, 02 Aug 1972, W.F. Barr, *Artemisia tridentata*, 3♂ (00122318–00122320), 1♀ (00122321) (UID). ***Bannock Co.:*** 3 mi E of McCammon, 42.65056° N 112.13325° W, 29 Jun 1966, W. Gagne and J. Haddock, 1♂ (00119273) (UCB). ***Bear Lake Co.:*** Cub River Canyon, Thompson Spring, 42.54882° N 111.29326° W, 2275 m, 05 Jul 1968, G.F. Knowlton and H.H. Knight, 1♂ (00134408) (USNM). ***Blaine Co.:*** 6 mi NW of Carey, Little Wood River, 43.37891° N 113.99758° W, 30 Jun 1966, W. Gagne and J. Haddock, 1♀ (00119272) (UCB). Sun Valley, 43.68875° N 114.31772° W, 2084 m, 18 Jul 1970, K.E. Gibson, 1♀ (00134137) (USNM). ***Boise Co.:*** Mores Mountain, 43.78431° N 116.08616° W, 2103 m, 09 Jul 2006, A.R. Gillogly, 4♂ (00094008 [cat TAMU-ENTO X0282229]–00094011 [cat TAMU-ENTO X0283444]), 3♀ (00094012 [cat TAMU-ENTO X0282357]–00094014 [cat TAMU-ENTO X0283962]) (TAMU). ***Butte Co.:*** 7 mi E of Howe, 43.78352° N 112.86345° W, 22 Jun 1966, W.F. Barr, 1♂ (00122329) (UID). Craters of the Moon National Monument, 43.42972° N 113.53056° W, 13 Jul 1965, D.S. Horning, Jr., *Artemisia tridentata*, 1♂ (00134532) (USNM). Craters of the Moon National Monument, 43.41667° N 113.51667° W, 23 Jul 1982, J. B Johnson, R.L. Gillespie, 1♂ (00122332), 1♀ (00122438) (UID). ***Camas Co.:*** 12 mi S of Fairfield, 43.20962° N 114.78699° W, 11 Jul 1978, unknown, 1♂ (00122327) (UID). ***Custer Co.:*** Bonanza, 44.37056° N 114.72694° W, 22 Jul 1965, W.F. Barr, 1♂ (00122331) (UID). Clayton, 44.25822° N 114.40124° W, 1658 m, 07 Jul 1928, C. Wakeland, 1♂ (00134517) (USNM). ***Elmore Co.:*** 10 mi S of Sunnyside, 43.13903° N 115.95278° W, 25 Jun 1964, W.F. Barr, *Artemisia tridentata*, 1♂ (00122326) (UID). 11 mi S of Pine, 43.32483° N 115.31111° W, 22 Jun 1977, W.F. Barr, *Vernonia* sp. (Scrophulariaceae), 1♂ (00122328) (UID). 13 mi N of Mountain Home, 43.32137° N 115.69028° W, 18 Jun 1966, A.R. Gittins, *Achillea millefolium*, 1♂ (00122325) (UID). ***Nez Perce Co.:*** Beaver Canyon, 46.39764° N 116.8079° W, 317 m, 23 Jul, unknown, 1♀ (00134513) (USNM). ***Owyhee Co.:*** 5 mi N of Reynolds, 43.26076° N 116.71034° W, 1249 m, 07 Jul 1965, W.F. Barr, 1♂ (00122436) (UID). 6 mi N of Reynolds, 43.25797° N 116.71044° W, 1259 m, 07 Jul 1965, W.F. Barr, 1♀ (00122437) (UID). 6 mi SE of Grasmere, 42.31517° N 115.79846° W, 06 Jul 1965, R.L. Westcott, 1♂ (00122322), 2♀ (00122323–00122324) (UID). Grand View Road, 42.99226° N 116.09706° W, 718 m, 25 Jun 1964, W.F. Barr, 1♂ (00122431), 4♀ (00122432–00122435) (UID). ***Power Co.:*** American Falls, 42.78611° N 112.85361° W, 05 Aug 1972, L.A. Kelton, *Artemisia* sp., 8♂ (00111088–00111095), 4♀ (00111096–00111099) (CNC). ***Teton Co.:*** Pine Creek Pass, 43.57167° N 111.21444° W, 06 Aug 1972, L.A. Kelton, *Artemisia*sp., 11♂ (00111070–00111080), 7♀ (00111081–00111087) (CNC). ***Twin Falls Co.:*** Roseworth, 42.36694° N 114.92139° W, 16 Jul 1963, O.O. Fillmore, G.B. Hewitt, 1♀ (00122333) (UID). **Montana:** ***Carbon Co.:*** 11 mi S of Red Lodge, Parkside Campground, 45.06221° N 109.41024° W, 2210 m, 12 Aug 1986, M.D. Schwartz and G.M. Stonedahl, *Artemisia tridentata*, 2♂ (00107867, 00107919), 2♀ (00107921–00107922) (AMNH). ***Gallatin Co.:*** Beaver Creek, 44.85687° N 111.37356° W, 1920 m, 15 Aug 1913, S.J. Hunter, 1♂ (00117809) (KU). Elkhorn Ranch, Gallatin River, Upper Gallatin Canyon, 45.06786° N 111.18763° W, 2134 m, 01 Aug 1928–05 Aug 1928, J. McDunnough, 14♂

(00110986, 00111035–00111047), 1♀ (00111048) (CNC). Targhee Pass on Rt 191, 44.67472° N 111.275° W, 2156 m, 10 Aug 1986, Schuh, Schwartz, and Stonedahl, *Artemisia tridentata*, 2♂ (00107920, 00107923), 3♀ (00107924–00107926) (AMNH). **Nevada:** ***Carson City Co.:*** Carson City, 39.16389° N 119.76639° W, 1829 m, 25 Jun 1929, R.L. Usinger, 2♂ (00242591–00242592) (CAS); 26 Jun 1929, R.L. Usinger, 1♂ (00242593), 2♀ (00242594–00242595) (CAS), 1♂ (00134538) (USNM). ***Clark Co.:*** Moapa, 36.67555° N 114.62055° W, 25 May 1963, R.C. Bechtel, paratype of Junior Synonym (*S. nevadensis*), 1♂ (00134017) (USNM). ***Elko Co.:*** 30 mi SE of I-80 on Hwy 229, 40.63882° N 115.26676° W, 1908 m, 19 Jul 1980, G.M. Stonedahl, *Artemisia* sp., 2♀ (00108093–00108094) (AMNH). Ruby Mountains, Lomoille Canyon, 40.96056° N 114.94917° W, 1890 m, 16 Jul 1970, D.G. Denning, 2♀ (00108091–00108092) (AMNH). ***Mineral Co.:*** 27 mi SW of Hawthorne on Rt 359, 1 mi NE of Anchorite Summit, 38.24871° N 118.97506° W, 2256 m, 02 Jul 1983, R.T. Schuh and M.D. Schwartz, *Artemisia tridentata*, 1♂ (00107944), *Chrysothamnus viscidiflorus*, 1♀ (00107943), *Purshia glandulosa* Curran (Rosaceae), 1♂ (00107942) (AMNH). ***Nye Co.:*** 1 mi NE of Belmont on Rt 82, 38.60633° N 116.86024° W, 2280 m, 13 Jul 1980, R.T. Schuh and G.M. Stonedahl, *Artemisia tridentata*, 1♂ (00108095) (AMNH). 3.5 mi SE of Manhattan, Toiyabe National Forest, 38.50311° N 117.02678° W, 2134 m, 13 Jul 1980, R.T. Schuh and G.M. Stonedahl, *Artemisia tridentata*, 5♂ (00107866, 00108076–00108079), 11♀ (00108080–00108090), *Lupinus* sp. (Fabaceae), 2♂ (00108074–00108075) (AMNH). ***Washoe Co.:*** 6.2 mi W of Junction of Rts 8A and 34A, 41.58199° N 119.68411° W, 1985 m, 02 Jul 1979, R.T. Schuh and B. Massie, *Artemisia tridentata*, 1♂ (00108096), 2♀ (00108097–00108098) (AMNH). 7 mi W of Vya on Rt 8A toward Cedarville, 41.59222° N 119.99475° W, 1800 m, 02 Jul 1979, R.T. Schuh and B.M. Massie, *Artemisia tridentata*, 31♂ (00108099–00108129), *Chrysothamnus* sp., 1♂ (00107871) (AMNH). 17 mi NW of Gerlach, 40.82565° N 119.58379° W, 11 Jun 1970, unknown, 1♂ (00119268), 1♀ (00119269) (UCB). ***White Pine Co.:*** Wheeler Peak Scenic Drive, Humboldt National Forest, 38.98611° N 114.3125° W, 2591 m, 06 Aug 1982, M.D. Schwartz, *Artemisia tridentata*, 4♂ (00111027, 00111293–00111295), 3♀ (00111033, 00111296–00111297) (CNC). **New Mexico:** ***San Juan Co.:*** 10 mi E of Blanco, 36.72403° N 107.64378° W, 14 Jun 1992, W.F. Chamberlain, 5♂ (00118257–00118260, 00118379) (TAMU). **Oregon:** ***Baker Co.:*** 2 mi NE of Rt 26 on Rt 245, Unity Lake State Park, 44.48696° N 118.19173° W, 27 Jun 1988, G.M. Stonedahl, *Artemisia tridentata*, 3♂ (00107868, 00108059–00108060), 11♀ (00108061–00108071) (AMNH). Unity, 44.4375° N 118.19167° W, 13 Jul 1991, W.F. Chamberlain, 1♂ (00118261) (TAMU). ***Deschutes Co.:*** 1 mi S of Millican, 43.86471° N 120.91889° W, 1335 m, 21 Jun 1979, R.T. Schuh, *Artemisia tridentata* ssp. *tridentata*, 2♂ (00108056–00108057) (AMNH). 1 mi S of Millican on Pine Mountain Road, 43.86471° N 120.91889° W, 1335 m, 21 Jun 1979, G.M. Stonedahl, G. Cooper, M.D. Schwartz, *Artemisia* sp., 1♂ (00107864) (AMNH); 21 Jun 1979, G.M. Stonedahl, *Artemisia tridentata* ssp. *tridentata*, 1♂ (00108054), 1♀ (00108055) (AMNH). 2.6 mi S of Millican, T20S R15E S10, 43.84151° N 120.91889° W, 1405 m, 21 Jun 1979, M.D. Schwartz, *Artemisia tridentata*, 2♂ (00111261–00111262) (CNC). Redmond, 44.27278° N 121.17278° W, 25 Jun 1939, Schuh and Gray, 1♀ (00107998) (AMNH). ***Harney Co.:*** Blitzen River, 42.61444° N 119.06806° W, 06 Jul 1906, unknown, 2♀ (00119274–00119275) (UCB), 1♂ (00134514) (USNM). Fish Lake, Steens Mountains, 42.73762° N 118.6413° W, 2286 m, 22 Jun 1951–26 Jun 1951, Borys Malkin, 1♂ (00242624), 1♀ (00242625) (CAS). Frenchglen, 42.82694° N 118.91555° W, 1372 m, 21 Jun 1951, Borys Malkin, 1♂ (00242626), 1♀ (00242627) (CAS). Narrows, 43.27884° N 118.96207° W, 1253 m, 01 Jul 1906, unknown, 1♂ (00134516) (USNM). Warm Springs V[alley], 43.27682° N 119.24912° W, 1253 m, 07 Jul 1906, unknown, 1♂ (00134515) (USNM). ***Klamath Co.:*** 4 mi NW of Worden on road to Keno, 42.09003° N 121.90227° W, 17 Jul 1985, G.M. Stonedahl and J.D. McIver, *Artemisia tridentata*, 1♀ (00108072) (AMNH). Swan Lake, 42.22861° N 121.59889° W, 12 Jul 1953, J. Schuh, 1♂ (00118065) (ORSU). ***Lake Co.:*** 3 km N of Fort Rock State Park, 43.39886° N 121.06805° W, 1326 m, Jun

1982–Jul 1982, Neil Cobb, Artemisia tridentata Nutt. (Asteraceae), 1♂ (NAUF). 5.7 mi E of Jct. Rts 395–140, Warner Mountain Pass, 42.2344° N 120.29111° W, 1765 m, 03 Jul 1979, R.T. Schuh and B. Massie, *Artemisia tridentata*, 1♀ (00108058) (AMNH). 11 mi NW of Silver Lake on Hwy 31, 43.24705° N 121.15712° W, 1372 m, 21 Jun 1979, G.M. Stonedahl, *Artemisia tridentata*, 1♂ (00107863) (AMNH); 25 Jun 1979, G. Stonedahl, *Artemisia tridentata*, 5♂ (00108047–00108051), 2♀ (00108052–00108053) (AMNH); 25 Jun 1979, M.D. Schwartz, *Artemisia tridentata* ssp. *tridentata*, 2♂ (00111256–00111257), 3♀ (00111258–00111260) (CNC). 28 mi SE of Jct. of Rts 97 and 31, 43.29935° N 121.18069° W, 1497 m, 25 Jul 1979, M.D. Schwartz, *Artemisia tridentata* ssp. *tridentata*, 11♂ (00110989, 00111028, 00111244–00111252), 3♀ (00111253–00111255) (CNC). 28 mi SE of La Pine on Rt 31, 43.3766° N 121.20966° W, 1535 m, 25 Jun 1979, R.T. Schuh, *Artemisia tridentata*, 9♂ (00108034–00108042), 4♀ (00108043–00108046) (AMNH). Abert Lake, 42.57024° N 120.18767° W, 02 Jul 1935, Joe Schuh, 1♂ (00107996) (AMNH). Big Squaw Flat, 18 mi SE of Bly, 42.39778° N 121.04056° W, 25 Jul 1962, J.D. Vertress, 1♀ (00108073) (AMNH). Lakeview, 42.18889° N 120.34472° W, 23 Jun 1933, G.P. Engelhardt, 1♂ (00117807), 1♀ (00117808) (KU). Paisley, 42.69388° N 120.54611° W, 1332 m, 28 Jun 1951–29 Jun 1951, Borys Malkin, 1♂ (00134533) (USNM). Silver Lake, 43.12806° N 121.045° W, 1510 m, 15 Jun 1938, Schuh and Gray, 1♂ (00118064) (ORSU); 16 Jun 1938, Gray and Schuh, 1♂ (00107997) (AMNH). Summer Lake, 42.82786° N 120.79559° W, 19 Jun 1952, Vincent Roth, 8♂ (00118055–00118062), 1♀ (00118063) (ORSU). ***Malheur Co.:*** 30 mi E of Rome, 42.83764° N 117.03452° W, 26 Jun 1952, R. Lauderdale, 1♂ (00118067) (ORSU). Succor Creek Canyon, 43.5922° N 117.05982° W, 726 m, 15 Jun 1951–18 Jun 1951, Borys Malkin, 1♂ (00242623) (CAS). ***Umatilla Co.:*** 2 mi E of Hermiston, 45.84055° N 119.24676° W, 12 Jun 1963, Charles W. Baker, 1♂ (00118066) (ORSU). **Utah:** ***Cache Co.:*** 0.4 mi off Rt 89 along Franklin Basin Rd, 41.93555° N 111.57222° W, 2004 m, 17 Jul 2001–18 Jul 2001, T.J. Henry and A.G. Wheeler, Jr., *Artemisia tridentata*, 1♂ (00122137), 1♀ (00122138) (USNM). 0.4 mi off Rt 89 along Franklin Basin Rd, 41.93555° N 111.57222° W, 2004 m, 18 Jul 2001, T.J. Henry and A.G. Wheeler, Jr., *Artemisia tridentata*, 1♂ (00122158), 2♀ (00122159–00122160) (USNM). 5 mi off Rt 89 along Franklin Basin Rd, 41.99166° N 111.59194° W, 2256 m, 18 Jul 2001, T.J. Henry and A.G. Wheeler, Jr., *Artemisia tridentata*, 4♀ (00122161–00122164) (USNM). 14 mi S on FS Rd 055 off Rt 89, USU Forest, T13N R4E Sec15, 41.54658° N 111.74944° W, 2591 m, 25 Jul 1981, M.D. Schwartz, *Artemisia tridentata*, 1♂ (00111298), 2♀ (00111299–00111300) (CNC). 14 mi S on FS Rd 055 off of Rt 89, USU For, T13N R4E Sec15, 41.8688° N 111.4844° W, 2591 m, 25 Jul 1981, M.D. Schwartz, *Artemisia tridentata*, 1♀ (00111034) (CNC). Logan Canyon, 41.7402° N 111.79383° W, 24 Jul 1948, G.G. Fleener, *Castilleja* sp. (Scrophulariaceae), 1♀ (00134526) (USNM). Logan Canyon site, 41.74027° N 111.79305° W, 1981 m, 15 Jul 1958, G.F. Knowlton, 3♂ (00122165–00122167) (USNM). ***Carbon Co.:*** Minnie Maud Creek, West Tavaputs Plateau, 51.8 mi SW of Myton, T12S R12E, 39.77482° N 110.50959° W, 1981 m, 09 Jul 1982, M.D. Schwartz, *Artemisia tridentata*, 2♂ (00111307–00111308) (CNC). ***Duchesne Co.:*** 23.7 mi S of Myton, Well's Draw, T10S R15E, 39.85181° N 110.06111° W, 1829 m, M.D. Schwartz, *Artemisia tridentata*, 1♀ (00111303) (CNC). ***Emery Co.:*** 13.2 mi NW of junction of Hwy 10 on Hwy 31, 39.46685° N 110.85733° W, 2179 m, 17 Jul 1980, G.M. Stonedahl, *Artemisia* sp., 8♂ (00107945–00107952), 3♀ (00107953–00107955) (AMNH). ***Grand Co.:*** South Beaver Mesa, La Sal Mountains, 38.6375° N 109.10111° W, 04 Jul 1980, J.T. and D.A. Polhemus, 1♂ (00116753) (JTP). ***Juab Co.:*** 7 mi W of Eureka, 39.94537° N 112.22612° W, 1841 m, 26 Jun 1966, W.M.T., *Artemisia tridentata*, 1♂ (00134506) (USNM). Fernow Valley, Juab County, 39.51972° N 111.93972° W, 06 Jun 1940, R.W. Fautin, 1♀ (00134524) (USNM). ***Millard Co.:*** Scipio, 39.245° N 112.10333° W, 29 Jun 1965, H.H. Knight, 1♂ (00134508) (USNM). ***Rich Co.:*** Garden City, 41.88917° N 111.385° W, 06 Jul 1968, G.F. Knowlton and H.H. Knight, 1♀ (00134529) (USNM). ***Salt Lake Co.:*** Salt Lake City, 40.76083° N 111.89028° W, 27 Jul 1953, R.R. Dreisbach, 1♂ (00127323) (UMMC). ***San***

Juan Co.: 20 mi SE of Blanding, 37.4348° N 109.3884° W, 1571 m, 20 Jun 1999, W.F. Chamberlain, 1♀ (00245352) (TAMU). Abajo Mountains, 0.2 mi SE Devils Canyon Campground, 38.15128° N 109.83851° W, 2103 m, 12 Jun 1982, M.D. Schwartz, *Artemisia tridentata*, 1♂ (00111304), 1♀ (00111305) (CNC). Brushy Basin Rim Rd, SW of Blanding, county rd #227, 0.5 E of milepost 116, T37S R12E, 37.56624° N 109.5534° W, 1737 m, 12 Jun 1982, M.D. Schwartz, *Artemisia tridentata*, 2♂ (00111023, 00111306), 2♀ (00111029, 00111309) (CNC). Grand Flat near Collins Canyon, 37.42167° N 110.16056° W, 1707 m, 01 Jun 1982, D.A. and J.T. Polhemus, 4♂ (00116702, 00116750–00116752) (JTP). ***Sevier Co.:*** 2.3 mi N of I-70 on road to Kanosh, 38.60638° N 112.45206° W, 2128 m, 16 Jul 1980, R.T. Schuh and G.M. Stonedahl, *Artemisia tridentata*, 1♀ (00107988) (AMNH); 16 Jul 1980, G.M. Stonedahl, *Artemisia* sp., 4♂ (00107865, 00107983–00107985), 2♀ (00107986, 00107987) (AMNH). Clear Creek Narrows Summit on Rt 4, 38.58156° N 112.25678° W, 2243 m, 15 Jul 1980, G.M. Stonedahl, *Artemisia* sp., 2♀ (00107989–00107990) (AMNH). Dog Spring Rd at Rt 25, 38.50569° N 111.79523° W, 2718 m, 16 Jul 1980, R.T. Schuh and G.M. Stonedahl, *Artemisia tridentata*, 6♂ (00107971–00107976), 1♀ (00107977) (AMNH). Jct. Mytoge Mountain Rd and Hwy 25, 38.51356° N 111.77316° W, 2697 m, 16 Jul 1980, G.M. Stonedahl, *Artemisia* sp., 2♂ (00107978–00107979), 3♀ (00107980–00107982) (AMNH). Salt Gulch, 12 mi N of Hwy 24 on Hwy 72, 38.51292° N 111.52473° W, 2457 m, 17 Jul 1980, G.M. Stonedahl, *Artemisia* sp., 1♀ (00107991) (AMNH). ***Tooele Co.:*** Benmore, environs, 40.0125° N 112.42083° W, C. Jorgensen, 1♀ (00070014) (USNM); 19 Jun 1954, G.L. Nielson, 1♀ (00134527) (USNM). ***Uintah Co.:*** 5–10 mi SW of Bonanza, T10S R24E Sec 29 (G2), 39.9161° N 109.2406° W, 1524 m, 08 Jun 1982, M.D. Schwartz, *Artemisia tridentata*, 11♂ (00110994, 00111310–00111319), 7♀ (00111320–00111326) (CNC). 5–10 mi SW of Bonanza, T11S R24E Sec 6, Asphalt Wash, 39.886° N 109.2721° W, 1615 m, 09 Jun 1981, M.D. Schwartz, *Artemisia tridentata*, 2♂ (00111327–00111328), 2♀ (00111329–00111330) (CNC). Blue Mountain Flat and Cliff Ridge, T5S R25E, 40.36083° N 109.13139° W, 2438 m, 08 Jul 1982, M.D. Schwartz, *Artemisia tridentata*, 1♂ (00111301), 1♀ (00111302) (CNC). Bonanza, White River Shale Project Trailers, T9S R24E S23, 39.97951° N 109.17957° W, 1524 m, 01 Jun 1981, M.D. Schwartz, *Artemisia tridentata*, 2♂ (00110988, 00111331–00111332), 3♀ (00111333–00111335) (CNC). ***Utah Co.:*** Cedar Valley Environs, 40.33684° N 112.10381° W, 1583 m, C. Jorgensen, 2♂ (00070012, 00134534) (USNM). Mount Nebo, 39.82334° N 111.74446° W, 12 Jul 1942, G.F. Knowlton, 1♂ (00134537) (USNM). Spanish Fork Canyon, 40.06283° N 111.57069° W, 17 Jul 1954, G.F. Knowlton, 1♂ (00134535) (USNM). ***Wasatch Co.:*** 30 mi SE of Kamas on Rt 35, Uinta National Forest, Wolf Creek Campground, T4S R10W Sec 7, 40.48162° N 111.03037° W, 2743 m, 15 Aug 1986, M.D. Schwartz and G.M. Stonedahl, *Artemisia tridentata*, 12♂ (00107869, 00107956–00107966), 4♀ (00107967–00107970) (AMNH). Deer Creek Reservoir, 40.4095° N 111.5303° W, 1677 m, C. Jorgensen, 1♂ (00070013) (USNM). Heber City, 40.50694° N 111.4125° W, 05 Jul 1922, E.P. Van Duzee, *Artemisia* sp., paratypes of Junior synonym (*S. uniformis*), 11♀ (00242596–00242606) (CAS), paratype of Junior synonym (*S. uniformis*), 1♂ (00134510) (USNM). **Washington:** ***Benton Co.:*** Hanford Site ALE, 117 gate to 1200 Ft Rd, 46.48883° N 119.65333° W, 24 May 1995, R.S. Zack, *Artemisia tridentata*, 1♀ (00121913) (UID), 2♂ (00121908–00121909), 3♀ (00121910–00121912) (WSU). Hanford Site ALE, Rattlesnake Ridge, spring, 46.58389° N 119.38667° W, 23 May 1995, R.S. Zack, 4♂ (00121902–00121905) (WSU). Hanford Site ALE, radio telescope, 46.58389° N 119.38667° W, 13 Jun 1995, R.S. Zack, 2♂ (00121906–00121907) (WSU). ***Yakima Co.:*** Toppenish, 46.3775° N 120.3075° W, 15 May 1926, E.W. Davis, 2♂ (00134521–00134522) (USNM). **Wyoming:** ***Albany Co.:*** The Summit, 41.23166° N 105.44055° W, 2591 m, 10 Aug 1950, R.R. Dreisbach, 1♂ (00127324) (UMMC). ***Big Horn Co.:*** Big Horn Mountains, 44.75499° N 107.78239° W, 1981 m, 17 Aug 1927, H.H. Knight, 1♂ (00134520) (USNM). ***Carbon Co.:*** 7 mi SW of Encampment, 41.13767° N 106.88451° W, 2682 m, 05 Aug 1967, F., P. and B. Rindge, 1♂ (00107928) (AMNH). Saratoga, 41.455° N 106.80583° W, 29 Jul 1931, H.H. Knight, 1♂ (00134505)

(USNM). ***Lincoln Co.:*** Alpine, 43.16012° N 111.02328° W, 1731 m, 19 Jul 1936, G.F. Knowlton, 1♀ (00134536) (USNM). Salt River Pass, 15 mi S of Afton on Rt 89, 42.54234° N 110.89431° W, 2326 m, 21 Jul 1981, M.D. Schwartz, *Pinus contorta* Dougl. ex Loud. (Pinaceae), 1♂ (00111025), *Artemisia tridentata*, 2♂ (00111024–00111285), 7♀ (00111286–00111292), (CNC). ***Park Co.:*** National Park [Yellowstone], 44.76667° N 110.23333° W, 01 Aug, unknown, 1♀ (00134512), (USNM). Yellowstone National Park, 44.76667° N 110.23333° W, 12 Aug 1907, W. Robinson, 1♂ (00134509), (USNM). ***Sublette Co.:*** 24 mi W of Big Piney, 42.53736° N 110.5855° W, 2560 m, 01 Aug 1928, F., P. and B. Rindge, 1♂ (00107927), (AMNH). 25 mi SE of Jackson, Hobart River, 43.22443° N 110.41095° W, 27 Jun 1966, W. Gagne and J. Haddock, *Artemisia tridentata*, 2♂ (00119270–00119271), (UCB). Green River Lake[s Campground], Wind River Mountains, 43.31169° N 109.86873° W, 2591 m, 01 Aug 1935–08 Aug 1935, H. Ruckes, 1♂ (00134507), (USNM). ***Sweetwater Co.:*** 10 mi E of Rock Springs, 41.5875° N 109.00893° W, 04 Jul 1968, H.H. Knight, 1♂ (00134525), (USNM). 30 mi E of Rock Springs near Point of Rocks, 41.5875° N 108.62236° W, 04 Jul 1968, H.H. Knight, 1♂ (00134523), (USNM). ***Teton Co.:*** Jackson, 43.48° N 110.76167° W, 2134 m, 15 Aug 1961, J.E.R. Stainer, 1♀ (00111069), (CNC). Teton Pass, 43.4975° N 110.95444° W, 06 Aug 1972, L.A. Kelton, *Artemisia* sp., 7♂ (00110987, 00111049–00111054), 14♀ (00111055–00111068) (CNC).

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AM Australian Museum, Sydney; Dave Britton

AMNH Division of Invertebrate Zoology, American Museum of Natural History, New York; Randall T. Schuh

BMNH Natural History Museum, London, England; Mick Webb, Paul Brown

CAS California Academy of Sciences, San Francisco; Paul Arnaud, Jr., Norman Penny

CMNH Cleveland Museum of Natural History, Ohio; Joe B. Kieper, Tom Pucci

CNC Canadian National Collection of Insects, Agriculture, and Agri-Food Canada, Ottawa; Robert G. Foottit

CUIC Cornell University, Ithaca, New York; James K. Liebherr, E.R. Hoebeke

DAR David A. Rider Collection, North Dakota State University, Fargo

DBUL Department of Biology, University of Louisville, Kentucky; Charles V. Novell, Jr.

DEBU University of Guelph Insect Collection, Ontario; Stephen A. Marshall

ESUW Insect Museum, Wyoming State University, Laramie; Scott R. Shaw

FSCA Florida State Collection of Arthropods, Florida Department of Agriculture, Gainesville; Susan E. Halbert

INHS Illinois Natural History Survey, Champaign; Chris Dietrich, Colin Favret, Paul P. Tinerella

IRCW Insect Research Collection, University of Wisconsin-Madison; Steven J. Krauth, Dan K. Young

JTP John T. Polhemus Collection, Englewood Colorado

KU University of Kansas, Snow Entomological Museum, Lawrence; Alex Slater, Zachary Falin

MSU Albert J. Cook Arthropod Research Collection, Michigan State University, East Lansing; Anthony Cognate, Gary Parsons

NAUF Colorado Plateau Museum of Arthropod Biodiversity, Northern Arizona University, Flagstaff; Neil Cobb

NCSU North Carolina State University, Raleigh; Robert Blinn

ORSU Oregon State Arthropod Collection, Oregon State University, Corvallis; John D. Lattin, Christopher J. Marshall

OSEC K.C. Emerson Museum, Oklahoma State University, Stillwater; Don Arnold

PDA Pennsylvania Department of Agriculture, Harrisburg; Karl Valley

SDNH San Diego Natural History Museum; Michael A. Wall
TAMU Department of Entomology, Texas A&M University; College Station, Texas, Joseph C. Schaffner, Edward G. Riley
UBC Spencer Entomological Museum, University of British Columbia, Vancouver; G.G.E. Scudder, Karen M. Needham
UCB University of California, Berkeley; John Chemsak, Cheryl Barr
UCR University of California, Riverside; Saul Frommer, John D. Pinto, Douglas Yanega
UID William F. Barr Entomological Museum, University of Idaho; Frank Merickel
UK University of Kentucky, Lexington; Michael J. Sharkey
UMMC Museum of Zoology–Insect Division, University of Michigan; Ann Arbor, Mark F. O'Brien, Barry M. O'Connor
UMRC W.R. Enns Entomology Museum, University of Missouri, Columbia; Kristin B. Simpson, Robert Sites
UNAM Instituto de Biología, Universidad Nacional Autónoma de Mexico, Mexico City, D.F.; Harry Brailovsky A.
USNM United States National Museum of Natural History, Washington, D.C.; Thomas J. Henry, Michele Touchet
WLNP Waterton Lake National Park, Waterton, Alberta; David Larson
WSU James Entomological Collection, Washington State University, Pullman; Richard S. Zack
ZISP Zoological Institute, Russian Academy of Sciences, St. Petersburg; Izya M. Kerzhner, Fedor Konstantinov
ZMAN Zoological Museum, University of Amsterdam; S.A. Ulenberg

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APPENDIX 1
USI Numbers of Dorsal Habitus Specimens (pls. 1–3)

Josephinus albicornis	♂ Mexico: Sinaloa: 13 mi E of Concordia, 00111393
	♀ Mexico: Sinaloa: Mazatlan, 00111394
J. capitatus	♂ Mexico: Sinaloa: Mazatlan, 00118381
	♀ Same as male, 00111372
J. reinhardi	♂ Mexico: Guerrero: 32 mi SE of Petatlan, 00118427
	♂ 00118428, Mexico: Michoacán: 28.5 mi S of Nueva Italia
	♂ 00119280, Mexico: Sinaloa: 3 mi E of Villa Union
	♀ 00108133, Mexico: Sonora: Minas Nuevas
Scalponotatus maturus	♂ USA: California: Phelan, 00108134
	♀ USA: Arizona: Cedar Pocket Rest Stop, 00111396
Slaterocoris alpinus	♂ USA: Texas: 2 mi W of Iredell, 00118488
	♀ Same as male, 00118493
S. ambrosiae	♂ Mexico: Guanajuato: Ojo de Agua, 00111408
	♀ USA: South Dakota: Emery, 00111407
S. apache	♂ USA, New Mexico: Glorieta Pass, 00111415
	♀ USA: Arizona: Eagar, 00111418
S. argenteoides	♂ Mexico: Oaxaca: 10.7 mi NE of El Punto, 00118431
	♀ Mexico: Oaxaca: Guelatao, 00111389
S. argenteus	♂ Mexico: Durango: 6 mi E of Durango, 00121773
	♀ Same as male, 00121774
S. atratus	♂ Mexico: Baja California: San Julio, 00122272 (paralectotype)
S. atritibialis	♂ Canada: Ontario: New Glasgow, 00111412
	♀ USA: New York: Lake Placid, 00111413
S. breviatus	♂ USA: District of Columbia: Washington, 00111410
	♀ USA: Pennsylvania: Long Pond, 00111411
S. clavatus	♂ Mexico: Guerrero: 2.1 mi NW of Cacahuamilpa, 00118436 (holotype)
	♀ Same as male, 00118435
S. croceipes	♂ USA: California: Largo Vista Road, 00108136
	♀ Same as male, 00108135
S. digitatus	♂ USA: Texas: Lost Mine Trail, 00118433
	♀ Same as male, 00118434
S. elongatus	♂ Mexico: Puebla: 4 mi E of Azumbilla, 00118447
	♀ Same as male, 00184696
S. flavipes	♂ USA: California: Carrizo Creek, 00111419
	♀ Same as male, 00111420
S. fuscomarginalis	♂ USA: Nevada: 11 mi N of Belmont, 00108137
	♀ USA: Nevada: 12 mi N of Rt 50, 00108138
S. hirtus	♂ USA: Iowa: 6 mi SE of Mt Pleasant, 00118450
	♀ USA: Iowa: Ames, 00118451
S. longipennis	♂ USA: Nevada: 11 mi N of Belmont, 00108139
	♂ USA: Colorado: Steamboat Springs, 00116756
	♀ USA: Colorado: Stockade Wash Road, 00108140
S. maculatus	♂ Mexico: Oaxaca: 9 mi N of Candelaria Loxicha, 00118408 (holotype)
	♀ Same as male, 00093263
S. mohri	♂ USA: Missouri: unknown, 00122270
	♀ USA: Illinois: unknown, 00133400
S. pallidicornis	♂ USA: South Dakota: Custer, 00118454
	♀ Canada: Alberta: Lundbreck, 00111414
S. pallipes	♂ USA: Maryland: North Beach, 00118452
	♀ Same as male, 00118453
S. pilosus	♂ Canada: British Columbia: Osoyoos Lake Indian Reservation, 00111421
	♀ Same as male, 00111422
S. punctatus	♂ Mexico: Durango, Navajos, 00111800
	♀ Mexico: Durango, Navios (left), 00111818
	♀ Mexico: Guerrero, Chilpancingo (right, holotype), 00085372

APPENDIX 1
(Continued)

S. robustus	♂ USA: Colorado: Baxter Pass, 00111129
	♀ USA: Colorado: Steamboat Springs, 00111030
S. rubrofemoratus	♂ USA: Utah: Duckett Crossing, 00116757
	♀ USA: Colorado: Gates of Lodore, 00116758
S. sheridani	♂ USA: Arizona: 15–20 mi SW of Show Low, 00108145
	♀ USA: Arizona: 36 mi SE of Globe, 00116759
S. simplex	♂ Mexico: Durango: Navios, 00111404
	♀ Same as male, 00111405
S. solidaginis	♂ USA: California: Mokelumne Hill, 00119281
	♀ USA: California: Tanbark Flat, 00119282
S. sparsus	♂ USA: California: Twin Oaks, 00108141
	♀ Same as male, 00108142
S. subalbicans	♀ Mexico: Guerrero: Amula (left, paralectotype), 00085374
	♀ Same as above (right, lectotype), 00085373
S. stygicus	♂ USA: Iowa: Ames, 00118455
	♀ USA: Missouri: 4 mi W of Montevallo, 00118456
S. tanydexios	♂ Mexico: Puebla: 4 mi W of Acatepec, 00118429
	♀ Same as male, 00118430
S. tibialis	♂ USA: Oregon: Rough and Ready Wayside, 00108144
	♀ Same as male, 00108143

APPENDIX 2

USI Numbers of Figures 3–**73**
(fig. no. followed by colon and pg. no. where fig. appears)

Female Genitalia

Fig. 5: 51. *Scalponotatus maturus*. A–D. USA: California: Stag Cove, 00112971.
Fig. 11: 70. *Josephinus reinhardi*. Mexico: Guerrero: 32 mi SE of Petatlan, 00184959.
Fig. 23: 106. *Slaterocoris croceipes*. USA: California: Phelan Road, 00169985.
Fig. 40: 188. *Slaterocoris stygicus*. USA: Ohio: Amherst, 00291081.
Fig. 47: 226. *Slaterocoris sheridani*. USA: North Dakota: 8 mi W of Belfield, 00134116.
Fig. 53: 241. *Slaterocoris hirtus*. USA: Arkansas: 4 mi S of Moko, 00122208.
Fig. 58: 251. *Slaterocoris clavatus*. Mexico: Puebla: 7.3 mi SW of Izucar de Matamoros, 00093307.
Fig. 62: 256. *Slaterocoris maculatus*. Mexico: Oaxaca: 9 mi N of Candelaria Loxicha, 00093262.
Fig. 66: 263. *Slaterocoris simplex*. Mexico: Durango: Navios, 00111839.
Fig. 70: 268. *Slaterocoris tanydexios*. Mexico: Puebla: 4.4 mi SW of Acatepec, 00118773.

Male Genitalia

Fig. 4: 49. *Scalponotatus maturus*. A–F, H. USA: Arizona: 5.3 mi SW of Salome, 00112325; G. USA: California: Thousand Palms, 00112313.
Fig. 7: 63. *Josephinus albicornis*. Mexico: Sinaloa: 5 mi N of Mazatlan, 00119227.
Fig. 8: 66. *J. capitatus*. Mexico: Sinaloa: Mazatlan, 00107895.
Fig. 10: 69. *J. reinhardi*. A–F. Mexico: Sinaloa: 3 mi E of Villa Union, 00108703; G. Mexico: Guerrero: 32 mi SE of Petatlan, 00058317; H. Mexico: Michoacán: 28.5 mi S of Nueva Italia, 00058298; I. Mexico: Oaxaca: 10 mi SE of Totolapan, 00093282.
Fig. 15: 85. *Slaterocoris ambrosiae*. A. USA: Texas, Kerrville, 00111337; B. USA: New Mexico: Gallinas Canyon., 00111353; C. Mexico: Durango: 6 mi E of Durango, 00111338; D. USA: South Dakota: Emery, 00111347; E. Mexico: San Luis Potosi: Santa Maria del Rio, 00111342; F. Mexico: Nuevo Leon: 4 mi W of Cercado, 00119276; G. Mexico: Guanajuato: San Luis de la Paz, 00111345; H. Mexico: Guanajuato: Ojo de Agua, 00111344; I. Mexico: Texas: La Copita Research Station, 00111471; J. USA: Arizona: Flagstaff, 00111348.
Fig. 16: 86. *Slaterocoris ambrosiae*. USA: South Dakota: Emery, 00111347.
Fig. 17: 94. *Slaterocoris apache*. A. USA: Utah: Roosevelt, 00107906; B. USA: Colorado: 29 mi SW of Norwood, 00116704; C. USA: New Mexico: White Rock Overlook, 00116722; D. USA: Colorado: Berthoud Pass, 00117795; E. USA: New Mexico: Taos, 00117842; F. USA: New Mexico: 33 mi SW of Dulce, 00118221; G. USA: Nevada: Connors Pass, 00119040; H. USA: Nevada: Lehman Caves, 00119430; I. USA: Nevada: Lehman Caves, 00119431.
Fig. 18: 95. *Slaterocoris apache*. A. USA: Utah: Roosevelt, 00107906; B. USA: Arizona: Eagar, 00111875; C. USA: Utah: Kimball Junction, 00111876; D. USA: Colorado: 12 mi W of Pueblo, 00116720; E. USA: Colorado: 12 mi W of Pueblo, 00116709.
Fig. 19: 100. *Slaterocoris atratus*. Mexico: Baja California: San Julio, 00122271.
Fig. 21: 104. *Slaterocoris croceipes*. A. USA: California: Willow Springs Road, 00091708; B. USA: California: Phelan Road, 00107875; C. USA: California: Largo Vista Road, 00107881; D. USA: Utah: 11 mi W of Sevier, 00107900; E. USA: Utah: Clear Crk Narrows Summit, 00107907; F. USA: California: 20 km W of Wofford Heights, 00110996; G. USA: Nevada: 10 mi E of Roggen, 00116727; H. USA: Nevada: Charleston Peak, 00116728; I. USA: Texas: 3 mi E of Lefors, 00118222.
Fig. 22: 105. *Slaterocoris croceipes*. A. USA: California: Tehachapi Willow Springs Road, 00091710; B. USA: California: Phelan Road, 00107875; C. USA: California: Largo Vista Road, 000107881; D. USA: Utah: Clear Creek Narrows Summit, 00107907; E. USA: Utah: American Fork, 00111892; F. USA: Colorado: 10 mi E of Roggen, 00116727; G. USA: Nevada: Charleston Peak, 00116728; H. USA: Nevada: 3 mi W of Lida, 00119411.
Fig. 24: 112. *Slaterocoris* species: *S. fuscomarginalis*. A. USA: Utah: South Curlew Valley, 00122251; B. USA: Nevada: 12 mi N of Rt 50 on Rt 278, 00107872. *S. tibialis*. C. USA: Oregon: Siskiyou Summit, 00110998; D. USA: Oregon: Lower Klamath Lake Hill, 00122267; E. USA: Oregon: Mitchell, 00107909.
Fig. 25: 114. *Slaterocoris pilosus*. A, N. USA: Oregon: Unity Lake State Park, 00107915; B, C, L. Canada: British Columbia: Oliver, 00111918; D, E, I–K. Canada: British Columbia: Oliver, 00111919; F–H. USA: Washington: Hanford Site, Arid Lands Ecological Preserve, 00121917; M. Canada: British Columbia: Osoyoos Lake Indian Reservation, 00111922.
Fig. 26: 117. *Slaterocoris rubrofemoratus*. A–C, H–J. USA: Nevada: Mercury, 00111910; D, M. USA: Utah: 2 mi NW of Toquerville, 00111895; E, N. USA: Utah: 2 mi NW of Toquerville, 00111894; F, K. USA: California: Escondido Canyon Road, 00091704; G, L. USA: California: Escondido Canyon Road, 00091709.
Fig. 28: 125. *Slaterocoris* species: *S. argenteoides*. A, B. Mexico: Oaxaca: 3.1 mi NW of Jct. 190/135, 00118993; C, D. Mexico: Puebla: 2.1 mi S of Coxcatlan, 00118397; E, F. Mexico: Oaxaca: 10 mi SE of Totolapan, 00118399; G, H. Mexico: Oaxaca: Guelatao, 00111729. *S. argenteus*. I. Mexico: Michoacán: Encinillas, 00111725; J. Mexico: Michoacán: Jilotepec, 00111688; K. Mexico: Durango: 40 mi S of Durango, 00111771; L. Mexico: Durango: 6 mi E of Durango, 00111763.
Fig. 29: 126. *Slaterocoris* species: *S. argenteoides*. A–C. Mexico: Oaxaca: 3.1 mi NW of Jct. 190/135, 00118399; D. Mexico: Oaxaca: Guelatao, 00111729. *S. argenteus*. E, F. Mexico: Durango: 40 mi S of Durango, 00111771; G. Mexico: Durango, 6 mi E of Durango, 00111763. *S.*

digtatus. H–K. USA: Texas: Big Bend National Park, 00118460.

Fig. 30: 131. *Slaterocoris atritibialis*. A, C, G–J. USA: New York: Napeaque, 00116323; B. USA: Wyoming: Shoshone National Forest, 00093776. Apex of dorsal lobe, USA: Wyoming: Jackson, 00170121; D. USA: New Mexico: 6 mi NE of Cloudcroft, 00243561; E. USA: Wyoming: Niobrara Co., 00116600; F. USA: Colorado: 27 mi E of Nucla, 00069991.

Fig. 32: 152. *Slaterocoris breviatus*. A. Canada: British Columbia: Progress, 00113594; B, K. USA: Idaho: Cedar Creek Recreation Area, 00169980; C, O. USA: Wisconsin: Peshtigo River, 00242106; D–F, I. USA: District of Columbia: Washington, 00113586; J. USA: Pennsylvania: Pine Grove Furnace State Park, 00117899; L. Canada: Alberta: Slave Lake, 00113583; M. Canada: Nova Scotia: Ingonish, 00113788; N. USA: Wisconsin: Chiwaukee Prairie, 00242087.

Fig. 33: 168. *Slaterocoris pallidicornis*. A, D, F–I. USA: North Dakota: Theodore Roosevelt National Park, 00113572; B, E, K. Canada: Nova Scotia; Beddeck, 00115092; C, J. Canada: Nova Scotia; Beddeck, 00115093; L. USA: Colorado: Pingree Park, 00113575.

Fig. 34: 175. *Slaterocoris pallipes*. A, D, E–G, I. USA: Maryland: North Beach, 00133392; B, H. Costa Rica: San Jose, 00070011; C. USA: South Carolina: S of Columbia, 00133375.

Fig. 35: 178. *Slaterocoris solidaginis*. A. USA: California: Dune Lakes, 00119380; B–H. USA: California: 1.5 mi E of San Juan Campground 00108183; I. USA: California: San Diego Co., 00121821.

Fig. 38: 186. *Slaterocoris stygicus*. A. USA: Wisconsin: Wyalusing State Park, 00242096; B. USA: Colorado: 27 mi E of Nucla, 00069922; C. USA: Oregon: Pioneer Ford Forest Campground, 00118054; D. USA: Washington: Lake Cushman, 00127485; E. USA: New York: Orient, 00116237; F. USA: New Mexico: 2 mi E of Cloudcroft, 00118218; G. USA: Mississippi: 4 mi S of Fort Gibson, 00069834; H. Canada: British Columbia: Fernie, 00114052; I. Canada: Northwest Territories: Fort Norman, 00112979; J. USA: Utah: Franklin Basin Road, 00069921; K. USA: Wyoming: Jackson, 00170122; L. Canada: British Columbia: 4 mi E of Cawston, 00112981; M. USA: British Columbia: 10 mi S of Merritt, 00112980.

Fig. 39: 187. *Slaterocoris stygicus*. A. USA: Washington: Lake Cushman, 00127485; B, J. USA: Washington: Orting, 00122252; C. Canada: Northwest Territories: Fort Norman, 00112979; D–I. USA: Indiana: Henryville, 00127411.

Fig. 41: 214. *Slaterocoris flavipes*. A, B. USA: Oregon: Powder Hill Road, 00107887, 00107905; C. USA: California: Carrizo Creek, 00112123; D. USA: Utah: 15 mi NW of Hog Springs, 00112119; E. USA: California: Phelan, 00091706; F. USA: Utah: S of Hanksville, 00107918; G. USA: Nevada: Sheldon National Wildlife Refuge, 00107897; H–J. USA: Oregon: 1 mi S of Millican, 00107898, 00111920, 00111921.

Fig. 42: 215. *Slaterocoris flavipes*. A. USA: Utah: S of Hanksville, 00107918; B, C. USA: Oregon: 1 mi S of Millican, 00111920, 00111921; D. USA: California: Indio, 00112112; E. USA: California: Carrizo Creek, 00112123.

Fig. 43: 220. *Slaterocoris longipennis*. A, B. USA: Utah: Kelton, Pass, 00112138; C. USA: Nevada: Stockade Wash, 00107874; D. USA: California: 2 km W of Kaiser Pass, 00110997; E. USA: Wyoming: 4 mi NW of Frontier, 00112143; F. USA: Colorado: Steamboat Springs, 00116721; G. USA: California: Westgard Pass, 00107913.

Fig. 44: 221. *Slaterocoris longipennis*. A, B. USA: Colorado: Baxter Pass, 00112140; C. USA: Nevada: 11 mi N of Belmont, 00107873; D. USA: Utah: Kelton Pass, 00112138; E. USA: California: Fish Lake Valley, 00119798; F. USA: California: 2 km W of Kaiser Pass, 00110997; G. USA: California: Westgard Pass, 00107913; H. USA: Colorado: Steamboat Springs, 00116721.

Fig. 45: 224. *Slaterocoris* species: *S. sheridani*. A. USA: North Dakota: 8 mi W of Belfield, 00122179; B. USA: Colorado: Englewood, 00116725; C. USA: Colorado: 12 mi W of Pueblo, 00116710. *S. sparsus*. D. USA: California: Caliente Creek Road, 00107883; E. USA: California: Sespe Canyon, 00112132.

Fig. 46: 225. *Slaterocoris sheridani*. A. USA: Arizona: nr Fish Creek, 00116731; B. USA: Arizona: Sunflower, 00116726; C, D. USA: Arizona: 1 mi E of Stoneman Lake, 00107901, 00107914; E. USA: Utah: Temple Wash, 00107908; F. USA: North Dakota: 8 mi W of Belfield, 00122179; G. USA: Arizona: 5 mi S of Clarkdale, 00116719; H. USA: Colorado: Pueblo, 00116710; I. USA: Colorado: Englewood, 00116725; J. USA: Arizona: 36 mi SE of Globe, 00116708; K. USA: Arizona: Mazatzal Wilderness Area, 00116715; L. USA: New Mexico: Tajique, 00117794.

Fig. 48: 232. *Slaterocoris sparsus*. A. USA: California: Phelan, 00107876; B. USA: California: Sespe Canyon, 00112132; C, D. USA: California: Caliente Creek Road, 00091707, 00107883.

Fig. 49: 236. *Slaterocoris alpinus*. A, B, D, E, O. USA: Texas: 2 mi W of Iredell, 00118457; C, G–I, USA: Colorado: Flagstaff Canyon, 00111426; F, L. USA: Colorado: Red Rocks Park, 00116711; J. USA: Nebraska: Wood Lake, 00111427; K. USA: Texas: Pope Bend Road, 00122136. M. USA: Wyoming: Goshen Co., 00116598; N. USA: Kansas: Linn Co., 0011797.

Fig. 51: 239. *Slaterocoris hirtus*. A. USA: Iowa: 6 mi SE of Mount Pleasant, 00118510; B. USA: Missouri: The Pinnacles, 00243023; C. USA: Missouri: Huzzah State Forest, 00243819; D. USA: Arkansas: 4 mi S of Moko, 00122200; E. USA: Illinois: West Union, 00243458; F. USA: Missouri: 1 mi E of jct. 160 and 248, 00243021; G. USA: Missouri: Taum Sauk Mountain State Park, 00243010.

Fig. 52: 240. *Slaterocoris hirtus*. A, E, I. USA: Iowa: 6 mi SE of Mt Pleasant, 00118510; B, D, J. USA: Missouri: Taum Sauk Mountain State Park, 00243010; C. USA: Missouri: The Pinnacles, 00243023; F–H. USA: Iowa: Ames, 0133404.

Fig. 54: 243. *Slaterocoris mohri*. A. USA: Wisconsin: Rindy Prairie, 00242035; B. USA: Arkansas: Queen Wilhelmina State Park, 00134035; C.

USA: Missouri: Roaring River State Park, 00242817; D. USA: Missouri: unknown, 00133389; E. USA: Missouri: Devil's Elbow, 00134037; F. USA: Missouri: Paint Brush Prairie Natural Area, 00243015.

Fig. 55: 244. *Slaterocoris mohri*. A, H. USA: Missouri: unknown, 00133389; B, E–G, I. USA: Illinois: "C[entral]. Ill[inois]." 00111436. C. USA: Wisconsin: Rindy Prairie, 00242035; D. USA: Arkansas: Queen Wilhelmina State Park, 00134035.

Fig. 57: 250. *Slaterocoris clavatus*. Mexico: Guerrero: 2.1 mi NW of Cacahuamilpa, 00118189.

Fig. 60: 253. *Slaterocoris elongatus*. Mexico: Puebla: 4 mi E of Azumbilla, 00118447.

Fig. 61: 255. *Slaterocoris maculatus*. Mexico: Oaxaca: 9 mi N of Candelaria Loxicha, 00118408.

Fig. 64: 258. *Slaterocoris punctatus*. A, D, E. Mexico: Oaxaca: 16.1 mi NW of Totolapan, 00118638; B, G–I, M, N. Mexico: Durango: 26 mi E of El Salto, 00111811; C, F, L. Mexico: Durango: 5 mi W of Durango, 00111812; J. Mexico: Oaxaca: 6.7 mi SW of El Camaron, 00118227; K. Mexico: San Luis Potosi: 1 mi S of San Lorenzo, 00118185.

Fig. 65: 262. *Slaterocoris simplex*. A, B, G, M. USA: Durango: Navajos, 00111848; C, H–J. USA: Durango: Navios, 00111844; D, K. USA: Puebla: Xometla, 00127326; E, L. Mexico: Mexico: Rio Frio, 00111826; F. Mexico: Mexico: Rio Frio, 001211830.

Fig. 68: 266. *Slaterocoris tanydexios*. A. Mexico: Oaxaca: 2.8 mi E of Matatlan, 00118404; B, C, F. Mexico: Puebla: 4.4 mi SW of Acatepec, 00118395; D. Mexico: Puebla: 4 mi W of Acatepec, 00118405; E. Mexico: Oaxaca: 3 mi SE of Matatlan, 00118407.

Fig. 69: 267. *S. tanydexios*. A, B. Mexico: Puebla: 4 mi W of Acatepec, 00118405; C. Mexico: Puebla: 4.4 mi SW of Acatepec, 00118395.

Fig. 72: 270. *Slaterocoris robustus*. A. USA: Colorado: Gould, 00110983; B. USA: Nevada: 3.5 mi SE of Manhattan, 00107866; C. USA: California: 10 km SE of Hesperia, 00119796; D. USA: Colorado: 35 mi E of Gunnison, 00107870; E. USA: Colorado: Steamboat Springs, 00118240; F. USA: Utah: Baxter Pass, 00110984.

Fig. 73: 271. *Slaterocoris robustus*. USA: Colorado: Gould, 00110983.

Scanning Electron Micrographs

Plate 4: 45. Detail of dorsal vestiture. A. *Slaterocoris alpinus*. USA: Texas: 2 mi W of Iredell, 00118502♂; B. *S. apache*. USA: Colorado: Blanca, 00115909♂; C. *S. argenteoides*. Mexico: Puebla: 2.1 mi S of Coxcatlan, 00118807♂; D. *S. breviatus*. USA: New York: Lake Placid, 00115911♂ E. *S. clavatus*. Mexico: Puebla: 5 mi SE of Izucar de Matamoros, 00093303♀; F. *S. croceipes*. USA: California: Largo Vista Road, 3.1 mi S of Rt 18, 00108853♂; G. *S. elongatus*. Mexico: Puebla: 4 mi E of Azumbilla, 00184701♂; H. *S. fuscomarginalis*. USA: Nevada: 12 mi N of Rt 50 on Rt 278, 00108224♂; I. *S. hirtus*. USA: Arkansas: Fayetteville, 00122238♂; J. *S. mohri*. USA: Missouri: Paint Brush Prairie Natural Area, 00243029♂; K. *S. pilosus*. Canada: British Columbia: Oliver, 00111956♂; L. *S. punctatus*. Mexico: Guanajuato: Ojo de Agua, 00111783♂; M. *S. robustus*. USA: Colorado: 4 mi N of Gould, 00094017♂; N. *S. rubrofemoratus*. USA: Utah: White Canyon, 00116810♂; O. *S. sheridani*. USA: Arizona: Rye, 00117197♂; P. *S. simplex*. Mexico: Durango: 26 mi E of El Salto, 00111843♂; Q. *S. stygicus*. Canada: Ontario: Black Sturgeon Lake, 00112918♂; R. *S. tanydexios*. Mexico: Durango: 4 mi W of Acatepec, 00118755♂.

Fig. 3: 48. *Scalponotatus maturus*. USA: Arizona: 5.3 mi SW of Salome, 00112919♂.

Fig. 6: 60. *Josephinus albicornis*. Mexico: Sinaloa: Mazatlan, 00112359♂.

Fig. 9: 68. *J. reinhardi*. Mexico: Sonora: Minas Nuevas, 00108703♂.

Fig. 14: 84. *Slaterocoris ambrosiae*. A, E. USA: Arizona: Reavis Ranch Trail, 00116785♂; B–D. USA: New Mexico: Gallinas Canyon, 00111479♂.

Fig. 20: 103. *Slaterocoris* species: A, E. *S. croceipes*. USA, California: Largo Vista Road, 00108853♂. B, D. *S. pilosus*. Canada: British Columbia: Oliver, 00111956♂. C. *S. rubrofemoratus*. USA: Utah: White Canyon, 00116810♂. F. *S. fuscomarginalis*. USA: Nevada: 12 mi N of Rt 50 on Rt 278, 00108224♂.

Fig. 27: 124. *Slaterocoris argenteoides*. Mexico: Puebla: 2.1 mi S of Coxcatlan, 00118807♂.

Fig. 31: 151. *Slaterocoris breviatus*. USA: New York: Lake Placid, 00115911♂.

Fig. 36: 184. *Slaterocoris stygicus*. USA: Illinois: Hamilton, 00114054♂.

Fig. 37: 185. *Slaterocoris stygicus*. A, B. Illinois: Hamilton, 00114054♂; C, D. Canada: Ontario: Black Sturgeon Lake, 00112918♂.

Fig. 50: 238. *Slaterocoris* species: A, B. *S. hirtus*. USA: Arkansas: Fayetteville, 00122238♂. C. *S. mohri*. USA: Missouri: Paint Brush Prairie Natural Area, 00243029♂.

Fig. 56: 249. *Slaterocoris clavatus*. Mexico: Puebla: 5 mi SE of Izucar de Matamoros, 00093303♀.

Fig. 59: 252. *Slaterocoris elongatus*. Mexico: Puebla: 4 mi E of Azumbilla, 00184701♀.

Fig. 63: 257. *Slaterocoris* species: A. *S. punctatus*. Mexico: Guerrero: Chilpancingo, 00085372♂. B. *S. subalbicans*. Mexico: Guerrero: Amula, 00085373♀. C. *S. simplex*. Mexico: Durango: 26 mi E of El Salto, 00111843♂.

Fig. 67: 265. *Slaterocoris tanydexios*. Mexico: Puebla: 4 mi W of Acatepec, 00118755♀.

Fig. 71: 269. *Slaterocoris robustus*. USA: Colorado: 4 mi N of Gould, 00094017♂.

APPENDIX 3

Abbreviations Used in the Figures

FEMALE GENITALIA

DLP	Dorsal labiate plate
IRL	Interramal lobe
IRS	Interramal sclerite

LFGP Left first gonapophysis
RLGP Right first gonapophysis
VLP Ventral labiate plate

MALE GENITALIA

PH Phallotheca
LP Left paramere
RP Right paramere
SP Endosomal spicule
TP Tergal process