

REVISION AND CLADISTIC
ANALYSIS OF THE HOLARCTIC
GENUS *ATRACTOTOMUS* FIEBER
(HETEROPTERA: MIRIDAE:
PHYLINAE)

GARY M. STONEDAHL

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GARY M. STONEDAHL
Research Associate, Department of Entomology
American Museum of Natural History
CAB International Institute of Entomology
56 Queen's Gate
London SW7 5JR
England

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ABSTRACT

The Holarctic genus *Atractotomus* Fieber is revised. *Lepidopsallus* Knight and *Microphylidea* Knight are relegated to synonymy with *Atractotomus*. Thirty-seven species are recognized, including 17 new species from the Nearctic region. *Microphylidea prosopidis* Knight, *Psallus kolenatii* (Flor), *Rhinacloa nigripennis* Schuh and Schwartz, and six species of *Lepidopsallus* (*arizonae* Knight, *atricolor* Knight, *miniatus* Knight, *ovatus* Knight, *rubidus* (Uhler), *tuthilli* Knight) are transferred to *Atractotomus*. *Atractotomus amygdali* Wagner, *A. mali* (Meyer-Dür), *A. rhodani* Fieber, and *A. vireti* Wagner are assigned the status of species incertae sedis. *Atractotomus femoralis* Fieber and *A. spissicornis* (Schränk) are declared nomina dubia. *Atractotomus crataegi* and the remaining eight species of *Lepidopsallus* (*australis* Blatchley, *claricornis* Knight, *hesperus* Knight, *longirostris* Knight, *minusculus* Knight, *olseni* Knight, *pini* Knight, *rostratus* Knight) are transferred to *Phoenicocoris* Reuter. The following species synonymies are proposed (senior synonym first): *Atractotomus albidicoxis* Reuter = *Lepidopsallus monticola* Knight; *Atractotomus balli* Knight = *Atractotomus purshiae* Froeschner and *Lepidopsallus californicus* Knight; *Atractotomus magnicornis* (Fallén) = *Atractotomus magnicornis buenoi* Knight; *Atractotomus miniatus* (Knight) = *Lepidopsallus nyssae* Johnston; *Atractotomus ovatus* (Knight) = *Lepidopsallus nicholi* Knight; *Atractotomus parvulus*

Reuter = *Atractotomus mirificus* Woodroffe; *Atractotomus persquamosus* Seidenstücker = *Atractotomus brunomassai* Carapezza.

Illustrations and/or photographs are provided for the antennae and male genitalic structures of all species of *Atractotomus*. Scanning electron micrographs are presented for the scalelike setae, metafemur, and pretarsus of representative species of *Atractotomus* and related genera. Separate keys are provided for the Nearctic and Palearctic members of the genus. A phylogenetic analysis of species is presented using *Psallus ancorifer* (Fieber) for out-group comparison. Three species groups are recognized from the resulting species phylogeny. An analysis of host plant associations suggests that *Atractotomus* was primitively associated with conifers, but shifted to legume feeding early in the evolution of the genus. In the Nearctic region, this was followed by separate shifts to feeding on *Quercus*, *Salix*, and Rhamnaceae + Rosaceae. Species diversity and endemism are greatest in parts of east-central and south-central Mexico. Species with restricted distributions also occur in southeastern Arizona, the Rocky Mountains, and upland regions of the Pacific coast states and Baja California. The phylogenetic analysis of species indicates a strong relationship between taxa occurring in the American Southwest and endemic species in central Mexico.

INTRODUCTION

The Phylinae of the Holarctic region continue to be a confusing group, with many genera lacking adequate diagnoses. Recent studies by Schuh (1984, 1990) and Schuh and Schwartz (1985) have indicated the problems encountered in recognizing monophyletic groups within the Phylini, and preparing workable diagnoses for these groups. One only has to look at the complex taxonomic history of species placed in genera such as *Campylomma* Reuter (Schuh, 1984) and *Rhinacloa* Reuter (Schuh and Schwartz, 1985) to appreciate the magnitude of the problem. In the Nearctic region, which has a very rich phylina fauna, the above authors have approached the problem of generic recognition by identifying monophyletic assemblages and revising these groups, complete with phylogenetic analyses and detailed comparisons with re-

lated taxa. This approach is desirable because it provides a data base of character information for future reference while reducing the number of undiagnosed and/or nonmonophyletic groups. I have adopted the approach of Schuh and Schwartz in the present study of the genus *Atractotomus* Fieber.

The close similarity between *Atractotomus*, *Lepidopsallus* Knight, and *Microphylidea* Knight in the Nearctic region prompted an investigation of the monophyly of these nominal genera within the Phylini. This investigation revealed that all three genera were nonmonophyletic, and that each contained taxa congeneric with the type species of *Atractotomus* (see generic discussion). Therefore, I here provide a revised diagnosis for *Atractotomus* and present comparative information on structural attributes of related

taxa. The genus now comprises six Palearctic and 31 Nearctic species, including the type and eight additional species of the nominal genus *Lepidopsallus*, as well as the type species of *Microphyllidea*. A key to all currently recognized species is provided, as well as a diagnosis and description or redescription for each species.

Fieber (1858) described the genus *Atractotomus* to include *Capsus magnicornis* Fallén, 1807, and three new species, *rufus* [syn. of *mali* (Meyer-Dür)], *albipes*, and *femoralis*. Although I have been unable to determine the generic placement of *femoralis* and *mali* (see discussion at end of Systematics section), it is clear that they are not congeneric with the type species, *magnicornis*, which was fixed by Kirkaldy (1906). The third species, *albipes*, has since been synonymized with *Phoenicocoris obscurellus* (Fallén).

Fieber (1858, 1861) diagnosed *Atractotomus* as having (among other features) three types of dorsal setae (dark bristles, white or yellow recumbent hairs, and featherlike hairs), and a cylindrical or spindle-shaped second antennal segment of various increased thickness. The above described dorsal vestiture is a feature typical of species currently placed in the genus *Heterocapillus* Wagner, and was given by Wagner (1960) as a diagnostic character of the group. Fieber (1861) placed nine species in *Atractotomus*. All except *magnicornis* have now been moved to other genera: *sulcicornis* (Kirschbaum) was transferred to *Criocoris*; *nigripes* Fieber was synonymized with *Psallus ancorifer* (Fieber); *oculatus* (Kirschbaum) was synonymized with *Phoenicocoris obscurellus* (Fallén); *tigripes* (Mulsant and Rey) was designated type species of *Heterocapillus*; *mali* (Meyer-Dür) and *rhodani* Fieber are here assigned the status of incertae sedis; and *femoralis* is here declared nomen dubium.

Reuter (1878, 1884) had a similar concept of *Atractotomus*, recognizing the genus by the golden pubescence or white, squamiform hairs on the dorsum always intermixed with dark, erect setae; the head strongly declivent or subvertical; and the variously thickened second antennal segment. He distinguished *Atractotomus* from *Psallus* Fieber by the former having a less produced head, and a thickened, fusiform second antennal segment in

the female; from *Excentricoris* Carvalho (as *Excentricus* Reuter) by the shorter first antennal segment and structure of the head; and from *Criocoris* Fieber by the weakly produced head with less prominent tylus, non-sinuate anterior margin of the pronotum, and thickened second antennal segment of the female. In Reuter's 1884 key to phyline genera, *Campylomma* is distinguished from *Atractotomus* by the shorter, broader head that is not or only slightly produced ventrad of the eyes. In addition to most of the taxa considered by Fieber, Reuter (1878) recognized the following species as belonging to *Atractotomus*: *albipennis* Reuter, since moved to *Dacota* Uhler; *parvulus* Reuter; and *validicornis* Reuter, now in *Heterocapillus*.

The generic concept for *Atractotomus* remained much the same through the first half of the 20th century, with some additional species described and others given new generic assignments (Carvalho, 1958). As recent as the works of Carvalho (1955) and Wagner (1975), *Atractotomus* was recognized solely on the basis of the enlarged second antennal segment and degree of development of the frons and tylus.

The only significant contribution to the taxonomy of the genus in Europe since the work of Carvalho (1955, 1958) has been the assignment of a large number of species to the subgenus *Heterocapillus* (Wagner, 1960)—subsequently raised to generic rank by Kerzhner (1962). Wagner (1960, 1975) distinguished *Heterocapillus* from *Atractotomus* by the dorsal vestiture and structure of the male genitalia. *Heterocapillus* was diagnosed as having a vesica with the gonopore well removed from the apex and overlaid with one or two slender, chitinous rods, and the dorsal vestiture with three distinct types of setae: (1) appressed scalelike setae; (2) pale, fine, suberect setae; and (3) coarse, black, suberect setae. In *Atractotomus*, the gonopore is near the apex of the vesica and the dorsum has only scalelike setae and dark, simple setae. Although the characters used by Wagner adequately distinguish two groups of species in Europe, neither of these groups is monophyletic. Wagner (1975) retained *amygdali* Wagner, *mali*, *rhodani*, and *vireti* Wagner in *Atractotomus*. These species together with *Heterocapillus pici* (Reuter) appear to form a

monophyletic group distinct from *Atractotomus*, but the relationships of this group to other Palearctic Phylini requires further investigation.

My preliminary examination of species currently placed in *Heterocapillus* indicates that at least two distinct groups are represented. The species *tigripes*, *niger* Wagner, and *validicornis* form one group, which appears to have affinities with the "*Psallus* complex." The second group comprises four species that live on *Genista* and other legumes, predominantly in the Mediterranean region: *cavinotum* Wagner, *genistae* (Lindberg), *nitidus* (Horvath), and *perpusillus* Wagner. The vesicae of these species are superficially similar to those of *Phoenicocoris* Reuter species, but differences in head structure, fine structure of scalelike setae, and other genitalic features readily distinguish the two groups. Of the remaining four species of *Heterocapillus* treated by Wagner (1975), *brevicornis* is likely to be a synonym of *Atractotomus parvulus* (see subsequent species treatment) and *pici*, as stated above, is a member of the *mali* complex of species. *Heterocapillus schmiedeknehti* (Reuter) is unknown to me, and I cannot comment as to the placement of *validus* (Reuter) because I have examined only one poorly preserved female (type?) in the collections of the BMNH.

As in Europe, Nearctic phylines have been placed in *Atractotomus* primarily on the basis of the enlarged second antennal segment. The first North American species were described by Reuter (1909), who did not provide a diagnosis for the genus. Additional species have been described by Knight (1925, 1931, 1968), Johnston (1939), and Froeschner (1963). Species described in other genera and here moved to *Atractotomus* are attributed to Uhler (1895—as *Sthenarus* Fieber), Knight (1923, 1926, 1968—as *Lepidopsallus*), Johnston (1930—as *Lepidopsallus*), and Schuh and Schwartz (1985—as *Rhinacloa*).

Knight (1923) distinguished *Atractotomus* from *Lepidopsallus* solely on the basis of the "strongly incrassated" second antennal segment. He further characterized *Lepidopsallus* as having a short, broad head, comparatively short second antennal segment, strongly spinose tibiae, and strongly curved pretarsal claws with small pulvilli. All these features are common to the majority of species rec-

ognized by Knight as belonging to *Atractotomus*. In addition, *Lepidopsallus* is clearly not monophyletic, with all the species inhabiting pines belonging instead to the genus *Phoenicocoris* (see generic discussion for detail). Knight's concept of *Atractotomus* did not change in his later works, with scalelike setae and the enlarged second antennal segment always employed to distinguish the genus. Knight (1968) separated *Atractotomus* from *Criocoris* by the less sharply produced tylus; from *Rhinacloa* by the head anteriad of the antennal fossae more strongly produced; and from *Ranzovius* Distant by the structure of the head and antennae.

It is clear from previous conceptions of *Atractotomus* that a workable diagnosis does not exist for the genus. The primary defining character in all existing works is the enlarged second antennal segment. Other dark phylines with scalelike setae and enlarged antennae (e.g., *Criocoris*, *Excentricoris*, *Heterocapillus*, *Ranzovius*, *Rhinacloa*) were separated from *Atractotomus* primarily on the basis of differences in head morphology. My study of *Atractotomus* indicates that the length and thickness of the second antennal segment vary greatly, even within certain species, and cannot be used as diagnostic at the generic level. A similar conclusion regarding the structure of the second antennal segment was reached by Schuh and Schwartz (1985) for *Rhinacloa*. Head morphology shows some variation in *Atractotomus*, but not to the extremes exhibited by species of *Criocoris*, *Excentricoris*, and *Ranzovius*. Wagner (1975) perhaps came closest to defining a monophyletic *Atractotomus* when he characterized the genus as having (among other things) an S-shaped vesica with the gonopore near the apex. In the present study, the structure of the vesica was found to be especially useful in defining the genus and distinguishing between species. Features of the male genitalia and other characters useful in diagnosing *Atractotomus* are discussed below. Comparative information for related genera is provided where possible. Further discussions of characters that vary within *Atractotomus* are provided in the species treatments.

DISCUSSION OF CHARACTERS

SEXUAL DIMORPHISM: Sexual dimorphism in wing length is common in *Atractotomus*,

with females usually having reduced forewings in comparison to fully macropterous males. In some species the dimorphism is rather strong, while in others, the forewing of the female is only slightly shortened.

HEAD AND EYES: Many species of *Atractotomus* have short heads (anterior to posterior), characterized by a steeply sloped, almost vertical frons that is only slightly produced anteriorly of the antennal fossae (figs. 8, 9). Although some species have the frons and tylus more strongly produced (e.g., *acaciae*, *balli*—figs. 6, 7), the tylus is never greatly enlarged as in *Criocoris* and *Ranzovius* species. The posterior margin of the head is either broadly and shallowly concave or nearly straight (fig. 11). In some species the posterior margin of the head is set off by a low, broad carina. The eyes usually occupy between two-thirds and five-sixths of the height of the head in lateral view, with the antennal fossae positioned at or slightly above the level of the ventral margin of the eyes. Several species with reduced eye size have the antennal fossae situated slightly below the eyes.

ANTENNAL STRUCTURE: As mentioned in the Introduction, *Atractotomus* species exhibit considerable variation in the structure and length of the second antennal segment. These characters while useful for distinguishing species, are not diagnostic at the generic level. Many species exhibit sexual dimorphism in the structure of the second antennal segment, which ranges from simple or slightly enlarged and cylindrical to greatly enlarged and fusiform (see figs. 14–46). In some species (e.g., *miniatus* group), females have slightly narrower second antennal segments than males, while in *magnicornis*, *persquamosus*, and many shrub-inhabiting species, the second segment is larger in the female. A few species (e.g., *acaciae*, *nicholi*) have similarly enlarged antennae in both sexes. Several Nearctic species (e.g., *albidicoxis*, *balli*) exhibit extreme intraspecific variation in the structure of the second antennal segment.

LABIAL LENGTH: The length of the labium varies greatly in the species recognized here as belonging to *Atractotomus*. This character is quite homoplasious in the phylogenetic analysis of species and, like the length of antennal segment II, is not especially useful for defining groups of species.

VESTITURE: Various features of scalelike se-

tae have been used in recent studies of orthotyline and phyline Miridae to elucidate relationships between taxa (Schuh and Schwartz, 1985, 1988; Stonedahl and Schwartz, 1986, 1988; Stonedahl and Schuh, 1986; Schwartz and Stonedahl, 1987). Although the value of vestiture characters in defining monophyletic groups in the Phylinae is still very much in question, it is clear from this and previous studies that the dorsal setae of phylines offer a variety of features for study. At present, the greatest disappointment in the study of setal characters is the apparent similarity in variation exhibited by many traditionally recognized groups. An exhaustive survey of setal morphology in the Phylinae is beyond the scope of the present study. However, in the following discussion, comparative information for related genera is included where possible.

Atractotomus species possess two basic types of flattened or scalelike setae: (1) narrow, moderately flattened, and apically acuminate setae (figs. 64, 65, 67); and (2) broad, strongly flattened setae, usually with broadly serrate apex (figs. 62, 63, 68–75).

The first setal type occurs in members of the *magnicornis* species group. The ridges on these setae are usually strongly developed and weakly converging distally (fig. 65). However in *cooperi* and *morio*, the ridges are less prominent, and usually obliterated medially (figs. 64, 67). Narrow scalelike setae also are found in *Dacota hesperia* Uhler, *Heterocapillus tigripes*, *Merinocapsus ephedrae* Knight, the genus *Megalopsallus* Knight, and some species of *Europiella* Reuter and *Psallus* (figs. 47–50, 52–54). Schuh and Schwartz (1985) noted a similar setal structure in *Campylomma verbasci* (Meyer-Dür) (fig. 51) and *Pseudatomoscelis seriatus* (Reuter). In *Dacota hesperia*, the setal ridges are almost entirely obliterated. Slightly broader setae with predominantly parallel ridges, but still retaining the acuminate apex were observed in species of *Beckocoris* Knight, *Criocoris*, *Europiella*, and *Nevadocoris* Knight (figs. 55–57).

The remaining species of *Atractotomus* possess the second setal type, which occurs in several modified forms. The ridges on these setae are usually distinctly raised and parallel to the axis of the seta (figs. 63, 66, 68, 69, 72–75). In some species such as *acaciae*, the ridges near the midline of the seta are no-

ticeably anastomosed (fig. 62), while in others they tend to ramify near the apex (figs. 63, 68, 69, 72). Schuh and Schwartz (1985) described a similar range of structural variation in broad scalelike setae of *Rhinacloa* species. Type two scalelike setae also occur in the genus *Phoenicocoris* (figs. 58, 59) and most species of legume-inhabiting *Heterocapillus* (fig. 61). The type species of *Heterocapillus* has type one scalelike setae (fig. 54).

Based on my preliminary examination of scalelike setae in *Atractotomus* and other phylinae genera, it appears that type two scalelike setae are apomorphic with respect to the narrower type one setae. The coding of setal characters for the phylogenetic analysis of *Atractotomus* species reflects this point of view.

METAFEMORAL SPINES: Metafemoral spines or spicules were first reported in the Phylinae by Schuh and Schwartz (1985). These authors noted that a nearly linear row of close set spicules occurred only in species of *Campylomma* and *Rhinacloa* (figs. 77, 79), but did not resolve whether this condition was a synapomorphy for the two genera. They also noted that a partial row of more widely spaced spicules occurred in other Nearctic phylines then placed in the genera *Atractotomus* and *Lepidopsallus*. My investigation of metafemoral spines in *Atractotomus* and related genera has verified the observations of Schuh and Schwartz. In comparison to *Campylomma* and *Rhinacloa*, a shorter, less regular (dispersed) row of spines was found in species of *Atractotomus* and *Phoenicocoris* (figs. 76, 78, 82–89). Several species of *Atractotomus* have apparently lost the row of spines on the metafemora (figs. 81, 90).

The species constituting the Nearctic genus *Lepidopsallus* are here divided between *Atractotomus* and *Phoenicocoris* (see generic discussion and section on misplaced species). It appears that the irregular row of metafemoral spines is a synapomorphy for these two genera. However, a more comprehensive study of generic relationships in the Phylinae is needed to resolve this question, as well as the possible relationship between dispersed and linear rows of metafemoral spines.

LEG COLOR: Leg coloration is quite variable in *Atractotomus*, ranging from uniformly pale brownish yellow to entirely dark brown

or black. Species with light colored legs sometimes have dark spots on the distal half of the femur and/or at the bases of the tibial spines. However, femoral and tibial spotting is much less common in *Atractotomus* than in genera like *Campylomma* and *Rhinacloa*. Leg coloration does not appear to be of much value for defining natural groups of species, except perhaps in the *miniatus* group, where species tend to have the basal half to two-thirds of the femora dark reddish brown and the distal portion pale. Some intraspecific variation in leg color also occurs, especially in several widespread Nearctic species.

PRETARSUS: *Atractotomus* species have a pretarsal structure much like that described by Schuh and Schwartz (1985) for *Rhinacloa*. The claw bases are relatively broad, and usually possess two or three claw hairs on the outer ventral surface (figs. 108, 109). The increased number of claw hairs noted for *cooperi* and *magnicornis* (figs. 111, 112) may with further investigation be verified as a synapomorphy of the *magnicornis* group. Increased numbers of claw hairs also was noted in some *Lycium*- and *Sarcobates*-inhabiting species of *Europiella*, but these species usually possess narrower claw bases and smaller pulvilli than *Atractotomus* species (figs. 98, 100). *Phoenicocoris* species also have relatively broad claw bases, but the pulvilli are much smaller than in *Atractotomus* species, and the parempodia are long and weakly spatulate distally (figs. 102, 103). Long, spatulate parempodia also occur in some species of *Campylomma* and *Heterocapillus* (figs. 97, 99).

The structure of the pulvillus is quite variable in *Atractotomus*. In the majority of species, it is relatively large, covering from half to nearly the entire ventral surface of the claw (figs. 108–114). The most notable exception is *morio*, which has a very narrow claw base, and nearly obsolete pulvilli (fig. 115). The pulvilli are especially large and fleshy in members of the *miniatus* group (figs. 109, 110). Large, fleshy pulvilli also are found in other phylinae genera such as *Beamerella* Knight, *Beckocoris*, *Dacota*, *Eminoculus* Schuh, *Heterocapillus*, *Nevadocoris*, and *Rhinacloa* (figs. 92–97).

In contrast to the above genera, most phylines with scalelike setae have relatively nar-

row claw bases and small pulvilli (figs. 99–107), which suggests that this is a plesiomorphic claw type within the subfamily. However, my investigation of pretarsal structure was not extensive enough to allow for the determination of primitive versus derived character states for the pretarsus. As a result, pretarsal characters are not employed in the subsequent phylogenetic analysis of *Atractotomus* species.

MALE GENITALIA: Recent studies of phyline Miridae (Schuh, 1984, 1990; Schuh and Schwartz, 1985, 1988) have shown conclusively that the male genitalia provide some of the most useful characters for diagnosing genera and species groups, and for determining relationships between groups. Such is the case in *Atractotomus*, where the primary diagnostic characters for the genus are found in the male genitalia.

My investigation of male genitalia in the present study suggests that *Atractotomus* belongs to a group of genera defined by a vesica composed of a single sclerotized strap, often with strongly reflected margins, that is strongly twisted medially giving it a somewhat coiled (cobralike) appearance. The vesica is further characterized by a small, straight sclerite, which is freely suspended in membrane proximad of the gonopore. Within this group, *Atractotomus* is recognized by the unique condition of having minute spines on the gonopore sclerite. Although some species lack these spines, it appears that their absence is not primitive but the result of secondary loss (see Phylogenetic Analysis). The coiled vesica is here hypothesized to be derived in comparison to more conventional designs, which usually feature two or sometimes three sclerotized straps variously twisted together for much of the length of the vesica. These vesicae tend not to be coiled medially, and do not have a suspended sclerite ventrad of the gonopore.

Within *Atractotomus*, the structure of the vesica shows variation, which is sometimes useful for defining natural groups of species (see phylogenetic analysis). The vesical strap distad of the medial coil varies in thickness and the degree of distal tapering, and the medial coil itself can be tight (figs. 146–151) or loose and broadly opened (figs. 152, 156). The location of the gonopore varies from po-

sitions at or slightly distad of the apex of the vesical strap (figs. 151, 153, 159), to well removed from the apex (figs. 150, 156, 162). The gonopore sclerite varies in length and the degree of sclerotization, as well as in the direction, density, and coarseness of the surface spines.

Additional information regarding structures of the male genitalia is provided in the subsequent species treatments.

MATERIALS AND METHODS

Approximately 6200 specimens were examined in the present study representing material borrowed from major entomological institutions in North America and Europe, as well as selected university and private collections. A list of collections and curators is given in the Acknowledgments section. The type specimens of all Nearctic species and most Palearctic taxa were examined. Type material could not be located for several European species. A lectotype designation is provided for *Sthenarus rubidus* Uhler, based on original syntype material discovered in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Locality data are recorded in the Specimens Examined sections, and for new species, under Holotype, Paratypes, and Additional Specimens. Full label data, including date, collector, and host association, are reported only for new species. Dates of collection are summarized for the remaining species, with collector names omitted. Information on host associations is summarized in the discussion section of each species treatment. Specimen depositories are given only for holotypes of new species and for some paratypes. The depositories of all other specimens are summarized following the reporting of label data. A list of institutional abbreviations used in reporting specimen depositories is provided under Museum Abbreviations.

Dissections of male genitalia were performed using the technique described by Kelton (1959). After dissection and study, the genitalic structures were placed in a plastic microvial containing glycerin for permanent storage.

Several new or little applied terms have

been used in the present study to distinguish various structures of the male genitalia. These terms are employed here to assist in clarifying differences between *Atractotomus* species, and between *Atractotomus* and other phylina genera. The primary sclerotized shaft of the vesica is termed the "sclerotized strap," to distinguish it from the much smaller sclerite located ventrad of the secondary gonopore, which is hereafter referred to as the "gonopore sclerite." The strongly coiled medial portion of the vesical strap is termed the "median coil." The basal and distal arms of the left paramere are referred to as the anterior and posterior processes, respectively, after Schuh and Schwartz (1985).

Illustrations of the male genitalia were prepared from temporary slide mounts in glycerin jelly, using a Wild M-20 compound microscope with camera lucida. Photographs of the male vesica were taken with an Olympus BH-2 stereoscope fitted with Nomarski phase contrast and a Polaroid camera back. Illustrations of the antennae were prepared using a Wild M-5A stereoscopic microscope with camera lucida. Scanning electron micrographs were prepared on a Cambridge 250 series microscope using Polaroid film (AMNH), and a Hitachi S-2500 microscope with Ilford HP-5 film (BMNH).

All measurements were made with an ocular micrometer and are given in millimeters.

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Assistance with this project was received from many sources. I am particularly grateful to the curators and managers of the numerous institutions and private collections that supplied specimens for study. A list of curators and their respective institutions is given under Museum Abbreviations.

Much of the information incorporated in this study regarding Nearctic taxa was acquired through fieldwork conducted with Randall T. Schuh and Michael D. Schwartz in the western United States. Their assistance and fine hospitality in the field are sincerely appreciated, as well as their professional advice and encouragement during the preparation of the manuscript. I also thank Michael for his assistance in arranging for the return of most of the borrowed material.

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MUSEUM ABBREVIATIONS

AMNH	American Museum of Natural History, New York – Randall T. Schuh
BMNH	British Museum of Natural History, London – William R. Dolling
CAF&A	California Department of Food and Agriculture, Sacramento – Alan R. Hardy
CAS	California Academy of Sciences, San Francisco – Paul H. Arnaud, Jr.
CU	Clemson University, Clemson, South Carolina – John C. Morse, Department of Entomology
CNC	Canadian National Collection, Ottawa – Robert Footitt, Biosystematics Research Centre, Agriculture Canada
JTP	John T. Polhemus Collection, Englewood, Colorado
KU	University of Kansas, Lawrence – Alex Slater and Robert Brooks, Snow Entomological Museum
MHNG	Museum d'Histoire Naturelle, Geneve, Switzerland – Bernd Hauser and Daniel H. Burckhardt
OSU	Oregon State University, Corvallis – John D. Lattin, Department of Entomology
PDA	Pennsylvania Department of Agriculture, Harrisburg – Alfred G. Wheeler, Jr.
PERI	Jean Péricart Collection, Montereau, France
PU	Purdue University, West Lafayette, Indiana – Arwin Provonsha, Department of Entomology
RIBE	Jordi Ribes Collection, Barcelona, Spain
SCHU	Gerhard Schuster Collection, Schwabmünchen, West Germany
SDNH	San Diego Natural History Museum, California – David K. Faulkner, Entomology Department
TA&M	Texas A&M University, College Station – Joseph C. Schaffner, Department of Entomology

UAZ	University of Arizona, Tucson – Floyd G. Werner, Department of Entomology		D.C. – Thomas J. Henry and Richard C. Froeschner
UCB	University of California, Berkeley – John A. Chemsak, Department of Entomology, California Insect Survey	USU	Utah State University, Logan – Wilford J. Hanson, Department of Biology
UCD	University of California, Davis – Robert O. Schuster, Department of Entomology	ZIL	Zoological Institute, Leningrad, USSR – I. M. Kerzhner
UCR	University of California, Riverside – John D. Pinto and Saul I. Frommer, Department of Entomology	ZIUT	Zoologisches Institut der Universität Tübingen, Federal Republic of Germany – Christian Rieger
USNM	National Museum of Natural History, Smithsonian Institution, Washington,	ZMHA	Zoologisches Museum, Universität Hamburg, West Germany – H. Strumpel
		ZMHE	Zoological Museum, University of Helsinki – Antti Jansson

SYSTEMATICS

Atractotomus Fieber

Atractotomus Fieber, 1858: 317 (n. gen., key). – Reuter, 1878: 92, 93 (descr.); 1884: 503 (key); 1910: 145 (cat.). – Van Duzee, 1917: 413, 414 (cat.). – Knight, 1923: 429 (key); 1941: 22 (key). – Carvalho, 1952: 61 (cat.). – Carvalho and Les-ton, 1952: 242 (key). – Carvalho, 1955: 45 (key); 1958: 15 (catalog with list of pre-1958 citations). – Kerzhner, 1962: 230 (note). – Wagner and Weber, 1964: 443 (descr.). – Wagner, 1975: 115 (descr.). Henry and Wheeler, 1988: 459 (cat.). Type species: *Capsus magnicornis* Fallén. *Lepidopsallus* Knight, 1923: 429, 470 (key, n. gen.); 1941: 22 (key). – Froeschner, 1949: 128 (key). – Carvalho, 1952: 63 (cat.); 1955: 45 (key); 1958: 53 (cat.). – Knight, 1968: 25 (key). – Kelton, 1980: 291, 331 (key, descr.). – Henry and Wheeler, 1988: 469 (cat.). Type species: *Sthenarus rubidus* Uhler. NEW SYNONYMY. *Microphylidea* Knight, 1968: 29 (n. gen.). – Henry and Wheeler, 1988: 476 (cat.). Type species: *Microphylidea prosopidis* Knight. NEW SYNONYMY.

DIAGNOSIS: Recognized by the appressed, scalelike setae on the dorsum, thoracic pleura, and lateral margins of the abdominal sterna; the dispersed row of spinules dorsally on the distal third to one-half of the metafemur (figs. 82–89); the pretarsal claws with large pulvilli, sometimes covering most of ventral claw surface—outer, basoventral surface of claw usually with well developed “claw hairs” (figs. 108–114); and vesica of male genitalia with simple, strongly twisted, vesical strap, apical or subapical gonopore, and variously developed sclerite suspended below gonopore, usually with distinctive field of spines (figs. 116–162).

DESCRIPTION: *Male.* Macropterous with compact or elongate body form; length from apex of tylus to cuneal fracture 1.56–3.05; width across humeral angles of pronotum 0.79–1.44; general coloration variable, usually dark reddish brown to black, sometimes yellow or brownish yellow with darker markings or suffusion, rarely broadly suffused with red or reddish orange; dorsal vestiture with light or dark simple setae, and narrow to broad, appressed, silvery white, scalelike setae, sometimes restricted to pronotal disk and anterior third to one-half of hemelytra, or rarely limited to anterior margin of pronotal disk and anterior margins of clavus; scalelike setae totally wanting in *chiapas* and *polymorphae*; hemelytral membrane rarely with limited to moderate distribution of scalelike setae (figs. 12, 13—see Introduction for discussion of fine structure of scalelike setae). **Head:** Short to moderately produced anteriorly in dorsal view; slightly to strongly produced anteriorly of antennae fossae in lateral view; posterior margin broadly concave to nearly straight, conforming to anterior margin of pronotum, with posterolateral margins of eyes contiguous with anterolateral margins of pronotum, or in species with head weakly concave or nearly straight posteriorly, posterolateral margins of eyes distinctly removed from pronotum; vertex flattened or weakly convex, occupying from one-third to three-fifths of width of head across eyes; posterior margin sometimes with low, broad carina; frons moderately to steeply sloping anteriorly in lateral view, junction with tylus indistinct; tylus weakly to moderately pro-

duced; eyes relatively large (except *balli*), occupying at least two-thirds of height of head in lateral view, sometimes nearly entire height of head; antennae inserted near ventral margin of eye, or sometimes slightly higher, rarely inserted at level slightly below ventral margin of eye; antennal segment I short, sometimes slightly narrowed distally, length usually equal to or less than half height of eye; antennal segment II linear, or weakly clavate or fusiform, diameter similar to that of segment I, or sometimes weakly to strongly inflated; diameter of antennal segments III and IV much smaller than that of segment II; all antennal segments with short, simple setae, segment I with several stout bristles on innerdorsal surface, segments I and II sometimes with longer, heavier, generally distributed, bristlelike setae; genae broadly developed to nearly obsolete; gula narrow or broad; buccal cavity large, subspherical or ovate; labium reaching from apex of mesosternum to slightly beyond metacoxae. **Pronotum:** Trapezoidal, usually about twice as broad as long, moderately to strongly narrowed anteriorly; disk weakly convex, without distinct anterior and posterior lobes, posterior margin nearly straight or weakly concave medially, lateral margins straight, posterolateral angles broadly rounded; calli weakly differentiated; mesonotum moderately to broadly exposed; scutellum weakly convex, or sometimes broadly flattened anteromedially; thoracic pleura usually with generally distributed scalelike setae; peritremal disk sometimes noticeably paler than surrounding sclerites. **Hemelytra:** Parallel-sided or weakly to moderately rounded laterally; embolium uniformly narrow, obscured distally; cuneal incisure distinct, fracture slightly angled anteromedially; cuneus about as long as broad to nearly twice as long as broad (length measured from cuneal fracture to apex, width measured laterally from fracture to commissure of paracuneus and hemelytral membrane); membrane lightly to heavily suffused with fuscous, veins usually pale. **Legs:** Coloration variable; femora elongate, usually slightly broader medially, sometimes with broadly distributed scalelike setae, rarely restricted to ventral surface, dorsodistal surface of metafemora with irregular row of spinules; tibiae cylindrical, tibial spines pale or dark;

pretarsal claws straight or weakly curved dorsally, moderately to sharply bent distally, pulvilli large, sometimes covering most of ventral claw surface; outer, basoventral surface of claw usually with well developed claw hairs; parempodia setiform. **Genitalia:** *Right paramere:* simple, ovate to slightly elongate, with distinct apical process. *Left paramere* (figs. 163–173): anterior and posterior processes well developed; anterior process sometimes with transverse ridge medially and excavated ventrally, sometimes flattened dorsoventrally and broadly produced in dorsal view. *Phallosome* (figs. 174–184): strongly curved distally, usually L-shaped, or sometimes nearly J-shaped; apical curved region narrow to moderately broad, sometimes with surface irregularities, ventral surface with narrow, slitlike opening, apex acute or narrowly rounded. *Vesica* (figs. 116–162): composed of a single straplike sclerite without ornamentation distally; vesical strap usually strongly twisted medially with distal region more or less perpendicular to base, usually coiled (cobralike) in appearance, but rarely less strongly twisted and appearing S-shaped; gonopore apical or subapical, narrowly to broadly developed in lateral view, subspherical to elongate in frontal view; gonopore subtended by variously developed sclerite suspended in surrounding membrane; gonopore sclerite usually well sclerotized, elongate, and with distinct field of spines—sometimes shortened, or weakly sclerotized, or with spines restricted to narrow region below gonopore, or rarely without spines.

Female. Macropterous. Similar to male in color, structure, and vestiture, but usually more strongly ovoid, and sometimes with slightly to strongly shortened hemelytral membrane; eyes slightly smaller than for male, with correspondingly broader vertex and genae; antennae variable, usually weakly to strongly clavate, sometimes moderately to strongly inflated (often more so than for male) and fusiform.

DISTRIBUTION: Holarctic, ranging from Scandinavia to the Mediterranean, and east to Korea in the Palearctic; and from central Canada to south-central Mexico in the Nearctic.

The Palearctic species of the *magnicornis* group are all broadly distributed, with the

exception of *marcoi* and *persquamosus*, which have more limited distributions in the Mediterranean region. In contrast, the majority of Nearctic species have rather restricted distributions. The few broadly distributed North American species (*atricolor*, *balli*, *miniatus*, and *rubidus*) tend to be inhabitants of widely distributed hosts (e.g., *Quercus* spp., *Salix* spp.), or in the case of *balli*, apparently polyphagous on a number of similar host plants.

DISCUSSION: The nominal genera *Microphylidea* and *Lepidopsallus* are proposed as new synonyms of *Atractotomus* based on the structure of the vesica of the male genitalia, and the irregular row of minute spines on the dorsodistal surface of the metafemora. Including the type species, nine species originally described in *Lepidopsallus* are here transferred to *Atractotomus*. The remaining eight species of *Lepidopsallus* are placed in the genus *Phoenicocoris* (see section on revised combinations). The only other species of *Microphylidea* (*pallens* Knight, 1968) is proposed as a new junior synonym of *Europiella pilosula* (Uhler).

Even though figure 185 shows clades which include the type species of three valid genera, I have chosen not to recognize two of those clades as genera, because the character support for them in the present analysis is not nearly so strong as it is for the entire grouping I refer to as *Atractotomus*. Furthermore, the diagnoses of the groups by previous workers has been so badly flawed that there has been no uniform conception of them. Thus, it seems practical to recognize a more inclusive *Atractotomus*, all of whose members share a number of characters, rather than apply all possible existing generic names.

The position of *Atractotomus* within the Phylini is uncertain and requires further investigation. My preliminary study of phylines with scalelike setae revealed that the vesica of *Atractotomus* is very similar to that of *Beamerella*, *Megalopsallus*, *Merinocapsus*, *Phoenicocoris*, and some species of *Europiella* and *Heterocapillus* (see Discussion of Characters). A similar type of vesica also was noted in the South African genera *Capecapsus* Schuh, *Coatonocapsus* Schuh, and *Psalomimus* Wagner, in several Chilean species of uncertain generic placement, and in *Sthenarus myersi* Woodward from New Zealand.

Within this group of genera, only *Phoenicocoris* and *Atractotomus* have an irregular row of spines on the metafemur, which suggests a sister-group relationship. However, *Atractotomus* shares a genitalic feature with *Beamerella* and at least some species of *Megalopsallus* (i.e., vesica with spines on gonopore sclerite), which is not found in *Phoenicocoris*. Other genitalic features and structures of the external morphology appear to support the sister group relationship of *Phoenicocoris* with *Atractotomus* rather than an *Atractotomus* + *Beamerella* + *Megalopsallus* clade. Clearly, a more precise phylogenetic placement of *Atractotomus* cannot be accomplished without a comprehensive study of characters in the above group of seemingly related taxa.

Three species groups are recognized for the 37 species of *Atractotomus*, which correspond to the major groupings identified in the phylogenetic analysis (see Phylogenetic Analysis section). Host plant associations are for the most part congruent with groupings formed on the basis of morphological features (see Host Analysis section).

CHECKLIST OF NAMES USED IN *ATRACTOTOMUS*

(boldface = species currently recognized in *Atractotomus*; italics = species moved to other genera; * = new placement or designation)

acaciae Knight

agrifoliae, new species

albidicoxis Reuter

albipennis Reuter, see *Dacota* Uhler

albipes Fieber, syn. of *Phoenicocoris obscurellus* (Fallén)

amygdali Wagner, species *incertae sedis**

apicalis Reuter, see *Criocoris* Fieber

arizonae Knight

atricolor Knight (*Lepidopsallus*)*

balli Knight

brevicornis Reuter, see *Heterocapillus* Wagner

brunomassai Carapezza, syn. of *persquamosus* Seidenstücker*

californicus Knight (*Lepidopsallus*), syn. of *balli* Knight*

cercocarpi Knight

chiapas, new species

collinus Van Duzee, see *Campylomma* Reuter

cooperi, new species

coxalis Reuter, see *Druthmarus* Distant

crataegi, see *Phoenicocoris* Reuter*

crinicornis Burmeister (*Capsus*), syn. of *magnicornis* (Fallén)
debilicornis Reuter, syn. of *kolenatii* (Flor)
egregius Berg, see *Bergmiris* Carvalho
femoralis Fieber, nomen dubium*
forticornis Mulsant and Rey (*Capsus*), syn. of *mali* (Meyer-Dür)
fuscinervis Reuter, syn. of *Psallus ancorifer* (Fieber)
genistae Lindberg, see *Heterocapillus* Wagner
hesperius Reuter, see *reuteri* Knight
hesperius Uhler (*Dacota*), see *Dacota* Uhler
iturbide, new species
jalisco, new species
kolenatii Flor (*Capsus*)*
magnicornis Fallén (*Capsus*)
mali Meyer-Dür (*Capsus*), species incertae sedis*
malinellus Pommerol (*Reduvius*), syn. of *mali* (Meyer-Dür)
marcoi Carapezza
miniatus Knight (*Lepidopsallus*)*
mirificus Woodroffe, syn. of *parvulus* Reuter*
mitla, new species
monticola Knight (*Lepidopsallus*), syn. of *albido-coxis* Reuter*
morelos, new species
morio Sahlberg
nicholi Knight (*Atractotomus*)
nicholi Knight (*Lepidopsallus*), syn. of *ovatus* (Knight)*
nigripennis Schuh and Schwartz (*Rhinacloa*)*
nigripes Fieber, syn. of *Psallus ancorifer* (Fieber)
nigritarsis Jakovlev, see *Dacota* Uhler
nitidus Horváth, see *Heterocapillus* Wagner
nyssae Johnston (*Lepidopsallus*), syn. of *miniatus* (Knight)*
oaxaca, new species
oculatus Kirschbaum (*Capsus*), syn. of *Phoenicocoris obscurellus* (Fallén)
ovatus Knight (*Lepidopsallus*)*
pallidus, new species
parvulus Reuter
persquamosus Seidenstücker
pici Reuter, see *Heterocapillus* Wagner
pini Douglas and Scott, syn. of *Phoenicocoris obscurellus* (Fallén)
planicornis Kolenati (*Phytocoris*), syn. of *magnicornis* (Fallén)
polymorphae, new species
prospidid Knight (*Microphylidea*)*
punctipes Fieber, see *Excentricoris* Carvalho
purshiae Froeschner, syn. of *balli* Knight*
putoni Reuter, syn. of *mali* (Meyer-Dür)
pyri Meyer-Dür (*Capsus*), syn. of *mali* (Meyer-Dür)
quercicola, new species
quercinus, new species
ramentum, new species

reuteri Knight, new name for *hesperius* Reuter
rhodani Fieber, species incertae sedis*
rubidus Uhler (*Sthenarus*)*
rubrolineatus Matsumura, see *Amphicapsus* China
rufus Fieber, syn. of *mali* (Meyer-Dür)
russatus, new species
schaffneri, new species
schmiedeknehti Reuter, see *Heterocapillus* Wagner
schwartzi, new species
seorsus Odhiambo, see *Atractotomellus* Linnavuori
spissicornis Schrank (*Cimex*), nomen dubium*
striatus Wagner, see *Opisthotaenia* Reuter
sulcicornis Kirschbaum (*Capsus*), see *Criocoris* Fieber
taxcoensis, new species
tigripes Mulsant and Rey (*Capsus*), type species of *Heterocapillus* Wagner
tuthilli Knight (*Lepidopsallus*)*
validicornis Reuter, see *Heterocapillus* Wagner
validus Reuter, see *Heterocapillus* Wagner
vinaceus Buchanan-White, see *Neisopsallus* Schmitz
vireti Wagner, species incertae sedis*

REVISED COMBINATIONS FOR NAMES
 USED IN *LEPIDOPSALLUS*
 (* = new combination)

atricolor Knight, as variety of *rubidus* (Uhler), see *Atractotomus*
australis Blatchley, see *Phoenicocoris**
californicus Knight, see *Atractotomus*
claricornis Knight, see *Phoenicocoris**
hesperus Knight, see *Phoenicocoris**
longirostris Knight, see *Phoenicocoris**
miniatus Knight, see *Atractotomus*
minuscule Knight, see *Phoenicocoris**
monticola Knight, see *Atractotomus*
nicholi Knight, see *Atractotomus*
nyssae Johnston, see *Atractotomus*
olseni Knight, see *Phoenicocoris**
ovatus Knight, see *Atractotomus*
pini Knight, see *Phoenicocoris**
pusillus Knight, syn. of *Rhinacloa basalis* Reuter
rostratus Knight, see *Phoenicocoris**
rubidus Uhler (*Sthenarus*), see *Atractotomus*
tuthilli Knight, see *Atractotomus*

KEY TO MALES OF NEARCTIC
ATRACTOTOMUS

1. Hind femora with moderate to dense covering of appressed, scalelike setae (figs. 81, 82), or rarely with scalelike setae restricted to ventral surface of femora

- (fig. 91) 2
- Hind femora without scalelike setae . . 10
- 2(1). Hemelytral membrane with scalelike setae, usually most abundant inside areolar cells and along veins (fig. 13) . . 3
- Hemelytral membrane without scalelike setae 4
- 3(2). Antennal fossae nearly contiguous with anteroventral margin of eye; length of antennal segment II slightly greater than width of head across eyes; peritremal disk and coxae pale 4
- *taxcoensis*, new species
- Antennal fossae removed from anteroventral of eye by distance equal to or greater than diameter of antennal segment I (fig. 7); length of antennal segment II much less than width of head across eyes (ratio—0.46:1 to 0.62:1); peritremal disk and coxae dark, or disk rarely somewhat paler than adjacent thoracic sclerites *balli* Knight
- 4(2). Hind femora with scalelike setae restricted to narrow band on ventral surface (fig. 91) *tuthilli* (Knight)
- Hind femora with more or less generally distributed scalelike setae (figs. 81, 82) 5
- 5(4). Tibiae uniformly dark reddish brown or black, never paler than adjoining femora; antennal segment III uniformly darkened, without pale region basally; dorsum uniformly dark brown or black, without red or yellow markings . . . 6
- Tibiae, at least distally, yellow or brownish yellow, rarely somewhat darker, but always paler than adjoining femora; antennal segment III uniformly pale yellow to yellowish brown, or with distinct pale region basally; dorsal coloration variable, usually with at least bases of corium and clavus, embolium, and cuneus yellowish brown or red 8
- 6(5). Antennal segment II strongly inflated, greatest thickness nearly twice that of segment I (fig. 41); length of gonopore sclerite in lateral view approximately 1.5 times that of the gonopore (figs. 140, 141) *reuteri* Knight
- Antennal segment II linear or weakly clavate, not strongly inflated, greatest thickness rarely little more than that of segment I (figs. 18, 22); length of gonopore sclerite in lateral view approximately twice that of the gonopore (figs. 120, 121, 123, 124) 7
- 7(6). Ratio of length of antennal segment II to width of head across eyes from 0.85:1 to 0.92:1; vesica as in figures 120 and 121, spinose field on gonopore sclerite usually broad proximally *arizonae* (Knight)
- Ratio of length of antennal segment II to width of head across eyes from 0.73:1 to 0.80:1; vesica as in figures 123 and 124, spinose field on gonopore sclerite usually narrow proximally *cercocarpi* Knight
- 8(5). Ratio of length of antennal segment II to width of head across eyes from 0.86:1 to 0.90:1; vesica as in figure 160, with short gonopore sclerite, and gonopore well removed from apex of vesical strap *ramentum*, new species
- Ratio of length of antennal segment II to width of head across eyes from 0.72:1 to 0.83:1; vesica either with long gonopore sclerite (fig. 162), or gonopore located near apex of strap (fig. 122) . . 9
- 9(8). Vesical strap distad of medial coil elongate, gonopore removed from apex, gonopore sclerite with elongate row of evenly distributed spines (fig. 162) . . . *rubidus* (Uhler)
- Vesical strap distad of medial coil short, gonopore near apex, gonopore sclerite with spines mostly restricted to distal half (fig. 122) *atricolor* (Knight)
- 10(1). Hemelytral membrane with widely distributed scalelike setae (fig. 12) *acaciae* Knight
- Hemelytral membrane without scalelike setae 11
- 11(10). Dorsum without scalelike setae . . . 12
- Dorsum with scalelike setae, sometimes restricted to anterior margin of pronotal disk and bases of clavus and corium 13
- 12(11). Head, pronotum, and base of hemelytra yellowish orange, sometimes tinged with red; remainder of hemelytra shiny black; ratio of width of vertex to width of head across eyes from 0.48:1 to 0.51:1 . . . *chiapas*, new species
- Head, pronotum, and hemelytra uniformly reddish brown; ratio of width of vertex to width of head across eyes from 0.36:1 to 0.40:1 *polymorphae*, new species
- 13(11). Hemelytra with light and dark scalelike setae *nicholi* Knight
- Hemelytra with silvery white scalelike setae only 14
- 14(13). Antennal segment II yellow or brownish yellow, rarely with apex narrowly darkened 15

- Antennal segment II brown or black 24
- 15(14). Head mostly yellow or brownish yellow, sometimes with limited fuscous markings 16
- Head mostly brown or fuscous, posterior region of vertex sometimes lighter yellowish brown 17
- 16(15). Head with fuscous spot bordering anterior margin of antennal fossae; apex of tylus usually infuscated; antennal segment II uniformly pale or sometimes narrowly infuscated basally; vesica as in figure 153 ... *pallidus*, new species
- Head without fuscous markings; antennal segment II usually infuscated distally; vesica as in figure 136 *prospidus* (Knight)
- 17(15). Scalelike setae on dorsum narrow, with weakly elevated, converging ridges and acute apex (fig. 64); gonopore sclerite with strong spines mostly restricted to distal half (fig. 147); inhabits *Abies* ... *cooperi*, new species
- Scalelike setae on dorsum broad, with strongly elevated, parallel ridges and serrate apex (fig. 70); gonopore sclerite without spines, or with weak, widely spaced spines, rarely with slightly stronger spines distributed along entire length of sclerite; inhabits *Quercus* ... 18
- 18(17). Hemelytra without scalelike setae, or rarely with scattered scalelike setae along anterior margins of clavus only; vesica as in figures 142 and 143 (see species diagnosis) *schaffneri*, new species
- Hemelytra, at least on anterior third, with evenly distributed scalelike setae ... 19
- 19(18). Gonopore sclerite without spines, or rarely with several weak spines on distal surface below gonopore (figs. 117, 131, 152) 20
- Gonopore sclerite with spines, sometimes small and widely spaced, but never restricted to region bordering gonopore (figs. 126, 138, 139, 154) 22
- 20(19). Ratio of width of vertex to width of head across eyes from 0.37:1 to 0.43:1; gonopore sclerite short, weakly sclerotized (figs. 131, 152) 21
- Ratio of width of vertex to width of head across eyes from 0.46:1 to 0.50:1; gonopore sclerite long, heavily sclerotized (fig. 117) *agrifoliae*, new species
- 21(20). Ratio of length of antennal segment II to width of head across eyes from 0.85:1 to 1.00:1; vesical strap broadly curved beyond middle, gonopore spherical (fig. 152) *ovatus* (Knight)
- Ratio of length of antennal segment II to width of head across eyes from 1.00:1 to 1.10:1; vesical strap abruptly twisted medially, gonopore obovate (fig. 131) *miniatus* (Knight)
- 22(19). Gonopore sclerite with closely set, coarse spines (fig. 154) *quercinus*, new species
- Gonopore sclerite with widely spaced, fine spines, rarely restricted to distal third of sclerite (figs. 126, 138) 23
- 23(22). Piceous general coloration; spines on gonopore sclerite pointing upward; gonopore well removed from apex of vesical strap, usually by distance equal to its length in lateral view (fig. 126) *iturbide*, new species
- Brownish red general coloration, anterior lobe of pronotum sometimes piceous; spines on gonopore sclerite pointing downward; gonopore near apex of vesical strap, never removed by distance greater than half its length in lateral view (figs. 138, 139) *quercicola*, new species
- 24(14). Hemelytra uniformly reddish orange, or moderately to extensively suffused or marked with red on pale grayish yellow background 25
- Hemelytra dark reddish brown or black 26
- 25(24). Hemelytra uniformly reddish orange, sometimes faintly overcast with fuscous; vesica as in figure 159 (see species diagnosis); length from apex of tylus to cuneal fracture 2.55–2.67 *russatus*, new species
- Hemelytra grayish yellow with faint reddish orange blotches, or sometimes extensively suffused with red; vesica as in figures 127 and 128 (see species diagnosis); length from apex of tylus to cuneal fracture 2.05–2.08 *jalisco*, new species
- 26(24). Peritremal disk white or yellowish white 27
- Peritremal disk reddish brown to black 28
- 27(26). Apex of propleura pale; basal third to one-half of hind femora brownish yellow, distal region brown or dark brown; gonopore sclerite with widely spaced, fine spines (fig. 134); length from apex of tylus to cuneal fracture 2.21–2.38 *oaxaca*, new species
- Propleura and hind femora uniformly

- brown to dark fuscous; gonopore sclerite with close set, coarse spines (fig. 119); length from apex of tylus to cuneal fracture 2.40–3.05 ... *albidicoxis* Reuter
- 28(26). Scalelike setae on dorsum broad, with mostly parallel ridges and serrate apex (figs. 66, 68, 74); inhabits woody shrubs 29
- Scalelike setae on dorsum narrow, ridges mostly converging, apex acute (figs. 64, 65); inhabits conifers 32
- 29(28). Length from apex of tylus to cuneal fracture 2.65–2.92; vesica as in figure 132 (see species diagnosis) *morelos*, new species
- Length from apex of tylus to cuneal fracture 1.46–2.38 30
- 30(29). Ratio of length of antennal segment II to width of head across eyes 1.05:1 (holotype); length from apex of tylus to cuneal fracture 2.38 (holotype) *mitla*, new species
- Ratio of length of antennal segment II to width of head across eyes from 0.75:1 to 0.84:1; length from apex of tylus to cuneal fracture 1.46–2.15 31
- 31(30). Ratio of width of vertex to width of head across eyes from 0.46:1 to 0.48:1; vesica as in figure 133 (see species diagnosis); length from apex of tylus to cuneal fracture 1.46–1.74 *nigripennis* (Schuh and Schwartz)
- Ratio of width of vertex to width of head across eyes from 0.55:1 to 0.57:1; vesica as in figure 161 (see species diagnosis); length from apex of tylus to cuneal fracture 1.91–2.15 *schwartzi*, new species
- 32(28). Ratio of width of vertex to width of head across eyes from 0.32:1 to 0.37:1; labium reaching beyond posterior margin of metacoxae; vesica with narrow strap and gonopore, gonopore sclerite without spines (fig. 129) ... *kolenatii* (Flor)
- Ratio of width of vertex to width of head across eyes from 0.38:1 to 0.48:1; labium not reaching beyond posterior margin of metacoxae; vesica with broad strap and gonopore, gonopore sclerite densely spinose 33
- 33(32). Ratio of width of vertex to width of head across eyes from 0.44:1 to 0.48:1; gonopore sclerite with spines mostly restricted to distal half (fig. 147) *cooperi*, new species
- Ratio of width of vertex to width of head across eyes from 0.38:1 to 0.43:1; gonopore sclerite with spines distributed

along entire length (fig. 148) *magnicornis* (Fallén)

KEY TO MALES OF PALEARCTIC *ATRACTOTOMUS*

1. Hemelytral membrane without scalelike setae 2
- Hemelytral membrane with scalelike setae, sometimes clustered near distal curve of areolar vein *persquamosus* Seidenstücker
- 2(1). Length of antennal segment II less than to slightly greater than width of head across eyes—ratio 0.88:1 to 1.08:1 ... 3
- Length of antennal segment II noticeably greater than width of head across eyes—ratio 1.17:1 to 1.58:1 4
- 3(2). Posterior margin of head weakly concave in dorsal view; vesica as in figure 150, with thin secondary gonopore, and short, nonspinose gonopore sclerite ... *marcoi* Carapezza
- Posterior margin of head nearly straight in dorsal view; vesica as in figures 157 and 158, with thicker secondary gonopore, and long gonopore sclerite bearing several weak spines distally *parvulus* Reuter
- 4(2). Length from apex of tylus to cuneal fracture 3.04–3.30; antennal segment II gradually thickened distally—length 1.22–1.33; pretarsus with long, narrow claws and minute pulvilli; vesica as in figure 149 *morio* Sahlberg
- Length from apex of tylus to cuneal fracture 2.29–2.58; antennal segment II uniformly narrow beyond basal constriction, not inflated distally—length 0.88–1.04; pretarsus with short, thickened claws and large pulvilli 5
- 5(4). Diameter of antennal segment II only slightly greater than that of foretibiae; vesica as in figure 129 *kolenatii* (Flor)
- Diameter of antennal segment II noticeably greater than that of foretibiae; vesica as in figure 148 *magnicornis* (Fallén)

Atractotomus acaciae Knight

Figures 6, 12, 14, 62, 108, 116, 163

Atractotomus acaciae Knight, 1925: 34 (n. sp.). – Carvalho, 1958: 15 (cat.). – Froeschner, 1963: 3 (key, note). – Knight, 1968: 57 (key, note). – Henry and Wheeler, 1988: 459 (cat.).

DIAGNOSIS: Recognized by the scalelike setae on the hemelytral membrane (fig. 12); hind femora without scalelike setae; peritremal disk and coxae pale; and the structure of the male genitalia, especially the vesica with apical gonopore and elongate gonopore sclerite (fig. 116), and left paramere with elongate anterior process (fig. 163). Distinguished from the closely related species, *taxcoensis*, by the narrower scalelike setae on the dorsum; femora without scalelike setae; and the structure of the vesica and left paramere.

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.56–2.22. **Dorsal Aspect:** General coloration variable—lightest specimens with grayish yellow or brownish yellow ground color; calli dark fuscous; pronotum behind calli, base of scutellum, inner half of clavus, and posteromedial region of corium broadly suffused with fuscous, sometimes heavily so; cuneus usually tinged with red, at least basally; darkest specimens nearly entirely dark fuscous, with only apex of scutellum, base of corium, and sometimes narrow, outer margin of clavus grayish yellow; vestiture with golden to dark brown, simple setae and uniformly distributed, broad, scalelike setae. **Head:** Coloration variable—lightest specimens with brownish yellow or grayish yellow ground color; jugum, lorum, and frons, except medially, broadly suffused with reddish brown or fuscous; tylus marked with red or reddish brown, especially basally and apically; darkest specimens uniformly black; width across eyes 0.60–0.72; width of vertex 0.27–0.33; ratio of vertex width to head width 0.43:1 to 0.47:1; moderately produced antieriad of antennal fossae; posterior margin weakly concave, not noticeably carinate; vertex flattened; eyes occupying about three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennal segments I and II reddish brown to black, segments III and IV brownish yellow, sometimes lightly tinged with red; antennal segment II moderately to strongly inflated, fusiform, often slightly broader basally than distally, length 0.44–0.65; ratio of length of antennal segment II to head width 0.69:1 to 0.94:1; genae and gula moderately developed; labium reaching from apex of mesosternum to middle of mesocox-

ae. **Pronotum:** Posterior width 0.79–1.06; peritremal disk grayish white or brownish yellow, sometimes lightly to moderately suffused with red or fuscous dorsad of ostiole. **Hemelytra:** Weakly rounded laterally; cuneus about a third again as long as broad; membrane moderately to heavily suffused with fuscous, and with broadly distributed, scalelike setae, veins pale, sometimes darkened basally, or lightly tinged with red. **Legs:** Brownish yellow or yellowish brown; femora lightly to moderately suffused with fuscous dorsally and distally, usually also with fuscous spots laterally, especially on distal third; tibiae sometimes marked with red or fuscous, mostly on basal third, usually with dark spots at spine bases; tibial spines black; tarsal segment III and pretarsus brown or dark brown. **Genitalia:** Figures 116 and 163. Vesica with apical gonopore and elongate gonopore sclerite (fig. 116).

Female. Similar to male in general appearance, but usually slightly more ovoid, and sometimes with hemelytral membrane slightly shortened; antennal segment II moderately to strongly inflated.

DISTRIBUTION: Southwestern United States and northern Mexico.

DISCUSSION: Although the size and general coloration of *acaciae* are quite variable (see Description), the species is easily recognized by the characters given in the preceding diagnosis. The second antennal segment is noticeably inflated, with the diameter ranging from slightly greater than that of antennal segment I to nearly twice that of segment I for some females (fig. 14).

Atractotomus acaciae has been collected on *Acacia greggii* A. Gray, *A. rididula* Benth., *Cercidium microphyllum* (Torr.) Rose & Jtn., *Prosopis glandulosa* Torrey, *P. juliflora* (Swartz) DC., and *Rhamnus* sp.

SPECIMENS EXAMINED: 606 specimens collected between March 23 and June 21 from the following localities: USA. – **Arizona:** *Cochise Co.:* Douglas; Huachuca; Huachuca Cyn., Fort Huachuca, 18 June 1915 (1♀ paratype); 4 mi E of Willcox; 1 mi E of Douglas; 4 mi NE of Apache; 19 mi SW of Apache; 0.5 mi E of Portal, 1450 m; Portal, 1500 m. *Gila Co.:* Rye, 3200 ft; Pinal Crk., Globe, 4000 ft; Fish Crk., Tonto Nat. For.; 10.5 mi N of Globe; 7 mi E of Globe on Rt. 70, 3500

ft; 14 mi N of Roosevelt Dam on Rt. 188, 2200 ft; 5.5 mi W of Roosevelt Dam, Apache Lk., 1750 ft; 2.6 mi W of Roosevelt Dam on Rt. 88, 2000 ft. *Graham Co.*: Bonita, 4500 ft; 3 mi W of Rt. 666 on Rt. 266, 4000 ft; Stockton Pass, Pinaleno Mts., 5200–5500 ft. *Maricopa Co.*: Fish Crk., W of Tortilla Flat; 1.3 mi E of Tortilla Flat; Four Peaks Rd., mile 7; Sunflower; Salt R. Cyn. at Apache Lk., 2000 ft.; 5 mi S of Freeman, SE of Gila Bend, 625 m; Phoenix; Phoenix, Arizona Canal at McDowell Rd.; 1.8 mi W of Roosevelt on Hwy. 88. *Mohave Co.*: Burro Crk. Cmpgd. on Rt. 93, T14N R11W, 2500 ft. *Pima Co.*: Santa Rita Mts., Madera Cyn.; Tortolito Mts., 2500–3000 ft; 7.5 mi S of Coronado Nat. For. Boundary on Mt. Lemmon Rd., 4700 ft; Sabino Cyn., Santa Catalina Mts.; Rincon Mts., 3300 ft; Tucson (including 1♂, 3♀, 31 May 1924 and 2♂, 2♀, 7 June 1924, paratypes); Ft. Lowell, Tucson; NW of Tucson on Old Father Rd., 2500 ft. *Pinal Co.*: 7 mi W of Superior, 2500 ft; 5.7 mi N of Apache Jct. *Santa Cruz Co.*: Santa Rita Mts., 4000 ft. *Yavapai Co.*: 4 mi SE of Mayer; 17 mi S of Bagdad at Jct. Rts. 93 and 97, T13N R9W, 2400 ft. *County ?*: Lewis Springs, 18 June 1915 (2♀ paratypes). *California*: *Imperial Co.*: E of Jct. Rt. S80 and Int. 8, 1 mi E of Coyote Wells. *Riverside Co.*: 8 mi N of Blythe; P. L. Boyd Desert Research Center, 3.5 mi S of Palm Desert. *San Bernardino Co.*: 16 mi SW of Baker, Basin Rd.; 1.5 mi W of Kramer Jct. *San Diego Co.*: Anza-Borrego St. Pk., Palm Cyn. Trail, 600 ft; Carrizo Crk., 10.2 mi NW of Ocotillo on Rt. S2; 5 mi E of Ocotillo Wells; 9.3 mi NW of Sissors X [crossing?] on Rt. S2. *New Mexico*: *Eddy Co.*: Carlsbad Cavern; Black R. at Hwy. 396, W of Malaga. *Guadalupe Co.*: Cuervo. *Hidalgo Co.*: wash at Cienega. *Otero Co.*: Three Rivers. *Texas*: *Brewster Co.*: Big Bend Nat. Pk., Dagger Flats, 3500 ft; Rt. 385, 5 mi N of Big Bend Nat. Pk. *El Paso Co.*: El Paso. *Frio Co.*: 10 mi N of Pearsall. *Jim Wells Co.*: 1.4 mi S of Pre-mont. *San Patricio Co.*: 4 mi SW of Mathis. *Terrell Co.*: 23 mi SE of Dryden. *Val Verde Co.*: Del Rio. *Utah*: *Washington Co.*: Santa Clara on Rt. 56, T42S R16W, 2800 ft. **MEXICO**. – **Baja California Norte**: 51 km W of Bahia Los Angeles, 470 m. **Baja California Sur**: 7.0 and 9.2 mi SE of Guerrero Negro. **Hidalgo**: 2 mi N of Zimapan. **Sonora**: 40 mi

W of Moctezuma. Deposited in the collections of the AMNH, CAF&A, CAS, CNC, JTP, KU, OSU, TA&M, UCB, UCR, and USNM.

Atractotomus agrifoliae, new species

Figures 15, 80, 109, 110, 117, 118, 166, 175

DIAGNOSIS: Within the group of oak-inhabiting species recognized by the brown to fuscous head, antennal segment II uniformly pale and not or only weakly inflated, and gonopore sclerite usually without or with limited spines (see also characters in phylogenetic analysis), *agrifoliae* is distinguished by the reddish brown general coloration; broad vertex (ratio of vertex width to width of head across eyes from 0.48:1 to 0.50:1); hemelytra, at least on anterior half, with evenly distributed, scalelike setae; and vesica with long, heavily sclerotized gonopore sclerite, without spines, or rarely with several weak spines below gonopore (figs. 117, 118).

DESCRIPTION: *Male*. Length from apex of tylus to cuneal fracture 1.88–2.28. **Dorsal Aspect**: Yellowish brown or pale grayish brown, to nearly fuscous; lighter specimens broadly tinged with red, especially on cuneus, and usually with head, collar and calli reddish brown or fuscous; pronotum sometimes more broadly darkened posteriad of calli; dorsal vestiture with golden to dark brown, simple setae and moderately broad, scalelike setae. **Head**: Reddish brown, vertex sometimes brownish yellow; width across eyes 0.68–0.79; width of vertex 0.34–0.38; ratio of vertex width to head width 0.48 to 0.50:1; weakly produced anteriad of antennal fossae; posterior margin slightly concave, with low, broad carina between eyes; eyes occupying about three-fourths of head height in lateral view; antennae pale yellow, inserted at level of ventral margin of eye; antennal segment II weakly clavate, length 0.54–0.67; ratio of length of antennal segment II to width of head across eyes 0.78:1 to 0.89:1; genae moderately developed; gula narrow; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum**: Posterior width 1.04–1.25; peritremal disk dark reddish brown. **Hemelytra**: Weakly rounded laterally; cuneus about a third again as long as broad; membrane moderately suffused with

fuscous, veins reddish yellow or brownish yellow. **Legs:** Femora reddish brown to piceous, yellow or brownish yellow apically, or sometimes more broadly pale distally; tibiae pale yellow with faint dark spots at spine bases; tibial spines black; tarsi pale; pretarsus brown. **Genitalia:** Figures 117, 118, 166, and 175. Gonopore sclerite of vesica without spines, or rarely with several weak spines below gonopore (figs. 117, 118).

Female. Similar to male but more strongly ovoid, and with slightly shortened hemelytral membrane; antennal segment II weakly clavate, diameter of segment slightly less than for male.

ETYMOLOGY: Named for its primary host plant, *Quercus agrifolia* Nee.

DISTRIBUTION: Coastal mountain ranges of southwestern California and Baja California Norte.

DISCUSSION: This species also has been collected to a limited degree on *Quercus chrysolepis* Liebm. Several specimens from Pinyon Flat, San Jacinto Mts. (UCB collections) were reported from *Pinus monophylla* Torr. & Frem. and *Juniperus* sp., but these records are surely adventitious.

HOLOTYPE ♂: USA, California, San Diego Co., S1 at old Rt. 80, N of Morena Lk., 1000 m, 29 April 1985, ex. *Quercus agrifolia* var. *oxyadenia* (Torr.) Howell, R. T. Schuh and B. M. Massie (AMNH).

PARATYPES: USA. – **California:** *Riverside Co.:* 6♂, 32♀, Tenaja Rd., 3 mi W of Murrieta, 345 m, 12 May 1978, ex. *Quercus agrifolia*, J. D. Pinto and R. T. Schuh; 1♂, 8♀, 6 mi W of Murrieta, Santa Rosa Plateau Preserve, 625 m, 1 May 1985, ex. *Quercus engelmannii* Greene and *Q. dumosa* Nutt., R. T. Schuh and B. M. Massie. *San Bernardino Co.:* 1♂, 4♀, Mojave R. Forks Rec. Area, 9 mi S of Hesperia, 720 m, 2 May 1985, ex. *Quercus wizlenzii* A. DC. *San Diego Co.:* 35♂, 53♀, same data as holotype; 8♂, 2♀, Oak Grove, Oak G[rove]. C[amp]G[round]., Cleveland Nat. For., 22 April 1980, ex. *Quercus* sp., Russell and Schwartz. Deposited in the collections of the AMNH, TA&M, and USNM.

ADDITIONAL SPECIMENS: 91 specimens collected between April 6 and July 14 from the following localities: **MEXICO:** **Baja California Norte:** Sierra San Pedro Matir, slope NE of Vallecitos and Las Encinas; 8 mi E of Tecate. USA. – **California:** *Los Angeles Co.:*

Claremont; San Gabriel; Santa Monica. *Monterey Co.:* Bryson. *Orange Co.:* Cleveland Nat. For., El Cariso Cmpgd., 750 m; Lower Santa Ana Cyn., Green R. Camp; Santiago. *Riverside Co.:* Dripping Springs, T8S R1W S28; Menifee Valley (hills on W end), 33°39'N 117°13'W, 1800 ft; 3 mi NW of Murrieta; 4 mi NW of Murrieta, 1800 ft; San Jacinto Mts., Pinyon Flat; Tin Mine Cyn. 1250–1750 ft. *San Bernardino Co.:* 2 mi E of Camp Angelus. *San Diego Co.:* just S of Santa Ysabel, 1060 m. *San Luis Obispo Co.:* 12.3 mi E of Arroyo Grande, Huasna Valley, 310 m. *Santa Barbara Co.:* Upper Oso Cmpgd. off Rt. 154, 310 m. *Santa Cruz Island:* Central Valley; Field Stn.; Prisoner's Harbor. *Ventura Co.:* Oakview; Ojai. Deposited in the collections of the AMNH, CAF&A, CAS, SDNH, UCB, UCR, and USNM.

Atractotomus albidicoxis Reuter

Figures 16, 17, 63, 119

Atractotomus albidicoxis Reuter, 1909: 79 (n. sp.).

– Van Duzee, 1917: 414 (cat.). – Carvalho, 1958: 16 (cat.). – Froeschner, 1963: 3, 4 (key, type). – Knight, 1968: 56, 57 (key, note). – Henry and Wheeler, 1988: 459 (cat.).

Lepidopsallus monticola Knight, 1968: 51, 54, 55 (n. sp., key). – Henry and Wheeler, 1988: 470 (cat.). **NEW SYNONYMY.**

DIAGNOSIS: Recognized by the large size; dark brown to black general coloration, cuneus sometimes tinged with red; dark second antennal segment, sometimes moderately to strongly inflated, length of segment equal to or greater than width of head across eyes (see ratio below); peritremal disk and sometimes coxae white or yellowish white; and vesica with densely spinose gonopore sclerite (fig. 119).

REDESCRIPTION: *Male.* Length from apex to tylus to cuneal fracture 2.38–3.05. **Dorsal Aspect:** Dark fuscous general coloration, approaching black, sometimes lighter brown or yellowish brown along embolium and outer margin of clavus; cuneus often yellowish red to dark reddish brown; vestiture with dark, simple setae and densely distributed, moderately broad, scalelike setae (fig. 63). **Head:** Dark reddish brown or fuscous; jugum sometimes slightly paler; width across eyes 0.73–0.89; width of vertex 0.35–0.39; ratio of vertex width to head width 0.44:1 to 0.48:1;

moderately produced anteriad of antennal fossae; posterior margin weakly concave to nearly straight, not noticeably carinate; vertex flattened or weakly convex; eyes occupying about three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae narrowly removed from anteroventral margin of eye; antennae dark reddish brown to nearly black, segments III and IV sometimes slightly lighter than segments I and II; structure of antennal segment II variable, weakly inflated and nearly linear beyond basal constriction, to strongly inflated and fusiform (see figs. 16, 17), length 0.86–0.98; ratio of length of antennal segment II to head width 1.00:1 to 1.23:1; genae and gula moderately developed; labium reaching from apex of mesosternum to middle of mesocoxae. **Pronotum:** Posterior width 1.14–1.38; peritremal disk and sometimes coxae white or yellowish white. **Hemelytra:** Weakly rounded laterally to nearly straight; cuneus slightly longer than broad; membrane heavily suffused with fuscous, veins white, or sometimes lightly to moderately suffused with fuscous, especially basally. **Legs:** Reddish brown to dark fuscous, femora sometimes yellowish brown medially and ventrally; tibial spines black. **Genitalia:** Vesical strap robust; gonopore sclerite densely spinose (fig. 119).

Female. Similar to male in general appearance, but with even stronger dimorphism in antennal segment II.

DISTRIBUTION: Southeastern Arizona, southern Colorado, and New Mexico.

DISCUSSION: The thickness of the second antennal segment of *albidicoxis* is quite variable, ranging from not or only slightly inflated (diameter similar to that of segment I), and nearly linear beyond basal constriction, to strongly inflated (diameter twice that of segment I) and fusiform. At several localities in Arizona, individuals displaying the full range of antennal variation were collected simultaneously on *Robinia*. Knight (1968), apparently unaware of the variation in antennal thickness, described the species *monticola*, based on specimens with a narrow second antennal segment, and placed it in the genus *Lepidopsallus* because of the broad, scalelike setae on the dorsum. Ironically, a number of specimens with inflated antennae were collected with the *monticola* paratypes in the

Santa Rita Mts. in Arizona. These were identified by Knight as *albidicoxis*. Besides the variation in thickness of the second antennal segment, I have been unable to find any distinguishing differences between *monticola* and *albidicoxis* and thus propose the former species as a junior synonym of *albidicoxis*.

Atractotomus albidicoxis has been collected on *Robinia neomexicana* Gray and *R. pseudo-acacia* L.

SPECIMENS EXAMINED: 362 specimens collected between June 13 and Aug. 20 from the following localities: USA. – **Arizona:** *Apache Co.:* Alpine, 31 July 1941 (3♂, 3♀ paratypes, *monticola*). *Cochise Co.:* Chiricahua Mts.; 0.5 and 1.5 mi towards Portal from Onion Saddle, 2350 m; Rustler Pk., 2600 m; Cave Crk. Falls, 2150 m; 1.4 mi towards Rustler Pk. from Onion Saddle, 2400 m. *Coconino Co.:* Oak Crk. Cyn. at Pine Flats Cmpgd., T19N R6E Sec.22, 5500 ft; Williams. *Graham Co.:* Bonita, 17 July 1917 (2♀ paratypes, *monticola*); Bonita, Post Crk. Cyn., 16 July 1917 (4♀ paratypes, *monticola*); Graham Mts., 8000–9000 ft. *Pima Co.:* Santa Catalina Mts.: Mt. Lemon, 9000 ft, 27 July 1917 (1♂, 3♀ paratypes, *monticola*); Mt. Lemmon, 5500 ft, Bear Cyn.; Marshall Gulch, 7600 ft; Sabino Cyn., 7800 ft, 26 July 1917 (2♂, 5♀ paratypes, *monticola*). Rincon Mts., 8000–9000 ft, 5 July 1924 (1♂, 1♀ paratypes, *monticola*). *Santa Cruz Co.:* Santa Rita Mts., 7000–8000 ft, 15 June 1924 (9♂, 1♀ paratypes, *monticola*). *Yavapai Co.:* 3 mi SW of Prescott. **Colorado:** *Costilla/Huerfano Co.:* [La] Veta Pass, 9 Aug. 1925 (♀ allotype, 15♂, 20♀ paratypes, *monticola*). **New Mexico:** *Lincoln Co.:* Sierra Blanca Mt., 8600 ft. *Otero Co.:* Slide Group Cmpgd., Lincoln Nat. For.; 2 mi S of Cloudcroft. Deposited in the collections of the AMNH, KU, OSU, TA&M, UAZ, UCR, and USNM.

Atractotomus arizonae (Knight),
new combination
Figures 18, 120, 121

Lepidopsallus arizonae Knight, 1968: 51, 52 (n. sp., key). – Henry and Wheeler, 1988: 469 (cat.).

DIAGNOSIS: Recognized by the hind femora with broadly distributed scalelike setae; tibiae uniformly dark reddish brown or black; dorsum dark brown or black, without red or yellowish brown markings; antennal segment

II linear, with greatest thickness approximately equal to that of segment I; and structure of the male genitalia. Distinguished from the related species, *reuteri*, by the much narrower second antennal segment, and longer gonopore sclerite (figs. 120, 121); and from *cercocarpi* by the longer second antennal segment (see couplet 7 in key), and gonopore sclerite usually with broader field of spines proximally (fig. 121).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.06–2.31. **Dorsal Aspect:** Dark reddish brown to black general coloration; vestiture with dark, simple setae and densely distributed, broad, scalelike setae. **Head:** Uniformly dark reddish brown to dark fuscous; width across eyes 0.80–0.88; width of vertex 0.38–0.40; ratio of vertex width to head width 0.44:1 to 0.48:1; moderately produced anteriorly of antennal fossae; posterior margin weakly concave, not or only faintly carinate; vertex flattened, or slightly depressed posteriorly; eyes occupying about three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae narrowly removed from anteroventral margin of eye; antennae dark reddish brown to dark fuscous; antennal segment II not noticeably inflated, linear beyond basal constriction, length 0.72–0.79; ratio of length of antennal segment II to head width 0.85:1 to 0.92:1; genae moderately broad, gula narrow; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 1.16–1.22; peritremal disk white or yellowish white. **Hemelytra:** Weakly rounded laterally; cuneus about as long as broad; membrane heavily suffused with fuscous, veins white, sometimes tinged with fuscous basally. **Legs:** Uniformly reddish brown to dark fuscous; femora, especially hind pair, with generally distributed, scalelike setae; tibial spines black. **Genitalia:** Gonopore sclerite densely spinose, spine field usually broadened basally (figs. 120, 121).

Female. Similar to male in general appearance, but with shorter, weakly clavate second antennal segment, and wing membrane slightly shortened.

DISTRIBUTION: Central and southeastern Arizona.

DISCUSSION: This species is very similar to

cercocarpi, differing appreciably only in the longer, slightly narrower second antennal segment, and the broader field of spines on the gonopore sclerite of the vesica. It is, however, well separated geographically from *cercocarpi*, which is not known to occur in Arizona.

Several specimens of *arizonae* were collected in the Santa Catalina Mts. on *Ceanothus* sp. Knight (1968) reported that the holotype, allotype, and some paratypes of *arizonae* were collected on "pines," but it is almost certain that *Pinus* is not a host plant of this species.

SPECIMENS EXAMINED: 14 specimens collected between June 30 and Aug. 5 from the following localities: USA. – **Arizona:** *Cochise Co.:* Huachuca Mts., 29 July 1905 (1♂, 4♀ paratypes). *Coconino Co.:* Flagstaff. *Pima Co.:* Santa Catalina Mts.: S side of Mt. Bigelow, 7000–8000 ft; Mt. Lemon, 9000 ft, 27 July 1917 (♂ holotype, allotype, and 2♀ paratypes); Hitchcock Hwy., mi 25. Deposited in the collections of the AMNH, UAZ, UCB, and USNM.

Atractotomus atricolor (Knight),
revised synonymy, new combination
Figures 19, 121, 164, 174

Sthenarus rubidus Uhler, 1895: 41 (n. sp.) (in part).
Europiella rubida: Reuter, 1909: 85 (n. comb., descr.). – Van Duzee, 1917: 415 (cat.) (in part).
Lepidopsallus rubidus atricolor Knight, 1923: 470, 472 (new variety, key); 1941: 47 (note). – Froeschner, 1949: 134 (key). – Carvalho, 1958: 54 (cat.). – Laroche, 1984: 318 [syn. with *rubidus* (Uhler)].
Lepidopsallus rubidus: Knight, 1941: 47 (key, descr.) (in part). – Carvalho, 1958: 54 (in part) (see this catalog for list of pre-1958 citations and misidentifications). – Knight, 1968: 51, 52 (key, note). – Kelton, 1980: 331–333 (key, descr.) (in part). – Henry and Wheeler, 1988: 471 (cat.) (in part).

DIAGNOSIS: Similar to *rubidus* in general appearance except some specimens more extensively darkened with tibiae pale on distal half only and antennal segment III with narrow pale region basally; readily distinguished from *rubidus* by the structure of the male genitalia, particularly the shorter distal region of the vesical strap with gonopore near apex (fig. 121), gonopore sclerite short with spines

mostly restricted to distal half (fig. 121), and broad anterior process of the left paramere with prominent, medial ridge (fig. 164).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.14–2.62. **Dorsal Aspect:** General coloration variable, ranging from brownish yellow with limited red or fuscous markings to uniformly dark reddish brown; lighter specimens with at least calli and most of frons and tylus fuscous, sometimes more broadly darkened on pronotum, inner half of clavus, and middle of corium; cuneus sometimes deeply tinged with red; vestiture with golden to dark brown or black, simple setae, and densely distributed, broad, scalelike setae. **Head:** Brownish yellow with fuscous markings on frons and tylus to uniformly reddish brown or fuscous; width across eyes 0.77–0.91; width of vertex 0.38–0.48; ratio of vertex width to head width 0.48:1 to 0.53:1; moderately produced anteriad of antennal fossae; posterior margin weakly concave, not noticeably carinate; eyes occupying about three-fourths of head height in lateral view; antennae pale brownish yellow to uniformly fuscous, pale specimens usually with segments I and II noticeably lighter than segments III and IV; antennae inserted at level of ventral margin of eye; antennal segment II slightly thicker distally, length 0.62–0.71; ratio of length of antennal segment II to width of head across eyes 0.72:1 to 0.83:1; genae moderately broad; gula narrow; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 1.03–1.24; peritremal disk ivory, sometimes tinged with brown or red dorsally. **Hemelytra:** Weakly rounded laterally; cuneus about as long as broad; membrane suffused with fuscous, veins ivory, sometimes lightly tinged with red. **Legs:** Femora brownish or reddish yellow, to uniformly dark reddish brown or piceous; hind femora with generally distributed, scalelike setae; tibiae brownish yellow or yellowish red, sometimes with fuscous markings especially basally; tibial spines dark brown or black; tarsi yellowish brown, last segment fuscous; pretarsus brown or dark brown. **Genitalia:** Figures 122, 164, and 174. Gonopore near apex of vesical strap; gonopore sclerite short, with spines mostly restricted to distal half (fig. 122).

Female. Similar to male in general appearance, but with slightly narrower second antennal segment.

DISTRIBUTION: Widely distributed, coastal and intermountain western United States and Canada, and east across southern Canada and the northern United States to the Atlantic.

DISCUSSION: This species was originally described as a subspecies (Knight, 1923), but was recently synonymized with *rubidus* (Uhl-er) by Laroche (1984). My examination of the holotype and other specimens of *atricolor* revealed that it is a distinct species, with male genitalic structures quite different from those of *rubidus*. In the western United States, *atricolor* is quite variable in general coloration, ranging from pale brownish yellow with limited red or fuscous markings, to uniformly dark reddish brown. East of the Rocky Mts., most specimens are dark reddish brown or dark fuscous, which helps distinguish *atricolor* from the usually paler *rubidus*.

I have examined specimens collected on *Salix amygdaloides* Anderss., *S. candida* Flugge, *S. hindsiana* Benth., *S. interior* Rowlee, and *S. sericea* Muhl.

SPECIMENS EXAMINED: 492 specimens collected between May 30 and Oct. 21 from the following localities: CANADA. – **Alberta:** Drumheller; Casstor; Elkwater Pk.; Grande Prairie. **Manitoba:** Horton. **Saskatchewan:** Candle Lk.; Fort a la [Lorne]?; Torch R.; Kelso; Saskatoon; Lumsden; Wood Mt.; Esterhazy; Dundurn; Hudson Bay; Indian Head; Bruno. USA. – **California:** *Butte Co.:* Oroville. *Contra Costa Co.:* Richmond. *Del Norte Co.:* 1 mi S of Crescent City. *Humboldt Co.:* Shively; Alton. *Inyo Co.:* 4 mi NW of Independence; Big Pine. *Lassen Co.:* Hallelujah Jct. *Modoc Co.:* Lake City. *Mono Co.:* 6500 ft. *Napa Co.:* Napa. *Orange Co.:* Laguna Beach. *Sacramento Co.:* Sacramento. *San Diego Co.:* La Jolla; Pine Valley. *San Mateo Co.:* Pacific; Half Moon Bay St. Beach. *Santa Cruz Co.:* Mt. Hermon; Felton. *Shasta Co.:* Burney Crk. Hatchery; Cayton. *Siskiyou Co.:* Siskiyou Co. *Sonoma Co.:* Guerneville Pk. *Sutter Co.:* Nicolaus. *Trinity Co.:* Junction City. *Ventura Co.:* Santa Paula. *County ?:* Owens R.; San Ardo. **Colorado:** *Archuleta Co.:* Pagosa Spgs. *Bent Co.:* Las Animas. *Boulder Co.:* Boulder. *Chaffee Co.:* Salida. *Douglas*

Co.: Chatfield St. Pk.; Waterton. *Gunnison Co.*: Gunnison and 5 mi WSW of; Taylor R., above Almont. *Jefferson Co.*: Waterton, Platte R., 5350 ft. *Larimer Co.*: Ft. Collins, Dixon's Cyn. *Las Animas Co.*: Stonewall, 8000 ft; Stonewall, nr. Trinidad, 8500 ft. *Mesa Co.*: Grand Junction. *Montezuma Co.*: Dolores; Mancos. *Pueblo Co.*: Pueblo. *Routt Co.*: Hayden. *Larimer Co.*: Little Beaver; Sloss. **Connecticut**: *Tolland Co.*: Storrs. **Idaho**: *Boise Co.*: 13 mi E of Boise, Dunnigan Crk. *Idaho Co.*: Wilderness Access Cmpgrd., E of Lowell, 2200 ft. *Nez Perce Co.*: 7 mi E of Lewiston. *Oneida Co.*: Stone Reservoir; Curlew Valley Reservoir. *County?*: Cow Crk. **Indiana**: *Marion Co.*: county record only. **Michigan**: *Oceana Co.*: Pentwater. **Minnesota**: *Hennepin Co.*: county record only (including 6♂, 7♀ paratypes, 12 July 1929). *Lake Co.*: 10 mi N of Two Harbors. *Ramsey Co.*: Red Rock, Mississippi R.; county record only. **Montana**: *Broadwater Co.*: W of Townsend, Missouri R. bank. *Missoula Co.*: Thibideau Cmpgd., E of Missoula on Blackfoot R., 3500 ft. *Mineral Co.*: Haugan. **Nevada**: *Eureka Co.*: Eureka. *White Pine Co.*: Humboldt Nat. For., Lehman Caves Nat. Mon., Cave Lk. **New Mexico**: *San Miguel Co.*: Las Vegas H. S. **New York**: *Genesee Co.*: Batavia (1♂ paratype, 29 July 1915; ♂ holotype and 2♂, 2♀ paratypes, 10 Aug. 1916. *St. Lawrence Co.*: Cranberry Lk. *Tompkins Co.*: Ithaca, Cornell Univ. *County?*: Wanakena, 1–7 Aug. 1917 (1♂ paratype). **Oregon**: *Benton Co.*: Corvallis; Willamette R. at Corvallis. *Crook Co.*: 10 mi SE of Prineville (Crooked R.). *Harney Co.*: Catlow Dunes, T35S R31E Sec.30. *Hood River Co.*: 1 mi E of Hood R. Rest Area, Columbia R., 250 ft. *Jackson Co.*: Phoenix. *Lake Co.*: Chewaucan R., nr. Valley Falls. *Morrow Co.*: Boardman. **Pennsylvania**: *Erie Co.*: Erie, I-90 and Rt. 19; Fairview. *Luzerne Co.*: Andy Pond, Rice Twp. **Utah**: *Cache Co.*: Utah Exp. Stn. *Duchesne Co.*: Myron. *Emery Co.*: Elmo. *Millard Co.*: Delta; Fillmore. *Sevier Co.*: Monroe; Richfield. *Summit Co.*: Park City. *Uintah Co.*: Naples; Hayden. *Washington Co.*: Santa Clara. *Weber Co.*: Ogden. **Vermont**: *Windham Co.*: Brattleboro, 15 June 1908 (1♂ paratype). **Washington**: *Kittitas Co.*: Cliffdell, Snoqualmie Nat. For. **West Virginia**: *Tucker Co.*: Blackwater Falls St. Pk., nr. Davis. Deposited in the collections of the

AMNH, CAF&A, CAS, CNC, JTP, KU, OSU, PDA, PU, TA&M, UCB, UCD, UCR, USNM, and USU.

Atractotomus balli Knight

Figures 7, 13, 20, 21, 81, 146

Atractotomus balli Knight, 1931: 38 (n. sp.). – Carvalho, 1958: 16 (cat.). – Froeschner, 1963: 3, 4 (key, note). – Knight, 1968: 57 (key, note). – Henry and Wheeler, 1988: 459 (cat.).

Atractotomus purshiae Froeschner, 1963: 1, 2 (n. sp.). – Knight 1968: 57 (key, dist.). – Henry and Wheeler, 1988: 460 (cat.). NEW SYNONYMY.

Lepidopsallus californicus Knight, 1968: 51, 53 (n. sp., key). – Henry and Wheeler, 1988: 470 (cat.). NEW SYNONYMY.

DIAGNOSIS: Recognized by its small size; short second antennal segment (see couplet 3 in key); generally distributed, scalelike setae on hemelytral membrane (fig. 13) and hind femora (fig. 81); antennal fossae removed from anteroventral margin of eye by distance equal to or greater than diameter of antennal segment I (fig. 7); and vesica with apical gonopore and long, densely spinose gonopore sclerite (fig. 146).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.70–1.92. **Dorsal Aspect:** Dark fuscous or black general coloration; vestiture with dark, simple setae and densely distributed, broad, scalelike setae. **Head:** Dark fuscous or black; width across eyes 0.80–0.92; width of vertex 0.43–0.55; ratio of vertex width to head width 0.53:1 to 0.60:1; moderately produced anteriad of antennal fossae; posterior margin broadly concave, with posterior margin of eyes contiguous with anterior margin of pronotum; vertex weakly convex, posterior margin not noticeably carinate; eyes occupying about three-fifths of head height in lateral view; antennae inserted below level of ventral margin of eye, fossae removed from anteroventral margin of eye by distance equal to or greater than diameter of antennal segment I; antennae uniformly dark reddish brown to nearly black, segments III and IV sometimes slightly paler; structure of antennal segment II variable—not or only slightly inflated, and nearly linear or weakly clavate, to strongly inflated and fusiform, length 0.41–0.50; ratio of length of antennal segment II to head width 0.46:1 to 0.62:1; genae broad; gula noticeably de-

veloped; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 0.91–1.08; peritremal disk reddish brown to fuscous, lateral margins opposite and ventrad of ostiole often grayish white. **Hemelytra:** Moderately rounded laterally; cuneus about as long as broad; membrane moderately suffused with fuscous, and with uniformly distributed, scalelike setae, veins darkened. **Legs:** Reddish brown to dark fuscous, tibiae sometimes slightly paler; femora and bases of tibiae with uniformly distributed, scalelike setae; tibial spines black. **Genitalia:** Vesical strap robust, with apical gonopore and long, densely spinose gonopore sclerite (fig. 146).

Female. Similar to male in general appearance, including variation in structure of antennal segment II.

DISTRIBUTION: Widely distributed in the western United States from Oregon and southern Idaho, south to the Mexican border.

DISCUSSION: As is the case with other *Atractotomus* species, the thickness of the second antennal segment of *balli* is extremely variable, ranging from weakly clavate and similar to segment I in thickness, to strongly inflated, fusiform, and noticeably thicker than segment I (figs. 20, 21). Despite the variation in antennal structure, *balli* is quite distinctive because of its small, ovoid body, scalelike setae on the hemelytral membrane, and antennal fossae well removed from the anteroventral margin of the eye.

Froeschner (1963) described *Atractotomus purshiae* from material collected in Idaho, and distinguished it from *balli* by the peritremal disk being "conspicuously paler than the surrounding sclerites." My examination of the type and paratypes of *purshiae* reveals that the color of peritremal disk is not appreciably different from that of typical *balli* (see description). Further, the male genitalia of the two species are indistinguishable, which supports the synonymy here of *purshiae* with *balli*.

With the exception of the narrow second antennal segment, all external and genitalic features of *Lepidopsallus californicus* are consistent with those of *balli*, and I am therefore treating the former species as a junior synonym of *balli*.

Atractotomus balli has been collected on

the following plants belonging to the families Rhamnaceae and Rosaceae: *Ceanothus crassifolius* Torr., *C. cuneatus* (Hook.) Nutt., *C. greggii* Gray, *Coleogyne ramosissima* Torr., *Cercocarpus betuloides* Nutt., *C. ledifolius* Nutt., *C. montanus* Raf., *Condalia* sp., *Cowania mexicana* D. Don var. *stansburiana* (Torr.) Jeps., *Purshia glandulosa* Curran, and *P. tridentata* (Pursh) DC.

SPECIMENS EXAMINED: 730 specimens collected between April 27 and Sept. 13 from the following localities: USA. – **Arizona:** *Cochise Co.:* vicinity of Portal, 1500–1700 m. *Gila Co.:* 2 mi W of Miami, 3800 ft; 10.5 mi N of Globe; 8 mi SW of Jct. Rts. 87 and 188, Tonto Nat. For., 4000 ft; Old CCC Cmpgd., S of Globe on Pioneer Pass Rd., 4700 ft. *Graham Co.:* Peloncillo Mts. *Maricopa Co.:* Four Peaks Rd., miles 12 and 17. *Mohave Co.:* Hualapai Mts., SE of Kingman, T20N R15W, 4000–6400 ft. *Pima Co.:* Tucson, 12 May 1929 (♂ holotype of *balli*). *Yavapai Co.:* Mud Tanks Mesa, George Crook Rd., T13N R7E Sec.20, 5500 ft; 5 mi N of Wilhoit (N of Kirkland), 1400 m; 1 mi S of Yarnell on Rt. 89; 2 mi S of Rt. 89A on Rt. 89. **California:** *Butte Co.:* Oroville. *Eldorado Co.:* Kyburz. *Fresno Co.:* Fresno, 20 June 1926 (♀ allotype, 3♀ paratypes, *californicus*). *Glenn Co.:* 10 mi W of Elk Crk. *Inyo Co.:* Independence; 7 mi N of Parcher's Cmpgd.; 3.5 mi W of Westgard Pass Smt. on Rt. 168, 2188 m. *Kern Co.:* Tehachapi Pass; Mt. Pino, 6800 ft. *Lake Co.:* St. Hwy. E of Clear Lk.; Middle Crk. *Lassen Co.:* 9 mi W of McArthur, 1280 m. *Los Angeles Co.:* Glendale; Griffith Park, Los Angeles, 21 May 1926 (1♀ paratype, *californicus*); Tanbark Flat. *Mendocino Co.:* Eel R. Ranger Stn. *Modoc Co.:* 24.7 mi NW of Canby, 1375 m; 2.5 mi S of Rt. 139 towards Lookout, 1440 m; 18 mi S of Rt. 139 towards Lookout, 1420 m. *Mono Co.:* Rt. 395 at Mono Craters, 2188 m; 1 mi SW of Tom's Place; 7.5 mi W of Bridgeport, 900 ft; Tioga Lodge, Mono Lk.; Sonora Jct., 6850 ft. *Riverside Co.:* San Jacinto Mts.: Idyllwild; Pinon Flat; Ribbonwood. Tenaja Rd., W of Murrieta, 410 m; Menifee Valley (hills on W end), 33°39'N 117°13'W, 1800 ft. *Sacramento Co.:* Folsom. *Shasta Co.:* Lakehead, Anther Rd. exit, 1150 ft; 7.6 mi N of Manton, 1138 m; Hat Creek Post Office; 6.5 mi E of Jct. Rt. 89 on Rt. 299, 3000 ft; Cayton; 1 mi E of Montgomery

Crk.; 1 mi W of Fall River Mills, 1030 m. *Siskiyou Co.*: Mt. Shasta City; McCloud; Macdoel; 12.3 mi N of St. Hwy. 89 on Powder Hill Rd. *Tehama Co.*: 10 mi W of Mineral. *Trinity Co.*: Hanleys, Mt. St. Helena. *Tulare Co.*: 2.6 mi W of county line nr. Chimney Peak Ranger Stn., 2000 m. **Colorado**: *Larimer Co.*: 1 mi S of Poudre R. on Pingree Pk. Rd. (37 mi W of Fort Collins), 6900 ft. *Routt Co.*: Steamboat Springs. **Idaho**: *Ada Co.*: Boise. *Custer Co.*: 3 mi E of Stanley. *Valley Co.*: Krassel, 29 May 1961 (1♂ paratype, *purshiae*); Krassel Ranger Stn., 13 July 1961 (2♀ paratypes, *purshiae*); 6 mi S of Krassel Ranger Stn., 27 June 1961 (1♀ paratype, *purshiae*). **Nevada**: *Elko Co.*: 30 mi SE of Int. 80 on Hwy. 229. *Lyon Co.*: 3 mi SE of Toiyabe Nat. For. Boundary on Rt. 338, 6300 ft. *Nye Co.*: Nevada Atomic Test Site, 2 mi W of Tip-papah Hwy. on Mine Mt. Rd., 4400 ft; Mercury; 3.5 mi SE of Manhattan, Toiyabe Nat. For., 2188 m. *White Pine Co.*: 6 mi SW of Ely, 6500 ft. *Carson City*: Carson City. **Oregon**: *Deschutes Co.*: 33 mi E of LaPine, T22S R16E Sec.19; 8 mi E of Bend; Deschutes Nat. For. *Jackson Co.*: 10 mi E of Brownsboro; just E of Pinehurst, 1140 m. *Josephine Co.*: Grants Pass; 10 mi N of Grants Pass; 2.8 mi S of Selma; 1 mi S of Rough and Ready Wayside. *Klamath Co.*: Wood R. Spg.; 1 mi W of Crescent; 9 mi W of Keno; 5 mi S of LaPine. *Lake Co.*: 13 mi SE of LaPine, T23S R12E Sec.16. *Wasco Co.*: 7 mi W of Simnasho; 10 mi N of Warm Spgs. **Utah**: *Garfield Co.*: 14.3 mi S of Rt. 95 on Rt. 276 (3.4 mi N of Starr Spg. turnoff), 5000 ft; Capitol Reef Nat. Pk., Grand Wash-Cobab Cyn. Trail, 5350–6640 ft. *Grand Co.*: Rd. 313 to Dead Horse Pt., 11 mi SE of Jct. with Rd. 163, 5200 ft. *San Juan Co.*: Grand Flat, nr. Collins Cyn.; Rim of Moki Cyn., nr. Halls Crossing, 4000 ft; 7.7 mi N of Mexican Hat on Rt. 261, T41S R18E, 5000 ft; Brush Basin Rim Rd. 277, 0.5 mi E of Rt. 95 (milepost 116), T37S R12E, 5700 ft; Head of Lake Cyn. nr. Nokai Dome Rd, 4200 ft; 1.2 mi W of Jct. of Gooseneck Rd. on Rt. 244, 5000 ft; 3 mi W of Clay Hills Crossing Rd. on Rt. 263, T39S R15E, 5000 ft; Rt. 63 at Arizona border, Monument Valley, 5200 ft; Goosenecks Overlook, 5000 ft. *Uintah Co.*: Blue Mt. Plateau and Cliff Ridge, T5S R25E, 8000 ft. *Utah Co.*: 3 mi SE of Alpine on Rt. 92 (mouth of American Fork

cyn.), T4S R2E, 4800 ft; American Fork Cyn., 0.2 mi W of Jct. Rts. 80 and 146. **MEXICO**. – **Baja California Norte**: Tecate, 6.3 mi S of El Condor, 4000 ft. Deposited in the collections of the AMNH, CAF&A, CAS, JTP, KU, OSU, UCB, UCD, UCR, and USNM.

Atractotomus cercocarpi Knight

Figures 10, 22, 82, 123, 124, 165, 176

Atractotomus cercocarpi Knight, 1931: 37, 38 (n. sp.). – Carvalho, 1958: 16 (cat.). – Froeschner, 1963: 3, 4 (key, note). – Knight, 1968: 57 (key, note). – Henry and Wheeler, 1988: 459 (cat.).

DIAGNOSIS: Very similar to *arizonae* in general appearance, with uniformly darkened antennae, legs, and dorsum, pale peritremal disk, and hind femora with widely distributed scalelike setae (fig. 82); distinguished by the shorter, weakly clavate second antennal segment (fig. 22) (ratio of segment length to width of head across eyes from 0.73:1 to 0.80:1), vesical strap distad of medial coil usually slightly longer, and spinose field on proximal region of gonopore sclerite narrow (figs. 123, 124). Distinguished from *reuteri* by the narrower second antennal segment, and long gonopore sclerite (see couplet 6 in key).

REDESCRIPTION: *Male*. Length from apex of tylus to cuneal fracture 2.12–2.30. **Dorsal Aspect**: Dark reddish brown to black general coloration; vestiture with dark, simple setae and densely distributed, broad, scalelike setae. **Head**: Dark reddish brown to dark fuscous; width across eyes 0.78–0.91; width of vertex 0.39–0.46; ratio of vertex width to head width 0.49:1 to 0.52:1; moderately produced anteriad of antennal fossae; posterior margin weakly concave, not noticeably carinate; vertex flattened, sometimes slightly depressed posteriorly; eyes occupying about three-fourths of head height in lateral view; antennae inserted at or slightly below level of ventral margin of eye, fossae narrowly removed from anteroventral margin of eye; antennae dark reddish brown to nearly black; antennal segment II slightly inflated, weakly clavate, length 0.60–0.69; ratio of length of antennal segment II to head width 0.73:1 to 0.82:1; genae moderately broad; gula narrow; labium reaching from middle of mesocoxae to middle of metacoxae. **Pronotum**: Posterior width 1.10–1.20; peritremal disk white or yellowish

white, sometimes lightly tinged with fuscous along dorsal margin. **Hemelytra:** Moderately rounded laterally; cuneus about as long as broad; membrane heavily suffused with fuscous, veins pale, or sometimes tinged with fuscous basally. **Legs:** Uniformly reddish brown to dark fuscous; tarsi, especially segment II sometimes lighter yellowish brown; femora, especially hind pair with generally distributed, scalelike setae; tibial spines black. **Genitalia:** Figures 123, 124, 165, and 176. Gonopore sclerite densely spinose, spine field narrowed proximally (fig. 123, 124).

Female. Similar to male in general appearance, but usually with antennal segment II slightly more swollen distally.

DISTRIBUTION: Rocky Mountain states from Caribou Co., Idaho and Lincoln Co., Wyoming, south to northern New Mexico.

DISCUSSION: *Atractotomus cercocarpi* occurs almost exclusively on plants belonging to the genus *Cercocarpus* (Rosaceae)—specimens have been collected on *C. ledifolius* Nutt., *C. montanus* Raf., and *C. parvifolius* Nutt. A small series of specimens was collected in Caribou Co., Idaho on *Purshia tridentata* Nutt. (Rosaceae).

SPECIMENS EXAMINED: 170 specimens collected between July 11 and Aug. 28 from the following localities: USA. — **Colorado:** *Bent Co.:* Las Animas. *Boulder Co.:* Wagonwheel Cmpgd., Fourmile Cyn. *Chaffee Co.:* 5 mi W of Buena. *Clear Crk. Co.:* Jct. I-70 and Hwy. 40. *Douglas Co.:* Daniel's Park; Perry Park; nr. Waterton. *Elbert Co.:* E of Kiowa along Bijou Crk. *Jefferson Co.:* Indian Hills; 15 mi NW of Deckers; Deer Crk. Cyn., 6500 ft. *Larimer Co.:* Estes Pk; Poudre R. Cyn.; 1 mi S of Poudre R. on Pingree Pk. Rd. (37 mi W of Ft. Collins), 6900 ft. *Las Animas Co.:* Monument Pk., 8650 ft; Stonewall, 8000 ft; S side of Cuchara Pass on Rt. 12, 9300 ft; 1 mi N of Stonewall on Purgatorie Cmpgd. Rd., 8400 ft; Stonewall, W of Trinidad, 8500 ft, 7 Aug. 1925 (including ♂ holotype and allotype). *Park Co.:* 3 mi S of Guffey. **Idaho:** *Caribou Co.:* Pine Bar Cmpgd., 11 mi E of Wayan on St. Hwy. 34, 6000 ft. **New Mexico:** *Colfax Co.:* Raton, 22 July 1928 (1♀ paratype). **Utah:** *Cache Co.:* Green Cyn. Trail, 5 mi NE of Logan, T12N R2E, 6000–6500 ft. **Wyoming:** *Lincoln Co.:* Salt R. Pass, 15 mi S of Afton on St. Hwy. 89, 7630 ft. Deposited

in the collections of the AMNH, JTP, KU, OSU, TA&M, and USNM.

Atractotomus chiapas, new species

Figures 23, 125

DIAGNOSIS: Recognized by shiny, orange and black general coloration; dorsum without scalelike setae; broad, noticeably carinate vertex; uniformly pale legs; long labium; and structure of the male genitalia, especially the long, coarsely spinose gonopore sclerite (fig. 125).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.12–2.25. **Dorsal Aspect:** Head, pronotum, and base of hemelytra yellowish orange, lightly to moderately tinged with red; remainder of hemelytra shiny black; vestiture with short, golden to dark brown, simple setae, but without scalelike setae. **Head:** Vertex and frons mostly yellowish orange; tylus fuscous; ventral region pale brownish yellow; width across eyes 0.86–0.94; width of vertex 0.43–0.46; ratio vertex width/head width 0.48:1 to 0.51:1; moderately produced anteriad of antennal fossae; posterior margin weakly concave, abruptly carinate; eyes occupying about three-fourths of head height in lateral view; antennae brown or dark brown, basal region of segment I and broad band below middle of segment II yellowish brown; antennae inserted at level of ventral margin of eye, segment II linear, not noticeably inflated, length 0.84–0.92; ratio of length of antennal segment II to width of head across eyes 0.98:1 to 1.00:1; genae broadly developed; gula narrow; labium reaching well beyond apices of hind coxae to sixth or seventh abdominal segment. **Pronotum:** Posterior width 1.18–1.22; propleura and remaining thoracic pleura, except metaepisternum, yellowish orange; metaepisternum, including ostiolar peritreme, dark fuscous; metaepisternal evaporative area extending nearly to dorsal margin of pleurite; mesosternum fuscous. **Hemelytra:** Moderately rounded laterally; strongly deflexed at cuneal fracture; cuneus only slightly longer than broad; membrane heavily infuscated, veins darkened. **Legs:** Uniformly pale brownish yellow; femora usually with several fuscous spots distally; tibiae with dusky spots at spine bases; tarsi yellowish brown, segment III darker brown

distally; pretarsus dark brown. **Genitalia:** Vesica with apical gonopore, and long, coarsely spinose gonopore sclerite (fig. 125).

Female. Similar to male in general appearance, but usually with hemelytra less strongly deflexed at cuneal fracture.

ETYMOLOGY: Named for the state of Chiapas, Mexico.

DISTRIBUTION: Chiapas, Mexico.

DISCUSSION: The smooth, shiny surface texture, and dorsal vestiture of *chiapas* are not typical of *Atractotomus* species. The carina on the posterodorsal margin of the head also is more strongly developed than for other members of the genus. However, the irregular row of spines on the dorsal surface of the hind femur, and structure of the male genitalia firmly place this species in *Atractotomus*.

HOLOTYPE ♂: MEXICO, Chiapas, Rincon Chamula, VIII-7-1969, L. A. Kelton (CNC).

PARATYPES: 2♂, 4♀, same data as holotype (AMNH, CNC).

Atractotomus cooperi, new species

Figures 24, 83, 147

DIAGNOSIS: Recognized by the dark reddish brown to black general coloration, antennae and tibiae sometimes brownish yellow; scalelike setae on dorsum narrow, with weakly elevated, converging ridges, and acute apex (fig. 83); ratio of width of vertex to width of head across eyes from 0.44:1 to 0.48:1; and vesica with distal region of strap broad, thick gonopore, and spines mostly restricted to distal half of gonopore sclerite (fig. 147).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.94–2.65. **Dorsal Aspect:** Dark brown to nearly black general coloration; vestiture with dark, simple setae and uniformly distributed, narrow, scalelike setae (fig. 83). **Head:** Brown to dark fuscous, vertex sometimes slightly lighter posteriorly; width across eyes 0.66–0.80; width of vertex 0.31–0.36; ratio of vertex width to head width 0.44:1 to 0.48:1; weakly produced anteriad of antennal fossae; posterior margin nearly straight, not noticeably carinate; vertex weakly convex; eyes occupying about three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae narrowly removed from anteroventral margin of eye; antennae brownish yellow to dark fuscous; antennal segment II linear beyond basal

constriction, not noticeably inflated, length 0.68–0.97; ratio of length of antennal segment II to head width 1.00:1 to 1.33:1; genae and gula moderately developed; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 0.84–1.20; peritremal disk fuscous. **Hemelytra:** Weakly rounded laterally; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins darkened, sometimes yellowish brown distally. **Legs:** Femora dark reddish brown to piceous, apex usually narrowly yellowish brown; tibiae brownish yellow or yellowish brown, sometimes slightly darker, especially on basal half; tibial spines dark brown; tarsi yellowish brown, segment III brown or dark brown; pretarsus dark brown. **Genitalia:** Distal half of vesical strap robust; gonopore thick; gonopore sclerite with heavy spines, mostly restricted to distal half (fig. 147).

Female. Similar to male in general appearance, except more ovoid, with slightly shortened hemelytral membrane, and antennal segment II usually yellow or brownish yellow, sometimes with limited fuscous suffusion.

ETYMOLOGY: Named for my good friend Gary M. Cooper, who collected the type and many additional specimens of this species in the coastal mountains and Cascade Range of Oregon.

DISTRIBUTION: Widely distributed in montane regions of the western United States.

DISCUSSION: This species is somewhat variable with respect to overall size and the color of the antennae. Specimens collected in the Great Basin and areas to the east are generally larger than individuals from north and west of the Basin. Antennal coloration varies from uniformly pale yellow or brownish yellow, to partly or entirely dark fuscous, and seems to vary randomly throughout the range of the species.

Some variation also occurs in the structure of the male vesica. A large series of specimens collected at Wheeler Pk., White Pine Co., Nevada on *Abies concolor* (Gord. & Glend.) Lindl. have a thinner vesical strap, and fewer, finer spines on the gonopore sclerite than is seen in the type. I also examined a dozen or so specimens from northern California and the Oregon Cascades, which had a thin vesical strap, but slightly coarser spines on the

gonopore sclerite. The latter specimens also were smaller than typical *cooperi*, and reddish brown in general coloration rather than dark brown to black. Although additional study may show that the specimens from Wheeler Pk. and the Oregon Cascades are not conspecific with *cooperi*, I do not have sufficient information at this time to treat them as such.

Atractotomus cooperi occurs on conifers throughout much of the western United States. Most of the specimens that I examined were collected from one of the following hosts: *Abies amabilis* (Dougl.) Forbes, *A. concolor* (Gord. & Glend.) Lindl., *A. lasiocarpa* (Hook.) Nutt., *A. procera* Rehd., *Picea engelmannii* Parry, and *Pseudotsuga menziesii* (Mirb.) Franco.

HOLOTYPE ♂: USA, Oregon, Benton Co., Marys Peak Campground, T12S R7W Sec.21 SW1/4, 3600 ft, 3 July 1979, ex. *Abies procera*, G. M. Cooper (OSU, deposited in the AMNH).

PARATYPES: USA. – **Oregon**: *Benton Co.*: Marys Peak (all on *Abies procera*, G. M. Cooper coll.): 33 ♂&♀, same data as holotype, 3 July–29 August 1979; 98 ♂&♀, T12S R7W Sec.20 SW1/4, 3500 ft, 17 June–4 Sept. 1979; 33 ♂&♀, T12S R7W Sec.19 SE1/4, 3250 ft, 19 June–29 August 1979; 27 ♂&♀, T12S R7W Sec.21 SW1/4, 0.25 mi W of summit park[ing] lot, 3650 ft, 17 August–4 Sept. 1979; 17 ♂&♀, T12S R7W Sec.21 SW1/4, peak parking lot, 3750 ft, 3 August–30 Sept. 1979. Deposited in the collections of the AMNH, OSU, and USNM.

ADDITIONAL SPECIMENS: 147 specimens collected between May 16 and Sept. 4 from the following localities: USA. – **Arizona**: *Cochise Co.*: Chiricahua Mts., Rd. from Portal to Rustler Pk., 6500 ft; 1.5 mi toward Portal from Onion Saddle, 2350 m. *Pima Co.*: Santa Catalina Mts., San Pedro Vista Pt., 7300 ft. **California**: *Humboldt Co.*: Grizzly Crk. *Trinity Co.*: Van Duzen Rd. **Colorado**: *Park Co.*: Rt. 285 at Santa Maria, nr. Glenisle. **Idaho**: *Bear Lake Co.*: Bloomington Lk., T14S R42W Sec.5. *Benewah Co.*: 4 mi W of Emida on Rt. 6. *Caribou Co.*: 8 mi E of Wayan (1 mi E of milepost 101 on ID Rt. 34), 6000 ft. *Franklin Co.*: Williams Cyn., milepost 20 on ID Rt. 36, 8000 ft. **Montana**: *Carbon Co.*: Rock Crk. Vista Pt. on Rt. 212, NE of Beartooth Smt., 9100 ft. **Nevada**: *Clark Co.*: Charleston Mts.,

Hilltop Camp. **Oregon**: *Baker Co.*: Wallowa Mts., W Eagle Meadow, 20 mi E of Medical Springs. *Benton Co.*: Corvallis, Timber Hill Area; Grass Mt., 5 mi NW of Alsea, T13S R8W Sec.21 SW1/4, 3520 ft; Marys Peak: Cmpgrd., T12S R7W Sec.21 SW1/4, 3600 ft; summit meadow; T12S R7W Sec.21 SW1/4, 3650 ft. *Hood River Co.*: Mt. Hood; 3.2 mi N of Barlow Pass, T3S R9E Sec.15 NW1/4. *Josephine Co.*: O'Brien. *Lane Co.*: 2 mi W of Willamette Pass on Rt. 58. *Linn/Lane Co.*: H. J. Andrews Exp. For.: Carpenter Mt., end of Rd. 350; 11 mi NE of Blue R., T15S R6E Sec.7 SW1/4, 4360 ft; 0.5 mi N of Fissel Pt., T15S R6E Sec.29 SE1/4, 4850 ft; T15S R5E Sec.28; T15S R6E Sec.29 NW1/4, 4750 ft. **Utah**: *Box Elder Co.*: Raft R. Mts., 5 mi SW of Clear Crk. Cmpgd., T14N R13E, 6200–8000 ft. *Salt Lake Co.*: Alta, Rd. to Cmpgd., 10,000 ft. *Uintah Co.*: Uintah Mts., nr. Little Brush Crk., milepost 22 on Rt. 44, T1N R22E, 8620 ft. *Wasatch Co.*: Uinta Nat. For., Wolf Crk. Cmpgd., T4S R10W Sec.7 (30 mi SE of Kamas on Rt. 35), 9000 ft. **Washington**: *King Co.*: Stevens Pass Summit on Rt. 2, T26N R13E Sec.14. *Lewis Co.*: Chehalis, 110 Urquhart Rd. *Okanogan Co.*: Washington Pass Meadow, 5400 ft. *Pierce Co.*: Mt. Rainier. *Yakima Co.*: Mt. Adams; 3 mi E of Dog Lk. on Rt. 12; 3 mi E of White Pass Summit on Rt. 12, T14N R12E Sec.33 SW1/4, 4200 ft. **Wyoming**: *Sublette Co.*: Wind R. Mts., 20 mi N of Pinedale, Elkhart Peak Trail to Hobbs Lk., 10,200 ft. Deposited in the collections of the AMNH, CAS, OSU, UCD, and USNM.

Atractotomus iturbide, new species

Figure 126

DIAGNOSIS: Distinguished from other oak-inhabiting species (see *agrifoliae* diagnosis and phylogenetic analysis for distinguishing characters) by the piceous general coloration; hemelytra, at least anteriorly, with evenly distributed, scalelike setae; secondary gonopore of vesica removed from apex of vesical strap by distance equal to its length in lateral view (fig. 126); and gonopore sclerite with widely spaced, distally directed, fine spines, sometimes restricted to distal third of sclerite (fig. 126).

DESCRIPTION: *Male*. Length from apex of tylus to cuneal fracture 2.02–2.28. **Dorsal Aspect**: Piceous general coloration, base of co-

rium sometimes narrowly yellowish brown; vestiture with golden to dark brown, simple setae, and moderately broad, scalelike setae, the latter mostly restricted to anterior third of pronotal disk and basal third to half of hemelytra. **Head:** Dark reddish brown or piceous, vertex sometimes slightly lighter; width across eyes 0.79–0.81; width of vertex 0.31–0.32; ratio of vertex width to head width 0.39:1 to 0.40:1; weakly produced antieriad of antennal fossae; posterior margin slightly concave, weakly carinate; vertex very slightly concave; eyes occupying nearly entire height of head in lateral view; antennae brownish yellow, segments III and IV sometimes darker, inserted slightly above level of ventral margin of eye; antennal segment II nearly linear, slightly narrowed basally, sometimes weakly inflated beyond basal constriction, length 0.65–0.71; ratio of length of antennal segment II to head width 0.82:1 to 0.95:1; genae and gula nearly obsolete; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 1.11–1.25; peritremal disk dark reddish brown. **Hemelytra:** Weakly rounded laterally; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins brownish red. **Legs:** Femora dark reddish brown, distal fourth to third yellow or brownish yellow; tibiae yellow or brownish yellow, sometimes with faint dusky spots at spine bases; tibial spines dark brown or black; tarsi yellowish brown; pretarsus dark brown. **Genitalia:** Gonopore sclerite with widely spaced, distally directed spines (fig. 126).

Female. Similar to male in general appearance, but with shortened wing membrane, and narrower, weakly clavate second antennal segment.

ETYMOLOGY: Named for the city of Iturbide, near the type locality in Nuevo Leon, Mexico.

DISTRIBUTION: East-central Mexico.

DISCUSSION: This species inhabits *Quercus*—see paratypes section below for listing of oak species.

HOLOTYPE ♂: MEXICO, Nuevo Leon, 14 mi W of Iturbide, 11 April 1979, ex. *Quercus* sp., T. P. Friedlander and J. C. Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Michoacan:** 2♂, 12 mi NE of Uruaban, 12 April 1980, ex.

Quercus candicans Nee, Cuda and Schaffner. **Nuevo Leon:** 12♂, 10♀, same data as holotype. **San Luis Potosi:** 3♂, 4♀, 2 mi E of Ciudad del Maiz, 12 April 1979, ex. *Quercus sideroxyla* Humboldt & Bonpland, T. P. Friedlander and J. C. Schaffner. **Tamaulipas:** 2♂, 1♀, Altas Cumbres, 12 mi SW of Cd. Victoria, 19 Mar. 1986, ex. *Quercus canbyi* Trelease, J. C. Schaffner; 2♂, 2♀, same as above except collected on *Quercus polymorpha* S. & C. Deposited in the collections of the AMNH, TA&M, and USNM.

Atractotomus jalisco, new species

Figures 25, 127, 128

DIAGNOSIS: Recognized by its small size; grayish yellow ground color with reddish orange markings or extensive red suffusion; strongly contrasting, black second antennal segment; robust vesical strap with apical gonopore; and gonopore sclerite with medially interrupted field of blunt spines (figs. 127, 128).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.05–2.08 (holotype and paratype). **Dorsal Aspect:** Grayish yellow ground color with red blotches on pronotal disk, scutellum, and hemelytra; posterior half of hemelytra, especially cuneus, more densely suffused with red in holotype; vestiture with golden to dark brown, simple setae and densely distributed, moderately broad, scalelike setae. **Head:** Brownish yellow with red markings on tylus and frons; lorum infuscated; width across eyes 0.71–0.74; width of vertex 0.38–0.39; ratio of vertex width to head width 0.53:1; weakly produced antieriad of antennal fossae; posterior margin slightly concave; vertex weakly inflated along posterior margin but not noticeably carinate; eyes occupying four-fifths of head height in lateral view; antennae inserted at level of ventral margin of eye, segments I and II dark brown or black, segments III and IV brown or yellowish brown; antennal segment II weakly clavate, slightly inflated beyond basal constriction, length 0.61–0.64; ratio of length of antennal segment II to head width 0.86:1; genae moderately developed; gula narrow; labium reaching posterior margin of mesocoxae. **Pronotum:** Posterior width 1.15–1.23; peritremal disk pale grayish yellow, lightly

tinged with red dorsally. **Hemelytra:** Moderately rounded laterally; cuneus about as long as broad; membrane suffused with fuscous, more densely so distally, veins brownish yellow, lightly tinged with red distally. **Legs:** Femora grayish yellow with fuscous spots distally; front and middle femora broadly suffused with fuscous medially; tibiae brownish yellow with large fuscous spots at spine bases; tibial spines dark brown or black; tarsi yellowish brown; pretarsus dark brown. **Genitalia:** Distal half of vesical strap broad, with apical gonopore; gonopore sclerite with medially interrupted field of blunt spines (figs. 127, 128).

Female. Similar to male in general appearance, but with narrower second antennal segment.

ETYMOLOGY: Named for the state of Jalisco, Mexico, where all known specimens were collected.

DISTRIBUTION: Jalisco, Mexico.

DISCUSSION: The holotype and all paratypes of *Jalisco* were collected on *Quercus castanea* Nee.

HOLOTYPE ♂: MEXICO, Jalisco, Nevado de Colima Rd., 7 mi W of Hwy. Jct. (nr. Atenquique), 14 April 1980, ex. *Quercus castanea*, Cuda and Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Jalisco:** 2♂, 2♀, same data as holotype; 2♂, 1♀, Nevado de Colima Rd., 5.9 mi W of Hwy. Jct. (nr. Atenquique), 6000 ft, 20–21 April 1977, *Quercus castanea*, R. Murray, M. Sweet, and J. Schaffner. Deposited in the collections of the AMNH, TA&M, and USNM.

Atractotomus kolenatii (Flor),
new combination

Figures 8, 26, 84, 129

Capsus kolenatii Flor, 1860: 585, 586 (n. sp.).

Psallus kolenatii: Reuter, 1878: 101–103 (n. comb., descr., hosts); 1908: 74 (hosts). – Carvalho, 1958: 123 (see this catalog for list of pre-1958 citations). – Wagner and Weber, 1964: 453 (key), 454 (descr., hosts). – Wagner, 1975: 164 (key), 165 (descr., hosts). – Matocq and Péricart, 1986: 105–111 (ident., distr., hosts).

DIAGNOSIS: Similar to *magnicornis*, but distinguished by the second antennal segment only slightly thicker than the foretibiae,

and the delicate vesica with narrow secondary gonopore and nonspinoso gonopore sclerite (fig. 129). Further distinguished from Nearctic specimens of *cooperi* and *magnicornis* by the narrower vertex, and the labium reaching beyond the posterior margin of the metacoxae (see discussion).

REDESCRIPTION: **Male.** Length from apex of tylus to cuneal fracture 2.30–2.57. **Dorsal Aspect:** Dark reddish brown to dark fuscous general coloration; vestiture with dark, simple setae and uniformly distributed, narrow, scalelike setae. **Head:** Dark fuscous, sometimes lighter reddish brown ventrad of antennal fossae; width across eyes 0.70–0.75; width of vertex 0.24–0.26; ratio of vertex width to head width 0.32:1 to 0.39:1; moderately produced anteriad of antennal fossae, with steeply sloping frons and prominent tylus; posterior margin nearly straight, not noticeably carinate; vertex flattened; eyes occupying about four-fifths of head height in lateral view; antennae inserted slightly above level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennae brown or dark brown; antennal segment II linear beyond basal constriction, not noticeably inflated, length 0.92–1.04; ratio of length of antennal segment II to head width 1.31:1 to 1.46:1; genae narrow; gula well developed; labium reaching from anterior margin to slightly beyond posterior margin of metacoxae. **Pronotum:** Posterior width 0.96–1.05; peritremal disk fuscous. **Hemelytra:** Nearly straight laterally, elongate; cuneus about half again as long as broad; membrane moderately suffused with fuscous, veins yellowish brown, or sometimes darker basally. **Legs:** Dark yellowish brown to fuscous; tibial spines dark brown. **Genitalia:** Distal half of vesical strap narrow, with thin gonopore; gonopore sclerite weakly sclerotized, without spines (fig. 129).

Female. Similar to male in general appearance, except slightly ovoid, with shortened hemelytral membrane, and slightly narrower second antennal segment (fig. 26).

DISTRIBUTION: Central Europe, western USA; also recorded from Scandinavia (see refs. in Carvalho, 1958).

DISCUSSION: *Atractotomus kolenatii* was originally described in the genus *Capsus*, and later moved to *Psallus* by Reuter (1878). Re-

cently, Matocq and Péricart (1986) summarized the distributional and habitat information for this species in Europe, and discussed the close relationship between *kolenatii* and *magnicornis*. My examination of this species revealed that it definitely belongs to *Atractotomus*, possessing both the dispersed row of spines on the hind femora, and the coiled vesica with spinose gonopore sclerite (fig. 129). The linear, uninflated second antennal segment of *kolenatii*, seems to have caused Wagner and other European workers to retain this species in *Psallus*, despite the distinct *Atractotomus*-like male genitalia.

Specimens from the coastal mountains and central Cascades of Oregon differ from Palearctic specimens by having a slightly longer labium and narrower vertex. Nearctic males usually have the labium reaching slightly beyond the posterior margin of the metacoxae, and a vertex/eye ratio of 0.32–0.37. Palearctic males rarely have the labium reaching beyond the middle of the metacoxae, and possess a vertex/eye ratio of 0.37–0.39. Since other external features and the male genitalia of the specimens examined were virtually identical, the Nearctic and Palearctic populations are treated here as conspecific.

Atractotomus kolenatii has been collected on *Abies pectinata* DC. and *Picea excelsa* Link in central Europe, and on *Abies procera* Rehd. in the western USA.

SPECIMENS EXAMINED: 133 specimens collected between July 2 and October 14 from the following localities: **FRANCE.** – **Ardeche Dept.:** Mt. Mezenc. **Hautes-Alpes Dept.:** Super-Devoluy. **Haut-Rhin Dept.:** Lapoutroie; Le Brezouard, 1000 m. **SWITZERLAND.** – [no specific locality]. **USA.** – **Oregon:** *Benton Co.:* Mary's Peak, 900–1115 m; Grass Mt., 5 mi NW of Alsea, 975–1085 m. *Clackamas Co.:* Government Camp, 5 mi SW of Mt. Hood, 1190 m. *Hood River Co.:* Barlow Pass Smt., 10 mi SE of Mt. Hood, 1270 m; 3.2 mi N of Barlow Pass Smt., 1360 m. *Lane/Linn Co.:* H. J. Andrews Expt. Forest, 0.5–1.3 mi N of Fissel Pt., 1450–1480 m. **USSR.** – **Yakutia Reg.:** Edey, 200 km SW of Yakutsk, Lena R. **WEST GERMANY.** – **Baden-Wuerttemberg Reg.:** Isny; Nordschwarzwald; Nurtin-gen/Neckar. Deposited in the collections of the AMNH, BMNH, OSU, PERI, ZIL, and ZIUT.

Atractotomus magnicornis (Fallén)

Figures 27, 65, 85, 112, 148, 167, 177

Capsus magnicornis Fallén, 1807: 99 (n. sp.).
Atractotomus magnicornis: Fieber, 1861: 296 (n. comb.). – Reuter, 1884: 459 (note); 1908: 74 (hosts). – Knight, 1923: 461 (descr., host). – Blatchley, 1926: 963, 964 (descr.). – Knight, 1941: 24 (fig.). – Carvalho, 1958: 17 (see this catalog for list of pre-1958 citations). – Southwood and Leston, 1959 (note). – Kerzhner, 1962: 379 (note). – Wagner and Weber, 1964: 445 (key), 448 (descr., hosts). – Wagner, 1975: 119, 120 (descr., hosts). – Carapezza, 1982: 42 (dist., note). – Henry and Wheeler, 1988: 460 (cat.).
Atractotomus magnicornis buenoi Knight, 1923: 461, 462 (new variety). – Blatchley, 1926: 964 (descr.). – Carvalho 1958: 17 (cat.). – Henry and Wheeler, 1988: 460 (cat.). **NEW SYNONYMY.**

DIAGNOSIS: Similar to *cooperi* in general appearance, but distinguished by narrower vertex (ratio of width of vertex to width of head across eyes from 0.38:1 to 0.43:1); scale-like setae on dorsum with more strongly elevated ridges (fig. 65); and gonopore sclerite with spines distributed along entire length (fig. 148). Distinguished from *kolenatii* by the slightly thicker second antennal segment (fig. 27), and structure of the vesica (fig. 148). The female of *magnicornis* has the second antennal segment strongly inflated (fig. 27).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.29–2.41. **Dorsal Aspect:** Brown or dark brown general coloration; vestiture with dark, simple setae and uniformly distributed, narrow, scalelike setae (fig. 65). **Head:** Brown or dark brown, sometimes lighter yellowish brown ventrad of antennal fossae; width across eyes 0.69–0.75; width of vertex 0.26–0.32; ratio of vertex width to head width 0.38:1 to 0.41:1; moderately produced anteriad of antennal fossae, with steeply sloping frons and moderately produced tylus; posterior margin nearly straight, not noticeably concave; vertex weakly convex; eyes occupying about three-fourths of head height in lateral view; antennae inserted slightly above level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennal segments I and II reddish brown to fuscous, segments III and IV brownish yellow to dark yellowish brown; antennal segment II linear beyond basal constriction, usually weakly in-

flated, length 0.91–0.98; ratio of length of antennal segment II to head width 1.28:1 to 1.34:1; genae and gula moderately developed; labium reaching from middle to posterior margin of metacoxae. **Pronotum:** Posterior width 1.00–1.09; peritremal disk brown or dark brown. **Hemelytra:** Nearly straight laterally, elongate; cuneus about half again as long as broad; membrane moderately suffused with fuscous, veins yellowish brown, usually darkened basally. **Legs:** Brown or dark brown; tibiae sometimes brownish yellow or yellowish brown; tibial spines dark brown. **Genitalia:** Figures 148, 167, and 177. Vesica with gonopore near apex of strap; gonopore sclerite elongate, with spines distributed along entire length (fig. 148).

Female. Similar to male in general appearance, except slightly ovoid, with shortened hemelytral membrane, and antennal segment II moderately to strongly inflated and fusiform (fig. 27).

DISTRIBUTION: Widely distributed in the western Palearctic from the United Kingdom east to the USSR, and south to Spain, Italy, and Bulgaria. Also reported from Connecticut, Iowa, New York, Pennsylvania, and West Virginia in the USA.

DISCUSSION: *Atractotomus magnicornis* appears to be an introduced species in North America as is evidenced by its limited distribution, and occurrence on conifers primarily in ornamental situations. Adults have been collected on *Abies balsamea* (L.) Nutt., *A. cilicica* Carr., *A. nordmanniana* Spach, *Picea abies* (L.) Karst., *P. excelsa* Link, *P. glauca* (Moench) Voss, *P. pungens* Engelm., *Pinus strobus* L., *P. sylvestris* L., *Pseudotsuga taxifolia* (Poir.) Britton, and *Tsuga canadensis* (L.) Carr. In the Palearctic region, *magnicornis* is most commonly collected on *Abies alba* Miller and *Picea excelsa*, but also is recorded from *Abies pectinata* DC., *Larix europaea* DC., *Pinus mugo* Turra, and *P. sylvestris*.

The holotype and paratypes of *A. magnicornis buenoi* are not discernibly different from typical *magnicornis*. Knight (1923) distinguished *buenoi* by its small, ovate body, short second antennal segment, and dark embolar margins. My examination of specimens from several large series collected in New York shows these features to be well within the range of variation of typical *magnicornis*.

Since no other characters were found to support *buenoi* as a distinct subspecies, it is here proposed as a new junior synonym of *magnicornis*.

SPECIMENS EXAMINED: 522 specimens collected between May 24 and August 31 from the following localities: **AUSTRIA.** – **Nieder-Osterreich Prov.:** Lunz. **Prov. ?:** Seebenstein. **BULGARIA.** – Rila Mts. **CZECHOSLOVAKIA.** – Jeseniky Mts., Moravice R. **FINLAND.** – **Turku Dist.:** Pargas. **FRANCE.** – **Bas-Rhin Dept.:** Le Donon, 850 m. **Creuse Prov.:** Vallieres. **Haut-Rhin Dept.:** Col du Bonhomme. **Vosges Dept.:** [no specific locality]. **SPAIN.** – **Aragon Reg.:** Huesca Prov.: Oza/Hecho; S. Juan Pena. **Catalonia Reg.:** Lerida Prov.: Pallars Dist.: Areu; Vall Ferrera. **SWEDEN.** – **Malmohus Dist.:** Ringsjon Lake. **SWITZERLAND.** – **Valais Cant.:** Vissoye. **UNITED KINGDOM.** – **England:** **Buckingham Co.:** Bucks; Chiltern Hills; Slough. **Derby Co.:** Goyts [Moss]. **Dorset Co.:** Wimborne. **Essex Co.:** Theydon Bois. **Hampshire Co.:** Bournemouth; New Forest; Pamber Forest. **Hereford Co.:** Breinton; Credenhill. **Hertford Co.:** Barnet; Chorleywood. **Kent Co.:** Burham. **Somerset Co.:** Winsford. **Surrey Co.:** Gomshall; Guildford; Shiere; Woking. **Sussex Co.:** Harkley Common; Hollington; Hurst Green. **Yorkshire Co.:** Lythe. **Scotland:** **Aberdeen Co.:** Loch Davan. **Inverness Co.:** Kincaig. **Wales:** **Carmarthen Co.:** Carmarthen. **USA.** – **Iowa:** **Polk Co.:** Mitchellville, Thomas Mitchell County Pk. **New York:** **Nassau Co.:** East Meadow nr. Rt. 25 on Bluebird Drive; Flower Hill nr. Rt. 25A on Ridge Drive East; Roslyn Cemetery on Rt. 25A; Roslyn Fine Arts Museum and Gardens on Rt. 25A. **Suffolk Co.:** Bayshore, Brentwood Rd.; Caumsett State Pk., Queens College Sci. Center, Lloyd Neck. **Tompkins Co.:** Ithaca. **Westchester Co.:** Armonk-Calder Ecology Study Center; Hartsdale; White Plains (including 2♀ paratypes of *buenoi*). **Pennsylvania:** **Adams Co.:** Gettysburg. **Blair Co.:** Altoona, Pleasant Valley Nursery. **Bradford Co.:** Shelan Gardens, E of Athens. **Bucks Co.:** Jamison, 5 Spruce Tree Farm. **Cambria Co.:** Johnstown. **Clearfield Co.:** DuBois, R. Nelson Tree Farm **Centre Co.:** 2 mi N of State College. **Crawford Co.:** Blooming Valley. **Cumberland Co.:** Allen; Camphill. **Dauphin Co.:** Harrisburg; East Harrisburg Cemetery;

W[illia]m. Penn H[igh]. S[chool]. Conewago Twp., Cedar Rd., Brandt Farm; Hershey Hotel; 3 mi S of Hershey. *Elk Co.*: Ridgeway. *Erie Co.*: Black Hills; Erie; Fairview; Girard. *Monroe Co.*: Sciota Flea Market. *Montgomery Co.*: Lansdale, St. John's Church; Merion Stn., Barnes Arboretum; Philadelphia, Forest Hills Cemetery. *Tioga Co.*: Tioga Cemetery. *Washington Co.*: Bergerrstown, Ianeris Nursery; McMurry Chaffon's Nursery; S of W Finley; Washington, Vogel's Home. **WEST GERMANY.** – **Bayern Reg.:** *Nieder-Bayern Dist.:* Breitenb[erg]; Wartenberg. *Oberpfalz Dist.:* Amberg. *Schwaben Dist.:* Gennacher Moos; Kranzegg-Buchenberg; Schwabmunchen. *Dist. ?:* Brauneck. **Hessen Reg.:** Volgselsberg Mts. **Nordrhein-Westfalen Reg.:** Ascheberg; Marienheide. **Reg. ?:** Koniggratz; Neuhaus. Deposited in the collections of the AMNH, BMNH, MHNG, PERI, RIBE, SCHU, USNM, ZIUT, ZMHA, and ZMHE.

Atractotomus marcoi Carapezza

Figures 28, 150

Atractotomus marcoi Carapezza, 1982: 42–46 (n. sp., host).

DIAGNOSIS: Among Palearctic species, recognized by its small size; short second antennal segment, and structure of the male genitalia, especially the vesica with narrow gonopore well removed from apex, and short gonopore sclerite without spines (fig. 150).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.85–1.90. **Dorsal Aspect:** Dark reddish brown general coloration; head and pronotum slightly darker than hemelytra; vestiture with dark, moderately long, simple setae, and narrow scalelike setae. **Head:** Brown, lighter yellowish brown ventrad of antennal fossae; width across eyes 0.66–0.67; width of vertex 0.25–0.28; ratio of vertex width to head width 0.38:1 to 0.42:1; weakly produced anteriad of antennal fossae; posterior margin weakly concave; eyes occupying nearly entire height of head in lateral view; antennae inserted slightly above level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennal segments I and II dark reddish brown, segments III and IV pale brownish yellow; antennal segment II weakly inflated, nearly linear beyond basal constriction, length

0.59–0.64; ratio of length of antennal segment II to head width 0.88:1 to 0.97:1; genae narrow; gula nearly obsolete; labium reaching between mesocoxae. **Pronotum:** Posterior width 0.88–0.90; peritremal disk brown. **Hemelytra:** Nearly straight laterally; cuneus about half again as long as broad; membrane suffused with fuscous, veins darkened. **Legs:** Brown or yellowish brown; tibiae lighter brownish yellow; tibial spines dark brown. **Genitalia:** Figure 150.

Female. Similar to male in general appearance, except slightly ovoid, and with antennal segment II more strongly inflated and fusiform (fig. 28).

DISTRIBUTION: Sicily, Italy, and Moscow District, USSR.

DISCUSSION: This species was described from 45 specimens collected on *Pinus laricio* Poiret on Mt. Baracca in northeast Sicily. I have examined an additional male from near Moscow in the USSR, which agrees in all respects with a male paratype sent to me by A. Carapezza. The Moscow record suggests that *marcoi* is more broadly distributed in eastern Europe than records indicate. While it is possible that this species is simply not well collected, an alternative explanation is that it has been confused in the past with other species of *Atractotomus* (e.g., *magnicornis*, *parvulus*), or species in other groups, such as the *Psallus-Plagiognathus* complex.

SPECIMENS EXAMINED: **ITALY.** – **Sicily:** *Etna Prov.:* Mt. Baracca, nr. Linguaglossa, 1520 m, 25 Aug. 1979 (1♂, 1♀, paratypes, BMNH, gift from A. Carapezza). **USSR.** – *Moskva Dist.:* Uzkoye Sanatorium, 9 Sept. 1962 (1♂, ZIL).

Atractotomus miniatus (Knight),
new combination

Figures 29, 131

Lepidopsallus miniatus Knight, 1926: 226, 227 (n. sp., key); 1941: 47, 48 (key, descr.). – Froeschner, 1949: 134, 161 (key, note). – Carvalho, 1958: 54 (cat.). – Henry and Wheeler, 1988: 470 (cat.).

Lepidopsallus nyssae Johnston, 1930: 299, 300 (n. sp.). – Knight, 1941: 47, 48 (key, descr.). – Froeschner, 1949: 134, 161 (key, note). – Carvalho, 1958: 54 (cat.). – Henry and Wheeler, 1988: 470 (cat.). **NEW SYNONYMY.**

DIAGNOSIS: Recognized by the uniformly

pale second antennal segment, length of segment equal to or greater than width of head across eyes; brown to fuscous head; pronotum and hemelytra with widely distributed, scalelike setae; femora without scalelike setae; and vesica with short, weakly sclerotized gonopore sclerite, without spines or rarely with one to several weak spines below gonopore (fig. 131).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.90–2.31. **Dorsal Aspect:** Brownish orange to fuscous general coloration; lighter specimens usually with head darker fuscous, at least on tylus and frons, and with cuneus heavily suffused with red; vestiture with golden to dark brown simple setae, and widely distributed, moderately broad, scalelike setae. **Head:** Yellowish brown with tylus and frons suffused with fuscous, or uniformly fuscous; width across eyes 0.71–0.79; width of vertex 0.28–0.30; ratio of vertex width to head width 0.37:1–0.40:1; weakly produced anteriad of antennal fossae; posterior margin nearly straight, weakly carinate; vertex flattened; eyes occupying nearly entire height of head in lateral view; antennae yellow or brownish yellow, inserted at or slightly above level of ventral margin of eye; antennal segment II weakly inflated and linear beyond basal constriction, length 0.72–0.81; ratio of length of antennal segment II to head width 0.99:1 to 1.08:1; genae and gula nearly obsolete; labium reaching from middle to posterior margin of mesocoxae. **Pronotum:** Posterior width 1.05–1.20; peritremal disk brownish yellow to dark reddish brown. **Hemelytra:** Weakly rounded laterally; cuneus about a third again as long as broad; membrane lightly to heavily suffused with fuscous, veins pale, or sometimes strongly tinged with red. **Legs:** Femora pale brownish orange to dark reddish brown, apex narrowly pale; tibiae yellow or brownish yellow, usually with faint dusky spots at spine bases; tibial spines dark reddish brown or black; tarsi brownish yellow; pretarsus brown or dark brown. **Genitalia:** Gonopore sclerite short, weakly sclerotized, without spines, or rarely with one to several weak spines below gonopore (fig. 131).

Female. Similar to male in general appearance, but with slightly shortened wing membrane, and narrower, weakly clavate second antennal segment (fig. 29).

DISTRIBUTION: Southeastern United States.

DISCUSSION: Comparison of the holotype of *miniatus* with paratypes of *nyssae* indicates that these two nominal taxa are conspecific, differing only in general coloration, which varies from brownish orange to nearly black. I have been unable to verify the differences in the relative lengths of antennal segments I and II, used by Johnston (1930) and Knight (1941) to distinguish *miniatus* and *nyssae*, although I concur that some variation in the lengths of segments I and II is evident. Further, the male genitalia of the two nominal species are indistinguishable. Based on these findings, *nyssae* is here proposed as a junior synonym of *miniatus*.

Atractotomus miniatus has been collected on *Quercus falcata* Michx., *Q. incana* Bartr., *Q. nigra* L., *Q. palustris* Du Roi, *Q. phellos* L., *Q. stellata* Wang., *Q. velutina* Lindl., and *Q. virginiana* Mill. The holotype and paratypes of *nyssae* were taken on black gum, *Nyssa sylvatica* Marsh.

SPECIMENS EXAMINED: 261 specimens collected between Feb. 19 and May 25 from the following localities: USA. – **Arkansas:** Washington Co.: Washington Co. **Florida:** Alachua Co.: Alachua Co. Duval Co.: Jacksonville. Hillsborough Co.: Tampa. Orange Co.: Winter Pk. Pinellas Co.: Dunedin (♀ holotype, 23 March 1921 and 1♀ paratype, 28 March 1923, *miniatus*); Belle Air. Seminole Co.: Sanford. **Georgia:** Fulton Co.: Atlanta. Clarke Co.: Athens. **Louisiana:** Grand Isle. **Mississippi:** Alcorn Co.: Corinth. Harrison Co.: Biloxi. Leake/Stone Co.: Wiggins. County ?: Landon. **North Carolina:** Mecklenburg Co.: Monroe; 1 mi W of Rt. 16 on Rt. 51, nr. Matthews. Union Co.: Rolling Hills, W of Monroe on Rt. 74. **Pennsylvania:** Dauphin Co.: Harrisburg, E Harrisburg Cemetery. **South Carolina:** S. Carolina (1♀ paratype, *miniatus*). Pickens Co.: Clemson. **Texas:** Bandera Co.: Lost Maples St. Natural Area; 3 and 21 mi W of Medina. Brazos Co.: College Station (including 5♂, 14♀ paratypes, 12 May 1928, *nyssae*); Bryan. Burleson Co.: 3 mi E of Somerville. Edwards Co.: 14 mi W and 23 mi SE of Rocksprings. Erath Co.: 2 mi N of Dublin. Gillespie Co.: 8 mi E of Fredericksburg. Grimes Co.: Navasota. Llano Co.: 13 mi W of Llano. Matagorda Co.: Bay City. Real Co.: 5.2 mi E of Leakey. Sutton Co.: Sonora. Trav-

is Co.: Zilker Pk. *Williamson Co.*: Taylor. *County ?*: Tiger Mills. Deposited in the collections of the AMNH, CAS, CU, OSU, PDA, PU, TA&M, and USNM.

Atractotomus mitla, new species

Figures 30, 130, 168, 178

DIAGNOSIS: Similar to *oaxaca* but distinguished by the broader, more robust body; lighter, reddish brown general coloration, especially on posterior lobe of pronotal disk and clavus; uniformly darkened propleura and peritremal disk; broader vertex; weakly inflated second antennal segment (fig. 30); and structure of the male genitalia, particularly the coarse spines on the gonopore sclerite (fig. 130).

DESCRIPTION: *Male holotype.* Length from apex of tylus to cuneal fracture 2.38. **Dorsal Aspect:** Reddish brown general coloration; anterior lobe of pronotum, distal half of corium, and cuneus darker fuscous; vestiture with dark, simple setae and moderately broad, scalelike setae. **Head:** Dark fuscous; width across eyes 0.80, width of vertex 0.40; ratio vertex width/head width 0.50:1; weakly produced anteriad of antennal fossae, slightly more so than for *oaxaca*; posterior margin nearly straight, not noticeably carinate; eyes occupying about five-sixths of head height in lateral view; antennae dark fuscous, inserted slightly above level of ventral margin of eye; antennal segment II linear beyond basal constriction, weakly inflated with diameter equal to that of segment I, length 0.84; ratio of length of antennal segment II to width of head across eyes 1.05:1; gena narrow; gula obsolete; labium reaching middle of mesocoxae. **Pronotum:** Posterior width 1.27; peritremal disk dark brown. **Hemelytra:** Weakly rounded laterally; cuneus only slightly longer than broad; membrane heavily infuscated, veins darkened, pale distally. **Legs:** Femora dark reddish brown; tibiae brown or yellowish brown, usually lighter distally; tibial spines black; tarsi yellowish brown, segment III darker brown distally; pretarsus dark brown. **Genitalia:** Figures 130, 168, and 178. Vesica with apical gonopore, and coarse spines on gonopore sclerite (fig. 130).

Female. Similar to male but usually more uniformly reddish brown, and with slightly shortened hemelytral membrane; antennal

segment II narrower, weakly clavate, and with broad, pale region medially (fig. 30).

ETYMOLOGY: Named for the type locality in Oaxaca, Mexico.

DISTRIBUTION: Jalisco and Oaxaca, Mexico.

DISCUSSION: This species is reported to have been collected on low, shrubby vegetation at the type locality near Mitla, Oaxaca (J. C. Schaffner, personal commun.).

HOLOTYPE ♂: MEXICO, Oaxaca, 9 mi NE of Mitla, 20 July 1985, Jones and Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. — **Jalisco:** 1♀, 11 mi NW of Cd. Guzman, 13 April 1980, Cuda and Schaffner (TA&M). **Oaxaca:** 4♀, same data as holotype (AMNH, TA&M).

Atractotomus morelos, new species

Figures 32, 66, 132

DIAGNOSIS: Similar to *albidicoxis* in general appearance but distinguished by the darkened peritremal disk; broader head and vertex (see measurements and ratio below); yellowish brown tibiae; and structure of the male genitalia, especially the robust vesical strap with apical gonopore, and elongate gonopore sclerite with coarse spines on distal two-thirds only (fig. 132).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.65–2.92. **Dorsal Aspect:** Brown to dark fuscous general coloration, sometimes lighter yellowish brown on posterior half of pronotal disk, apex and lateral margins of scutellum, and margins of clavus and corium bordering claval suture; cuneus sometimes tinged with red; vestiture with dark, simple setae and moderately broad, scalelike setae. **Head:** Dark reddish brown to black; tylus, frons, and posterior margin of vertex sometimes yellowish brown, at least in part; width across eyes 1.00–1.02; width of vertex 0.52–0.54; ratio of vertex width to head width 0.52:1 to 0.54:1; moderately produced anteriad of antennal fossae; posterior margin nearly straight, weakly carinate; vertex flattened or slightly convex medially, weakly depressed bordering eyes; eyes occupying three-fourths of head height or slightly less in lateral view; antennae inserted at or slightly below level of ventral margin of eye, fossae narrowly removed from anteroventral margin of eye; antennae reddish

brown to dark fuscous, segment II sometimes slightly paler; antennal segment II weakly clavate, length 0.88–0.95; ratio of length of antennal segment II to head width 0.88:1 to 0.93:1; genae moderately broad; gula narrow; labium reaching from anterior margin to middle of mesocoxae. **Pronotum:** Posterior width 1.30–1.39; peritremal disk dark brown; apices of coxae white or yellowish white. **Hemelytra:** Weakly rounded laterally; cuneus about a fourth again as long as broad; membrane heavily suffused with fuscous, veins and narrow region bordering apex of cuneus pale. **Legs:** Brownish yellow or darker yellowish brown; femora lightly to heavily suffused with fuscous, especially dorsally; tibiae with dark spots at spine bases; tibial spines black; tarsal segment III and pretarsus brown or dark brown. **Genitalia:** Vesical strap robust, with apical gonopore; gonopore sclerite with coarse spines on distal two-thirds only (fig. 132).

Female. Similar to male in general appearance, but with slightly shortened hemelytral membrane, and antennal segment II shorter, narrower, and with lighter brown or yellowish brown coloration (fig. 32).

ETYMOLOGY: Named for its occurrence in the state of Morelos, Mexico.

DISTRIBUTION: South-central Mexico.

DISCUSSION: *Atractotomus morelos* is easily distinguished from other species of the genus by its large size, brownish general coloration, broad vertex, and robust vesica of the male with apical gonopore. The host plant association is not known.

HOLOTYPE ♂: MEXICO, Morelos, 10 mi SW of Cd. Mexico, 29 July 1976, Peigler, Gruetzmacher, R. and M. Murray, and Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Distrito Federal:** 3♂, 2♀, Contreras, 30 May 1946, J. and D. Pallister (AMNH); 1♀, Desiertos de los Leones, 12 June 1946, J. and D. Pallister (AMNH). **Mexico:** 4♂, Amecameca, 8 June 1897, Koebele Coll. (CAS). **Morelos:** 4♂, 7♀, same data as holotype (TA&M, USNM).

Atractotomus morio Sahlberg

Figures 31, 67, 115, 149

Atractotomus morio Sahlberg, 1883: 94, 95 (n. sp.). – Reuter, 1884: 458 (descr.), 515 (key); 1908: 74 (host). – Carvalho, 1958: 18 (see this catalog for list of pre-1958 citations).

DIAGNOSIS: Among Palearctic species, distinguished by its large size; long, slightly inflated second antennal segment (fig. 31); narrow, weakly curved pretarsal claws with minute pulvilli (fig. 115); and by the structure of the male genitalia, especially the S-shaped vesica with obsolete gonopore sclerite, and narrow, membranous finger extending from apex of vesical strap (fig. 149).

REDESCRIPTION: **Male.** Length from apex of tylus to cuneal fracture 3.04–3.30. **Dorsal Aspect:** Dark brown to nearly black general coloration; vestiture with suberect, dark, simple setae, and narrow scalelike setae. **Head:** Shiny fuscous, vertex lighter yellowish brown; width across eyes 0.82–0.84; width of vertex 0.32–0.35; ratio of vertex width to head width 0.38:1 to 0.42:1; narrowly produced anteriad of antennal fossae with steeply sloping frons and weakly produced tylus; posterior margin straight in dorsal view, very weakly elevated; vertex flattened; eyes occupying about five-sixths of head height in lateral view; antennae inserted slightly above level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennal segments I and II fuscous, segments III and IV yellow or brownish yellow; antennal segment II gradually thickened distally, diameter near apex nearly twice that of basal diameter, length 1.22–1.33; ratio of length of antennal segment II to head width 1.45:1 to 1.58; genae narrow; gula moderately developed; labium reaching from middle of mesocoxae to middle of metacoxae. **Pronotum:** Posterior width 1.26–1.28; peritremal disk darkened. **Hemelytra:** Long, straight laterally; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins slightly darker. **Legs:** Femora reddish brown to fuscous; tibiae brown or yellowish brown, hind pair usually darker reddish brown; tibial spines dark brown. **Genitalia:** Figure 149.

Female. Similar to male in general appearance, except slightly ovoid with shorter hemelytral membrane, and antennal segment II more strongly inflated distally, fusiform, distal diameter three times that of basal diameter (fig. 31).

DISTRIBUTION: Korea, Scandinavia, USSR.

DISCUSSION: *Atractotomus morio* is widely distributed in the northern Palearctic region, where it occurs primarily on *Picea*. Sahlberg

(1883) reported this species from among bushes in a spruce forest, and Reuter (1908) recorded it from Finland and western Siberia on *Picea excelsa* Link.

The vesica of the male is atypical of the genus, having an S-shaped rather than coiled appearance, and the gonopore is without a suspended sclerite (fig. 149). The long, weakly curved pretarsal claws with minute pulvilli (fig. 115) also are not typical of *Atractotomus*. However, *morio* does possess the field of stout spines on the dorsodistal surface of the metafemur, a feature shared only by species of *Atractotomus* and members of the related genus *Phoenicocoris*. *Atractotomus morio* is thus maintained in the genus based on the possession of metafemoral spines, and because it has no obvious relationship to other groups of Palearctic Phylini.

SPECIMENS EXAMINED: 15 specimens collected between July 9 and July 19 from the following localities: FINLAND. – Hammaslahti; Helsinki; Jaakkim[vaar]ja (♂ holotype); Kristunankaupunki. KOREA. – Jangkangdo; Samdzijon. SWEDEN. – Rautas. Deposited in the collections of the ZMHA, ZMHE, and ZIL.

Atractotomus nicholi Knight

Figures 33, 151

Atractotomus nicholi Knight, 1968: 57, 58 (n. sp., key). – Henry and Wheeler, 1988: 460 (cat.).

DIAGNOSIS: Recognized by its small size; brownish yellow general coloration, sometimes suffused with fuscous dorsally but leaving scutellum pale; dorsum with light and dark scalelike setae; antennal segment II black, slightly inflated in both sexes (fig. 33); legs uniformly pale yellow, or with fuscous suffusion on femora of darker specimens; and structure of the male genitalia, especially the form of the vesica (fig. 151). Similar to *acaciae* in general appearance but distinguished by the paler dorsal coloration, and hemelytral membrane without scalelike setae.

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.59–2.06. **Dorsal Aspect:** Grayish white or pale yellow ground color; pronotum and hemelytra lightly to heavily suffused with reddish brown or fuscous, sometimes broadly so—darker specimens with only lateral margins and medial stripe on pronotum, scutellum, base of co-

rium, and apex of corium bordering cuneal fracture pale; cuneus usually reddish orange or brownish orange; vestiture with light and dark simple setae, and silvery white to dark brown, scalelike setae. **Head:** Brownish yellow; usually suffused with brownish orange to fuscous, especially on jugum, lorum, apex of tylus, and lateral margins of frons bordering eyes; width across eyes 0.66–0.76; width of vertex 0.30–0.36; ratio of vertex width to head width 0.45:1 to 0.47:1; moderately produced anterior of antennal fossae; posterior margin weakly concave, not noticeably carinate; vertex flattened or slightly convex; eyes occupying about three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae narrowly removed from anteroventral margin of eye; antennal yellow or brownish yellow in pale specimens, segment II sometimes brown or dark brown; segments I and II always dark brown to black in darker specimens; antennal segment II weakly to moderately inflated, length 0.50–0.65; ratio of length of antennal segment II to head width 0.75:1 to 0.87:1; genae moderately broad; gula narrow; labium reaching from anterior margin to middle of mesocoxae. **Pronotum:** Posterior width 0.86–1.05; peritremal disk pale yellow, sometimes lightly suffused with fuscous along dorsal margin. **Hemelytra:** Weakly rounded laterally; cuneus about a fourth again as long as broad; membrane moderately suffused with fuscous, veins white. **Legs:** Yellowish white to pale brownish yellow, femora of darker specimens suffused with fuscous medially; tibiae with dusky spots at spine bases; tibial spines black; tarsi yellowish brown, segment III darker brown; pretarsus dark brown. **Genitalia:** Vesica with apical gonopore, and long gonopore sclerite with spines restricted to distal half (fig. 151).

Female. Similar to male in general appearance, but usually slightly more ovoid; antennal segment II sometimes weakly clavate or fusiform.

DISTRIBUTION: Southern Arizona and California.

DISCUSSION: The light and dark, scalelike setae on the dorsum will distinguish this species from all other representatives of the genus. *Atractotomus nicholi* occurs exclusively on *Acacia greggii* A. Gray

SPECIMENS EXAMINED: 117 specimens col-

lected between April 23 and June 12 from the following localities: USA. – **Arizona:** *Cochise Co.*: 8 mi NE of Portal. *Graham Co.*: 3 mi W of Rt. 666 on Rt. 266, 4000 ft. *Mari-copa Co.*: 5 mi S of Freeman (SE of Gila Bend), 625 m. *Pima Co.*: Santa Catalina Mts., Lower Sabino Cyn., 13500 ft. *Pinal Co.*: 7 mi W of Superior, 2500 ft. *Santa Cruz Co.*: Santa Rita Mts.; Santa Rita Mts., 4000 ft, 16 May 1928 (♀ allotype, 1♂ paratype). **California:** *San Diego Co.*: Anza-Borrego St. Pk., Carrizo Crk., 10.2 mi NW of Ocotillo on Rt. 52. Deposited in the collections of the AMNH, JTP, KU, UCR, and USNM.

Atractotomus nigripennis

(Schuh and Schwartz)

new combination

Figures 11, 34, 68, 133

Rhinacloa nigripennis Schuh and Schwartz, 1985: 424 (n. sp.).

DIAGNOSIS: Similar to *schwartzi* in general appearance but distinguished by its smaller, more elongate body form; deep castaneous general coloration; narrower vertex relative to head width; and structure of the male genitalia, especially the vesica with gonopore well removed from apex of strap, and short, weakly sclerotized gonopore sclerite with two or three tiny spines (fig. 133).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.46–1.74 (measurements taken from Schuh and Schwartz, 1985). **Dorsal Aspect:** Dark reddish brown to fuscous general coloration; vestiture with long, dark brown simple setae and moderately broad, scalelike setae. **Head:** Reddish brown to fuscous; width across eyes 0.66–0.71; width of vertex 0.31–0.33; ratio vertex width/head width 0.46:1 to 0.48:1; weakly produced anteriad of antennal fossae; posterior margin weakly concave, not noticeably carinate; eyes occupying about three-fourths of head height in lateral view; antennae uniformly reddish brown to fuscous, inserted at level of ventral margin of eye; antennal segment II nearly linear beyond basal constriction, diameter about equal to that of segment I, length 0.53–0.56; ratio of length of antennal segment II to width of head across eyes 0.78:1 to 0.80:1; genae moderately developed; gula narrow; labium reaching apex of mesocoxae. **Pronotum:** Posterior width 0.81–0.91; peritremal

disk dark reddish brown. **Hemelytra:** Elongate, parallel-sided; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins darkened, or sometimes tinged with red distally. **Legs:** Uniformly dark reddish brown; tibial spines black. **Genitalia:** Figure 133.

Female. Broadly ovoid with shorter hemelytral membrane than male; antennal segment II weakly clavate, sometimes yellow or yellowish brown on proximal half (fig. 34).

DISTRIBUTION: Central Mexico.

DISCUSSION: This species was originally described in the genus *Rhinacloa* by Schuh and Schwartz because it had a distinct row of spines on the dorsodistal surface of the hind femora. At the time, the authors noted that the male genitalia of *nigripennis* did not closely resemble those of any other known species of *Rhinacloa*. In fact, the male genitalia and head structure of *nigripennis* are much more similar to those of *Atractotomus* species. Further, close examination of the femoral spines of *nigripennis* reveals that they are not as linear in arrangement as is typical of the genus *Rhinacloa*. Instead, the spines form an irregular row with some doubling—a condition which is found in many *Atractotomus* species (e.g., *magnicornis* (fig. 85), *oaxaca*). These features justify the movement of *nigripennis* into the genus *Atractotomus*.

SPECIMENS EXAMINED: 63 specimens collected between July 3 and September 7 from the following localities: MEXICO. – **Durango:** 5 mi W of Durango (1♂, 2♀, paratypes). **Nuevo Leon:** 5.3 mi S of La Escondida. **Oaxaca:** 6 and 9 mi NE of Mitla. **San Luis Potosi:** Matehuala (1♂, 2♀, paratypes); 7 mi E of San Luis Potosi. **Zacatecas:** Tropic of Cancer marker on Hwy. 54, 1958 m (including 6♂ and 4♀ paratypes). Deposited in the collections of the AMNH, CNC, and TA&M.

Atractotomus oaxaca, new species

Figures 35, 69, 134, 169, 179

DIAGNOSIS: Recognized by the dark brown general coloration, with peritremal disk and apex of propleuron pale; length of antennal segment II greater than width of head across eyes; femora without scalelike setae—hind pair with nearly linear row of spines dorsally; and structure of the male genitalia, especially the elongate anterior process of the left par-

amere (fig. 169), and gonopore sclerite with widely spaced, fine spines (fig. 134).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.21–2.38. **Dorsal Aspect:** Dark brown or fuscous general coloration, sometimes with embolium and cuneus lighter brown or yellowish brown; vestiture with dark, simple setae and moderately broad, scalelike setae. **Head:** Dark brown or fuscous; bucculae and genae white; width across eyes 0.74–0.76; width of vertex 0.32–0.34; ratio of vertex width to head width 0.43:1 to 0.46:1; weakly produced antieriad of antennal fossae; posterior margin nearly straight, not noticeably carinate; eyes occupying about five-sixths of head height in lateral view; antennae dark brown, segments III and IV, and middle of segment II sometimes lighter brown, inserted slightly above level of ventral margin of eye; antennal segment II linear beyond basal constriction, length 0.79–0.94; ratio of length of antennal segment II to width of head across eyes 1.07:1 to 1.24:1; genae narrow; gula obsolete; labium reaching apex of mesosternum or slightly beyond. **Pronotum:** Posterior width 1.06–1.09; peritremal disk and apical third of propleura white or yellowish white. **Hemelytra:** Nearly straight laterally, elongate, well surpassing apex of genital capsule; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins testaceous. **Legs:** Front and middle femora mostly brownish yellow, sometimes darker distally or at least tinged with fuscous dorsally; basal third to one-half of hind femora brownish yellow, distal region brown or dark brown; tibiae mostly pale, hind pair sometimes lightly to moderately tinged with fuscous; tibial spines black; tarsi brown or yellowish brown; pretarsus dark brown. **Genitalia:** Figures 134, 169, and 179. Gonopore sclerite with widely spaced, fine spines (fig. 134).

Female. Similar to male in general appearance, but with distinctly shortened hemelytral membrane, and shorter, narrower second antennal segment (fig. 35).

ETYMOLOGY: Named for the state of Oaxaca, Mexico.

DISTRIBUTION: Oaxaca, Mexico.

DISCUSSION: Although host plant information was not provided with the examined specimens of *oaxaca*, it is reported to have

been taken at both localities in Oaxaca on low, shrubby vegetation (J. C. Schaffner, personal commun.).

HOLOTYPE ♂: MEXICO, Oaxaca, 9 mi NE of Mitla, 20 July 1985, Jones and Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Oaxaca:** 20♂, 13♀, same data as holotype; 6♂, 7♀, same data as holotype except 6 mi NE of Mitla. Deposited in the collections of the AMNH, TA&M, and USNM.

Atractotomus ovatus (Knight),
new combination

Figures 9, 70, 86, 152

Lepidopsallus ovatus Knight, 1926: 227 (n. sp.). – Carvalho, 1958: 54 (cat.). – Knight, 1968: 51 (key, note) (in part). – Henry and Wheeler, 1988: 470 (cat.).

Lepidopsallus nicholi Knight, 1968: 51–53 (n. sp., key). – Henry and Wheeler, 1988: 470 (cat.).
NEW SYNONYMY.

DIAGNOSIS: Similar to *miniatus* in general appearance but distinguished by the shorter relative length of antennal segment II (ratio of length of segment to width of head across eyes from 0.85:1 to 1.00:1) and broadly curved vesica with spherical gonopore (fig. 152).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.76–2.31. **Dorsal Aspect:** Brownish yellow or grayish yellow, to uniformly piceous general coloration; lighter specimens with head and calli mostly dark brown or fuscous, or sometimes with pronotum more extensively darkened; hemelytra of pale specimens sometimes lightly tinged with red, especially on cuneus; vestiture with golden to black, simple setae and moderately broad scalelike setae. **Head:** Fuscous or piceous, interocular region sometimes brown or yellowish brown; width across eyes 0.69–0.79; width of vertex 0.28–0.34; ratio of vertex width to head width 0.39:1 to 0.43:1; weakly produced antieriad of antennal fossae; posterior margin nearly straight, weakly carinate; eyes occupying three-fourths to five-sixths of head height in lateral view; antennae yellow or brownish yellow, inserted slightly above level of ventral margin of eye; antennal segment II weakly clavate, length 0.61–0.79; ratio of length of antennal seg-

ment II to width of head across eyes 0.85:1 to 1.00:1; genae moderately developed; gula narrow; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 0.96–1.25; peritremal disk reddish brown or piceous, sometimes yellowish brown in pale specimens. **Hemelytra:** Weakly rounded laterally; cuneus only slightly longer than broad; membrane lightly to heavily suffused with fuscous, veins brownish yellow, sometimes lightly tinged with orange. **Legs:** Femora uniformly brownish yellow, or fuscous to near apex with distal region pale; tibiae and tarsi pale brownish yellow; tibiae with black spines and dusky spots at spine bases; pretarsus brown or yellowish brown. **Genitalia:** Vesica with broadly curved strap, narrow subspherical gonopore, and weakly sclerotized, spineless gonopore sclerite (fig. 152).

Female. Similar to male in general appearance, but more ovoid with slightly shortened wing membrane, and narrower second antennal segment.

DISTRIBUTION: Southwestern United States.

DISCUSSION: Examination of the holotypes of *Lepidopsallus nicholi* and *L. ovatus* reveals that these two nominal species are conspecific. Knight (1968) distinguished *nicholi* from *ovatus* by its lighter general coloration and uniformly "pallid legs and antennae." My examination of material from numerous localities indicates that the general coloration of this species, including that of the legs, is quite variable, ranging from pale brownish yellow to uniformly piceous. I have not seen the differences in antennal coloration referred to by Knight (1968)—all specimens had uniformly yellow or brownish yellow antennae. Based on these observations, I propose *nicholi* as a new junior synonym of *ovatus*. The species is easily recognized by the structure of the vesica (fig. 152).

Atractotomus ovatus has been collected on the following plants: *Berberis fremonti* Torr., *Juglans major* (Torr.) Heller, *Quercus arizonica* Sarg., *Q. emoryi* Torr., *Q. gambelii* Nutt., *Q. hypoleucoides* A. Camus, *Q. oblongifolia* Torr., *Q. reticulata* Humb. & Bonpl., *Q. turbinella* Greene, and *Q. undulate* Torr.

SPECIMENS EXAMINED: 962 specimens collected between April 18 and Aug. 14 from the following localities: USA. — **Arizona:** Co-

chise Co.: Chiricahua Mts., 6000 ft, 20 June 1928 (1♂ paratype, *nicholi*); Chiricahua Mts., 6200 ft; Chiricahua Mts., Onion Saddle, 7600 ft, 31°56'N 109°16'W; Onion Saddle to 3.5 mi E of Nat. For. boundary, Chiricahua Mts., 5300–5600 ft; Portal, 4770 ft; 5 mi W of Portal; vicinity of Portal, 1500–1700 m; 0.5 and 1.5 mi towards Portal from Onion Saddle, 2350 m; 1.4 mi towards Rustler Pk. from Onion Saddle, 2400 m; Rd. from Portal to Rustler Pk., Chiricahua Mts., 6500 ft; Texas Cyn. rest stop on US Rt. 10, T16S R22E, 4970 ft. *Coconino Co.:* Coconino Co.; S rim of Grand Canyon Nat. Pk.; 7 and 11 mi N of Jacob Lk. on Rt. 89, 2313–2355 m; 3.5 mi S of Sedona on Rt. 179, 4200 ft, T17N R6E Sec.30. *Gila Co.:* Old CCC Cmpgd. S of Globe on Pioneer Pass Rd., 4700 ft; 2 mi SE of Gila Co. Line (4 mi NE of Strawberry) on Rt. 87, 6500 ft; 6 mi S of Jct. Rts. 87 and 188 (Rt. 87 at For. Ser. Rd. 171), 3300 ft; 17 mi N of Globe, Jones Water Cmpgd., 4300 ft. *Graham Co.:* Stockton Pass, Pinaleno Mts., 5200–5500 ft. *Maricopa Co.:* Four Peaks Rd., mile 12. *Mohave Co.:* Hualapai Mts., SE of Kingman, T20N R15W, 4000–6400 ft. *Pima Co.:* Baboquivari Mts., Sabino Cyn.; Empire Mts., 5000 ft, 20 May 1928 (♀ holotype, allotype, and 2♂, 7♀ paratypes, *nicholi*); Tucson, 3 May 1924 (♀ holotype, *ovatus*); Tucson, 12 May 1929 (2♀ paratypes, *nicholi*); Santa Catalina Mts.: Windy Pt. Vista, 6300 ft; Bear Cyn. Picnic Area, 5700 ft. *Pinal Co.:* 19 mi W of Globe, Magma Mine Rd. at Rt. 60. *Santa Cruz Co.:* Atascosa Mts., Calabasas Cyn. P[icnic]. G[round]. *Yavapai Co.:* 1 mi S of Yarnell on Rt. 89; 2.0 mi S of Rt. 89A on Rt. 89; 4 mi S of Prescott Nat. For. boundary, 1600 m; 5 mi N of Prescott on Rt. 89, 1800 mm; 15.8 mi S of Ash Fork on Rt. 89. **Colorado:** *Douglas Co.:* Waterton; Waterton, Head of Hiline. *Garfield Co.:* Baxter Pass (radio tower), 14 mi SE of Colorado St. border on UT St. Rt. 45, 8200 ft.; 10 mi E of Glenwood Springs. *Jefferson Co.:* Deer Crk. Cyn., 6500 ft. *Montezuma Co.:* Mesa Verde Nat. Pk. *Montrose Co.:* Montrose; 2 mi S of Columbine Pass. *Ouray Co.:* Ridgeway. **Nevada:** *Nye Co.:* Nevada Atomic Test Site, Shoshone Mts., 9.0–10.5 mi SW of Tippapah Hwy. on Mine Mt. Rd., 5200–6000 ft. **New Mexico:** *Otero Co.:* Cloudcroft. *Torrance Co.:* Ta-jique. **Utah:** *Carbon Co.:* entr. to Price Cyn.

Recr. Area, 8 mi NW of Helper on Rt. 50/6, T12E R9E, 8000 ft. *Garfield Co.*: Mt. Hillers at Starr Spgs. Cmpgd., T34S R11E, 6300 ft. *Grand Co.*: Geyser Crk., nr. Taylor Flats. *Iron Co.*: East Cedar City. *Salt Lake Co.*: Emigration Cyn.; mouth of Little Cottonwood Cyn. on UT St. Rt. 210, 5800 ft. *San Juan Co.*: La Sal Mts., nr. Brumley Crk., T27S R24E, 8000 ft. *Sanpete Co.*: Cottonwood Crk., 4.7 mi NE of Fairview on Rt. 31 (0.5 mi W of Nat. For. boundary), 7000 ft. *Sevier Co.*: Richfield; Clear Crk. Narrows Summit on Rt. 4, 2244 m. *Wasatch Co.*: Dock Flat, 1 mi NE of UT St. Rt. 40, T2S R12W Sec.9, 8000 ft; 5 mi W of Duchesne Co. line on UT St. Rt. 40, Deep Cyn., T3S R9W, 7000 ft. *Washington Co.*: Leeds Canyon; Zion Nat. Pk., 7 mi NE of St. Rt. 15 on Kolob Reservoir Rd., 4000–5000 ft. Deposited in the collections of the AMNH, CAS, JTP, KU, TA&M, and USNM.

Atractotomus pallidus, new species

Figures 36, 71, 88, 153

DIAGNOSIS: Recognized by the pale grayish yellow general coloration, hemelytra sometimes slightly darker; head yellow or brownish yellow with apex of tylus and spot above antennal fossae fuscous; antennae pale, segment I and basal joint of segment II sometimes suffused with fuscous; hind femora with limited fuscous spots; and structure of the male genitalia, especially the elongate, narrowly opened gonopore at apex of vesical strap, and gonopore sclerite without spines, or rarely with one or two weak spines distally (fig. 153).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.76–2.12. **Dorsal Aspect:** Brownish yellow to dark yellowish brown general coloration; hemelytra sometimes darker brown; pronotal disk sometimes tinged with green anteriorly; vestiture with golden to dark brown, simple setae and uniformly distributed, moderately broad, scale-like setae (fig. 71). **Head:** Yellow or pale brownish yellow; spot above antennal fossae and apex of tylus fuscous; width across eyes 0.58–0.70; width of vertex 0.28–0.30; ratio of vertex width to head width 0.43:1 to 0.48:1; weakly produced anterior of antennal fossae; posterior margin weakly concave, not noticeably carinate; vertex weakly convex;

eyes occupying about three-fourths of head height in lateral view; antennae inserted near ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennae brownish yellow or yellowish brown, segment I and narrow band at base of segment I sometimes infuscated; antennal segment II linear beyond basal constriction, not noticeably inflated, length 0.70–0.91; ratio of length of antennal segment II to head width 1.09:1 to 1.30:1; genae moderately developed; gula narrow; labium reaching from anterior margin to middle of mesocoxae. **Pronotum:** Posterior width 0.84–1.03; peritremal disk yellowish white or pale yellow. **Hemelytra:** Weakly rounded laterally; cuneus about a third again as long as broad; membrane lightly to moderately suffused with fuscous, veins pale, or sometimes darkened basally. **Legs:** Yellow or brownish yellow; tarsi sometimes yellowish brown; pretarsus brown or yellowish brown; femora with scattered fuscous spots, at least dorsodistally, but usually more widely distributed; tibiae with dark brown or black spines, and usually with dusky to fuscous spots at spine bases. **Genitalia:** Vesica with elongate, narrowly opened gonopore at apex of vesical strap, and gonopore sclerite without spines, or rarely with one or two weak spines distally (fig. 153).

Female. Similar to male in general appearance, except hemelytral membrane slightly shortened, and second antennal segment narrower and weakly clavate (fig. 36).

ETYMOLOGY: From the Latin, *pallidus* (ashen, pale), referring to the pale general coloration.

DISTRIBUTION: Southern Mexico.

DISCUSSION: The pale general coloration, including the head, and the male genitalia of *pallidus* indicate a relationship with the American Southwest species, *prosopidis*. The general coloration of some specimens examined from the states of Guerrero and Puebla was considerably darker than that of the holotype and paratypes from Jalisco. In particular, the hemelytra and first antennal segment were noticeably suffused with fuscous. Other external features and the male genitalia of the various specimens were indistinguishable.

The host plant association is not known.

HOLOTYPE ♂: MEXICO, Jalisco, Nevado de Colima Rd., 2.3 mi W of Hwy. Jct. (nr.

Atenquique), 5000 ft, 20–21 April 1977, R. Murray, M. Sweet, and J. Schaffner (TA&M, deposited in the AMNH).

PARATYPES: 1♂, 2♀, same data as holotype (AMNH, TA&M, USNM).

ADDITIONAL SPECIMENS: 11 specimens collected between July 16 and July 27 from the following localities: MEXICO. – **Guerrero:** 2.1 mi NW of Cacahuamilpa; 6 mi NE of Tixtla de Guerrero. **Puebla:** 4 mi SW of Acatpec (all TA&M).

Atractotomus parvulus Reuter

Figures 37, 157, 158

Atractotomus parvulus Reuter, 1878: 95, 96 (n. sp.); 1884: 458 (descr.), 515, 516 (key); 1908: 74 (host). – Carvalho, 1958: 18, 19 (see this catalog for list of pre-1958 citations). – Wagner and Weber, 1964: 444 (key), 445, 446 (descr., host). – Wagner, 1975: 116 (key).

Atractotomus brevicornis: Reuter, 1908: 74 (host), in part.

Atractotomus mirificus Woodroffe, 1971: 265–267 (n. sp.). **NEW SYNONYMY.**

Heterocapillus brevicornis: Wagner, 1960: 2–4 (n. comb.); 1975: 122 (key), 125 (descr., host).

DIAGNOSIS: Very similar to *marcoi*, the two species adequately distinguished only by the structure of the vesica (see figures 150 and 157). In *parvulus* the secondary gonopore is thicker with a longer sclerite, and the vesical strap distad of the gonopore is noticeably broader than for *marcoi*. Although only two males of *marcoi* were available for examination, *parvulus* males were further differentiated from these by the slightly longer second antennal segment (see description), and the nearly straight posterior margin of the head.

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.67–2.20. **Dorsal Aspect:** Brown or dark brown general coloration, sometimes suffused with red especially on hemelytra; head, pronotum, and scutellum usually darker fuscous; vestiture with dark, moderately long, simple setae, and narrow scalelike setae. **Head:** Dark brown or fuscous, usually somewhat lighter ventrad of antennal fossae; width across eyes 0.64–0.69; width of vertex 0.26–0.29; ratio of vertex width to head width 0.41:1 to 0.44:1; only slightly produced anteriad of antennal fossae; posterior margin nearly straight; eyes occupying nearly entire height of head in lateral

view; antennae inserted slightly above level of ventral margin of eye, fossae narrowly removed from anteroventral margin of eye; antennal segments I and II dark reddish brown or fuscous, segments III and IV pale brownish yellow; antennal segment II weakly inflated, linear beyond basal constriction, or sometimes very slightly expanded distally, length 0.66–0.74; ratio of length of antennal segment II to head width 1.04:1 to 1.08:1; genae and gula narrow; labium reaching between mesocoxae. **Pronotum:** Posterior width 0.86–0.96; peritremal disk dark brown. **Hemelytra:** Nearly straight laterally; cuneus about a third again as long as broad; membrane suffused with fuscous, veins slightly darker. **Legs:** Femora brown or dark brown; tibiae pale brownish yellow to light brown, hind pair usually somewhat darker than others; tibial spines dark brown. **Genitalia:** Figure 157.

Female. Similar to male in general appearance, except slightly ovoid, and with antennal segment II more strongly inflated and fusiform (fig. 37).

DISTRIBUTION: Widely distributed in the western Palearctic.

DISCUSSION: The primary host plant of this species is pine, although it sometimes is taken on other conifers such as *Abies* and *Picea*. I have examined material from United Kingdom and Spain collected on *Pinus sylvestris* L., and from Yugoslavia on *P. halepensis* Mill. The *P. halepensis* record for *Heterocapillus brevicornis* (Reuter) in Reuter (1908) almost certainly pertains to *parvulus*.

Atractotomus brevicornis was described by Reuter (1900) from an unspecified number of female specimens collected in Algeria. Along with other species of *Atractotomus*, *brevicornis* was placed in the subgenus *Heterocapillus* by Wagner (1960). *Heterocapillus* was subsequently raised to the rank of genus by Kerzhner (1962). The illustrations of the male genitalia provided in Wagner (1975) suggest that the correct placement of *brevicornis* is in the genus *Atractotomus*. I have examined specimens identified as *brevicornis* from Spain and Yugoslavia, including material from the Wagner collection, and found all of these to be conspecific with *parvulus*. It is apparent from Reuter's (1908) record of *brevicornis* on *P. halepensis* in the Dalmatia region of Yugoslavia that he could not distinguish this species from *parvulus*. All spec-

imens that I have examined from Dalmatia seem to belong to *parvulus*, even though they are widely variable in size and general coloration. One series of specimens taken at Ragusa (= Dubrovnik) and identified by Reuter as *brevicornis* are much smaller (length, 1.67–1.75; antennal segment II, 0.57–0.61) and paler than those from other southern European localities, including nearby Hvar Is. and Split. However, the head structure, vestiture, and male genitalia of these specimens are indistinguishable from typical *parvulus*. Based on these findings, it is likely that the type of *brevicornis* from Algeria is conspecific with *parvulus*. However, as I have been unable to locate the type material of this species, no synonymy is proposed at this time.

I have examined the holotype and paratypes of *mirificus*, deposited in the BMNH, and found these to be indistinguishable from *parvulus* as it is known in central Europe. I found no distinction between the male genitalia of *mirificus* and *parvulus* as was suggested by Woodroffe (1971). It is possible that Woodroffe had a confused concept of *parvulus*, either from the inaccurate illustrations of the male genitalia of this species in Wagner and Weber (1964), or from misidentified material in the BMNH collections. Based on these findings, *mirificus* is proposed as a new junior synonym of *parvulus*.

SPECIMENS EXAMINED: 45 specimens collected between July 11 and August 30 from the following localities: AUSTRIA. – Grins, 1300 m. FRANCE. – Essonne Dep.: Saclas. Siene-et-Marne Dep.: Fontainebleau Forest. SPAIN. – Catalonia Reg.: Calella/Palafrugell; Lladurs; Sant Andreu. UNITED KINGDOM. – England: Surrey Co.: Thursley Common, 13 Aug. 1970 (holotype, allotype, 21 paratypes, *mirificus*). WEST GERMANY. – Baden-Württemberg Reg.: Nürtingen/Neckar. Niedersachsen Reg.: Hannover. YUGOSLAVIA. – Dalmatia Reg.: Hvar Is.; Ragusa (= Dubrovnik); Split. Deposited in the collections of the BMNH, MHNG, PERI, RIBE, ZIUT, ZMHA, and ZMHE.

Atractotomus persquamosus Seidenstücker
Figures 39, 155

Atractotomus persquamosus Seidenstücker, 1961:
49–41 (n. sp., host). – Wagner, 1975: 116 (key),
120 (descr., host).

Atractotomus brunomassai Carapezza, 1982: 46–48 (n. sp., host). NEW SYNONYMY.

DIAGNOSIS: Distinguished from other Palearctic species by the scalelike setae on the hemelytral membrane, and the structure of the male genitalia, especially the robust vesica with apical gonopore, and the long gonopore sclerite with spines mostly restricted to distal half (fig. 155).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.98–2.20. **Dorsal Aspect:** Reddish brown to dark brown general coloration; head, pronotum, and scutellum usually somewhat darker than hemelytra; vestiture with moderately long, dark, simple setae, especially along embolium and lateral margins of pronotum, and with narrow scalelike setae. **Head:** Dark reddish brown or fuscous; width across eyes 0.68–0.69; width of vertex 0.29; ratio of vertex width to head width 0.42:1 to 0.43:1; moderately produced anteriad of antennal fossae with steeply sloping frons and moderately produced tylus; posterior margin weakly concave; eyes occupying about three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennal segments I and II dark reddish brown or fuscous, segments III and IV pale brownish yellow; antennal segment II strongly and evenly inflated, length 0.81; ratio of length of antennal segment II to head width 1.17:1 to 1.19:1; genae and gula moderately developed; labium reaching from posterior margin of mesocoxae to middle of metacoxae. **Pronotum:** Posterior width 0.92–1.04; peritremal disk darkened. **Hemelytra:** Nearly straight laterally; cuneus about a third again as long as broad; membrane suffused with fuscous, veins slightly darker. **Legs:** Femora reddish brown to fuscous; tibiae pale brownish yellow, hind pair darker yellowish brown or reddish brown especially on basal half; tibial spines dark brown. **Genitalia:** Figure 155.

Female. Similar to male in general appearance, except slightly ovoid with shorter hemelytral membrane, and antennal segment II more strongly inflated, diameter at least twice that of segment I (fig. 39).

DISTRIBUTION: Greece, Italy, Turkey.

DISCUSSION: *Atractotomus persquamosus* was described from four females collected on

Abies cilicica Carr. in the Taurus Mts., near Namrun, Cilicia Prov., Turkey. It has since been collected in southern Italy on *Abies alba* Miller (as *A. brunomassai*) and in Greece.

Although I have not examined the holotype of *persquamosus*, specimens of this species collected in Greece are indistinguishable from paratypes of *brunomassai*. Carapezza (1982) used the color of the hind tibiae, and the vertex width/eye width ratio to distinguish *brunomassai* from *persquamosus*, but I have not found reliable differences in these features. The vertex/eye ratio was constant in the specimens that I examined (1.45:1, males; 1.80:1, females), while the coloration of the hind tibiae varied indiscriminately. Similar variation in leg coloration occurs in other *Atractotomus* species, which suggests that the differences noted by Carapezza are not species specific. It is apparent from Seidenstücker's description, that the holotype and paratypes of *persquamosus* are simply slightly darker overall than the type series of *brunomassai*, some of which appear to be teneral. My investigation of structural features, including the male genitalia, revealed no discernible differences between these nominal taxa. Based on these findings, *brunomassai* is proposed here as a new synonym of *persquamosus*.

SPECIMENS EXAMINED: GREECE. – **Argolis Prov.:** 1♂, between Kandhila and Skotini, 12 July 1982 (ZIUT). **Larisa Prov.:** 1♀, Mt. Olympus, nr. Karia, 16–18 July 1982 (ZIUT). ITALY. – **Calabria: Costenza Prov.:** Sila Piccola Mts., Mt. Gariglione, 1600 m, 24 July 1981 (1♂, 1♀, paratypes, *brunomassai*, BMNH, gift from A. Carapezza).

Atractotomus polymorphae, new species

Figure 135

DIAGNOSIS: Recognized by the second antennal segment longer than width of head across eyes (ratio—1.06:1 to 1.22:1); body and legs without scalelike setae; legs uniformly brownish yellow; gonopore of vesica situated near apex of strap; and gonopore sclerite without, or with several widely spaced, indistinct spines distally (fig. 135).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.15–2.42. **Dorsal Aspect:** Brownish red to dark reddish brown

general coloration; vestiture with silvery white to dark brown, simple setae only, no scalelike setae. **Head:** Brown or yellowish brown ventrad of eyes; frons and tylus usually darker fuscous; vertex slightly lighter, especially bordering eyes; width across eyes 0.72–0.79; width of vertex 0.27–0.30; ratio of vertex width to head width 0.36:1 to 0.40:1; weakly produced anterior of antennal fossae; posterior margin nearly straight, weakly carinate; eyes occupying nearly entire height of head in lateral view; antennae yellow or yellowish brown, segment II sometimes fuscous distally, inserted slightly above level of ventral margin of eye; antennal segment II nearly linear, slightly narrowed basally, length 0.80–0.94; ratio of length of antennal segment II to head width 1.06:1 to 1.22:1; genae and gula narrow; labium reaching from posterior margin of mesocoxae to middle of metacoxae. **Pronotum:** Posterior width 1.07–1.22; peritremal disk yellowish brown to fuscous; thoracic pleura and venter without scalelike setae. **Hemelytra:** Nearly straight laterally; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins yellowish brown, sometimes tinged with red. **Legs:** Uniformly brownish yellow, coxae and femora sometimes lightly tinged with red or brown; tibial spines dark brown; pretarsus brown or dark brown. **Genitalia:** Gonopore sclerite without spines, or sometimes with one to several weak spines distally (fig. 135).

Female. Similar to male in general appearance, but with slightly shortened hemelytral membrane, and thinner, weakly clavate second antennal segment.

ETYMOLOGY: Named for the oak species on which the holotype and many of the paratypes were collected.

DISTRIBUTION: Nuevo Leon and Tamaulipas, Mexico.

DISCUSSION: The most distinguishing feature of *polymorphae* in the absence of scalelike setae on the dorsum and lateral sclerites of the thorax and abdomen. Other features of the external morphology and male genitalia firmly place this species in the genus *Atractotomus*, and indicate a relationship with other oak-inhabiting species (see *agrifoliae* diagnosis and phylogenetic analysis).

HOLOTYPE ♂: MEXICO, Nuevo Leon, 7.5 mi S of Monterrey, 21 Mar. 1974, ex. *Quercus*

polymorpha S. & C., J. C. Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Nuevo Leon:** 11♂, 8♀, same data as holotype; 10♂, 14♀, same data as holotype except 12 Mar. 1976, Vincent and Schaffner [no host plant]; 4♂, 3♀, same data as holotype except 13 Mar. 1977, Gruetzmacher, Sweet, Jordon, and Schaffner; 1♂, same data as holotype except 26 Mar. 1979. **Tamaulipas:** 1♂, 3♀, 11 mi NW of Cd. Victoria, Canon de Libertad, 21 Mar. 1986, ex. *Quercus* sp., J. C. Schaffner. Deposited in the collections of the AMNH, TA&M, and USNM.

Atractotomus prosopidis (Knight),
new combination

Figures 38, 136, 137, 180

Microphylidea prosopidis Knight, 1968: 29 (n. sp.).
– Schuh and Schwartz, 1985: 429, 430 (descr.).
– Henry and Wheeler, 1988: 477 (cat.).

DIAGNOSIS: Similar to *pallidus* in general appearance but distinguished by the narrower vertex and shorter relative length of antennal segment II (see ratios below); head and femora uniformly pale, without fuscous markings; antennal segment II usually infuscated distally; secondary gonopore more broadly opened; and gonopore sclerite with eight or more widely spaced spines (figs. 136, 137).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.88–2.32. **Dorsal Aspect:** Yellow or pale brownish yellow general coloration; vestiture with silvery white to golden, simple setae and uniformly distributed, narrow, scalelike setae. **Head:** Yellowish white or pale yellow; width across eyes 0.70–0.75; width of vertex 0.25–0.28; ratio of vertex width to head width 0.33:1 to 0.38:1; weakly produced anteriad of antennal fossae; posterior margin nearly straight; vertex flattened medially, with low, broad carina posteriorly; eyes occupying about five-sixths of head height in lateral view; antennae inserted slightly above level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennae yellow or brownish yellow, segment II usually infuscated distally; antennal segment II nearly linear beyond basal constriction, or sometimes slightly inflated distally and appearing weakly

clavate, length 0.65–0.84; ratio of length of antennal segment II to head width 0.93:1 to 1.12:1; genae noticeably developed; gula narrow; labium reaching from apex of mesosternum to anterior margin of mesocoxae. **Pronotum:** Posterior width 0.98–1.09; peritremal disk pale yellow. **Hemelytra:** Weakly rounded laterally; cuneus about two-thirds again as long as broad; membrane with faint, brownish yellow tinge, veins white or yellowish white. **Legs:** Uniformly pale yellow or brownish yellow; tarsi and pretarsus sometimes yellowish brown; tibial spines golden. **Genitalia:** Figures 136, 137, and 180. Vesica with gonopore near apex of vesical strap, and gonopore sclerite with widely spaced, coarse spines (figs. 136, 137).

Female. Similar to male in general appearance except more ovoid, with slightly shortened hemelytral membrane, and antennal segment II narrower and usually weakly clavate (fig. 38).

DISTRIBUTION: American Southwest.

DISCUSSION: See generic treatment for justification of the synonymy of *Microphylidea* with *Atractotomus*. *Atractotomus prosopidis* has been collected on *Prosopis glandulosa* Torr. and *P. juliflora* (SW) DC.

SPECIMENS EXAMINED: 125 specimens collected between April 11 and Aug. 15 from the following localities: **USA.** – **Arizona:** *Cochise Co.:* Huachuca Mts., Sierra Vista. **California:** *Imperial Co.:* Fish Crk. Mts. *Riverside Co.:* Willis Palms Oasis, Thousand Palms. *San Bernardino Co.:* 16 mi SW of Baker (Basin Rd.). **Texas:** *Brewster Co.:* Big Bend Nat. Pk., Hot Spgs.; 5 mi N of Big Bend Nat. Pk. on Rt. 385. *Culberson Co.:* Van Horn, 1440 m. **Utah:** *Washington Co.:* Santa Clara on Rt. 56, T42S R16W, 2800 ft. **MEXICO.** – **Baja California Sur:** 3 mi NE of San Isidro (La Purisima). Deposited in the collections of the AMNH, CNC, KU, SDNH, and UCB.

Atractotomus quercicola, new species

Figures 1, 2, 87, 138, 139

DIAGNOSIS: Similar to *iturbide* in general appearance and structure of the male genitalia, but distinguished by the brownish red general coloration; gonopore closer to apex of vesical strap, never removed by distance

greater than half its length in lateral view; and gonopore sclerite with widely spaced, basally directed spines (figs. 138, 139).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.76–2.18. **Dorsal Aspect:** Brownish red or reddish brown general coloration; head and pronotum sometimes darker fuscous; vestiture with golden to dark brown simple setae, and moderately broad, scalelike setae, the latter mostly restricted to anterior third of pronotal disk and basal third to half of hemelytra. **Head:** Reddish brown or fuscous; vertex, especially bordering eyes, usually lighter yellowish brown; width across eyes 0.68–0.78; width of vertex 0.30–0.33; ratio of vertex width to head width 0.42:1 to 0.45:1; weakly produced anteriad of antennal fossae; posterior margin slightly concave, weakly carinate; eyes occupying slightly more than five-sixths of head height in lateral view; antennae uniformly yellow or brownish yellow, inserted slightly above level of ventral margin of eye; antennal segment II nearly linear, slightly narrowed basally, sometimes weakly inflated beyond basal constriction, length 0.60–0.72; ratio of length of antennal segment II to head width 0.87:1 to 0.92:1; genae and gula narrow; labium reaching from middle to posterior margin of metacoxae. **Pronotum:** Posterior width 0.97–1.14; peritremal disk dark reddish brown. **Hemelytra:** Nearly straight laterally; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins yellowish red. **Legs:** Femora reddish brown to piceous basally, distal third to half yellow or brownish yellow, sometimes lightly tinged with red; tibiae uniformly yellow; tibial spines black; tarsi brownish yellow, last segment brown to fuscous; pretarsus brown or dark brown. **Genitalia:** Gonopore sclerite with widely spaced, basally directed spines (figs. 138, 139).

Female. Similar to male in general appearance, but usually with slightly shorter hemelytral membrane, and antennal segment II thinner and weakly clavate (fig. 2).

ETYMOLOGY: From the Latin, *quercus* (oak) and *-cola* (dweller, inhabitant), referring to its occurrence on *Quercus*.

DISTRIBUTION: Southeastern Texas and northeastern Mexico as far south as San Luis Potosi.

DISCUSSION: This species occurs on several species of *Quercus* in Mexico (see type data). In Texas, *quercicola* has been collected on *Quercus grisea* Liebm. and *Q. virginiana* Mill.

HOLOTYPE ♂: MEXICO, Nuevo Leon, 7.5 mi S of Monterrey, 21 Mar. 1974, ex. *Quercus polymorpha* S. & C., J. C. Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Nuevo Leon:** 10♂, 9♀, same data as holotype; 4♂, 17♀, same data as holotype except 17 Mar. 1975, Clark and Schaffner [no host plant]; 10♂, 2♀, same data as holotype except 12 Mar. 1976, Vincent and Schaffner [no host plant]; 31♂, 22♀, same data as holotype except 26 Mar. 1979, ex. *Quercus fusiformis* Small; 9♂, 10♀, 30 km W of Linares toward San Roberto on Rt. 58, 750 m, 23 Mar. 1985, ex. *Quercus microlepis* Trel., R. T. Schuh and B. M. Massie. **San Luis Potosi:** 25♂, 26♀, 2 mi E of Ciudad del Maiz, 12 April 1979, ex. *Quercus sideroxyla* Humboldt & Bonpland, T. P. Friedlander and J. C. Schaffner. **Tamaulipas:** 5♂, 5♀, 11 mi NW of Cd. Victoria, Canon de Libertad, 21 Mar. 1986, ex. *Quercus* sp., J. C. Schaffner. Deposited in the collections of the AMNH, TA&M, and USNM.

ADDITIONAL SPECIMENS: 25 specimens collected between March 26 and April 19 from the following localities: MEXICO. – **Durango:** 15 km N of Michilia Field Stn. (39 km S of Suchil), 2265 m, ex. *Quercus grisea* Liebm. **Nuevo Leon:** Valle Alto just S of Monterrey, 720 m, ex. *Quercus* sp. **USA.** – **Texas:** **Comal Co.:** 5 mi W of Sattler on Canyon Lk. **Harris Co.:** Houston. **Kendall Co.:** Boerne City Pk. **Matagorda Co.:** Bay City, on live oak. **Real Co.:** 3 mi E of Bandera. **Travis Co.:** Zilker Pk. **Uvalde Co.:** 1.3 mi NW of Uvalde; 16.4 mi NW of Uvalde on Nueces R. Deposited in the collections of the AMNH, TA&M, and USNM.

Atractotomus quercinus, new species

Figure 154

DIAGNOSIS: Distinguished from other oak-inhabiting species (see *agrifoliae* diagnosis and phylogenetic analysis for distinguishing characters) by the structure of the vesica, especially the densely spinose gonopore sclerite, and broad gonopore, well removed from apex

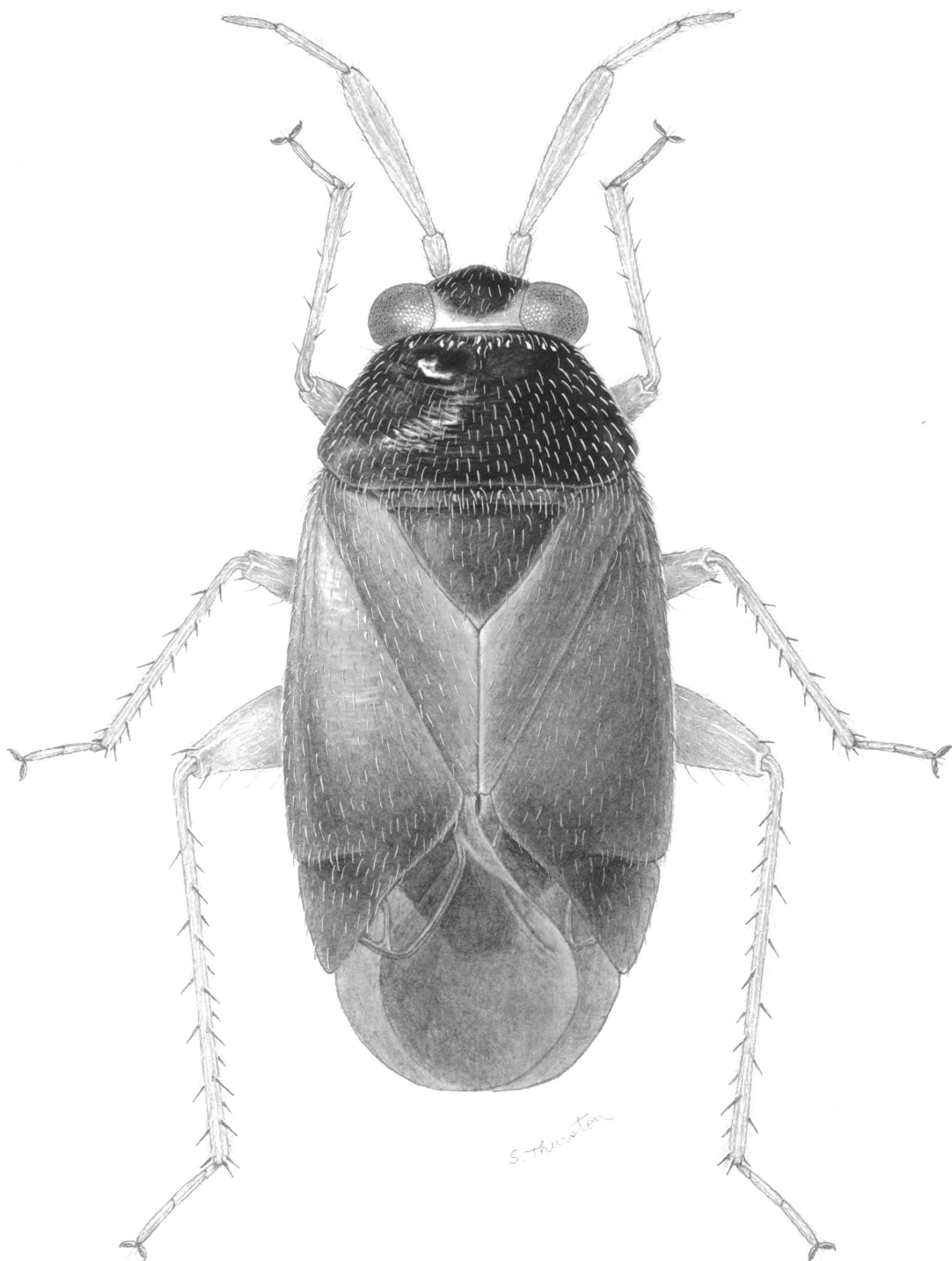


Fig. 1. *Atractotomus quercicola*, dorsal habitus, ♂.

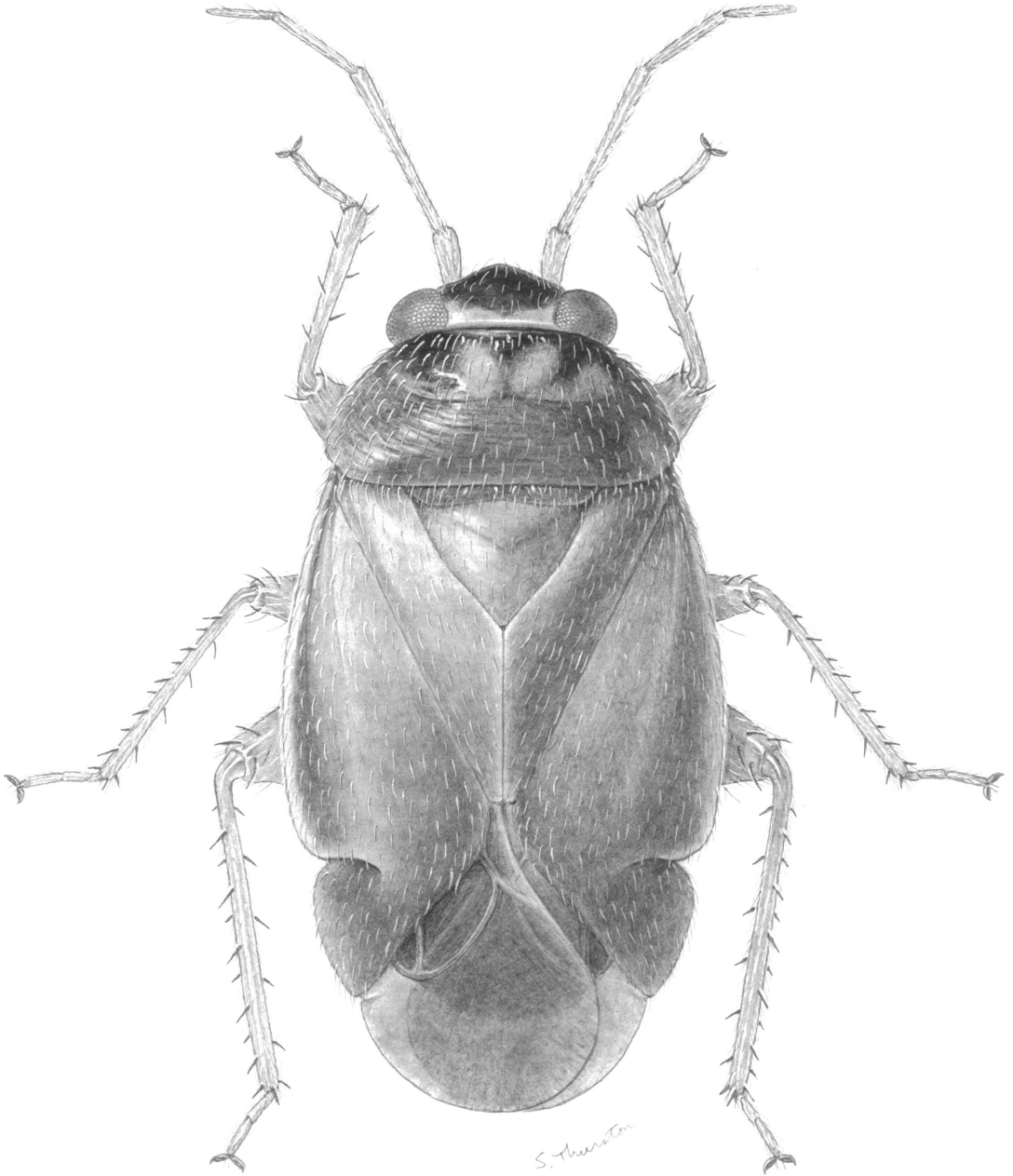


Fig. 2. *Atractotomus quercicola*, dorsal habitus, ♀.

of vesical strap (fig. 154). Distinguished from *schaffneri*, which has very similar male genitalia, by the paler general coloration, scale-like setae on the hemelytra, and narrower gonopore in lateral view. The general color-

ation of *quercinus* is quite variable, with the dorsal half of the head sometimes yellowish brown in pale specimens.

DESCRIPTION: *Male*. Length from apex of tylus to cuneal fracture 1.90–2.19. **Dorsal As-**

pect: Yellowish brown to dark reddish brown; head and pronotum fuscous or piceous, interocular region and pronotum posteriad of calli sometimes lighter brown or yellowish brown; hemelytra of paler specimens tinged with red, especially on cuneus; dorsal vestiture with golden to dark brown, simple setae and moderately broad, scalelike setae. **Head:** Fuscous or piceous, interocular region sometimes brown or yellowish brown; width across eyes 0.67–0.76; width of vertex 0.28–0.31; ratio of vertex width to head width 0.39:1 to 0.44:1; weakly produced anteriad of antennal fossae; posterior margin nearly straight, weakly carinate; eyes occupying three-fourths to five-sixths of head height in lateral view; antennae yellow or brownish yellow, inserted slightly above level of ventral margin of eye; antennal segment II weakly clavate, length 0.59–0.72; ratio of length of antennal segment II to width of head across eyes 0.83:1 to 0.97:1; genae moderately developed; gula narrow; labium reaching from middle of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 1.04–1.20; peritremal disk dark brown or piceous, sometimes lighter brown along dorsal margin. **Hemelytra:** Weakly rounded laterally; cuneus a third to half again as long as broad; membrane lightly to moderately suffused with fuscous, veins red or reddish yellow. **Legs:** Femora uniformly yellow or brownish yellow, or with basal two-thirds to three-fourths dark reddish brown to piceous; tibiae pale yellow with faint dusky spots at spine bases; tibial spines dark brown or black; tarsi brownish yellow; pretarsus brown. **Genitalia:** Vesica with broad gonopore, well removed from apex of vesical strap, and densely spinose gonopore sclerite (fig. 154).

Female. Similar to male but more strongly ovoid with shorter hemelytral membrane; antennal segment II weakly clavate, narrower than for male.

ETYMOLOGY: Named for its occurrence on oak.

DISTRIBUTION: Central and southeastern Arizona, and Sonora, Mexico.

DISCUSSION: The male genitalic structures of specimens collected in Sabino Cyn., Baboquivari Mts., Arizona, on *Quercus arizonica* Sarg. are slightly divergent from those of the holotype and other examined specimens.

Most noticeable is the shorter gonopore sclerite of the vesica which has two or three fine, distally directed spines rather than numerous basally directed spines as in typical *quercinus*. In this respect, the vesica of the Sabino Cyn. specimens is more similar to *iturbide* and *miniatus*. However, other external and genitalic features of these specimens are consistent with the holotype of *quercinus*, so I am treating them as conspecific, realizing that further collecting and studies of material from southwestern Arizona may indicate that the Sabino Cyn. specimens represent a distinct species.

Atractotomus quercinus is an inhabitant of *Quercus*—see type data for list of oak species.

HOLOTYPE ♂: USA, Arizona, Cochise Co., vicinity of Portal, 1500–1700 m, 2–7 May 1978, ex. *Quercus oblongifolia* Torr., R. T. Schuh (AMNH).

PARATYPES: USA. – **Arizona:** *Cochise Co.:* 5♂, 16♀, same data as holotype except some taken on *Quercus emoryi* Torr.; 3♂, 11♀, Texas Cyn. rest area on US Rt. 10, T16S R22E, 4970 ft, 25 April 1982, ex. *Quercus undulata* Torr., M. D. Schwartz, *Mohave Co.:* 5♂, 16♀, Hualapai Mts., SE of Kingman, T20N R15W, 4000–6400 ft, 9–10 June 1983, ex. *Quercus oblongifolia* Torr. and *Q. turbinella* Greene, R. T. Schuh, M. D. Schwartz, and G. M. Stonedahl. Deposited in the collections of the AMNH, TA&M, and USNM.

ADDITIONAL SPECIMENS: 47 specimens collected between April 20 and June 20 from the following localities: **MEXICO.** – **Sonora:** 11 mi E of Maicova. **USA.** – **Arizona:** *Cochise Co.:* Portal, 4770 ft. *Gila Co.:* 2 mi W of Miami, 3800 ft; 8 mi SW of Jct. of Rts. 87 and 188 (off Rt. 87), Tonto Nat. For., 4000 ft. *Graham Co.:* Pinaleno Mts., Stockton Pass, 5200–5500 ft. *Pima Co.:* Baboquivari Mts., Sabino Cyn. *Yavapai Co.:* 2 mi S of Rt. 89A on Rt. 89; 4 mi S of Prescott Nat. For. boundary, 1600 m. Deposited in the collections of the AMNH, JTP, and UCR.

Atractotomus ramentum, new species

Figures 40, 160

DIAGNOSIS: Recognized by the widely distributed scalelike setae on the hind femora, tibiae and third antennal segment pale (see couplet 5 in key), ratio of length of antennal

segment II to width of head across eyes from 0.86:1 to 0.90:1, and vesica with short, sparsely spinose gonopore sclerite, and gonopore well removed from apex of vesical strap (fig. 160). This species is very similar to *atricolor* and *rubidus* in general appearance, but is easily distinguished by the longer second antennal segment and structure of the vesica.

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.18–2.49. **Dorsal Aspect:** Dark brown general coloration, sometimes tinged with red especially on cuneus and distal half of embolium; vestiture with black, simple setae and densely distributed, broad, scalelike setae. **Head:** Uniformly fuscous, vertex sometimes dark yellowish brown; width across eyes 0.81–0.86; width of vertex 0.38–0.40; ratio of vertex width to head width 0.45:1 to 0.47:1; weakly produced antieriad of antennal fossae; posterior margin weakly concave, not noticeably carinate; eyes occupying about four-fifths of head height in lateral view; antennae brown or dark reddish brown, segment III usually yellowish brown, inserted at level of ventral margin of eye; antennal segment II linear, or only slightly narrowed basally, length 0.70–0.77; ratio of length of antennal segment II to width of head across eyes 0.86:1 to 0.90:1; genae moderately developed; gula narrow; labium reaching from middle to posterior margin of mesocoxae. **Pronotum:** Posterior width 1.21–1.28; peritremal disk ivory. **Hemelytra:** Weakly rounded laterally; cuneus slightly longer than broad; membrane heavily suffused with fuscous, veins ivory. **Legs:** Femora mostly fuscous or piceous, apex sometimes narrowly pale; hind femora with generally distributed, scalelike setae; tibiae ivory or yellowish white, sometimes marked with fuscous basally and at apex, or lightly tinged with red medially; tibial spines black; tarsi yellowish brown, last segment darker brown; pretarsus dark brown. **Genitalia:** Distal portion of vesical strap elongate, with gonopore well removed from apex. Gonopore sclerite short and sparsely spinose (fig. 160).

Female. Similar to male in general appearance, but with slightly thinner, weakly clavate second antennal segment (fig. 40).

ETYMOLOGY: From the Latin, *ramentum* (loose scales), referring to dense covering of scalelike setae on the body and legs.

DISTRIBUTION: Central midwestern United States.

DISCUSSION: This species has been collected on *Salix* in Indiana and Ohio.

HOLOTYPE ♂: USA, Ohio, Wayne Co., Wooster, VIII-30-1978, ex. *Salix* sp., E. L. Paddock (CAF&A).

PARATYPES: USA. – **Indiana:** Cass Co.: 3♂, 3♀, Logansport, 2 mi E of 18th St. Bridge, 11 July 1976, *Salix interior* Rowlee, T. J. Henry (PDA). Marion Co.: 1♂, 1♀, Marion Co., 15 July 1926, W. S. B[latchley]. (PU). **Iowa:** Story Co.: 1♂, Ames, 26 July 1928, H. H. Knight (USNM). **Ohio:** Wayne Co.: 1♂, 7♀, same data as holotype (AMNH, CAF&A).

Atractotomus reuteri Knight

Figures 41, 140, 141

Atractotomus hesperius Reuter, 1909: 78, 79 (n. sp., preoccupied by *Dacota hesperia* Uhler, 1872). – Van Duzee, 1917: 414 (cat.).

Atractotomus reuteri Knight, 1931: 37 (synonymy of *Dacota* Uhler with *Atractotomus* Fieber creating secondary homonym; new name for *Atractotomus hesperius* Reuter). – Carvalho, 1958: 19 (cat.). – Froeschner, 1963: 3, 5 (key, type). – Knight, 1968: 57 (key, note). – Henry and Wheeler, 1988: 460 (cat.).

DIAGNOSIS: Similar to *arizonae* and *cercocarpini* in general appearance (e.g., dark general coloration, pale peritremal disk, hind femora with widely distributed scalelike setae); distinguished by the strongly inflated second antennal segment, greatest thickness nearly twice that of segment I (fig. 41), and short gonopore sclerite, length only 1.5 times that of gonopore in lateral view (figs. 140, 141).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.22–2.39. **Dorsal Aspect:** Dark fuscous to black general coloration; vestiture with dark, simple setae and densely distributed, broad, scalelike setae. **Head:** Uniformly fuscous to black; width across eyes 0.80–0.88; width of vertex; 0.41–0.45; ratio of vertex width to head width 0.48:1 to 0.51:1; moderately produced antieriad of antennal fossae; posterior margin weakly concave, not noticeably carinate; vertex flattened or weakly convex; eyes occupying slightly less than three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae narrowly re-

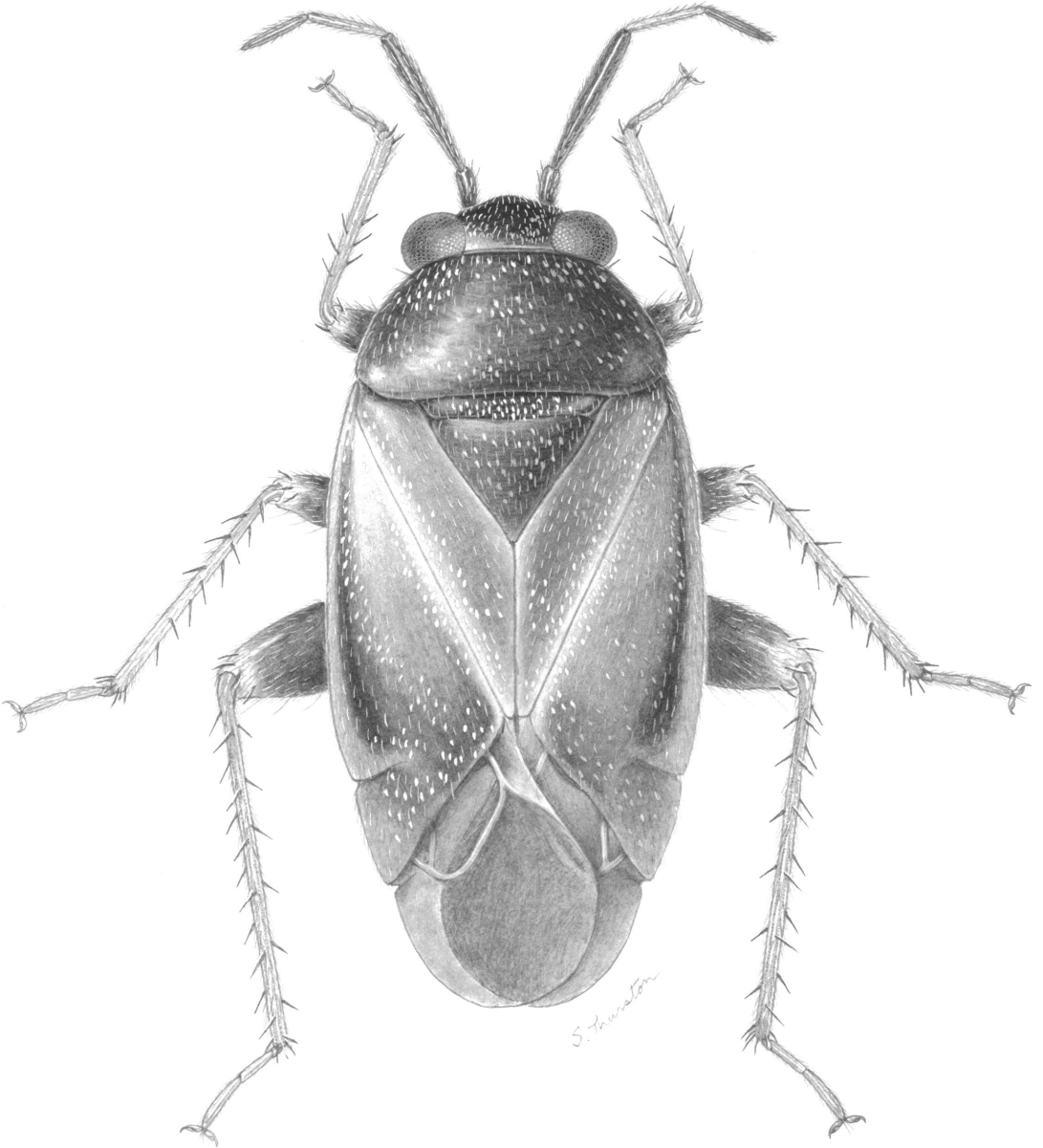


Fig. 3. *Atractotomus rubidus*, dorsal habitus, ♂.

moved from anteroventral margin of eye; antennae dark reddish brown to nearly black, segments III and IV sometimes lighter brownish red; antennal segment II strongly inflated, weakly fusiform, length 0.75–0.86; ratio of length of antennal segment II to head width 0.94:1 to 1.00:1; genae moderately broad; gula narrow; labium reaching from anterior margin to middle of mesocoxae. **Pro-**

notum: Posterior width 1.10–1.25; peritremal disk ivory, sometimes lightly tinged with fuscous along dorsal margin. **Hemelytra:** Moderately rounded laterally; cuneus about as long as broad; membrane heavily suffused with fuscous, veins white, sometimes lightly tinged with fuscous basally. **Legs:** Uniformly reddish brown to dark fuscous; femora, especially hind pair, with generally distributed,

scalelike setae; tibial spines black. **Genitalia:** Vesica with short, densely spinose gonopore sclerite (figs. 140, 141).

Female. Similar to male in general appearance, including strongly inflated, fusiform second antennal segment (fig. 41).

DISTRIBUTION: Western slopes of the Sierra Nevada Mts. and Cascade Range from San Bernardino Co., California to Linn Co., Oregon.

DISCUSSION: Adults of this species have been collected on *Ceanothus* sp. (probably *integerrimus* Hook.) in California and Oregon. Several specimens also were reported from *Chrysothamnus* sp.

SPECIMENS EXAMINED: 96 specimens collected between July 5 and Aug. 27 from the following localities: USA. – **California:** *Fresno Co.:* Dinkey Crk.; Huntington Lk.; Mono Hot Spgs. *Modoc Co.:* Hackamore. *Placer Co.:* Placer Co.; Truckee. *Plumas Co.:* 1 mi NW of Almanor Dam; 3 mi SE of Big Spring. *San Bernardino Co.:* San Bernardino Mts., Arrowbear Lk., 6400 ft; 5 mi E of Arrowbear, 6900 ft. *Siskiyou Co.:* McCloud; Siskiyou Co.; Sisson (= Mt. Shasta City). *Trinity Co.:* Coffee Crk. *Tulare Co.:* Sequoia Nat. Pk. *County ?:* Towie. **Oregon:** *Linn/Lane Co.:* H. J. Andrews Exp. For., 0.9 mi N of Jct. of Access Rds. 1533 and 1533J. Deposited in the collections of the AMNH, CAF&A, CAS, KU, OSU, UCD, UCB, and USNM.

Atractotomus rubidus (Uhler),
new combination

Figures 3, 42, 72, 89, 113, 162, 170, 181

Sthenarus rubidus Uhler, 1895: 41 (n. sp.) (in part).

Europiella rubida: Van Duzee, 1917: 415 (cat.) (in part).

Lepidopsallus rubidus: Knight, 1923: 470–472 (n. comb., key, descr.); 1941: 47 (key, descr.) (in part). – Froeschner, 1949: 134, 161 (key, note). – Carvalho, 1958: 54 (in part) (see this catalog for list of pre-1958 citations and misidentifications). – Kelton, 1980: 331–333 (key, descr.) (in part). – Henry and Wheeler, 1988: 471 (cat.) (in part).

DIAGNOSIS: Within the group of species having widely distributed scalelike setae on the hind femora, *rubidus* is distinguished by the yellow or yellowish brown tibiae and third antennal segment, short second antennal segment—ratio of segment length to width of

head across eyes from 0.72:1 to 0.83:1, and structure of the male genitalia, especially the elongate vesical strap with gonopore well removed from apex and coarsely spinose gonopore sclerite (fig. 162), and the left paramere with short, upturned anterior process (fig. 170). Although the general coloration of *rubidus* varies from reddish yellow to dark brown with lighter markings, most specimens have the cuneus and embolium distinctly suffused with red.

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.21–2.60. **Dorsal Aspect:** General coloration variable, ranging from reddish yellow with fuscous markings on tylus, frons and calli only, to mostly fuscous, with only bases of corium and clavus, and cuneus lighter yellowish brown or reddish yellow; darker specimens sometimes also with lighter coloration along embolium and margins of claval suture; vestiture with brown or black, simple setae and densely distributed, broad, scalelike setae (fig. 72). **Head:** Yellowish brown with lorum, tylus, and frons mostly fuscous, to uniformly fuscous; width across eyes 0.79–0.89; width of vertex 0.34–0.41; ratio of vertex width to head width 0.42:1 to 0.48:1; weakly produced antieriad of antennal fossae; posterior margin weakly concave in dorsal view, not noticeably carinate; eyes occupying about four-fifths of head height in lateral view; antennae yellowish brown to fuscous; pale specimens with segment II usually lighter than remaining segments; antennae inserted at level of ventral margin of eye; antennal segment II linear, or only slightly thickened distally, length 0.57–0.71; ratio of length of antennal segment II to width of head across eyes 0.72:1 to 0.80:1; genae moderately broad; gula narrow; labium reaching between anterior margin and posterior margin of mesocoxae. **Pronotum:** Posterior width 1.14–1.33; peritremal disk ivory, sometimes tinged with red or fuscous dorsally. **Hemelytra:** Weakly rounded laterally; cuneus about a third again as long as broad; membrane moderately to heavily suffused with fuscous, veins ivory. **Legs:** Femora uniformly brownish or reddish yellow, or piceous to near apex; hind femora with generally distributed, scalelike setae; tibiae brownish yellow or reddish yellow, sometimes infuscated basally; tibial spines black; tarsi yellowish brown; pretarsus

brown or dark brown. **Genitalia:** Figures 162, 170, and 181. Vesica with elongate distal portion of strap, with gonopore well removed from apex (fig. 162).

Female. Similar to male in general appearance, but with slightly thinner, weakly clavate second antennal segment (fig. 42).

DISTRIBUTION: Eastern United States and Ontario, Canada.

DISCUSSION: In the original description of *rubidus*, Uhler (1895: 41) mentioned specimens from Colorado, Illinois, New York, Cuba, San[to] Domingo, Texas, Florida, and Mexico. These distribution records in conjunction with Uhler's discussion of variation strongly suggest that more than one species was represented in the original syntype series, perhaps as many as three or four species. For example the Colorado records probably pertain to the species *atricolor* as treated herein, while the Florida and Texas records could well be *miniatus*, and certainly, the Cuba, San[to] Domingo, and Mexico records are not *rubidus*, possibly not *Atractotomus*.

I have examined two specimens from Illinois (USNM collection) that appear to be from the original syntype series of *rubidus*. One of these specimens is here designated a lectotype—label data: Ill.; 8/1/92 [?]; PR Uhler Collection; *Sthenarus rubidus* Uhler, Ill. [hand-printed]; *Sthenarus rubidus* Uhler, Ill. [hand-printed], Det. UHLER. The other specimen, with label data, Ill., PR Uhler Collection, is designated a paralectotype.

No other specimens were discovered which could be verified as coming from the original syntype series of *rubidus*. I did examine several specimens of *atricolor* from Colorado, which carried Uhler's identification labels for *Sthenarus rubidus*. However, the Gillette/Baker collection numbers on these specimens indicate that they were not collected at Colorado Springs in August by E. S. Tucker, which is the only Colorado record given by Uhler (1895) in the original description of *rubidus*.

Atractotomus rubidus has been collected on *Salix babylonica* L., *S. interior* Rowlee, and *S. nigra* Marsh.

SPECIMENS EXAMINED: 153 specimens collected between April 29 and Aug. 10 from the following localities: CANADA. — **Ontario:** Ottawa. USA. — **Florida:** *Levy Co.*: Wac-

casassa R. at Hwy. 24. **Illinois:** *Jefferson Co.*: county record only. *Knox Co.*: Galesburg. *Mason Co.*: Havana. *Morgan Co.*: Meredosia. *Pope Co.*: Golconda. *County ?*: Herod. **Iowa:** *Boone Co.*: Ledges St. Pk. *Lee Co.*: Ft. Madison; Donnelson. *Page Co.*: Braddyville. *Story Co.*: Ames. **Massachusetts:** Mass. **Minnesota:** *Hennepin Co.*: St. Anthony Pk. *Ramsey Co.*: Red Rock, Miss. R.; county record only. **Mississippi:** *Washington Co.*: Greenville. **Missouri:** *Barry Co.*: Roaring R. St. Pk. **New Jersey:** *Cape May Co.*: Rio Grande. **New York:** *Genesee Co.*: Batavia. *Monroe Co.*: Honeoye Falls. *Tompkins Co.*: Ithaca, Cornell Univ. **North Carolina:** *Mecklenburg Co.*: Rt. 51, 1 mi W of Rt. 16, nr. Matthews. **Pennsylvania:** *Bucks Co.*: Danboro, Coloniel Village Hotel. *Erie Co.*: I-90 and Rt. 87, nr. Erie. *Dauphin Co.*: Susq[uehanna]. Twp.: HACC Campus; Poxton Church Rd. *Lehigh Co.*: Allentown: Jordon Crk.; Lehigh Pk. *Monroe Co.*: Delaware Water Gap. *Montgomery Co.*: Ambler. *Snyder Co.*: Port Trevorton. **South Carolina:** *Greenville Co.*: Greenville. *Pickens Co.*: Clemson College. **Texas:** *Hidalgo Co.*: Santa Ana Wildlife Refuge. **Virginia:** *County ?*: Great Falls. Deposited in the collections of the AMNH, CU, CAS, JTP, PDA, PU, TA&M, and USNM.

Atractotomus russatus, new species

Figures 4, 43, 73, 114, 159, 171, 182

DIAGNOSIS: Recognized by the large size; reddish orange general coloration, head and anterior third of pronotal disk usually with limited to extensive fuscous suffusion; antennal segments I and II brownish red to fuscous, segment II moderately inflated (fig. 43); femora without scalelike setae; large, strongly curved vesical strap with gonopore distad of strap apex; and elongate gonopore sclerite with spines mostly restricted to distal third (fig. 159).

DESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 2.55–2.67. **Dorsal Aspect:** Reddish orange or brownish red general coloration; head and anterior third of pronotal disk with limited to extensive fuscous suffusion; vestiture with golden to dark brown, simple setae and widely distributed, moderately broad, scalelike setae. **Head:** Yellowish brown, with limited to extensive, fuscous suf-

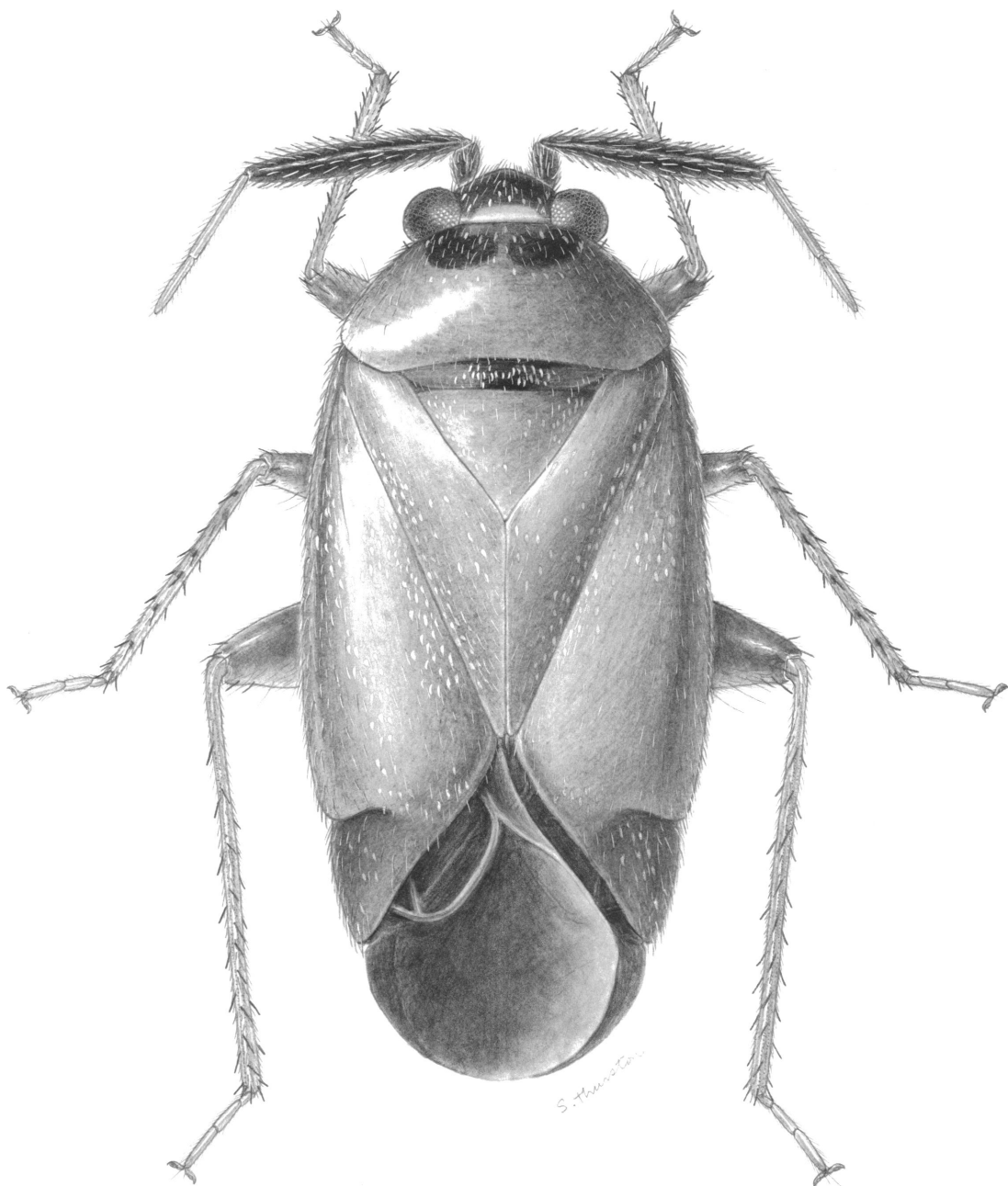


Fig. 4. *Atractotomus russatus*, dorsal habitus, ♂.

fusion, especially on lorum, tylus and frons; width across eyes 0.78–0.81; width of vertex 0.39–0.41; ratio of vertex width to head width 0.50:1 to 0.51:1; moderately produced anteriad of antennal fossae; posterior margin nearly straight, weakly carinate; vertex slight-

ly depressed posteromedially; eyes occupying about three-fourths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennal segments I and II dark reddish brown or piceous,

segment III brownish yellow, segment IV brown; antennal segment II moderately inflated, weakly fusiform, length 0.75–0.88; ratio of length of antennal segment II to head width 0.95:1 to 1.09:1; genae moderately broad; gula narrow; labium reaching from middle to posterior margin of mesocoxae. **Pronotum:** Posterior width 1.26–1.34; peritremal disk yellowish white or brownish yellow, usually tinged with red or brown dorsally, or sometimes broadly darkened with fuscous dorsad of ostiole. **Hemelytra:** Weakly rounded laterally; cuneus about half again as long as broad; membrane heavily suffused with fuscous, veins mostly darkened, or sometimes red or reddish yellow distally. **Legs:** Femora with reddish yellow ground color, usually suffused with reddish brown or fuscous basally and dorsally, sometimes darkened to beyond middle; tibiae reddish yellow or brownish yellow, with faint fuscous spots at spine bases; tibial spines black; tarsi yellowish brown, last segment fuscous distally; pretarsus fuscous. **Genitalia:** Figures 159, 171, and 182. Vesical strap robust, strongly curved, with gonopore distad of apex; gonopore sclerite elongate, distal third densely spinose (fig. 159).

Female. Similar to male in general appearance, but slightly more ovoid, and with antennal segment II more strongly inflated (fig. 43).

ETYMOLOGY: From the Latin, *russatus* (clothed in red), referring to the general coloration.

DISTRIBUTION: Veracruz, Mexico.

DISCUSSION: *Atractotomus russatus* is easily distinguished from other members of the genus by its large size, reddish general coloration, and structure of the male genitalia. The structure of the vesica is unusual for the genus in that the gonopore is located distad of the apex of the vesical strap (fig. 159).

The host plant of this species is *Crataegus*.

HOLOTYPE ♂: MEXICO, Veracruz, 21 km N of Naolinco, 21 April 1978, ex. *Crataegus* sp., Henry, Schaffner, and Schuh (AMNH).

PARATYPES: MEXICO. – **Veracruz:** 1♂, 2♀, same data as holotype; 3♂, 18♀, same data as holotype except J. C. Schaffner only and no host plant; 4♂, 12♀, 7 mi W of Jalapa, 20 Mar. 1975, ex. *Crataegus* sp., Clark and Schaffner; 5♂, 11♀, 10 mi W of Jalapa, 21 April 1978,

5200 ft, J. C. Schaffner. Deposited in the collections of the AMNH, TA&M, and USNM.

Atractotomus schaffneri, new species

Figures 142, 143

DIAGNOSIS: Distinguished from other oak-inhabiting species (see *agrifoliae* diagnosis and phylogenetic analysis for distinguishing characters) by the hemelytra without scalelike setae, or with scattered scalelike setae along anterior margins of clavus only, and the vesica with densely spinose gonopore sclerite, and thin, subspherical gonopore, well removed from apex of strap (figs. 142, 143).

DESCRIPTION: **Male.** Length from apex of tylus to cuneal fracture 1.80–2.28. **Dorsal Aspect:** Dark reddish brown to piceous general coloration, base of corium sometimes narrowly yellowish brown; vestiture with dark, simple setae and moderately broad, scalelike setae, the latter restricted to anterior margin of pronotal disk and anterior margins of clavus. **Head:** Reddish brown to piceous; width across eyes 0.70–0.77; width of vertex 0.28–0.30; ratio of vertex width to head width 0.38:1 to 0.43:1; weakly produced anteriorly of antennal fossae; posterior margin slightly concave to nearly straight; vertex flattened or slightly concave, posterior margin weakly carinate; eyes occupying nearly entire height of head in lateral view; antennae yellow or brownish yellow, inserted slightly above ventral margin of eye; antennal segment II nearly linear, narrowed basally, weakly inflated beyond basal constriction, length 0.66–0.78; ratio of length of antennal segment II to head width 0.94:1 to 1.01:1; genae and gula nearly obsolete; labium reaching from middle to posterior margin of mesocoxae. **Pronotum:** Posterior width 0.91–1.12; peritremal disk dark reddish brown. **Hemelytra:** Nearly straight laterally; cuneus about a third again as long as broad; membrane heavily suffused with fuscous, veins brownish red. **Legs:** Femora dark reddish brown, distal third to half yellow or brownish yellow; tibiae yellow or brownish yellow; tibial spines dark brown or black; tarsi yellowish brown; pretarsus brown or dark brown. **Genitalia:** Distal half of vesical strap narrow, with thin, subspherical gonopore; gonopore sclerite densely spinose (figs. 142, 143).

Female. Similar to male in general appearance, but with shortened wing membrane, and narrower, weakly clavate second antennal segment.

ETYMOLOGY: Named for Joseph C. Schaffner, Professor of Entomology, Texas A&M University, College Station. Dr. Schaffner is an enthusiastic collector of Miridae and other Heteroptera throughout Mexico.

DISTRIBUTION: Nuevo Leon and Tamaulipas, Mexico.

DISCUSSION: See type data for host plants.

HOLOTYPE ♂: MEXICO, Nuevo Leon, 7.5 mi S of Monterrey, 21 Mar. 1974, ex. *Quercus polymorpha* S. & C., J. C. Schaffner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Nuevo Leon:** 11♂, 10♀, same data as holotype; 1♂, 6♀, same data as holotype except 17 Mar. 1975, Clark and Schaffner [no host plant]; 9♂, 4♀, same data as holotype except 12 March 1976, Vincent and Schaffner [no host plant]; 1♂, same data as holotype except 13 Mar. 1977, Gruetzmacher, Sweet, Jordon, and Schaffner [no host plant]; 6♀, same data as holotype except 17 April 1978; 2♂, same data as holotype except 26 Mar. 1979 [no host plant]. **Tamaulipas:** 5♂, 3♀, Altas Cumbres, 12 mi SW of Cd. Victoria, 19 Mar. 1986, ex. *Quercus canbyi* Trelease, J. C. Schaffner; 26♂, 32♀, same as above except collected on *Quercus polymorpha* S. & C. Deposited in the collections of the AMNH, TA&M, and USNM.

Atractotomus schwartzi, new species

Figures 5, 44, 74, 161, 172, 183

DIAGNOSIS: Recognized by the small size; dark reddish brown to black general coloration; broad vertex (see ratio below); slightly to moderately inflated, dark second antennal segment (fig. 44); and structure of the male genitalia, especially the broad anterior process of the left paramere (fig. 172), and vesica with broad medial coil, basally directed gonopore, and gonopore sclerite without spines (fig. 161). Similar to *arizonae* and *cercocarp*i in general appearance, but distinguished by the broader vertex, darkened peritremal disk, femora without scalelike setae, and structure of the vesica. Distinguished from *nigripennis* by its larger size, broad vertex, and structure of the male genitalia.

DESCRIPTION: *Male*. Length from apex of tylus to cuneal fracture 1.91–2.15. **Dorsal Aspect:** Dark reddish brown to black general coloration; vestiture with dark, simple setae and widely distributed, moderately broad, scalelike setae. **Head:** Uniformly dark brown or black; width across eyes 0.80–0.84; width of vertex 0.44–0.48; ratio of vertex width to head width 0.55:1 to 0.57:1; moderately produced anteriad of antennal fossae; posterior margin weakly concave; vertex slightly convex, posterior margin weakly carinate; eyes occupying about two-thirds of head height in lateral view; antennae uniformly dark reddish brown or fuscous, inserted at or slightly below level of ventral margin of eye; antennal fossae removed from anteroventral margin of eye by distance nearly equal to diameter of fossa; antennal segment II moderately inflated, weakly fusiform, length 0.64–0.71; ratio of length of antennal segment II to head width 0.79:1 to 0.84:1; genae broad; gula moderately developed; labium reaching from posterior margin of mesocoxae to middle of metacoxae. **Pronotum:** Posterior width 1.01–1.10; peritremal disk dark reddish brown or fuscous. **Hemelytra:** Moderately rounded laterally, cuneus about as long as broad; membrane heavily suffused with fuscous, veins mostly darkened, sometimes lightly tinged with red. **Legs:** Femora dark reddish brown or fuscous; tibiae grayish white, lightly to moderately suffused or marked with red or fuscous, usually with fuscous spots at spine bases; tibial spines black; tarsi yellowish brown, last segment and pretarsus fuscous. **Genitalia:** Figures 161, 172, and 183. Vesical strap with broad medial coil, and basally directed gonopore; gonopore sclerite without spines (fig. 161).

Female. Similar to male in general appearance, but usually slightly more ovoid; antennal segment II as for male, except some specimens from Oaxaca and Puebla, Mexico with narrower, weakly clavate segment II.

ETYMOLOGY: Named for my good friend and colleague Dr. Michael D. Schwartz, who contributed numerous specimens for study, including the holotype of this species.

DISTRIBUTION: Southeastern Arizona, and Mexico, as far south as Oaxaca.

DISCUSSION: Specimens examined from Oaxaca and Puebla differ slightly from others

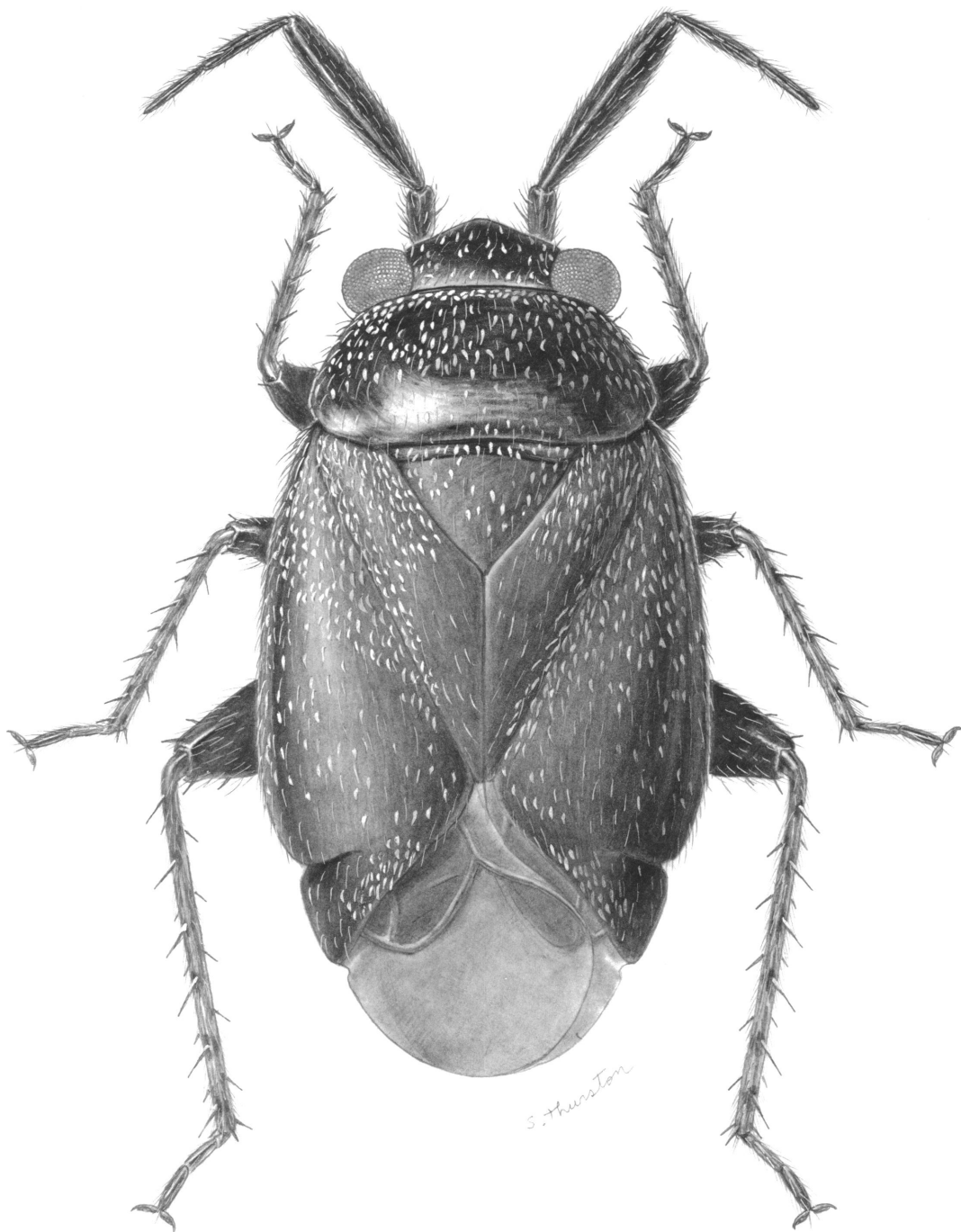


Fig. 5. *Atractotomus schwartzi*, dorsal habitus, ♂.

considered here by the slightly narrower scalelike setae, and females with the second antennal segment noticeably narrower than for males. However, all other external fea-

tures and the male genitalia are typical of *schwartzii*, indicating that these specimens are conspecific with the type.

See type data for host plants.

HOLOTYPE ♂: USA, Arizona, Cochise Co., Huachuca Mts., Miller Cyn. Rd., 5000–6000 ft, 4 April 1981, ex. *Arctostaphylos* sp., M. D. Schwartz (AMNH).

PARATYPES: USA. – **Arizona**: *Cochise Co.*: 7♂, 2♀, same data as holotype (AMNH, TA&M). *Graham Co.*: 1♂, 1♀, Graham Mts., For. Ser. Rd. 808, T9S R25E, 5000 ft, 25 April 1982, ex. *Ceanothus greggii* A. Gray var. *vestitus* (Greene) McMinn, M. D. Schwartz (AMNH). *Maricopa Co.*: 4♂, 1♀, Four Peaks Rd., mile 10, 25 April 1983, ex. *Simmondsia chinensis* (Link) Scheid., J. T. Polhemus (JTP). *Pima Co.*: 7♀, Santa Catalina Mts., 3800 ft, 20 April 1982, ex. *Simmondsia chinensis*, D. A. and J. T. Polhemus (JTP).

ADDITIONAL SPECIMENS: 39 specimens collected between April 24 and Sept. 7 from the following localities: **MEXICO**. – **Chihuahua**: 1 mi N of Creel; 84 mi NW of Nuevo Casas Grandes on Agua Prieta Rd., 4500 ft. **Durango**: 30 mi W of Durango, 7500–8000 ft. **Guanajuato**: 3 mi NE of Santa Rosa. **Mexico**: 7 mi N of Acambay. **Oaxaca**: 6 and 9 mi NE of Mitla; 8 mi SE of Nochixtlan, 7500 ft. **Puebla**: 4 mi E of Azumbilla. **San Luis Potosi**: Matehuala. **Sinaloa**: Chupaderos. USA. – **Arizona**: *Pima Co.*: Mt. Lemmon Rd., 5400 ft. **California**: *Los Angeles Co.*: 2 mi S of Palmdale. Deposited in the collections of the AMNH, CAS, CNC, OSU, TA&M, and UCD.

Atractotomus taxcoensis, new species

Figures 45, 156, 173, 184

DIAGNOSIS: Similar to *acaciae*, with scalelike setae on the hemelytral membrane, and coxae and peritremal disk pale, but distinguished by the broader scalelike setae on the dorsum, hind femora with generally distributed scalelike setae, and structure of the male genitalia, especially the vesica with subapical gonopore and short gonopore sclerite (fig. 156) and left paramere with shorter anterior process (fig. 173). Distinguished from *balli* by the longer second antennal segment, antennal fossae nearly contiguous with anteroventral margin of eye, pale coxae, and the structure of the vesica.

DESCRIPTION: *Male Holotype*. Length from apex of tylus to cuneal fracture 2.15. **Dorsal Aspect**: Dark brown general coloration, cox-

ae and peritremal disk ivory; vestiture with silvery white to dark brown, simple setae and densely distributed, broad, scalelike setae. **Head**: Uniformly fuscous; width across eyes 0.69; width of vertex 0.29; ratio of vertex width to head width 0.42:1; moderately produced anteriad of antennal fossae; posterior margin nearly straight, not noticeably carinate; vertex weakly convex; eyes occupying slightly more than five-sixths of head height in lateral view; antennae inserted at level of ventral margin of eye, fossae nearly contiguous with anteroventral margin of eye; antennal segments I and II dark reddish brown, segment III yellowish brown, segment IV brown; antennal segment II moderately inflated, nearly linear beyond basal constriction, length 0.75; ratio of length of antennal segment II to head width 1.09:1; genae and gula narrow; labium reaching middle of mesocoxae. **Pronotum**: Posterior width 1.06; peritremal disk ivory. **Hemelytra**: Nearly straight laterally; cuneus slightly longer than broad; membrane fuscous with widely distributed scalelike setae, veins pale distally, darkened basally. **Legs**: Femora dark reddish brown, extreme apex yellowish brown; all femora, especially hind pair, with generally distributed scalelike setae; tibiae brownish yellow, tinged with fuscous basally; tarsi yellowish brown, last segment slightly darker; pretarsus brown or dark brown. **Genitalia**: Figures 156, 173, and 184. Distal half of vesical strap narrow, with thin, subapical gonopore; gonopore sclerite short, with weak spines (fig. 156).

Female. Similar to male in general appearance, but with slightly shortened hemelytral membrane, and shorter, strongly inflated second antennal segment (fig. 45).

ETYMOLOGY: Named for the city of Taxco, near the type locality in Guerrero, Mexico.

DISTRIBUTION: Southern Mexico.

HOLOTYPE ♂: MEXICO, Guerrero, 8 mi SW of Taxco, VII-11-1966, P. M. and P. K. Wagner (TA&M, deposited in the AMNH).

PARATYPES: MEXICO. – **Oaxaca**: 1♂, 4 mi NE of Miltepec, 21 July 1984, Carroll, Schaffner, and Friedlander (TA&M). **Puebla**: 1♀, 4 mi W of Acatepec, 9 July 1977, J. C. Schaffner (AMNH); 1♀, 4 mi SW of Acatepec, 11 July 1973, Mastro and Schaffner (TA&M); 1♀, 4.4 mi SW of Acatepec, 9 July 1977, J. C. Schaffner (TA&M).

Atractotomus tuthilli (Knight),
new combination

Figures 46, 75, 90, 91, 144, 145

Lepidopsallus tuthilli Knight, 1968: 51, 52 (n. sp., key). – Henry and Wheeler, 1988: 471 (cat.).

DIAGNOSIS: Recognized by the scalelike setae on hind femora restricted to narrow band on ventral surface (fig. 91), vesical strap distad of gonopore weakly curved in posterior view, and gonopore sclerite with widely spaced spines (figs. 144, 145). Other distinguishing features are the pale peritremal disk, brown or reddish brown legs with tibiae, at least on distal half, brownish yellow, antennal segment III usually noticeably paler than segment II, and length of antennal segment II much less than width of head across eyes (ratio—0.70:1 to 0.78:1).

REDESCRIPTION: *Male.* Length from apex of tylus to cuneal fracture 1.89–2.02. **Dorsal Aspect:** Dark reddish brown to brownish black general coloration; vestiture with dark simple setae and densely distributed, moderately broad, scalelike setae. **Head:** Uniformly fuscous; width across eyes 0.76–0.80; width of vertex 0.38–0.40; ratio of vertex width to head width 0.49:1 to 0.51:1; moderately produced antieriad of antennal fossae; posterior margin weakly concave, not noticeably carinate; eyes occupying slightly less than three-fourths of head height in lateral view; antennae dark reddish brown or fuscous, segment III sometimes yellowish brown at least basally, inserted at level of ventral margin of eye; antennal segment II weakly clavate, length 0.55–0.59; ratio of length of antennal segment II to width of head across eyes 0.70:1 to 0.78:1; genae moderately broad; gula narrow; labium reaching from posterior margin of mesocoxae to anterior margin of metacoxae. **Pronotum:** Posterior width 0.98–1.02; peritremal disk ivory or yellowish white, sometimes tinged with red dorsally. **Hemelytra:** Moderately rounded laterally; cuneus about as long as broad; membrane heavily suffused with fuscous, veins brownish yellow, sometimes tinged with brown anteriorly. **Legs:** Femora reddish brown to nearly piceous, sometimes narrowly pale apically with scalelike setae restricted to narrow band on ventral surface; tibiae, at least on distal half, brownish yellow, basal half lightly to heavily suffused with fuscous; pretarsus piceous.

Genitalia: Distal portion of vesical strap narrow, slightly curved distad of gonopore in posterior view; gonopore sclerite with widely spaced spines (figs. 144, 145).

Female. Very similar to male in general appearance, but with antennal segment II slightly thinner basally.

DISTRIBUTION: Colorado and eastern Utah.

DISCUSSION: The primary distinguishing feature of *tuthilli* is the row of scalelike setae on the ventral surface of the hind femora. Adults have been collected on *Ribes velutinum* Greene and *Ribes* sp.

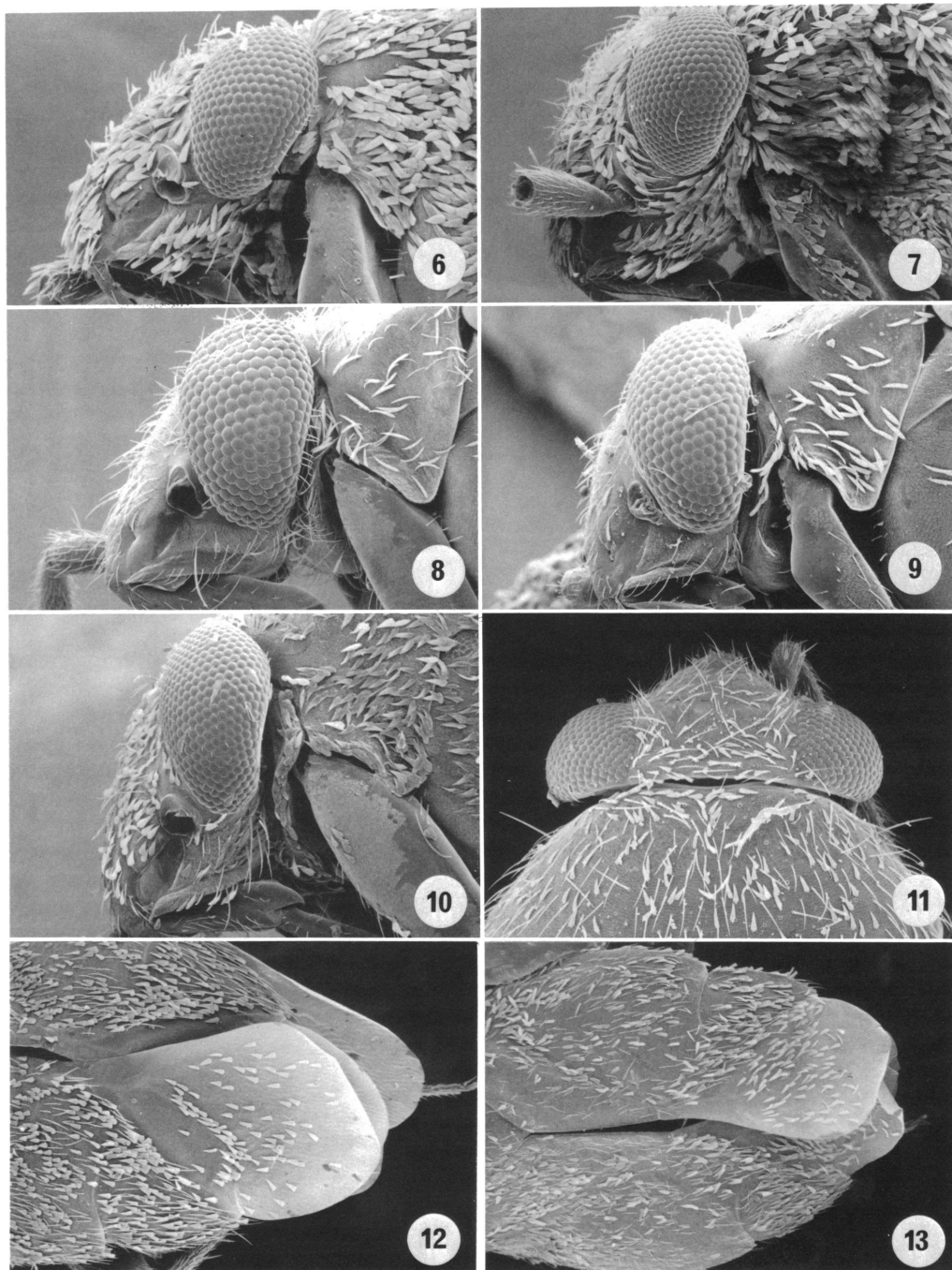
SPECIMENS EXAMINED: 43 specimens collected between July 22 and Aug. 18 from the following localities: **USA.** – **Colorado:** *Las Animas Co.:* 1 mi N of Stonewall on Purgatorie Cmpgd. Rd., 8400 ft. *Mineral Co.:* Creede, 22 July 1940 (♂ holotype). *Park Co.:* 3 mi S of Guffey. **Utah:** *Uintah Co.:* Uintah Mts., nr. Little Brush Crk., milepost 22 on Rt. 44, T1N R22E, 8620 ft. Deposited in the collections of the AMNH, JTP, and USNM.

OTHER REVISED COMBINATIONS

Phoenicocoris Reuter

Phoenicocoris Reuter, 1875: 99 (subgen. of *Plagiognathus*). – Wagner, 1952: 206, 207 (subgen. of *Sthenarus*). – Carvalho, 1958: 144 (cat.). – Kerzhner, 1962: 231 (genus). – Wagner, 1975: 103 (descr., key). – Henry and Wheeler, 1988: 478 (cat.).

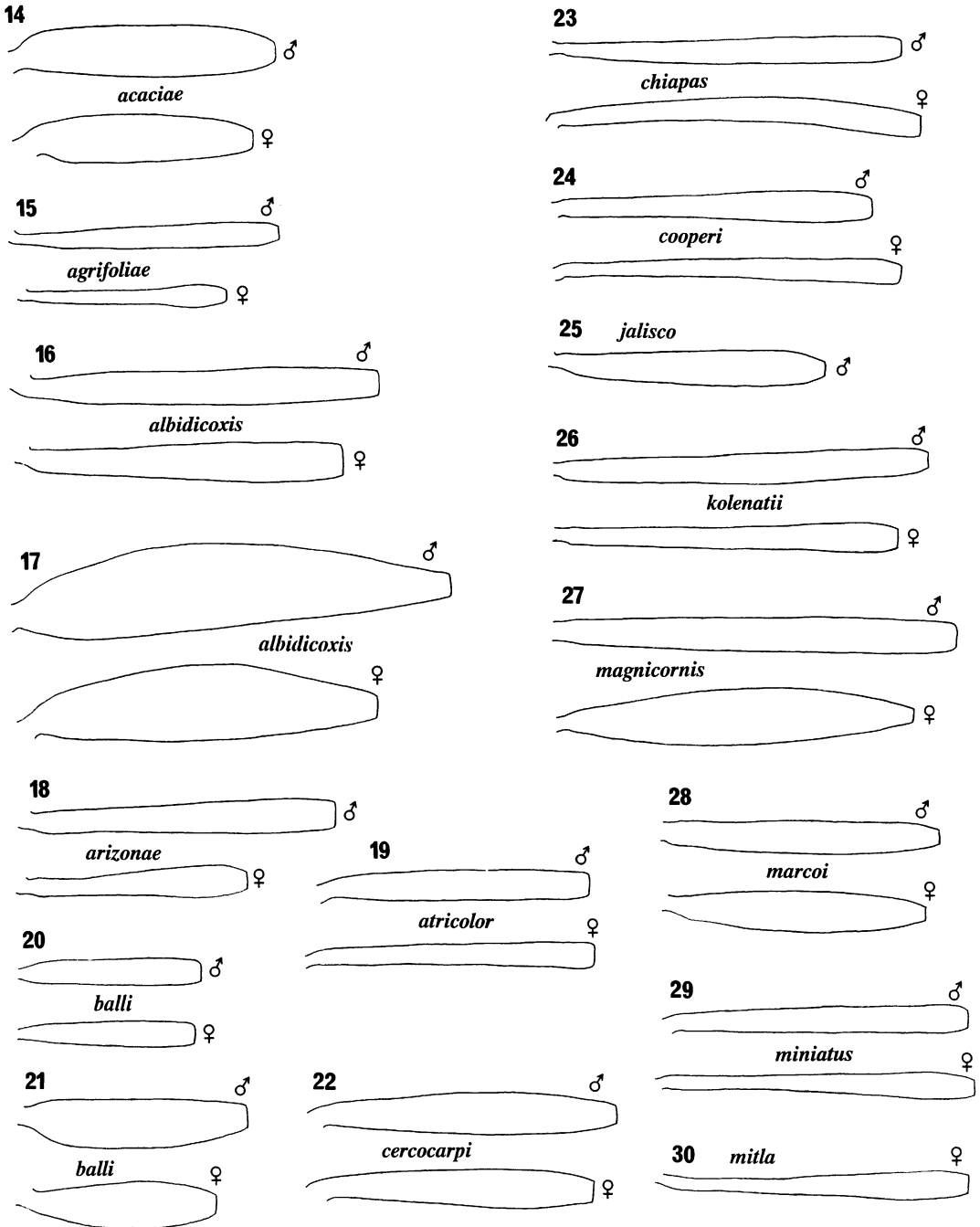
DISCUSSION: In the present study, nine species of the nominal genus *Lepidopsallus* Knight, including the type species, are transferred to *Atractotomus*. My examination of type material indicates that the correct placement of the remaining eight species of *Lepidopsallus* is in the genus *Phoenicocoris* Reuter. *Phoenicocoris* species are recognized by the moderate to broad scalelike setae on the dorsum, often with pustulate ridges (figs. 58, 59); the irregular row of minute spines on the dorsodistal surface of the metafemora (figs. 76, 78); and the distally bifurcate vesica of the male genitalia. The majority of species with known host associations are inhabitants of *Pinus*. Based on this characterization, the following eight species of *Lepidopsallus* are transferred to *Phoenicocoris*: *australis* Blatchley, 1926; *claricornis* Knight, 1923;



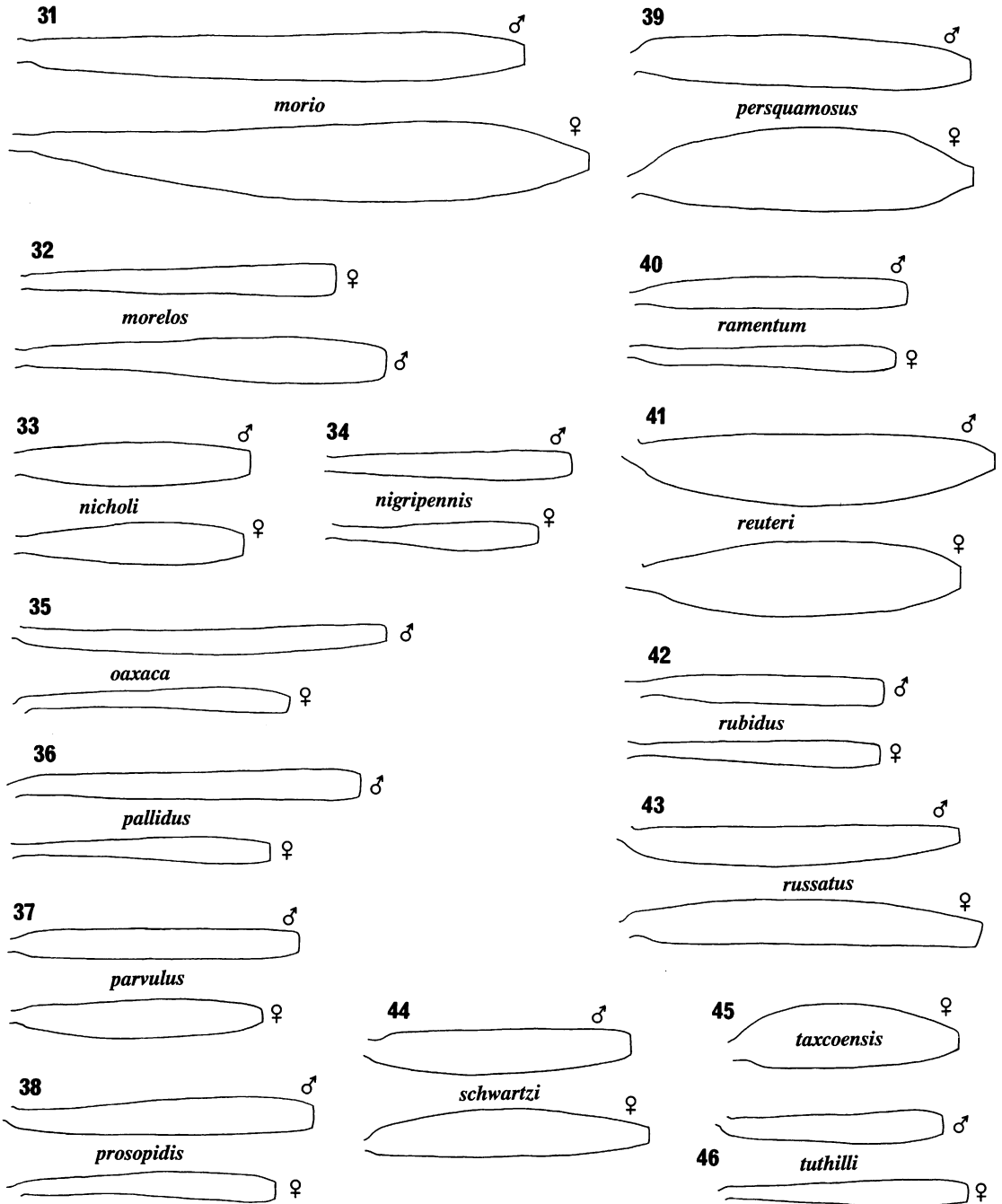
Figs. 6–13. *Atractotomus* species. 6–10. Lateral view of head. 6. *acaciae*. 7. *balli*. 8. *kolenatii*. 9. *ovatus*. 10. *cercocarpi*. 11. Dorsal view of head and pronotum, *nigripennis*. 12, 13. Hemelytra. 12. *acaciae*. 13. *balli*.

hesperus Knight, 1968; *longirostris* Knight, 1968; *minusculus* Knight, 1923; *olseni* Knight, 1923; *pini* Knight, 1968; and *rostra-*

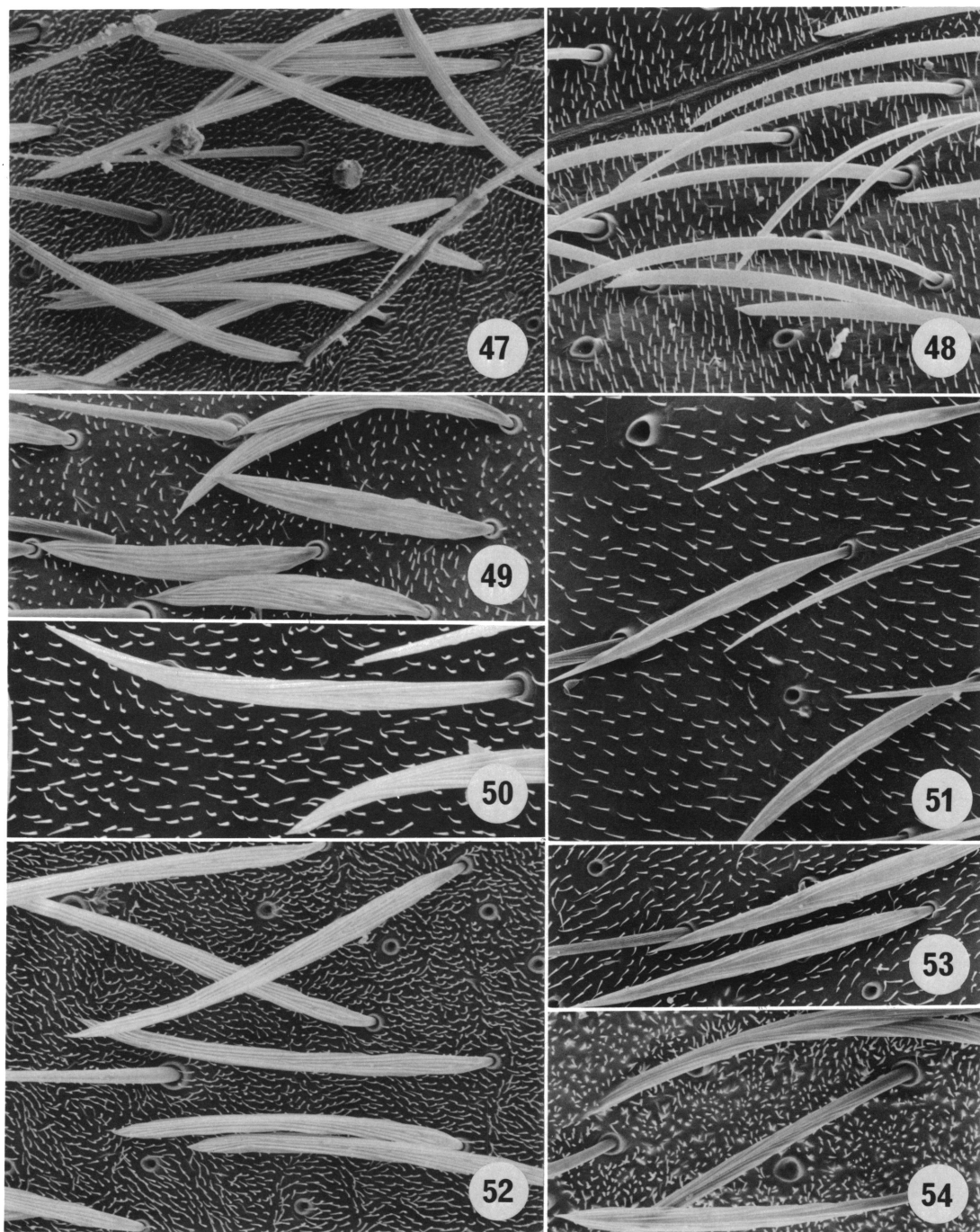
tus Knight, 1923. *Atractotomus crataegi* Knight, 1931, also is transferred to *Phoenicocoris*. Previously, *Phoenicocoris* was rep-



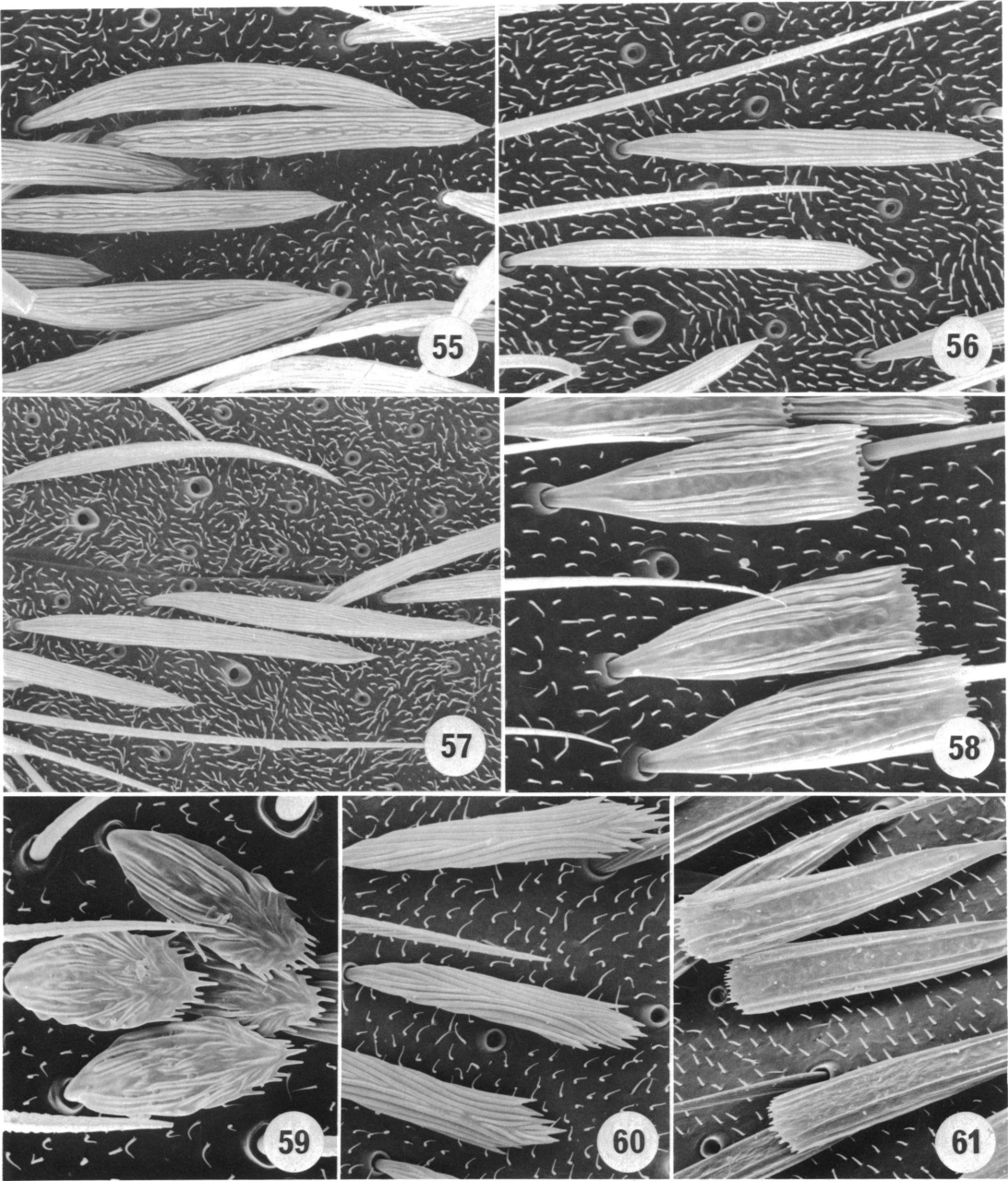
Figs. 14–30. Second antennal segment of *Atractotomus* species. 14. *acaciae*. 15. *agrifoliae*. 16. *albidicoxis*, near linear form. 17. *albidicoxis*, enlarged form. 18. *arizonae*. 19. *attricolor*. 20. *balli*, near linear form. 21. *balli*, enlarged form. 22. *cercocarpi*. 23. *chiapas*. 24. *cooperi*. 25. *jalisco*. 26. *kolenatii*. 27. *magnicornis*. 28. *marcoi*. 29. *miniatus*. 30. *mitla*.



Figs. 31–46. Second antennal segment of *Atractotomus* species. 31. *morio*. 32. *morelos*. 33. *nicholi*. 34. *nigripennis*. 35. *oaxaca*. 36. *pallidus*. 37. *parvulus*. 38. *prosopidis*. 39. *persquamosus*. 40. *ramentum*. 41. *reuteri*. 42. *rubidus*. 43. *russatus*. 44. *schwartzi*. 45. *taxcoensis*. 46. *tuthilli*.



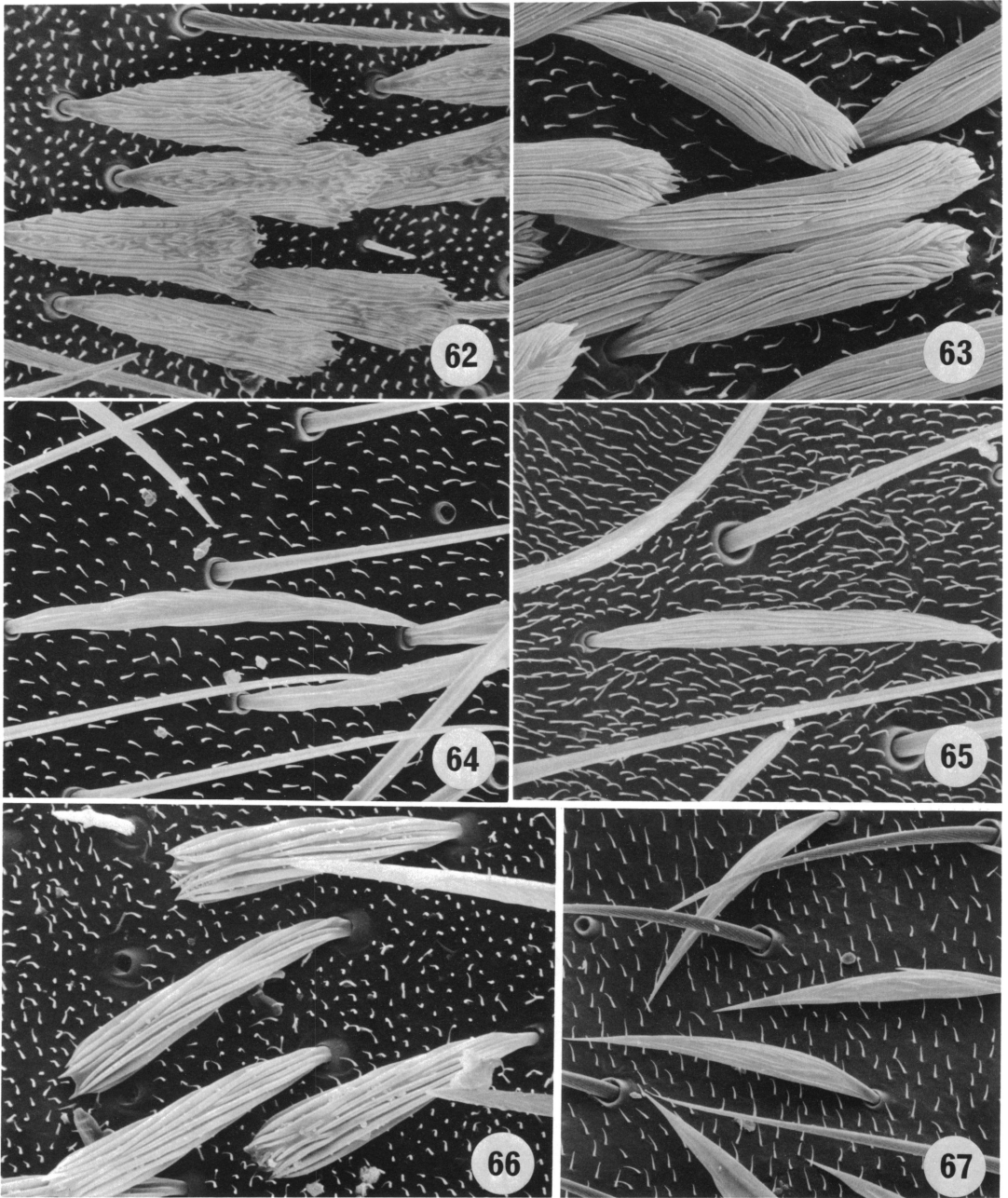
Figs. 47–54. Scalelike setae. 47. *Megalopsallus adustus*. 48. *Dacota hesperia*. 49. *Psallus ancorifer*. 50. *Merinocapsus ephedrae*. 51. *Campylomma verbasci*. 52. *Megalopsallus latifrons*. 53. *Europiella* sp. (pale species with reddish brown head and thorax; on *Sarcobatus vermiculatus*). 54. *Heterocapillus tigripes*.



Figs. 55–61. Scalelike setae. 55. *Beckocoris laticephalus*. 56. *Europiella pictipes*. 57. *Nevadocoris becki*. 58. *Phoenicocoris crataegi*. 59. *Phoenicocoris rostratus*. 60. *Rhinacloa forticornis*. 61. *Heterocapillus genistae*.

resented in the Nearctic region by a single native species, *P. strobicola* (Knight), and one apparently introduced species, *P. dissimilis*,

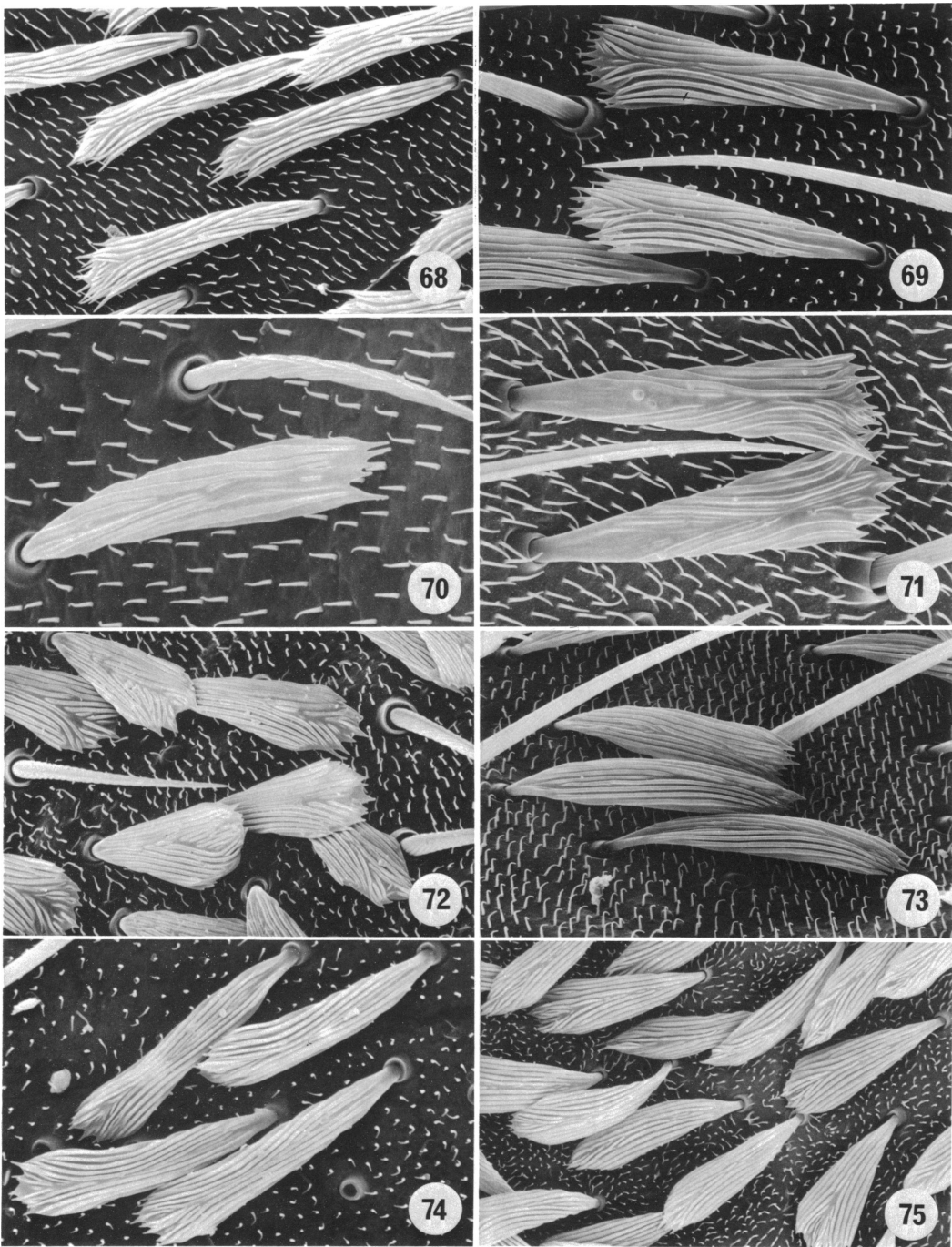
both rather narrowly distributed in the eastern and midwestern United States. The changes specified above greatly expand the



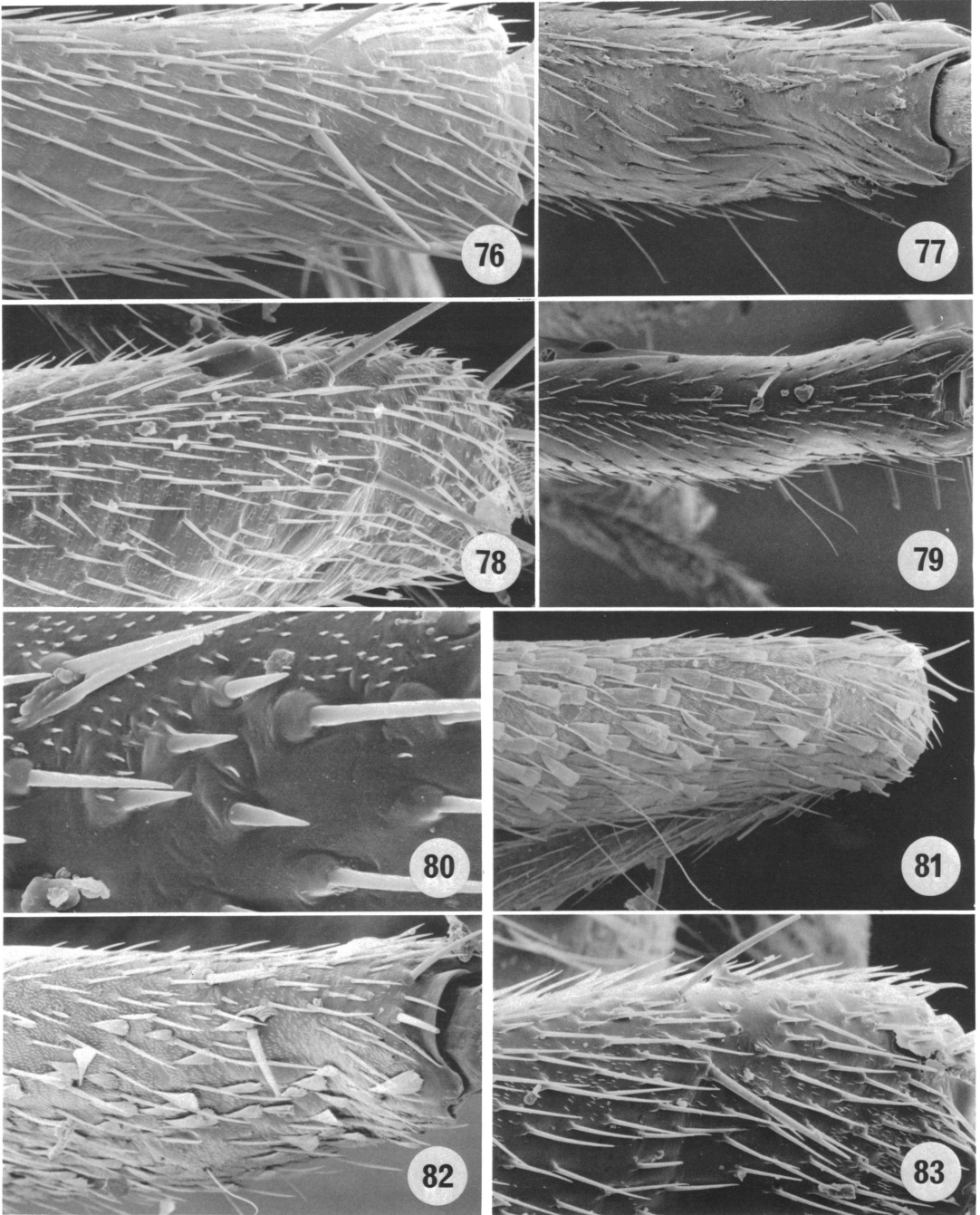
Figs. 62-67. Scalelike setae of *Atractotomus* species. 62. *acaciae*. 63. *albidicoxis*. 64. *cooperi*. 65. *magnicornis*. 66. *morelos*. 67. *morio*.

distribution of *Phoenicocoris* in North America and throughout the Holarctic. Seven Palearctic species are currently recognized as follows: *carbonarius* (Horváth), *dissimilis* (Reuter), *flagellatus* Wagner, *kyushuensis*

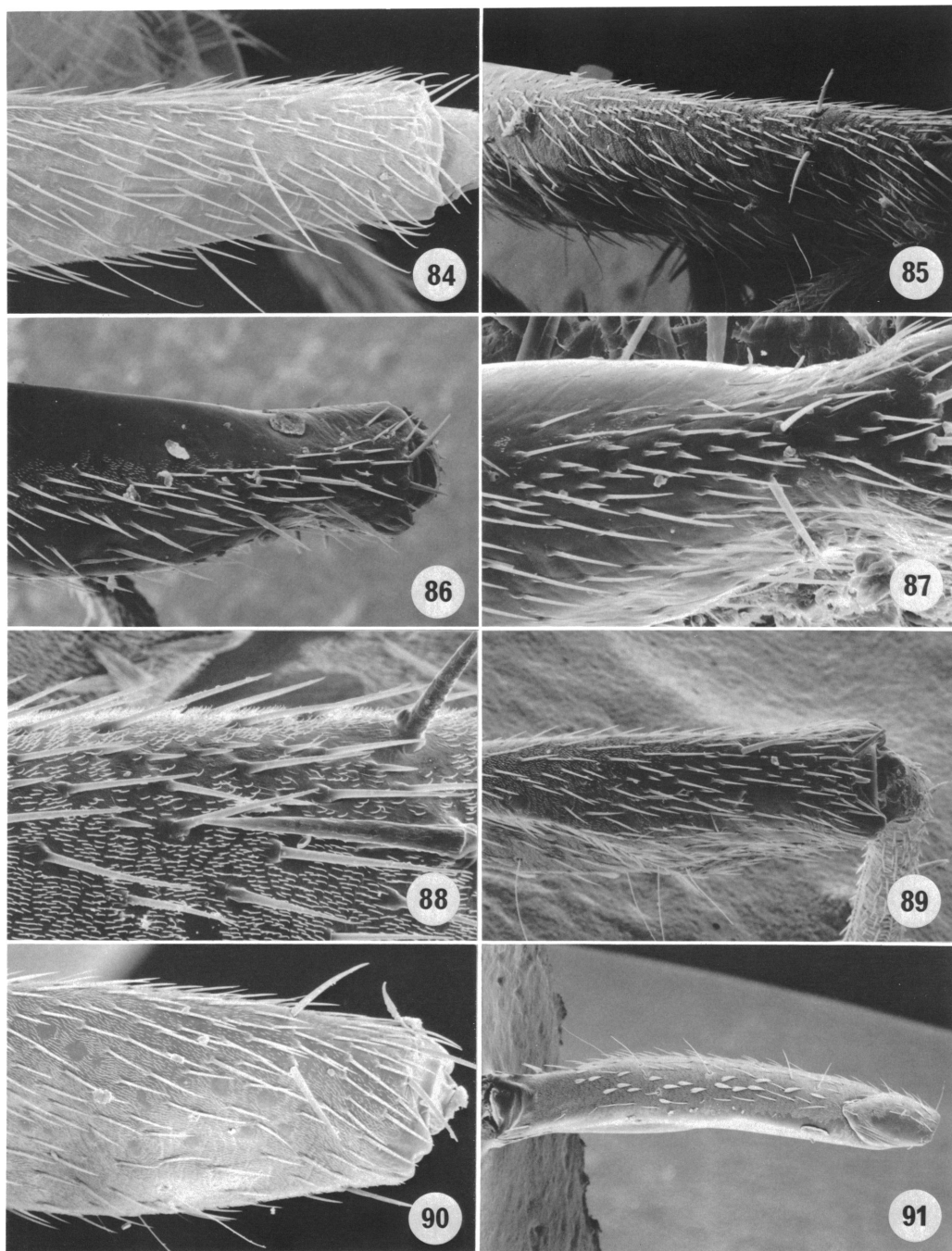
Kerzhner, *modestus* (Meyer-Dür), *obscurulus* (Fallén), and *vidali* (Lindberg). Several of these species do not appear to be congeneric with the type species, *modestus*, indicating the need for further comparative study.



Figs. 68–75. Scalelike setae of *Atractotomus* species. 68. *nigripennis*. 69. *oaxaca*. 70. *ovatus*. 71. *pallidus*. 72. *rubidus*. 73. *russatus*. 74. *schwartzi*. 75. *tuthilli*.



Figs. 76–83. Dorsodistal surface of metafemora. 76. *Phoenicocoris rostratus*. 77. *Rhinacloa forticornis*. 78. *Phoenicocoris crataegi*. 79. *Campylomma verbasci*. 80–83. *Atractotomus* species. 80. *agrifoliae*. 81. *balli*. 82. *cercocarpi*. 83. *cooperi*.

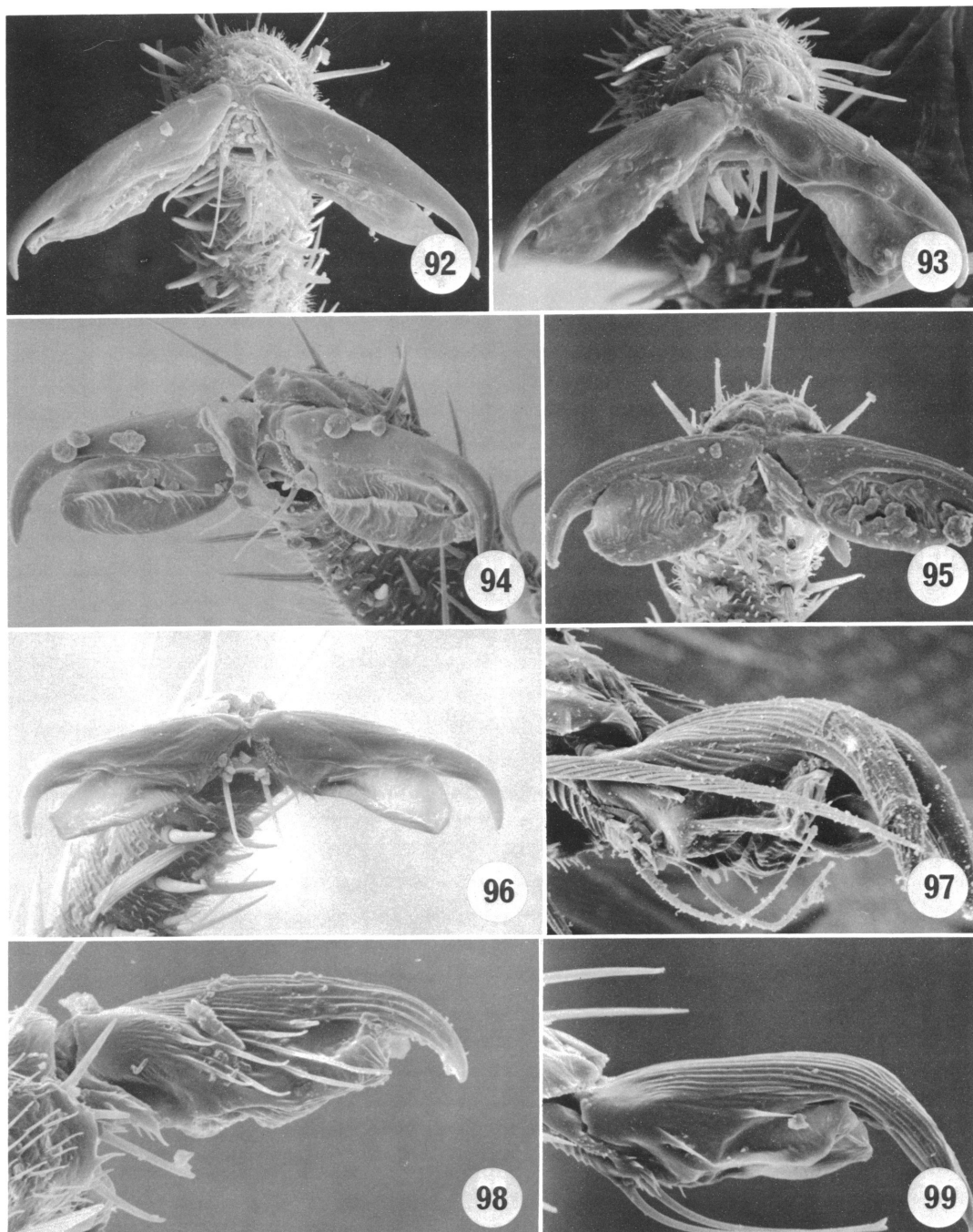


Figs. 84–91. Metafemora of *Atractotomus* species. 84–90. Dorsodistal surface. 84. *kolenatii*. 85. *magnicornis*. 86. *ovatus*. 87. *quercicola*. 88. *pallidus*. 89. *rubidus*. 90. *tuthilli*. 91. Ventral surface, *tuthilli*.

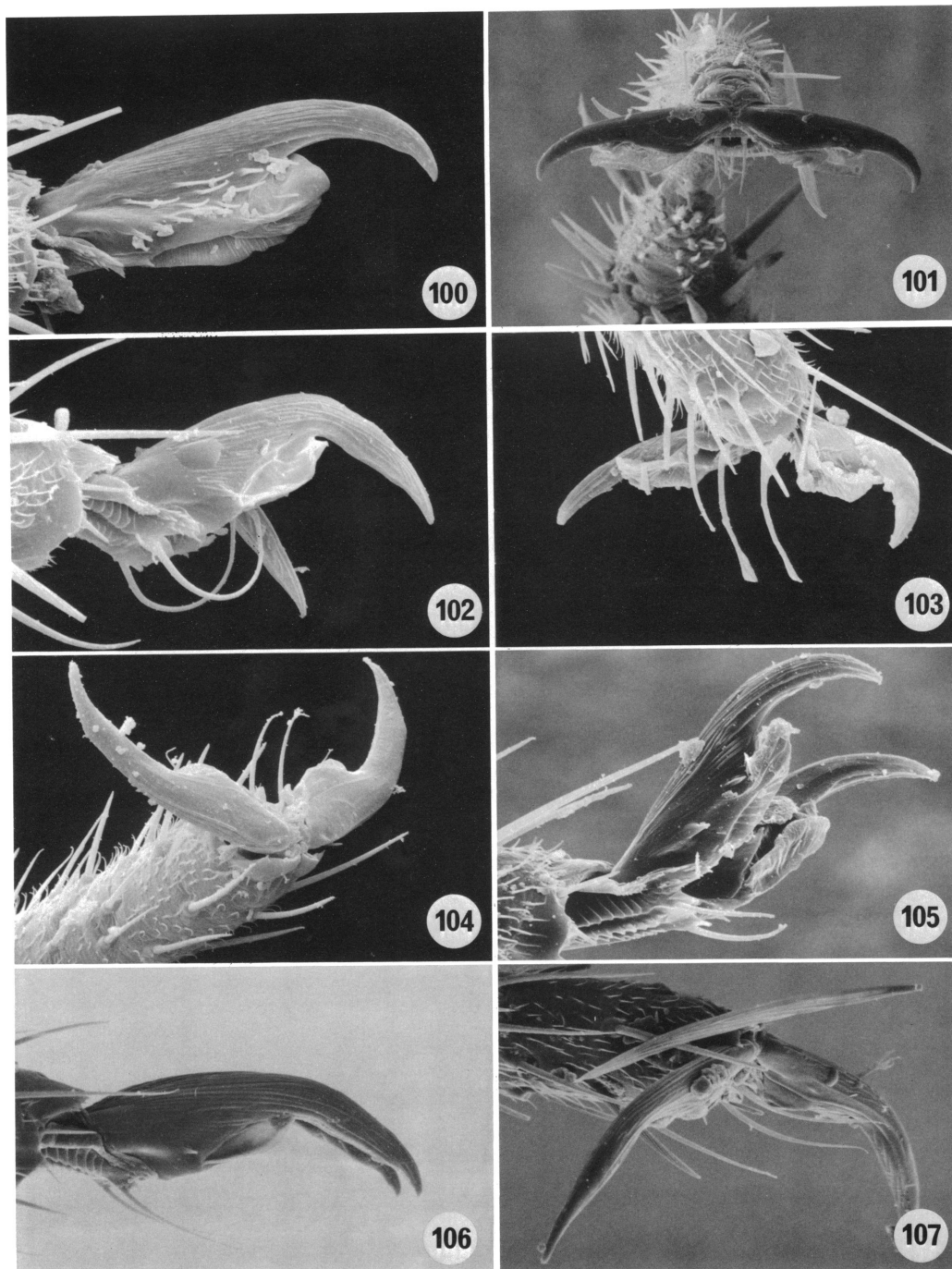
Dacota Uhler

Dacota Uhler, 1872: 413, 414 (n. gen.). – Van Duzee, 1917: 362 (cat.). – Knight, 1931: 36 (syn.

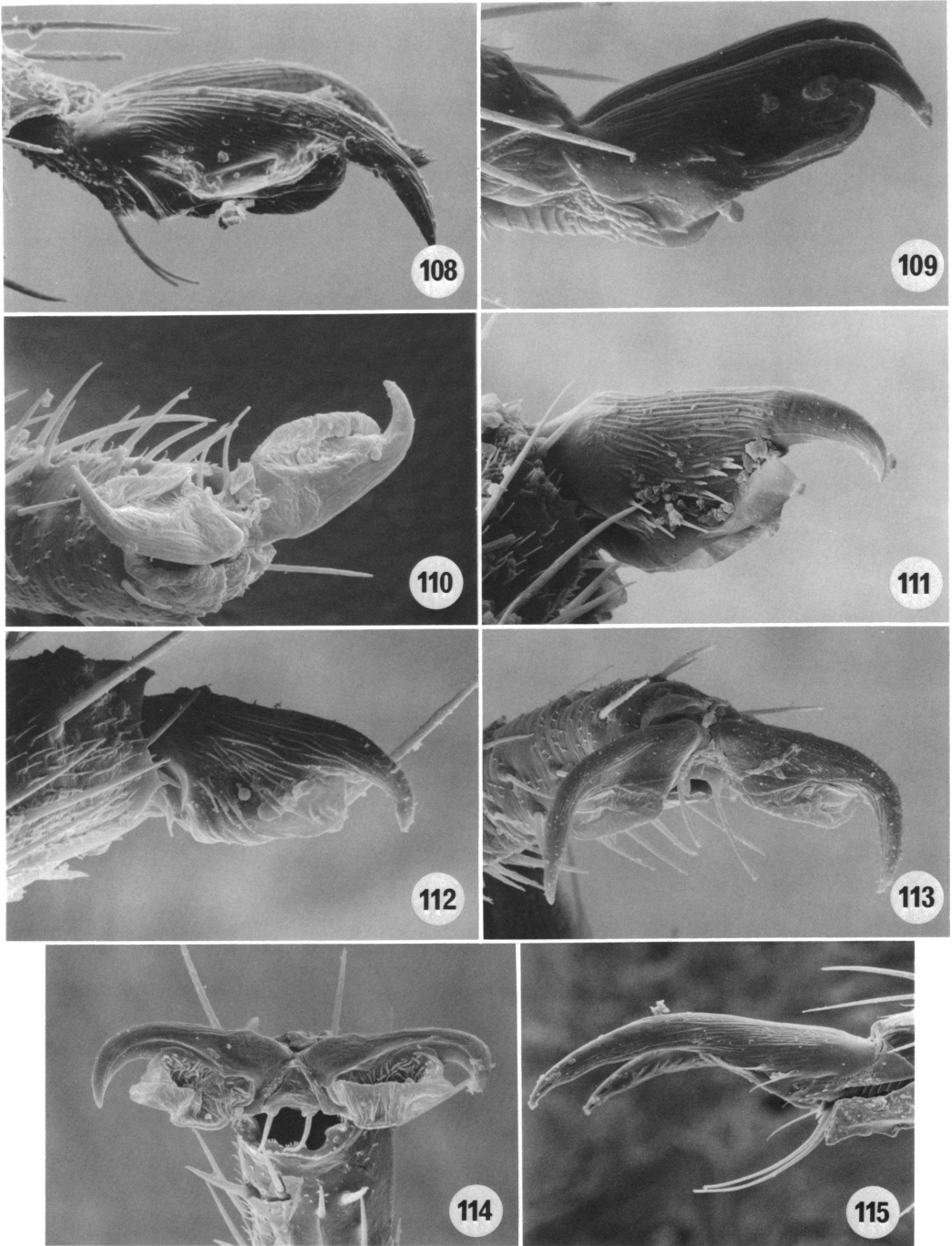
with *Atractotomus*). – Carvalho, 1958: 15 (cat.). – Henry and Wheeler, 1988: 459 (cat.). – Kerzhner 1988a: 849 (revised syn., dist.); 1988b: 74 (syn. notes).



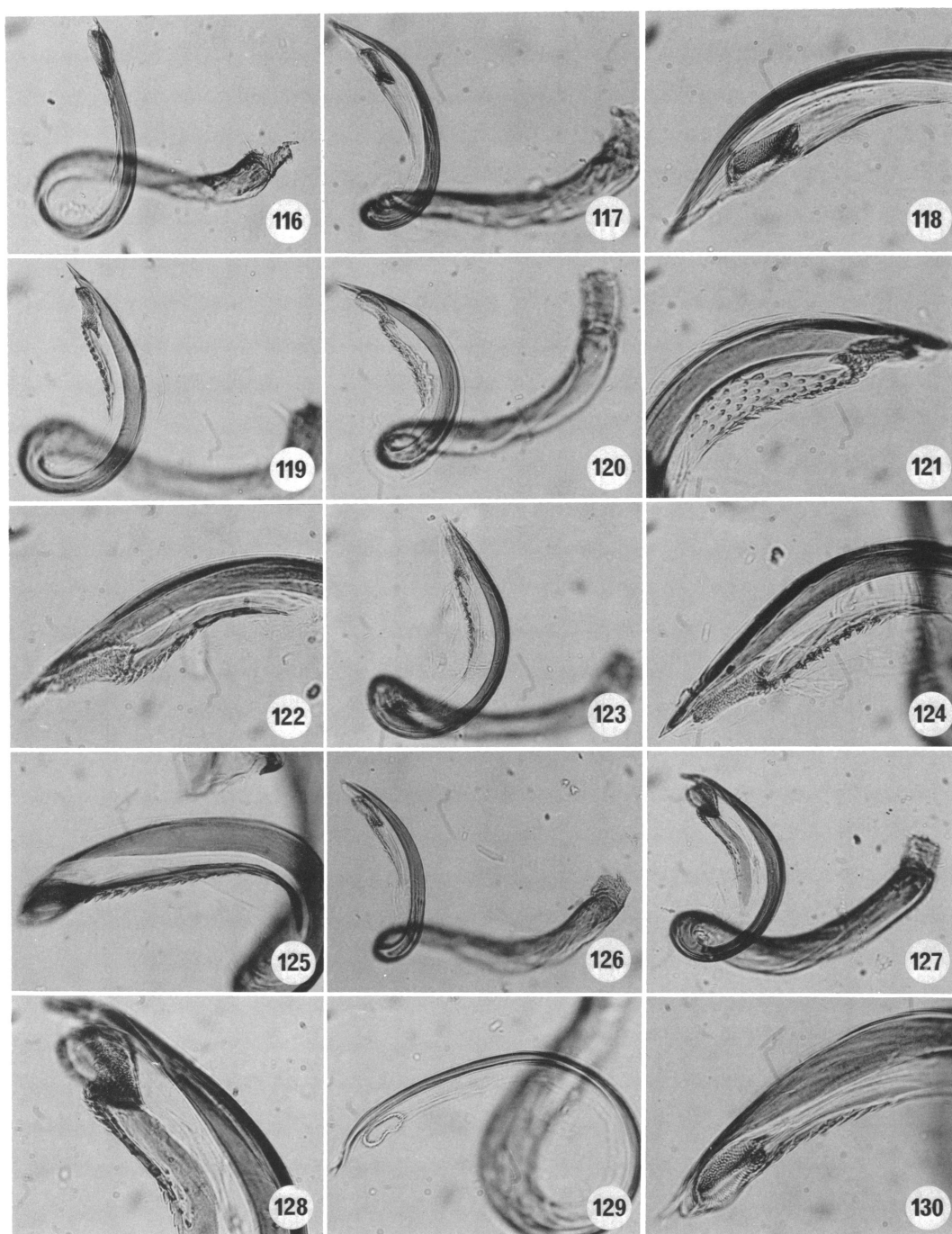
Figs. 92–99. Pretarsal structures. 92. *Dacota hesperia*. 93. *Beckocoris laticephalus*. 94. *Beamerella balius*. 95. *Rhinacloa forticornis*. 96. *Nevadocoris becki*. 97. *Heterocapillus genistae*. 98. *Europiella* sp. (brownish yellow species with dark head and pronotum; on *Lycium andersonii*) 99. *Campylomma verbasici*.



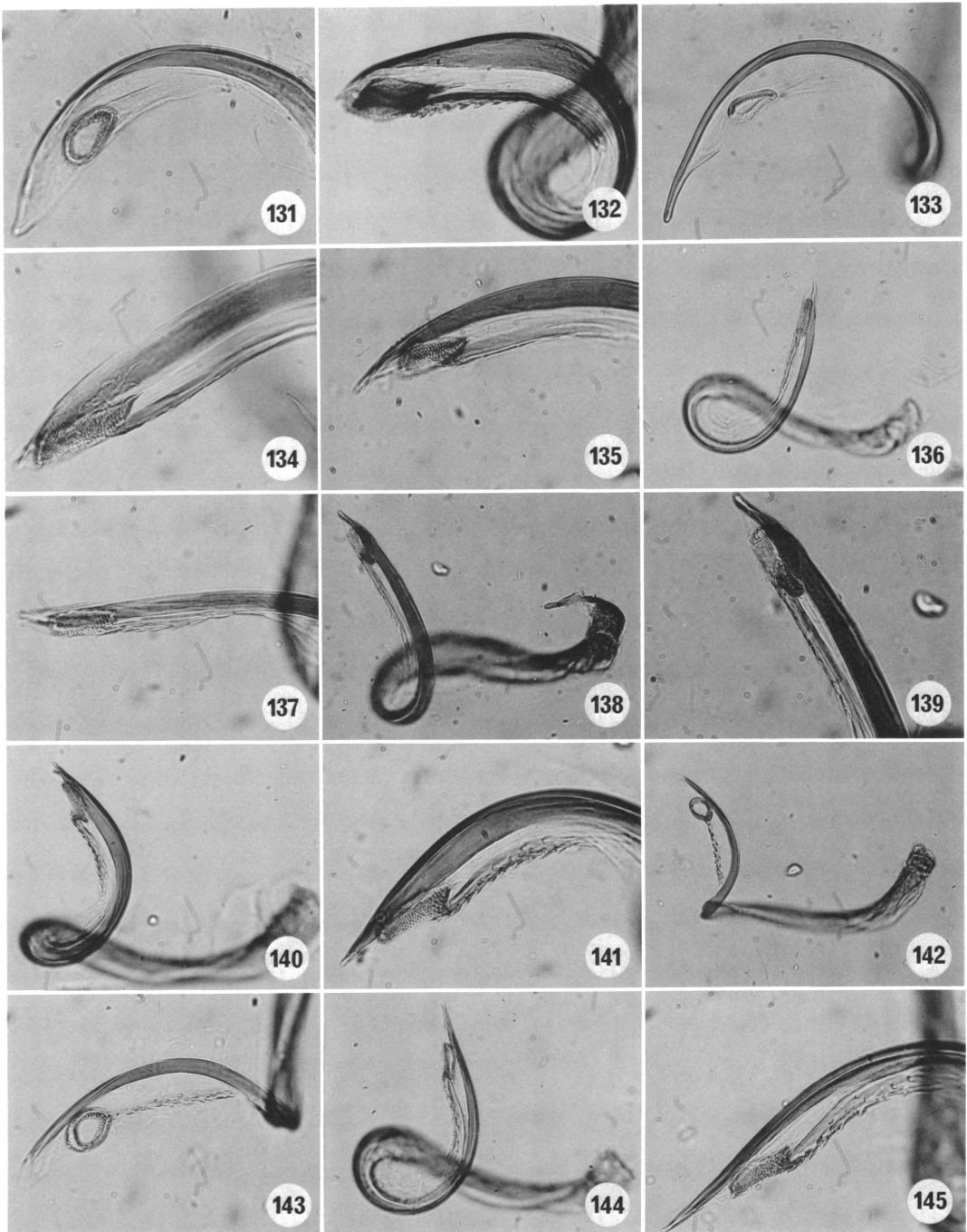
Figs. 100–107. Pretarsal structures. 100, 101. *Europiella* sp. (green species on *Sarcobatus vermiculatus*). 102. *Phoenicocoris crataegi*. 103. *Phoenicocoris longirostris*. 104. *Megalopsallus latifrons*. 105. *Merinocapsus ephedrae*. 106. *Psallus ancorifer*. 107. *Psallus* sp. (nr. *flaviclavus*).



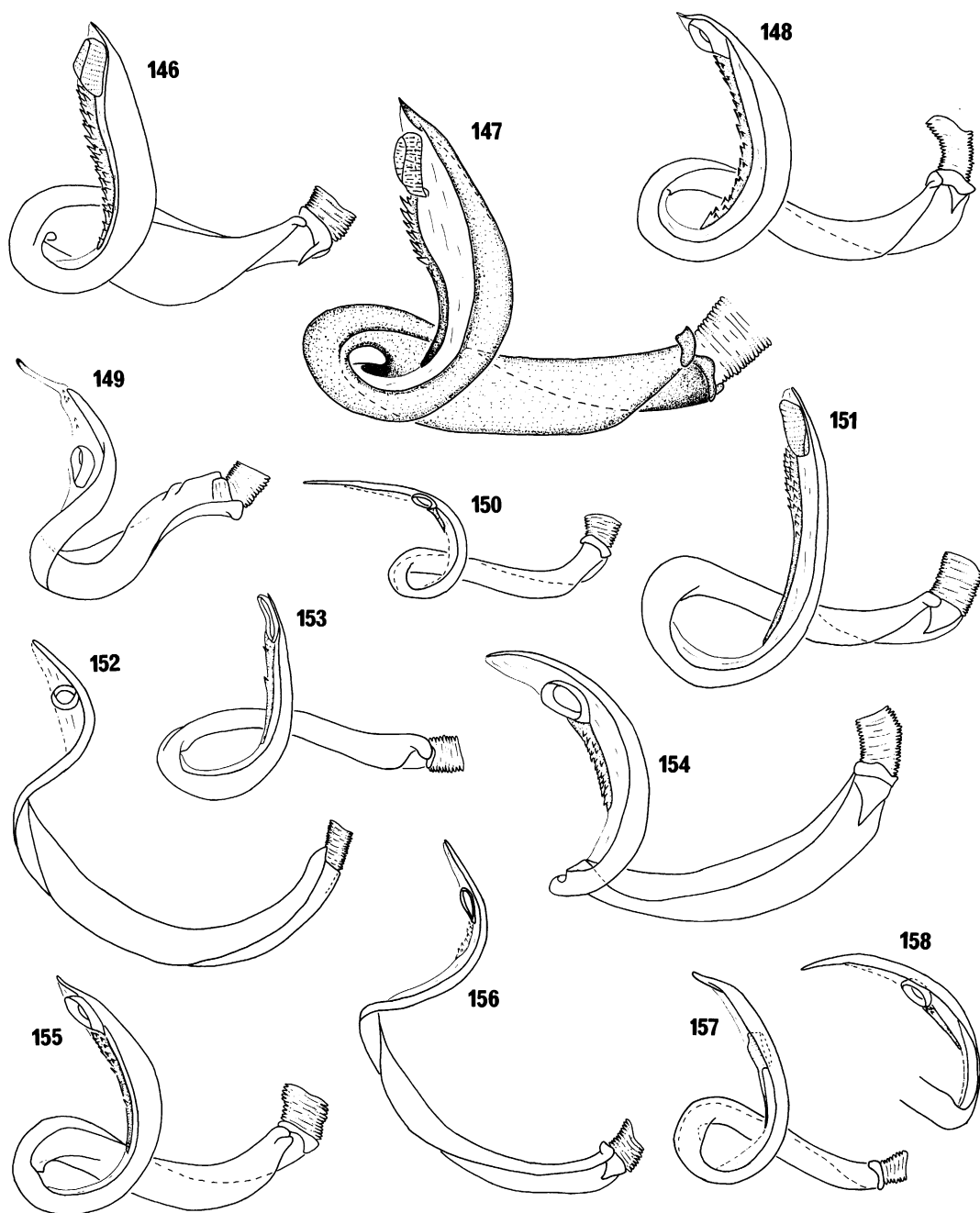
Figs. 108–115. Pretarsal structures of *Atractotomus* species. 108. *acaciae*. 109, 110. *agrifoliae*. 111. *cooperi*. 112. *magnicornis*. 113. *rubidus*. 114. *russatus*. 115. *morio*.



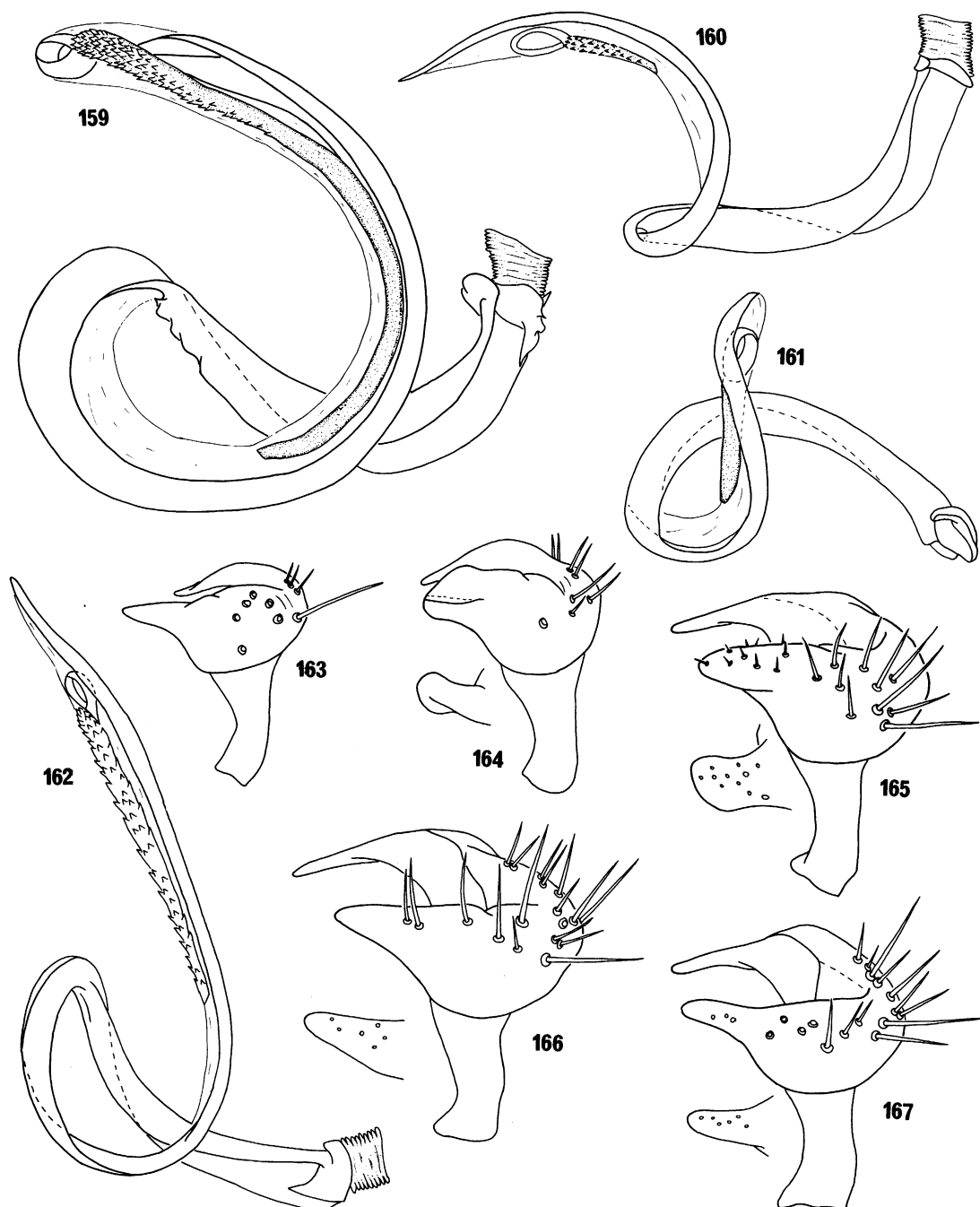
Figs. 116–130. Vesicae of *Atractotomus* species. 116. *acaciae*. 117, 118. *agrifoliae*. 119. *albidicoxis*. 120, 121. *arizonae*. 122. *atricolor*. 123, 124. *cercocarpi*. 125. *chiapas*. 126. *iturbide*. 127, 128. *jalisco*. 129. *kolenatii*. 130. *mitla*.



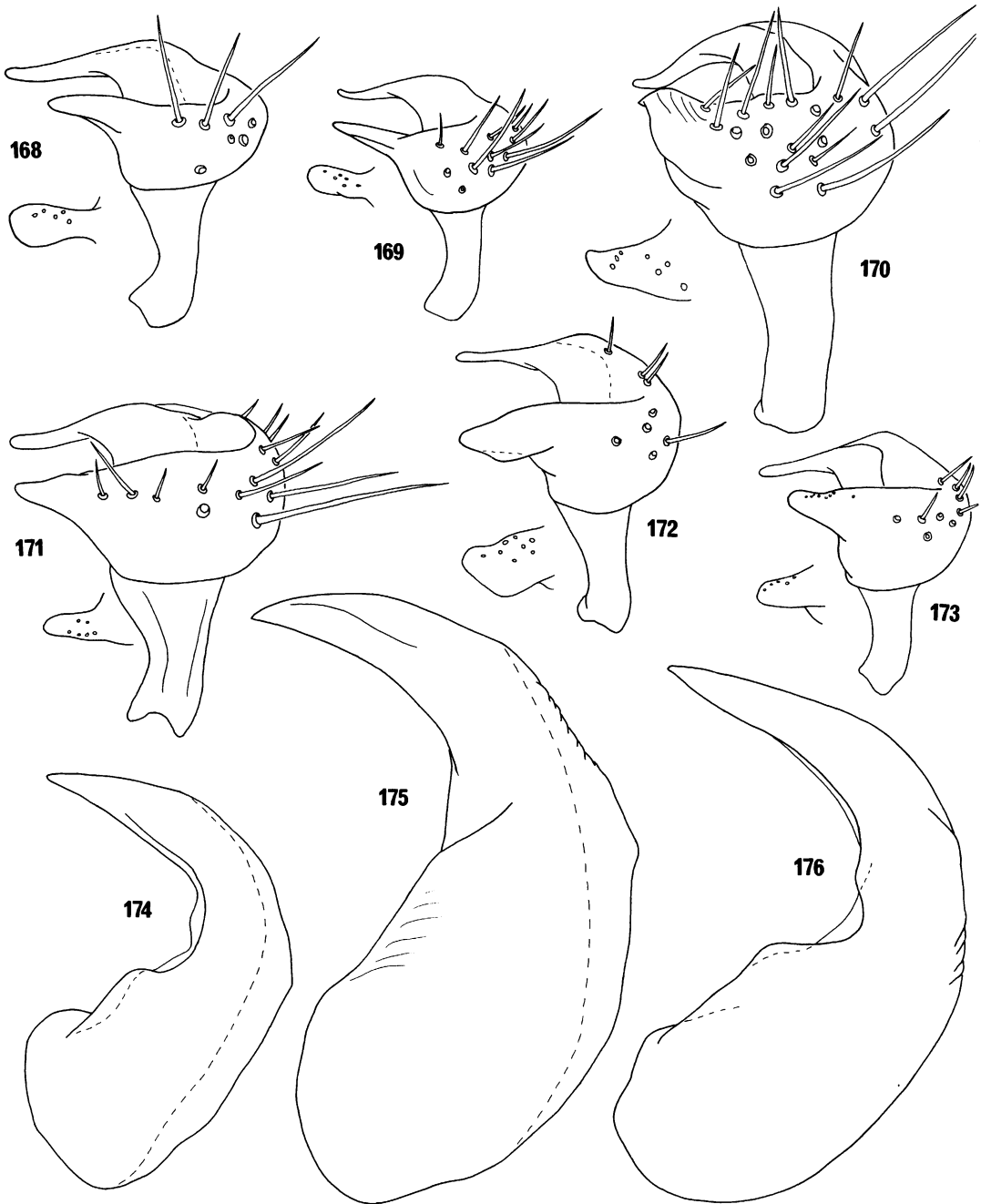
Figs. 131–145. Vesicae of *Atractotomus* species. 131. *miniatus*. 132. *morelos*. 133. *nigripennis*. 134. *oaxaca*. 135. *polymorphae*. 136, 137. *prosopidis*. 138, 139. *quercicola*. 140, 141. *reuteri*. 142, 143. *schaffneri*. 144, 145. *tuthilli*.



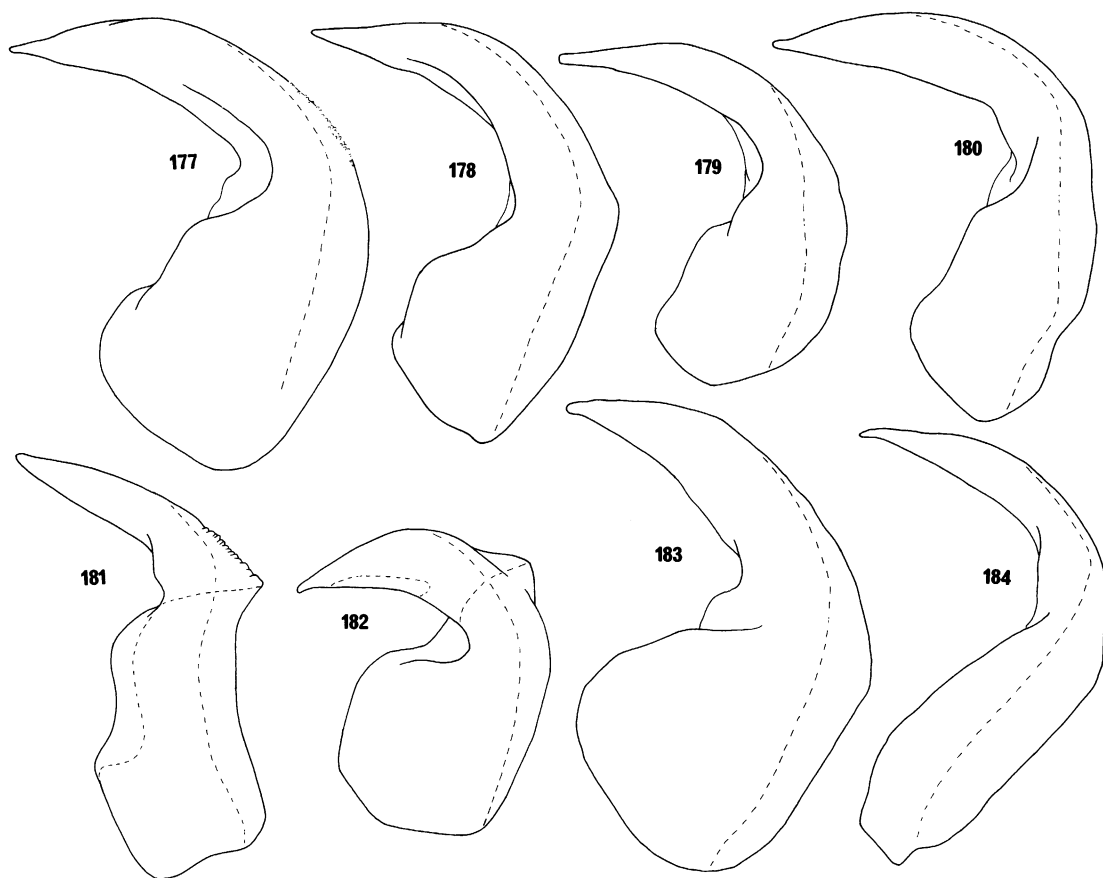
Figs. 146–158. Vesicae of *Atractotomus* species. 146. *balli*. 147. *cooperi*. 148. *magnicornis*. 149. *morio*. 150. *marcoi*. 151. *nicholi*. 152. *ovatus*. 153. *pallidus*. 154. *quercinus*. 155. *persquamosus*. 156. *taxcoensis*. 157, 158. *parvulus*.



Figs. 159–167. Genital structures of *Atractotomus* species. 159–162. Vesicae. 159. *russatus*. 160. *ramentum*. 161. *schwartzi*. 162. *rubidus*. 163–167. Left parameres (inset on lower left – dorsal view of anterior process). 163. *acaciae*. 164. *atricolor*. 165. *cercocarpi*. 166. *agrifoliae*. 167. *magnicornis*.



Figs. 168–176. Genital structures of *Atractotomus* species. 168–173. Left parameres (inset on lower left – dorsal view of anterior process). 168. *mitla*. 169. *oaxaca*. 170. *rubidus*. 171. *russatus*. 172. *schwartzi*. 173. *taxcoensis*. 174–176. Phallothecae. 174. *atricolor*. 175. *agrifoliae*. 176. *cercocarpi*.



Figs. 177–184. Phallosomes of *Atractotomus* species. 177. *magnicornis*. 178. *mitla*. 179. *oaxaca*. 180. *prosopidis*. 181. *rubidus*. 182. *russatus*. 183. *schwartzi*. 184. *taxcoensis*.

Nyctidea Reuter, 1904: 14 (n. gen.). – Carvalho, 1958: 78 (cat.). – Kerzhner 1988a: 849 (syn.); 1988b: 74 (syn. notes).

Leguminola Kerzhner, 1962: 230 (n. gen.); 1988a, b (as subgen. of *Dacota*).

DISCUSSION: Uhler (1872) described the genus *Dacota* to accommodate a single species, *hesperia*, known then from Colorado and the Dakotas. Knight (1931) synonymized *Dacota* with *Atractotomus* and provided additional records of *hesperia* from Colorado and Wyoming. *Dacota* was reinstated as a valid genus by Kerzhner (1988a), who recognized *hesperia* as the senior synonym of the Siberian species, *nigra* (Jakovlev)—type species of *Nyctidea* Reuter. Two other species combined with *Dacota* as a result of the above synonymy are *Nyctidea nigratarsus* (Jakovlev) and *N. albipennis* Reuter, both originally described in the genus *Atractotomus*. Additional information on the synonymy of *Nyc-*

tidea with *Atractotomus* is provided in Kerzhner 1988b. I have been unable to find a reference to the paper where *Leguminola* is synonymized with *Nyctidea*, but in the recent works of Kerzhner (1988a, b), it is treated as a subgenus of *Dacota*.

I concur fully with Kerzhner's treatment of *Dacota* as a distinct genus. My examination of *hesperia* and other *Dacota* species revealed that they differ significantly from *Atractotomus* species in external morphology and the structure of the male genitalia.

In North America, *Dacota hesperia* also has been reported from Arizona, California, and Montana (Knight, 1968), and from the Prairie Provinces of Canada (Kelton, 1980). I have examined additional material from Idaho and Utah. The host plant of this species is *Potentilla fruticosa* L., but specimens also have been collected on *Betula* and *Salix* in the USSR.

Europiella pilosula (Uhler)

Atomoscelis pilosula Uhler, 1893: 377 (n. sp.).
Psallus pilosulus: Van Duzee, 1917: 407 (cat.). –
 Carvalho, 1958: 127 (cat.).
Europiella pilosula: Knight, 1968: 38, 44 (key,
 note). – Henry and Wheeler, 1988: 467 (cat.).
Microphylidea pallens Knight, 1968: 29, 30 (n.
 sp.). – Henry and Wheeler, 1988: 477 (cat.).
 NEW SYNONYMY.

DISCUSSION: Comparison of the holotype male of *Microphylidea pallens* with specimens of *Europiella pilosula* provided by Dr. Randall T. Schuh, AMNH, revealed that these two nominal taxa are conspecific. The male genitalic structures of the holotype of *pallens*, although slightly teneral, are indistinguishable from those of *pilosula*. In the absence of any external differences, *Microphylidea pallens* is here proposed as a new junior synonym of *Europiella pilosula*.

SPECIES INCERTAE SEDIS

DISCUSSION: Four Palearctic species previously placed in the genus *Atractotomus* are not congeneric with the type species. These

are *amygdali* Wagner, *mali* (Meyer-Dür), *rhodani* Fieber, and *vireti* Wagner. These species appear to be closely related, and together with *Heterocapillus pici* (Reuter), probably form a monophyletic group defined by the structure of the male genitalia. Since the relationship of these species to other Palearctic phylines has not been established, they are here assigned the status of species incertae sedis.

SPECIES NOMINA DUBIA

DISCUSSION: The type specimens of two nominal species of *Atractotomus* could not be located despite persistent requests to institutions where they might be deposited. The type material of *Atractotomus femoralis* Fieber could not be located at either the Paris Museum or the Naturhistorisches Museum Wien, the two most likely depositories of Fieber material. As for *Atractotomus spissicornis* (Schrank), I have inquired at several German institutions, and it appears that Schrank's types do not exist. On the basis of these findings, the above two nominal species are declared nomina dubia.

PHYLOGENETIC ANALYSIS

OUTGROUPS, CHARACTERS, AND CHARACTER POLARITY: The data set used to determine the species phylogeny contains 27 characters of the external morphology and male genitalia. Descriptions of these characters are provided in table 1.

An attempt was made to establish character polarities for *Atractotomus* by considering character state distributions in the related genera *Beamerella*, *Europiella*, *Megalopsallus*, and *Phoenicocoris*. Together with *Atractotomus*, these genera appear to form a monophyletic group defined by features of the male genitalia (see Introduction and generic discussion). However, when representative species of these genera are scored for the characters described in table 1, only six of the 27 characters occur in a single state throughout the outgroup taxa. Even *Phoenicocoris*, the proposed sister group of *Atractotomus*, showed interspecific variation in six of the characters under consideration. The polarity of these characters and others that vary within the outgroup genera cannot be

adequately inferred without extending the search for outgroups beyond the recognized set of five related genera. As this is beyond the scope of the present study, especially given the limited knowledge of phyline relationships in the Holarctic region, I have elected to establish character polarities by way of comparison to a single outgroup taxon *Psallus ancorifer* (Fieber), which I believe is plesiomorphic relative to *Atractotomus* and other related genera. Although *Psallus ancorifer* possesses scalelike setae, which is certainly a derived feature in the Phylini, it lacks many of the modifications of the head, antennae, and vestiture that are characteristic of *Atractotomus* and related genera. Further, my brief study of phylines with scalelike setae suggests that the simple J-shaped vesica of *Psallus* and other genera such as *Heterocapillus* and *Dacota* is plesiomorphic relative to the coiled vesica of *Atractotomus* and related genera.

Using the character states in *Psallus ancorifer* as plesiomorphic ("0" state), the 27 characters in table 1 were scored for 37 spe-

TABLE 1

Description of Characters

(Values from left margin: character no., additivity, length on tree, consistency index)

SURFACE TEXTURE

0 + 4 0.25—PRONOTUM: (0) smooth or finely granulose; (1) faintly rugulose

VESTITURE

1 + 4 0.50—SCALELIKE SETAE ON DORSUM: (0) uniformly distributed; (1) absent or more sparsely distributed on distal half of hemelytra; (2) entirely absent, or restricted to anterior margins of pronotum and hemelytra

2 + 3 0.33—SCALELIKE SETAE ON HEMELYTRAL MEMBRANE: (0) absent; (1) present

3 + 5 0.40—SCALELIKE SETAE ON LATERAL MARGINS OF ABDOMEN: (0) moderate to dense, uniform distribution; (1) scattered, irregular distribution; (2) absent

4 + 2 0.50—SCALELIKE SETAE ON METAFEMORA: (0) absent; (1) present

5 + 1 1.00—SCALELIKE SETAE ON DORSUM: (0) narrow, with acuminate apex; (1) broad, with serrate apex

6 - 2 1.00—SURFACE RIDGES ON SCALELIKE SETAE: (0) weakly converging distally; (1) parallel throughout; (2) weakly diverging distally

7 + 1 1.00—SURFACE RIDGES ON SCALELIKE SETAE: (0) diminished medially, or sometimes noticeably anastomosed; (1) strongly developed across entire seta, rarely anastomosed

8 - 3 0.66—MICROTRICHIA ON DISTAL HALF OF METAFEMORA: (0) densely distributed; (1) sparsely distributed; (2) sparsely distributed on dorsodistal margin only

9 + 4 0.25—IRREGULAR ROW OF SPINES ON DORSODISTAL SURFACE OF METAFEMORA: (0) absent; (1) present

TABLE 1—(Continued)

HEAD STRUCTURE

10 + 4 0.25—LOCATION OF ANTENNAL FOSSAE: (0) at or slightly below level of ventral margin of eyes; (1) slightly above level of ventral margin of eyes

11 + 4 0.25—POSTERIOR MARGIN OF HEAD: (0) rounded; (1) angulate or weakly carinate

12 + 7 0.14—LABIUM: (0) usually reaching beyond middle of mesocoxae, sometimes to posterior margin of metacoxae; (1) not reaching beyond middle of mesocoxae

ANTENNAE

13 + 7 0.14—LENGTH OF SEGMENT II OF MALE: (0) greater than width of head across eyes; (1) less than or equal to width of head across eyes

14 + 4 0.25—SEGMENT II OF MALE: (0) not or only weakly inflated; (1) moderately to strongly inflated

15 + 1 1.00—SEGMENT II OF MALE: (0) cylindrical or weakly clavate; (1) fusiform

16 + 5 0.20—SEGMENT II OF FEMALE: (0) not or only weakly inflated; (1) moderately to strongly inflated

17 + 5 0.20—SEGMENT II OF FEMALE: (0) cylindrical or weakly clavate; (1) strongly clavate or fusiform

18 + 1 1.00—COLOR OF SEGMENT II: (0) dark brown or black; (1) pale yellow or brownish yellow

THORAX

19 + 4 0.25—PERITREMAL DISC: (0) more or less unicolorous with rest of metapleuron; (1) paler than surrounding metapleural region

VESICA OF MALE GENITALIA

20 + 4 0.25—LOCATION OF SECONDARY GONOPORE: (0) removed from apex of vesical strap by distance equal to or greater than half of gonopore length; (1) removed from apex

TABLE 1—(Continued)

				of vesical strap by distance less than half of gonopore length
21	+	4	0.25	—GONOPORE SCLERITE: (0) long and well sclerotized; (1) short and weakly sclerotized, or obsolete
22	+	11	0.18	—SPINES ON GONOPORE SCLERITE: (0) absent, or restricted to narrow region below gonopore; (1) mostly restricted to basal half of sclerite; (2) distributed along entire length of sclerite
23	+	3	0.33	—SPINES ON GONOPORE SCLERITE: (0) directed distally; (1) directed proximally
24	+	4	0.25	—SPINES ON GONOPORE SCLERITE: (0) fine; (1) coarse
25	+	4	0.25	—SPINES ON GONOPORE SCLERITE: (0) widely spaced; (1) close set
26	+	10	0.20	—WALL OF GONOPORE: (0) thick; (1) thin

cies of *Atractotomus* and the genus *Phoenicocoris* (table 2). Characters that showed variation within *Phoenicocoris* (characters 5, 6, 11, 13, 18, 21) were assigned missing data codes ("—"). The polarities of genitalic characters 23–25 were assigned arbitrarily because a homologous structure could not be identified in *Psallus*. If a homologous structure could not be identified in an ingroup taxon, or the structure was damaged or missing, a missing data code was assigned. Several characters (e.g., antennal length) showed variation spanning more than one character state in a limited number of ingroup taxa. Missing data codes also were assigned in these instances. Six multistate characters were included in the analysis (characters 1, 3, 6, 8, 22, 26), two of which (6, 8) were treated as nonadditive (unordered).

DATA ANALYSIS: All analyses was performed using the Hennig86 microcomputer phylogenetics package of J. S. Farris. Individual runs were conducted using the bb* tree-building option, which applies extended branch-swapping and retains all shortest length trees found. For the complete data set (*Psallus ancorifer* and *Phoenicocoris* included as outgroups with *Psallus* designated the pri-

TABLE 2
Character Matrix Processed by HENNIG86

	00000000001111111112222222 012345678901234567890123456
<i>Psallus ancorifer</i>	0000000000000000000000—0
<i>Phoenicocoris</i>	00000—0010—0—0000—00—0—0
<i>acaciae</i>	101001210100111011011010012
<i>agrifoliae</i>	11010110211101000010000—1
<i>albidicoxis</i>	00000121010010—011020110
<i>arizonae</i>	000011210100010000011020110
<i>atricolor</i>	100011210000010000—11010110
<i>balli</i>	001011210000011111001020110
<i>cercocarp</i>	000011210100011100011020110
<i>chiapas</i>	02020—0101010000—01020110
<i>cooperi</i>	000100001100000000001010110
<i>iturbide</i>	110101102111010000100010011
<i>jalisco</i>	100001210100011000011011110
<i>kolenatii</i>	000100001110000000000010—2
<i>magnicornis</i>	000100001110000011001020110
<i>marcoi</i>	00010000111001001100010—2
<i>miniatus</i>	11010110211100000010010—1
<i>mitla</i>	1000012—0110000000001010110
<i>morelos</i>	100001210101110000001010110
<i>morio</i>	00010000111000001100010—1
<i>nicholi</i>	1001012—0100111011011010012
<i>nigripennis</i>	00000121110001000000010—2
<i>oaxaca</i>	00000121011010000001101000—
<i>ovatus</i>	11010110211101000010010—2
<i>pallidus</i>	000101200100100000101010101
<i>parvulus</i>	00010000111000001100010—2
<i>persquamosus</i>	000100001100001011001010110
<i>polymorphae</i>	12020—2111000000100010001
<i>prosopidis</i>	0001012001111—0000101010012
<i>quercicola</i>	120201102111010000100021001
<i>quercinus</i>	110101102111010000100021011
<i>ramentum</i>	100011210100010000010120002
<i>reuteri</i>	000011210000111111011020110
<i>rubidus</i>	100011210100010000—10020102
<i>russatus</i>	100001210101001010011010112
<i>schaffneri</i>	120101102111010000100021001
<i>schwartzi</i>	00001121010101—00000—2
<i>taxcoensis</i>	0010112—0100101011010120002
<i>tuthilli</i>	100011210000010000010020112

mary outgroup), this procedure resulted in two equally parsimonious trees being found, each with a consistency index of 0.29 and length of 111. These trees differed only in the position of the species *iturbide*. One alternative has *iturbide* resolved as the sister species of all other members of the *miniatus* group, while the other tree has *iturbide* in an equivocal position with nodes leading to two fully resolved subclades of the *miniatus* group. The Nelson consensus (fig. 185a) has the same consistency and length as the individual trees,

TABLE 3
List of Character State Changes at Ancestral
Nodes for Figure 185

Cladogram 185a:

71:	3-0.1, 9-1, 20-1, 22-1, 24-1, 25-1
70:	3-1, 8-1
69:	3-0.1, 5-1, 6-2
68:	16-1, 17-1
67:	3-1, 18-1, 26-0.1
66:	7-1
65:	10-1
64:	1-0.1, 11-1, 13-1, 26-0.1
63:	12-1, 19-1
62:	0-1
61:	20-0, 21-1, 22-0, 26-1
60:	1-0.1, 10-1, 24-0, 26-1
59:	13-1
58:	26-2
57:	0-1, 1-1, 6-1, 8-2, 20-0
56:	19-1
55:	22-2, 23-1
54:	22-0
53:	14-1
52:	4-1
51:	1-2, 25-0
50:	21-1
49:	16-1, 26-2
48:	22-2
47:	3-2
46:	12-1, 17-1, 24-0
45:	20-0, 26-2
44:	0-0
43:	25-0
42:	14-1, 15-1
41:	21-1, 24-0
40:	9-0, 16-1, 17-1
39:	0-0
38:	19-0, 22-0

Cladogram 185b:

72:	5-1, 6-2, 9-1, 20-1, 22-1, 24-1, 25-1
71 + 69:	3-1
70:	5-0, 6-0, 8-1
68:	16-1, 17-1
67:	18-1, 26-0.1
66 — 38:	same as for cladogram 185a

and the topology of the later tree described above. A list of additivities, lengths, and consistency indices for all characters as they apply to figure 185a is given in table 1. Synapomorphies for all nodes are given in table 3. Characters having alternative optimizations at a node are indicated as ranges separated by a period (e.g., 0.2). Character distributions for terminal taxa are not provided,

but can be determined from the data matrix (table 2).

When the data in table 2 is analyzed with *Psallus ancorifer* designated as the sole outgroup and *Phoenicocoris* included as an ingroup taxon, the same two trees are found as described previously. If *Phoenicocoris* is excluded from the data set with *Psallus* remaining the sole outgroup, the outcome is again the same except that *Psallus* now arises from node 71 along with the stems leading to nodes 70 and 69, rather than from a separate node (72) as in figure 185a. Two slightly different trees are obtained when *Psallus ancorifer* is removed from the data set and *Phoenicocoris* is designated as the sole outgroup. The two trees differ from one another only in the placement of the species *iturbide* as described earlier. The Nelson tree (fig. 185b) has a consistency index of 0.30 and length of 109. This tree differs from the previous Nelson tree (fig. 185a) only in the collapsing of node 71 with node 69, which is the result of different optimizations of characters 5 and 6. In figure 185a, characters 5-1 and 6-2 define node 69, while in figure 185b these characters are placed at the basal node of the cladogram defining *Phoenicocoris* + *Atractotomus*, and are reversed to 5-0 and 6-0 on the stem leading to node 70 (see table 3 for list of synapomorphies for fig. 185b). The reason for the shift in the placement of characters 5-1 and 6-2 is a direct result of these characters being scored as no codes in the designated outgroup *Phoenicocoris*. A final run of the data with *Phoenicocoris* assigned the "0" state for characters 5 and 6, which is the condition found in all Palearctic members of the genus, again produces the ingroup topology depicted in figure 185a. The close similarity of the cladograms resulting from analyses employing widely different outgroups supports the argument that character polarities have been adequately established through outgroup comparison.

DISCUSSION: In the analysis using both *Psallus ancorifer* and *Phoenicocoris* as outgroups (fig. 185a), only 5 of the 27 characters showed no homoplasy. Eighteen characters had consistency indices ranging between 0.14 and 0.33 (table 1). It can be seen by examining the character state distributions in table 3 that some highly homoplasious characters such as 22 (ci = 0.18) are responsible for a

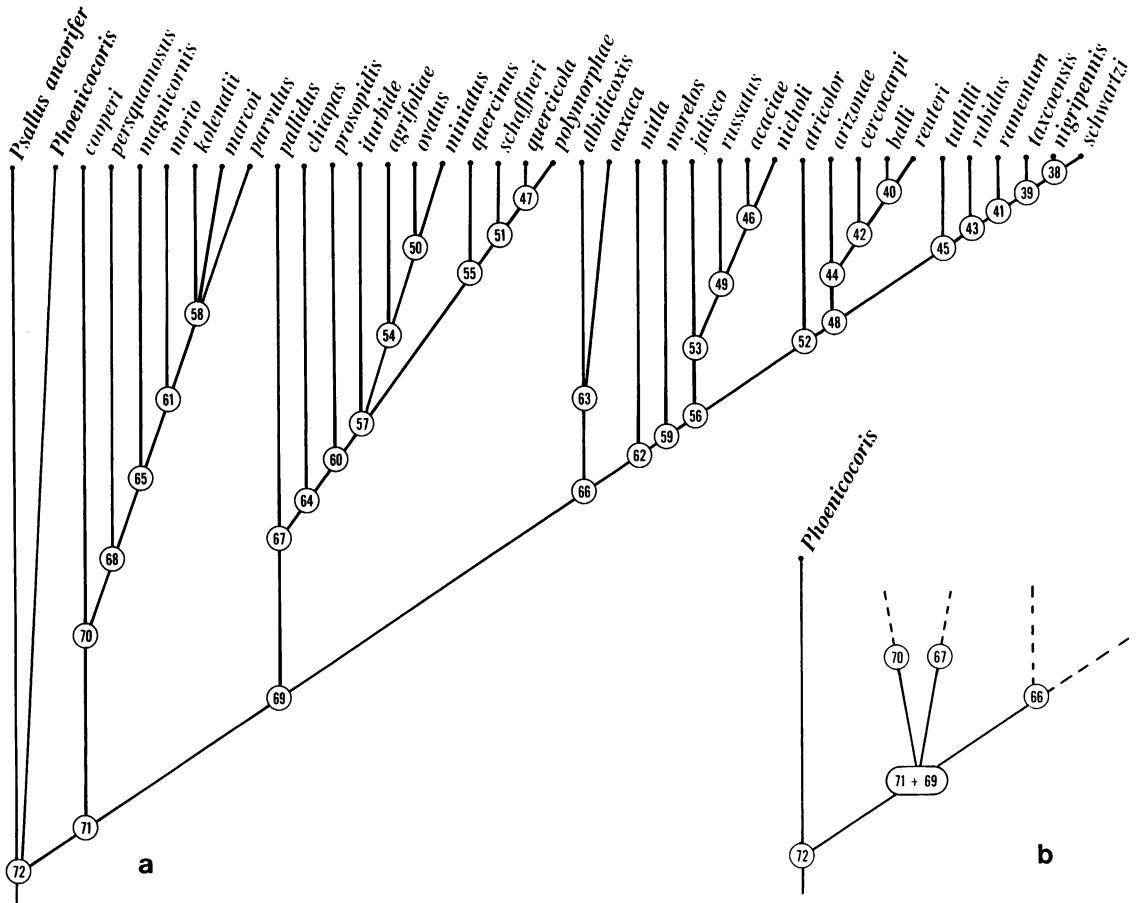


Fig. 185. Cladograms for *Atractotomus* species. **a.** Nelson consensus of two cladograms (length = 111, ci = 0.29) resulting from analysis of data in table 2 with both *Psallus ancorifer* and *Phoenicocoris* designated as outgroups. **b.** Nelson consensus (length = 109, ci = 0.30) resulting from analysis of the same data, except with *P. ancorifer* excluded and *Phoenicocoris* designated as sole outgroup. Numbers identify nodes that are discussed in the text. Character distributions are given in table 3.

significant portion of the resolution in figure 185a, with several nodes supported only by a single homoplasious character. The low consistency index of 0.29 for the consensus tree is an indication of the rather substantial character incongruence in the data set. However, while a number of clades depicted in figure 185a are not well supported by the available data, several of the large groupings clearly have stronger support. I have elected to recognize three of these clades as species groups in the present study.

Node 70: *Magnicornis* Species Group: This group includes all species inhabiting coniferous host plants. The group is recognized by characters 8-1 (femora with uniformly dis-

tributed, sparse microtrichia) and 3-1 (sides of abdomen with limited, often irregularly distributed scalelike setae). The only other occurrence of character 8-1 is in the seemingly distantly species *nigripennis*. Character 3 is slightly more homoplasious, occurring in some species of the *miniatus* group, as well as in *chiapas*, *pallidus*, *prosopidis*, and *nicholi*.

Node 57: *Miniatus* Species Group: This group of eight oak-inhabiting species is recognized by characters 0-1 (pronotum finely rugulose), 6-1 (scalelike setae with parallel ridges throughout), 8-2 (femora with sparsely distributed microtrichia on dorsodistal margin only), and 1-1 (distal half of hemelytra

with scalelike setae missing or greatly reduced in number). Characters 6-1 and 8-2 are unique to the *miniatus* group, while 0-1 and 1-1 show some homoplasy. Node 57 also is supported by a reversal in character 25 to the plesiomorphic state of having the gonopore well removed from the apex of the vesica. Within the *miniatus* clade, various subgroups are supported by characters 1, 3, 21-23, and 25. All of these characters show homoplasy, with consistency indices ranging from 0.18 to 0.50.

Node 66: *Rubidus* Species Group: This group is defined by a single fully consistent character, 7-1 (scalelike setae with strongly developed ridges). The 19 included species inhabit a variety of woody shrubs, but, with the exception of *jalisco*, do not occur on oaks or conifers. The relationships of *rubidus* group

species are fully resolved in the analysis, but many of the nodes are supported by single homoplasious characters. The most notable exception to this is the subgroup defined at node 52 by character 4-1 (femora with scalelike setae). Scaly femora is unique to the species of this clade, although it is reversed at *nigripennis*.

Only three species, *chiapas*, *pallidus*, and *prosopidis*, are not included in one of the three recognized species groups. According to figure 185a, these species are most closely related to members of the *miniatus* clade, a grouping which appears to be based primarily on the joint possession of character 18-1 (pale second antennal segment). Other characters relating some or all of these taxa to the *miniatus* group are 3-1, 11-1, 13-1, and 26-1.

HOST ANALYSIS

Atractotomus species are mostly host plant specific, usually occurring on a single plant species or group of related plants. Members of the *magnicornis* group are found exclusively on plants belonging to the family Pinaceae, and appear to be most common on species of *Abies*, *Picea*, and *Pinus*. Little is known of the habits of these species, although it is likely that some species are at least partially predaceous on scales, aphids, mites, and other small arthropods. Wagner (1975) reported that *magnicornis* is both phytophagous and zoophagous in the Palearctic region, while *kolenatii* is recorded as strictly phytophagous by Kullenberg (1944).

The species of the *miniatus* group are strict inhabitants of *Quercus* (Fagaceae). Populations often peak during the flowering period of the plant and then rapidly decline, which suggests that members of this group are feeding on flower parts, possibly pollen.

The host plants of *rubidus* group species are varied, but the majority of species occur on plants belonging to the families Fabaceae, Rhamnaceae, Rosaceae, and Salicaceae. One species, *schwartzi*, has been collected on *Arcostaphylos* (Ericaceae), *Ceanothus* (Rosaceae), and *Simmondsia* (Simmondsiaceae), and *tuthilli* is known only from *Ribes* (Grossulariaceae). The host plants of other species

in the *rubidus* group are given in the discussion sections of the species treatments.

In figure 186, host plant data have been fitted to the cladogram derived from structural characters (fig. 185a). Redundant host associations have been removed except in cases where they are important in determining the most likely positions of shifts in host associations. The original node numbers from figure 185a have been maintained for comparative purposes.

The plesiomorphic host association for *Atractotomus* cannot be determined with certainty because the relationship of this group to other phyline genera has not yet been firmly established. If *Phoenicocoris* is the sister group of *Atractotomus* as proposed in the generic discussion, then a primitive association with conifers would be indicated. However, should further study show that *Phoenicocoris* and *Atractotomus* are not true sister groups, then it is much more likely, considering the feeding habits of other genera related to *Atractotomus*, that an association with legumes and/or other flowering plants is plesiomorphic. If this is the case, then conifer-feeding in *Phoenicocoris* and the *magnicornis* species group would almost certainly represent independent shifts to a derived feeding habit.

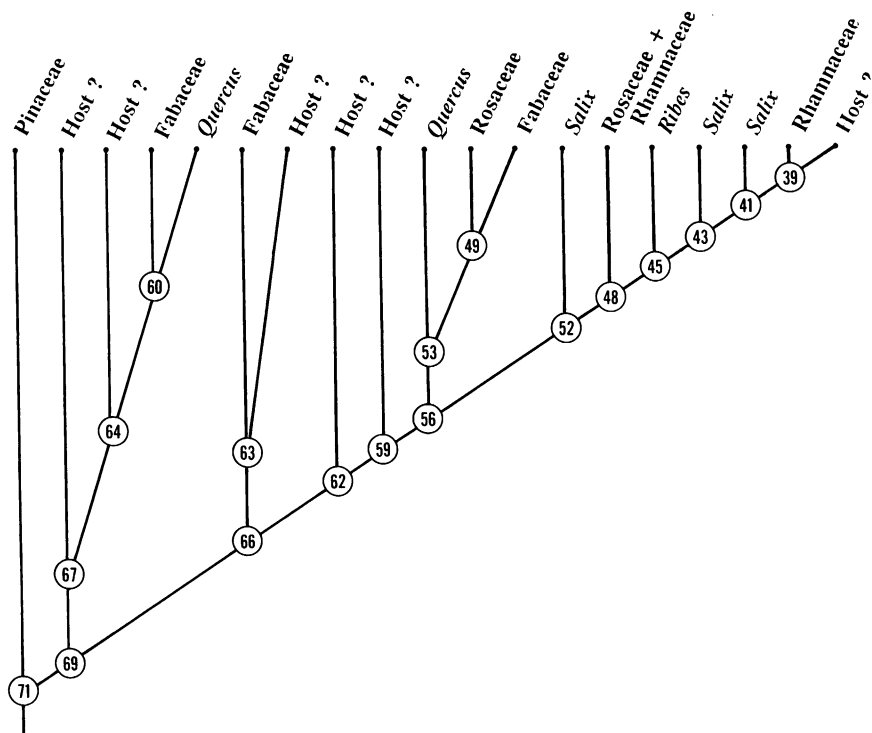


Fig. 186. Host cladogram for *Atractotomus* species.

For the same reason stated above, the plesiomorphic feeding habit at node 69 is questionable. Perhaps the most plausible hypothesis is that legume-feeding was established at this point, although the actual origin(s) of this feeding habit is(are) confused by the unknown host associations of species stemming from nodes 67, 64, 63, 62, and 59. As mentioned earlier, all species of the *miniatus* group are inhabitants of *Quercus* (node 57, stemming from node 60). The sister species of this group, *prosopidis*, is a legume feeder (node 60).

The evolution of host associations in the *rubidus* group is equally complex. In keeping with the hypothesis of the establishment of legume feeding at node 69, it would follow that the most plesiomorphic members of the group are legume feeders, with independent shifts to feeding on oaks and rosaceous plants at *jalisco* (node 53) and *russatus* (node 49), respectively, and a major switch to *Salix* feeding at node 52. However, as only one of the four basal species of the *rubidus* group is a known legume feeder (*albidicoxis* feeds on

Robinia; the host associations of *mitla*, *morelos*, and *oaxaca* are unknown), the primitive condition of legume feeding in this group requires confirmation. Within the clade of species defined at node 52, a significant shift to feeding on Rhamnaceae and Rosaceae occurs in the *arizonae* complex [four species (node 44) stemming from node 48]. Independent shifts to feeding on *Ribes* (Grossulariaceae) and Ericaceae + Rhamnaceae + Simmondsiaceae occur at *tuthilli* (node 45) and *schwartzi* (node 38, stemming from node 39), respectively. The host associations of *taxcoensis* (node 39) and *nigripennis* (node 38) are not known.

In summary, the available evidence suggests that within *Atractotomus*, the plesiomorphic condition was either an association with conifers (node 71) or legumes (node 69). In the latter case, conifer-feeding would be a derived feature at node 70 (*magnicornis* species group). Major host shifts are indicated at node 57 (to *Quercus*), node 52 (to *Salix*), and node 44 (to Rhamnaceae + Rosaceae).

BIOGEOGRAPHIC DISCUSSION

Several areas of endemism are indicated by the distributions of *Atractotomus* species. A large number of species in both the *miniatus* and *rubidus* species groups appear to be restricted to parts of east-central and south-central Mexico. Several species are endemic to southeastern Arizona and adjacent Sonoran Mexico, two species occur only in the Rocky Mts., and single species are restricted to the central midwestern United States, western slopes of the Cascade and Sierra Nevada Mts., and the coastal mountain ranges of southwestern California and northern Baja California.

If distributions are substituted for the terminal taxa in figure 185a, a clear picture of area interrelationships is not evident. However, several significant points are worthy of mention: (1) In the *magnicornis* group, a western Nearctic species is the sister group of a western Palearctic clade containing all

remaining species of the group (node 70); (2) the most plesiomorphic members of the *rubidus* group are distributed in central and south-central Mexico (nodes 66, 62, 59), while in the *miniatus* group, the Mexican taxa are relatively derived (node 55)—the closest relatives of the *miniatus* group are distributed primarily in south-central Mexico (nodes 67, 64, 60); and (3) various clades within the *rubidus* group consistently have parts of east-central and south-central Mexico as sister areas of the southwestern United States (see nodes 63, 53-49-46, and 39-38).

Although the present study clearly indicates a relationship between the American Southwest and endemic areas in central Mexico, further cladistic evidence and a more complete understanding of endemic areas in the Nearctic region are required to clarify the nature of the relationships among these areas.

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