

AMERICAN MUSEUM *Novitates*

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, NY 10024

Number 3300, 44 pp., 16 figures, 1 table

June 28, 2000

Revision of *Oligotylus* Van Duzee with Descriptions of Ten New Species from Western North America and Comments on *Lepidargyrus* in the Nearctic (Heteroptera: Miridae: Phylinae: Phylini)

RANDALL T. SCHUH¹

ABSTRACT

Oligotylus Van Duzee, 1916, is revised to include 16 species from western North America, six of which were previously described and placed in *Psallus* Fieber. Habitus and male genitalic illustrations are provided for all *Oligotylus* species; scanning micrographs of the head, scent-gland evaporatory area, vestiture, and pretarsus are included for selected species; a key to the species is presented. *Oligotylus* is compared with *Lepidargyrus* Muminov, the latter group being represented in North America by a single introduced species, *L. ancorifer* (Fieber); it is also compared with *Plagiognathus* Fieber, which is diverse in North America, and *Psallus* Fieber, which has no species native to North America except possibly at very high latitudes. Included for *L. ancorifer* are illustrations of male genitalia, scanning micrographs of selected structures, and locality and host data. The male genitalia and host associations of *Oligotylus* are shown to be distinctive from those of *Lepidargyrus*, *Plagiognathus*, and *Psallus*. *Oligotylus* species all feed on woody perennials in the families Rhamnaceae, Rosaceae, Saxifragaceae, and occasionally Ericaceae. Extensive host documentation is provided.

INTRODUCTION

Harry H. Knight, dean of the North American Miridae, placed most large, black Phy-

linae in North America in *Plagiognathus* Fieber or *Psallus* Fieber (e.g., Knight, 1923). He distinguished between these two genera on the basis of the vestiture of the dorsum. In

¹ George Willett Curator of Entomology and Chair, Division of Invertebrate Zoology, American Museum of Natural History.

Plagiognathus, the dorsal vestiture was composed of a single type of fine, chiefly erect setae, whereas in *Psallus* the dorsal vestiture comprised closely appressed, tomentose or scalelike setae often interspersed with more erect, simple setae (Knight, 1923). Until now, no authors have chosen to seriously question these diagnoses.

The first and only published illustrations of male genitalia of North American Phylinae during the working lifetime of Knight were those of his student L. A. Kelton. Kelton (1959) examined 24 species of Phylinae, and later monographed a number of genera, consistently illustrating the male genitalia. Kelton confirmed what was already known to European workers like Eduard Wagner: that the male genitalia of the Phylinae possessed attributes important for diagnosing genera and for separating species within those genera. He did not, however, seriously address the issue of Knight's diagnoses for *Plagiognathus* and *Psallus*, nor did he determine if the North American species placed in those genera conformed to the concepts based on Palearctic type species.

Dissection of males of most North American phylina species has clarified several points relative to the above discussion. First, there are apparently no native species of *Psallus* in North America, although several widespread Palearctic species are known to occur here (Wheeler and Henry, 1992; see also Schwartz and Kelton, 1990). Second, *Plagiognathus*, in the sense of the type species *arbustorum* (Fabricius) includes many North American species, but some of those species were placed in *Psallus* by Knight. And third, many of the species placed in these two genera by Knight belong to neither.

The previously described taxa treated in the present paper were all placed in *Psallus*. Comparisons of the male genitalia make it clear that none of the species belong to *Psallus*. Rather, the distinctive assemblage of 16 western North American species, 10 which are herein described as new, can be grouped under the existing generic name *Oligotylus* Van Duzee, 1916a. As noted by Slater and Knight (1954), Van Duzee first used the name *Oligotylus* in his synoptic key to the genera of North American Miridae; he did not at that time, or later, designate a type spe-

cies for the genus. Slater and Knight (1954) designated their new species *Psallus brevitylus* Slater and Drake, 1954, as the type of *Oligotylus*.

My analysis of *Oligotylus* is based on the examination of a large amount of material; just under 4000 specimens are listed in the Material Examined sections. It was unclear at the outset how many species might be involved, and indeed my first sorting of the material badly underestimated the number of *Oligotylus* species I finally recognized. I dissected more than 90 male specimens, a number that would certainly have been much higher had much of the material not had associated host data. I did not attempt to identify some specimens to species, particularly females, which lacked hosts and were in poor condition.

The habitus photographs are not all reproduced at a comparable scale. Thus, relative sizes of the taxa cannot be assessed by comparing the figures. Detailed measurements for all species are given in table 1, and these data should be used for making size comparisons.

All measurements are given in millimeters.

ACKNOWLEDGMENTS

I especially thank John D. Lattin, Professor Emeritus of Entomology at Oregon State University, Corvallis, who originally stimulated my interest in working on North American Miridae, and more particularly the Western fauna. It is now clear to me that Jack's enthusiasm for these bugs far outstripped the useful literature pertaining to them. Nonetheless, had Jack not recognized the novelty of the fauna and the need for additional work on it, I might never have pursued the study of the remarkably diverse Phylinae of the West.

Michael D. Schwartz and Gary M. Stonedahl deserve thanks for their invaluable efforts in collecting much of the host-documented material, for technical assistance, and for helping to solve taxonomic problems related to this project. Both of them are experts on the Western fauna in their own right and have contributed greatly to the development of this and other studies.

Jeff Knight, University of Nevada, Reno, arranged permission to collect at the Department of Energy Atomic Test Site, Nye County, Nevada. My late father, Joe Schuh, introduced me to many productive localities in southern Oregon and northern California. John Pinto and his family provided valuable field assistance and hospitality in southern California. John, Irma, and Dan Polhemus provided hospitality and field support in Colorado. To all of these individuals and organizations I offer my sincere thanks.

Fieldwork and initial assembly and sorting of collections were supported by NSF grants DEB-8113481 and BSR-8516635. Habitus photographs were prepared and locality data recorded by Erica Chiao, with support from a National Science Foundation Research Experiences for Undergraduates grant to the American Museum of Natural History (AMNH), Melany Stiassny, Principal Investigator. I thank Mark Abraham and John Davey, *Natural History Magazine*, American Museum of Natural History, for their assistance with digitizing the photographs. Christine Johnson, Scientific Assistant, American Museum of Natural History, edited the digital images, measured the specimens, and assembled the illustrations in their final form.

The herbarium staff at the New York Botanical Garden identified the hosts for material collected by Michael Schwartz, Gary Stonedahl, and me. These authoritative determinations add greatly to confidence in our knowledge of host relationships within *Oligotylus*. My sincere thanks to Jackie Kallunki, Eileen Schofield, Arnold Tiehm, and James Grimes for their prompt and professional service.

Many individuals and institutions provided material for this study. Without their assistance, the diversity of the group would be much less well understood. Institutions, names of curators or other responsible individuals, and institutional abbreviations are presented in the following list:

American Museum of Natural History (AMNH)
California Department of Food and Agriculture,
Sacramento, Alan Hardy (CAFA)
California Academy of Sciences, San Francisco,
Paul Arnaud, Jr., Norman Penny (CAS)
Canadian National Collection of Insects, Agricul-

ture and Agri-Food Canada, Ottawa, Leonard A. Kelton and Michael D. Schwartz (CNC)
Natural History Museum of Los Angeles County,
Julian P. Donahue (LACM)
Oregon State University, Corvallis, John D. Lattin (OSU)
John T. Polhemus Collection, Englewood, Colorado (JTP)
San Diego Museum of Natural History, David K. Faulkner (SDNM)
University of Arizona, Tucson, Arizona, the late Floyd Werner (UAZ)
University of California, Berkeley, John Chemsak (UBC)
University of California, Davis, the late Robert Schuster (UCD)
University of California, Riverside, Saul Frommer, John D. Pinto (UCR)
University of Kansas, Snow Entomological Museum, Lawrence, Alex Slater (KU)
United States National Museum of Natural History, Washington, D. C., Thomas J. Henry, U. S. Department of Agriculture Systematic Entomology Laboratory, and Richard C. Froeschner, Smithsonian Institution (USNM)

Oligotylus Van Duzee

Oligotylus Van Duzee, 1916a: 216 (n. gen., in key).

TYPE SPECIES: *Psallus brevitylus* Slater and Knight, 1954 (by subsequent designation)

DIAGNOSIS: *Oligotylus* spp. are most easily confused with *Lepidargyrus ancorifer* and some large, black *Plagiognathus* and *Psallus* spp., on the basis of the body size, nearly black coloration, and the rather shaggy vestiture. The males of *Oligotylus* can usually be recognized by the very large size and squared-off shape of the genital capsule as viewed from the side (fig. 8C), whereas in *Lepidargyrus*, *Plagiognathus*, and *Psallus* the ventral surface of the genital capsule is distinctly and more-or-less uniformly sloping from its anteroventral margin to the apex (fig. 15C), being much more nearly conical in form than is the case in *Oligotylus*; the genital capsule in *Psallus* species is also much smaller than in *Oligotylus*. The genitalia of *Oligotylus* are themselves distinctive and allow for discrimination among the species; the vesica differs dramatically from *Lepidargyrus* in having two apical spines or blades (figs. 4, 6, 10, 13, 14) as opposed to one (fig. 16A); from similar-appearing, large,

black *Plagiognathus* species by being strongly bent near the base as well as twisted; and from *Psallus* species by its much larger size, conspicuous bending, and dramatic differences in apical ornamentation.

DESCRIPTION: *Male:* Relatively large, heavy-bodied, range of total length 2.92–4.57. **COLORATION:** Generally black, blackish-brown, or red-orange. **SURFACE AND VESTITURE:** Body surface smooth, dull to weakly shining. Dorsum and venter with recumbent simple setae; dorsum always with some woolly setae (figs. 1, 2), venter with or without such setae. **STRUCTURE:** **Head:** short, transverse, clypeus never visible from above; antennae showing very weak sexual dimorphism, segment 2 slightly narrower and more tapered proximally in females than in males, segments 3 and 4 slender; gula very short, posterior margin of bucculae adjacent to anterior pronotal margin; labium either short and reaching only to about mesotrochanters or longer and reaching to metatrochanters. **Pronotum:** at least twice as broad as long, disc evenly convex, calli not demarcated; posterior margin weakly concave across moderately exposed mesoscutum; scutellum very weakly convex. **Hemelytra:** always macropterous, membrane well developed, apex of abdomen reaching to about posterior margin of membrane cells; corial margin very weakly to moderately convex in males, distinctly convex in females. **Legs:** tibiae with moderately heavy black spines with dark bases; claws strongly curving; parempodia setiform; pulvilli relatively small, covering about half of ventral claw surface. **Abdomen:** genital capsule very large, occupying about half of length of abdomen; capsule in lateral view deep, posteroventral margin sharply rounded, posterior and ventral surfaces appearing at nearly right angles to one another. **GENITALIA** (figs. 4, 6, 10, 13, 14): [In this description and that of the species, the vesica is always viewed and described where the vesical blades are lying flat in the viewing plane.] Vesica very large and heavily sclerotized, strongly curving (bent) basally, J-shaped, often with some twisting; vesical straps apically forming two large, rather broad blades, these frequently forming a nearly right angle with body of vesica near

proximal portion of relatively large, heavily sclerotized secondary gonopore; phallosome L-shaped without obviously distinctive features within the Phylinae (fig. 13); left paramere typically phylinae (fig. 13); right paramere elongate (fig. 13), much more so than in *Lepidargyrus ancorifer* (fig. 16B), *Plagiognathus*, and *Psallus*.

Female: Coloration and vestiture as in males. Body form always ovoid, even in species with elongate, parallel-sided males.

ETYMOLOGY: Named for Edward P. Van Duzee, the first individual to personally collect and describe a significant number of Miridae from North America, and particularly California, combined with the classical generic name *Phylus* Hahn, 1831. Masculine.

DISCUSSION: Several *Oligotylus* species are similar in appearance to *Lepidargyrus ancorifer* and some large, black *Plagiognathus* and *Psallus* species, but males can be separated by the shape of the genital capsule and by the structure of the vesica. Their distinctive nature is also often corroborated by their biology. Whereas *Lepidargyrus ancorifer* breeds only on annual plants, *Oligotylus* species are restricted to woody shrubs and small trees, apparently all members of the Rosaceae, Rhamnaceae, Saxifragaceae, and less commonly on the Ericaceae, the few remaining records pertaining to other families probably being sitting records. *Plagiognathus* may breed on either annuals or perennials, depending on the species, but none are known from the Rhamnaceae, and none from the rosaceous genera fed upon by *Oligotylus*. Those *Psallus* species that occur in North America feed on the same genera as do those in the Palearctic, primarily *Alnus*, *Betula*, and *Salix*, none of which serve as hosts for *Oligotylus*. Most *Oligotylus* species are restricted to feeding on a single genus or single species within one of these families, although a few, such as *nigerrimus*, are known to breed on both the Rhamnaceae and Rosaceae.

Oligotylus species have proven to be even more difficult to separate from one another than they are from similar-appearing members of other genera. The length of the labium and coloration allow for recognition of three groupings that are utilized in the present paper, including the key below. Distributions and host associations will separate

additional species. In the end, however, the only definitive indicators of specific identity for many species are found in the male genitalia. Thus, to function effectively, the following key will require occasional—if not frequent—dissections of the male genitalia.

KEY TO SPECIES OF *OLIGOTYLUS*

1. General body coloration orange to orange-red (fig. 11), sometimes weakly to moderately infusate (GROUP 3) 2
 - General body coloration medium brown to black (figs. 1, 3, 5, 7, 9), occasionally with some pale areas, and with some distinctly reddish coloration, particularly in females of *ceanothi* 5
2. Males and females distinctly ovate (fig. 11); coloration usually distinctly orange, sometimes partially reddish; male genitalia as in figure 13; southern Oregon to northern Baja California; ex *Cercocarpus* spp.
 - Males more elongate and parallel-sided than distinctly ovate females (fig. 11); endocorium and clavus in males often darker than remainder of dorsum, in contrast to *carneatus* 3
3. Antennal segment 1 in males mostly dark, infusate, segment 2 infusate proximally and distally, both segments often largely pale in females; male genitalia as in figure 14; central and southern Great Basin; ex *Cercocarpus ledifolius* *merinoi*
 - Antennal segments 1 and 2 orange or pale in both males and females 4
4. Larger species, length apex clypeus–cuneal fracture in males, 2.61–2.99 in females 2.79–2.99; vesica in male as in figure 14; northwestern Colorado; ex *Cercocarpus montanus* *schwartzi*
 - Smaller species, length apex clypeus–cuneal fracture in males 2.26–2.66, in females 2.42–2.82; vesica in male as in figure 14; ex *Cercocarpus breviflorus*, *C. ledifolius*; southern Utah to northern Mexico *paracarneatus*
5. Apex of labium at most just attaining middle trochanters, rarely slightly longer, but never surpassing posterior margin of middle trochanters (GROUP 1) 6
 - Apex of labium surpassing (sometimes very slightly) posterior margin of middle trochanters, often reaching to posterior trochanters (GROUP 2) 12
6. Larger species, males nearly parallel-sided, length apex clypeus–cuneal fracture in males at least 2.81, in females at least 2.87; venter with pale, scalelike setae concentrated primarily along abdominal margin, never with entire venter densely covered 7
 - Smaller species, males sometimes nearly parallel-sided, but body form usually more ovoid, length apex clypeus–cuneal fracture never more than 2.75 in males, usually under 2.70, in females 2.79, usually under 2.75; venter sometimes densely covered with appressed, pale, scalelike setae . . . 8
7. Tibiae infusate to black in both sexes, bases of tibial spines not strongly demarcated from general tibial coloration; femora usually black distally, pale to reddish proximally; entire cuneus unicolorous, usually black; all antennal segments black in both sexes; vesica as in figure 6; southern Oregon, northern California; ex *Ribes* spp. *ribesi*
 - Tibiae pale, bases of tibial spines black contrasting with lighter background coloration of tibiae; femora entirely pale, usually yellowish; base of cuneus variably pale (brownish) in both sexes; antennal segments 1 and 2 in females mostly pale, segment 1 black at base, segment 2 infusate on distal third; all antennal segments black in males; vesica as in figure 6; southern California; ex *Ribes* sp. . . . *saxifragicola*
8. Coiling of body of vesica and shape and orientation of vesical blades as shown for *cercocarpicola* in figure 4; antennal segment 2 usually black in both sexes, sometimes partially pale in less frequently encountered lighter-colored specimens; widely distributed from Oregon east to Colorado plains, south to northern Mexico; usually on *Cercocarpus* spp., more rarely on other Rosaceae *cercocarpicola*
 - Coiling of body of vesica and shape and orientation of apical blades not as in *cercocarpicola*; antennal segment 2 largely pale in both sexes, never totally black; breeds on *Ceanothus* spp. 9
9. Known range restricted to Central Valley of California and southwestern Oregon; male genitalia as in figure 4; recorded from *Ceanothus* sp. and *Quercus* sp. . . . *centralis*
 - Range more southerly, from southern California east to New Mexico 10
10. Male genitalia as in figure 4, vesical blades of unequal length, not superposed on apical half; southern California and western Arizona; ex *Ceanothus* spp. . . . *meridionalis*
 - Vesical blades either of nearly equal length (*yavapaiensis*) or posterior blade not smoothly

TABLE 1
Measurements of *Oligotylus* spp.

Species		Length				Width		InterOcDi	AntSeg2
		Total Body	Cun-Clyp	Pronotum	Head	Pronotum	Head		
<i>brevitylus</i>									
M (N = 4)	Mean	3.36	2.49	0.54	0.21	1.24	0.85	0.40	0.92
	SD	0.39	0.27	0.05	0.04	0.11	0.07	0.03	0.07
	Range	0.95	0.62	0.10	0.08	0.25	0.14	0.06	0.14
	Min	2.92	2.20	0.48	0.15	1.15	0.81	0.37	0.86
	Max	3.86	2.82	0.58	0.23	1.40	0.95	0.43	1.00
<i>carneatus</i>									
M (N = 5)	Mean	3.95	2.80	0.54	0.18	1.38	0.87	0.43	1.08
	SD	0.23	0.19	0.04	0.02	0.09	0.05	0.02	0.08
	Range	0.53	0.42	0.11	0.06	0.23	0.12	0.04	0.18
	Min	3.65	2.59	0.48	0.16	1.26	0.81	0.41	1.00
	Max	4.19	3.01	0.60	0.22	1.49	0.93	0.45	1.18
F (N = 5)	Mean	3.93	2.84	0.60	0.24	1.38	0.86	0.45	1.09
	SD	0.15	0.17	0.06	0.04	0.10	0.04	0.02	0.10
	Range	0.37	0.38	0.15	0.09	0.23	0.08	0.05	0.26
	Min	3.71	2.64	0.51	0.19	1.26	0.82	0.42	0.92
	Max	4.09	3.02	0.66	0.28	1.48	0.90	0.47	1.18
<i>ceanothi</i>									
M (N = 5)	Mean	4.28	2.89	0.50	0.18	1.36	0.88	0.38	1.32
	SD	0.23	0.15	0.02	0.01	0.04	0.03	0.02	0.12
	Range	0.50	0.36	0.04	0.01	0.10	0.09	0.05	0.32
	Min	4.07	2.71	0.49	0.17	1.31	0.84	0.35	1.18
	Max	4.57	3.07	0.53	0.18	1.41	0.93	0.4	1.49
F (N = 5)	Mean	3.94	2.80	0.53	0.21	1.41	0.86	0.41	1.07
	SD	0.32	0.22	0.07	0.04	0.10	0.04	0.03	0.11
	Range	0.81	0.55	0.16	0.12	0.26	0.10	0.07	0.28
	Min	3.50	2.47	0.43	0.15	1.25	0.80	0.38	0.91
	Max	4.31	3.03	0.60	0.27	1.51	0.89	0.45	1.1
<i>centralis</i>									
M (N = 5)	Mean	3.35	2.43	0.54	0.20	1.24	0.86	0.45	0.79
	SD	0.25	0.22	0.06	0.02	0.08	0.06	0.04	0.05
	Range	0.70	0.58	0.14	0.04	0.23	0.15	0.10	0.15
	Min	3.04	2.17	0.46	0.17	1.13	0.78	0.38	0.73
	Max	3.73	2.75	0.61	0.22	1.35	0.93	0.48	0.88
F (N = 5)	Mean	3.44	2.49	0.52	0.21	1.26	0.89	0.48	0.82
	SD	0.17	0.14	0.04	0.02	0.03	0.01	0.04	0.03
	Range	0.47	0.34	0.09	0.06	0.07	0.01	0.07	0.08
	Min	3.23	2.40	0.46	0.18	1.23	0.88	0.45	0.78
	Max	3.70	2.74	0.55	0.24	1.31	0.90	0.52	0.86
<i>cercocarpicola</i>									
M (N = 5)	Mean	3.55	2.65	0.54	0.25	1.26	0.90	0.43	0.87
	SD	0.20	0.16	0.03	0.06	0.06	0.06	0.03	0.09
	Range	0.51	0.43	0.08	0.15	0.17	0.15	0.07	0.23
	Min	3.19	2.37	0.49	0.21	1.17	0.81	0.40	0.74
	Max	3.71	2.80	0.57	0.35	1.34	0.97	0.48	0.97
F (N = 5)	Mean	3.54	2.58	0.55	0.24	1.29	0.86	0.45	0.82
	SD	0.21	0.16	0.07	0.04	0.12	0.08	0.04	0.08
	Range	0.53	0.39	0.18	0.09	0.25	0.19	0.1	0.2
	Min	3.24	2.40	0.46	0.20	1.16	0.76	0.41	0.73
	Max	3.77	2.79	0.64	0.29	1.41	0.96	0.51	0.93

TABLE 1
Continued

Species		Length				Width		InterOcDi	AntSeg2
		Total Body	Cun-Clyp	Pronotum	Head	Pronotum	Head		
<i>maneadero</i>									
M (N = 5)	Mean	3.83	2.68	0.56	0.21	1.29	0.82	0.36	1.09
	SD	0.09	0.04	0.03	0.05	0.02	0.02	0.01	0.05
	Range	0.21	0.10	0.09	0.12	0.05	0.05	0.03	0.11
	Min	3.76	2.63	0.52	0.16	1.26	0.8	0.34	1.04
	Max	3.97	2.74	0.61	0.28	1.31	0.85	0.38	1.14
F (N = 5)	Mean	3.87	2.71	0.57	0.22	1.33	0.83	0.39	0.99
	SD	0.09	0.06	0.01	0.03	0.08	0.03	0.01	0.03
	Range	0.20	0.18	0.03	0.07	0.22	0.07	0.03	0.09
	Min	3.72	2.62	0.55	0.19	1.20	0.79	0.37	0.94
	Max	3.92	2.79	0.58	0.26	1.42	0.86	0.41	1.03
<i>meridionalis</i>									
M (N = 5)	Mean	3.31	2.37	0.50	0.18	1.26	0.85	0.42	0.88
	SD	0.25	0.21	0.07	0.06	0.08	0.05	0.02	0.08
	Range	0.53	0.42	0.17	0.16	0.21	0.13	0.06	0.19
	Min	3.01	2.12	0.40	0.09	1.18	0.79	0.39	0.77
	Max	3.54	2.54	0.57	0.25	1.38	0.93	0.46	0.96
F (N = 5)	Mean	3.49	2.45	0.56	0.23	1.30	0.90	0.47	0.79
	SD	0.16	0.11	0.05	0.02	0.05	0.04	0.03	0.06
	Range	0.34	0.25	0.12	0.04	0.12	0.09	0.08	0.14
	Min	3.27	2.32	0.51	0.22	1.24	0.85	0.43	0.73
	Max	3.61	2.56	0.63	0.26	1.36	0.93	0.51	0.87
<i>merinoi</i>									
M (N = 5)	Mean	3.79	2.70	0.51	0.20	1.29	0.87	0.43	0.93
	SD	0.17	0.07	0.03	0.04	0.02	0.02	0.03	0.09
	Range	0.45	0.18	0.06	0.11	0.06	0.06	0.08	0.24
	Min	3.62	2.63	0.48	0.15	1.27	0.84	0.40	0.84
	Max	4.07	2.81	0.54	0.26	1.33	0.9	0.47	1.08
F (N = 5)	Mean	3.98	2.76	0.53	0.23	1.34	0.88	0.46	0.88
	SD	0.07	0.06	0.05	0.05	0.05	0.02	0.03	0.05
	Range	0.19	0.12	0.13	0.14	0.12	0.04	0.08	0.12
	Min	3.86	2.69	0.46	0.16	1.30	0.87	0.43	0.83
	Max	4.06	2.81	0.59	0.30	1.41	0.91	0.51	0.95
<i>nigerrimus</i>									
M (N = 5)	Mean	3.56	2.59	0.53	0.18	1.23	0.79	0.38	0.88
	SD	0.17	0.12	0.07	0.03	0.03	0.02	0.02	0.09
	Range	0.41	0.30	0.16	0.07	0.06	0.06	0.06	0.23
	Min	3.34	2.42	0.46	0.15	1.19	0.77	0.36	0.77
	Max	3.75	2.72	0.62	0.21	1.25	0.83	0.42	1.00
F (N = 5)	Mean	3.72	2.76	0.56	0.26	1.31	0.82	0.43	0.88
	SD	0.07	0.05	0.05	0.02	0.06	0.01	0.02	0.07
	Range	0.17	0.14	0.12	0.06	0.15	0.03	0.05	0.14
	Min	3.62	2.67	0.49	0.24	1.22	0.81	0.40	0.82
	Max	3.79	2.81	0.61	0.30	1.37	0.83	0.46	0.95
<i>paracarneatus</i>									
M (N = 5)	Mean	3.55	2.51	0.49	0.17	1.26	0.8	0.41	0.97
	SD	0.23	0.16	0.05	0.02	0.08	0.05	0.01	0.05
	Range	0.61	0.40	0.12	0.04	0.22	0.14	0.04	0.14
	Min	3.18	2.26	0.41	0.15	1.11	0.71	0.39	0.91
	Max	3.79	2.66	0.53	0.20	1.33	0.85	0.42	1.05

TABLE 1
Continued

Species		Length				Width		InterOcDi	AntSeg2
		Total Body	Cun-Clyp	Pronotum	Head	Pronotum	Head		
<i>paracarneatus</i>									
F (N = 5)	Mean	3.67	2.63	0.52	0.24	1.28	0.82	0.43	0.96
	SD	0.22	0.15	0.02	0.03	0.11	0.03	0.02	0.09
	Range	0.55	0.41	0.04	0.07	0.25	0.08	0.04	0.23
	Min	3.32	2.42	0.50	0.22	1.11	0.77	0.40	0.80
	Max	3.88	2.82	0.54	0.29	1.36	0.85	0.44	1.02
<i>pintoii</i>									
M (N = 4)	Mean	3.35	2.48	0.52	0.19	1.17	0.81	0.38	0.89
	SD	0.18	0.07	0.01	0.01	0.06	0.01	0.02	0.04
	Range	0.43	0.15	0.03	0.03	0.14	0.03	0.04	0.08
	Min	3.12	2.40	0.50	0.18	1.08	0.80	0.36	0.87
	Max	3.55	2.56	0.54	0.21	1.22	0.82	0.40	0.94
F (N = 4)	Mean	3.47	2.52	0.51	0.20	1.18	0.83	0.41	0.86
	SD	0.04	0.08	0.03	0.03	0.03	0.01	0.01	0.02
	Range	0.08	0.19	0.07	0.06	0.08	0.02	0.02	0.04
	Min	3.43	2.43	0.47	0.18	1.15	0.82	0.40	0.85
	Max	3.52	2.62	0.55	0.24	1.22	0.84	0.42	0.89
<i>purshiae</i>									
M (N = 5)	Mean	3.46	2.49	0.55	0.19	1.19	0.80	0.37	0.94
	SD	0.18	0.18	0.08	0.05	0.08	0.03	0.01	0.06
	Range	0.45	0.46	0.19	0.12	0.22	0.07	0.02	0.14
	Min	3.19	2.21	0.43	0.14	1.08	0.76	0.36	0.88
	Max	3.64	2.66	0.62	0.26	1.29	0.83	0.38	1.03
F (N = 5)	Mean	3.43	2.51	0.54	0.22	1.25	0.82	0.42	0.83
	SD	0.12	0.13	0.01	0.02	0.05	0.02	0.04	0.05
	Range	0.28	0.32	0.03	0.05	0.13	0.06	0.11	0.13
	Min	3.30	2.36	0.52	0.20	1.19	0.79	0.37	0.76
	Max	3.59	2.68	0.55	0.25	1.32	0.85	0.48	0.89
<i>ribesi</i>									
M (N = 13)	Mean	4.21	3.00	0.61	0.24	1.37	0.87	0.41	1.17
	SD	0.15	0.09	0.03	0.03	0.05	0.03	0.01	0.1
	Range	0.46	0.32	0.11	0.11	0.15	0.11	0.05	0.29
	Min	4.00	2.87	0.55	0.18	1.29	0.81	0.39	1.05
	Max	4.46	3.18	0.65	0.29	1.44	0.92	0.44	1.34
F (N = 10)	Mean	4.21	3.03	0.62	0.25	1.41	0.89	0.46	1.14
	SD	0.15	0.13	0.07	0.05	0.05	0.03	0.03	0.06
	Range	0.49	0.37	0.23	0.17	0.13	0.09	0.11	0.20
	Min	4.05	2.87	0.50	0.16	1.37	0.82	0.41	1.06
	Max	4.54	3.24	0.72	0.33	1.51	0.91	0.51	1.26
<i>saxifragicola</i>									
M (N = 5)	Mean	3.93	2.84	0.63	0.22	1.33	0.88	0.4	1.13
	SD	0.09	0.04	0.03	0.02	0.02	0.03	0.03	0.05
	Range	0.21	0.09	0.07	0.06	0.05	0.08	0.08	0.11
	Min	3.80	2.81	0.59	0.18	1.31	0.84	0.36	1.09
	Max	4.01	2.91	0.66	0.25	1.36	0.92	0.44	1.21
F (N = 5)	Mean	4.18	3.01	0.65	0.27	1.47	0.93	0.46	1.13
	SD	0.11	0.09	0.03	0.04	0.04	0.03	0.02	0.06
	Range	0.28	0.23	0.06	0.10	0.09	0.07	0.06	0.16
	Min	4.05	2.89	0.62	0.22	1.44	0.89	0.43	1.06
	Max	4.33	3.12	0.68	0.32	1.53	0.97	0.48	1.22

TABLE 1
Continued

Species		Length				Width		InterOcDi	AntSeg2
		Total Body	Cun-Clyp	Pronotum	Head	Pronotum	Head		
<i>schwartzi</i>									
M (N = 3)	Mean	3.94	2.82	0.58	0.20	1.36	0.88	0.45	1.12
	SD	0.25	0.19	0.06	0.06	0.03	0.01	0.02	0.04
	Range	0.48	0.38	0.10	0.12	0.06	0.03	0.04	0.07
	Min	3.65	2.61	0.52	0.13	1.34	0.86	0.42	1.09
	Max	4.13	2.99	0.62	0.25	1.40	0.89	0.46	1.16
F (N = 5)	Mean	4.00	2.89	0.62	0.25	1.39	0.89	0.47	1.10
	SD	0.12	0.08	0.05	0.05	0.02	0.01	0.01	0.02
	Range	0.29	0.20	0.10	0.13	0.05	0.02	0.03	0.05
	Min	3.88	2.79	0.57	0.17	1.36	0.88	0.45	1.09
	Max	4.17	2.99	0.68	0.30	1.41	0.91	0.48	1.13
<i>yavapaiensis</i>									
M (N = 5)	Mean	3.27	2.37	0.49	0.18	1.24	0.86	0.45	0.77
	SD	0.05	0.05	0.08	0.05	0.04	0.01	0.01	0.02
	Range	0.12	0.13	0.20	0.12	0.11	0.02	0.02	0.04
	Min	3.20	2.30	0.36	0.10	1.18	0.85	0.45	0.74
	Max	3.32	2.43	0.56	0.23	1.29	0.87	0.47	0.79
F (N = 5)	Mean	3.36	2.52	0.54	0.22	1.25	0.86	0.45	0.74
	SD	0.09	0.03	0.01	0.01	0.04	0.03	0.02	0.04
	Range	0.25	0.07	0.03	0.04	0.10	0.07	0.06	0.10
	Min	3.26	2.49	0.53	0.21	1.19	0.83	0.41	0.69
	Max	3.51	2.56	0.56	0.24	1.29	0.90	0.47	0.79

- tapering to a sharp point (*brevitylus*); Arizona and southern California 11
11. Tibia with a black stripe along opposing surfaces; male genitalia as in figure 4; coastal mountains of southern California; ex *Ceanothus cuneatus*, *Cercocarpus betuloides* *brevitylus*
- Tibiae without a black stripe along opposing surfaces; male genitalia as in figure 6; Arizona; *Ceanothus greggii* . . . *yavapaiensis*
12. Tibiae with a continuous black stripe on opposing surfaces; male genitalia as in figure 10, with minute serrations on apex of posterior apical blade; dorsum and femora usually almost entirely black; Pasadena, California; northern California north to Okanagan Valley of British Columbia and east to Wyoming; usually ex *Purshia* sp., also *Ceanothus* spp. *nigerrimus*
- Tibiae without a continuous black stripe on opposing surfaces; male genitalia without minute serrations on apex of posterior apical blade 13
13. Larger species, males nearly parallel-sided, length apex clypeus-cuneal fracture in males at least 2.63, in females 2.62 . . 14
- Somewhat smaller species, males more ovate in outline, average length apex clypeus-cuneal fracture in males never greater than 2.66, in females 2.68 15
14. Usually at least hemelytra and femora with some reddish in males, head, pronotum, and scutellum also reddish in females; base of cuneus unicolorous with remainder of hemelytra; scent-gland auricle entirely dark; dorsum appearing dull; usually on *Ceanothus* spp., more rarely *Arctostaphylos* sp.; northern Baja California, Arizona, California, southwestern Oregon . . *ceanothi*
- General coloration of head, scutellum, and hemelytra in males shining black, females lighter and partially reddish; bases of cuneus always white in both sexes, and strongly contrasting with remainder of dorsum in males; legs pale proximally but not reddish; scent-gland auricle pale on posterior margin, usually largely dark anteriorly; dorsum usually appearing polished; ex *Ceanothus* spp.; central coast of California south to northern Baja California *maneadero*
15. Male genitalia as in figure 10; dorsum generally black; femora always heavily orange; Great Basin and its margins; ex *Purshia* sp., *Cowania* sp., *Ceanothus* sp. *purshiae*

- Male genitalia as in figure 10; dorsum usually at least partly brownish, legs not reddish; coastal mountains of southern California; ex *Ceanothus* spp. *pintoi*

GROUP 1: BLACK SPECIES, LABIUM SHORT, NOT SURPASSING MIDDLE TROCHANTERS

Oligotylus brevitylus (Slater and Knight),
new combination
Figures 1, 4

Psallus brevitylus Slater and Knight, 1954: 144
(n. sp.).

DIAGNOSIS: Recognized along with *O. centralis*, *O. meridionalis*, and *O. yavapaiensis* by its relatively small size, short labium, a mostly pale second antennal segment, and similar structure of the male genitalia. Distinguished from those species by the details of genitalic structure (fig. 4) and the black stripes on opposing surfaces of the tibiae.

REDESCRIPTION: *Male*: Relatively small species (fig. 1), total length 2.92–3.86, length apex clypeus–cuneal fracture 2.20–2.82, width across pronotum 1.15–1.40. COLORATION: Blackish brown to black; antennal segment 2 pale except extreme proximal and distal portion, remainder of segment dark; legs moderately to heavily infuscate; trochanters pale; tibiae pale with a black stripe on opposing surfaces, spines dark with dark bases. SURFACE AND VESTITURE: Simple setae dark; woolly setae silvery, generally distributed and thickly set on dorsum and pregenital abdominal sterna. STRUCTURE: Labium short, reaching to mesotrochanters. GENITALIA: Vesical blades very long, gently curving, anterior blade lanceolate, broadly decurving and longer than posterior blade, posterior blade with distinctive apex, blades of vesica at nearly right angles to body of vesica; base of vesica partially superposed over main body of vesica in lateral view, similar to *yavapaiensis* in twisting and general conformation (fig. 4).

Female: Unknown.

HOSTS: *Ceanothus cuneatus* (Rhamnaceae); *Cercocarpus betuloides* (Rosaceae).

DISTRIBUTION: Coastal mountains of southern California.

DISCUSSION: This species was described on

the basis of five specimens collected in “San Diego Co., California” on May 20, 1913, and June 8, 1913, with no host data. I have examined a male paratype collected on each of these two dates. The phallus for the May 20 specimen was apparently lost, so my genitalic comparisons are based on the June 8 specimen and on additional material from Santa Barbara and San Luis Obispo counties, which would appear to represent *brevitylus* on the basis of labial length and the presence of black stripes on opposing surfaces of the tibiae. Specimens here identified as *brevitylus* were collected on *Ceanothus* and *Cercocarpus*, suggesting that the taxon may have multiple hosts, or that available data are ambiguous if it is indeed host-specific.

SPECIMENS EXAMINED: USA: **California**: *San Diego Co.*: May 20, 1913, E. P. Van Duzee – Paratypes: 1 ♂ (CAS); June 8, 1913, E. P. Van Duzee – Paratypes: 1 ♂ (AMNH). *San Luis Obispo Co.*: Arroy. Grd. Creek SW of San Luis Obispo, 160 m, May 8, 1985, R. T. Schuh, B.M. Massie, ex *Ceanothus cuneatus* (Rhamnaceae), 2 ♂ (AMNH). *Santa Barbara Co.*: Upper Oso Campground off Rte 154, 310 m, May 7, 1985, R. T. Schuh and B. M. Massie, ex *Cercocarpus betuloides* (Rosaceae), 2 ♂ (AMNH).

Oligotylus centralis, new species
Figures 1, 4

HOLOTYPE: Male, [USA:] Oregon: Josephine Co.: just S. of Pinehurst, 1140 m., June 27, 1979, R. T. and Joe Schuh, ex: *Ceanothus cuneatus* (Rhamnaceae). Deposited in the American Museum of Natural History.

DIAGNOSIS: Recognized along with *brevitylus*, *meridionalis*, and *yavapaiensis* by its relatively small size, short labium, mostly pale second antennal segment, and similar structure of the male genitalia. Distinguished from those species by the details of genitalic structure and by its more northerly distribution.

DESCRIPTION: *Male*: Relatively small species (fig. 1), total length 3.04–3.73, length apex clypeus–cuneal fracture 2.17–2.75, width across pronotum 1.13–1.35. COLORATION: Blackish-brown to black; antennal segment 2 pale except extreme proximal and distal portions, remainder of antennae dark;

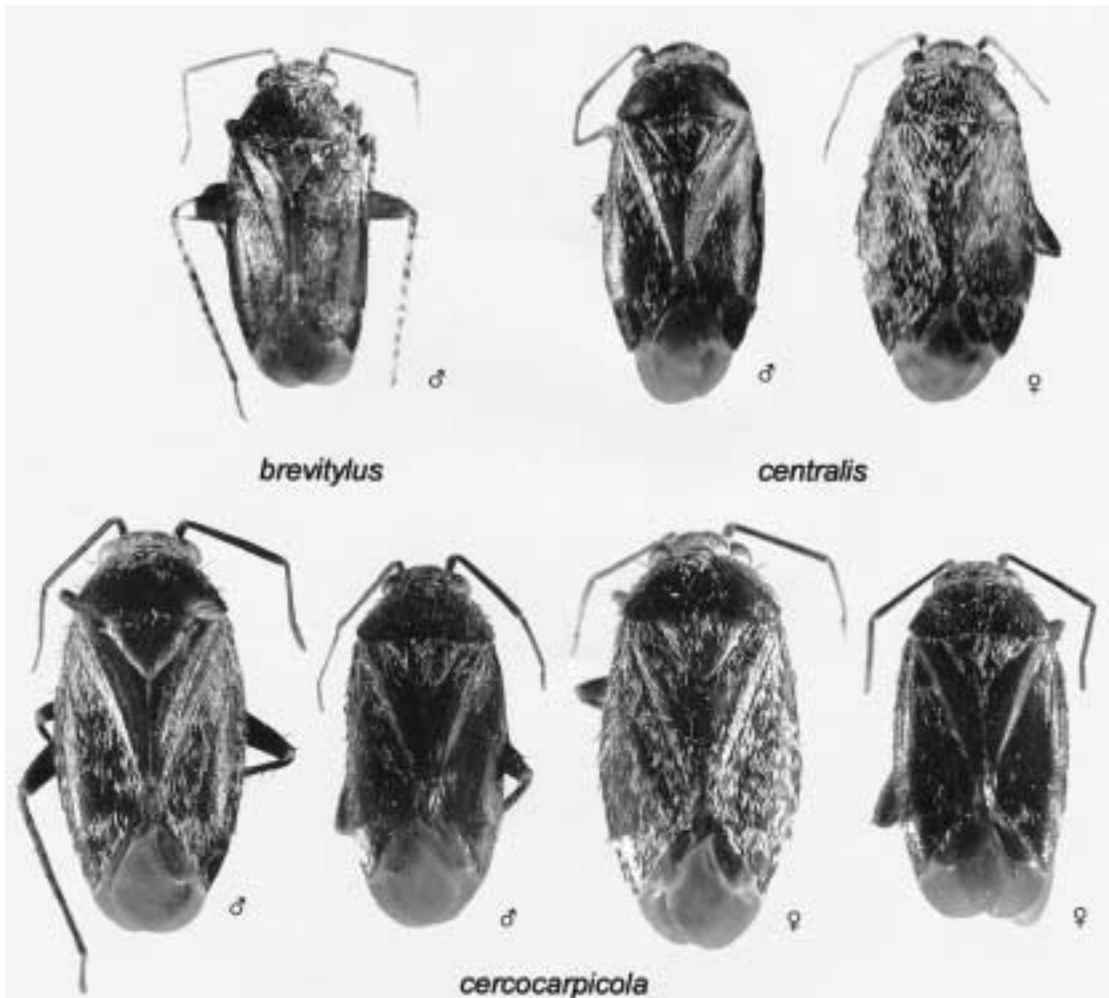


Fig. 1. Habitus photographs of *Oligotylus* spp. *O. brevitylus* (male: California: San Diego Co.). *O. centralis* (male: Oregon: Jackson Co.: just E of Pinhurst; female: Oregon: Josephine Co.: 2.8 mi S of Selma). *O. cercocarpicola* (male: Colorado: Elbert Co.: 3 mi E of Kiowa; male: Nevada: Nye Co.: 1 mi NE of Belmont; female: Colorado: Perry Park; female: Nevada: Nye Co.: 1 mi NE of Belmont).

femora moderately to heavily infuscate with some darker spots; trochanters pale; tibiae pale with contrasting dark bases of tibial spines. SURFACE AND VESTITURE: Simple setae dark; woolly setae silvery, generally distributed and thickly set on dorsum and pregenital abdominal sterna. STRUCTURE: Labium short, reaching to mesotrochanters. GENITALIA: Vesical blades rather strongly broadened, posterior blade particularly so and strongly curving on distal third, blades at nearly right angles to body of vesica; base

of vesica superposed over much of main body of vesica in lateral view, similar to *meridionalis* in twisting and general conformation, although apical blades distinctive (fig. 4).

Female: Similar to male in coloration, vestiture, and body shape as viewed from above (fig. 1). Total length 3.23–3.70, length apex clypeus–cuneal fracture 2.40–2.74, width across pronotum 1.23–1.31.

ETYMOLOGY: Named for its occurrence in the Central Valley of California.

HOST: *Ceanothus cuneatus* (Rhamnaceae).

DISTRIBUTION: Southwestern Oregon south to the Central Valley of California.

PARATYPES: USA: **California:** *Butte Co.:* Oroville, May 1, 1928, H. H. Kelfer, ex *Ceanothus cuneatus* (Rhamnaceae), 11♂, 32♀ (CAS); Yankee Hill, May 8, 1928, H. H. Keifer, ex *Ceanothus cuneatus* (Rhamnaceae), 5♂, 5♀ (CAS). *Kern Co.:* Lake Isabella, Main Dam Campground, April 24, 1980, Russell and Schwartz, ex *Quercus* sp. (Fagaceae), 1♂, 3♀ (AMNH). *Sacramento Co.:* Folsom, June 4, 1933, H. H. Keifer, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂, 2♀ (CAFA). **Oregon:** *Jackson Co.:* just E of Pinehurst, 1340 m, June 27, 1979, R. T. and Joe Schuh, ex *Ceanothus cuneatus* (Rhamnaceae), 4♂, 9♀ (AMNH); Pinehurst, May 24, 1958, Joe Schuh, ex *Ceanothus cuneatus* (Rhamnaceae), 2♂ (OSU). *Josephine Co.:* Rough and Ready Wayside S of Cave Junction, June 12, 1979, R. T. Schuh and M. D. Schwartz, ex *Ceanothus cuneatus* (Rhamnaceae), 10♂, 22♀ (AMNH); 2.8 mi S of Selma, June 12, 1979, R. T. Schuh, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂, 6♀ (AMNH).

Oligotylus cercocarpicola (Knight),
new combination

Figures 1, 2, 4

Psallus cercocarpicola Knight, 1930: 127 (n. sp.)

DIAGNOSIS: Recognized along with *brevitylus*, *meridionalis*, and *yavapaiensis* by its relatively small size and short labium. Distinguished unequivocally from those species by the distinctly different genitalic structure (fig. 4) similar to that found in *O. ribesi* and *O. saxifragicola*, by its habit of feeding on the Rosaceae (*Cercocarpus*, *Cowania*, *Holodiscus*, *Purshia*) rather than the Rhamnaceae, and antennal segment 2 being often totally black, particularly in the southern and eastern parts of the range.

REDESCRIPTION: *Male:* Relatively small species (fig. 1), total length 3.19–3.71, length apex clypeus–cuneal fracture 2.37–2.80, width across pronotum 1.17–1.34; body form often robust, particularly in the eastern part of the range. COLORATION: Usually black, especially in southern and eastern parts of range, sometimes distinctly brown; all anten-

nal segments usually black, segment 2 sometimes infuscate or approaching pale; femora often black, sometimes lighter with black spots; tibiae often black, sometimes lighter with contrasting black bases of tibial spines. SURFACE AND VESTITURE: Simple setae dark; woolly setae silvery, generally distributed and thickly set on dorsum, pregenital abdominal sterna, and genital capsule. STRUCTURE: Labium short, reaching to mesotrochanters. GENITALIA: Vesical blades not forming a distinct angle with body of vesica near base of secondary gonopore, blades acuminate, not conspicuously elongate, anterior blade with ventral margin sinuously curving; main body of vesica superposed over basal half in lateral view, a portion of one vesical strap discontinuous at a point basad of secondary gonopore (as in *ribes* and *saxifragicola* and all species with long labium) and rounded (fig. 4).

Female: Coloration, vestiture, and general conformation of body very similar to male (fig. 1). Total length 3.24–3.77, length apex clypeus–cuneal fracture 2.40–2.79, width across pronotum 1.16–1.41.

HOSTS: *Cercoparus betuloides*, *C. breviflorus*, *C. ledifolius*, *C. montanus*; *Coleogyne ramosissima*; *Cowania mexicana*, *C. stansburiana*; *Holodiscus discolor*, *H. microphylla*; *Purshia tridentata* (Rosaceae).

DISTRIBUTION: Foothills of the Rocky Mountains in northern Colorado west to the western margins of the Great Basin south to northern Mexico.

DISCUSSION: This species, originally described from Stonewall, Las Animas County, Colorado, is the most widely distributed species of *Oligotylus*, covering nearly the entire range of the genus except coastal areas and the Central Valley of California. Although *cercocarpicola* is one of the most variable *Oligotylus* species in terms of size and coloration, the structure of the male genitalia is quite constant over its entire range. The range of hosts includes a variety of rosaceous taxa. If only a few specimens were available from widely scattered localities and different hosts, one might conclude that several species were involved. However, after examining a large amount of host-documented material I have opted to treat *cercocarpicola* as a single, variable, widely distributed species.

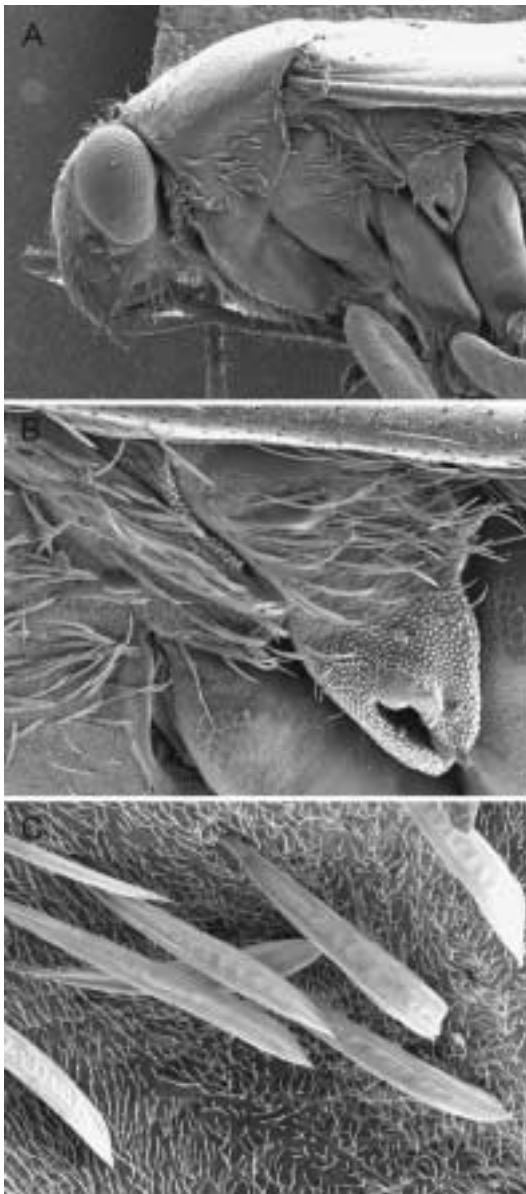


Fig. 2. *Oligotylus cercocarpicola*, female, scanning micrographs. **A.** Lateral view of head and thorax. **B.** Metathoracic spiracle and metathoracic scent-gland evaporatory area. **C.** Detail of setae comprising dorsal vestiture.

SPECIMENS EXAMINED: MEXICO: **Chihuahua:** 84 mi NW of Nuevo Casas Grandes on Agua Prieta Rd, 4500 ft, August 24, 1982, M. D. Schwartz, ex *Cercocarpus breviflorus* (Rosaceae), 3♂, 1♀ (AMNH). USA: **Arizona:** *Cochise Co.:* road from, Portal to Rustler

Park, Chiricahua Mts, 6500 ft, June 2, 1983, R. T. Schuh, G.M. Stonedahl, ex *Cercocarpus breviflorus* (Rosaceae), 19♂, 24♀ (AMNH). *Pima Co.:* Greaterville, May 4, 1988, W. A. Jone, 3♂, 3♀ (USNM). **California:** *Lassen Co.:* 9 mi W of McArthur, 1280 m, July 6, 1979, R. T. and Joe Schuh, ex *Cercocarpus betuloides* (Rosaceae), 3♂, 3♀ (AMNH). *Mendocino Co.:* Eel River R. S., Mendocino Natl. Forest, June 12, 1972, J. Doyen, ex *Cercocarpus betuloides* (Rosaceae), 3♂, 4♀ (UCB). *Mono Co.:* Mono Lake at Hwy 395, 7000 ft, July 11, 1980, G.M. Stonedahl, 6♂, 6♀ (AMNH); Rte 395 at N edge of Mono Lake, 2188 m, July 11, 1980, R. T. Schuh, G.M. Stonedahl, ex *Holodiscus microphylla* (Rosaceae), 6♂, 17♀ (AMNH). *Santa Barbara Co.:* Upper Oso Campground off Rte 154, 310 m, May 7, 1985, R. T. Schuh and B. M. Massie, ex *Cercocarpus betuloides* (Rosaceae), 3♂, 3♀ (AMNH). *Shasta Co.:* 1 mi W of Fall River Mills, 1030 m, July 7, 1979, R. T. and Joe Schuh, ex *Cercocarpus betuloides* (Rosaceae), 4♀ (AMNH); 6.5 mi E of jct. of Hwy 89 on Rt 299, 3000 ft, July 9, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 2♂, 1♀ (AMNH); 7.6 mi N of Manton, 1138 m, July 10, 1980, R. T. Schuh, G.M. Stonedahl, 1♂, 7♀ (AMNH). *Siskiyou Co.:* Lava Beds Natl. Mon. near Headquarters, 1560 m, June 26, 1979, R. T. and Joe Schuh, ex *Cercocarpus ledifolius* (Rosaceae), 23♂, 12♀ (AMNH); 0.5 mi S of Lava Beds Natl. Mon. toward Medicine Lake, 5300 ft, July 27, 1986, R. T. Schuh, ex *Purshia tridentata* (Rosaceae), 1♂, 3♀ (AMNH); Lava Beds Natl. Mon., 5000 ft, June 26, 1979, M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 4♂, 2♀ (AMNH); S boundary Lava Beds Natl. Mon. on Medicine Lake Rd, July 17, 1985, G.M. Stonedahl and J. D. McIver, ex *Cercocarpus ledifolius* (Rosaceae), 9♂, 10♀ (AMNH); 12.3 mi N of State Hwy 89 on Powder Hill Rd, July 19, 1985, G.M. Stonedahl and J. D. McIver, ex *Purshia tridentata* (Rosaceae), 4♂, 7♀ (AMNH). **Colorado:** *Douglas Co.:* Daniel's Park, June 21, 1982, D. A. Polhemus, 1♂, 1♀ (JTP); Perry Park, June 15, 1978, J. T. Polhemus, 2♀ (JTP); Waterton, June 13, 1982–July 27, 1983, D. A. and J. T. Polhemus, ex *Cercocarpus montanus* (Ro-

saceae), 13♂, 12♀ (JTP); near, Waterton, Boxborough Rd, 5600 ft, June 8, 1981, D. A. Polhemus, 1♂ (JTP); Waterton, Head of Hiline Canal, June 17, 1980, J. T. Polhemus, 14♂, 14♀ (JTP); Head of Hiline Canal, July 2, 1979, J. T. Polhemus, 2♂, 3♀ (AMNH). **Elbert Co.:** E of Kiowa along West Bijou Creek, July 16, 1983, D. A. and J. T. Polhemus, 1♂, 1♀ (JTP); 3 mi E of Kiowa, 6500 ft, July 16, 1983, R. T. Schuh, J. T. and D. A. Polhemus, ex *Cercocarpus montanus* (Rosaceae), 4♂, 5♀ (AMNH). **Jefferson Co.:** Deer Creek Canyon, 6500 ft, July 11, 1986, R. T. Schuh and J. T. Polhemus, ex *Quercus gambelli* (Fagaceae), 1♂, 3♀ (AMNH); Red Rocks Park, July 7, 1983, D. A. Polhemus, 12♂, 11♀ (JTP); Red Rocks Park, July 15, 1983, R. T. Schuh and D. A. Polhemus, ex *Cercocarpus montanus* (Rosaceae), 5♂, 7♀ (AMNH). **Las Animas Co.:** Monument Park, 8650 ft, August 28, 1982, D. A. and J. T. Polhemus, 1♂, 3♀ (JTP); 1 mi N of Stonewall on Purgatoire Campground Rd, 8400 ft, August 18, 1986, R. T. Schuh, ex *Cercocarpus montanus* (Rosaceae), 1♂, 3♀ (AMNH); Trinidad, 8500 ft, August 7, 1925, H. H. Knight – Paratypes: 2♀ (USNM). **Park Co.:** 3 mi S of Guffey, July 30, 1983, D. A. and J. T. Polhemus, ex *Cercocarpus montanus* (Rosaceae), 1♂ (JTP). **Nevada:** **Churchill Co.:** Campbell Creek on Rte 2, 6300 ft, August 5, 1982, M. D. Schwartz, ex *Holodiscus discolor* (Rosaceae), 8♀ (AMNH); Kingston Canyon Campground, Toiyabe Mts, August 5, 1982, M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 1♂ (AMNH). **Nye Co.:** 1 mi NE of Belmont on Rt 82, 2281 m, July 13, 1980, R. T. Schuh and G.M. Stonedahl, ex *Cowania mexicana stansburiana* (Rosaceae), 20♂, 16♀ (AMNH); 3.5 mi SE of Manhattan, Toiyabe Natl. Forest, 7000 ft, July 13, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 3♂, 9♀ (AMNH); 15.5 mi N of Rte 376 on Northumberland Mine Rd, 7000 ft, June 29, 1983, R. T. Schuh and M. D. Schwartz, ex *Holodiscus microphyllus* (Rosaceae), 37♂, 53♀ (AMNH); Atomic Test Site, 6.8 mi SE of Mercury Hwy on Orangeblossom Rd, 4000 ft, June 8, 1983, Schuh, Schwartz, and Stonedahl, 1♂ (AMNH). **White Pine Co.:** Wheeler Peak Drive, 7000–10,000 ft, August 6, 1982, M. D. Schwartz, ex *Cercocarpus*

ledifolius (Rosaceae), 3♂, 3♀ (AMNH); Wheeler Peak Rd, W of Baker, Humboldt Natl. Forest, 2609 m, July 14, 1980, R. T. Schuh and G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 3♂, 1♀ (AMNH). **New Mexico:** **Bernalillo Co.:** Tijeras, along I-40, June 1, 1983, J. T. Polhemus, 7♂, 10♀ (JTP). **Colfax Co.:** Raton, July 22, 1928, A. A. Nichol – Paratypes: 2♂, 2♀ (USNM). **Oregon:** **Baker Co.:** 14 mi S of Baker, August 7, 1957, G. F. Kraft, ex *Cercocarpus ledifolius* (Rosaceae), 1♀ (OSU). **Deschutes Co.:** 14 mi S of Millican, R15E T20S Sec 34, 5400 ft, July 21, 1979, M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 1♀ (AMNH). **Grant Co.:** Malheur Natl. Forest, T14S R33E Sec 15, July 21, 1979, M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 5♂, 4♀ (AMNH). **Harney Co.:** 10 mi E of Frenchglen, July 18, 1961, D. R. Smith, ex *Cercocarpus* sp. (Rosaceae), 2♂, 1♀ (OSU). **Klamath Co.:** 4 mi NW of Worden on road to Keno, July 17, 1985, G.M. Stonedahl and J. D. McIver, ex *Cercocarpus ledifolius* (Rosaceae), 2♂, 2♀ (AMNH). **Lake Co.:** 24 mi E of LaPine, July 12, 1957, G. F. Kraft, ex *Cercocarpus ledifolius* (Rosaceae), 8♂, 13♀ (OSU); 24 mi E of LaPine, July 16, 1957, G. F. Kraft, ex *Purshia tridentata* (Rosaceae), 5♂, 4♀ (OSU). **Utah:** **Box Elder Co.:** Raft River Mts, 5 mi SW of Clear Creek Campground, 6200–8000 ft, July 31, 1981, M. D. Schwartz, ex *Holodiscus discolor* (Rosaceae), 4♂, 5♀ (AMNH). **Emery Co.:** Temple Wash, 6.2 mi W at Rt 24 (Goblin Valley Rd), 5600 ft, June 19, 1983, R. T. Schuh and M. D. Schwartz, ex *Cercocarpus* sp. (Rosaceae), 2♂, 6♀ (AMNH). **Garfield Co.:** Capitol Reef Natl. Park, Grand Wash, 5350–6640 ft, June 21, 1983, R. T. Schuh and M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 12♂, 16♀ (AMNH). **Grand Co.:** 11 mi SE of jct. Rtes 313 and 163 toward Dead Horse Point, 5200 ft, June 11, 1982, M. D. Schwartz, ex *Coleogyne ramosissima* (Rosaceae), 1♂, 6♀ (AMNH). **San Juan Co.:** Grand Flat near Collins Canyon, 5600 ft, May 28, 1984, D. A. and J. T. Polhemus, ex *Cowania stansburiana* (Rosaceae), 5♂, 5♀ (JTP); Head of Lake Canyon near Nokai Dome Rd, 4200 ft, May 29, 1978, D. A. and J. T. Polhemus, 2♂, 4♀ (JTP). **Sevier Co.:** 2.3 mi N of I-70 on road to Kanosh, 6980

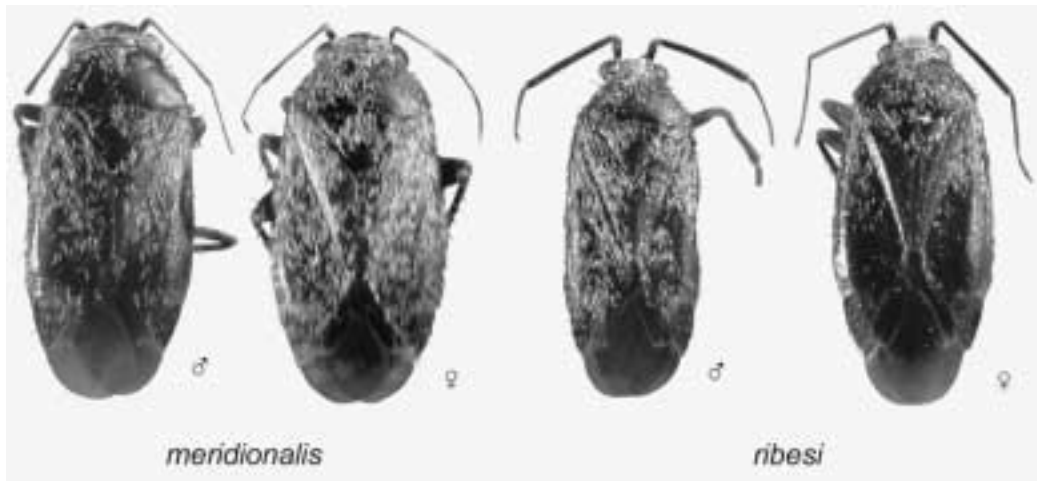


Fig. 3. Habitus photographs of *Oligotylus* spp. *O. meridionalis* (male: Mexico: Baja California Norte: 7 km W of Parque San Pedro Martir; female: California: San Diego Co.: Cuyamaca Rancho State Park). *O. ribesi* (male: California: Mono Co.: 10 mi S of Walker; female: California: Humboldt Co.: Blocksburg).

ft, July 16, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 1 ♀ (AMNH). **Wyoming:** *Lincoln Co.:* Wolf Creek Campground, 10 mi E of Alpine Junction, July 21, 1981, M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 1 ♂, 1 ♀ (AMNH).

***Oligotylus meridionalis*, new species**

Figures 3, 4

HOLOTYPE: Male, [USA:] Arizona: Cochise Co.: vicinity of Portal, 1500–1700 meters, May 2–7, 1978, R. T. Schuh, ex: *Ceanothus greggii* (Rhamnaceae). Deposited in the American Museum of Natural History.

DIAGNOSIS: Recognized along with *brevitylus*, *centralis*, and *yavapaiensis* by its relatively small size, having a short labium, a mostly pale second antennal segment, and similar structure of the male genitalia. Distinguished from those species by the details of genitalic structure, and easily separated from *brevitylus* and *centralis* by its occurrence primarily in Arizona; also separated from *brevitylus* on the basis of coloration of the hind tibiae.

DESCRIPTION: Male: Relatively small species (fig. 3), total length 3.01–3.54, length apex clypeus–cuneal fracture 2.12–2.54, width across pronotum 1.18–1.38. **COLOR-**

ATION: Blackish brown; antennal segment 2 pale except extreme proximal and distal portion, remainder of antennae dark; femora strongly infuscate in males, pale to moderately infuscate in females with obvious dark spots; tibial spines with black bases contrasting with lighter background coloration of tibiae. **SURFACE AND VESTITURE:** Simple setae on dorsum dark; woolly setae silvery, generally distributed and thickly set on dorsum, pregenital abdominal sterna, and genital capsule. **STRUCTURE:** Labium short, reaching to mesotrochanters. **GENITALIA:** Vesical blades broadened basally, apical one-fourth slender and nearly parallel-sided, apices not parallel to one another, conspicuously divergent, blades at nearly right angles to body of vesica; base of vesica superposed over main body of vesica in lateral view, similar to *centralis* in twisting and general conformation, although vesical blades distinctive (fig. 4).

Female: Coloration and vestiture similar to male; body form more strongly ovate than in male (fig. 3). Total length 3.27–3.61, length apex clypeus–cuneal fracture 2.32–2.56, width across pronotum 1.24–1.36.

ETYMOLOGY: Named for its occurrence in the southern part of the range of the genus; *meridionalis*, Latin, southern.

HOSTS: *Ceanothus cuneatus*, *C. greggii* (Rhamnaceae).

DISTRIBUTION: Southern California and Arizona, northern Mexico.

PARATYPES: MEXICO: **Baja California Norte:** 7 km W of Parque Sierra San Pedro Martir, 1720 m, April 25, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus cuneatus* (Rhamnaceae), 12♂, 4♀ (AMNH); 3.5 mi W of Parque Sierra San Pedro Martir, 1875 m, April 25, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂ (AMNH); 1.5 mi W of Parque Sierra San Pedro Martir, 2090 m, April 25, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus cuneatus* (Rhamnaceae), 6♂, 4♀ (AMNH); Tecate, 6.3 mi S of El Condor, 4000 ft, May 15, 1982, M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 17♂, 17♀ (AMNH). USA: **Arizona:** *Cochise Co.:* vicinity of Portal, 1500–1700 m, May 1, 1978, R. T. Schuh, ex *Ceanothus greggii* (Rhamnaceae), 18♂, 48♀ (AMNH). *Gila Co.:* Tonto Natl. Forest, 8 mi SE jct. Rts. 87 and 188, 4000 ft, May 27, 1983, R. T. Schuh and G.M. Stonedahl, ex *Ceanothus greggii* (Rhamnaceae), 1♀ (AMNH). *Yavapai Co.:* 1 mi S of Yarnell on Rt 89, June 3, 1983, G.M. Stonedahl, ex *Ceanothus greggii* (Rhamnaceae), 1♂, 1♀ (AMNH). **California:** *Inyo Co.:* Independence, June 14, 1929, R. L. Usinger, 16♂, 12♀ (CAS). *Kern Co.:* Walker Pass, 5250 ft, May 30, 1981, J. T. Polhemus, 4♂, 6♀ (JTP). *San Diego Co.:* May 1, 1913, E. P. Van Duzee, 6♂, 9♀ (AMNH); Cibbets Flat Campground on Kimball Creek Rd, 1280 m, April 29, 1985, R. T. Schuh, ex *Ceanothus greggii* (Rhamnaceae), 1♂, 2♀ (AMNH); Cuyamaca Rancho State Park, Green Valley Trail, May 16, 1982, M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 3♂ (AMNH); Morena Dam, May 26, 1927, C. C. Searl, 5♂, 12♀ (SDNH); Pine Valley, 1190 m, April 29, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus greggii* (Rhamnaceae), 16♂, 6♀ (AMNH).

Oligotylus ribesi, new species

Figures 3, 6

HOLOTYPE: Male, USA: Calif.: Mono Co.: 10 mi. S of Walker, July 3, 1980, R. T. Schuh, ex: *Ribes* sp. (Saxifragaceae). Depos-

ited in the American Museum of Natural History.

DIAGNOSIS: Most similar in its large size, general appearance, and short labium to *O. saxifragicola*. Separated from *saxifragicola* by the cuneus being unicolorous, usually black, rather than with the basal half pale and by the uniformly black antennae in both sexes; also distinguished from *saxifragicola* by the largely reddish or black coloration of the femora, particularly of the distal half, in contrast to the almost entirely yellowish femora in *saxifragicola*; tibiae in *saxifragicola* pale except for dark spots at bases of spines, whereas in *ribesi* the tibiae at least weakly infuscate and often almost entirely black.

DESCRIPTION: *Male:* Large, elongate species (fig. 3), total length 4.00–4.46, length apex clypeus–cuneal fracture 2.87–3.18, width across pronotum 1.29–1.44. COLORATION: Generally black, posterior margin of vertex pale; antennae black; trochanters and proximal two-thirds of femora pale or sometimes reddish, femora strongly infuscate to black distally; tibiae black or at least distinctly infuscate. SURFACE AND VESTITURE: Simple setae on dorsum dark, dull, those on abdominal venter shining; woolly setae silvery, densely placed on dorsum (although often badly rubbed); pregenital abdominal sterna broadly covered with simple setae, woolly setae present only laterally on abdomen. STRUCTURE: Labium short, reaching to about mesotrochanters. GENITALIA: Vesical blades forming a moderate angle with body of vesica near base of secondary gonopore, not conspicuously elongate, anterior blade weakly sinuous and acuminate, main body of posterior blade nearly straight with only apex distinctly decurved; a portion of one vesical strap discontinuous at a point basad of secondary gonopore (as in *ribes* and *saxifragicola* and all species with long labium) and distinctly angled (fig. 6); and main body of vesica not superposed over basal portion in lateral view as in *cercocarpicola* and *saxifragicola*.

Female: Vestiture and coloration similar to male; body form broader and more strongly ovoid (fig. 3). Total length 4.05–4.54, length apex clypeus–cuneal fracture 2.87–3.24, width across pronotum 1.37–1.51.

ETYMOLOGY: Named for its occurrence on *Ribes* spp., wild currant.

HOSTS: *Ribes cereum*, *R.* sp. (Saxifragaceae); *Purshia tridentata* (Rosaceae); *Spiraea* sp. (Rosaceae).

DISTRIBUTION: Southern Oregon, northern California.

DISCUSSION: The majority of known specimens were apparently collected on *Ribes* spp. It appears, however, that *ribesi* occasionally breeds on other plants, including *Purshia* and *Spiraea*. A series of specimens comprising one male and six females, which on the basis of male genitalic structure, appear to be close to *ribesi*, were collected by John Polhemus, July 20–22, 1982, from Charleston Peak, Clark County, Nevada (JTP collection). No host is indicated on the labels, but the short labium and vesical structure suggest that *Ribes* might be a productive starting point in the search for additional material.

PARATYPES: USA: **California:** *Fresno Co.:* Huntington Lake, 7000 ft, July 9, 1919, F. E. Blaisdell, 3 ♀ (CAS). *Humboldt Co.:* Blocksburg, June 12, 1938, B. P. Bliven, 1 ♂, 3 ♀ (CAS); Dinsmores, June 15, 1941, B. P. Bliven, 3 ♂ (CAS); Larabee Valley, June 26, 1938, B. P. Bliven, 2 ♂ (CAS). *Lassen Co.:* Martins Springs, July 23, 1922, J. O. Martin, 1 ♂, 1 ♀ (CAS). *Madera Co.:* Biledo Meadows, July 11, 1946, R. L. Usinger, ex *Ribes* sp. (Saxifragaceae), 4 ♂ (UCB). *Mono Co.:* 10 mi S of Walker, July 3, 1980, R. T. Schuh, ex *Ribes* sp. (Saxifragaceae), 4 ♂, 7 ♀ (AMNH). *Placer Co.:* Juniper Creek, 7300 ft, August 21, 1969, W. Gagne, ex *Ribes cereum* (Saxifragaceae), 1 ♂ (UCB); Juniper Creek, 7300 ft, August 21, 1969, W. Gagne, 1 ♂ (UCB). *Santa Barbara Co.:* San Geronio Wilderness Area, 8200 ft, July 18, 1978, J. D. Pinto, ex *Ribes* sp. (Saxifragaceae), 1 ♂ (UCR). *Shasta Co.:* Old Station, June 22, 1955, E. E. Lindquist, 1 ♂ (UCB). *Siskiyou Co.:* just S of Lava Beds Natl. Mon. on Medicine Lake Rd, Mammoth Crater, 1625 m, June 26, 1979, R. T. and Joe Schuh, ex *Purshia tridentata* (Rosaceae), 9 ♂, 10 ♀ (AMNH); 8.5 mi S of Lava Beds Natl. Mon. toward Medicine Lake, 7000 ft, July 27, 1986, R. T. Schuh, ex *Ribes cereum* (Saxifragaceae), 1 ♂ (AMNH); 9 mi E of McCloud, Ash Creek Ranger Station, 3500 ft,

June 7, 1974, R. Coville, 2 ♂ (UCB); 2.5 mi N of Medicine Lake on Medicine Lake Rd, July 18, 1985, G. M. Stonedahl and J. D. McIver, ex *Ribes cereum* (Saxifragaceae), 1 ♂, 3 ♀ (AMNH); Medicine Lake Rd, 5200 ft, June 26, 1979, G. Stonedahl, ex *Ribes cereum* (Saxifragaceae), 5 ♂, 9 ♀ (AMNH). *Stanislaus Co.:* 18 mi W of Patterson, Frank Raines Park, April 16, 1977, A. Ludtke, 1 ♂ (UCD). *Trinity Co.:* Coffee Creek, July 30, 1931, R. L. Usinger, 1 ♀ (UCB); 6 mi NE of Hayfork, May 20, 1973, J. Powell, 1 ♀ (UCB). **Oregon:** *Deschutes Co.:* 4.2 mi S of Millican, 5000 ft, June 21, 1979, R. T. Schuh, ex *Purshia tridentata* (Rosaceae), 4 ♂ (AMNH). *Josephine Co.:* Oregon Caves, 3900 ft, June 27, 1972, J. Sawbridge, 1 ♂, 1 ♀ (OSU). *Klamath Co.:* 2 mi S of Chemult on Rt 97, July 2, 1982, G.M. Stonedahl and T. J. Henry, ex *Ribes* sp. (Saxifragaceae), 4 ♂ (AMNH); 16.4 mi N of jct. Hwy 62 on Hwy 97, 4880 ft, July 8, 1980, G. Stonedahl, ex *Ribes* sp. (Saxifragaceae), 4 ♂, 9 ♀ (AMNH); 30 mi N of Klamath Falls on Hwy 97, 4500 ft, June 25, 1979, G. M. Stonedahl, M. D. Schwartz, J. D. Lattin, ex *Ribes* sp. (Saxifragaceae), 15 ♂, 12 ♀ (AMNH).

Additional specimens examined: Bridgeville, June 20, 1959, Kelton and Madge, ex *Spiraea* sp. (Rosaceae), 9 ♂, 17 ♀ (CNC)

Oligotylus saxifragicola, new species

Figures 5, 6

HOLOTYPE: Male, USA: California: San Diego Co.: Cibbets Flat Cmpgrnd on Kimball Crk Rd, 1280 m, April 29, 1985, R. T. Schuh, ex: *Ribes indecorum* Eastw. (Saxifragaceae). Deposited in the American Museum of Natural History.

DIAGNOSIS: Most similar in its large size, general appearance, and short labium to *ribesi*. Separated from *ribesi* by the almost entirely yellowish femora, rather than largely reddish or black coloration, particularly of the distal half of the femora; tibiae in *saxifragicola* pale except for dark spots at bases of spines, whereas in *ribesi* the tibiae at least weakly infuscate and often almost entirely black; cuneus pale on basal half in *saxifragicola*, unicolorous, usually black, in *ribesi*; female distinctive because of the mostly pale antennal segments 1 and 2.

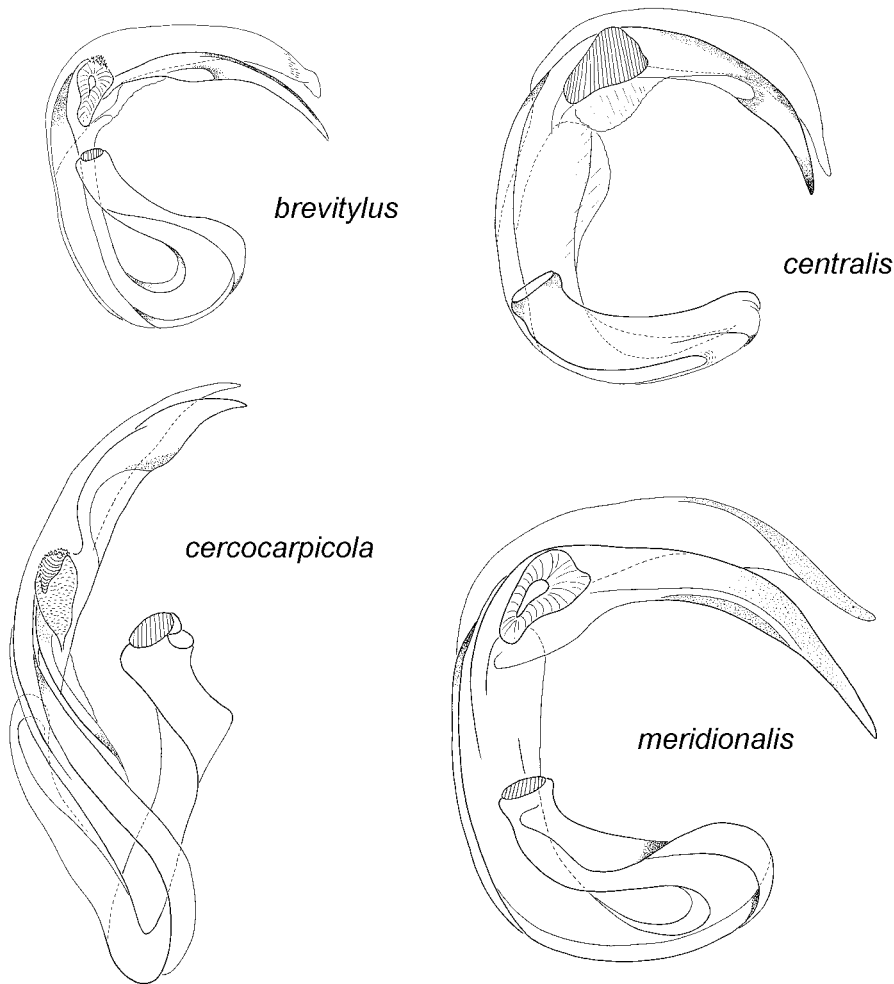


Fig. 4. Vesicae of males, *Oligotylus* spp.

DESCRIPTION: Male: Relatively large, elongate species (fig. 5), total length 3.80–4.01, length apex clypeus–cuneal fracture 2.81–2.91, width across pronotum 1.31–1.36. **COLORATION:** Generally chocolate brown to brownish black, posterior margin of vertex mostly pale, basal half of cuneus pale; antennae black; legs, including coxae, generally pale, yellow-orange, femora with some black spots; tibial spines with small contrasting black spots at bases. **SURFACE AND VESTITURE:** Simple setae on dorsum dark, dull, those on abdominal venter shining; woolly setae golden, densely placed on dorsum; pregenital abdominal sterna broadly covered

with simple setae, woolly setae present in a broad band along lateral margin only. **STRUCTURE:** Labium short, reaching to about mesotrochanters. **GENITALIA:** Vesical blades not forming a distinct angle with body of vesica near base of secondary gonopore, blades not conspicuously elongate, rather abruptly acuminate with apices decurved, anterior blade distinctly sinuously curving; main body of vesica superposed over basal half in lateral view, a portion of one vesical strap discontinuous at a point basal of secondary gonopore (as in *ribes* and *saxifragicola* and all species with long labium) and rather sharply angled (fig. 6); shape

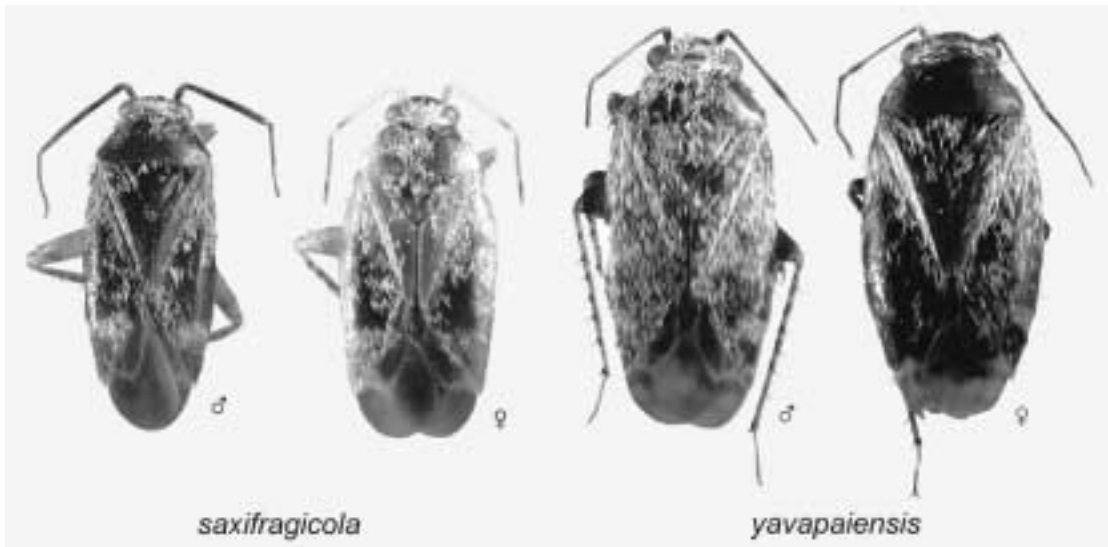


Fig. 5. Habitus photographs of *Oligotylus* spp. *O. saxifragicola* (male and female: California: San Diego Co.: Cibbets Flat Campground on Kimball Creek Rd). *O. yavapaiensis* (male: Arizona: Yavapai Co. 15 mi W of Prescott; female: Arizona: Gila Co.: Rye).

of vesical blades, twisting, and general conformation of vesica most similar to that in *cercocarpicola*.

Female: Vestiture similar to male; coloration similar except antennal segment 1 pale except at extreme base, segment 2 pale except distal one-fourth; body somewhat broader and more strongly ovoid than in male (fig. 5). Total length 4.05–4.33, length apex clypeus–cuneal fracture 2.89–3.12, width across pronotum 1.44–1.53.

ETYMOLOGY: Named for its occurrence on the Saxifragaceae.

HOSTS: *Ribes indecorum*, *R.* sp. (Saxifragaceae).

DISTRIBUTION: Coastal mountains of extreme southern California.

PARATYPES: USA: **California**: *Orange Co.*: Santiago Canyon, April 2, 1936, E. L. Paddock, ex *Ribes indecorum* (Saxifragaceae), 8♂, 11♀ (USNM); 3 mi W of Silverado, March 30, 1968, P. A. Opler, ex *Ribes* sp. (Saxifragaceae), 1♂ (UCB). *San Diego Co.*: Cibbets Flat Campground on Kimball Creek Rd, 1280 m, April 29, 1985, R. T. Schuh, ex *Ribes indecorum* (Saxifragaceae), 9♂, 17♀ (AMNH); Spring Valley, April 19, 1957, W. E. Simonis, 1♂ (CAFA).

Oligotylus yavapaiensis, new species

Figures 5, 6

HOLOTYPE: Male, USA: Arizona: Yavapai Co.: on US Rt. 17, 1 mi. N mp. 295 (S. rests-top), 2 mi. S Rt. 179, 2000 ft., April 18, 1982, M. D. Schwartz, *Ceanothus greggii* Gray (Rhamnaceae). Deposited in the American Museum of Natural History.

DIAGNOSIS: Recognized along with *brevitylus*, *centralis*, and *meridionalis* by the short labium, a mostly pale second antennal segment, and similar structure of the male genitalia. Distinguished from those species by the details of genitalic structure, and easily separated from *brevitylus* and *centralis* by its occurrence primarily in Arizona.

DESCRIPTION: *Male*: Relatively small species (fig. 5), total length 3.20–3.32, length apex clypeus–cuneal fracture 2.30–2.43, width across pronotum 1.18–1.29. COLORATION: Blackish-brown; antennal segment 2 pale except extreme proximal and distal portions, remaining segments dark; legs pale to moderately infuscate, femora with some darker spots; tibial spines with black bases contrasting with pale background coloration of tibiae. SURFACE AND VESTITURE: Simple setae on dorsum dark; woolly setae

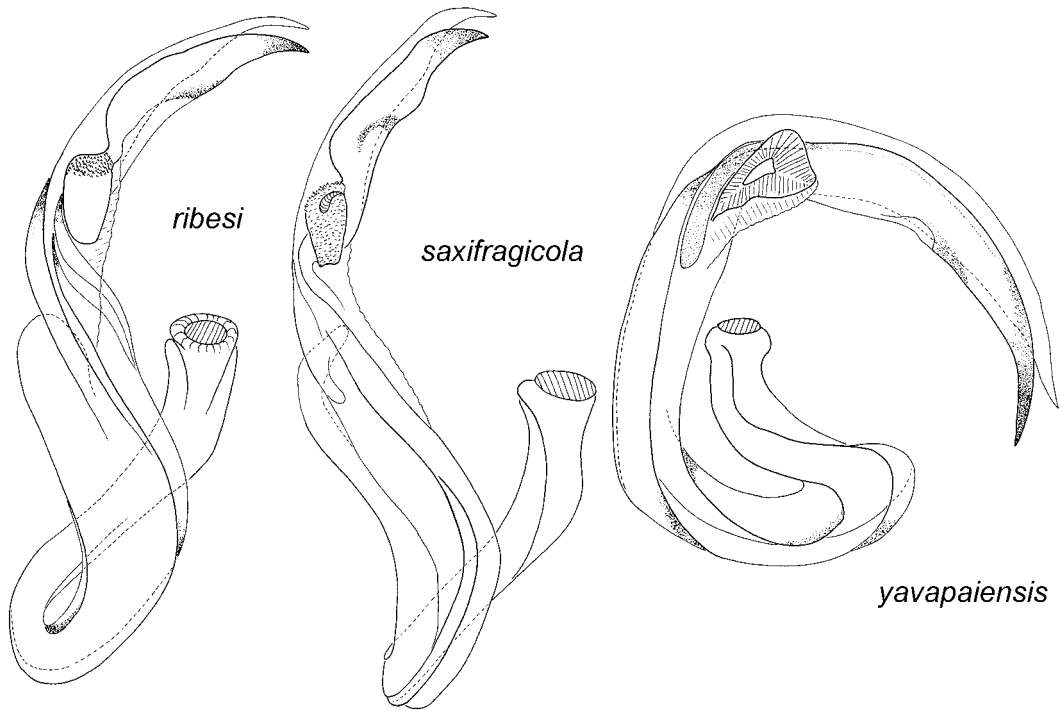


Fig. 6. Vesicae of males, *Oligotylus* spp.

silvery, generally distributed and thickly set on dorsum, pregenital abdominal sterna, and genital capsule. STRUCTURE: Labium short, reaching to mesotrochanters. GENITALIA: Vesical blades long, gradually tapering toward slightly divergent apices, at nearly right angles to body of vesica; similar to *brevitylus* in twisting and general conformation, although base of vesica usually not superposed over main body of vesica in lateral view.

Female: Vestiture and coloration similar to male, body form somewhat more strongly ovoid (fig. 5). Total length 3.26–3.51, length apex clypeus–cuneal fracture 2.49–2.56, width across pronotum 1.19–1.29.

ETYMOLOGY: Named for its occurrence in Yavapai County, Arizona.

HOST: *Ceanothus greggii* (Rhamnaceae).

DISTRIBUTION: Arizona.

PARATYPES: USA: **Arizona**: *Gila Co.*: 2 mi W of Miami, 3800 ft, May 4, 1979, J. D. Pinto, E. M. Fisher, ex *Ceanothus* sp. (Rhamnaceae), 1♂ (UCR); Old CCC Campground S of Globe on Pioneer Pass Rd, 4700 ft, May 30, 1983, Schuh, Stonedahl, and Massie, 2♂,

1♀ (AMNH); Rye, 3500 ft, April 18, 1982, D. A. and J. T. Polhemus, 9♂, 11♀ (JTP). *Maricopa Co.*: 4 Peaks Rd, mile 11, May 24, 1982, J. T. Polhemus, 1♀ (JTP). *Mojave Co.*: Hualapi Mts, SE of Kingman, 4000–6500 ft, June 9, 1983, Schuh, Schwartz, and Stonedahl, ex *Ceanothus greggii* (Rhamnaceae), 4♂, 3♀ (AMNH). *Yavapai Co.*: Mud Tanks Mesa, George Crook Rd, 6500 ft, June 14, 1983, Schuh, Schwartz, and Stonedahl, ex *Ceanothus greggii* (Rhamnaceae), 3♂, 4♀ (AMNH); ca. 15 mi W of Prescott, April 30, 1981, D. A. and J. T. Polhemus, 2♂, 2♀ (JTP); US Rt 17 2 mi S of Rte 179, 4000 ft, April 18, 1982, M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 12♂, 10♀ (AMNH).

GROUP 2: BLACK SPECIES, LABIUM LONG, REACHING MIDDLE TROCHANTERS OR BEYOND

Oligotylus ceanothi, new species

Figures 9, 10

HOLOTYPE: Male, USA: California: San Diego Co.: Pine Valley, 1190 m., April 29,

1985, R. T. Schuh & B. M. Massie, ex: *Ceanothus greggii* var. *perplexans* (Trel) Jepson (Rhamnaceae). Deposited in the American Museum of Natural History.

DIAGNOSIS: Recognized among large black or blackish species with a long labium by the reddish aspect of the hemelytral coloration, relatively large size, genitalic structure, and habit of feeding on *Ceanothus* spp.

DESCRIPTION: *Male*: Large, elongate species (fig. 9), total length 4.07–4.57, length apex clypeus–cuneal fracture 2.71–3.07, width across pronotum 1.31–1.41. COLORATION: Head, pronotum, scutellum, and venter (mostly) black, hemelytra always with some reddish, although often very dark; antennae black; femora and tibiae reddish, usually darker in males than females, tibial spines with at most small black bases not contrasting with red ground color of tibiae. SURFACE AND VESTITURE: Simple setae on dorsum dark; woolly setae silvery, scattered on pregenital abdominal sterna. STRUCTURE: Labium long, reaching to between meso- and metatrochanters. GENITALIA: Anterior vesical blade obviously longer and more slender than posterior blade, both blades acuminate, apices distinctly separated, blade at about a 45° angle to body of vesica; a portion of one vesical strap discontinuous at a point basad of secondary gonopore and truncate; body of vesica appearing short in lateral view, basal portion strongly upturned relative to main body of vesica (fig. 10).

Female: Vestiture similar to male; coloration lighter than in male, entire dorsum and venter always reddish; tibiae usually lighter than in males (fig. 9). Total length 3.50–4.31, length apex clypeus–cuneal fracture 2.47–3.03, width across pronotum 1.25–1.51.

ETYMOLOGY: Named for its occurrence on *Ceanothus* spp.

HOSTS: *Ceanothus crassifolius*, *C. cuneatus*, *C. greggii*, *C. integerrimus*, *C.* spp. (Rhamnaceae); *Cercocarpus* sp. (Rosaceae). Probable sitting records: *Arctostaphylos pungens*, *A.* sp. (Ericaceae); *Quercus* sp. (Fagaceae); *Adenostema* sp., *Prunus illicifolia* (Rosaceae).

DISTRIBUTION: Southern Oregon south to northern Baja California, east to eastern Arizona.

PARATYPES: MEXICO: **Baja California Norte**: 2 mi W of Las Encinas, 5200 ft, March 18, 1972, J. Powell, ex *Ceanothus* sp. (Rhamnaceae), 4♀ (UCB); 7 mi SE of Maneadero, 100 ft, March 25, 1973, J. Doyen, ex *Ceanothus* sp. (Rhamnaceae), 3♀ (UCB); 1.5 mi W of Parque Sierra San Pedro Martir, 2090 m, April 25, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂, 14♀ (AMNH); 3.5 mi W of Parque Sierra San Pedro Martir, 1875 m, April 25, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂ (AMNH); 7 km W of Parque Sierra San Pedro Martir, 1720 m, April 25, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus cuneatus* (Rhamnaceae), 15♂, 38♀ (AMNH); Tecate, 6.3 mi S of El Condor, 4000 ft, May 15, 1982, M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 2♂, 11♀ (AMNH). USA: **Arizona**: *Cochise Co.*: 5354 Ash Canyon Rd, 0.5 mi W of Hwy 92, 5100 ft, February 28, 1995, M. D. Schwartz, ex *Arctostaphylos pungens* (Ericaceae), 2♂ (AMNH); Huachuca Mts, Carr Canyon, March 29, 1955, F. Werner, ex *Arctostaphylos* sp. (Ericaceae), 1♀ (UAZ); Huachuca Mts, Miller Canyon, March 29, 1955, F. G. Werner, ex *Arctostaphylos* sp. (Ericaceae), 1♀ (UAZ); Huachuca Mts, Miller Canyon Rd, 5000–6000 ft, April 4, 1981, M. D. Schwartz, ex *Arctostaphylos* sp. (Ericaceae), 1♂ (AMNH); Huachuca Mts, Miller Canyon Rd 3 mi W Hwy 92, 5300 ft, February 28, 1995–March 1, 1995, M. D. Schwartz, ex *Arctostaphylos pungens* (Ericaceae), 4♂, 3♀ (AMNH). *Gila Co.*: 9 mi W of Globe, 3800 ft, April 7, 1979, E. M. Fisher, ex *Ceanothus* sp. (Rhamnaceae), 3♂, 1♀ (UCR); 2 mi W of Miami, 3800 ft, May 4, 1979, E. M. Fisher, ex *Ceanothus* sp. (Rhamnaceae), 1♀ (UCR); 4 mi E of Payson on Rte 260, April 18, 1982, D. A. and J. T. Polhemus, 9♂, 14♀ (JTP). *Pima Co.*: Santa Catalina Mts, Molino Basin, March 20, 1964, F. Werner, ex *Arctostaphylos pungens* (Ericaceae), 1♀ (UAZ). *Yavapai Co.*: US Rt 17, 1 mi N of milepost 295, 4000 ft, April 18, 1982, M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 2♀ (AMNH); US Rt 17, 2 mi S of Rte 179, 4000 ft, April 18, 1982, M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 1♂ (AMNH); Yarnell, 1300–1475 m, March 31, 1981, R. T. Schuh

and M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 9♂, 20♀ (AMNH). **California:** *Alameda Co.:* Oakland, June 1, 1935, E. S. Ross, 1♀ (CAS). *Contra Costa Co.:* Mt. Diablo, March 1, 1959–March 4, 1959, G. I. Stage, ex *Ceanothus* sp. (Rhamnaceae), 2♂ (UCB). *Kern Co.:* 14.5 mi S of Havilah, April 28, 1978, J. D. Pinto, ex *Ceanothus* sp. (Rhamnaceae), 1♀ (UCR); 4.5 mi E of Onyx, April 21, 1983, J. D. Pinto and R. K. Velten, ex *Ceanothus* sp. (Rhamnaceae), 3♂, 2♀ (UCR); Walker Pass, 5250 ft, May 30, 1981, J. T. Polhemus, 1♀ (JTP); 3 mi W of Wofford Heights, April 29, 1964, W. Turner, 1♂, 2♀ (UCB). *Lake Co.:* 12 mi N of Upper Lake, 2000 ft, March 18, 1965, J. Powell, 1♂, 1♀ (UCB). *Los Angeles Co.:* Mt. Baldy, May 26, 1950, H. F. Robinson, 1♂ (UCD); N fork San Gabriel River along Hwy 39, April 15, 1977, D. Wilder, 1♂ (CAS); Tanbark Flat, March 29, 1957, D. D. Linsdale, 3♂, 1♀ (UCB); W Fork San Gabriel River, San Gabriel Mts, 2600 ft, May 5, 1946, F. W. Furry, 1♂ (LACM). *Marin Co.:* Mt. Tamalipas State Park, March 2, 1983, J. T. Polhemus, 1♂ (JTP). *Monterey Co.:* Carmel, April 19, 1936, L. S. Slevin, 1♀ (CAS). *Riverside Co.:* Cactus Spring Trail between Hwy 74 and Horsethief Creek, Deep Canyon area, March 15, 1975, G. R. Ballmer, ex *Prunus ilicifolia* (Rosaceae), 1♂ (UCR); Deep Canyon area, Cactus Spring Trail, May 1, 1976, E.W. Grese, 2♂, 1♀ (UCR); Hwy 74 E of Hemet, 3900 ft, April 7, 1983, R. K. Velten, 1♀ (UCR); Menifee Valley, hills on W end, 1800 ft, February 11, 1979–March 18, 1979, J. D. Pinto, ex *Ceanothus crassifolius* (Rhamnaceae), 49♂, 52♀ (UCR, USNM); Pinyon Flat, 16 mi SW of Palm Desert, April 13, 1963, C.A. Tosch, 1♀ (UCB); Rte 243, milepost 21.29, April 21, 1980, Russell and Schwartz, ex *Cercocarpus* sp. (Rosaceae), 8♂, 4♀ (AMNH); San Jacinto Wild Area, trail to Fall Creek Falls, February 21, 1970, P. H. Arnaud, Jr., 7♂, 2♀ (CAS). *San Benito Co.:* Pinnacles Natl. Mon., June 14, 1961, E. J. Taylor, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂ (UCD); Pinnacles Natl. Mon., April 6, 1951, W. H. Lange, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂, 3♀ (UCD). *San Diego Co.:* April 22, 1913, E. P. Van Duzee, 1♀ (CAS); Alpine, March 31, 1961, W. A. Steffan, ex *Ceanothus* sp. (Rhamnaceae), 1♀

(UCB); Carrista Creek, Morettis Junction, May 13, 1980, Brown and Faulkner, 1♀ (SDNM); Cibbets Flat Campground on Kimball Creek Rd, 1280 m, April 29, 1985, R. T. Schuh, ex *Ceanothus greggii* (Rhamnaceae), 2♀ (AMNH); Cuyamaca Rancho State Park, Green Valley Trail, May 16, 1982, M. D. Schwartz, ex *Ceanothus greggii* (Rhamnaceae), 11♂, 10♀ (AMNH); McCain Valley, May 3, 1980, Brown and Faulkner, 1♂, 1♀ (SDNM); 1 mi N of Mt. Laguna Junction, March 26, 1961, W. A. Steffan, ex *Ceanothus* sp. (Rhamnaceae), 8♂ (UCB); 3 mi SE of Oak Grove, 3000 ft, April 14, 1983, J. D. Pinto, ex *Ceanothus* sp. (Rhamnaceae), 1♀ (UCR); Pine Valley, 1190 m, April 29, 1985, R. T. Schuh and B. M. Massie, ex *Ceanothus greggii* (Rhamnaceae), 2♂, 7♀ (AMNH); 2 mi S of Pine Valley, April 5, 1966, C. W. O'Brien, 1♀ (UCB); San Diego, May 17, 1913, W. S. Wright, 1♀ (CAS). *San Luis Obispo Co.:* 7 mi SW of Cresson, April 26, 1968, J. A. Chemsak, 1♂ (UCB). *San Mateo Co.:* Pedro Hills, May 8, 1926, H. H. Kelfer, 1♀ (CAS). *Santa Clara Co.:* near jct. of Mines Rd and Beauregard Rd, 2350 ft, April 23, 1972, H. B. Leach, ex *Adenostoma* sp. (Rosaceae), 1♀ (CAS); S end of Mines Rd, 2350 ft, April 23, 1972, H. B. Leach, ex *Ceanothus cuneatus* (Rhamnaceae), 2♀ (CAS). *Tulare Co.:* 2 mi E of Johnsondale, April 27, 1964, C. A. Tosch, ex *Ceanothus* sp. (Rhamnaceae), 1♂ (UCB). *Ventura Co.:* Oakview, April 10, 1949, E. L. Paddock, ex *Quercus* sp. (Fagaceae), 2♂ (CAFA). **Oregon:** *Josephine Co.:* 3 mi SW of Cave Junction, Woodcock Creek, April 28, 1980, Russell and Schwartz, ex *Ceanothus integerimus* (Rhamnaceae), 4♂, 20♀ (AMNH).

Oligotylus maneadero, new species

Figures 9, 10

HOLOTYPE: Male, USA: California: Monterey Co.: Big Sur, 6.5 mi. S., 30 April 1977, Adriean J. Mayor, on *Ceanothus*. Deposited in the American Museum of Natural History.

DIAGNOSIS: Recognized among black species with a long labium by its polished dorsum, white base of the cuneus, moderately large size, genitalic structure, coastal distribution, and habit of feeding on *Ceanothus* spp.

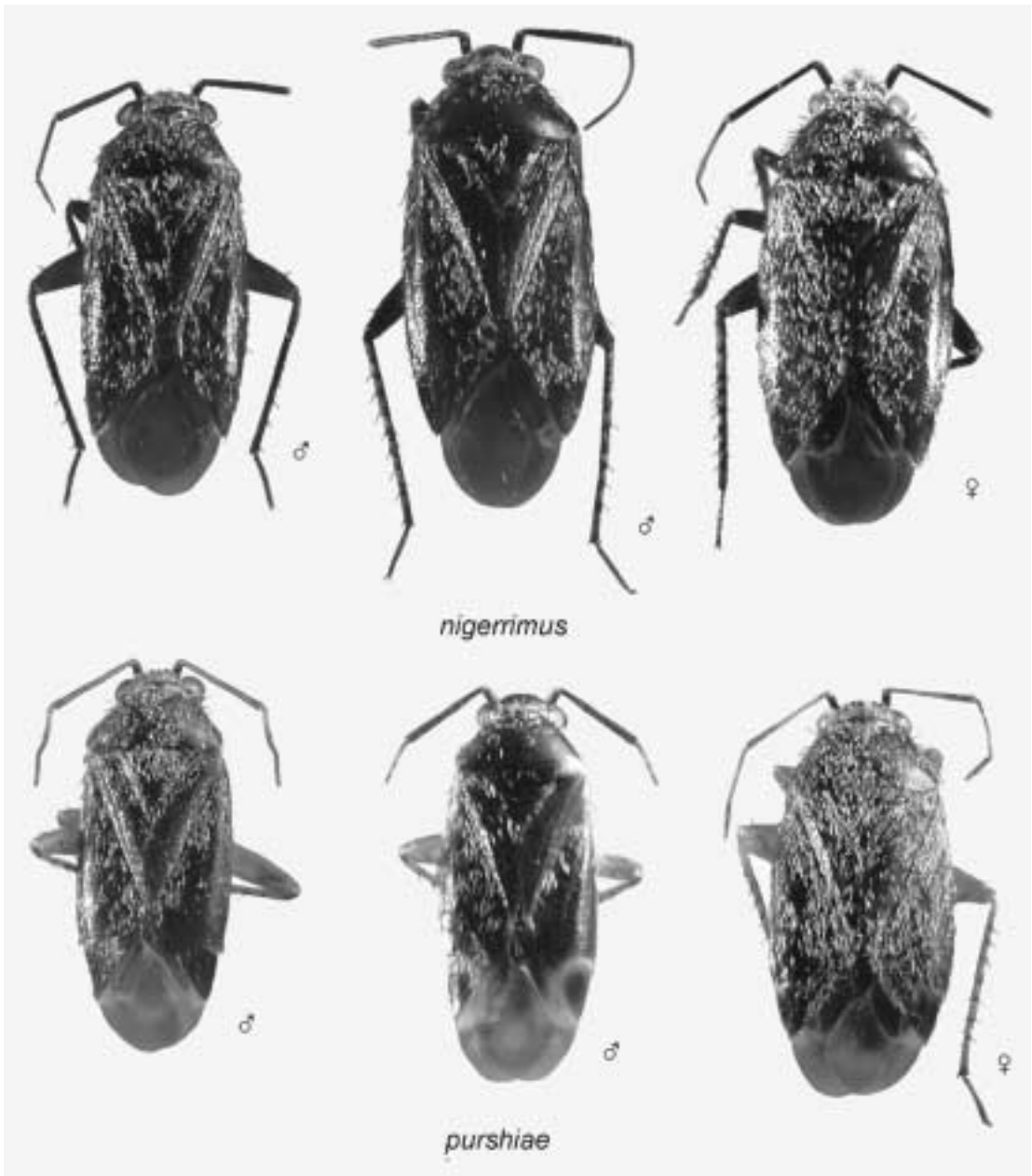


Fig. 7. Habitus photographs of *Oligotylus* spp. *O. nigerrimus* (male: Nevada: Washoe Co.: 4.5 mi SW of Washoe; male: Utah: Uintah Co.: Blue Mt. Flat and Cliff Ridge; female: California: Siskiyou Co.: just S of Lava Beds Natl. Mon., Medicine Lake Rd). *O. purshiae* (male: Nevada: Mineral Co.: 27 mi SW of Hawthorne on Rte 359; male: California: San Bernardino Co.: New York Mountains, Live Oak Canyon; female: Nevada: Nye Co.: Atomic Test Site).

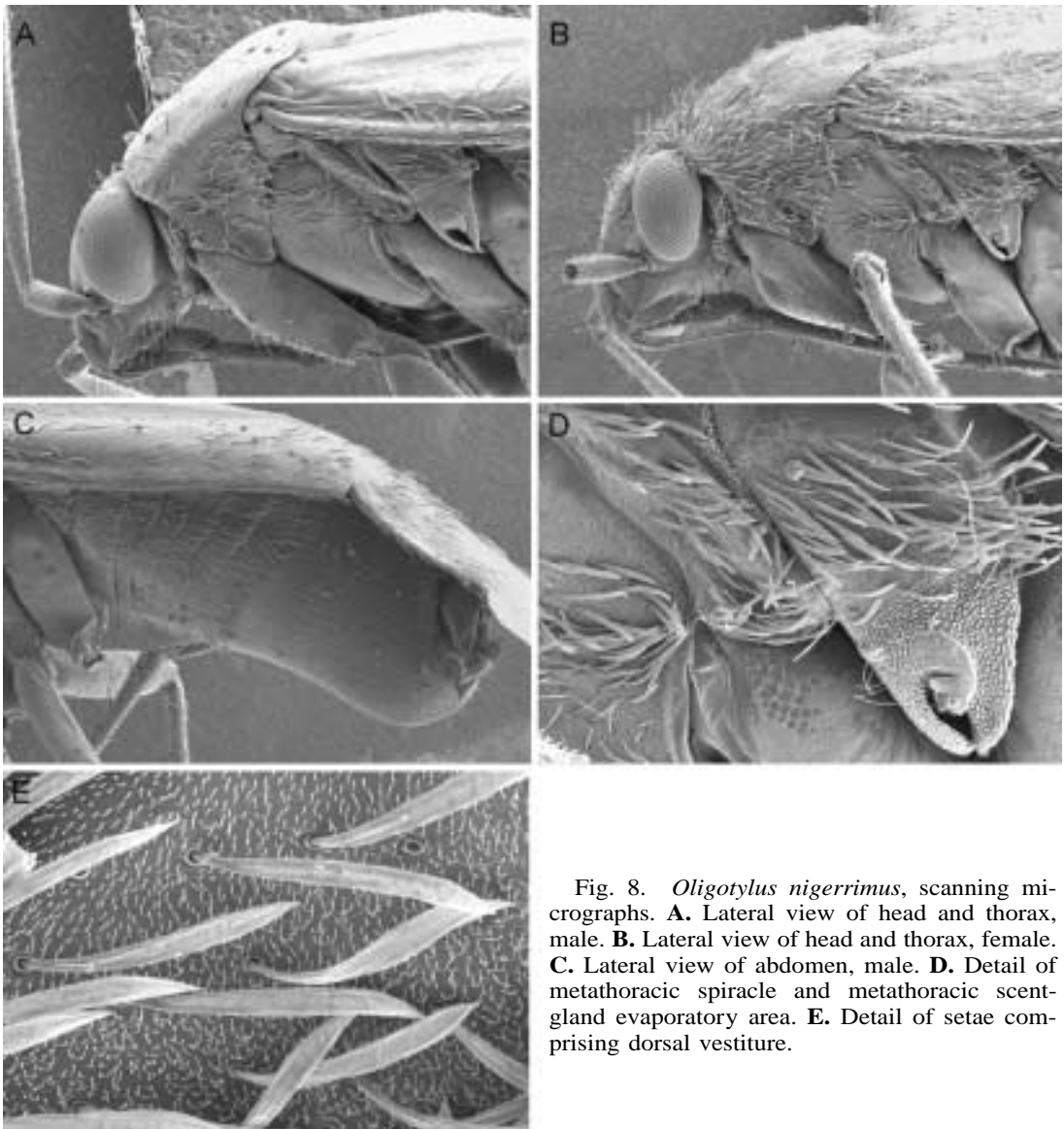


Fig. 8. *Oligotylus nigerrimus*, scanning micrographs. **A.** Lateral view of head and thorax, male. **B.** Lateral view of head and thorax, female. **C.** Lateral view of abdomen, male. **D.** Detail of metathoracic spiracle and metathoracic scent-gland evaporatory area. **E.** Detail of setae comprising dorsal vestiture.

DESCRIPTION: Male: Medium sized species (fig. 9), total length 3.76–3.97, length apex clypeus–cuneal fracture 2.63–2.74, width across pronotum 1.26–1.31. **COLORATION:** Males generally black, females generally lighter, somewhat reddish and mottled; antennae black, more intensely so in males than in females; femora black distally in males, pale proximally, trochanters pale, distal portion of femora with black spots in females; tibia with pale ground coloration, spines with

contrasting black bases. **SURFACE AND VESTITURE:** Dorsum distinctly polished and shining; simple setae on dorsum dark, shining on abdominal venter; woolly setae silvery, distributed in patches on dorsum, occurring in a broad band laterally on abdominal venter. **STRUCTURE:** Labium long, reaching to between meso- and metatrochanters. **GENITALIA:** Vesical straps not so smoothly curving as in most species, anterior strap with an apparent indentation on “ven-

tral" edge, posterior strap curved strongly upward when vesica viewed laterally; a portion of one vesical strap discontinuous at a point basad of secondary gonopore (fig. 10).

Female: Vestiture similar to male; coloration generally much lighter, dorsum usually with some reddish; body form more strongly ovate than in male (fig. 9). Total length 3.72–3.92, length apex clypeus–cuneal fracture 2.62–2.79, width across pronotum 1.20–1.42.

ETYMOLOGY: Named for its occurrence near Maneadero, Baja California Norte, Mexico; a noun in apposition.

HOSTS: *Ceanothus cuneatus*, *C. spinosus*, *C. sp.* (Rhamnaceae).

DISTRIBUTION: Coastal areas from Monterey, California south to northern Baja California.

PARATYPES: MEXICO: **Baja California Norte**: La Mision, Rio San Miguel, February 27, 1982, Faulkner and Brown, 3♂ (SDNH); 2 mi W of Las Encinas, Sierra Martyr, 3600 ft, March 18, 1972, J. Doyen, ex *Ceanothus* sp. (Rhamnaceae), 1♂ (UCB); 7 mi SE of Maneadero, 100 ft, March 25, 1973, J. Doyen, 5♂, 5♀ (UCB). USA: **California**: *Humboldt Co.*: Arcata, June 30, 1969, J. Powell, ex *Ceanothus* sp. (Rhamnaceae), 1♂, 2♀ (UCB); Beatrice, June 21, 1959, Kelton and Madge, 4♂, 1♀ (CNC); Shively, June 21, 1959, Kelton and Madge, 1♂ (CNC); Trinidad, May 29, 1955, E. I. Schlinger, 1♂ (UCD). *Los Angeles Co.*: Latigo Canyon Rd, 11.6 mi WNW of Malibu, April 1, 1977, A.J. Mayor, ex *Ceanothus spinosus* (Rhamnaceae), 6♂, 7♀ (UCR). *Marin Co.*: 1 mi SE of Inverness, May 12, 1966, L. O'Brien, 2♂ (UCB); Mt. Tamalpais, June 23, 1918, E. P. Van Duzee, 1♂ (CAS). *Monterey Co.*: Big Creek Reserve, March 26, 1980, J. Whitfield, 1♂ (UCB); 9 mi S of Big Sur, April 2, 1959, C.W. O'Brien, 1♂ (UCB); 6.5 mi S of Big Sur, April 30, 1977, A.J. Mayor, ex *Ceanothus* sp. (Rhamnaceae), 12♂, 15♀ (UCR, AMNH); Ventana Wilderness, 8 mi SSE Hwy 1 on Palo Colorado Rd, April 20, 1980, Russell and Schwartz, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂, 4♀ (AMNH). *San Diego Co.*: Otay Mountain, May 18, 1978, D. Faulkner, 7♂, 2♀ (SDNH). *San Mateo Co.*: Redwood City, April 15, 1954, P. H. Arnaud, Jr., 1♂ (UCD). *Santa Barbara Co.*:

Los Prietos, March 14, 1967, J. Powell, ex *Ceanothus* sp. (Rhamnaceae), 2♂ (UCB). *Santa Cruz Co.*: Soquel Creek, May 30, 1909, E. C. Van Dyke, 1♂ (CAS). *Ventura Co.*: N end of Casitas Reservoir, March 15, 1967, P. A. Opler, 13♂ (UCB).

Oligotylus nigerrimus (Van Duzee),
new combination

Figures 7, 8, 10

Apocremnus nigerrimus Van Duzee, 1916b: 243 (n. sp.) *Psallus nigerrimus* Carvalho, 1958:125 (cat.; new combination)

DIAGNOSIS: Recognized among black species with a long labium by its moderate size and minute serrations on the apex of the posterior apical blade of the vesica. *Oligotylus nigerrimus* shares only with *brevitylus* black stripes on opposing surfaces of the tibiae; it can be easily separated from *brevitylus* by its longer labium.

DESCRIPTION: *Male*: Moderately small species (fig. 7), total length 3.34–3.75, length apex clypeus–cuneal fracture 2.42–2.72, width across pronotum 1.19–1.25. COLORATION: Black; antennae black; femora mostly black; tibia with pale, nearly white, ground color, spines with contrasting black bases, opposing surfaces of tibiae with a solid black stripe. SURFACE AND VESTITURE: Simple setae on dorsum dark; woolly setae silvery, generally distributed and thickly set on dorsum and in a broad lateral band on pregenital abdominal sterna. STRUCTURE: Labium moderately long, reaching just beyond middle trochanters. GENITALIA: Vesical blades of moderate length, anterior blade attenuated and decurved at apex, posterior blade broad, unevenly rounded, and minutely serrate at apex (seen elsewhere only in *paracarneatus*); a portion of one vesical strap discontinuous at a point basad of secondary gonopore and rounded; main body of vesica superposed over basal section in lateral view (fig. 10).

Female: Similar in coloration and vestiture to male; body somewhat more ovoid (fig. 7). Total length 3.62–3.79, length apex clypeus–cuneal fracture 2.67–2.81, width across pronotum 1.22–1.37.

HOSTS: *Purshia tridentata* (Rosaceae); *Ceanothus* spp.

DISTRIBUTION: Widely distributed in California north to British Columbia and east to Wyoming.

DISCUSSION: Van Duzee (1916b) described the species *nigerrimus* in the genus *Apocremnus* on the basis of 12 specimens from Pasadena, California (5 males, 5 females examined for the present study); he also listed the species as having been taken at Fallen Leaf Lake, near Lake Tahoe, California, although I was not able to find specimens from the latter locality. He compared this new taxon with the European species *Apocremnus ancorifer* Fieber (= *Lepidargyrus Muminov*). The Pasadena specimens clearly represent an *Oligotylus* species on the basis of dissections three of the male specimens. One was teneral. The other two are apparently identical in structure but unusual among *Oligotylus* species because the apical vesical blades do not lay in the same plane. In this sense they are reminiscent of *O. schwartzi*. It appears that treatment of the vesica in KOH caused the structures in the apical portion of the vesica to become dissociated. In all other respects, including the minute serrations on the apex of the posterior apical blade, the vesica of the Pasadena specimens is like that of a large number of specimens from northern California, Oregon and scattered localities east to Wyoming. Even though the vesica was apparently distorted in the dissected Pasadena specimens, the coloration of the tibiae is indicative for the taxon and of a type found elsewhere only in *brevitylus*.

More than 80% of all specimens here assigned to *nigerrimus* were taken on *Purshia tridentata*, with a few small collections having been made on *Ceanothus* spp. The specimens examined by Van Duzee from Pasadena could not have been taken on *Purshia* because the plant does not occur there. Two specimens collected on *Ceanothus* spp. were examined from Mt. Wilson, Los Angeles County.

I examined one male and one female specimen deposited in the California Academy of Sciences labeled as the lectotype and allotype, respectively, of *nigerrimus*. The locality label reads: "Pasadena, Cal., 6-5-09, Grinnell." There is no published lectotype designation for this taxon. I am therefore

designating the male as the lectotype, the female as a paralectotype. The six remaining specimens of the Pasadena series that I have been able to locate are deposited in the Smithsonian Institution (USNM).

SPECIMENS EXAMINED: CANADA: **British Columbia:** Kaleden, July 2, 1975, L. A. Kelton, 7♂, 10♀ (CNC); Oliver, July 2, 1974, L. A. Kelton, ex *Ceanothus* sp. (Rhamnaceae), 3♂, 16♀ (CNC); Summerland, July 2, 1974–July 11, 1974, L. A. Kelton, ex *Ceanothus* sp. (Rhamnaceae), 2♂, 10♀ (CNC). USA: **California:** *Calaveras Co.:* Camp Cornell Maintenance Camp, Stanislaus Natl. Forest On Rte 4, May 7, 1994, M. D. Schwartz, ex *Ceanothus integerrimus* (Rhamnaceae), 3♂, 3♀ (CNC). *Contra Costa Co.:* Mt. Diablo, July 14, 1916, E. P. Van Duzee, 1♀ (CAS). *Humboldt Co.:* Bridgeville, June 20, 1950, Kelton and Madge, ex *Ceanothus* sp. (Rhamnaceae), 9♂ (CNC); McCann, June 9, 1959, Kelton and Madge, 2♂ (CNC); Westwood, June 17, 1959, Kelton and Madge, 1♂, 2♀ (CNC). *Lassen Co.:* Susanville, June 17, 1959, Kelton and Madge, 16♂, 14♀ (CNC). *Los Angeles Co.:* 33 mi E of La Canada on Rte 2, 218 m, June 26, 1980, R. T. Schuh, ex *Ceanothus cordulatus* (Rhamnaceae), 1♂ (AMNH); Pasadena, June 5, 1909, Grinnell, 3♂, 3♀ (USNM, CAS) – Paratypes: 1♀ (CAS); Lectotype ♂ (CAS). *Mariposa Co.:* July 6, 1946, H. P. Chandler, 1♂ (CAS). Yosemite, 3800–4000 ft, June 7, 1931 1♀ (UCB). *Modoc Co.:* Hackamore, July 12, 1947, R. L. Usinger, ex *Chrysothamnus* sp. (Asteraceae), 1♀ (UCB). *Mono Co.:* Rte 395 at Mono Craters, 2188 m, July 3, 1980, R. T. Schuh, ex *Purshia tridentata* (Rosaceae), 13♂, 23♀ (AMNH). *Nevada Co.:* Boca, June 23, 1978, L. R. Bronson, 1♂ (UCD); Sagehen Creek, July 5, 1972–April 25, 1966, C. Goodpasture, C. E. Hawkins, 2♂ (UCD, OSU); Truckee, July 5, 1927, E. P. Van Duzee, ex *Purshia tridentata* (Rosaceae), 8♂, 16♀ (CAS, CNC). *Plumas Co.:* Chester, June 25, 1937, B. P. Bliven, 7♂, 12♀ (CAS). *Riverside Co.:* Idyllwild, San Jacinto Mountains, May 23, 1940, R. Husbands, ex *Ceanothus* sp. (Rhamnaceae), 1♂, 1♀ (UCB); Keen Camp, June 6, 1917, E. P. Van Duzee, 1♂ (CAS); 2 mi N of Poppet Flat on Rte 243, May 22, 1976, J. D. Pinto, 3♂ (UCR). *San Diego Co.:* Mt. La-

guna, June 21, 1963, J. Powell, ex *Ceanothus integerrimus* (Rhamnaceae), 2♂ (UCB); Mt. Palomar, June 28, 1963, J. Powell, ex *Ceanothus integerrimus* (Rhamnaceae), 4♂ (UCB). *Shasta Co.*: 1 mi SE of Bartle, June 8, 1974, J. Sorensen, 2♂ (UCB); 13 mi E of Bartle, jct. Rts 89 and A19, 1270 m, July 9, 1980, R. T. Schuh and G.M. Stonedahl, ex *Ceanothus integerrimus* (Rhamnaceae), 1♂, 3♀ (AMNH); Lake Elder, July 9, 1947, T. F. Leigh, 1♂ (UCB). *Sierra Co.*: Davies Canyon, July 1, 1966, P. R. Schmitz, 1♂, 1♀ (UCD). *Siskiyou Co.*: 20-22 mi W of McArthur, July 3, 1964, Joe Schuh, 1♂, 1♀ (AMNH); Black Butte Summit, 8 mi S of Weed, 3900 ft, June 22, 1981, J. D. Lattin, 2♂ (OSU); 7 mi S of Happy Camp, May 26, 1964, Joe Schuh, 1♂ (AMNH); just S of Lava Beds Natl. Mon. on Medicine Lake Rd, 1875 m, June 26, 1979, R. T. and Joe Schuh, G. Stonedahl, ex *Purshia tridentata* (Rosaceae), 24♂, 25♀ (AMNH); 9 mi SW of Lava Beds Natl. Mon. on Medicine Lake Rd, 6000 ft, June 26, 1979, M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 6♂, 3♀ (AMNH); 3.7 mi W of McCloud, 1390 m, July 9, 1980, R. T. Schuh and G.M. Stonedahl, ex *Ceanothus cordulatus* (Rhamnaceae), 4♂, 11♀ (AMNH); 9 mi E of McCloud, Ash Creek Ranger Station, 3500 ft, June 7, 1974, J. Powell, J. Sorensen, and D. Green, ex *Purshia tridentata* (Rosaceae), 15♂, 14♀ (UCB); Shasta Springs, June 6, 1920, C. L. Fox, 1♀ (CAS); 5 mi S of Weed, June 15, 1959, Kelton and Madge, 51♂, 38♀ (CNC); 10 mi NE of Weed, jct. Rts 97 and A12, 3800 ft, June 21, 1981, J. D. Lattin, ex *Purshia tridentata* (Rosaceae), 8♂, 11♀ (OSU); Yreka, June 15, 1959, Kelton and Madge, 1♂ (CNC). *Tehama Co.*: 12 mi E of Mineral on Rte 36, 1513 m, July 10, 1980, R. T. Schuh and G. M. Stonedahl, ex *Pinus contorta* (Pinaceae), 1♂, 1♀ (AMNH). *Trinity Co.*: 3 mi W of Forest Glen, May 25, 1973, J. Doyen, ex *Ceanothus* sp. (Rhamnaceae), 1♂ (UCB); Mtn. Meadow Ranch, head of Coffee Creek, 6100 ft, July 8, 1969, J. Powell, 1♂, 2♀ (UCB). *Tuolumne Co.*: Strawberry, June 22, 1951, E. L. Silver, 1♀ (UCD). *Ventura Co.*: Tule Creek, June 27, 1965, P. M. Jump, 2♀ (LACM). **Colorado:** *Eagle Co.*: Vail, June 23, 1986, J. T. Polhemus, ex *Purshia tridentata* (Rhamnaceae),

26♂, 41♀ (JTP). *Routt Co.*: Steamboat Springs, July 1, 1944 1♂ (KU); Steamboat Springs, July 23, 1983, D. A. and J. T. Polhemus, ex *Purshia tridentata* (Rosaceae), 2♂, 4♀ (JTP). **Idaho:** *Caribou Co.*: 11 mi W of Wayan on Rt 34, Pine Bar Campground, 6000 ft, July 30, 1981, M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 1♂, 1♀ (AMNH). **Nevada:** *Elko Co.*: 5 mi E of Deeth, June 17, 1952, R. H. Beamer et al., 1♂ (KU); 30 mi SE of I-80 on Hwy 229, 6260 ft, July 19, 1980, G.M. Stonedahl, ex *Purshia tridentata* (Rosaceae), 6♀ (AMNH); Secret Pass, 17 mi S of I-80 on Rt 229, 6250 ft, June 26, 1983, R. T. Schuh and M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 2♂, 4♀ (AMNH). *Mineral Co.*: 27 mi SW of Hawthorne on Rt 359, 1 mi NE of Anchorite Summit, 7400 ft, July 2, 1983, R. T. Schuh and M. D. Schwartz, ex *Purshia glandulosa* (Rhamnaceae), 3♂ (AMNH). *Nye Co.*: 3.5 mi SE of Manhattan, Toiyabe Natl. Forest, July 13, 1980, G. M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 1♀ (AMNH). *Washoe Co.*: Lake Tahoe, Conference Point, July 17, 1929, R. L. Usinger, 2♂, 2♀ (UCB); 4.5 mi SW of Washoe, Little Valley Research Area, 6200 ft, August 4, 1982, M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 9♂, 14♀ (AMNH). **Oregon:** *Deschutes Co.*: 7 mi S of Bend, June 6, 1957, G. F. Kraft, ex *Purshia tridentata* (Rosaceae), 1♂, 2♀ (OSU); 20 mi NE of LaPine, July 10, 1957, G. F. Kraft, ex *Purshia tridentata* (Rosaceae), 2♂, 2♀ (OSU); 33 mi E of Lapine, July 16, 1957, G. F. Kraft, ex *Purshia tridentata* (Rosaceae), 2♂, 5♀ (OSU); 2 mi E of LaPine, June 25, 1957, G. F. Kraft, ex *Purshia tridentata* (Rosaceae), 3♂, 8♀ (OSU); 4.2 mi S of Millican, 4980 ft, July 21, 1979, M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 4♂, 6♀ (AMNH); 14 mi S of Millican, R15E T20S Sec 34, 5400 ft, June 21, 1979, R. T. Schuh, ex *Purshia tridentata* (Rosaceae), 5♂, 11♀ (AMNH); 0.6 mi NW of Sisters, June 21, 1979, R. T. Schuh, ex *Purshia tridentata* (Rosaceae), 5♂, 15♀ (AMNH). *Grant Co.*: 13 mi S of Dale, 3400 ft, June 14, 1973, Oman and Musgrave, 2♂, 1♀ (OSU). *Jackson Co.*: Siskiyou, June 15, 1959, Kelton and Madge, 13♂, 7♀ (CNC); 0.5 mi S of Siskiyou Summit on Old Rte 99, 4300 ft, June 27, 1979,

G. M. Stonedahl and M. D. Schwartz, ex *Ceanothus integerrimus* (Rhamnaceae), 3♂, 4♀ (AMNH). *Josephine Co.*: 12 mi N of Cave Junction, June 12, 1979, M. D. Schwartz, ex *Ceanothus integerrimus* (Rhamnaceae), 2♀ (AMNH). *Klamath Co.*: 1 mi N of Chiloquin, June 21, 1974, P. Oman, ex *Purshia* sp. (Rosaceae), 3♂, 1♀ (OSU); 1 mi W of Crescent, July 17, 1979, P. Oman, 12♂, 18♀ (OSU); 1 mi W of Crescent, 4500 ft, July 17, 1979, M. D. Schwartz, ex *Pinus contorta* (Pinaceae), 3♂, 1♀ (AMNH); Hayden Mt. Summit W of Keno, 1475 m, June 27, 1979, R. T. and Joe Schuh, ex *Ceanothus velutinus* (Rhamnaceae), 7♀ (AMNH); jct. Rts 97 and 58, July 3, 1982, G.M. Stonedahl and T. J. Henry, ex *Purshia tridentata* (Rosaceae), 7♂, 11♀ (AMNH); 30 mi N of Klamath Falls on Hwy 97, 4500 ft, June 25, 1979, G.M. Stonedahl and M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 5♂, 7♀ (AMNH); 11 mi W of Rt 97 on Rt 58, July 8, 1980, G.M. Stonedahl, ex *Purshia tridentata* (Rosaceae), 5♂, 5♀ (AMNH); 0.5 mi W of Rte 97 at Crescent, 1440 m, June 25, 1979, R. T. Schuh, M. D. Schwartz, G. M. Stonedahl, ex *Purshia tridentata* (Rosaceae), 11♂, 35♀ (AMNH). *Lake Co.*: 24 mi SE of LaPine, July 16, 1957, G. F. Kraft, ex *Purshia tridentata* (Rosaceae), 1♀ (OSU). *Union Co.*: 14 mi S of Union, 4200 ft, June 30, 1960, J. D. Lattin, ex *Ceanothus velutinus* (Rhamnaceae), 1♂, 2♀ (OSU). *Wheeler Co.*: 1 mi SE of Mitchell, June 5, 1973, Oman and Musgrave, 2♀ (OSU); 0.1 mi E of Ochoco Divide, Ochoco Natl. Forest, June 22, 1979, G.M. Stonedahl and M. D. Schwartz, ex *Ceanothus velutinus* (Rhamnaceae), 1♂, 2♀ (AMNH). **Utah:** *Box Elder Co.*: 5 mi SW of Clear Creek Campground, Raft River Mountains, 6200–8000 ft, July 31, 1981, M. D. Schwartz, ex *Holodiscus discolor* (Rosaceae), 1♂ (AMNH). *Carbon Co.*: 8 mi NW of Helper, Prince Canyon Rec. Area, 8000 ft, July 9, 1982, M. D. Schwartz, ex *Cowaniana mexicana* (Rosaceae), 1♀ (AMNH). *Grand Co.*: 11 mi SE of jct. Rtes 313 and 163 toward Dead Horse Point, 5200 ft, June 11, 1982, M. D. Schwartz, ex *Cowaniana mexicana* (Rosaceae), 3♂, 4♀ (AMNH). *Juab Co.*: 5 mi W of Eureka, June 8, 1966–June 10, 1966, W. M. T., ex *Purshia tridentata* (Rosaceae), 2♂, 3♀ (USNM). *Uintah Co.*: Blue

Mt. Flat and Cliff Ridge, T5S R25E, 8000 ft, July 8, 1982, M. D. Schwartz, ex *Cowaniana mexicana* (Rosaceae), 2♂, 4♀ (AMNH). **Wyoming:** *Lincoln Co.*: 10 mi E of Alpine, near Wolf Creek Campground, July 21, 1981, M. D. Schwartz, ex *Purshia tridentata* (Rosaceae), 1♀ (AMNH); Salt River Pass, 15 mi S of Afton on Rt 89, 7630 ft, July 21, 1981, M. D. Schwartz, ex *Ceanothus velutinus* (Rhamnaceae), 1♂, 11♀ (AMNH).

Oligotylus pintoi, new species

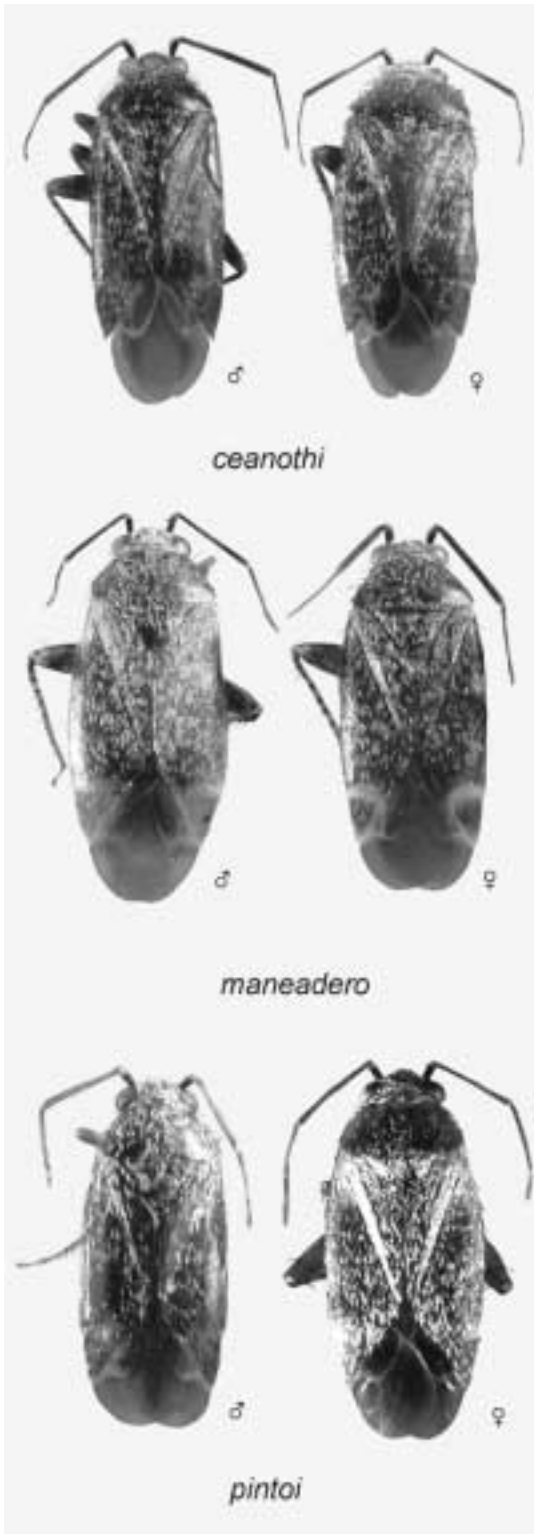
Figures 9, 10

HOLOTYPE: Male, [USA:] Cal., Riverside Co., Menifee Vly. (hills on W. end), 33°39' N 117°13' W, 1800 ft. el., IV-15-79, John D. Pinto, on *Ceanothus crassifolius*. Deposited in the American Museum of Natural History.

DIAGNOSIS: Recognized among black species with a long labium by antennal segment 2 being pale on proximal three-fourths in both sexes, its relatively small size, genitalic structure, occurrence in the coastal mountains of southern California, and habit of feeding on *Ceanothus crassifolius*.

DESCRIPTION: *Male:* Small species (fig. 9), total length 3.12–3.55, length apex clypeus–cuneal fracture 2.40–2.56, width across pronotum 1.08–1.22. **COLORATION:** Dull castaneous; antennal segment 1 dark, segment 2 pale on proximal three-fourths in both sexes, segments 3 and 4 dark; femora moderately to heavily infuscate, black spots distinct in some specimens; tibia with pale ground color, spines with contrasting black bases. **SURFACE AND VESTITURE:** Simple setae on dorsum dark, shining on abdominal venter; woolly setae silvery, distributed in patches on dorsum, occurring as a broad band along lateral margin of pregenital abdominal sterna. **STRUCTURE:** Labium long, reaching to between meso- and metatrochanters. **GENITALIA:** Anterior vesical strap very broad just distad of secondary gonopore, apices of both straps superposed, weakly acuminate, and rather strongly decurved (fig. 10); a portion of one vesical strap discontinuous at a point basad of secondary gonopore, right-angled, and truncate; main body of vesica superposed over basal portion in lateral view.

Female: Vestiture similar to male; coloration not so consistently dark as in male,



much of dorsum appearing brownish or reddish; body form more strongly ovate (fig. 9). Total length 3.43–3.52, length apex clypeus–cuneal fracture 2.43–2.62, width across pronotum 1.15–1.22.

ETYMOLOGY: Named for the collector of most available specimens, John D. Pinto.

HOST: *Ceanothus crassifolius* (Rhamnaceae).

DISTRIBUTION: Coastal mountains of southern California.

PARATYPES: USA: **California:** *Orange Co.:* Cleveland Natl. Forest, 1.5 mi E of San Juan Campground, 500 m, May 12, 1978, R. T. Schuh and J. D. Pinto, 2♂, 4♀ (AMNH). *Riverside Co.:* Menifee Valley, hills on W end, 1800 ft, April 10, 1979–May 22, 1979, J. D. Pinto, ex *Ceanothus crassifolius* (Rhamnaceae), 37♂, 36♀ (UCR); Menifee Valley, hills on W end, 1800 ft, April 10, 1979–April 15, 1979, J. D. Pinto, ex *Ceanothus crassifolius* (Rhamnaceae), 1♂, 1♀ (USNM); Tenaja Rd W of Murietta, 410 m, May 12, 1978, R. T. Schuh and J. D. Pinto, ex *Ceanothus crassifolius* (Rhamnaceae), 6♂, 4♀ (AMNH).

Oligotylus purshiae (Knight),
new combination

Figures 7, 10

Psallus purshiae Knight, 1968: 48 (n. sp.).

DIAGNOSIS: Recognized among black species with a long labium, by its relatively small size and genitalic structure. Possibly most easily confused with *nigerrimus* for its habit of commonly feeding on *Purshia* spp., but in most cases distinguished by its more southerly range in the Great Basin and Mojave Desert, the consistently orange rather than blackish femora, tibiae lacking the black

←

Fig. 9. Habitus photographs of *Oligotylus* spp. *O. ceanothi* (male: California: San Diego Co.: Cuyamaca Rancho State Park; female: Mexico: Baja Calif. Norte: 7 mi W of Parque San Pedro Martir). *O. maneadero* (male: California: Monterey Co.: 6.5 mi S of Big Sur; female: California: Humboldt Co.: Arcata). *O. pinto* (male and female: California: Riverside Co.: Menifee Valley, Hills on W end).

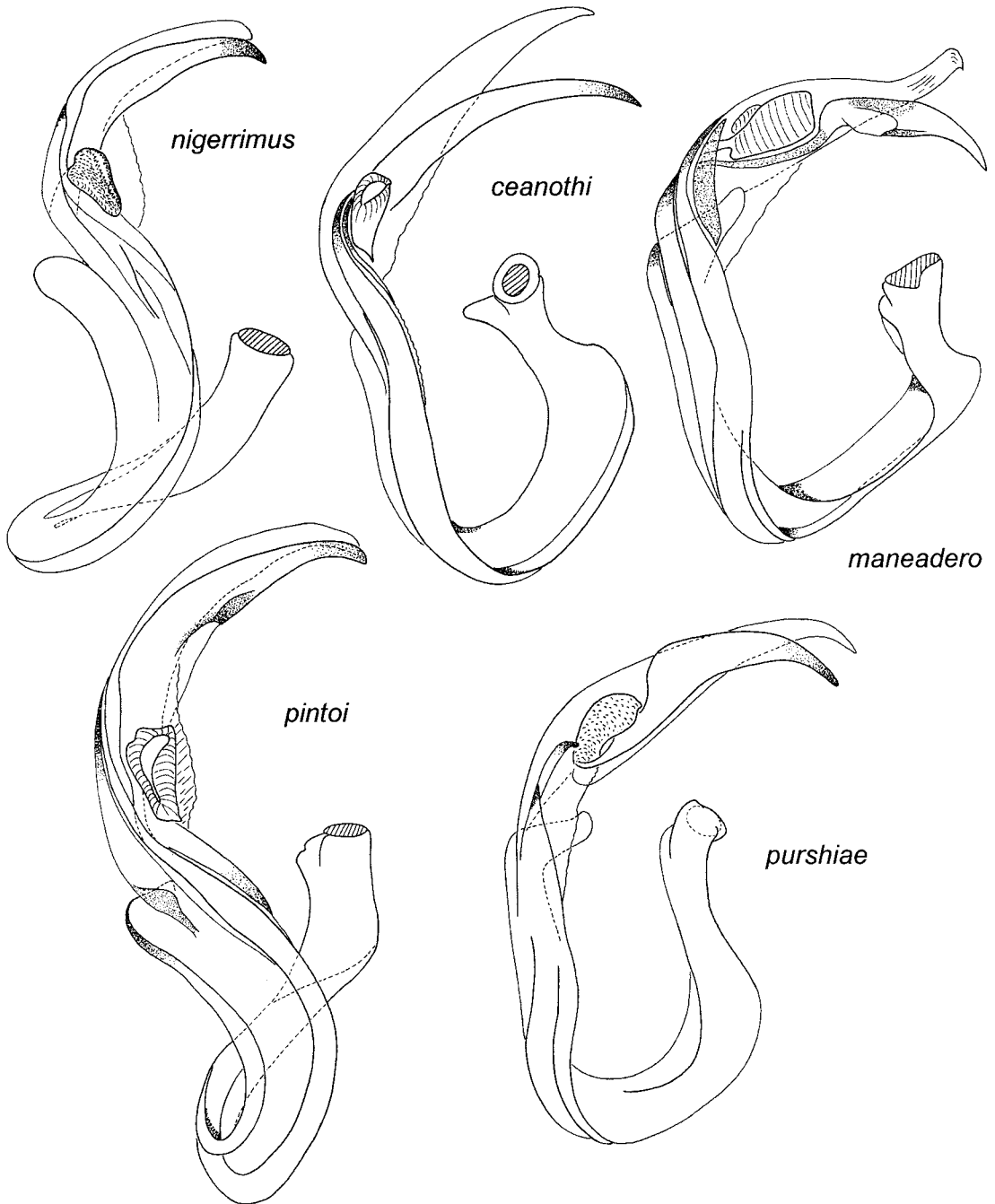


Fig. 10. Vesicae of males, *Oligotylus* spp.

stripe on opposing surfaces, genitalic structure, and by antennal segment 2 being largely pale in the female. Distinguished from *pintoii* by the dark coloration of antennal segment

2, genitalic structure, and the different host associations.

REDESCRIPTION: *Male*: Moderately small species (fig. 7), total length 3.19–3.64, length

apex clypeus–cuneal fracture 2.21–2.66, width across pronotum 1.08–1.29. **COLORATION:** Black, tending toward castaneous, moderately shining, lighter in some populations; antennae generally dark; femora reddish with some faint black spots; tibia with pale ground color, spines with small black bases. **SURFACE AND VESTITURE:** Simple setae on dorsum dark; woolly setae silvery, generally distributed and thickly set on dorsum, occurring as a lateral band on pregenital abdominal sterna. **STRUCTURE:** Labium long, reaching to between meso- and metatrochanters. **GENITALIA:** Anterior vesical strap broadened just distad of secondary gonopore, apices of both straps acuminate and decurved (fig. 10), not so nearly superposed as in *pinto*; a portion of one vesical strap discontinuous at a point basad of secondary gonopore, right-angled, and elongate-truncate; main body of vesica U-shaped in lateral view.

Female: Vestiture similar to male; antennal segment 2 reddish to pale on proximal three-fourths; body form more strongly ovate (fig. 7). Total length 3.30–3.59, length apex clypeus–cuneal fracture 2.36–2.68, width across pronotum 1.19–1.32.

HOSTS: *Cowania mexicana*, *C. stansburiana*; *Purshia glandulosa*, *P. tridentata* (Rosaceae).

DISTRIBUTION: Southern Great Basin and eastern Mojave Desert, from southwestern Colorado to southeastern California.

SPECIMENS EXAMINED: USA: **Arizona:** *Navajo Co.:* 20 mi SW of Show Low, 5200–6000 ft, May 30, 1983, Schuh, Stonedahl, and Massie, ex *Cowania mexicana* (Rosaceae), 3♂ (AMNH). *Yavapai Co.:* 5 mi N of Prescott on Rt 89, 1800 m, June 20, 1980, R. T. Schuh, ex *Cowania mexicana* (Rosaceae), 1♂, 1♀ (AMNH); 2 mi S of Rt 89, June 4, 1983, G.M. Stonedahl, ex *Cowania mexicana* (Rosaceae), 3♂, 2♀ (AMNH). **California:** *Inyo Co.:* 2 mi W of Westgard Pass, 7000 ft, June 10, 1976, J. D. Pinto, ex *Purshia glandulosa* (Rosaceae), 9♂, 7♀ (UCR). *Mono Co.:* 7.5 mi W of Bridgeport, July 6, 1966, C. W. O'Brien, 6♀ (UCB); Rte 395 at Mono Craters, 2188 m, July 3, 1980, R. T. Schuh, ex *Purshia tridentata* (Rosaceae), 3♂, 13♀ (AMNH). *Nevada Co.:* Donner Pass, August 3, 1962, A.G. Raske, 2♂

(UCB). *San Bernardino Co.:* New York Mts, Live Oak Canyon, 5500 ft, May 25, 1977, J. D. Pinto, ex *Purshia* sp. (Rosaceae), 12♂, 8♀ (UCR). *San Diego Co.:* 1 mi N of Cameron Forest Station on Kitchen Creek Rd, 1125 m, April 29, 1985, R. T. Schuh and B. M. Massie, 1♂ (AMNH). *Tulare Co.:* 2.5 mi W of county line near Chimney Peak Ranger Station, 2000 m, July 1, 1980, R. T. Schuh, ex *Purshia glandulosa* (Rosaceae), 3♂, 1♀ (AMNH). **Colorado:** *Montezuma Co.:* Hovenweep Natl. Mon., Holly Canyon, May 28, 1983, D. A. and J. T. Polhemus, ex *Cowania stansburiana* (Rosaceae), 7♂, 5♀ (JTP). **Nevada:** *Lyon Co.:* 3 mi S of Toiyabe Natl. Forest Boundary on Rte 338, 6300 ft, July 2, 1983, Schuh and Schwartz, ex *Purshia tridentata* (Rosaceae), 1♀ (AMNH). *Mineral Co.:* 27 mi SW of Hawthorne on Rt 359. 1 mi NE of Anchorite Summit, 7400 ft, July 2, 1983, R. T. Schuh and M. D. Schwartz, ex *Purshia glandulosa* (Rosaceae), 30♂, 50♀ (AMNH). *Nye Co.:* Atomic Test Site, 1.5 mi W Area 12 camp on Stockade Wash Rd, June 7, 1983, Schuh, Schwartz, and Stonedahl, ex *Cowania mexicana* (Rosaceae), 1♂ (AMNH); Atomic Test Site, 2 mi W Tippapah Hwy on Mine Mt Rd, 4400 ft, June 7, 1983, Schuh, Stonedahl, and Schwartz, ex *Purshia tridentata* (Rosaceae), 30♀ (AMNH); Atomic Test Site, 2 mi W Tippapah Hwy on Mine Mt Rd, 4400 ft, June 7, 1983, Schuh, Stonedahl, and Schwartz, ex *Cowania mexicana* (Rosaceae), 108♂, 115♀ (AMNH); Berlin Ichthyosaur State Mon. on Rte 844, 6350 ft, July 1, 1983, R. T. Schuh and M. D. Schwartz, ex *Cowania mexicana* (Rosaceae), 5♂, 5♀ (AMNH). **Utah:** *Grand Co.:* 11 mi SE of jct. Rtes 313 and 163 toward Dead Horse Point, 5200 ft, June 11, 1982, M. D. Schwartz, ex *Cowania mexicana* (Rosaceae), 3♂, 5♀ (AMNH).

GROUP 3: RED-ORANGE SPECIES,
LABIUM REACHING TO ABOUT
METATROCHANTERS, ALWAYS
BREEDING ON *CERCOCARPUS*

Oligotylus carneatus (Knight),
new combination
Figures 11–13

Psallus carneatus Knight, 1930: 128 (n. sp.)

DIAGNOSIS: Red-orange, similar in color-

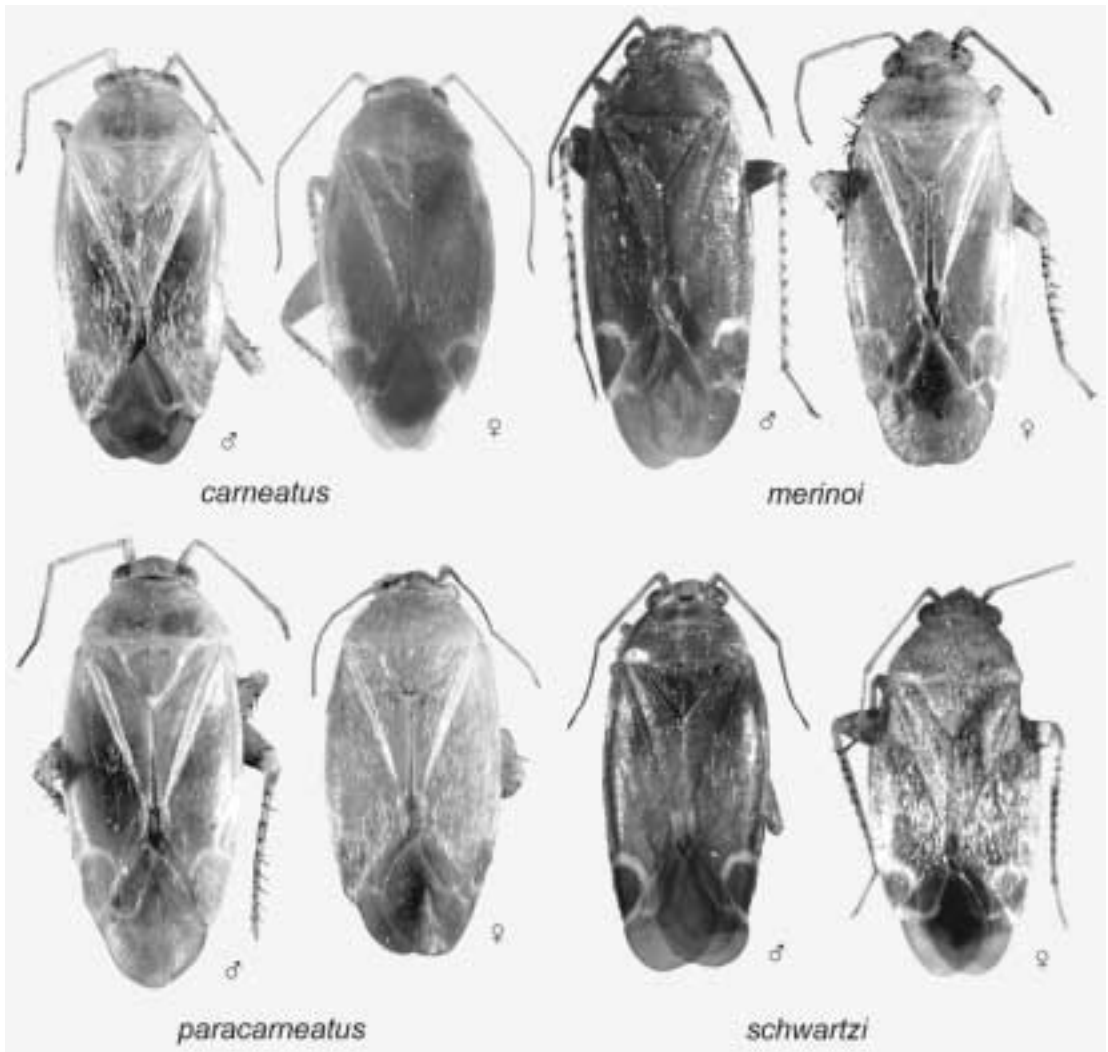


Fig. 11. Habitus photographs of *Oligotylus* spp. *O. carneatus* (male: California: San Diego Co.: Cibbets Flat Campground on Kimball Creek Rd; female: California: Modoc Co.: Fandango Pass Summit). *O. merinoi* (male: Nevada: White Pine Co.: Wheeler Peak Rd, Humboldt Natl. Forest; female: Utah: Grand Co.: road to Dead Horse Point). *O. paracarneatus* (male: Arizona: Gila Co.: Tonto Natl. Forest, 8 mi SW jct. Rts 87 and 188; female: Mexico: Chihuahua: 84 mi NW of Nuevas Casas Grandes on Aqua Prieta Rd). *O. schwartzi* (male and female: Colorado: Mesa Co.: Colorado Natl. Mon., Liberty Cap Trailhead).

tion to *O. merinoi*, *O. paracarneatus*, and *O. schwartzi*. Recognized by its relatively large size, western distribution, and the structure of the vesica in the male.

REDESCRIPTION: *Male:* Moderately large, ovate species (fig. 11), total length 3.65–4.19, length apex clypeus–cuneal fracture 2.59–3.01, width across pronotum 1.26–

1.49. **COLORATION:** Generally red-orange to red, head and pronotum often pale orange; antennae generally pale; legs pale orange with some dark spots on the femora, tibial spines with large dark bases. **SURFACE AND VESTITURE:** Simple setae pale; woolly setae on dorsum very weakly flattened (fig. 12D), golden, sparsely placed;

pregenital abdominal sterna with only pale simple setae. STRUCTURE: Labium long, reaching to about metatrochanters. GENITALIA: Vesical blades relatively short and conspicuously broad, anterior blade with a strong hump distad of secondary gonopore, posterior blade broad over much of length and apex strongly decurved; a portion of one vesical strap discontinuous at a point basad of secondary gonopore; basal portion of vesica partially superposed over main body in lateral view (fig. 13).

Female: Coloration and vestiture similar to male, although almost always faded orange rather than reddish; body form usually only slightly more strongly ovate than in male (fig. 11). Total length 3.71–4.09, length apex clypeus–cuneal fracture 2.64–3.02, width across pronotum 1.26–1.48.

HOSTS: *Cercocarpus alnifolius*, *C. betuloides*, and *C. ledifolius* (Rosaceae). Also listed from *Rhamnus* sp. (Rhamnaceae).

DISTRIBUTION: Southern Oregon to Southern California, including western margins of Great Basin.

SPECIMENS EXAMINED: USA: **California**: *Alpine Co.*: 11 mi SE of Markleesville on Wolf Creek Rd, July 4, 1969, P. H. Arnaud, Jr., 1 ♀ (CAS). *Contra Costa Co.*: Mt. Diablo, July 14, 1915, E. P. Van Duzee, 1 ♀ (CAS). *Fresno Co.*: Fresno, June 20, 1926, C. J. Drake – Paratypes: 1 ♀ (USNM). *Inyo Co.*: Independence, May 31, 1919, L. L. Muchmore, 1 ♀ (LACM). *Los Angeles Co.*: Los Angeles, Coquillett, 1 ♂, 4 ♀ (USNM) – Paratypes: 1 ♀ (USNM). Palmdale, April 30, 1949, E. I. Schlinger, 1 ♂ (UCD). Pasadena, 1 ♂, 1 ♀ (USNM, CAS); Stone Canyon, Santa Monica Mts, May 9, 1933, F. Glass, 1 ♂ (LACM); Tanbark Flat, June 24, 1952, J.P. Powers, R. Tingelof, 3 ♀ (LACM). *Mendocino Co.*: Eel River Ranger Station, June 12, 1972, J. Doyen, ex *Cercocarpus betuloides* (Rosaceae), 1 ♂, 2 ♀ (UCB). *Modoc Co.*: Fandango Pass Summit, Warner Mts, 1890 m, July 3, 1979, R. T. Schuh and B. M. Massie, ex *Cercocarpus ledifolius* (Rosaceae), 9 ♂, 31 ♀ (AMNH). *Napa Co.*: Soda Creek, May 3, 1931, H. H. Keifer, ex Rosaceae, 6 ♀ (CAFA). *Riverside Co.*: Deep Canyon, June 20, 1963, E. I. Schlinger, 1 ♀ (UCR); Hemet Reservoir, San Jacinto Mts, May 22, 1940, R. L. Usinger, 1 ♂, 2 ♀ (UCB); Herkey Creek,

San Jacinto Mts, June 10, 1940, C. G. Lewis, ex *Cercocarpus* sp. (Rosaceae), 2 ♂, 1 ♀ (UCB); 2 mi W of Mountain Center, May 19, 1983, J. D. Pinto, ex *Cercocarpus* sp. (Rosaceae), 3 ♀ (UCR); Palm Canyon, 5 mi S of Palm Springs, June 8, 1978, J. D. Pinto, 1 ♀ (UCR); Ribbonwood, San Jacinto Mts, May 21, 1940, R. L. Usinger, 2 ♀ (UCB). *San Bernardino Co.*: Cajon, May 15, 1979, C. W. Melton, 1 ♂ (UCR); Cajon Pass, jct. Rtes I-15 and 138, 1030 m, May 2, 1985, R. T. Schuh and B. M. Massie, ex *Cercocarpus betuloides* (Rosaceae), 2 ♂ (AMNH); Cajon Pass, Verdmont, April 20, 1933–April 27, 1933, E. P. Van Duzee, 13 ♂, 28 ♀ (CAS); Camp Baldy, June 15, 1917, L. J. Muchmore, ex *Rhamnus* sp. (Rhamnaceae), 5 ♀ (LACM); Lone Pine Canyon, May 15, 1979, H. L. Murray, 1 ♂ (UCR). *San Diego Co.*: April 12, 1914–July 28, 1929, E. P. Van Duzee, P. W. Oman, 5 ♀ (CAS, KU); Cibbets Flat Campground on Kimball Creek Rd, 1280 m, April 29, 1985, R. T. Schuh, ex *Cercocarpus betuloides* (Rosaceae), 33 ♂, 24 ♀ (AMNH); Cuyumaca Lake, July 6, 1929, R. H. Beamer, 1 ♀ (KU); Laguna Mts, July 6, 1929, R. H. Beamer, 1 ♀ (KU); Mt. Laguna, June 21, 1963, C. H. Frady, 1 ♂ (OSU). *San Luis Obispo Co.*: Morro Rd near Atascadero, May 15, 1962, B. P. Bliven, 3 ♂, 6 ♀ (CAS); 12 mi NE of Pozo, La Panza Camp, April 29, 1962, C. A. Toschi, 1 ♂ (UCB). *Santa Barbara Co.*: Upper Oso Campground off Rte 154, 310 m, May 7, 1985, R. T. Schuh and B. M. Massie, ex *Cercocarpus betuloides* (Rosaceae), 2 ♂, 2 ♀ (AMNH). *Shasta Co.*: Brown Butte, July 7, 1947, T. F. Leigh, 2 ♀ (UCB); 1 mi W of Fall River Mills, 1030 m, July 7, 1979, R. T. and Joe Schuh, ex *Cercocarpus betuloides* (Rosaceae), 1 ♀ (AMNH); Hat Creek, June 20, 1955, D. L. Dahlsten, ex *Cercocarpus* sp. (Rosaceae), 3 ♀ (UCD); Hat Creek, June 20, 1955, D. L. Dahlsten, ex *Cercocarpus* sp. (Rosaceae), 2 ♀ (USNM); 7.6 mi N of Manton, 1138 m, July 19, 1980, R. T. Schuh and G. M. Stonedahl, ex *Cercocarpus alnifolius* (Rosaceae), 1 ♂, 2 ♀ (AMNH). *Siskiyou Co.*: Bray, June 30, 1935, R. H. Beamer, 1 ♀ (KU); Lava Beds Natl. Mon. near headquarters, 1560 m, June 26, 1979, R. T. and Joe Schuh, ex *Cercocarpus ledifolius* (Rosaceae), 3 ♂, 38 ♀ (AMNH); 2 mi SW of Lava Beds Natl. Mon.,

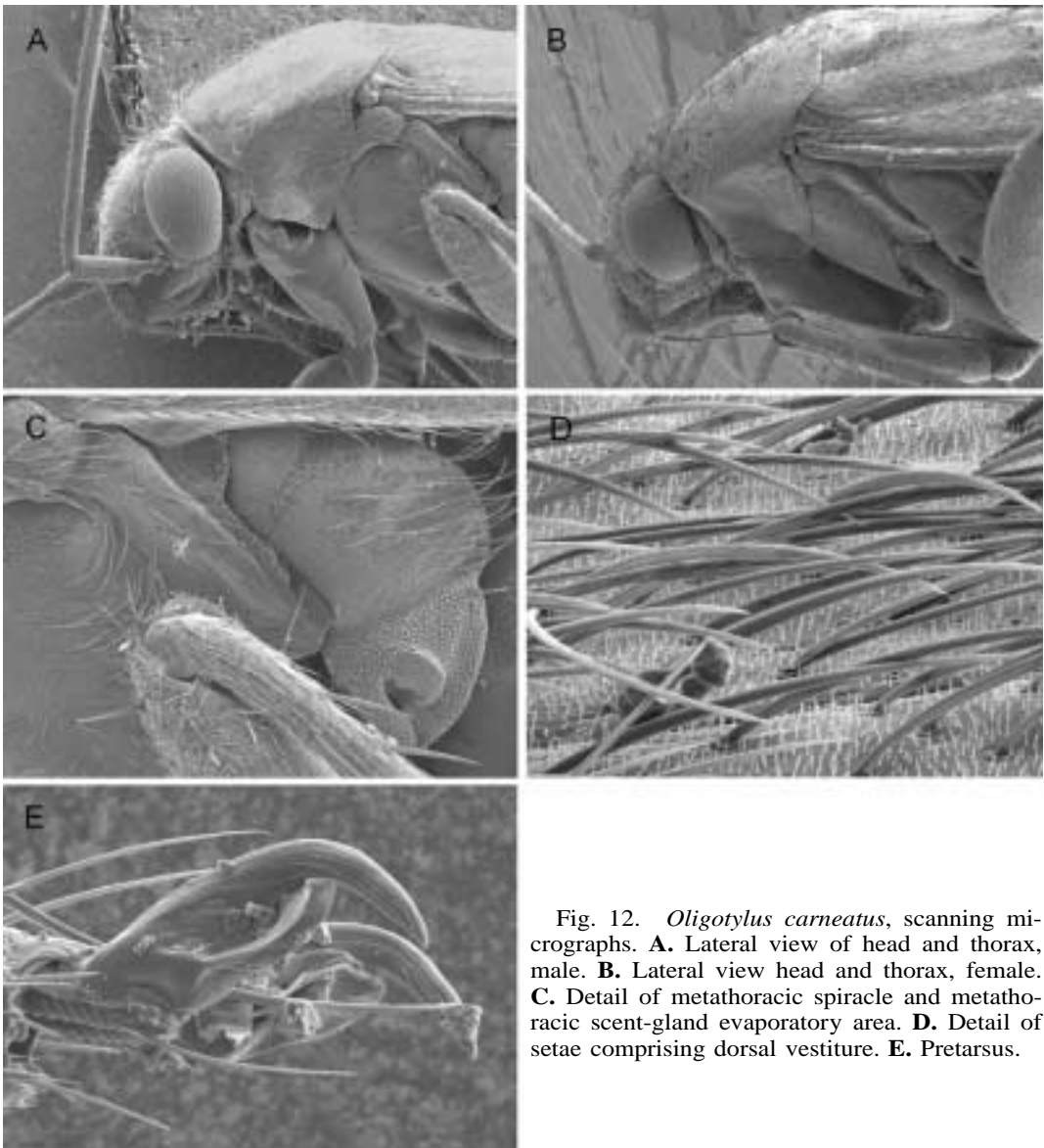


Fig. 12. *Oligotylus carneatus*, scanning micrographs. **A.** Lateral view of head and thorax, male. **B.** Lateral view head and thorax, female. **C.** Detail of metathoracic spiracle and metathoracic scent-gland evaporatory area. **D.** Detail of setae comprising dorsal vestiture. **E.** Pretarsus.

Medicine Lake Rd, 4800–5000 ft, June 26, 1979, Stonedahl, Schwartz, Lattin, ex *Cercocarpus ledifolius* (Rosaceae), 6♂, 46♀ (AMNH, OSU); Mt. Eddy, July 28, 1918, E. P. Van Duzee, 1♀ (CAS). **Oregon:** Jackson Co.: 0.5 mi S of Siskiyou Summit on Old Rte 99, 1350 m, June 26, 1979, R. T. and Joe Schuh, 1♀ (AMNH). Klamath Co.: Bly Mt., June 25, 1961, Joe Schuh, ex *Cercocarpus ledifolius* (Rosaceae), 1♂ (OSU); Klamath Falls, above Geary Ranch, June 16, 1966,

Joe Schuh, ex *Cercocarpus betuloides* (Rosaceae), 3♀ (OSU); 28 mi SE of LaPine on Rt 31, 1535 m, June 25, 1979, Schuh, Stonedahl, Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 40♂, 57♀ (AMNH).

Oligotylus merinoi (Knight),
new combination

Figures 11, 14

Psallus merinoi Knight, 1968: 47 (n. sp.)

DIAGNOSIS: Red-orange, similar in color-

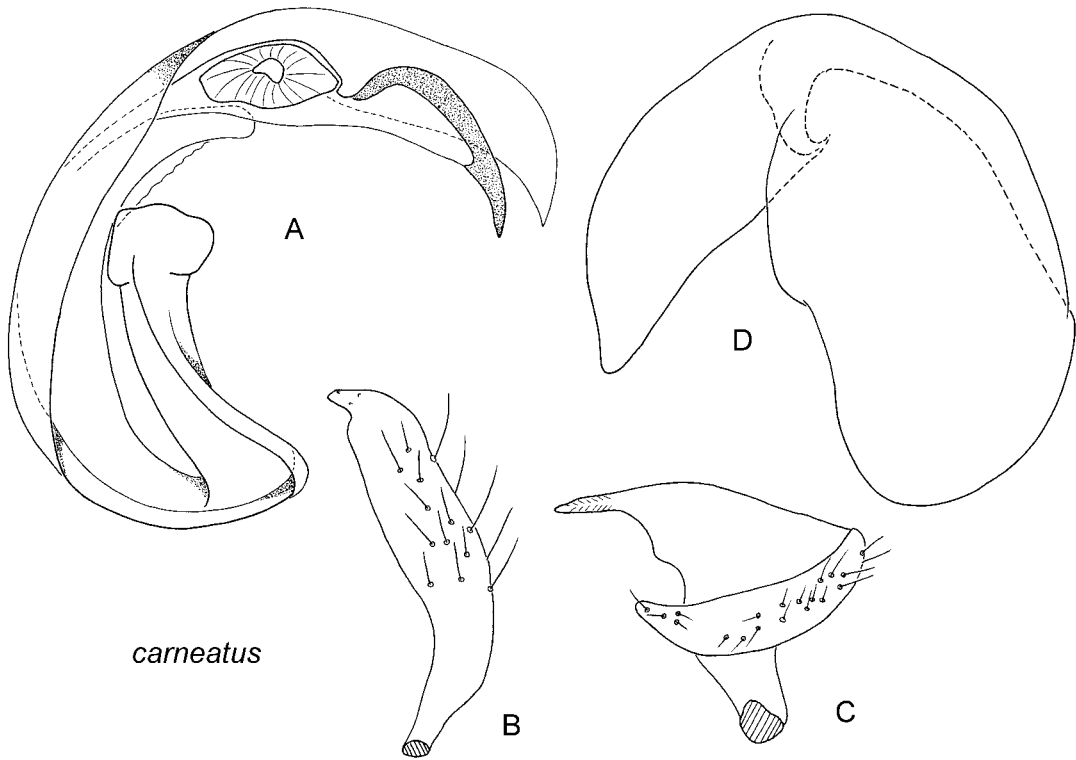


Fig. 13. Male genitalic structures, *Oligotylus carneatus*. **A.** Vesica. **B.** Right paramere. **C.** Left paramere. **D.** Phallosheca.

tion to *carneatus*, *paracarneatus*, and *schwartzi*. Most similar in size to *paracarneatus* and *schwartzi*, smaller than *carneatus*. Most easily distinguished from *paracarneatus* and *schwartzi* by the dark coloration of antennal segments 1 and 2 and the structure of the vesica in the male.

REDESCRIPTION: Male: Medium-sized species (fig. 11), total length 3.62–4.07, length apex clypeus–cuneal fracture 2.63–2.81, width across pronotum 1.27–1.33. **COLORATION:** Generally red-orange to red, often with some infuscation on at least endocorium and clavus, head and pronotum usually somewhat lighter than remainder of dorsum; antennal segment 1 heavily infuscate, segment 2 infuscate proximally and distally; legs pale with numerous dark spots on femora, tibial spines with large dark bases; abdominal venter dark. **SURFACE AND VESTITURE:** Simple setae dark on dorsum; woolly setae on dorsum weakly flattened, golden, sparsely placed and occurring only

on dorsum; pregenital abdominal sterna with only pale simple setae. **STRUCTURE:** Labium long, reaching to about metatrochanters. **GENITALIA:** Vesical blades long, slender, superposed over entire length, anterior blade appearing somewhat contorted and distinctly shorter than posterior blade; vesical straps appearing continuous; basal portion of vesica superposed over main body (fig. 14).

Female: Coloration similar to male but pale orange to orange; vestiture as in male; antennal segment 1 much less strongly infuscate; abdominal venter always pale; body somewhat more strongly ovoid than in male (fig. 11). Total length 3.86–4.06, length apex clypeus–cuneal fracture 2.69–2.81, width across pronotum 1.30–1.41.

HOST: *Cercocarpus ledifolius* (Rosaceae).

DISTRIBUTION: Higher elevations in and around the Great Basin.

DISCUSSION: Knight (1968) described *Psallus merinoi* on the basis of a single female specimen, with no host data, from Charleston

Canyon near Indian Springs, Clark County, Nevada. This locality is not far from the Nevada Test Site where Knight did most of his fieldwork on the Miridae in the western United States. Knight compared *merinoi* to *Psalis carneatus*, which suggests that the two were, in his opinion, indeed closely related. I apply the name *merinoi* with some reservations, using general appearance and distribution as a guide. This approach is less than optimal, but there is no stronger evidence arguing for synonymy with *carneatus*, or for *merinoi* being a member of another genus with similar coloration.

SPECIMENS EXAMINED: USA: **California:**

Alpine Co.: 4 mi SE of Markleeville, June 10, 1966, W. Gagne, 3♂, 1♀ (UCB). *Mono Co.:* 2 mi N of Tom's Place, June 9, 1966, W. Gagne, ex *Cercocarpus ledifolius* (Rosaceae), 1♂, 3♀ (UCB). **Nevada:** *Elko Co.:* Ruby Mts, Lomoille Canyon, just E of Powerhouse Picnic Area, 6200 ft, June 16, 1983, R. T. Schuh and M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 2♂, 4♀ (AMNH). *White Pine Co.:* Humboldt Natl. Forest, Lebanon Creek Campground, 7620 ft, July 14, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 1♀ (AMNH); 8.3 mi N of Hwy 50 on Steptoe Creek Rd, 7580 ft, July 19, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 10♂, 6♀ (AMNH); Wheeler Peak Drive, Humboldt Natl. Forest, 7000–10,000 ft, August 6, 1982, M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 2♂, 7♀ (AMNH); Wheeler Peak Rd W of Baker, Humboldt Natl. Forest, 2609 m, July 14, 1980, R. T. Schuh, ex *Cercocarpus ledifolius* (Rosaceae), 48♂, 42♀ (AMNH, USNM); Wheeler Peak Rd, Humboldt Natl. Forest, 9000 ft, July 14, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 8♂, 9♀ (AMNH). **Oregon:** *Lake Co.:* Silver Lake, 4955 ft, July 13, 1978, P. Oman, 1♂ (OSU). **Utah:** *Carbon Co.:* 8 mi NW of Helper, Price Canyon Rec. Area, 8000 ft, July 9, 1982, M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 9♂, 13♀ (AMNH). *Grand Co.:* 11 mi S of jct. Rd 313 and Rd 163 toward Dead Horse Point, 5200 ft, June 11, 1982, M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 3♂, 2♀ (AMNH). *Sevier Co.:* Clear Creek Narrows Summit on Rte 4, 2244 m,

July 16, 1980, R. T. Schuh and G. M. Stonedahl, 1♀ (AMNH); Dog Spring Rd at Rt 25, 2719 m, July 16, 1980, R. T. Schuh and G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 9♂, 5♀ (AMNH); 18 mi N of Hwy 24 on Hwy 72, 8820 ft, July 17, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 10♂, 8♀ (AMNH); 2.3 mi N of I-70 on road to Kanosh, 6980 ft, July 16, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 2♂, 7♀ (AMNH); jct. Mytoge Mtn Rd and Hwy 25, 8850 ft, July 16, 1980, G.M. Stonedahl, ex *Cercocarpus ledifolius* (Rosaceae), 3♂, 4♀ (AMNH).

Oligotylus paracarneatus, new species

Figures 11, 14

HOLOTYPE: Male, [USA:] Arizona: Cochise Co.: Rd from Portal-Rustler Park, Chiricahua Mts, 6500 ft., June 2, 1983, colls. R. T. Schuh, G. M. Stonedahl, *Cercocarpus breviflorus* A. Gray (Rosaceae). Deposited in the American Museum of Natural History.

DIAGNOSIS: Red-orange, similar in coloration to *carneatus*, *merinoi*, and *schwartzi*. Most similar in size to *merinoi* and *schwartzi*, smaller than *carneatus*. Most easily distinguished from *merinoi* by its pale first and second antennal segments, and from *schwartzi* by the structure of the vesica in the male.

DESCRIPTION: *Male:* Moderately small species (fig. 11), total length 3.18–3.79, length apex clypeus–cuneal fracture 2.26–2.66, width across pronotum 1.11–1.33. COLORATION: Generally red-orange to red; antennae generally pale; legs pale orange with some dark spots on femora, tibial spines with small dark bases; abdominal venter ranging from pale to moderately darkened. SURFACE AND VESTITURE: Simple setae darkened on dorsum; woolly setae on dorsum weakly flattened, golden, sparsely placed; pregenital abdominal sterna with only pale simple setae. STRUCTURE: Labium long, reaching to about metatrochanters. GENITALIA: Anterior vesical blade relatively slender, acuminate, and decurved apically, posterior blade nearly straight, broad and minutely serrate apically; straps of vesica apparently continuous; body of vesica J-shaped in lateral view (fig. 14).

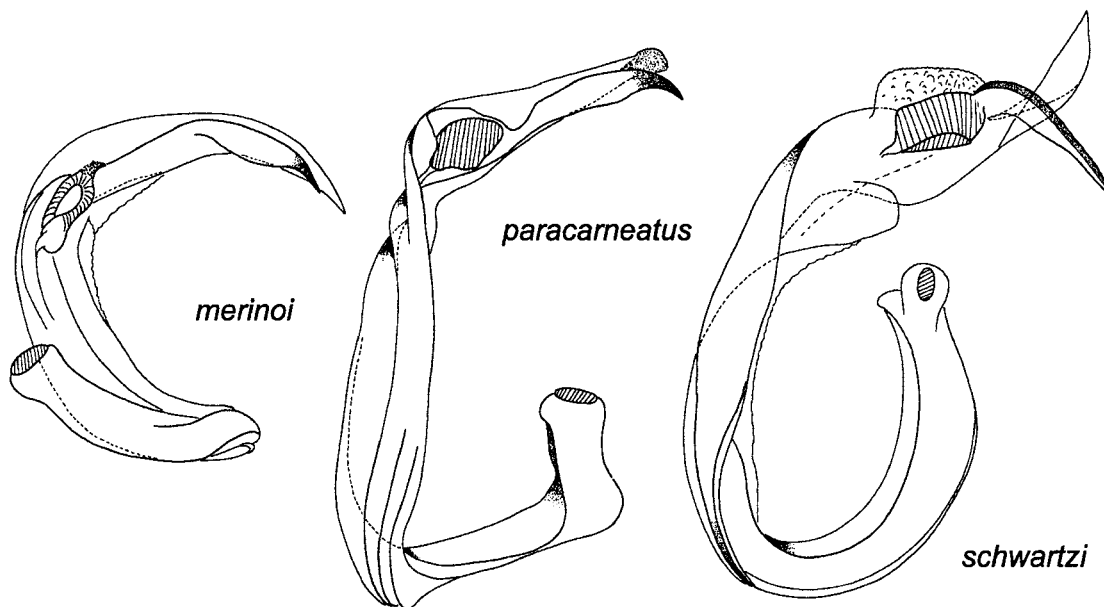


Fig. 14. Vesicae of males, *Oligotylus* spp.

Female: Coloration similar to male but pale orange to orange; vestiture as in male; abdominal venter always pale; body form more strongly ovate than in male (fig. 11). Total length 3.32–3.88, length apex clypeus–cuneal fracture 2.42–2.82, width across pronotum 1.11–1.36.

ETYMOLOGY: Named for its similarity to *Oligotylus carneatus* (Knight).

HOSTS: *Cercocarpus betuloides*, *C. breviflorus*, *C. intricatus*, *C. ledifolius*, *C. montanus*, and other *C.* spp. (Rosaceae).

DISTRIBUTION: Southern Utah, Arizona, northern Mexico.

PARATYPES: MEXICO: **Chihuahua**: 84 mi NW of Nuevo Casas Grandes on Agua Prieta Rd, 4500 ft, April 24, 1982, M. D. Schwartz, ex *Cercocarpus breviflorus* (Rosaceae), 7♂, 7♀ (AMNH). USA: **Arizona**: *Yavapai Co.*: Ash Fork, May 23, 1927, J.O. Martin, 7♂, 4♀ (CAS). *Cochise Co.*: Chiricahua Mts, road from Portal to Rustler Park, 6500 ft, June 2, 1983, R. T. Schuh and G.M. Stonedahl, ex *Cercocarpus breviflorus* (Rosaceae), 21♂, 20♀ (AMNH). *Gila Co.*: 10.5 mi N of Globe, May 10, 1980, J. D. Pinto, ex *Ceanothus* sp. (Rhamnaceae), 3♀ (UCR); 8 mi SW of jct. Rtes 87 and 188, Tonto Natl. Forest, 4000 ft, May 27, 1983, R. T. Schuh and

G. M. Stonedahl, ex *Cercocarpus montanus* (Rosaceae), 10♂, 12♀ (AMNH). *Graham Co.*: Pinaleno Mts, Stockton Pass, 5200–5500 ft, June 1, 1982, R. T. Schuh and G.M. Stonedahl, ex *Cercocarpus breviflorus* (Rosaceae), 6♂, 5♀ (AMNH). *Maricopa Co.*: Four Peaks Rd, mile 11, May 24, 1982, J. T. Polhemus, 3♂, 1♀ (JTP); Reavis Ranch Trail, 3600 ft, April 19, 1982, D. A. and J. T. Polhemus, ex *Cercocarpus betuloides* (Rosaceae), 10♂, 24♀ (JTP). *Navajo Co.*: 20 mi SW of Show Low, 5200–6000 ft, May 30, 1983, Schuh, Stonedahl, Massie, 1♂ (AMNH). *Yavapai Co.*: Mud Tanks Mesa, George Crook Rd, 6500 ft, June 14, 1983, R. T. Schuh and M. D. Schwartz, ex *Cercocarpus montanus* (Rosaceae), 7♀ (AMNH); 4 mi S of Prescott Natl. Forest Boundary S of Prescott, 1600 m, June 20, 1980, R. T. Schuh, ex *Cercocarpus* sp. (Rosaceae), 5♂, 14♀ (AMNH); 5 mi N of Wilhoit N of Kirkland, 1400 m, June 19, 1980, R. T. Schuh, ex *Cercocarpus montanus* (Rosaceae), 1♂, 1♀ (AMNH); 1 mi E of Yarnell, April 29, 1981, D. A. and J. T. Polhemus, 11♂, 2♀ (JTP); 1 mi S of Yarnell on Rt 89, June 3, 1983, G.M. Stonedahl, ex *Cercocarpus montanus* (Rosaceae), 3♂, 3♀ (AMNH). **Utah**: *Garfield Co.*: Capitol Reef Natl. Park, Grand Wash,

5350–6640 ft, June 21, 1983, R. T. Schuh and M. D. Schwartz, ex *Cercocarpus ledifolius* (Rosaceae), 7♂ (AMNH). *San Juan Co.*: Beef Basin, 6000 ft, May 26, 1979, J. T. and D. A. Polhemus, 3♂, 8♀ (JTP); Natural Bridges Natl. Mon., 6300 ft, June 12, 1982, M. D. Schwartz, ex *Cercocarpus intricatus* (Rosaceae), 1♀ (AMNH).

Oligotylus schwartzi, new species

Figures 11, 14

HOLOTYPE: Male, USA: Colorado: Mesa Co.: Colorado Nat'l. Mon., Liberty Cap Trailhead, el. 6000 ft, June 10, 1982, coll. M. D. Schwartz, ex *Cercocarpus montanus* [Rosaceae]. Deposited in the American Museum of Natural History.

DIAGNOSIS: Red-orange, very similar in coloration to *carneatus*, *merinoi*, and *paracarneatus*. Most similar in size to *merinoi*, and *paracarneatus*, smaller than *carneatus*. Most easily distinguished from *paracarneatus* by the structure of the vesica in the male, and from *merinoi* by the fact that the antennae are much darker in the latter species.

DESCRIPTION: *Male*: Medium-sized species (fig. 11), total length 3.65–4.13, length apex clypeus–cuneal fracture 2.61–2.99, width across pronotum 1.34–1.40. COLORATION: Generally red-orange to red, the endocorium and clavus often darker than the remainder of the dorsum; antennae orange; legs orange with some dark spots on femora, tibial spines with enlarged dark bases; most of abdominal venter strongly infuscate. SURFACE AND VESTITURE: Simple setae darkened on dorsum; woolly setae on dorsum weakly flattened, golden, sparsely placed; pregenital abdominal sterna with only pale simple setae. STRUCTURE: Labium long, reaching to about metatrochanters. GENITALIA: Anterior vesical blade relatively short, narrow, posterior blade also relatively short, blades not superposed in dissections of available specimens; body of vesica J-shaped (fig. 14).

Female: Coloration similar to male, but pale orange to orange; vestiture as in male; dorsum more uniformly pale orange than in males, antennae entirely pale, legs pale, tibial spines with small dark bases, abdominal venter always pale; body form slightly more strongly ovate than in male (fig. 11). Total

length 3.88–4.17, length apex clypeus–cuneal fracture 2.79–2.99, width across pronotum 1.36–1.41.

ETYMOLOGY: Named for the collector of known specimens, Michael D. Schwartz.

HOST: *Cercocarpus montanus* (Rosaceae).

DISTRIBUTION: Northwestern Colorado and eastern Utah.

PARATYPES: USA: **Colorado**: *Mesa Co.*: Colorado Natl. Mon., Liberty Cap Trailhead, 6000 ft, June 10, 1982, M. D. Schwartz, ex *Cercocarpus montanus* (Rosaceae), 2♂, 17♀ (AMNH). **Utah**: *Sanpete Co.*: 4.7 mi NE of Fairview on Rt 31, Cottonwood Creek, 7000 ft, July 12, 1981, M. D. Schwartz, ex *Cercocarpus montanus* (Rosaceae), 2♂, 1♀ (AMNH).

Lepidargyrus ancorifer (Fieber)

Figures 15, 16

Apocremnus ancorifer Fieber, 1858: 336 (n. sp.).

Psallus ancorifer, Wheeler and Henry, 1992: 183 (distr., hosts). *Lepidargyrus ancorifer*: Drapolyuk, 1993: 113 (n. comb.).

DIAGNOSIS: Large, castaneous to nearly black species, cuneus sometimes weakly ochraceous; antennae dark, tibiae usually dark, dark bases of tibial spines obscure; body uniformly and rather densely covered with dark, reclining, simple setae and flattened, appressed, scalelike, silvery setae (figs. 15C, D, E). Easily confused with some large, dark *Plagiognathus* species on the basis of coloration and body form and with *Oligotylus* species on the basis of vestiture. Separated from *Plagiognathus* by the dense placement of more scalelike setae than those usually found in that genus and the form of the male genitalia. Separated from *Oligotylus* by the more tapered genital capsule (fig. 15C) and the form of the vesica.

DISCUSSION: Wheeler and Henry (1992) discussed this species as *Psallus ancorifer*. The presence of *ancorifer* in the eastern United States was well documented by them. Wheeler and Henry noted, however, that despite intensive collecting in the 1970s and 1980s they saw only one recent collection from the East, that being from Byron, Georgia.

As the locality data recorded in the present paper make clear, *ancorifer* has been com-

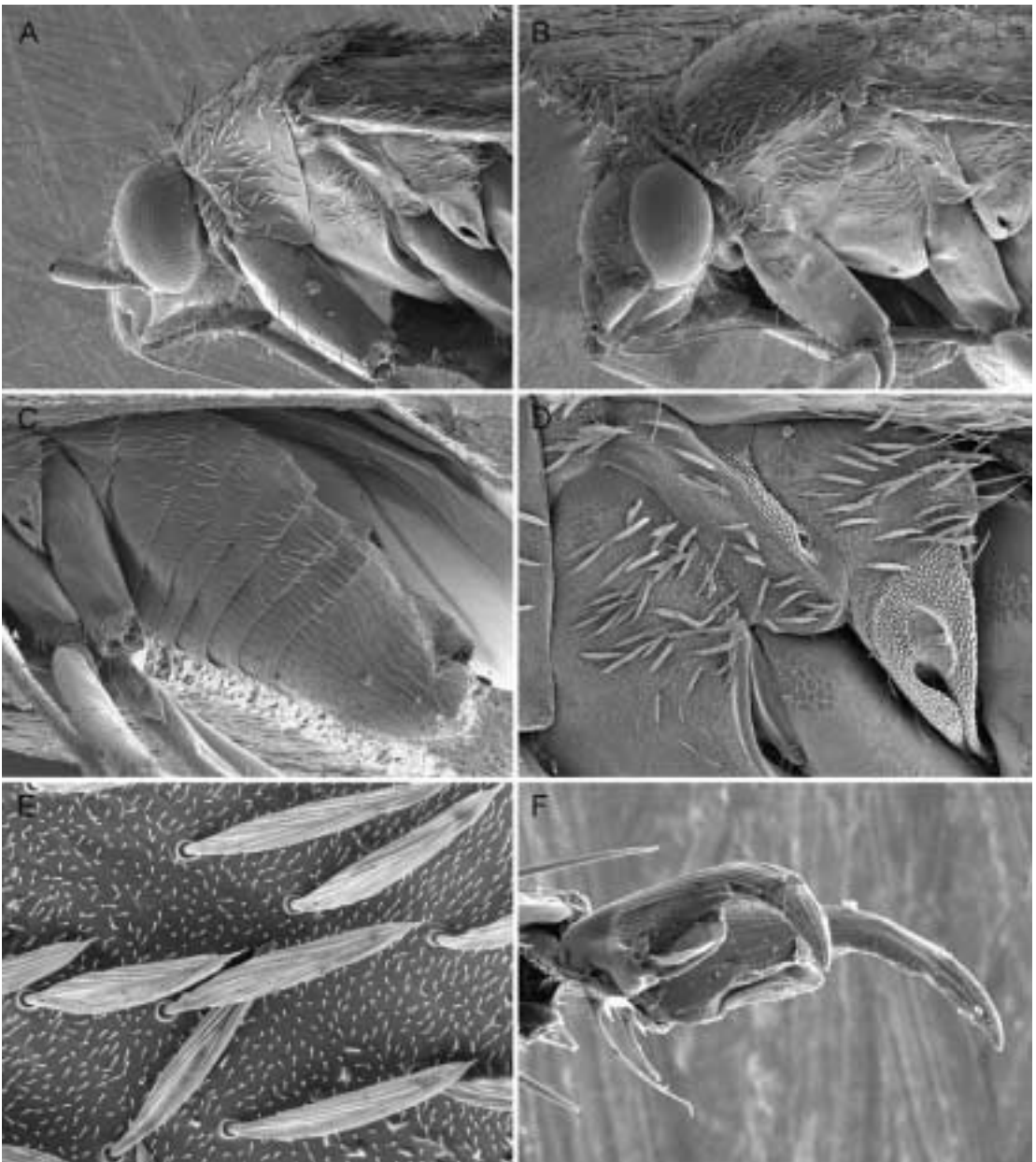


Fig. 15. Scanning micrographs of *Lepidargyrus ancorifer*. **A.** Lateral view of head and thorax, male. **B.** Lateral view of head and thorax, female. **C.** Lateral view of abdomen, male. **D.** Detail of metathoracic spiracle and metathoracic scent-gland evaporatory area. **E.** Detail of setae comprising dorsal vestiture. **F.** Pretarsus.

monly collected in the last four decades from British Columbia south through most of California; it is also more widely distributed in western North America, having been collected in Wyoming and Utah. The specimens I

have examined confirm, in general, the observations of Wheeler and Henry concerning the apparent disappearance of *ancorifer* from the Northeast, with the exception of the 1965 record from Ontario. There seems little ques-

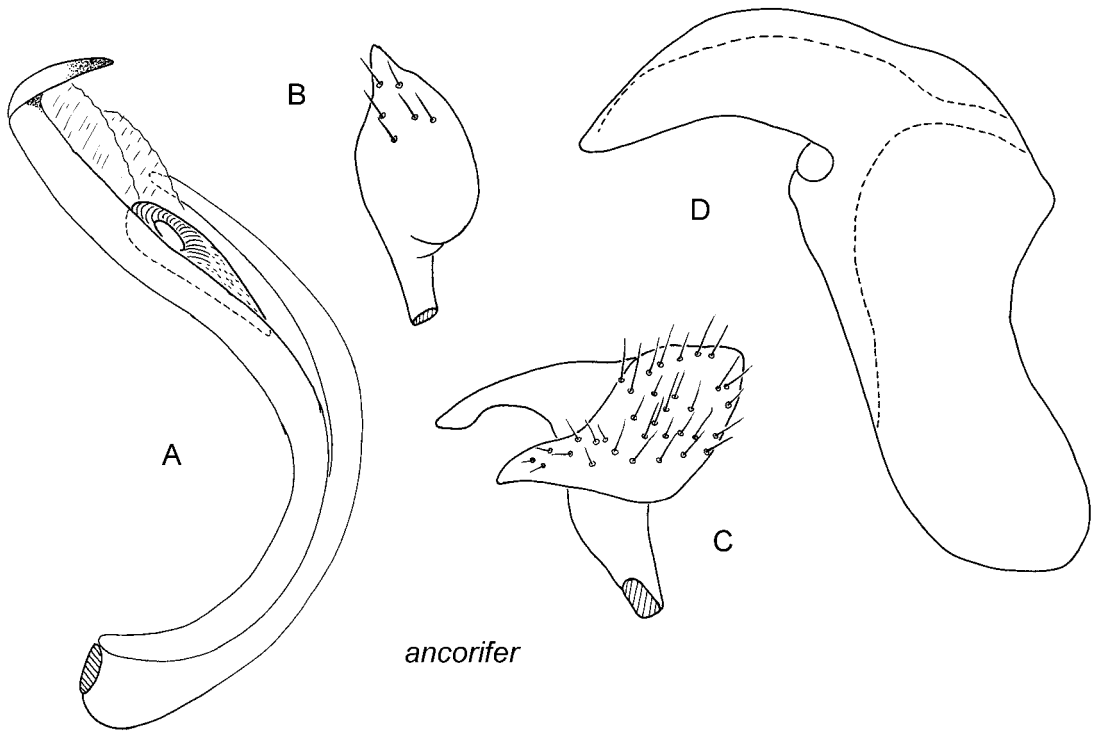


Fig. 16. Male genitalic structures, *Lepidargyrus ancorifer*. A. Vesica. B. Right paramere. C. Left paramere. D. Phallosome.

tion that this species is introduced, probably multiple times.

HOSTS: The feeding habits of *ancorifer* in the New World conform to those recorded in the Palearctic. It commonly feeds on European weeds and cultivated annuals and has more rarely been collected on perennials, sometimes native species, as can be seen from the hosts recorded in the locality data.

SPECIMENS EXAMINED: CANADA: **British Columbia:** 7 mi W of Bridesville, July 9, 1966, W. Gagne & J. Haddock, 1♂ (UCB). **Ontario:** Thessalon, June 15, 1965, W. Gagne, 1♂ (UCB). USA: **California:** *Alpine Co.:* N of, Ebbetts Pass, Pacific Crest Trail, Toiyabe Natl. Forest, Rt4, May 7, 1994, M. D. Schwartz, ex *Prunus emarginata* (Rosaceae), 1♂ (AMNH). *Amador Co.:* 2 mi S of Fiddletown, June 14, 1960, L. Brown, ex *Centaurea melitensis* (Asteraceae), 1♂ (CAFA); Plymouth, May 29, 1960, W. E. Simonds, ex *Calochortus* (Liliaceae), 1♂ (CAFA). *Calaveras Co.:* San Andreas, June 10, 1958, W. B. Andahl, 2♂ (CAFA). *Colusa*

Co.: Arbuckle, May 20, 1969, Munroe & Hetzel, 8♂ (CAFA). *Contra Costa Co.:* Moraga, June 5, 1976, D. G. Denning, 1♂ (UCD); Moraga, June 24, 1977, D. G. Denning, 2♂ (UCD); Walnut Creek (San Ramon Creek), April 7, 1968, J. Powell, 1♂ (UCB). *Del Norte Co.:* 35 mi NE of Crescent City on road to Bear Basin, 280 m, July 10, 1979, R. T. & Joe Schuh, ex *Chrysanthemum* (Asteraceae), 1♂ (AMNH); Elk Valley, June 6, 1968, L.L. Dunning, ex *Lathyrus* sp. (Fabaceae), 1♂ (UCD). *El Dorado Co.:* Blodgett Forest, 18 mi E Georgetown, July 1, 1967, W.J. Turner, 1♂ (UCB); Greenwood, June 21, 1967, W. Turner, 16♂ (UCB); 2 mi N of Kelsey, June 23, 1967, J. Powell, 59♂ (UCB); 2 mi N of Kelsey, June 23, 1967, A. J. Gilbert, 2♂ (CAFA); Pilot Creek, June 26, 1967, W. J. Turner, ex *Ceanothus integerrimus* (Rhamnaceae), 1♂ (UCB); Pino Grande, SW of Lake Edson, June 29, 1967, W. Turner, 1♂ (UCB); Snowline Camp, June 21, 1948, K. W. Tucker, 1♂ (UCB); Snowline Camp, June 21, 1948, O. E. Myers, 1♂

(OSU). *Fresno Co.*: Huntington Lake, 7000 ft, July 14, 1919, E. P. Van Duzee, 1♂ (CAS). *Humboldt Co.*: Arcata, June 11, 1969, J. Powell, ex *Ceanothus* (Rhamnaceae), 1♂ (UCB); Dinsmores, May 19, 1940, B. P. Bliven, 3♂ (CAS); Dinsmores, June 15, 1941, B. P. Bliven, 1♂ (CAS); Dyerville, July 24, 1966, B. P. Bliven, 33♂ (CAS); Dyerville, July 7, 1953, B. P. Bliven, 30♂ (CAS); Dyerville, July 19, 1964, B. P. Bliven, 10♂ (CAS); Dyerville, June 24, 1962, B. P. Bliven, 15♂ (CAS); Eureka, June 10, 1954, B. P. Bliven, 1♂ (CAS); Grizzly Creek, June 25, 1967, B. P. Bliven, 1♂ (CAS); Larabee Valley, June 3, 1934, B. P. Bliven, 2♂ (CAS); Pepperwood, September 3, 1950, B. P. Bliven, 1♂ (CAS); Pepperwood, July 7, 1968, B. P. Bliven, 3♂ (CAS); Pepperwood Flat, July 21, 1968, B. P. Bliven, 13♂ (CAS); Redcrest, July 8, 1973, B. P. Bliven, 4♂ (CAS). *Los Angeles Co.*: Tanbark Flat, March 29, 1957, J. Powell, 1♂ (UCD). *Mariposa Co.*: Yosemite, 3880–4000 ft, June 7, 1931, E. O. Essig, 1♂ (UCB). *Modoc Co.*: Likely, July 1, 1975, E. Paddock, 1♂ (CAFA). *Mono Co.*: 1 mi S of Saddlebag Lake, July 13, 1961, J. S. Buckett, 1♂ (UCD). *Napa Co.*: Angwin, June 21, 1982, H.B. Leech, 8♂ (CAS); 2 mi NNE of Angwin, on N side of Howell Mountain, 1300 ft, July 18, 1982, H.B. Leech, 1♂ (CAS); 2 mi NNE of Angwin, on N side of Howell Mountain, 1300 ft, June 22, 1983, H.B. Leech, 1♂ (CAS); 2 mi NNE of Angwin, on N side of Howell Mountain, 1300 ft, June 6, 1984, H.B. Leech, 1♂ (CAS); 2 mi NNE of Angwin, on N side of Howell Mountain, 1300 ft, June 23, 1975, H.B. Leech, 3♂ (CAS); 2 mi NNE of Angwin, on N side of Howell Mountain, 1300 ft, June 15, 1985, H.B. Leech, 2♂ (CAS); Spanish Flat, 3 mi W Coppel Creek, June 11, 1984, J. D. Pinto, 1♂ (UCR). *Nevada Co.*: Alta Sierra, NW of Placerville, June 27, 1971, Stella E. Tatro, 3♂ (CAS); 2 mi S of Grass Valley, June 27, 1967, J. Powell, 30♂ (UCB); North San Juan, June 30, 1975, Paddock, ex *Carthamus lanatus* (Asteraceae), 1♂ (CAFA); Penn Valley, June 20, 1969, Munroe & Hetzel, ex Poaceae, 1♂ (CAFA). *Placer Co.*: Bear Valley, 1 mi N of Emigrant Gap, June 5, 1970, J. T. Doyen, 5♂ (UCB); Forest Hill, May 25, 1979, E. L. Klee, 1♂ (CAS). *Plumas Co.*:

Johnsville, May 29, 1967, Helena Pini, 1♂ (CAFA). *Riverside Co.*: Dripping Spring, T85, RIW, S28, September 22, 1980, J. N. Chandler, 1♂ (CAS); San Jacinto Wild Area, trail to Fall Creek Falls, February 21, 1970, P. H. Arnaud Jr., 1♂ (CAS); Almanor, June 24, 1937, B. P. Bliven, 1♂ (CAS); Idyllwild, San Jacinto Mountains, May 23, 1940, R. Husbands, 3♂ (UCB). *Sacramento Co.*: Citrus Heights, May 25, 1968, A. D. Kenter, 1♂ (CAS); Citrus Heights, June 3, 1967, A. D. & G. J. Keuter, 7♂ (CAS); Fair Oaks, May 30, 1969, J. Vettel, 1♂ (CAFA); Folsom, May 30, 1952, T. R. Haig, 3♂ (UCB); 1 mi E of Folsom, May 22, 1969, W. E. Simonds, ex *Juncus* sp. (Juncaceae), 1♂ (CAFA); Folsome Lake, June 7, 1983, D. McGrath, 2♂ (UCR); Hwy 50, near Folsom, May 14, 1960, W. E. Simonds, 1♂ (CAFA); Natoma, May 10, 1958, W. E. Simonds, 7♂ (CAFA); Nimbus, June 20, 1961, T. Fuller, ex *Centaurea sulphurea* (Asteraceae), 1♂ (CAFA); Orangevale, June 25, 1967, E. Tinker, ex Malvaceae, 1♂ (CAFA); Sacramento, May 29, 1960, M. Wasbauer, 14♂ (CAFA); Sacramento, May 24, 1962, M. Wasbauer, 2♂ (CAFA); Sacramento, May 21, 1964, I. Savage, 7♂ (CAFA); Sacramento, May 13, 1950, H. F. Robinson, 1♂ (UCD); Sacramento, May 2, 1959, T. R. Haig, 2♂ (UCD); Sacramento, May 10, 1959, I. Savage, 2♂ (CAFA); Sacramento, May 21, 1964, I. Savage, 2♂, 2♀ (USNM). *San Bernardino Co.*: 4 mi E of Mentone, 750 m, May 11, 1978, J. D. Pinto & R. T. Schuh, 1♂ (AMNH). *San Mateo Co.*: Redwood City, April 15, 1954, P. H. Arnaud, 1♂ (UCD); Woodside, 5 km. W on Kings Mt. Rd at Huddart Park, May 8, 1973, P. H. Arnaud Jr., 1♂ (CAS). *Santa Clara Co.*: Mines Rd, S end, 2350 ft, April 23, 1972, H. B. Leech, ex *Ceanothus cuneatus* (Rhamnaceae), 1♂ (CAS). *Santa Cruz Co.*: Soquel, 2 mi NE at Bates Creek, May 6, 1980, M. Buegler, 4♂ (UCB). *Shasta Co.*: Redding, June 8, 1980, T. R. Haig, 1♂ (CAFA); Redding, June 2, 1974, T. R. Haig, 3♂ (CAFA). *Sierra Co.*: Davies Canyon, July 1, 1966, P.B. Schultz, 1♂ (UCD). *Siskiyou Co.*: Ash Creek Ranger Station, 9 mi E McCloud, 3500 ft, June 7, 1974, J. Powell, 11♂ (UCB); 2 mi W of McCloud, 3750 ft, June 26, 1981, J. D. Lattin, 4♂ (OSU); Trinity Alps, Caribou Mountain, 6300–7000 ft,

July 9, 1969, J. Powell, 2♂ (UCB); Mt. Shasta City, June 30, 1937, B. P. Bliven, 4♂ (CAS). Woodland, July 3, 1956, R. Gay, ex Asteraceae, 1♂ (UCD). **Sonoma Co.:** Boyes Springs, May 27, 1972, P. H. Arnaud, 1♂ (CAS); 3 mi N of Sebastopol, May 30, 1954, P. Rubtsoff, 2♂ (CAS); Santa Rosa, Franz Valley Rd, Pepperwood Ranch Natl. Park, Martin Creek, May 27, 1982, Stella E. Tatro, 5♂ (CAS). **Tehoma Co.:** Corning, May 12, 1966, R. P. Allen, 4♂ (CAFA). **Trinity Co.:** Denny, 6 mi SW at Bell Creek, July 2, 1969, J. Powell, 8♂ (UCB); 24 mi E of Forest Glen, June 8, 1985, J. D. Pinto, 1♂ (UCR). **Tuolumne Co.:** Sonora, May 21, 1969, A. E. & M. M. Michelbacher, 1♂ (UCB); Sonora, 6 mi NE, June 19, 1982, Paul Oman, 2♂ (OSU). **Ventura Co.:** Casitas Reserve, N end, March 15, 1967, P. A. Opler, 2♂ (UCB). **Yolo Co.:** Davis, June 8, 1955, A. T. McClay, 1♂ (UCD); Davis, May 29, 1961, J.S. Buckett, 1♂ (UCD); Davis, June 24, 1956, A. T. McClay, ex Apiaceae, 1♂ (UCD); Davis, June 3, 1965, M. R. Gardner, 1♂ (UCD); Davis, June 18, 1956, J. Powell, 6♂ (UCB); Davis, May 28, 1954, E. C. Carlson, 1♂ (UCD); Davis, June 3, 1967, R. Gardner, 1♂ (UCD); 4 mi S of West Sacramento, May 27, 1962, M. Wasbauer, 1♂ (CAFA); West Sacramento, June 19, 1952, P. H. Arnaud, 3♂ (CAS). **Yuba Co.:** Camp Far West Reservoir Dam, May 6, 1980, J. Powell, 2♂ (UCB); Challenge, July 14, 1963, E. E. Ball, 4♂ (CAS); 18 mi NE of Marysville, Sierra Foothill Rge F. S., May 7, 1977, K. C. Berg, 6♂ (UCD). **Connecticut:** New Haven, June 25, 1911, J. K. Lewis, 1♂ (CAS). **Georgia:** **Byron Co.:** April 18, 1977, R. Stapleton, ex Asteraceae, 3♂ (USNM). **Maryland:** Beltsville, July 3, 1926, H. H. Knight, 2♀ (USNM). Somerset Heights, July 18, 1904, E. S. G. Titus, 1♀ (USNM). **Michigan:** **Cheboygan Co.:** July 26, 1950, J. D. Lattin, 1♂ (OSU). **New Hampshire:** Bretton Woods, June 30, 1909, E. P. Van Duzee, 1♂ (UCB). **New York:** **Queens Co.:** North Beach, July 4, 1908, 1♀ (USNM). **Richmond Co.:** Staten Island, 7/17/1900, 1♀ (USNM). **Bronx Co.:** Mosholu, July 19, 1902, 1♂ (USNM). **Nassau Co.:** Cold Spring Harbor, Long Island, July 13, 1919, H. M. Parshley, 1♂ (CAS). **Suffolk Co.:** Cold Spring Harbor, Long Island, July 12, 1902, H. G. Barber, 1♂ (USNM).

Westchester Co.: White Plains, July 10, 1915, ex Rosaceae, 1♀ (USNM); White Plains, July 3, 1916, H. M. Parshley, 2♂ (CAS). **Oregon:** **Benton Co.:** July 9, 1947, H. H. Crowell, 2♂ (OSU); June 30, 1958, E. A. Dickason, ex Fabaceae, 1♂ (OSU); 3.5 mi NE of Alsea Fish Hatchery, August 2, 1959, J. D. Lattin, 4♂ (OSU); Corvallis, July 12, 1960, Gerald Greene, 1♂ (OSU); Corvallis, July 30, 1959, J. D. Lattin, 1♂ (OSU); Corvallis, July 12, 1930, W. Downes, 4♀ (USNM); Corvallis, July 11, 1956, K. C. Swenson, 3♂ (OSU); 10 mi N of Corvallis, July 11, 1978, J. Capizzi, ex Fabaceae, 1♂ (OSU); Corvallis, July 9, 1947, H. H. Crowell, ex Brassicaceae, 2♂, 5♀ (USNM); Corvallis, July 28, 1959, J. D. Lattin, 20♂ (OSU); Corvallis, July 10, 1962, 1♂ (OSU); Corvallis, June 25, 1982–July 8, 1982, T. J. Henry, ex *Chrysanthemum* sp. (Asteraceae), 10♂, 10♀ (USNM); Corvallis, July 20, 1956, J. D. Lattin, 2♂ (OSU); 9 mi N of Corvallis, Berry Creek, June 16, 1959, 1♂ (OSU); 10 mi S of Corvallis, McFadden Pond, August 9, 1964, Charles W. Baker, 4♂ (OSU); Corvallis, Oregon State University Campus, Cordley Hall, June 24, 1979, G. Stonedahl, 1♂ (AMNH); Corvallis, Seavy Rd, July 20, 1976, J. D. Lattin, 3♂ (OSU); Corvallis, Timber Hill area, July 13, 1979, G. Stonedahl, 12♂ (AMNH); Helmick State Park, June 27, 1960, E. A. Dickason, 5♂ (OSU); Mary's Peak, 4000 ft, July 29, 1966, W. Gagne & J. Haddock, 4♂ (UCB); Mary's Peak, 3500 ft, August 10, 1971, J. D. Lattin & P. Oman, 2♂ (OSU); Mary's Peak, August 7, 1968, Paul Oman, 1♂ (OSU); Mary's Peak, 14 mi W Corvallis, July 12, 1958, J. D. Lattin, 3♂ (OSU); Philomath, July 30, 1953, W. J. & J. W. Gertsch, 1♂ (AMNH). **Clackamas Co.:** Barton, July 25, 1962, Joe Capizzi, 4♂ (OSU); near, Boring/Sandy, August 4, 1980, Paul Oman, 1♂ (OSU); Canby, July 20, 1956, J. D. Lattin, ex Fabaceae, 1♂ (OSU); 2 mi N of Colton, Milk Creek, July 25, 1964, Toby Schuh, 1♂ (OSU); Eagle Creek, July 4, 1940, Joe Schuh, ex *Holodiscus discolor* (Asteraceae), 4♂ (OSU); Milwaukie, July 18, 1935, K. Gray, ex Apiaceae, 1♂ (AMNH); 8 mi E of Oregon City, August 3, 1962, H. E. Morrison & R. F. Koontz, ex Solanaceae, 1♂ (OSU); Oregon City, August 5, 1975, Jack Parsons, ex Poaceae, 1♂

(OSU); Wilsonville, July 3, 1963, Kenneth Goeden, 3♂ (OSU). 1 mi W of Woodburn, July 5, 1957, J. D. Lattin, 3♂ (OSU). *Curry Co.*: Burnt Hill Summit, July 5, 1958, F. M. Beer, 2♂ (OSU); 21 mi N of Gold Beach just S of Humbug State Park, 95 m, July 12, 1979, R. T. & Joe Schuh, ex *Plantago* sp. (Plantaginaceae), 1♂ (AMNH). *Deschutes Co.*: 4 mi S of Millican, at Pine Mt., 4980 ft, June 21, 1979, G. M. Cooper, ex *Ribes* (Saxifragaceae), 1♂ (OSU). *Douglas Co.*: 15 mi E of Canyonville, 280 m, July 12, 1979, R. T. & Joe Schuh, 24♂ (AMNH); 3 mi S of Canyonville, July 24, 1957, J. D. Lattin, 2♂ (OSU); Sutherlin, July 7, 1962, Ed E. Ball, 1♂ (CAS); 3 mi N of Sutherlin, Cabin Creek Rest Area, July 19, 1975, L. Russell, 4♂ (OSU); 35 mi W of Winston, 190 m, July 12, 1979, R. T. & Joe Schuh, ex Fabaceae, 1♂ (AMNH). *Hood River Co.*: 1.5 mi E of Cascade Locks, Herman Creek, July 10, 1978, N. Herman, 52♂ (AMNH). *Jackson Co.*: 10 mi E of Brownsboro, July 10, 1979, R. T. & Joe Schuh, ex *Cichorium intybus* (Asteraceae), 1♂ (AMNH); Eagle Point, July 23, 1957, J. D. Lattin, 5♂ (OSU); Jacksonville, July 16, 1964, L. Gentner, 12♂ (OSU); Talent, July 12, 1945, L. G. Gentner, ex Asteraceae, 7♀ (USNM). *Jefferson Co.*: Culver, July 20, 1962, R.F. Koontz, 2♂ (OSU). *Josephine Co.*: Cave Junction, May 30, 1956, J. D. Vertrees, 1♂ (OSU); Grant's Pass, August 4, 1952, H. A. Scullen, ex *Daucus carota* (Apiaceae), 1♂ (OSU); Oregon Caves, 3900 ft, June 27, 1972, Jane Sawbridge, 1♂ (OSU). *Klamath Co.*: Spencer Creek, July 4, 1967, Joe Schuh, 1♂ (OSU). *Lane Co.*: Cape Creek, 12 mi N of Florence, June 28, 1967, Kenneth Goeden, ex Asteraceae, 1♂ (OSU); Coburg, July 14, 1962, Morrison, ex Apiaceae, 1♂ (OSU); 3 mi N of Coburg, July 20, 1956, J. D. Lattin, 9♂ (OSU); 15 mi S of Cottage Grove, July 24, 1957, J. D. Lattin, 7♂ (OSU); 5 mi N of Eugene, June 17, 1961, D. R. Smith, 2♂ (OSU); Green River, R9W T155 Sec 8, August 10, 1968, J. D. Lattin, 2♂ (OSU); Sunrise Shelter above Frog Camp, 6600 ft, August 1, 1959, J. D. Lattin, 2♂ (OSU). *Linn Co.*: 10 mi N of Albany, July 3, 1945, H. A. Scullen, 2♂ (USNM); 5–15 mi E of Cascadia, July 23, 1959, V. Roth & F. Beer, 24♂ (OSU); 8.5 mi E of Crabtree, Lorwood Park, August 17, 1968, J. D. Lattin,

9♂ (OSU); Dever, July 23, 1931, 1♀ (USNM); Foster, August 5, 1959, J. D. Lattin, 2♂ (OSU); Horse Butte, July 9, 1977, G. Eulenson, 4♂ (OSU); Lebanon, June 6, 1961, ex Poaceae, 1♂ (OSU); Monument Park, June 16, 1960, J. D. Lattin, 5♂ (OSU); 10 mi N of Peoria, July 20, 1976, J. D. Lattin, 1♂ (OSU); 2 mi N of Scio, July 10, 1957, J. D. Lattin, 10♂ (OSU). *Marion Co.*: July 20, 1975, Jim Hay, ex Liliaceae, 1♂ (OSU); Aurora, August 1, 1977, R. A. Shuren, ex Pinaceae, 1♂ (OSU); Salem, August 24, 1943, R. E. Rieder, 1♂, 4♀ (USNM); Salem, August 24, 1943, R. E. Rieder, ex Liliaceae, 1♂ (AMNH); 1 mi NW of Sublimity, July 10, 1957, J. D. Lattin, 2♂ (OSU). *Multnomah Co.*: July 14, 1961, Faith P. Mackaness, ex *Penstemon* (Scrophulariaceae), 1♂ (OSU); Gresham, August 8, 1945, Joe Schuh, Solanaceae, 1♂ (OSU); Linnton, July 16, 1959, J. D. Lattin, 2♂ (OSU); Portland, July 26, 1946, Joe Schuh, ex *Cirsium canadense* (Asteraceae), 1♂ (OSU); Portland, July 19, 1944, ex *Linaria vulgaris* (Scrophulariaceae), 2♂, 5♀ (USNM). *Polk Co.*: Buena Vista, July 9, 1941, Schuh & Gray, ex Lamiaceae, 1♂ (OSU); Independence, July 5, 1934, N. P. Larson, 1♀ (USNM); 1 mi E of Independence, July 10, 1957, J. D. Lattin, 1♂ (OSU); Independence, July 23, 1981, 3♂ (OSU); 6 mi E of Independence, July 10, 1957, J. D. Lattin, ex *Salix* sp. (Salicaceae), 1♂ (OSU); Monmouth, August 2, 1943, H. A. Scullen, ex Liliaceae, 1♂ (AMNH); 5 mi S of Monmouth, July 12, 1960, J. D. Lattin, 5♂ (OSU); Monmouth, August 2, 1943, H.A. Scullen, 1♀ (USNM); Oak Grove, August 6, 1933, W. W. Yates, 1♂ (OSU). *Washington Co.*: 5 mi N of North Plains, August 10, 1960, J. D. Lattin, 5♂ (OSU); Tigard, July 1, 1944, ex Fabaceae, 10♂, 10♀ (USNM). *Yamhill Co.*: Bald Mountain, July 28, 1957, K. M. Fender, 1♂ (OSU); Bald Mountain, 5 mi from top, July 13, 1958, J. D. Lattin, 2♂ (OSU); Dayton, Dorsey's Gravel Bar, July 22, 1963, K. M. Fender, 1♂ (OSU); Grand Island, June 30, 1968, K.M. Fender, 2♂ (OSU); R. Boyer Farm, July 22, 1981, ex Fabaceae, 1♂ (OSU); top of Bald Mountain, July 13, 1958, K. M. Fender, 20♂ (OSU); McMinnville, Peavine Ridge, June 27, 1958, K. M. Fender, ex Apiaceae, 1♂ (OSU); Weston (Lincoln Mt.), July 14, 1938,

Schuh & Gray, 1♂ (OSU). **Utah:** *Sevier Co.:* Fish Lake Natl. Forest, N end of Johnson Valley Reservoir, 2725 m, July 16, 1980, R. T. Schuh & G.M. Stonedahl, ex *Salix* sp. (Salicaceae), 1♂ (AMNH). **Virginia:** 5/22/1881, 1♀ (USNM). *Arlington Co.:* Falls Church, June 29, 1900, 1♀ (USNM). *Fairfax Co.:* Vienna, July 11, 1926, H. H. Knight, 4♂, 5♀ (USNM); *Northhampton Co.:* Arlington, July 7, 1900, W. Palmer, 1♀ (USNM). Vienna, July 11, 1926, H. H. Knight, 1♂ (CAS). **Washington:** *Klickitat Co.:* 12 mi NE of Goldendale, 2550 ft, June 12, 1973, Oman & Musgrave, 2♂ (OSU). *Pierce Co.:* Pleasant Valley, September 8, 1977, T. L. Whitworth, 1♂ (USU); Pleasant Valley, July 22, 1978, T. L. Whitworth, 1♂ (USU). *Whatcom Co.:* 2 mi SW of Lyndon, July 14, 1966, W. Gagne & J. Haddock, 14♂ (UCB). Green Lake, July 14, 1966, W. Gagne & J. Haddock, 2♂ (UCB). **Washington, D. C.:** June 8, 1879, P.R. Uhler, 2♂, 3♀ (USNM); June 24, 1926, H. H. Knight, 4♂, 10♀ (USNM); July 3, 1885–July 10, 1895, 3♀ (USNM); June 18, 1891, 4♀ (USNM); Rock Creek, June 13, 1890, 1♂ (USNM). **Wyoming:** *Big Horn Co.:* Shell, Shell Creek at mouth of Shell Canyon, 4320 ft, July 24, 1964, H. B. Leech, 1♂ (CAS). *Sheridan Co.:* 42 mi W of Sheridan, Prune Creek at Prune Creek Campground, 7400 ft, July 25, 1978, Nancy L. Herman, 7♂ (AMNH).

REFERENCES

- Carvalho, J.C.M.
1958. Catalogue of the Miridae of the World. Part II. Subfamily Phylinae. Arq. Mus. Nac., Rio de Janeiro 45: 216 pp.
- Drapolyuk, I. S.
1993. Review of the capsid bugs of the genus *Lepidargyrus* (Heteroptera: Miridae). Zoosystematica Rossica 2: 107–119.
- Fieber, F. X.
1858. Kriterien zur generischen Theilung der Phytocoriden (Capsini auct.). Wiener entomol. Monatschr. 2: 289–327, 329–347, 388, 1 pl.
- Kelton, L. A.
1959. Male genitalia as taxonomic characters in the Miridae (Hemiptera). Can. Entomol., suppl. 11: 72 pp.
- Knight, H. H.
1923. Family Miridae. In: W. E. Britton, (ed.), Guide to the Insects of Connecticut. Part IV. The Hemiptera or Sucking Insects of Connecticut. pp. 422–658. State Geological and Natural History Survey, Hartford.
1930. New species of *Psallus* Fieb. (Hemiptera, Miridae). Can. Entomol. 62: 125–131.
1968. Taxonomic review: Miridae of the Nevada Test Site and the western United States. Brigham Young Univ. Sci. Bull., Biol. Ser. 9: 282 pp.
- Schwartz, M. D., and L. A. Kelton
1990. *Psallus salicicola*, a new species, with additional records of recently discovered Palearctic *Psallus* Fieber from Canada (Heteroptera: Miridae: Phylinae). Can. Entomol. 122: 941–947.
- Slater, J. A., and H. H. Knight
1954. The taxonomic status of *Oligotylus* Van Duzee and *Leptotylus* Van Duzee, with the description of a new species of *Psallus*. Pan-Pac. Entomol. 30: 143–146.
- Van Duzee, E. P.
1916a. Synoptical keys to the genera of North American Miridae. Univ. Calif. Publ. Entomol., Tech. Bull., 1: 199–216.
1916b. Notes on some Hemiptera taken near Lake Tahoe, California. Ibid. 1: 229–249.
- Wheeler, A. G., Jr., and T. J. Henry
1992. A Synthesis of the Holarctic Miridae (Heteroptera): Distribution, Biology, and Origin, with Emphasis on North America. Thomas Say Foundation, Entomological Society of America, Lanham, Maryland. 282 pp.