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The Ant-Like Litter Beetles of the H. J. Andrews Experimental Forest, Oregon (Coleoptera: Staphylinidae: Pselaphinae)

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Abstract

Twenty-eight species of Pselaphinae have been collected at the H. J. Andrews Experimental Forest: *Sonoma cascadia* Chandler, *Sonoma conifera* Chandler, *Sonoma hespera* Park and Wagner, *Sonoma margemina* Park and Wagner, *Sonoma olycalida* Park and Wagner, *Sonoma parviceps* (Mäklin), *Mayetia smithi* (Schuster), *Oropus cavicauda* Casey, *Oropus micropthalmus* Chandler, *Oropus striatus* (LeConte), *Euboarhexius sinus* Grigarick and Schuster, *Trisignis marshi* Park and Schuster, *Abdiunguis fenderi* Park and Wagner, *Oropodes dybasi* Grigarick and Schuster, *Euplecterga norstelcha* Grigarick and Schuster, *Euplectus silvicolus* Chandler, *Actium barri* Park and Wagner, *Actium microphthalmum* Park and Wagner, *Actium retractum* Casey, *Cupila excavata* Park and Wagner, *Batrisodes albionicus* (Aubé), *Reichenbachia fusticornis* Casey, *Lucifotychus cognatus* (LeConte), *Lucifotychus dentatus* (Grigarick and Schuster), *Lucifotychus impellus* Park and Wagner, *Lucifotychus stellatus* (Grigarick and Schuster), *Pselaptrichus intimus* Schuster and Marsh, and *Pselaptrichus rothi* Park. Twelve other species known from the Cascade Mountains of Oregon are included in a key to the species of this area. Species richness and abundance are discussed for the sixteen species taken during a two-year study of a series of sites representing different ages in a forest succession and plant associations/habitats. For drier sites species richness and abundance increase with the age of the forest; for moderately wet sites species richness is slightly higher for the youngest sites; and for the wettest sites species richness remains similar while abundance increases sharply after the herb stage and is similar for the older successional stages. Two species, *O. micropthalmus* and *A. microphthalmum*, both with small eyes, are most abundant in the tree and old-growth stages, and *A. microphthalmum* is clearly most abundant in old-growth forests. The species characteristic of old-growth or early successional stages are noted, as well as those typical of high or low elevations in the Cascade Mountains.

Key Words: old-growth, managed forests, biodiversity, Cascade Mountains, ecology, Pacific Northwest

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Introduction

Members of the staphylinid subfamily Pselaphinae, or ant-like litter beetles, are most commonly collected in forest leaf litter and woody debris. They are thought to be greatly affected by forest disturbances (Balletto and Casale 1991), and certain members have been found to be strongly associated with old-growth forests in England (Garland 1983), Italy (Seriani 1987), and New Hampshire (Chandler 1987). The subfamily currently contains over 700 species for North America, and holds over 8,200 species for the world (Asenjo *et al.* 2019; Chandler 2000). However, members of the family are typically poorly represented in collections due to their small size (0.6–3.1 mm in North America) and

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reclusive habits. The most commonly collected species are the large species found under bark of dead trees or under stones, while the majority of species are found primarily through sampling leaf and log litters from different habitats, and processing these samples in the laboratory with Berlese or Tullgren funnels. Other taxa are found in moss and grass sods, and may be associated with ants or termites (Chandler 1990b, 1997, 2000, 2001a). Species are most diverse in tropical to warm temperate regions, with species richness decreasing with increasing latitude. Thirteen species are known from Alaska, 39 from Washington, 88 from Oregon, 255 from California (DSC, unpublished data), and over 500 from Panama based on limited sampling (Chandler 1992).

There are few surveys that have documented the species richness and abundance of pselaphines for local communities or regional areas. Three local communities in the northern United States have had thorough faunal studies of this group: An Illinois prairie (Park *et al.* 1949, 1953; eight species), an Illinois sphagnum bog (Reichle 1969; 13 species), and an old-growth forest in New Hampshire (Chandler 1987; 12 species). Species richness has been documented for a few counties and portions of counties, with 29 species recorded from montane Butte County, California (Chandler 1983), 51 from Tehama County, California (Chandler 2003), 65 from Latimer County, Oklahoma (Riley and Quinn 2016), and 70 from Linn County, Iowa (Chandler 1990a). Two papers have targeted the pselaphine biodiversity of areas in the Pacific Northwest. Chandler (2001b) documented the diversity of the Queen Charlotte Islands (Haida Gwaii), treating 11 species, while Owens *et al.* (2015) found 19 species inhabiting the Mt. Rainier area. The H. J. Andrews Experimental Forest (HJA), the major research site for studies of coniferous forests in the Pacific Northwest, has 28 species documented here, with twelve others likely occurring in this forest (thus a total of 40 species), representing nearly half of the species currently known from Oregon.

The HJA was established in 1948 as the Blue River Experimental Forest by the U. S. Forest Service to study the long-term effects of logging and associated manipulations of the forest environment. It encompasses a portion of the Lookout Creek drainage on the western slope of the Cascade Mountains in Lane and Linn Counties, central Oregon. It later became part of the International Biological Program (IBP) as a premier representative of an old-growth conifer forest in the Pacific Northwest, and is currently one of the Long-Term Ecological Research Sites funded by NSF (Dyrness and Franklin 1971; Lattin 1993). The HJA covers 6,400 ha, encompassing an area roughly 64 km N–S and 32 km E–W (Dyrness *et al.* 1974). It is primarily comprised of two elevationally-based forest zones as defined by Franklin and Dyrness (1973): The lower elevation Temperate Western Hemlock Zone, whose canopy consists primarily of western hemlock (*Tsuga heterophylla* (Rafinesque) Sargent) and Douglas-fir (*Pseudotsuga menziesii* (Mirbel) Franco); and the higher elevation Pacific Silver Fir Zone, whose canopy is dominated by Pacific silver fir (*Abies amabilis* Douglas ex. J. Forbes), noble fir (*Abies procera* Rehder), as well as including Douglas-fir and western hemlock. The forest communities within the HJA were further delineated by Dyrness *et al.* (1974).

These forests are characterized by large, old trees, with large amounts of coarse woody debris and a deep, moist humus layer that nurtures a complex food web of arthropod species (Lattin 1990, 1993). In order to promote knowledge of the arthropods and facilitate an understanding of species diversity and their ecological roles in the HJA several papers have documented their presence via checklists (Anderson *et al.* 1982, caddisflies; Lewis and Maser 1981, Siphonaptera; Parsons *et al.* 1991, list of arthropods; Voegtlin 1982, canopy arthropods), and by illustrated keys (Lightfoot 1986, Orthoptera; Moldenke and Fichter 1988, oribatid mites). Lattin (1993) noted that over 3,400 arthropod species were then known from the HJA. Our goal is to increase accessibility to the pselaphine fauna of the HJA for use in studies on the impact of forest management practices. This goal is achieved by including an illustrated species identification key so that users of all backgrounds may be able to identify species, as well as by providing access to the specimen data together with notes on their habitats and association with the successional stages produced by forest management.

Such a study at the HJA is particularly appropriate in its support of studying differences between differently aged forests and old-growth (Lattin 1993). Only one other North American study has compared the diversity of the pselaphine fauna of forests of different ages. Chandler (1987) documented pselaphine species richness and abundances in New Hampshire in a comparison of the fauna of an old-growth mixed deciduous/coniferous forest and a 40-year-old selectively cut forest. That study found a slightly higher species richness for the old-growth forest, and greater abundances in old-growth for the species associated with deciduous leaf litter. The species found only at the old-growth site were suspected subcortical inhabitants of dead trees, a habitat that is comparatively rare or reduced in the younger forest. Higher abundance of the deciduous leaf litter associates was assumed to be related to the larger and more complex leaf litter depths of the older forest.

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Biology

Pselaphine adults and larvae are predaceous on small arthropods and worms, particularly mites and Collembola, and differences have been demonstrated in prey choice and feeding behavior for several species (Engelmann 1956; Reichle 1969; Schomann *et al.* 2008). Ecological information for many species is lacking, and typically consists of information on the habitat where the adult specimens were collected. Some species display a definite preference for a specific microhabitat (Reichle 1969), while other species may be found in a wide variety of leaf litters and woody debris. In New Hampshire, Chandler (1987) found that species associated with deciduous leaf litter were more abundant in an old-growth mixed deciduous/coniferous forest than in a 40-year-old forest of similar composition, and that species richness was slightly higher for the old-growth forest.

Pselaphines appear to be active only when their habitat is moist, and forest or woodland species will be quiescent or in diapause after a formerly productive site dries out. During the dry season in California some species became active and reappear in leaf litters for a brief period following showers from summer storms, but are otherwise inactive and only collected during the rainy season during winter and spring (Chandler 2003).

Methods

Several collection techniques have been employed to produce the material covered here. Mispagel and Rose (1978) utilized a sampling regime of pole-pruning, pitfall traps, and aerial rotary traps for their 1973 comparison of the fauna of clearcuts and differently aged Douglas-fir forests, with only pitfall traps yielding pselaphine specimens. In 1981 Gerasimos Cassis sampled from nine of the seventeen habitat types as defined by Dyrness *et al.* (1974) for the HJA, which included mature forests and clearcut sites of various ages. Whole-litter samples were taken down to the soil surface, with 15 (sites 1–11) or 20 (sites 12–30) samples taken at the 30 different sites. Each sample had an unsifted volume of 30,000 cm^3 (G. Cassis, *in litt.*). These samples were processed by Berlese funnels, with the goal of producing a preliminary list of litter arthropods.

Author GLP designed a program to sample and compare species richness and abundances of the leaf litter fauna of three plant associations/habitats (defined in Dyrness *et al.* 1974) that represented dry, moderately wet, and wet habitats in the area. For each of these plant associations four successional stages were sampled: Herb-dominated clearcut (1–7 years after cutting), shrub-dominated clearcut (7–15 years after cutting), tree-dominated clearcut (15–35 years after cutting), and old-growth (100–400 years old). Samples were taken at four different times each year: Spring (April–May), early summer (June–July), late summer (August–September), and fall (October–November). Sampling was conducted from 1982 to early 1984 (two years), by processing whole-litter samples in Berlese funnels, and by use of pitfall traps to sample from these sites which ranged from 533–655 m within the Experimental Forest. Two 500-cm^2 litter samples were obtained during the visit to each site, with sampling not possible for five of the 96 site visits due to excessive rain and snow during fall 1983. During 1985 a season-long project, the Vanilla Leaf Study, was conducted by GLP to compare the fauna of a recent 1985 clearcut and an old-growth forest at 1,219 m. A similar sampling protocol of pitfall traps and whole-litter samples was followed, with subsequent arthropod extraction by use of Berlese funnels.

Short collecting trips by author DSC during May 1983 and 1984 were directed toward sampling all habitats that might produce pselaphines, and in particular targeted riparian habitats and elevations above 655 m. Samples were initially processed in the field by using a sifter with a 0.6-cm hardware-cloth screen to remove larger sample fragments. Sampling from that habitat stopped when the sample weighed about 2.5 kg. These samples were then processed using Berlese funnels at the forest headquarters.

Statements regarding whether species are common, rare or abundant are in comparison to the relative abundances of those species taken during the two-year study by GLP, or from the composite collection of specimens taken by all the studies at the HJA. Specimens are shared between the Oregon State University Insect Collection (OSUC) and the University of New Hampshire Insect Collection (UNHC).

Results

Twelve pselaphine taxa were recorded by Mispagel and Rose (1978). Four of these (*Megarafonus* sp., *Cupila clavicornis* (Mäklin), *Pselaptrichus proprius* Schuster and Marsh, *P. vanus* Schuster and Marsh) were not collected subsequently, nor could they be found in the Oregon State University Collection where specimens from the Mispagel and Rose study were deposited, though the rest of their material was present. These four names are treated as misidentifications below. The study by Cassis during 1981 produced twenty taxa of pselaphines, the GLP study generated 16 species, and seven

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species were taken during the Vanilla Leaf Study. The two visits by DSC produced 24 species, with six of these representing new records for the forest. The last summary of the arthropod species of the HJA (Parsons *et al.* 1991) listed 35 pselaphine species. Presently, twenty-eight species have been collected in the HJA, while twelve others probably occur there since they have been found at other locations in the Cascade Mountains of Oregon, for a total of 40 species. All are included in the key to species below. Seven prior records are regarded as incorrect, with four of these being the aforementioned four species listed by Mispagel and Rose (1978), and three being names in a preliminary species list provided by DSC:

Megarafonus sp.: Mispagel and Rose (1978); probably *Sonoma* sp., since members of *Megarafonus* are not known from the Cascade Mountains.

Euplecterga impressicollis Park and Wagner: Chandler in preliminary list of HJA species; this was an error for *Euplecterga norstelcha* Grigarick and Schuster.

Actium wawonaensis Grigarick and Schuster: Chandler in preliminary list of HJA species; this was an error for a few *Actium retractum* Park and Wagner.

Cupila clavicornis (Mäklin): Mispagel and Rose (1978); this was an error for *Cupila excavata* Park and Wagner.

Hylotychus intellectus Grigarick and Schuster: Chandler in preliminary list of HJA species; this was an error for *Lucifotychus stellatus* (Grigarick and Schuster).

Pselaptrichus proprius Schuster and Marsh: Mispagel and Rose (1978); this was an error for a different species of this genus.

Pselaptrichus vanus Schuster and Marsh: Mispagel and Rose (1978); this was an error for a different species of the genus, though this species was collected in Berlin, Linn County OR, and is treated in the key.

The cumulative species richness and abundance of the 16 species collected by GLP from litter samples are portrayed for each site in Table 1, with these data organized based on plant associations, successional stages, and seasons collected at the various sample sites. The data are also summed for each species by the same factors in Table 2.

Discussion

Based on a summary of the data generated by the GLP study (Table 1), richness increased from six to nine species with increasing forest age for the driest sites (sites 5–8); it decreased from 11 to nine species with increasing forest age for the moderately wet sites (sites 17–20); and was marginally highest (nine species) for the shrub stage of the wettest sites (sites 25, 30–32). Abundance was lowest for the herb stage for the driest and wettest sites. There is no consistent trend in abundance apparent for the moderately wet sites, though if data from the two missing herb and two missing shrub samples could be added there may perhaps be a clear indication of a decrease in abundance with increasing forest age (Table 1). The species richness numbers documented for other communities near the temperate latitude of 44° are close to those found at the HJA (see Chandler 2001a for references). Chandler (1987) dealt with a mixed deciduous-coniferous forest with two study areas, one old-growth and the other a forest in the tree stage that had been selectively cut 40 years previously. For this study species richness was slightly higher for old-growth (12 vs. nine species), and pooled abundance was twice as high for old-growth when compared with pooled abundance of the managed forest.

Of the sixteen species collected during the GLP study, the more abundant species (>15 total individuals; eight of the species) were present in all successional stages. These species were also present at all sites when grouped by moisture levels, with some trends in abundances observed (Table 2). *Batrisodes albionicus* (Aubé) is the only species that was more abundant in the earlier successional stages

Table 1. Number of species/number of specimens per site from GLP litter samples, all samples for site pooled for the two-year period. Forest succession stages tied to vegetation stage; vegetation composition based on moisture received (Dyrness *et al.* 1974) [driest sites (Psme-Tshe/Cococa): *Pseudotsuga menziesii-Tsuga heterophylla*/*Corylus cornuta* assemblage; moderately wet sites (Tshe/Rhma/Bene): *Tsuga heterophylla*/*Rhododendron macrophyllum*/*Berberis nervosa* assemblage; wettest sites (Tshe/Pomu-Oxor): *Tsuga heterophylla*/*Polystichum munitum-Oxalis oregana* assemblage].

	1–7 years Herb clearcut	7–15 years Shrub clearcut	15–35 years Tree clearcut	100–400 years Old-growth
Psme-Tshe/Cococa	site 5	site 6	site 7	site 8
driest sites	6/28	7/78	8/285	9/176
Tshe/Rhma/Bene	site 17	site 18	site 19	site 20
moderately wet sites	11/169	11/118	9/175	9/213
Tshe/Pomu-Oxor	site 25	site 30	site 31	site 32
wettest sites	7/101	9/209	8/157	8/246

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Table 2. Number of individuals of each species organized by vegetational composition (Dyrness *et al.* 1974), successional stage, and season of sampling; from litter samples taken by GLP. Five of the 96 planned samples were not taken during fall 1983 due to an extensive period of rain/snow that prevented sampling.

	Sites by moisture received				**Sites by successional stages**					**Sites by season**					
	dry	**moderate**	**wet**		**early, herb**	**middle, shrub**	**late, tree**	**old-growth**		**spring**	**early summer**	**late summer**	**fall**		**TOTALS**
Sonoma conifera			2				1	1				1	1		2
Sonoma hespera	2	10			1	1	7	3		3		3	6		12
Mayetia davisi		3						3			1	2			3
Euboarhexius sinus		1			1							1			1
Oropus cavicauda	129	74	39		39	84	104	15		58	67	75	42		242
Oropus micropthalmus	9	14	26		6	5	10	28		21	6	17	5		49
Oropus striatus	110	91	64		25	79	66	95		68	52	92	53		265
Trisignis marshi		4	1		2	3						2	3		5
Oropodes dybasi	12		1			3	10			2	1	1	9		13
Actium microphthalmum	93	201	175		38	37	144	250		53	164	194	58		469
Actium retractum	1				1								1		1
Cupila excavata	52	60	184		58	40	98	100		68	66	95	67		296
Batrisodes albionicus	4	18	8		16	8	4	2		5	12	11	2		30
Lucifotychus cognatus		1				1					1				1
Lucifotychus impellus	78	113	154		71	111	82	81		79	97	107	62		345
Pselaptrichus rothi	77	85	59		40	33	91	57		39	64	93	25		221
TOTALS	567	675	713		298	405	617	635		396	531	694	334		1,955
*Samples missed	1	2	2	5	2	2		1	5				5	5	5
Total samples	31	30	30	91	22	22	24	23	91	24	24	24	19	91	91

(herb/shrub), though the rarely collected species *Trisignis marshi* Park and Schuster also falls here when the HJA specimens taken outside of the GLP study are included. Two species were more typical of the shrub/tree stages, the abundant *Oropus cavicauda* Casey and the rarely collected *Oropodes dybasi* Grigarick and Schuster, with both being more abundant in the drier vegetation assemblages. Four species were most abundant at the stages with extensive canopy cover (tree/old-growth stages): Three common species, *Oropus micropthalmus* Chandler, *Actium microphthalmum* Park and Wagner, and *Cupila excavata*, plus the rarely taken *Sonoma hespera* Park and Wagner. The first two species were most abundant in the old-growth sites, and interestingly were the only two species characterized by reduced eyes for both sexes. However, both have been taken from all successional stages (Table 2). The abundant *Oropus striatus* (LeConte) clearly is most common in drier sites. The common species taken during this study (8 species with >15 total individuals) were present throughout the sampling period (May to November), with their only shared pattern being that they were usually most abundant during the late summer.

Using data from all studies, certain species exhibit marked distributional differences that could be characterized by differences in elevation. Five taxa were only collected at high elevations (975–1,463 m), and some were most abundant at or near the snow line: *Sonoma olycalida* Park and Wagner, *Sonoma parviceps* (Mäklin), *Abdiunguis fenderi* Park and Wagner, *Actium barri* Park and Wagner, and *Pselaptrichus intimus* Schuster and Marsh. Species that were found only at the lower elevations (518–762 m) are: *Sonoma margemina* Park and Wagner, *Mayetia smithi* (Schuster), *Oropus micropthalmus*, *O. cavicauda*, *Euboarhexius sinus* Grigarick and Schuster, *Oropodes dybasi*, *Euplecterga norstelcha*, *Actium microphthalmum*, *Reichenbachia fusticornis* Casey, *Lucifotychus dentatus* (Grigarick and Schuster), and *L. stellatus*.

The visits by DSC produced six species that had not taken by intensive sampling of forest leaf litter (*Sonoma margemina*, *Euplectus silvicolus* Chandler, *Abdiunguis fenderi*, *Reichenbachia fusticornis*, *Lucifotychus dentatus*, and *L. stellatus*). Five of these species were produced by targeting leaf litter in riparian stream and spring areas. An additional forest habitat that should be targeted is the fauna of rotten wood. Twelve additional species probably occur in the Experimental Forest and are treated in the key, with many of these being subcortical bark/rotten wood associates. Only one of the species taken during this study is a true rotten wood associate (*Euplectus silvicolus*). Further additions to the pselaphine fauna of the HJA will likely be of these rotten wood species, or of those species found at high elevations.

Identification

Park and Wagner (1962) generated the primary resource for identification of the pselaphine fauna of the Pacific Northwest and covered 57 species. However, this important work was produced during the middle of an extremely productive sequence of revisions by R. O. Schuster, A. A. Grigarick, and G. A. Marsh (1956–1981) that targeted nearly all genera of the Pacific Coast states and provinces. These must be consulted for groups treated after the work of Park and Wagner (1962). Later treatments by other authors relevant to the Pacific Northwest have been: Chandler (1986b) who added six new species from Oregon; *Sonoma squamishorum* Chandler from Vancouver was described in McLean *et al.* (2009); Chandler and Caterino (2011) revised *Oropodes* Casey; Ferro (2016) revised the diverse genus *Sonoma* Casey for the Pacific Coast states/provinces; and Owens *et al.* (2015) described three new species and provided an update and keys to three major genera (*Tychus* Leach, *Lucifotychus* Park and Wagner, and *Pselaptrichus* Brendel) which all have species common in the Pacific Northwest.

These studies have revealed that a distinct assemblage of species is restricted to the Pacific Northwest. One cluster contains species that range from extreme northwestern California to Alaska, with a smaller cluster within this group holding species known only from Oregon and Washington. A small separate subset of species from this region are transboreal (*Actiastes foveicollis* (LeConte), *Actizona trifoveata* (Park), *Euplectus silvicolus*, *Rybaxis transversa* Fall, *Pselaphus bellax* Casey), with their ranges extending east to the Maritime Provinces of Canada (Chandler 2001b). A few other species range south well into California (*Oropus cavicauda*, *Batrisodes denticauda* Casey, *Reichenbachia binodifer* Casey, *Reichenbachia fusticornis*, and *Tyrus corticinus* (Casey)).

Characters used to define the Pselaphinae may be shared by some members of other Staphylinidae subfamilies, but the following combination of characters will serve to separate them: 1–3 terminal antennomeres of antennae enlarged to form a club, head with vertexal foveae, tarsi composed of 2–3 tarsomeres. While pselaphines have abbreviated elytra like many other staphylinids (Figs. 1–8), they are more compact in appearance, with the exception of *Mayetia* (Fig. 2).

Key to Species of Pselaphinae of HJA

Notes. Specimens are easily identified when dried and glued on points, as long as the mount adhesive is not excessively applied. Males are generally best for confirmation of identification, since they have more diagnostic features than females. However, both sexes in *Sonoma* may be readily identified. Males have an additional ventrite at the apex of the abdomen, which is

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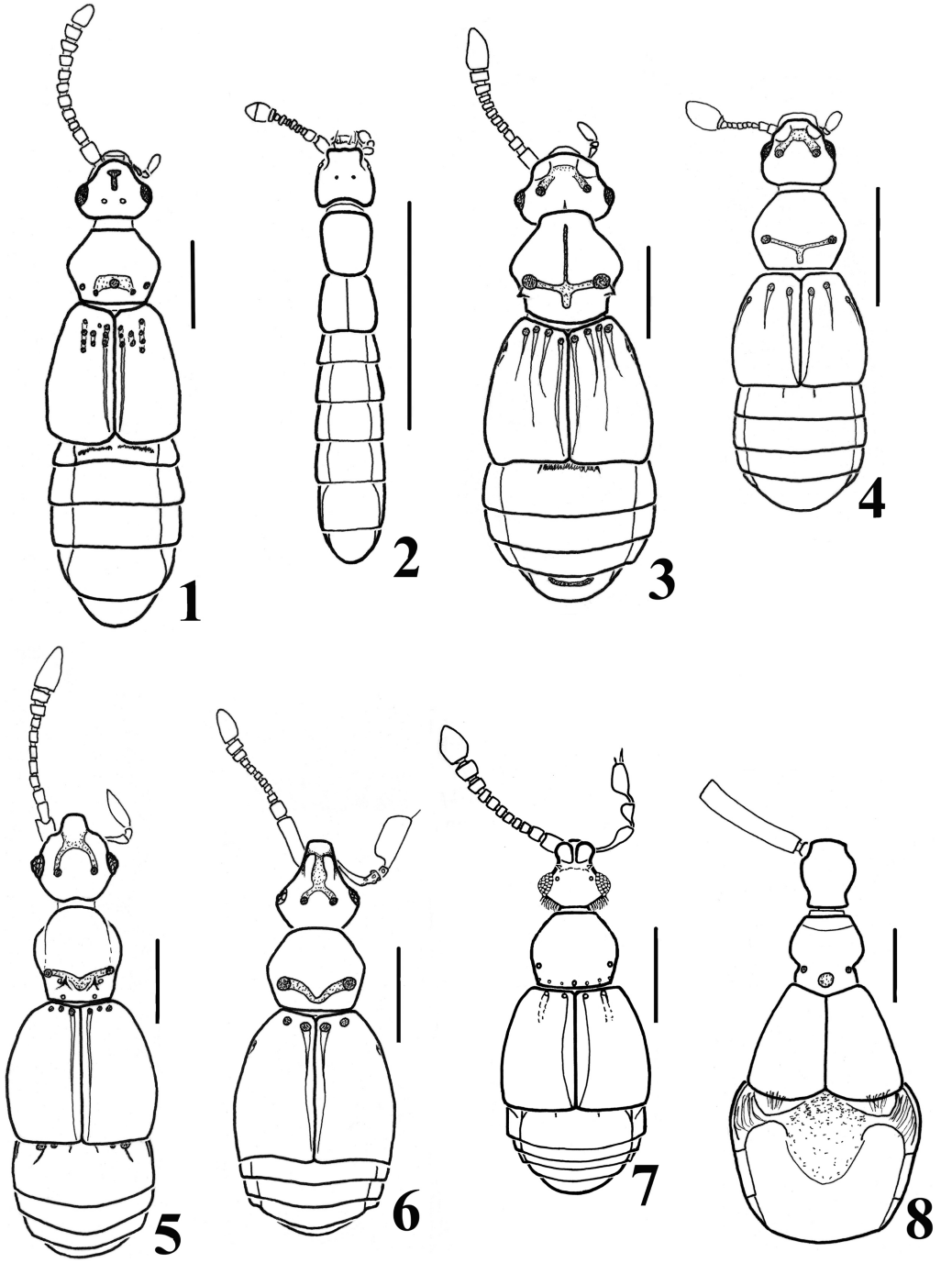

Figs. 1–8. Dorsal view of 8 generic representatives. **1)** *Sonoma hespera*; **2)** *Mayetia smithi*; **3)** *Oropus striatus*; **4)** *Actium barri*; **5)** *Batrisodes albionicus*; **6)** *Pselaptrichus rothi*; **7)** *Lucifotychus impellus*; **8)** *Adranes taylori*. Scale bars = 0.5 mm.

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either small and oval or somewhat transverse and medially impressed. The last female ventrite is transverse and is convex, medially flattened, or only vaguely impressed at the middle, except for females of *Sonoma* whose apical ventrites are variously modified. Depending on the genus males may have complex structures on the underside of the head, enlarged antennomeres, modifications of the apical abdominal tergites, toothed, setose or impressed lateral areas of the abdominal ventrites, or legs with teeth or angulations of the trochanters or tibiae. Females lack all of these. The most useful paper for identification within a genus is indicated at an appropriate place in the key for those who wish to investigate the potential discovery of unrecorded species for the forest. The species are numbered and arranged in a system following the current arrangement of taxonomic groups for this subfamily. Those species with an asterisk have not yet been collected in the HJA, but are expected to occur there.

1. Body elongate and slender, with head, thorax and abdomen same width (Fig. 2); body 0.8 mm long ..... **7. *Mayetia smithi* Schuster**

1′. Body more robust, head usually narrower than prothorax, always narrower than meso/metathorax or abdomen (Figs. 1, 3–8); body longer 2

2(1). Abdomen rounded laterally, lacking carinae separating tergites from ventrites for segments except shortly present at the basolateral margin of first visible abdominal segment (Fig. 5); *Batrisodes* [revision: Grigarick and Schuster 1962a] 3

2′. Abdomen angulate laterally, with lateral carinae separating tergites, paratergites, and ventrites from each other on segments 1–4 (Figs. 1, 3–4, 6–8) 4

3(2). Head with lateral vertexal carinae extending posteriorly from antennal tubercles to above eyes; both sexes with last tergite strongly projecting in lateral view (Figs. 10A–B) ..... ***Batrisodes denticauda* (Casey)**

3′. Head lacking lateral vertexal carinae; male with last tergite broadly rounded, only female with last tergite bluntly protruding (Figs. 9A–B) ..... **21. *Batrisodes albionicus* (Aubé)**

4(2). Maxillary palp with third (penultimate) segment elongate, more than half as long as last segment, inner margin protruding, fourth (apical) segment with narrow apical lobe (Figs. 7, 11); *Lucifotychus* [key: Grigarick and Schuster 1962b] 5

4′. Maxillary palp with third segment one-third or less length of last segment, mesal margin straight to evenly curved, fourth segment lacking apical lobe (Figs. 4, 6) 8

5(4). Elytra same color as prothorax and abdomen; male with strongly projecting metaventral tubercle just posterior to mesocoxae ..... **25. *Lucifotychus impellus* Park and Wagner**

5′. With elytra markedly lighter than prothorax and abdomen; male lacking metaventral tubercle 6

6(5). Male genitalia with parameres short, less than half as long as median lobe (Fig. 14) ..... **26. *Lucifotychus stellatus* (Grigarick and Schuster)**

6′. Male genitalia with parameres longer, almost reaching apex of median lobe (Figs. 12–13) 7

7(6). Male genitalia with ventral portion of median lobe laterally tuberculate near apex (Fig. 13) ..... **24. *Lucifotychus dentatus* (Grigarick and Schuster)**

7′. Male genitalia with ventral portion of median lobe lacking lateral tubercles (Fig. 12) ..... **23. *Lucifotychus cognatus* (LeConte)**

8(4). Last segment of maxillary palp enlarged, at least half as long as head, antennomere 1 elongate, as long as antennomeres 2–7 (Fig. 6); male with underside of head modified as prominent gular tubercle; *Pselaptrichus* [revision: Schuster and Marsh 1956] 9

8′. Last segment of maxillary palp not enlarged, at most one-third of head length (Figs. 2–4); antennomere 1 not as elongate, as long as antennomeres 2–4; male lacking modifications of head underside 13

9(8). Large, 2 mm or more in length; male gular tubercle widely emarginate at middle (Fig. 20) ..... **28. *Pselaptrichus rothi* Park**

9′. Smaller, 1.7 mm or less in length 10

10(9). Gular tubercle not raised medially (Fig. 21) ..... ***Pselaptrichus vanus* Schuster and Marsh**

10′. Gular tubercle raised at middle (Figs. 17–19) 11

11(10). Gular tubercle weakly bidentate at middle on anterior margin (Fig. 18) .....

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…… ***Pselaptrichus perditus* Schuster and Marsh**

11′. Gular tubercle emarginate on anterior margin …… 12

12(11). Gular tubercle with lateral flanges prominent, broadly truncate (Fig. 19) … …… ***Pselaptrichus perfidus* Schuster and Marsh**

12′. Gular tubercle with lateral flanges short, broadly rounded (Fig. 17) …… …… **27. *Pselaptrichus intimus* Schuster and Marsh**

13(8). Antenna with 3 antennomeres, antennomere 3 much longer than first two combined (Fig. 8); eyes absent [key: Wickham 1901] …… …… ***Adranes taylori* Wickham**

13′. Antenna with 11 antennomeres, last antennomere at most as long as previous segments combined (Figs. 1, 3–4); eyes present …… 14

14(13). Tarsi with first two tarsomeres short, last tarsomere long (Fig. 15); elytron with foveae at base and also on disc (Fig. 1); *Sonoma* [revision: Ferro 2016] 15

14′. Tarsi with second tarsomere as long or longer than third (Fig. 16); elytron with 2–4 foveae only at base (Figs. 3–4) 20

15(14). Head with frontal fovea circular to rounded-triangular, at most only slightly longer than width near base (Fig. 24) …. …… 16

15′. Head with frontal fovea elongate, expanded at apex, twice as long as width near base (Fig. 2) …… 17

16(15). Frontal fovea elongate; pronotum with discal foveae distinct; male genitalia with bifurcate median lobe (Fig. 27A); female abdominal ventrite 6 projecting at apex as rectangular lobe (Fig. 27B) …… …… **1. *Sonoma cascadia* Chandler**

16′. Frontal fovea small, circular; pronotum with discal foveae weak; male genitalia with apex of median lobe truncate (Fig. 28A); female abdominal ventrite 6 asymmetrically bidentate at middle, extending to touch ventrite 7 (Fig. 28B) .... **2. *Sonoma conifera* Chandler**

17(15). Antennomere 4 slender, almost half again as long as wide; male genitalia with median lobe curved laterally (Fig. 32A); female genitalia with ventrite 6 notched on left side (Fig. 32B) …… …… **6. *Sonoma parviceps* (Mäklin)**

17′. Antennomere 4 globose, about as long as wide …… 18

18(17). Male genitalia with median lobe broadly truncate at apex (Fig. 31A); female with ventrite 6 asymmetrically bilobed at apex (Fig. 31B) ..... **5. *Sonoma olycalida* Park and Wagner**

18′. Male genitalia with median lobe narrowly rounded or pointed at apex (Figs. 29A, 30A); female ventrite 6 different (Figs. 29B, 30B) …… 19

19(18). Male genitalia with apex of median lobe narrowly subtruncate (Fig. 29A); apex of female ventrite 6 acutely pointed at middle (Fig. 29B) ..... **3. *Sonoma hespera* Park and Wagner**

19′. Male genitalia with apex of median lobe pointed (Fig. 30A); apex of female ventrite 6 notched to right (Fig. 30B) ..... …… **4. *Sonoma margemina* Park and Wagner**

20(14). Mesotrochanter long, junction with femur less than one-half trochanter length (Fig. 23) …… ***Tyrus corticinus* (Casey)**

20′. Mesotrochanter short, junction with femur more than one-half trochanter length (Fig. 22) …… 21

21(20). Metacoxae widely separated (Fig. 25); pronotum lacking antebasal transverse sulcus; *Reichenbachia* [revision: Grigarick and Schuster 1967] …… 22

21′. Metacoxae contiguous or nearly so (Fig. 40); pronotum with antebasal transverse sulcus …… 24

22(21). Male with antennomeres 4 and 7–8 about same width (Fig. 35) …… …… ***Reichenbachia dorothyae* Park and Wagner**

22′. Male with antennomere 4 no more than two-thirds width of 7–8, 7–8 clearly transverse (Figs. 34, 36) …… 23

23(22). Male with antennomeres 5 and 6 similar in form, 6 only slightly narrower than 5 (Fig. 36), genitalia with 8 microspines .... **22. *Reichenbachia fusticornis* Casey**

23′. Male with antennomere 5 longer than 6, 6 clearly transverse (Fig. 34), genitalia with 4 microspines …… ……. ***Reichenbachia binodifer* Casey**

24(21). Prosternum with median longitudinal carina (Fig. 33B, mc) …… 25

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24′. Prosternum flat or with smooth raised median area 26

25(24). Elytron lacking subhumeral fovea .... **13.** ***Abdiunguis fenderi*** **Park and Wagner**

25′. Elytron with subhumeral fovea (Fig. 33A, shf) ..... **16.** ***Trisignis marshi*** **Park and Schuster**

26(24). Elytron lacking subhumeral fovea .... ****Tetrascapha dentata*** **Park and Wagner**

26′. Elytron with subhumeral fovea (Fig. 33A, shf) 27

27(26). Pronotal disc with faint to distinct median longitudinal sulcus or impression; antennal club gradually formed by last three antennomeres, last antennomere no longer than previous four antennomeres combined (Fig. 3) 28

27′. Pronotal disc convex; antennal club abruptly formed, last antennomere large, as long as previous seven antennomeres combined (Fig. 4) 35

28(27). Pronotum with median longitudinal sulcus thin, sharply defined throughout length from near pronotal apex to transverse antebasal sulcus (Fig. 3) 29

28′. Pronotum with margins of median longitudinal sulcus or impression poorly defined, often interrupted near transverse antebasal sulcus 32

29(28). Pronotal margin crenulate, lacking tooth near lateral antebasal foveae (Fig. 33A, laf); male with antennomeres 5–9 laterally expanded (Fig. 37), abdominal tergite 4 convex ..... **11.** ***Euboarhexius sinus*** **Grigarick and Schuster**

29′. Pronotal margin with tooth near lateral antebasal foveae (Fig. 4); males lacking modified antennomeres, tergite 4 basally sulcate or tuberculate; *Oropus* [revision: Schuster and Grigarick 1960] 30

30(29). Large, more than 2.0 mm long; tergite 1 slightly longer than second; male tergite 4 with transverse crescentiform sulcus (Fig. 40) .... **10.** ***Oropus striatus*** **(LeConte)**

30′. Smaller, less than 1.5 mm long; tergite 1 half again as long as second 31

31(30). Male with 20 or more facets forming eye, tergite 4 basally tuberculate (Fig. 38); female with 12 or more facets forming eye .... **8.** ***Oropus cavicauda*** **Casey**

31′. Male with 8 or fewer facets forming eye, tergite 4 with transverse basal sulcus (Fig. 39); female with 7 or fewer facets forming eye .... **9.** ***Oropus micropthalmus*** **Chandler**

32(28). Anteroprosternal foveae present (Fig. 33B, apf); lateral margins of body parallel in dorsal view .... **12.** ***Euplectus silvicolus*** **Chandler**

32′. Anteroprosternal foveae absent; with head clearly narrower than width across elytra in dorsal view 33

33(32). Lateral metasternal foveae present (Fig. 33B, lmf); head narrower than pronotum ..... ****Foveoscapha terracola*** **Park and Wagner**

33′. Lateral metasternal foveae absent; head as wide or wider than pronotum 34

34(33). Antennomere 10 triangular in lateral view; promesocoxal foveae present (Fig. 33B, pmf) ..... **14.** ***Euplecterga norstelcha*** **Grigarick and Schuster**

34′. Antennomere 10 quadrate in lateral view; promesocoxal foveae absent [revision: Chandler and Caterino 2011] .... **15.** ***Oropodes dybasi*** **Grigarick and Schuster**

35(27). Each elytron with three basal foveae; *Actium* in part [revision: Grigarick and Schuster 1971] 36

35′. Each elytron with two basal foveae 37

36(35). Male last ventrite with setose area longer than wide (Fig. 45) .... ****Actium fastosum*** **Grigarick and Schuster**

36′. Male last ventrite with setose area slightly wider than long (Fig. 46) .... **19.** ***Actium retractum*** **Casey**

37(35). Pronotum with longitudinal sulcus extending posteriorly from median antebasal fovea (Fig. 33A, maf) to pronotal base complete (Fig. 41); body dark brown; male with ventrite 3 deeply and broadly excavate laterally (Fig. 44) [revision: Grigarick and Schuster 1968] .... **20.** ***Cupila excavata*** **Park and Wagner**

37′. Pronotum with longitudinal sulcus extending posteriorly from median antebasal fovea abbreviated, not reaching pronotal base (Fig. 4); body lighter in color; male lacking broad lateral excavations on ventrites; *Actium* in part [revision: Grigarick and Schuster 1971] 38

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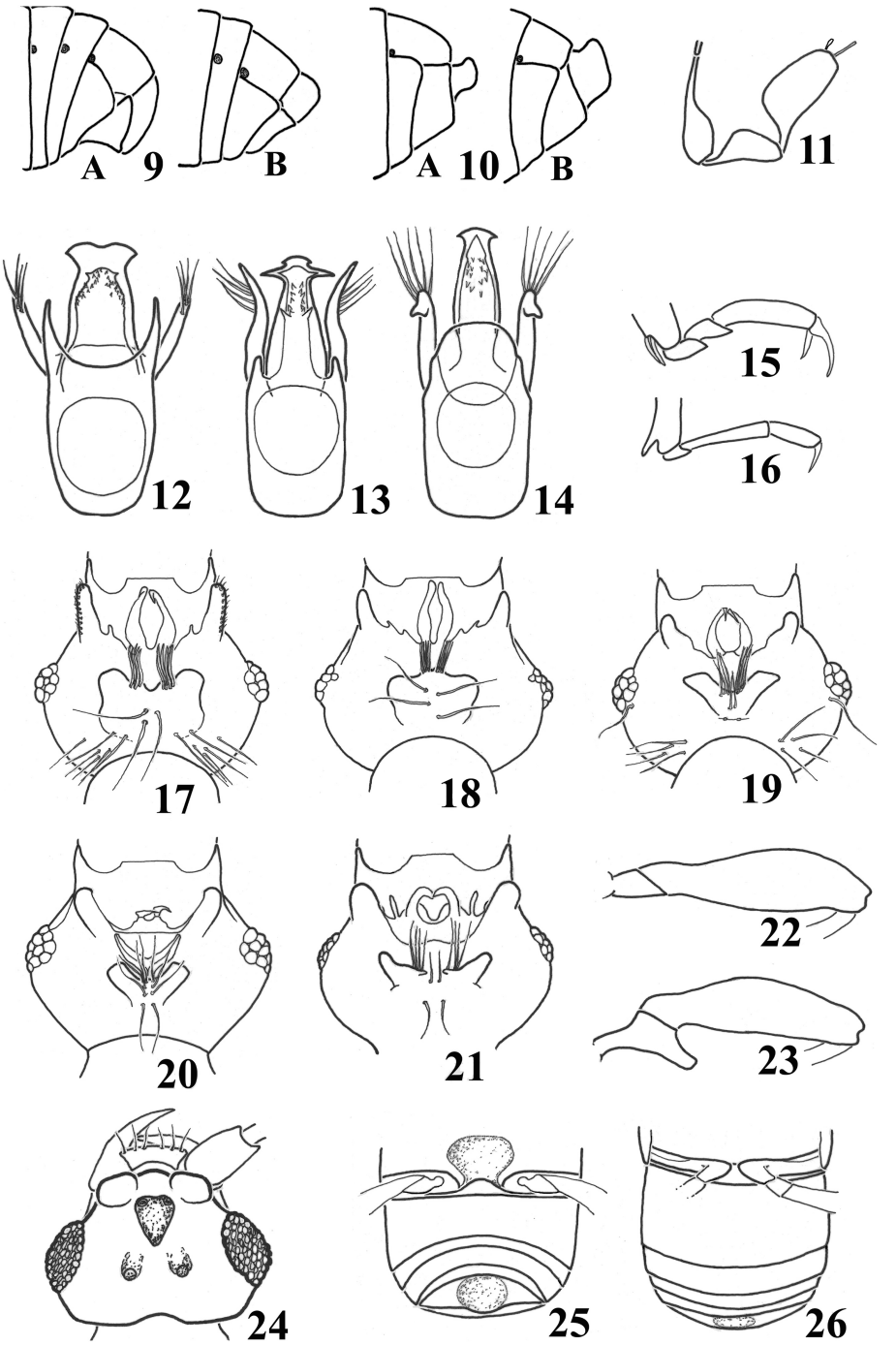

Figs. 9–26. Details of morphology. Left lateral view of A) Male abdomen, B) Female abdomen: **9)** *Batrisodes albionicus*; **10)** *B. denticauda* male. **11)** *Lucifotychus impellus*, dorsal view of right maxillary palpus. Dorsal view of male genitalia of *Lucifotychus* species: **12)** *L. cognatus*; **13)** *L. dentatus*; **14)** *L. stellatus*. Lateral view of metatarsus: **15)** *Sonoma hespera*; **16)** *Reichenbachia binodifer*. *Pselaptrichus* species, ventral view of gular area: **17)** *P. intimus*; **18)** *P. perditus*; **19)** *P. perfidus*; **20)** *P. rothi*; **21)** *P. vanus*. Posterior view of right mesotrochanter and femur: **22)** *Reichenbachia binodifer*; **23)** *Tyrus corticinus*. **24)** *Sonoma cascadia*, dorsal view of head. Ventral view of metaventrite and abdomen: **25)** *Reichenbachia binodifer*; **26)** *Oropus striatus*.

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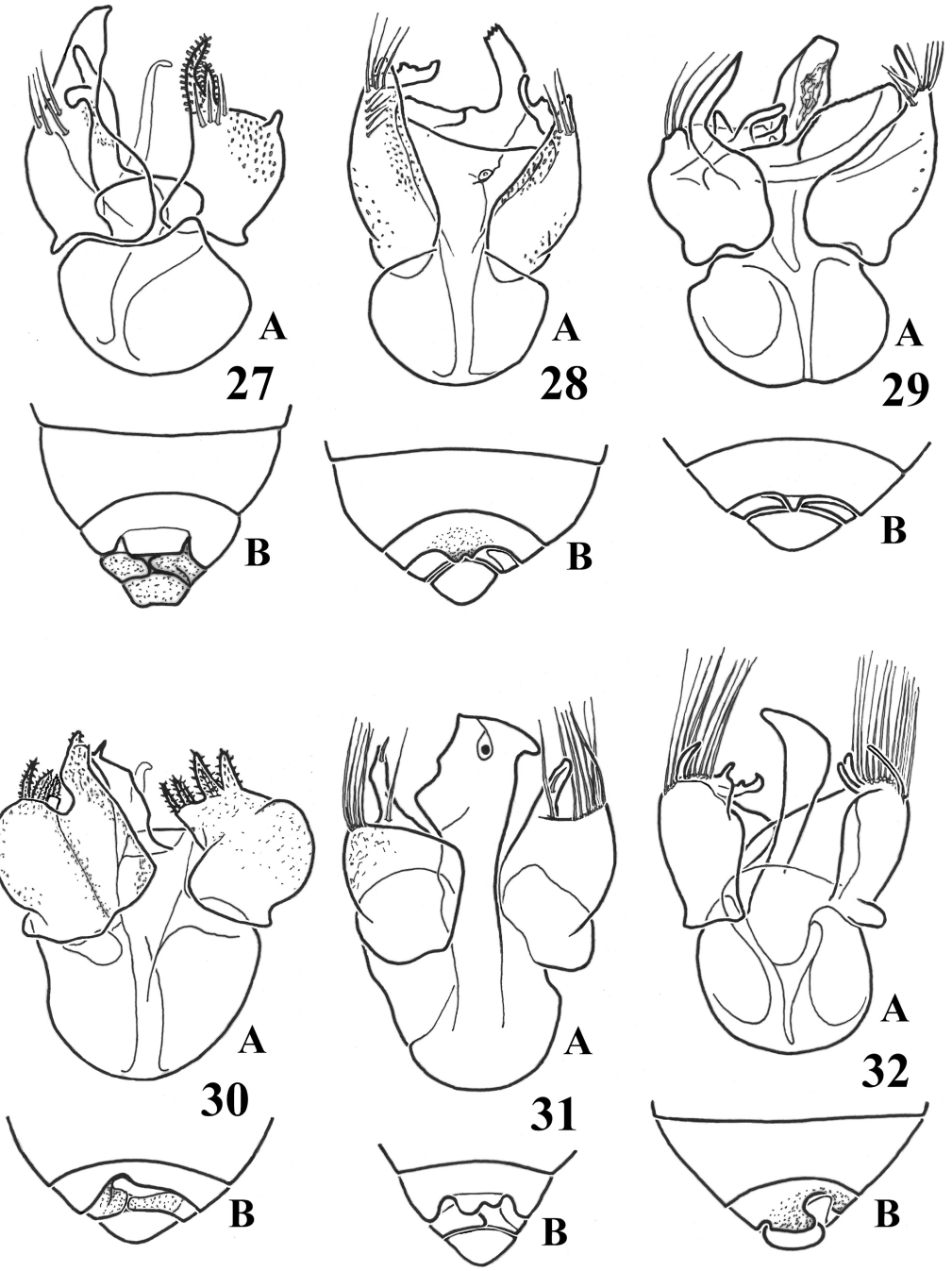

Figs. 27–32. *Sonoma* species, A) Dorsal view of male genitalia, B) Ventral view of female abdominal apex: **27)** *S. cascadia*; **28)** *S. conifera*; **29)** *S. hespera*; **30)** *S. margemina*; **31)** *S. olycalida*; **32)** *S. parviceps*.

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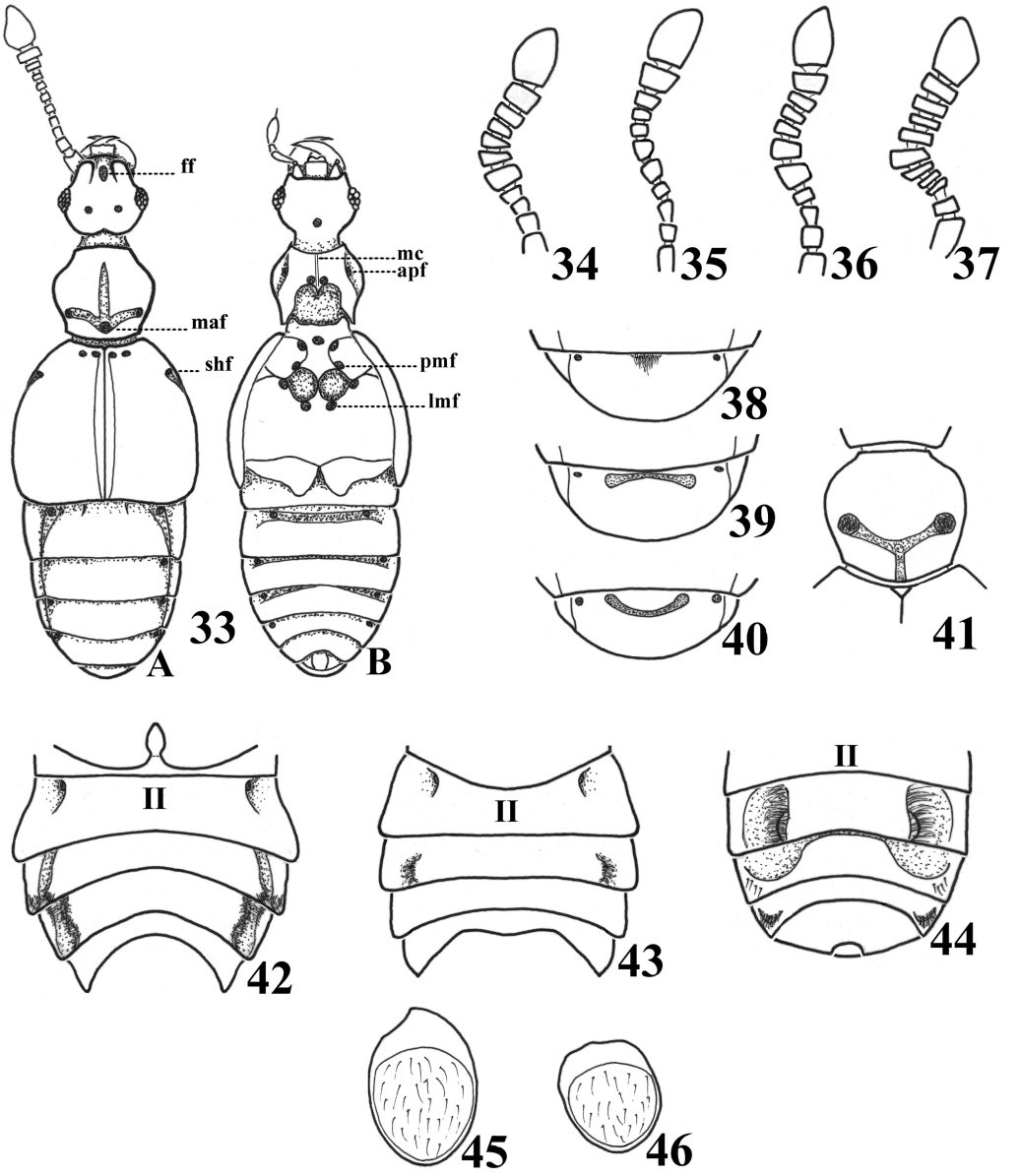

Figs. 33–46. **33)** Generalized member of Trichonychina, A) Dorsal view, B) Ventral view. Structures identified: A (dorsal), ff - frontal fovea, maf - median antebasal fovea, shf - subhumeral fovea. B (ventral), apf - anteroprosternal fovea, lmf - lateral metasternal fovea, mc - median carina of prosternum, pmf - promesosternal fovea. Anterodorsal view of male antenna: **34)** *Reichenbachia binodifer*; **35)** *R. dorothyae*; **36)** *R. fusticornis*; **37)** *Euboarhexius sinus*. Dorsal view of male tergite 4: **38)** *Oropus cavicauda*; **39)** *O. micropthalmus*; **40)** *O. striatus*. **41)** *Cupila excavata*, dorsal view of pronotum. Ventral view of male abdomen: **42)** *Actium barri*; **43)** *A. tentum*; **44)** *Cupila excavata*. Ventral view of male ventrite 6 (penial plate): **45)** *Actium fastosum*; **46)** *A. retractum*.

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38(37). Eye with 5 or fewer facets .... **18. *Actium microphthalmum* Park and Wagner**

38′. Eye with 20 or more facets 39

39(38). Male with ventrites 3–4 tuberculate and impressed laterally (Fig. 42) .... **17. *Actium barri* Park and Wagner**

39′. Male with ventrite 3 bearing small setose lobe laterally, ventrite 4 simple laterally (Fig. 43) ..... ***Actium tentum* Grigarick and Schuster**

Species Accounts

1. *Sonoma cascadia* Chandler, 1986

(Figs. 24, 27A–B)

Specimens Examined (3). Road 1508, 1750′, I-24-1981, G. Cassis, site 5, old-growth, *Tsuga*/*Pseudotsuga* litter (1); 1450′, R. S. 7, V-13-1983, D. S. Chandler, old-growth, sift rotten Douglas-fir (1); Road 359, 4000′, V-16/VI-5-1985, G. L. Parsons, old-growth, pitfall (1).

Biology. Old-growth, 3. This species has been collected in Douglas-fir leaf and log litter in old-growth areas (Chandler 1986). The three specimens were collected during the winter and spring at a range of elevations in the forest.

Distribution. Known from southern Alaska (Prince of Wales Island) to west-central Oregon (Ferro 2016).

2. *Sonoma conifera* Chandler, 1986

(Figs. 28A–B)

Specimens Examined (9). Road 1508, 1750′, I-24-1981, G. Cassis, sitem 5, old-growth, *Tsuga*/*Pseudotsuga* litter (1); Road 1506, 1750′, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (1); Road 1508, 1750′, II-19-1979, G. Cooper, old-growth, moss (1); Road 359, 4100′, V-13-1984, D. S. Chandler, old-growth area, sift alder litter (1); Road 1506, 1800′, IX-26-1983, G. L. Parsons, site 31, 1950 clearcut, litter (1); R. S. 7, 1500′, Road 1506, X-19-1983, G. L. Parsons, site 32, old-growth, litter (1); Road 1507, 2900′, IX-13-1982, G. L. Parsons, site 11, 1951 clearcut, pitfall (1); Watershed 1, 1900′, IX-22-1982, G. L. Parsons, site 18, 1963–66 clearcut, pitfall (1); Road 359, 4000′, VII-29/IX-24-1985, G. L. Parsons, old-growth, pitfall (1).

Biology. Old-growth, 5; 1950 clearcut, 1; 1951 clearcut, 1; 1963–66 clearcut, 1; 1970 clearcut, 1. *Sonoma conifera* has been found primarily in mature/old-growth forests at all elevations in the Experimental Forest. It was collected in Douglas-fir and alder leaf litters primarily during the fall, winter, and spring, and has been taken elsewhere in various confier litters (Chandler 1997).

Distribution. Known from the Cascade and Coast Range Mountains in northwest-central Oregon (Ferro 2016).

3. *Sonoma hespera* Park and Wagner, 1962

(Figs. 1, 15, 29A–B)

Specimens Examined (55). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (2); Road 1508, 1750′, I-24-1981, G. Cassis, site 5, old-growth, *Tsuga*/*Pseudotsuga* litter (3); Road 320, 2000′, II-21-1981, G. Cassis, site 7, old-growth, *Pseudotsuga* litter (1); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (2); Road 1506, 2500′, L301A, III-12-1981, G. Cassis, site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (1); Road 1507, 2000′, III-25-1981, G. Cassis, site 10, old-growth, *Tsuga* litter (2); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (1); Road 360, 2600′, nr. L113, III-14-1979, G. Cooper, moss (1); 1 mi N Lookout Mtn., 3250′, V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir litter (1); Road 1506, Watershed 1, 1400′, V-14-1984, D. S. Chandler, 1963–66 clearcut, Berlese moss by stream (1); Road 130, 1650′, V-12-1984, D. S. Chandler, old-growth, sift *Castanopsis* duff (1); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift forest litter by stream (1); R. S. 20, 2250′, Road 134, V-12-1984, D. S. Chandler, old-growth, sift oak & Douglas-fir litter (1); Junction Road 1507 & 465, 2600′, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir & *Rhododendron* litter (1), sift Douglas-fir and fern leaf litter (1); Road 1507, 2850′, V-12-1984, D. S. Chandler, 1951 clearcut, sift *Castanopsis* litter (2); Road 350, 3700′, V-11-1984, D. S. Chandler, 1960 clearcut, sift *Ceanothus* & vine maple litter (3); Road 1506, 4000′, V-17-1984, D. S. Chandler, old-growth, sift silver fir leaf litter (2); Road 350, 4050′, V-11-1984, D. S. Chandler, old-growth, sift Douglas-fir leaf litter (1), sift Douglas-fir rotten log (1); Road 359, 4050′, V-13-1984, D. S. Chandler, sift forest litter by stream; Road 130, 1900′, IX-30-1982 (1), V-12-1984 (1), G. L. Parsons, site 8, old-growth, litter; Road 134, Watershed 10, 1850′, IX-30-1982, G. L. Parsons, site 17, 1975 clearcut, litter (1); Watershed 1, 1900′, VII-9-1983, G. L. Parsons, site 18, 1963–66 clearcut, litter (1); Road 1506, 1750′, XI-2-1982 (2), IX-6-1983 (4), V-7-1984 (1), G. L. Parsons, site 19, 1950 clearcut, litter; R. S. 2, Road 1506, 1550′, IV-14-1983, G. L. Parsons, site 20, old-growth, litter (1); Road 359, 4000′, V-16/VI-5-1985 (3), VI-5/20-1985 (2), IX-24/X-25-1985 (1), G. L. Parsons, old-growth, pitfall; Road 359, 4000′, V-16/VI-5-1985 (2), VI-5/20-1985 (2), VIII-29/IX-24-

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1985 (2), IX-24/X-25-1985 (1), G. L. Parsons, 1985 clearcut, pitfall.

Biology. Old-growth, 24; 1950 clearcut, 7; 1951 clearcut, 2; 1954 clearcut, 1; 1959 clearcut, 1; 1960 clearcut, 3; 1963–66 clearcut, 2; 1970 clearcut, 3; 1975 clearcut, 1; 1985 clearcut, 7. This species was collected primarily in Douglas-fir and fir leaf litters, but was also taken in a variety of other leaf litters (Chandler 1997). Almost all records are from the fall, winter, and spring, with the few early summer records at the higher elevations. Collected at all elevations in the Experimental Forest, with about half the specimens obtained from mature and old-growth forests.

Distribution. Extreme northern California to southern British Columbia (Ferro 2016).

4. *Sonoma margemina* Park and Wagner, 1962
(Figs. 30A–B)

Specimen Examined. 2000′, clearcut 502, V-13-1983, D. S. Chandler, 1959 clearcut, sift alder litter and rotten wood, spring area.

Biology. The single specimen was obtained from alder litter and rotten wood at a grassy spring at low elevation. Other specimen records are from pitfalls in a supratidal meadow (Alaska), from under a rotten log, and from alder leaf litter (Chandler 1997, 2001b); Ferro (2016) noted collections from mosses with fungi, and moss with alder litter, as well as from an old-growth *Abies procera* forest.

Distribution. From montane west-central Oregon to southern Alaska (Ferro 2016).

5. *Sonoma olycalida* Park and Wagner, 1962
(Figs. 31A–B)

Specimens Examined (20). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (1); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (3); Road 350, 4800′, IX-19-1981, G. Cassis, site 23, old-growth, *Abies*/*Tsuga* litter (1); 1 mi N Lookout Mtn., 3250, V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir litter (2); Road 1506, 4000′, V-17-1984, D. S. Chandler, old-growth, sift silver fir leaf litter (2); Road 350, 4050′, V-11-1984, D. S. Chandler, old-growth, sift Douglas-fir leaf litter (2), sift Douglas-fir rotten log (1); Road 359, 4050′, V-13-1984, D. S. Chandler, sift forest litter by stream (1); Road 1507, 2900′, VII-18-1982 (1), VIII-2-1983 (1), G. L. Parsons, site 11, 1951 clearcut, pitfall; Road 1506, 1800′, IX-6-1982, G. L. Parsons, site 31, 1950 clearcut, pitfall (1); Road 359, 4000′, V-16/VI-5-1985, G. L. Parsons, pitfall, old-growth (2), 1985 clearcut (1); Road 1506, 3150′, VI-5/10-1986, G. L. Parsons, old-growth, ex: sticky trap on *Abies amabilis* (1).

Biology. Old-growth, 11; 1950 clearcut, 1; 1951 clearcut, 2; 1959 clearcut, 3; 1970 clearcut, 1; 1985 clearcut, 1. Collected primarily from Douglas-fir and fir leaf litters at elevations above 3000′ (Chandler 1997). Found occasionally through the year, with half of the specimens collected in old-growth sites during the spring. Ferro (2016) noted several collections from old-growth *Abies procera* forests.

Distribution. Mountains of west-central Oregon north to southern British Columbia (Ferro 2016).

6. *Sonoma parviceps* (Mäklin, 1852)
(Figs. 32A–B)

Specimens Examined (11). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (1); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (2); Junction Roads 1507 & 465, 2600′, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir & fern leaf litter (1); Road 360, 2450′, VII-6-1982, G. L. Parsons, site 22, 1965 clearcut, pitfall (2); Road 300, 1900′, IX-22-1982, G. L. Parsons, site 32, old-growth, pitfall (1); Road 359, 4000′, V-16/VI-5-1985, G. L. Parsons, 1985 clearcut, pitfall (1); Road 1506, 3150′, VI-5/10-1986, G. L. Parsons, old-growth, ex: sticky trap on *Abies amabilis* (3).

Biology. Old-growth, 5; 1959 clearcut, 2; 1965 clearcut, 2; 1970 clearcut, 1; 1985 clearcut, 1. Collected throughout the year at moderate to high elevations. Apparently associated with Douglas-fir leaf litter, with half the specimens obtained from old-growth. Found in a wide variety of leaf litters and in rotten conifer logs (Chandler 1997, 2001b), and is more of a mature forest species based on records from sites outside of the HJA.

Distribution. Coastal California from San Luis Obispo County to southern Alaska in the Coast Range and Cascade Mountains area (Ferro 2016).

7. *Mayetia smithi* Schuster, 1961
(Fig. 2)

Specimens Examined (3). R. S. 2, Road 1506, 1550′, VII-1-1982 (2), IX-22-1982 (1), G. L. Parsons, site 20, old-growth, litter. Three females were collected, but males are needed to confirm this identification. *Mayetia smithi* was described from Douglas County, Oregon, and is the only species of *Mayetia* known from Oregon.

Biology. All three specimens are from the same old-growth site at low elevation (472 m) in the Experimental Forest. The two collections are from early and late summer.

Distribution. West-central Oregon.

8. *Oropus cavicauda* Casey, 1894
(Fig. 38)

Specimens Examined (284). Road 1508, 1800′, L401, IX-28-1981, G. Cassis, site 27, 1952 clearcut, *Pseudotsuga* and fern litter (2); Watershed 10, X-26-1972, J. Wernz, 1975 clearcut (1); 1850′, nr. cut L501, V-13-1983, D. S. Chandler, 1952–53 clearcut, sift fern and vine maple litter (3); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift cedar litter by stream (1); Lookout Creek, 1750′, V-13-1984, D. S. Chandler, bigleaf maple litter (1); 2 mi N Rainbow, Road 720, 1800′, X-27-1982 (5), IX-19-1983 (7), IV-26-1984 (5), G. L. Parsons, site 5, 1978 clearcut,

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litter; Road 1506, 1900′, Lookout Creek, VII-6-1982 (5), IX-1-1982 (1), X-27-1982 (4), V-11-1983 (2), VII-4-1983 (1), IX-6-1983 (4), X-26-1983 (3), V-7-1984 (11), G. L. Parsons, site 6, 1963 clearcut, litter; Road 1506, 1900′, Lookout Creek, VII-6-1982 (18), IX-1-1982 (8), X-27-1982 (11), V-11-1983 (1), VII-4-1983 (2), IX-6-1983 (16), X-26-1983 (3), V-7-1984 (10), litter, VII-4-1983 (1), pitfall, G. L. Parsons, site 7, 1954–55 clearcut; Road 130, 1900′, VII-10-1982 (7), IX-30-1982 (1), XI-22-1982 (1), VII-11-1983 (1), IX-21-1983 (2), litter, VII-11-1983 (1), pitfall, G. L. Parsons, site 8, old-growth, litter; Watershed 1, Road 1506, 1700′, VII-9-1983, G. L. Parsons, site 14, 1963–66 clearcut, pitfall (1); Road 134, Watershed 10, 1850′, VII-10-1982 (1), IX-30-1982 (4), XI-22-1982 (3), VII-11-1983 (1), IX-21-1983 (1), V-24-1984 (12), G. L. Parsons, site 17, 1975 clearcut, litter; Watershed 1, 1900′, VII-14-1982 (4), IX-22-1982 (2), XII-5-1982 (2), VII-9-1983 (2), IX-28-1983 (4), VI-2-1984 (2), G. L. Parsons, site 18, 1963–66 clearcut, litter; Road 1506, 1750′, VII-14-1982 (13), IX-6-1982 (4), XI-2-1982 (2), V-11-1983 (2), VII-4-1983 (1), IX-6-1984 (9), V-7-1984 (4), litter, VII-14-1982 (1), VII-4-1983 (1), pitfall, G. L. Parsons, site 19, 1950 clearcut; Watershed 1, 1600′, end Road 115, VII-18-1982 (5), IX-22-1982 (14), IV-21-1983 (5), VII-9-1983 (6), IX-28-1983 (4), VI-2-1984 (6), G. L. Parsons, site 30, 1963–66 clearcut; R. S. 7, 1500′, Road 1506, VII-1-1982 (26), IV-14-1983 (1), VIII-24-1983 (1), G. L. Parsons, site 32, old-growth, litter.

Biology. Old-growth, 17; 1950 clearcut, 37; 1952 clearcut, 5; 1954–55 clearcut, 70; 1963 clearcut, 31; 1963–66 clearcut, 53; 1975 clearcut, 23; 1978 clearcut, 17. This species is most abundant in younger forests, especially those 7–35 years old (Table 2); it has been rarely taken in old-growth. *Oropus cavicauda* is most abundant in the dry lower elevations of the Experimental Forest and is most commonly taken during the spring and summer and has been found in a wide variety of leaf litters (Chandler 1997).

Distribution. From the foothill and mountain areas of north-central California through the mountains of western Oregon.

Comments. This species was originally identified as *Oropus schusteri* Chandler for this study and specimens of that time were labeled as such, but this name was later placed as a junior synonym of *O. cavicauda* by Chandler (2003).

9. *Oropus micropthalmus* Chandler, 1986
(Fig. 39)

Specimens Examined (65). Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (2); Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (5); Road 320, 2000′, II-21-1981, G. Cassis, site 7, old-growth, *Pseudotsuga* litter (1); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (1); Road 1507, 2000′, III-25-1981, G. Cassis, site 10, old-growth, *Tsuga* litter (2); Watershed 10, X-5-1972, XI-15-1972, II-26-1973, J. Wernz, 1975 clearcut (4); Road 1506, 1900′, Lookout Creek, V-7-1984, G. L. Parsons, site 6, 1963 clearcut, litter (1); Road 130, 1900′, IX-30-1982 (5), IV-27-1983 (1), V-12-1984 (1), G. L. Parsons, site 8, old-growth, litter; Road 1507, 2850′, VII-18-1982, G. L. Parsons, site 15, 1951 clearcut, pitfall (1); Road 134, Watershed 10, 1850′, IX-30-1982 (2), IV-27-1983 (2), G. L. Parsons, site 17, 1975 clearcut, litter; Watershed 1, 1900′, IX-22-1982, G. L. Parsons, site 18, 1963–66 clearcut, litter (2); Road 1506, 1750′, XI-2-1982 (2), V-7-1984 (1), G. L. Parsons, site 19, 1950 clearcut, litter; R. S. 2, Road 1506, 1550′, VII-1-1982 (1), IV-14-1983 (2), IV-26-1984 (2), G. L. Parsons, site 20, old-growth, litter; Road 360, 2150′, IX-6-1982, G. L. Parsons, site 25, 1976 clearcut (1); Watershed 1, 1600′, end Road 115, VII-18-1982 (1), IX-22-1982 (1), G. L. Parsons, site 30, 1963–66 clearcut, litter; Road 1506, 1800′, VII-18-1982 (1), IX-6-1982 (2), XI-2-1982 (1), V-11-1983 (1), V-7-1984 (2), G. L. Parsons, site 31, 1950 clearcut, litter; R. S. 7, 1500′, Road 1506, VII-1-1982 (3), IX-22-1982 (4), IV-14-1983 (4), X-19-1983 (1), IV-26-1984 (4), G. L. Parsons, site 32, old-growth, litter.

Biology. Old-growth, 31; 1950 clearcut, 10; 1951 clearcut, 1; 1959 clearcut, 5; 1963 clearcut, 1; 1963–66 clearcut, 5; 1970 clearcut, 1; 1975 clearcut, 10; 1976 clearcut, 1. Collected from Douglas-fir, fir, and hemlock litters, and found primarily at the lower elevations of the Experimental Forest. This species is most abundant in moister sites and in mature or old-growth-forests, but it is present throughout the year and has been collected from forests of a range of ages (Table 2) (Chandler 1997).

Distribution. Known only from the Cascade Mountains of west-central Oregon.

10. *Oropus striatus* (LeConte, 1874)
(Figs. 3, 26, 40)

Specimens Examined (476). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (21); Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (5); Road 1508, 1750′, I-24-1981, G. Cassis, site 5, old-growth, *Tsuga*/*Pseudotsuga* litter (2); Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (2); Road 320, 2000′, II-21-1981, G. Cassis, site 7, old-growth, *Pseudotsuga* litter (20); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (26); Road 1506, 2500′, L301A, III-12-1981, G. Cassis, site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (6); Road 1507, 2000′, III-25-1981, G. Cassis, site 10, old-growth, *Tsuga* litter (9); Road 1506, 1.3 mi N Frissell Point, 4800′,V-23-1981, G. Cassis, site 16, meadow, *Pseudotsuga*/*Abies* litter (1); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (3); T15S R5E S26 sw1/4, III-14-1979, G. Cooper (15); T15S R5E S31 sw1/4, I-29-1979, II-19-1979, G.

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Cooper (2); Clearcut L502, V-17-1973, M. Mispagel, 1959 clearcut, 48 hour pitfall (1); Clearcut L107, V-30-1973, M. Mispagel, 1951 clearcut, 48 hour pitfall (1); old-growth Douglas-fir, V-23-1973, M. Mispagel, 48 hour pitfall (1); Watershed 10, XI-15-1972, J. Wernz, 1975 clearcut (1); N end Blue River Reservoir, V-13-1983, D. S. Chandler, sift bark, alder leaves and mushrooms (1); R. S. 7, 1450′, V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir litter (3); 3250′, 1 mi N Lookout Mtn., V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir litter (1); Road 1506, Watershed 1, 1400′, V-14-1984, D. S. Chandler, 1963–66 clearcut, Berlese moss by stream (1); Road 130, 1650′, V-12-1984, D. S. Chandler, old-growth, sift *Castanopsis* duff (2); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift rotten wood (5), sift cedar litter by stream (1); Lookout Creek, 1750′, V-12-1984, D. S. Chandler, flying (1); McRae Creek, 1800′, V-17-1984, D. S. Chandler, sift litter by stream (1); McRae Creek, 1800′, V-13-1984, D. S. Chandler, sift maple, fern & grass litter by stream (3); Lookout Creek, 1950′, V-13-1984, D. S. Chandler, old-growth, sift bigleaf maple litter (2), sift cedar litter (1); R. S. 20, 2250′, Road 134, V-12-1984, D. S. Chandler, old-growth, sift rotten Douglas-fir log (1), sift Douglas-fir & vine maple litter (6); Junction Roads 1507 & 465, 2600′, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir/*Rhododendron* duff (1); Road 1506, 2700′, V-17-1984, D. S. Chandler, old-growth, sift Douglas-fir litter by stream (2); Road 1507, 2850′, V-12-1984, D. S. Chandler, 1951 clearcut, sift *Castanopsis* litter (2); Road 1506, 3500′, V-14-1984, D. S. Chandler, old-growth, Berlese moss by stream (2), Berlese moss on hill (1); Road 1506, 3500′, V-15-1984, D. S. Chandler, old-growth, sift Douglas-fir litter (8); Road 350, 3700′, V-11-1984, D. S. Chandler, 1960 clearcut, sift *Ceanothus* and vine maple litter (6); Road 1506, 4000′, V-17-1984, D. S. Chandler, old-growth, sift silver fir leaf litter (3), sift rotten logs (2); Road 350, 4050′, V-11-1984, D. S. Chandler, old-growth, sift Douglas-fir rotten logs (7), sift Douglas-fir leaf litter (2); Road 359, 4050′, V-13-1984, D. S. Chandler, sift forest litter by stream (1); Road 359, 4100′, V-13-1984, D. S. Chandler, old-growth, sift alder litter (1); R. S. 20, Road 134, 2300′, IX-30-1982, G. L. Parsons, site 4, old-growth, pitfall (1); 2 mi N Rainbow, Road 720, 1800′, X-27-1982 (1), X-19-1983 (1), litter, VII-1-1982 (1), IX-6-1982 (1), IV-14-1983 (3), pitfall, G. L. Parsons, site 5, 1978 clearcut, litter; Road 1506, 1900′, Lookout Creek, VII-6-1982 (1), IX-1-1982 (1), X-27-1982 (2), V-11-1983 (1), VII-4-1983 (3), IX-6-1983 (1), X-26-1983 (11), V-7-1984 (3), litter, VII-6-1982 (1), IX-1-1982 (5), pitfall, G. L. Parsons, site 6, 1963 clearcut; Road 1506, 1900′, Lookout Creek, VII-6-1982 (4), IX-1-1982 (2), X-27-1982 (6), V-11-1983 (5), VII-4-1983 (1), IX-6-1983 (4), X-26-1983 (11), V-7-1984 (7), litter, IX-1-1982 (2), VII-4-1983 (1), pitfall, G. L. Parsons, site 7, 1954–55 clearcut; Road 130, 1900′, VII-10-1982 (7), IX-30-1982 (7), XI-22-1982 (4), IV-27-1983 (5), VII-11-1983 (3), IX-21-1983 (15), V-12-1984 (11), site 8, old-growth, litter; Watershed 1, Road 1506, 1700′, VII-14-1982 (2), IX-1-1982 (2), IX-1-1982 (1), G. L. Parsons, site 10, 1963–66 clearcut, pitfall; Road 1507, 2900′, VII-18-1982 (2), VIII-2-1983 (1), G. L. Parsons, site 11, 1951 clearcut, pitfall; Watershed 1, Road 1506, 1700′, IX-1-1982 (2), VII-9-1983 (2), G. L. Parsons, site 14, 1963–66 clearcut, pitfall; Road 1507, 2850′, VIII-2-1983 (1), G. L. Parsons, site 15, 1951 clearcut, pitfall; Road 134, Watershed 10, 1850′, VII-10-1982 (2), IX-30-1982 (4), XI-22-1982 (1), IV-27-1983 (1), IX-21-1983 (6), V-24-1984 (4), G. L. Parsons, site 17, 1975 clearcut, litter; Watershed 1, 1900′, VII-14-1982 (3), IX-22-1982 (8), XII-5-1982 (5), IV-21-1983 (2), IX-28-1983 (7), VI-2-1984 (9), litter, IX-22-1982 (6), VII-9-1983 (1), pitfall, G. L. Parsons, site 18, 1963–66 clearcut; Road 1506, 1750′, VII-14-1982 (5), IX-6-1982 (4), XI-2-1982 (3), V-11-1983 (1), VII-4-1983 (2), IX-6-1983 (3), X-26-1983 (2), V-7-1984 (3), G. L. Parsons, site 19, clearcut 1950, litter; R. S. 2, Road 1506, 1550′, VII-1-1982 (2), IX-22-1982 (7), X-27-1982 (2), IV-14-1983 (1), VI-21-1983 (1), X-19-1983 (2), IV-26-1984 (1), litter, VII-1-1982 (1), VI-21-1983 (2), pitfall, G. L. Parsons, site 20, old-growth; Road 360, 2450′, IX-6-1982, G. L. Parsons, site 22, 1965 clearcut, pitfall (2); Road 1507, 1850′, VII-4-1983, G. L. Parsons, site 23, 1950 clearcut, pitfall (1); Road 360, 2150′, IX-6-1982 (2), IX-13-1983 (2), V-29-1984 (1), G. L. Parsons, site 25, 1976 clearcut, litter; Watershed 1, 1600′, end Road 115, VII-18-1982 (3), IX-22-1982 (9), XII-5-1982 (8), V-11-1983 (2), VII-9-1983 (2), IX-28-1983 (1), VII-2-1984 (6), litter, VII-18-1982 (1), IX-22-1982 (1), pitfall, G. L. Parsons, site 30, 1963–66 clearcut; Road 1506, 1800′, XI-2-1982 (1), IX-6-1983 (2), G. L. Parsons, site 31, 1950 clearcut, litter; R. S. 7, 1500′, Road 1506, VII-1-1982 (7), IX-22-1982 (6), IV-14-1983 (5), VI-21-1983 (6), VIII-24-1983 (1), IV-26-1984 (2), G. L. Parsons, site 32, old-growth, litter.

Biology. Old-growth, 183; 1950 clearcut, 27; 1951 clearcut, 7; 1954 clearcut, 6; 1954–55 clearcut, 43; 1959 clearcut, 6; 1960 clearcut, 6; 1963 clearcut, 29; 1963–66 clearcut, 84; 1965 clearcut, 2; 1970 clearcut, 47; 1975 clearcut, 24; 1976 clearcut, 5; 1978 clearcut, 7. *Oropus striatus* has been collected in many different leaf litters at all elevations of the Experimental Forest. This species is most abundant in the drier sites, and is common in all successional stages of the forests except the youngest (herb stage) clearcuts (Table 2). *Oropus striatus* adults are present throughout the year, but are most common during the

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winter, spring, and late summer, and individuals are found in a wide variety of leaf litters throughout the range of this species (Chandler 1997, 2001b).

Distribution. A common species ranging from northwestern California to northern British Columbia (Chandler 2001b).

11. *Euboarhexius sinus* Grigarick and Schuster, 1966

(Fig. 37)

Specimens Examined (7). R. S. 20, 2250′, Road 134, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir & vine maple litter (1), sift rotten Douglas-fir log (1); Road 130, 1800′, VII-11-1982, G. L. Parsons, site 3, 1960 clearcut, pitfall (2); Watershed 10, Road 143, VII-9-1983, G. L. Parsons, site 13, 1975 clearcut, pitfall (1); Watershed 1, Road 1506, 1700′, VII-14-1983, G. L. Parsons, site 14, 1963–66 clearcut, pitfall (1); Road 134, Watershed 10, 1850′, IX-21-1983, G. L. Parsons, site 17, 1975 clearcut, litter (1).

Biology. Old-growth, 2; 1960 clearcut, 2; 1963–66 clearcut, 1; 1975 clearcut, 2. This species has been collected in forests of all ages at the lower elevations of the Experimental Forest. All of these sites are comparatively dry based on the criteria of Dyrness *et al.* (1974). Most of the specimens were obtained during the summer. Outside of the HJA this species has been taken from Douglas-fir and vine maple leaf litters (Chandler 1997).

Distribution. Northwestern California to west-central Oregon.

12. *Euplectus silvicolus* Chandler, 1986

Specimen Examined. Lookout Creek, 1750′, V-12-1984, D. S. Chandler, flying. A single female was collected and is placed as this species by its somewhat larger size and the presence of the baso-longitudinal carinae on the first three tergites.

Biology. *Euplectus silvicolus* has been collected in New Hampshire almost entirely from old-growth forests (Chandler 1986a). The adults have been found in rotting conifer logs in New Hampshire (Chandler 1997).

Distribution. Maine and Nova Scotia to west-central Oregon.

13. *Abdiunguis fenderi* Park and Wagner, 1962

Specimens Examined (14). Road 1506, 3900′, V-14-1984, D. S. Chandler, 1965 clearcut, Berlese moss in spring (4); Road 350, 4000′, V-11-1984, D. S. Chandler, old-growth, Berlese moss in spring (10).

Biology. Old-growth, 10; 1965 clearcut, 4. *Abdiunguis fenderi* was collected during May at high elevations from moss in spring areas, which is the habitat recorded for other sites (Chandler 1997).

Distribution. Montane west-central Oregon to western Washington.

14. *Euplecterga norstelcha* Park and Wagner, 1976

Specimen Examined. Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter.

Biology. A single male of this species was collected from a 22-year-old clearcut in Douglas-fir litter (Chandler 1997). This record is from a low elevation site in the Experimental Forest.

Distribution. West-central Oregon.

15. *Oropodes dybasi* Grigarick and Schuster, 1976

Specimens Examined (22). Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (1); Road 1506, 2500′, L301A, III-12-1981, G. Cassis, site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (1); R. S. 7, 1450′, V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir leaf litter & moss (1); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift cedar litter by stream (1); Lookout Creek, 1950′, V-13-1984, D. S. Chandler, old-growth, sift bigleaf maple litter (1); Road 1506, 3500′, V-14-1984, D. S. Chandler, old-growth, Berlese moss by stream (1); R. S. 20, 2250′, Road 134, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir leaf litter (1); Road 350, 4050′, V-11-1984, D. S. Chandler, old-growth, sift Douglas-fir leaf litter (1); Road 1506, 1900′, Lookout Creek, X-27-1982 (2), V-11-1983 (1), G. L. Parsons, site 6, 1963 clearcut, litter; Road 1506, 1900′, Lookout Creek, VII-6-1982 (1), X-27-1982 (4), V-11-1983 (1), X-26-1983 (3), G. L. Parsons, site 7, 1954–55 clearcut, litter; Road 130, 1900′, VII-11-1983, G. L. Parsons, site 8, old-growth, litter (1); Road 1506, 1800′, IX-6-1982, G. L. Parsons, site 31, 1950 clearcut, litter (1).

Biology. Old-growth, 7; 1950 clearcut, 1; 1954 clearcut, 1; 1954–55 clearcut, 9; 1963 clearcut, 3; 1975 clearcut, 1. This species was collected most commonly in old-growth and 30 year-old clearcut regrowth, primarily from Douglas-fir leaf litter at low elevations in the Experimental Forest (Chandler and Caterino 2011). Most of the specimens were taken in the fall and were found in drier sites (Table 2). At other locations this species has been taken from Douglas-fir and bigleaf maple leaf litters (Chandler 1997).

Distribution. West-central Oregon.

16. *Trisignis marshi* Park and Schuster, 1955

Specimens Examined (17). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (3); Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (2); Road 320, 2000′, L502, II-21-

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1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (2); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (1); Watershed 10, XI-15-1972, J. Wernz, 1975 clearcut (1); Road 1506, 4000′, V-17-1984, D. S. Chandler, old-growth, sift rotten logs (1); Road 134, Watershed 10, 1850′, IX-30-1982 (1), XI-22-1982 (1), G. L. Parsons, site 17, 1975 clearcut, litter; Watershed 1, 1900′, IX-22-1982 (1), XII-5-1982 (1), G. L. Parsons, site 18, 1963–66 clearcut, litter; Watershed 1, 1600′, end Road 115, XII-5-1982, G. L. Parsons, site 30, 1963–66 clearcut, litter (1); Road 359, 4000′, V-16/VI-5-1988, G. L. Parsons, old-growth, pitfall (1); Road 359, 4000′, VI-5/20-1985, G. L. Parsons, 1985 clearcut, pitfall (1).

Biology. Old-growth, 2; 1959 clearcut, 2; 1963–66 clearcut, 3; 1970 clearcut, 4; 1975 clearcut, 5; 1985 clearcut, 1. This species was collected primarily in recently clearcut areas (Table 2) from Douglas-fir litter. *Trisignis marshi* was found at all elevations in the Experimental Forest, and was most commonly collected in the fall or winter with the June records taken at high elevations.

Distribution. Northern coastal California to montane west-central Oregon.

17. *Actium barri* Park and Wagner, 1962

(Figs. 4, 42)

Specimens Examined (84). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (1); Road 1506, 4800′, V-23-1981, G. Cassis, site 17, old-growth, *Abies*/*Tsuga* litter (37); Road 350, 4800′, IX-19-1981, G. Cassis, site 23, old-growth, *Abies/Tsuga* litter (5); Road 1506, 4000′, V-15-1984, D. S. Chandler, old-growth, sift silver-fir leaf litter (31), sift rotten logs (5); Road 359, 4100′, V-13-1984, D. S. Chandler, old-growth, sift alder litter (4); Road 359, 4000′, VI-5/20-1988, G. L. Parsons, 1985 clearcut, pitfall (1).

Biology. Old-growth, 82; 1970 clearcut, 1; 1975 clearcut, 1. All except two specimens were taken from old-growth spruce, fir, and alder leaf litters at high elevations. This species was collected most commonly at snow line during the winter and spring (Chandler 2001b), and has been most frequently taken in *Abies* species leaf litters in old-growth forests, but has been collected in the leaf litter of other conifer and deciduous species (Chandler 1997).

Distribution. Montane west-central Oregon to Montana and British Columbia.

18. *Actium microphthalmum* Park and Wagner, 1962

Specimens Examined (533). Road 1508, 1750′, I-24-1981, G. Cassis, site 5, old-growth, *Tsuga*/*Pseudotsuga* litter (39); Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (1); Road 320, 2000′, II-21-1981, G. Cassis, site 7, old-growth, *Pseudotsuga* litter (21); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (2); Road 1506, 2500′, L301A, III-12-1981, G. Cassis, site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (3); Road 1507, 2000′, III-25-1981, G. Cassis, site 10, old-growth, *Tsuga* litter (14); Road 1506, 1.3 mi N Frissell Point, 4800′, V-23-1981, G. Cassis, site 16, meadow, *Pseudotsuga*/*Abies* litter (3); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (7); Road 1508, 1800′, L401, IX-28-1981, G. Cassis, site 27, 1952 clearcut, *Pseudotsuga* & fern litter (1); Watershed 10, IX-15/28-1972, X-26-1972, II-26-1973, III-8-1973, V-14-1973, J. Wernz, 1975 clearcut (5); Road 1506, 1900′, Lookout Creek, V-11-1982, G. L. Parsons, site 6, 1963 clearcut, litter (1); Road 1506, 1900′, Lookout Creek, VII-6-1982 (16), IX-1-1982 (3), X-27-1982 (7), VII-4-1983 (3), IX-6-1983 (8), X-26-1983 (8), V-7-1984 (3), G. L. Parsons, site 7, 1954–55 clearcut, litter; Road 130, 1900′, VII-10-1982 (7), IX-30-1982 (16), VII-11-1983 (1), IX-21-1983 (8), V-12-1984 (12), G. L. Parsons, site 8, old-growth, litter; Road 134, Watershed 10, 1850′, VII-10-1982 (3), IX-30-1982 (3), V-24-1982 (2), G. L. Parsons, site 17, 1975 clearcut, litter; Watershed 1, 1900′, VII-14-1982 (3), IX-22-1982 (2), VII-9-1983 (1), VI-2-1984 (1), G. L. Parsons, site 18, 1963–66 clearcut, litter; Road 1506, 1750′, VII-14-1982 (9), IX-6-1982 (15), XI-2-1982 (4), VII-4-1983 (5), IX-6-1983 (11), X-26-1983 (2), V-7-1984 (1), G. L. Parsons, site 19, 1950 clearcut, litter; R. S. 2, Road 1506, 1550′, VII-1-1982 (44), IX-22-1982 (45), X-27-1982 (7), IV-14-1983 (1), VI-21-1983 (11), VIII-24-1983 (17), X-19-1983 (5), IV-26-1984 (9), G. L. Parsons, site 20, old-growth, litter; Road 360, 2150′, VII-1-1982 (2), IX-6-1982 (3), VIII-2-1983 (2), IX-13-1983 (2), G. L. Parsons, site 25, 1976 clearcut, litter; Watershed 1, 1600′, end Road 115, VII-18-1982 (5), IX-22-1982 (13), XII-5-1982 (2), VII-9-1983 (1), IX-28-1983 (1), VI-2-1984 (2), G. L. Parsons, site 30, 1963–66 clearcut, litter; Road 1506, 1800′, VII-14-1982 (19), IX-6-1982 (15), XI-2-1982 (3), V-11-1983 (2), VII-4-1983 (1), IX-6-1983 (8), V-7-1984 (1), G. L. Parsons, site 31, 1950 clearcut, litter; R. S. 7, 1500′, Road 1506, VII-1-1982 (17), IX-22-1982 (20), IV-14-1983 (6), VI-21-1983 (5), VIII-24-1983 (3), IV-26-1984 (7), G. L. Parsons, site 32, old-growth, litter. The three specimens from 1.3 mi N Frissell Point were macropterous females taken during May, while one macropterous female from site 25 (Rd. 360, site L107B) was taken during late summer. No other macropterous females have been seen.

Biology. Old-growth, 317; 1950 clearcut, 96; 1952 clearcut, 1; 1954 clearcut, 10; 1954–55 clearcut, 48; 1959 clearcut, 1; 1963 clearcut, 1; 1963–66 clearcut, 31; 1970 clearcut, 2; 1975 clearcut, 13; 1976 clearcut, 9. This species demonstrates a clear association with older forests, with over three-fourths of the specimens taken from tree and old-growth sites. It is

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associated with Douglas-fir leaf litter, and is most abundant at the lower elevations of the Experimental Forest. *Actium microphthalmum* is most abundant in moister sites and mature forests, and is most frequently taken during the summer (Table 2) (Chandler 1997).

Distribution. Western Oregon.

19. *Actium retractum* Casey, 1908

(Fig. 46)

Specimens Examined (7). Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (2); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (2); Road 1506, 4250′, L708, IX-19-1981, G. Cassis, site 24, 1965 clearcut, litter (1); Road 1506, 2500′, V-14-1984, D. S. Chandler, old-growth, Berlese moss by stream (1); R. S. 2, Road 1506, 1550′, VI-21-1983, G. L. Parsons, site 20, old-growth, litter (1).

Biology. Old-growth, 2; 1959 clearcut, 2; 1965 clearcut, 1; 1970 clearcut, 2. Collected occasionally at all elevations during the spring and summer in forests of all ages (Chandler 2001b), and at other sites is typically taken from conifer species leaf litters (Chandler 1997).

Distribution. Northern coastal California to Montana and southern Alaska.

20. *Cupila excavata* Park and Wagner, 1962

(Figs. 41, 44)

Specimens Examined (407). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (5); Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (2); Road 1508, 1750′, I-24-1981, G. Cassis, site 5, old-growth, *Tsuga*/*Pseudotsuga* litter (5); Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (11); Road 320, 2000′, II-21-1981, G. Cassis, site 7, old-growth, *Pseudotsuga* litter (10); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (1); Road 1506, 2500′, L301A, III-12-1981, G. Cassis, site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (3); Road 1507, 2000′, III-25-1981, G. Cassis, site 10, old-growth, *Tsuga* litter (11); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (13); Road 1507, 2200′, L201, VIII-4-1981, G. Cassis, site 20, 1950 clearcut, *Pseudotsuga* litter (10); Road 1508, 1800′, L401, IX-28-1981, G. Cassis, site 27, 1952 clearcut, *Pseudotsuga* & fern litter (1); T15S R5E S26 sw1/4, III-14-1979, G. Cooper (1); 1450′, R. S. 7, V-13-1983, D. S. Chandler, old-growth, sift rotten Douglas-fir (3); 2000′, clearcut 502, V-13-1983, D. S. Chandler, 1959 clearcut, sift alder litter & rotten wood (3); 3/4 mi SE Lookout Mtn., 4000′, V-13-1983, D. S. Chandler, 1965 clearcut, sift rotten wood (1); Road 1506, Watershed 1, 1450′, V-14-1984, D. S. Chandler, 1963–66 clearcut, Berlese moss by stream (2); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift cedar litter by stream (1), sift rotten wood (15); McRae Creek, 1800′, V-17-1984, D. S. Chandler, sift litter by stream (1); McRae Creek, 1800′, V-13-1984, D. S. Chandler, 1952–53 clearcut, sift fern & grass litter in spring (6), sift maple, fern & grass litter by stream (2); Lookout Creek, 1950′, V-17-1984, D. S. Chandler, old-growth, Berlese moss in swamp (1); R. S. 20, 2250′, Road 134, V-12-1984, old-growth, sift Douglas-fir & vine maple litter (4); Road 1506, 2700′, V-17-1984, D. S. Chandler, old-growth, sift Douglas-fir litter by stream (1); Road 1507, 2850′, V-12-1984, D. S. Chandler, 1951 clearcut, sift *Castanopsis* litter (1); Road 1506, 3500′, V-14-1984, D. S. Chandler, old-growth, Berlese moss by stream (4), Berlese moss on hill (2), sift Douglas-fir litter (2); Road 350, 3700′, V-11-1984, D. S. Chandler, 1960 clearcut, sift *Ceanothus* & vine maple litter (1); Road 1506, 4000′, V-17-1984, D. S. Chandler, old-growth, sift silver fir leaf litter (1); Road 350, 4050′, V-11-1984, D. S. Chandler, old-growth, sift Douglas-fir rotten log (7), sift Douglas-fir leaf litter (1); Road 359, 4050′, V-13-1984, D. S. Chandler, sift forest litter by stream (3); Road 359, 4100′, V-13-1984, D. S. Chandler, old-growth, sift alder litter (2); Road 1506, 1900′, Lookout Creek, X-27-1982 (1), V-11-1983 (1), G. L. Parsons, site 6, 1963 clearcut, litter; Road 1506, 1900′, Lookout Creek, VII-6-1982 (10), IX-1-1982 (1), X-27-1982 (4), V-11-1983 (3), VII-4-1982, (2), IX-6-1983 (3), X-26-1983 (1), V-7-1984 (10), G. L. Parsons, site 7, 1954–55 clearcut, litter; Road 130, 1900′, VII-10-1982 (3), IX-30-1982 (5), XI-22-1982 (1), IV-17-1983 (2), VII-11-1983 (1), IX-21-1983 (2), V-12-1984 (2), G. L. Parsons, site 8, old-growth, litter; Road 134, Watershed 10, 1850′, VII-10-1982 (3), IX-30-1982 (5), XI-22-1982 (6), IV-27-1983 (1), IX-21-1983 (4), V-24-1984 (8), G. L. Parsons, site 17, 1975 clearcut, litter; Watershed 1, 1900′, VII-14-1982 (1), IX-22-1982 (1), IX-28-1983 (2), G. L. Parsons, site 18, 1963–66 clearcut, litter; Road 1506, 1750′, VII-14-1982, G. L. Parsons, site 19, 1950 clearcut, litter (1); R. S. 2, Road 1506, 1550′, VII-1-1982 (5), IX-22-1982 (1), X-27-1982 (11), IV-14-1983 (1), VI-21-1983 (2), VIII-24-1983 (5), IV-26-1984 (2), G. L. Parsons, site 20, old-growth, litter; Road 360, 2150′, VII-1-1982 (1), IX-6-1982 (1), XI-2-1982 (1), V-24-1983 (1), VIII-2-1983 (1), IX-13-1983 (6), V-29-1984 (3), G. L. Parsons, site 25, 1976 clearcut, litter; Watershed 1, 1600′, end Road 115, VII-18-1982 (2), IX-22-1982 (6), XII-5-1982 (12), VII-9-1983 (1), IX-28-1983 (6), VI-2-1984 (7), G. L. Parsons, site 30, 1963–66

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clearcut, litter; Road 1506, 1800′, VII-14-1982 (8), IX-6-1982 (18), XI-2-1982 (3), V-11-1983 (7), IX-6-1983 (5), X-26-1983 (8), V-7-1984 (14), G. L. Parsons, site 31, 1950 clearcut, litter; R. S. 7, 1500′, Road 1506, VII-1-1982 (12), IX-22-1982 (9), IV-14-1983 (1), VI-21-1983 (4), VIII-24-1983 (18), X-19-1983 (3), IV-26-1984 (5), G. L. Parsons, site 32, old-growth, litter.

Biology. Old-growth, 165; 1950 clearcut, 74; 1951 clearcut, 1; 1952 clearcut, 1; 1952–53 clearcut, 8; 1954 clearcut, 3; 1954–55 clearcut, 34; 1959 clearcut, 27; 1960 clearcut, 1; 1963 clearcut, 2; 1963–66 clearcut, 40; 1965 clearcut, 1; 1970 clearcut, 6; 1975 clearcut, 25; 1976 clearcut, 14. This species was collected throughout the year in many different leaf litters at all elevations of the forest. *Cupila excavata* was most common in older clearcuts and old-growth, and is most frequently taken from moister sites (Table 2). Data from other locations suggest an association with various conifer leaf litters (Chandler 1997).

Distribution. Western Oregon to southern Alaska.

21. *Batrisodes albionicus* (Aubé, 1833)

(Figs. 5, 9A–B)

Specimens Examined (123). Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (4); Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (1); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (1); Road 1506, 2500′, L301A, III-12-1981, G. Cassis, site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (1); Road 1506, 1500′, Watershed 1, III-25-1981, G. Cassis, site 11, 1963–66 clearcut, alder litter (2); Road 1506, 1.3 mi N Frissell Point, 4800′, VII-15-1981, G. Cassis, site 16, meadow (2); Road 1508, 1800′, L401, IX-28-1981, G. Cassis, site 27, 1952 clearcut, *Pseudotsuga* & fern litter (2); Clearcut L502, V-2/VI-20-1973, M. Mispagel, 1959 clearcut, 48 hour pitfall trap (11); New growth area L105, IV-21-1973, V-17-1973, M. Mispagel, rotary net trap, 48 hour pitfall trap (2); Midgrowth Douglas-fir, IV-10-1973, M. Mispagel, 48 hour pitfall trap (1); Old-growth Douglas-fir, IV-10-1973, V-2-1973, M. Mispagel, 48 hour pitfall trap (2); 1450′, R. S. 7, V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir & fern litter (1); 1850′, nr. cut L501, V-13-1983, D. S. Chandler, 1952–53 clearcut, sift fern & vine maple litter (2); Mack Creek, 2600′, V-18-1983, D. S. Chandler, along stream (1); Road 115, Watershed 1, 1550′, V-15-1984, D. S. Chandler, 1963–66 clearcut, sift alder litter & bark (2); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift forest litter by stream (1), sift rotten wood (1); 1750′, Lookout Creek, V-13-1984, D. S. Chandler, sift bigleaf maple litter (3), sift willow litter (1); Lookout Creek, 1750′, V-12-1984, D. S. Chandler, flying (2); McRae Creek, 1800′, V-13-1984, D. S. Chandler, 1952–53 clearcut, sift fern & grass litter in spring (1); R. S. 20, 2250′, Road 134, V-12-1984, D. S. Chandler, old-growth, sift rotten Douglas-fir log (1), sift Douglas-fir & vine maple litter (8); Road 1506, 2500′, V-14-1984, D. S. Chandler, old-growth, Berlese moss by stream (1); Road 1507, 2850′, V-12-1984, D. S. Chandler, 1951 clearcut, sift *Castanopsis* litter (1); Road 350, 4050′, V-11-1984, D. S. Chandler, old-growth, under stones with ants (6); Road 332, 2300′, VII-6-1982 (1), IX-1-1982 (1), VII-4-1982 (1), G. L. Parsons, site 2, 1954 clearcut, pitfall; Road 130, 1800′, VII-11-1982, G. L. Parsons, site 3, 1960 clearcut, pitfall (1); 2 mi N Rainbow, Road 720, 1800′, VII-1-1982 (2), IX-6-1982 (1), IV-14-1983 (3), VI-21-1983 (2), G. L. Parsons, site 5, 1978 clearcut, pitfall; Road 1506, 1900′, Lookout Creek, X-26-1983 (1), V-7-1984 (1), G. L. Parsons, site 7, 1954–55 clearcut, pitfall; Road 130, 1900′, IX-21-1983, G. L. Parsons, site 8, old-growth, pitfall (2); Watershed 10, Road 134, 2100′, VII-10-1982, G. L. Parsons, site 9, 1975 clearcut, pitfall (1); Road 1507, 2900′, VIII-2-1983, G. L. Parsons, site 11, 1951 clearcut, pitfall (1); Watershed 10, Road 143, VII-6-1982, G. L. Parsons, site 13, 1975 clearcut, pitfall (2); Watershed 1, Road 1506, 1700′, VII-14-1982 (1), IX-1-1982 (1), G. L. Parsons, site 14, 1963–66 clearcut, pitfall; Road 134, Watershed 10, 1850′, VII-10-1982 (2), IX-30-1982 (4), IX-21-1983 (3), V-24-1984 (1), litter, VII-10-1982 (3), IX-30-1982 (1), pitfall, G. L. Parsons, site 17, 1975 clearcut; Watershed 1, 1900′, VII-14-1982 (2), IX-22-1982 (2), VII-9-1983 (1), VI-2-1984 (1), litter, IX-22-1982 (1), pitfall, G. L. Parsons, site 18, 1963–66 clearcut; Road 1506, 1750′, V-11-1982 (1), X-26-1983 (1), litter, VII-14-1982 (1), pitfall, G. L. Parsons, site 19, 1950 clearcut; Watershed 10, Road 143, 1550′, VII-6-1982, G. L. Parsons, site 21, 1975 clearcut, pitfall (1); Road 360, 2450′, IX-6-1982, G. L. Parsons, site 22, 1965 clearcut, pitfall (1); Junction Road 1507 & 465, IX-13-1982, G. L. Parsons, site 24, old-growth, pitfall (1); Road 360, 2150′, VII-1-1982 (4), V-24-1983 (1), VIII-2-1983 (1), litter, VIII-2-1983 (1), pitfall, G. L. Parsons, site 25, 1976 clearcut; Road 455, 2400′, VII-18-1982, G. L. Parsons, site 27, 1963 clearcut, pitfall (1); Road 300, 1900′, IX-22-1982, G. L. Parsons, site 28, old-growth, pitfall (1); Watershed 1, 1600′, end Road 115, VII-18-1982 (2), litter, IX-22-1982 (2), pitfall, G. L. Parsons, site 30, 1963–66 clearcut.

Biology. Old-growth, 25; 1950 clearcut, 3; 1951 clearcut, 2; 1952 clearcut, 2; 1952–53 clearcut, 3; 1954 clearcut, 4; 1954–55 clearcut, 2; 1959 clearcut, 12; 1960 clearcut, 1; 1963 clearcut, 1;

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1963–66 clearcut, 17; 1965 clearcut, 1; 1970 clearcut, 1; 1975 clearcut, 22; 1976 clearcut, 7; 1978 clearcut, 8. This species was collected at all elevations and in forests of all ages, and is most abundant in younger clearcuts (Table 2). It has been found in various leaf litters (Chandler 1997), and also with ants (*Lasius* sp.) beneath rocks during the spring at high elevations. It was collected throughout the year, but most commonly taken during the summer.

Distribution. Extreme northwestern California to the islands of southern Alaska.

22. *Reichenbachia fusticornis* Casey, 1897

(Fig. 36)

Specimen Examined. 2000′, clearcut 502, V-13-1983, D. S. Chandler, 1959 clearcut, sift alder litter & rotten wood, spring area.

Biology. Collected at other localities in grass litter around springs (Chandler 1983, 1997, 2003).

Distribution. Central California to Montana and British Columbia.

23. *Lucifotychus cognatus* (LeConte, 1874)

(Fig. 12)

Specimens Examined (6). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (1); Road 1506, 1.3 mi N Frissell Point, 4800′, V-23-1981, G. Cassis, site 16, meadow, *Pseudotsuga*/*Abies* litter (1); Road 322, 2000′, V-13-1984, D. S. Chandler, 1959 clearcut, sift alder litter in spring area (3); Watershed 1, 1900′, VII-14-1982, G. L. Parsons, site 18, 1963–66 clearcut, litter (1).

Biology. Old-growth, 1; 1959 clearcut, 3; 1963–66 clearcut, 1; 1970 clearcut, 1. This species was collected in alder and Douglas-fir leaf litters throughout the year at all elevations. Taken primarily from *Alnus* and *Acer* leaf litters at other locations, but also being frequent in coniferous leaf litters (Chandler 1997, 2001b).

Distribution. West-central Oregon to the Kenai Peninsula of southern Alaska.

24. *Lucifotychus dentatus* (Grigarick and Schuster, 1962)

(Fig. 13)

Specimens Examined (8). 2000′, clearcut 502, V-13-1983, D. S. Chandler, 1959 clearcut, sift alder litter & rotten wood, spring area (4); McRae Creek, 1800′, V-13-1984, D. S. Chandler, 1952–53 clearcut, sift maple, fern & grass litter by stream (3); McRae Creek, 1800′, V-17-1984, D. S. Chandler, sift litter by stream (1).

Biology. 1952–53 clearcut, 3; 1959 clearcut, 4. Collected in alder, and maple, fern and grass leaf litters along streams in disturbed areas at the lower elevations of the Experimental Forest (Chandler 1997).

Distribution. Northwestern California to west-central Oregon.

25. *Lucifotychus impellus* Park and Wagner, 1962

(Fig. 11)

Specimens Examined (477). Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (4); Road 1508, 1750′, I-24-1981, G. Cassis, site 5, old-growth, *Tsuga*/*Pseudotsuga* litter (11); Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (18); Road 320, 2000′, II-21-1981, G. Cassis, site 7, old-growth, *Pseudotsuga* litter (3); Road 1506, 2500′, L301A, III-12-1981, G. Cassis, site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (4); Road 1507, 2000′, III-25-1981, G. Cassis, site 10, old-growth, *Tsuga* litter (4); Road 1506, 1500′, Watershed 1, III-25-1981, G. Cassis, site 11, alder litter (2); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (4); Road 1508, 1800′, L401, IX-28-1981, G. Cassis, site 27, 1952 clearcut, *Pseudotsuga* & fern litter (3); Road 360, 1900′, L106, IX-28-1981, G. Cassis, site 28, 1952 clearcut (1); T15S R5E S6 sw1/4, III-14-1979, G. Cooper (4); Clearcut area L502, IV-5/V-30-1973, M. Mispagel, 1959 clearcut, 48 hour pitfall trap (4); Clearcut area L107, V-9-1973, VI-27-1973, M. Mispagel, 1951 clearcut, 48 hour pitfall trap (2); New growth area L105, IV-21-1973, M. Mispagel, 48 hour pitfall trap, rotary net trap (1); Watershed 10, XI-15-1972, J. Wernz, 1975 clearcut (1); 1450′, R. S. 7, V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir litter & moss (1), sift rotten Douglas-fir (1), sift Douglas-fir & fern litter (1); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift forest litter by stream (3), sift rotten wood (1), sift cedar litter by stream (5); Lookout Creek, 1750′, V-13-1984, D. S. Chandler, sift bigleaf maple litter (1), sift willow litter (2); McRae Creek, 1800′, V-13-1984, D. S. Chandler, 1952–53 clearcut, sift maple, fern & grass litter by stream (2), sift fern & grass litter in spring (7); McRae Creek, 1800′, V-17-1984, D. S. Chandler, sift litter by stream (1); Lookout Creek, 1950′, V-13-1984, D. S. Chandler, old-growth, sift cedar litter (3); R. S. 20, 2250′, Road 134, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir & vine maple litter (5); Junction Roads 1507 & 465, 2600′, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir & fern leaf litter (1); 2 mi N Rainbow, Road 720, 1800′, X-27-1982 (1), X-19-1982 (3), IV-26-1984 (2), litter, IV-14-1983 (2), VI-21-1983 (1), pitfall, G. L. Parsons, site 5, 1978 clearcut; Road 1506, 1900′, Lookout Creek, VII-6-1982 (6), X-27-1982 (3), V-11-1983 (2), VII-4-1983

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(1), IX-6-1983 (4), X-26-1983 (2), V-7-1984 (6), G. L. Parsons, site 6, 1963 clearcut, litter; Road 1506, 1900′, Lookout Creek, VII-6-1982 (16), IX-1-1982 (1), X-27-1982 (5), V-11-1983 (3), IX-6-1983 (2), X-26-1983 (4), V-7-1984 (5), G. L. Parsons, site 7, 1954–55 clearcut, litter; Road 130, 1900′, VII-10-1982 (1), IX-30-1982 (5), XI-22-1982 (1), VII-11-1983 (1), IX-21-1983 (3), V-12-1984 (1), G. L. Parsons, site 8, old-growth, litter; Watershed 10, Road 134, 2100′, IX-30-1982, G. L. Parsons, site 9, 1975 clearcut, pitfall (1); Watershed 1, Road 1506, 1700′, IX-1-1982 (3), VII-9-1983 (1), G. L. Parsons, site 10, 1963–66 clearcut, pitfall; Watershed 10, Road 143, 1700′, IX-13-1982, G. L. Parsons, site 13, 1975 clearcut, pitfall (1); Watershed 1, Road 1506, 1700′, IX-1-1982, G. L. Parsons, site 14, 1963–66 clearcut, pitfall (3); Road 134, Watershed 10, 1850′, VII-10-1982 (7), IX-30-1982 (10), XI-22-1982 (7), IV-27-1983 (4), IX-21-1983 (6), V-24-1984 (10), litter, IX-30-1982 (5), VII-11-1983 (1), pitfall, G. L. Parsons, site 17, 1975 clearcut; Watershed 1, 1900′, VII-14-1982 (5), IX-22-1982 (12), XI-22-1982 (4), IV-21-1983 (3), VII-9-1983 (4), IX-28-1983 (5), G. L. Parsons, site 18, 1963–66 clearcut, litter; Road 1506, 1750′, VII-14-1982 (3), IX-6-1982 (1), XI-2-1982 (1), V-11-1983 (3), VII-4-1983 (2), IX-6-1983 (1), X-26-1983 (4), V-7-1984 (6), litter, IX-6-1982 (1), VII-4-1983 (1), pitfall, G. L. Parsons, site 19, 1950 clearcut, litter; R. S. 2, Road 1506, 1550′, VII-1-1982 (5), IX-22-1982 (2), X-27-1982 (1), IV-14-1983 (2), VIII-24-1983 (1), X-19-1983 (4), G. L. Parsons, site 20, old-growth, litter; Watershed 10, Road 143, 1550′, IX-13-1982, G. L. Parsons, site 21, 1975 clearcut, pitfall (4); Road 360, 2450′, IX-6-1982 (6), VIII-2-1983 (1), G. L. Parsons, site 22, 1965 clearcut, pitfall; Road 1507, 1850′, VII-4-1983, G. L. Parsons, site 23, 1950 clearcut, pitfall (1); Road 360, 2150′, VII-1-1982 (7), IX-6-1982 (4), IX-13-1983 (3), G. L. Parsons, site 25, 1976 clearcut, litter; Road 455, 2400′, IX-13-1982, G. L. Parsons, site 27, 1963 clearcut, pitfall (2); Watershed 1, 1600′, end Road 115, VII-18-1982 (10), IX-22-1982 (15), XII-5-1982 (4), IV-21-1983 (2), VII-9-1983 (4), IX-28-1983 (9), VI-2-1984 (10), litter, IX-22-1982 (4), VII-9-1983 (1), pitfall, G. L. Parsons, site 30, 1963–66 clearcut; Road 1506, 1800′, VII-14-1982 (4), IX-6-1982 (3), XI-2-1982 (1), V-11-1983 (1), VII-4-1983 (1), IX-6-1983 (7), X-26-1983 (2), V-7-1984 (6), G. L. Parsons, site 31, 1950 clearcut, litter; R. S. 7, 1500′, Road 1506, VII-1-1982 (15), IX-22-1982 (10), XII-8-1982 (3), IV-14-1983 (3), VI-21-1983 (5), VIII-24-1983 (3), X-19-1983 (5), IV-26-1984 (10), litter, VI-21-1983 (1), pitfall, G. L. Parsons, site 32, old-growth.

Biology. Old-growth, 121; 1950 clearcut, 49; 1951 clearcut, 2; 1952 clearcut, 4; 1952–53 clearcut, 9; 1954 clearcut, 4; 1954–55 clearcut, 36; 1959 clearcut, 26; 1963 clearcut, 26; 1963–66 clearcut, 99; 1965 clearcut, 7; 1975 clearcut, 61; 1976 clearcut, 14; 1978 clearcut, 8. *Lucifotychus impellus* is common in forests of all ages at low to moderate elevations. It has been collected in various leaf litters (Chandler 1997) and is found throughout the year.

Distribution. Western Oregon and Washington.

26. *Lucifotychus stellatus* (Grigarick and Schuster, 1962)

(Fig. 14)

Specimens Examined (9). N end Blue River Reservoir, Watershed 1, V-13-1983, D. S. Chandler, 1963–66 clearcut, sift bark, alder leaves & mushrooms (1); Road 115, Watershed 1, 1550′, V-15-1984, D. S. Chandler, 1963–66 clearcut, sift alder leaves & bark (5); Lookout Creek, 1750′, V-13-1984, D. S. Chandler, sift willow litter (3).

Biology. 1963–66 clearcut, 6. *Lucifotychus stellatus* was collected in disturbed areas in alder and willow leaf litters at the lower elevations of the Experimental Forest, and is known to occur in a variety of deciduous and coniferous leaf litters (Chandler 1997).

Distribution. Northwestern California to west-central Oregon.

27. *Pselaptrichus intimus* Schuster and Marsh, 1956

(Fig. 17)

Specimens Examined (14). Road 1506, 4800′, L704A, I-13-1981, G. Cassis, site 3, 1970 clearcut, litter (2); Road 1506, 3750′, L704A, III-12-1981, G. Cassis, site 8, 1970 clearcut, litter (8); Road 1506, 4000′, V-15-1984, D. S. Chandler, old-growth, sift silver fir leaf litter (3); Road 359, 4100′, V-13-1984, D. S. Chandler, old-growth, sift alder litter (1).

Biology. Old-growth, 4; 1970 clearcut, 10. This species is found at the higher elevations in Douglas-fir and fir leaf litters, and was found in old and young forests at snow line during the winter and spring. It has been collected in various conifer leaf litters at other localities (Chandler 1997).

Distribution. Cascade Mountains in central Oregon.

28. *Pselaptrichus rothi* Park and Wagner, 1962

(Figs. 6, 20)

Specimens Examined (328). Road 134, 1750′, Watershed 10, I-24-1981, G. Cassis, site 4, 1975 clearcut, *Pseudotsuga* litter (3); Road 1508, 1750′, I-24-1981, G. Cassis, site 5, old-growth, *Tsuga*/*Pseudotsuga* litter (13); Road 320, 2000′, L502, II-21-1981, G. Cassis, site 6, 1959 clearcut, *Pseudotsuga* litter (4); Road 320, 2000′, II-21-1981, G. Cassis, site 7, old-growth, *Pseudotsuga* litter (4); Road 1506, 2500′, L301A, III-12-1981, G. Cassis,

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site 9, 1954 clearcut, *Pseudotsuga*/*Rhododendron* litter (2); Road 1507, 2000′, III-25-1981, G. Cassis, site 10, old-growth, *Tsuga* litter (3); Road 1506, 1500′, Watershed 1, III-25-1981, G. Cassis, site 11, alder litter (2); Road 330, 3000′, L602, VII-28-1981, G. Cassis, site 19, 1959 clearcut, *Pseudotsuga*/*Tsuga* litter (10); Road 360, 2600′, L113, IX-28-1981, G. Cassis, site 26, 1966 clearcut (1); Road 1508, 1800′, L401, IX-28-1981, G. Cassis, site 27, 1952 clearcut, *Pseudotsuga*/fern litter (15); T15S R5E S31 sw1/4, II-19-1979, G. Cooper (1); T15S R5E S26 sw1/4, III-14-1979, G. Cooper (12); Clearcut area L502, V-30/VI-20-1973, M. Mispagel, 1959 clearcut, 48 hour pitfall trap (3); Clearcut area L107, IV-5-1973, M. Mispagel, 1951 clearcut, 48 hour pitfall trap (2); Midgrowth Douglas-fir, V-2-1973, M. Mispagel, 48 hour pitfall trap (1); Old-growth Douglas-fir, V-23/30-1973, M. Mispagel, 48 hour pitfall trap (2); 1450′, R. S. 7, V-13-1983, D. S. Chandler, old-growth, sift Douglas-fir litter & moss (2); 1650′, R. S. 2, V-13-1981, D. S. Chandler, old-growth, sift *Rhododendron* & Douglas-fir litter (2); 1850′, nr. cut L501, V-13-1983, D. S. Chandler, 1952–53 clearcut, sift fern & vine maple litter (2); Road 130, 1650′, V-12-1984, D. S. Chandler, old-growth, sift *Castanopsis* duff (5); Road 130, 1750′, V-12-1984, D. S. Chandler, old-growth, sift rotten wood (1); Lookout Creek, 1750′, V-13-1984, D. S. Chandler, sift bigleaf maple litter (1), Berlese grass (1); McRae Creek, 1800′, V-13-1984, D. S. Chandler, 1952–53 clearcut, sift fern & grass litter in spring (1); Lookout Creek, 1950′, V-13-1984, D. S. Chandler, old-growth, sift cedar litter (1); R. S. 20, 2250′, Road 134, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir & vine maple litter (3), sift Douglas-fir leaf litter (1); Junction Roads 1507 & 465, 2600′, V-12-1984, D. S. Chandler, old-growth, sift Douglas-fir & fern leaf litter (1); Road 1507, 2850′, V-12-1984, D. S. Chandler, 1951 clearcut, sift *Tsuga* litter (2); Road 350, 3700′, V-11-1984, D. S. Chandler, 1960 clearcut, sift *Ceanothus* & vine maple litter (1); 2 mi N Rainbow, Road 720, 1800′, X-19-1982 (1), litter, IV-14-1982 (1), pitfall, G. L. Parsons, site 5, 1978 clearcut; Road 1506, 1900′, Lookout Creek, VII-6-1982 (15), IX-1-1982 (1), X-27-1982 (4), V-11-1983 (6), IX-6-1983 (10), X-26-1983 (4), V-7-1984 (5), litter, VII-4-1982 (2), pitfall, G. L. Parsons, site 7, 1954–55 clearcut; Road 130, 1900′, VII-10-1982 (9), IX-30-1982 (5), XI-22-1982 (1), IV-27-1983 (3), VII-11-1983 (1), IX-21-1983 (7), V-12-1984 (3), litter, IV-27-1983 (1), VII-11-1983 (1), pitfall, G. L. Parsons, site 8, old-growth; Watershed 10, Road 134, 2100′, VII-10-1982 (1), IX-30-1982 (1), G. L. Parsons, site 9, 1975 clearcut, pitfall; Road 130, 1700′, VII-10-1982 (1), VII-11-1983 (1), G. L. Parsons, site 12, old-growth, pitfall; Watershed 10, 1700′, Road 143, VII-6-1982, G. L. Parsons, site 13, 1975 clearcut, pitfall (1); Road 305, 1750′, IX-22-1982, G. L. Parsons, site 16, old-growth, pitfall (1); Road 134, Watershed 10, 1850′, VII-10-1982 (2), IX-30-1982 (11), XI-22-1982 (6), IX-21-1983 (4), V-24-1984 (8), G. L. Parsons, site 17, 1975 clearcut, litter; Watershed 1, 1900′, IX-22-1982 (6), IV-21-1982 (1), IX-28-1983 (4), VI-2-1984 (1), litter, VII-14-1982 (1), IX-22-1982 (1), pitfall, G. L. Parsons, site 18, 1963–66 clearcut; Road 1506, 1750′, VII-14-1982 (8), IX-6-1982 (2), XI-2-1982 (3), V-11-1983 (3), VII-4-1983 (10), X-26-1983 (3), V-7-1984 (5), G. L. Parsons, site 19, 1950 clearcut, litter; R. S. 2, Road 1506, 1550′, VII-1-1982 (5), IX-22-1982 (3), IV-14-1983 (1), VIII-24-1983 (2), litter, IX-22-1982 (1), pitfall, G. L. Parsons, site 20, old-growth; Road 360, 2450′, VII-6-1982 (1), IX-6-1982 (1), G. L. Parsons, site 22, 1965 clearcut, pitfall; Junction Road 1507 & 465, 2600′, VII-18-1982, G. L. Parsons, site 24, old-growth, pitfall (1); Road 360, 2150′, VII-1-1982 (1), IX-6-1982 (3), XI-2-1982 (1), IX-13-1983 (2), V-29-1984 (1), G. L. Parsons, site 25, 1976 clearcut, litter; Road 455, 2400′, IX-13-1982, G. L. Parsons, site 27, 1963 clearcut, pitfall (1); Watershed 1, 1600′, end Road 115, VII-18-1982 (5), IX-22-1982 (8), XII-5-1982 (2), IX-28-1983 (4), VI-2-1984 (2), G. L. Parsons, site 30, 1963–66 clearcut litter; Road 1506, 1800′, VII-14-1982 (3), IX-6-1982 (3), IX-6-1983 (2), G. L. Parsons, site 31, 1950 clearcut, litter; R. S. 7, 1500′, Road 1506, IX-22-1982 (4), IV-14-1983 (2), VIII-24-1983 (2), IV-26-1984 (2), G. L. Parsons, site 32, old-growth, litter.

Biology. Old-growth, 93; 1950 clearcut, 42; 1951 clearcut, 4; 1952 clearcut, 15; 1952–53 clearcut, 3; 1954 clearcut, 2; 1954–55 clearcut, 47; 1959 clearcut, 17; 1960 clearcut, 1; 1963 clearcut, 1; 1963–66 clearcut, 35; 1966 clearcut, 1; 1975 clearcut, 37; 1976 clearcut, 8; 1978 clearcut, 2. Collected in a variety of leaf litters in forests of all ages (Chandler 1997), although it is most common in older forests. *Pselaptrichus rothi* is most abundant during the summer (Table 2) at low to moderate elevations in the Experimental Forest.

Distribution. Extreme northwestern California through western Oregon and Washington.

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