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ABSTRACT

Pseudopsis is redescribed, a key to the species is presented, and the phylogeny, distributional history, and biology of the species are discussed. Of the 30 species in the genus five are redescribed, 24 are newly described, and one, *P. columbica*, is resurrected from synonymy with *P. sulcata*, but was not studied. *Pseudopsis montoraria* is proposed to replace what mistakenly had been called *P. obliterata*. The true *P. obliterata* and *P. detrita* are synonyms, the former taking priority. What was previously the geographically widespread *P. sulcata* is a complex of 24 sibling species. The new species of the *P. sulcata* complex in the Old World are *P. afra*, *P. himalayensis*, *P. prolixa*, and *P. watanabei*. In the New World the complex is represented by the newly described *P. subulata*, *P. sagitta*, *P. obtusa*, *P. callosa*, *P. abbreviata*, *P. sinuata*, *P. echinata*, *P. maja*, *P. spicula*, *P. bilacuna*, *P. biloba*, *P. constricta*, *P. vespina*, *P. lata*, *P. dybasi*, *P. petila*, *P. dilata*, *P. grossa*, and *P. wygodzinskyi*. *Pseudopsis sulcata* (*sensu stricto*) occurs in the western Palaearctic region. Most species of the complex are allopatric, but nine occur sympatrically, three at one locality, and two at each of three other places.

Pseudopsis is the only genus of the Pseudopsinae and is the sister group of the Oxytelinae. Two subgenera are recognized: *Pseudopsis* and *Pseudopsiella*. *Chiliopseudopsis* is a junior synonym of *Pseudopsiella*. The nominal subgenus contains the 25 species of the *sulcata* complex. *Pseudopsis obliterata*, *P. montoraria*, *P. minuta*, *P. arrowi*, and *P. adustipennis* comprise *Pseudopsiella*.

Pseudopsis and *Pseudopsiella* are sister groups. Within *Pseudopsiella*, *P. minuta* is the sister species of the other four species. *Pseudopsis obliterata* and *P. montoraria* are the sister group to *P. arrowi* and *P. adustipennis*. Alternative phylogenetic schemes are discussed.

The species of the genus live principally in temperate, montane regions of the world. They probably originated in western North America and spread from there.

INTRODUCTION

Most of the species of *Pseudopsis* live in the New World where they inhabit temperate and montane regions. They are relatively primitive, slow-moving animals and live on the ground in vegetable matter.

My study of *Pseudopsis* was stimulated for two reasons. The first was the need for clarification of the taxonomic position of the genus, which had been in doubt since it was described; the second concerned the disjunct distribution of the species. Most of the species were Holarctic, but one occurred in Chile, the other in New Zealand. Several questions arise. What is the sister group of *Pseudopsis*? Do the Chilean and New Zealandese species belong in the genus, and if so, which are their sister species? What are the cladistic and distributional histories of the species? These questions were clarified by determination of the apomorphic and plesiomorphic characteristics (Hennig, 1965, 1966) and selection of the most parsimonious phylogenetic hypothesis to fit the observations.

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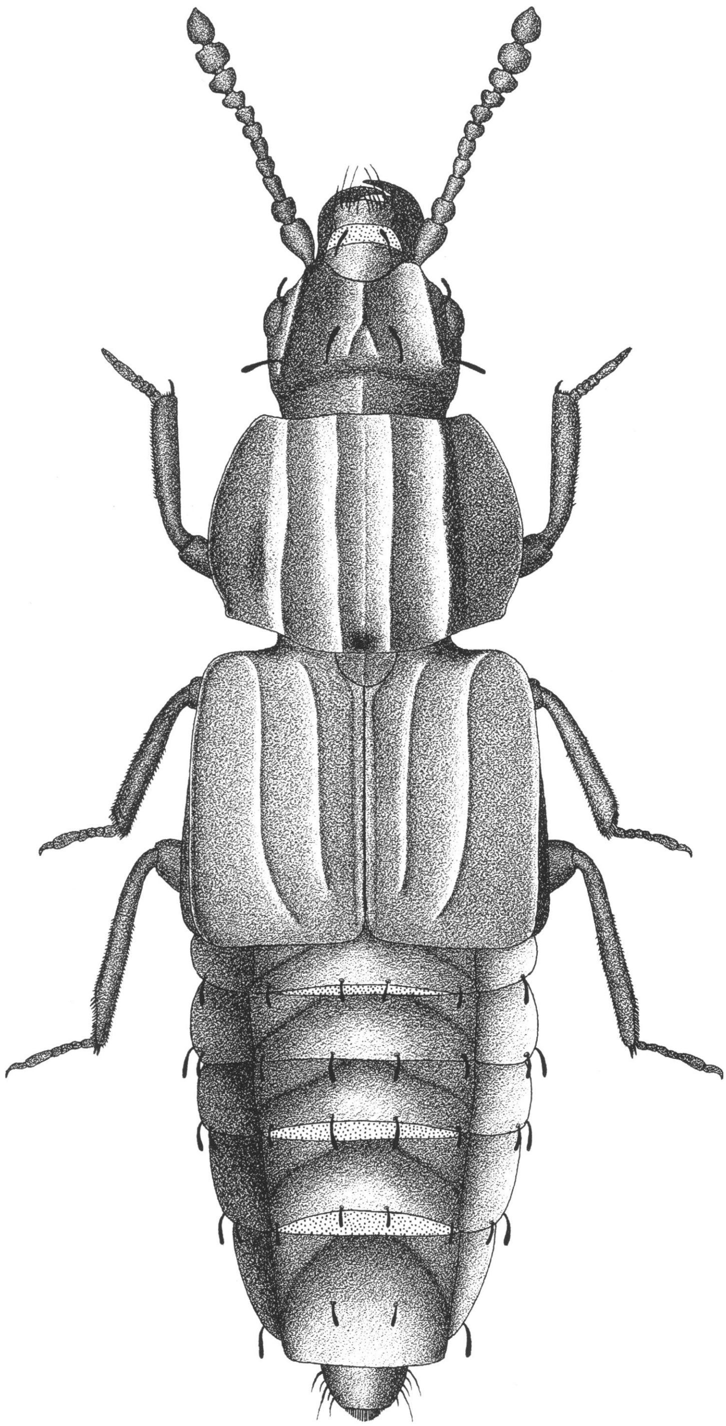

FIG. 1. General aspect of *Pseudopsis callosa*.

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TAXONOMIC HISTORY

Pseudopsis Newman (1834) was described with one species, *P. sulcata*, from the Isle of Wight, in the English Channel. Subsequently species from scattered parts of the world were added: *Pseudopsis adustipennis* from Chile (Fairmair and Germain, 1861), *P. columbica* from Venezuela (Fauvel, 1866), *P. obliterata* (LeConte, 1879), *P. detrita* and *P. minuta* (Fall, 1901) from the United States, and finally *P. arrowi* from New Zealand (Bernhauer, 1939). Although several American workers (Horn, 1871, 1874; Hubbard and Schwarz, 1878a, 1878b; LeConte, 1879) considered *P. sulcata* to be a part of the American fauna, Fauvel (1874, 1878, 1889) regarded *P. columbica* to be the New World counterpart of *P. sulcata*. Hamilton (1889) synonymized *P. columbica* and *P. sulcata*, but Fauvel refused to accept this view until 1891. Thereafter *P. sulcata* and *P. columbica* were listed as synonyms.

The taxonomic position of the genus has long been in doubt. When Newman (1834) described *Pseudopsis* he thought its general appearance suggested relationship to *Micropeplus*. Kraatz (1858) placed the genus with *Phloeocharis* and *Olisthaerus* in the Phloeocharinae. Ganglbauer (1895) moved the genus to the Oxytelinae, but as a monogeneric tribe, Pseudopsini, which was elevated to a subfamily by Reitter (1909). Since the work of Kraatz (1858) some authors have regarded *Pseudopsis* as representing a genus or tribe (Pseudopsini) of the Phloeocharinae (or Phloeocharini) (Redtenbacher, 1858; Fauvel, 1878; LeConte and Horn, 1883; Blatchley, 1910; Hatch, 1957), Oxytelinae (*sensu lato*) (Bernhauer and Schubert, 1910; Cameron, 1930; Scheerpeltz, 1933; Arnett, 1963), or Piestinae (Leng, 1920; Blackwelder, 1936). Other workers following Reitter (1909) have recognized *Pseudopsis* as a subfamily (Portevin, 1929; Blackwelder, 1944; Tottenham, 1954; Crowson, 1955; Lohse, 1964; Moore, 1964; Scheerpeltz, 1968).

NATURAL HISTORY

Most species of *Pseudopsis* occupy cool, temperate, montane regions at elevations of 1000 to 11,000 feet. The more poleward the species the lower the elevation at which it is collected, until in northern regions the species are not particularly associated with highlands. In the Southern Hemisphere the species are all known from montane areas. The species are ground-dwelling and associated with moist vegetable matter such as leaf litter; moldy layers of cone remnants;

debris from close to streams, swamps, or lakes, from fungus, garden, and hay refuse; and occasionally mosses. A few species have at times been found in cow, human, and chipmunk dung.

In a few instances one species or another has been collected in the nests of mammals. One species was collected twice from the nest of a wood rat (*Neotoma*). Long series of two others were taken in moldy cone remnants near the burrows of squirrels and are apparently found in large numbers and "characteristically" in this habitat in the mountains of the western United States (A. Smetana, personal commun.).

On the other hand, in addition to the occasional collection of species from fungi, one collection (*P. constricta*) was made as the individuals flew to a freshly opened polypore fungus. This observation hints that ovipositioning or feeding may be in fungus.

The larvae of *Pseudopsis* are unknown. Although many collections were made from leaf litter, only adults have been taken.

WING LENGTH

Most species of *Pseudopsis* have the metathoracic wings fully developed and presumably functional. In *P. arrowi*, *P. montoraria*, and *P. obliterata* some or all of the known individuals have micropterous metathoracic wings, a reduced metathorax, and elytra shorter than those of the other species of *Pseudopsis*.

All specimens of *P. arrowi* examined had micropterous metathoracic wings. The only two specimens of *P. montoraria* from Siskiyou County, California and all 20 from Mount Garibaldi, British Columbia had reduced hind wings, but in all other instances they were fully developed. *Pseudopsis obliterata* is quite polymorphic for wing development. Of the 103 specimens studied 30 percent (31 specimens) had reduced metathoracic wings. All the specimens from Triangle Lake, Oregon (one), Yosemite National Park (six), Pomona Mountains (two), Lake Tahoe (10), Tallac (two), Siskiyou County (eight), and Sonoma County (two), California, were micropterous. The individuals from all other localities were macropterous.

The reason for the wing reduction, especially when polymorphic, is not evident. All the species are montane and/or cool temperate, but not all are micropterous. In addition to being montane and micropterous, *P. arrowi* is also insular.

PSEUDOPSIS SULCATA COMPLEX

Previous workers considered *P. sulcata* to be a distinct and easily recognized species with an extensive geographical range that included England, continental Europe, the Caucasus, north Africa, the Himalayas, and recently Japan (Watanabe, 1972) in the Old World, and the United States and Venezuela in the New World. Records published herein add Mexico, Central America, Ecuador, Colombia, and many new localities in the United States and Canada.

Throughout the range the "sulcata" populations are virtually indistinguishable externally from one region to the next (as in fig. 1). Although external variation exists for size, color, and microsculpturing, it intergrades within and/or between populations. In some populations the individuals are small (for example *dybasi*, *prolixa*) or large (for example *sagitta*, *subulata*), have a yellowish humeral spot on the elytra (see description of complex), or lack it (all others), are dark or light, or have slight, variable changes of the microsculpturing for which a pattern is indiscernible.

However, the aedeagus permits recognition of at least 24 often allopatric forms within "*P. sulcata*." The females can be identified tentatively only by geographical association with the male.

Analysis of the complex required dissection of all 385 males, and identification still requires dissection. The forms are separable by features of the parameres, median lobe, and internal sac.

The apical portion of the median lobe may be parallel-sided with an acute apex (*dybasi*), gradually attenuated apically, then more strongly so at the apex (*vespina*, *constricta*), gradually convergent apically (*sinuata*, *obtusa*, *subulata*, *sulcata*, *lata*, etc.), weakly convergent apically, then more strongly so at the apex (*callosa*), or broad and nearly truncate apically with the middle of the apex suddenly produced (*biloba*, *echinata*). The membranous region of the apical quarter or third of the median lobe may be absent (*callosa*) or present (all other forms). The median lobe is short and slender (*vespina*) or moderately slender (*dybasi*), long and slender (*sinuata*), moderately broad and moderately long (*callosa*, *abbreviata*, etc.), or broad and long (*biloba*, *subulata*, *wygodzinskyi*, etc.). The size of the sclerotized portion of the apex of the dorsal surface is large (*sagitta*, *obtusa*), small (*dybasi*, *vespina*, *constricta*), or moderate (all others), and its interior margin may be sinuate (*biloba*), broadly rounded (*sagitta*, *obtusa*), narrowly rounded (*sinuata*, *subulata*, *lata*), or acute (*vespina*, *afra*, *sulcata*). Finally, the gestalt of the apical portion of the median lobe may be distinctive (*sagitta*, *dybasi*, *vespina*, *biloba*) or the apical region may have spines (*echinata*) or spicules (*spicula*).

The parameres may reach the apex of the median lobe (*sagitta*, *vespina*, *dybasi*, *callosa*), be just short of it (*obtusa*, *sulcata*, *subulata*), or notably shortened (*abbreviata*). The parameres, although usually gradually deflexed, in *sagitta* are suddenly deflexed at the apex (fig. 66), and in *dybasi* are broadly and strongly deflexed (fig. 123). Occasionally they are stout relative to the median lobe (*vespina*) as compared with all other forms, and they may be strongly sinuous (*dybasi*, *sagitta*), although most often are only slightly so. Occasionally the apical seta of the paramere is long and stout (*afra*).

The length and width of the internal sac, its configuration when retracted into the median lobe, and the size of the spines vary among the forms, but are consistent within each. The internal sac may have no evident, sclerotized spines (*vespina*). Some types have similar aedeagi and are difficult or impossible to distinguish, except with the internal sac (*subulata*, *lata*, *wygodzinskyi*). Others are recognizable by many characters.

Since most forms are allopatric and the aedeagal differences slight, a careful analysis of variation is important. Fortunately I was able to study both long series of *callosa*, *subulata*, and *dybasi* and samples of each from numerous localities. *Pseudopsis sulcata* was represented from many localities, but not by long series. Within each type the aedeagal variation was slight and intergrading. The variation found in one form did not approach the features of another. In forms for which the sample was small I assumed the variation was no greater than that found in the more abundantly represented taxa.

To support the hypothesis that the 24 forms of the *sulcata* complex are species we have both anatomical gaps and the existence of sympatric taxa. *Pseudopsis dilata*, *petila*, and *dybasi* occur sympatrically and syntopically at one locality, *maja* and *bilacuna* at another, and *echinata* and *sinuata* at a third. *Pseudopsis lata* and *vespina* were collected at the same locality, but I do not know if at the same spot.

Further, *prolixa* and *himalayensis*, *sagitta* and *subulata*, *abbreviata* and *callosa*, and *afra* and *sulcata* occur within close proximity of one another. When considering that the genetic continuity is sufficiently strong to permit only slight aedeagal variation among the often widely separated populations of, for example, *subulata*, *sulcata*, or *callosa*, then the anatomical gap between geographically adjacent forms suggests a break in gene flow.

Sympatry of forms with maintenance of differences is a good test of reproductive isolation. The degree of difference between some allopatric forms is at least equal to that of the sympatric forms and suggests reproductive isolation among them all. Although the difference between some allopatric forms (figs. 60, 75, 135) is not so great as that of the sympatric forms (figs. 120, 122, 125), the differences do not intergrade and to call all the more similar, but widely scattered allopatric forms one species would make no zoogeographical sense. Evidence of genetic continuity within a form and a sharp anatomical gap between it and another geographically proximate form further suggests reproductive isolation. There is no evidence, such as intergradation, to suggest interbreeding of any forms.

The evidence supports recognition of many species for what was formerly called *P. sulcata*.

CLADISTIC ANALYSIS

Pseudopsis exhibits several autapomorphic character states that define it, but few synapomorphic features that indicate its sister group relationship.

The genus can be characterized apomorphically by the ridged body (1)[1], the basolateral ridges of the abdominal terga (6), the cuticular comb on tergum VIII (7), the flattened (20), basally fused (17), shortened (19) coxites, the

[1]The numbers in parentheses refer to the apomorphic states given in table 1. The table also gives the figure number for each characteristic.

reduced, knoblike stylus (22), and the openings for glands on abdominal segment IX (25).

Ridges on the dorsum of the body such as those in *Pseudopsis* and the abdominal, basolateral ridges are found in other genera (e.g., *Micropeplus*, *Thoracophorus*, *Oxytelus*, *Thinobius*, *Zalobius*) but were derived independently in *Pseudopsis*. The cuticular comb of the eighth tergum seems to be autapomorphic. The stylus is reduced and the coxites somewhat shortened and flattened, but still separated in *Trigonurus*, *Siagonium*, and *Olisthaerus*. With *Pseudopsis*, *Olisthaerus* also shares similarities of the hypopharynx that are not shared with *Trigonurus* and *Siagonum*.

The relative apomorphy and plesiomorphy of characteristics of the hypopharynx is beyond surmise at present. I can only recognize similarities among taxa. The hypopharynx of *Pseudopsis* (figs. 8, 18) is almost identical with that of *Charhyphus* (Herman, 1972, fig. 6) and *Phloeocharis* and slightly different from that of *Zalobius* and *Olisthaerus*.

Pseudopsis and the Oxytelinae both have the exit for the abdominal glands on the dorsal surface of segment IX. On the basis of this synapomorphic feature I regarded *Pseudopsis* (Pseudopsinae) and the Oxytelinae to be sister groups but acknowledge that other characters are shared with the Phloeocharinae and Piestinae.

A cladistic analysis of the species of *Pseudopsis* yields three plausible hypotheses. In order of the discussion, they have five (fig. 2), seven (fig. 3), and six (fig. 4) multiply derived characters.

In the hypothesis (fig. 2) with five multiply derived characters, the *sulcata* complex stands as the sister of *minuta*, *obliterata*, *montoraria*, *adustipennis*, and *arrowi*. The synapomorphic feature unique to the *sulcata* complex is the absence of the stylus of the female coxites (23). Additional apomorphic features that support the *sulcata* complex are the fused coxites (18), the carinate body (2), and the clubbed setae (4). The fused coxites are shared with *minuta* and *arrowi*, the carinate body with *minuta*, and the clubbed setae with *arrowi*.

The sister group of the *sulcata* complex, with five species, is supported by the presence of a sclerite surrounding the basal foramen (14)[1] and the absence of parameres (12). Both are autapomorphic features for the branch.

Pseudopsis minuta is the sister species of *obliterata*, *montoraria*, *adustipennis*, and *arrowi*. The scalelike setae (5), and the basally separated sclerite surrounding the basal foramen (15) are autapomorphic for *minuta*. The fused coxites (18), carinate body (2), and broadly sclerotized dorsal surface of the aedeagus (35) are apomorphic and help support this line, but are also found in other species. The *sulcata* complex has a carinate body and both it and *P. arrowi* have fused coxites. The dorsally sclerotized aedeagus is found in *obliterata*, *montoraria*, and *adustipennis*. In the last three species the dorsal sclerite is small.

The sister group of *minuta* is recognized more because *minuta* is so apomorphically divergent than because the group has strong synapomorphically defining features. The broad median lobe (13) possessed by all the members of the group is helpful for supporting it.

Within the lineage *obliterata-montoraria* is the sister group to *adustipennis-arrowi*. The former group has a process on the posterior margin of sternum IX of the male (10), an elliptical depression on the ventral surface of the median lobe (16), and spinelike setae on the posterior margin of the coxites of the female (21). These characters are all autapomorphic for the group. The group is further supported by the presence of a sclerite on the dorsal surface (34), a feature also found in *minuta* and *adustipennis*. *Pseudopsis montoraria* has spinelike setae on the posterior margin of sternum IX of the male (24); this is an autapomorphic characteristic. *Pseudopsis montoraria* has a depression on sternum VII of the male (8), a feature shared with *P. arrowi*.

The *adustipennis-arrowi* group can be supported by the emargination of the posterior margin of sternum IX of the male (9) and the short struts of sternum IX of the male (11); both are autapomorphic for the group. *Pseudopsis arrowi* has clubbed setae (4) and the female has fused coxites (18). Both features are apomorphic, but

[1]A sclerite surrounding the basal foramen similar to that in some species of *Pseudopsis* is found also in *Micropeplus*.

fused coxites are found in *P. minuta* and the *P. sulcata* complex and the clubbed setae in the *P. sulcata* complex. In *P. arrowi* the setae are not so evidently clubbed as in the *P. sulcata* complex.

The preceding phylogenetic scheme assumes that the small, curved, difficult to see, weakly sclerotized, poorly pigmented thickening, fused to the median lobe, anterior to the basal foramen of *P. arrowi* (fig. 201) is homologous to the basal sclerite of *montoraria*, *obliterata*, and *adustipennis*. This basal sclerite is large, heavily sclerotized, more basad than in *P. arrowi*, heavily sclerotized, darkly pigmented and separable from the median lobe (figs. 162, 176, 178). In *P. minuta* the basal sclerite is usually pigmented but is separate basally into two parts that are fused to the lateroventral surface of the anterior end of the median lobe (fig. 150). In the case of *P. minuta* there is little question that these sclerites are homologous to the basal sclerite. There is, though, some doubt in the case of *arrowi* in which the position and sclerotization of the structure is different and in which the fusion renders it merely a thickening at the base of the basal foramen.

If *P. arrowi* is considered to lack the basal

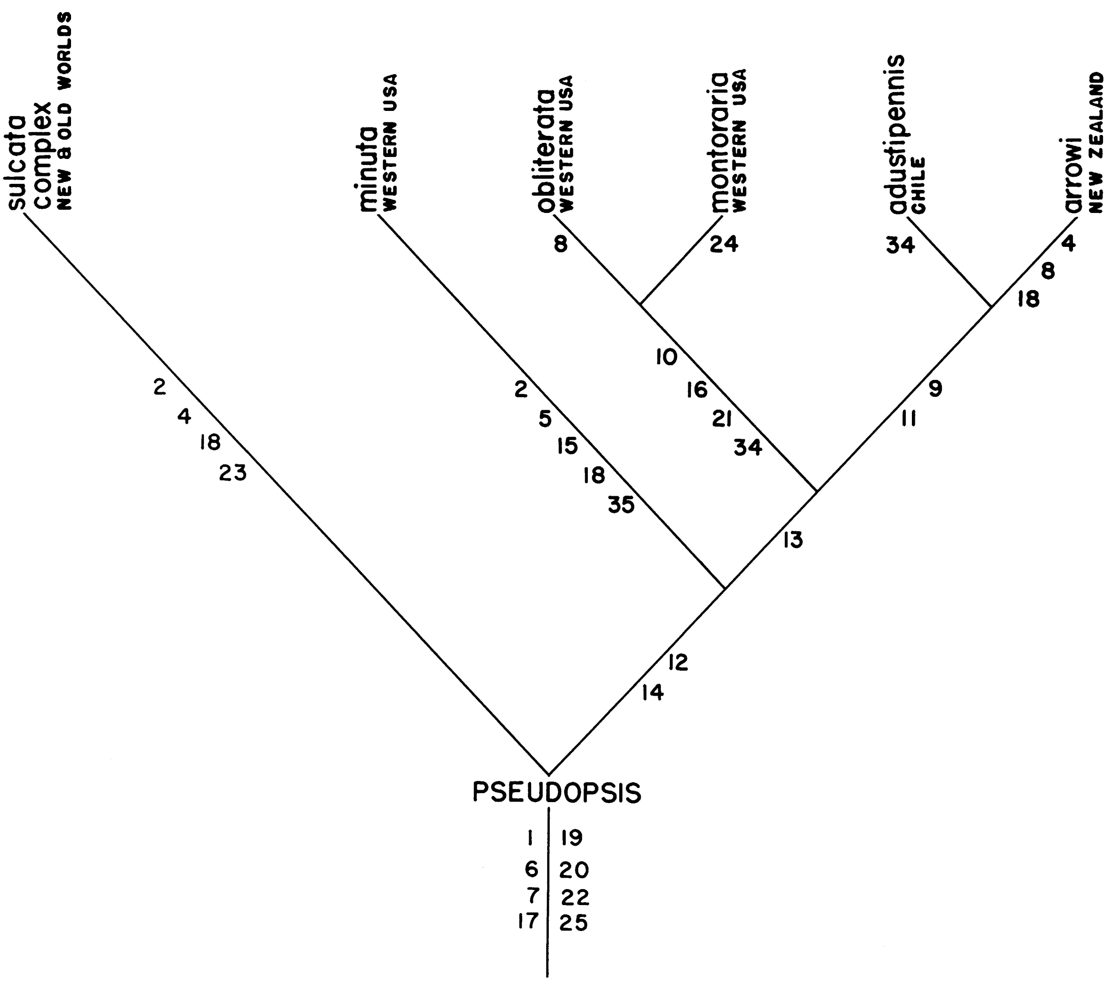


FIG. 2. Proposed phylogeny of *Pseudopsis*.

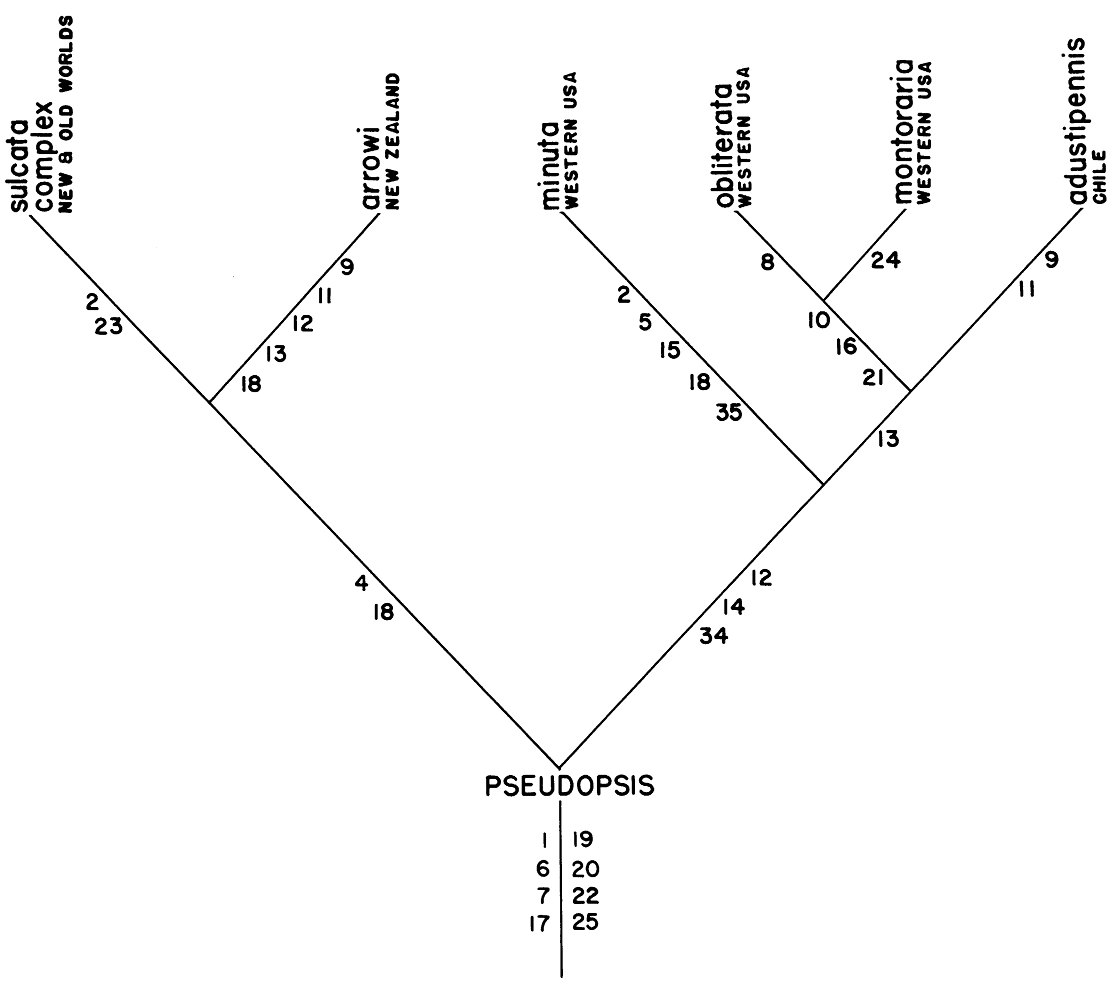


FIG. 3. An alternative phylogenetic scheme of *Pseudopsis*.

sclerite then *arrowi* can be the sister to the *sulcata* complex (fig. 3). In this hypothesis the *sulcata-arrowi* group is supported by the autapomorphic clubbed setae (4). Both have fused coxites (18), which is an apomorphic feature, but also found in *P. minuta*. The *sulcata* complex lacks the stylus of the coxites of the female (23) and the body is carinate (2). The absence of the stylus is autapomorphic and the carinate body is found also in *P. minuta*.

The apomorphic features defining *arrowi* are all found in other species. Parameres are absent (12) in *obliterata*, *montoraria*, *adustipennis*, and *minuta*. The median lobe (13) is broad in *obliterata*, *montoraria*, and *adustipennis*. The males of *P. adustipennis* have short struts on sternum IX (11) and an emargination of the posterior margin of sternum IX (9).

The sister group of *sulcata-arrowi* has four species and is autapomorphically defined by the presence of the basal sclerite of the aedeagus (14) and the dorsally sclerotized median lobe (34). The group is further supported in not having parameres (12) which is apomorphic but also found in *P. arrowi*.

In this lineage all the members have many cuticular processes on the lateral sides of the hypopharynx, whereas the species of the *sulcata-arrowi* group have few. I am unable to evaluate this difference in terms of relative apomorphy and plesiomorphy.

The *adustipennis-obliterata-montoraria* group can only be supported by the broad median lobe (13) which, unfortunately, is also present in *P. arrowi*. Although it cannot be supported autapomorphically it is recognized as a group because *minuta* is so apomorphically divergent.

The support for the remaining groups is the same as that presented for the first hypothesis (fig. 2).

In the third alternative the *sulcata-minuta* group, the sister to the other species (fig. 4), is supported by the autapomorphic carinate body (2) and the fused coxites (18). The latter feature is also found in *P. arrowi. Pseudopsis sulcata* is based on the absence of the stylus (23), which is autapomorphic, and the clubbed setae (4) found also in *P. arrowi. Pseudopsis minuta* has scalelike setae (5), lacks parameres (12), has a basal sclerite separated into two parts (15), and has the dorsal surface of the median lobe broadly sclerotized (35). The absence of parameres and presence of a basal sclerite are shared with *obliterata*, *montoraria*, *adustipennis*, and *arrowi*.

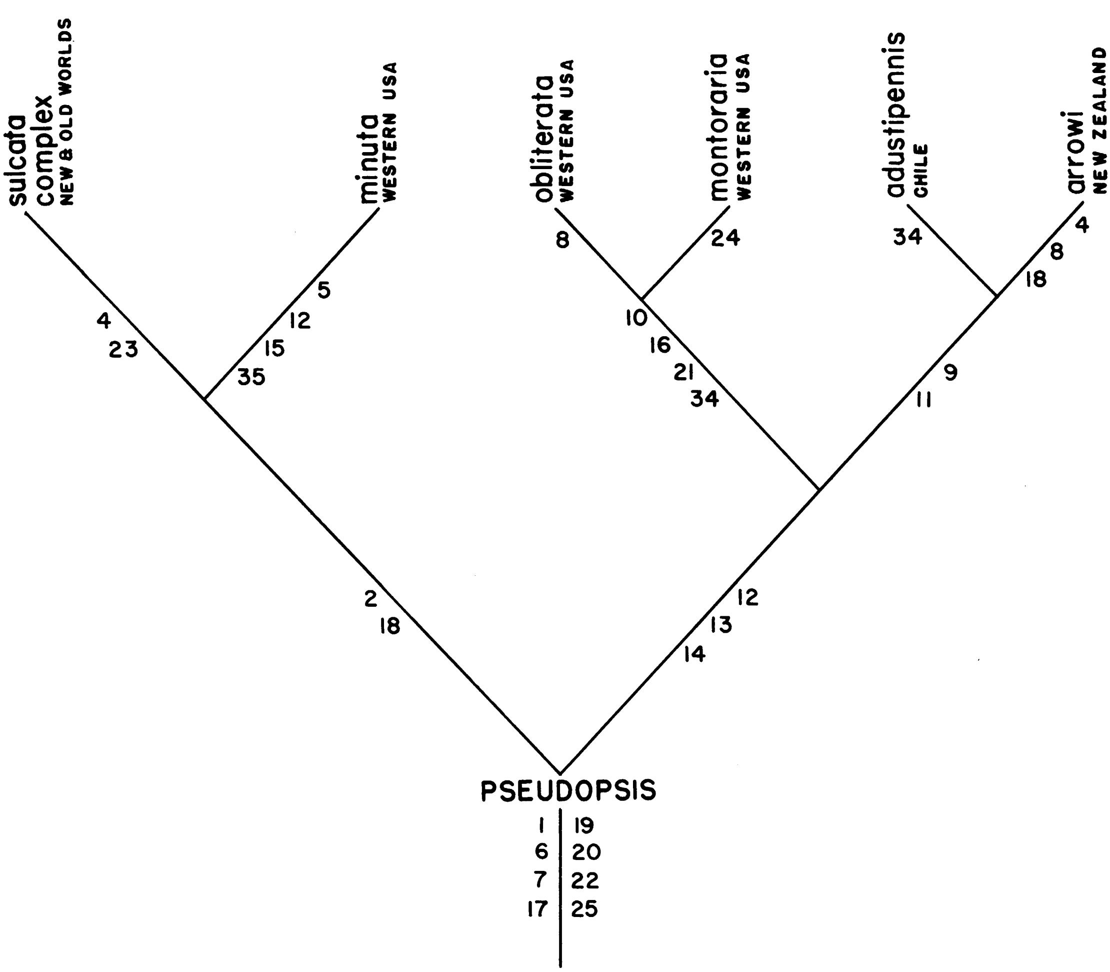


FIG. 4. An alternative phylogenetic scheme of *Pseudopsis*.

There is a sclerite on the dorsal surface of the median lobe in *obliterata*, *montoraria*, and *adustipennis*.

The *obliterata-montoraria-adustipennis-arrowi* group is based on the absence of parameres (12), the broad median lobe (13), and a sclerite surrounding the basal foramen (14). The broad median lobe is autapomorphic; the other two features are shared with *P. minuta*.

The *obliterata-montoraria* and the *adustipennis-arrowi* groups are supported as described for the first alternative (fig. 2).

In lieu of other evidence, the most parsimonious choice is the scheme in which the *sulcata* complex is the sister of the other species. It requires multiple derivation of only five characters as opposed to seven for the second hypothesis (fig. 3) and six in the third (fig. 4).

The species of the *sulcata* complex were based on aedeagal characters, most of which I find difficult to judge for relative apomorphy and plesiomorphy. Some, though, are more obvious than others. In table 1, characters 26 to 33 refer to this complex. Unfortunately, most of these characters are autapomorphic for single species; few are synapomorphic, features that allow the grouping of two or more species. In most cases, any statements relating to cladistic relationships

TABLE 1
Relative Plesiomorphy and Apomorphy of Characters Used for a Cladistic Analysis of *Pseudopsis*

Plesiomorphic	Apomorphic
1. Pronotum and elytra without ridges	1. Ridges on head, pronotum and elytra (figs. 155, 156, 166, 167, 179, 182, 192, 198)
2. Costae on head, pronotum and elytra (figs. 155, 156, 166, 167, 192, 198)	2. Carina on head, pronotum and elytra (figs. 1, 142, 143)
3. Unmodified setae	3. Modified setae (figs. 14, 15, 16, 25, 26, 148, 149)
4. Unmodified setae	4. Clubbed setae (figs. 16, 25, 26)
5. Unmodified setae	5. Scalelike setae (figs. 14, 15, 148, 149)
6. Abdominal terga without ridges	6. Abdominal terga with basolateral ridges (figs. 1, 25, 148)
7. Tergum VIII unmodified	7. Tergum VIII with comb on posterior margin (figs. 1, 13, 151, 191)
8. Sternum VII of male unmodified	8. Sternum VII of male with deep, median depression (fig. 165)
9. Posterior margin of sternite IX of male truncate (fig. 24)	9. Posterior margin of sternite IX of male emarginate (figs. 183, 197)
10. Posterior margin of sternite IX of male truncate (fig. 24)	10. Posterior margin of sternite IX of male produced (figs. 164, 177)
11. Sternum IX of male with long struts (figs. 24, 141, 164, 177)	11. Sternum IX of male with short struts (figs. 181, 197)
12. Parameres present	12. Parameres absent (figs. 145, 162, 176, 178, 201)
13. Median lobe tapering apically (figs. 31, 145)	13. Median lobe broad apically (figs. 162, 176, 178, 201)
14. Median lobe without sclerite surrounding basal oriface (figs. 31, 60, 98)	14. Median lobe with curved basal sclerite surrounding proximal and lateral sides of basal oriface (figs. 145, 162, 176, 178, 201)
15. Basal sclerite intact (162, 176, 178, 201)	15. Basal sclerite separated into two parts (fig. 145)

TABLE 1–(*Continued*)

Plesiomorphic	Apomorphic
16. Median lobe without elliptical depression on ventral surface (figs. 31, 145, 178, 201)	16. Median lobe with elliptical depression on ventral surface (figs. 162, 176)
17. Coxites separated	17. Coxites fused basally (figs. 161, 175, 181)
18. Coxites fused basally (figs. 161, 175, 181)	18. Coxites entirely fused (figs. 28, 141, 199)
19. Coxites elongate (Herman, 1972, figs. 27, 28)	19. Coxites shortened (figs. 28, 141, 161, 175, 181, 199)
20. Coxites cylindrical (Herman, 1972, figs. 27, 28)	20. Coxites broad and flattened (figs. 28, 141, 161, 175, 181, 199)
21. Coxites with unmodified setae on posterior margin (figs. 141, 181, 199)	21. Coxites with spinelike setae on posterior margin (figs. 161, 175)
22. Stylus elongate (Herman, 1972, figs. 27, 28)	22. Stylus reduced, knoblike (figs. 141, 181, 189)
23. Stylus present (figs. 141, 175, 181, 199)	23. Stylus absent (fig. 28)
24. Setae on posterior margin of sternum IX of male long and slender (fig. 177)	24. Setae on posterior margin of sternum IX of male spinelike (fig. 164)
25. Abdominal glands absent	25. Abdominal glands opening on segment IX (fig. 27)
26. Ventral surface of median lobe with apical membranous region (fig. 87)	26. Ventral surface of median lobe entirely sclerotized (fig. 80)
27. Ventral surface of median lobe without depressions (fig. 97)	27. Ventral surface of median lobe with pair of depressions (fig. 98)
28. Dorsal surface of median lobe without spicules	28. Dorsal surface of median lobe with spicules (figs. 105, 106)
29. Dorsal surface of median lobe without spinelike processes	29. Dorsal surface of median lobe with spinelike processes (fig. 94)
30. Apex of median lobe gradually tapered (fig. 107)	30. Apex of median lobe "truncate" (figs. 91, 110)
31. Apex of median lobe gradually tapered	31. Apex of median lobe arrowhead shaped (figs. 62, 67-70)
32. Internal sac shorter than or equal to length of median lobe (fig. 51)	32. Internal sac elongate, much longer than median lobe (figs. 48, 56)
33. Apex of paramere with slender, unpigmented seta (figs. 50, 57)	33. Apex of paramere with stout, pigmented seta (fig. 47)
34. Dorsal surface of median lobe membranous	34. Dorsal surface of median lobe with sclerite (figs. 154, 170, 184)
35. Dorsal surface of median lobe with small sclerite (fig. 203)	35. Dorsal surface of median lobe broadly sclerotized (fig. 141)

are premature. It may be possible to group *P. afra* and *P. prolixa* on the basis of the elongate internal sac (32) and *P. echinata* and *P. biloba* by the "truncated" apex of the median lobe (30). Of the other apomorphic characters, 26 is found only in *P. callosa*, 33 in *P. afra*, 31 in *P. sagitta*, 28 in *P. spicula*, 29 in *P. echinata* and 27 in *P. bilacuna*. The apex of the median lobe is variously constricted in a number of species, and many species have large spines. These conditions are probably apomorphic, but I cannot evaluate them as yet. Study of the pattern and condition of the spines and processes of the *everted* internal sac may aid in a cladistic analysis of the group.

DISTRIBUTIONAL HISTORY

Pseudopsis is principally a New World group. Twenty-four species are New World, five Palearctic, and one New Zealandese.

Three of the species are found in the western United States, one in the southern Andes, and one in New Zealand. Five species of the *sulcata* complex are in the Old World; two are in Europe and north Africa, two in the Himalayas, and one in Japan. Most probably other species will be found in the mountains from the Caucasus to Japan and northeastern Asia. In the New World the *sulcata* complex is enormously expanded. One species is in Canada, four are in the United States (one extends into Mexico), nine in Mexico (principally the southern part), three in Central America, and three in northwestern South America.

The greater number and diversity of forms in the Western Hemisphere and the proposed cladistic history of the genus (fig. 2) do not contradict a New World, possibly western United States or Mexican, origin of *Pseudopsis*. The New World ancestor to the genus divided into the ancestors of the *sulcata* complex and *minuta-obliterata-montoraria-adustipennis-arrowi*.

The ancestor of the *P. sulcata* complex spread into South America, eastern North America, and Asia to Europe and northern Africa. Numerous populations were isolated and finally diversified, often becoming allopatric species.

The ancestor of the *minuta-obliterata-montoraria-adustipennis-arrowi* group gave rise to two species that remained in North America. One became *P. minuta*. From the second species *obliterata-montoraria* diverged and remained in North America and another emigrated to South America. Some populations became established in the southern Andes; others moved to New Zealand. These populations further differentiated to become *P. adustipennis* and *P. arrowi* respectively.

In an attempt to explain the presence of *arrowi* in New Zealand by migration from the Northern Hemisphere, with *arrowi* and the *sulcata* complex as sister groups, the hypothesis of figure 3 was discussed. In the Cladistic Analysis section, this hypothesis was discarded as less parsimonious than that indicating *arrowi* to be the sister species of *adustipennis*.

Pseudopsis arrowi and *P. adustipennis* could not be sister species if in future collections the sister of *P. arrowi* were found in the mountains of southeastern Asia or New Guinea. Further, this hypothetical species and *arrowi* might then be shown to be the sister group of *obliterata-montoraria-adustipennis*. However, with the characters used in the cladistic analysis seven features are multiply derived when *arrowi* is the sister of *obliterata*, *monotoraria*, and *adustipennis*, two more than the hypothesis accepted herein (fig. 2).

TAXONOMIC POSITION

Since 1895 (see Ganglbauer, 1895, pp. 609, 690), *Pseudopsis* has represented a separate tribe or subfamily. With the present state of the higher classification of the Staphylinidae the taxonomic position of *Pseudopsis* is equivocal.

The genus has several unique derived features and some derived characters shared with other subfamilies (synapomorphic). In the Cladistic Analysis I postulate *Pseudopsis* and the Oxytelinae to be sister groups and therefore must recognize them at the same categorical level. Until the sister group of *Pseudopsis* is demonstrated to be a genus or tribe within the Oxytelinae or another subfamily I will regard *Pseudopsis* as the Pseudopsinae.

SUBGENERIC CLASSIFICATION

Bernhauer (1939) described *Pseudopsiella* to include *P. arrowi* because the elytra are very short and have only one short carina laterad of the scutellum (fig. 198). Coiffait and Saiz (1968) erected *Chiliopseudopsis* for *P. adustipennis* because the elytra have only the epipleural and humeral carinae (fig. 182); the pronotum has a transverse groove near the anterior margin and another near the posterior margin (fig. 179); the lateral margin of the pronotum is "double," with the upper edge smooth and the lower denticulate; and the aedeagus lacks parameres (fig. 178).

Pseudopsis sulcata undoubtedly formed the basis of comparison for the preceding subgeneric diagnoses. The reduced elytral carination, lack of parameres, and the denticulate, double pronotal margin characterize *P. obliterata* and *P. montoraria*, in addition to *P. adustipennis* and *P. arrowi*. *Pseudopsis minuta* lacks parameres (fig. 145) and has a denticulate, double pronotal margin but has well-developed elytral carinae (fig. 143). On the basis of the above features alone, four species would be classified in one subgenus with *P. sulcata* in another and *P. minuta* having characters of both. *Chiliopseudopsis* and *Pseudopsiella* would be synonymized. The shortened elytra of *P. arrowi* are correlated with the loss of flight, and reduction of the metathorax and metathoracic wings. As such reduction is the case for many diverse Staphylinidae, it hardly warrants subgeneric recognition. Furthermore, *montoraria* and *obliterata* are dimorphic for elytral and metathoracic wing length.

A cladistic analysis of *Pseudopsis* applied to the subgeneric classification should reflect equal treatment of sister groups. Among the three hypotheses suggested, I regard the phyletic scheme of figure 2 to be the most parsimonious and therefore most acceptable (see Cladistic Analysis).

Considering the *sulcata* complex as the sister group of the other species, there are two to four possible subgenera. In each case the *sulcata* complex forms the nominate subgenus. The remaining species can all be assigned to the same subgenus, in which case the name would be *Pseudopsiella*. Alternatives would be to consider *minuta* as one subgenus and *montoraria-obliterata-adustipennis-arrowi* as one or as two with *montoraria-obliterata* in one and *adustipennis-arrowi* in the other.

In addition to the nominate subgenus, the names *Pseudopsiella* and *Chiliopseudopsis* are available. The former was applied to *arrowi*, the latter to *adustipennis*. If *minuta* or *montoraria-obliterata* are recognized as subgenera, then new names must be proposed for each.

I accept only two subgenera, *Pseudopsis* that includes the species of the *sulcata* complex and *Pseudopsiella* to which are assigned the remaining five species. *Pseudopsis minuta*, *obliterata-montoraria*, and *adustipennis-arrowi* can each be regarded as species groups. This classification reflects equal treatment of sister groups, requires proposal of no new names, and can be recognized by clear, albeit internal, characters. *Chiliopseudopsis* is reduced to a junior synonym of *Pseudopsiella*.

PSEUDOPSIS NEWMAN

Pseudopsis Newman, 1834, p. 313 (type species: *Pseudopsis sulcata* Newman, by monotypy).
Pseudopsiella Bernhauer, 1939, p. 204 (type species: *Pseudopsiella arrowi* [Bernhauer], by monotypy). Subgenus.
Chiliopseudopsis Coiffait and Saiz, 1968, p. 458 (type species. *Chiliopseudopsis adustipennis* [Fairmaire and Germain], by original designation). NEW SYNONYM.

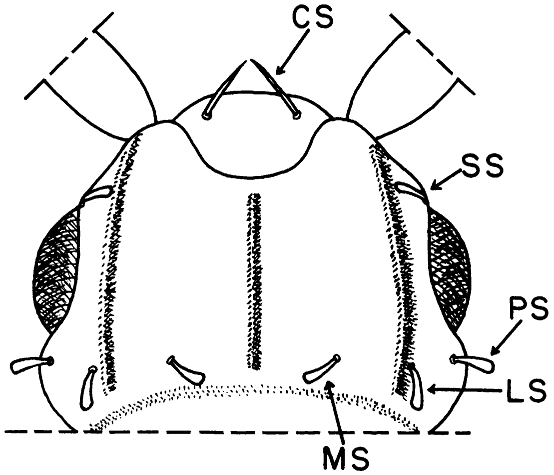
Diagnosis. *Pseudopsis* can be separated from other staphylinids by the comb of tergum VIII (figs. 1, 13), the single pair of paratergites per segment on segment III to VI (figs. 1, 25), the basolateral ridge on segments III to VII (figs. 1, 25), the longitudinal costae (figs. 155, 156, 166, 167), or carinae (figs. 1, 142, 143) of the head, pronotum, and elytra, the reduction and partial (figs. 161, 175, 181) or complete fusion of the coxites (figs. 28, 141, 199) of the female, and the loss (fig. 28) or reduction to a knoblike structure of the stylus of the female (figs. 141, 161, 181, 189).

The nominal subgenus can be separated from *Pseudopsiella* by the presence of parameres on the aedeagus (fig. 31), by the lack of a stylus on the coxites (fig. 28), and by the pair of carinae at the base of the midlongitudinal carina of the head (fig. 1).

Description. Length 1.8 to 5.0 mm. Body moderately flattened dorsoventrally. Color reddish brown.

Labrum (fig. 187) with anterior margin sinuate; dorsal surface with moderately numerous setae; ventral surface without distinctive epipharyngeal lobes. Labrum separated from clypeus by broad membranous anteclypeus (fig. 1); anteclypeus apparently permitting extrusion of labrum. Clypeus short (figs. 1, 142, 166).

5



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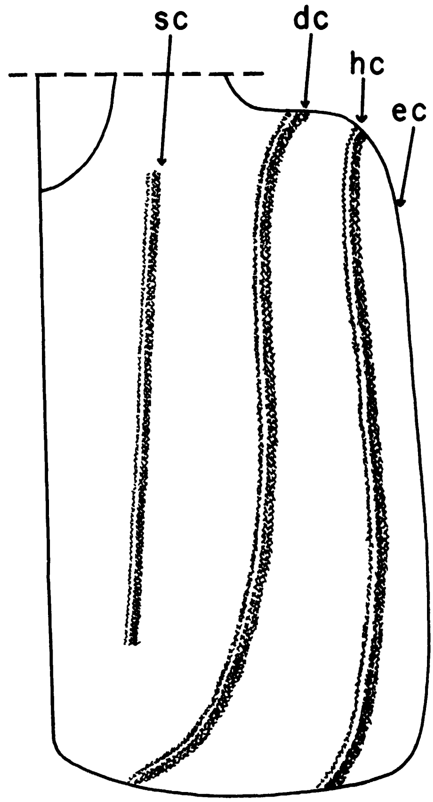


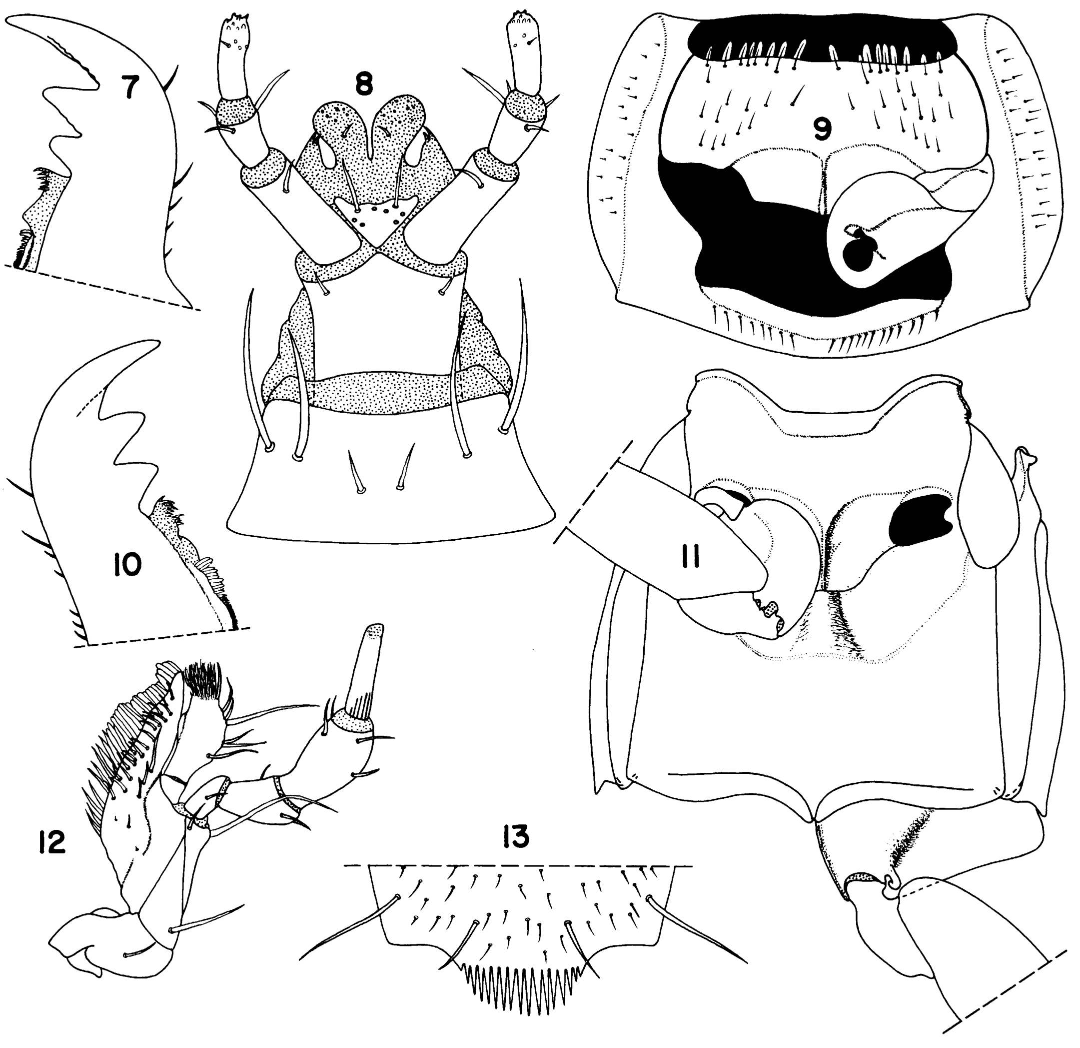
FIGS. 5, 6. *Pseudopsis minuta*. 5. Dorsal view of head showing positions of modified setae. 6. Right elytra showing positions of carinae.

Abbreviations: CS, clypeal seta; dc, discal carina; ec, epipleural carina; hc, humeral carina; LS, lateroposterior seta; MS, medioposterior seta; PS, postocular seta; sc, sutural carina; SS, supraorbital seta.

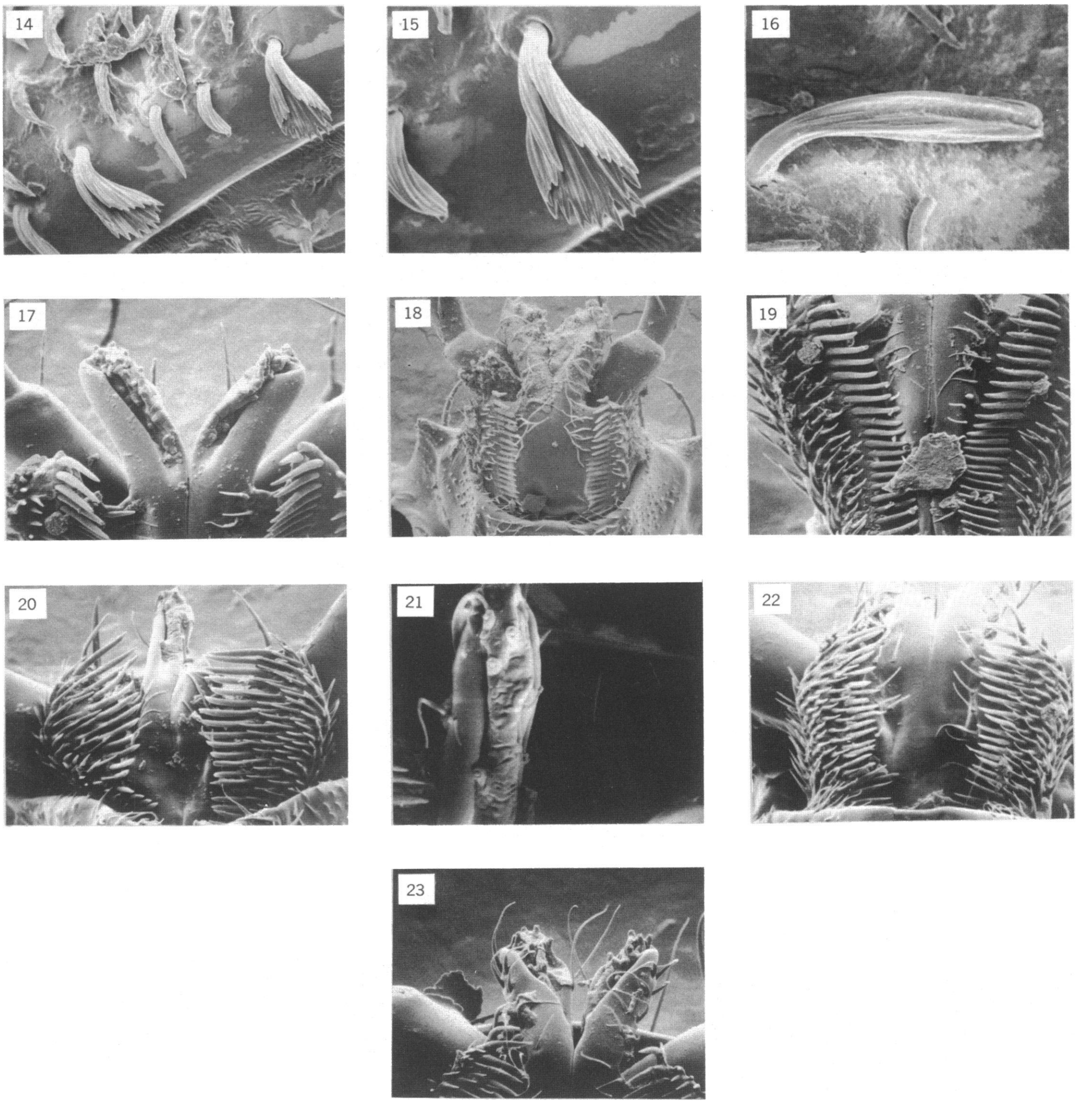
Supra-antennal ridge low (figs. 1, 142, 166). Epistomal suture broadly and deeply curved (figs. 1, 142). Dorsum of head with (figs. 1, 142) or without (figs. 155, 166) lateral and midlongitudinal carinae; lateral carinae, if present, extending posteriorly from anterior margin of supra-antennal ridge to base of head. Pubescence long and evident or short and obscure. Dorsum (fig. 5) with long, stout setae on clypeus (fig. 5, CS, clypeal seta), above eye (fig. 5, SS, supraorbital seta), behind eye (fig. 5, PS, postorbital seta), and near base laterally (fig. 5 LS, lateroposterior seta) and medially (fig. 5 MS, medioposterior seta); all but postorbital setae present; postorbital present or absent; seta tapering apically or apically expanded. Antenna relatively stout and with 11 articles (fig. 1). Mandibles asymmetrical (figs. 7, 10, 186, 188); mesial margin with two to four denticles; lateral side with setae. Maxilla as in figure 12; palpus four-segmented; fourth segment long and slender and with long processes at base. Labium as in figure 8; palpus three-segmented; ventral surface with triangular sclerite between base of palpi; hypopharynx with four lobes, on anterior margin, median lobes spatulate, lateral lobes acute, surface with median groove and longitudinal row of setae on lateral side, lateral side with numerous cuticular processes (figs. 17-23). Gular sutures separated and sinuate (fig. 172); submentum and gula not separated by suture (fig. 172).

Pronotum (figs. 1, 142, 155, 166, 179, 192) with broad, median region elevated; elevation with two median and two lateral longitudinal carinae or costae, occasionally with fifth mid-longitudinal carina (fig. 1); pubescence long and distinct or short and obscure. Protergosternal suture present (fig. 9). Procoxal fissure open (fig. 9). Protrochantin exposed (fig. 9). Postprocoxal lobe present. Procoxae without groove on mesial surface. Prosternal process short and developed only as low carina (fig. 9).

Scutellum with apex exposed from under prothorax (fig. 1). Elytron (figs. 1, 143, 156, 167, 182, 198) with four longitudinal carinate or costate ridges; sutural ridge (fig. 6, sc, sutural carina) laterad of suture and carinate or costate; discal ridge (fig. 6, dc, discal carina) extending posteriorly on middle of disk and costate or carinate; humeral ridge (fig. 6, hc, humeral carina) extending posteriorly from humeral area and usually carinate, occasionally costate; epipleural



FIGS. 7-13. *Pseudopsis callosa*. 7. Right mandible. 8. Labium, ventral view. 9. Prothorax, ventral view, right coxa removed. 10. Left mandible. 11. Pterothorax, ventral view, left mesocoxa and right metacoxa removed. 12. Maxilla. 13. Tergum VIII, apical portion.



FIGS. 14, 15. *Pseudopsis minuta*, modified setae of abdominal tergum IV. 14. X1125. 15. X2250.

FIGS. 16, 17. *P. sinuata*. 16. Modified seta of abdominal tergum V, X1200. 17. Hypopharynx, lobes of anterior portion, X1200.

FIG. 18. *P. arrowi*, hypopharynx, anterior lobes covered with dirt. X700.

FIG. 19. *P. sinuata*, hypopharynx, central and posterior portions. X1200.

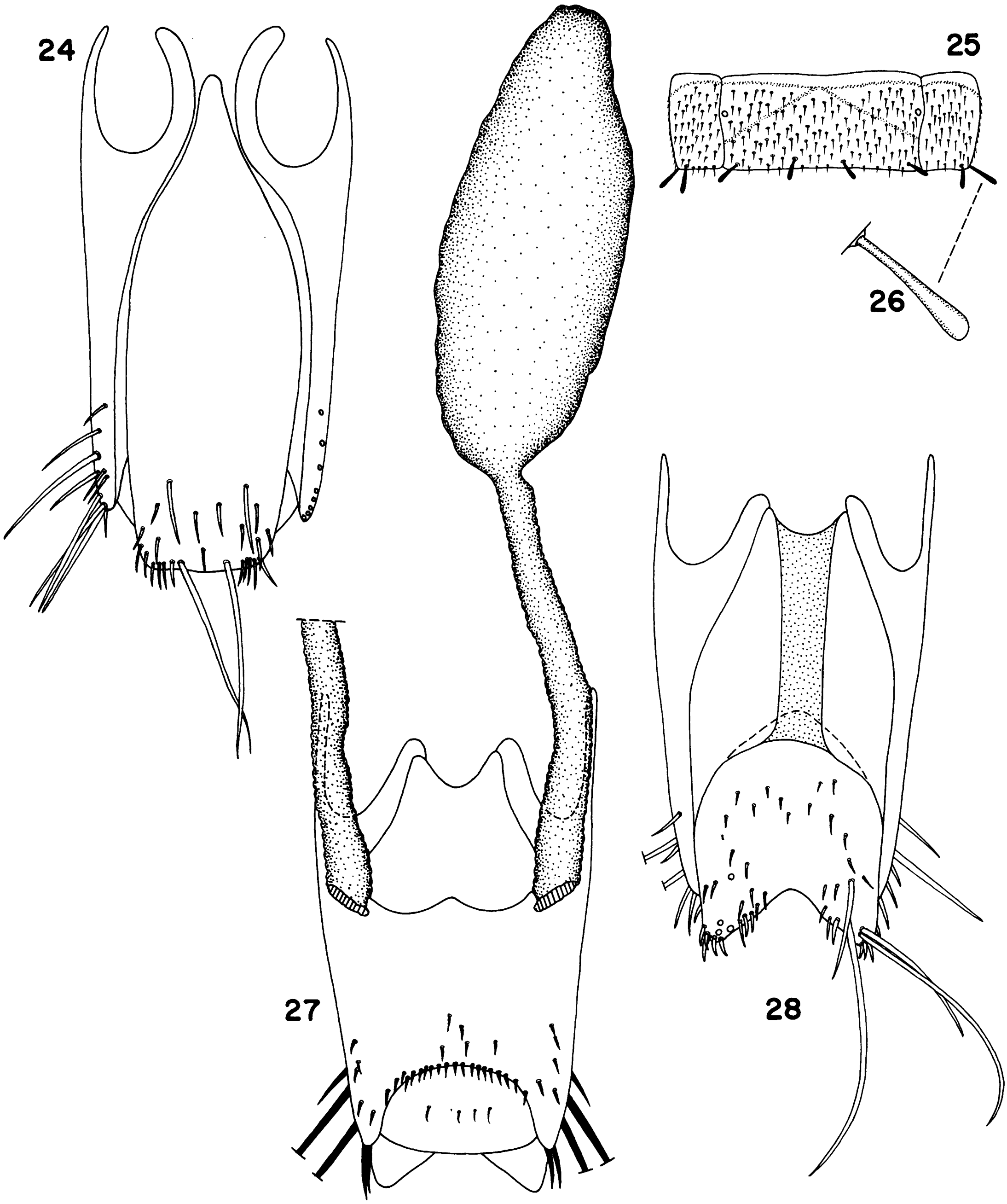
FIGS. 20, 21. *P. obliterata*, hypopharynx, 20. X1400. 21. Left lateral anterior lobe, X2800.

FIGS. 22, 23. *P. adustipennis*, hypopharynx, X1200. 22. Central and posterior portions. 23. Anterior portion.

ridge (fig. 6, ec, epipleural carina) on epipleuron or on dorsal margin of epipleuron and strongly carinate. Mesocoxae contiguous (fig. 11). Metacoxae transverse (fig. 11).

Tibiae with longitudinal rows of spines. Tarsal formula 5-5-5 (fig. 1).

Abdominal segments II to VI with one pair of laterotergites per segment (fig. 1); segment VII



FIGS. 24-28. *Pseudopsis callosa*. 24. Abdominal segment IX, male, ventral view. 25. Abdominal tergum VI with paratergites. 26. Modified seta of abdomen, enlarged. 27. Abdominal terga IX and X with reservoir of secretory gland, left reservoir removed. 28. Abdominal segment IX, female, ventral view.

with two pairs of transversely divided laterotergites (figs. 1, 148). Segment VIII without laterotergites. Terga III to VII with basolateral ridge (fig. 1). Tergum VIII with cuticular comb on posterior margin (figs. 1, 13, 151, 191). Sternite II reduced and fused to anterior margin of sternite III (fig. 171). Sternite III without median carina or strong ridge (fig. 171). Terga, laterotergites, and sternites with or without large, modified setae.

Segment IX with pair of large reservoirs for secretory glands; external orifice on laterodorsal margin of segment IX (fig. 27). Sternum IX of male with posterior margin sinuate (fig. 24), emarginate (figs. 183, 197), rounded (fig. 139), or medially produced (figs. 164, 177). Tergum X ovoid (fig. 27).

Aedeagus asymmetrical and with (figs. 31, 60) or without parameres (figs. 145, 176, 201); median lobe broad (figs. 176, 201) or slender (fig. 31) with apex variously modified; dorsal surface largely membranous; ventral side largely sclerotized.

Stylus of female present (figs. 175, 181) or absent (fig. 28) and, if present, reduced to small knoblike structure. Coxites flattened and fused (figs. 28, 141, 199) or divided anteriorly by suture and separated posteriorly (figs. 161, 175, 181).

Synonymy. I regard *Chiliopseudopsis* to be a junior synonym of *Pseudopsis*. The characters used to separate this species as a subgenus are basically the same as those suggested for *Pseudopsiella*. Further, a cladistic analysis of *Pseudopsis* suggests the type species of *Pseudopsiella* and *Chiliopseudopsis* to be sister species. For further discussion of the synonymy see "Subgeneric Classification."

Discussion. The nominal subgenus includes only the species of the *sulcata* complex. All the others are relegated to *Pseudopsiella*.

KEY TO THE SPECIES OF *PSEUDOPSIS*

1. Head with three and pronotum with four or five, well-developed, longitudinal carinae (figs. 1, 142); sutural carina of elytra well developed (fig. 1, 143) 2

Head with two or three moderately (figs. 179, 192) to poorly developed (figs. 155, 156) longitudinal costae and pronotum with four or five well-developed costae (figs. 155, 166, 179, 192); sutural costa of elytra obsolete or poorly developed (figs. 156, 167, 182, 198) 3

2(1). Abdominal paratergites IV to VI each with one pair of scalelike setae (fig. 148); tergum VII without scalelike setae (fig. 148); postocular scalelike seta present (fig. 5); pronotum without median carina (fig. 142); aedeagus without parameres (fig. 145); western United States (fig. 152) . . . . *minuta*

Abdominal paratergites IV to VI each with one clubbed seta (fig. 1); tergum VII with pair of clubbed seta near middle (fig. 1); postocular clubbed seta absent (fig. 1); pronotum with median carina (fig. 1); aedeagus with parameres (fig. 31); Europe, Asia, North, Central, and South America . . . . *sulcata* complex . . . 6

3(1). Left mandible quadridentate (figs. 186, 194), right mandible tridentate (fig. 188, 196); posterior margin of sternum IX of male with broadly rounded median emargination (figs. 183, 197); ventral surface of median lobe broadly depressed but without elongate, elliptical depression (figs. 178, 201); coxites of female without elongate, spinelike setae on posterior margin and with lateral portion of posterior margin produced posteriorly (figs. 181, 199); Southern Hemisphere 4

Mandibles bidentate (figs. 153, 157, 168, 169); posterior margin of sternum IX of male with median portion produced posteriorly (fig. 164); ventral surface of median lobe with elongate, elliptical depression (figs. 162, 176); coxites of female with elongate, spinelike setae on posterior margin and with posterior margin more or less sinuately truncate (figs. 161, 175); Northern Hemisphere . . 5

4(3). Pronotum with strongly angulate and distinct basal angles (fig. 179); sternum VII of male without median depression; posterior margin of sternum VIII of male shallowly emarginate (fig. 190); ventral surface of median lobe with sinuate posterior margin (fig. 178); coxites of female with apical half separated and basal half divided by suture (fig. 181); Chile and Argentina (fig. 185) .... *adustipennis*

Pronotum with basal angles rounded and more or less indistinct (fig. 192); sternum VII of male with broad, moderately deep depression: posterior margin of sternum VIII of male moderately deeply emarginate (fig. 192); ventral surface of median lobe with apical fifth longitudinally divided (figs. 195, 201); coxites of female fused and with round, median notch on posterior margin (fig. 199); New Zealand (fig. 200) .... *arrowi*

5(3). Costae of pronotum moderately strongly carinate (fig. 155); sternum VII of male with obsolete depression lacking medioposteriorly directed pubescence; sternum IX of male with pair of spinelike setae on posterior margin laterad of median process (fig. 164); ventral surface of median lobe with elliptical depression nearly reaching basal orifice, depression more than one-half length of aedeagus (fig. 162); coxites of female with median portion of posterior margin slightly produced (fig. 161); western United States (fig. 160) . . *montoraria*

Costae of pronotum rounded (fig. 166); sternum VII of male with moderately deep, median depression (fig. 165), depression with medioposteriorly directed pubescence; sternum IX of male without spinelike setae on posterior margin (fig. 177); ventral surface of median lobe with elliptical depression not nearly reaching basal orifice, depression about one-third length of aedeagus (fig. 176); coxites of female with posterior margin more or less truncate (fig. 175); western United States (fig. 152) . . *obliterata*

6(2). Internal sac coiled and at least one-half longer than median lobe (figs. 48, 56) 7

Internal sac curved at base of median lobe and shorter than or as long as or only slightly longer than median lobe 8

7(6). Apical seta of parameres dark reddish brown (fig. 47); internal sac more than twice length of median lobe (fig. 48); north Africa (fig. 42) .... *afra*

Apical seta of parameres unpigmented (fig. 57); internal sac one-half longer than median lobe (fig. 56); northern India (fig. 42) .... *prolixa*

8(6). Apical portion of dorsal surface of median lobe with spines (fig. 94) or patches of spicules (figs. 105, 106). 9

Apical portion of dorsal surface of median lobe entirely membranous (fig. 111), without spines or spicules 10

9(8). Median lobe with spinelike processes on dorsal surface of apical region (fig. 94); apex of median lobe nearly truncate with median attenuation (fig. 91); Mexico (fig. 89) .... *echinata*

Median lobe with patches of spicules on dorsal surface of apical region (figs. 105, 106); median lobe gradually tapered to apex, apex acute (fig. 107); Mexico (fig. 89) ..... *spicula*

10(8). Internal sac seemingly absent because of absence of pigmented spines, sac transparent; aedeagus long and slender (fig. 103); Mexico (fig. 112) .... *vespina*

Internal sac with numerous, darkly pigmented spines, sac clearly visible; aedeagus variable 11

11(10). Ventral surface of median lobe with pair of depressions just proximad of apical third (fig. 98); Mexico (fig. 104) .... *bilacuna*

Ventral surface without pair of depressions 12

12(11). Median lobe with apical portion expanded before tapering to apex (figs. 62, 67-70; 125, 128)......... 13

Median lobe tapered to apex (figs. 31, 60, 80)................. 14

13(12). Median lobe with arrowhead shaped apical portion (figs. 62, 67-70); eastern and western Canada (fig. 73) .... *sagitta*

Median lobe with dilated apical portion (fig. 125, 128); Panama (fig. 129)... .... *dilata*

14(13). Membranous portion of ventral surface of median lobe extending beyond dorsal sclerotization as parallel-sided, apically acute lobe (fig. 122); parameres strongly sinuate in ventral view (fig. 122) and strongly deflexed in lateral view (fig. 123); Costa Rica and Panama (fig. 129) . . . . *dybasi*

Membranous portion of ventral surface of median lobe not extending beyond apex of dorsal sclerotization (figs. 31, 60, 120, 125); parameres slightly (figs. 31, 116) to moderately strongly (figs. 92, 120) sinuate in ventral view and gradually and moderately deflexed in lateral view (figs. 119) . 15

15(14). Apex of median lobe (dorsal sclerotization) moderately strongly to strongly attenuate (figs. 80, 110, 116, 120) 16

Apex of median lobe (dorsal sclerotization) gradually tapered from more basal portion, apex not differentiated appreciably (fig. 31, 60, 92, 97, 114) 19

16(15). Apex of median lobe so strongly convergent medially as to be nearly truncate with median, abruptly attenuate process (fig. 110); internal sac, in repose, broad apically (fig. 109); Mexico (fig. 104) . . . . *biloba*

Apex of median lobe gradually convergent and acuminate (figs. 80, 116, 120); internal sac, in repose, slender (figs. 81, 117, 126) 17

17(16). Ventral surface of median lobe entirely sclerotized (fig. 80), apex of median lobe broadly but strongly attenuate (fig. 80); southwestern United States (fig. 73) . . . . *callosa*

Ventral surface of median lobe with membranous region on apical portion (figs. 116, 120); apex of median lobe narrowly attenuate (figs. 116, 120) 18

18(17). Apical portion of median lobe (dorsal sclerotization) constricted then attenuate to apex (fig. 116, 118); membranous portion of ventral surface of median lobe short and poorly delimited anteriorly (figs. 116, 118); internal sac, in repose, slightly longer than median lobe (fig. 117); Mexico (fig. 112) . . . . *constricta*

Apical portion of median lobe (dorsal sclerotization) gradually but strongly attenuate to apex, not constricted (fig. 120); membranous portion of ventral surface of median lobe long, narrow, well defined (fig. 120); internal sac, in repose, shorter than median lobe (fig. 126); Costa Rica and Panama (fig. 129) . . . . . . *petila*

19(15). Apex of parameres reaching apex of median lobe (figs. 92, 97, 135) . . 20

Apex of parameres not reaching apex of median lobe (figs. 31, 50, 54, 130) 22

20(19). Median lobe broad and with lateral margins of apical portion broadly rounded and convergent to acute apex (fig. 97); internal sac in repose, broad at apex of median lobe (fig. 101); Mexico (fig. 104) . . . . . . *maja*

Median lobe broad or slender and with lateral margins of apical portion gradually convergent and slightly rounded to acute apex (figs. 92, 95, 96, 135); internal sac broad (fig. 93) or slender (fig. 136) 21

21(20). Median lobe slender (fig. 92); parameres relatively stout (fig. 92) and sinuate; internal sac, in repose, slender and without stout spines (fig. 93); Mexico (fig. 89) . . . . *sinuata*

Median lobe broad (fig. 135); parameres relatively slender and slightly sinuate (fig. 135); internal sac broad and with some moderately stout spines (fig. 136); Ecuador (fig. 134). . . . . *wygodzinskyi*

22(19). Internal sac, in repose, with two rows of large, stout spines (figs. 44, 46, 53, 59, 131) 23

Internal sac, in repose, with one row of stout spines (fig. 88) or stout spines not in row (fig. 51) or stout spines apparently absent (figs. 74, 76, 113) 26

23(22). Apical portion of ventral surface of median lobe with pair of lightly sclerotized plates (figs. 29-37); internal sac, in repose, with two rows of elongate, moderately stout spines (figs. 44, 46); Europe, northern Africa, the Near East (fig. 42) . . . . *sulcata*

Apical portion of ventral surface of median lobe entirely membranous (figs. 54, 60, 130); internal sac, in repose, with two rows of large, stout spines (figs. 53) 24

24(23). Apical portion of dorsal sclerotization of median lobe broad and apex rounded to pointed apex (fig. 54); apical third of median lobe slightly constricted then nearly parallel-sided to near apex (fig. 54); apical seta of paramere long (fig. 54); Japan . . . . *watanabei*

Apical portion of dorsal sclerotization of median lobe narrow and apex gradually convergent (fig. 60) or rounded (fig. 130) to pointed apex; median lobe gradually tapered apically, not constricted (figs. 60, 130); apical seta of paramere short (fig. 60) or moderately long (fig. 130) . . . 25

25(24). Internal sac, in repose, with two rows of large, very thick spines (fig. 131); apical portion of median lobe rounded to apical point (fig. 130); Colombia (fig. 134) . . . . *grossa*

Internal sac, in repose, with two rows of moderately large spines (fig. 59); apical portion of median lobe gradually convergent to acute apex (fig. 60); northeastern North America (fig. 73) . . . . *subulata*

26(22). Aedeagus short (figs. 87, 114) 27

Aedeagus long (figs. 50, 75, 77) . . . 28

27(26). Internal sac, in repose, short, broad, and with only small spines (fig. 113); apical third of median lobe gradually convergent to acute apex (fig. 114); Mexico (fig. 112) . . . . *lata*

Internal sac, in repose, long, slender, and with some stout spines (fig. 88); apical third of median lobe with lateral margins nearly parallel, then rounded and more strongly convergent to apex (fig. 87); Mexico and southwestern United States (fig. 89) . . . . *abbreviata*

28(26). Internal sac, in repose, with some stout and many small spines (fig. 51); apical seta of parameres small (fig. 50); inner margin of dorsal sclerotization of median lobe acutely V-shaped (fig. 50); northern India (fig. 42) . . . . *himalayensis*

Internal sac, in repose, with spines of approximately equal size (figs. 74, 76); inner margin of dorsal sclerotization of median lobe rounded or V-shaped and less strongly rounded (figs. 75, 77-79); western United States (fig. 73) . . . . *obtusa*

DESCRIPTIONS OF THE SPECIES

Pseudopsis sulcata complex

Figures 1, 7-13, 16, 17, 19, 24-138

Diagnosis. All the species of this complex can be distinguished from the remaining species of the genus by the combination of the strongly carinate head, pronotum, and elytra (fig. 1), clubbed cephalic and abdominal setae (figs. 1, 16, 25, 26), presence of parameres (figs. 31, 60, 110), fused coxites and absence of the stylus (fig. 28), and absence of the basal sclerite of the median lobe (figs. 31, 60).

Description. Length 2.5 to 5.0 mm.

Color pale to dark reddish brown, occasionally nearly black; head usually darker than remainder of body; elytra occasionally with yellowish brown humeral spot, spot distinct to indistinct (some Mexican species).[1]

Dorsum of head with distinct, well-developed lateral and midlongitudinal carinae (fig. 1); base of head with pair of short, anteriorly convergent carinae posterior to median carina (fig. 1); dorsum with numerous, short, coarse, distinct carinules and moderately distinct punctiform depressions; carinules more or less anastomosing; dorsum with broad, moderately deep depression between median and lateral carinae; pubescence short and obscure (evident with slide preparation and compound microscope); clypeal, supraorbital, lateroposterior, and medioposterior clubbed setae present (fig. 1); postorbital seta absent.

Venter of head with strong carina near lateral margin. Mandibles asymmetrical and without basal molar region (figs. 7, 10); right mandible tridentate, base of apical denticle serrate, lateral side with five setae (fig. 7); left mandible tridentate, lateral side with seven setae (fig. 10).

Pronotum with five carinae (fig. 1); two lateral and two median carinae distinct, large, well developed, and slightly sinuate; midlongitudinal carina distinct, low, moderately well developed and straight; surface with numerous punctiform depressions producing roughened sur-

[1]The elytral humeral spot is present on *P. echinata*, *P. biloba*, *P. maja*, *P. spicula*, most specimens of *P. sinuata*, and some of *P. lata*. The holotype of *P. bilacuna* has the spot, the paratype does not.

face; lateral margin entire; basal angles strongly angulate; pubescence short and obscure (evident with slide preparation and compound microscope).

Elytron with sutural, discal, humeral, and epipleural carinae well developed; humeral carina at lateral margin of elytron; epipleural carina on epipleuron and difficult to see in dorsal aspect (fig. 1). Surface with numerous obscure punctures. Pubescence short and obscure (visible only with dissecting microscope).

Abdominal terga pubescent; posterior margin of terga III-VI with row of clubbed setae (figs. 1, 16, 25, 26); tergum VII with pair of clubbed setae just distad of middle (fig. 1); paratergites of segments III to VI each with one clubbed seta (figs. 1, 25); sternites IV to VII each with one clubbed seta near lateral margin. Pubescence of tergum VII posteriorly directed. Sternite VI unmodified. Sternite VII without median depression. Posterior margin of sternum VIII of male obsoletely emarginate. Sternum IX (fig. 24) of male with posterior margin sinuate to truncate; apical region moderately densely pubescent, with two long, moderately stout setae each laterad of midline; posterior margin without spinelike setae. Tergal elements of segment IX of male with two pairs of long, slender, curved, anteriorly directed struts on anterior margin; medial and lateral struts of approximately equal length (fig. 24).

Aedeagus (figs. 31, 60, 91) with parameres present. Parameres slender and straight or slightly to strongly sinuate in ventral view; slightly and gradually to strongly to abruptly deflexed; base of paramere fused to median lobe; apical portion with four setae; apical setae stoutest. Median lobe slender to broad and tapering apically, apex pointed; apical region usually without setae but occasionally with numerous spines (*P. echinata*) or spicules (*P. spicula*); ventral surface without cone-shaped depression on apical portion; basal orifice without basal sclerite surrounding base and lateral sides; dorsal surface membranous except for apex (e.g., *echinata*, fig. 94).

Stylus of female absent (fig. 28); coxites fused and without midlongitudinal suture, posterior margin with deep V-shaped emargination and with several spinelike setae laterally and three long setae near lateral apical angle (fig. 28).

Sexual Dimorphism. The sexes of the species of this complex can be dintinguished by examination of sternum IX (coxites). That of the female is deeply emarginate with several appressed setae near the lateroposterior angle (fig. 28). The male has a nearly truncate posterior margin of sternum IX and a pair of long setae laterad of the midline near the posterior margin (fig. 24).

Pseudopsis sulcata Newman
Figures 29-46

Pseudopsis sulcata Newman, 1834, p. 314. Erichson,[1] 1840, p. 914. Redtenbacher, 1858, p. 259. Fauvel, 1886, p. 12 (probably refers in part to *P. sulcata*). Ganglbauer, 1895, p. 692 (refers in part to *P. sulcata*). Reitter, 1909, p. 119. Deville, 1921, pp. 394, 417 (refers in part to *P. sulcata*). Portevin, 1929, p. 459. Tottenham, 1954, p. 12. Horion, 1963, pp. 16, 17 (refers in part to *P. sulcata*). Lohse, 1964, p. 19. Scheerpeltz, 1968, p. 12. (Type locality: Isle of Wight, England. Holotype not studied.)

Pseudopsis sulcata var. *gravei* Hubenthal, 1911, p. 99. Lohse, 1964, p. 19. Scheerpeltz, 1968, p. 3. (Type locality: Germany, Thuringer Wald, Reinhardsbrunn, near Friedrichroda. Type not studied.)

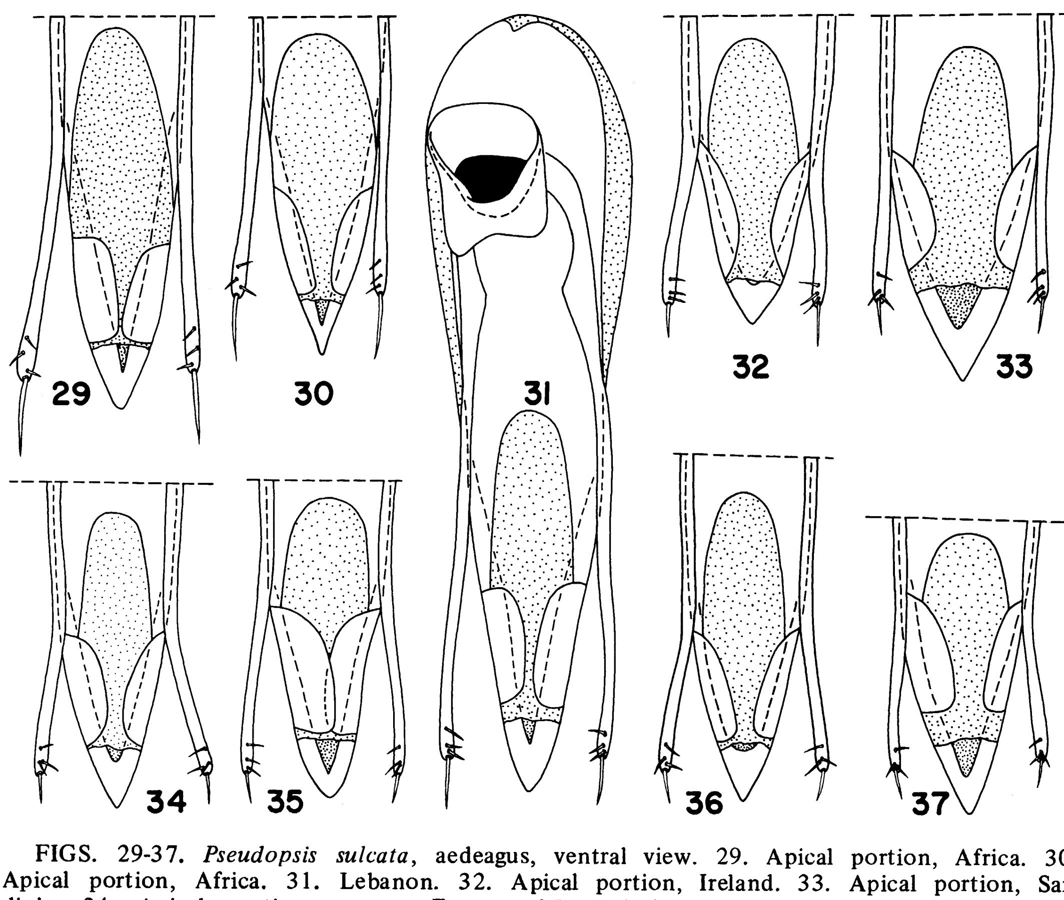
Diagnosis. Pseudopsis sulcata can be separated from the other Old World species by the pair of lightly sclerotized plates laterally on the apical portion of the ventral surface (figs. 29-39). These plates are unique. The apical third of the median lobe tapers to an acute apex. The apex of the paramere does not reach the apex of the median lobe (fig. 31). Those specimens with a long seta on the apex of the paramere should not be confused with *P. afra*, in which the seta is pigmented and the internal sac long and coiled. The internal sac, when inverted, is approximately the same length as the median lobe and has a double row of long, stout spines (fig. 44) and numerous other spines.

Description. Length 2.6 to 4.0 mm. Parameres (fig. 31) gradually deflexed ventrally and in ventral aspect nearly straight; apex of paramere not reaching apex of median lobe and with moder-

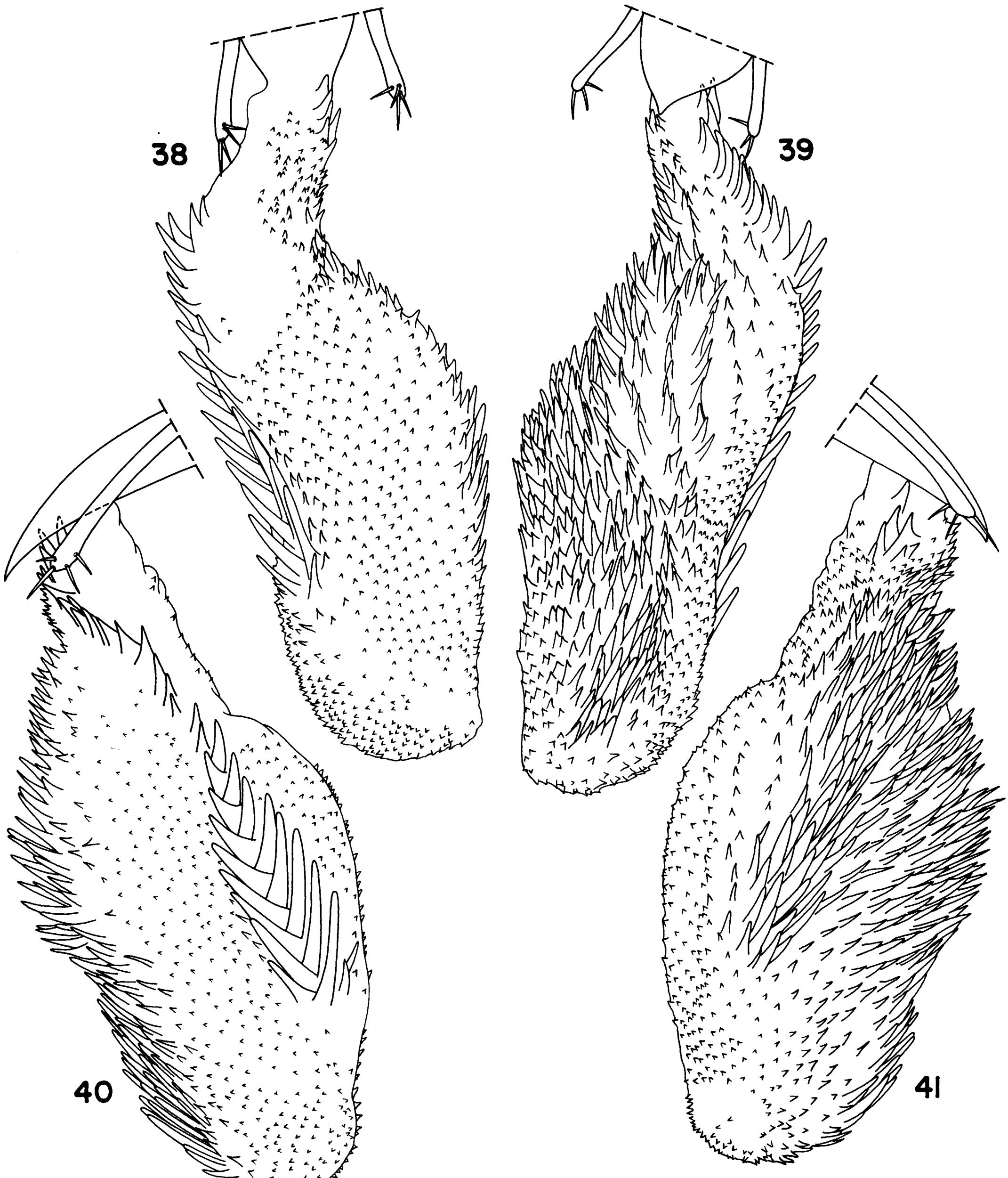
[1] Many subsequent citations refer to what are now different species. The references included here are those I deduce, on geographical grounds to most probably apply to *P. sulcata* (*sensu stricto*).

ately long to long seta extending nearly to or beyond apex of median lobe; apical seta unpigmented. Median lobe (figs. 29-37) moderately long, moderately broad, and moderately strongly tapered to near apex; apical region more strongly tapered to round pointed apex; apical region cone-shaped in ventral view; lateral margins near apex slightly sinuate and apex slightly to strongly attenuate; dorsal sclerotization broad at apex of median lobe and inner margin acutely V-shaped (figs. 29-31) to slightly rounded (figs. 33, 34, 37) to rounded (figs. 32, 36); apical portion of ventral surface with elliptical membranous region occupying about one-third of length of median lobe (fig. 31); apical portion of membranous region with lightly sclerotized plates laterally, sclerotization variable; ventral surface without depression; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (figs. 43-46), approximately two-thirds as long as median lobe and moderately broad with numerous small slender spines and two rows of large, long, stout spines. Internal sac, everted (figs. 38-41), with numerous large, slender spines on dorsal surface (fig. 39) and numerous scalelike spines on ventral surface (fig. 38); right side (fig. 40) with numerous scalelike spines and two rows of long slender spines medially and continuing as single row basally, spines of double row with base closely associated; left side (fig. 41) densely covered with long, slender spines.

Variation. Pseudopsis sulcata exhibits the



FIGS. 29-37. *Pseudopsis sulcata*, aedeagus, ventral view. 29. Apical portion, Africa. 30. Apical portion, Africa. 31. Lebanon. 32. Apical portion, Ireland. 33. Apical portion, Sardinia. 34. Apical portion, eastern Europe. 35. Apical portion, Caucasus Mountains. 36. Apical portion, central Europe. 37. Apical portion, Caucasus Mountains.



FIGS. 38-41. *Pseudopsis sulcata*, internal sac everted. 38. Ventral view. 39. Dorsal view. 40. Right lateral side. 41. Left lateral side.

greatest aedeagal variations of all the species of the *sulcata* complex. Two major forms can be identified.

The North African and Portuguese specimens have a long, stout seta on the apex of the paramere (figs. 29, 30); the seta extends beyond the apex of the median lobe. The apical region of the median lobe is slender, gradually convergent apically, and the apex is attenuate; the inner margin of the dorsal sclerite is acute. The internal sac, in repose, has two rows of long, stout spines; the right row is always clearly visible (fig. 43).

The British, European, and Caucasian specimens (figs. 32, 34-37) have a shorter, more slender seta on the apex of the paramere; the setae falls short of or extends slightly beyond the apex of the median lobe. The apical portion of the median lobe is broader and usually slightly constricted, then gradually convergent to the apex, which may be slightly attenuate. The inner margin of the dorsal sclerite is indistinct or acute to rounded. In repose the internal sac also has two rows of long, stout spines which are mostly basal (fig. 44). The right row is less evident than that of the African form.

Although the African and European forms appear to be distinct a careful examination demonstrates intergradation of the length of the seta of the paramere and of the form of the apical portion of the median lobe. Until the internal sac of both forms is everted analysis of the internal sac is impossible.

A Lebanese specimen (fig. 31) exhibits features of both forms and could be placed with either, depending on which characters are used. The seta of the paramere is long, the apical region of the median lobe is slightly constricted and more strongly convergent than in either form, and the inner margin of the dorsal sclerite is acute. The internal sac in repose is similar to the European form. The specimen can be neither grouped easily with one of the two forms, nor clearly separated from them.

Specimens from Sardinia (fig. 33) have a broader aedeagus than those from mainland Europe.

For the present I regard the Lebanese, Sardinian, African, and European forms to represent the same species.

All forms have a unique pair of slightly sclerotized plates near the apex of the median lobe. The sclerotization and size are variable. If the plates are lightly pigmented or sclerotized they are difficult to see.

Habitat and Distribution. Pseudopsis sulcata is now restricted to the western Palearctic region. It is known from the British Isles, continental Europe, the Caucasus Mountains, Lebanon, and North Africa (fig. 42).

For specimens that I have studied the associated habitat data is limited. Two Moroccan specimens were collected at a spring in the humus of yews and another was collected in Lebanon at 900 m.

Lohse (1964, p. 19) listed the species as occurring in decaying wood of broad-leafed trees, and Tottenham (1954, p. 12) reported it in "stack refuse." In a review of *Pseudopsis*, Hubenthal (1911) indicated *P. sulcata* was collected in moldy pieces of wood twigs and leaves and in moss. Peter Hammond of the British Museum (Natural History) has encountered the species most commonly in hay or straw stacks where loose material has accumulated at the base of the stack and in garden refuse (personal commun.). He indicated also that it had been reported from old faggots, compost heaps, decaying ferns, and manure heaps.

Discussion. I did not study the type of the variation *gravei*, but judging from its locality I suspect it would fall within the range of aedeagal variation of the European form of *P. sulcata.*

I was unable to locate the type of *P. sulcata*, but presume it is conspecific with the European species as it is the only one in the region.

Material Examined. 70 males.

Algeria: Alger, (1 RIS). Mt. Edough, A. Chobaut (1 JJ). Kabylie, Yakouren (2 JJ). Oran (2 OS).

Bulgaria: [Krstalva or Kvstaloa (?)] (1 MNHB). Maglige (?), July, Aug. (1 MNHB, 1 OS).

England: (1 HM). CAMBRIDGESHIRE: Wicken Fen, G. C. Champion (1 BMNH). Durham: Jarrow, June 17 (6 BMNH). ESSEX: Great Baddow, June 19, 1967, P. Hammond (1 BMNH). HAMPSHIRE: Bournemouth, May 23, 1901 (2 BMNH). NORTHUMBERLAND: Newcastle (1 JJ). SURREY: Caterham, G. C. Champion (1 BMNH); Reigate (2 BMNH); Woking, G. C. Champion (1 BMNH). YORKSHIRE: Scarborough (2 BMNH). Labeled "Gibside" (2 BMNH). Labeled "SPK" (1 BMNH). Labeled "Plantol WK" (1 BMNH).

France: INDRE: Sainte Gemmes (1 RIS).

Hungary: SOMOGY: Siófok (2 HM).

Ireland: (1 HM, 1 MNHB). WICKLOW: Avoca (3 BMNH).

Italy: LAZIO: Monte Autore (1 JJ). SAR-

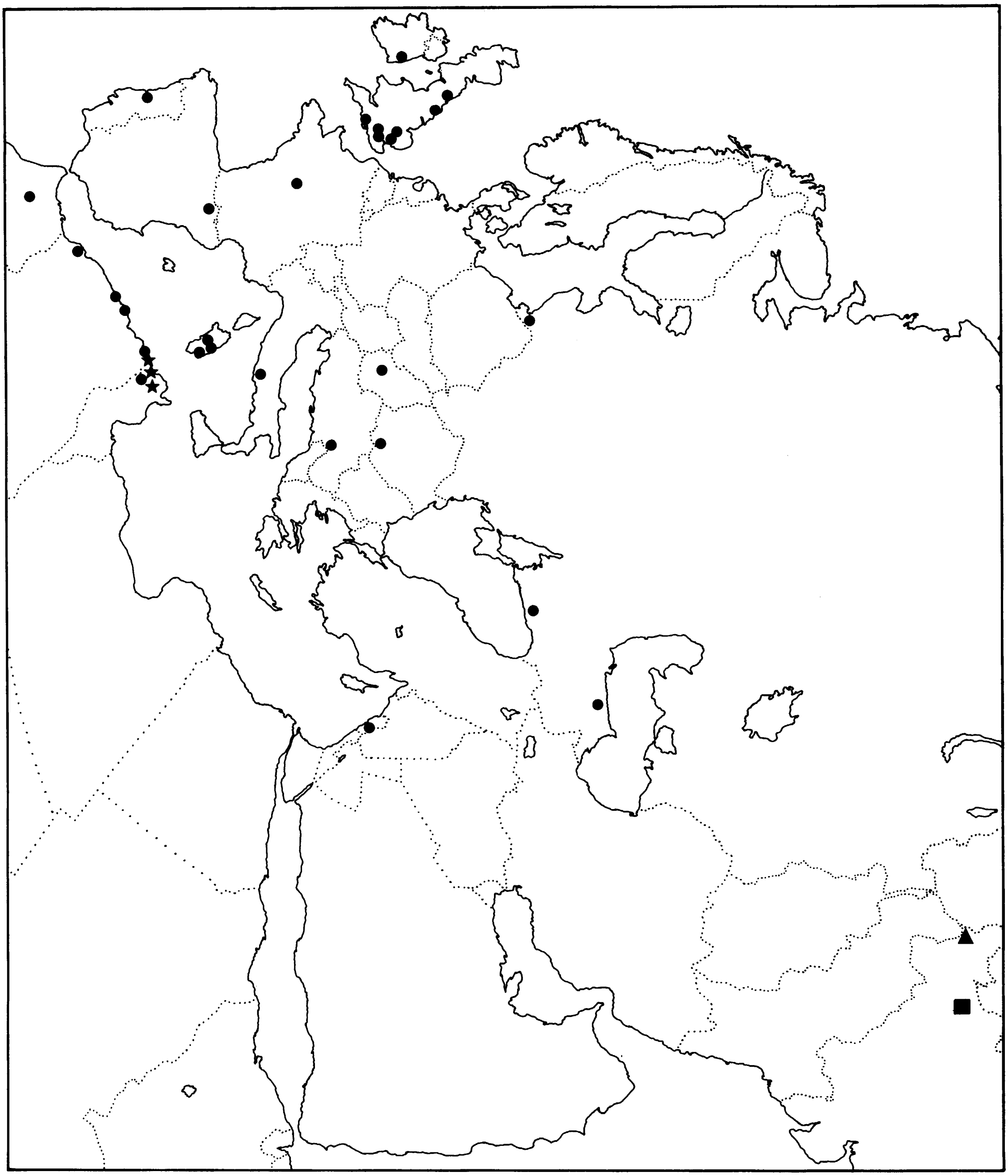


FIG. 42. Map of western Palearctic region showing distributions of *Pseudopsis sulcata* (dots), *P. afra* (stars), *P. prolixa* (square), and *P. himalayensis* (triangle).

DINIA: Sorgono, Krausse (1 MNHB); Monte Sette Fratelli, G. C. Krüger (1 MNHB); Assuni (?), Krausse (1 OS); Aritzo, Monte Gennargentu, G. C. Krüger (1 OS).

Lebanon: Ain Dara Nahr Jesâyer, 900 m. elevation, May, 1966, G. Fagel (1 RIS).

Morocco: Middle Atlas Mountains, near Ifrane, May 26, 1961, near spring of mineral water in humus of yew, P. N. Lawrence (1 BMNH).

Portugal: BEIRA LITORAL: Coimbra (1 OS).

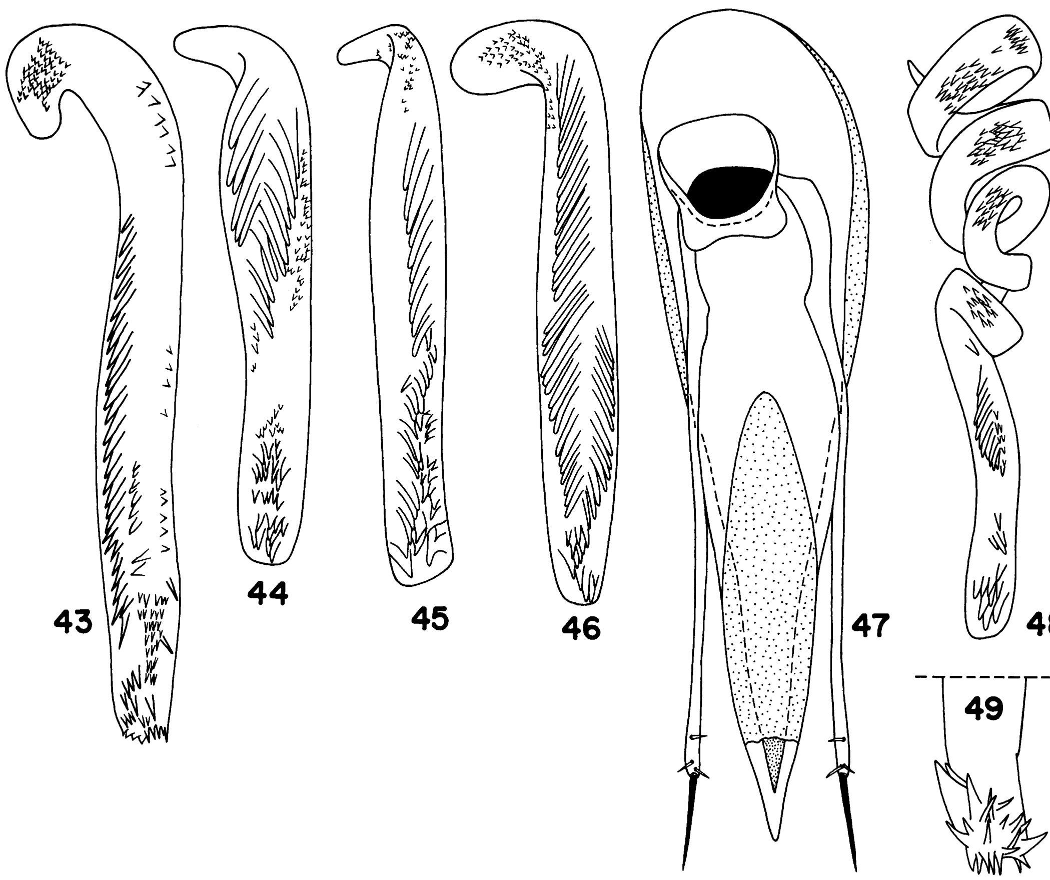
Romania: BANAT: Herkulesbad [=Herkulesfürdö or Băile Herculane], June 11, 1932, Aug. 19, 1933 (2 MNHB).

Spain: Arragonia [=Orgaña or Aragon?] (1 HM).

Tunisia: (1 HM). Le Kef (1 OS; 1 FMNH).

Union of Soviet Socialist Republics: DAGHESTAN (1 OS). KALINGRAD: Insterburg (=Chernyakhovsk) (1 FMNH). KRASNODAR: Krasnaya Polyana, July, Aug. (1 FMNH; 1 MNHB; 1 OS). "Kuban": western Caucasus (2 HM; 2 OS; 1 FMNH; 1 BMNH). Caucasus (western), "Circassia" (2 HM). Caucasus, Tbatani (?) (1 RIS).

Yugoslavia: MONTENEGRO: Diakovár [=Diakova?], July, 1892 (1 HM).



FIGS. 43-46. *Pseudopsis sulcata*, variation of internal sac, inverted. 43. Africa. 44. England. 45. Lebanon. 46. Africa.

FIGS. 47-49. *P. afra*. 47. Aedeagus, ventral view. 48. Internal sac, inverted. 49. Apex of median lobe with internal sac partially everted.

Pseudopsis afra, new species
Figures 42, 47-49

Holotype. Male. Tunisia, El-Feidja. Deposited in the Field Museum of Natural History.

Paratypes. Twelve males. With same data as holotype (1 FMNH; 1 RIS; 2 OS). Algeria: Bône (1 MHNB). Tunisia: (1 AMNH); Ain Draham (1 CNC; 1 MNHB; 1 RIS; 1 AMNH; 2 OS).

Diagnosis. This species can be separated from all others by the elongate internal sac (fig. 48) and long, stout, reddish brown seta on the apex of the paramere (fig. 47). The strongly tapered, apical region of the median lobe (fig. 47) is also diagnostic.

Description. Length 2.5 to 3.5 mm. Parameres (fig. 47) gradually deflexed ventrally and in ventral aspect nearly straight; apex of paramere not reaching apex of median lobe; apical seta long, stout, and extending beyond apex of median lobe; apical seta reddish brown. Median lobe (fig. 47) moderately long, moderately broad, and gradually, but strongly tapered apically; apex strongly attenuate; apical third cone-shaped in ventral view; dorsal sclerotization moderately broad and with V-shaped inner margin of apex; apical portion of ventral surface with elliptical membranous region occupying nearly one-half of length of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 78), slender, elongate, and coiled; length more than twice median lobe; sac with stout spines near apex (in repose), and numerous short, moderately long, and long spines. Internal sac, slightly everted (fig. 49), with large, stout, and moderately large spines.

Variation. Among the 13 males studied the only appreciable variation was one specimen with slightly more attenuation of the apex of the median lobe than is shown in figure 47.

Habitat and Distribution. The species is known only from Algeria and Tunisia (fig. 42).

The Tunisian localities are in the mountains but nothing further of certainty is known of the habitat of *P. afra.* Fauvel (1902) reported *P. sulcata* (*sensu lato*) from the three localities known for *P. afra.* At Bône, Algeria the specimens are recorded from the base of a rotten poplar and at El-Fedja (*sic*) from mosses near water. As Fauvel may have had *P. afra*, these data would be the only indications of its habitat.

Etymology. From the Latin *afra*, denoting the continent from which the species is known.

Material Examined. Only the holotype and 12 paratypes are known.

Pseudopsis himalayensis, new species
Figures 42, 50, 51

Holotype. Male. Kashmir: Gulmarg, June-July, 1931, M. Cameron. Deposited in the British Museum (Natural History).

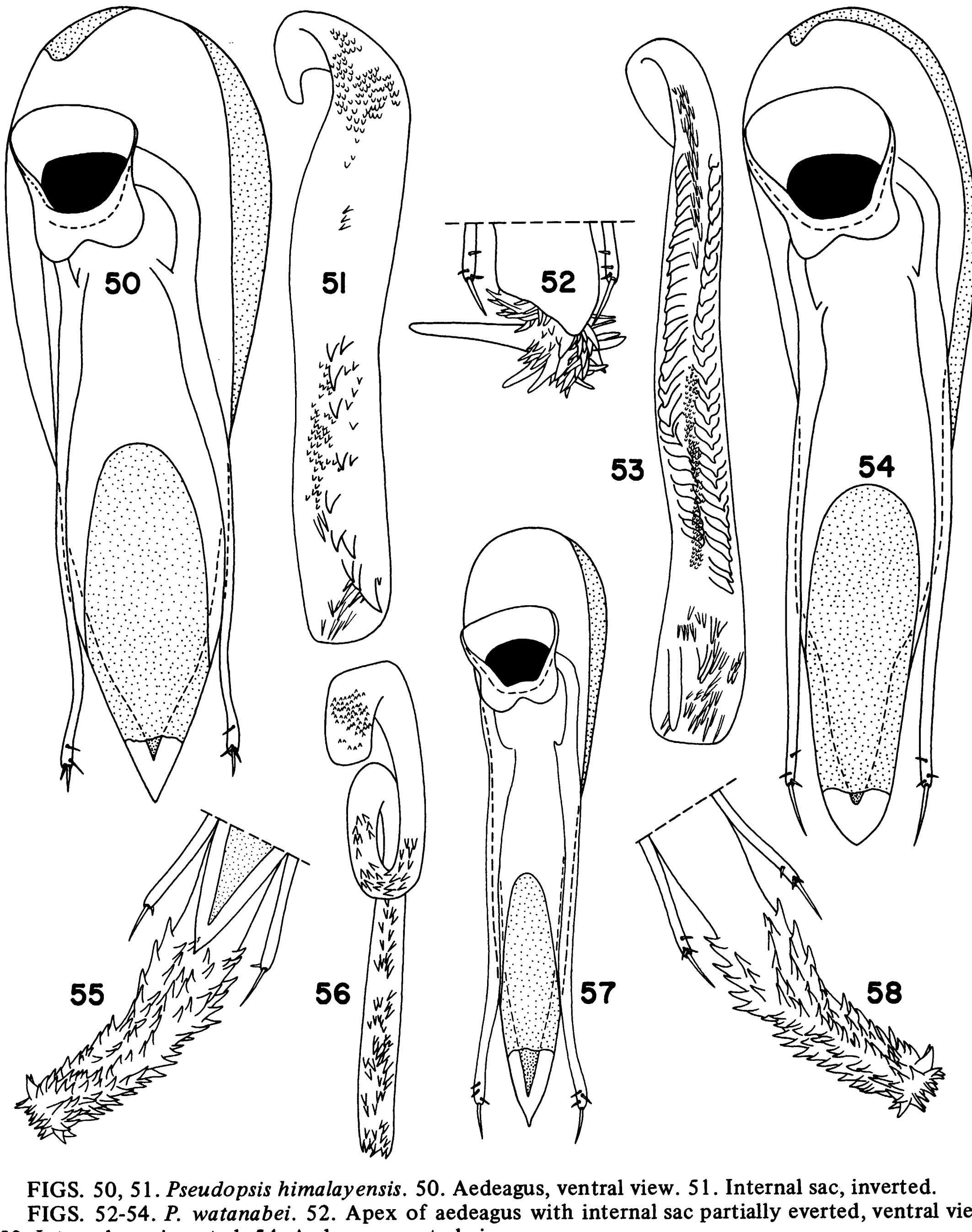
Paratypes. Three males. Kashmir: 1905 (1 FMNH); with same data as holotype (1 BM; 1 AMNH).

Diagnosis. This species can be distinguished from the other Old World species by an internal sac that has large, moderately long, stout spines, and when in repose is approximately as long as the median lobe (fig. 51). The median lobe (fig. 50) is broader than that in all the other Old World species. The seta on the apex of the paramere is short. The apex of the paramere does not reach the apex of the median lobe.

Description. Length 3.5 to 3.7 mm. Parameres (fig. 50) gradually deflexed ventrally and in ventral aspect slightly sinuate; apex of paramere not reaching apex of median lobe and with short seta on apex; seta unpigmented. Median lobe (fig. 50) long, broad, and gradually tapering apically, but with apical third more strongly tapered to pointed apex; apical region cone-shaped in ventral view; dorsal sclerite of apical region moderately broad and with V-shaped inner margin of apex; apex of ventral surface with elliptical membranous region occupying approximately one-third of length of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 51), broad, approximately as long as median lobe, and with numerous large, stout, and smaller, moderately stout spines.

Habitat and Distribution. Other than the fact that Gulmarg, Kashmir (fig. 42), the only locality known for the species is at about 8500 feet, nothing is known of the habitat of *P. himalayensis.*

Etymology. The species is named for the



FIGS. 50, 51. *Pseudopsis himalayensis*. 50. Aedeagus, ventral view. 51. Internal sac, inverted.

FIGS. 52-54. *P. watanabei*. 52. Apex of aedeagus with internal sac partially everted, ventral view. 53. Internal sac, inverted. 54. Aedeagus, ventral view.

FIGS. 55-58. *P. prolixa*. 55. Apex of aedeagus with internal sac partially everted, dorsal view. 56. Internal sac, inverted. 57. Aedeagus, ventral view. 58. Apex of aedeagus with internal sac partially everted, ventral view.

Himalayas, the mountainous region where it was collected.

Material Examined. Only the holotype and three paratypes are known for this species.

Pseudopsis prolixa, new species
Figures 42, 55-58

Holotype. Male. India: Uttar Pradesh: Chakrata, Deoban, 9331 feet elevation, May 3, 1921, M. Cameron. Deposited in the British Museum (Natural History).

Paratypes. Four males. India: Uttar Pradesh: Chakrata: with same data as holotype (1 BMNH); Manjgaon, 6500 feet elevation, May 21, 1922, M. Cameron (1 BMNH, 1 AMNH); Kanasar, 7050 feet elevation, May 14-22, 1922, M. Cameron (1 BMNH).

Diagnosis. This species can be distinguished from all other species but *P. afra* by the elongate, coiled internal sac (fig. 56) and the slender median lobe (fig. 57). It can be separated from *P. afra* by the shorter, unpigmented apical seta of the paramere (fig. 57), the more abrupt attenuation of the apex of the median lobe (fig. 57), the shorter internal sac (fig. 56), and shorter, more slender aedeagus.

Description. Length 2.7 to 3.7 mm. Parameres (fig. 57) gradually deflexed ventrally and in ventral aspect slightly sinuate with apical third splayed laterally; apex of paramere just short of apex of median lobe; apical seta unpigmented, moderately long, and extending beyond apex of median lobe. Median lobe moderately long, slender, and gradually tapered apically (fig. 57), but with apical third more strongly tapered; apex strongly and more or less abruptly attenuate; apical third cone-shaped in ventral view; dorsal sclerotization broad to moderately broad, with V-shaped inner margin of apex; apex of ventral surface with elliptical membranous region occupying approximately one-third of length of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 56), slender, elongate, and coiled; length approximately one-half longer than median lobe; sac with numerous moderately long and stout and some short spines. Internal sac, partially everted (figs. 55, 58), densely covered with moderately long and stout spines.

Habitat and Distribution. The species is known only from the mountains near Chakrata, India (fig. 42) at between 6500 and 9331 feet elevation. Two females collected in dung are tentatively associated with males of *P. prolixa* from Manjgaon, India.

Etymology. From the Latin *prolixus*, stretched out long, referring to the elongate, slender phallobase.

Material Examined. Only the holotype and four paratypes are known.

Pseudopsis watanabei, new species
Figures 52-54

Watanabe, 1972, pp. 114-117, figs. 3, 4 (cited as *Pseudopsis sulcata*).

Holotype. Male. Japan: Hokkaido: Mt. Poroshiri-dake in the Hidaka Mountains, July 27, 1973, Y. Watanabe. Deposited in the American Museum of Natural History.

Paratypes. Three males. Two with same data as holotype and one with same locality and collector, but collected on July 24, 1971 (AMNH).

Diagnosis. This species can be distinguished from all others by the two rows of short, stout spines on the internal sac (fig. 53) and the constricted, then gradually tapered apical region of the median lobe (fig. 54). The form of the apex is also useful. The apex of the paramere does not reach the apex of the median lobe.

Description. Length 3.2 to 3.7 mm. Parameres (fig. 54) gradually deflexed ventrally and in ventral aspect nearly straight; apex of paramere not reaching apex of median lobe; apical seta extending to apex of median lobe; apical seta unpigmented. Median lobe (fig. 54) long, moderately broad, and gradually tapered to apical third, then constricted and gradually tapered to pointed apex; apical third cone-shaped in ventral view; dorsal sclerotization moderately broad and with rounded, V-shaped, inner margin; apex of ventral surface with elliptical, membranous region occupying slightly more than one-third of length of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 53), slender and approximately as long as median lobe; sac with two rows of short, stout spines on each side, a long, stout spine near apex (in repose) and numerous moderately long, slender spines and short spines. Internal sac, partially everted (fig. 52), with long, stout basal spine and numerous moderately long, slender spines.

Habitat and Distribution. The species is known only from the Hidaka Mountains of Hokkaido, Japan.

The type series was found near Poroshiri-sanô at the northwestern foot of Mt. Poroshiri-dake. Other examples, which I have not studied but which were adequately illustrated (Watanabe, 1972), were taken in droppings of the chipmunk, *Tamias sibiricus lineatus* Siebold. The droppings were under alpine plants at an elevation of 1800 m. on the eastern slope of the north cirque of Mt. Poroshiri-dake (Watanabe, *op. cit.*).

Discussion. Upon commencement of this study of *Pseudopsis*, it was evident that the *P. sulcata* complex should occur in Japan and eastern Asia. Watanabe's (1972) discovery confirmed this suspicion.

Etymology. This species is named in honor of its collector, Dr. Yasuaki Watanabe.

Material Examined. Only the holotype and three paratypes were studied.

Pseudopsis subulata, new species
Figures 59, 60, 63-65, 73

Holotype. Male. United States: Michigan: Delta County: 13 miles N of Nahma Junction, August 13, 1953, from leaf litter under animal dung, Henry Dybas. Deposited in the Field Museum of Natural History.

Paratypes. Sixteen males with same data as holotype (10 FMNH; 6 AMNH).

Diagnosis. The species is recognizable by the gradually tapered apical region of the median lobe (fig. 60), the unpigmented apical seta of the paramere, the length of the internal sac, and the absence of sclerotized plates on the apical portion of the ventral surface. The internal sac (fig. 59) has two rows of moderately large spines. The apex of the paramere does not reach the apex of the median lobe (fig. 60).

Description. Length 3.0 to 4.0 mm. Parameres (fig. 60) gradually deflexed ventrally and moderately sinuate in ventral aspect; apex of parameres not reaching apex of median lobe; apical seta short, slender and not or just reaching apex of median lobe; apical seta unpigmented. Median lobe (fig. 60) long, moderately broad, and gradually tapering to acute apex; apical portion pointed; dorsal sclerotization moderately broad and with U-shaped inner margin of apex; apical portion of ventral surface with membranous region occupying nearly one-quarter of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 59), approximately two-thirds as long as median lobe, with two rows of moderately large stout spines and numerous moderately long, slender spines. Internal sac, partially everted, with row of stout spines on dorsal and ventral (fig. 65) surfaces; right side (fig. 63) with long, stout spine near base and larger spine with cluster of shorter, stout spines at base; right side with numerous short, apically rounded, moderately stout spines; left side (fig. 64) with numerous, moderately long spines; ventral surface (fig. 65) with some small, moderately stout, apically rounded spines.

Variation. The apical portion of the median lobe may be slightly more or slightly less attenuate and the dorsal sclerotization slightly broader or narrower than shown in figure 60.

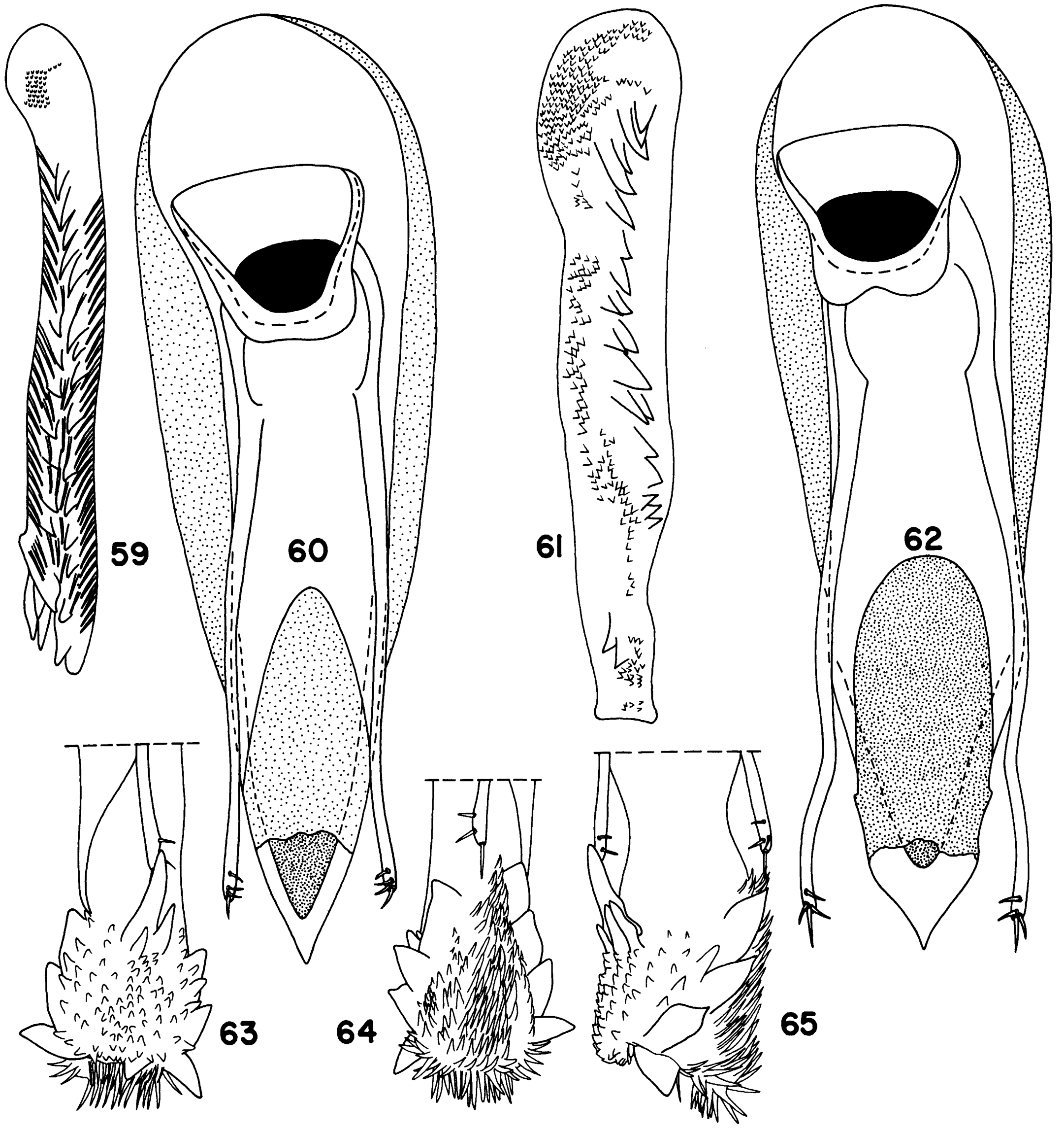
Habitat and Distribution. The species is known in southeastern Canada from Lake Superior east to Newfoundland, and from the northeastern quarter of the United States, south along the Appalachian Mountains to North Carolina (fig. 73). Interestingly, it is found nearly as far south in Illinois, which leads me to suspect that the species will be found farther south and west into the Ozark region of Arkansas.

The species has been collected in leaf litter of mixed broadleaf forests and once in leaf litter under animal dung.

Etymology. From the Latin *subulatus*, awl-shaped or pointed, referring to the pointed apex of the median lobe.

Material Examined. 73 males.

Canada: NEWFOUNDLAND: Spruce Brook, Aug. (1 AMNH); Cow Head, Aug. 10, 1938, E. Palmén (1 BMNH). ONTARIO: *Thunder Bay*



FIGS. 59, 60. *Pseudopsis subulata*. 59. Internal sac, inverted. 60. Aedeagus, ventral view.
FIGS. 61, 62. *P. sagitta*. 61. Internal sac, inverted. 62. Aedeagus, ventral view, western Canada.
FIGS. 63-65. *P. subulata*, apex of aedeagus with internal sac partially everted. 63. Right lateral view. 64. Left lateral view. 65. Ventral view.

District: Schreiber, Sept. 25, 1971, mixed forest litter, S. Peck (2 AMNH; 7 CNC); Dorion, Sept. 25, 1971, mixed forest litter, S. Peck (2 AMNH; 5 CNC). QUEBEC: Kazabazua, July 15, 1967, deciduous duff, J. M. Campbell (1 CNC); Parc des Laurentides, Mare du Sault, 2700 ft. elevation, Aug. 15-17, 1970, J. M. and B. A. Campbell (1 AMNH; 4 CNC); Gatineau Park, Ramsey Lake area, June 17, 1971, J. M. Campbell (1 CNC); Laniel, Aug. 15, 1932, W. J. Brown (2 CNC); Sainte Agathe, June 17, 1971, E. J. Kiteley (1 CNC).

United States: ILLINOIS: *Union County*: Pine Hills Field Station, May 15-22, 1967, malt trap, J. M. Campbell (4 CNC). MAINE: *Franklin County*: Rangeley, Aug. (1 MCZ). MARYLAND: *Garrett County*: Oakland, July, Hubbard and Schwarz (2 USNM). MICHIGAN: "Type series." *Cheboygan County*: Aug. 10, 1953, S. E. Neff (1 CU). NEW HAMPSHIRE: *Carroll County*: Passaconaway, Passaconaway Campground, Oct. 17-18, 1973, leafmold and rain-washed litter, 1200 ft. elevation, A. Newton (1 AN; 1 AMNH); *Grafton County*: Franconia (1 AMNH). NEW YORK: *Essex County*: Keene Valley, May 27, 1916, H. Notman (1 FMNH). NORTH CAROLINA: *Buncombe County*: Black Mountain, July (2 AMNH). PENNSYLVANIA: *Monroe County*: Wind Gap, July 14, 1941, J. W. Green (1 CAS); *Warren County*: Bear Lake (1 FMNH). TENNESSEE: *Sevier County*: Greenbrier Cove, Ramsey Cascade Trail, May 18-23, 1972, in flight, A. Newton (1 AN). VIRGINIA: *Lee County*: Penington Gap, July, Hubbard and Schwarz (1 AMNH; 3 USNM). WEST VIRGINIA: *Tucker County*: Fort Pendelton (1 AMNH).

Lake Superior: (1 BMNH; 1 INHS). Bachewauung Bay (1 USNM; 1 UK; 1 MCZ); Pointe aux Pins (1 USNM).

Pseudopsis sagitta, new species
Figures 62, 66-73

Holotype. Male. Canada: British Columbia: 10 miles north of Revelstoke, Jordan River, 2500 feet elevation, August 26, 1971, J. M. Campbell. Deposited in the Canadian National Collection.

Paratypes. Seven males. Canada: British Columbia: with same data as holotype (4 CNC; 2 AMNH); Stanley, July 14, 1931, W. G. Mathers (1 CNC).

Diagnosis. This species can be differentiated from all the others by the parameres that are sharply deflexed at about the apical quarter (fig. 66) and by the arrowhead-shaped apical portion of the median lobe (figs. 62, 67-71).

Description. Length 2.6 to 5.0 mm. Parameres (fig. 66) strongly deflexed ventrally at apical quarter and in ventral view apical quarter strongly sinuate. Basal three-quarters weakly sinuate; apex of parameres not reaching apex of median lobe; apical seta moderately long, slender, and extending just beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 62) long, broad, and slightly tapered to apical third, then strongly tapered to arrowhead shaped apical fifth; apical fifth with obsolete (figs. 62, 70) to small to large (figs. 67, 68) lateral projections basally, lateral margins sinuate, and strongly convergent to strongly pointed apex; lateral projections of apical fifth acute (figs. 67-69, 71) to rounded (fig. 70); dorsal sclerotization moderately broad laterally but very broad apically and with U-shaped inner margin of apex; apical portion of ventral surface with membranous region occupying approximately one-third of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 72), about four-fifths length of median lobe; sac with numerous small spines and row of large, stout spines.

Variation. *Pseudopsis sagitta* has an eastern and a western form. In the western one the basolateral angles of the arrowhead-shaped apex of the median lobe are weakly (fig. 70) to moderately strongly (figs. 62, 69) developed and the "arrowhead" is long. The basolateral angles of the shorter "arrowhead" of the eastern form are moderately (fig. 71) to strongly (figs. 67, 68) developed. The membranous region of the ventral surface of the eastern form is very lightly sclerotized, but membranous in the western form.

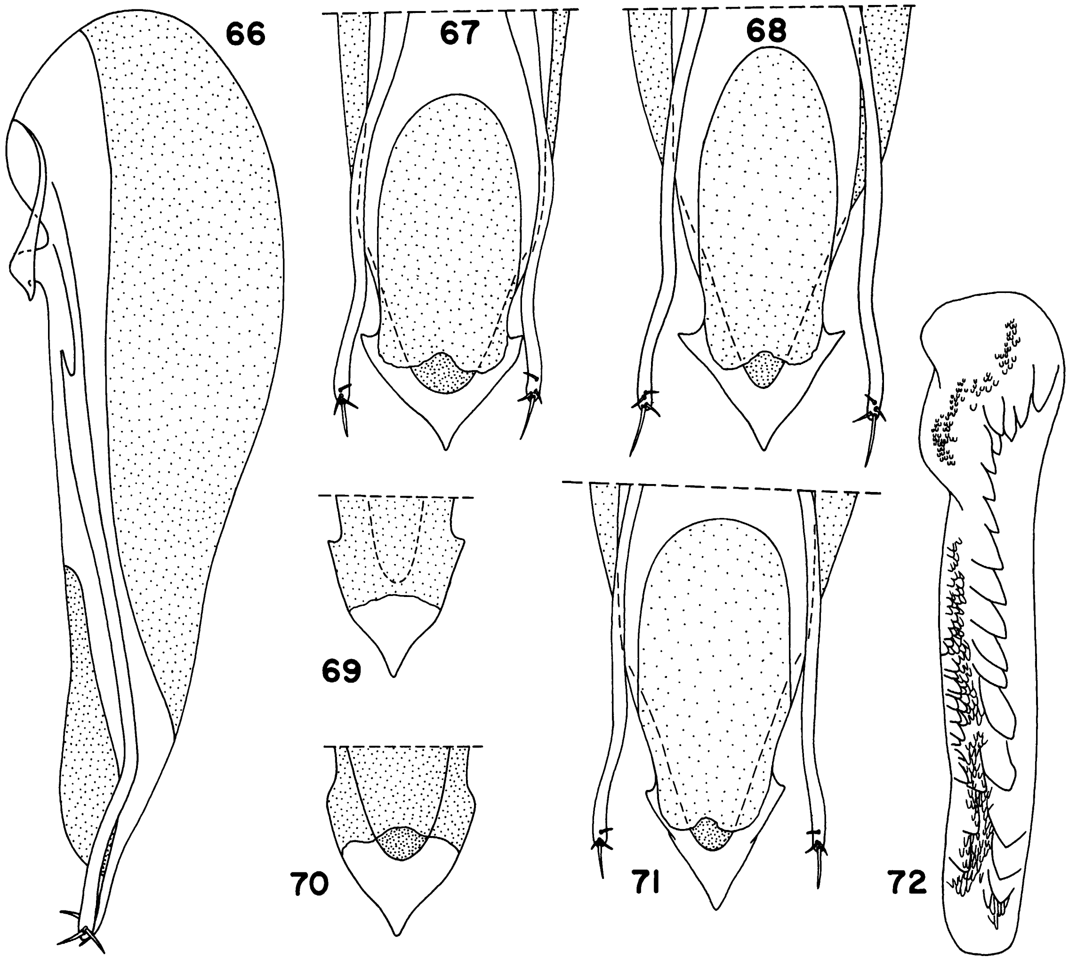
Habitat and Distribution. The species is known from British Columbia and Quebec, Canada (fig. 73) and has been taken at 1000 to 2500 feet elevation.

Discussion. The eastern and western forms of *P. sagitta* are provisionally conspecific. The shape of the apical portion of the median lobe is similar, the apical portion of the paramere is strongly deflexed in both and the internal sacs, when in repose, are essentially the same. The internal sac may exhibit differences if everted.

Differences of the apical region of the median lobe, described under Variation, intergrade (see figs. 62, 67-71), but I cannot account for the difference of the sclerotization of the ventral surface. The sclerotization is hardly noticeable and may also intergrade.

I surmise that the species will be found to be trans-Canadian.

Etymology. From the Latin *sagitta*, arrow,



FIGS. 66-72. *Pseudopsis sagitta*. 66. Aedeagus, lateral view. 67-71. Variation of apical portion of aedeagus. 67. Eastern Canada. 68. Eastern Canada. 69. Western Canada. 70. Western Canada. 71. Eastern Canada. 72. Internal sac, inverted.

referring to the arrowhead-shaped apical portion of the aedeagus.

Material Examined. 14 males.

Canada: BRITISH COLUMBIA: "Type series." QUEBEC: Parc des Laurentides, Belle Riviere, 2000 ft. elevation, Aug. 18-20, 1970, J. M. and B. A. Campbell (1 CNC); Parc Gaspesie, Mont Albert, July 8, 1972, 1000 ft. elevation, J. M. and B. A. Campbell (2 CNC); Cascapedia, June 9, 1933, W. J. Brown (1 AMNH; 2 CNC).

Pseudopsis obtusa, new species
Figures 73-79, 85

Holotype. Male. United States: California: Mono County: 6 miles southwest of Tom's Place, 9000 feet elevation, August 8, 1969, A. Smetana. Deposited in the Canadian National Collection.

Paratypes. Sixteen males, with same data as holotype (10 CNC, 6 AMNH).

Diagnosis. This species can be recognized by the short parameres that do not reach the apex of the median lobe (figs. 75, 77-79), the blunt apex of the median lobe, and the numerous, moderately large spines of the internal sac (figs. 74, 76).

Description. Length 3.0 to 4.5 mm. Parameres (figs. 75, 77) gradually deflexed ventrally and in ventral aspect slightly sinuate; apex of paramere not reaching apex of median lobe; apical seta slender and extending beyond to just short of apex of median lobe; apical seta unpigmented. Median lobe (figs. 75, 77) broad, long, and gradually tapered from apical third to apex; apex blunt; dorsal sclerotization moderately broad to broad and with rounded inner margin; apical portion of ventral surface with membranous region occupying two-fifths of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (figs. 74, 76), broad, about as long as median lobe, and with numerous moderately large spines. Internal sac, partially everted, with numerous, uniformly distributed moderately large spines (fig. 85).

Variation. The blunt apex of the median lobe and the length of the parameres vary.

I have tentatively included as conspecific two males from Mary's Peak, Oregon. The apex of the median lobe (figs. 75, 78) is more attenuate and acute and the parameres longer than in California individuals, but the internal sac cannot be differentiated.

Habitat and Distribution. The species is known from the Sierra Nevadas in California at elevations of 6200 to 9000 feet, and provisionally, from Oregon (fig. 73).

On Maggie's Peak in California the species was collected from moist, rotten remnants of wood, bark, and other debris around the bases of tree stumps. At Tahoe Pines and Tom's Place, California collections were made by sifting deep, moist, moldy layers of cone remnants around the burrows of squirrels (Smetana, in letter).

Etymology. From the Latin *obtusus*, blunt or dull, referring to the generally blunt apex of the median lobe.

Material Examined. 25 males.

United States: CALIFORNIA: 17 specimens of type series. *Alpine County*: Hermit Valley Campground, June 20, 1970, Fred Andrews (1 UCR). *El Dorado County*: Desolation Valley, Primitive Area, Maggie's Peak, 7500 to 8300 ft. elevation, Aug. 12, 1969, A. Smetana (2 CNC). *Placer County*: June (2 CAS); Lake Tahoe, Tahoe Pines, 6200 ft. elevation, Aug. 10, 1969, A. Smetana (1 CNC). OREGON: *Benton County*: Mary's Peak, May 5-8, 1967, J. F. Cornell (1 JFC; 1 AMNH).

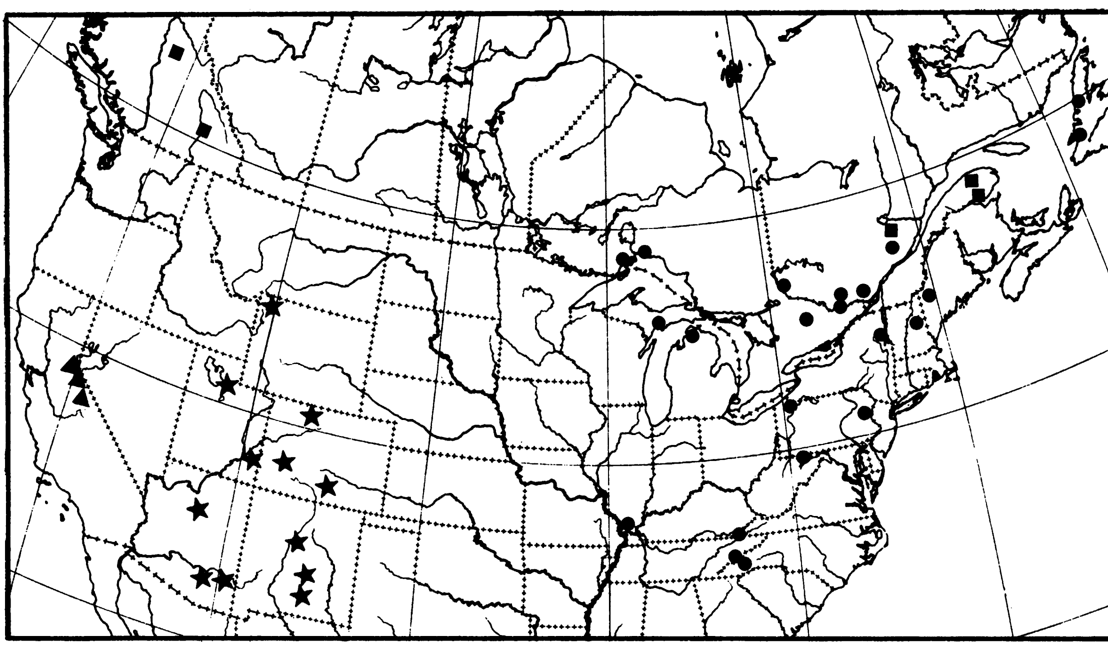
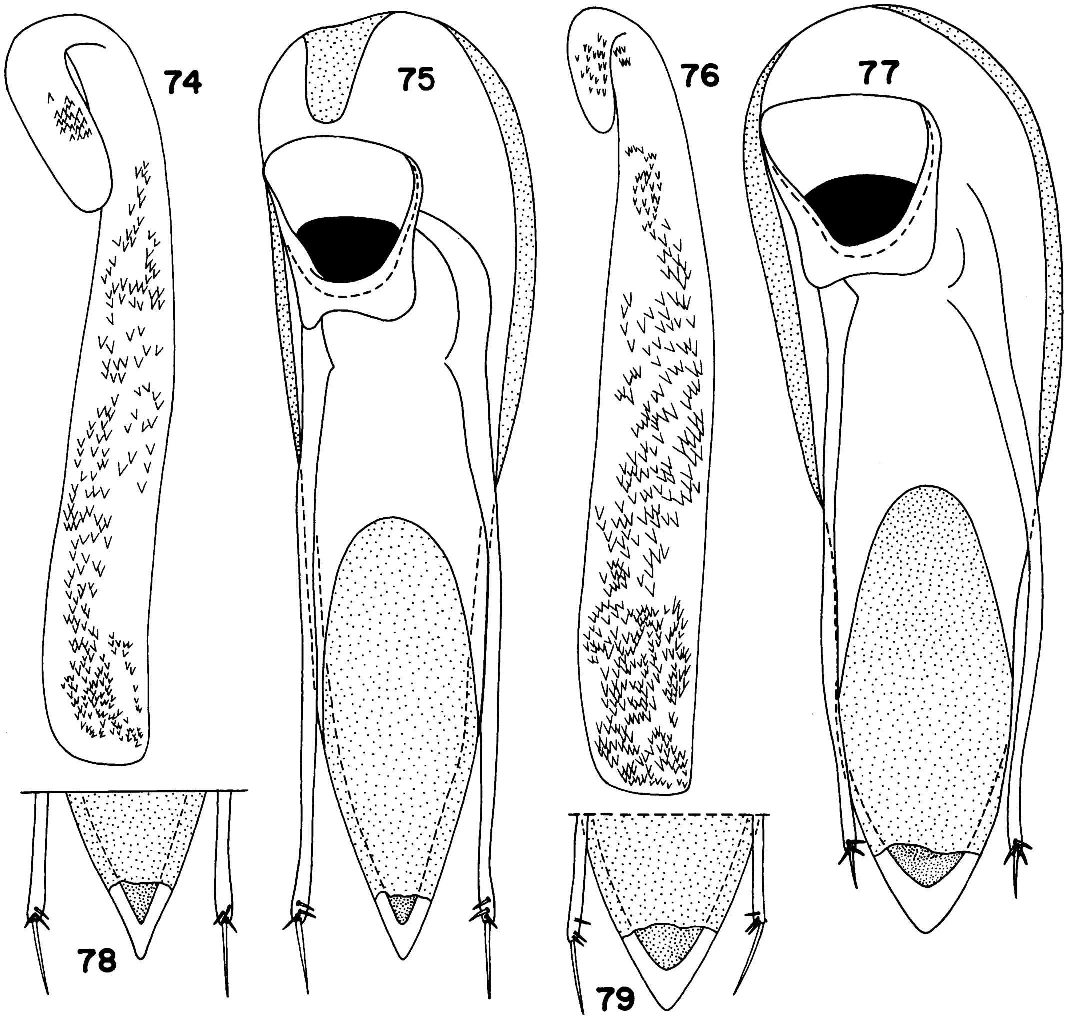


FIG. 73. Distribution of *Pseudopsis subulata* (dots), *P. sagitta* (squares), *P. obtusa* (triangles), and *P. callosa* (stars) in the United States and Canada.



FIGS. 74-79. *Pseudopsis obtusa*. 74. Internal sac, inverted. 75. Aedeagus, ventral view, Oregon. 76. Internal sac, inverted. 77. Aedeagus, ventral view, California. 78. Apical portion of aedeagus, ventral view, Oregon. 79. Apical portion of aedeagus, ventral view, California.

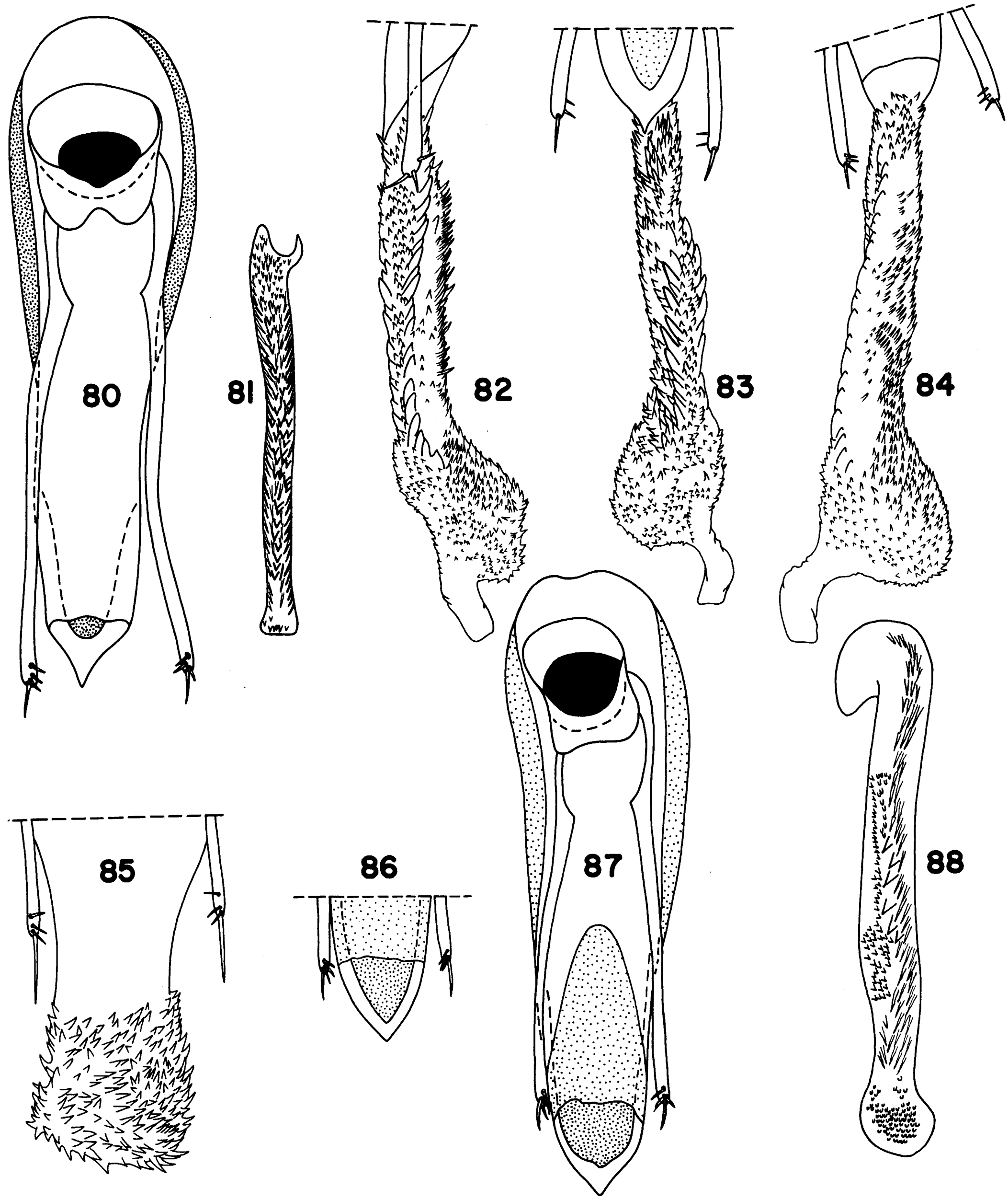
Pseudopsis callosa, new species
Figures 1, 7-13, 24-28, 73, 80-84

Holotype. Male. United States: Colorado: Routt County: 5 miles northeast of Clark, Hinman Campground, 7600 feet elevation, June 23-25, 1972, human dung trap, A. Newton. Deposited in the American Museum of Natural History.

Paratypes. Six males, with same data as holotype (2 AMNH; 4 AN).

Diagnosis. This species is readily separated from all other species by the absence of the membranous region of the apical third of the ventral surface of the median lobe (fig. 80). This region is sclerotized. The median lobe barely tapers apically, but the apical ninth is suddenly and strongly tapered to an attenuate apex (fig. 80).

Description. Length 3.0 to 4.0 mm. Parameres (fig. 80) gradually deflexed ventrally and in ven-



FIGS. 80-84. *Pseudopsis callosa*. 80. Aedeagus, ventral view. 81. Internal sac, inverted. 82. Internal sac, everted, right lateral view. 83. Internal sac, everted, right laterodorsal view. 84. Internal sac, everted, left laterodorsal view.

FIG. 85. *P. obtusa*, apical portion of aedeagus with internal sac partially everted, ventral view.

FIGS. 86-88. *P. abbreviata*. 86. Apical portion of aedeagus, ventral view. 87. Aedeagus, ventral view. 88. Internal sac, inverted.

tral aspect slightly sinuate and often with apical portion slightly splayed laterally; apex of paramere reaching apex of median lobe to extending slightly beyond; apical seta moderately long, slender, and extending beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 80) slender, moderately long, and nearly parallel-sided to apical ninth; apical ninth strongly tapered to attenuate apex; apex acute; dorsal sclerotization moderately broad, with U-shaped inner margin of apex; apical portion of ventral surface entirely sclerotized, membranous region absent, surface near middle often thin but not membranous; ventral surface without depressions; apical portion of dorsal surface without spicules or species. Internal sac, in repose (fig. 81), slightly more than half as long as median lobe, slender, and with numerous slender spines and some moderately large spines. Internal sac, everted, (figs. 83, 84) with two rows of moderately stout spines and numerous smaller, more slender spines; apex bulbous; gonopore at end of stalk on right side of apex (fig. 84); one row of moderately stout spines on right side (fig. 82) and continuing onto ventral side, another row of spines on ventral surface (fig. 84) and continuing onto left side slightly; surface between rows of stout spines and ventral and left lateral surfaces with numerous smaller more slender spines (as depicted in figs. 83, 84, internal sac slightly rotated to right, giving appearance of displacement of stouter spines from position given in description).

Variation. Little appreciable variation of the aedeagus was found among the 57 males studied. The parameres may be slightly longer or shorter and may splay more or less. It was possible to evert the endophallus of seven specimens, from two localities, and little variation was noted other than the artifactual displacement discussed at the end of the Description.

Habitat and Distribution. The species is known from the United States in the eastern half of the Rocky Mountains from Wyoming south to southern Arizona and New Mexico (fig. 73).

The species has been collected at 7200 to 10,500 feet elevation. Two specimens were collected on fungus of the genus *Ganoderma*, another on a bracket fungus, and another by sifting leafmold. Seven specimens were collected in a trap baited with human dung. At Sandia Crest, New Mexico, the species was taken in deep, moist, moldy layers of cone remnants around the burrows of squirrels (Smetana, in letter).

Etymology. From the Latin, *callosus*, with a hard skin, referring to the completely sclerotized ventral surface of the median lobe.

Material Examined. 57 males.

United States: ARIZONA: *Coconino County*: Flagstaff, San Francisco Mountains, 8000 ft. elevation, Aug. 13, 1938, D. Rockefeller (5 AMNH). *Graham County*: Post Creek, Pinaleno Mountains, 9000 ft. elevation, July 26, 1969, A. Smetana (2 CNC); Turkey Flat, Pinaleno Mountains, 7200 ft. elevation, July 27, 1969, A. Smetana (4 CNC); 4 miles NW of Columbine, Pinaleno Mountains, 8800 ft. elevation, July 28, 1969, A. Smetana (3 CNC). *Pima County*: Santa Catalina Mountains, 8000 ft. elevation, June 16, July 7, Sept. 27, 1968, K. Stephan (3 AMNH); Hitchcock Highway, Santa Catalina Mountains, 9000 ft. elevation, on *Ganoderma* sp. fungus, Aug. 27-Sept. 2, 1970, A. Newton (1 AN); Santa Catalina Mountains, July 15, 1938, Bryant (1 CAS). COLORADO: *Ouray County*: Ouray, July 1-15, 1897 (1 FMNH; 4 USNM; 1 UK). *Routt County*: "type series." NEW MEXICO: Cibola National Forest, Sandia Crest, Sandia Mountains, 10,000-10,500 ft. elevation, July 7, 1969, A. Smetana (5 AMNH; 15 CNC). Cibola National Forest, Tree Spring Trail, Sandia Mountains, 8500 ft. elevation, July 6, 1969, A. Smetana (3 CNC). *Lincoln County*: 8 miles west of Angus, Bonito Creek, 7700 ft. elevation, on *Ganoderma* sp. fungus, July 6-8, 1972 (1 AN). *Otero County*: Saddle Campground, near Cloudcroft, 8900 ft. elevation, on bracket fungus, July 9-11, 1972, A. Newton (1 AN). UTAH: La Sal Mountains, near Warner, 9000 ft. elevation, July 22, 1933, from sifted leafmold, A. G. Richards (1 AMNH). *Summit County*: Park City, Hubbard and Schwarz (1 USNM). WYOMING: Yellowstone National Park, Hubbard and Schwarz (1 USNM).

Pseudopsis abbreviata, new species

Figures 86-89

Holotype. Male. United States: Arizona: Cochise County: Huachuca Mountains, Upper

Carr Canyon, 7500 feet elevation, August 6-10, 1952, H. B. Leech. Deposited in the California Academy of Sciences.

Paratypes. Five males. United States: with same data as holotype (1 CAS; 1 AMNH). Mexico: Durango: El Salto, 9300 feet elevation, June 2, 1937 (1 AMNH); 11 miles W El Salto, 9000 feet elevation, June 14-17, 1971, dung and carrion trap, S. Peck (2 CNC).

Diagnosis. This species can be distinguished by the shortened parameres (fig. 87) and by the median lobe that is gradually tapered apically, then strongly tapered from near the apex (figs. 86, 87).

Description. Length 2.7 to 3.0 mm. Parameres (fig. 87) gradually deflexed ventrally and in ventral aspect slightly sinuate; apex of paramere not reaching apex of median lobe; apical seta moderately long, slender, and not reaching apex of median lobe; apical seta unpigmented. Median lobe (figs. 86, 87) short, moderately slender, and gradually tapered to near apical portion, then strongly convergent to apex; apex slightly rounded to more acute; dorsal sclerotization moderately broad and with V-shaped to sinuate inner margin of apex; apical portion of ventral surface with membranous region occupying approximately one-third of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 88), slender, and approximately as long as median lobe; sac with numerous long, slender spines, numerous short spines, and row of stout spines.

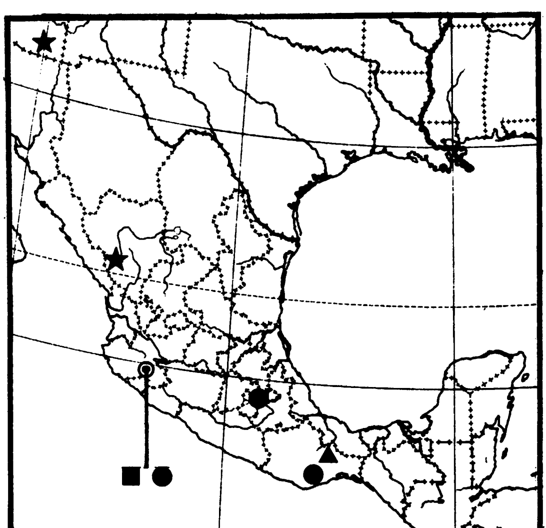


FIG. 89. Distribution of *Pseudopsis abbreviata* (stars), *P. echinata* (square), *P. sinuata* (dots), and *P. spicula* (triangle) in the United States and Mexico.

Variation. A specimen from near El Salto has the inner margin of the apex V-shaped (fig. 86) rather than sinuate.

Habitat and Distribution. The species is known from Arizona and the Mexican state of Durango (fig. 89).

The species has been collected at 7500 to 9300 feet elevation and near El Salto, Durango; was taken from a trap of carrion and dung.

Etymology. From the Latin *abbreviatus*, shortened, referring to the shortened parameres.

Material Examined. Only the holotype and five paratypes are known.

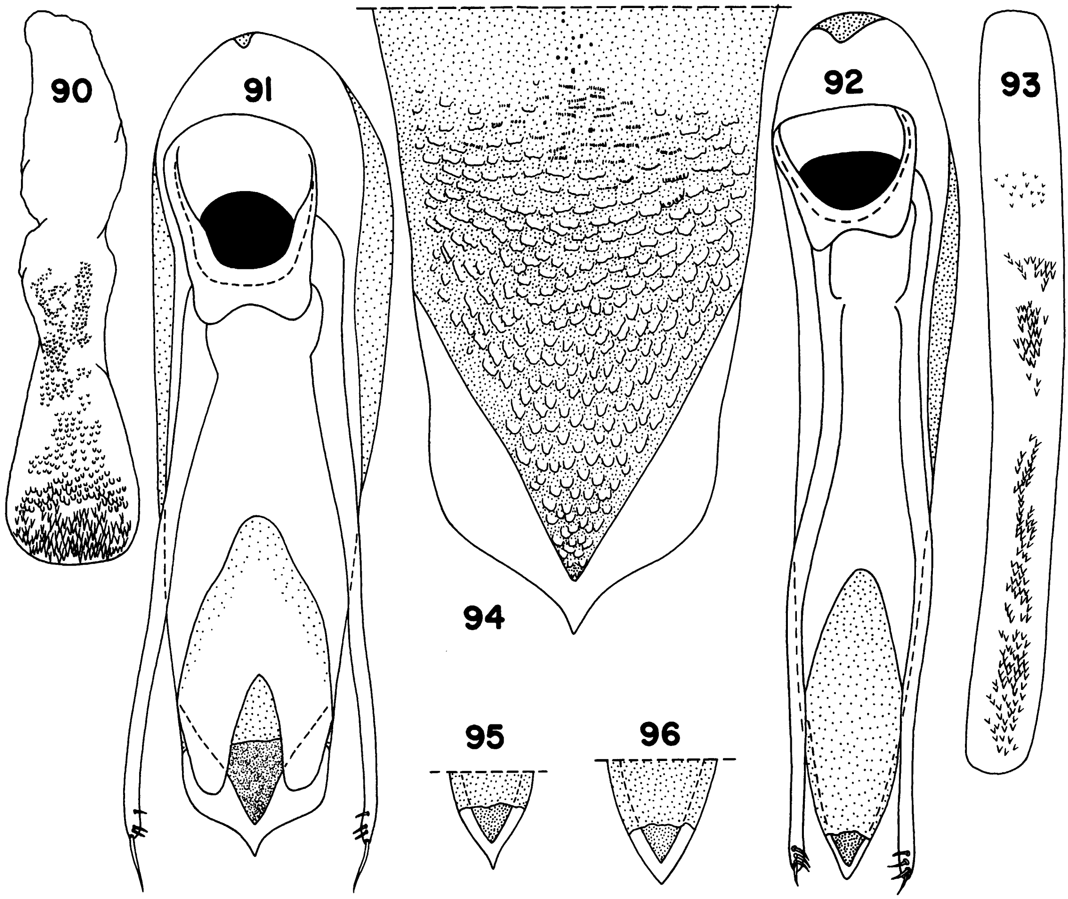
Pseudopsis echinata, new species
Figures 89-91, 94

Holotype. Male. Mexico: Jalisco: east slope of Nevado de Colima, 10,000 feet elevation, September 20-21, 1973, from litter of *Alnus* sp. in mesic woodland, A. Newton. Deposited in the American Museum of Natural History.

Paratypes. None.

Diagnosis. This species can be distinguished from all the others by the numerous short spine-like processes on the dorsal surface of the apical portion of the median lobe (fig. 94).

Description. Length 3.5 mm. Parameres (fig. 91) gradually deflexed ventrally and nearly straight in ventral view; apex of parameres just short of apex of median lobe; apical seta moderately long and extending beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 91, 94) broad, moderately long, and slightly convergent apically to near apex; apical portion strongly convergent to short, attenuate, median process; apex acute; dorsal sclerotization broad and with V-shaped inner margin of apex; apical portion of ventral surface with membranous region occupying apical third of median lobe;



FIGS. 90, 91. *Pseudopsis echinata*. 90. Internal sac, inverted. 91. Aedeagus, ventral view.
FIGS. 92, 93. *P. sinuata*. 92. Aedeagus, ventral view. 93. Internal sac, inverted.
FIG. 94. *P. echinata*, apical portion of median lobe, dorsal view.
FIGS. 95, 96. *P. sinuata*, variation of apical portion of median lobe, ventral view.

membranous region sclerotized apically and medially, sclerite bilobed apically, ventral surface without depressions; apical portion of dorsal surface with many short, stout spinelike processes, processes elongated or transverse, transverse spines basad (fig. 94). Internal sac (fig. 90) broad apically (in repose), about two-thirds length of median lobe, and with numerous moderately long and short acute spines, and numerous moderately large spines with blunt apex.

Habitat and Distribution. The species is known only from the state of Jalisco, Mexico (fig. 89), in leaf litter of a mesic woodland at 10,000 feet.

Etymology. From the Latin *echinatus*, spiny, referring to the multitude of spinelike processes on the dorsal surface of the apical portion of the median lobe.

Material Examined. Only the holotype is known.

Pseudopsis sinuata, new species
Figures 16, 17, 19, 89, 92, 93, 95, 96

Holotype. Male. Mexico: Mexico: at kilometer 10, Volcan Popocatepetl, 10,000 feet elevation, May 9, 1971, J. M. Campbell. Deposited in the Canadian National Collection.

Paratypes. Four males, Mexico: Mexico: with same data as holotype (1 CNC). Oaxaca: 35 miles S of Suchixtepec, 8000 feet elevation, June 3, 1971, leaf litter, S. Peck (1 CNC). Jalisco: east slope of Nevado de Colima, 8000 feet elevation, September 21-22, 1973, litter of hardwood and pine forest, A. Newton (1 AMNH).

Diagnosis. This species can be recognized by the gradually tapered median lobe (fig. 92) and the long, slender tubular (in repose) internal sac (fig. 93). The apex of the paramere reaches the apex of the median lobe. The internal sac has numerous short spines of nearly equal size.

Description. Length 3.0 to 3.7 mm. Parameres (fig. 92) gradually deflexed ventrally and in ventral view moderately strongly sinuate; parameres relatively stout; apex of parameres reaching apex of median lobe; apical seta short, slender, and extending slightly beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 92) long, slender, and gradually tapered to apex; apex obtuse (fig. 92) to acute (figs. 95, 96); dorsal sclerotization narrow to moderately broad and with V-shaped inner margin of apex; apical portion of ventral surface with membranous region occupying approximately one-third of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 93), slender, nearly as long as median lobe and with numerous short spines of approximately equal size; spines shorter near base (in repose).

Variation. The width of the dorsal sclerite varies from narrow (fig. 92) to moderately broad (figs. 95, 96). The apex is more attenuate in some specimens (fig. 95).

Habitat and Distribution. The species is known from the Mexican states of Jalisco, Mexico, and Oaxaca (fig. 89).

The species has been collected in leaf litter at 8000 and 10,000 feet. In one instance the collection was made specifically in litter of mixed hardwoods and pines.

Etymology. From the Latin *sinuatus*, bend or curve, referring to the sinuate parameres.

Material Examined. Only the holotype and four paratypes are known.

Pseudopsis maja, new species
Figures 97, 101, 104

Holotype. Male. Mexico: Oaxaca: 4 miles W of junction 175, Yuvila Road, 9300 feet elevation, August 8, 1973, leaf litter around logs of oak-pine fir forest, A. Newton. Deposited in the American Museum of Natural History.

Paratypes. Four males with same data as holotype (2 AMNH; 2 AN).

Diagnosis. This species can be separated from all others by the combination of the sclerotized plates on the membranous region of the ventral surface of the median lobe (fig. 97), the parameres that reach the apex of the median lobe, the shape of the apical portion of the median lobe, the sinuate inner margin of the apex of the dorsal sclerotization and the moderately long spines of the internal sac (fig. 101).

Description. Length 3.5 mm. Parameres (fig. 97) gradually deflexed ventrally and nearly straight in ventral view; apex of parameres extending to apex of median lobe; apical seta moderately long and extending beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 97) moderately long, moderately broad, and gradually tapered to apical seventh, then more strongly tapered to acute apex; dorsal sclerotization narrow laterally and broad apically and with sinuate inner margin of apex; apical portion of ventral surface with lightly sclerotized plates at apex; plates obsoletely delimited posteriorly; membranous region occupying apical third of median lobe; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 101), broad apically, about two-thirds length of median lobe, and with numerous moderately long and long, slender spines.

Habitat and Distribution. The species is known only from the state of Oaxaca, Mexico (fig. 104) at 9300 feet in leaf litter of an oak-pine-fir forest.

Etymology. The name is an arbitrary combination of letters.

Material Examined. Only the holotype and four paratypes are known.

Pseudopsis bilacuna, new species
Figures 98-100, 102, 104

Holotype. Male. Mexico: Oaxaca: 4 miles W of junction 175, Yuvila Road, 9300 feet elevation, August 8, 1973, from leaf litter near logs in oak-pine-fir forest, A. Newton. Deposited in the American Museum of Natural History.

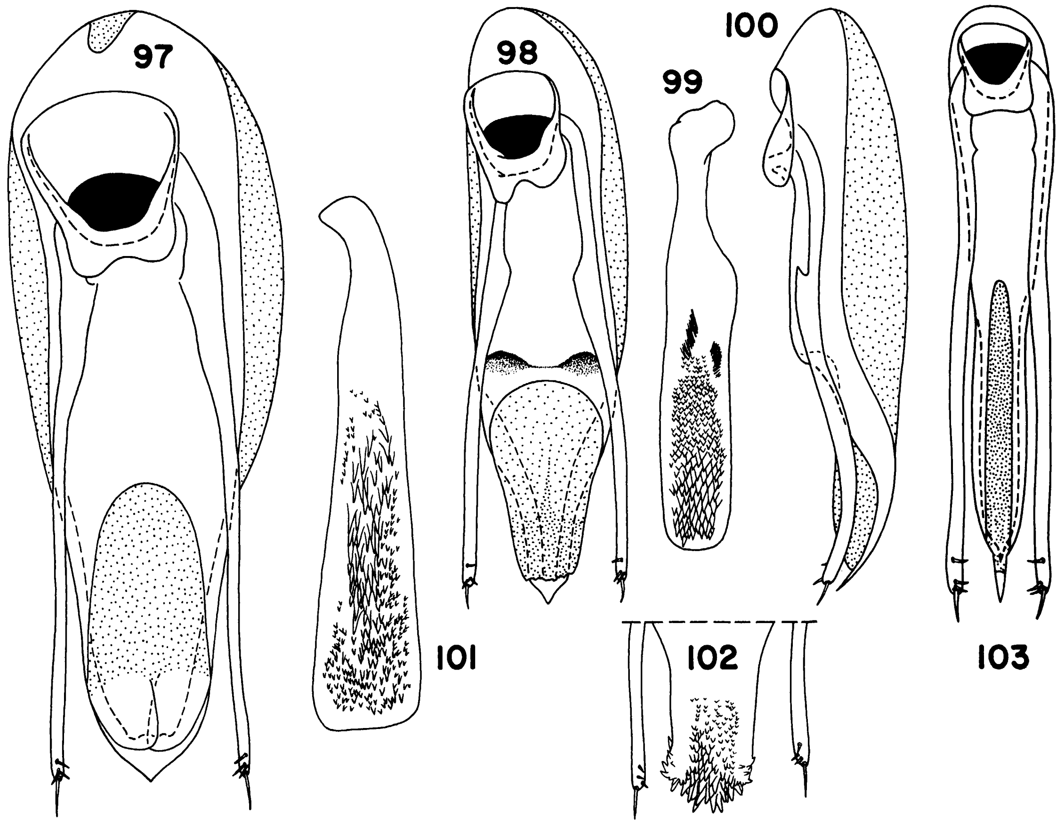


FIG. 97. *Pseudopsis maja*, aedeagus, ventral view.
FIGS. 98-100. *P. bilacuna*. 98. Aedeagus, ventral view. 99. Internal sac, inverted. 100. Aedeagus, lateral view.
FIG. 101. *P. maja*, internal sac, inverted.
FIG. 102. *P. bilacuna*, apical portion of aedeagus with internal sac partially everted, ventral view.
FIG. 103. *P. vespina*, aedeagus, ventral view.

Paratype. One male with same data as holotype (AMNH).

Diagnosis. This species is readily separated from all others by the pair of depressions just posterior to the apical third of the ventral surface of the median lobe (fig. 98). The dorsal sclerotization of the apical quarter is strongly constricted, and the apex strongly convergent (fig. 98). The parameres in ventral view are nearly straight (fig. 98) and in lateral view gradually deflexed (fig. 100).

Description. Length 3.5 to 3.7 mm. Parameres (figs. 98, 100) gradually deflexed ventrally and nearly straight in ventral view; apex of parameres just short of apex of median lobe; apical seta short and just reaching or extending slightly beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 98) short, moderately slender, and constricted near apical quarter, then gradually convergent to near apex; apical portion strongly convergent to acute apex; dorsal sclerotization moderately broad and with U-shaped inner margin of apex; apical portion of ventral surface with membranous region occupying apical third of median lobe; membranous region with very lightly sclerotized plates, plates barely visible or delimited; ventral surface with two depressions (fig. 98) just posterior to membranous region; apical portion of dorsal surface without spicules or spines. Internal sac, in repose

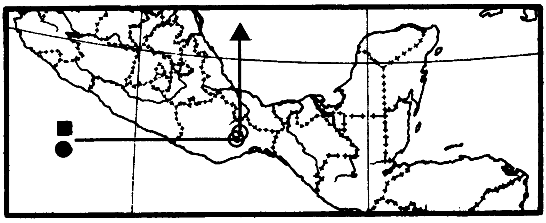


FIG. 104. Distribution of *Pseudopsis maja* (square), *P. bilacuna* (dot), and *P. biloba* (triangle) in Mexico.

(fig. 99), moderately broad, about three-fourths as long as median lobe, and with numerous moderately large and moderately stout spines and some long, slender spines. Internal sac, partially everted, with small scalelike spines at base and numerous small and moderately large spines (fig. 102).

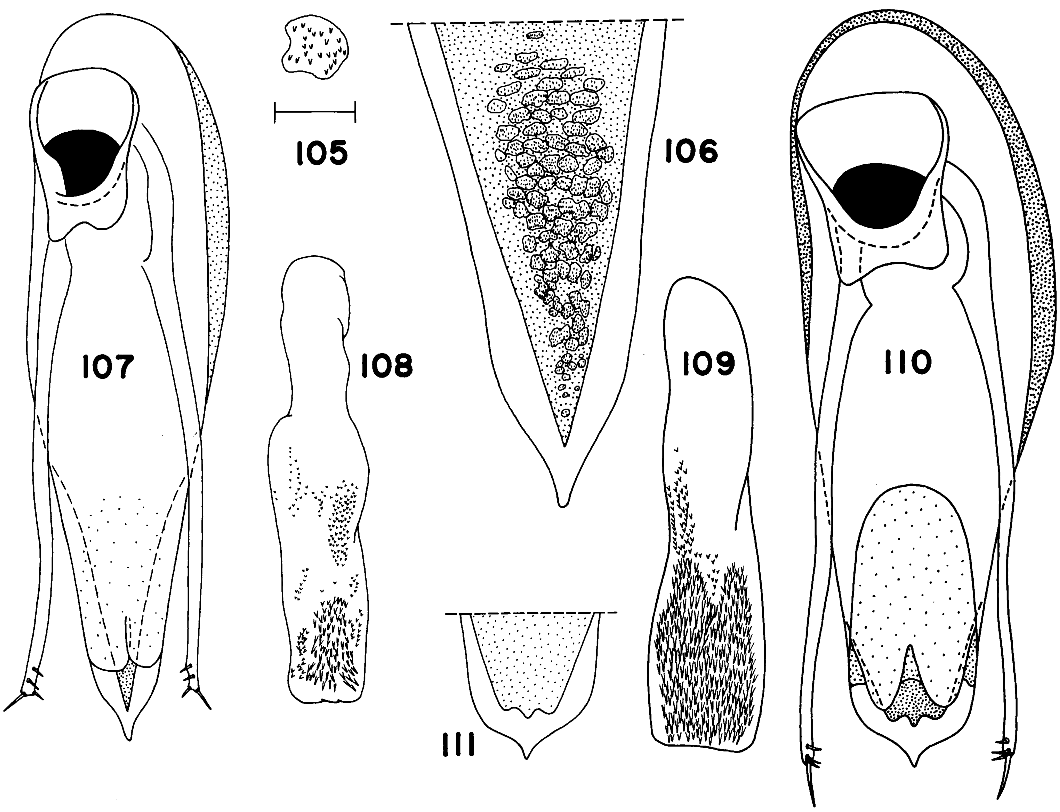
Habitat and Distribution. See under holotype (fig. 104).

Etymology. From the Latin *bis*, two, and *lacuna*, cavity or hollow, referring to the depressions on the ventral surface of the aedeagus.

Material Examined. Only the holotype and paratype are known.

Pseudopsis spicula, new species
Figures 89, 105-108

Holotype. Male. Mexico: Oaxaca: 32 miles S of Valle Nacional, 7000 feet elevation, May



FIGS. 105-108. *Pseudopsis spicula*. 105. Enlargement of patch of spicules from dorsal surface of median lobe, scale equals 0.01 mm. 106. Enlargement of apical portion of median lobe, dorsal view. 107. Aedeagus, ventral view. 108. Internal sac, inverted.

FIGS. 109-111. *P. biloba*. 109. Internal sac, inverted. 110. Aedeagus, ventral view. 111. Apical portion of median lobe, dorsal view.

21-24, 1971, S. Peck. Deposited in the Canadian National Collection.

Paratypes. None.

Diagnosis. This species is separated from all the others by the patches of spicules on the dorsal surface of the median lobe (figs. 105, 106) and the attenuate, pointed apex of the median lobe (fig. 107).

Description. Length 3.6 mm. Parameres (fig. 107) gradually deflexed ventrally and slightly sinuate in ventral view; apex of paramere not reaching apex of median lobe; apical seta moderately long and extending to just short of apex of median lobe; apical seta unpigmented. Median lobe (fig. 107) moderately slender, moderately long, and gradually tapered from apical half to more strongly tapered apex; apex attenuate; dorsal sclerotization moderately broad and with V-shaped inner margin of apex; apical portion of ventral surface lightly sclerotized, occupying apical quarter of median lobe; apical margin bilobed, ventral surface without depressions; apical portion of dorsal surface with numerous patches of spicules (figs. 105, 106). Internal sac, in repose (fig. 108), moderately broad, about three-fifths length of median lobe and with numerous moderately large and small spines.

Habitat and Distribution. The species is known only from the state of Oaxaca, Mexico (fig. 89) at 7000 feet elevation.

Etymology. From the Latin *spica*, point, referring to the patches of spicules on the dorsal surface of the median lobe.

Material Examined. Only the holotype is known.

Pseudopsis biloba, new species
Figures 104, 109-111

Holotype. Male. Mexico: Oaxaca: 56 miles S of Valle Nacional, 10,000 feet elevation, May 16-25, 1971, S. Peck. Deposited in the Canadian National Collection.

Paratypes. Three males. Mexico: Oaxaca: with same data as holotype (1 CNC; 1 AMNH); 52 miles N of Oaxaca, 9500 feet elevation, May 17, 1971, from leaf litter in sink hole, S. Peck (1 CNC).

Diagnosis. This species can be separated from all others except *P. echinata* by the bilobed, lightly sclerotized region of the ventral surface (fig. 110), the form of the apex of the median lobe. The apical portion of the median lobe is broad, tapers only slightly and is strongly convergent near the apex with a median, attenuate process at the apex (fig. 110). *Pseudopsis biloba* does not have a series of spines on the apical portion of the dorsal surface (fig. 111); *P. echinata* does.

Description. Length 3.3 to 4.2 mm. Parameres (fig. 110) gradually deflexed ventrally and in ventral aspect broadly sinuate; apex of paramere just reaching apex of median lobe; apical seta moderately long and slender and extending beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 110) moderately long, moderately broad, and with apical third gradually but slightly tapered to apex; apex strongly convergent to acute, median, attenuate projection extending posteriorly; dorsal sclerotization moderately broad and with strongly sinuate inner margin of apex; apical portion of ventral surface with broad, apically bilobed, lightly sclerotized region occupying approximately one-third of length of median lobe; ventral surface without depressions; apical portion of dorsal surface without spicules or spines (fig. 111). Internal sac, in repose (fig. 109), broad and about two-thirds length of median lobe; sac with numerous, moderately large spines at apex (in repose) and without spines on basal position (in repose).

Habitat and Distribution. The species is known only from Oaxaca State, Mexico (fig. 104).

At one locality the species was taken in leaf litter in a sinkhole and at another from a trap of carrion and human dung. The species has been found at 9500 feet and 10,000 feet elevation.

Discussion. The humeral angle of the elytra is yellowish brown and the remainder of the elytra is dark brown.

Etymology. From the Latin *bi*, two, and *lobus*, rounded projection, referring to the lightly sclerotized region of the ventral surface.

Material Examined. Only the holotype and three paratypes are known.

Pseudopsis vespina, new species
Figures 103, 112

Holotype. Male. Mexico: Chiapas: 8 miles N

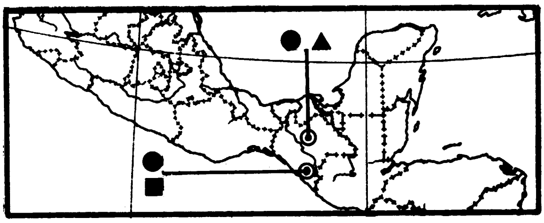


FIG. 112. Distribution of *Pseudopsis vespina* (dots), *P. lata* (triangle), and *P. constricta* (square) in Mexico.

of Pueblo Nuevo, Solistahuacán, 6000 feet elevation, August 26-27, 1973, from leaf litter in cloud forest, Al Newton. Deposited in the American Museum of Natural History.

Paratypes. Five males. Mexico: Chiapas: with same data as holotype (1 AMNH); 5 km. W of San Cristóbal de las Casas, 8900 feet elevation, August 16 to September 3, 1969, from carrion trap in pine-oak forest, S. Peck (1 AMNH); 3 miles N of San Cristóbal de las Casas, May 29, 1969, J. M. Campbell (2 CNC); Tinijapa [=Tenejapa], 8 miles NE of San Cristóbal de las Casas, May 26, 1969, J. M. Campbell (1 CNC).

Diagnosis. This species can be separated from the others by the slender median lobe (fig. 103), the relatively stout parameres, the abruptly acuminate apex of the median lobe, and the absence of sclerotized spines on the internal sac. The distance between the basal foramen and the anterior margin of the median lobe is shorter than in all other species (fig. 103). The species might be confused with *P. petila* or *P. sinuata*, but can be distinguished by the internal sac and short anterior end.

Description. Length 3.0 to 4.0 mm. Parameres (fig. 103) stout, gradually deflexed ventrally and in ventral aspect nearly straight to slightly sinuate; apex of paramere just short of to reaching slightly beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 103) moderately long, slender, and gradually tapered to near apical half then obsoletely expanded apically to near apex then tapered to strongly and abruptly acuminate apex; dorsal sclerotization moderately broad and with V-shaped inner margin of apex; apical portion of ventral surface with long, narrow membranous region occupying approximately one half of length of median lobe; membranous region without sclerotized plates; base, from basal foramen to anterior margin, short (this character unique in *sulcata* complex); ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose, slender and about two-thirds length of median lobe; sac membranous and difficult to see because of lack of sclerotized spines.

Habitat and Distribution. This species is known only from the Mexican state of Chiapas (fig. 112). It has been collected from leaf litter in a cloud forest at 6000 feet elevation and from a carrion trap in a pine-oak forest at 8900 feet elevation.

Etymology. From the Latin *ve*, without, and *spina*, spines, referring to the absence of sclerotized spines on the internal sac.

Material Examined. Only the holotype and five paratypes are known.

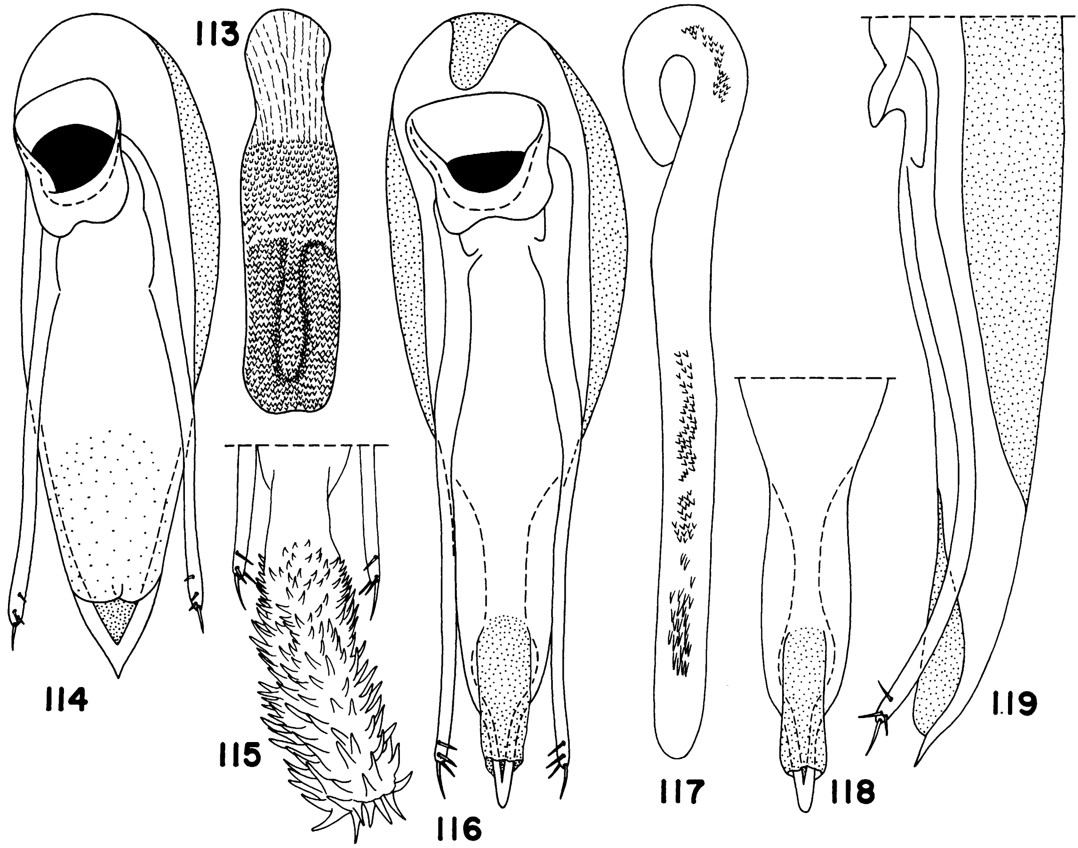
Pseudopsis lata, new species
Figures 112-114

Holotype. Male. Mexico: Chiapas: Mt. Tzontehuitz, 9500 feet elevation, May 17, 1969, J. M. Campbell. Deposited in the Canadian National Collection.

Paratypes. Six males. Mexico: Chiapas: with same data as holotype (1 AMNH; 2 CNC); with the same locality and collector as holotype, May 27, 1969 (1 CNC); 8 miles NE of San Cristóbal de las Casas, near Tinijapa [=Tenejapa], May 18, 1969, J. M. Campbell (1 AMNH; 1 CNC).

Diagnosis. This species can be recognized by the combination of the internal sac (fig. 113) that is broad in repose and has many short spines, the parameres (fig. 114) that do not reach the apex of the median lobe, the acute apex of the gradually tapered median lobe, and the lightly sclerotized apical portion of the ventral surface of the median lobe (fig. 114).

Description. Length 3.2 to 3.5 mm. Parameres (fig. 114) gradually deflexed ventrally and nearly straight in ventral view; apex of parameres not reaching apex of median lobe; apical seta short and not reaching apex of median lobe; apical seta unpigmented. Median lobe (fig. 114) moderately long and gradually tapered to acute apex; dorsal sclerotization narrow laterally and moderately broad apically and with V-shaped inner margin of



FIGS. 113, 114. *Pseudopsis lata*. 113. Internal sac, inverted. 114. Aedeagus, ventral view.
FIGS. 115-119. *P. constricta*. 115. Apical portion of aedeagus with internal sac partially everted. 116. Aedeagus, ventral view. 117. Internal sac, inverted. 118. Apical half of median lobe, ventral view. 119. Apical four-fifths of aedeagus, lateral view.

apex; apical portion of ventral surface lightly sclerotized, and occupying apical quarter of median lobe; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 113), broad, about two-thirds length of median lobe and with numerous short spines.

Habitat and Distribution. The species is known only from the state of Chiapas, Mexico (fig. 112) and at one place was collected at 9500 feet elevation.

Etymology. From the Latin *latus*, broad, referring to the broad internal sac.

Material Examined. Only the holotype and six paratypes are known.

Pseudopsis constricta, new species
Figures 112, 115-119

Holotype. Male. Mexico: Chiapas: 8 miles N of Pueblo Nuevo, Solistahuacán, 6000 feet elevation, August 26, 1973, on large, white, polypore fungus near dead log, A. Newton. Deposited in the American Museum of Natural History.

Paratypes. Five males with same data as holotype (2 AMNH; 3 AN).

Diagnosis. This species is readily separated from all the others by the strongly and abruptly constricted apical region of the median lobe (figs. 116, 118). The membranous region of the ventral surface of the median lobe is short (figs. 116,

118) and anteriorly poorly delineated in this species.

Description. Length 3.0 to 3.6 mm. Parameres (fig. 116) moderately strongly deflexed ventrally and nearly straight to slightly sinuate in ventral view; apex of parameres not reaching apex of median lobe; apical seta moderately long, extending to apex of median lobe; apical seta unpigmented. Median lobe (figs. 116, 118) moderately long, moderately broad, and gradually tapered to near apical half, then slightly to moderately constricted, then gradually tapered to apical eighth, then abruptly and strongly constricted, then tapered to apex; apex rounded; dorsal sclerotization narrowly anteriorly and broad posteriorly and with narrow V-shaped inner margin of apex; apical portion of ventral surface with membranous region occupying apical fifth of median lobe; membranous region obsoletely delimited anteriorly and without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 117), with numerous long, slender spines and numerous short spines; sac, in repose, slender and slightly longer than median lobe. Internal sac, partially everted (fig. 115), with numerous short spines at base and longer, slender spines more proximal.

Variation. The attenuation of the apical eighth varies slightly and the constriction near the apical half varies between the extremes shown in figures 116 and 118.

Habitat and Distribution. The species is known only from the state of Chiapas, Mexico (fig. 112) and was collected from a polypore fungus at 6000 feet elevation.

The specimens were collected when they flew to fungus as it was freshly broken open (A. Newton, personal commun.).

Etymology. From the Latin *constrictus*, contracted, referring to the constricted, narrow apex of the median lobe.

Material Examined. Only the holotype and five paratypes are known.

Pseudopsis dybasi, new species
Figures 122, 123, 127, 129

Holotype. Male. Panama: Chiriqui: Finca Lerida, near Boquete, "Barca" area, 5650 feet elevation, March 14, 1959, in litter of the forest floor (Berlese number B-490), Henry Dybas. Deposited in the Field Museum of Natural History.

Paratypes. Twenty-one males with same data as holotype (12 FMNH; 9 AMNH).

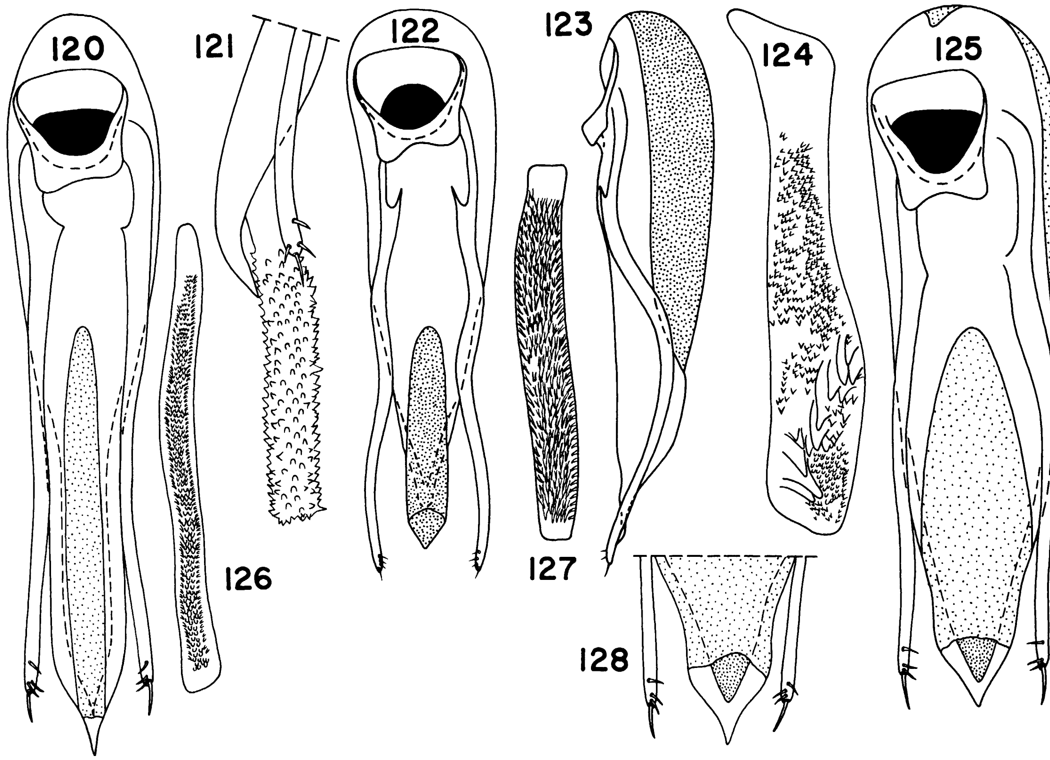
Diagnosis. This species is distinguished from all others by the strongly sinuate parameres (fig. 122) that are strongly deflexed ventrally (fig. 123) and by the parallel-sided, membranous apical fifth of the ventral surface of the median lobe. The membranous region of the ventral surface is elongate and narrow and extends beyond the apex of dorsal sclerotization (fig. 122). The internal sac has many slender, moderately long spines (fig. 127).

Description. Length 2.5 to 3.0 mm. Parameres (figs. 122, 123) with apical half strongly and broadly deflexed ventrally, and in ventral aspect with apical two-thirds strongly sinuate; apex of parameres extending beyond apex of median lobe; apical seta short, slender, and unpigmented. Median lobe (fig. 122) short, moderately broad, and gradually tapering apically to point; membranous apical fifth of ventral surface with parallel-sided lateral margins, and strongly convergent apex; membranous portion extending beyond apex of dorsal sclerotization; dorsal sclerotization narrow, with V-shaped inner margin; apical portion of ventral surface with elliptical membranous region occupying approximately two-fifths of length of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose, broad, about two-thirds length of median lobe and with numerous slender, moderately long spines (fig. 127).

Habitat and Distribution. The species is known only from the mountains of Costa Rica and Panama (fig. 129).

Near Boquete, Panama, *P. dybasi* was collected in the floor litter of a damp ravine at 4900 and 6900 feet elevation. The longest series was taken in forest floor litter at 5650 feet elevation. In Costa Rica the species was found at 1800 and 2000 meters elevation.

Discussion. Pseudopsis dybasi was collected with *P. dilata* and *P. petila* at the same time,



FIGS. 120, 121. *Pseudopsis petila*. 120. Aedeagus, ventral view. 121. Apical third of aedeagus with internal sac partially exposed, lateral view.

FIGS. 122, 123. *P. dybasi*, aedeagus. 122. Ventral view. 123. Lateral view.

FIGS. 124, 125. *P. dilata*. 124. Internal sac, inverted. 125. Aedeagus, ventral view.

FIG. 126. *P. petila*, internal sac, inverted.

FIG. 127. *P. dybasi*, internal sac, inverted.

FIG. 128. *P. dilata*, apical portion of aedeagus, ventral view.

place, and habitat by Henry Dybas. This collection helps support my hypotheses for the *sulcata* complex.

Etymology. This species is named in honor of my friend and colleague Henry Dybas of the Field Museum. His collection of this species and long series of several others was important support to the conclusions of my analysis of the *sulcata* complex.

Material Examined. 41 males.

Costa Rica: CARTAGO: Carpintera, Aug., 1948, Bierig (3 FMNH). Rabo de Mico (?), Mar. 6-8, 1948, 1800 m. elevation, Bierig (1 FMNH). San Isidro-La Estrella (?), Oct. 16, 1941, Bierig (1 FMNH). HEREDIA: Vara Blanca, 2000 m. elevation, Aug., 1938, Bierig (2 FMNH). ALAJUELA: Zarcero, Sept. 15, 1943, Bierig (1 FMNH).

Panama: CHIRIQUI: "type series" (16 FMNH; 6 AMNH); Finca Lerida, near Boquete, "Casita Alta," 6900 ft. elevation, Mar. 18, 1959, from concentrated floor litter of damp ravine, Berlese number B-543, H. S. Dybas (7 FMNH, 3 AMNH); Finca Palo Santo, west of Nueva California, 4900 ft. elevation, Mar. 9, 1956, from concentrated floor litter of damp ravine, Berlese number B-433, H. S. Dybas (1 FMNH).

Pseudopsis petila new species
Figures 120, 121, 126, 129

Holotype. Male. Panama: Chiriqui: Finca

Lerida, near Boquete, "Casita Alta," 6900 feet elevation, March 18, 1959, in floor debris of a damp ravine (Berlese number B-543), Henry Dybas. Deposited in the Field Museum of Natural History.

Paratypes. Twenty-one males with same data as holotype (12 FMNH; 9 AMNH).

Diagnosis. This species can be separated from the others by the long, slender median lobe, the strongly attenuate apex of the median lobe, the long, narrow membranous region of the median lobe, and the somewhat expanded apical third of the median lobe (fig. 120). *Pseudopsis vespina* is similar but *P. petila* can be separated by the distinct, sclerotized armature of the internal sac (fig. 126).

Description. Length 3.0 to 4.0 mm. Parameres (fig. 120) gradually deflexed ventrally and in ventral aspect nearly straight to slightly sinuate; apex of paramere not reaching apex of median lobe; apical seta moderately long, slender, and not or just reaching apex of median lobe; apical seta unpigmented. Median lobe (fig. 120) elongate, slender and gradually tapered to near apical half, then gradually expanded apically to near apex, then strongly attenuate to apex; dorsal sclerotization moderately broad, with V-shaped inner margin of apex; apical portion of ventral surface with long, narrow membranous region occupying approximately one-half of length of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface with spicules or spines. Internal sac, in repose (fig. 126), slender and about two-thirds length of median lobe; sac with numerous small, slender spines. Internal sac, partially everted (fig. 121), with numerous uniformly distributed, small, scalelike spines.

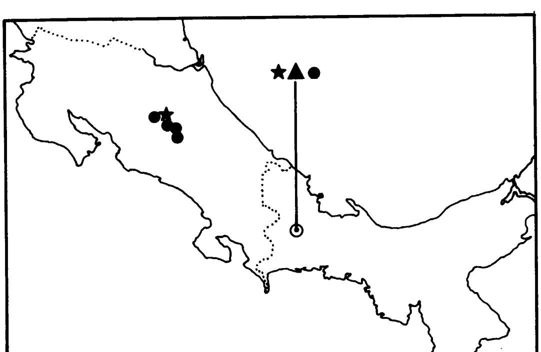


FIG. 129. Map of Costa Rica and Panama showing distribution of *Pseudopsis petila* (stars), *P. dybasi* (dots), and *P. dilata* (triangle).

Variation. There is slight variation in the width of the median lobe and in the attenuation of its apex.

Habitat and Distribution. The species is known from Costa Rica and Panama (fig. 129).

In Costa Rica it was collected at 2000 m. elevation from floor mold under tree ferns on a slope, and the Panamanian examples were collected at 6900 feet elevation from floor debris in a deep ravine.

Etymology. From the Latin *petilus*, thin or slender, referring to the slender aedeagus.

Material Examined. 23 males.

Costa Rica: ALAJUELA: Río Poasito (below Volcán Poas about 10 km.), 84° 13′ W, 10° 9′ N, 2000 m. elevation, April 16, 1973, from floor mold under tree fern on slope, J. Wagner and J. Ketheley (1 FMNH).

Panama: "type series" (13 FMNH, 9 AMNH).

Pseudopsis dilata, new species
Figures 124, 125, 128, 129

Holotype. Male. Panama: Chiriqui: Finca Lerida, near Boquete, "Casita Alta," 6900 feet elevation, March 18, 1959, in floor debris from a deep ravine (Berlese number B-543), Henry Dybas. Deposited in the Field Museum of Natural History.

Paratypes. Six males. Panama: Chiriqui: with same data as holotype (1 FMNH; 1 AMNH); wooded slope on road to Cerro Punta, 5600 feet elevation, March 8, 1959, damp litter near spring, Berlese number B-432, H. S. Dybas (3 FMNH; 1 AMNH).

Diagnosis. The expanded aedeagal apex (figs. 125, 128), straight parameres (fig. 125), and large, stout spines of the internal sac (fig. 124) separate this species from all others. Although similar to *P. wygodzinskyi* and *P. grossa*, the species can be separated from them by the above characters.

Description. Length 3.0 to 3.2 mm. Parameres (fig. 125) gradually deflexed ventrally and in ventral aspect nearly straight; apex of paramere not reaching apex of median lobe; apical seta moderately long and not or just reaching apex of median lobe; apical seta unpigmented. Median lobe (fig. 125) moderately long, moderately broad and gradually tapered to apical seventh, then strongly dilated, then strongly attenuated to apex; dorsal sclerotization moderately broad and with V-shaped inner margin; apical portion of ventral surface with elliptical membranous region occupying nearly one-half of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 124), moderately broad and slightly more than two-thirds as long as median lobe; sac with row of large, stout spines and numerous, small spines.

Variation. Among the seven males studied the only appreciable variation was in the attenuation of the apex of the median lobe (figs. 125, 128).

Habitat and Distribution. The species, known only from Panama (fig. 129) was collected at 6900 feet elevation in floor debris from a deep ravine and at 5600 feet elevation in damp litter near a spring.

Etymology. From the Greek *dilatus*, expanded, referring to the expanded aedeagal apex.

Material Examined. Only the holotype and six paratypes are known from this species.

Pseudopsis grossa, new species
Figures 130-134

Holotype. Male. Colombia: Valle del Cauca: San Antonio, near Cali, 2000 meters elevation, May, 1909, from a fungus ("Stockschwamm"). Deposited in the Field Museum of Natural History.

Paratypes. Four males. Colombia: Valle del Cauca: with same data as holotype (1 FMNH; 1 AMNH); Cali (1 AMNH, 1 OS).

Diagnosis. This species is similar to *P. wygodzinskyi*, but can be separated from it and other species in the New World by the two rows of large, thick spines on the internal sac (figs. 131-133). The apical third of the median lobe is gradually tapered to a moderately acute apex (fig. 130). The apex of the paramere does not reach the apex of the median lobe.

Description. Length 3.1 to 3.5 mm. Parameres (fig. 130) gradually deflexed ventrally and in ventral aspect moderately to slightly sinuate; apex of paramere just short of apex of median lobe; apical seta slender, moderately long and extending slightly beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 130) broad and moderately long, moderately gradually tapered from apical third to apex; apex moderately acute; dorsal sclerotization narrow and with sinuate inner margin of apex; apical portion of ventral surface with membranous region occupying nearly one-third of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 131), moderately broad, about three-fourths length of median lobe with two rows of large, thick spines and with numerous moderately large and small spines. Internal sac, partially everted (figs. 132, 133), with numerous small, large and moderately large spines; row of thick, large spines on each lateral side; dorsal surface with mass of large, long spines on middle; small and moderately large spines scattered over surface.

Habitat and Distribution. This species was collected in Colombia (fig. 134) at 2000 meters from a fungus ("Stockschwamm").

Etymology. From the Latin *grossus*, coarse, thick or big, referring to large, thick spines of the internal sac.

Material Examined. Only the holotype and four paratypes are known.

Pseudopsis wygodzinskyi, new species
Figures 134-138

Holotype. Male. Ecuador: Cotopaxi: NW slope of Mt. Cotopaxi, 3500 meters, July 26-August 5, 1969, P. and B. Wygodzinsky. Deposited in the American Museum of Natural History.

Paratype. Two males with same data as holotype (AMNH).

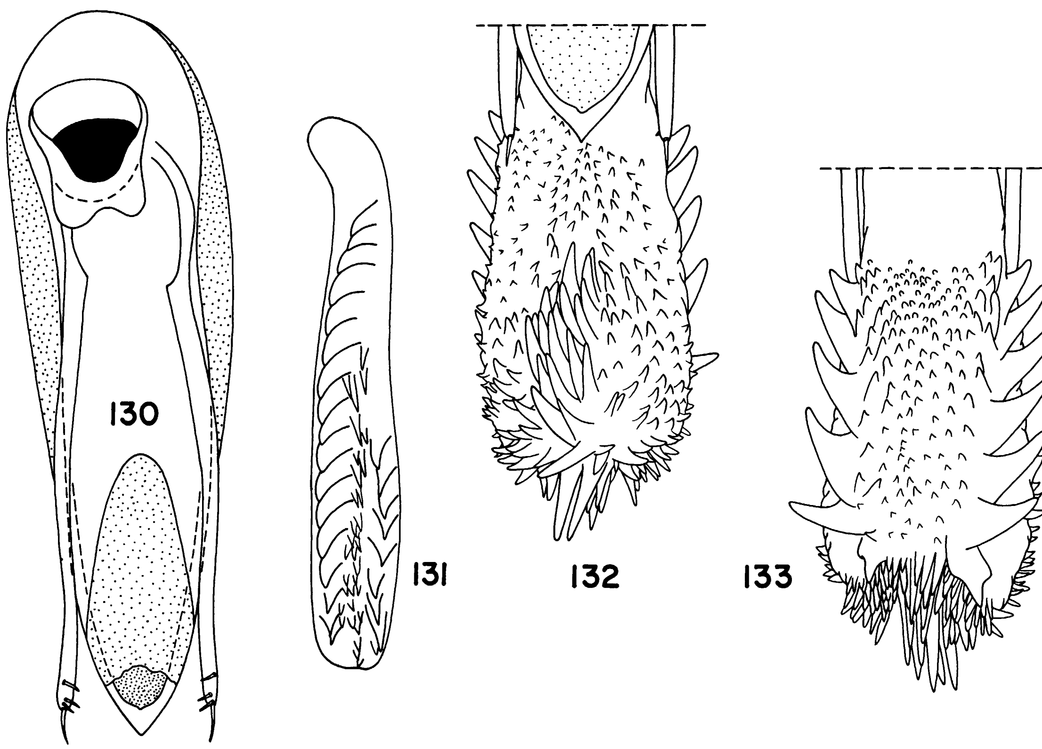
Diagnosis. Pseudopsis wygodzinskyi can be recognized by the large median lobe (fig. 135) that is gradually tapered apically to an acute apex, and by the large internal sac (fig. 136) with many long, slender spines, moderately large spines and small spines, and two rows of long, moderately stout ones. The apex of the paramere reaches the apex of the median lobe. The species is similar to *P. grossa* which has two rows of large spines.

Description. Length 3.0 to 3.6 mm. Parameres (fig. 135) gradually deflexed ventrally and in ventral aspect moderately sinuate; apex of paramere just reaching apex of median lobe; apical seta short, slender, and extending just beyond apex of median lobe; apical seta unpigmented. Median lobe (fig. 135) long, broad, and gradually tapered from apical third to apex; apical portion slightly more attenuate; apex acute; dorsal sclerotization narrow with sinuate inner margin of apex; apical portion of ventral surface with membranous region occupying approximately one-third of median lobe; membranous region without sclerotized plates; ventral surface without depressions; apical portion of dorsal surface without spicules or spines. Internal sac, in repose (fig. 136), broad, and approximately as long as, or slightly longer than median lobe; sac with numerous moderately large spines and numerous small spines. Internal sac, partially everted (figs. 137, 138), with numerous short spines, numerous long, slender spines, and two rows of long, moderately stout spines; ventral surface with one row of stouter spines and dorsal surface with another.

Variation. The attenuation of the apex of the median lobe varies slightly.

Habitat and Distribution. This species, known only from Ecuador (fig. 134) was collected at 3500 meters elevation from debris near a small stream.

Etymology. This species is named in honor of



FIGS. 130-133. *Pseudopsis grossa*. 130. Aedeagus, ventral view. 131. Internal sac, inverted. 132. Apical portion of aedeagus with internal sac partially everted, dorsal view. 133. Apical portion of aedeagus with internal sac partially everted, ventral view.

my friend and colleague, P. Wygodzinsky, who is the collector and with whom I have had many valuable discussions.

Pseudopsis columbica Fauvel

Pseudopsis columbica Fauvel, 1866, p. 11. (Type locality: Caracas, Venezuela; holotype not studied.)

Discussion. After *P. columbica* was described by Fauvel it was placed as a junior synonym of *P. sulcata* (Hamilton, 1889, p. 118). Fauvel at first rejected this decision (1878, p. 190) but later he (1891, pp. 89-90) and all subsequent authors accepted it.

The holotype and all the specimens I have seen from the vicinity of Caracas are females, but it is necessary to resurrect *P. columbica* because of the numerous sibling species of the *P. sulcata* complex. When males of *P. columbica* are found they unquestionably will be different from *P. sulcata* and likely will be different from any of the other known forms of the complex.

Although *P. columbica* has been cited many times, the citations are either misidentifications or add no new knowledge. I have therefore omitted subsequent references.

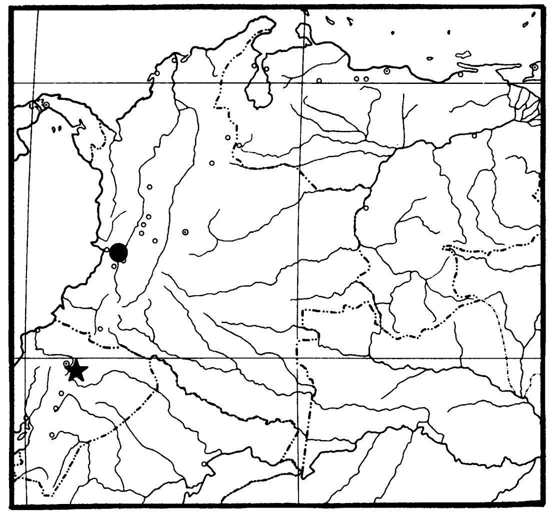


FIG. 134. Map of northwestern South America showing distribution of *Pseudopsis grossa* (dot) and *P. wygodzinskyi* (star).

Pseudopsis minuta Fall
Figures 14, 15, 139-152

Pseudopsis minuta Fall, 1901, p. 227. Hubenthal, 1911, p. 100. (Type locality: California, from canyons of the southern Sierra Nevadas; holotype deposited in the Museum of Comparative Zoology, Harvard University; holotype examined).

Diagnosis. Pseudopsis minuta can be separated from *P. arrowi*, *P. adustipennis*, *P. montoraria*, and *P. obliterata* by the strongly carinate head, pronotum (fig. 142), and elytra (fig. 143) and from all the species by the scalelike setae (figs. 14, 15, 149) of the head (fig. 5) and abdomen (fig. 148) and the presence of the modified postocular seta (fig. 5, PS).

Description. Length 1.8 to 2.5 mm.

Color pale reddish brown.

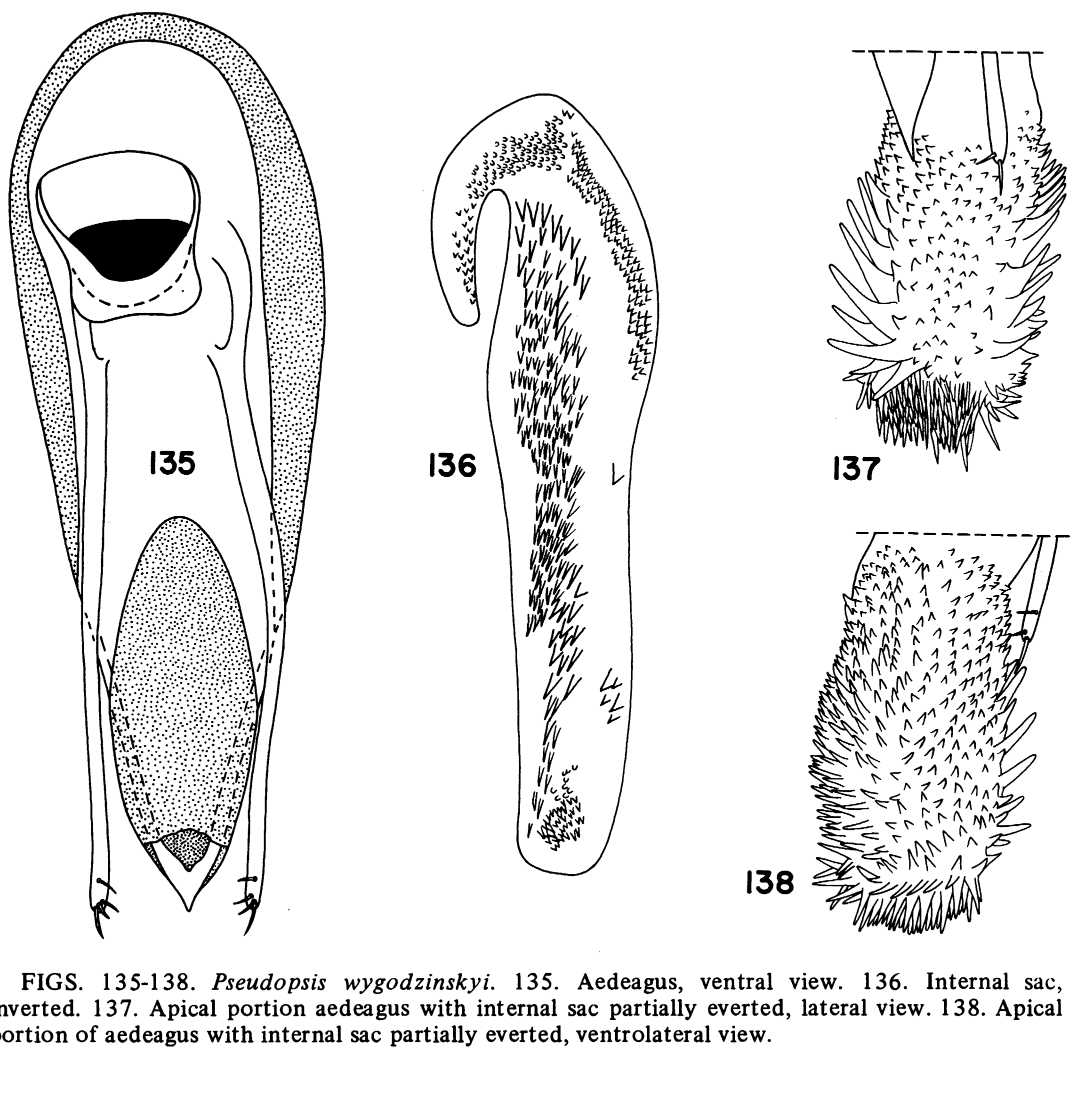
Dorsum of head with well-developed median and lateral carinae, lateral carina straight to moderately curved (fig. 142); dorsum with numerous, minute obsolete longitudinal carinules; dorsum with broad depression between lateral and median carinae; pubescence moderately long and easily visible; clypeal seta slender and tapering apically (fig. 5); supraorbital, postorbital, lateroposterior, and medioposterior seta present and scalelike (fig. 5). Venter of head without strong carina near lateral margin. Mandibles asymmetrical and with basal molar region (figs. 146, 147); right mandible bidentate, apical denticle serrate near base with serration extending on to dorsal surface, lateral side with five setae (fig. 147); left mandible bidentate, lateral side with five setae (fig. 146).

Pronotum (fig. 142) with four, well-developed, longitudinal carinae; lateral carina strongly sinuate, mesial carina weakly sinuate; surface with numerous, minute, obsolete carinules; lateral margin serrate; basal angles rounded but distinct; pubescence distinct (evident with dissecting microscope).

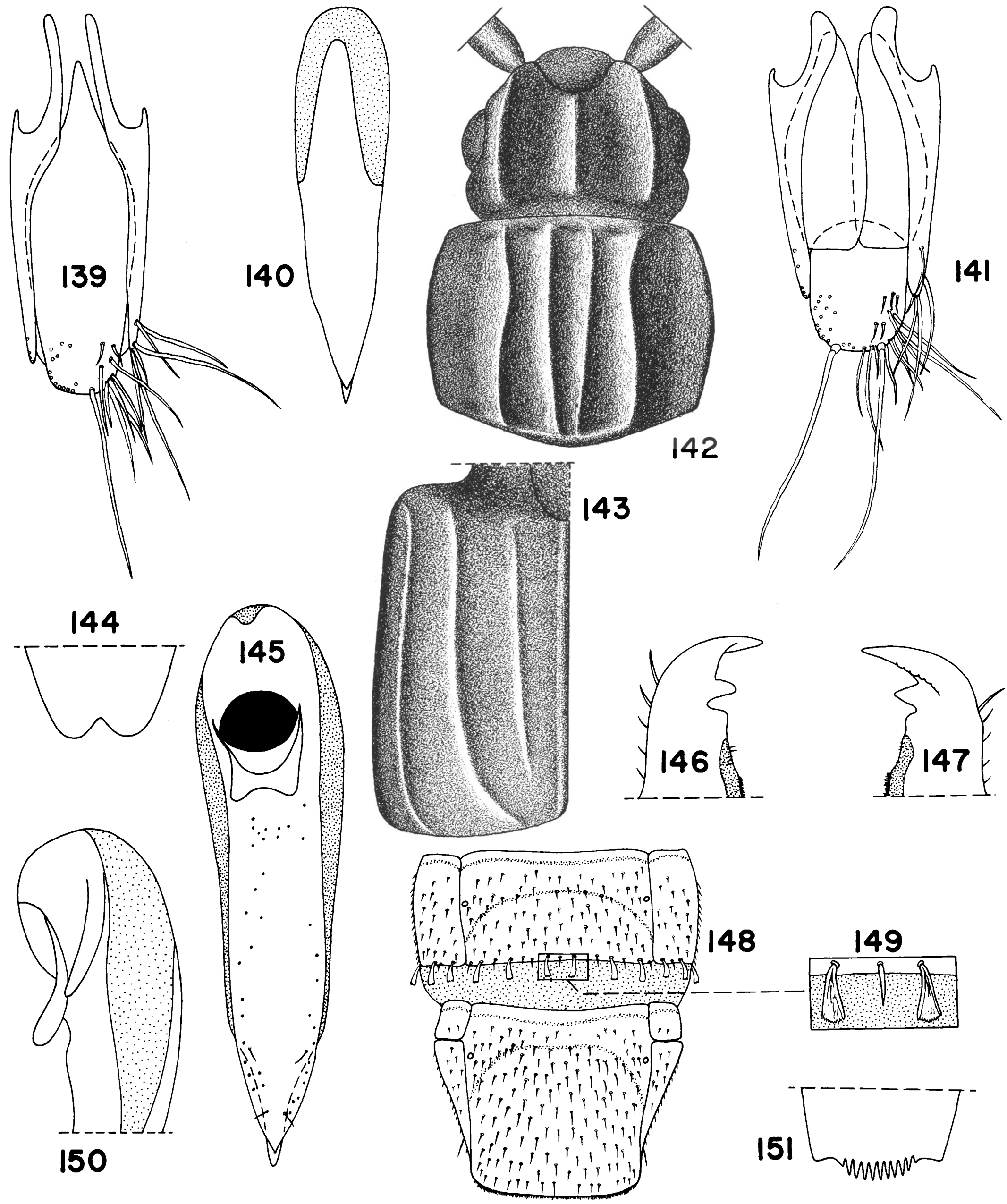
Elytron with four, well-developed, longitudinal carinae (figs. 5, 143). Surface without distinct punctation. Pubescence distinct.

Abdominal terga distinctly pubescent; posterior margin of terga III to VI with row of scalelike setae (figs. 148, 149); tergum VII without apically expanded setae (fig. 148); paratergites (fig. 148) of segments III to VI each with pair of scalelike setae on posterior margin; sternites IV to VI each with pair of scalelike setae near lateral margin; sternite VII without scalelike setae. Pubescence of tergum VII posteriorly directed (fig. 148). Sternite VI of male with slightly denser pubescence on median portion of posterior margin. Sternite VII without median depression. Posterior margin of sternum VIII of male emarginate (fig. 144). Sternum IX of male with posterior margin broadly and shallowly rounded (fig. 139); apical region with numerous long setae; posterior margin without spinelike setae (fig. 139). Tergal elements of segment IX of male with two pairs of slender, anteriorly directed struts on anterior margins; medial pair longer than lateral (fig. 139).

Aedeagus (fig. 145) without parameres. Median lobe slender and tapering apically; posterior margin of median lobe pointed, with four setae near apex; ventral surface without cone-shaped depression on apical portion; basal foramen with basal sclerite surrounding lateral sides;



FIGS. 135-138. *Pseudopsis wygodzinskyi*. 135. Aedeagus, ventral view. 136. Internal sac, inverted. 137. Apical portion aedeagus with internal sac partially everted, lateral view. 138. Apical portion of aedeagus with internal sac partially everted, ventrolateral view.



FIGS. 139-151. *Pseudopsis minuta*. 139. Abdominal segment IX, male, ventral view. 140. Aedeagus, dorsal view. 141. Abdominal segment IX, female, ventral view. 142. Head and pronotum, dorsal view, setae removed. 143. Elytron, left, dorsal view. 144. Apical portion of abdominal sternum VIII, male, setae removed. 145. Aedeagus, ventral view. 146. Mandible, left. 147. Mandible, right. 148. Abdominal segments VI and VII, dorsal view. 149. Enlargement of one unmodified and two modified abdominal setae. 150. Aedeagus, basal half, left lateral view. 151. Apical portion of abdominal tergum VIII, setae removed.

basal sclerite fused to median lobe and separated basally (fig. 150); dorsal surface largely sclerotized (fig. 140).

Stylus of female present and on rounded, posterior margin of coxite (fig. 141); coxites fused and with numerous long setae, but without spinelike setae (fig. 141).

Habitat and Distribution. The species is known only from western United States in the mountains of California and Arizona (fig. 152).

Pseudopsis minuta has been collected in leaf litter, at the margin of a sedgy area and in debris near streams; 8000 feet is the only known altitudinal record.

Material Examined. 23 specimens.

U.S.A.: ARIZONA: *Coconino County*: Flagstaff (2 FMNH). *Pima County*: Santa Catalina Mountains, at 8000 ft. elevation, Sept. 17, 1968, K. Stephan (5 AMNH). CALIFORNIA: Kenworthy Guard Station, San Jacinto Mountains,

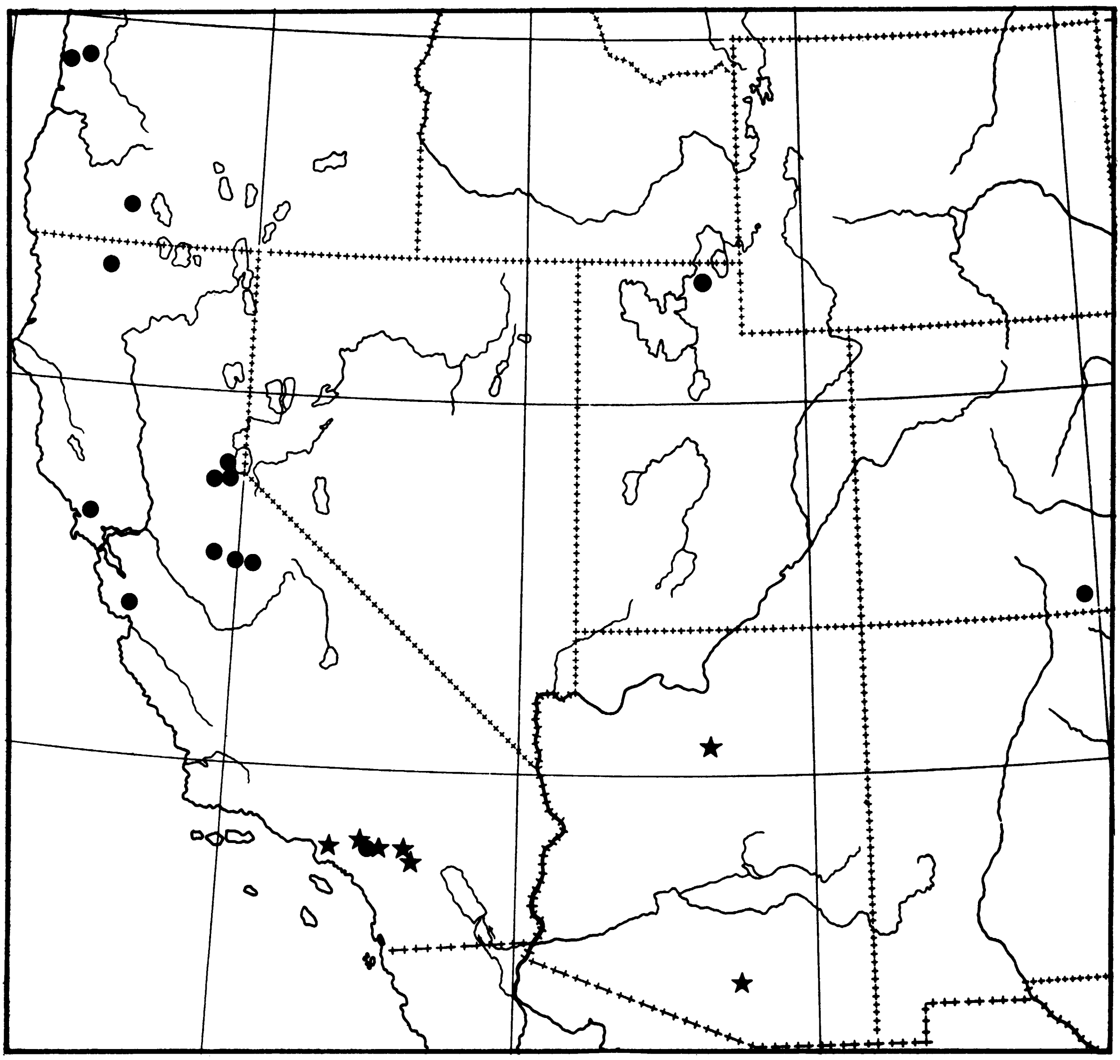


FIG. 152. Distribution of *Pseudopsis minuta* (stars) and *P. obliterata* (dots) in western United States.

sedgy pond margin, Oct. 29, 1955, I. M. Newell (1 DM). Pomona Mountains, Mar., Sept. (1 AMNH; 1 CAS; 1 USNM; 1 MCZ). *San Bernardino County*: Ice House Canyon, San Gabriel Mountains, July 14, 1956, around seepage area, R. K. Benjamin (2 INHS). *Los Angeles County*: Pasadena, Dec. (1 CAS); Pomona, June 11, 1892 (1 CAS); Evey Canyon, Sept. 28, 1952, debris along mountain stream, R. K. Benjamin (3 INHS); Evey Canyon, 4 miles NNE of Claremont, May 29, 1953, duff under log, R. K. Benjamin (1 INHS); San Dimas Canyon, San Gabriel Mountains, July 16, 1956, debris at stream margin, R. K. Benjamin (1 INHS). *Riverside County*: Millard Canyon, May 7, 1971, *Quercus* duff, J. Pinto (2 UCR).

Pseudopsis montoraria, new species

Figures 153-164

Holotype. Male. United States: California: Santa Cruz County: 14 miles N of Boulder Creek, at 2630 feet elevation, from oak leaf litter at the base of a slope, October 3, 1972. Collected by Lee H. Herman, Jr. Deposited at the American Museum of Natural History.

Paratype. Four, with same collection data as holotype and deposited with the holotype.

Diagnosis. *Pseudopsis montoraria* can be separated from the *sulcata* complex and *P. minuta* by the poorly to moderately well-developed costae of the head, pronotum (fig. 155), and elytra (fig. 156), by the partially separated coxites (fig. 161), and by absence of clubbed or scalelike setae on the head or abdomen (see figs. 1, 148). *Pseudopsis montoraria* is further distinguishable from the *sulcata* complex by the absence of parameres (fig. 162). The elliptical depression on the ventral surface of the aedeagus (fig. 162), the median process on the posterior margin of sternum IX of the male (fig. 164), the bidentate mandibles (figs. 153, 157), and the spinelike setae on the posterior margin of the coxites (fig. 161) separate *P. montoraria* from *P. arrowi* and *P. adustipennis*. The character given in couplet 5 of the Key to Species separates *P. montoraria* and *P. obliterata*. In addition, *P. montoraria* has distinct carinules on the head and pronotum (fig. 158).

Description of Holotype. Male. Length 3.1 mm. (range of species 2.5 to 3.5).

Color reddish brown, head and elytra dark reddish brown, pronotum and abdomen reddish brown.

Dorsum of head without median or lateral carinae (fig. 155); dorsum with numerous, long, distinct, longitudinal carinules (fig. 158); carinules anastomosing slightly; dorsum with broad, shallow depression laterad of middle (fig. 155); median region broadly tumescent; pubescence short and obscure (evident with slide preparation and compound microscope); clypeal, supraorbital, lateroposterior and medioposterior setae tapering apically; postorbital setae absent. Venter of head with carina near lateral margin. Mandibles asymmetrical and with basal molar region (figs. 153, 157); right mandible bidentate, apical denticle serrate near base, lateral side with four setae (fig. 153); left mandible bidentate, with five setae on lateral side (fig. 157).

Pronotum (fig. 155) with four longitudinal carinae; carinae moderately well developed, lateral carinae sinuate, median carinae more or less convergent posteriorly; surface with numerous, distinct, longitudinal carinules (fig. 158); lateral margin obsoletely serrate; basal angles distinct and rounded; pubescence obscure and short (evident on slide preparation with compound microscope).

Elytron with two longitudinal costae and two longitudinal carinae; sutural costa and discal costa obscure and poorly developed; humeral and epipleural carinae distinct and well developed (fig. 156). Surface with obsolete punctation. Pubescence distinct (readily visible with dissecting microscope).

Abdominal terga pubescent; terga, paratergites, and sternites without apically expanded setae. Pubescence of posterior portion of tergum VII lateroposteriorly directed. Sternite VI unmodified. Sternite VII with median obsolete, obscure depression; depression without medioposteriorly directed pubescence. Posterior margin of sternum VIII with rounded, moderately deep emargination (fig. 159). Sternum IX with median portion produced posteriorly (fig. 164); apical third moderately densely pubescent; posterior margin with pair of spinelike setae on each side of median process (fig. 164). Tergal elements of segment IX of male with two pairs of anteriorly directed struts on anterior margin; medial pair longer and broader than lateral (fig. 164).

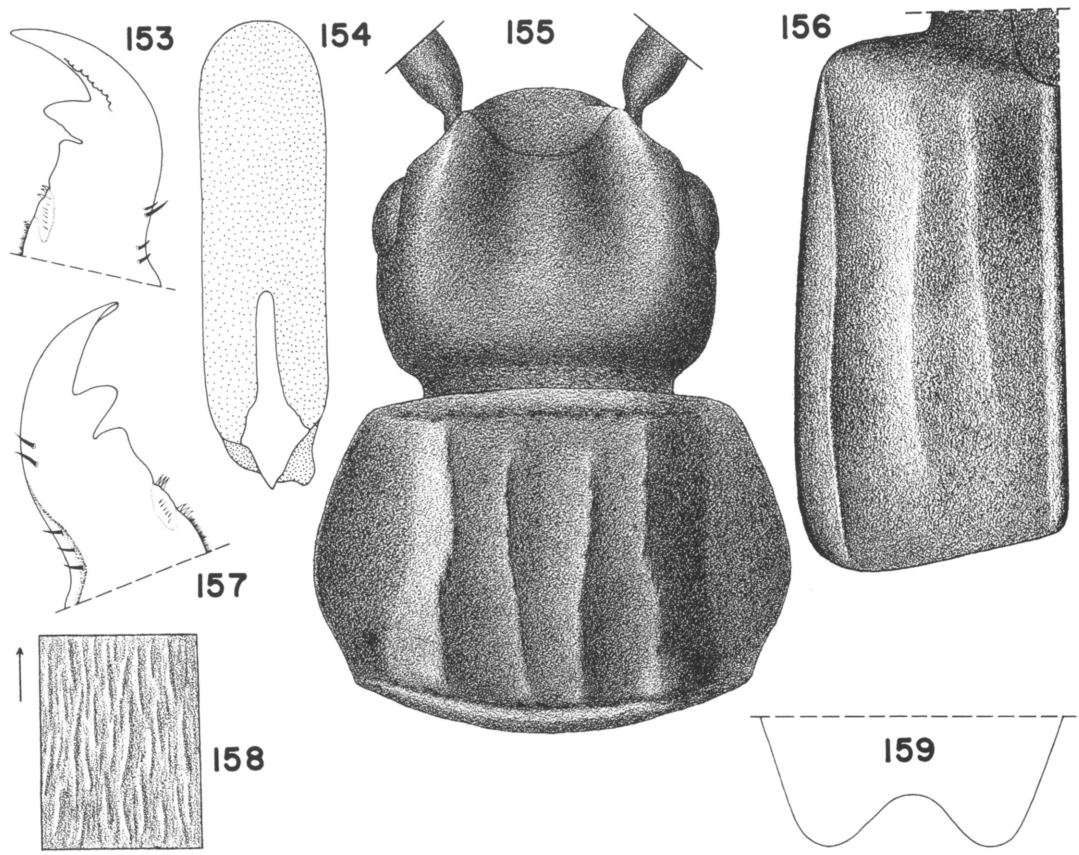
Aedeagus (fig. 162) without parameres. Median lobe broad; posterior margin emarginate with setigerous process on each side (figs. 162, 163); surface with elongate elliptical depression; basal orifice surrounded basally and laterally by basal sclerite; dorsal surface largely membranous but with sclerite on apical portion of shape shown in figure 154.

Female. Sternite VII and sternum VIII unmodified. Stylus present near middle of serrate posterior margin of coxite (fig. 161); coxites divided anteriorly by suture and separated posteriorly, apical region with numerous setae, posterior margin with pair of long, spinelike setae laterad of stylus, posterior margin slightly produced medially (fig. 161).

Variation. The color varies from that described for the holotype to reddish brown or pale reddish brown without differential coloration of the head and elytra.

See the discussion of wing length in the introductory parts of the paper for details of brachyptery in this species.

Habitat and Distribution. The species is known from the western United States and Canada in the mountains of British Columbia, Idaho, Washington, Oregon, California, and Arizona (fig. 160) at elevations of from 1200 to 6100 feet. In British



FIGS. 153-159. *Pseudopsis montoraria*. 153. Right mandible. 154. Aedeagus, dorsal view. 155. Head and pronotum, dorsal view. 156. Left elytron, dorsal view. 157. Left mandible. 158. Ground sculpturing of dorsum of head, arrow points anteriorly. 159. Abdominal sternum VIII, male, apical portion, setae removed.

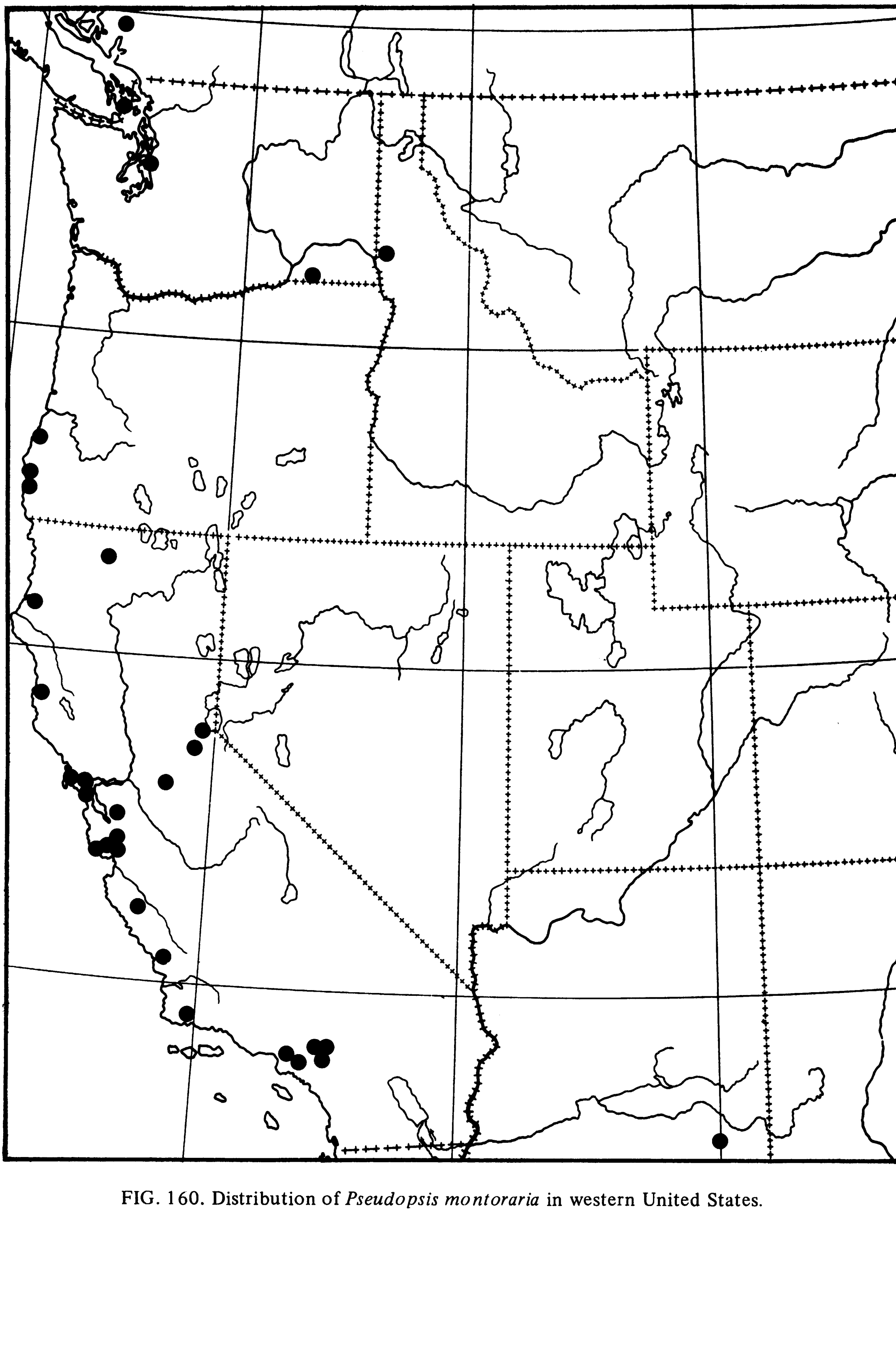


FIG. 160. Distribution of *Pseudopsis montoraria* in western United States.

Columbia it was collected at 1500 feet elevation, at 2400 to 2600 in northern and central California, at 1200 to 5200 feet in southern California and at 6100 in Arizona. Most of the material is from the coastal mountain ranges of the Pacific coast.

Moist Douglas fir, cedar, oak or willow leaf litter, leafmold, or debris near streams harbor this species. The species was taken from the debris pile of a wood rat twice.

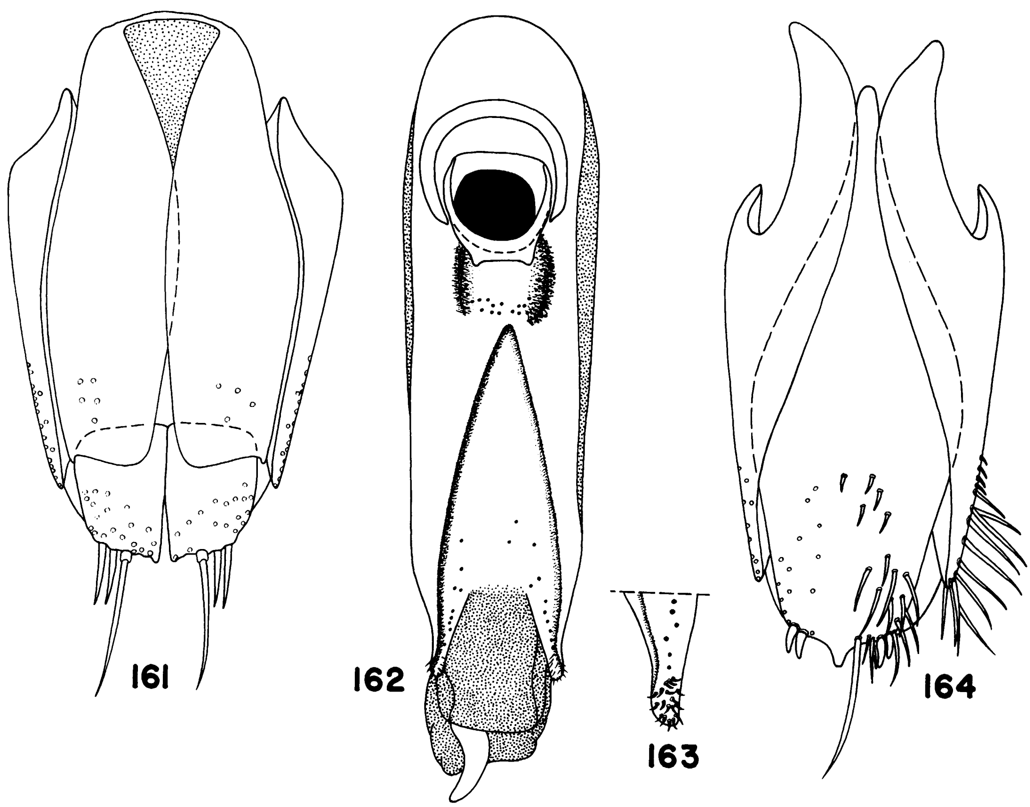
Discussion. This species is named for what was first called *P. obliterata* by Fall (1901, pp. 75, 227) and thereafter by most subsequent workers. (See synonymic discussion following *P. obliterata*).

Etymology. From the Latin *mons*, mountain, and *orarius*, of the coast, referring to its distribution, which is largely in the coastal range on the Pacific.

Material Examined. 454 specimens.

Canada: BRITISH COLUMBIA: Mount Garibaldi, 9 miles N of Squamish, 1500 ft. elevation, May 30, 1968, M. Campbell and A. Smetana (20 CNC).

United States: ARIZONA: *Graham County*: Pinaleno Mountains, Wet Canyon, 6100 ft. elevation, July 29, 1969, A. Smetana (18 CNC), Sept. 13, 1952, B. Malkin (1 FMNH). CALIFORNIA: *Alameda County*: Aug., Koebele (1 USNM). *Calaveras County*: Mokel [umne?] Hill, July (1 CAS). *El Dorado County*: Riverton, 3000 ft. elevation, Aug. 30, H. E. Hinton (8 AMNH). *Humboldt County*: Eureka, July 6, H. S.



FIGS. 161-164. *Pseudopsis montoraria*. 161. Abdominal segment IX, female, ventral view. 162. Aedeagus, ventral view. 163. Enlargement of left apical process of median lobe. 164. Abdominal segment IX, male, ventral view.

Barber (6 USNM). *Los Angeles County*: Pasadena, Mar., Oct. (3 CAS, 1 MCZ); Pomona Mountains, Sept. (3 AMNH; 1 CAS; 2 MCZ); Pomona (1 UK; 4 INHS; 1 USNM); San Dimas Canyon, north of San Dimas, San Gabriel Mountains, June 6, 1954, litter near stream, R. K. Benjamin (1 INHS), July 16, 1956, debris at stream margin, R. K. Benjamin (34 INHS), 1200 ft. elevation, Aug. 8, 1954, stream debris (8 INHS); Evey Canyon, N Claremont, San Gabriel Mountains, June 26, 1956, stream bed, R. K. Benjamin (3 INHS), Sept. 28, 1952, debris near mountain stream (1 INHS). *Marin County*: Samuel P. Taylor State Park, Oct. 24, 25, 1953, V. D. Roth (10 UCB); Nov. 8, 1953, R. O. Schuster, E. E. Gilbert (5 UCB); Olema, Nov. 1, 1953, R. O. Schuster (3 UCB); Tocaloma, May 19, 1952, *Neotoma* debris pile, H. Dybas (1 FMNH); Muir Woods, May 14, 1905, Aug. 30, 1908 (2 CAS); Mill Valley, May 30, 1952, sifting forest duff, June 25, 1950, caught in cheese cloth trap, H. B. Leech (2 CAS). *Mendocino County*: (2 CAS); Mendocino, Sept. 25, 1954, Helfer (1 CNC). *Monterey County*: Junipero Sierra Peak, Santa Lucia Mountains, Forestry Camp spring, 4900 ft. elevation, Aug. 12, 1956, H. B. Leech (1 CAS). *Orange County*: J. O. Martin (1 CAS). *San Bernardino County*: Ice House Canyon, 2 miles N Camp Baldy, San Gabriel Mountains, R. K. Benjamin, June 4, 1954, duff (3 INHS), 5200 ft. elevation, August 11, 1954, sifting debris (6 INHS), 5000 ft. elevation, October 15, 1953, in debris on margin of stream (3 INHS), July 14, 1956, around seepage (25 AMNH; 108 INHS); Ice House Canyon, N Ontario Peak, 4700 ft. elevation, October 8, 1953, debris along stream, R. K. Benjamin (2 INHS); San Antonio Canyon, 3000 ft. elevation, Oct. 2, 1953, leafmold along stream, R. K. Benjamin (8 INHS); Jenks Lake, San Bernardino Mountains, July 25, 1956, debris from stream margin, R. K. Benjamin (7 INHS). *San Luis Obispo County*: 8 miles E of Morro Bay, June 15, 1961, at light, H. Howden (1 CNC). *Santa Barbara County*: 3 miles N of Refugio Beach, June 28, 1965, J. S. Buckett (1 CNC). *Santa Clara County*: Mount Madonna, Jan. 2, 1954, D. Burdick (2 UCB); Alma, in nearby mountains, Sept. 29, 1929, Oct. 21, 1929, J. O. Martin (4 CAS); Los Gatos, Hubbard and Schwarz (3 USNM). *Santa Cruz County*: Santa Cruz Mountains, June (5 FMNH; 28 AMNH; 5 CAS; 1 CNC); "type series" (5 AMNH); Redwood Park, Aug. 10, 1918, J. O. Martin (6 CAS); Santa Cruz, Big Trees, Mar. 27, 1954, J. Helfer (1 INHS). *Siskiyou County*: (1 CAS); Shasta Retreat, 2416 ft. elevation, July, Blaisdell (1 CAS). *Sonoma County*: (1 CAS). Lake Tahoe, Hubbard and Schwarz (1 CAS). "Southern California" (1 CAS). Northfork, Mar. 28, 1920, in nest of wood rat, H. Deitrich (1 CU). IDAHO: *Latah County*: Moscow, Moscow Mountain, 3000 ft. elevation, Apr. 25, 1953, *Salix* leaf litter, W. F. Barr (1 UI; 1 UW). OREGON: *Coos County*: Coos Head, Sept. 4, 1947, cedar litter, I. M. Newell (4 DM). *Curry County*: Gold Beach, June 21, 1955, Douglas fir duff, J. Capizzi (50 UW); 4 miles N of Humbug Mountain, May 11, 1955, J. Capizzi (1 UW). WASHINGTON: *King County*: Seattle, Carkeek Park, June 14, 1955, litter, D. W. Boddy (2 UW). *San Juan County*: Friday Harbor, July, 1924 (1 UW). *Walla Walla County*: Kooskooskie, Oct. 6, 1948; G. H. Nelson (1 UW; 1 MCZ; 1 CNC; 1 GN).

Three specimens from the Field Museum are labeled "Ven., St. Lucia, May 13, 1922." If "Ven." is an abbreviation for Venezuela then the material is mislabeled. However, in California the Santa Lucia Mountains are within the range of *P. montoraria*. The abbreviation "Ven." may stand for Ventura County, but the Santa Lucia Mountains are not in that county.

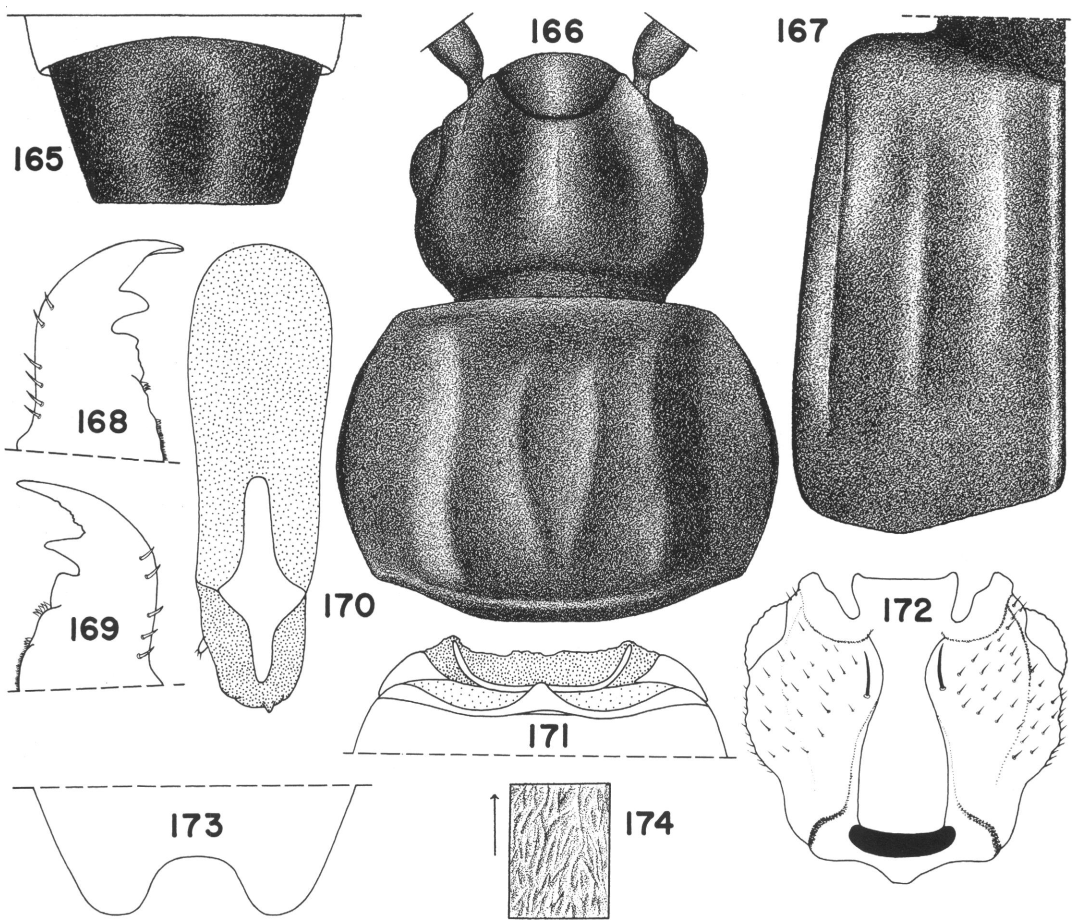
Pseudopsis obliterata LeConte
Figures 20, 21, 152, 165-177

Pseudopsis obliterata LeConte, 1879, p. 511. Hubenthal, 1911, p. 101. (Type locality: Colorado, La Veta; lectotype deposited in the Museum of Comparative Zoology, Harvard University; type studied).

Pseudopsis detrita Fall, 1901, p. 226. Hubenthal, 1911, p. 101. (Type locality: California, from the western slopes of the southern Sierras; holotype deposited at the

Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; type studied. NEW SYNONYM.

Diagnosis. *Pseudopsis obliterata* can be distinguished from the *sulcata* complex and *P. minuta* by the poorly to moderately well-developed costae of the head, pronotum (fig. 166) and elytra (fig. 167), by the partially separated coxites (fig. 175) that have spiniform setae on the posterior margin, and by the absence of clubbed or scalelike setae on the head or abdomen (see figs. 1, 148). *Pseudopsis obliterata* is further distinguishable from the *sulcata* complex by the absence of parameres (fig. 176). The elliptical depression on the ventral surface of the median lobe (fig. 176), the median process on the posterior margin of sternum IX of the male (fig. 177), the bidentate mandibles (figs. 168, 169), and the spiniform setae on the posterior margin of the coxites (fig. 175) separate *P. obliterata* from *P. arrowi* and *P. adustipennis*. The characters given in couplet 5 of the Key to Species separate *P. obliterata*



FIGS. 165-174. *Pseudopsis obliterata*. 165. Abdominal sternite VII and apex of sternite VI, male, setae removed. 166. Head and pronotum, dorsal view. 167. Left elytron, dorsal view. 168. Left mandible. 169. Right mandible. 170. Aedeagus, dorsal view. 171. Abdominal sternite II and base of III. 172. Head, ventral view, mouthparts removed. 173. Abdominal sternum VIII, male, apical portion, setae removed. 174. Ground sculpturing of dorsum of head, arrow points anteriorly.

from *P. montoraria*. In addition the short, anastomosing carinules of the head and pronotum (fig. 174) further aid recognition of the two species.

Description. Length 2.0 to 3.3 mm.

Color pale reddish brown to dark reddish brown to almost black; elytra unicolorous.

Dorsum of head (fig. 166) without prominent midlongitudinal or lateral costae or carinae; ridges evident as short, low, slightly larger carinules (fig. 166) in position of carinae of other species (compare figs. 1, 179, 192); dorsum with numerous, short, obscure, anastomosing carinules (fig. 174); dorsum with broad, shallow depression laterad of middle; median region broadly tumescent; pubescence distinct (evident with dissecting microscope); clypeal, lateroposterior, and medioposterior supraorbital setae present and tapering; postorbital setae absent. Venter of head with carina near lateral margin (fig. 172). Mandibles asymmetrical and with basal molar region (figs. 168, 169); right bidentate, apical denticle serrate near base, lateral side with five setae (fig. 169); left mandible bidentate, lateral side with six setae (fig. 168).

Pronotum with four, more or less obsolete, longitudinal costae (fig. 166); median costae weakly sinuate, lateral costae strongly sinuate; surface with numerous short, fine, carinules (fig. 174); lateral margin obsoletely serrate to entire; basal angles distinct but rounded; pubescence distinct (evident with dissecting microscope).

Elytron (fig. 167) with three longitudinal costae and one longitudinal carina; sutural and discal costae obscure and poorly developed; humeral costa distinct and well developed; epipleural carina well developed. Surface with obscure punctation. Pubescence well developed.

Abdominal terga pubescent; terga, paratergites and sternites without apically expanded setae; pubescence of posterior portion of tergum VII lateroposteriorly directed. Sternite VI unmodified. Sternite VII with moderately deep median, elliptical depression (fig. 165); depression with medioposteriorly directed pubescence. Posterior margin of sternum VIII of male with moderately deep, U-shaped emargination (fig. 173). Sternum IX of male with median portion of posterior margin produced (fig. 177); apical third moderately densely pubescent; posterior margin without spinelike setae (fig. 177). Tergal elements of segment IX of male with two pair of slender, anteriorly directed struts on anterior margin; medial struts longer than lateral (fig. 177).

Aedeagus (fig. 176) without parameres. Median lobe broad; posterior margin emarginate and with setigerous process on each side; surface with elliptical depression on apical portion; basal orifice surrounded basally and lateral by sclerite; dorsal surface largely membranous but with sclerite on apical portion of shape shown in figure 170.

Stylus of female present near middle of serrate posterior margin of coxite (fig. 175); coxites divided anteriorly by suture and separated posteriorly, with numerous setae and with pair of spinelike setae on posterior margin laterad of stylus, posterior margin not distinctly produced medially (fig. 175).

Variation. See the discussion of wing length in the introductory parts of the paper for details of brachyptery of *P. obliterata*.

Habitat and Distribution. The species is known from the western United States in the mountains of California, Oregon, Utah, and Colorado (fig. 152).

Elevations of 4000 and 6000 feet, from which the species was collected, are known for only two localities. Collections have been made in leaf litter, leafmold, near a swampy area, moss, and from debris on a stream margin. On the shore of a creek near Eagle Point, Oregon, I collected numerous individuals from among the roots of grass.

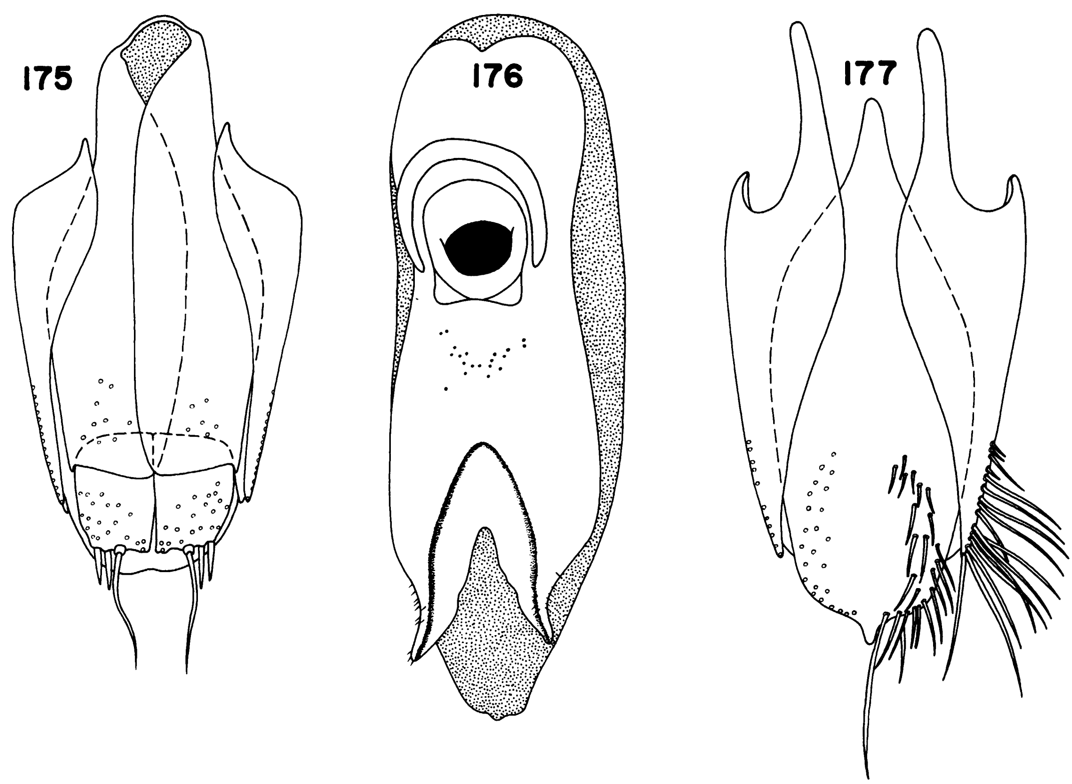
Synonymy. Because *P. obliterata* and *P. detrita* are identical with respect to sculpturing, the depression of sternite VII of the male, and other characters, they are synonymized. The species referred to by most previous workers as *P. detrita* is now *P. obliterata*. The species referred to as *P. obliterata* by most authors from Fall's paper (1901) onward is now *P. montoraria*.

Lectotypic Designation. In the original description LeConte (1879) gave the locality for *P. obliterata* as La Veta, Colorado, and added, "I found also one specimen in the Gila Valley in 1851." Although I was unable to find the specimen from Gila Valley, LeConte's presentation of the localities suggests La Veta to be the type locality, and I therefore designate the specimen from La Veta as the lectotype.

According to Fall (1901), *P. obliterata* can be distinguished from *P. detrita* by the longitudinally strigose sculpturing on the head and thorax. The lectotype lacks this sculpturing and the specimen from Gila Valley was not available for study. In the LeConte collection an unlabeled specimen beside the La Veta specimen has longitudinally strigose sculpturing and may be the one upon which Fall based his diagnosis of *P. obliterata*. This specimen cannot be designated as the lectotype because it is not clearly the syntype from Gila Valley.

Material Examined. 103 specimens.

United States. CALIFORNIA: Pomona Mountains, Sept. (1 USNM; 1 CAS; 1 MCZ). Lake Tahoe, July 15, Hubbard and Schwarz (10 USNM). Yosemite National Park, Happy Isle, Aug. 19, 1947, leafmold near swampy area, Marie O'Brien (7 INHS). *Calaveras County*: Big Trees, July 29, 1907, Baisdell (1 CAS). *El Dorado County*: Tallac (2 FMNH); 5 miles SW of Kyburz, 4000 ft. elevation, May 6, 1968, Smetana and Campbell (1 CNC). *San Bernardino County*: Jenks Lake, San Bernardino Mountains, 6000 ft. elevation, July 25, 1956, debris on stream margin, R. K. Benjamin (1 INHS). *Santa Clara County*: Los Gatos, Hubbard and Schwarz (1 USNM). *Siskiyou County*: Koe-



FIGS. 175-177. *Pseudopsis obliterata*. 175. Segment IX, female, ventral view. 176. Aedeagus, ventral view. 177. Abdominal segment IX, male, ventral view.

bele (5 USNM); July 1, 1931, Blaisdell (3 CAS). *Sonoma County*: (2 CAS). *Toulumne County*: Pinecrest, July, 1948, P. H. Arnaud (5 AMNH, 19 CAS). COLORADO: *Huerfano County*: La Veta, Hubbard and Schwarz (1 USNM). OREGON: *Jackson County*: 19 miles SE of Eagle Point, South Fork of Little Butte Creek, Aug. 5, 1969, from among roots of grass on shore of stream, L. Herman (39 AMNH). *Klamath County*: Geary Canal, Feb. 28, 1959, J. Schuh (1 GN). *Lane County*: 25 miles E of Florence, Aug. 3, 1969, shore of river, L. Herman (2 AMNH); Triangle Lake, Apr. 13, 1947, leaf litter, I. M. Newell (1 DM). UTAH: *Logan County*: Logan Canyon, July 3, 1957, in moss, G. F. Knowlton (2 FDA).

Pseudopsis adustipennis Fairmaire and Germain
Figures 22, 23, 178-190

Pseudopsis adustipennis Fairmaire and Germain, 1861, p. 455. Hubenthal, 1911, p. 102. Coiffait and Saiz, 1968, p. 459. (Type locality: Chile, Chiloe, in decayed wood; holotype not studied.)

Diagnosis. *Pseudopsis adustipennis* can be separated from *P. minuta* and the *sulcata* complex by the moderately well-developed costae of the head, pronotum (fig. 179), and elytra (fig. 182), by the partially separated coxites (fig. 181), and by the absence of clubbed or scalelike cephalic or abdominal setae. From *P. montoraria* and *P. obliterata*, *P. adustipennis* can be separated by the emarginate posterior margin of sternum IX of the male (fig. 183), the quadridentate left (fig. 186) and the tridentate right mandibles (fig. 188), and the absence of spiniform setae on the coxites (fig. 181). Characters given in couplet 4 of the Key to Species separate *P. arrowi* and *P. adustipennis*.

Description. Length 2.4 to 3.5 mm.

Color pale reddish brown, elytra with black spot on lateroapical angle.

Dorsum of head with obsolete midlongitudinal carina and obsolete carina near lateral margin (fig. 179); lateral carina broadly curved; dorsum with numerous distinct longitudinal carinules and numerous shallow, punctiform depressions between carinules; carinules more or less anastomosing; dorsum with broad, shallow depression laterad of middle (fig. 179); median region broadly tumescent (fig. 179); pubescence short and obscure (evident with slide preparation and compound microscope). Clypeal, supraorbital, lateroposterior, and medioposterior setae tapering apically; postorbital seta absent.

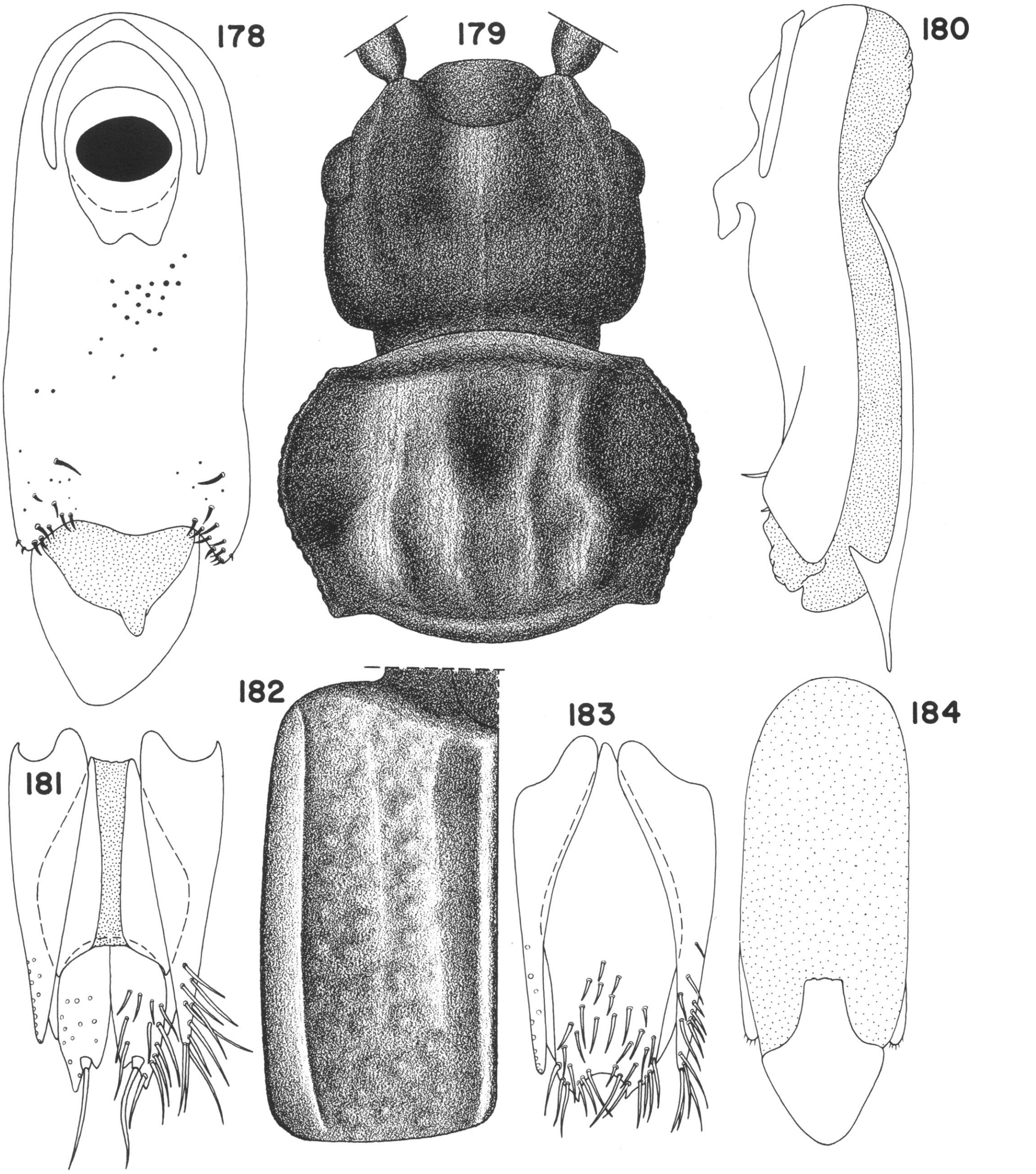
Venter of head with strong carina near lateral margin. Mandibles asymmetrical and with basal molar region more or less well developed (figs. 186, 188); right mandible (fig. 188) tridentate, apical denticle serrate near base, second denticle stout, lateral side with three setae; left mandible (fig. 186) quadridentate, lateral side with two setae.

Pronotum with four more or less obsolete, longitudinal costae (fig. 179); medial costa sinuate and posteriorly convergent; lateral costa strongly sinuate and posteriorly divergent; surface with numerous, longitudinal carinules; lateral margin serrate (fig. 179); basal angles strongly angulate (fig. 179); pubescence obscure and short (evident on slide preparation and compound microscope.)

Elytron (fig. 182) with sutural and discal ridges costate and humeral and epipleural ridges carinate; sutural and discal costae poorly developed and obscure; humeral carina near, not on lateral margin; epipleural carina on lateral margin above epipleuron; surface with numerous punctures (fig. 182). Pubescence short but more readily visible than that on head and pronotum.

Abdominal terga pubescent; terga, paratergites and sternites without apically expanded setae. Pubescence of tergum VII posteriorly directed. Sternite VI unmodified. Sternite VII without median depression. Posterior margin of sternum VIII of male weakly emarginate (fig. 190). Sternum IX (fig. 183) of male with moderately deep, broad, median emargination of posterior margin, with moderately dense pubescence on apical third; lateral angle of emargination acute; posterior margin without spinelike setae. Tergal elements of segment IX of male with struts reduced to swellings on anterior margin (fig. 181); medial struts short, broad, and rounded; lateral struts small, slender processes.

Aedeagus (figs. 178, 180) without parameres. Median lobe broad; posterior margin



FIGS. 178-184. *Pseudopsis adustipennis*. 178. Aedeagus, ventral view. 179. Head and pronotum, dorsal view. 180. Aedeagus, lateral view. 181. Abdominal segment IX, female, ventral view. 182. Left elytron. 183. Abdominal segment IX, male, ventral view. 184. Aedeagus, dorsal view.

of median lobe sinuate, with setae on lateral portion of posterior region (fig. 178); ventral surface (fig. 178) without elliptical depression on apical portion; basal orifice surrounded anteriorly and laterally by sclerite (fig. 178); dorsal surface largely membranous but with sclerite on apical portion of shape shown in figure 184.

Stylus (figs. 181, 189) of female present and in V-shaped emargination of coxite; coxites (fig. 181) divided anteriorly by suture and separated posteriorly, with numerous long setae, but without spinelike setae.

Habitat and Distribution. The species, known only from southern South America, is recorded from Argentina and Chile (fig. 185).

In Argentina the species was collected at about 900 meters elevation near a small stream in moist leaf litter of *Nothofagus* spp.

The specimens of the type series are reported from decayed wood ("dan les bois pourris").

Discussion. The suggestion (Blackwelder, 1944, p. 101) that *P. adustipennis* may occur in Venezuela is possibly based on a misinterpretation of, "On en doit une troisième aux recherches de M. Auguste Sallé, dans le Vénézuéla" (Fauvel, 1866, p. 11). This obviously refers to the third species, *P. columbica*, which follows the sentence, not to a third specimen of *P. adustipennis.*

Material Examined. 19 specimens.

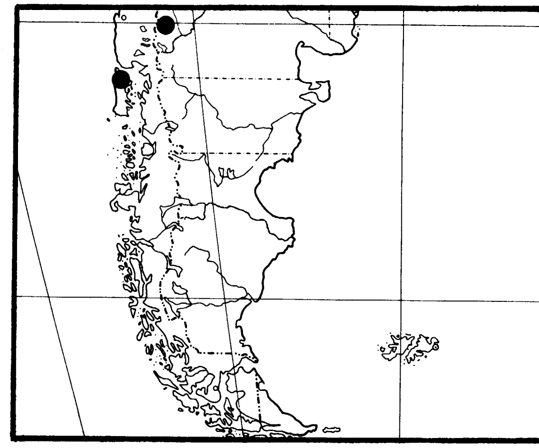


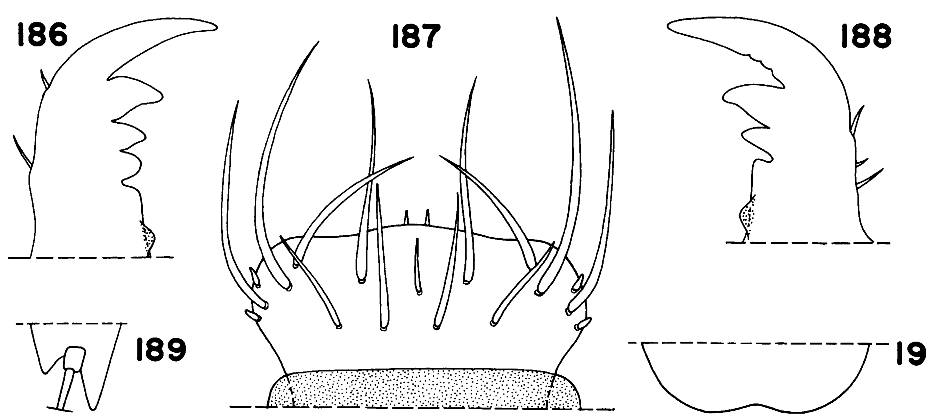
FIG. 185. Distribution of *Pseudopsis adustipennis* in southern Argentina and Chile.

Argentina: NEUQUÉN PROVINCE: 4 km. W of Pucara, at 900 m. elevation, Jan. 21, 1972, L. Herman (11 AMNH; 1 FMNH; 1 CNC; 1 BMNH).

Chile: Chiloe (1 RIS); Ancud ("nord de l'Araucania"?) (1 RIS); "Nord de l'Araucania" (3 RIS).

Pseudopsis arrowi Bernhauer
Figures 18, 191-203

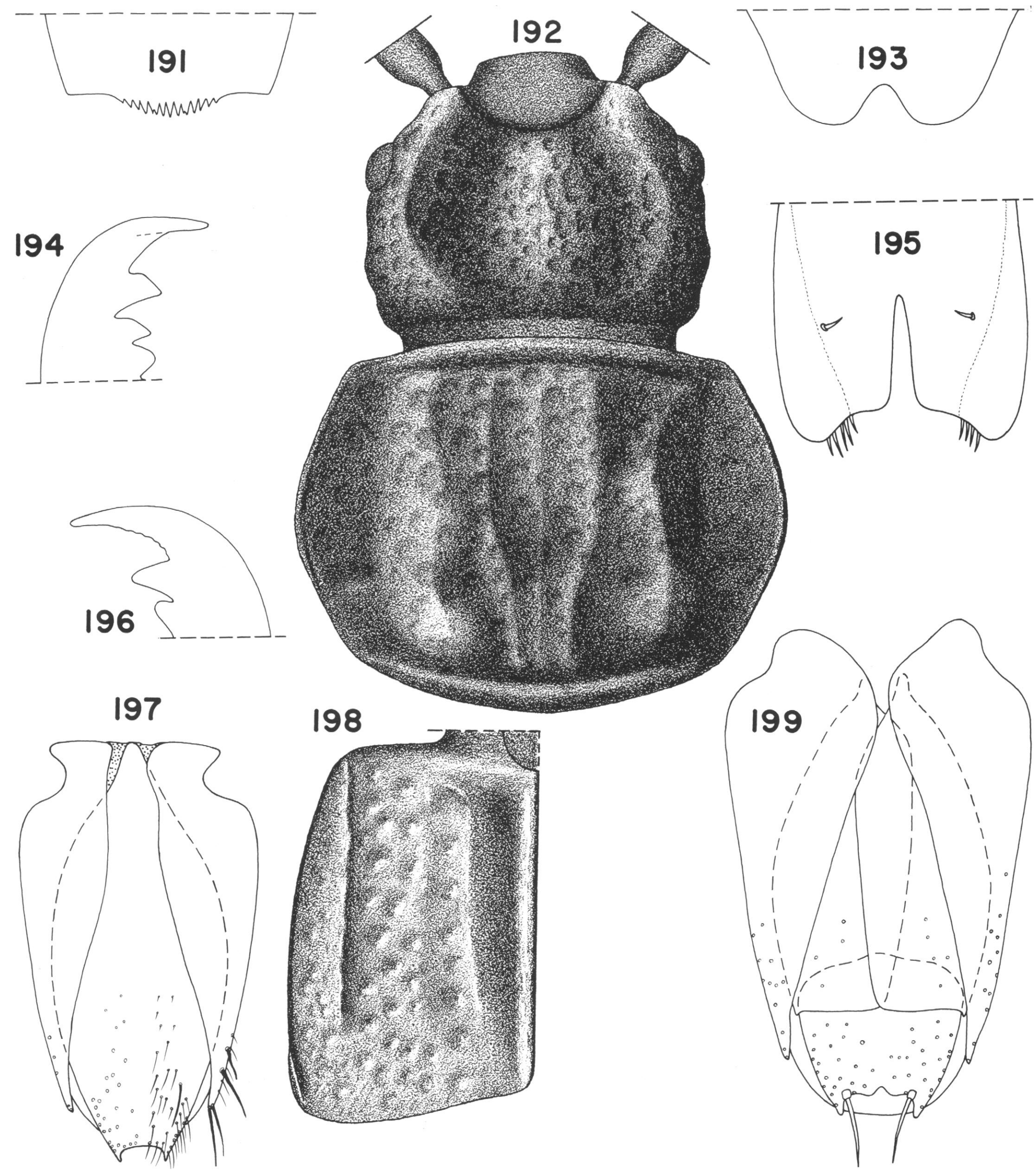
Pseudopsis arrowi Bernhauer, 1939, p. 204. (Type locality: New Zealand, Rotoiti;



FIGS. 186-190. *Pseudopsis adustipennis.* 186. Left mandible. 187. Labrum, dorsal view. 188. Right mandible. 189. Apical half of left coxite, female, ventral view. 190. Abdominal sternum VIII, male, apical portion.

lectotype deposited in the British Museum [Natural History]; lectotype studied.)

Diagnosis. Pseudopsis arrowi can be separated from *P. montoraria*, *P. obliterata*, and



FIGS. 191-199. *Pseudopsis arrowi*. 191. Abdominal sternum VIII, dorsal view, apical portion. 192. Head and pronotum, dorsal view. 193. Abdominal sternum VIII, male, apical portion. 194. Left mandible. 195. Aedeagus, apical third, ventral view. 196. Right mandible. 197. Abdominal segment IX, male, ventral view. 198. Left elytron, dorsal view. 199. Abdominal segment IX, female, ventral view, setae removed.

P. adustipennis by the fused coxites (fig. 199), the broad, bilobed median lobe (figs. 195, 201), the poorly developed basal sclerite (fig. 201). Other characters are given in couplets 3 and 4 of the Key to the Species. *Pseudopsis arrowi* can be separated from *P. minuta* and the *sulcata* complex by the moderately well-developed costae of the head, pronotum (fig. 192), and elytra (fig. 198), the emarginate posterior margin of sternum IX of the male (fig. 197), and the quadridentate left and tridentate right mandibles (figs. 194, 196). In contrast to the *sulcata* complex, *arrowi* lacks parameres.

Description. Length 2.8 to 3.3 mm.

Color reddish brown.

Dorsum of head shining strongly and with obsolete, midlongitudinal carina and weakly developed carina near lateral margin (fig. 192); lateral carina broadly curved; dorsum with numerous, moderately large, punctiform foveae (fig. 192) and without longitudinal carinules; dorsum with broad, shallow depression laterad of middle; median region broadly tumescent; pubescence not visible without dissecting microscope; clypeal, supraorbital, lateroposterior, and medioposterior setae slightly clubbed apically; postorbital seta absent. Venter of head with strong carina near lateral margin. Mandibles (fig. 194, 196) asymmetrical (base not visible); right mandible tridentate, apical denticle serrate near base, second denticle stout (seta not visible) (fig. 196); left mandible quadridentate (setae not visible) (fig. 194).

Pronotum with five costae (fig. 192); lateral costa broad, moderately well developed, and strongly sinuate; medial costa narrow, well developed, and broadly curved; midlongitudinal costa distinct, low, and straight; surface with numerous, small, punctiform foveae (fig. 192) and without longitudinal carinules; lateral margin serrate; basal angles poorly developed, nearly rounded (fig. 192); pubescence not visible with dissecting microscope.

Elytron (fig. 198) with two longitudinal costae and two well-developed, longitudinal carinae; sutural costa moderately well developed; discal costa poorly developed; humeral carina near, not on lateral margin; epipleural carina on lateral margin above epipleuron; surface with numerous punctures (fig. 198). Pubescence short.

Abdominal terga pubescent; terga, paratergites, and sternites with slightly clubbed setae; terga IV to VI with row of apically clubbed setae on posterior margin; sternites IV to VI each with large, apically clubbed seta near lateral margin; paratergites IV to VI each with one clubbed seta. Pubescence of tergum VII posteriorly directed. Apex of sternite VI of male with elliptical median depression and sternite VII with broad, shallow median depression. Posterior margin of sternum VIII of male moderately deeply emarginate (fig. 193). Sternum IX (fig. 197) of male with moderately deep, broad, median emargination of posterior margin, with moderately dense pubescence on apical third;

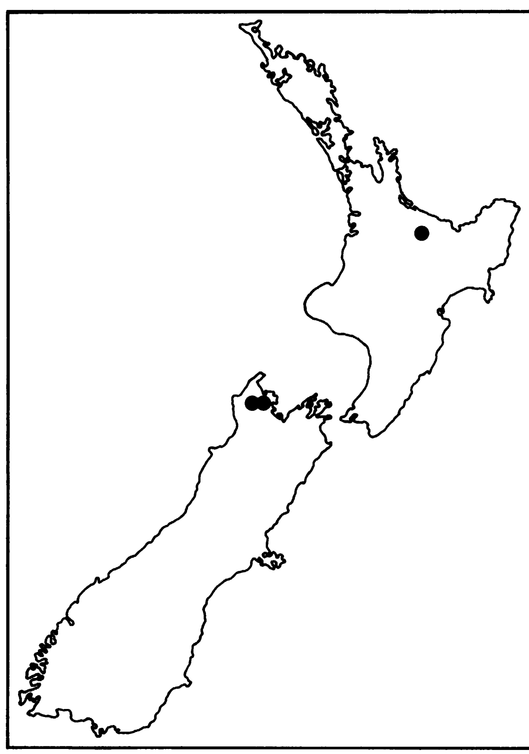
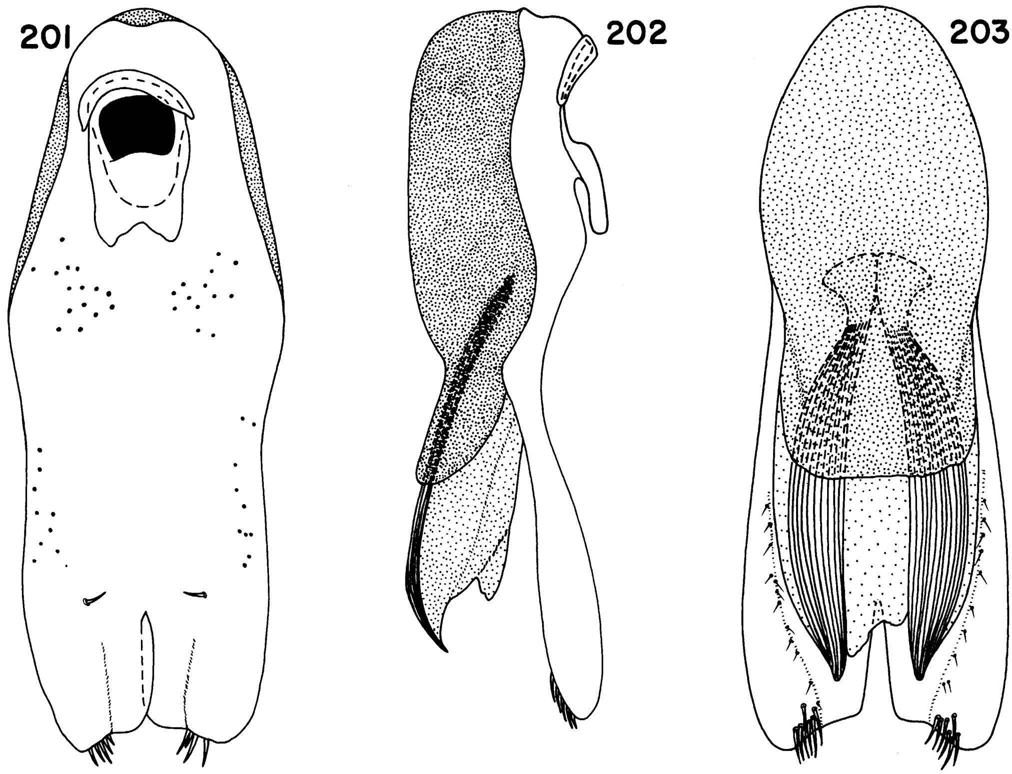


FIG. 200. Map of New Zealand showing distribution of *Pseudopsis arrowi*.



FIGS. 201-203. *Pseudopsis arrowi*, aedeagus. 201. Ventral view. 202. Lateral view. 203. Dorsal view.

lateral angle of emargination acute; posterior margin without spinelike setae. Tergal elements of segment IX of male with struts reduced to swellings on anterior margin (fig. 197); medial struts short, broad, truncated anteriorly, and with outer margin curved; lateral struts small, slender processes.

Aedeagus (figs. 201, 202) without parameres. Median lobe broad; posterior third divided longitudinally (figs. 195, 201) and with setae arising from dorsal surface (figs. 202, 203); ventral surface without elliptical depression; basal orifice surrounded anteriorly by basal sclerite; basal sclerite extending only slightly around lateral sides; poorly sclerotized and fused to surface (fig. 201); dorsal surface membranous (fig. 203).

Stylus (fig. 199) of female present and mesad of posteriorly directed, lateral process of posterior margin of coxites; coxites fused and with numerous setae but without spinelike setae (fig. 199).

Variation. See the discussion of wing length in the introductory parts of the paper for details of brachyptery in *P. arrowi*.

Habitat and Distribution. This species is known only from New Zealand (fig. 200) and was collected at 2500 and 3000 feet elevation. One collector indicated a specimen to be from leaf litter of *Nothofagus*.

Lectotypic Designation. From the specimens collected by Broun at the British Museum (Natural History), I am designating as the lectotype the specimen with the following data: New Zealand, Rotoiti, June 15, 1916, Broun.

Discussion. Many of the anatomical details of the species of *Pseudopsis* were obtained by studying slide preparations with a compound microscope. When only undissected, dry specimens and a dissecting microscope are used, some features cannot be studied.

In the case of *P. arrowi* lack of material for preparations of slides of completely dissected specimens precluded examination of the mandibular setae and base and pubescence of the head and prothorax.

Although pubescence of the head and prothorax of *P. arrowi* cannot be seen with a dissecting microscope, similar experience with *P. sulcata* and *P. montoraria* suggest the presence of short setae evident only with a compound microscope.

Material Examined. 5 specimens.

New Zealand: AUCKLAND PROVINCE: Rotoiti, June 15, 1916, Broun (1 FMNH; 1 BMNH). NELSON PROVINCE: Riwaka, Takaka Hills, 3000 ft. elevation, March 5, 1957, *Nothofagus* leaf litter, R. A. Crowson (1 AMNH); Mount Arthur, [?], Balis, 3000 ft. elevation, Jan. 23, 1943, E. S. Gourlay (1 BMNH). Salisbury's Opng. [?], 2500 ft. elevation, Jan. 17, 1943, E. S. Gourlay (1 BMNH).

APPENDIX

Identification of species of the *sulcata* complex was possible only if a male was studied. Below are listed the localities from which only the females of the complex are known and the species therefore unidentified. These localities are listed to further indicate the geographical range of the complex.

Algeria: Kabylie, Bou Berak, L. Puel (1 INHS); Chreá, June 6, 1955, Liebman (105).

India: West Almora Diva, Sunderdhunga, 8000 to 12,000 ft. elevation, G. C. Champion (1 BMNH).

Italy: LAZIO: Filettino, P. Luigioni (3 MNHB).

Morocco: Tangier (1 JJ).

Mexico: Tenancingo, 2400 m. elevation, Mar. 5, 1933 (1 FMNH). DISTRITO FEDERAL: Desiertos de los Leones, April 27, 1947, J. Pallister (1 AMNH). MICHOACÁN: Cerro de Garnica, 9400 ft. elevation, Sept. 18, 1973, litter of oak-pine-fir forest, A. Newton (1 AN). MEXICO: 1 mile E of Ixtapan de la Sal, 6200 ft. elevation, Aug. 31-Sept. 6, 1971, human dung trap, A. Newton (1 AN). OAXACA: 3 miles N of Suchixtepec, 9500 ft. elevation, June 4, 1971, carrion and human dung trap, S. Peck (1 CNC); 37 miles S of Valle Nacional, 8500 ft. elevation, May 24, 1971, oak litter, S. Peck (1 CNC).

Portugal: BEIRA LITORAL: Coimbra, P. de Marrocos (RF).

Spain: GRANADA: Lanjaron, Apr. 26-May 18, 1961, G. Fagel (1 RIS). Andalusian Region: Ronda Rio Grande, May 8-20, 1956, G. Fagel (1 RIS).

Turkey: (1 MHNB).

United States: ARIZONA: *Cochise County*: Texas Pass, Dragoon Mountains, July 19-21, 1917 (1 CU); Round Park, Chiricahua Mountains, 9300 ft. elevation, May 5, 1966, V. Roth (1 AMNH). *Pima County*: Bear Wallow, Santa Catalina Mountains, 8000 ft. elevation, 32° 25′ 03″ N, 110° 44′ W, July 12-17, 1916 (1 AMNH). COLORADO: Peaceful Valley (1 AMNH; 1 USNM).

Venezuela: Colonia Tovar, Mar. 1888, fir forest, F. Simon (2 RIS).

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INDEX OF SCIENTIFIC NAMES

Page numbers in boldface type refer to the description or main reference for each name.