Studies of Neotropical Caddisflies, XVII: The Genus *Smicridea* from North and Central America (Trichoptera: Hydropsychidae)

OLIVER S. FLINT, JR.

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY · NUMBER 167

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ABSTRACT

Flint, Oliver S., Jr. Studies of Neotropical Caddisflies, XVII: The Genus *Smicridea* from North and Central America (Trichoptera: Hydropsychidae). *Smithsonian Contributions to Zoology,* number 167, 65 pages, 227 figures, 1974.—The genus *Smicridea* is characterized in its adult, larval, and pupal stages, and its affinities and distribution discussed. The tribe Smicrideini is proposed in the subfamily Hydropsychinae for the genera *Smicridea* McLachlan and *Asmicridea* Mosely and Kimmins. In the region covered, the genus is composed of 2 subgenera, the nominate and *Rhyacophylax* Müller, which are keyed, differentiated, and the species in each assigned to species groups. The subgenus *Smicridea* (*Antarctopsyche* Ulmer, new synonym) contains 17 species, and the subgenus *Rhyacophylax* contains 12 species, all of which are keyed, described, and figured, with habitat notes and distribution added.

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Studies of Neotropical Caddisflies, XVII: The Genus *Smicridea* from North and Central America (Trichoptera: Hydropsychidae)

Oliver S. Flint, Jr.

Introduction

One of the dominant elements in the Neotropical caddisfly fauna is the hydropsychid genus *Smicridea*. Species of *Smicridea* are found from the southwestern United States, throughout Central and South America, on all the major Antillean islands, and in Australia. The diversity of this fauna has been only barely suggested by the taxonomic work up to now. Collections presently available from South America indicate that the number of species there are much greater than that here reported from North and Central America.

Smicridea is the only genus of the subfamily Hydropsychinae presently known to occur in South America. In Mesoamerica the other hydropsychine genera *Hydropsyche* and *Cheumatopsyche* are known primarily from north of the Isthmus of Tehuantepec, and the genus *Plectropsyche* occurs sparingly throughout the region. The genus *Hydropsyche* also occurs in the West Indian islands of Cuba and Hispaniola. Nevertheless, throughout Mesoamerica and the Antilles the genus *Smicridea* is generally the dominant one of the subfamily, both in terms of number of species and quantity of individuals. Considering these patterns of distribution it seems clear that the genus must have been the only one in the subfamily to have persisted in Gondwanaland, and its subsequent fragments of South America and Australia. The minor extension of *Smicridea* into the southwestern United States is undoubtedly the result of dispersal northward over the Central American land bridge since its establishment in late Tertiary. However, the other hydropsychine genera have not yet been able to cross the bridge into South America.

I thank the following for the loan of types from their collections: Dr. H. E. Evans and Dr. J. F. Lawrence of the Museum of Comparative Zoology, Harvard University, Cambridge; Dr. Jack Unzicker, The Illinois Natural History Survey, Urbana; and Dr. S. Kellner-Pillaut, of the Muséum National d'Histoire Naturelle, Paris.

The collections of the author from Mexico and Central America were the result of a grant (GB–2616) from the National Science Foundation. The additional collections made by my coworkers at the National Museum of Natural History have been very important and I am most grateful to them. The department of Entomology staff artists, Mrs. Elsie M. Froeschner and Mr. George Venable prepared the excellent habitus illustrations.

Unless otherwise stated, all the material is in the collections of the National Museum of Natural History under the catalog numbers of the United

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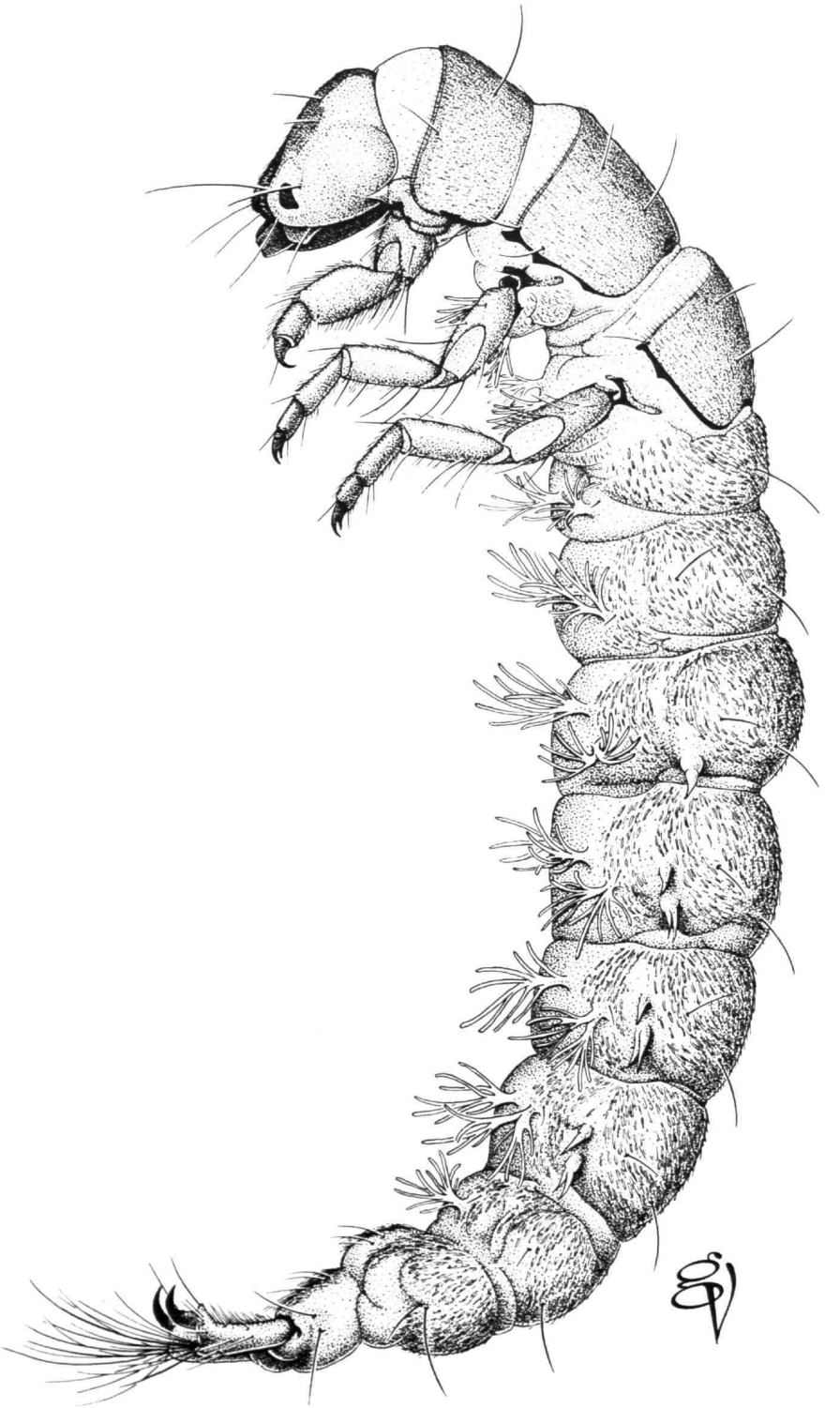


FIGURE 1.—*Smicridea fasciatella* McLachlan: larva, lateral.

States National Museum (USNM). Other institutions in which material is located are identified as follows:

CNC	Canadian National Collection, Ottawa, Ontario
CU	Cornell University, Ithaca, New York
INHS	Illinois Natural History Survey, Urbana, Illinois
MCZ	Museum of Comparative Zoology, Cambridge, Massachusetts
MNHN	Muséum National d'Histoire Naturelle, Paris, France
UCR	University of California, Riverside, California
UK	University of Kansas, Lawrence, Kansas

Classification

I consider that the Hydropsychidae is divided into four subfamilies, the Arctopsychinae, Diplectroninae, Hydropsychinae, and Macronematinae. On the basis of the sum of the characters in the larva, pupa, and adult stages, *Smicridea* can only be placed in the subfamily Hydropsychinae. It is excluded from the Arctopsychinae and Diplectroninae by the lack of a transverse suture on the meso- and metanota in the larval stage. It is excluded from the Macronematinae by the venation of the radio-medial system in the hind wing and lack of long antennae in the adult stage.

In the New World, the subfamily Hydropsychinae contains the genera *Hydropsyche, Cheumatopsyche, Potamyia, Plectropsyche,* and *Smicridea.* On the basis of venation of the adult stage *Smicridea* agrees well with the other genera, especially *Cheumatopsyche* whose species are also smaller in size. It differs from all in possessing certain abdominal organs (probably for scent production) which to me are known otherwise only in the Diplectroninae.

The larvae also agree in most characteristics with the other hydropsychine genera. The mentum is entire apically in *Smicridea* but cleft in all the other New World genera, and the trochantin is single rather than forked. In *Potamyia,* however, the dorsal branch of the trochantin is very small.

The pupae are equally distinctive. The mandibles with the teeth at the base of the apical blade are different from the other hydropsychine genera in which the teeth are clustered near the apex. The rodlike apical appendages are also unique; as in the other genera these are flattened and bifid apically.

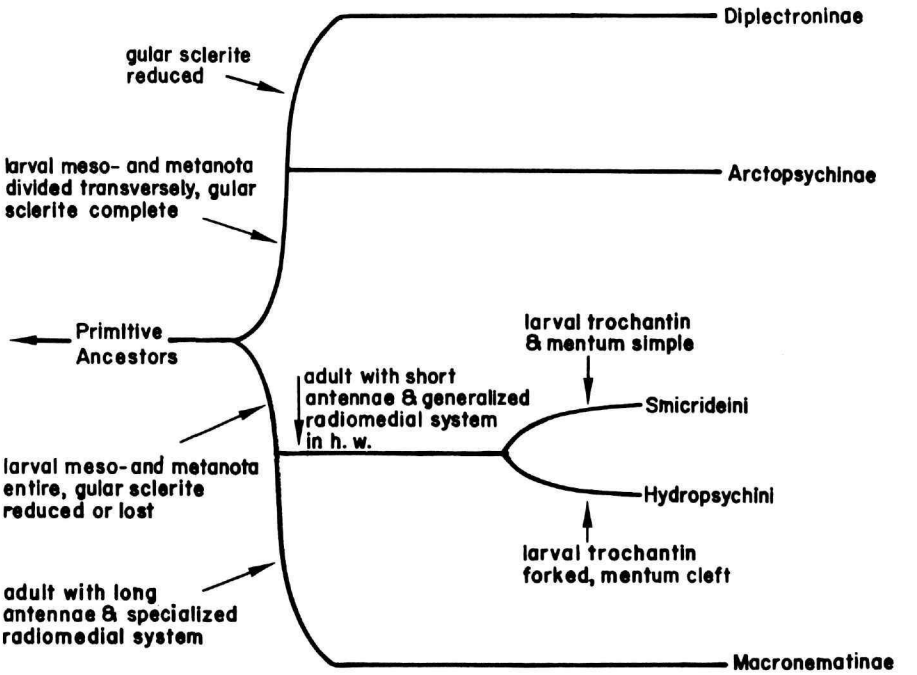


FIGURE 2.—Phylogenetic tree of certain higher categories of Hydropsychidae.

On the basis of these distinctions in the adult, larval, and pupal stages, I propose the tribe Smicrideini (new tribe) for the typical genus *Smicridea* and the Australian genus *Asmicridea*. The remaining genera in the Hydropsychinae will thus fall into the tribe Hydropsychini.

It seems to me that the tribe Smicrideini is the more primitive tribe in the subfamily. The simple larval mentum and trochantin, pupal apical appendages, and basally toothed mandibles all seem to represent the plesiomorphic condition. My preliminary ideas on the relationships of the higher categories in the Hydropsychidae are summed up in Figure 2.

I consider that the genus *Smicridea* is composed of two subgenera, *Smicridea* sensu stricto and *Rhyacophylax*. In the adult stage the two taxa are very distinct, yet I am unable to find such diagnostic characters in the larvae or pupae. Therefore I consider the two taxa to be no more than subgenera.

Genus *Smicridea* McLachlan

Smicridea McLachlan, 1871:134.—Ulmer, 1907b:175.—Mosely and Kimmins, 1953:326.—Fischer, 1963:130. [Type-species: *Smicridea fasciatella* McLachlan, 1871, by Milne 1936.]

Rhyacophylax Müller, 1879.—Ulmer, 1907b:174.—Ross, 1947: 144.—Fischer, 1963:134. [Type-species: *Rhyacophylax brasilianus* Ulmer, 1905, by Fischer 1963.]

Pellopsyche Banks, 1903a:243.—Ulmer, 1907b:175. [Type-species: *Pellopsyche signata* Banks, 1903a, monobasic.]

Antarctopsyche Ulmer, 1907a:30; 1907b:173.—Fischer, 1963: 98. [Type-species: *Antarctopsyche annulicornis* Ulmer (not Blanchard) 1907a, monobasic. New synonymy.]

Badallus Navas, 1918:21; 1920:42. [Type-species: *Badallus argentinus* Navas, 1918, by original designation.]

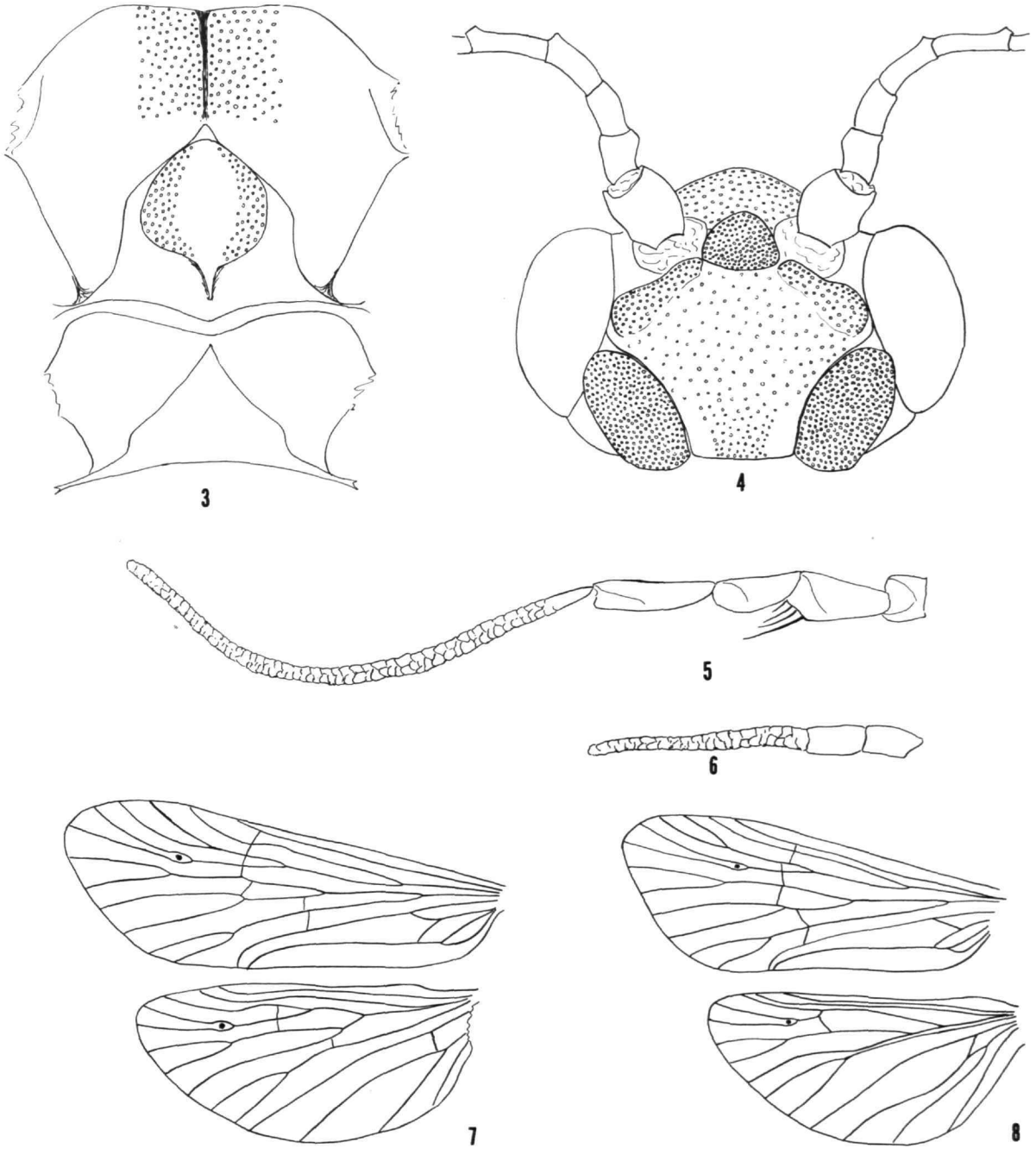
ADULT.—Ocelli absent. Spurs 1, 4, 4, or 1, 4, 2. Maxillary palpus with first 4 segments short, fifth longer than basal four and multiarticulate, second segment with several rows of stout setae apically (Figure 5). Labial palpus with first 2 segments short, third longer than first two, and articulate (Figure 6). Antenna no longer than forewing. Head dorsally lacking well-developed sutures; with anteromesal and posterolateral warts well developed, anterolateral warts present but only weakly delimited (Figure 4). Meso- and metanota without setal warts (but with areas of setae) (Figure 3). Forewing without specially modified hairs on vein 1A. Hind wing with R_{2+3} undivided, M arising from R basally (Figure 7).

LARVA.—Labrum simple, with large anterolateral brushes, dorsal surface sparsely setate (Figure 9). Mandibles with lateral surface bearing narrow dorsal and ventral flanges, with setae between; mesal face bearing a variable number and form of teeth; left mandible with a brush of setae (Figure 221). Labium with submentum not deeply cleft apicomesally (Figure 10). Frontoclypeus with lateral margin not, or barely, expanded posterolaterally. Trochantin a simple conical projection (Figure 11). Prosternum transverse without posterolateral sclerites. Pronotum divided on midline; meso- and metanotum entire. Abdomen without lateral line fringe; eighth and ninth sterna with sclerites bearing numerous setae; body surface with setae flattened and scalelike. Gills consisting of a central stalk generally bearing several whorls of smaller lateral filaments. Mesosternum with 1 pair of gills, metasternum with 1 or 2 pairs; abdominal segments 1–6 with a pair of ventral gills, segments 1–7 with a more lateral pair of ventral gills which consist of 2 stalks on segments 2–7; with 1 to 3 single, small, filaments dorsally on each side of segments 3–7. Anal claw without ventral teeth; brush well developed.

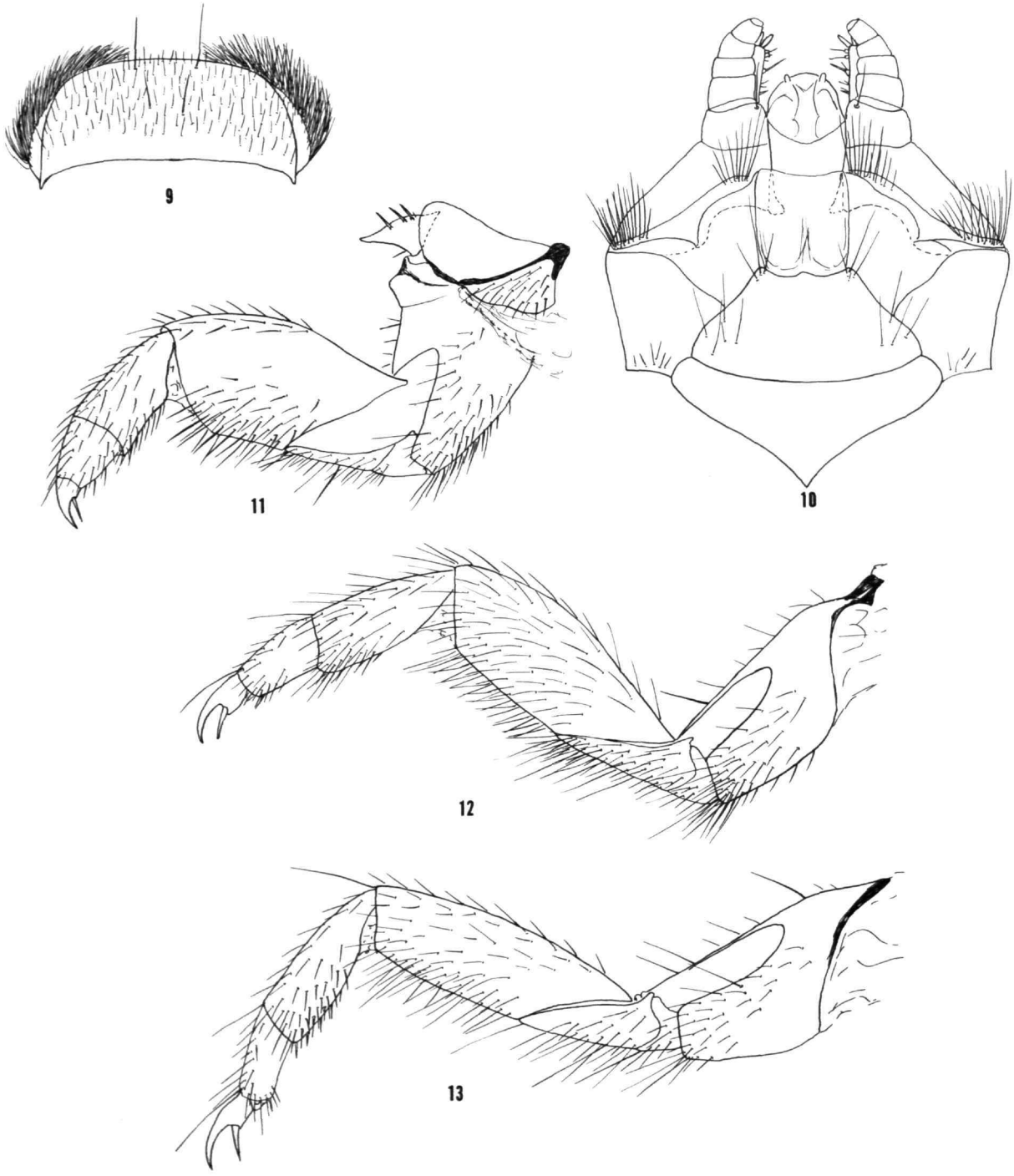
PUPA.—Labrum with distinct basolateral lobes, each bearing 4–5 long setae, anteromesal region with scattered setae (Figure 14). Mandibles inflated basally and bearing setae laterally and posteriorly on this portion; tapering regularly to a pointed apex, inner margin with large teeth near base and minutely serrate beyond (Figure 18). Head anteriorly with numerous setae. Antennae reaching tip of abdomen. Tarsus of midleg broadened and bearing lateral fringes. Thorax and abdomen with sparse setae; lacking lateral line fringe. Abdomen with broad single or bifid lateral gills; ventrally with branched gills. Hook plates anteriorly on segments 2–8, posteriorly on 3 and usually 4 (Figure 17). Apical processes rodlike, bearing an apical brush of stout setae (Figure 16).

COMMENTS.—The name *Antarctopsyche* is a junior, subjective synonym of *Smicridea* sensu stricto, whereas *Pellopsyche* and *Badallus* are junior, subjective synonyms of the subgenus *Rhyacophylax*.

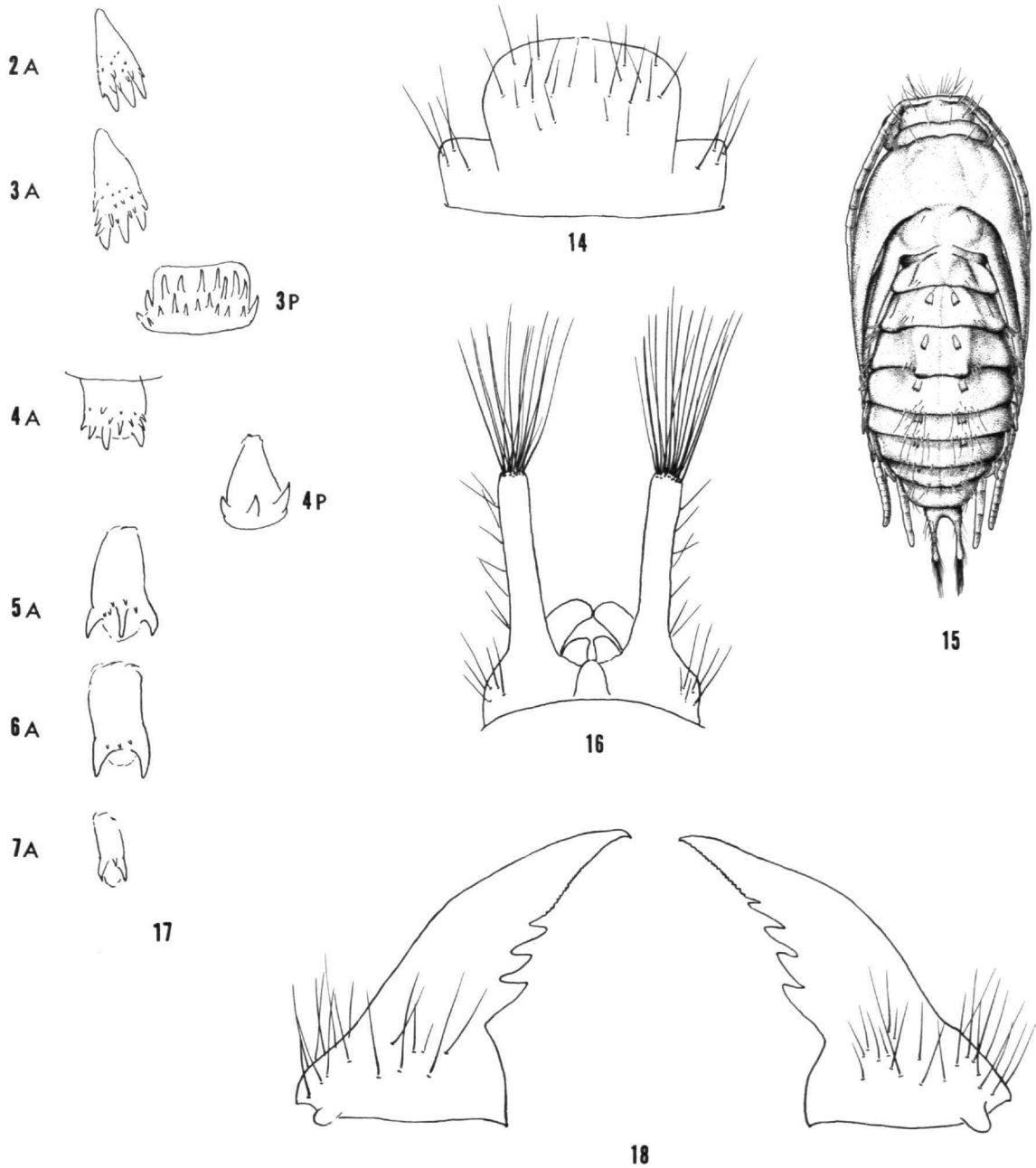
The above diagnoses are based primarily upon the type-species of the genus, *S. fasciatella* McLach-



FIGURES 3–8.—Adult structures. *Smicridea fasciatella* McLachlan: 3, thorax, dorsal; 4, head, dorsal; 5, maxillary palpus, lateral; 6, labial palpus, lateral; 7, wing venation. *Smicridea signata* (Banks): 8, wing venation.



FIGURES 9–13.—Larval structures. *Smicridea fasciatella* McLachlan: 9, labrum, dorsal; 10, maxillolabium, ventral; 11, foreleg and propleuron, lateral; 12, midleg, lateral; 13, hind leg, lateral.



FIGURES 14–18.—Pupal structures. *Smicridea fasciatella* McLachlan: 14, labrum, dorsal; 15, habitus, dorsal; 16, apical appendages, dorsal; 17, hook plates, dorsal (A = anterior, P = posterior, 2–8 = segment member); 18, mandibles, ventral.

lan, but have been broadened where necessary to include known divergences in other species of the genus.

From the practical standpoint, when trying to identify larvae of Neotropical Hydropsychidae, one has considerable difficulty in separating the first few instars of the macronematine genus *Leptonema* from those of *Smicridea*. These may be distinguished by the type of abdominal pelage, that of *Leptonema* being hairs and that of *Smicridea* broad scales. In the last instars they are easily differentiated by size, structure of gills, and shape of head.

No keys are being presented to the larvae or pupae, as I feel it would be too misleading to do so when these stages are known for only 5 of the 29 species. The few distinguishing characteristics are discussed under the heading in the appropriate species.

Only selected references are given in the synonymy of each species. The full bibliography is found in the listed Fischer references.

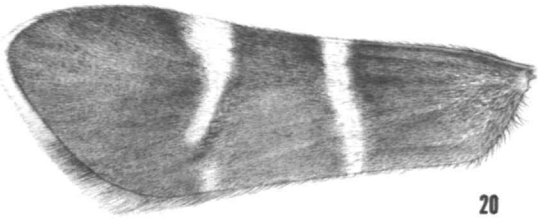
Key to Subgenera

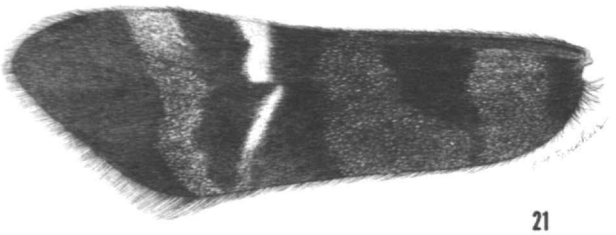
Hind wing with R_{2+3} and R_{4+5} parallel for a considerable distance, with r present (though rather weak), radiomedial system well separated from Cu_1 (Figure 7) ..... ***Smicridea*** sensu stricto

Hind wing with R_{4+5} separating from R_{2+3} at a sharp angle, no r, and with basal portion of radiomedial system approximate to Cu_1 (Figure 8) ..... ***Rhyacophylax***

Subgenus *Smicridea* McLachlan

The adults of this subgenus are characterized by their venation. In the forewings the two posterior crossveins (between M and Cu, and Cu_1 and Cu_2) are separated from the crossveins connecting R and M by a distance two or more times that of the crossvein m-cu. In *Rhyacophylax* all crossveins in the forewing are nearly in alignment. In the hind wing of *Smicridea* sensu stricto R_{2+3} and R_{4+5} are subparallel, R_{4+5} is about as long as R_4 or R_5, crossvein r is present (although weak), and the basal portion of the radiomedial system is well separated from Cu. *Rhyacophylax*, in contrast, has





FIGURES 19–21.—Forewings: 19, *Smicridea fasciatella* McLachlan; 20, *S. bivittata* (Hagen); 21, *S. varia* (Banks).

R_{4+5} strongly divergent from R_{2+3} basally, R_{4+5} is about half as long as either R_4 or R_5, there is no crossvein r, and the basal portion of the radiomedial system is closely approximate to Cu, basad of its apical fork. In both sexes *Rhyacophylax* bears a ventrolateral process from the fifth abdominal segment (smaller in the females), which process is lacking in *Smicridea* sensu stricto but which possesses in the males 2 pairs of internal, reticulate sacs in the subapical abdominal segments. In addition the hind legs in *Smicridea* sensu stricto have 2 pairs of spurs, whereas *Rhyacophylax* males lack the spurs at midlength.

Within the subgenus there are two clearly defined groups of species. The *fasciatella* group is characterized in the male sex by the form of the aedeagus, which is a simple tube bearing internally, eversible sclerites at the apex. In the second group, the *nigripennis* group, the aedeagus is greatly modified. The basal half is open ventrally with the sclerotized part very much enlarged. The apical half is essentially open posterodorsally with various types of spines and structures extending from the membranous central portion, and with the lateral and ventral regions produced into various lobes and spurs.

Key to Species, Subgenus *Smicridea**

1. Males with aedeagus a simple, angulate tube with spines or internal sclerites at apex (Figures 46–47); female vagina with an anterolateral cuplike sclerite partially surrounding a central shield-shaped sclerite (Figure 70) ..... ***fasciatella*** group, 2
   Males with aedeagus complex, open posterodorsally with spines, processes, etc. (Figures 80–81); female vagina with anterolateral sclerite more or less ribbonlike, often very complex, surpassing a small central sclerite which is found in anterior angle (Figures 110–111) ..... ***nigripennis*** group, 6
2. Male with basal segment of clasper short, clasper barely attaining apex of tenth tergite (Figures 60–63); female with ventral margin of ninth tergum bearing a deep, round incision (Figures 76–77); color bivittate (cf. Figure 20) .... 5. ***S. breviuncata***, new species
   Male with basal segment of clasper elongate, basal segment alone usually attaining tip of tenth tergite (Figure 44); female with ventral margin of ninth tergum straight or slightly undulate (Figures 68, 74); color various 3
3. Male with tenth tergum broad and short in lateral aspect; apex of clasper broadly rounded in dorsal aspect (Figures 56–59); female unknown; color uniformly fuscous ..... 4. ***S. unicolor*** (Banks)
   Male with tenth tergum, narrowly elongate in lateral aspect; apex of clasper pointed or bifid (Figures 44–45, 53); color fuscous with white markings 4
4. Male with apex of clasper bifid (Figures 52–55); female with ventral margin of ninth tergum distinctly sinuate (Figures 74–75); color bivittate (Figure 20) ..... 3. ***S. bivittata*** (Hagen)
   Male with apex of clasper pointed (Figure 45); female with ventral margin of ninth tergum nearly straight (Figure 68); color with several, broad diffuse white bands (Figures 19, 21) 5
5. Male aedeagus in dorsal aspect with posterolateral arms of internal sclerite narrow and divergent (Figures 44–47); color grayish with 3 ill-defined transverse white bands (Figure 19) ..... 1. ***S. fasciatella*** McLachlan
   Male aedeagus in dorsal aspect with posterolateral arms of internal sclerite elongate and rectangular (Figures 48–59); color fuscous with 1 sharp transverse white band, and iridescent silvery scales basally and apically (Figure 21) ..... 2. ***S. varia*** (Banks)
6. Males 7
   Females 18
7. Aedeagus deeply divided from the posterior on the midline ventrally, lateral halves may be produced posteriad into 1 or 2 processes (Figures 80, 104) 8
   Aedeagus not divided midventrally, but entire and usually produced from the posterior margin (Figures 66, 130) 16
8. Aedeagus with a single process laterally or lateroventrally (Figures 123, 81) 9
   Aedeagus with 2 processes laterally or lateroventrally (Figures 89, 105) 12

* Females of *S. unicolor*, *S. dampfi*, *S. campana*, and *S. ulva* are unknown.

9. Aedeagus with a ventrally directed, pointed process dorsolaterally from posterior margin, centrally with a pair of slender semimembranous rods (Figures 120–123) ..... 14. *S. matagalpa*, new species
   Aedeagus without dorsolateral processes, possibly with a single dorsomesal process; with at least one pair of central spines and often a central semimembranous tube (Figures 81, 97) 10
10. Aedeagus with a middorsal membranous process, with 1 or 2 pairs of short central spines (Figures 97, 101) 11
   Aedeagus with a long, moderately sclerotized mesal process flanked by long spines and a lateral process (Figures 78–81) ..... 6. *S. caldwelli* Ross
11. Aedeagus with ventrolateral process directed posteriad, with several lateral teeth; with 1 pair of internal spines (Figures 98–101) ..... 11. *S. calopa*, new species
   Aedeagus with apex of ventrolateral process sharply angled laterad; with 2 contiguous pairs of spines (Figures 94–97) ..... 10. *S. turrialbana*, new species
12. Aedeagus with both processes short, and sharply angled laterad (Figures 89, 92) 13
   Aedeagus with both processes long and fingerlike, no more than gently curved laterad (Figures 84, 104) 14
13. Aedeagus with internal spine short, not attaining apex of lateral process, and with a dorsal tooth (Figures 86–89) ..... 8. *S. nahuatl*, new species
   Aedeagus with internal spine very long and slender, as long as lateral process (Figures 90–93) ..... 9. *S. cholta*, new species
14. Aedeagus with lateral processes curving laterad in ventral aspect (Figures 104, 108) 15
   Aedeagus with lateralmost process sharply angled mesad in ventral aspect (Figures 82–85) ..... 7. *S. dampfi*, new species
15. Aedeagus with a slender lightly sclerotized central process (Figures 102–105) ..... 12. *S. ulva*, new species
   Aedeagus without a central process (Figures 106–109) ..... 13. *S. cuna*, new species
16. Aedeagus with a dorsomesal, tubular process with a pair of apicolateral earlike lobes (Figures 124–127) ..... 15. *S. tarasca*, new species
   Aedeagus without such a process 17
17. Aedeagus with midventral lobe narrowed and produced apically (Figures 128–131) ..... 16. *S. campana*, new species
   Aedeagus with midventral lobe parallel-sided and truncate apically (Figures 64–67) ..... 17. *S. pipila*, new species
18. Vaginal sclerites with lateral supports and central sclerite not clearly separated; with central "keyhole" opening near posterior margin (Figures 132–133) ..... 17. *S. pipila*, new species
   Lateral supports and central sclerite separate and distinct, "keyhole" opening of central sclerite in anterior half of complex (Figures 110–119, 134–136) 19
19. Lateral supports of vagina parallel and of uniform width, truncate anteriorly (Figures 134–136) 20
   Lateral supports divergent posteriad, anteriorly obliquely truncate or pointed (Figures 110–119) 21
20. Lateral supports capped by a series of intricate sclerotized folds (Figure 136) ..... 14. *S. matagalpa*, new species
   Lateral supports not so capped (Figures 134–135) ..... 15. *S. tarasca*, new species
21. Lateral supports of vagina with inner margin strongly crenulate (Figures 110–111) ..... 6. *S. caldwelli* Ross
   Inner margin smoothly sinuate 22
22. Lateral supports of vagina ending in a rounded lobe, without sclerotized folds capping the ends (Figures 116-117) ..... 9. *S. cholta*, new species
   Lateral supports capped posteriorly by sclerotized folds varying in complexity (Figures 112–115) 23
23. Lateral supports surmounted by a rather simple, caplike pocket (Figure 114) ..... 10. *S. turrialbana*, new species
   Lateral supports surmounted by a more complex series of folds, hooks, etc. (Figures 112, 115–118) 24
24. Lateral supports posteriorly completely united by a series of heavily sclerotized folds (Figure 115) ..... 13. *S. cuna*, new species
   Sclerotized folds posteriorly not uniting the two arms (Figures 112, 118) 25

25. Lateral supports with sclerotized folds large and complex (Figures 112–113) ..... 8. ***S. nahuatl,*** new species
Lateral supports posteriorly bearing a mesally directed hook, and a few simple, lightly sclerotized folds (Figures 118–119) ..... 11. ***S. calopa,*** new species

1. *Smicridea* (*S.*) *fasciatella* McLachlan

FIGURES 1, 3–7, 9–19, 22, 44–47, 68–71, 217 220–221

Smicridea fasciatella McLachlan, 1871:136.—Milne, 1936:72, 73.—Ross, 1944:85.—Kimmins and Denning, 1951:116.—Kimmins, 1957:106.—Fischer, 1963:132; 1972:144.
Hydropsyche divisa Banks, 1903b:244.
Smicridea divisa (Banks) .—Ulmer, 1907b:175.
Smicridea divisa (Banks) [as synonym of *fasciatella*].—Milne, 1936:73.—Ross, 1938:19.—Fischer, 1963:133.

This, the type-species of the genus, is common in the southwestern United States and northeastern Mexico. I have examined the type series of *H. divisa* Banks and concur in its synonymy with *S. fasciatella* McLachlan. The generic diagnoses of adult, larva, and pupa are based primarily upon this species.

The coloration is sufficient in general for the recognition of the adults of this species. The genitalia of the male are extremely similar to those of the following species, *S. varia* (Banks), but the apex of the tenth tergite in dorsal aspect is obliquely truncate, and the posterolateral arms of the internal sclerite of the aedeagus are narrow and diverge at right angles from the central axis. The female genitalia do not appear to be distinctive in the two species.

The larvae appear to be identical to those of *S. varia,* although the shape of the anterior margin of the frontoclypeus and molar tooth of the mandibles will distinguish the known larvae of the other species in the genus. The pupae of all three species known in this subgenus seem inseparable. They may be separated from the pupae of the two known species in *Rhyacophylax,* by the teeth on 3P which is *Smicridea* sensu stricto are borne irregularly over its surface rather than in one anterior row.

ADULT.—Length of forewing 6 mm. Color gray, legs pale brown, head with pale hair anteromesally; forewing with 3 transverse, irregular bands of white hair of which the basal and apical bands are rather diffuse, apical fringe white (Figure 19). *Male genitalia:* Ninth segment with anterior margin nearly vertical. Tenth tergite constricted subapically with tip produced into a dorsal point in lateral aspect, in dorsal aspect with tip obliquely truncate. Clasper with basal segment long, barely expanded apicad; apical segment tapering to a point in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at an angle of about 130°; internal sclerite narrow, with narrow, laterally directed apical arms. *Female genitalia:* Eighth sternite with posterolateral lobe narrow, dark fold straight, posterior margin nearly straight. Ninth tergum with anterior margin nearly right angled, nearly vertical below angle. Vagina with lateral and anterior support narrow, central sclerite and opening simple; with a lightly sclerotized pouch arising posteriad.

LARVA.—Length to 9 mm. Sclerites yellowish brown to brown; head with color pattern distinct to very obscure, with a distinct pale, small spot at base of each seta. Anterior margin of frontoclypeus with evenly spaced, rounded lobes. Mandibles with molar tooth produced, with ventral angle of about 90°.

PUPA.—Length 4.5–5.5 mm. See generic description.

MATERIAL.—U.S.A.: COLORADO: Adams County, Watkins, 4–5 July 1927, Cornell University, Lot 542 Sub 300, 1 ♀ (CU). OKLAHOMA: Reagan, Pennington Creek, 15 October 1937, K. and R. Weddle, 1 ♂ (INHS); same, but 1 June 1937, H. H. Ross, many ♂ ♀ (INHS). TEXAS: Spring fed stream W of Brackettville, 17 April 1939, H. H. and J. A. Ross, 1 ♂ 3 ♀ pupae; same but 21 September 1960, Flint and Collette, 20 larvae. Gonzales, 12 May 1958, Flint and Evans, 5 ♂ 4 ♀. Zavalla County, Nueces R., 26 April 1910, Hunter and Pratt, 1 ♀. Nueces R., 5 miles SW of Mathis, 12 August 1963, Duckworth and Davis, many ♂ ♀. Mission, Bentsen State Park, 28 September 1951, A. B. Gurney, 1 ♀; same, but 10–11 August 1963, P. J. Spangler, 2 ♀. Victoria, March 1926, E. A. Schwarz, 1 ♀; same, but 24 April 1904, H. S. Barber, 3 larvae. Ottine, Palmetto State Park, 12–13 August 1963, P. J. Spangler, many ♂ ♀, 2 larvae; same, but 24 September 1960, Flint and Collette, 2 larvae. Del Rio, San Felipe Spring, 21 September 1960, Flint

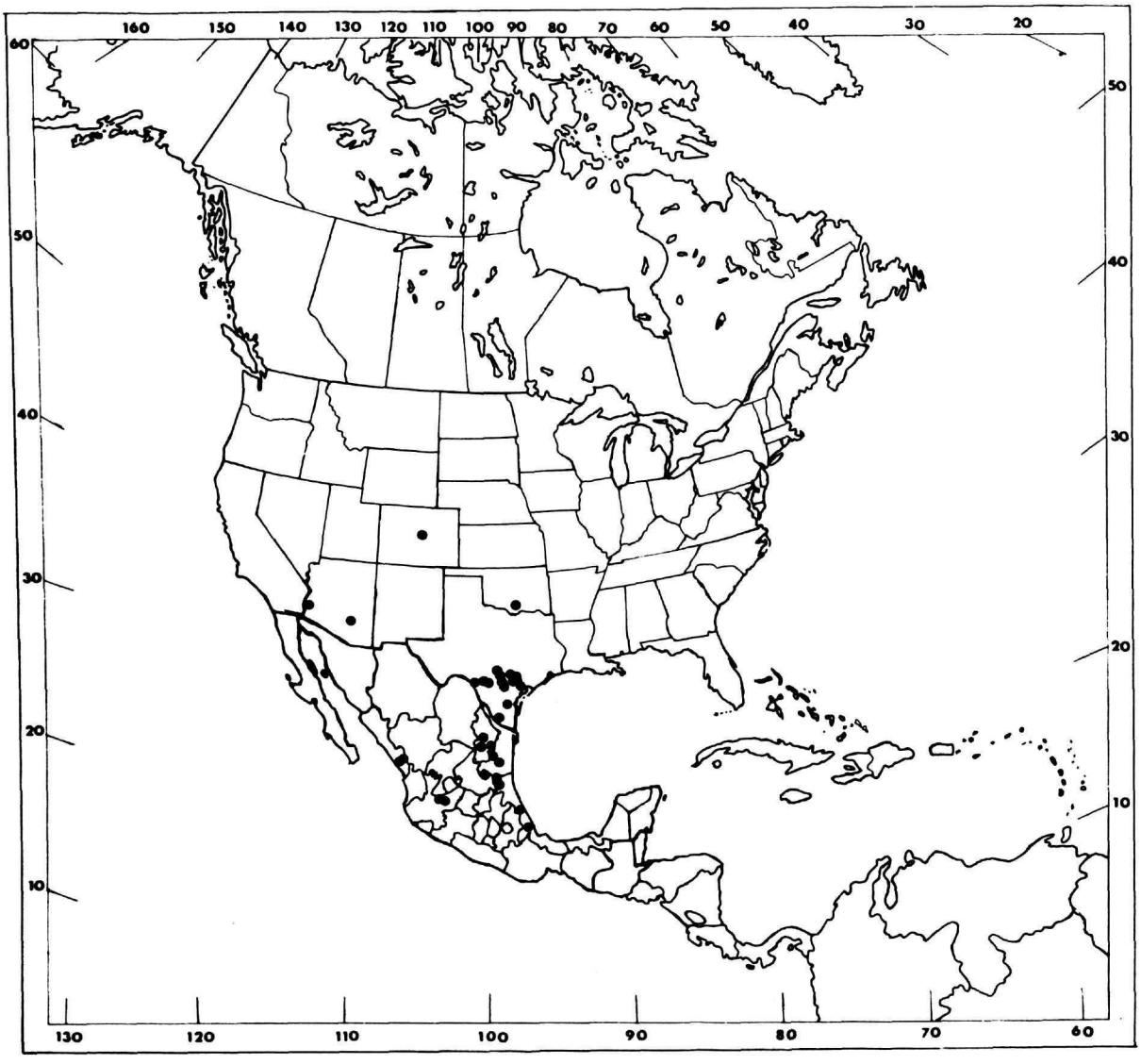


FIGURE 22.—Distribution of *Smicridea fasciatella* McLachlan.

and Collette, 4 ♂ 2 ♀, 1 larva, 1 pupa. Kerr County, Camp Verde, 9 October 1960, Flint and Collette, many ♂ ♀, 15 larvae. San Marcos, San Marcos R., 18 June 1960, O. S. Flint, Jr., 4 larvae, 2 pupae; same, but 21 May 1960, many ♂ ♀. Fentress, San Marcos R., 17 September 1960, Flint and Collette, 11 larvae. Martindale Bridge, San Marcos R., 21 May 1960, Flint and Edwards, 5 ♂ 4 ♀, 13 larvae; same, but 17 September 1960, Flint and Collette, 9 larvae. Bandera, 9 October 1960, Flint and Collette, 2 ♂ 1 ♀, 7 larvae, 2 pupae. East of Seguin, 17 September 1960, Flint and Collette, 25 larvae; same, but 24 September 1960, 75 larvae. San Geronimo Cr., between Riomedina and Castroville, 10 May 1960, Flint and Collette, 11 larvae. Medina R., below Castroville, 14 May 1960, Flint and Huddleston, 6 larvae, 1 ♂ pupa; same, but 8 October 1960, Flint and Collette, many larvae and pupae. Medina R., above Riomedina, 14 May 1960, Flint and Huddleston, 5 ♂ 1 ♀, many larvae

and pupae; same, but 10 May 1960, Flint and Collette, many larvae and pupae. ARIZONA: Salt River, April, Oslar, ♂ lectotype *H. divisa* Banks, ♀ lectoallotype, ♂ lectoparatype (MCZ). 3 miles W of Quartzsite, 25 July 1952, R. B. and J. M. Selander, 1 ♂ (INHS).

MEXICO: TAMAULIPAS: Santa Engracia, 25 April 1936, A. Dampf, 1 ♂ (INHS). Ciudad Victoria, 22 March 1963, R. Balderas L., 1 ♂. NUEVO LEON: Rió Elizondo, Monterrey, 19–20 June 1965, O. S. Flint, Jr., 1 ♂ 2 ♀. Rió Camacho, Linares, 21–22 June 1965, O. S. Flint, Jr., many ♂ ♀. 3 miles E of Galeana, 7–9 August 1963, Duckworth and Davis, 2 ♀. SAN LUIS POTOSI: El Salto, 11–14 July 1963, Duckworth and Davis, many ♂ ♀; same, but 23–24 June 1965, O. S. Flint, Jr., 4 ♂ 4 ♀; same, but 8 August 1966, many ♂ ♀. Tamazunchale, 29 March 1951, Lattin and Walker, many ♂ ♀ (INHS). 2 miles S of Tamazunchale, 15 July 1963, Duckworth and Davis, many ♂ ♀. Rancho Quemado (4 miles S of Tamazunchale), route 85, km 353, 4–6 August 1966, O. S. Flint, Jr., many ♂ ♀; same, but 27 June 1965, 5 ♂ 1 ♀. 2 miles N of Tamazunchale, 2 August 1963, Duckworth and Davis, 5 ♂ 11 ♀; same, but 16–18 July 1963, 15 ♀. Palitla (6 miles N of Tamazunchale), 25 June 1965, O. S. Flint, Jr., many ♂ ♀; same, but 5 June 1966, many ♂ ♀; same, but 5 August 1966, many ♂ ♀. Huichihuayan (25 miles N of Tamazunchale), 3–4 August 1963, Duckworth and Davis, many ♂ ♀; same, but 26 June 1965, O. S. Flint, Jr., many ♂ ♀; same, but 4 June 1967, 1 ♀. VERACRUZ: 7 miles SW of Poza Rica, 20–22 July, Duckworth and Davis, 3 ♂ 18 ♀. Puente Nacional, 31 July 1966, Flint and Ortiz, 2 ♂. SINALOA: 25 miles E of Villa Union, 4 August 1964, 2 ♀ (CNC). 21 miles E of Villa Union, 25 July 1964, 3 ♂ 3 ♀ (CNC). JALISCO: 13 miles N of Chapala, 1 August 1963, P. J. Spangler, 1 ♂. La Barca, 2 October 1934, A. Dampf, 16 ♂ (INHS).

BIOLOGY.—This is a common and often abundant species in the southwestern United States and northern Mexico. The immature stages are found on rocks and sticks, generally in riffle areas, in flowing water of from a meter to 10–15 meters in width. The larvae construct a typically hydropsychid retreat and net extending into the current. The pupae are generally found in a more protected site enclosed in a shelter of sand and/or organic matter rather solidly held together by silk. The adults are taken at light, often abundantly, at night.

2. *Smicridea* (*S.*) *varia* (Banks)

FIGURES 21, 23, 48–51, 72–73, 216

Rhyacophylax varius Banks, 1913:239.—Fischer, 1963:137.
Smicridea varius (Banks).—Flint, 1967:15.

This species is very close to *S. fasciatella* McLachlan, but the typical form is easily recognized by its color. The male genitalia offer a few distinctions, the tenth tergite is more narrowly rounded apically in dorsal aspect, and the internal sclerite of the aedeagus is quite differently shaped. There appear to be no really diagnostic differences in the female genitalia.

There is a form, that I attribute to this species, in which the forewings are brown rather than fuscous. The white bands in this form are also more diffuse, producing an appearance approaching that of *S. fasciatella*. Possibly additional collections, especially with associated larvae, will require a reevaluation of the relationship of these forms.

ADULT.—Length of forewing 5–6 mm. Color black, bases of legs pale brown, midtarsi externally white; forewings black, with a broad diffuse U-shaped band of white, opalescent hairs basally, and a similar, broad transverse band of hair subapically, a narrow distinct white band from stigma, usually offset at midlength (Figure 21). (There is a form in which the black is replaced by brown, and the opalescent hairs become more yellowish. It may then appear very similar to *fasciatella*.) *Male genitalia:* Ninth segment with anterior margin nearly vertical. Tenth tergite constricted subapically, tip rounded; in dorsal aspect with tip rounded, usually showing a rounded mesally directed lobe. Clasper with basal segment long, barely expanded apicad; apical segment tapering to a point in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at an angle of about 130°; internal sclerite in lateral aspect with a narrow basal and a broad apical section, in dorsal aspect with basal section Y-shaped and apical section composed of a broad plate narrowly divided mesally. *Female genitalia:* Eighth sternite with posterolateral lobe large, dark fold slightly curved, posterior margin rounded. Ninth tergum with an-

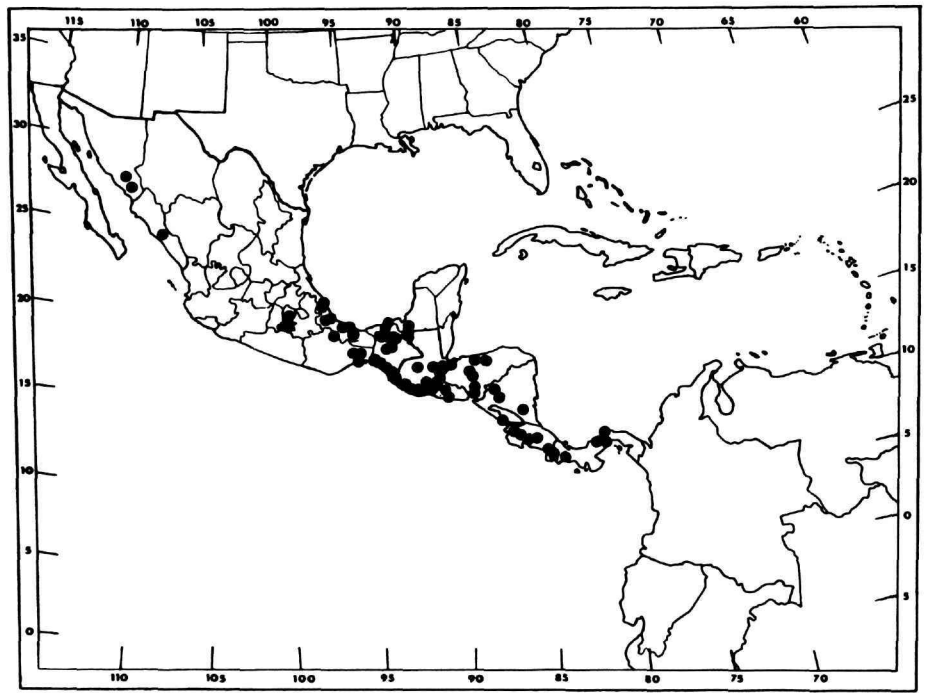


FIGURE 23.—Distribution of *Smicridea varia* (Banks).

terolateral margin a right-angled lobe, ventral margin nearly straight. Vagina with lateral and anterior sclerotized band broad, central sclerite and opening, usually borne nearly vertically; with a small rectangular sclerite posteriad.

LARVA.—Length to 7 mm. Sclerites yellowish brown; head with a distinct color pattern, with distinct pale spot around seta base. Anterior margin of frontoclypeus with evenly spaced, rounded lobes. Mandibles with inner and ventral margins of molar tooth straight, meeting at right angle.

PUPA.—Length 5 mm. No distinction from *S. fasciatella* found.

MATERIAL.—MEXICO: VERACRUZ: La Gloria Cardel, January 1938, J. Carmelo G., 1 ♂. Cuitlahuac, 10–12 August 1964, P. J. Spangler, many ♂ ♀; same, but 24–27 July 1965, Flint and Ortiz, 1 ♂; same, but 3 July 1965, P. J. Spangler, 2 ♂ 6 ♀. Puente Nacional, 23–24 July 1965, Flint and Ortiz, 1 ♂ 2 ♀. Catemaco, 26 July 1966, Flint and Ortiz, many ♂ ♀. El Encero, route 140, km 347, 22 July 1965, Flint and Ortiz, many ♂ ♀. 2 miles S. of Acayucan, route 185, 10 July 1965, Campbell and Hill, 7 ♂ 5 ♀ (INHS). Rió Tacolapan, route 180, km 551, 25–26 July 1966, Flint and Ortiz, 3 ♂. DISTRITO FEDERAL: Lomas de Chapultepec, 19 July 1938, A. Dampf, 4 ♂ (INHS). MORELOS: Xochitepec, 12–14 July 1965, Flint and Ortiz, 1 ♀. Jojutla, 1 September 1937, A. Dampf, 2 ♂ (INHS). SINALOA: Culiacan, 16 July 1963, P. J. Spangler, 5 ♂ 6 ♀. 32 miles SSE of Culiacan, 16 June 1954, A. A. Alcorn, 2 ♂ 1 ♀ (UK). SONORA: Ciudad Obregon, 17 July 1955, Flint and Pacheco, 4 ♂. Navajoa, 14 July 1963, P. J. Spangler, 1 ♂ 12 ♀. OAXACA: Tehuantepec, 23 July 1964, P. J. Spangler, 9 ♂ 4 ♀. Puente Tlacotepec, S of Tehuantepec, 8 June 1966, Flint and Ortiz, many ♂ ♀; same, but 8–9 June 1967, many ♂ ♀. Puerto Angel, 31 July 1965, A. B. Lau, 1 ♂. Tuxtepec, April 1938, J. Carmelo G., 1 ♂. Laguna Superior de Juchitan, 30 April 1932, A. Dampf, 4 ♂ (INHS). CHIAPAS: 7.8 miles E of Pichucalco, 27–28 July 1966, Flint and Ortiz, many ♂ ♀. Puente Arroyo Viejo, route 200, km 141, 9 June 1967, Flint and Ortiz, 1 ♂. Arriaga, 22 August 1965, P. J. Spangler, many ♂ ♀. Salto de Agua, 28 April 1938, A. Dampf, 1 ♂ (INHS). Santa Lucia, 29 July 1926, A. Dampf, 1 ♂ (INHS). Tonala, 3 November 1932, A. Dampf, 7 ♂; same, but 2 No-

vember 1932, many ♂; same, but 27 November 1932, many ♂ (INHS). Acapatehua, 7 November 1932, A. Dampf, many ♂ (INHS). Suchiate, 16 November 1932, A. Dampf, 3 ♂ (INHS). Huehuetan, 9 November 1932, A. Dampf, 5 ♂ (INHS). Ocosingo Valley, Rió Santa Cruz, Finca El Real, 1 July 1950, Goodnight and Stannard, 7 ♂ 32 ♀ (INHS). Ocosingo Valley, Finca Monte Libano, 4 July 1950, Goodnight and Stannard, 11 ♂ 12 ♀ (INHS). Chiapa de Corzo, 26 July 1926, A. Dampf, 23 ♂ (INHS). Mapastepec, 5 November 1932, A. Dampf, many ♂ (INHS). Near Pijijiapan, 5 July 1965, P. J. Spangler, many ♂ ♀. TABASCO: Rió Puyacatengo, E of Teapa, 28–29 July 1966, Flint and Ortiz, many ♂ ♀. Pocvicuc, 1 January 1939, A. Dampf, many ♂ ♀; same, but 31 December 1938, many ♂ (INHS). Villahermosa, 13 August 1937, A. Dampf, 11 ♂ (INHS); same, but October 1954, N.L.H. Krauss, 7 ♂. Tiradero, 6 January 1939, A. Dampf, 1 ♂ (INHS). Las Mercedes, 25 June 1938, A. Dampf, 7 ♂ 5 ♀ (INHS). Frontera, 11 November 1937, A. Dampf, 6 ♂ (INHS). CAMPECHE: Salto Grande, 11 January 1939, A. Dampf, 5 ♂ (INHS).

GUATEMALA: RETALHULEU: Puento El Nino, near Retalhuleu, 16 June 1966, Flint and Ortiz, 3 ♂ 1 ♀. SUCHITEPEQUEZ: Puento Ixtacapa, near San Antonio, 18–19 June 1966, Flint and Ortiz, many ♂ ♀. Rió Sis, 22 km S of Finca La Maquina, 11 June 1966, Flint and Ortiz, many ♂ ♀. Finca Mocá, 12 June 1966, Flint and Ortiz, 2 ♂. ESCUINTLA: Escuintla, 10 August 1965, P. J. Spangler, 1 ♂. Tequisati, 4–12 May 1929, G. Heinrich, 1 ♀. JUTIAPA: Laguna Nisguaya, 4 August 1965, P. J. Spangler, 1 ♂. QUICHE: Chejel, June, Schaus and Barnes, 1 ♂. EL PROGRESSO: San Augustin Acasaguastlan, 11–21 August 1965, Flint and Ortiz, many ♂ ♀. IZABAL: Limones, route CA9, km 282, 16–18 August 1965, Flint and Ortiz, 3 ♂. Quirigua, February 1915, W. Schaus, 1 ♂ 1 ♀. Cayuga, April 1915, W. Schaus, 3 ♂ 2 ♀; same, but May 1915, 1 ♀; same, but August 1915 1 ♂. SANTA ROSA: 7.7 miles SE of Cuilapa, 7 August 1967, O. S. Flint, Jr., 4 ♂. GUATEMALA: 10 miles S of Guatemala City, 5 August 1965, P. J. Spangler, 1 ♂ 2 ♀.

EL SALVADOR: LA LIBERTAD: Rió El Taquio, N of La Libertad, 3 July 1966, Flint and Ortiz, 1 ♂. Quezaltepeque, 11 February 1965, S. S. and W. D. Duckworth, 1 ♂.

HONDURAS: VALLE: Nacaome, 4 August 1967, O. S. Flint, Jr., many ♂ ♀, larvae, ♂ pupae; same, but 9 July 1965, P. J. Spangler, 5 ♂ 16 ♀. CHOLUTECA: Pespire, 1 August 1967, O. S. Flint, many ♂ ♀. COMAYAGUA: Rancho Chiquito, SE of Flores, 2–3 August 1967, O. S. Flint, Jr., 1 ♂. Rió Humuya, NW of Comayagua, 3 August 1967, O. S. Flint, Jr. many ♂ ♀. ATLANTIDA: La Ceiba, 21 June 1949, E. C. Becker, 2 ♂ (INHS); same, but 14 July 1949, 2 ♂ 3 ♀; same, but 19–21 July 1949, 6 ♂ 8 ♀. YORO: 12 km W of Olanchito, May 1949, E. C. Becker, 1 ♂ 1 ♀ (INHS); same, but 24–25 May 1949, 2 ♂; same, but 22 June 1949, 3 ♂ 1 ♀; same, but 5–7 July 1949, 3 ♂.

NICARAGUA: NUEVA SEGOVIA: Rió Coco, Ocotal, 31 July 1967, O. S. Flint, Jr., many ♂ ♀. MATAGALPA: 5.3 miles E of Matagalpa, 30 July 1967, O. S. Flint, Jr., 1 ♂. CHONTALES: Puente Quinama, E of Villa Somoza, 29 July 1967, O. S. Flint, Jr., many ♂ ♀. RIVAS: 16 miles S of Rivas, 12 July 1965, P. J. Spangler, 5 ♀.

COSTA RICA: GUANACASTE: 10 miles NW of Liberia, 25 July 1967, P. J. Spangler, many ♂ ♀. Rió Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr., many ♂ ♀. Quebrada Tronadorcita, near Arenal, 24 July 1967, O. S. Flint, Jr., 1 ♀. 1.5 miles S of Potrerillos, 27 July 1967, O. S. Flint, Jr., 1 ♂ 2 ♀. ALAJUELA: Turrúcares, 1 ♂ holotype (MCZ). PUNTARENAS: Rió Seco, NW of Esparta, 23 July 1967, O. S. Flint, Jr., many ♂ ♀. 2.8 miles E of Golfito, 3–4 July 1967, Flint and Ortiz, 3 ♂; same, but 18–19 July 1967, 1 ♂. Palmar Sur, August 1962, F. S. Blanton, 1 ♂ 1 ♀. CARTAGO: Rió Reventazon, Hamburg Farm, Nevermann, 4 (Vienna Museum).

PANAMA: CHIRIQUI: Dolega, 17 July 1967, O. S. Flint, Jr., many ♂ ♀. COLON: Portobelo, 18 February 1911, A. Busck, 1 ♂. CANAL ZONE: Paraiso, February 1911, A. Busck, 1 ♀. Tabernilla, A. Busck, 1 ♂ 1 ♀.

BIOLOGY.—Adults of this species are freely attracted to lights. The one collection of larvae and metamorphotypes was made in a shallow river 10–20 meters wide. They were found on rocks in a shallow riffle in full sun. Adult collections tend to indicate a rather wide habitat range for the species in rivers and streams. Most waters in which they have been found are of rather low gradient, with shallow riffle areas, often in full sun.

3. *Smicridea* (*S.*) *bivittata* (Hagen)

FIGURES 20, 24, 52–55, 74–75, 218, 222–223

Hydropsyche bivittata Hagen 1861:291.—Ross 1952:33.
Smicridea bivittata (Hagen).—Ulmer, 1913:390.—Fischer, 1963:131; 1972:144.—Flint, 1967:13.
Wormaldia albata Navas, 1924:75.—Fischer, 1961:32 [new synonymy].

Within the *fasciatella* group, this is the only species with bivittate forewings. In the male sex the angulate and bifurcate apex of the apical clasper segment is unique. The female genitalia are less easily characterized. However, the shape of the ninth tergum, especially the ventral margin and appearance of the sclerites of the vagina permit a definitive identification.

I have cleared and studied the holotype female of *W. albata* Navas located in the Paris Museum. It is a typical example of this species.

The larvae are most similar to those of *S. fasciatella*. They may be recognized by the slightly asymmetrical anterior margin of the frontoclypeus, and especially by the shape of the left mandible whose molar tooth is bilobate. The pupae, however, offer no clearcut distinctions.

ADULT.—Length of forewing 4.5–5.5 mm. Color black, legs pale, head with white hair anteromesally; forewing black, with two distinct, transverse, white bands, apical fringe white (Figure 20). *Male genitalia:* Ninth segment with anterior margin vertical. Tenth tergite constricted subapically, tip produced into a small dorsal point in lateral aspect; in dorsal aspect obliquely truncate, produced laterad. Clasper with basal segment long, nearly parallel-sided; apical segment in dorsal aspect enlarged subapically and angled mesad, tip shallowly bifid. Aedeagus tubular, with basal and apical sections meeting at an angle of about 150°; internal sclerite in lateral aspect long and slender, enlarged apicad, in dorsal aspect with basal section divided for a short distance and apex bearing 2 small ovoid plates. *Female genitalia:* Eighth sternite with posterolateral lobe large, dark fold distinctly sinuate; posterior margin produced into an angled lobe at midlength. Ninth tergum with dorsolateral margin produced into a small, angled lobe, ventral margin shallowly emarginate. Vagina with lateral and posterior support broad, central sclerite and opening borne nearly vertical.

FIGURE 24.—Distribution of *Smicridea bivittata* (Hagen).

LARVA.—Length to 8 mm. Sclerites generally pale yellowish, head darker centrally. Anterior margin of frontoclypeus with numerous small, rounded lobes, slightly enlarged on right side. Left mandible with molar tooth bilobate, right mandible with molar tooth rounded and enlarged ventrad.

PUPA.—Length 5 mm. No distinct differences from *S. fasciatella.*

MATERIAL.—MEXICO: SAN LUIS POTOSI: Huichihuayan, 4 June 1967, O. S. Flint, Jr., 1 ♂; same, but 26 June 1965, larvae, prepupae, 1 ♂ pupa. VERACRUZ: Cordoba, 28 July 1965, Flint and Ortiz, 1 ♂; same, but 6–9 November 1966, A. B. Lau, 2 ♂. Cuitlahuac, 10–12 August 1964, P. J. Spangler, 3 ♂ 4 ♀; same, but 24–27 July 1965, Flint and Ortiz, 1 ♀. Route 140, km 347, near El Encero, 22 July 1965, Flint and Ortiz, many ♂ ♀. Near Huatusco, 25–26 July 1965, Flint and Ortiz, 1 ♀. Puente Nacional, 23–24 July 1965, Flint and Ortiz, 1 ♂. TABASCO: Reforma, 4 January 1939, A. Dampf, 5 ♂ (INHS). CHIAPAS: 7.8 miles E of Pichucalco, 27–28 July 1966, Flint and Ortiz, 1 ♂. Finca Victoria, 2 June 1935, A. Dampf, 1 ♂ (INHS). Finca Vergel, 21 May 1935, A. Dampf, 1 ♂ (INHS); same, but 7 June 1935, 1 ♂; same, but 12 June 1935, 1 ♂. Mapastepec, 5 November 1932, A. Dampf, 6 ♂ (INHS). Puente Arroyo Viejo, route 200, km 141, 9 June 1967, Flint and Ortiz, 1 ♂ 4 ♀.

GUATEMALA: RETALHULEU: Puente El Nino, near Retalhuleu, 16 June 1966, Flint and Ortiz, 1 ♂. SUCHITEPEQUEZ: Cuyotenango, 10–20 June 1966, Flint and Ortiz, many ♂ ♀. Finca Mocá, 12 June 1966, Flint and Ortiz, 1 ♂ 1 ♀; same, but 11 June 1967, 1 ♀. Puente Ixtacapa, near San Antonio, 18–19 June 1966, Flint and Ortiz, 1 ♀. IZABAL: Limones, route CA9, km 282, 16–18 August 1965, Flint and Ortiz, 1 ♂.

EL SALVADOR: LA LIBERTAD: Santa Tecla, 900 m, 2–13 May 1969, S. Steinhauser, 1 ♂. Rió Majagual, near La Libertad, 1 July 1966, Flint and Ortiz, 1 ♀. Rió El Taquio, N of La Libertad, 3 July 1966, Flint and Ortiz, 1 ♀.

NICARAGUA: CHONTALES: Puente Quinama, E of Villa Somoza, 29 July 1967, O. S. Flint, Jr., 3 ♂.

COSTA RICA: GUANACASTE: Quebrada Tronadorcita, near Arenal, 24 July 1967, O. S. Flint, Jr., 1 ♂. SAN JOSE: Pacuare, Rió General, 1 July 1967, Flint and Ortiz, 1 ♂ 5 ♀. PUNTARENAS: Rió Vieja, near Lagarto, 2–3 July 1967, Flint and Ortiz, many ♂ ♀. Palma Sur, August 1962, F. S. Blanton, 1 ♂ 1 ♀. CARTAGO: Chitaria, 19 June 1967, Flint and Ortiz, 1 ♂. La Suiza, 17 June 1967, Flint and Ortiz, 1 ♂. HEREDIA?: La Caja, 1920, Paul Serre, 1 ♀ holotype *Wormaldia albata* Navas (MNHN).

PANAMA: No further data, 1 ♀ holotype (MCZ). CHIRIQUI: Rió Caimito, 10 miles N of David, 4 July 1967, Flint and Ortiz, 3 ♂ 3 ♀. COCLE: El Valle, 15 July 1967, O. S. Flint, Jr., 1 ♂. PANAMA: Cerro Azul, 7 July 1967, Flint and Ortiz, many ♂ ♀. CANAL ZONE: Pipeline Road, Rió Frijoles, 6–7 July 1967, Flint and Ortiz, 1 ♀. Madden Dam, 10–13 July 1967, O. S. Flint, Jr., many ♂ ♀. Barro Colorado Island, 18–28 April 1964, W. D. and S. S. Duckworth, 1 ♀; same, but 1–9 May 1964, 1 ♂ 1 ♀; same, but 10–17 May 1964, 1 ♀; same, but 12 March 1967, M. E. Irwin, many ♂ ♀ (UCR).

BIOLOGY.—Adults of this species are commonly attracted to lights at night. The one collection of larvae and pupae was made in a small stream in a rather open woods. Adults, however, have been taken near flowing waters up to 5 meters or more in width. Although this species appears frequently with *S. varia,* it appears that the probable breeding sites are at the larger, warmer end of the tolerance range of *S. bivittata,* and the smaller, cooler end of the tolerance range of *S. varia.*

4. *Smicridea* (*S.*) *unicolor* (Banks)

FIGURES 25, 56–59

Diplectrona unicolor Banks, 1901:370.—Fischer, 1963:150.
Smicridea unicolor (Banks).—Ross, 1947:144.—Flint, 1967: 15.—Fischer, 1972:145.

This is a very distinctive species of the *fasciatella* group. It is unique within the regional species of the genus in having unicolorous, fuscous wings. The shapes of the tenth tergite and apical segment of the clasper also offer distinctive features.

ADULT.—Length of forewing 6 mm. Color fuscous, legs paler basally; without a color pattern on wings. *Male genitalia:* Ninth segment with anterior margin slightly rounded. Tenth tergite in lateral aspect very broad basally, tapering rapidly to a small protuberant apex; in dorsal aspect short, broad basally, with apex evenly rounded from lateral margin. Clasper with basal segment long, parallel-sided; apical segment tapering to a point in lateral aspect, in dorsal aspect with tip broadly rounded. Aedeagus tubular, with basal and apical

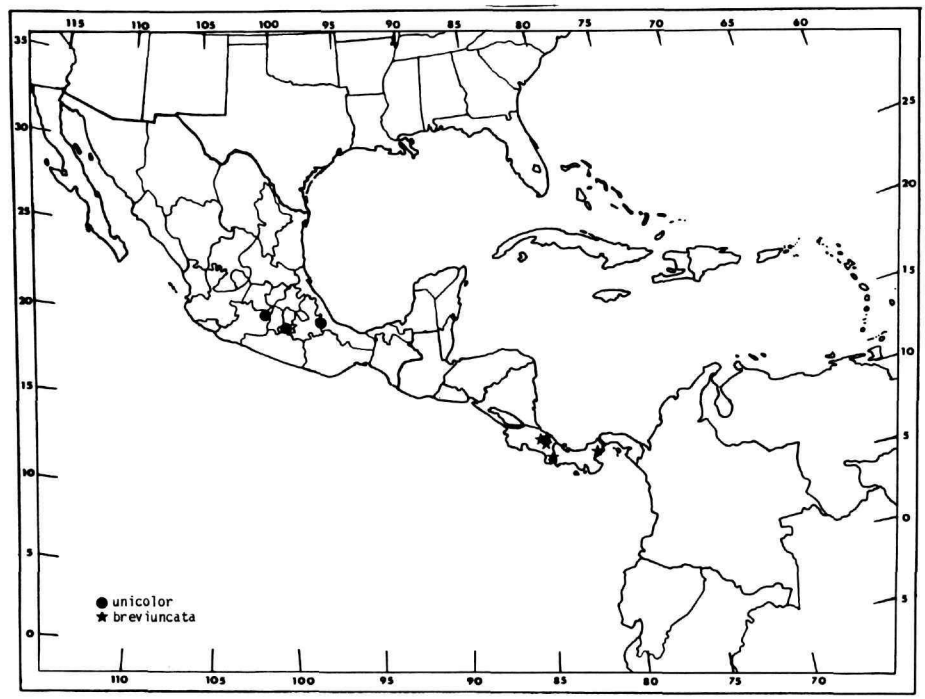


FIGURE 25.—Distribution of *Smicridea unicolor* (Banks) and *S. breviuncata,* new species.

sections meeting at an angle of about 145°; internal sclerite long and slender in lateral aspect, in dorsal with base shallowly divided, apex with lateral, angulate sclerites. *Female genitalia:* Unknown.

IMMATURE STAGES.—Unknown.

MATERIAL.—MEXICO: MORELOS: Cuernavaca, June, ♂ holotype (MCZ), 1 ♂. VERACRUZ: 1.6 miles N of Coscomatepec, 22 July 1966, Flint and Ortiz, 1 ♂. MICHOACAN: 2 miles W of Ciudad Hidalgo, 19 July 1955, R. B. and J. M. Selander, 1 ♂ (INHS).

BIOLOGY.—The only specimen of this species that I have collected was beaten from foliage beside a small brooklet overgrown with bushes and brambles.

5. *Smicridea* (*S.*) *breviuncata,* new species

FIGURES 25, 60–63, 76–77

This is a very distinctive new species that belongs to the *fasciatella* group, but differs greatly from all other described species. The very short and inflated basal segment of the claspers, and the broad (in dorsal aspect) tenth tergite are distinctive as is the bispinous apex of the aedeagus. The very deep, rounded incision in the ventral margin of the ninth tergum of the female is equally distinctive.

ADULT.—Length of forewing 5–6 mm. Color fuscous, legs paler basally, head with white hair anteromesally; forewing fuscous with 2 transverse white bands (cf. Figure 20). *Male genitalia:* Ninth segment narrow laterally, with anterior margin nearly vertical. Tenth tergite narrow and short in lateral aspect, with a small apical point; in dorsal aspect very broad, rounded apically. Clasper with basal segment very short and broad, with a mesal patch of peglike setae apically; apical segment with tip slightly hooked. Aedeagus tubular, with basal and apical sections meeting at an angle of about 115°; apex with a pair of slender, projecting rods. *Female genitalia:* Eighth sternite with posterolateral lobe broad, dark fold strongly curved, and posterior margin developed into a small lobe. Ninth tergum with anterolateral lobe rounded, ventral margin with a deep, rounded, indentation. Vagina with lateral and anterior support broad, central sclerite and opening usually borne nearly vertically.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: COSTA RICA, CARTAGO, Turrialba, 1–6 March 1965, S. S. and W. D. Duckworth. USNM Type 72694. Paratypes: La Suiza, 17 June 1967, Flint and Ortiz, 1 ♀. Chitaria, 19 June 1967, Flint and Ortiz, 1 ♀. PUNTARENAS: 2.8 miles E of Golfito, 3–4 July 1967, Flint and Ortiz, 6 ♂ 1 ♀.

PANAMA: PANAMA: Cerro Campana, July 1967, Wirth and Blanton, 2 ♂.

BIOLOGY.—This species usually has been taken at lights, operated near small, tumbling, mountain brooklets in which the larvae probably occur.

6. *Smicridea* (*S.*) *caldwelli* Ross

FIGURES 26, 78–81, 110–111

Smicridea caldwelli Ross, 1947:145.—Fischer, 1972:144.

This species appears to be most closely related to *S. dampfi*, new species, on the basis of general structure of the male genitalia. They are easily distinguished by the aedeagus which in *S. caldwelli* bears only a single lateral process, but bears 2 processes in *S. dampfi*.

The female of *S. caldwelli* is easily recognized by the form of the vaginal sclerites: in no other species is the inner margin of the lateral supports so strongly crenulate.

ADULT.—Length of forewing 4–5.5 mm. Color black, legs paler basally, head with white hair anteromesally; forewing with 2 transverse white bands (cf. Figure 20). *Male genitalia:* Ninth segment with anterior margin produced into a right-angled lobe. Tenth tergite narrow and upturned in lateral aspect, tip produced into a dorsally directed point; in dorsal aspect broad basally, evenly rounded apically and laterally. Clasper with basal segment long and slender, slightly inflated apically; apical segment produced into a pointed apex in dorsal aspect. Aedeagus enlarged basally, open apically; apex with ventral lobe truncate mesally, lateral margin bearing an elongate pointed process; with 2 long, slightly curved mesal spines; with a tubular dorsomesal structure. *Female genitalia:* Ninth tergum greatly produced anterolaterally. Vagina with

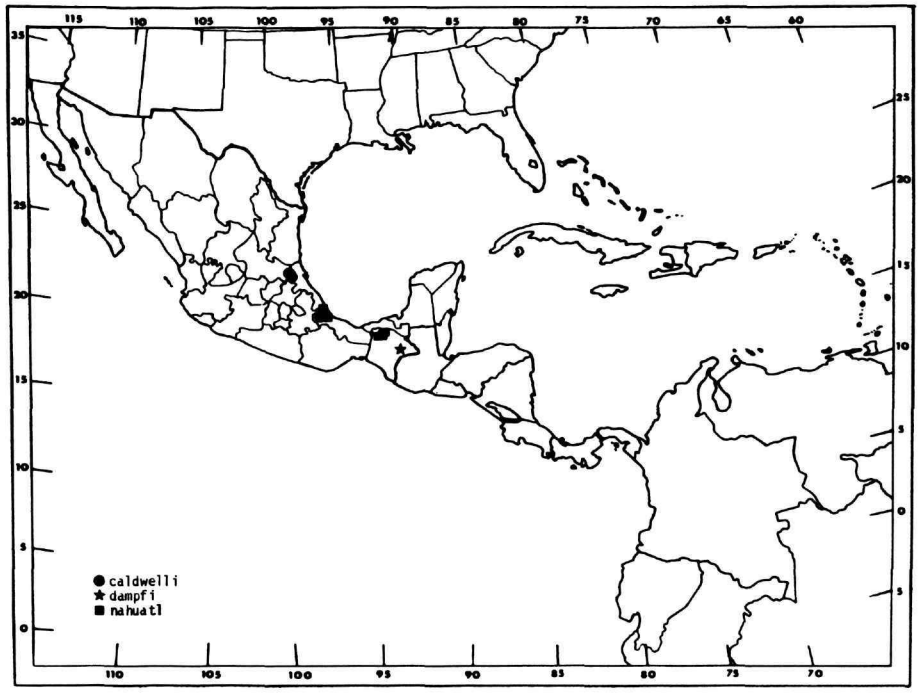


FIGURE 26.—Distribution of *Smicridea caldwelli* Ross, *S. dampfi*, new species, and *S. nahuatl*, new species.

central sclerite ovoid, with a circular opening; lateral support V-shaped, inner margin strongly crenulate, with sclerotized folds posteriorly.

IMMATURE STAGES.—Unknown.

MATERIAL.—MEXICO: VERACRUZ: Fortin, 9 October 1941, DeLong, Goodnight and Caldwell, holotype ♂ (INHS). SAN LUIS POTOSI: Rancho Quemado (4 miles S of Tamazunchale), route 85, km 353, 27 June 1965, O. S. Flint, Jr., 3 ♂ 1 ♀; same, but 4–6 August 1966, 3 ♀. Tierra Blanca, route 85, km 348, 5 August 1966, O. S. Flint, Jr., 1 ♂.

BIOLOGY.—Adults have been taken at ultraviolet lights and by sweeping. Both of my collection sites were at small, tumbling mountain brooklets.

7. *Smicridea* (*S.*) *dampfi*, new species

FIGURES 26, 82–85

Although the presence of two processes laterally from the aedeagus would suggest that the species is related to *S. ulva*, new species, the general form of the remainder of the aedeagus, especially the lack of a small middorsal process, suggests that it is most closely related to *S. caldwelli* Ross. The shape of the aedeagus will readily serve to distinguish the two species.

ADULT.—Length of forewing 4.5 mm. Color in alcohol uniformly brown. *Male genitalia:* Ninth segment with anterior margin produced into a rounded lobe. Tenth tergite narrow and upturned in lateral aspect, tip produced into a dorsally directed point; in dorsal aspect broad basally, evenly rounded apically. Clasper with basal segment long and slender, slightly inflated apicad; apical segment produced into an apical point in dorsal aspect. Aedeagus enlarged basally, open apically; apical region angled sharply ventrad, with 2 pairs of apicolateral processes, dorsalmost hooked mesad in ventral aspect, ventralmost filiform; with a pair of long, slightly sinuate spines arising internally; with a central tubular structure lightly sclerotized basally. *Female genitalia:* Unknown.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, CHIAPAS, Finca Vergel, 2 June 1935, A. Dampf, MF 4398, at light (INHS).

BIOLOGY.—Beyond the fact that the specimen was taken at a light, nothing is known of its biology.

8. *Smicridea* (*S.*) *nahuatl*, new species

FIGURES 26, 86–89, 112–113

Smicridea nahuatl, new species, and *S. cholta*, new species, form a closely related pair. They differ in the form of the two lateral processes of the lateral plate and in the shape of the internal spine of the aedeagus. In *S. nahuatl* the ventral process extends farther to the posterior than the dorsal, and the internal spine is short with a small dorsal tooth.

The sclerites of the vagina, especially the large, convoluted folds capping the lateral supports are very distinctive.

ADULT.—Length of forewing 4.5 mm. Color black, legs paler basally, head with white hair anteromesally; forewing with 2 transverse white bands, apical fringe white (cf. Figure 20). *Male genitalia:* Ninth segment with anterior margin expanded into an angulate lobe. Tenth tergite in lateral aspect short, with apex produced into a small, rounded, upturned lobe; in dorsal aspect with lateral margin expanded basally, tip angulate. Clasper with basal segment long, slightly expanded apicad; apical segment with tip produced into a point in dorsal aspect. Aedeagus enlarged basally, open apically; apex with ventral lobe divided mesally, developed into broad lateral plates bearing laterally directed points apicoventrally and dorsally, ventral point considerably prolonged beyond dorsal point; with a pair of short central spines bearing a dorsal point; with a membranous central region, and a slender membranous dorsal process. *Female genitalia:* Ninth tergum produced anterolaterally. Vagina with central sclerite elongate-ovoid, with central opening circular; lateral supports V-shaped, with smooth outline, with a complex series of sclerotized folds posteriad of each arm.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, VERACRUZ, Puente Nacional, 23–24 July 1965, Flint and Ortiz. USNM Type 72695. Paratypes: Same data, 1 ♀. Cuitlahuac, 3 July 1965, P. J. Spangler, 1 ♂. CHIAPAS: 7.8 miles E of Pichucalco, 27–28 July 1966, Flint and Ortiz, 2 ♂. TABASCO: Rió Puyaca-

tengo, E of Teapa, 28–29 July 1966, Flint and Ortiz, 1 ♂.

BIOLOGY.—Adults were collected at an ultraviolet light. The adjacent streams were 3–5 meters wide by a quarter to half meter deep. The substrate was mostly gravel and small boulders in long riffles.

9. *Smicridea* (*S.*) *cholta*, new species

FIGURES 27, 90–93, 116–117

From *S. nahuatl*, new species, this species is to be distinguished by the structure of the aedeagus. The dorsal and ventral processes of the lateral plate of the aedeagus are almost directly over one another and the internal spine is long and slender, with the tip sharply angled dorsad in *S. cholta*.

The female is to be recognized by the structure of the sclerites of the vagina. The outline of the lateral supports are uniform and rather simple, without heavily sclerotized folds capping the arms, but with several lightly sclerotized structures in the membrane posteriad.

ADULT.—Length of forewing 4.5 mm. Color black, legs paler basally, head with white hair anteromesally; forewing with 2 transverse white bands, with white apical fringe (cf. Figure 20). *Male genitalia:* Ninth segment with anterior margin greatly expanded into a rounded lobe. Tenth tergite in lateral aspect narrow, with an upturned tip; in dorsal aspect with lateral margin expanded basally, tip broadly rounded. Clasper with basal segment long, slightly expanded apically; apical segment with tip produced into a point in dorsal aspect. Aedeagus enlarged basally, open apically; apex with ventral lobe divided mesally, developed as broad lateral plates, bearing laterally directed points apicoventrally and apicodorsally; with a pair of long, slender, mesal spines angled dorsad at tips; with a membranous central region, and a slender membranous dorsomesal process. *Female genitalia:* Ninth tergum produced anterolaterally. Vagina with central sclerite slightly elongate with mesal opening circular; lateral supports in form of a truncate V, outline smooth, with several lightly sclerotized structures posteriad.

FIGURE 27.—Distribution of *Smicridea cholta*, new species, *S. turrialbana*, new species, and *S. calopa*, new species.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: GUATEMALA, IZABAL, Matias de Galvez, 14–16 August 1965, Flint, Spangler, and Ortiz. USNM Type 72696. Paratypes: Same data, 15 ♂ 3 ♀.

BIOLOGY.—I have only taken this species at an ultraviolet light on one occasion, the adjacent stream being 3–5 meters wide by a quarter to a half meter deep, and flowing rapidly over falls, cascades, and pools. Although the stream fluctuates with heavy rains, it remains surprisingly clear, and is probably mostly spring fed.

10. *Smicridea* (*S.*) *turrialbana*, new species

FIGURES 27, 94–97, 114

Smicridea turrialbana, new species, appears to be most closely related to the following species, *S. calopa*, new species, as both possess only a single ventrolateral process from the aedeagus. The sharply angulate ventrolateral process which lacks the small lateral teeth is distinctive in *S. turrialbana*.

The rather smooth lateral supports of the vagina with apical caps permit easy recognition of the female sex.

ADULT.—Length of forewing 4.5–5 mm. Color black, legs paler basally, head with white hair anteromesally; forewing with 2 transverse white bands, apical band not reaching posterior margin, apical fringe white (cf. Figure 20). *Male genitalia:* Ninth segment with anterior margin produced into a rounded lobe. Tenth tergite in lateral aspect short, rather broad, with dorsal subapical point; in dorsal aspect expanded laterad, apex rounded. Clasper with basal segment long, slender, expanded apicad; apical segment in dorsal aspect with tip produced into a point. Aedeagus enlarged basally, open apically; apex with ventral lobe produced into a pair of processes hooked sharply laterad, lateral plate nearly vertical; with 2 pairs of curved internal spines, and a dorsomesal rodlike process. *Female genitalia:* Ninth tergum produced anterolaterally. Vagina with central sclerite shield-shaped with central opening slightly elongate; lateral supports U-shaped with smooth outline, apex enlarged and capped by a hoodlike fold.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: COSTA RICA, CARTAGO, 3 miles W of Turrialba, 18–21 June 1967, Flint and Ortiz. USNM Type 72697. Paratypes: Same data, 3 ♂ 1 ♀.

BIOLOGY.—The adults were collected at an ultraviolet light placed adjacent to a small stream where it tumbles over several small falls.

11. *Smicridea* (*S.*) *calopa*, new species

FIGURES 27, 98–101, 118–119

This species is probably most closely related to the preceding species, *S. turrialbana*, new species. It is easily recognized by the rather simple ventrolateral processes of the aedeagus which bear a number of small teeth.

The female vagina presents certain diagnostic characters, most noticeably the rather complex hooklike folds capping the apex and the anteromesal excision of the lateral supports.

ADULT.—Length of forewing 4.5 mm. Color in alcohol brown; mostly denuded but indications are compatible with typical pattern (cf. Figure 20). *Male genitalia:* Ninth segment with anterior margin produced into a broad shallow lobe. Tenth tergite in lateral aspect narrow, elongate, tip produced into a dorsal point; in dorsal aspect with lateral margin slightly produced basad, apex pointed. Clasper with basal segment long, slightly inflated subapically; apical segment with tip produced into a point. Aedeagus enlarged basally, open apically; apicoventrally produced into a pair of elongate, rather irregular processes bearing a number of lateral points; with a pair of internal spines; middorsally with a membranous appendage. *Female genitalia:* Ninth segment produced anterolaterally. Vagina with central sclerite shield-shaped with a heart-shaped opening; lateral supports V-shaped, inner margin with a deep excision anteromesally, margins smooth, apex of each arm produced into a hooked lobe and a complex of sclerotized folds.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, VERACRUZ, Rió Tacolopan, route 180, km 551, 25–26 July 1966, Flint and Ortiz. USNM Type 72698. Paratypes: Same data, 2 ♂ 1 ♀.

BIOLOGY.—The adults were attracted to an ultraviolet light placed beside a clear, gravel-bottomed, spring-fed stream, 1–2 meters wide.

12. *Smicridea* (*S.*) *ulva*, new species

FIGURES 28, 102–105

Related to the following species, *S. ulva*, new species, is distinguished by the more elongate processes of the lateral plate and especially by the slender, tubular central process of the aedeagus.

ADULT.—Length of forewing 4.5 mm. Color black, legs paler basally, head with white hair anteromesally; forewing with 2 transverse white bands, apical fringe white (cf. Figure 20). *Male genitalia:* Ninth segment slightly expanded anterolaterally. Tenth tergite in lateral aspect narrow, with an angulate, upturned tip; in dorsal aspect with lateral margin expanded basally, apex angulate. Clasper with basal segment long, expanded apically; apical segment in dorsal aspect with tip produced into a point. Aedeagus enlarged basally, open apically; apex with ventral lobe produced as a pair of very long, contiguous processes mesally, and a long, slender, pointed process laterally; with a pair of long, slender central spines; with a tubular central process and a small dorsal process. *Female genitalia:* Unknown.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: NICARAGUA, CHONTALES, Puente Quinama, E of Villa Somoza, 29 July 1967, O. C. Flint, Jr. USNM Type 72699. Paratype: MATAGALPA, 5.3 miles E of Matagalpa, 30 July 1967, O. S. Flint, Jr., 1 ♂.

BIOLOGY.—Both specimens were taken at an ultraviolet light. The Matagalpa locality was adjacent to a small tumbling mountain brooklet, while the Puente Quinama locality was in the vicinity of several streams. The main stream is a large, turbulent river, 10–15 meters wide by a half to a meter deep, but there were several small streams nearby which could equally well have been the source of the type.

13. *Smicridea* (*S.*) *cuna*, new species

FIGURES 28, 106–109, 115

This Panamanian species is clearly related to *S. ulva*, new species, but is easily recognized by the structure of the aedeagus. The processes of the lateral plate are proportionately shorter and dif-

FIGURE 28.—Distribution of *Smicridea ulva*, new species, *S. cuna*, new species, and *S. tarasca*, new species.

ferently shaped, and the central tubular structure is lacking in *S. cuna*.

The large, strongly sclerotized folds completely closing the posterior of the vagina are extremely distinctive.

ADULT.—Length of forewing 4.5 mm. Color black, head with white hair anteriorly; forewing with 2 transverse white bands, apical fringe white (cf. Figure 20). *Male genitalia:* Ninth segment with anterior margin broadly rounded. Tenth tergite in lateral aspect elongate, narrow, tip produced dorsad; in dorsal aspect produced laterad basally, tip broadly rounded. Clasper with basal segment long, inflated apically; apical segment in dorsal aspect with tip produced into a point. Aedeagus enlarged basally, open apically; lateral plate produced into 2 long rods, ventralmost with tip angled laterad; internally with a pair of long spines, dorsally with a mesal appendage. *Female genitalia:* Ninth segment produced anterolaterally. Vagina with central sclerite shield-shaped, with a round opening; lateral supports V-shaped, somewhat irregular in outline; with posterior area completely filled by convoluted, heavily sclerotized folds.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: PANAMA, CANAL ZONE, Barro Colorado Island, Shannon Creek, 10 July 1967, W. W. Wirth, malaise trap. USNM Type 72700. Paratypes: Same data, 1 ♂; same, but 12 March 1967, M. E. Irwin, many ♂ ♀ (UCR); same, but 22–28 March 1924, Cornell University, 1 ♂ (CU). PANAMA: Alhajuelo, 6 April 1911, A. Busck, 1 ♂. COLON: Portobelo, 18 February 1911, A. Busck, 5 ♂ 1 ♀.

BIOLOGY.—The specimens taken by Dr. Wirth were found in a malaise trap placed across Shannon Creek. At this point the creek is barely a foot wide and arises from many small springs and seeps.

14. *Smicridea* (*S.*) *matagalpa*, new species

FIGURES 29, 120–123, 136

This species is rather widely distributed over the southern half of Central America. It does not show any obvious relationships to the other regional species of the *nigripennis* group, nor to any known South American species. The paired, decumbent, dorsal processes of the aedeagus, simple divergent ventral processes with small basolateral teeth, and paired central rods are very distinctive.

The broadly U-shaped lateral supports in the vagina, with a series of sclerotized folds capping each arm, produce a distinctive appearance to the internal female genitalia.

ADULT.—Length of forewing 5–5.5 mm. Color black, legs paler basally, head with white hair anteriorly; forewing with 2 transverse white bands, apical fringe white (rarely with white markings lacking) (cf. Figure 20). *Male genitalia:* Ninth segment with anterior margin produced into a small, narrow lobe. Tenth tergite in lateral aspect rather short, tapering to a pointed and upturned apex; in dorsal aspect very broad basally, tapering to a small, narrowly produced apex. Clasper with basal segment long, inflated apicad; apical segment in dorsal aspect, with tip produced into a point. Aedeagus enlarged basally, open apically; apex with ventral lobe produced into a pair of slightly divergent processes as seen in ventral aspect, each process bearing laterally several small points; dorsolateral margins produced into decumbent pointed lobes, with a pair of central membranous rods. *Female genitalia:* Ninth segment produced anterolaterally. Vagina with central sclerite nearly rectangular, with a round opening; lateral supports parallel, with anterior margin transverse; with a complex of sclerotized folds posteriad to each arm and a central plate with reflexed lateral margins.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: NICARAGUA, MATAGALPA, 5.3 miles E of Matagalpa, 30 July 1967, O. S. Flint, Jr. USNM Type 72701. Paratypes: Same data, 2 ♂ 6 ♀.

HONDURAS: FRANCISCO MORAZAN: Tegucigalpa, 6 October 1917, F. J. Dyar, 1 ♀.

COSTA RICA: CARTAGO: La Suiza, 17 June 1967, Flint and Ortiz, 2 ♂. Tuis, 18 June 1967, Flint and Ortiz, 1 ♀. Turrialba, 22–28 February 1965, S. S. and W. D. Duckworth, 2 ♂. 3 miles W of Turrialba, 18–21 June 1967, Flint and Ortiz, 1 ♂ 5 ♀.

PANAMA: CHIRIQUI: Boquette, 16–17 July 1967, O. S. Flint, Jr., 24 ♂ 28 ♀. COCLE: El Valle, 15 July 1967, O. S. Flint, Jr., 4 ♂ 1 ♀. CANAL ZONE: Pipeline Road, Rió Agua Salud, 8–12 July 1967, Flint and Ortiz, 1 ♀. Paraiso, 15 January 1911, A. Busck, 1 ♂.

BIOLOGY.—All the adults that I have collected were taken at an ultraviolet light. The adjacent

FIGURE 29.—Distribution of *Smicridea campana,* new species, *S. matagalpa,* new species, and *S. pipila,* new species.

streams were usually less than 5 meters wide and tumbling rapidly over a bottom of boulders and gravel.

15. *Smicridea* (*S.*) *tarasca,* new species

FIGURES 28, 124–127, 134–135

Although this species is probably most closely related to the following, *S. tarasca,* new species, appears to occupy a rather isolated taxonomic position in the subgenus. The long, dorsomesal, tubular process of the aedeagus with its apicolateral earlike lobes is extremely distinctive.

The very simple, smooth, lateral supports in the vagina produce a very distinctive appearance.

ADULT.—Length of forewing 4.5–5 mm. Color brownish black, legs paler basally, head with anteromesal hair slightly paler; forewing with 2 paler crossbands, which are sometimes obsolete, fringe dark. *Male genitalia:* Ninth segment with anterior margin developed into a broadly rounded lobe. Tenth tergite narrow and rather short in lateral aspect, with tip narrowed and rounded; in dorsal aspect, broad basally, evenly rounded to apex, apex barely produced. Clasper with basal segment long, slightly inflated subapically; apical segment tapering to a rounded apex. Aedeagus with basal half enlarged, open apically; apex with ventral lobe entire, produced into a short, terete mesal lobe; with 2 long, slightly curved central spines; with a dorsal tubular structure ending in a pair of lateral earlike lobes. *Female genitalia:* Ninth tergum produced anterolaterally. Vagina with central sclerite pear-shaped with mesal opening elongate, lateral supports parallel-sided, anterior margin truncate, with several lightly sclerotized plates posteriad.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, MICHOACAN, San Lorenzo, route 15, km 206, 14–15 July 1966, Flint and Ortiz. USNM Type 72702. Paratypes: Same data, 4 ♂ 1 ♀. MORELOS: Cuernavaca, San Anton Falls, 13 July 1965, Flint and Ortiz, 1 ♀.

BIOLOGY.—Adults were taken both by sweeping overhanging foliage and at an ultraviolet light.

Both localities were at rather small (half meter wide by a tenth meter deep), clear, spring-fed rivulets.

16. *Smicridea* (*S.*) *campana*, new species

FIGURES 29, 128–131

This species is distantly related to the preceding species, but shows great differences in the structure of the aedeagus. In *S. campana* this structure is comparatively simple with 2 pairs of internal spines and a small central structure.

The female of this species is unknown.

ADULT.—Length of forewing 4.5 mm. Color black, legs paler, head denuded; forewing with 2 transverse white bands, apical fringe white (cf. Figure 20). *Male genitalia:* Ninth segment nearly vertical anteriorly, then bent posteriad at right angles dorsally. Tenth tergite in lateral aspect, long and narrow, tip produced dorsad; in dorsal aspect with lateral margin tapering evenly to apex which is narrowly rounded. Clasper with basal segment long, inflated apically; apical segment with tip produced into a point in dorsal aspect. Aedeagus enlarged basally, open apically; apex with ventral lobe entire, produced into a terete mesal rod; internally with a pair of long spines, a pair of short spines, and a lightly sclerotized, ringlike structure. *Female genitalia:* Unknown.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: PANAMA, PANAMA, Cerro Campana, July 1967, W. W. Wirth. USNM Type 72703. Paratypes: Same data, 1 ♂; same, but F. S. Blanton, light trap, 1 ♂.

BIOLOGY.—The types were either swept at a small, tumbling, mountain brook, or taken in a light trap operated nearby.

17. *Smicridea* (*S.*) *pipila*, new species

FIGURES 29, 64–67, 132–133

This is another species which, beyond its obvious placement in the *nigripennis* group, does not show any clear relationships. The very broad, truncate mesal lobe and unusual mesal structure of the aedeagus are diagnostic. In the Mexican specimen the aedeagus differs somewhat in being proportionately longer between the ventral attachment near midlength and the commencement of the dorsal complex, and in that the ventral, internal spine is long and straight. The remainder of the genitalia seem identical, however.

The general appearance of the sclerites of the female vagina is totally different from that of any other known species, and permits easy identification.

ADULT.—Length of forewing 4 mm. Color in alcohol, dark brown; with an indication of transverse pale bands on the forewing. *Male genitalia:* Ninth segment with anterior margin developed into a rounded lobe. Tenth tergite short in lateral aspect, tapering from a broad base to a rounded apex; in dorsal aspect with apex truncate, lateral margin not produced. Clasper with basal segment long, barely inflated apically; apical segment with tip barely pointed in dorsal aspect. Aedeagus with basal half enlarged, open apically; apex with ventral lobe entire, broadly scoop-shaped, truncate apically; internally with a complex of structures, including a hooked ventral spine, and a pair of elongate, lightly sclerotized processes. *Female genitalia:* Ninth segment produced anterolaterally. Vagina with several lobes anteriorly, central sclerite thick with an elongate mesal opening, with lateral caplike sclerites.

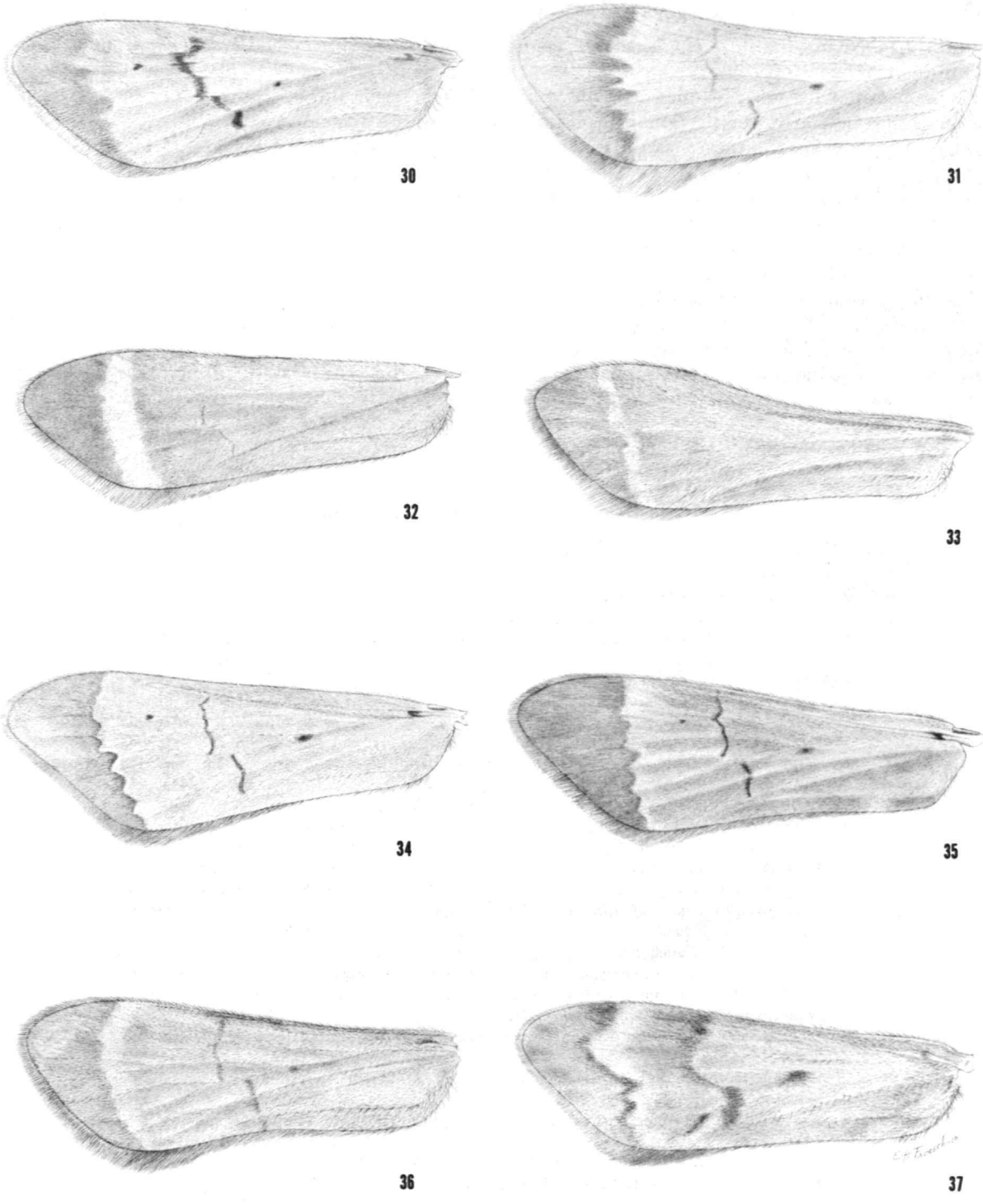
IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: GUATEMALA, ESCUINTLA, Rió Metapa, 10 km SE of Escuintla, 275 m elevation, 5–6 March 1970, E. J. Fee. USNM Type 72704. Paratype: Same data, 1 ♀. Other: MEXICO (no further data), A. Dampf, MF 4643, 1 ♂ (INHS).

BIOLOGY.—Nothing is known of the biology of this species.

Subgenus *Rhyacophylax* Müller

As outlined under the subgenus *Smicridea*, the two subgenera are easily characterized in the adult stage, but not in the immature stages. The manner of separation of the veins R_{2+3} and R_{4+5} and the proximity of the radiomedial system basally to the cubital system in the hind wing are sufficient for the recognition of the two subgenera. In addition the fifth abdominal sternum in *Rhyacophylax* bears anterolateral filaments which are lacking in *Smicridea* sensu stricto. The males of *Rhyacophylax* lack the two preapical spurs on the hind leg



FIGURES 30–37.—Forewings: 30, *Smicridea signata* (Banks); 31, *S. radula*, new species; 32, *S. arizonensis*, new species; 33, *S. salta*, new species; 34, *S. acuminata*, new species, male; 35, female; 36, *S. zanclophora*, new species; 37, *S. dispar* (Banks).

rather than having the full complement of spurs as in the nominate subgenus.

The species of the subgenus that occur in Mesoamerica may be placed into five groups, which are not so sharply defined, however, as the two major groups in *Smicridea* sensu stricto. The *signata* group is defined by the possession of a fixed, tongue-like process ventrally from the apex of the aedeagus, and there is often a lobe with spines from the ventrolateral margin of the tenth tergite. This group contains *S. signata* (Banks), *S. bifurcata,* new species, *S. salta,* new species, *S. inarmata,* new species, and S. *arizonensis,* new species. The second group contains only *S. radula,* new species. This species offers so many unique structures in the aedeagus and tenth tergite that it is difficult to discern its relationships. The next two species, *S. acuminata,* new species, and *S. talamanca,* new species, belong to the *peruana* group, which, like the *magna* group, seems to be centered in South America. These are large species, and the aedeagus often bears asperites externally and a rather complex, eversible internal complex. *Smicridea zanclophora,* new species, is the only regional species that belongs to the *magna* group. This group is recognized by the lack of the apicoventral lobe on the aedeagus and the possession of a pair of apicodorsal lobes. The *dispar* group contains in addition to *S. dispar* (Banks), *S. dithyra,* new species, and *S. veracruzensis,* new species. In this group the aedeagus is quite simple, without major lobes apically, and the forewings have a characteristic dark coloration (Figure 37).

Key to Species, Subgenus *Rhyacophylax**

1. Males 2
   Females 13
2. Aedeagus bearing a fixed apicoventral, tonguelike lobe (Figures 139–140) 3
   Aedeagus without such a lobe (Figures 160, 165) 7
3. Aedeagus laterally with serrate lobes, and with paired apicodorsal lobes (Figures 137–140) ..... 18. *S. signata* (Banks)
   Aedeagus lacking lateral and apicodorsal lobes (Figures 143–144) 4
4. Tenth tergite with a bifurcate lateral process, and apex with several small teeth (Figures 141–144) ..... 19. *S. bifurcata,* new species
   Tenth tergite either unarmed or with a single point, tip without teeth (Figures 145–153) 5
5. Tenth tergite with a single ventrolateral point, (Figures 153–156); size small (forewing 3.5 mm) ..... 22. *S. salta,* new species
   Tenth tergite without ventrolateral points (Figure 145); forewing at least 4.5 mm long 6
6. Apicoventral process of aedeagus two-thirds as wide in dorsal aspect as tip of stem, straight in outline (Figures 149–152) ..... 21. *S. arizonensis,* new species
   Apicoventral process of aedeagus about one-fourth as wide as stem, sinuate in lateral aspect (Figures 145–148) ..... 20. *S. inarmata,* new species
7. Aedeagus with a pair of apicodorsal lobes, caliper-like in posteroventral aspect (Figures 170–173) ..... 26. *S. zanclophora,* new species
   Aedeagus without such lobes (Figures 164, 177) 8
8. Aedeagus with a broad, elongate apicodorsal lobe overhanging the venter which bears laterally a cluster of small teeth (Figures 162–165) ..... 23. *S. radula,* new species
   Aedeagus without such lobes (Figures 159, 177) 9
9. Aedeagus simple, at most with a pair of internal apicolateral plates (Figures 177, 181, 185) 10
   Aedeagus more complex, with lateral asperites or apical processes, and with an internal complex (Figures 159, 168) 12
10. Aedeagus with stem long, arched, with axis at right angles to basal opening (Figures 174–177) ..... 29. *S. veracruzensis,* new species
    Aedeagus shorter, with axis at about 120° to base (Figures 181, 185) 11
11. Aedeagus apically with distinct, eversible, ventrolateral plates (Figures 182–186) ..... 28. *S. dithyra,* new species
    Aedeagus with dark apicolateral structures, apparently not eversible (Figures 178–181) ..... 27. *S. dispar* (Banks)

* Female of *S. inarmata* unknown.

12. Ninth sternum with a pointed, triangular process between bases of claspers (Figures 157–161) ..... 24. *S. acuminata*, new species
Ninth sternum without posterior process (Figures 166–169) ..... 25. *S. talamanca*, new species

13. Vaginal sclerites consisting of an anterior transverse bar, with a central pore (Figures 203, 210–214) 14
Vaginal sclerites consisting of an anterior, transverse bar, with either a pair of large, lightly sclerotized plates or a U-shaped sclerite posteriorly (Figures 187–202, 205–208) 17

14. Internal plate with lateral arms parallel, anterior bridge narrow and transverse (Figures 203–204) ..... 26. *S. zanclophora*, new species
Internal plate with lateral arms V- or U-shaped, anterior bridge obsolescent (Figures 209–214) 15

15. Anterior bar of vagina with central pore complexly sclerotized; internal plate broad anteriorly, U-shaped (Figures 213–214) ..... 29. *S. veracruzensis*, new species
Anterior bar with central pore simple; internal plate narrow, V-shaped (Figures 209–212) 16

16. Internal plate with a pair of small knobs anteromesally; anterior bar with ends directed primarily laterad (Figures 211–212) ..... 28. *S. dithyra*, new species
Internal plate without knobs; anterior bar with apices directed primarily posteriad (Figures 209–210) ..... 27. *S. dispar* (Banks)

17. Vagina with a heavily sclerotized U-shaped sclerite posteriad of anterior bar (Figures 205–208) 18
Vagina with a pair of lightly sclerotized plates posteriad of anterior bar (Figures 187–202) 19

18. Internal plate with anterior bridge broad, with a small, dark anteromesal tab (Figures 205–206) ..... 24. *S. acuminata*, new species
Internal plate with anterior bridge narrow, bearing a large anteriorly directed plate (Figures 207–208) ..... 25. *S. talamanca*, new species

19. Dorsal bridge of ninth tergum short, in dorsal aspect with lateral margins expanded, shoulder-like; posterior plates of vagina sharply angled at midlength (Figures 199–202) ..... 23. *S. radula*, new species
Not with above combination of characters (Figures 187–198) 20

20. Internal plate narrow, Y-shaped in posterodorsal aspect (Figures 193–195) ..... 22. *S. salta*, new species
Internal plate with anterior bridge broad, sometimes with an anteromesal appendage (Figures 188, 191, 198) 21

21. Posterior vaginal sclerites small; internal plate with a broad anterior bridge (Figures 196–198) ..... 21. *S. arizonensis*, new species
Vaginal sclerites long and broad, sometimes with a faint indication of anteromesal connection; internal plate with anterior bridge bearing a tonguelike appendage (Figures 187–192) 22

22. Internal plate with anterior bridge and appendage narrower, more V-shaped; dorsal bridge of ninth segment about one-third length of segment (Figures 190–192) ..... 19. *S. bifurcata*, new species
Internal plate with anterior bridge and appendage broader, generally U-shaped; dorsal bridge of ninth segment nearly two-thirds length of segment (Figures 187–189) ..... 18. *S. signata* (Banks)

18. *Smicridea* (*R.*) *signata* (Banks)

FIGURES 8, 30, 38, 137–140, 187–189, 219, 226–227

Pellopsyche signata Banks, 1903a:243.
Rhyacophylax signatus (Banks).—Ulmer, 1907b:176; 1913: 391.—Milne, 1936:72–73.—Fischer, 1963:137; 1972:145.
Smicridea signata (Banks).—Ross, 1947:145.

This is probably the most frequently encountered species of the genus in Mesoamerica, and is also often extremely abundant. The males are easily recognized by the presence of a lateral serrate process and a pair of apicodorsal lobes on the aedeagus. There is considerable variation in the degree to which the serrate process of the aedeagus and

the ventral lobe of the tenth tergite are developed. However, these lobes are present, in some degree, in all the males here identified as *S. signata*. It is possible that *S. bifida*, new species, and *S. inarmata*, new species, are individuals or populations in which these structures are lost. In the case of *S. bifida*, at least, this seems unlikely as it is generally sympatric with *S. signata*.

The female genitalia are less distinctive than those of the male, although generally sufficient for identification. The dorsal bridge of the ninth segment in lateral aspect is proportionately much longer than in the closely related *S. bifurcata* and the anterior bridge of the internal plate is broad and often hoodlike.

The anterior margin of the larval frontoclypeus is very distinctive. The three or four lobes on each side are unlike those of any other known species. The pupae differ from those of the *fasciatella* group in possessing only a single row of hooks anteriorly on plate 3P. In this regard they agree with the pupae of *S. dispar* (Banks), but may be distinguished by being slightly smaller.

ADULT.—Length of forewing 4–6 mm. Color generally pale yellowish brown; forewings pale yellowish with darker marks along crossveins and beyond anastomosis (some females have the forewing almost uniformly brown with a transverse white band along anastomosis) (Figure 30). Fifth sternum in male with anterolateral process slightly longer than sternum; about half length of sternum in female. *Male genitalia:* Ninth segment with anterolateral margin slightly produced into an upturned lobe. Tenth tergite in lateral aspect with tip narrowly produced into an upturned point, ventral margin at midlength bearing a small lobe which may vary from rounded and barely produced to distinctly projecting and bifurcate; in dorsal aspect with apex produced into a long, rounded lobe. Clasper with basal segment long and slightly inflated apically; apical segment with tip rounded in dorsal aspect. Aedeagus tubular, with basal section enlarged and meeting apical section at about 120°; with a lateral serrate lobe nearly at midlength (lobe varying considerably in length); apex with a bilobed, erect, dorsal plate, and a tonguelike, slightly sinuate ventral lobe, internally with long, paired, eversible rods. *Female genitalia:* Ninth segment produced posteriad, dorsal bridge about two-thirds length of segment. Internal plate in lateral aspect sharply angled at midlength, in posterodorsal aspect U-shaped, with anterior bridge broad and produced anteromesally, often appearing hoodlike. Vagina with ends of anterior bar pointed, directed posteriad; posteromesally with a pair of lightly sclerotized ovoid plates darkened on mesal margins.

LARVA.—Length to 6 mm. Sclerites generally pale yellowish brown; head usually darker dorsally and ventrally, pale around eyes. Anterior margin of frontoclypeus with pronounced sublateral projections consisting of 3 or 4 lobes each. Mandibles with molar tooth small, that of right mandible consisting of rounded lobes only. Metasternum with 1 pair of gill stalks.

PUPA.—Length 4.5 mm. Hook plates anteriorly lacking small secondary points; plate 3P with a single row of spines along anterior margin.

MATERIAL.—U.S.A.: COLORADO: No further data, 1 ♀ holotype (MCZ). Garfield County, Colorado R. bottom near Rifle, 20 July 1941, B. Patterson, 1 ♂ 6 ♀ (INHS). UTAH: Near Moab, 27 June 1943, G. F. Knowlton, 42 ♂ (INHS); same, but on willows along Colorado River, 36 ♂. NEW MEXICO: Catron County, Gila National Monument, 6000′, 4 July 1964, D. R. Davis, 2 ♀. ARIZONA: Clear Creek Campground, SE of Camp Verde, 17 June 1968, Flint and Menke, 1 ♂ 12 ♀.

MEXICO: SAN LUIS POTOSI: Palitla, 25 June 1965, O. S. Flint, Jr., 3 ♂ 5 ♀; same, but 5 June 1966, 100 ♂ ♀; same, but 5 August 1966, 1 ♀. 2 miles N of Tamazunchale, 400′, 2 August 1963, Duckworth and Davis, 5 ♀. Rancho Quemado, route 85, km 353, 4–6 August 1966, O. S. Flint, Jr., 3 ♂ 2 ♀. Huichihuyan (25 miles N of Tamazunchale), 3–4 August 1963, Duckworth and Davis, 14 ♂ 17 ♀. VERACRUZ: Cordoba, 11–20 November 1966, A. B. Lau, 1 ♂ 1 ♀; same, but 13 August 1964, P. J. Spangler, 2 ♀. Cuitlahuac, 10–12 August 1964, P. J. Spangler, 200 ♂ ♀. Puente Nacional, 23–24 July 1965, Flint and Ortiz, 4 ♂ 5 ♀; same, but 31 July 1966, 7 ♂ 5 ♀. Rió Tacolapan, route 180, km 551, 25–26 July 1966, Flint and Ortiz, 100 ♂ ♀. DISTRITO FEDERAL: Lomas de Chapultepec, 19 July 1938, A. Dampf, 1 ♂ (INHS). JALISCO: 8 miles N of Guadalajara, 4 July 1964, P. J. Spangler, 4 ♀. Tejuila, 29 July 1934, A. Dampf, 2 ♂ 1 ♀ (INHS). NAYARIT: Tepic, 3000′, 21 August 1964, Blanton and Broce, 2 ♀. MICHOACAN: Huetamo, stream bank 20 km from Rió Balsas, 22 August

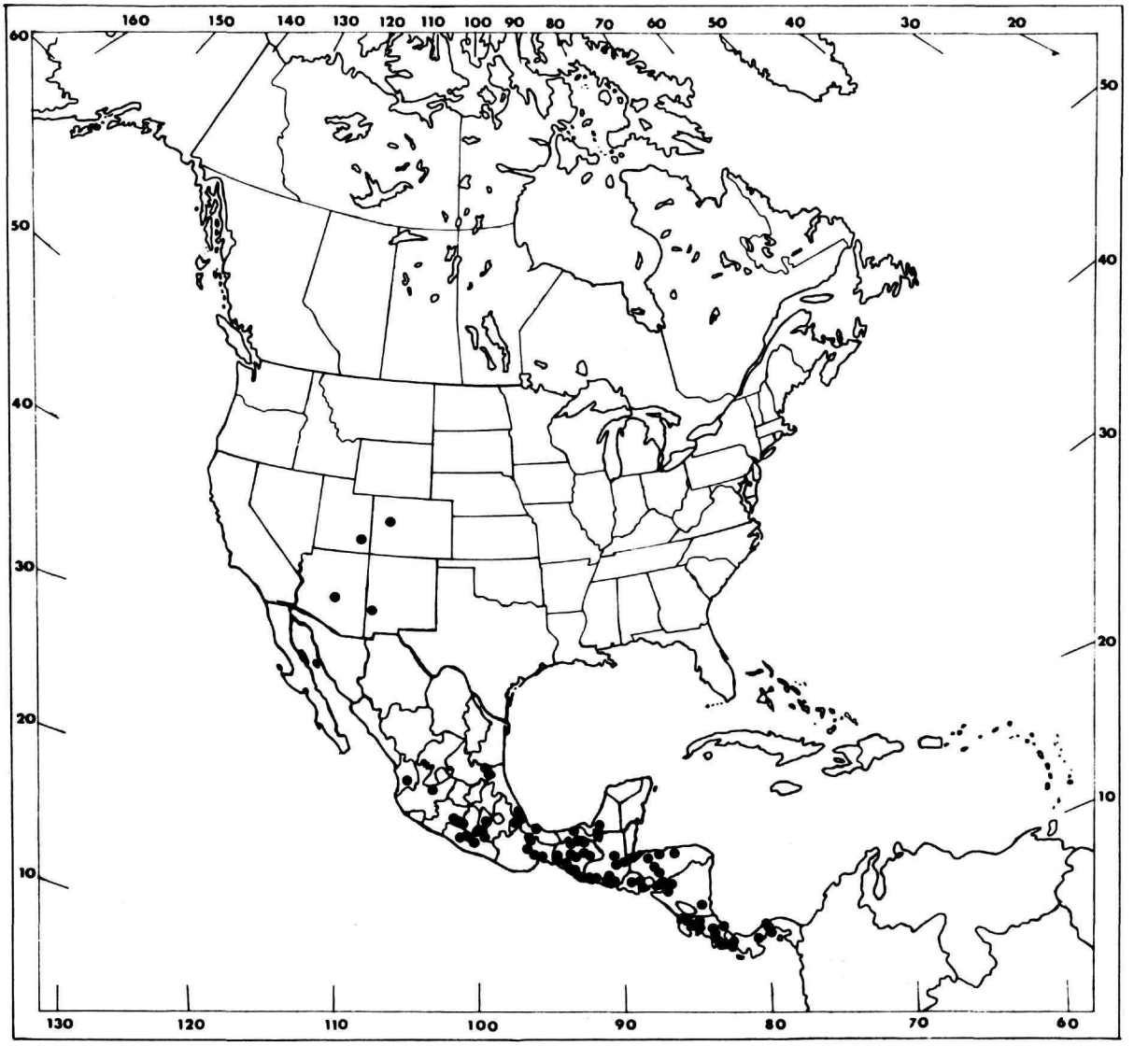


FIGURE 38.—Distribution of *Smicridea signata* (Banks).

1933, A. Dampf, 25 ♂ ♀ (INHS). Cutzamala, 20 August 1930, A. Dampf, 14 ♂ ♀ (INHS). GUERRERO: Cocula, 5 March 1935, A. Dampf, 1 ♂ (INHS); same, but 6 August 1930, T. Parra, 4 ♂. Acatlan del Rio, 10 August 1930, T. Parra, 20 ♂ ♀ (INHS). Tetla, 11 August 1930, A. Dampf, 4 ♂ 6 ♀ (INHS). Vejulo, Rió Balsas, 3 September 1930, A. Dampf, 4 ♂ (INHS). MORELOS: Acatilpa, 16 July 1965, Flint and Ortiz, 5 ♀. Xochitepec, 12–14 July 1965, Flint and Ortiz, 1 ♂ 13 ♀. Near Xochitepec, route 95, km 91, 1 August 1965, O. S. Flint, Jr., 60 ♂ ♀. Cuautla, 2 September 1937, A. Dampf, 100 ♂ (INHS); same, but 28 August 1937, 1 ♂. Cuernavaca, 16 July 1930, A. Dampf, 16 ♂ (INHS). OAXACA: near El Camaron, route 190, km, 687, 12 August 1967, O. S. Flint, Jr., 3 ♀. Tehuantepec, 23 July 1964, P. J. Spangler, 6 ♂ 32 ♀. Valle Nacional, 2 March 1932, A. Dampf, 1 ♂ (INHS). Rancho Moter, 16 December 1973, A. Dampf, 3 ♂ (INHS). Laguna Superior de Juchitan, 30

April 1932, A. Dampf. 50 ♂ (INHS). Chiltepec, 9 December 1937, A. Dampf, 1 ♂ (INHS); same but 12 December 1937, 4 ♂. CHIAPAS: 7.8 miles E of Pichucalco, 27–28 July 1966, Flint and Ortiz, 4 ♀. El Chorreadero, near Chiapa de Corzo, 11 August 1967, O. S. Flint, Jr., 27 ♂ 11 ♀. Mazatan, 12 November 1932, A. Dampf, 2 ♂ (INHS). Chiapa de Corzo, 26 July 1926, A. Dampf, 4 ♂ (INHS). Arriaga, 22 August 1965, P. J. Spangler, 200 ♂ ♀. E of Arriaga, route 185, km 135, 7–8 July 1966, Flint and Ortiz, ♀ metamorphotype, larvae. Puente Arroyo Viejo, route 200, km 141, near Mapastepec, 7 July 1966, Flint and Ortiz, 3 ♂; same, but 9 June 1967, 200 ♂ ♀. Near Pijijiapan, 5 July 1965; P. J. Spangler, 32 ♂ 24 ♀. Acapatehua, 7 November 1932, A. Dampf, 1 ♂ (INHS). Finca Vergel, 22 May 1935, A. Dampf, 1 ♂ (INHS). Escuintla, bank mountain stream, 11 November 1930, A. Dampf, 35 ♂ ♀ (INHS). Mapastepec, 5 November 1932, A. Dampf, 2 ♂ (INHS). San Cristobal, 1 June 1926, A. Dampf, 6 ♂ (INHS). Copainala, 5 November 1946, A. Dampf, 3 ♂ (INHS). Tonala, 27 November 1932, A. Dampf, 55 ♂ (INHS); same, but 3 November 1932, 5 ♂; same, but 2 November 1932, 162 ♂. Santa Lucia, 29 July 1926, A. Dampf, 3 ♂ (INHS). Tuxtla Gutierrez, 29 May 1926, A. Dampf, 3 ♂ (INHS). Huixtla, Sierra Madre, 9 November 1932, A. Dampf, 2 ♂ (INHS). Ocosingo Valley, Finca El Real, 1–7 July 1950, C. and M. Goodnight and L. S. Stannard, 9 ♂ 6 ♀ (INHS); same, but Rió Santa Cruz, 1 July 1950, 250 ♂ ♀. TABASCO: Balancan, 2 January 1939, A. Dampf, 2 ♂ (INHS). Las Mercedes, 25 June 1938, A. Dampf, 1 ♂ (INHS). Pocvicuc, 1 January 1939, A. Dampf, 4 ♂ (INHS). Villahermosa, 13 August 1937, A. Dampf, 3 ♂ (INHS). Rió Puyacatengo, E of Teapa, 28–29 July 1966, Flint and Ortiz, 300 ♂ ♀, 1 ♀ metamorphotype, 5 larvae. CAMPECHE: Salto Grande, 11 January, 1939, A. Dampf, 5 ♂ 1 ♀ (INHS).

GUATEMALA: SAN MARCOS: Puente Ixben, 6 July 1966, Flint and Ortiz, 2 ♀. RETALHULEU: Puente El Nino, 16 June 1966, Flint and Ortiz, 1 ♂ 13 ♀. SUCHITEPEQUEZ: Cuyotenango, 10–20 June 1966, Flint and Ortiz, 4 ♂ 7 ♀; same, but 30 December 1965, J. M. Campbell, 2 ♀. Puente Ixtacapa, near San Antonio, 18–19 June 1966, Flint and Ortiz, 23 ♂ 50 ♀. San Antonio, 6 July 1965, P. J. Spangler, 1 ♂ 1 ♀. Finca Mocá, 12 June 1966, Flint and Ortiz, 5 ♂ 6 ♀. Rió Sis, 22 km S. of Finca La Maquina, 11 June 1966, Flint and Ortiz, 10 ♂ 7 ♀. ESCUINTLA: Tequisate, 4–12 May 1929, G. Heinrich, 1 ♀. Escuintla, Grutas de San Pedro Martir, 10 July 1965, P. J. Spangler 100 ♂ ♀. Rió Metapa, 10 km SE of Escuintla, 5–6 March 1970, E. J. Fee, 5 ♂ 3 ♀. JUTIAPA: Laguna Nisguaya, 4 August 1965, P. J. Spangler, 11 ♂ 14 ♀. ZACAPA: Rió Teculutan, 18 August 1965, Flint and Ortiz, 100 ♂ ♀. EL PROGRESSO: San Agustin Acasaguastlan, 11–21 August 1965, Flint and Ortiz, 12 ♂ 20 ♀. IZABAL: Near Matias de Galvez, 26–27 June 1966, Flint and Ortiz, 3 ♀. ALTO VERA PAZ: Coban, 22–23 June 1966, Flint and Ortiz, 1 ♀.

EL SALVADOR: LA LIBERTAD: Quezaltepeque, 11 February 1965, S. S. and W. D. Duckworth, 7 ♂ 10 ♀. Rió El Palmar, near La Libertad, 2–3 July 1966, Flint and Ortiz, 2 ♀. SAN SALVADOR: Lago Ilopango, 5 August 1967, O. S. Flint, Jr., 3 ♂; same, but 2 August 1965, P. J. Spangler, 4 ♀. USULUTAN: San Nicholas Lempa, 31 July 1965, P. J. Spangler, 6 ♀.

HONDURAS: VALLE: Nacaome, 4 August 1967, O. S. Flint, Jr., 200 ♂ ♀, ♂ ♀ metamorphotypes, larvae and pupae. 5 miles W of Jicaro Galan Junction, 9 July 1965, P. J. Spangler, 70 ♂ ♀. CHOLUTECA: Pespire, 1 August 1967, O. S. Flint, Jr., 100 ♂ ♀. 5 miles E of Choluteca, 28 July 1965, P. J. Spangler, 300 ♂ ♀. COMAYAGUA: Rancho Chiquito, SE of Flores, 2–3 August 1967, O. S. Flint, Jr., 6 ♂ 2 ♀. Rió Humuya, NW of Comayagua, 3 August 1967, O. S. Flint, Jr., 100 ♂ ♀. YORO: 12 km W of Olanchito, 11 May 1949, E. C. Becker, 5 ♂ 9 ♀ (INHS); same, but 17 May 1949, 50 ♂ 3 ♀; same, but 24–25 May 1949, 300 ♂ 500 ♀; same, but 20 June 1949, 2 ♂; same, but 21 June 1949, 25 ♂; same, but 5–7 July 1949, 8 ♂ 14 ♀; same, but 13 July 1949, 2 ♂. ATLANTIDA: La Ceiba, 27–29 March 1920, W. M. Mann, 2 ♂; same, but 27 May 1949, E. C. Becker, 2 ♂ 2 ♀ (INHS); same, but 29 May 1949, 5 ♂; same, but 2 June 1949, 2 ♂; same, but 7 June 1949, 1 ♂; same, but 16 June 1949, 1 ♂; same, but 21 June 1949, 2 ♂; same, but 22 June 1949, 35 ♂; same, but 14 July 1949, 4 ♂ 5 ♀; same, but 19–21 July 1949, 4 ♂ 7 ♀; same, but 29–30 July 1949, 2 ♂; same, but 22 August 1949, 4 ♂ 9 ♀. Lancetilla, August, Stadelmann, 4 ♂ 6 ♀ (MCZ). SANTA BARBARA: Casas Viejas, 250′, 20 May 1966, J. M. Matta, 30 ♂ ♀.

NICARAGUA: NUEVA SEGOVIA: Rió Coco, Ocotal, 31 July 1967, O. S. Flint, Jr., 75 ♂ ♀. ESTELI:

Ducuali, 13 June 1967, Flint and Ortiz, 3 ♂ 21 ♀. CHONTALES: Puente Quinama, E of Villa Somoza, 29 July 1967, Flint and Ortiz, 300 ♂ ♀.

COSTA RICA: GUANACASTE: 1.5 miles S of Potrerillos, 27 July 1967, O. S. Flint, Jr., 2 ♀. Quebrada Tronadorcita, Arenal, 24 July 1967, O. S. Flint, Jr., 8 ♂ 24 ♀. Rió Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr., 36 ♂ 7 ♀. Las Canas, 13 July 1965, P. J. Spangler, 28 ♂ 20 ♀. Rió Canas, Las Canas, 28 June 1967, Flint and Ortiz, 1 ♀. Taboga, 26–29 June 1967, Flint and Ortiz, 2 ♂ 2 ♀. PUNTARENAS: Rió Seco, NW of Esparta, 23 July 1967, O. S. Flint, Jr., 75 ♂ ♀. 9 miles NW of Esparta, 22 July 1965, P. J. Spangler, 25 ♂ 22 ♀. Rió La Vieja, near Lagarto, 2–3 July 1967, Flint and Ortiz, 5 ♂. 2.8 miles E of Golfito, 3–4 July 1967, Flint and Ortiz, 7 ♂ 3 ♀; same, but 18–19 July 1967, 43 ♂ 16 ♀. CARTAGO: Turrialba, 17–21 February 1965, S. S. and W. D. Duckworth, 1 ♀. LIMON: La Lola, near Matina, 11 March 1965, S. S. and W. D. Duckworth, 24 ♂ 42 ♀. SAN JOSE: Rió General, Pacuare, 1 July 1967, Flint, Spangler and Ortiz, 2 ♂ 1 ♀.

PANAMA: CHIRIQUI: Rió Caimito, 10 miles N of David, 4 July 1967, Flint, Spangler and Ortiz, 4 ♂ 23 ♀. Dolega, 17 July 1967, O. S. Flint, Jr., 300 ♂ ♀. David, Rovira, 2200′, 13 July 1964, A. Broce, 2 ♂ 1 ♀. David, Doleguita, 3 June 1964, A. Broce, 11 ♂ 21 ♀. COCLE: El Valle, 15 July 1967, O. S. Flint, Jr., 1 ♂. CANAL ZONE: Pipeline Road, Rió Agua Salud, 8–12 July 1967, Flint and Ortiz, 14 ♂; same, but 30 March 1965, S. S. and W. D. Duckworth, 6 ♂ 2 ♀. Pipeline Road, near Gamboa, July 1967, W. W. Wirth, 1 ♂. Madden Dam, 10–13 July 1967, O. S. Flint, Jr., 2 ♀.

BIOLOGY.—The immature stages have been collected a number of times on rocks in shallow riffles in full sun. The streams vary greatly in size, from small ones barely a meter wide, to larger ones 10–20 meters in width. If proximity of adult collections are an indication, they may well breed in rivers too large and deep to be worked easily on foot.

The adults come freely to lights, both white and ultraviolet, and may be beaten from overhanging foliage.

19. *Smicridea (R.) bifurcata*, new species

FIGURES 39, 141–144, 190–192

This species is closely related to *S. signata* (Banks) with which it often occurs. The males are recognized by the lack of lateral processes and apicodorsal lobes on the aedeagus, and by the presence of the small apical points and bifurcate process ventrolaterally on the tenth tergite.

The female differs in the shape of the ninth tergum, in which the dorsal bridge is proportionately much shorter than in *S. signata,* and in the anterior bridge of the internal plate which is much narrower.

ADULT.—Length of forewing 4.5 mm. Color pale yellowish brown; forewing marked much as in *S. signata,* but with dark subterminal band narrower and with wing tip pale. Fifth sternum in male with anterolateral process about one and one-half times length of sternum; slightly less than length of sternum in female. *Male genitalia:* Ninth segment with anterolateral process upturned. Tenth tergite rapidly narrowed to an upturned apex in lateral aspect and with a bifurcate process ventrolaterally; in dorsal aspect with tip bluntly rounded and with small sclerotized points marginally. Clasper with basal segment long, parallel-sided; apical segment with rounded apex in dorsal aspect. Aedeagus tubular, apical and basal sections meeting at about 100°; apex with a tongue-like process from near ventral margin, ventrally with a small lobe bearing several spicules, internally with a long, paired eversible structure. *Female genitalia:* Ninth segment short dorsally, with anterolateral margin obliquely produced and angled. Internal plate U-shaped in posterodorsal aspect with bridge broad, and with a tonguelike anterior process. Vagina with ends of anterior bar produced posteriad; with a pair of elongate, lightly sclerotized plates posteriorly.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: COSTA RICA, GUANACASTE, Rió Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr. USNM Type 72705. Paratypes: Same data, 54 ♂ 13 ♀. Las Canas, 13 July 1965, P. J. Spangler, 1 ♂ 3 ♀. PUNTARENAS: Rió La Vieja, near Lagarto, 2–3 July 1967, Flint and Ortiz, 21 ♂ 145 ♀. Rió Seco, NW of Esparta, 23 July 1967, O. S. Flint, Jr., 1 ♂.

HONDURAS: COMAYAGUA: Rió Humuya, NW of Comayagua, 3 August 1967, O. S. Flint, Jr., 2 ♂.

BIOLOGY.—Although the immatures of this species have not yet been taken, I expect that they will be found in habitats similar to those of *S.*

signata. Adults have been taken at ultraviolet lights.

20. *Smicridea* (*R.*) *inarmata,* new species

FIGURES 39, 145–148

This species is a member of the *signata* group, very close to *S. bifurcata,* new species, with which it agrees in lacking the lateral processes and apical lobes of the aedeagus. However, the apicoventral, tonguelike process of the aedeagus is more like that of *S. signata,* and the tenth tergite lacks the apical and lateral points, but has developed the ventrolateral margin into a more heavily sclerotized, rimlike, structure.

ADULT.—Length of forewing 4.5 mm. Color in alcohol pale brown; forewing appearing to be colored much as in *S. signata* (cf. Figure 30). Fifth sternum in male with anterolateral process one and one-half length of sternum. *Male genitalia*: Ninth segment with anterolateral margin produced into a rounded lobe. Tenth tergite in lateral aspect with apex produced into a small dorsal angle, with ventral margin developed into a strongly sclerotized rim; in dorsal aspect with tip rounded and slightly incurved, with lateral margin slightly produced. Clasper with basal segment long, slightly inflated apicad; apical segment ending in a point in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at an angle of about 110°; apex with a tonguelike ventral lobe arising from a slightly sinuate base, internally with a long, paired, eversible structure bearing a pair of lateral sclerotized points. *Female genitalia:* Unknown.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, CHIAPAS, Finca Esperanza, 26 June 1938, A. Dampf, at light, MF 6937 (INHS). Paratypes: Same, but 26–31 March 1939, 1 ♂ (USNM); same, but 12 April 1938, 1 ♂ (INHS); same, but 25 April 1938, 1 ♂ (USNM); same, but 2 May 1938, 1 ♂ (INHS); same, but 26 May 1938, 1 ♂ (USNM); same, but 28 June 1938, 1 ♂ (INHS); same, but 30 June 1938, 2 ♂ (INHS, USNM); same, but 3 August 1938, 1 ♂ (USNM).

FIGURE 39.—Distribution of *Smicridea bifurcata,* new species, *S. inarmata,* new species, and *S. arizonensis,* new species.

BIOLOGY.—Beyond the fact that the adults were attracted to lights, nothing is known about the biology of this species.

21. *Smicridea (R.) arizonensis,* new species

FIGURES 32, 39, 149–152, 196–198

This species is a member of the *signata* group, closely related to *S. salta,* new species. The adults are larger and paler than those of *S. salta.* The male genitalia of *S. arizonensis* lack the sharp ventrolateral spine on the tenth tergite, and have a broader apicoventral process at the tip of the aedeagus than *S. salta.*

The internal plate of the female has broader lateral arms and anterior bridge than does the plate of *S. salta,* and the dorsal bridge of the ninth segment is proportionately longer in *S. arizonensis.*

ADULT.—Length of forewing 4.5–6 mm. Color brown; forewing nearly uniformly brown with a transverse white band at anastomosis (Figure 32). Fifth sternum with anterolateral process slightly shorter than sternum in male and less than half length of sternum in female. *Male genitalia:* Ninth segment with anterolateral process short, slightly upturned. Tenth tergite in lateral aspect with apex broadly upturned, ventral margin with a small lobe at midlength; in dorsal aspect with tip slightly produced. Clasper with basal segment long, slightly sinuate; apical segment bluntly pointed in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at about 120°; apex with ventral process straight, about two-thirds width of stem, dorsally with darkened apicolateral spots, internally with a long, paired, eversible structure. *Female genitalia:* Ninth tergum with anterolateral margin sinuate, not strongly produced. Internal plate in posterodorsal aspect U-shaped, with anterior bridge produced mesally; in lateral aspect with posterior arms rather short, and angled to axis of bridge. Vagina with anterior bar bearing very short, posteriorly directed processes laterally; with a pair of very small, lightly sclerotized plates posteriorly.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: U.S.A., ARIZONA, Clear Creek Campground SE of Camp Verde, 17 June 1968, Flint and Menke. USNM Type 72706. Paratypes: Same data, 3 ♂ 25 ♀.

BIOLOGY.—The adults were attracted to an ultraviolet light in company with adults of *S. signata* and *S. dispar.* The adjacent stream was 3–5 meters wide and flowing over shallow, gravel riffles.

22. *Smicridea (R.) salta,* new species

FIGURES 33, 40, 153–156, 193–195

This and *S. radula* are the smallest species of the genus found in the region of this study. The species may be immediately recognized by the combination of very small size and uniform grayish brown color with a pale subapical band on the forewing. It is clearly a member of the *signata* group on the basis of genitalia and is closest to *S. arizonensis,* new species. In the male sex it is distinguished by the presence of a small spur ventrolaterally and narrower, more elongate apices of the tenth tergite, plus small differences in the tip of the aedeagus.

The female internal plate is very slender and "wishbone" shaped, quite unlike that of *S. arizonensis.*

ADULT.—Length of forewing 3.5 mm. Color grayish brown; forewing uniformly grayish brown with a pale subterminal band, wing of male darker than in female (Figure 33). Fifth sternum with anterolateral process slightly longer than length of sternum in male, about half length of sternum in female. *Male genitalia:* Ninth segment produced into a pointed, upturned lobe anterolaterally. Tenth tergite in lateral aspect with tip upturned and pointed, ventral margin with a sharp spur at midlength; in dorsal aspect with apex produced into a long, rounded lobe. Clasper with basal segment long, slightly enlarged beyond midlength; apical segment with tip pointed in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at an angle of about 110°; apex with a narrow, ventral tonguelike process, in dorsal aspect with apicolateral dark marks, internally with a long, thin, eversible structure. *Female genitalia:* Ninth segment blunt apically, with anterolateral margin produced and angled at about 90°. Internal plate with posterior arms narrow, with a small narrow anteromesal process. Vagina with anterior bar bearing short, posteriorly directed processes laterally, posteriorly with a pair of elongate, lightly sclerotized plates.

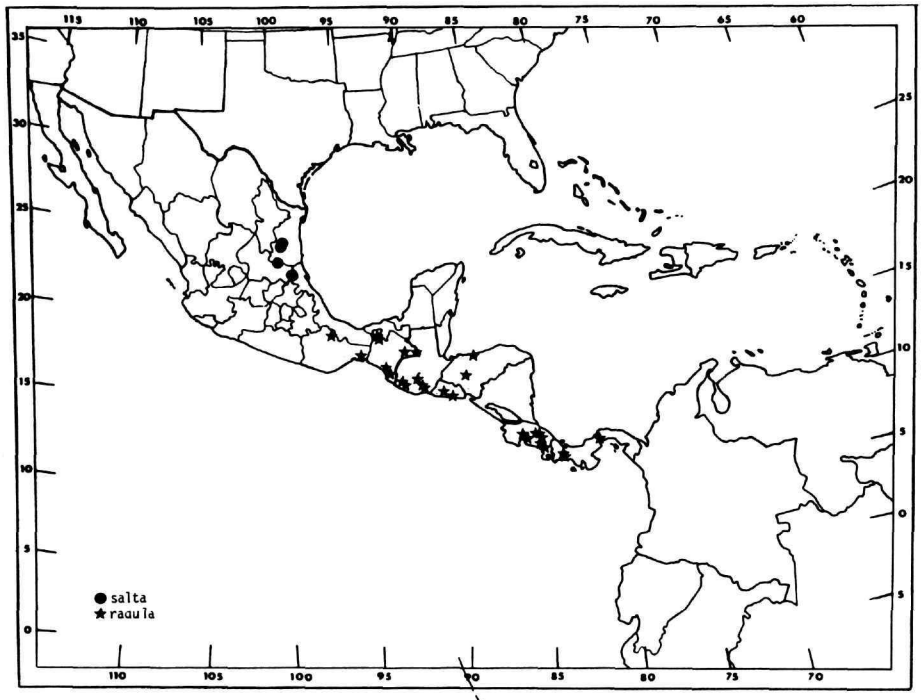


FIGURE 40.—Distribution of *Smicridea salta*, new species, and *S. radula*, new species.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, SAN LUIS POTOSI, El Salto (26 miles W of Antiguo Morelos), 8 August 1966, O. S. Flint, Jr. USNM Type 72707. Paratypes: Same data, 150 ♂ ♀; same, but 3 June 1967, 5 ♂ 250 ♀; same, but 23–24 June 1965, 25 ♂ 75 ♀; same, but 11–14 July 1963, Duckworth and Davis, 100 ♂ ♀; same, but 8 May 1964, Blanton, et al., 2 ♂ 3 ♀. Palitla, 5 June 1966, O. S. Flint, Jr., 1 ♂ 2 ♀. TAMAULIPAS: 6 miles S of Ciudad Victoria, 1050′, 6 August 1963, Duckworth and Davis, 1 ♀. 4 miles SW of Ciudad Victoria, 1100′, 10 July 1965, Duckworth and Davis, 3 ♀.

BIOLOGY.—The adults of this species are attracted to lights, often in great numbers. Although the larvae have not been taken, they probably may be found in the streams adjacent to the adult collection sites. A few adults have been taken near small, shallow streams a meter or two in width with shallow riffles. The one site, El Salto, where this species has been consistently collected in abundance, is quite different. Here, just below a large waterfall, the river is 10–20 meters wide, with boulders and deep pools, overflowing travertine rims.

23. *Smicridea* (*R.*) *radula*, new species

FIGURES 31, 40, 162–165, 199–202

This is a small species, colored much like *S. signata*, except that the terminal area of the forewing is usually dark. The male genitalia, however, are very distinctive and like no other known species of the genus. The short, broad apex of the tenth tergite with projecting ventral margin is distinctive, and the structure of the apex of the aedeagus is not only distinctive, but unique.

The female is quite distinctive, although the internal genitalia are suggestive of the *signata* group. The dorsum of the ninth segment is proportionately very short, and in dorsal aspect broad with lateral shoulder-like lobes and the shape of the internal plate is quite distinctive.

ADULT.—Length of forewing 3–4.5 mm. Color pale yellowish brown; forewing marked much as in *S. signata*, but with terminal area dark (Figure 31), female occasionally with entire wing dark. Fifth sternum in male and female with anterolateral process about one and one-half times the length of sternum. *Male genitalia:* Ninth segment with anterolateral margin produced as a narrow,

upturned lobe; sternum with a narrow, pointed process between clasper bases. Tenth tergite in lateral aspect with apex rounded, with ventral margin produced into a point beneath apex; in dorsal aspect with apex broadly rounded, and flanked laterally by a pointed projection. Clasper with basal segment long, inflated subapically; apical segment with apex pointed in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at about 90°; apex with dorsum produced as a broad, rounded lobe bearing basolaterally a spiculate patch, with a ventrolateral plate bearing a series of short, dark teeth, internally with a long, paired, eversible structure. *Female genitalia:* Ninth tergum short posterodorsally, nearly truncate, with broad, lateral shoulders; anterolateral angle broadly rounded. Internal plate with narrow arms, U-shaped in posterodorsal aspect with a small anteromesal process, in lateral aspect with anterior portion borne at about right angles to lateral arms. Vagina with anterior bar bearing short, posteriorly directed processes laterally; mesally with a pair of lightly sclerotized plates which are sharply angled at midlength when seen in lateral aspect.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: COSTA RICA, SAN JOSE, Rió General, Pacuare, 1 July 1967, Flint, Spangler and Ortiz. USNM Type 72708. Paratypes: MEXICO: VERACRUZ: Puente Nacional, 15 June 1964, F. S. Blanton, 1 ♂. OAXACA: Chiltepec, 12 December 1937, A. Dampf, at light, 1 ♂ (INHS). CHIAPAS: Copainala, 5 September 1946, A. Dampf, 4 ♂ (INHS). Tecpatan, 2 September 1946, A. Dampf, 105 ♂ (INHS); same, but 29 August 1946, 21 ♂; same, but 3 September 1946, 205 ♂; same, but 1 September 1946, 13 ♂; same, but 30 August 1946, 6 ♂. Finca Vergel, 22 May 1935, A. Dampf, 1 ♂ (INHS); same, but 23 May 1935, 1 ♂. Finca Fortuna, 11 May 1938, A. Dampf, 1 ♂ (INHS). Huixtla, Sierra Madre, 9 November 1932, A Dampf, 1 ♂ (INHS). Puente Arroyo Viejo, route 200, km 141, 9 June 1967, Flint and Ortiz, 4 ♂ 27 ♀.

GUATEMALA: SUCHITEPEQUEZ: Cuyotenango, 10–20 June 1966, Flint and Ortiz, 1 ♀. Puente Ixtacapa, near San Antonio, 18–19 June 1966, Flint and Ortiz, 2 ♂ 40 ♀. CHIMALTENANGO: Chimaltenango, 19–20 August 1965, P. J. Spangler, 5 ♂ 6 ♀. ESCUINTLA: Escuintla, Grutas de San Pedro Martir, 10 August 1965, P. J. Spangler, 1 ♂. Rió Metapa, 10 km SE of Escuintla, 275 m, 5–6 March 1970, E. J. Fee, 9 ♂ 15 ♀.

EL SALVADOR: LA LIBERTAD: Quezaltepeque, 11 February 1965, S. S. and W. D. Duckworth, 3 ♂ 9 ♀. USULUTAN: San Nicholas Lempa, 31 July 1965, P. J. Spangler, 1 ♀.

HONDURAS: ATLANTIDA: La Ceiba, 27–29 March 1920, W. M. Mann, 2 ♀. COMAYAGUA: Rió Humuya, NW of Comayagua, 3 August 1967, O. S. Flint, Jr., 1 ♂.

COSTA RICA: GUANACASTE: Las Canas, 13 July 1965, P. J. Spangler, 1 ♂. Rió Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr., 3 ♂ 2 ♀. Quebrada Tronadorcita, Arenal, 24 July 1967, O. S. Flint, Jr., 1 ♂ 1 ♀. PUNTARENAS: 9 miles NW of Esparta, 22 July 1965, P. J. Spangler, 1 ♂ 1 ♀. Rió La Vieja, near Lagarto, 2–3 July 1967, Flint and Ortiz, 3 ♂ 3 ♀. SAN JOSE: Same data as holotype, 55 ♂ 31 ♀. CARTAGO: 3 miles W of Turrialba, 18–21 June 1967, Flint and Ortiz, 1 ♂. La Suiza, 17 June 1967, Flint and Ortiz, 3 ♂ 15 ♀. La Cruzada, Quebrada Relleno, 20 June 1967, Flint and Ortiz, 2 ♀.

PANAMA: CHIRIQUI: Dolega, 17 July 1967, O. S. Flint, Jr., 1 ♂ 1 ♀. David, Rovira, 2200′, 13 July 1964, A. Broce, 1 ♂ 1 ♀. CANAL ZONE: Pipeline Road, Rió Agua Salud, 8–12 July 1967, Flint and Ortiz, 16 ♂ 9 ♀; same, but 30 March 1965, S. S. and W. D. Duckworth, 4 ♂ 3 ♀.

BIOLOGY.—The adults of this species are commonly attracted to lights, usually in company with those of *S. signata*. The streams adjacent to adult collecting sites vary in size from a few meters in width to larger rivers 20–30 meters wide. As in the case in streams occupied by most species of the subgenus, rather shallow, sunny riffle areas are common, even though the stream may be broad and deep in intervening pools.

24. *Smicridea* (*R.*) *acuminata*, new species

FIGURES 34–35, 41, 157–161, 205–206

This species and *S. talamanca*, new species, belong to the *peruana* group. *S. acuminata* is readily separated from *S. talamanca* by the possession of a pointed, triangular process from the ninth sternum in addition to major differences in the aedeagus.

The females of *S. acuminata* are distinctly darker than the males, whereas the females of *S. talamanca*

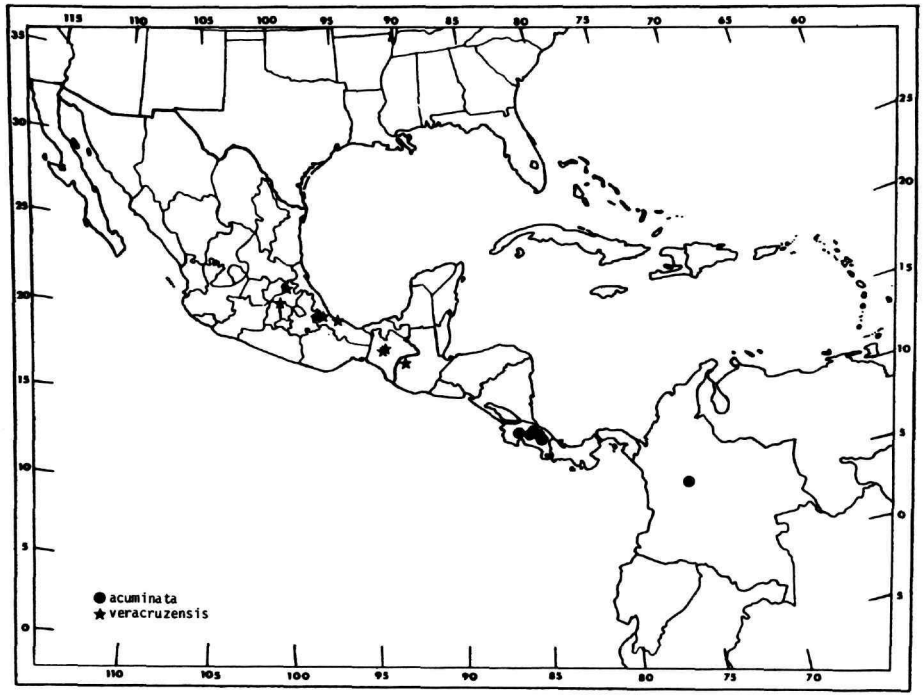


FIGURE 41.—Distribution of *Smicridea acuminata*, new species, and *S. veracruzensis*, new species.

are the same color as the males. In addition there are distinct differences between the two species in the sclerites of the vagina and internal plate.

ADULT.—Length of forewing 6.5–7.5 mm. Color pale yellowish brown; forewing pale yellowish with darker marks in crossveins, and in a subterminal band; female with wings darker brown (Figures 34, 35). Fifth sternum with anterolateral process almost twice length of sternum in male and female. *Male genitalia:* Ninth segment with anterolateral margin only moderately produced; posterior margin produced into a pointed, trianguloid lobe midventrally. Tenth tergite in lateral aspect with lateral margin strongly sclerotized, tip narrow, upturned; in dorsal aspect with tip narrowly produced and rounded. Clasper with basal segment long, slightly inflated apicad; apical segment with tip rounded in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at about 90°, apical section slightly arched; subapically with spicules laterally and midventrally; internally with a long, eversible structure with a dorsal spiculate sac and a ventral sigmoid sclerite. *Female genitalia:* Ninth segment with anterolateral margin produced and angled at 90°; ventral plate large and strongly sclerotized. Internal plate with lateral arms narrow, anterior bridge broad, with a narrow, erect anteromesal lobe. Vagina with anterior bar expanded laterad; with a heavily sclerotized, U-shaped sclerite posteriad.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: COSTA RICA, CARTAGO, Turrialba, 17–21 February 1965, S. S. and W. D. Duckworth. USNM Type 72709. Paratypes: Same data, 75 ♂ ♀; same, but 22–28 February 1965, 200 ♂ ♀; same, but 3 March 1965, 200 ♂ ♀; same, but 13–17 March 1965, 2 ♀; same, but 15–19 July 1965, P. J. Spangler, 7 ♂ 4 ♀. 3 miles W of Turrialba, 18–21 June 1967, Flint and Ortiz, 3 ♂ 2 ♀. Chitaria, 19 June 1967, Flint and Ortiz, 48 ♂ 26 ♀. Quebrada Relleno, La Cruzada, 20 June 1967, Flint and Ortiz, 1 ♂ 12 ♀. La Suiza, 17 June 1967, Flint and Ortiz, 5 ♂ 27 ♀. GUANACASTE: Quebrada Tronadorcita, Arenal, 24 July 1967, O. S. Flint, Jr., 1 ♂ 1 ♀.

COLOMBIA: CUNDINAMARCA: Rió Sumapaz Gorge, E of Melgar, 1000 m, 5 January 1959, J. F. G. Clarke, 1 ♂ 1 ♀.

BIOLOGY.—The adults have been taken at lights, often in great abundance. The lights were usually operated near large (10–20 meters wide), clear, tumbling streams in forested areas of heavy rainfall. However, such areas have many smaller lateral rivulets and springs falling into the river, so that the exact breeding site was uncertain.

25. *Smicridea (R.) talamanca,* new species

FIGURES 43, 166–169, 207–208

This species of the *peruana* group is easily told apart from the only other species of the group herein treated by the lack of the mesal point from the ninth sternum in the male. In addition, the apex of the aedeagus is totally different in the two species.

The females of *S. talamanca* are colored the same as the males, rather than being darker, as is the case with *S. acuminata.* The dorsomesal lobe of the internal plate in *S. acuminata* is also quite distinctive.

ADULT.—Length of forewing 6–7 mm. Color pale yellowish; forewing yellowish, with dark markings on crossveins and in a subterminal band (cf. Figure 34). Fifth sternum with anterolateral process almost twice length of sternum in male and female. *Male genitalia:* Ninth segment with anterolateral angle produced, rounded, no midventral process. Tenth tergite in lateral aspect with ventral margin straight and strongly sclerotized, with tip narrowly produced posteriad; in dorsal aspect with tip narrowly produced and rounded. Clasper with basal segment long and inflated apicad; apical segment with tip rounded in dorsal aspect. Aedeagus tubular, with basal and apical sections angled at about 90°; apical section slightly arched, with a lightly sclerotized middorsal, hoodlike structure; tip with a transverse, dark, dorsal band, with a pointed, serrate, ventrolateral process, and a rounded midventral lobe; internally with a long, probably eversible, structure. *Female genitalia:* Ninth tergum with anterolateral margin angled at about 90°. Internal plate with long, slender lateral arms, with a large mesal lobe directed anteriorly from anterior bridge. Vagina with anterior bar bearing lateral, twisted processes, with an irregular, U-shaped plate posteriad, and a small, lightly sclerotized plate over anterior bar.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: COSTA RICA, CARTAGO, Chitaria, 19 June 1967, Flint and Ortiz. USNM Type 72710. Paratypes: Same data, 1 ♂ 1 ♀. 3 miles W of Turrialba, 18–21 June 1967, Flint and Ortiz, 1 ♂ 2 ♀. PUNTARENAS: 14.1 miles E of Esparta, 23 July 1967, O. S. Flint, Jr., 4 ♂. GUANACASTE: Quebrada Tronadorcita, Arenal, 24 July 1967, O. S. Flint, Jr., 1 ♀.

BIOLOGY.—The adults have been collected sparingly, both at lights and beaten from foliage. The four males from near Esparta were beaten from foliage overhanging a stream only 2–3 meters wide that was cascading rapidly down a forested mountainside. Similar habitats were nearby most of the other sites, leading me to believe that this species may be limited to waterfalls or other restricted habitats.

26. *Smicridea (R.) zanclophora,* new species

FIGURES 36, 42, 170–173, 203–204

Although in appearance this species is quite similar to *S. salta,* new species, and *S. arizonensis,* new species, the structure of the aedeagus indicates its total distinctness within the Central American fauna. The aedeagal structure places this species in the *magna* group, which is typically South American. From *S. magna* (Ulmer) this species differs in coloration and structure of the tenth tergites which are strongly rimmed ventrolaterally.

The shape of the internal plate is unique within the species treated here, although the structure of the vaginal sclerites is similar to that of the *dispar* group.

ADULT.—Length of forewing 5 mm. Color dark brown; forewings dark brown, with indistinctly darker irrorations, and with a distinct pale transverse band subapically (Figure 36). Fifth sternum with anterolateral process one and one-half times length of sternum in male, and as long as sternum in female. *Male genitalia:* Ninth segment with anterolateral margin upcurved and acutely angulate. Tenth tergite in lateral aspect with tip barely upturned and produced, with ventrolateral margin heavily sclerotized, forming a distinct rim; in dorsal aspect with tip slightly produced and rounded, broad laterally. Clasper with basal segment long, parallel-sided; apical segment with tip pointed in

FIGURE 42.—Distribution of *Smicridea zanclophora*, new species.

dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at about 90°; apical section slightly enlarged apicad, tip with a pair of hooked processes directed dorsomesad; internally with a long, paired, structure enlarged apically, with a ventral curved plate. *Female genitalia:* Internal plate in posterodorsal aspect with lateral arms parallel, anterior bridge transverse. Vagina with anterior bar bearing posterolateral processes about a third as long as bar; centrally with a small, dark pore.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: PANAMA, CANAL ZONE, Pipeline Road, Rió Agua Salud, 8–12 July 1967, Flint and Ortiz. USNM Type 72711. Paratypes: COSTA RICA: GUANACASTE: Quebrada Tronadorcita, Arenal, 24 July 1967, O. S. Flint, Jr., 6♂ 3♀. Las Canas, 13 July 1965, P. J. Spangler, 6♂ 2♀. Rió Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr., 7♂ 4♀. SAN JOSE: Rió General, Pacuare, 1 July 1967, Flint, Spangler and Ortiz, 2♂ 2♀ in copula, 53♂ 50♀. PUNTARENAS: Rió Ceibo, Buenos Aires, 2 July 1967, Flint and Ortiz, 1♂. Rió La Vieja, near Lagarto, 2–3 July 1967, Flint and Ortiz, 6♂ 4♀.

PANAMA: PANAMA: Cerro Azul, 7 July 1967, Flint and Ortiz, 1♀. CANAL ZONE: Tabernilla, 16 June 1907, A. Busck, 2♀. Pipeline Road, Rió Frijoles, 6–7 July 1967, Flint and Ortiz, 14♂ 34♀. Same data as holotype, 65♂ 29♀; same, but 30 March 1965, S. S. and W. D. Duckworth, 70♂ 30♀. Pipeline Road, near Gamboa, July 1967, W. W. Wirth, 6♂ 6♀.

BIOLOGY.—The adults are freely attracted to lights at night, and have been swept from foliage bordering streams. The larvae of this species have not been associated with the adults. However, the streams adjacent to adult sites vary from brooklets a few meters wide, to large streams 20–30 meters wide. All have extensive, shallow, riffle areas, and are rather open to the sun.

27. *Smicridea* (*R.*) *dispar* (Banks), resurrected species

FIGURES 37, 43, 178–181, 209–210, 215, 224–225

Polycentropus dispar Banks, 1905:16.

Smicridea dispar (Banks) [as synonym of *S. fasiatella* McLachlan].—Milne, 1936:73.—Fischer, 1963:133.

Smicridea utico Ross, 1947:144.—Denning, 1956:252.—Fischer, 1972:145. [New synonymy.]

This species, *S. dithyra,* new species, and *S. veracruzensis,* new species, form a closely interrelated group that I refer to as the *dispar* group. *S. dispar* is allopatric to the other two species, which are essentially sympatric. The recognition of the three species lies almostly wholly in the structure of the aedeagus, although there are slight differences in the shape of the tenth tergites. In the most similar species, *S. dithyra,* the aedeagus is a little more sinuate and possesses a pair of eversible ventrolateral plates.

In the female the internal plate is V-shaped with narrow lateral arms gradually widening toward the anterior junction, but without the anterior knobs of *S. dithyra.* The anterior sclerotized bar of the vagina of *S. dispar* has the ends projecting distinctly posteriad and of intermediate length, with a simple central pore.

The larvae appear to be superficially more similar to those of *S. fasciatella* than to *S. signata.* The shapes of the molar areas of the mandibles are distinctive in *S. dispar;* however, the pupae seem to differ from those of *S. signata,* to which they are most similar, only in being slightly larger.

ADULT.—Length of forewing 5–6.5 mm. Color brown; forewing brown of several shades, marked with irregular lighter and darker transverse bands (Figure 37). Fifth sternum with anterolateral process barely half length of sternum in male and female. *Male genitalia:* Ninth segment with anterolateral margin broadly rounded. Tenth tergite in lateral aspect with tip produced and upturned; in dorsal aspect with tip produced into a narrowly elongate, rounded lobe. Clasper with basal segment long, slightly sinuate, with parallel sides; apical segment in dorsal aspect with tip rounded. Aedeagus tubular, with basal and apical sections meeting at about 120°; apical section straight, inflated apicad; tip internally with a slender mesal process and a pair of darkened, lateral structures. *Female genitalia:* Internal plate narrow, V-shaped. Vagina with anterior bar bearing posteriorly directed projections laterally, with a small central pore.

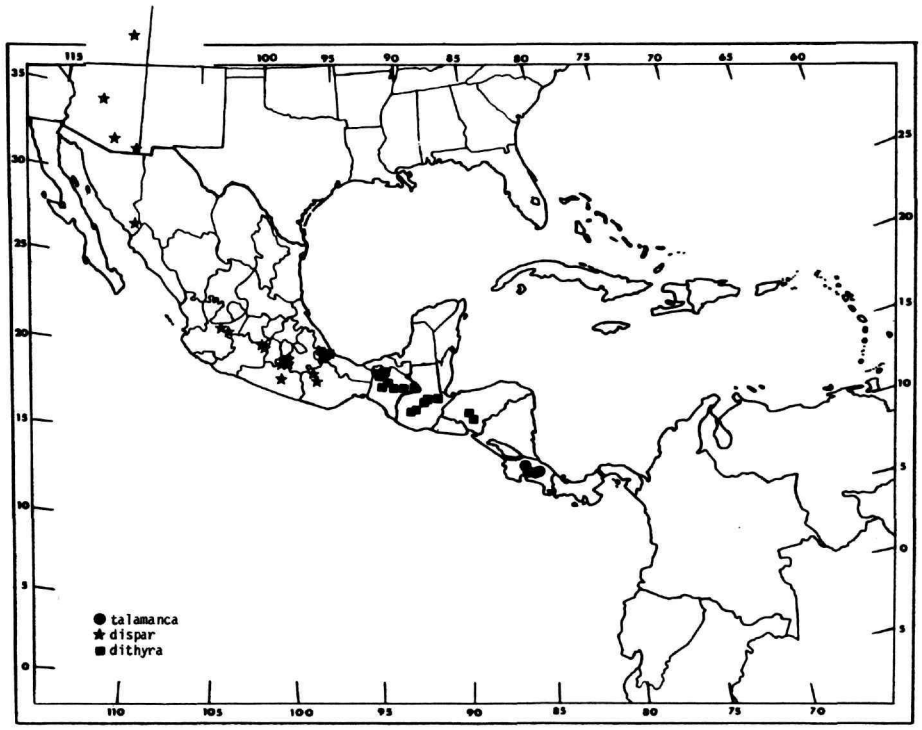


FIGURE 43.—Distribution of *Smicridea talamanca,* new species, *S. dispar* (Banks), and *S. dithyra,* new species.

LARVA.—Length to 9 mm. Sclerites yellowish brown; head slightly darkened posteromesally. Anterior margin of frontoclypeus slightly produced mesally with 3–4 low, rounded lobes connected mesally by a broad sinuate lobe. Mandibles with molar area rounded, bilobate, that of right mandible slightly more produced. Metasternum with 2 pairs of gill stalks.

PUPA.—Length 5.5 mm. Hook plates anteriorly lacking small secondary points; plate 3P with a single row of spines along anterior margin.

MATERIAL.—U.S.A.: UTAH: NW of Moab, 27 June 1943, G. F. Knowlton, 1 ♂ paratype of *utico* (INHS). ARIZONA: Clear Creek Campground, SE of Camp Verde, 17 June 1968, Flint and Menke, 2 ♂. 1 mile S of Portal, 14 June 1965, M. A. Cazier, 1 ♂. Tucson, 5 June 190?, Oslar, ♀ holotype (MCZ).

MEXICO: SONORA: 5 miles W of Alamos, 14 August 1959, F. Werner and W. Nutting, 15 ♂ 9 ♀. JALISCO: 8 miles N of Guadalajara, 4 July 1964, P. J. Spangler, 1 ♀. La Barca, 2 October 1934, A. Dampf, 6 ♂ (INHS). MICHOACAN: San Lorenzo, route 15, km 206, 14–15 July 1966, Flint and Ortiz, 81 ♂ 4 ♀. Turundeo, route 15, km 200, 14 July 1966, Flint and Ortiz, 2 ♀. MORELOS: Cuautla, 28 October 1922, E. G. Smyth, 1 ♀. Acatilpa, 16 July 1965, Flint and Ortiz, 1 ♀. Xochitepec, 12–14 July 1965, Flint and Ortiz, 3 ♂ 24 ♀, ♂ ♀ metamorphtypes, larvae. Near Xochitepec, route 95, km 91, 1 August 1965, O. S. Flint, Jr., 2 ♂ 42 ♀. Cuernavaca, 26–29 March 1932, A. Dampf, 1 ♂ (INHS). Chipitlan, Cuernavaca, 3 May 1941, A. Dampf, 1 ♂ (INHS). OAXACA: Tamazulapan, 7–8 June 1967, Flint and Ortiz, 41 ♂ 29 ♀. Huajapan, 8 November 1944, A. Dampf, 1 ♂ (INHS). GUERRERO: Chilpancingo, 22 October 1941, D. M. DeLong, at light, 1 ♂ paratype of *utico* (INHS).

BIOLOGY.—I have taken larvae in, and collected adults adjacent to, streams, usually of low gradient, that vary in width from about 5 meters to over 10 meters. Generally they have many shallow riffle areas well exposed to the sun.

The adults are commonly taken at lights, often in abundance.

28. *Smicridea* (*R.*) *dithyra*, new species

FIGURES 43, 182–186, 211–212

This species is a member of the *dispar* group, closely related to *S. dispar* (Banks). In coloration the two species are inseparable; however, they are distinguishable on the basis of genital characteristics. In the male, the apex of the aedeagus in *S. dithyra* possesses a pair of small eversible plates ventrolaterally which are lacking in *S. dispar*. In the female the anterior bar of the vagina possesses a simple dark ring centrally, and laterally it is slightly produced laterad. The internal plate is V-shaped, but with small anterior knobs.

ADULT.—Length of forewing 5–6.5 mm. Color brown; forewing brown of several shades, marked with irregular, lighter and darker transverse bands (cf. Figure 37). Fifth sternum with anterolateral process length of sternum in male, half length of sternum in female. *Male genitalia:* Ninth segment with anterolateral margin broadly rounded. Tenth tergite in lateral aspect with tip elongate and slightly upturned; in dorsal aspect with tip produced as a narrowly elongate, rounded lobe. Clasper with basal segment long, slightly inflated apicad; apical segment with tip pointed in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at about 120°; apical section slightly sinuate, tip enlarged; internally with a slender mesal structure and a pair of ventrolateral plates which open laterally when the mesal structure is everted. *Female genitalia:* Internal plate in posterodorsal aspect roughly V-shaped, with small anterolateral knobs. Vagina with anterior bar bearing short lateral processes which are directed primarily laterad; centrally with a small ringlike pore.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, VERACRUZ, near Huatusco, 25–26 July 1965, Flint and Ortiz. USNM Type 72712. Paratypes: Same data, 1 ♂ 9 ♀. Fortin de las Flores, 24 July 1966, Flint and Ortiz, 1 ♀; same, but 17 May 1964, Blanton et al., 5 ♂. Cordoba, 7 June 1966, Flint and Ortiz 1 ♀. Near El Encero, route 140, km 347, 22 July 1965, Flint and Ortiz, 29 ♀. TABASCO: Rió Puyacatengo, E of Teapa, 28–29 July 1966, Flint and Ortiz, 7 ♂ 12 ♀. CHIAPAS: Tecpatán, 2–3 September 1946, A. Dampf, 7 ♂ (INHS and USNM). Copainala, 4 September 1946, A. Dampf, 1 ♂ (INHS). 7.8 miles E of Pichucalco, 27–28 July 1966, Flint and Ortiz, 1 ♂ 3 ♀. El Chorreadero, near Chiapa

de Corzo, 11 August 1967, O. S. Flint, Jr., 11 ♂ 3 ♀. Soyalo, route 195, km 24, 10 August 1967, O. S. Flint, Jr., 1 ♂ 33 ♀. San Cristobal, 19 December 1937, A. Dampf, 1 ♂ (INHS). Finca Vergel, 27 October 1945, A. Dampf, 5 ♂ (INHS and USNM). San Geronimo, 11 March 1938, A. Dampf, 1 ♂ (INHS). Finca Esperanza, 8 March 1938, A. Dampf, 23 ♂ (INHS and USNM); same, but 26 April 1938, 1 ♂ (INHS); same, but 30 April 1938, 2 ♂ (USNM); same, but 4 May 1938, 1 ♂ (INHS); same, but 5 May 1938, 3 ♂ (INHS); same, but 6 May 1938, 2 ♂ (USNM); same, but 30 May 1938, 1 ♂ (INHS); same, but 16 June 1938, 4 ♂ (INHS); same, but 30 June 1938, 1 ♂ (INHS); same, but 12 September 1938, 1 ♂ (USNM); same, but 20 September 1938, 1 ♂ (INHS); same, but 13–26 March 1939, 3 ♂ (INHS); same, but 26–31 March 1939, 2 ♂ 2 ♀ (USNM); same, but 13 April 1939, 1 ♂ (INHS); same, but 26–30 April 1939, 5 ♂ (INHS); same, but 28 May 1939, 1 ♂ (INHS); same, but 10 June 1939, 1 ♂ (USNM). Finca Fortuna, 9 May 1938, A. Dampf, 25 ♂ (INHS and USNM); same, but 12 May 1938, 1 ♂ (INHS). Finca Victoria, 15 May 1938, A. Dampf, 1 ♂ (INHS).

GUATEMALA: SOLOLA: Panajachel, 20 July 1965, P. J. Spangler, 1 ♂. CHIMALTENANGO: Chimaltenango, 19 July 1965, P. J. Spangler, 14 ♂ 5 ♀. BAJA VERA PAZ: Puente Las Burras, route 5, km 156, 22–24 June 1966, Flint and Ortiz, 2 ♂ 3 ♀. ALTA VERA PAZ: Cacao, Trece Aguas, September 4, Schwartz and Barber, 1 ♀. Finca Holandia, near Santa Cruz, 23–24 June 1966, Flint and Ortiz, 1 ♀.

HONDURAS: FRANCISCO MORAZAN: Tegucigalpa, 24 July 1918, F. J. Dyer, 1 ♀. COMAYAGUA: Rancho Chiquito, SE of Flores, 2–3 August 1967, O. S. Flint, Jr., 11 ♀.

BIOLOGY.—Adults have been taken almost exclusively at lights. Most of these localities have been adjacent to rather small streams of 5–10 meters in width, with shallow riffles. Many of the streams are rather fully shaded by marginal forests, whereas others are open to the full sun.

29. *Smicridea* (*R.*) *veracruzensis*, new species

FIGURES 41, 174–177, 213–214

This, the third species of the *dispar* group, is not as closely related as the other two. The long, slightly bowed apical section of the aedeagus of this species is very different from that of the others. In the female, the anterior bar of the vagina possesses long, posteriorly directed lateral processes, and the central pore is a more complex structure than in the other two species. The internal plate is more U-shaped, with a broader anterior connection between the lateral arms.

ADULT.—Length of forewing 5.5–6.5 mm. Color brown; forewing brown of several shades, marked with irregular, lighter, and darker transverse bands (cf. Figure 37). Fifth sternum with anterolateral process barely longer than sternum in male, a bit shorter than sternum in female. *Male genitalia:* Ninth segment with anterolateral margin broadly rounded. Tenth tergite in lateral aspect with apex produced into a small, rounded, upturned lobe; in dorsal aspect with tip broadly rounded. Clasper with basal segment long, dorsal margin sinuate; apical segment with tip produced into a point in dorsal aspect. Aedeagus tubular, with basal and apical sections meeting at about 90°; apical section long, slender, and gently arched; tip internally with a slender mesal structure and lateral plates which open laterad when the mesal structure is exserted. *Female genitalia:* Internal plate in posterodorsal aspect broadly U-shaped, with anterior connection broad. Vagina with anterior bar with long, posteriorly directed lateral processes, central pore borne on a complex sclerite.

IMMATURE STAGES.—Unknown.

MATERIAL.—Holotype, male: MEXICO, VERACRUZ, Cordoba, 28 July 1965, Flint and Ortiz. USNM Type 72713. Paratypes: Same, but 13 August 1964, P. J. Spangler, 66 ♀; same, but 6–9 November 1966, A. B. Lau, 8 ♀; same, but 11–20 November 1966, 11 ♀. Fortin de las Flores, 17 May 1964, Blanton, et al, 4 ♂. Cuitlahuac, 10–12 August 1964, P. J. Spangler, 1 ♂ 10 ♀. Rió Tacolapan, route 180, km 551, 25–26 July 1966, Flint and Ortiz, 87 ♂ 81 ♀. HIDALGO: Mixquiahuala, 17 June 1934, A. Dampf, at light, 1 ♂ (INHS). 3 miles E of Zimapan, 6400′, 31 July–1 August 1963, Duckworth and Davis, 1 ♂ 1 ♀. CHIAPAS: El Chorreadero, near Chiapa de Corzo, 11 August 1967, Flint and Ortiz, 1 ♂ 3 ♀. Chiapa de Corzo, 26 July 1926, A. Dampf, 1 ♂ (INHS).

GUATEMALA: HUEHUETENANGO: 20 miles NW of Huehuetenango, 8–10 August 1967, O. S. Flint, Jr., 1 ♂ 1 ♀.

BIOLOGY.—Although the adults of this species are frequently taken at lights together with those of *S. dithyra*, other aspects of the biology are unclear. The two larger collections were taken near small, clear streams 3–5 meters wide, flowing through forests, and with many lateral springs.

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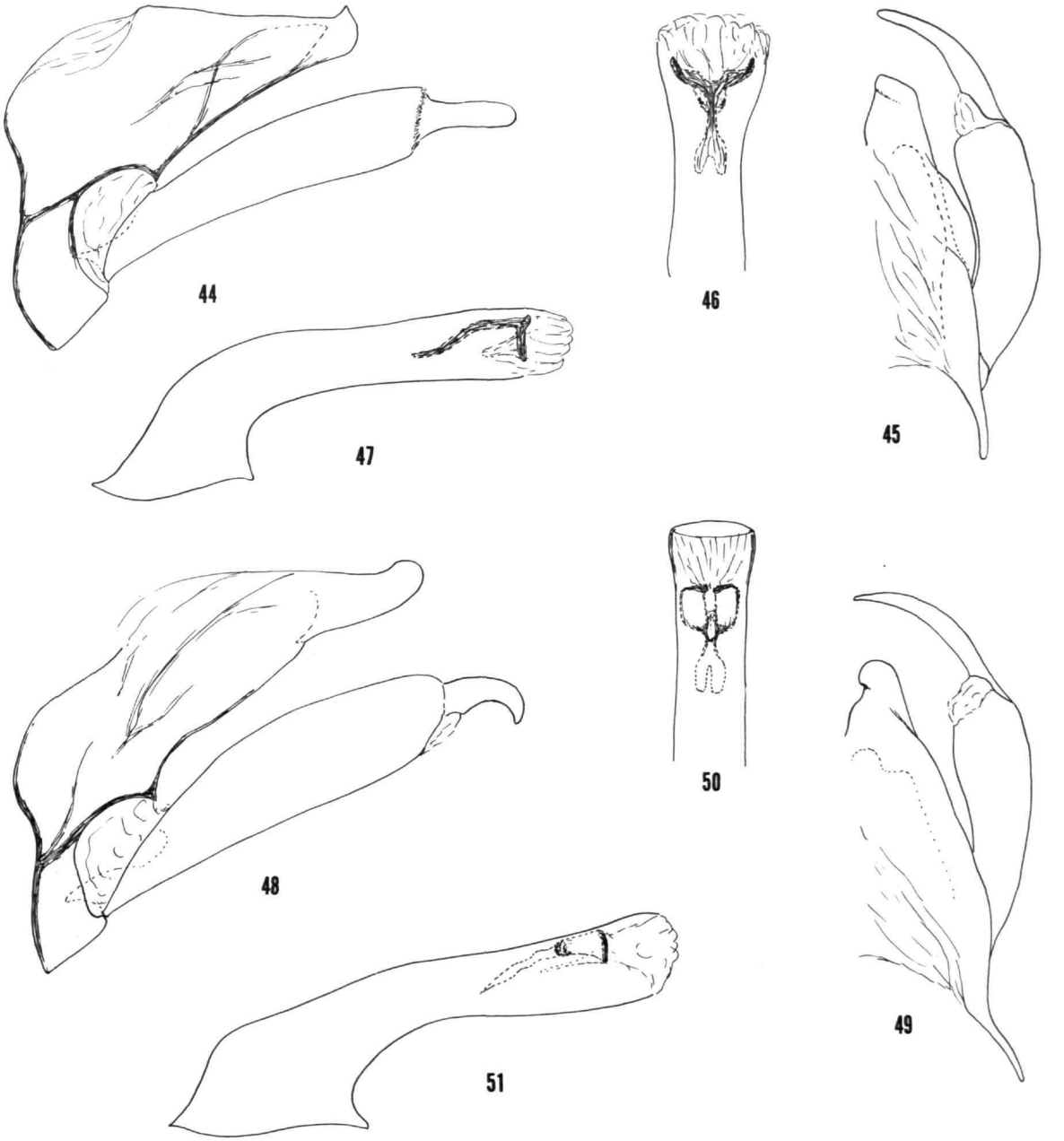
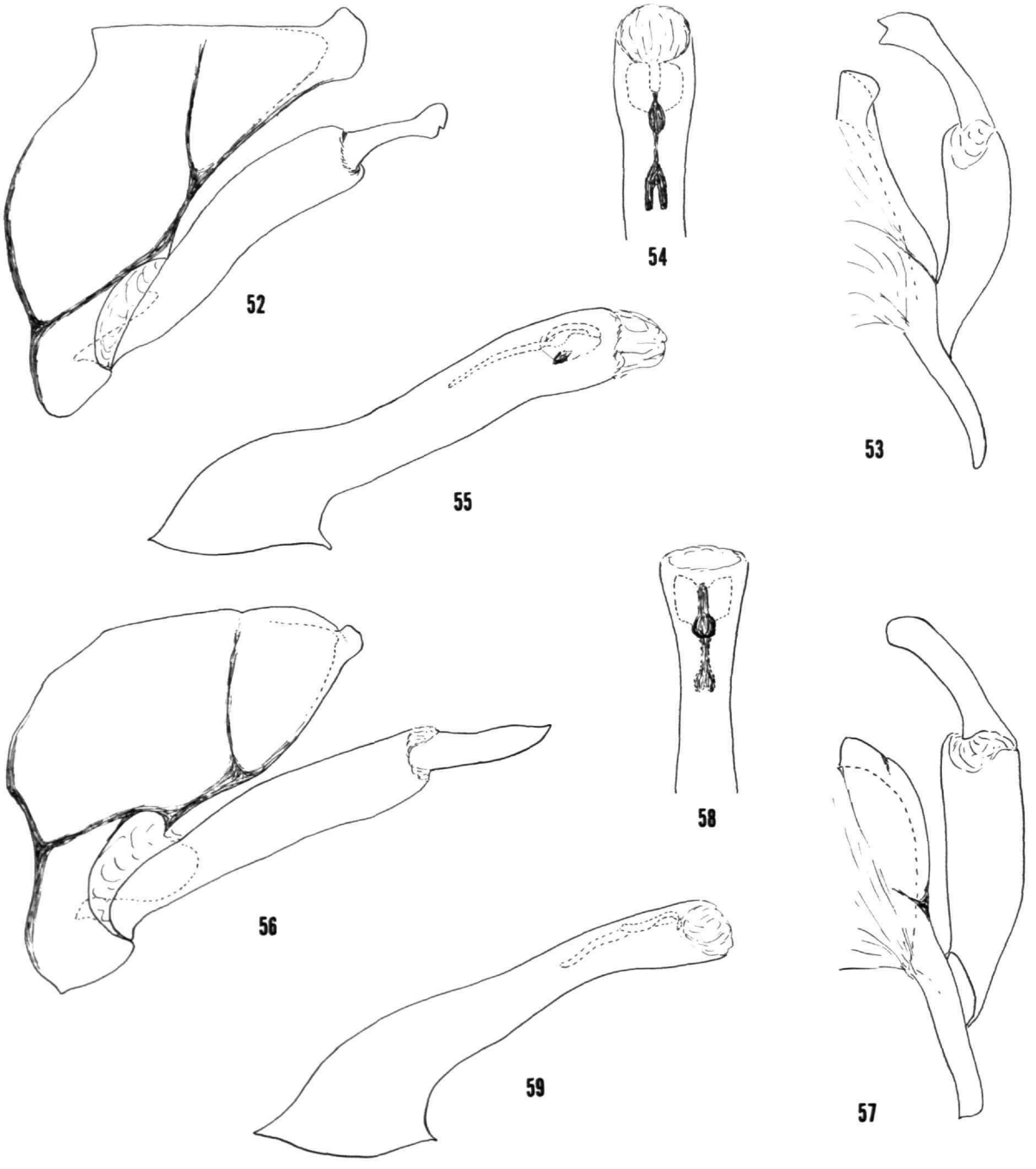
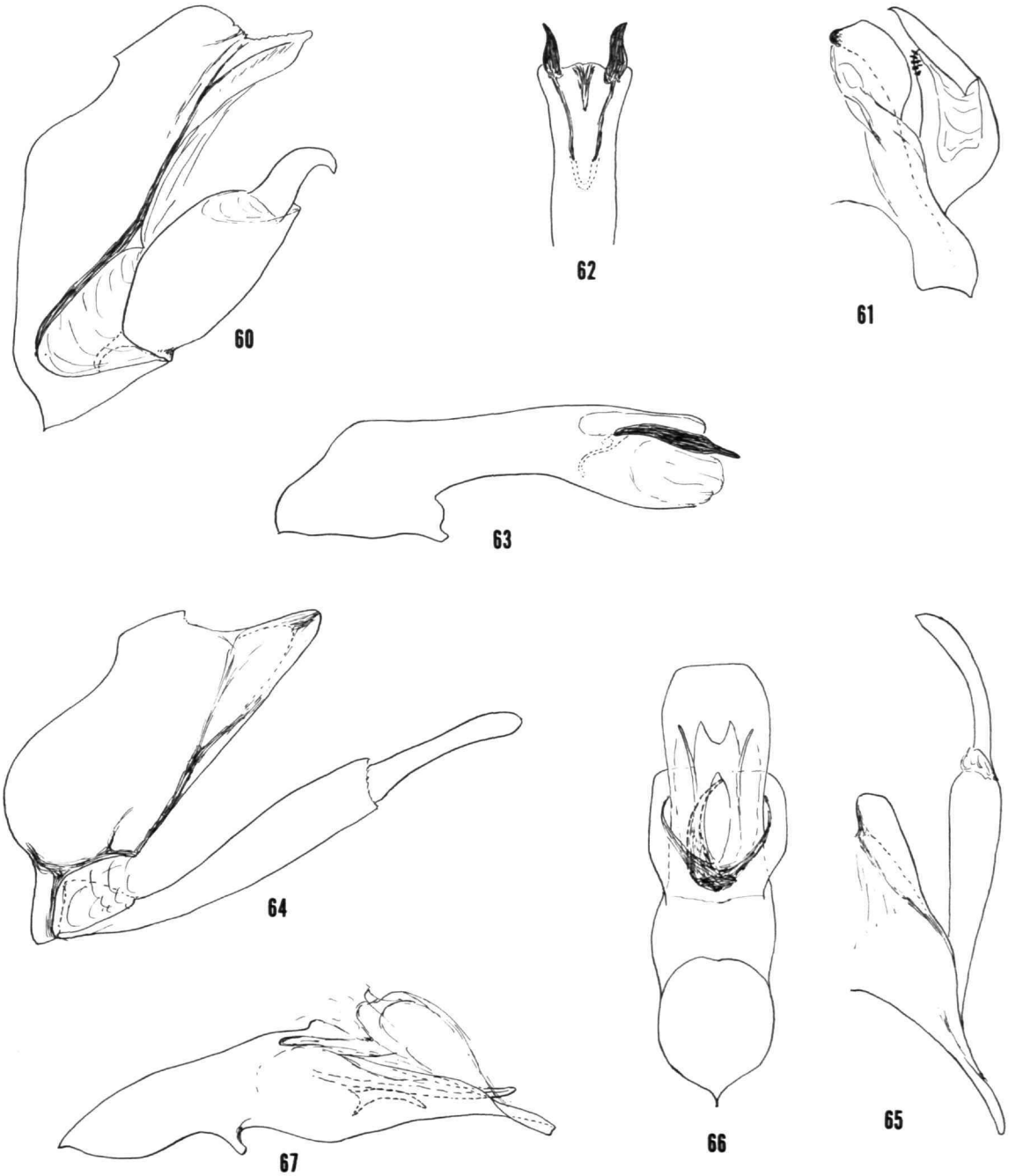


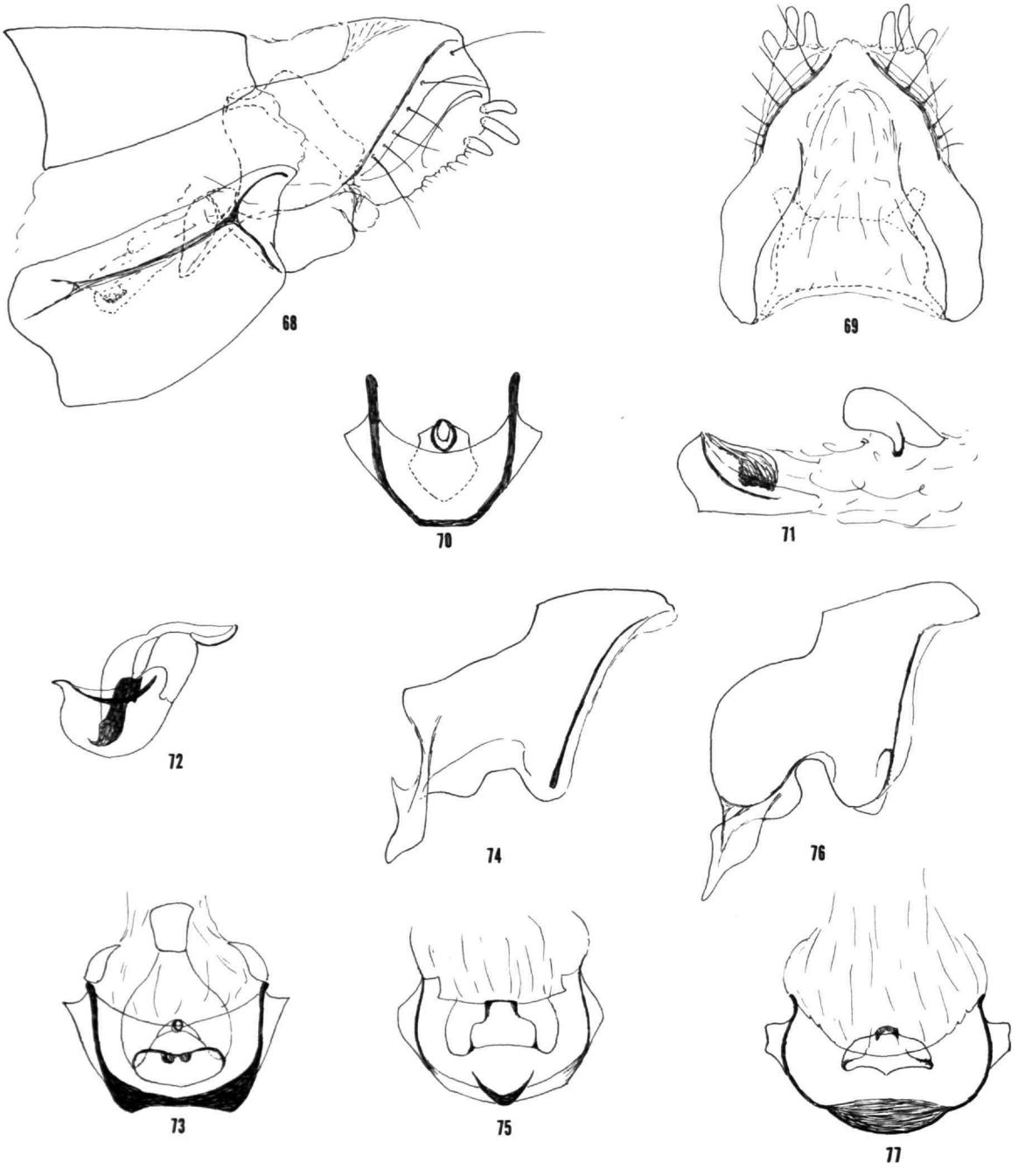
FIGURES 44–51.—Male genitalia. *Smicridea fasciatella* McLachlan: 44, lateral; 45, dorsal; 46, tip of aedeagus, dorsal; 47, aedeagus, lateral. *S. varia* (Banks): 48, lateral; 49, dorsal; 50, tip of aedeagus, dorsal; 51, aedeagus, lateral.



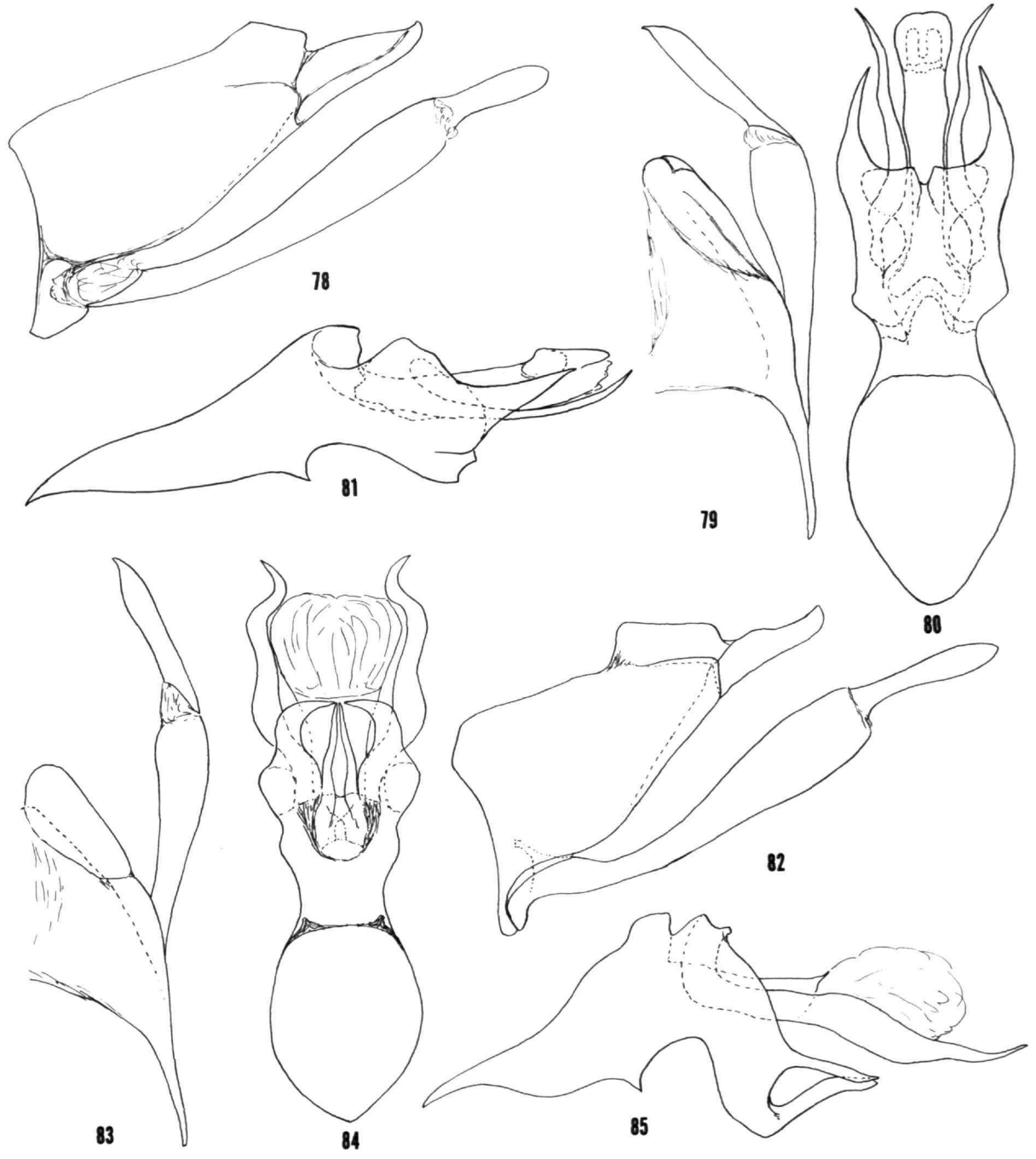
FIGURES 52–59.—Male genitalia. *Smicridea bivittata* (Hagen): 52, lateral; 53, dorsal; 54, tip of aedeagus, dorsal; 55, aedeagus, lateral. *S. unicolor* (Banks): 56, lateral; 57, dorsal; 58, tip of aedeagus, dorsal; 59, aedeagus, lateral.



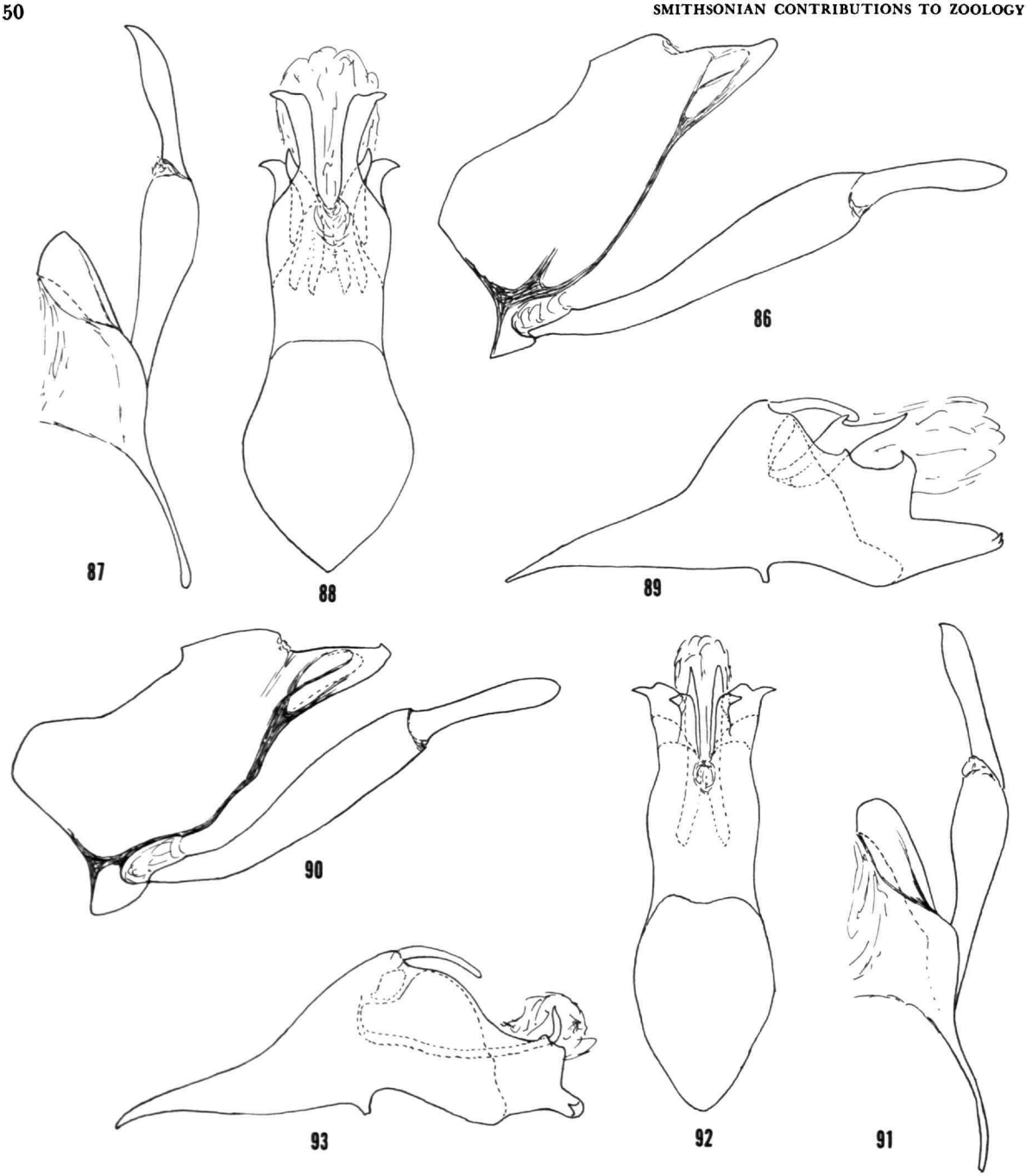
FIGURES 60–67.—Male genitalia. *Smicridea breviuncata*, new species: 60, lateral; 61, dorsal; 62, tip of aedeagus, dorsal; 63, aedeagus, lateral. *S. pipila*, new species: 64, lateral; 65, dorsal; 66, aedeagus, dorsal; 67, aedeagus, lateral.



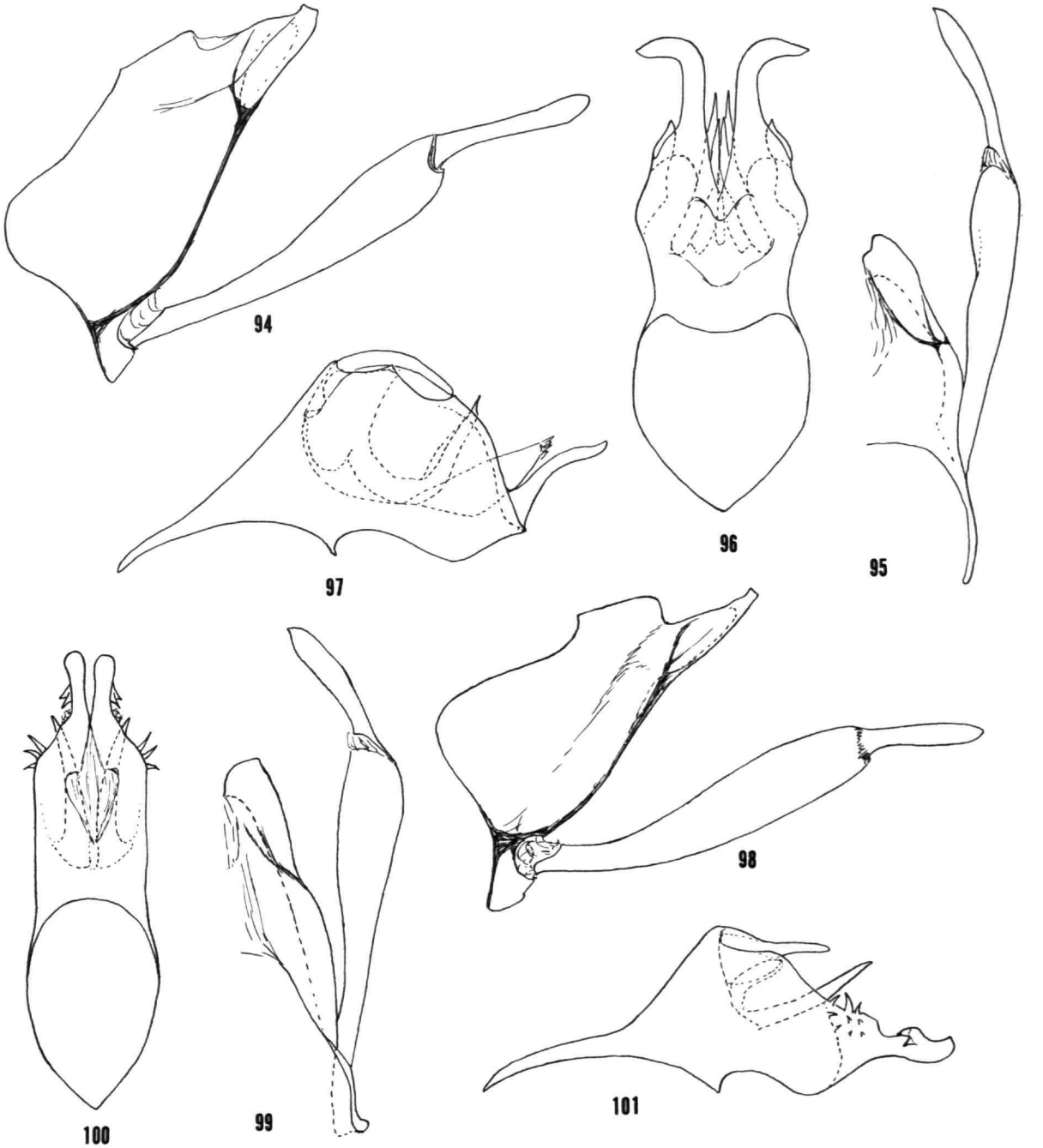
FIGURES 68–77.—Female genitalia. *Smicridea fasciatella* McLachlan: 68, lateral; 69, dorsal; 70, vagina ventral; 71, vagina, lateral. *S. varia* (Banks): 72, vagina, lateral; 73, vagina, ventral. *S. bivittata* (Hagen): 74, ninth tergum, lateral; 75, vagina, ventral. *S. breviuncata*, new species: 76, ninth tergum, lateral; 77, vagina, ventral.



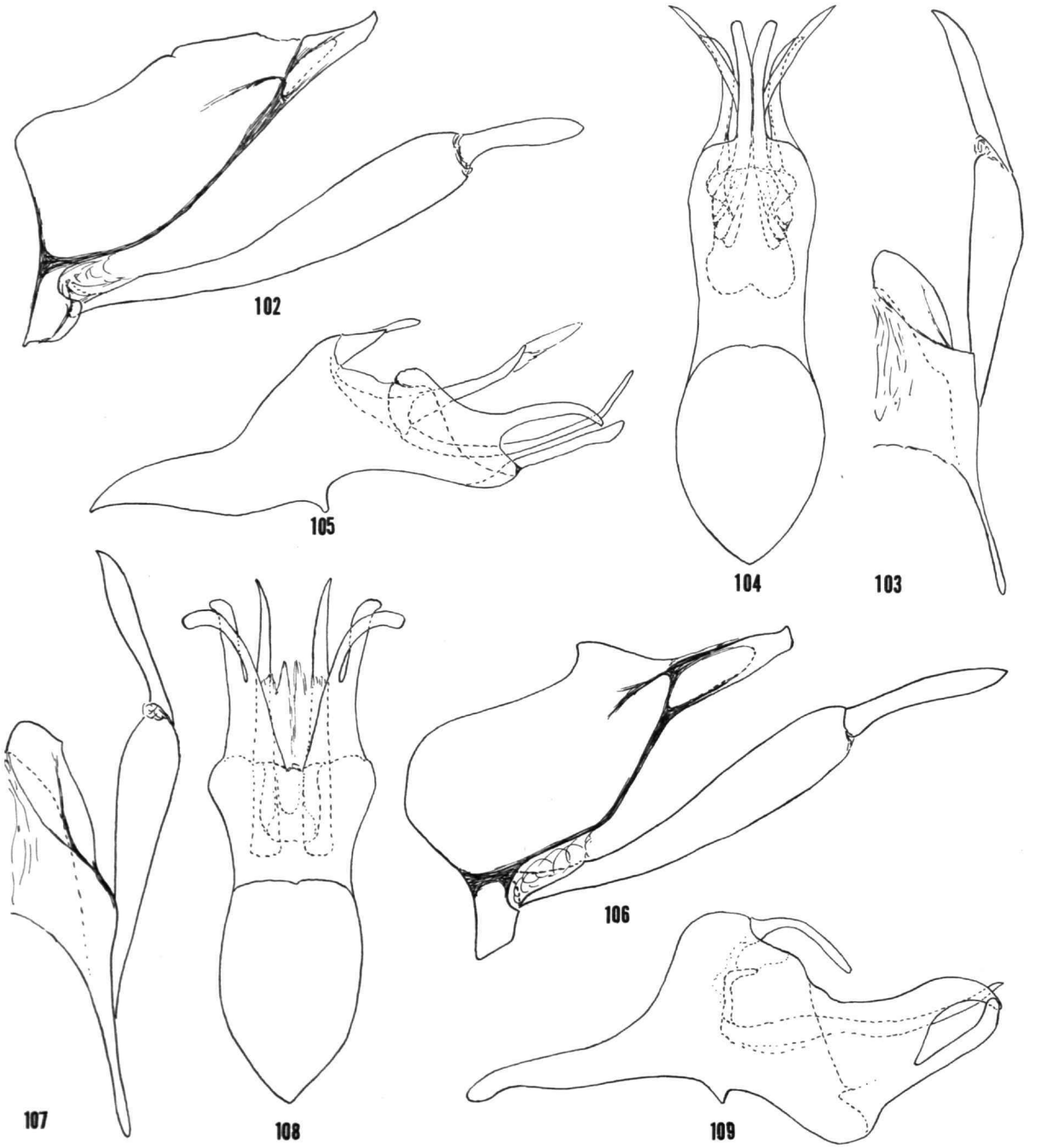
FIGURES 78–85.—Male genitalia. *Smicridea caldwelli* Ross: 78, lateral; 79, dorsal; 80, aedeagus, ventral; 81, aedeagus, lateral. *S. dampfi*, new species: 82, lateral; 83, dorsal; 84, aedeagus, ventral; 85, aedeagus, lateral.



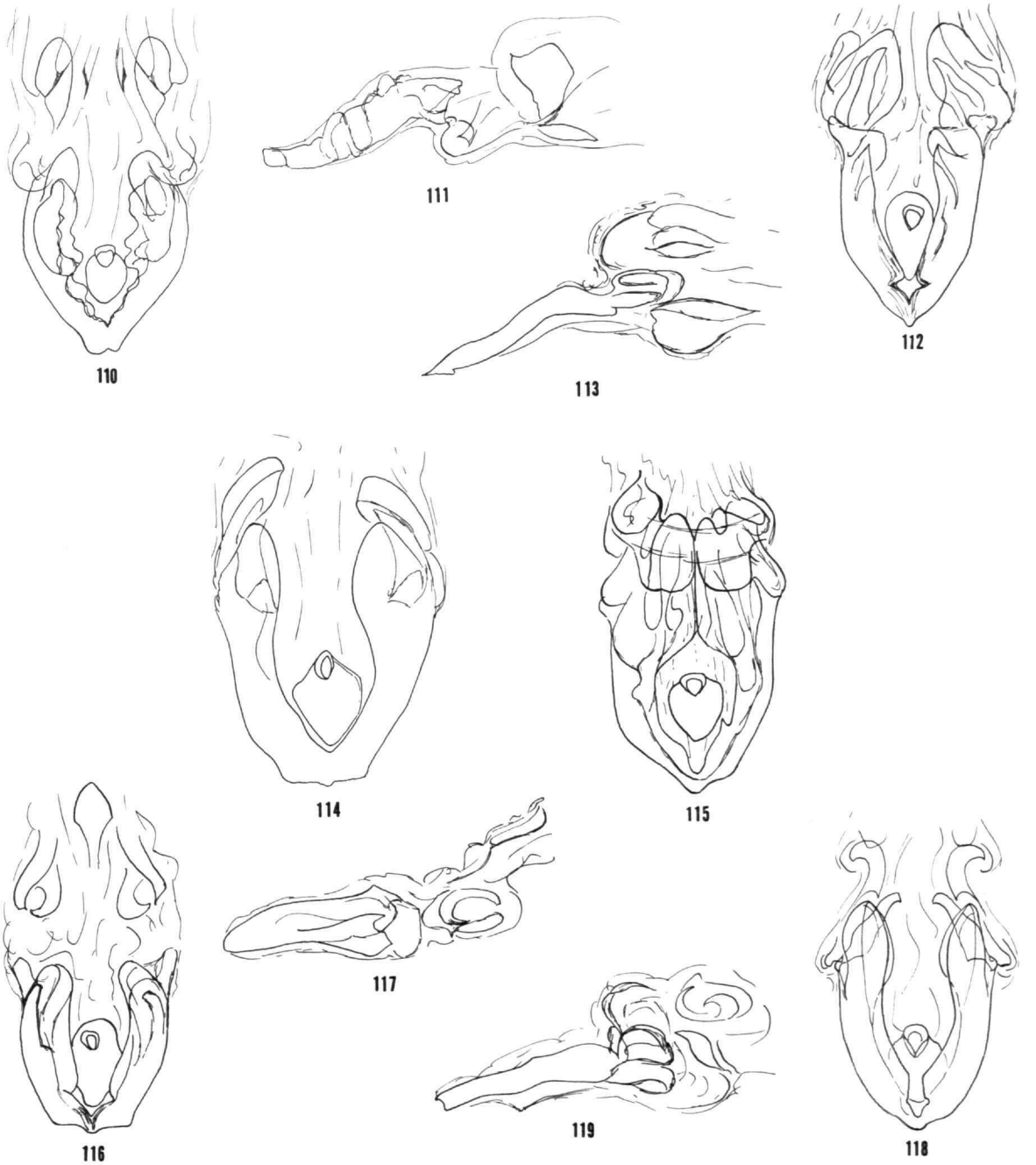
FIGURES 86–93.—Male genitalia. *Smicridea nahuatl*, new species: 86, lateral; 87, dorsal; 88, aedeagus, ventral; 89, aedeagus, lateral. *S. cholta*, new species: 90, lateral; 91, dorsal; 92, aedeagus, ventral; 93, aedeagus, lateral.



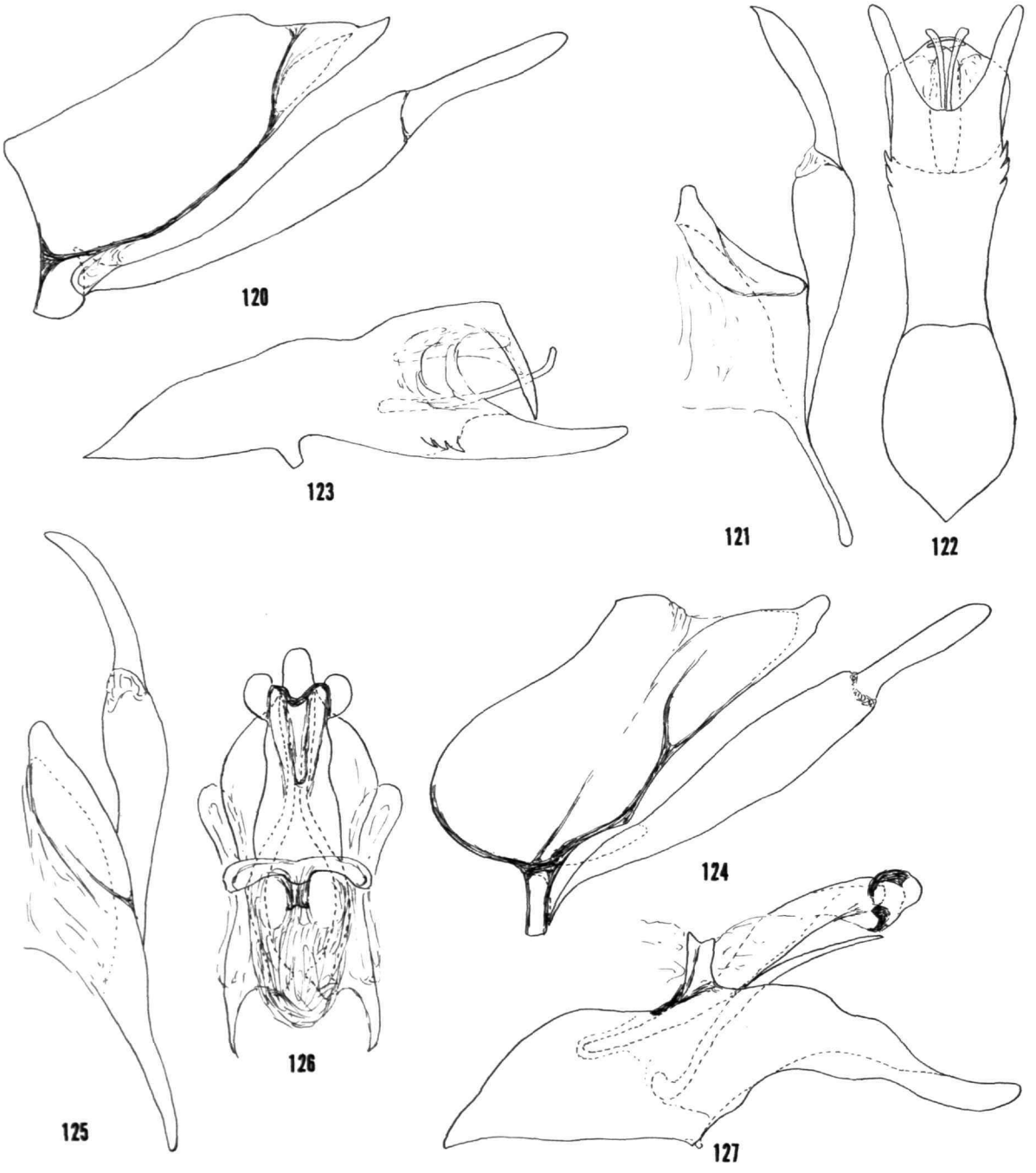
FIGURES 94–101.—Male genitalia. *Smicridea turrialbana*, new species: 94, lateral; 95, dorsal; 96, aedeagus, ventral; 97, aedeagus, lateral. *S. calopa*, new species: 98, lateral; 99, dorsal; 100, aedeagus, ventral; 101, aedeagus, lateral.



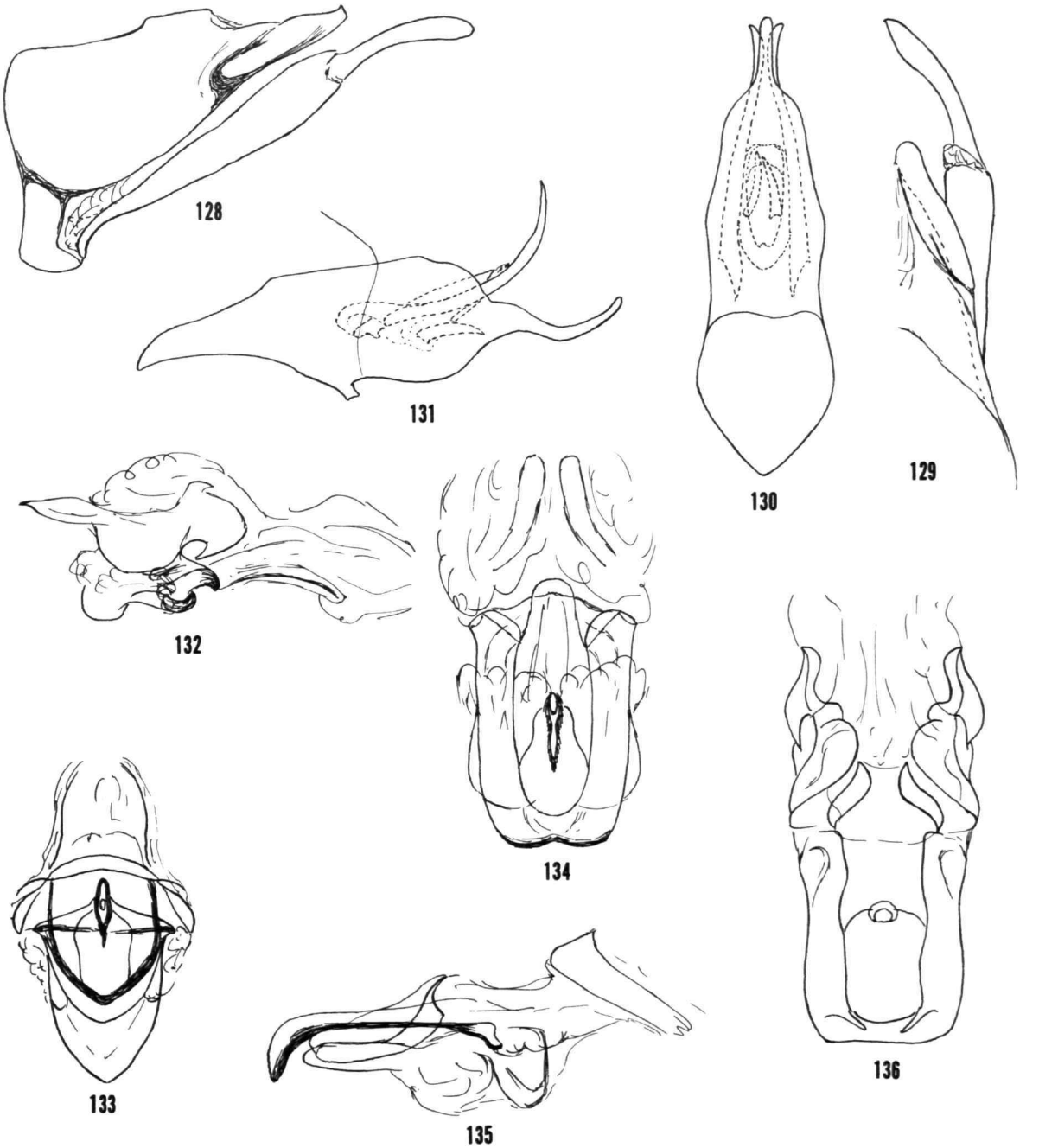
FIGURES 102–109.—Male genitalia. *Smicridea ulva*, new species: 102, lateral; 103, dorsal; 104, aedeagus, ventral; 105, aedeagus, lateral. *S. cuna*, new species: 106, lateral; 107, dorsal; 108, aedeagus, ventral; 109, aedeagus, lateral.



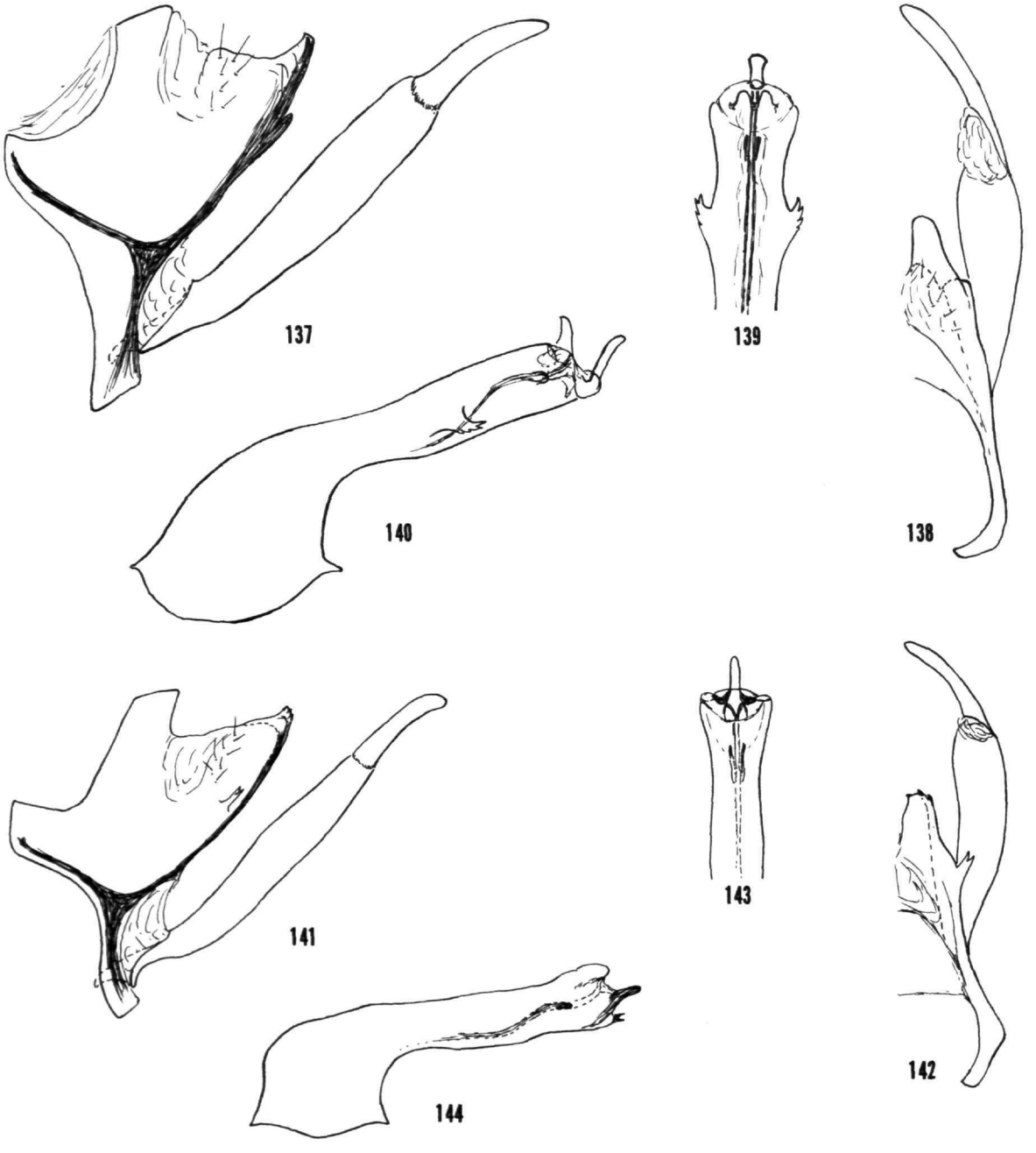
FIGURES 110–119.—Female vagina. *Smicridea caldwelli* Ross: 110, ventral; 111, lateral. *S. nahuatl*, new species: 112, ventral; 113, lateral. *S. turrialbana*, new species: 114, ventral. *S. cuna*, new species: 115, ventral. *S. cholta*, new species: 116, ventral; 117, lateral. *S. calopa*, new species: 118, ventral; 119, lateral.



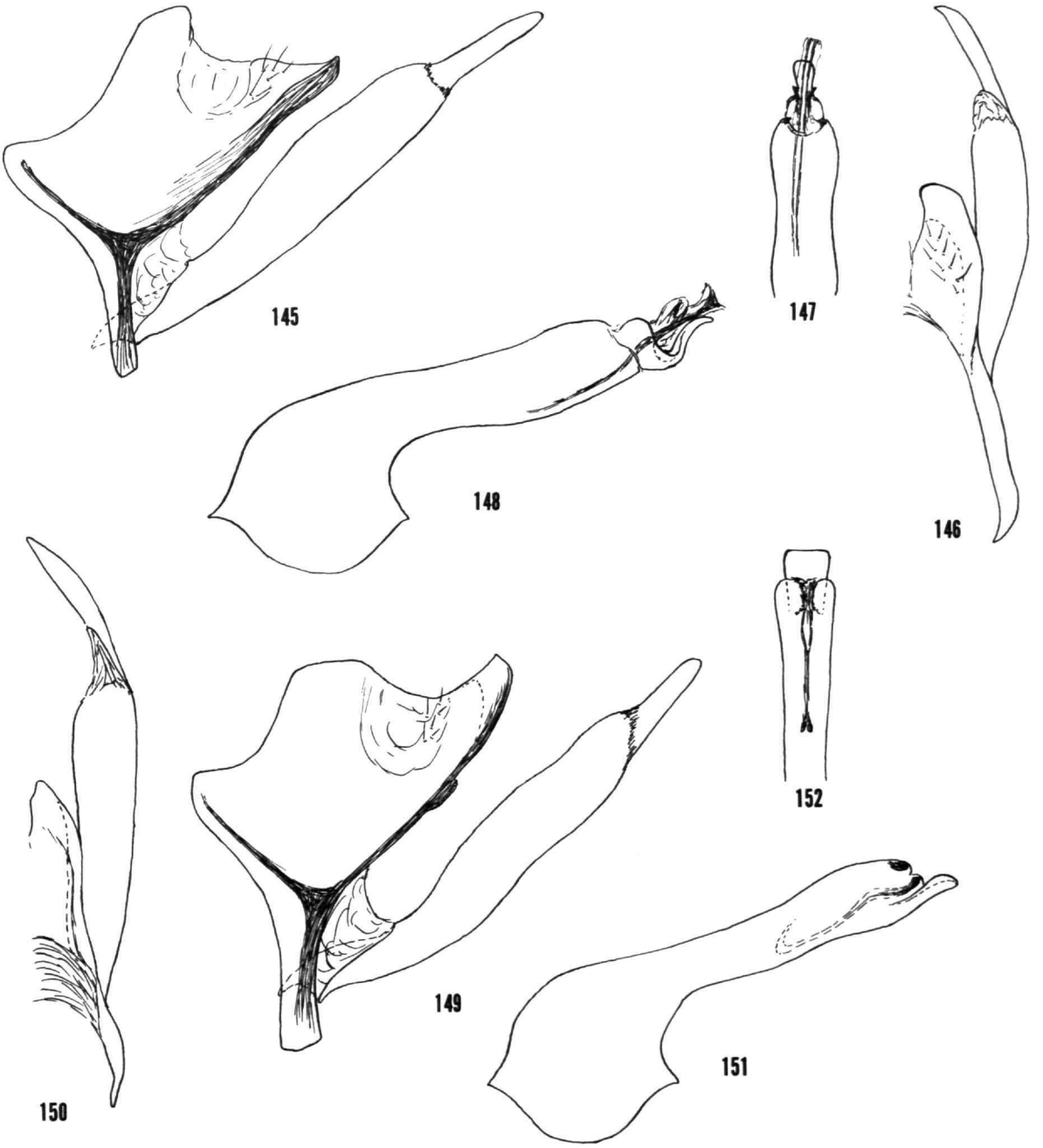
FIGURES 120–127.—Male genitalia. *Smicridea matagalpa*, new species: 120, lateral; 121, dorsal; 122, aedeagus, ventral; 123, aedeagus, lateral. *S. tarasca*, new species: 124, lateral; 125, dorsal; 126, apex of aedeagus, dorsal; 127, aedeagus, lateral.



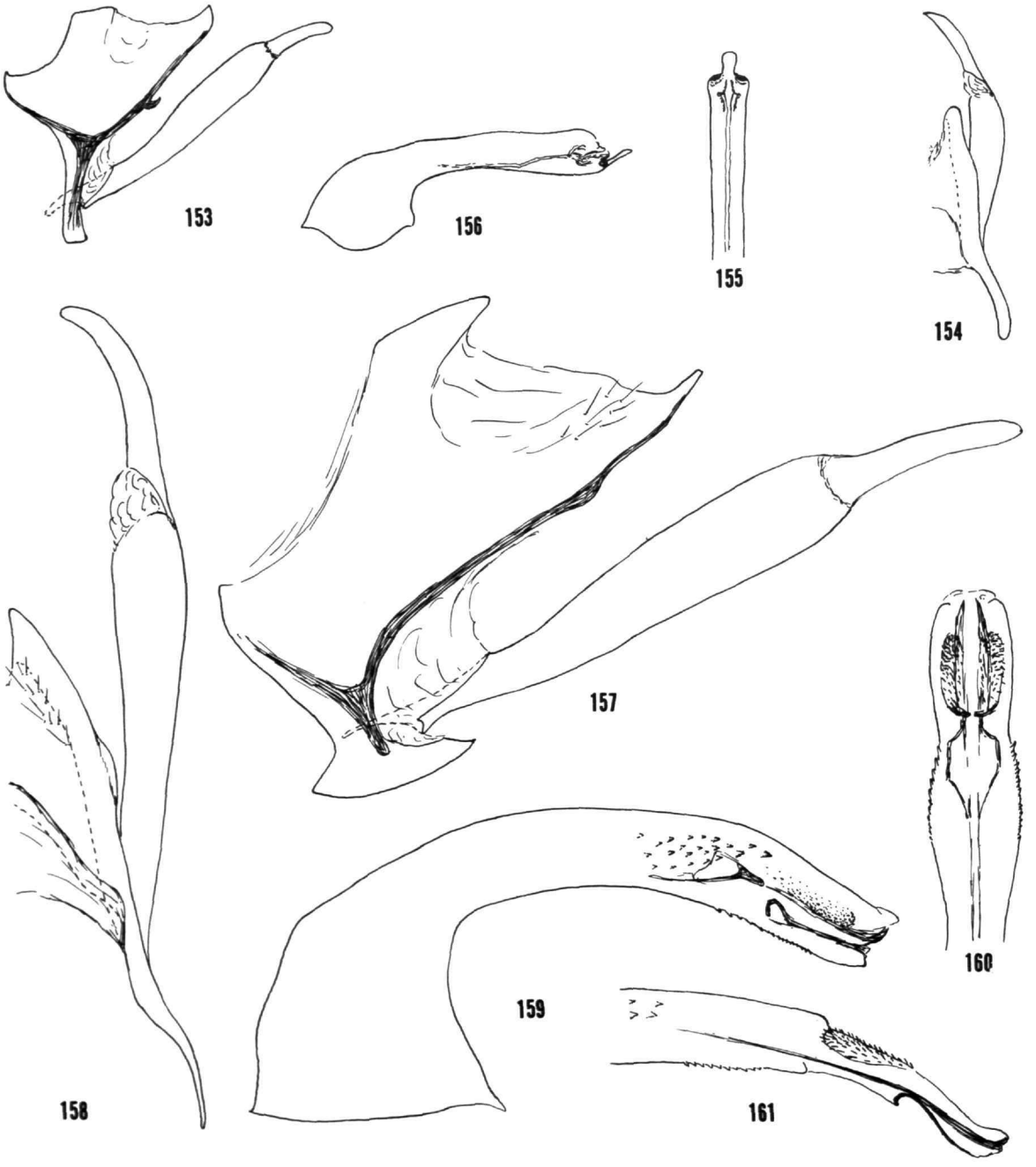
FIGURES 128–136.—*Smicridea campana*, new species, male genitalia: 128, lateral; 129, dorsal; 130, aedeagus, ventral; 131, aedeagus, lateral. *S. pipila*, new species, female vagina: 132, lateral; 133, ventral. *S. tarasca*, new species, female vagina: 134, ventral; 135, lateral. *S. matagalpa*, new species, female vagina: 136, ventral.



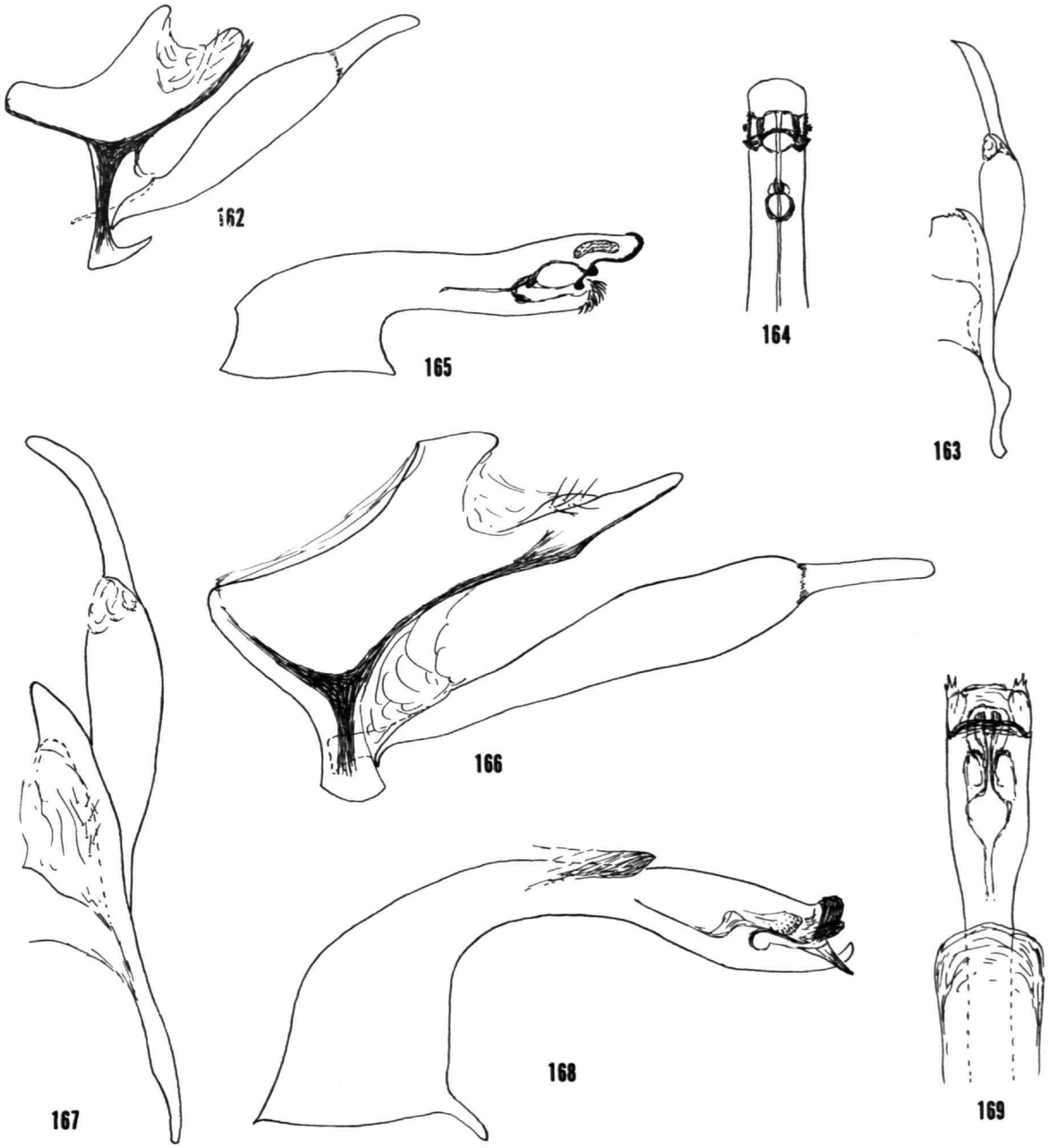
FIGURES 137–144.—Male genitalia. *Smicridea signata* (Banks): 137, lateral; 138, dorsal; 139, tip of aedeagus, dorsal; 140, aedeagus, lateral. *S. bifurcata*, new species: 141, lateral; 142, dorsal; 143, tip of aedeagus, dorsal; 144, aedeagus, lateral.



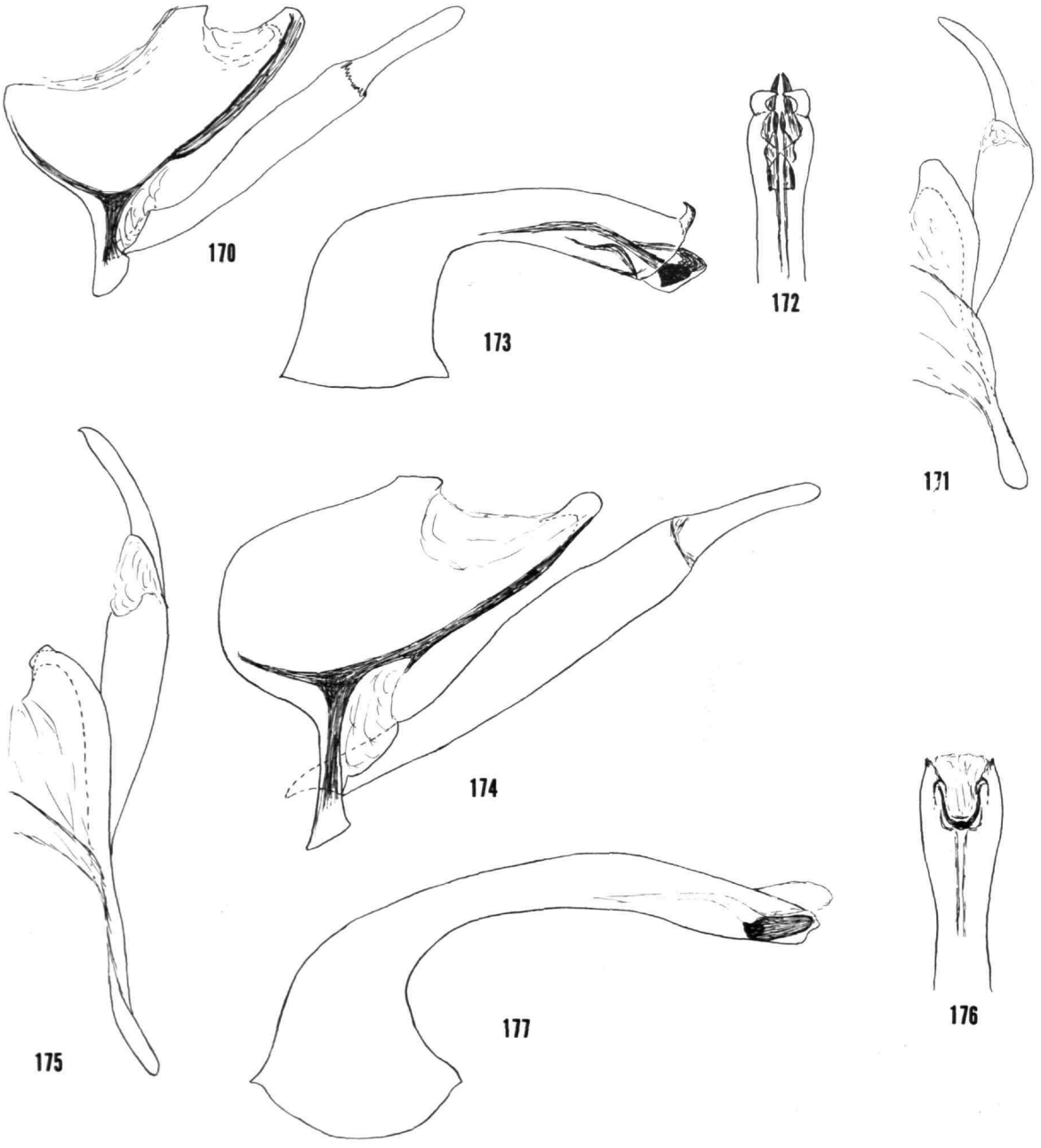
FIGURES 145–152.—Male genitalia. *Smicridea inarmata*, new species: 145, lateral; 146, dorsal; 147, tip of aedeagus, dorsal; 148, aedeagus, lateral. *S. arizonensis*, new species: 149, lateral; 150, dorsal; 151, aedeagus, lateral; 152, tip of aedeagus, dorsal.



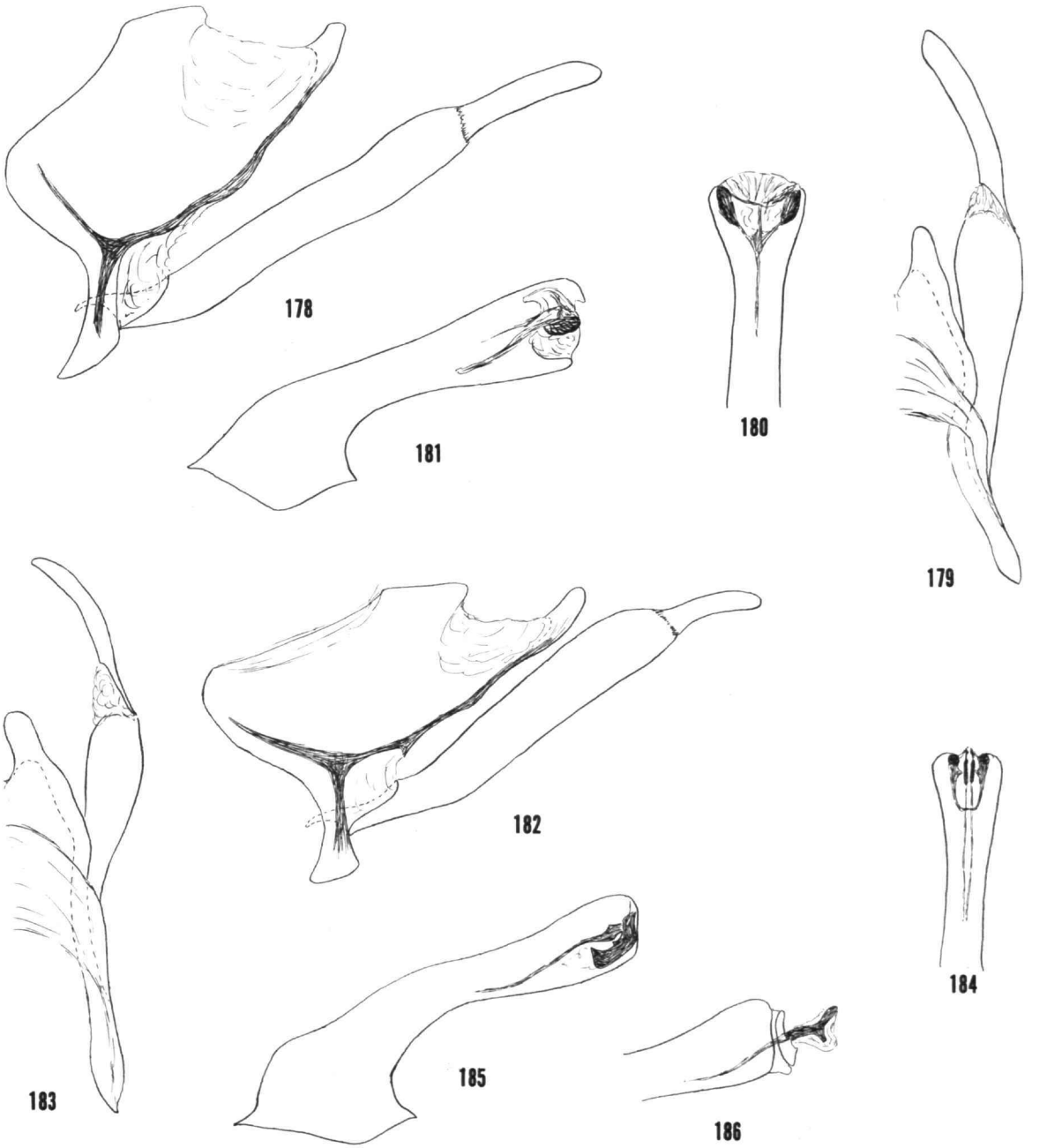
FIGURES 153–161.—Male genitalia. *Smicridea salta*, new species: 153, lateral; 154, dorsal; 155, tip of aedeagus, dorsal; 156, aedeagus, lateral. *Smicridea acuminata*, new species: 157, lateral; 158, dorsal; 159, aedeagus, lateral; 160, tip of aedeagus, dorsal; 161, tip of aedeagus, with internal sclerites everted, lateral.



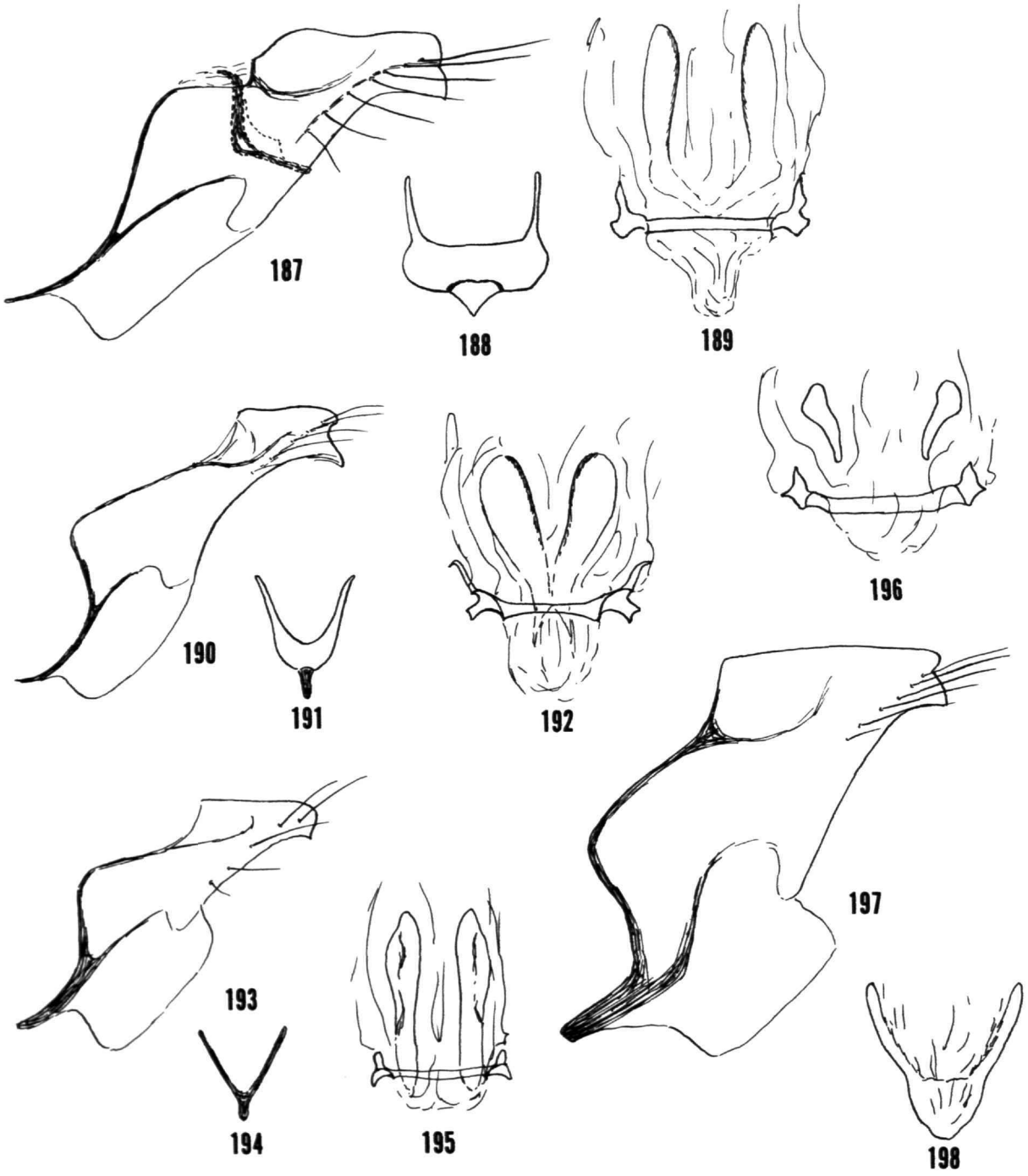
FIGURES 162–169.—Male genitalia. *Smicridea radula*, new species: 162, lateral; 163, dorsal; 164, tip of aedeagus, dorsal; 165, aedeagus, lateral. *S. talamanca*, new species: 166, lateral; 167, dorsal; 168, aedeagus, lateral; 169, tip of aedeagus, dorsal.



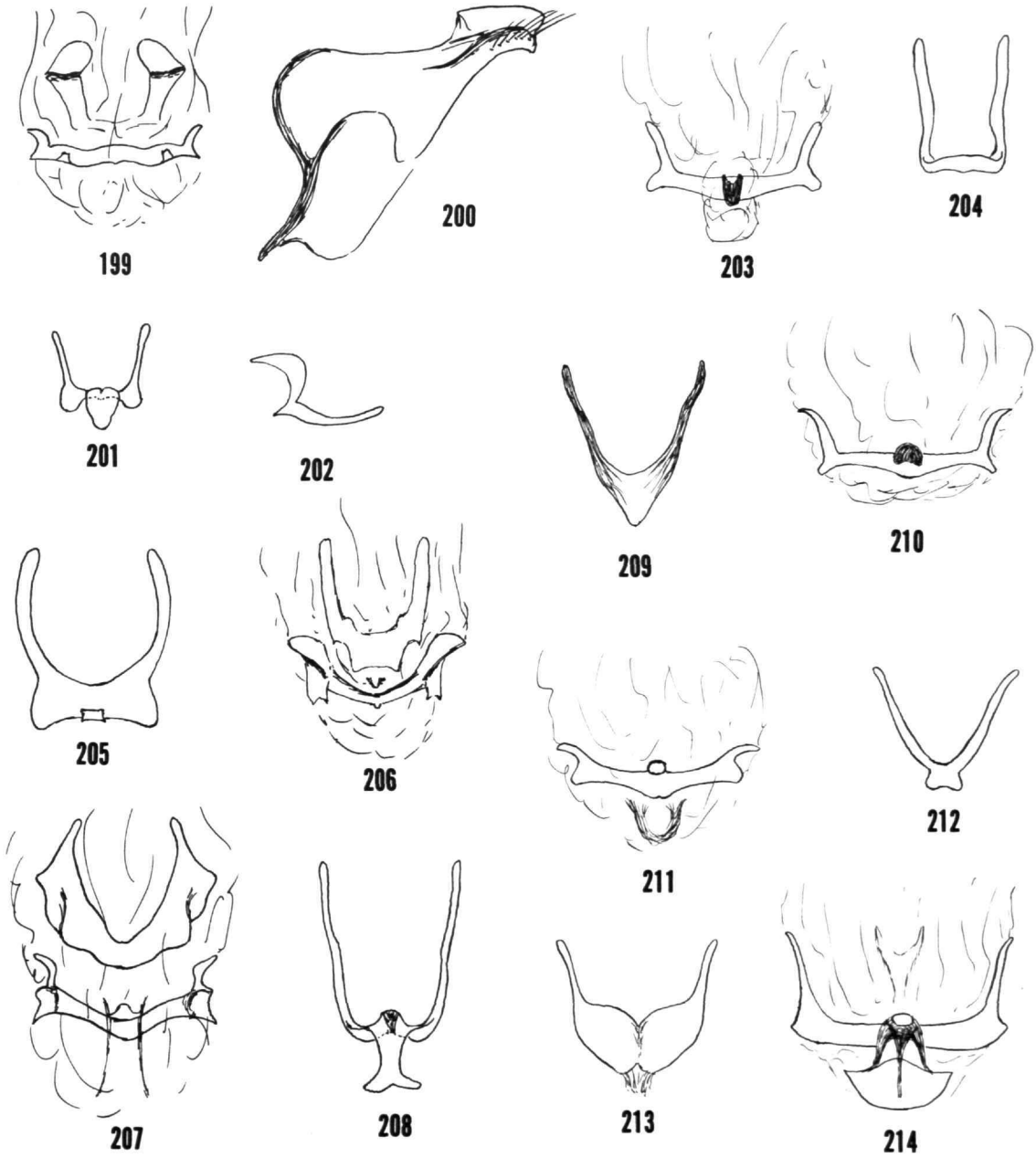
FIGURES 170–177.—Male genitalia. *Smicridea zanclophora*, new species: 170, lateral; 171, dorsal; 172, tip of aedeagus, dorsal; 173, aedeagus, lateral. *S. veracruzensis*, new species: 174, lateral; 175, dorsal; 176, tip of aedeagus, dorsal; 177, aedeagus, lateral.



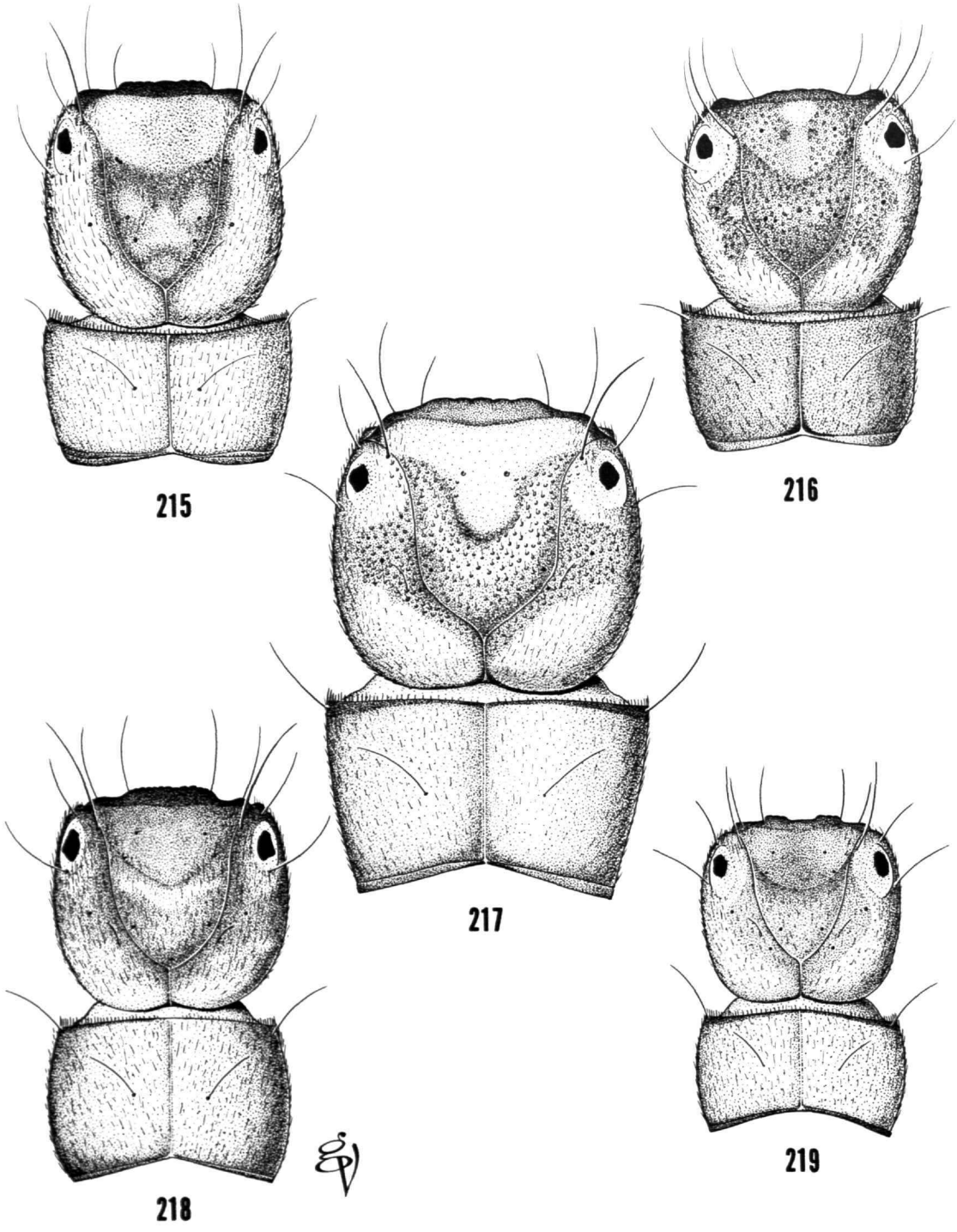
FIGURES 178–186.—Male genitalia. *Smicridea dispar* (Banks): 178, lateral; 179, dorsal; 180, tip of aedeagus, dorsal; 181, aedeagus, lateral. *S. dithyra*, new species: 182, lateral; 183, dorsal; 184, tip of aedeagus, dorsal; 185, aedeagus, lateral; 186, tip of aedeagus, with internal sclerites everted, lateral.



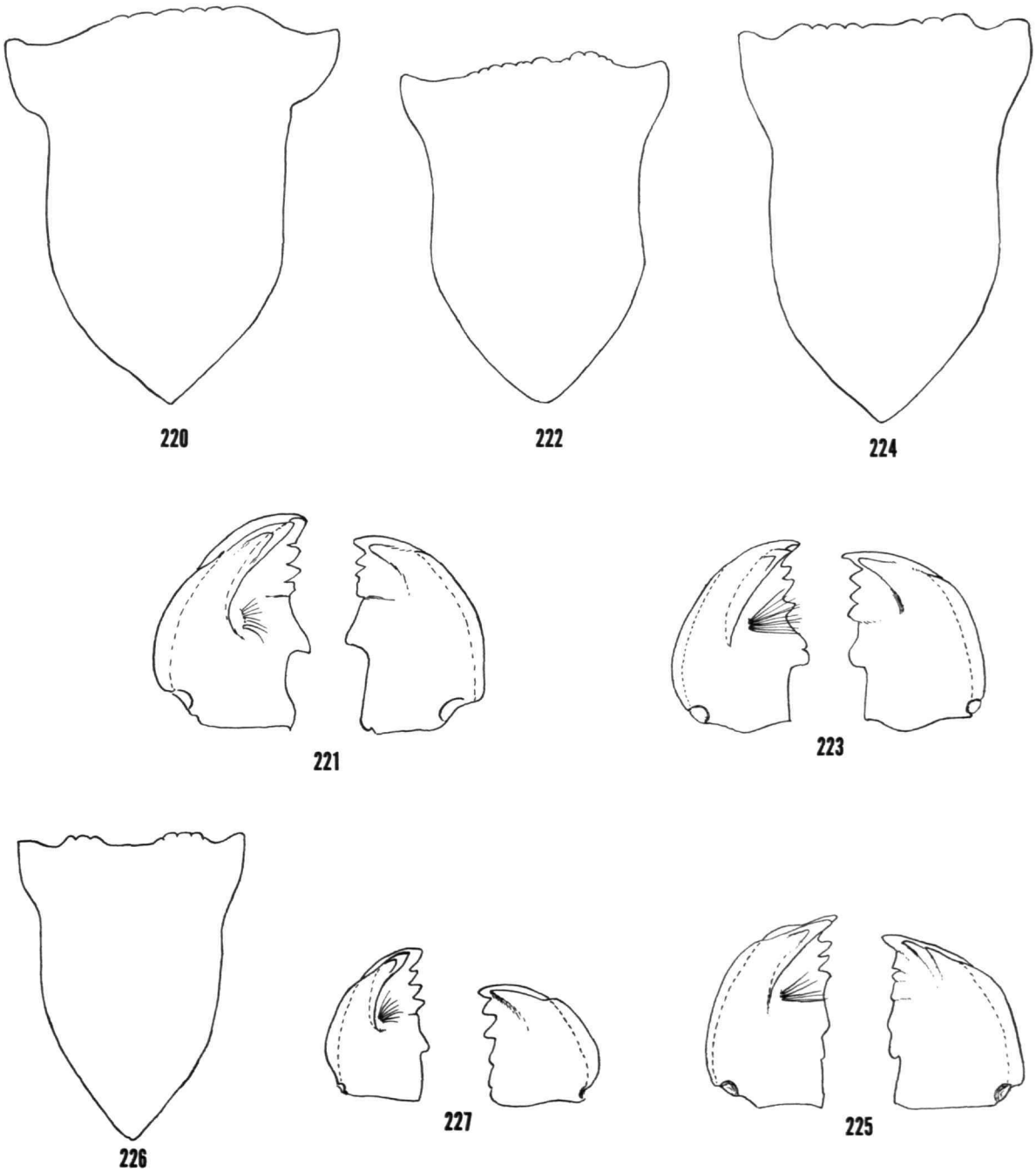
FIGURES 187–198.—Female genitalia. *Smicridea signata* (Banks): 187, ninth tergum, lateral; 188, internal plate, posterodorsal; 189, vagina, ventral. *S. bifurcata*, new species: 190, ninth tergum, lateral; 191, internal plate, posterodorsal; 192, vagina, ventral. *S. salta*, new species: 193, ninth tergum lateral; 194, internal plate, posterodorsal; 195, vagina, ventral. *S. arizonensis*, new species: 196, vagina, ventral; 197, ninth tergum, lateral; 198, internal plate, posterodorsal.



FIGURES 199–214.—Female genitalia. *Smicridea radula*, new species: 199, vagina, ventral; 200, ninth tergum, lateral; 201, internal plate, posterodorsal; 202, internal plate, lateral. *S. zanclophora*, new species: 203, vagina, ventral; 204, internal plate, posterodorsal. *S. acuminata*, new species: 205, internal plate, posterodorsal; 206, vagina, ventral. *S. talamanca*, new species: 207, vagina, ventral; 208, internal plate, posterodorsal. *S. dispar* (Banks): 209, internal plate, posterodorsal; 210, vagina, ventral. *S. dithyra*, new species: 211, vagina, ventral; 212, internal plate, posterodorsal. *S. veracruzensis*, new species: 213, internal plate, posterodorsal; 214, vagina, ventral.



FIGURES 215–219.—Larval head and pronotum, dorsal: 215, *Smicridea dispar* (Banks); 216, *S. varia* (Banks); 217, *S. fasciatella* McLachlan; 218, *S. bivittata* (Hagen); 219, *S. signata* (Banks).



FIGURES 220–227.—Larval structures. *Smicridea fasciatella* McLachlan: 220, frontoclypeus; 221, mandibles. *S. bivittata* (Hagen): 222, frontoclypeus; 223, mandibles. *S. dispar* (Banks): 224, frontoclypeus; 225, mandibles. *S. signata* (Banks): 226, frontoclypeus; 227, mandibles.

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