

STUDIES OF NEOTROPICAL CADDISFLIES, XL:
NEW SPECIES OF *SMICRIDEA* (*SMICRIDEA*)
FROM MIDDLE AMERICA AND THE WEST INDIES
(TRICHOPTERA: HYDROPSYCHIDAE)

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Abstract.—Twelve species are described in the genus *Smicridea*, subgenus *Smicridea*: *tobada* (Tobago, Trinidad), *anomala* (Trinidad, Tobago), *aurimacula* (St. Vincent), *cartiensis* (Panama), *multidens* (Panama), *corralita* (Mexico), *bulara* (Trinidad), *mirama* (Panama), *flicata* (Costa Rica, Panama), *circinata* (Panama), *holzenthali* (Costa Rica), and *latipala* (Panama). Abdominal pheromone glands, found in segments 6 and 7 of the male, are described and illustrated for *S. breviuncata* Flint and *S. cuna* Flint. Variations in male genitalia are shown for these two species and *S. turrialbana* Flint.

The nominal subgenus of *Smicridea*, containing over 60 species, is limited to the New World. Its closest relationships are with several similar genera from Tasmania and Australia (Flint 1989). The New World species are found from southwestern United States to southern South America, with species on all the larger Antillean islands.

Flint revised the systematics of the species in North and Central America (1974a), in the Lesser Antilles (1968), in central, northern Venezuela (1981), and in Suriname (1974b). Although the majority of species from these regions are now namable, undescribed species continue to be collected, and species descriptions and names are necessary for impending faunal studies.

We have also obtained from the University of California, Berkeley those unnamed specimens reported by McElravy et al. (1981). The genitalia were missing from the only example of "A," so its identity remains unknown. Species "B" is described as *S. flicata*.

All species described here belong to the subgenus *Smicridea* as defined by Flint (1974a). Males of species in this subgenus are easily distinguished from those in subgenus *Rhyacophylax* by a spur count of 1,

4, 4 (rather than 1, 4, 2), and by two pairs of pheromone glands in the abdomen (lacking in *Rhyacophylax*). These glands open externally through the membranes between segments 7 and 8 and segments 6 and 7, but lie within segments 7 and 6 when not extruded.

Within the subgenus *Smicridea*, the new species *tobada* is placed in the *fasciatella* group, and the remaining new species are placed in the *nigripennis* group (Flint 1974a). *Smicridea anomala* is quite unusual, because its phallus is very long, open and membranous ventrally and contains a series of heavy spines. These characteristics are lacking in the *fasciatella* group. Species of the *nigripennis* group, however, have somewhat similar phalli: generally open and membranous apicad and bearing a wide assortment of spines and processes. Therefore we place *anomala* in the latter group and recognize that when the Neotropical fauna is better known it may be transferred to a newly recognized species group.

Acronyms used in the text indicate depositories of specimens as follows: CAS (California Academy of Sciences, San Francisco, California), DGD (D. G. Denning collection, Moraga, California), NMNH (Nation-

al Museum of Natural History, Smithsonian Institution, Washington, D.C.), UCD (University of California, Davis, California), UMSP (University of Minnesota, St. Paul, Minnesota), UPP (Fairchild Museo de Invertebrados, University of Panama, Panama), WSU (Washington State University, Pullman, Washington).

Smicridea (Smicridea) tobada, new species
Figs. 1–5

This species is related to *S. bulbosa* Flint (Flint 1974b, figs. 191–193) on the basis of the general structure of the genitalia and the presence of apical sclerites in the phallus. Diagnostic differences are a less bulbous apex of the phallus, and especially, the basal angulation of the phallotheca, which is very prominent on the ventral margin, and the broader apex of the clasper.

Adult.—Length of forewing, 4–5 mm. Color fuscous, legs and antennae paler; forewing fuscous with two white bands, apical fringe white. *Male genitalia* (Figs. 1–2): Ninth segment with anterior margin slightly expanded. Tenth tergite elongate, narrowing apicad in lateral aspect; in dorsal aspect elongate, apex obliquely truncate, with small apicomesal lobe. Clasper with basal segment elongate, parallel-sided; apical segment third length of basal segment, dorsal margin with apex acute, enlarged ventrad and nearly truncate, with cluster of small setae (Fig. 3). Phallus (Figs. 4–5) tubular, angled posteriad from base, with a distinct angle near base which is most pronounced on ventral margin; apex with a pair of dorsolateral sclerites with apices curved mesad; with a recurved internal sclerite in lateral aspect, dorsal aspect of this sclerite with mesobasal section divided apically into two lateral, bandlike sclerites that curve ventrad and then basad.

Type material.—Holotype, ♂, Tobago: St. John Province; Charlotteville, 14–21 Mar 1979, D. Hardy and W. Rowe (NMNH). Paratypes: Same data, 1 ♂, 1 ♀ (NMNH).

Trinidad: Arima Valley, Spring Hill Estate, 1500', 1 Feb 1983, W. G. Downs, 24 ♂ (DGD, NMNH).

Smicridea (S.) breviuncata Flint
Figs. 26–29

Smicridea (S.) breviuncata Flint 1974a:18.

Minor differences are present between a specimen from southern Costa Rica (Figs. 26–29) and figures in Flint (1974a, figs. 60–63) prepared from a specimen from central Costa Rica.

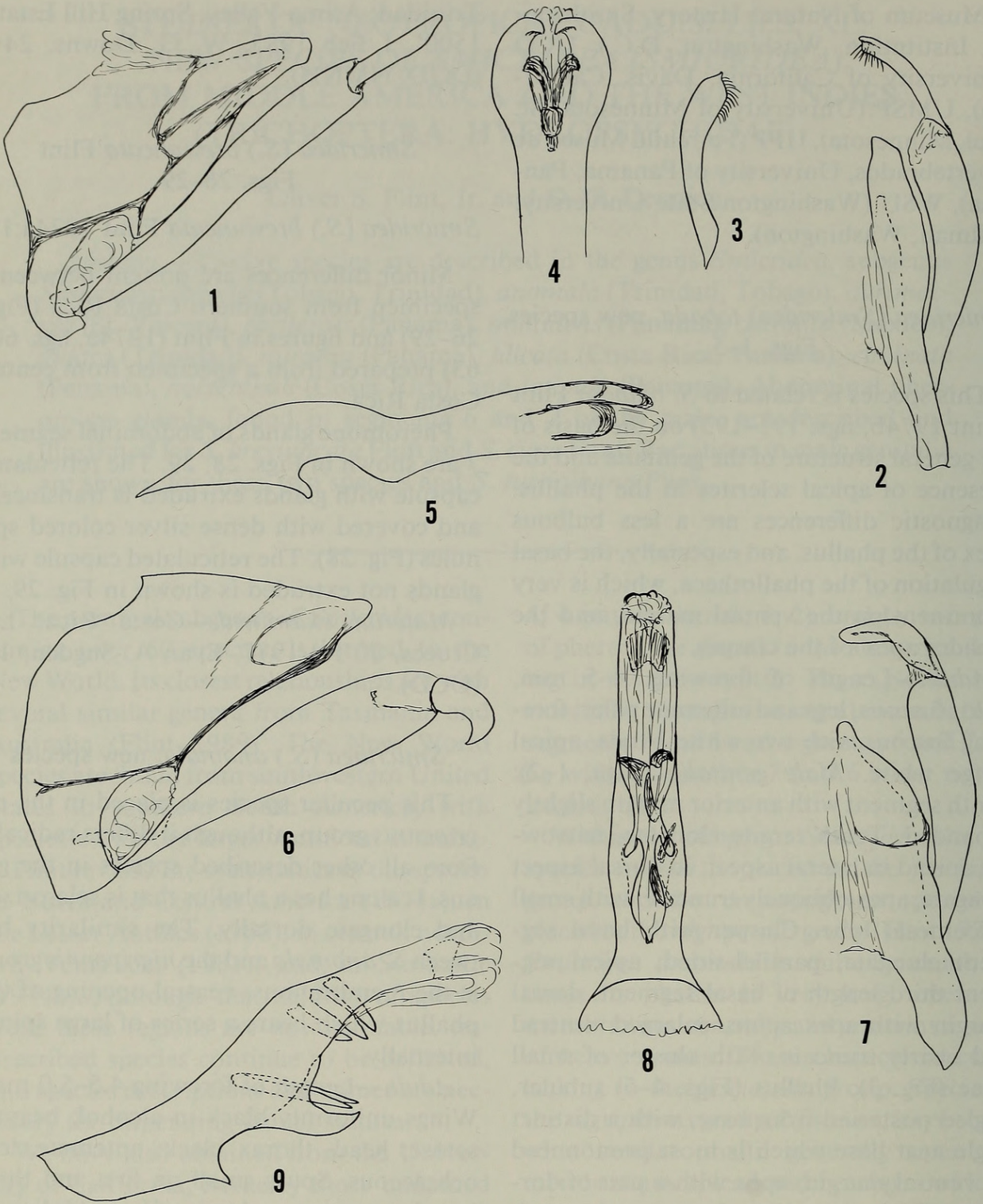
Pheromone glands of abdominal segment 7 are shown in Figs. 28, 29. The reticulated capsule with glands extruded is translucent and covered with dense silver colored spinules (Fig. 28). The reticulated capsule with glands not extruded is shown in Fig. 29.

Material examined.—Costa Rica: Las Cruces, 20 Jul 1977, Evan A. Sugden, 1 ♂ (UCD).

Smicridea (S.) anomala, new species

This peculiar species is placed in the *nigripennis* group, although it differs radically from all other described species in the genus. It alone has a phallus that is sclerotized and elongate dorsally. The similarity between *S. anomala* and the *nigripennis* group is the membranous, ventral opening of the phallus which bears a series of large spines internally.

Adult.—Length of forewing 4.5–5.0 mm. Wings uniformly black in alcohol, heavily setose; head, thorax black; antennae, legs ochraceous. Spurs small on first and third legs, large on second pair of legs. *Male genitalia* (Figs. 6–7): Ninth segment with anterior margin rounded, slightly produced. Tenth tergite in lateral and dorsal aspects wide, lightly sclerotized, tapering to a narrow, rounded apex. Clasper basal segment expanded distally; apical segment short, apex acute and curved ventromesad. Phallus (Figs. 8, 9) semierect, sclerotized dorsally; apex and ventral area membra-



Figs. 1-9. Male genitalia of *Smicridea*. 1-5, *tobada*. 1, Lateral view. 2, Ninth and tenth terga and clasper, dorsal view. 3, Apical segment of clasper, posteroventral view. 4, Apex of phallus, dorsal view. 5, Phallus, lateral view. 6-9, *anomala*. 6, Lateral view. 7, Ninth and tenth terga and clasper, dorsal view. 8, Apical half of phallus, ventral view. 9, Phallus, lateral view.

nous; 5–6 large, dark brown spines arise from mesal surface and project to or beyond ventral margin, a slightly darkened phallotremal sclerite near apex.

Type material.—Holotype, ♂, Trinidad Island: Simla Research Station, 2–15 Jun 1981, W. J. Hanson and C. L. Clemons (DGD, to be deposited in CAS). Paratypes: Same data, 1 ♂ (DGD). Tobago: St. John Province; Charlotteville, 14–21 Mar 1979, D. Hardy and W. Rowe, 1 ♂ (NMNH).

Dr. W. H. Hanson informs us that the specimens were collected in a light trap, with “a few ponds and a stream about one-eighth mile away in the heavily forested area.”

Smicridea (S.) aurimacula, new species
Figs. 18–21

This species is a member of the *nigripennis* group of *Smicridea* and is in the *cariba* section where it is closely related to *S. grenadensis* Flint (1968, figs. 61–63). *Smicridea aurimacula* shares with *S. grenadensis* the slightly upturned and truncate apex of the tenth tergum and six pairs of long internal phallic spines. However, it differs conspicuously by the golden banding on the forewings and the presence of straight lateral spine and an apicolateral plate bearing several small teeth on the phallus.

Adult.—Length of forewing, 4.5 mm. Color golden brown, head and thorax with golden hair; forewing with stripe of golden hair in costal cell widening at stigma and apicad, another broad golden stripe along posterior margin almost touching anterior stripe at chord, thus leaving a central, fuscous stripe in center of wing which is almost bisected at chord. *Male genitalia* (Figs. 18, 19): Ninth segment with anterior margin vertical, making a right angle posteriad subdorsally. Tenth tergite short, apex truncate and slightly upturned in lateral aspect; in dorsal aspect short, apex truncate, broad. Clasper with basal segment long, extending beyond apex of segment 10, expanded distally; apical seg-

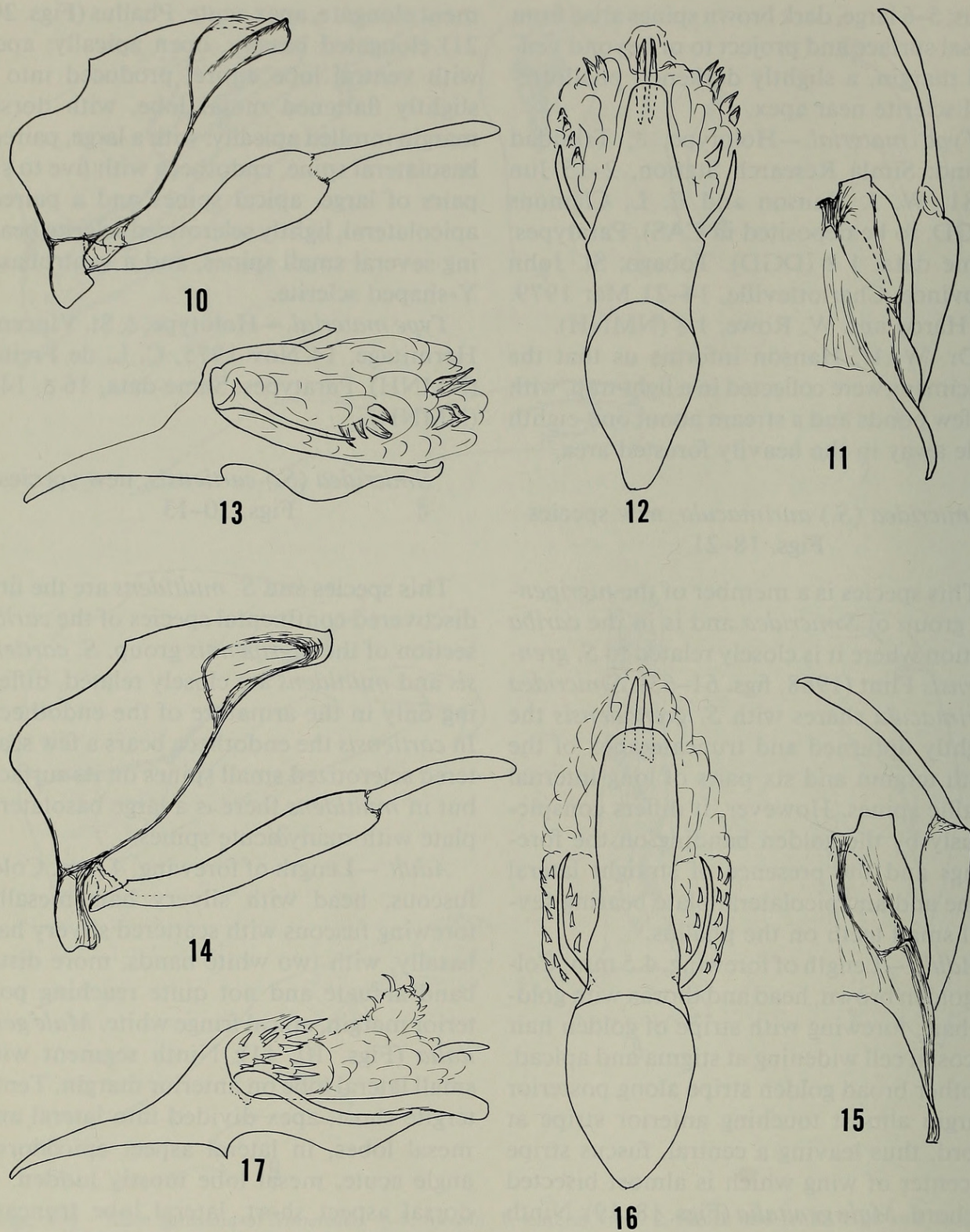
ment elongate, apex acute. Phallus (Figs. 20, 21) elongated basally, open apically; apex with ventral lobe entire, produced into a slightly flattened mesal lobe, with dorsal margin inrolled apically; with a large, paired, basolateral spine, endotheca with five to six pairs of large, apical spines and a paired, apicolateral, lightly sclerotized sclerite bearing several small spines, and a ventrobasal Y-shaped sclerite.

Type material.—Holotype, ♂, St. Vincent: Hermitage, 14 Nov 1975, C. L. de Freitas (NMNH). Paratypes: Same data, 16 ♂, 14 ♀ (NMNH).

Smicridea (S.) cartiensis, new species
Figs. 10–13

This species and *S. multident*s are the first discovered continental species of the *cariba* section of the *nigripennis* group. *S. cartiensis* and *multident*s are closely related, differing only in the armature of the endotheca. In *cartiensis* the endotheca bears a few scattered sclerotized small spines on its surface, but in *multident*s there is a large basolateral plate with many acute spines.

Adult.—Length of forewing, 4 mm. Color fuscous, head with silvery hair mesally; forewing fuscous with scattered silvery hair basally, with two white bands, more distal band arcuate and not quite reaching posterior margin, apical fringe white. *Male genitalia* (Figs. 10, 11): Ninth segment with small lateral lobe on anterior margin. Tenth tergite short, apex divided into lateral and mesal lobes, in lateral aspect apicodorsal angle acute, mesal lobe mostly hidden; in dorsal aspect short, lateral lobe truncate, broad, mesal lobe shorter and darker than lateral lobe. Clasper with basal segment long, inflated distally; apical segment elongate, apex acute. Phallus (Figs. 12, 13) elongated basally, open apically; apex with ventral lobe entire, produced into a tapered mesal projection; endotheca with dorsal margin light-



Figs. 10–17. Male genitalia of *Smicridea*. 10–13, *cartiensis*. 10, Lateral view. 11, Ninth and tenth terga and clasper, dorsal view. 12, Phallus, ventral view. 13, Phallus, lateral view. 14–17, *multidentis*. 14, Lateral view. 15, Ninth and tenth terga and clasper, dorsal view. 16, Phallus, ventral view. 17, Phallus, lateral view.

ly sclerotized, with a large, paired, basolateral spine, a pair of large, internal spines apically and broad, short spines irregularly located apicolaterally.

Type material.—Holotype, ♂, Panama: Intendency of San Blas; Rio Carti Grande, 2 km W. Nusagandi (9°20'N; 78°56'W), 5 Mar 1985, Flint and Louton (NMNH).

Paratypes: Same data, 7 ♂, 3 ♀ (NMNH, UPP).

Smicridea (S.) multidentis, new species
Figs. 14–17

This species is closely related to *S. cartiensis*. Diagnostic differences are in the armature of the membranous central lobe of the endotheca. In *multidentis* this lobe bears a large basolateral plate armed with many spines; in *cartiensis* the plate is broken up and the spines are fewer and concentrated on the lateral surface of the endotheca.

Adult.—Length of forewing, 4.5 mm. Color brown in alcohol, denuded; forewing membrane with pale band at level of stigma. *Male genitalia* (Figs. 14, 15): Ninth segment with small lateral lobe on anterior margin. Tenth tergite short, apex divided into lateral and mesal lobes, in lateral aspect, apico-dorsal angle acute, mesal lobe mostly hidden; in dorsal aspect lateral lobe truncate, broad, mesal lobe shorter and darker than lateral. Clasper with basal segment long, inflated distally; apical segment elongate, apex acute. Phallus (Figs. 16, 17) elongated basally, open apically; apex with ventral lobe entire, produced into a mesal process; endotheca with large, paired, basolateral spine, a pair of large, internal spines apically, a basolateral plate with many short spines and an apicomeral membranous lobe bearing sclerotized projections.

Type material.—Holotype, ♂, Panama: Bocas del Toro Province; Miramar [9°N; 82°15'W], 21–27 Feb 1979, H. Wolda (DGD, to be deposited in UCD). Paratypes: Same data, but 15–21 Nov 1978, 1 ♂ (NMNH); 28 Feb–6 Mar 1979, 1 ♂ (UPP).

Smicridea (S.) corralita, new species
Figs. 22–25

The species is related to *S. cholta* Flint (1974a, figs. 90–93) and is distinguished by the male genitalia. In *corralita* the tenth tergite is shorter and broader in dorsal aspect than in *cholta*, and the apex is shaped dif-

ferently in lateral aspect. The base of the apicolateral lobe of the phallus is angled sharply ventrad in lateral aspect, and the dorsal arm is long and slender, as opposed to being nearly straight ventrally with the dorsal arm almost lost in *cholta*.

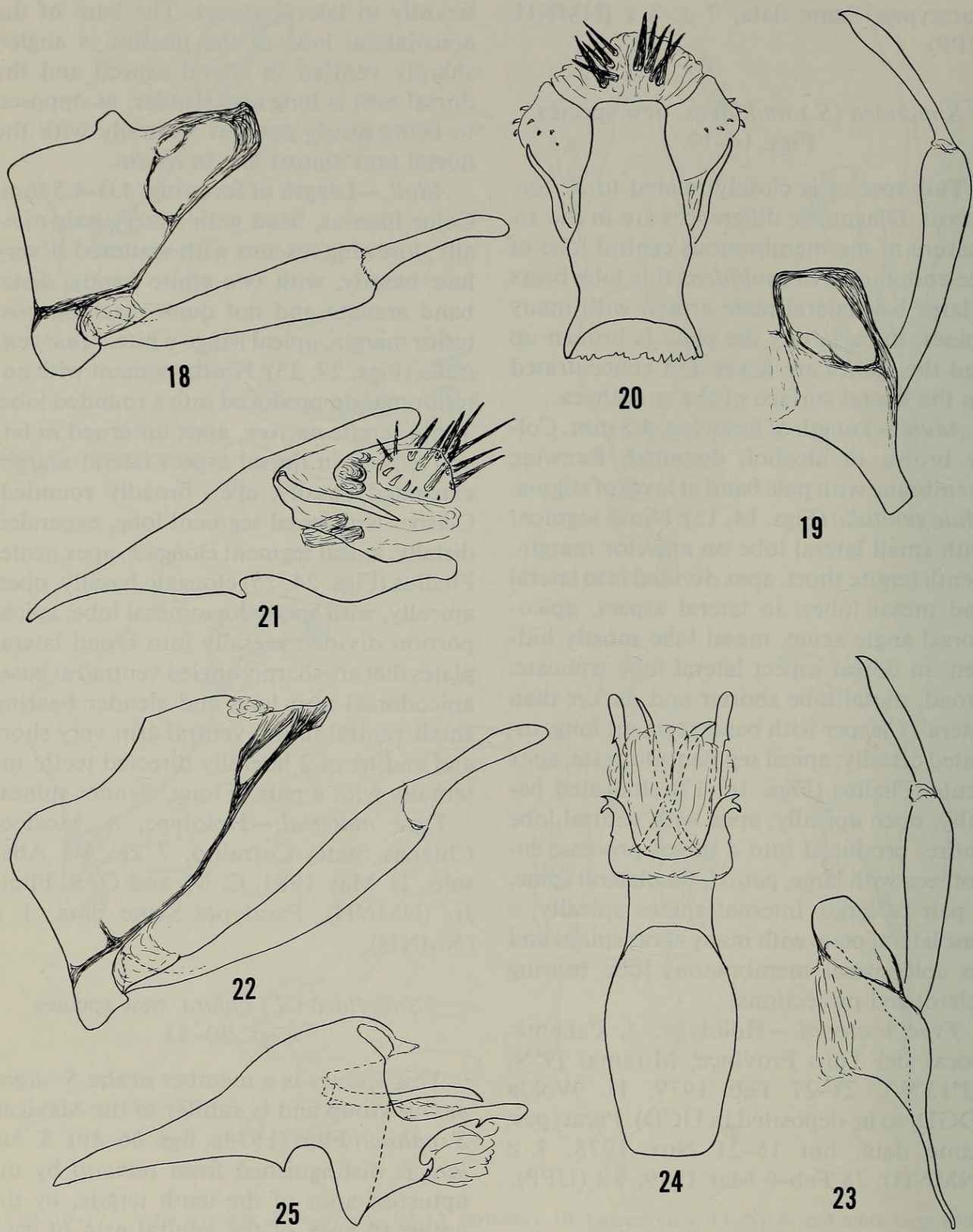
Adult.—Length of forewing, 4.0–4.5 mm. Color fuscous, head with silvery hair mesally; forewing fuscous with scattered silvery hair basally, with two white bands, distal band arcuate and not quite reaching posterior margin, apical fringe white. *Male genitalia* (Figs. 22, 23): Ninth segment with anterior margin produced into a rounded lobe. Tenth tergite narrow, apex upturned in lateral aspect; in dorsal aspect lateral margin expanded basally, apex broadly rounded. Clasper with basal segment long, expanded distally; apical segment elongate, apex acute. Phallus (Figs. 24, 25) elongate basally, open apically, with small dorsomesal lobe; apical portion divided mesally into broad lateral plates that are sharply angled ventrad at base, apicodorsal arm long and slender bearing small ventral tooth, ventral arm very short and ending in 2 laterally directed teeth; internally with a pair of long, slender spines.

Type material.—Holotype, ♂, Mexico: Chiapas State; Corralito, 7 km W. Abasolo, 21 May 1981, C. M. and O. S. Flint, Jr. (NMNH). Paratype: Same data, 1 ♀ (NMNH).

Smicridea (S.) bulara, new species
Figs. 30–33

This species is a member of the *S. nigripennis* group and is similar to the Mexican *S. nahuatl* Flint (1974a, figs. 86–89). *S. bulara* is distinguished from *nahuatl* by the upturned apex of the tenth tergite, by the upturned apex of the ventral arm of each ventrolateral phallic lobe, and by the longer spines in the phallotheca.

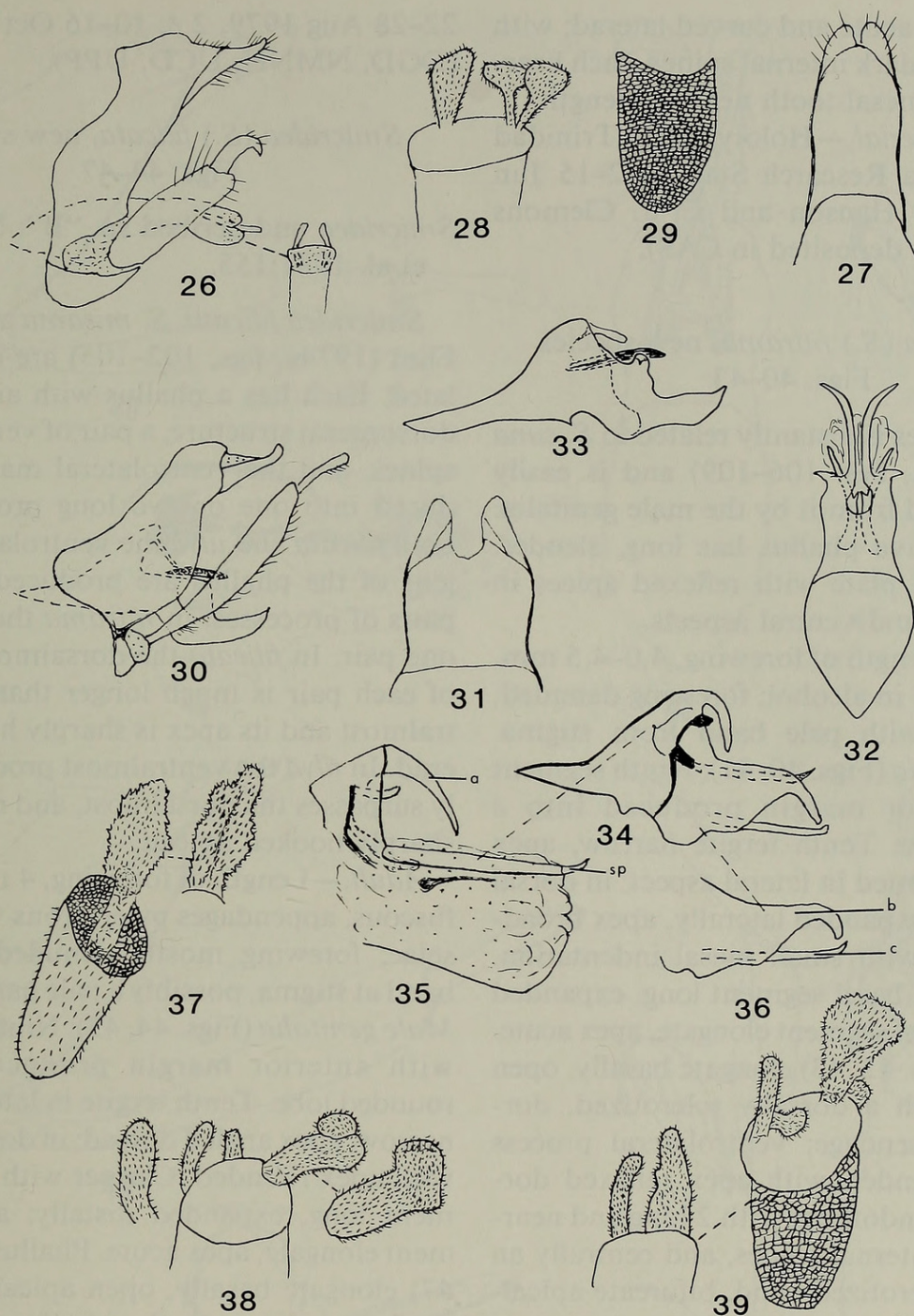
Adult.—Length of forewing, 4.5 mm. General color of body and wings fulvous in alcohol; forewings with an indication of faint pale band. Spurs of second and third pair of legs heavily setose. Fourth segment of



Figs. 18–25. Male genitalia of *Smicridea*. 18–21, *aurimacula*. 18, Lateral view. 19, Ninth and tenth terga and clasper, dorsal view. 20, Phallus, ventral view. 21, Phallus, lateral view. 22–25, *corralita*. 22, Lateral view. 23, Ninth and tenth terga and clasper, dorsal view. 24, Phallus, ventral view. 25, Phallus, lateral view.

maxillary palpus about twice length of second or third segment. *Male genitalia* (Figs. 30, 31): Ninth segment with anterior margin expanded near base, sternum narrow. Tenth

tergite slender, apex curved dorsad; in dorsal aspect (Fig. 31), posterior margin of ninth tergum dark brown and deeply incised; tenth tergites rounded apically; a brown pig-



Figs. 26–39. Male genitalia and pheromone glands of *Smicridea*. 26–29, *breviuncata*. 26, Lateral view, with ventral view of apex of phallus. 27, Ninth and tenth terga, dorsal view. 28, Pheromone capsule of segment 7, glands extruded. 29, Same, glands not extruded. 30–33, *bulara*. 30, Lateral view. 31, Ninth and tenth terga, dorsal view. 32, Phallus, ventral view. 33, Phallus, lateral view. 34–39, *cuna*. 34, Phallus, lateral view. 35, Phallus, lateral view with lateral portion of phallus detached to show translucent process (a), paired endothelial spines (sp), and large membranous mesal lobe. 36, Lateral plate of phallus (b) and mesal tubular process (c). 37, Segment 7 pheromone capsule, gland extruded, ventral view. 38, Segment 7 pheromone glands extruded, lateral view. 39, Segment 6 pheromone capsule, glands extruded, ventral view to left, dorsal view to right.

mented line divides tergites into fulvous and translucent portions. Basal clasper segment expanded distally; apical segment slender, obtuse. Phallus (Figs. 32, 33) with dorsal margin expanded, giving rise to a short

translucent ventrally curved lobe; ventral lobe divided mesally into broad lateral plates, dorsal arm produced into laterally directed point, ventral arm a large, apically acute lobe curved dorsad, in ventral aspect

apex of lobe acute and curved laterad; with pair of long, dark internal spines, each bearing a small mesal tooth near midlength.

Type material.—Holotype, ♂, Trinidad Island: Simla Research Station, 2–15 Jun 1981, W. J. Hanson and C. J. Clemons (DGD, to be deposited in CAS).

Smicridea (S.) mirama, new species
Figs. 40–43

This species is distantly related to *S. cuna* Flint (1974a, figs. 106–109) and is easily distinguished from it by the male genitalia. The distinctive phallus has long, slender, ventrolateral plate with reflexed apices in both lateral and ventral aspects.

Adult.—Length of forewing, 4.0–4.5 mm. Color brown in alcohol; forewing denuded, membrane with pale band from stigma. *Male genitalia* (Figs. 40, 41): Ninth segment with anterior margin produced into a rounded lobe. Tenth tergite narrow, apex slightly upturned in lateral aspect; in dorsal aspect base expanded laterally, apex broadly rounded with small mesal indentation. Clasper with basal segment long, expanded distally; apical segment elongate, apex acute. Phallus (Figs. 42, 43) elongate basally, open apically, with a dorsally sclerotized, dorsomesal appendage; ventrolateral process long and slender, with apex reflexed dorsolaterally; endotheca with 2 long and nearly straight internal spines, and centrally an irregular sclerotized band, bifurcate apically.

Type material.—Holotype, ♂, Panama: Bocas del Toro Province; Miramar [9°N; 82°15'W], 14–20 Feb 1979, H. Wolda (DGD, to be deposited in UCD). Paratypes: Same Locality: 3 ♂; 18–24 Oct 1978, 1 ♂; 15–21 Nov 1978, 3 ♂; 20–26 Dec 1978, 8 ♂; 10–16 Jan 1979, 3 ♂; 7–13 Feb 1979, 4 ♂; 21–27 Feb 1979, 12 ♂; 28 Feb 6–Mar 1979, 11 ♂; 7–13 Mar 1979, 19 ♂; 14–20 Mar 1979, 8 ♂; 9–15 May 1979, 13 ♂; 16–22 May 1979, 11 ♂; 23–29 May 1979, 7 ♂;

22–28 Aug 1979, 2 ♂; 10–16 Oct 1979, 1 ♂ (DGD, NMNH, UCD, UPP).

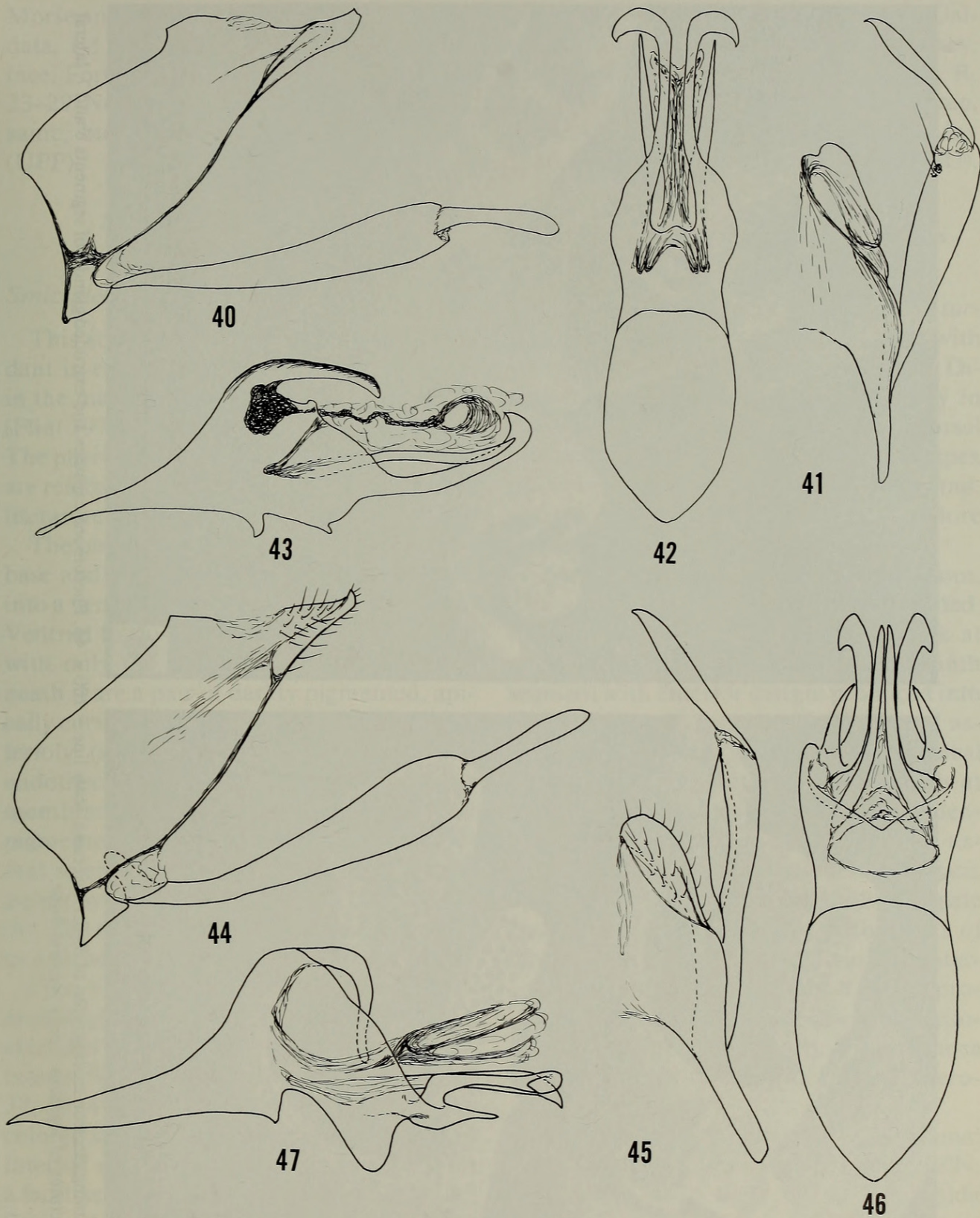
Smicridea (S.) filicata, new species
Figs. 44–47

Smicridea undescribed sp. “B”: McElravy, et al. 1981:153.

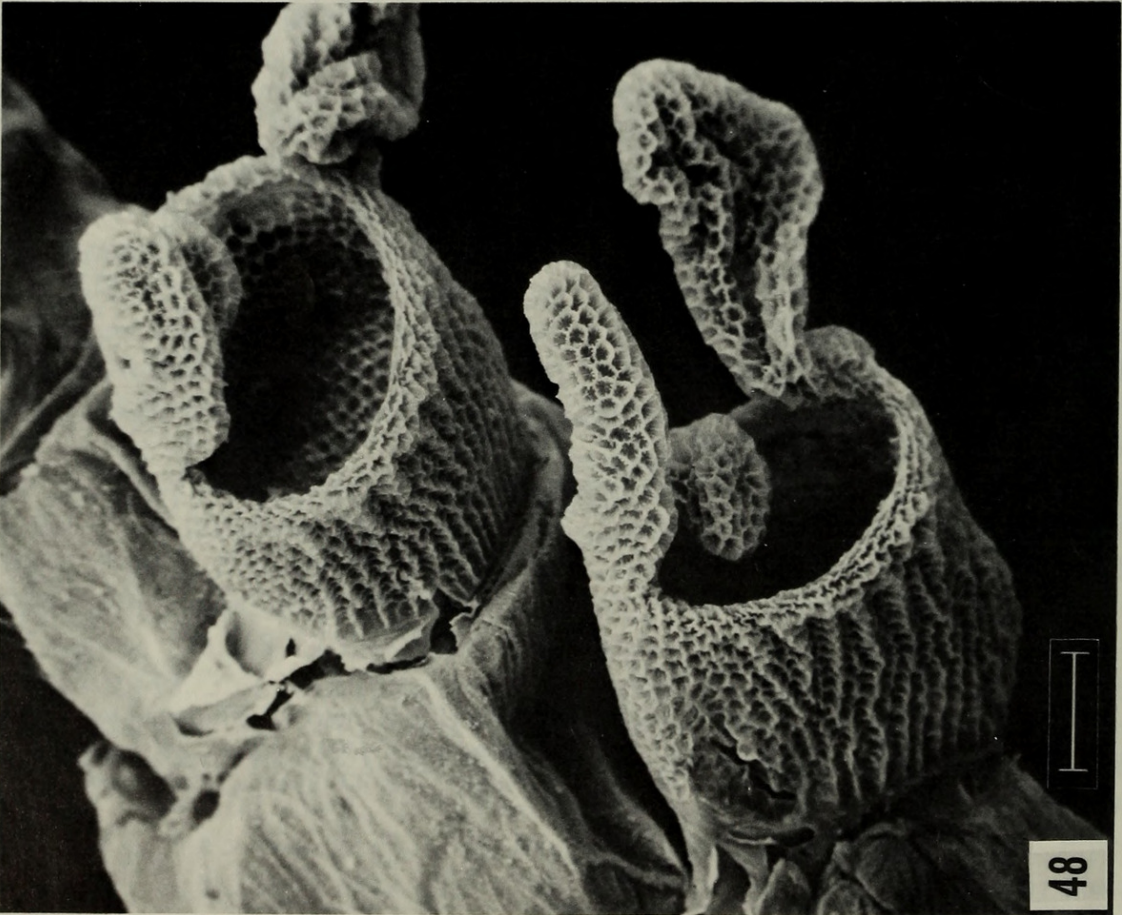
Smicridea filicata, *S. mirama* and *S. ulva* Flint (1974a, figs. 102–105) are closely related. Each has a phallus with an elongate dorsomesal structure, a pair of ventrolateral spines, and the ventrolateral margins produced into one or two long processes. In both *filicata* and *ulva* the ventrolateral margins of the phallus are produced into two pairs of processes; in *mirama* there is only one pair. In *filicata* the dorsalmost process of each pair is much longer than the ventralmost and its apex is sharply hooked laterad. In *ulva* the ventralmost process slightly surpasses the dorsalmost, and neither are sharply hooked apicad.

Adult.—Length of forewing, 4 mm. Color fuscous, appendages paler, frons with white setae; forewing mostly denuded, a white band at stigma, possibly a pale band basally. *Male genitalia* (Figs. 44, 45): Ninth segment with anterior margin produced into a rounded lobe. Tenth tergite in lateral aspect narrow, apex angled dorsad; in dorsal aspect with apex rounded. Clasper with basal segment long, expanded distally; apical segment elongate, apex acute. Phallus (Figs. 46, 47) elongate basally, open apically, with a declivous, dorsomesal appendage; with two ventrolateral processes on each side, ventralmost short and acute, dorsalmost longer with apex sharply hooked laterad; endotheca with two long, nearly straight internal spines, and centrally with long, lightly sclerotized lobe, weakly divided on the midline.

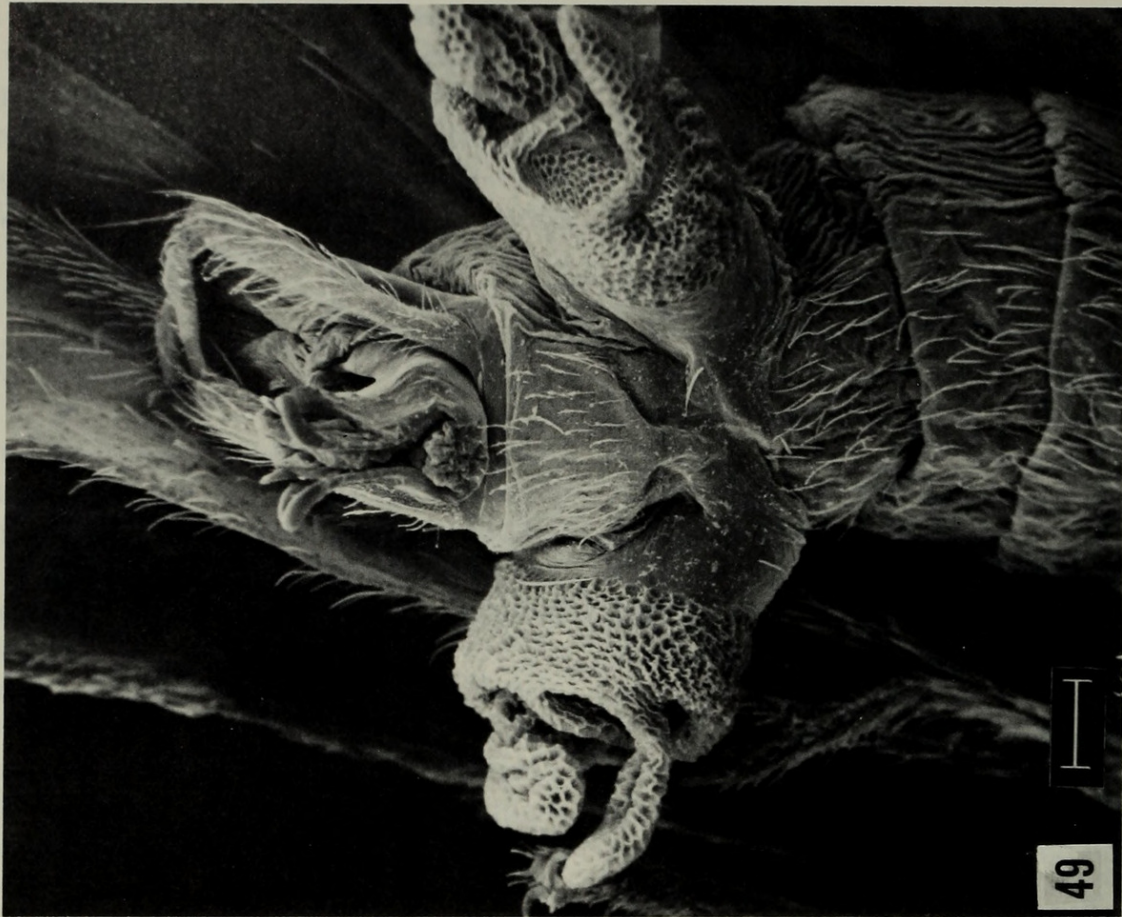
Type material.—Holotype, ♂, Costa Rica: Puntarenas Province; Rio Singri (9.057°N; 83.082°W), ca. 2 km (air) S. Finca Helechaes, 720 m, 21 Feb 1986, Holzenthal,



Figs. 40–47. Male genitalia of *Smicridea*. 40–43, *mirama*. 40, Lateral view. 41, Ninth and tenth terga and clasper, dorsal view. 42, Phallus, ventral view. 43, Phallus, lateral view. 44–47, *filicata*. 44, Lateral view. 45, Ninth and tenth terga and clasper, dorsal view. 46, Phallus, ventral view. 47, Phallus, lateral view.



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49

Figs. 48–49. Scanning electron micrographs of *Smicridea cuna*, scale line = 100 μ . 48, Pheromone capsules and extruded glands, of segments 6 and 7, lateral view. 49, Same structures of segment 7 only, ventral view.

Morse and Fasth (NMNH). Paratype: Same data, 1 ♂ (UMSP). Panama: Chiriqui Province; Fortuna Dam Site [8°44'N, 82°16'W], 23–29 Nov 1977 H. Wolda, 1 ♂ (NMNH); same, but 28 Dec 1977–3 Jan 1978, 1 ♂ (UPP).

Smicridea (S.) cuna Flint

Figs. 34–39, 48, 49

Smicridea (S.) cuna Flint 1974a:23.

This somewhat variable species is abundant in central Panama. Minor differences in the male genitalia, especially the phallus (Flint 1974a, figs. 108, 109), are figured here. The pheromone glands (Figs. 37–39, 48, 49) are referred to as “reticulated bodies” in the literature.

The phallus (Figs. 34, 35) has an enlarged base and a dorsal margin that is produced into a ventral curved translucent process (a). Ventrad to this process is a small structure with only the acute apex discernable. Beneath it are a pair of darkly pigmented, apically curved endothecal spines directed posteriolaterally (sp). The ventral portion of the endotheca (Figs. 35, 36) consists of a large membranous lobe containing small, dark pigmented sclerites (possibly the phallotremal sclerites), which are hidden in lateral aspect by the brown pigmented lateral plate (b). The mesal surface of plate (b) gives rise to a slender, tubular, opaque lobe (c).

Figs. 37–39, 48, 49 show the paired pheromone glands of segment 6 and segment 7 extruded through inter-segmental membranes. Segment 7 pheromone glands (Figs. 37, 38, 49) are covered with minute silver-colored spinules. The glands originate from internal surface of a vase-like capsule with a lacelike and irregular external membrane. Segment 6 pheromone glands, extruded through intersegmental membrane 6–7, are smaller, but are also densely covered with silver spinules (Fig. 39).

Material examined.—Panama: Canal Zone; Lion Hill Island, 27 Nov 1981, R. B. Kimsey, 1 ♂; 27 Oct 1981, 1 ♂; Puma Island,

20 Nov 1981, R. B. Kimsey, 1 ♂; Juan Gallegos Island, 27 Nov 1981, R. B. Kimsey, 11 ♂; Barro Colorado Island, Mar 1963, R. D. Akre, 1 ♂; 13 Mar 1963, Malaise Trap, R. D. Akre 2 ♂; Mar 1963, 7 ♂, 1 ♀; 21 May 1980, Henk Wolda, 1 ♂ (DGD, UCD, WSU).

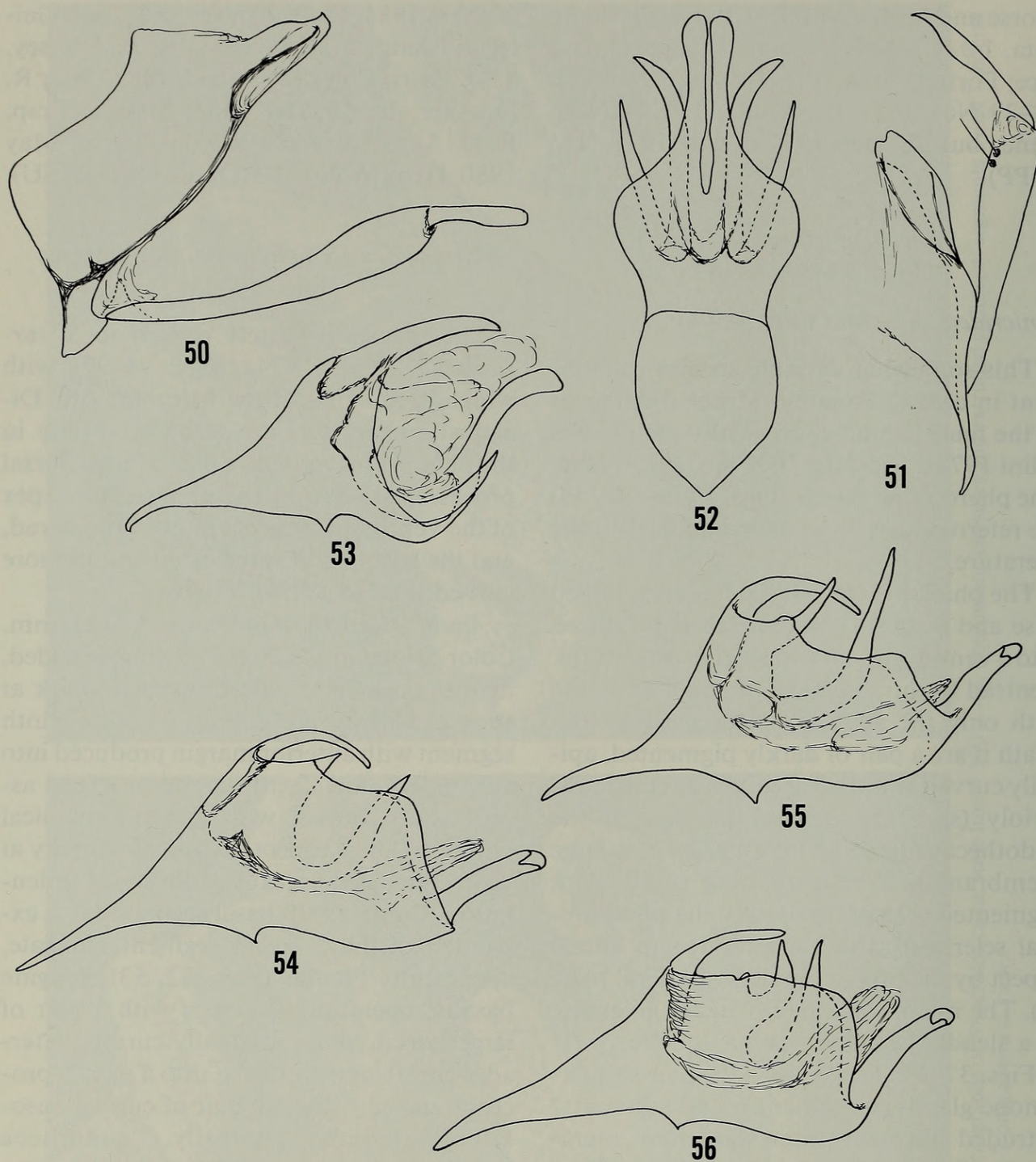
Smicridea (S.) circinata, new species

Figs. 50–53

The species is closely related to *S. turrialbana* Flint (1974a, figs. 94–97) with which it co-exists at the Miramar site. Diagnostic characters are recognized only in the phallus. In *circinata* a pair of large dorsal processes arise from the phallus. The apex of the ventral process is not hooked laterad, and the basolateral spine is larger and more curved than in *S. turrialbana*.

Adult.—Length of forewing, 3.5–4.0 mm. Color brown in alcohol; forewing denuded, membrane with a pale transverse mark at stigma. *Male genitalia* (Figs. 50, 51): Ninth segment with anterior margin produced into a rounded lobe. Tenth tergite in lateral aspect short, broad, with dorsal, subapical point; in dorsal aspect expanded laterally at base, narrowed apically with mesal indentation. Clasper with basal segment long, expanded distally; apical segment elongate, apex acute. Phallus (Figs. 52, 53) elongate basally, open apically; apex with a pair of large dorsal spines gradually curving laterad, ventral lobe produced into a pair of processes curving dorsad, pair of curved basolateral spines ventrally, endotheca membranous with indistinct mesal sclerotization.

Type material.—Holotype, ♂, Panama: Bocas del Toro Province; Miramar [9°N; 82°15'W], 14–20 Feb 1979, H. Wolda (DGD, to be deposited in UCD). Paratypes: Same data 18–24 Oct 1978, 1 ♂; 15–21 Oct 1978, 14 ♂; 29 Nov–5 Dec 1978, 3 ♂; 20–26 Dec 1978, 1 ♂; 10–16 Jan 1979, 2 ♂; 7–13 Feb 1979, 1 ♂; 21–27 Feb 1979, 11 ♂; 28 Feb–6 Mar 1979, 31 ♂; 7–13 Mar 1979, 4 ♂; 14–20 Mar 1979, 3 ♂; 16–22 May 1979,



Figs. 50–56. Male genitalia of *Smicridea*. 50–53, *circinata*. 50, Lateral view. 51, Ninth and tenth terga and clasper, dorsal view. 52, Phallus, ventral view. 53, Phallus, lateral view. 54–56, *turrialbana*. 54, Phallus of holotype, lateral view. 55, Phallus of specimen from Miramar, Panama. 56, Phallus of specimen from Quebrada Grande, Costa Rica.

5 ♂; 23–29 May 1979, 8 ♂; 4–10 Jul 1979, 3 ♂; 22–28 Aug 1979, 2 ♂; 10–16 Oct 1979, 3 ♂ (DGD, NMNH, UCD, UPP).

Smicridea (S.) turrialbana Flint
Figs. 54–56

Smicridea (S.) turrialbana Flint 1974a:22.

We have seen material of this species from four widely separated localities in Costa Rica and Panama. There are three different forms of the dorsolateral point of the phallus. In the holotype from Turrialba, Costa Rica, the point is barely developed (Fig. 54). In the material from Miramar, Panama, the point is developed into a strong spine (Fig. 55), and in the examples from Quebrada Grande and Reserva Forestal San Ramon, Costa Rica, the point is produced into a hook-like process directed vertically (Fig. 56). The remainder of the genitalia do not appear to be significantly different. We believe this to be variation in a single species and predict that examples from other localities will also differ in the development of the dorsolateral point.

Material examined.—Costa Rica: Cartago Province; 3 mi W Turrialba, 18–21 Jun 1967, Flint and Ortiz, holotype ♂ (NMNH); Guanacaste Province; Quebrada Garcia (10.862°N; 85.428°W), 10.6 km ENE Quebrada Grande, 470 m, 8 Mar 1986, Holzenthal and Fasth, 1 ♂ (NMNH); Alajuela Province; Rio San Lorenzo and tribs. (10.192°N; 84.510°W), Reserva Forestal San Ramon, 1090 m, 2–4 Jul 1986, Holzenthal, Heyn and Armitage, 6 ♂ (NMNH, UMSP). Panama: Bocas del Toro Province; Miramar [9°N; 82°15'W], 14–20 Feb 1979, H. Wolda, 2 ♂ (UCD, NMNH).

Smicridea (S.) holzenthali, new species
Figs. 57–64

This unusual species appears to be distantly related to *S. turrialbana*. In *holzenthali* the internal plate and spine of the phallus are greatly reduced to a small dorsal tooth

and a slightly curved ventral spine, neither extending beyond the margin of the phallus. The rodlike ventrolateral processes of the phallus are flat and broad in *holzenthali*.

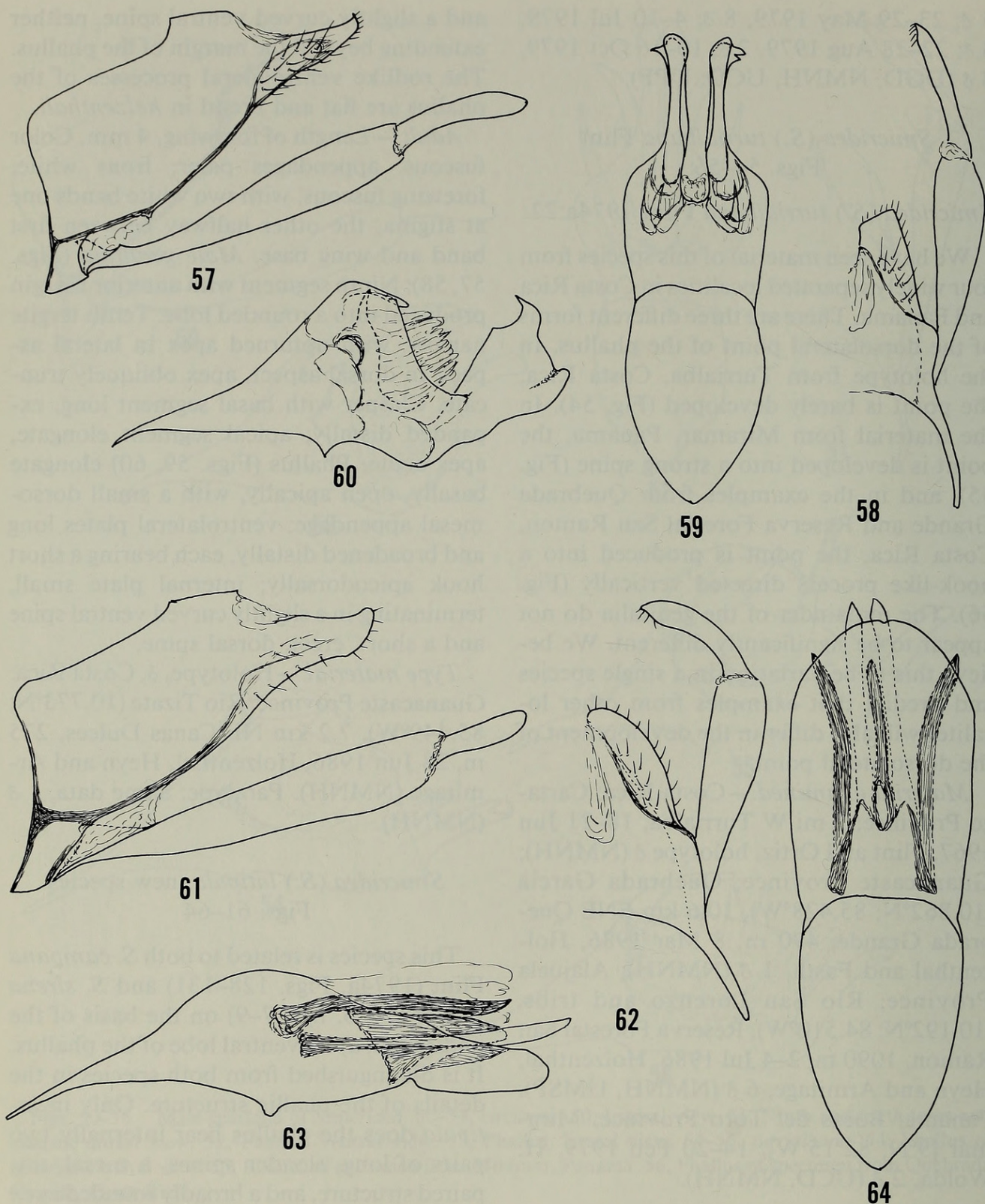
Adult.—Length of forewing, 4 mm. Color fuscous, appendages paler; frons white; forewing fuscous, with two white bands one at stigma, the other halfway between first band and wing base. *Male genitalia* (Figs. 57, 58): Ninth segment with anterior margin produced into a rounded lobe. Tenth tergite narrow, with upturned apex in lateral aspect; in dorsal aspect, apex obliquely truncate. Clasper with basal segment long, expanded distally; apical segment elongate, apex acute. Phallus (Figs. 59, 60) elongate basally, open apically, with a small dorso-mesal appendage; ventrolateral plates long and broadened distally, each bearing a short hook apicodorsally; internal plate small, terminating in a slightly curved ventral spine and a short, erect, dorsal spine.

Type material.—Holotype, ♂, Costa Rica: Guanacaste Province; Rio Tizate (10.773°N; 85.449°W), 7.2 km NE Canas Dulces, 275 m, 28 Jun 1986, Holzenthal, Heyn and Armitage (NMNH). Paratype: Same data, 1 ♂ (NMNH).

Smicridea (S.) latipala, new species
Figs. 61–64

This species is related to both *S. campana* Flint (1974a, Figs. 128–131) and *S. sirena* Bueno (1986, figs. 7–9) on the basis of the undivided, apicoventral lobe of the phallus. It is distinguished from both species in the details of the phallic structure. Only in *latipala* does the phallus bear internally two pairs of long, slender spines, a mesal, unpaired structure, and a broadly rounded apex on the phallus, in ventral aspect.

Adult.—Length of forewing, 5.5 mm. Color uniformly fuscous in alcohol. *Male genitalia* (Figs. 61, 62): Ninth segment with anterior margin produced into a narrowly rounded lobe. Tenth tergite narrow, apex upturned in lateral aspect; in dorsal aspect



Figs. 57-64. Male genitalia of *Smicridea*. 57-60, *holzenthali*. 57, Lateral view. 58, Ninth and tenth terga and clasper, dorsal view. 59, Phallus, ventral view. 60, Phallus, lateral view. 61-64, *latipala*. 61, Lateral view. 62, Ninth and tenth terga and clasper, dorsal view. 63, Phallus, lateral view. 64, Phallus, ventral view.

apex broadly rounded. Clasper with basal segment long, expanded distally; apical segment elongate, apex acute. Phallus (Figs. 63, 64) elongate basally, open apically; apex produced into single broadly rounded lobe beneath endotheca; internally bearing pair of long, dark spines dorsally, another pair of pale spines ventrally, and a single, shorter mesal process.

Type material.—Holotype, ♂, Panama: Chiriqui Province; Guadalupe Arrriba (8°52'26"N; 82°33'13"W), 2200 m, 18–24 Apr 1984, H. Wolda, in light trap 20 m above ground (NMNH). Paratypes: Same data, 2 ♂, 1 ♀ (NMNH); same, but 2–8 May 1984, 1 ♂, 1 ♀ (UPP); same, but 6–12 Feb 1985, 1 ♀ (NMNH); same, but 17–23 Apr 1985, 1 ♂ (NMNH); same, but 24–30 Apr 1985, 1 ♀ (NMNH); same, but 8–14 May 1985, 1 ♂, 1 ♀ (UPP); same, but 22–28 May 1985, 1 ♂ (NMNH); same, but 12–18 Jun 1985, 1 ♀ (NMNH); same, but 19–25 Jun 1985, 1 ♂ (NMNH).

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Literature Cited

- Bueno Soria, J. 1986. Estudios en insectos acuaticos VII: Cinco nuevas especies de Trichopteros de Mexico y Costa Rica (Trichoptera: Hydropsychidae).—*Folia Entomologica Mexicana* 68: 53–65.
- Flint, O. S., Jr. 1968. Bredin-Archbold-Smithsonian Biological Survey of Dominica, 9. The trichoptera of the Lesser Antilles.—*Proceedings of the United States National Museum* 125 (3665):1–60.
- . 1974a. Studies of neotropical caddisflies, XVII: The genus *Smicridea* from North and Central America (Trichoptera: Hydropsychidae).—*Smithsonian Contributions to Zoology* 167:1–65.
- . 1974b. The trichoptera of Surinam.—*Studies on the Fauna of Suriname and other Guyanas* 14 (55):1–151.
- . 1981. Studies of neotropical caddisflies, XXVIII: The Trichoptera of the Rio Limon Basin, Venezuela.—*Smithsonian Contribution to Zoology* 330:1–61.
- . 1989. Studies of neotropical caddisflies, XXXIX: The genus *Smicridea* in the Chilean subregion (Trichoptera: Hydropsychidae).—*Smithsonian Contributions to Zoology* 472:1–45.
- McElravy, E. P., V. H. Resh, H. Wolda, & O. S. Flint, Jr. 1981. Diversity of adult Trichoptera in a "non-seasonal" tropical environment.—*Proceedings of the 3rd International Symposium on Trichoptera*:149–156.
- Wolda, H. 1982. Seasonality of Homoptera at Barro Colorado Island. Pp. 319–330 in E. G. Leigh, Jr., A. S. Rand, & D. M. Windsor, ed., *The ecology of a tropical forest: seasonal rhythms and long-term changes*. Smithsonian Institution Press, Washington, D.C.
- , & R. W. Flowers. 1985. Seasonality and diversity of Mayfly adults (Ephemeroptera) in a "nonseasonal" tropical environment.—*Biotropica* 17: 330–335.

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Flint, Oliver S. and Denning, D. G. 1989. "Studies Of Neotropical Caddisflies .40. New Species Of Smicridea Hydropsychidae)." *Proceedings of the Biological Society of Washington* 102, 418–433.

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