

Studies in Neotropical Leptoceridae (Trichoptera), a New Species of *Amphoropsyche*, with a Redescription of the Immature Stages of *A. insularis* (Flint)

RALPH W. HOLZENTHAL

Department of Entomology, Clemson University,
Clemson, South Carolina 29634-0365

Ann. Entomol. Soc. Am. 79: 251-255 (1986)

ABSTRACT The male and female of a new species of *Amphoropsyche* Holzenthal from Bolivia are described and illustrated. The new species is closest to *A. quebrada* Holzenthal and can be distinguished from it and other members of the genus by the presence of spinelike setae on abdominal segment X, the inferior appendages, and the phallic apparatus of the male genitalia. The larva of *A. insularis* (Flint) is redescribed and illustrated. It can be separated from other Neotropical leptocerids by the presence of secondary setae on the pro- and mesonota and two bands of flat, spinelike setae on the anal prolegs. The pupa of *A. insularis* is described and figured, representing the first description of a pupa of this genus.

In 1985, I erected the long-horned caddisfly genus *Amphoropsyche* and predicted that it contained many more undescribed species (Holzenthal 1985a). I based my prediction partially on observations made by Stout and Vandermeer (1975), who demonstrated that species-richness of rheophilic insects was significantly higher in the tropics than in mid-latitudes, and by Janzen (1973), who showed that mid-elevation tropical habitats are generally more species-rich than lowland and high altitude ones. In addition, many natural historians have noted the highly endemic nature of much of the Neotropical biota, and Flint (1981) indicated that many Neotropical caddisflies appear to be restricted to rather small drainage basins. Occurrence of numerous, apparently endemic new species of *Amphoropsyche*, including the one described in this paper, in collections made near small streams in premontane and lower montane tropical moist habitats (1,000-3,000 m) supports these observations. The actual size of the genus may be limited only by the potential for isolation in the innumerable mid-elevation watersheds of the northern Andes.

In this paper, I describe the males and females of a new species of *Amphoropsyche*, the 11th in the genus, collected in Bolivia by Luis E. Peña G. and kindly lent to me by Oliver S. Flint, Jr. The new species is most closely related to *A. quebrada* Holzenthal and extends the known range of the genus considerably southward. I also redescribe and illustrate the larva of *A. insularis* (Flint), first described by Flint (1968) (as *Brachysetodes*), and describe the pupa of *A. insularis* for the first time. Terminology for adult characters follows that used by Holzenthal (1985a) and, for larval and pupal characters, that presented by Wiggins (1977, 1984). Larval setal nomenclature and homology follows that proposed by Williams and Wiggins (1981). All

material examined, including types, is deposited in the collection of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH, formerly USNM).

Amphoropsyche spinifera Holzenthal, sp. nov. (Fig. 1 and 2)

This species is closest to *A. quebrada* in the structure of abdominal segment X and inferior appendages of the male genitalia and in the overall plan of the female genitalia. Its male can be separated from the male of *A. quebrada* by the presence of spinelike setae on abdominal segment X, by the presence of a terminal, spinelike seta on the second article of each inferior appendage, and by the bifid, spiniferous, lateral extensions of the phallicata.

Male. Length of forewing 6-7 mm. Color brown (in alcohol). Genitalia as in Fig. 1 A-D. Segment IX annular. Segment X composed of single mesal process (*m. p. X*) and pair of lateral processes (*l. p. X*). Mesal process lightly sclerotized, brim-shaped; lateral processes each bearing mid-dorsal, spinelike seta and subterminal, ventral, spinelike seta. Preanal appendages (*pr. ap.*) large, oval, fused along basal 2/3 of their midlengths; each with large internal gland. First article of each inferior appendage (*inf. ap.*) slender, L-shaped in lateral and ventral views; with linear patch of short setae basomesally; apical portion ending in bulbous lobe bearing tuft of setae. Second article (*2nd art.*) of each inferior appendage broad, thin, curved mesally, bearing terminal, slightly recessed, spinelike seta. Phallic apparatus with phallobase well developed; phallicata bearing ventromesal, terminal, pointed projection and pair of bifid, spiniferous, lateral extensions. Parameres absent; phallosomal sclerite well developed.

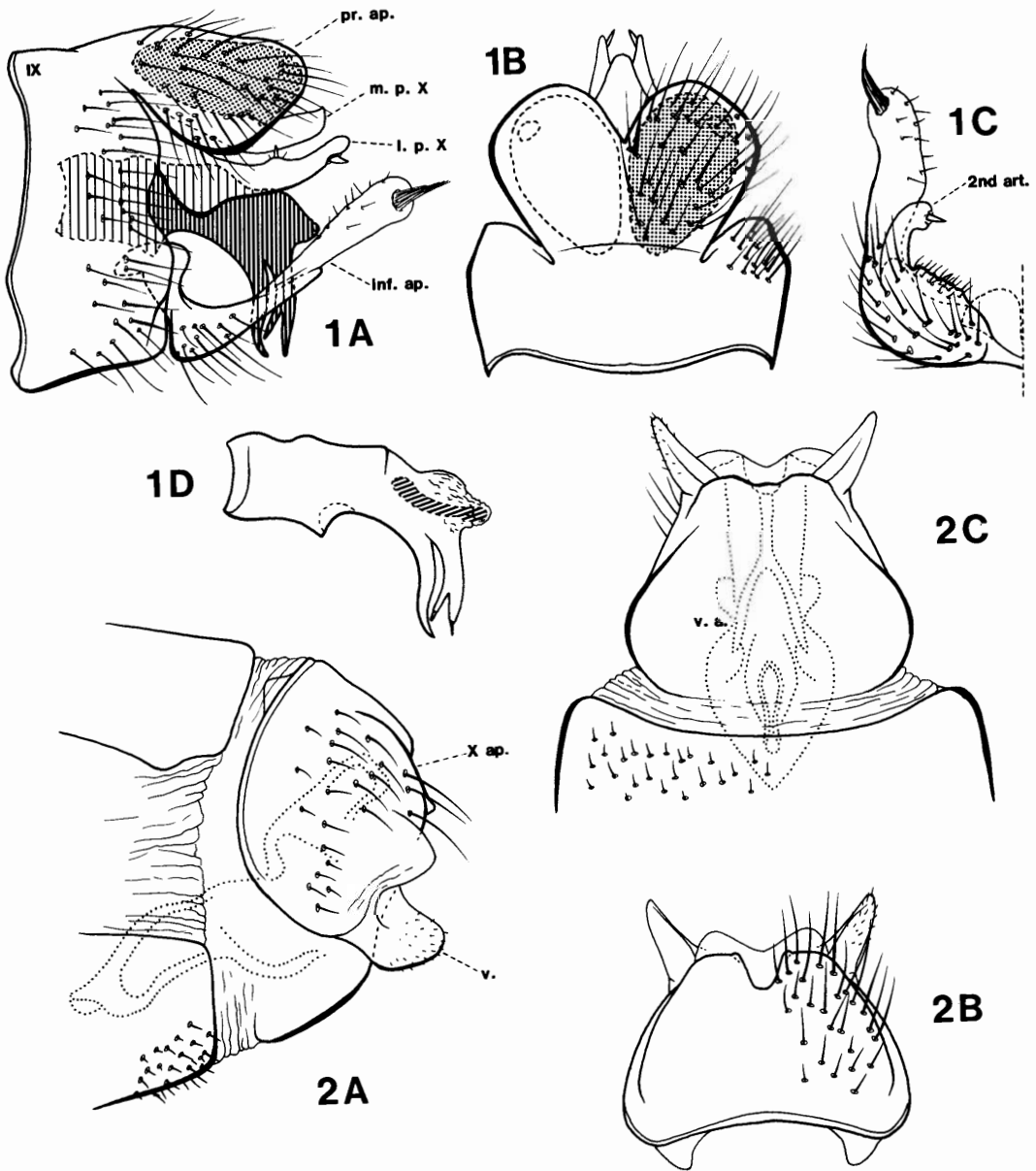


Fig. 1. *Amphoropsyche spinifera*, sp. nov., male genitalia: A, lateral; B, dorsal; C, left inferior appendage, ventral; D, phallic apparatus, lateral. Fig. 2. Female genitalia: A, lateral; B, dorsal; C, ventral. (See text for abbreviations.)

Female. Length of forewing 6 mm. Color and structure similar to male's. Genitalia as in Fig. 2 A-C. Abdominal tergum IX excised mesally. Appendages of segment X (*X ap.*) each reduced to dorsal, heavily setose patch. Valves (*v.*) situated ventrolaterally; each short, with oblique apex and concave dorsal margin in lateral view. Vaginal apparatus (*v. a.*) complex, with broad, posterior neck and central, keyhole-shaped sclerites.

Type Material. *Holotype.* Male, BOLIVIA:

Yungas La Paz, Pte. Mururata to Cusilloni, 1,600 m, 26-28-XI-1984, L. E. Peña G. (NMNH). *Paratypes.* 3 males, 1 female, BOLIVIA: La Paz, Coroico, 2,200 m, 23-24-XI-1984, L. E. Peña G. (NMNH).

Etymology. The specific epithet is derived from the Latin *spina*, thorn, and *fera*, to carry or bear, in reference to the spinelike setae on segment X, the inferior appendages, and the phallicata of the male genitalia.

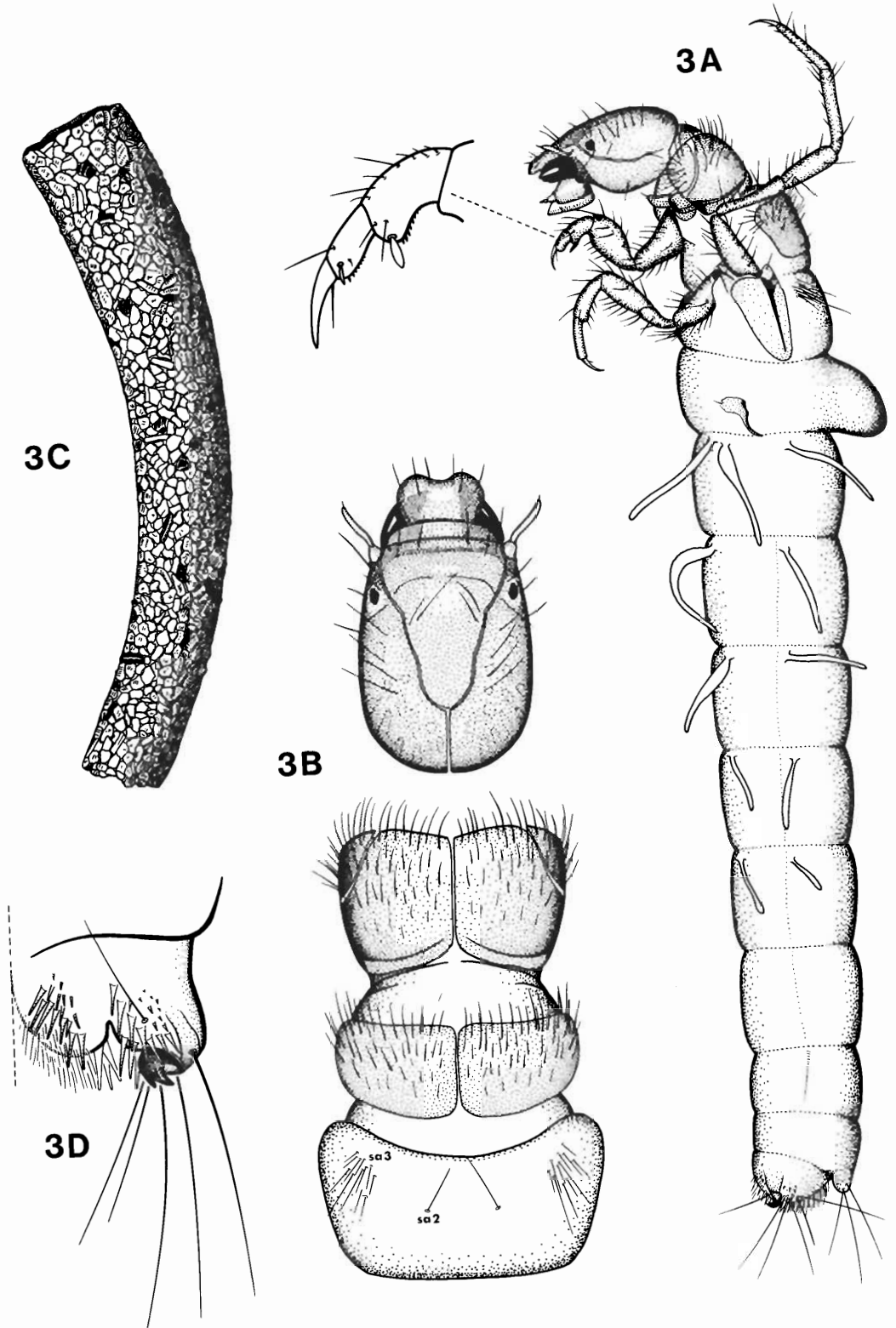


Fig. 3. *Amphoropsycha insularis* (Flint), larva and case: A, larva, lateral, fore tibia and tarsus enlarged; B, head and thorax, dorsal; C, case, lateral; D, left anal proleg, ventral.

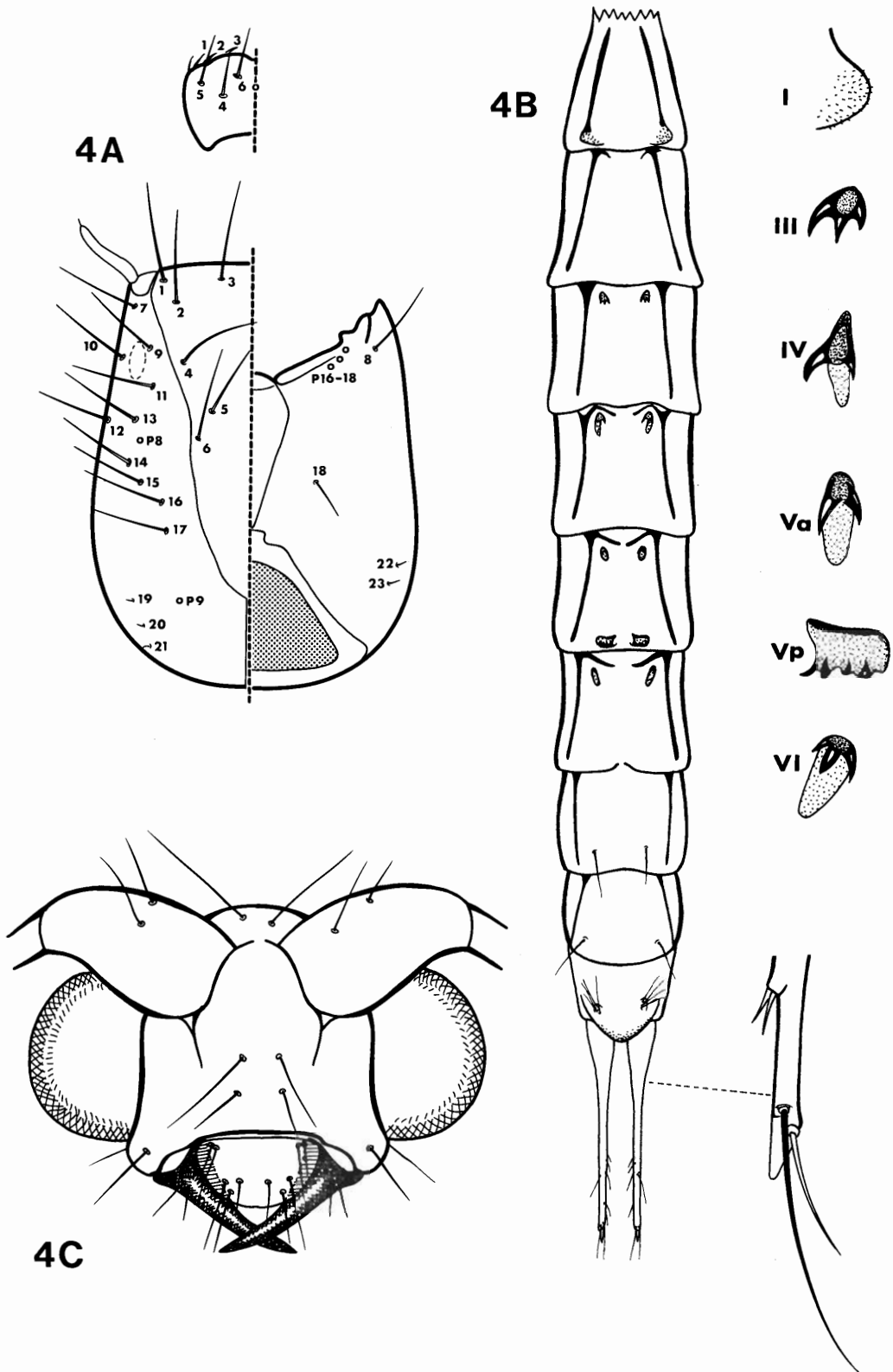


Fig. 4. *Amphoropsyche insularis* (Flint), larva and pupa: A, larva, setae of head and labrum, left half dorsal, right half ventral; B, pupa, abdomen, dorsal, hook plates and anal process enlarged; C, pupa, head, frontal.

Amphoropsyche insularis (Flint)
(Fig. 3 and 4)

Brachysetodes insularis Flint, 1968: 69, Fig. 189–192; 202–208, male, female, larva, biology.

Amphoropsyche insularis: Holzenthal, 1985: 255, Fig. 1–4, male, female.

Egg. Unknown.

Larva. Head (Fig. 3 A and B, 4A): rounded; ventral apotome large, triangular, completely separating genae ventrally; subocular ecdysial line present; head setal pattern as in Fig. 4A, typical for family; mandibles short, wide, with short, rounded teeth. Thorax (Fig. 3 A and B): pronotum with anterolateral corners delimited by ecdysial line; anterior $\frac{2}{3}$ bearing many fine secondary setae; mesonotum with pair of lightly sclerotized, quadrate sclerites, each bearing many fine secondary setae; metanotum without sclerites; metanotal *sa*1 without setae, *sa*2 with a single seta, *sa*3 with patch of ca. 12 long, thin setae; metasternum with transverse row of about 20 setae. Head and thoracic sclerites uniformly light yellowish brown; head with inconspicuous muscle scars. Legs slender, moderately setose, yellowish. Fore tibia and tarsus (Fig. 3A) each with subapical, ventral, peg-like seta; hind tibia undivided. Abdomen (Fig. 3 A and D): segment I with lateral hump poorly developed; lateral hump sclerite small, with slender, dorsal projection; lateral fringe very fine on segments III–VII; lateral tubercles on segment VIII; abdominal gills single, distributed on segments II–VI as indicated in Fig. 3A; dorsal sclerite of abdominal segment IX lightly sclerotized, with 3 pairs of long, apical setae; lateral sclerite of anal prolegs lightly sclerotized; each anal proleg with 6 long setae, a distal band of many flat, spinelike setae, and a band of both spinelike and hairlike setae adjacent to anal opening; anal claw with 2 short, stout, dorsal accessory hooks (Fig. 3D). Length of larva 5–6 mm.

Larva Case. Composed entirely of sand grains; curved and tapered (Fig. 3C); posterior opening not constricted by silken membrane. Length 5–6 mm.

Pupa. Head (Fig. 4C): 2 pairs of long frontal setae, 1 pair of setae on vertex, 2 setae below each eye, 5 pairs of setae on labrum; mandibles each with single, sharply pointed apical tooth. Abdomen: hook plates as in Fig. 4B; segments VII and VIII each with a pair of dorsal setae; segment IX with paired, dorsal, setose protuberances; anal processes long, slender, straight; apices flat and blade-like, each with 2 subterminal setae (Fig. 4B).

Material Examined. DOMINICA: 1.6 mi W of Pont Casse, 29-IV-1964, O. S. Flint, Jr., 3 larvae, 1 pupa, (NMNH).

I demonstrated elsewhere (Holzenthal 1985a,b), based mainly on adult characters, that *A. insularis* and nine of its relatives were not conspecific with

Brachysetodes, the Chilean genus to which *insularis* was tentatively assigned (Flint 1968). Several characters possessed by the larva of *A. insularis*, but not shared with those of *Brachysetodes*, support this distinction; these include the many secondary setae on the pro- and mesonota and, especially, the two bands of flat, spinelike setae on the anal prolegs. It is unfortunate that larvae of more species of *Amphoropsyche* are not known in order to determine which of these characters are autapomorphic and which are more generally distributed within the genus. This uncertainty holds equally well for pupa characters, as the description is based on a single specimen.

Acknowledgment

I am grateful to Oliver S. Flint, Jr. (National Museum of Natural History, Smithsonian Institution) for his generous loan of material and for his continued interest in my research. Thanks are also expressed to Peter H. Adler and John C. Morse (Clemson Univ.) for reviewing the manuscript. This is Technical Contribution 2439 of the South Carolina Agric. Exp. Stn. This paper is no. 5 in a series.

References Cited

- Flint, O. S., Jr. 1968. Bredin-Archbold-Smithsonian biological survey of Dominica, 9: the Trichoptera (Caddisflies) of the Lesser Antilles. Proc. U.S. Natl. Mus. 125: 1–86.
1981. Studies of Neotropical Caddisflies XXVIII: the Trichoptera of the Río Limón Basin, Venezuela. Smithson. Contrib. Zool. 330: 1–61.
- Holzenthal, R. W. 1985a. Studies in Neotropical Leptoceridae (Trichoptera), II: *Amphoropsyche*, a new genus and species of Leptocerinae from northern South America. Int. J. Entomol. 27: 254–269.
- 1985b. Studies in Neotropical Leptoceridae (Trichoptera), IV: a revision of *Brachysetodes* Schmid. Trans. Am. Entomol. Soc. (Philadelphia): (in press).
- Janzen, D. H. 1973. Sweep samples of tropical foliage insects: effects of seasons, vegetation types, elevation, time of day, and insularity. Ecology 54: 687–708.
- Stout, J., and J. Vandermeer. 1975. Comparison of species richness for stream-inhabiting insects in tropical and mid-latitude streams. Am. Nat. 109: 263–280.
- Wiggins, G. B. 1977. Larvae of the North American caddisfly (Trichoptera) genera. University of Toronto, Toronto.
1984. Trichoptera, pp. 271–311. In R. W. Merritt and K. W. Cummins [eds.], An introduction to the aquatic insects of North America, 2nd ed. Kendall/Hunt, Dubuque.
- Williams, N. E., and G. B. Wiggins. 1981. A proposed setal nomenclature and homology for larval Trichoptera, pp. 421–429. In G. P. Moretti [ed.], Proceedings, Third International Symposium on Trichoptera. Junk, The Hague.

Received for publication 8 July 1985; accepted 24 September 1985.