

The Trichoptera, Caddisflies, of Venezuela: Three New Species and Records of *Atopsyche* Banks (Hydrobiosidae)

Ralph W. Holzenthal¹ and Claudia Cressa²

¹Department of Entomology, University of Minnesota, St. Paul, Minnesota, USA

²Institute of Tropical Zoology, Central University of Venezuela, Caracas, Venezuela

Abstract

Three new species of *Atopsyche* (Trichoptera: Hydrobiosidae) from Venezuela are described, *Atopsyche (Atopsyche) allani*, *Atopsyche (Atopsyche) rinconi*, and *Atopsyche (Atopsaura) segninii*, bringing to 23 the number of species in the genus known from the country. New records are presented for additional species.

Keywords: Trichoptera, *Atopsyche*, Hydrobiosidae, Venezuela, new species, new records, inventory.

Introduction

Of the 2196 Trichoptera species recorded for the Neotropics 170 are known from Venezuela (Flint et al., 1999). Flint (1981) provided the most comprehensive treatment of the fauna mainly based on material collected from the Río Limón basin, Estado Aragua. In that paper, he recorded 56 species from the basin and described 32 of them as new to science. Other records of the Venezuelan Trichoptera fauna are scattered in about 40 additional publications (cited in Flint et al., 1999). Since the frequency of new species encountered in some regions of the Neotropics can reach 75% of species collected, the recorded Trichoptera fauna of Venezuela is certainly an underestimate of the actual fauna, which could reach well over 500 species.

The purpose of this paper is to continue the formal documentation of the Trichoptera of Venezuela based on the material obtained from recent collecting efforts in the country by the authors and Dr. Flint during 1994, 1995, and

1997. It is planned that other papers treating additional families and genera will follow this first contribution.

Materials and Methods

Specimens were attracted to ultraviolet and mercury vapor lights placed in front of a white bed sheet erected adjacent to water courses. Individuals landing on the sheet were collected in potassium cyanide kill jars and were subsequently pinned. Genitalia were prepared using the standard entomological technique of clearing in 12% potassium hydroxide. Genitalia were examined in glycerin in a small watch glass under a dissecting microscope. Illustrations were prepared using a 10 × 10 mm ocular grid or with a drawing tube, then rendered in black india ink.

Terminology used in this paper follows that of Schmid (1989) and Blahnik & Gottschalk (1997). Length is measured from the base of the forewing to the tip in its folded position and is given as a range when more than one specimen is measured. Locality data are cited as they appear in the published record and are annotated for clarity where appropriate. Annotations appear between brackets and include subsequently determined latitude and longitude where these data were not included on locality labels. These coordinates were determined by searching the Geographic Names System database of the U.S. National Imagery and Mapping Agency (<http://gnpswww.nima.mil/geonames/GNS/>). Type material is housed in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH), the Instituto de Zoología Agrícola, Universidad

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Correspondence: R. W. Holzenthal, Department of Entomology, University of Minnesota, 219 Hodson Hall, 1980 Folwell Ave., St. Paul, Minnesota, 55108, USA. E-mail: holze001@tc.umn.edu

Central de Venezuela, Maracay (IZAM), the University of Minnesota Insect Collection, St. Paul, Minnesota (UMSP), and the Muséum National d'Histoire Naturelle, Paris (MNHN).

Results

Family Hydrobiosidae

The family Hydrobiosidae, once considered a subfamily of Rhyacophilidae, is restricted in distribution to the Neotropical and Australasian biogeographic regions, although a few species in each region have distributions that extend northwards into the Oriental, Palearctic, or Nearctic regions. Schmid (1989) provided a review of the World fauna. Some 48 genera are known, of which 22 are restricted to the Neotropics, where all but 2 are endemic to the Chilean subregion. Only the genus *Atopsyche* Banks occurs in Venezuela.

The larvae are caseless predators and build a structure only for pupation; they capture prey with chelate forelegs. They are restricted to flowing water, more often than not in clean, mountainous streams.

Genus *Atopsyche* Banks

Atopsyche Banks, 1905:17 [Type species: *Atopsyche tripunctata* Banks 1905, original designation]. Ross and King, 1952 [revision, biogeography]. Schmid, 1989:58 [redescription].

Dolochorema Banks, 1913:240 [Type species: *Dolochorema irregularis* Banks 1913, monobasic]. Ross, 1956:125 [redescription]. Schmid, 1989:60 [redescription, to subgenus].

Harpax Müller, 1921:524 [Type species: no species ever included. Preoccupied by Parkinson, 1811 and 3 others]. Ulmer, 1957:142 [bibliography, placement, to synonymy].

Ventrarma Navás, 1924:76 [Type species: *Ventrarma implexa* Navás 1924, original designation]. Ross, 1947:127 [to synonymy]. Ross and King, 1952:177 [as subgenus]. Ross, 1953:288 [to full synonymy].

Atopsychodes Mosely, 1949:37 [Type species: *Atopsychodes cira* Mosely 1949, original designation]. Ross and King, 1952:177 [to synonymy].

Atopsaura Ross, 1953:292 [Type species: *Atopsyche hamata* Ross and King 1952, original designation, as a subgenus].

With the description of 3 new species in this paper, the genus now contains 120 species, making it by far the largest genus in the family. The range of the genus is from the southwestern states of the United States, through Mexico and Central America, the Caribbean, and South America, except the Chilean region, where the family is represented by other genera. In Venezuela, the majority of the 23 known species are largely restricted to higher elevations of the Andes or the Guayana Highlands. In the páramo of the high Andes, it was the only genus of Trichoptera that came to the collecting lights of the authors. However, one species, *A. callosa*, does

occur at lower elevations, down to about 500m. All of the Venezuelan species are endemic to the country except *A. callosa*, and most are known from only a few localities and specimens.

Atopsyche (Atopsaura) asancarú Schmid, 1989:118

Type locality: VENEZUELA, Edo. Bolívar [Estado Bolívar], 10km S of km 88 [Km 88, 5°56'00"N, 61°25'00"W] at Piedra de Virgen [Piedra de la Virgen]; NMNH; ♂. Known only from the holotype.

Atopsyche (Atopsaura) atahualpa Schmid, 1989:118

Type locality: Venezuela, Bolívar [Estado Bolívar], Ptari-tepui [5°46'00"N, 61°46'00"W], 30 mi. N. Kavanayen, 1800m; NMNH; ♂. Known only from the holotype.

Atopsyche (Atopsaura) ayacucho Schmid, 1989:119

Type locality: VENEZUELA, T.F.A. [Territorio Federal Amazonas = Estado Amazonas] Cerro d.l. [La] Neblina, Camp II, 0°49'N, 65°59'W, 2100m; NMNH; ♂. Known only from the holotype and paratype series.

Atopsyche (Atopsaura) ayahuaca Schmid, 1989:119

Type locality: VENEZUELA, T.F.Amaz. [Territorio Federal Amazonas = Estado Amazonas] Cerro d.l. [La] Neblina, Camp II, 0°49'41"N, 65°58'56"W, 2085m; NMNH; ♂. Known only from the holotype and paratype series.

Atopsyche (Atopsaura) calahuaya Schmid, 1989:120

Type locality: VENEZUELA, Bolívar [Estado Bolívar], Ptari-tepui [5°46'00"N, 61°46'00"W], 30 mi. [45km] N. Kavanayen, 1800m; NMNH; ♂. Known only from the holotype.

Atopsyche (Atopsaura) callosa (Navás) 1924:78

Type locality: COSTA RICA; MNHN; ♂. Flint (1975) mentioned the occurrence of the species in Venezuela but did not provide specific locality information. Also known from Colombia, Ecuador, Panama, and Peru (Flint et al., 1999).

New Records: **Estado Barinas**, Queb. [Quebrada] San Juan in Santa Rosa, tributary to Río Sinigüis, Parque Nacional Sierra Nevada, 8°27.87'N, 70°50.92'W, el. 993 m, 21.iii.1997, Holzenthal, 2 ♂♂, 2 ♀♀ (UMSP). Río Sinigüis, in Caño Grande, 8°24.00'N, 70°46.45'W, el. 520 m, 22.iii.97, Holzenthal, 2 ♂♂, 2 ♀♀ (UMSP). **Estado Guárico**, Queb. [Quebrada] Guatopo, P. N. [Parque Nacional] Guatopo, 0.5 km N Estación La Colina, 10.014°N, 66.363°W, el. 600 m, 22.i.1994, Holzenthal, Cressa, Rincón, 1 ♂ (IZAM). **Estado Trujillo**, Quebrada Potrerito, 7.5 km NE Bocono, 9°16.435'N, 70°13.102'W, el. 1530 m,

29–30.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 5 ♂♂, 30 ♀♀ (UMSP). **Estado Zulia**, Río Negro in Toromo, Parque Nacional Perijá, 10.051°N, 72.712°W, el. 360m, 15.i.1994, Holzenthal, Cressa, Rincón, 1 ♂, 7 ♀♀ (IZAM).

Atopsyche (Atopsyche) caquetia Flint, 1974:2

Type locality: VENEZUELA, Edo. Aragua [**Estado Aragua**], Rancho Grande [10°20'58"N, 67°41'08"W], 1100m; NMNH; ♂. Flint 1996:69 [distribution]. Flint (1981) provided additional records of specimens from Rancho Grande as well as from Dos Riitos, 6 km N Rancho Grande and from **Estado Mérida**, La Pedregosa [8°37'20"N, 71°40'40"W]. Flint (1996) mentioned its occurrence in the Sierra Turimiquire, Estado Sucre.

New Records: **Estado Aragua**, [Quebrada Puente de Hierro], 1 km E Estación Biológica Rancho Grande, 10.352°N, 67.680°W, el. 1100m, 27.i.1994, Holzenthal & Cressa, 1 ♂ (UMSP). **Estado Sucre**, Río Cocollar, 1.5 km SE Las Piedras de Cocollar, 10°09.617'N, 63°47.605'W, el. 810m, 7–8.iv.1995, Holzenthal & Flint, 1 ♂ (UMSP).

Atopsyche (Atopsaura) chimuru Schmid, 1989:121

Type locality: VENEZUELA, T.P.[sic].Amaz. [Territorio Federal Amazonas = **Estado Amazonas**] Cerro de la [La] Neblina, Camp II, 0°49'41"N, 65°58'56"W, 2085m; NMNH; ♂. Known only from the holotype and a male paratype from the same locality.

Atopsyche (Atopsaura) chinchamac Schmid, 1989:121

Type locality: VENEZUELA, T.F.A. [Territorio Federal Amazonas = **Estado Amazonas**] Cerro de la [La] Neblina, camp II, 0°49'N, 65°59'W, 2100m; NMNH; ♂. Known only from the holotype.

Atopsyche (Atopsaura) choronica Flint, 1974:3

Type locality: VENEZUELA, Aragua [**Estado Aragua**], Choroní Pass [Choroní, 10°29'37"N, 67°36'37"W], 1400m; NMNH; ♂. In addition to the holotype, Flint (1974, 1981) recorded additional specimens from Estado Aragua, Rancho Grande, and from 1 km N Rancho Grande.

Atopsyche (Atopsaura) huacapuncu Schmid, 1989:123

Type locality: VENEZUELA, Merida [**Estado Mérida**], S. Bolívar N.P., near La Aguada [8°24'16"N, 71°21'08"W], 3000m; NMNH; ♂. Previously known only from the holotype.

New Record: **Estado Táchira**, trib. to Río El Valle, 3.8 km SE El Zumbador, 7°57.411'N, 72°04.394'W, el. 2730m, 21.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 1 ♂ (UMSP).

Atopsyche (Atopsaura) huachacuyac Schmid, 1989:123

Type locality: VENEZUELA, Merida [**Estado Mérida**], Mucuy Fish Hatchery, 7 km E Tabay, 6600 ft; NMNH; ♂. Previously known only from the holotype.

New Records: **Estado Barinas**, Parque Nacional Sierra Nevada, cascade & trib. to Río Sinigüis, appx. 8°33'N, 70°55'W, el. 2540m, 18.iii.1997, Holzenthal, 1 ♂, 3 ♀♀ (UMSP). **Estado Mérida**, Queb. [Quebrada] La Mucuy, 7 km E Tabay, 8.637°N, 71.034°W, el. 2200, 18.i.1994, Holzenthal, Cressa, Rincón, [Segnini], 1 ♂ (UMSP); same, 26.iv.1995, Holzenthal, Cressa, Gutic, [Barrios, Segnini,] 1 ♂ (UMSP). **Estado Táchira**, Quebrada La Honda, 10 km E La Grita, 8°08.817'N, 71°56.027'W, el. 2300m, 23.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 1 ♂, 1 ♀ (UMSP).

Atopsyche (Atopsaura) huallaripa Schmid, 1989:124

Type locality: VENEZUELA, T.F.Amaz. [Territorio Federal Amazonas = **Estado Amazonas**] Cerro de la [La] Neblina, Camp II, 0°49'41"N, 65°58'56"W, 2085m; NMNH; ♂. Known only from the holotype.

Atopsyche (Atopsaura) huanucu Schmid, 1989:125

Type locality: VENEZUELA, Lara [**Estado Lara**], Yacambu National Park [Parque Nacional Yacambú], 13 km SE Sanare [Sanare, 9°47'07"N, 69°09'49"W], 4800 ft; NMNH; ♂. Previously known only from the holotype.

New Records: **Estado Mérida**, Queb. [Quebrada] La Mucuy, 7 km E Tabay, 8.637°N, 71.034°W, el. 2200m, 18.i.1994, Holzenthal, Cressa, Rincón, [Segnini], 1 ♂ (UMSP); same, 26.iv.1995, Holzenthal, Cressa, Gutic, [Barrios, Segnini], 1 ♂ (UMSP); Quebrada La Cuesta, 5 km N Mérida, 8°39.142'N, 71°07.885'W, el. 2010m, 27.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 1 ♂ (UMSP). **Estado Táchira**, trib. to Río El Valle, 3.8 km SE El Zumbador, 7°57.411'N, 72°04.394'W, el. 2730m, 21.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 1 ♂ (UMSP).

Atopsyche (Atopsaura) mayucapac Schmid, 1989:127

Type locality: VENEZUELA, Merida [**Estado Mérida**], El Valle, 2400m; IZAM; ♂. Previously known only from the holotype.

New Record: **Estado Mérida**, 2 km N Estación Santa Rosa ULA/UCV nr. La Hechicera [Cerro La Hechicera, 8°38'39"N, 71°09'16"W], el. 1700m, 1.v.1988, Epstein & Blahnik, 1 ♂ (UMSP).

Atopsyche (Atopsaura) pacharurac Schmid, 1989:128

Type locality: VENEZUELA, ME [**Estado Mérida**], La Campana, 12 km SE Santo Domingo [Santo Domingo, 8°51'54"N, 70°41'40"W]; NMNH; ♂. The species was known previously from the holotype and a male paratype from: **Estado Barinas**, San Isidro [Estación Experimental,

Universidad Central de Venezuela [San Isidro, 8°24'00"N, 70°39'00"W].

New Records: **Estado Mérida**, Río Albarregas, ca. 1 km NW Universidad de Los Andes, 8.634°N, 71.158°W, el. 1980 m, 17.i.1994, Holzenthal, Cressa, Rincón, [Segnini], 1 ♂ (UMSP); Queb. [Quebrada] La Mucuy, 7 km E Tabay, 8.637°N, 71.034°W, el. 2200 m, 18.i.1994, Holzenthal, Cressa, Rincón, [Segnini], 1 ♂ (UMSP); Quebrada La Cuesta, 5 km N Mérida, 8°39.142'N, 71°07.885'W, el. 2010 m, 27.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 1 ♂ (UMSP); 2 km N Estación Santa Rosa ULA/UCV nr. La Hechicera [Cerro La Hechicera, 8°38'39"N, 71°09'16"W], el. 1700 m, 1.v.1988, Epstein & Blahnik, 1 ♂ (UMSP).

Atopsyche (Atopsaura) parihuana Schmid, 1989:128

Type locality: VENEZUELA, T.F.A. [Territorio Federal Amazonas = **Estado Amazonas**] Cerro d.l. [La] Neblina, Camp IV, 0°58'N, 65°57'W, el. 760 m; NMNH; ♂. Known only from the holotype and a paratype from the same locality.

Atopsyche (Atopsaura) viracocha Schmid, 1989:131

Type locality: VENEZUELA, Lara [**Estado Lara**], Yacambu National Park [Parque Nacional Yacambú], 13 km SE Sanare [Sanare, 9°47'07"N, 69°09'49"W], 4800 ft; NMNH; ♂. Known only from the holotype.

Atopsyche (Atopsyche) weibezahni Flint 1974:3

Type locality: VENEZUELA, Merida [**Estado Mérida**], Río Santo Domingo, outlet to Laguna Mucubají [8°48'06"N, 70°49'40"W], 3550 m; NMNH; ♂. Previously known from the holotype and a male paratype.

New Records: **Estado Barinas**, Río Sinigüis at 'Los Arangures', 8°33.85'N, 70°56.32'W, el. 2880 m, 13.iii.1997, Holzenthal, 4 ♂♂, 8 ♀♀ (UMSP). **Estado Mérida**, Queb. [Quebrada] La Mucuy, 7 km E Tabay, 8.637°N, 71.034°W, el. 2200 m, 18.i.1994, Holzenthal, Cressa, Rincón, [Segnini], 1 ♂ (UMSP); same, except 26.iv.1995, Holzenthal, Cressa, Gutic, [Barrios, Segnini], 3 ♂♂ (UMSP); Quebrada La Cuesta, 5 km N Mérida, 8°39.142'N, 71°07.885'W, el. 2010 m, 27.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 1 ♂ (UMSP). **Estado Táchira**, Quebrada La Honda, 10 km E La Grita, 8°08.817'N, 71°56.027'W, 2300 m, 21.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 3 ♂♂ (UMSP).

Atopsyche (unplaced) yupanqui Schmid, 1989:132

Type locality: VENEZUELA, ME [**Estado Mérida**], 8 km SE Apartaderos [8°48'22"N, 70°50'41"W]; NMNH; ♂. In addition to the holotype, the species was known previously from paratypes from Estado Mérida, Río Santo Domingo, 5 km NW Sto. Domingo [Santo Domingo, 8°51'54"N, 70°41'40"W]; Mucuy Fish Hatchery, 7 km E Tabay, el. 6600 ft.

New Records: **Estado Barinas**, Río Sinigüis at 'Las Arangures', 8°33.85'N, 70°56.32'W, el. 2880 m, 13.iii.1997,

Holzenthal, 3 ♂♂, 4 ♀♀ (UMSP). **Estado Mérida**, Páramo de Mucuchies, 5 km NE Pico El Aguila, 8.8°N, 70.8°W, el. 3700 m, 17.i.1994, Holzenthal, 1 ♂ (UMSP); Río Sinigüis at 'El Molino', 8°34.76'N, 70°58.33'W, el. 3340 m, 14–15.iii.1997, Holzenthal, 13 ♂♂, 8 ♀♀ (UMSP). Río Sinigüis at 'El Tambor', 8°34.34'N, 70°57.87'W, el. 3200 m, 16.iii.1997, Holzenthal, 1 ♂, 3 ♀♀ (UMSP). **Estado Táchira**, trib. to Río El Valle, 3.8 km SE El Zumbador, 7°57.411'N, 72°04.394'W, el. 2730 m, 21.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 1 ♂ (UMSP); Quebrada Los Mirtos, 8 km S El Cobre 7°58.593'N, 72°04.515'W, el. 2400 m, 22.iv.1995, Holzenthal, Cressa, Gutic, [Barrios], 2 ♂♂, 1 ♀ (UMSP).

Atopsyche (Atopsyche) allani, n. sp. (Figs. 1, 4)

Diagnosis

This species is most similar to *A. weibezahni* Flint, also known from Venezuela. Differences between the two species occur primarily in the parapod of the male genitalia. In *A. weibezahni* the lateral region of the parapod consists largely of an irregularly rounded apical lobe (Flint, 1974, Fig. 12), while in *A. allani* this lobe is jaggedly toothed and heavily sclerotized. Similarly, the mesal region of the parapod bears an apical rounded setose process in *A. allani* and a more acute process in *A. weibezahni*. The apex of the phallus is acute in the new species, while in *A. weibezahni* it is rounded with a small acute projection (Flint, 1974, Fig. 13).

Description

Male. Forewing length 11–12.5 mm (n = 10). Overall body color light brown; legs yellowish brown, coxae of all legs and foreleg tibiae darker brown; antennal scape with long yellow setae, pedicel and basal flagellomeres yellow, apical flagellomeres brown; maxillary palp segments 3 and 4 and labial palp segment 2 with yellow setae apically, otherwise all papal segments with fuscous setae; frons and vertex of head with long, erect brown and yellow setae; dorsum of thorax with long, erect brown and yellow setae. Forewings brown, erect setae of veins forming distinct mottled pattern of alternate dark brown and yellow setae, with fewer, scattered white setae, distinct patch of white setae at junction of 2A + 3A and larger patch of yellow setae at arculus, scattered dark brown setae at midlength of cord; apex of wing with fringe of alternating patches of dark brown and yellow setae. Forewing venation (Fig. 4A) complete; R1 branched; fork I with stem equal to its length; fork II long, sessile; fork III stem equal in length to stem of fork I; fork IV long, sessile; stem of M only slightly curved between m-cu crossvein and first fork of M; fork V long, narrow; Cu2 long, converging near fused anal veins (1A + 2A + 3A), with crossvein near apex forming small cell on posterior margin of wing; apical stem of 1A + 2A very short. Hind wing (Fig. 4B) with Sc and R1 fused apically; forks I, III, and V present, the former

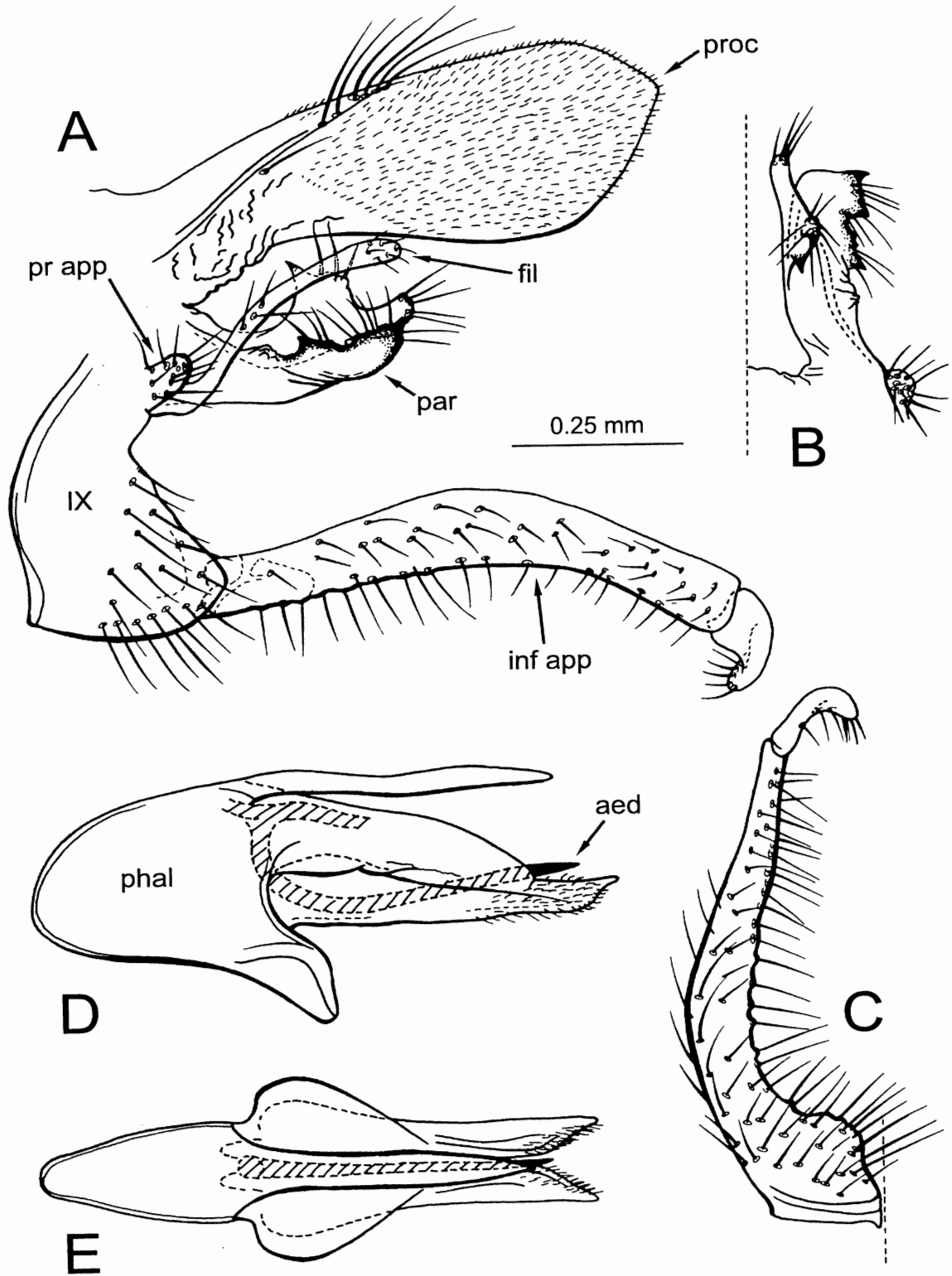


Fig. 1. *Atopsyche (A.) allani* n. sp. ♂ genitalia: A: Segments IX & X, lateral. B: Parapod, dorsal. C: Inferior appendage, ventral. D: Phallic apparatus, lateral. E: Phallic apparatus, dorsal. Abbreviations: aed = aedeagus, fil = filipod, inf app = inferior appendage, par = parapod, phal = phallosome, pr app = preanal appendage, proc = proctiger, IX = abdominal segment IX.

with a short stem, the latter deep with a short stem, fork III stem equal to its length; forks II and IV absent; Cu2 long, straight, with row of straight setae along midlength and patch of clavate setae apically; 1A sinuate, with row of hooked setae along midlength and first anal cell with elongate setae; base of 3A with patch of long setae. Nygmata absent in both wings. Terga III and IV each with pair of prominent, concavely rounded glands, lined internally with numerous short setae, located at anterolateral margins of respective terga. Sternum V of male with pair of small, convexly rounded glands, located at anterolateral margin of sclerite. Sterna VI and VII of male each with prominent spine-like ventral process on posteromesal margin; process on VII short, straight, process on VI long, slender, curved, with row of short spine-like setae along ventral margin and terminating with longer, spine-like seta. Segment IX, in lateral view, narrow (Fig. 1A). Parapod complex, with two prominent spinose regions, lateral region heavily sclerotized bearing prominent spines and setae, mesal region less heavily sclerotized, bearing apical rounded setose process and more basal, dorsally directed spinose process, this process bearing distinct setae dorsally (Figs. 1A, B). Filipod long, slender, sparsely covered with elongate setae along length, with shorter setae apically (Fig. 1A). Preanal appendage small, rounded, setose (Fig. 1A). Proctiger, in lateral view, broadly widened apically, covered externally with numerous minute setae; apicodorsal margins with elongate, coarse setae (Fig. 1A). Inferior appendage with first article very long, relatively narrow and of uniform width, slightly curved mesad, heavily setose, basoventral region, when viewed ventrally, slightly produced; second article small, apex rounded, turned ventromesally, with setae along mesal and ventral edges (Fig. 1A, C). Phallic apparatus complex, phallosome (Figs. 1D, E) broadly rounded basally, with broad ventral extension with keel-like lateral flanges and single strong dorsal spine-like projection; apex divided mesally into paired apically acute lobes, bearing minute setae; aedeagus an elongate, stout, spine-like structure, with ventral curvature.

Type material

Holotype, ♂. VENEZUELA: **Estado Mérida**: Río Sinigüis at 'El Molino', 8°34.76'N, 70°58.33'W, el. 2340 m, 14–15.iii.1997, Holzenthal (NMNH). Paratypes. VENEZUELA: **Estado Mérida**: Same data as holotype, 64 ♂♂, 31 ♀♀ (UMSP); Río Sinigüis at 'El Tambor', Parque Nacional Sierra Nevada, 8°33.34'N, 70°57.87'W, el. 3200 m, 16.iii.97, Holzenthal, 5 ♂♂, 4 ♀♀ (IZAM), 4 ♂♂, 3 ♀♀ (NMNH).

Etymology

Named for Dr. J. David Allan, University of Michigan, leader of the ecological survey of the aquatic macroinvertebrates of

the Río Sinigüis basin, in recognition to his contributions to the study of Neotropical stream ecology.

Atopsyche (Atopsyche) rinconi, n. sp. (Figs. 2, 5)

Diagnosis

Atopsyche rinconi, new species, is very similar to *A. erigia* Ross, placed in the *tripunctata* group of the subgenus *Atopsyche* by Schmid (1989). The two species differ in subtle shapes of a number of characters in the male genitalia. The parapod of the new species is a simple structure with an apically rounded, acutely upturned apex. In *A. erigia*, the parapod is straighter with subapical pointed projections (Ross, 1947, Fig. 5; Ross & King, 1952, Fig. 3). The second article of the inferior appendage in *A. rinconi* is rounded apically, while in *A. erigia* the second article is more acute apically. Finally, the phallus of *A. rinconi* is a little shorter and stouter than in *A. erigia*.

Description

Male. Forewing length 5.5–6.0 mm (n = 10). Overall body color yellow to light brown, legs yellow, coxae of all legs and foreleg tibiae darker brown, mid- and hindleg tibiae with fuscous setae giving a striped pattern; antennal scape with long stramineous setae, pedicel and basal flagellomeres yellow, apical flagellomeres brown. Palps fuscous. Setae of head and thorax whitish with scattered darker setae. Wings light brown, erect setae of veins forming irregular pattern of alternate brown and whitish setae, with dark brown setae along costal margin and dark brown patch in middle of wing; apex of wing with fringe of alternating patches of light brown and whitish setae. Forewing venation (Fig. 5A) complete; R1 unbranched; fork I with stem slightly longer than its length; fork II long, sessile; fork III equal in length to its stem; fork IV long, sessile; stem of M slightly curved between m-cu crossvein and first fork of M; fork V long, narrow; Cu2 long, converging near fused anal veins (1A + 2A + 3A), with crossvein near apex forming small cell on posterior margin of wing; apical stem of 1A + 2A long. Hind wing (Fig. 5B) with Sc reaching wing margin, R1 incomplete, fused apically to Sc; forks I, III, and V present, all forks longer than their stems; forks II and IV absent; Cu2 long, straight, thickened sub-basally, the thickening bearing short setae; 1A sinuate, widely separated from Cu2; base of 2A thickened with patch of long setae. Nygmata absent in both wings. Tergum III anterolaterally with pair of concavely rounded glands and patch of minute seta, anteromesally with minute setae (Fig. 2E). Sternum V with pair of projecting, rugose glands laterally on anterodorsal margin, located at anterolateral margin of sclerite (Fig. 2F). Sterna VI and VII each with prominent spine-like ventral process on posteromesal margin; process on VII short, straight, process on VI long, slender, curved,

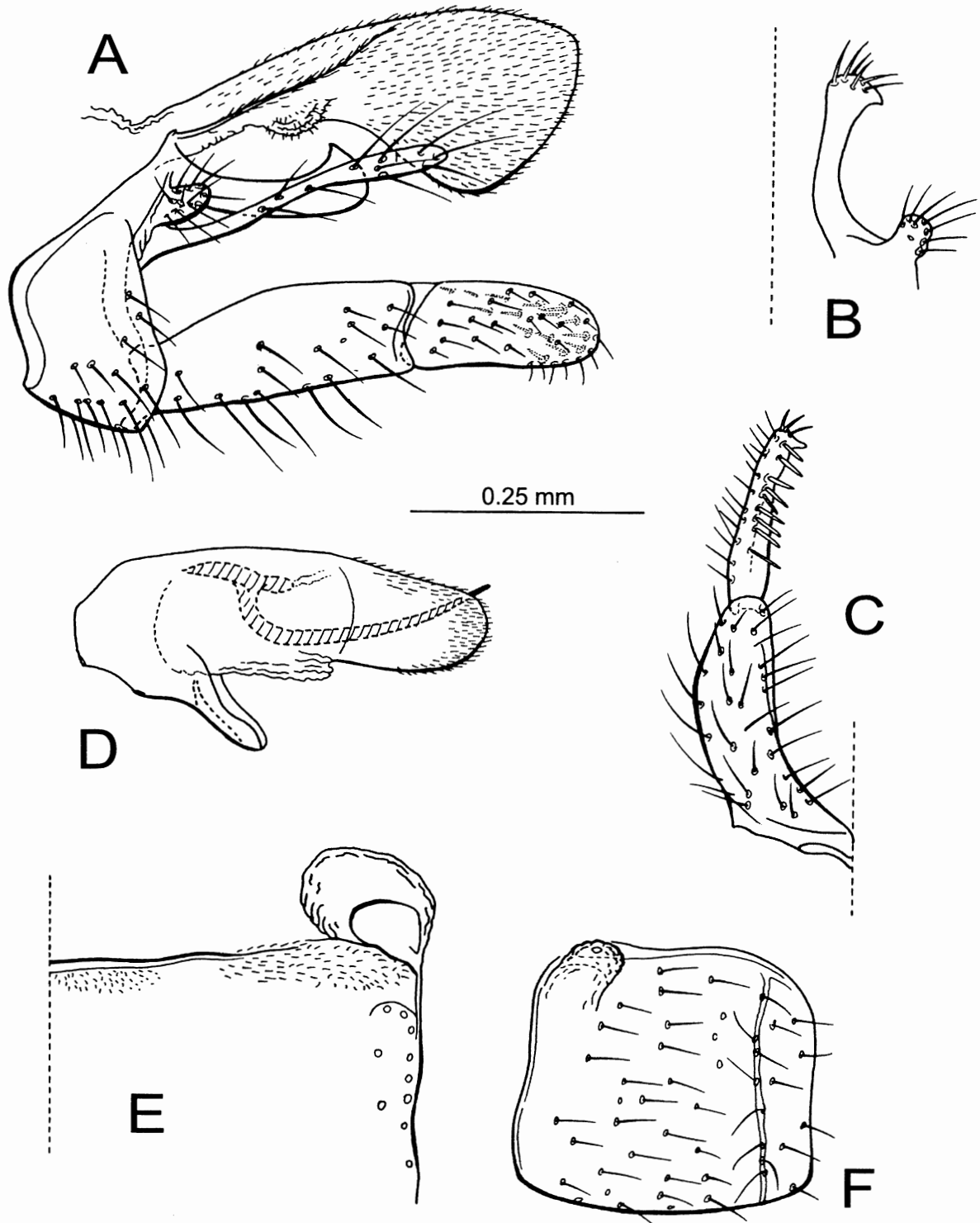


Fig. 2. *Atopsyche (A.) rinconi* n. sp. ♂ genitalia: A: Segments IX & X, lateral. B: Parapod, dorsal. C: Inferior appendage, ventral. D: Phallic apparatus, lateral. E: Tergum III and associated gland, dorsal. F: Sternum V and associated gland, lateral.

with row of short spine-like setae along ventral margin and terminating with longer, spine-like seta. Segment IX, in lateral view, narrow (Fig. 2A). Parapod simple, narrow, apex rounded, setose, with acute, dorsolaterally directed projec-

tion (Figs. 2A, B). Filipod long, slender, with elongate setae along length (Fig. 2A). Preanal appendage small, rounded, setose (Figs. 2A, B). Proctiger, in lateral view, broadly widened apically, covered externally with numerous minute

setae, but without long setae, basoventrally with small setose membranous mound (Fig. 2A). Inferior appendage with first article short, straight sided, of uniform width; second article slightly shorter than first article, apex broadly rounded, with apicomeral tooth-like projection and prominent mesal spines (Figs. 2A, C). Phallic apparatus simple, phallosome (Fig. 2D) rounded basally, with ventral extension; apex divided mesally into paired apically rounded lobes, bearing minute setae; aedeagus an elongate, stout, spine-like structure, with ventral curvature.

Type material

Holotype, ♂. VENEZUELA: **Estado Sucre**: Río Cocollar, 1.5 km SE Las Piedras de Cocollar, 10°09.617'N, 63°47.605'W, el. 810 m, 7–8.iv.1995, Holzenthal & Flint (NMNH). Paratypes. VENEZUELA: **Estado Sucre**: Same data as holotype, 21 ♂♂, 6 ♀♀ (UMSP), 5 ♂♂, 3 ♀♀ (IZAM); Quebrada Zapateral, 1.5 km SE Las Piedras de Cocollar, 10°09.753'N, 63°47.587'W, el. 810 m, 9.iv.1995, Holzenthal & Flint, 1 ♀ (NMNH).

Etymology

We name the species in recognition of the support we received from Prof. José Rincón, Universidad de Zulia, Maracaibo. Dr. Rincón accompanied us on our first trip in 1994 and facilitated our access to collecting sites in the Sierra de Perijá.

Atopsyche (Atopsaura) segninii, n. sp. (Figs. 3, 6)

Diagnosis

This third new species is similar to *A. spinosa* Navás (= *A. falina* Ross & King) placed in the *falina* group of the subgenus *Atopsaura* by Schmid (1989), but differs in several details of the male genitalia. The filipod is short in the new species, but long and slender in *A. spinosa* (Ross & King, 1952, Fig. 18A). In *A. spinosa*, the parapod has dorsally directed mesal and apical spines, while in the new species there are a series of laterally directed spines along the length of the parapod. In *A. segninii*, there is a subapical sclerotized projection on the phallus which is lacking in *A. spinosa*, but the latter species has a cordiform, tuberculate process not found in the new species (Ross & King, 1952, Fig. 18B, C).

Description

Male. Forewing length 10, 10.5 mm (n = 2). Overall body color light brown, both specimens somewhat denuded; legs yellowish brown, coxae of all legs and foreleg tibiae darker brown; antennae yellow; maxillary palp segments 3 and 4 and labial palp segment 2 with yellow setae apically, other-

wise all papal segment with fuscous setae; head and dorsum of thorax with long, erect brown and yellow setae. Forewings brown, erect setae of veins forming irregular mottled pattern of dark brown and yellow setae, with a few, scattered white setae, small but distinct patches of white and black setae at junction of 2A + 3A; apex of wing with fringe of alternating patches of brown and yellow setae. Forewing venation (Fig. 6A) complete; R1 branched, although anterior branch abbreviated; fork I with stem equal to its length; fork II long, sessile; fork III stem shorter than its fork; fork IV long, sessile; stem of M short, only slightly curved between m-cu crossvein and first fork of M; fork V long, narrow; Cu2 long, converging near fused anal veins (1A + 2A + 3A), with crossvein near apex forming small cell on posterior margin of wing; apical stem of 1A + 2A very short. Hind wing (Fig. 6B) with Sc and R1 equal in length, falling just short of costal margin; forks I, III, and V present, the former with a short stem, the latter deep with a short stem, fork III slightly longer than its stem; forks II and IV absent; Cu2 long, straight; 1A sinuate, with row of hooked setae along midlength and first anal cell with elongate setae (Fig. 6B); base of 3A with small patch of long setae. Nygmata absent in both wings. Terga III and IV each with pair of prominent, concavely rounded glands, lined internally with numerous short setae, located at anterolateral margins of respective terga (Fig. 3F). Sternum V with pair of small, convexly rounded glands, located at anterolateral margin of sclerite (Fig. 3G). Sterna VI and VII each with prominent spine-like ventral process on posteromesal margin; process on VII short, straight, process on VI long, slender, curved, with row of short spine-like setae along ventral margin and terminating with longer, spine-like seta. Segment IX, in lateral view, broad (Fig. 3A). Parapod with prominent laterally directed tooth-like spines (Fig. 3B). Filipod short, covered with elongate setae along length (Fig. 3A). Preanal appendage small, rounded, setose (Fig. 3A). Proctiger, in lateral view, broadly widened apically, covered externally with numerous minute setae; apicodorsal and lateral margins with elongate, coarse setae (Fig. 3A). Inferior appendage with first article short, relatively narrow and of uniform width, ventrally and mesally curved, with a slight apicoventral projection subtending second article, heavily setose; second article small, apex slightly acute, turned ventromesally, with setae along mesal and ventral edges (Figs. 3A, C). Phallic apparatus complex, phallosome (Figs. 3D, E) long, broadly rounded basally, with broad ventral extension with keel-like lateral flanges and single strong dorsal spine-like projection; apex divided mesally into paired apically rounded lobes, bearing minute setae and apicodorsal, sclerotized spine-like projection; aedeagus an elongate, stout, spine-like structure, with ventral curvature.

Type material

Holotype, ♂. VENEZUELA: **Estado Mérida**: Río Sinigüis at 'El Tambor', Parque Nacional Sierra Nevada, 8°33.34'N,

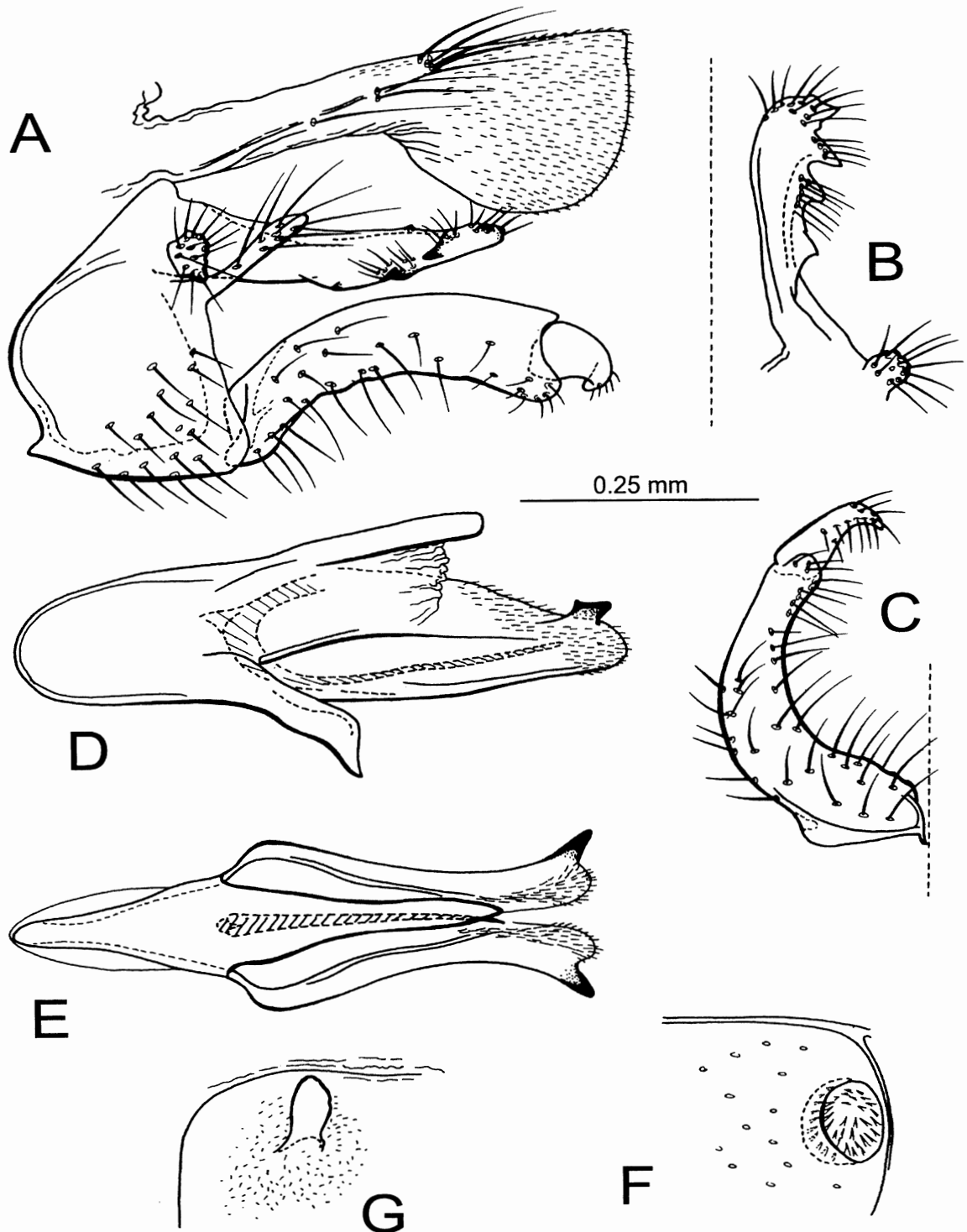


Fig. 3. *Atopsyche (Atopsaura) segninii* n. sp. ♂ genitalia: A: Segments IX & X, lateral. B: Parapod, dorsal. C: Inferior appendage, ventral. D: Phallic apparatus, lateral. E: Phallic apparatus, dorsal. F: Tergum III gland, dorsal. G: Sternum V gland, lateral.

70°57.87'W, el. 3200 m, Holzenthal, 16.iii.1997 (NMNH).
Paratypes. VENEZUELA: **Estado Mérida**: Río Sinigüis at 'Tres Quebradas', Parque Nacional Sierra Nevada, 8°31.43'N, 70°53.77'W, el. 1900 m, 19.iii.1997, Holzenthal, 1 ♂, 1 ♀ (UMSP).

Etymology

Named for Dr. Professor Samuel Segnini, Universidad de los Andes, Mérida. Dr. Segnini offered generous and invaluable assistance to the authors during their visits to the Andean

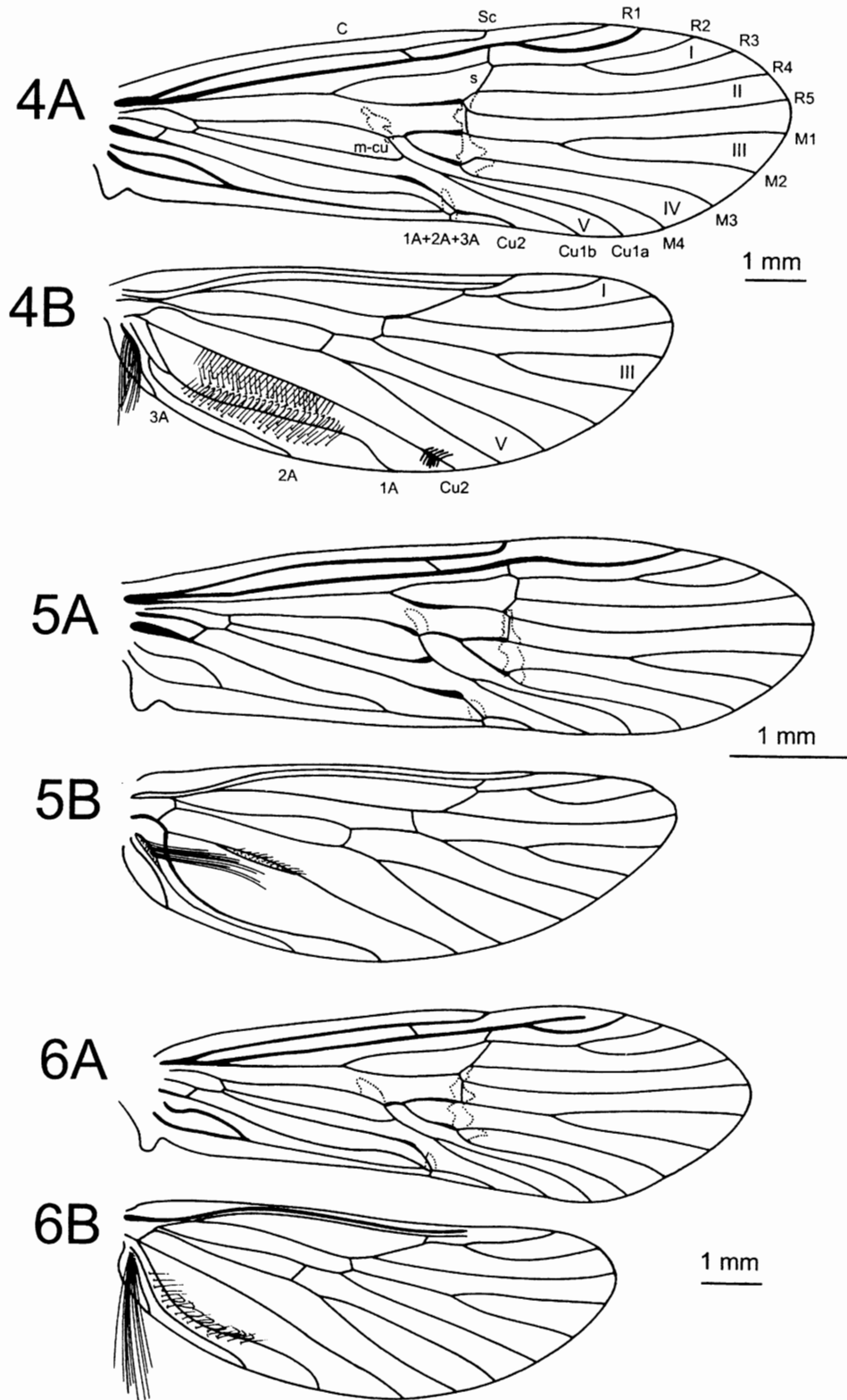


Fig. 4–6. *Atopsyche* n. spp. ♂ wing venation: Fig. 4. *Atopsyche (A.) allani* n. sp. ♂: 4A. Forewing. 4B. Hind wing. Fig. 5. *Atopsyche (A.) rinconi* n. sp. ♂: 5A. Forewing. 5B. Hind wing. Fig. 6. *Atopsyche (Atopsaura) segninii* n. sp. ♂: 6A. Forewing. 6B. Hind wing.

regions of Venezuela. He was also a principal participant in the Río Sinigüis research project.

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