



<http://dx.doi.org/10.11646/zootaxa.4040.4.2>

<http://zoobank.org/urn:lsid:zoobank.org:pub:B50C1290-A6F7-461E-AC0F-F490F26E9780>

New species of *Plectropsyche* Ross 1947 (Trichoptera: Hydropsychidae: Hydropsychinae)

JOAQUÍN BUENO-SORIA¹ & RAFAEL BARBA-ALVAREZ²

¹141 Preamble Dr. Marlton, NJ 08053-5350, USA. E-mail: bueno@unam.mx

²Instituto de Biología, Departamento de Zoología UNAM. AP 70-153, Ciudad Universitaria, 3erCto. Exterior S/N. México 04510 D.F. E-mail: rbarba@ib.unam.mx

Abstract

Two new species from Mexico and Central America of the genus *Plectropsyche* Ross are described and the male and female genitalia are figured. The only extant previous described species, *Plectropsyche hoogstraali* Ross and its synonym *Plectropsyche pitella* (Denning) from Mexico are studied. A map with the distribution of all known *Plectropsyche* species is presented and an illustrated key for the males of the extant species are included.

Key words: taxonomy, Mexico, Central America

Resumen

Se describen dos especies nuevas del género *Plectropsyche* Ross de México y Centroamérica y se ilustran los genitalia de los machos y las hembras. Únicamente se estudiaron las especies actuales previamente descritas para México, *Plectropsyche hoogstraali* Ross y su sinónimo *P. pitella* (Denning). Se incluye un mapa con la distribución de las especies así como una clave ilustrada de los machos del género.

Introduction

The genus *Plectropsyche* Ross 1947, with type species *Plectropsyche hoogstraali* Ross 1947, is considered to be closely related to the genera *Cheumatopsyche* Wallengren 1891 and *Potamyia* Banks 1900. The genus is endemic to the Neotropical Region of Mexico and Central America, and belongs to the family Hydropsychidae subfamily Hydropsychinae (Scheffer 2005; Geraci *et al.* 2005). Denning (1968) described the species *Cheumatopsyche pitella*, but later Gordon (1974) removed it from this genus and transferred it to the genus *Plectropsyche*, making the combination *Plectropsyche pitella* (Denning 1968). In recent years Wichard, *et al.* (2006), described a fossil species *Plectropsyche alvarezzi* from the middle Miocene Mexican amber of Simojovel, Chiapas, Mexico, increasing to three the number of species for the genus. Recently, Oláh & Johanson (2008) synonymized the genus *Plectropsyche* with the genus *Cheumatopsyche*, but Geraci, *et al.* (2010), based on molecular analysis, resurrected the genus *Plectropsyche* Ross. Therefore consistent with morphological evidence (Scheffer 2005) and molecular analysis (Geraci *et al.* 2010), we recognize *Plectropsyche* Ross as a valid genus. In addition to the species listed above we describe two more new species, one from México and one from Costa Rica and Panamá and, after careful study of their male genitalia, we consider *Plectropsyche pitella* (Denning 1968) as a **new synonym** of *Plectropsyche hoogstraali* Ross 1947.

Material and methods

The specimens studied were provided by Dr. Oliver S. Flint, Jr., of the National Museum of Natural History

(NMNH), Mr. Jason Weintraub of the Academy of Natural Sciences of Philadelphia (ANSP, now Academy of Natural Sciences of Drexel University), Mr. Vincent Lee of the California Academy of Sciences (CAS), Dr. Ralph Holzenthal of the University of Minnesota St. Paul (UMSP), and Biól. Rafael Barba-Alvarez of the Universidad Nacional Autónoma de México, Instituto de Biología, UNAM (CNIN-IBUNAM). The numbers that appear with some pinned specimens of the CNIN-IBUNAM belong to the database of the collection.

During the study of the paratypes of *Plectropsyche hoogstraali* Ross, deposited in the Academy of Natural Sciences of Philadelphia (ANSP), we observed that several individuals showed some differences in the male genitalia and those specimens were the basis for the recognition of another new species mixed with the paratypes of *Plectropsyche hoogstraali* Ross.

The illustrations of the genitalia were made under a stereomicroscope and an optical microscope equipped with a camera lucida. The software Adobe® Illustrator® CS5 and Adobe® Photoshop® CS5 were used to enhance and compose the plates.

When some specimens were very pale, we put the genitalia for 10 minutes in Lignin pink, acid fuchsin, GAA with water DOUBLE STAIN (Blahnik & Holzenthal 2004). For clearing the genitalia, we used 10% KOH. For the description of the new species, we followed the style of Flint *et al.* (1987) and Flint (2008). Abbreviations for Mexican States are as follows: Nuevo León (NL), San Luis Potosí (SLP), Nayarit (Nay.), Jalisco (Jal.), Puebla (Pue.), Morelos (Mor.), Estado de México (Edo. de Méx.), Michoacán (Mich.), Guerrero (Gro.), Oaxaca (Oax.), Veracruz (Ver.), Tabasco (Tab.), Chiapas (Chis.). The material studied will be deposited in the already mentioned collections: ANSP, NMNH, CAS, UMSP and CNIN-IBUNAM.

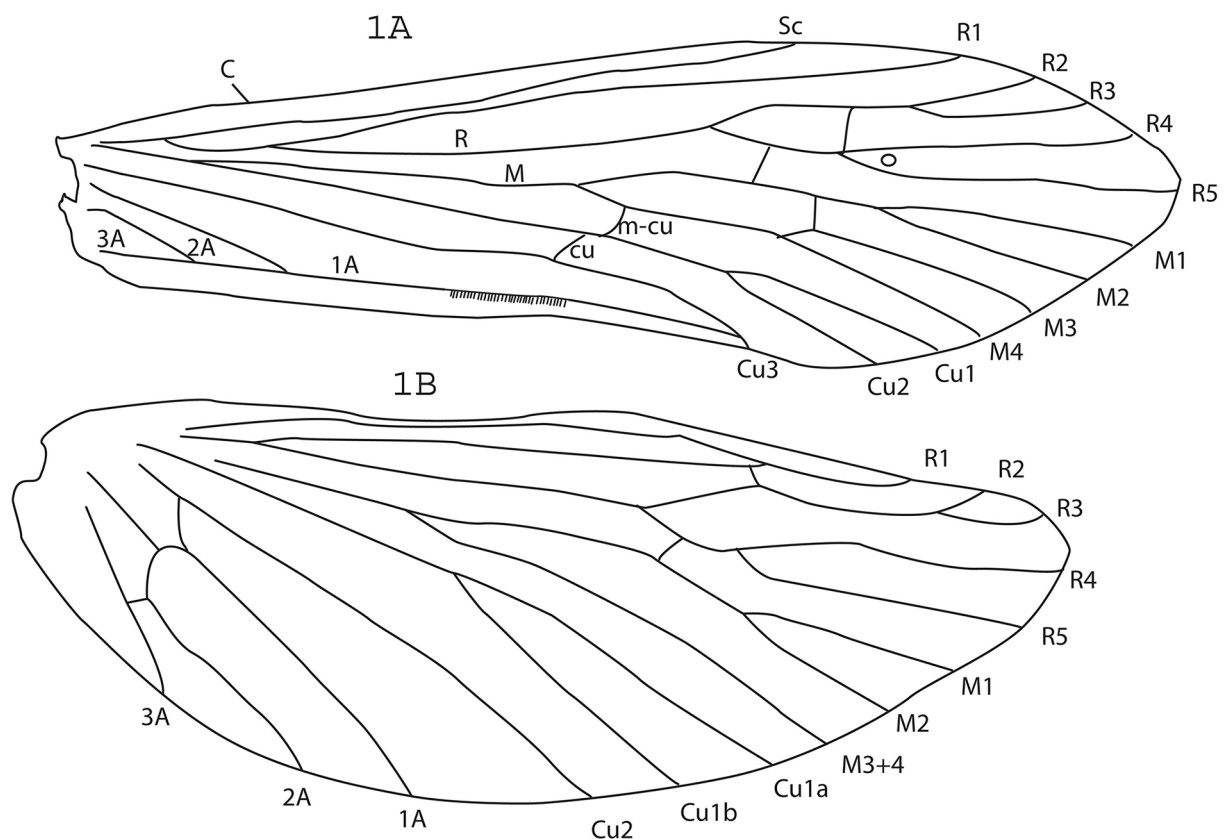


FIGURE 1. *Plectropsyche hoogstraali* Ross, wings. 1A, right forewing, dorsal; 1B, right hind wing, dorsal, Specimen from NICARAGUA: Ocotal, Rio Coco.

Family Hydropsychidae Curtis 1835

Subfamily Hydropsychinae Curtis 1835

Plectropsyche Ross 1947

Plectropsyche Ross 1947, 141–142, 144. Type species: *Plectropsyche hoogstraali* Ross (original designation). Oláh & Johanson, 2008, 176, as a synonym of *Cheumatopsyche*; Geraci et al. 2010, 925, restored to valid genus *Plectropsyche*.

Plectropsyche spp. have each front wing (Fig. 1A) with the cross-vein *cu* situated beneath the fork of M and not more than its own length basad of the *m-cu*; vein 1A has a linear tuft of stout setae about midway between the fusion of 1A and 2A and the apex of 1A, the tuft occupying about one-sixth of this fragment of the vein. Each hind wing (Fig. 1B) has Cu2 and 1A joining to form a sharp angle and R2 is present. Because of the presence of only three extant and one fossil species, *Plectropsyche* is a small genus in the family Hydropsychidae.

Plectropsyche hoogstraali Ross 1947

Figs. 1, 2, 5

Plectropsyche hoogstraali Ross 1947, 142–143, pl. 4 fig. 20–20E; holotype male; La Majada. Apatzingán, Michoacán, México, August 12, 1941, (H. Hoogstraal), collected at 1200 feet in moist jungle, deposited in the Illinois Natural History Survey; allotype female and paratypes 7 males, 3 females, same data as for holotype; paratypes 12 males, 1 female, same data but collected five miles west of Apatzingán, August 13, at light; paratypes 1 male, 1 female, Tancítaro–Apatzingán region, Michoacán, México, summer 1941; paratypes deposited in the Illinois Natural History Survey and the Academy of Natural Sciences of Philadelphia [now the Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania].

Cheumatopsyche pitella Denning 1968, 18–19, figs. 3–4; holotype male; 20 miles east of Villa Unión, Sinaloa, México, 31 January 1964, at light, M.E. Irwin; allotype female, same data as for holotype; paratypes 2 females, same data as for holotype; types deposited in the D.G. Denning Collection [now in the California Academy of Sciences, San Francisco, California]. NEW SYNONYM.

Plectropsyche pitella (Denning 1968); Gordon 1974, 143, transferred to *Plectropsyche*.

Diagnosis. *Plectropsyche hoogstraali* Ross is distinguished from the other species of the genus by the middle incision on the apical border of segment X being bordered by low lateral lobes, by the two rounded lateral warts of segment X that are visible in lateral view, and by the long, cylindrical apical segment of each inferior appendage in posteroventral view.

Adult Male: Length of each forewing 6–8 mm ($n = 12$). Color of pinned specimens fuscous, in alcohol brown without any marked pattern. Male genitalia: Abdominal segment IX in dorsal view produced into two widely divergent lobes, each bearing three or more long setae; in lateral view posterolateral margin produced into long, tapering truncate lobe, directed dorsocaudad, with row of long setae on each dorsal and ventral edge. Segment X in dorsal view composed of tapering, central lobe incised mesally to form pair of angulate points, flanked on each side by low lateral lobe and setose wart; in lateral view apex slightly truncate and sinuous, with two preapical, almost spherical, setose warts. Inferior appendages in posteroventral view nearly straight, each with basal segment with scoop-like basal portion, slightly narrowed beyond base and widened again near apex, bearing several long setae near apex; apical segment cylindrical, almost half length of basal segment. Phallus in dorsal view gradually constricted apically to narrow neck, apical region enlarged suddenly to form pair of scoop-like, membranous, apicolateral valves.

Adult Female: Length of forewing 5.8–8.0 mm ($n = 9$). Color in alcohol dark brown. Female genitalia: Ventral view of segment IX with complex, internal, membranous structures including vaginal opening at center with two or more rectangular plates, and pair of rounded bag-like structures situated anteriorly; lateral view of segment IX with rounded posterolateral lobe on each side overhanging receptacle for male inferior appendage. Ventral view of segment X with pair of lateral setose warts, each wart with pair of short, stout lobes underneath cluster of hair-like spines; in lateral view with three pairs of finger-like lobes setose basally, in dorsal aspect fused segment IX+X forming dorsal cap composed of two large plates bearing minute setae and divided in center, inferior appendage receptacles large, situated at midlength of segment.

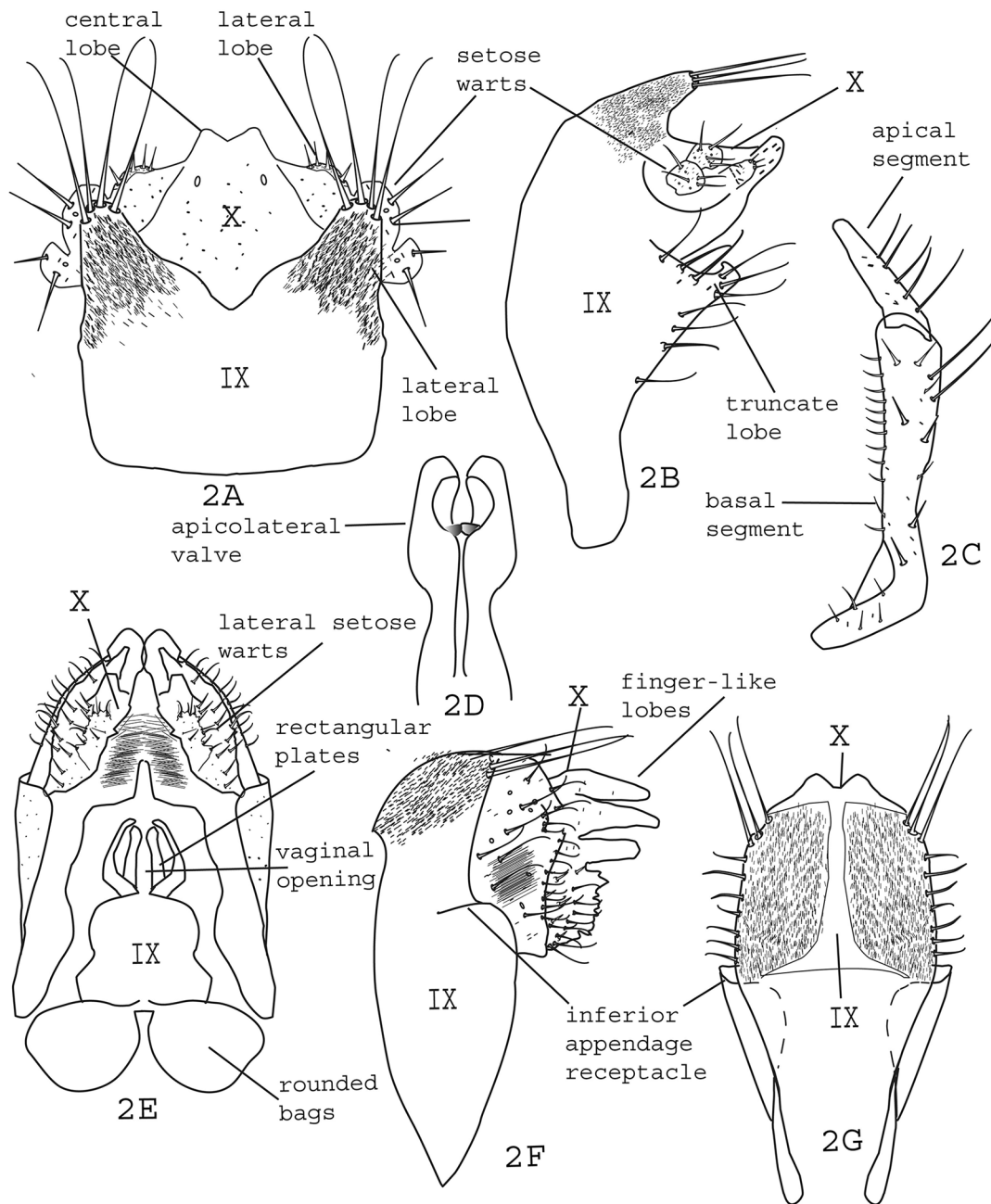


FIGURE 2. *Plectropsyche hoogstraali* Ross. male and female:genitalia. 2A–2D, male genitalia: 2A, abdominal segments IX and X, dorsal; 2B, segments IX and X, left lateral, without inferior appendages; 2C, right inferior appendage, posteroventral; 2D, apex of phallus, dorsal; 2E–2G, female genitalia, abdominal segments IX and X: 2E, ventral; 2F, left lateral; 2G, dorsal. Abbreviations: IX = abdominal segment IX; X = abdominal segment X. Material from MEXICO: Michoacán, 5 mi W of Apatzingán.

Material examined. MÉXICO: Chiapas: Arriaga, 22.viii.1965, P.J. Spangler, 3 males 4 females pinned, 4 males 3 females alcohol (NMNH); 4 km N Arriaga, 09.xii.1975, E. González, 3 males alcohol (CNIN-IBUNAM); Rt. 35, 4 km N Arriaga, 09.xii.1975, C.M. & O.S. Flint, Jr., 3 males 5 females pinned (NMNH); Tapachula, La Chinita, 20.iii.1985, F. Arias, M. Vértiz, 1 male #4389 pinned (CNIN-IBUNAM); Chintul, 06.iii.1988, R. Barba, E. Barrera, 1 male #4386, 1 female #4382 pinned (CNIN-IBUNAM); Frontera Hidalgo, 20.iii.1985, H. Velasco, 1 male pinned in glycerin (CNIN-IBUNAM); 7.8 Mi E., Pichucalco, 27–28.vii.1966, Flint, Ortiz, 1 female pinned (NMNH). **Estado de México:** Bejucos, 02.vii.1987, J. Padilla, 1 female #4339 pinned (CNIN-IBUNAM).

Guerrero: Zihuaquio, km 95, Coyuca de Catalán-Zihuatanejo, 24.vii.1985, F. Arias, R. Barba, 2 males #4553, #4600 pinned, 8 males alcohol (CNIN-IBUNAM); Ruta 130, Río Placeres del Oro, 22.xi.1984, H. Velasco, 1 female #4178 pinned (CNIN-IBUNAM); 6 km E Tixtla, 29.vii.1962, F. Pacheco, 2 females alcohol (NMNH). **Jalisco:** Chamela, Río Purificación, 19°31'34.30"N, 105°03'39.08"W, el. 31 m, 22.viii.1978, J. Bueno, S. Santiago, 1 male 1 female alcohol (CNIN-IBUNAM); Río Cuitzmala, 23.ii.1990, E. Ramírez, J. Villa, 1 male #4082 pinned (CNIN-IBUNAM); same, but 02.xii.1988, 4 males #4900, #4905, #4907, #4908 pinned (CNIN-IBUNAM); same, but 29.ix.1989, 1 male #4196 pinned (CNIN-IBUNAM); same, but 24.xi.1989, E. Ramírez, J. Villa, 4 males #4188, #4189, #4190, #4194 pinned (CNIN-IBUNAM); same, but 25.i.1989, J. Bueno, E. Ramírez, 1 male #4961, 1 female #4964 pinned (CNIN-IBUNAM); km 84, Rta. Barra de Navidad-Puerto Vallarta, Río San Nicolás, 09.viii.1991, E. Ramírez, 1 male #4976 1 female #4989 pinned (CNIN-IBUNAM); same, but 6.x.1989, 1 male #4199 pinned (CNIN-IBUNAM). **Michoacán:** 5 mi W of Apatzingán, 19°06'17.54"N, 102°20'19.58"W, 13.viii.1941, elev.1200 ft, H. Hoogstraal, 6 males, 1 female paratype, alcohol (ANSP); Aguililla, 31.vii.1985, R. Barba, 1 male #4176 pinned (CNIN-IBUNAM); Caleta de Campo, 27.vii.1985, F. Arias, R. Barba, 1 female #4221 pinned, 1 male alcohol (CNIN-IBUNAM); Pedernales, Arroyo Frío, 17.ix.1987, E. Barrera, 1 male #4618 pinned (CNIN-IBUNAM); Pedernales, El Salitre, 19.x.1987, R. Barba, E. Barrera, 1 male #4555 pinned (CNIN-IBUNAM). **Nayarit:** Río Santiago, Colorado de la Mora, 28.xi.1991, R. Barba, 2 males #4215, #4517 pinned (CNIN-IBUNAM); same but 22.v.1991, R. Barba, E. Barrera, 1 male #4045 pinned, 75 males 13 females alcohol (CNIN-IBUNAM); same, but 20–23.v.1991, 2 males #4699, #4700, 2 females #4214, #4711 pinned (CNIN-IBUNAM); Río Huaynamota, Los Sabinos, 23.v.1991, R. Barba, E. Barrera, 3 males 2 females alcohol (CNIN-IBUNAM); Río Santiago, Paso de Bueyes, elev. 220 m, 29.xi.1989, A. Cadena, 3 males #4208, #4209, #4210 pinned (CNIN-IBUNAM); Jesús María, 25.iv.1955, B. Malkin, 3 males 8 females alcohol (CAS); Arroyo Santiago, 3 mi NW Jesús María, 04–06.vii.1958, Borys Malkin, 37 males alcohol (CAS). **Oaxaca:** Uxpanapa, 27.ix.1977, J. Bueno, 1 male pinned in glycerin (CNIN-IBUNAM); Totoltepec, 30.v.1987, L. Cervantes, 1 male alcohol (CNIN-IBUNAM); Putla, Río Las Peñas, 3.iii.1986, E. Barrera, E. Mariño, 1 male pinned, 2 males alcohol (CNIN-IBUNAM); Valle Nacional, Arroyo Blanco, 10–13.iii.1989, R. Barba, A. Cadena, 2 males pinned in glycerin, 3 males 1 female #4423 pinned (CNIN-IBUNAM); km 3 camino Mixtequilla-El Tablón, 24.iii.1990, elev. 140 m, E. Barrera, A. Cadena, 1 female #4355 pinned (CNIN-IBUNAM); Teotilapan, Río Santo Domingo, 07.iii.1989, elev.100 m, R. Barba, A. Cadena, 1 male #4430 pinned (CNIN-IBUNAM); Río Valle Nacional, Chiltepec, 25.v.1981, C.M. & O.S. Flint, Jr. 1 male 5 females pinned (NMNH); Km 11, Carr. Cuicatlán-Quioitepec 12.vii.1996, elev. 610 m, R. Barba, A. Rojas, 1 female #4204 pinned (CNIN-IBUNAM). **Puebla:** Teotitlán, Río Xiquila, 05.xi.1988, R. Barba, 1 female #4329 pinned (CNIN-IBUNAM); Patla, 20°14'50.06"N, 097°51'6.87"W, 16.iv.1976, J. Bueno, 1 male alcohol (CNIN-IBUNAM); 30 km N of Xicotepec de Juárez, 24.iii.1977, J. Bueno, 1 male pinned in glycerin (CNIN-IBUNAM). **San Luis Potosí:** Rancho el Quemado, Rt. 85, km 353, 04–06.viii.1966, O.S. Flint, Jr., 2 males 1 female pinned, 1 male 1 female alcohol (NMNH); Ciudad Valles, Río Micos, 21°58'28"N, 099°00'59"W, 07.iv.1978, J. Figueroa, 1 male alcohol (NMNH); El Salto, 22°21'45"N, 099°15'56"W, 23–24.vi.1965, O.S. Flint, Jr., 1 female pinned (NMNH); same, but 08.viii.1966, 1 male alcohol (NMNH); same, but 03.vi.1967, 6 females pinned (NMNH); 19 mi N of Tamazunchale, 19.ix.1972, W. Hanson, Poff, 1 male alcohol (CAS). **Tabasco:** Río Puyacatengo, E. Teapa, 28–29.vii.1966, Flint, Ortiz, 8 males 5 females pinned, 19 males 16 females alcohol (NMNH); Río Puyacatengo, Grutas de Cocona, 07.iii.1988, R. Barba, 1 male #4177 pinned in glycerin (CNIN-IBUNAM). **Tamaulipas:** Rta. 85, Río Guayalejo, 25.x.1985, R. Barba, E. Mejorada, 6 males #4983, #4984, #4985, #4986, #4987, #4988 pinned (CNIN-IBUNAM); Río Corona, 18 mi N. Ciudad Victoria, 13.iii.1982, J.E. Gillaspay, 4 females alcohol, (NMNH). **Veracruz:** Chicontepec, 28°58'8.73"N, 098°10'27.92"W, 14.iv.1975, elev. 1848 ft, J. Bueno, 1 male pinned in glycerin, 5 males alcohol (CNIN-IBUNAM); Río Tecolapan, Rt. 180 Km 551, 25–26.vii.1966, Flint, Ortiz, 9 females pinned, 3 males 7 females alcohol (NMNH); Cuitlahuac, 03.vii.1965, P.J. Spangler, 1 female pinned (NMNH); Puente Nacional, 23–24.vii.1965, Flint, Ortiz, 1 male 2 females pinned (NMNH); same, but 31.vii.1966, 1 female pinned (NMNH). **GUATEMALA: Dept. Baja Verapaz:** Rt. 5, km 156, Pte. Las Burras, 22–24.vi.1966, Flint, Ortiz, 2 females pinned (NMNH); 46.5 km NE Guatemala City, Hwy CA9, on Río Plátanos, 14°48'N, 90°15'W, 29.v.1973, elev. 750 m, Erwin, Hevel Central American Expedition, 1973, 1 male pinned (NMNH). **Dept. Zacapa:** Río Tuculátán, 18.viii.1965, Flint, Ortiz, 1 female pinned (NMNH). **Dept. Alta Verapaz:** Río Cahabon, Chibite, 03.i.1989, B.C. Kondratieff, 8 males, 57 females alcohol (NMNH). **HONDURAS: [Dept Valle]:** Nacaome, 04.viii.1967, O.S. Flint, Jr., 3 males 5 females pinned, 1 male 4 females alcohol (NMNH); 5 mi W Jícaro Galán Jct., 09.vii.1965, P. J. Spangler, 6 females pinned,

1 male 3 female alcohol (NMNH). [**Dept. Comayagua**]: Río Humuya, NW. Comayagua, 03.viii.1967, O.S. Flint, Jr., 3 males 10 females pinned, 15 males 16 females alcohol (NMNH); Rancho Chiquito, SE. Flores, 02–03.viii.1967, O.S. Flint, Jr., 3 females pinned (NMNH). [**Dept. Choluteca**]: Pespire, 01.viii.1967, O.S. Flint, Jr., 1 male 14 females alcohol (NMNH); 5 mi E Choluteca, 26.vii.1965, P.J. Spangler, 4 females alcohol (NMNH). [**Francisco Morazán**]: El Zamorano, 16.iv.1966, G.F. Freytag, 1 male 5 females alcohol (NMNH); same, but 28–29.i.1966, 1 male 19 females alcohol (NMNH). **Dept. Copán**: Sesesmil/Quebrada, 5 km N Copan, 15.vii.1989, D.L. Lentz, 7 males 2 females alcohol (NMNH). **Dept. Santa Bárbara**: Casas Viejas, 250', 20.v.1966, J.M. Matta, 5 males 5 females alcohol (NMNH). **NICARAGUA**: [**Región Autonomista Atlántico Norte**]: Musawas, Wasque [=Waspuk] R., ??x.1955, Boris Malkin, 30 males 2 females alcohol (CAS); same, but Aug? 1950, 2 males with 3 male abdomens in vial of alcohol (CAS). **Dept. Estelí**: Ducuali, 13.vi.1967, Flint, Ortiz, 2 males 4 females pinned, 1 male 1 female alcohol (NMNH). [**Dept. Jinotega**]: El Coyolar, 50 km NE Saslaya, 13°44'N; 85°01'W, ??iv.1996, elev. 700 m, J.M. Maes, J. Hernández, 4 males alcohol (NMNH). [**Dept. Chontales**]: Pte. Quinama, E Villa Somoza, 29.vii.1967, O.S. Flint, Jr., 5 males 6 females pinned, 1 male 3 females alcohol (NMNH). [**Dept. Nueva Segovia**]: Ocotol, Río Coco, 31.vii.1967, O.S. Flint, Jr., 1 male 1 female pinned (NMNH).

Distribution. México (Chis., Edo. de Mex., Gro., Jal., Mich., Nay., Oax., Pue., S.L.P., Sin., Tamps., Ver.), Guatemala, Honduras, Nicaragua.

Plectropsyche velascoi, n. sp.

Figs. 3, 5

Diagnosis. *Plectropsyche velascoi* n. sp. can be separated from the other species of the genus by the two short, horn-like, lateral lobes on segment X as seen in dorsal view; by the elliptical, lateral, setose warts of segment X in lateral view; by the short apical segment of each inferior appendage in posteroventral view; and by the rectangular, apicolateral valves of the phallus in dorsal view. Some of the material here studied was taken from the paratype series of *Plectropsyche hoogstraali* Ross, deposited in the Entomological Collection of the Academy of Natural Sciences of Philadelphia (ANSP, now Academy of Natural Sciences of Drexel University).

Adult male. Length of each forewing 4.5–6 mm (n = 8). Color of pinned specimens stramineous, in alcohol light brown, without any marked color pattern. Male genitalia: Abdominal segment IX in dorsal view produced into two widely divergent lobes, each bearing three or more long setae; in lateral view posterior margin produced into long truncate lobe, dorsally tapering with row of long setae. Segment X in dorsal view with apical margin slightly concave at center, flanked on each corner by horn-like lateral lobe and setose wart; in lateral view acuminate with apex rounded and with ellipsoidal, setose wart. Inferior appendages in posteroventral view each having basal segment nearly straight, with scoop-like basal portion, slightly narrowed beyond base and widened again near apex, with several long setae near apex; apical segment cylindrical, less than one-half length of basal segment. Phallus in dorsal view gradually constricted apically to narrow neck, apical region suddenly enlarged to form pair of rectangular, apicolateral valves with straight inner margins.

Adult female: Length of each forewing 4–7 mm (n = 8). Color in alcohol light brown. Female genitalia: In ventral view having segments IX with complex, internal, membranous structures with vaginal opening at center, with two or more rectangular plates and with pair of rounded bag-like structures situated basally; segment X with pair of lateral, setose warts, each wart with pair of stout finger-like lobes underneath cluster of hair-like spines; in lateral view with three pairs of finger-like lobes setose basally, in dorsal aspect fused segment IX+X with dorsal cap covered by two large plates bearing minute setae divided in center; inferior appendage receptacles large, situated at midlength of segment.

Holotype male: **MÉXICO: Morelos**: San Rafael Vicente Aranda, 15 km SE Tehuixtla, 27.viii.1982, H. Velasco, #4130 pinned (CNIN-IBUNAM).

Paratypes: **MÉXICO: Estado de México**: Bejucos, 02.vii.1987, J. Padilla, 2 males #4659, #4687, 1 female #4657 pinned (CNIN-IBUNAM). **Guerrero**: Ciudad Altamirano, 07.vi.1984, J. Bueno, E. Barrera, 2 males #4541, #4542 pinned (CNIN-IBUNAM); Zihuaquio, km 95 Route Coyuca-Zihuatanejo, 24.viii.1985, R. Barba, F. Arias, 1 male #4044 pinned, 4 males alcohol (CNIN-IBUNAM); same, but, 28.vii.1985, 1 male 1 female alcohol (CNIN-IBUNAM); Presa El Caracol a 70 km de Teloloapan, 21.x.1988, J. Bueno, 4 males #4360, #4365, #4366, #4608, 1 female #4361 pinned (CNIN-IBUNAM); Totoapa, 8 km SO Ahuehuepan, Rta. 51, 24.vi.1995, R. Barba, D. Ocaña,

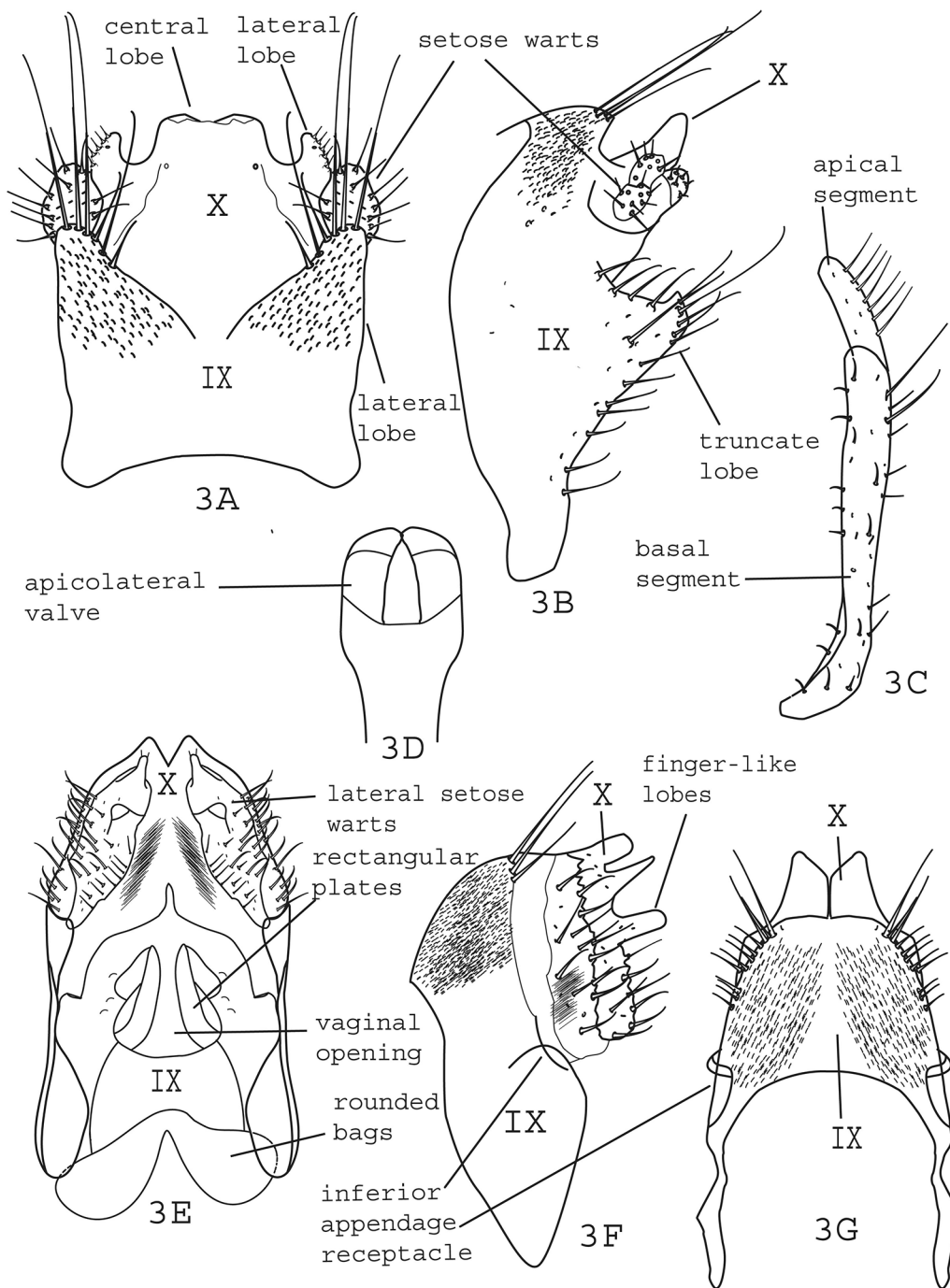


FIGURE 3. *Plectropsyche velascoi* n. sp., male and female genitalia. 3A–D, male genitalia: 3A, segments IX and X, dorsal; 3B, segments IX and X, left lateral, without inferior appendages; 3C, right inferior appendage, posteroventral; 3D, phallus, apical region, dorsal. 3E–G, female genitalia: 3E, ventral; 3F, left lateral; 3G, dorsal. Abbreviations: IX = abdominal segment IX; X = abdominal segment X. Material from MEXICO: Morelos, Vicente Aranda.

A. Ocampo, 1 male #4201 pinned (CNIN-IBUNAM). **Michoacán:** 5 mi W of Apatzingán, 13.viii.1941, H. Hoogstraal, 1 male pinned in glycerin, 5 males alcohol (ANSP). **Morelos:** San Rafael Vicente Aranda, 15 km SE Tehuixtla, 27.viii.1982, H. Velasco, 2 males #4134, #4146 pinned (CNIN-IBUNAM); same, but 31.vii.1982, 1 male #4688 pinned (CNIN-IBUNAM); same, but 18.xi.1982, 1 male #4109 pinned (CNIN-IBUNAM); same, but

17.ix.1982, 11 males 1 female alcohol (CNIN-IBUNAM); same, but 26.iii.1982, 63 males alcohol (CNIN-IBUNAM); same, but 16.iv.1982, 1 male #4180 pinned (CNIN-IBUNAM); same, but 01.v.1982, 2 males alcohol (CNIN-IBUNAM); same, but 27.viii.1982, 1 female pinned (CNIN-IBUNAM); same, but 13.vii.1982, 2 females #4660, #4661 pinned, 3 males alcohol (CNIN-IBUNAM); Balneario Tehuixtla, 13.iv.1978, H. Brailovsky, 1 male alcohol (CNIN-IBUNAM); 2.5 km NO of Cuautla, Estación CEAMISH TL3, 10°27'67"N, 099°02'47.5"W, elev. 940 m, 11.vii.1996, E. González, 2 males (CNIN-IBUNAM); same, but, 17.xi.1995, E. González, S. Zaragoza, 1 male 1 female alcohol (CNIN-IBUNAM); Jojutla, Balneario Las Huertas, 23.vi.1985, R. Sánchez, 1 male pinned in glycerin (CNIN-IBUNAM); same, but 28.vi.1987, 2 males alcohol (CNIN-IBUNAM); near Xochitepec, Rt. 95, km 91, 01.viii.1965, O.S. Flint, Jr., 2 males, 33 females pinned (NMNH); Xochitepec, 12–14.vii.1965, Flint, Jr., 1 male 1 female pinned (NMNH); Acatilpa, 16.vii.1965, Flint, Ortiz, 1 male pinned (NMNH); Alpuyecá, Mpio. de Xochitepec, 17°39'53"N, 098°30'39"W, elev. 1074 m, 14.vi.2006, H. Brailovsky, L. Cervantes, 7 males 33 females alcohol (CNIN-IBUNAM). **Nuevo León:** Mpio. Bustamante, Ojo de Agua, 13.xi.1985, elev. 410 m, R. Benavides, 2 males pinned in glycerin, 2 males alcohol (CNIN-IBUNAM). **Oaxaca:** km 11, carr. Cuicatlán-Sgo. Quiotepec, elev. 610 m, 12.vii.1996, R. Barba, A. Rojas, 1 male #4202, 1 female #4204 pinned (CNIN-IBUNAM).

Etymology. The specific epithet is in honor of Biól. Héctor Velasco-Madrigal, who collected most of the material here studied during his research for his Bachelor degree thesis in Morelos State, México.

Distribution. México (N.L., Mor., Edo. De Méx., Mich., Gro., Oax.).

Plectropsyche wallacei, n. sp.

Figs. 4, 5

Diagnosis. *Plectropsyche wallacei* n. sp. can be separated from the other species of the genus by the cone-shaped apical segment of each inferior appendage in posteroventral view, by the elongate shape of the setose warts of segment X in lateral view, and by the long truncate posterolateral lobe on each side of segment IX tapering dorsally in lateral view (Fig. 4).

Adult male. Length of each forewing 6–7 mm (n = 8). Color of pinned specimen light brown, without any marked pattern. Male genitalia: Abdominal segment IX in dorsal view produced into two widely separated lobes, each bearing three or more long setae; in lateral view posterolateral margin produced into truncate lobe tapering dorsally, with row of long setae. Segment X in dorsal view with posterior margin slightly concave at center, flanked on each side by large, spinose lobe, each with lateral, setose wart; in lateral view slightly produced posterad with preapical, elongate setose wart and short, setose lobe apically. Inferior appendages in posteroventral view nearly straight, each basal segment with scoop-like basal portion, slightly narrowed beyond base and widened again near apex, bearing several long setae near apex; apical segment tapering to apex, less than one-half length of basal segment. Phallus in dorsal view gradually constricted apically to narrow neck, beyond which apical region enlarged suddenly to form pair of separated, scoop-like apicolateral valves.

Adult female. Length of each forewing 6–7 mm (n = 5). Color in alcohol light brown. Female genitalia in ventral view with segment IX+X with complex internal membranous structures with vaginal opening at center and with two or more rectangular plates and with pair of rounded bag-like structures situated basally; segment X with pair of lateral, setose warts, each wart with pair of finger-like lobes underneath cluster of hair-like spines; in lateral view with three pairs of finger-like lobes setose basally, in dorsal aspect fused segment IX+X with dorsal cap covered by two large plates bearing minute setae not divided in center, inferior appendage receptacles large, situated at midlength of segment

Holotype male: **COSTA RICA: Limón:** Río Barbilla, ca. 8 km W B-Line, 10.067°N, 83.369°W, 31.i.1986, elev. 30 m, Holzenthal, Morse, Fasth (UMSP).

Paratypes: **COSTA RICA: Limón:** Same data as holotype, 2 females pinned, 1 male 4 females alcohol (UMSP); Río Banano, 16 km WSW Bomba, 09.888°N, 083.167°W, 26.iii.1987, elev. 150 m, Holzenthal, Hamilton, Heyn, 1 male 1 female pinned (UMSP); Río Uatsi, ca. 8 km (air) W Bribri, 09.62°N, 082.90°W, 25.iii.1987, elev. 60 m, Holzenthal, Hamilton, Heyn, 1 male 1 female pinned, 1 male 5 females alcohol (UMSP); Río Telire and small trib., SE Suretka, 09.554°N, 082.892°W, 01.ii.1986, elev. 48 m, Holzenthal, Morse, Fasth, 1 female pinned, 2 females alcohol (UMSP); E.A.R.T.H., Río Destierro, Pozo Azul, 10.208°N, 083.574°W, 27.vi.1992, elev. 15 m, Fdo. Muñoz, 1 male 3 females pinned (UMSP); E.A.R.T.H., Río Dos Novillos, 10.220°N, 083.591°W, 03.ii.1992,

elev. 20 m, Holzenthal, Muñoz, Kjer, 2 females pinned (UMSP); same, but 26.vi.1992, elev. 20 m, Fdo. Muñoz, 1 female pinned (UMSP); E.A.R.T.H., Río Parismina, 10.248°N, 083.570°W, 04.ii.1992, elev. 5 m, Holzenthal, Muñoz, Kjer, 1 female pinned (UMSP); Reserva Biol. Hitoy-Cerere, Río Cerere, 09.671°N, 083.028°W, 23–24.iii.1987, elev. 90 m, Holzenthal, Hamilton, Heyn, 1 male pinned, 2 males 1 female alcohol (UMSP); same, but, ?? .xii.1990, F. Muñoz, 1 male alcohol (UMSP). **Guanacaste:** Las Canas, Río Coribici, 26.viii.1967, O.S. Flint Jr., 21 males 25 females pinned, 26 males 6 females alcohol (NMNH); Río La Vieja nr. Lagarto, 02–03.vii.1967, Flint, Ortiz, 12 males 11 females pinned, 2 males 1 female alcohol (NMNH); Hacienda Tempisquito (Pelón de la Altura), 1 km NE km 265 Rt.1, 10.84°N, 085.56°W, 18.vii.1987, elev. 100 m, Holzenthal, Morse, Clausen, 2 males 1 female pinned, 1 male 4 females alcohol (UMSP); Río Tizate, 7.2 km NE Canas Dulces, 10.773°N, 085.449°W, 28.vi.1986, elev. 275 m, Holzenthal, Heyn, Armitage, 15 males 64 females alcohol (UMSP); Río Mena, 4.2 km W Santa Cecilia, 11.059°N, 085.448°W, 11.iii.1986, elev. 260 m, Holzenthal, Fasth, 2 males pinned, 5 males 5 females alcohol (UMSP); Parque Nacional Guanacaste, Maritza, Río Tempisquito, 10.958°N, 085.497°W, 17–18.vi.1988, elev. 550 m, C.M. & O.S. Flint, Holzenthal, 11 females pinned (NMNH); same, but 19–20.vii.1987, Holzenthal, Morse, Clausen, 1 female pinned. (UMSP); Río Tempisquito, ca. 3 km S Route 1, 10.790°N, 085.552°W, 06.iii.1986, elev. 75 m, Holzenthal, Fasth, 1 male 2 females pinned, 5 males 5 females alcohol (UMSP); Parque Nacional Guanacaste, El Hacha, Queb. Pedregal, 10.983°N, 085.539°W, 27.vii.1987, elev. 300 m, Holzenthal, Morse, Clausen, 1 male 1 female pinned (UMSP); Parque Nacional Santa Rosa, Río Cuajiniquil, 10.881°N, 85.613°W, 25.vii.1987, elev. 250 m, Holzenthal, Morse, Clausen, 1 female pinned (UMSP). **Heredia:** Río Bijagual on road to Magsasay, 10.408°N, 084.076°W, 12.ii.1986, elev. 140 m, Holzenthal, Morse, Fasth, 2 males 2 females pinned, 13 males 47 females alcohol (UMSP); Río Bijagual, 3.5 km S Chilamata, 10.436°N, 084.060°W, 1.vii.1992, elev. 40 m, Fdo. Muñoz, 2 males pinned (UMSP); Quebrada Ceiba, 6 km E Cháves, 10.382°N, 083.922°W, 02.vii.1992, elev. 50 m, Fdo. Muñoz, 1 male 2 females pinned (UMSP); Río Sarapiquí, 300 m S Chilamata, 10.451°N, 084.064°W, 30.vi.1992, elev. 40 m, Fdo. Muñoz, 6 females pinned (UMSP); Río Sarapiquí, 7 km W Puerto Viejo, 10.452°N, 084.067°W, 11.ii.1986, elev. 50 m, Morse, Fasth, 1 female pinned, 9 males 240 females alcohol (UMSP); P.N. Braulio Carrillo, Est. Magsasay, Río Peje, 10.402°N, 084.050°W, 25–26.viii.1990, elev. 130 m, Holzenthal, Blahnik, Huisman, 2 females pinned, 2 males 28 females alcohol (UMSP); Est. Biol. La Selva, Quebrada Sura, 10.439°N, 084.010°W, 20–21.vi.1986, elev. 50 m, Holzenthal, Heyn, Armitage, 2 females pinned, 5 females alcohol (UMSP); Est. Biol. La Selva, Río Puerto Viejo, 10.440°N, 084.012°W, 10.ix.1986, elev. 30 m, Chavarria, 1 male pinned (UMSP); same, but 19.vi.1986, Holzenthal, Heyn, Armitage, 15 females alcohol (UMSP); La Selva Field Sta., near Puerto Viejo, 21–28.iii.1988, W.E. Steiner, J.M. Hill, J.M. Swearingen, J. M. Mitchell, 13 females pinned (NMNH); 10 mi NW Liberia, 25.vii.1965, P.J. Spangler, 1 male 6 females pinned, 3 females alcohol (NMNH). **Puntarenas:** Pacuare, Río General, 1.vii.1967, Flint, Ortiz, 1 male 1 female pinned (NMNH); same, but P.J. Spangler, 1 female alcohol (NMNH); Reserva Biológica Carara, Quebrada Bonita, 09.775°N, 084.605°W, 11.iii.1991, elev. 35 m, Holzenthal, Muñoz, Huisman, 1 male pinned (UMSP); Río Ceibo, Route 2, ca. 6 km W road to Buenos Aires, 09.149°N, 083.577°W, 20.ii.1986, elev. 250 m, Holzenthal, Morse, Fasth, 1 male 1 female pinned, 10 females alcohol (UMSP). **San José:** Res. Biól. Carara, Río Carara in Carara, 09.778°N, 084.531°W, 14.iii.1991, elev. 200 m, Holzenthal, Muñoz, Huisman, (voucher specimen) PLI-Kjer DNA, 1 male 2 females pinned (UMSP); Res. Biol. Carara, Río del Sur, 1.5 km (rd.) S of Carara, 09.769°N, 084.531°W, 13.iii.1991, elev. 160 m, Holzenthal, Muñoz, Huisman, 2 females alcohol (UMSP). **PANAMA: Veraguas:** Río Jorones, 05.vi.1983, P.J. Spangler, R.A. Faitoute, W.E. Steiner, 3 males 1 female alcohol (NMNH). **Cocle:** El Valle, 25.v.1983, elev. 829 m, P.J. Spangler, R.A. Faitoute, W.E. Steiner, 1 male pinned (NMNH). **Canal Zone:** Gamboa, Pipeline Rd., ?? .vii.1967, W.W. Wirth, 1 male alcohol (NMNH); Río Agua Salud, 30.iii.1965, S.S. & W.D. Duckworth, 3 males 1 female pinned, 4 males 6 females alcohol (NMNH); same, but 08–12.vii.1967, Flint, Ortiz, 21 females pinned, 2 females alcohol (NMNH). **Chiriquí:** David (3 km N), Río Majagua at Balneario Majagua, 31.v.1983, P.J. Spangler, R.A. Faitoute, W.R. Steiner, 2 males 15 females pinned (NMNH). **San Blas:** Río Carti Grande near coast, 02.iii.1985, Flint & Louton, 4 females pinned (NMNH); Río Canita near Canita, 24.ii.1985, Flint & Louton, 17 females pinned (NMNH).

Etymology. The specific epithet is in honor of Alfred Russell Wallace, for his great contributions to the theories of evolution and biogeography.

Distribution. Costa Rica, Panamá.

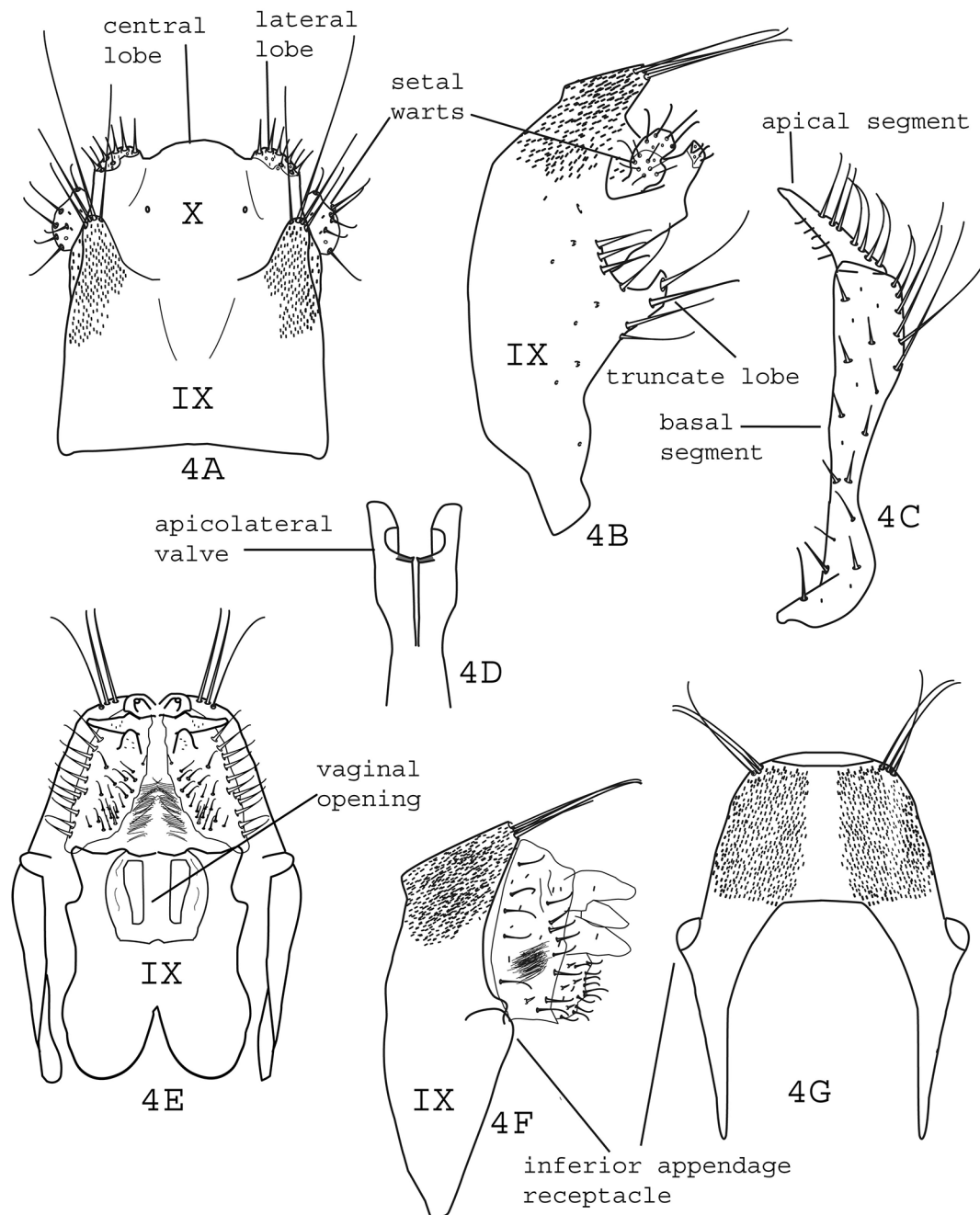


FIGURE 4. *Plectopsyche wallacei* n. sp., male and female genitalia. 4A–D, male genitalia: 4A, segments IX and X, dorsal; 4B, segments IX and X, left lateral, without inferior appendages; 4C, right inferior appendage, posteroventral; 4D, phallus, apical region, dorsal. 4E–G, female genitalia: 4E, ventral; 4F, left lateral; 4G, dorsal. Abbreviations: IX = abdominal segment IX; X = abdominal segment X. Material from COSTA RICA: Limón, Río Barbilla.

***Plectopsyche* †*alvarezii* Wichard, Solórzano-Kraemer & Luer 2006**

Fig. 5

Plectopsyche †*alvarezii* Wichard, Solórzano-Kraemer & Luer, 2006, pp. 41–42, figs. 3–4; holotype male; **MÉXICO**: Chiapas, Miocene Mexican amber; Collection No IHNFA 014; deposited in the Instituto de Historia Natural y Ecología, Museum of Paleontology, Tuxtla Gutiérrez, Chiapas, México.

This fossil species was described from the amber of Simojovel de Allende, Chiapas, México by Wichard, et al. (2006). It reinforces the likelihood of a Centroamerican origin of this genus in the Neotropical region.

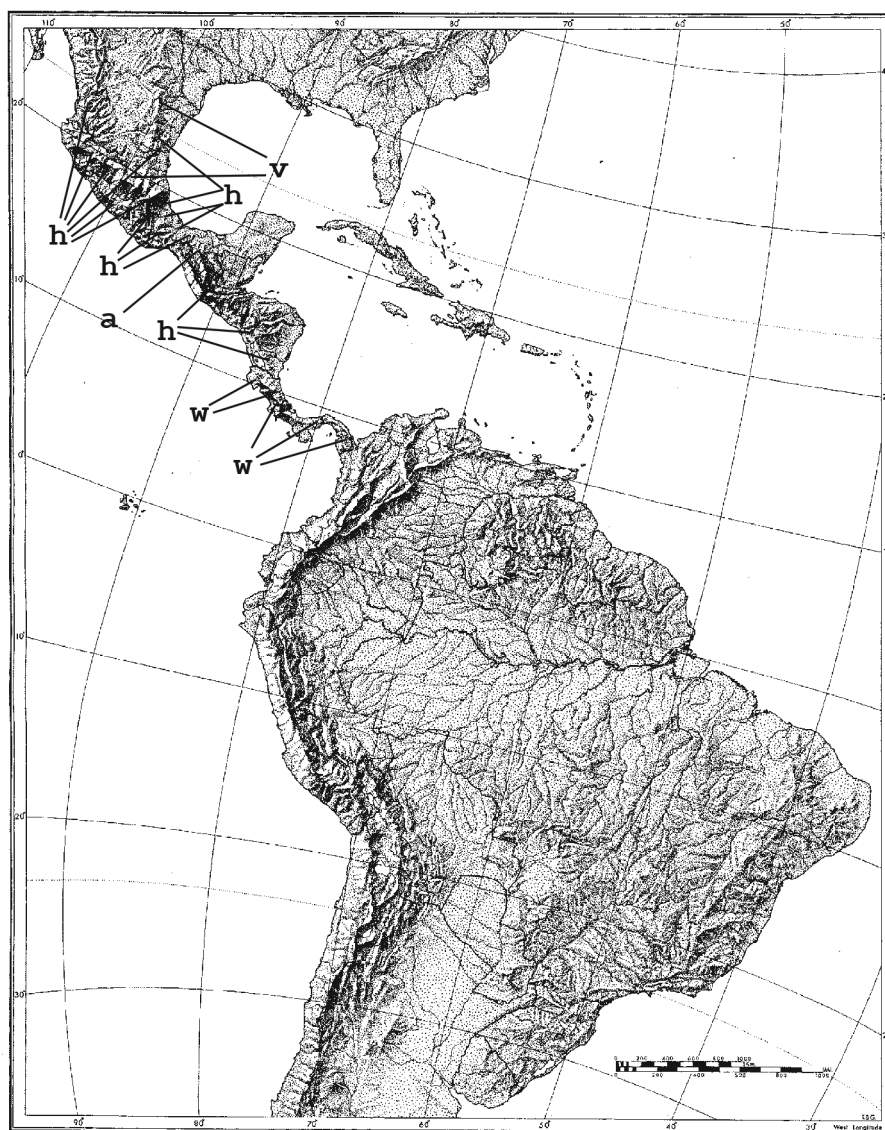


FIGURE 5. Distribution of *Plectropsyche* spp. h = *Plectropsyche hoogstraali* Ross; a = *P. alvarezii* Wichard, Solórzano-Kraemer & Luer; v = *P. velascoi*, new species; w = *P. wallacei*, new species.

Key for the males of extant species of the genus *Plectropsyche* Ross

- 1 Apicolateral lobes of segment X low (Figs. 2A, 2C, 4A, 4C) 2
- 1' Apicolateral lobes of segment X produced posterad, horn-like (Fig. 3A) *Plectropsyche velascoi* n. sp.
- 2 Apical segment of each inferior appendage long and cylindrical (Fig. 2C) *Plectropsyche hoogstraali* Ross.
- 2' Apical segment of each inferior appendage tapering to apex (Fig. 4C) *Plectropsyche wallacei* n. sp.

Distribution. The distribution of the genus *Plectropsyche* in the Neotropical Realm is widespread from the northcentral part of México through Panama in Central America. The species *Plectropsyche hoogstraali* Ross (fig. 5) has a wide distribution in the Mexican Republic, appearing in both the Sierra Madre Oriental and Sierra Madre Occidental (fig. 5). It is collected in flowing waters, from spring brooks to large lowland rivers such as the Tamazunchale River in the tropical rainforest of San Luis Potosí State. The species *Plectropsyche velascoi* n. sp. is restricted mainly to the central part of the Mexican Republic (fig. 5) between Morelos and Guerrero States in the Biotic Province, Sierra Madre del Sur (SMS), (Espinosa-Organista et al. 2000) with some records as far north as

southern Nuevo Leon State in the northeastern Mexican Republic. The fossil species †*Plectropsyche alvarezi* from the Mexican amber of Simojovel de Allende, Chiapas (Wichard et al. 2006), is the third species, found in the southern Mexican Republic. Finally the distribution of *Plectropsyche wallacei* n. sp. appears to be restricted to Central America between Costa Rica and Panamá (fig. 5).

Acknowledgements

We express our gratitude to Dr. Oliver S. Flint, Jr. (NMNH), Mr. Vincent Lee (CAS), Mr. Jason Weintraub (ANSP), and Dr. Ralph Holzenthal (UMSP) for their kind support with biological material; to Dr. Flint for his helpful comments on the manuscript; and to the reviewers Dr. John C. Morse and Dr. Wilfred Wichard for the time and effort they spent to improve the manuscript.

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