

**NEW SPECIES AND RECORDS OF COSTA RICAN *AUSTROTINODES*
(TRICHOPTERA: ECNOMIDAE)**

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Abstract. — Two new species of *Austrotinodes* (Trichoptera: Ecnomidae) from Costa Rica are described and illustrated: *A. doublesi* and *A. inbio*. In addition, *A. contubernalis* Flint and Denning and *A. panamensis* Flint are illustrated and recorded from Costa Rica for the first time. *Austrotinodes sedmani* Flint is illustrated and new distribution records in Costa Rica are documented. Finally, a key to the males of Costa Rican *Austrotinodes* is presented.

Resumen. — Dos nuevas especies de *Austrotinodes* (Trichoptera: Ecnomidae) de Costa Rica se ilustran y describen: *A. doublesi* y *A. inbio*. Además, se ilustran y reportan por primera vez para Costa Rica *A. contubernalis* Flint y Denning y *A. panamensis* Flint. Se ilustra y documenta un nuevo reporte de distribución en Costa Rica de *A. sedmani* Flint. Finalmente, se presenta una clave para la identificación de los machos de las especies de *Austrotinodes* de Costa Rica.

Key Words: Trichoptera, *Austrotinodes*, new species, Costa Rica

Schmid (1955) established the genus *Austrotinodes* for two species from Chile. Flint (1973) presented a review of the genus and descriptions of four new species, three of them from Mexico and Central America. In 1989, Flint and Denning reexamined the genus and presented a list of the known species. They described fourteen new species, and presented new records, including *A. sedmani* Flint as the first record of the genus for Costa Rica. Collections made in Costa Rica from 1986 through 1992 by Holzenthal and his colleagues resulted in new distribution records for Costa Rica, as well as two new species. In this paper, we describe these two species, present the new distribution records for Costa Rica, and provide

a key for the species of Costa Rican *Austrotinodes*. Terminology used for genitalic structures follows that presented by Flint and Denning (1989). This paper represents the results of an ongoing project, sponsored by the National Science Foundation, the University of Minnesota Insect Collection, and the Instituto Nacional de Biodiversidad (INBio) of Costa Rica, to discover and describe the caddisfly fauna of Costa Rica. Types of species described and other specimens examined are deposited in the collections of the University of Minnesota Insect Collection, St. Paul, Minnesota (UMSP), Instituto Nacional de Biodiversidad, Costa Rica (INBio) and the National Museum of Natural History, Smithsonian

Institution, Washington, D.C. (NMNH). All specimens are pinned unless otherwise noted.

Austrotinodes doublesi
Muñoz and Holzenthal,
 NEW SPECIES

Fig. 1

Diagnosis.—This new species can be distinguished from all other species of the genus by the unusual shape and large size of the phallic guide. Also, the intermediate appendage is long and simple with a single apical seta and the shape of lobe “a” of the inferior appendage is enlarged and is rounded basally and thin apically.

Description.—*Male*: Forewing length 4 mm. Body sclerites generally pale brown, dorsum of head with light setae. Thorax dark brown dorsally, pale brown ventrally. Leg segments with brown setae. Forewings covered with fine, brown setae and with small scattered patches of lighter brown setae, principally along the costal margin. *Genitalia* (Fig. 1): Segment IX deeply divided, sternum elongated; in lateral view, very narrow basally, enlarging apically, ventral margin slightly convex; in ventral view, apical margin convex. Phallic guide very heavily sclerotized, large, elevated and arched over inferior appendages, apex sharply pointed, in lateral view, reaching middle of lobe “b” of inferior appendage. Inferior appendages attached subapicomeresally on sternum IX, reduced, fused mesally; in ventral view, posterior margin with mesal emargination; in lateral view, lobe “a” rounded basally and lobe “b” slightly elevated and rounded, darkened. Tergum X divided into pair of semimembranous oval lobes, in lateral view, each part with dorsum convex, posterior margin with weak mesal emargination, bearing slender setae along inner margin. Preanal appendage long, broad, parallel-sided, apex broadly rounded, margins crenulated, surface setose. Intermediate appendage long, approximately length of preanal

appendage, slender, simple, slightly curved, bearing an enlarged apical rugose seta. Phallus with sclerotized base and membranous apical region; lateral process of phallus long, slender, enlarging to rounded apex, subapically with an enlarged curved seta; apical region with few short setae and slender, slightly darkened membranous apical lobe, bearing an enlarged rugose seta.

Type material.—*Holotype*: Male, Costa Rica: Parque Nacional Guanacaste, Estación Pitilla, Río Orosí, 10.991°N, 85.428°W, 700 m, 19–20.vi.1988, C. M. & O. S. Flint, Holzenthal (NMNH). *Paratypes*: Costa Rica: Guanacaste: Parque Nacional Guanacaste, Estación Maritza, Río Tempisque, 10.958°N, 83.497°W, 550 m, 19–20.vii.1987, Holzenthal, Morse, Clausen, 1 male (UMSP); same except, ca. 0.7 km N Est. Maritza, 10.96°N, 85.50°W, 550 m, 31.viii.1990, Huisman and Quesada, 2 males (in alcohol) (UMSP, INBio).

Etymology.—Named in honor of our close friend Mr. James C. Doublés, whose tragic death saddened us deeply and ended a promising career in trichopterozoology.

Austrotinodes inbio
Muñoz and Holzenthal,
 NEW SPECIES

Fig. 2

Diagnosis.—This species is closest to *A. fortunata* Flint and Denning and *A. contubernalis* Flint and Denning, differing from those species in the shape and setation of the intermediate appendage. In *A. inbio*, the intermediate appendage is slender and tubular with a very long mesoventral seta, but it lacks the mesodorsal seta of *A. contubernalis* and the apical seta of *A. fortunata*. In addition, in the new species sternum IX is longer than in *A. contubernalis*. Also, the shape of the apical margin of the inferior appendages is different among the three species when viewed ventrally; in the new species it is essentially straight, in *A. fortunata* it is convex mesally, and in *A. contubernalis*

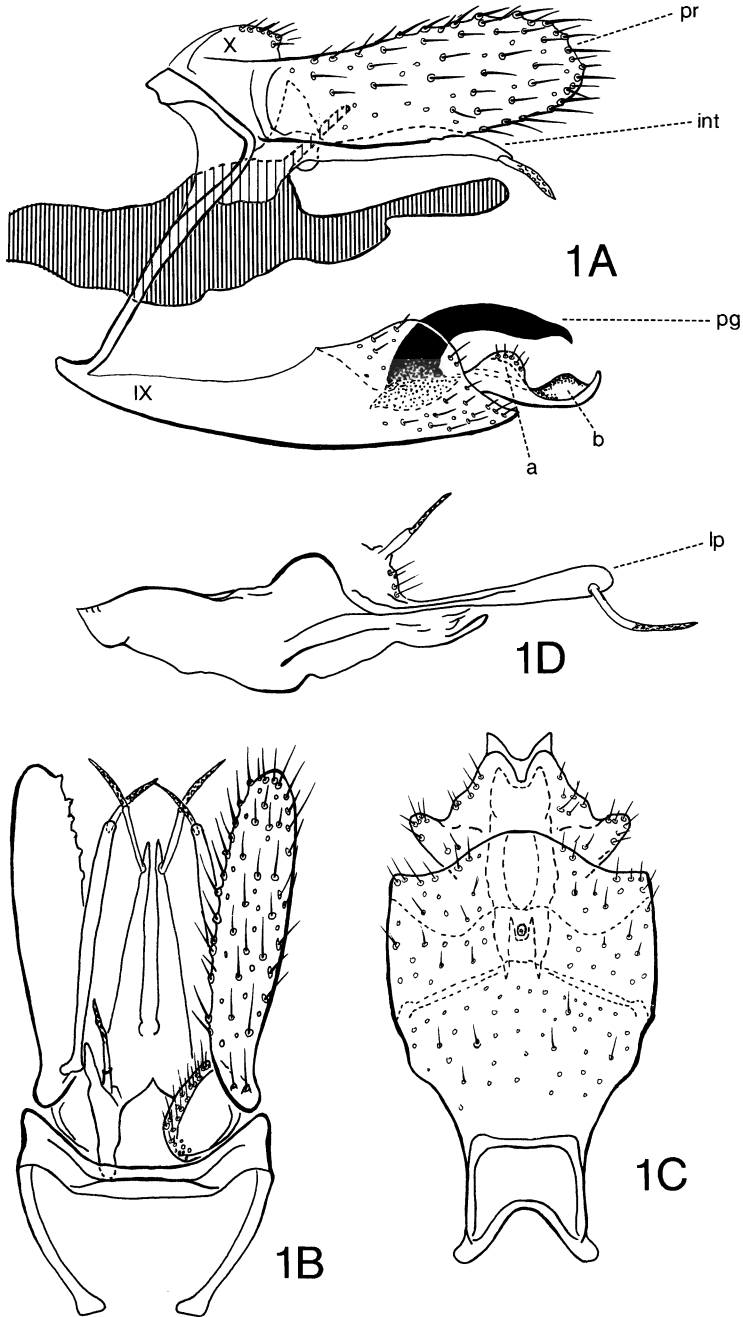


Fig. 1. *Austrotinodes doublesi*, new species, male genitalia: A, lateral view. B, dorsal view. C, ventral view. D, phallus, lateral view. Abbreviations: a = lobe "a" of inferior appendage; b = lobe "b" of inferior appendage; int = intermediate appendage; lp = lateral process of phallus; pg = phallic guide; pr = preanal appendage; IX = abdominal sternum IX; X = abdominal tergum X.

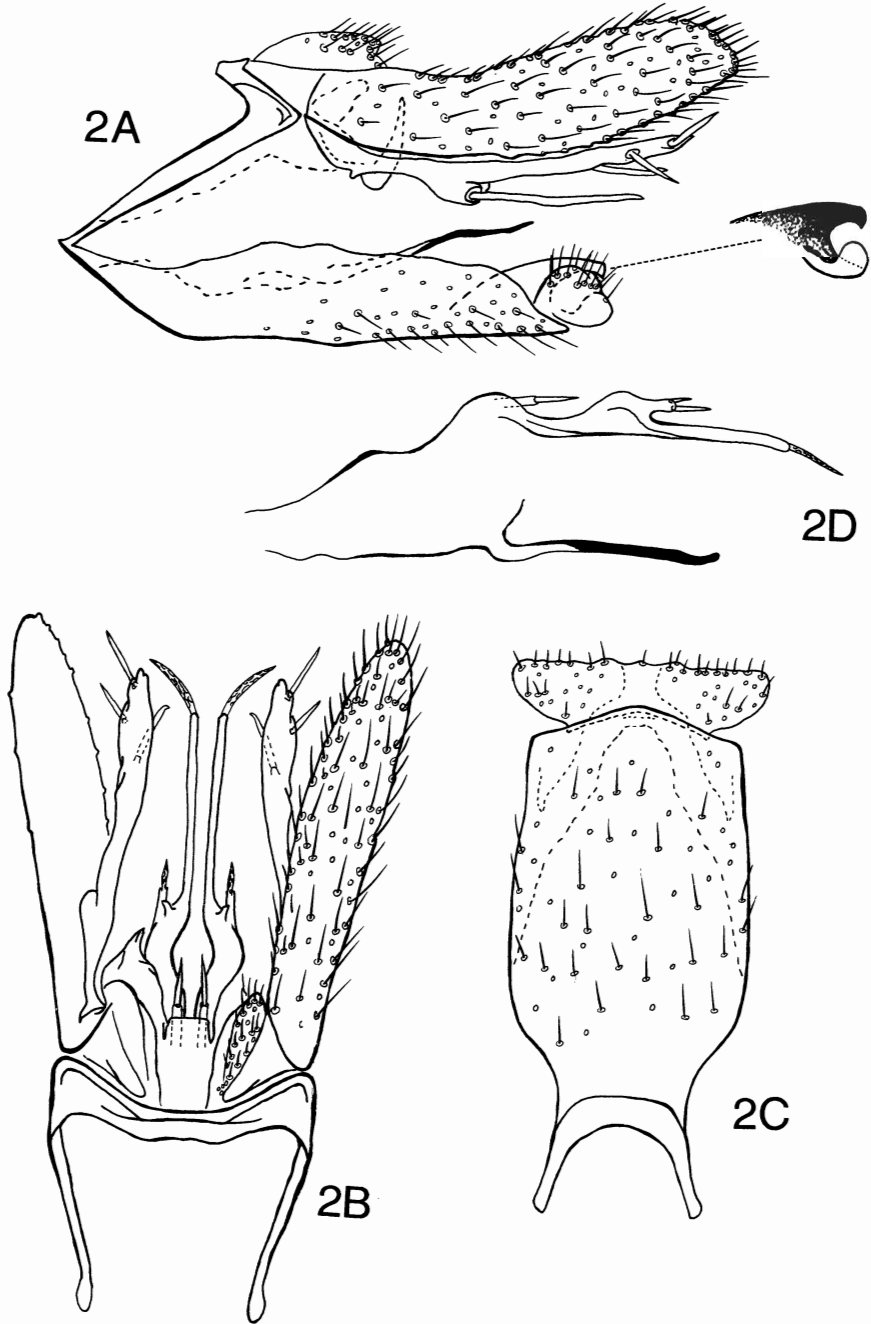


Fig. 2. *Austrotnodes inbio*, new species, male genitalia: A, lateral view (inset: phallic guide). B, dorsal view. C, ventral view. D, phallus of the paratype, lateral view.

it has a mesal emargination. Finally, the shape and setation of the lateral process of the phallus also differ between the three species; in *A. inbio* the lateral process is enlarged and curved basally, in *A. fortunata* it is slender and straight basally. The lateral process of the phallus of the new species bears a curved seta apically and in *A. contubernalis* it bears a straight, subapical pointed seta.

Description.—*Male*: Forewing length 4 mm. Body sclerites pale brown, dorsum of head and thorax dark brown with pale yellow and brown setae, thorax light brown ventrally. Leg segments with brown setae. Forewings covered with fine, brown setae and with small scattered patches of lighter brown setae, principally along the costal margin. **Genitalia** (Fig. 2): Segment IX deeply divided, sternum elongated; in ventral view, about 2 times as long as wide; in lateral view, enlarging medially, ventral margin curved basally; in ventral view, apical margin convex. Phallic guide sclerotized, darkened, dorsal margin convex, ventral margin strongly concave; apex with inferior corner pointed, reaching tip of lobe “b” of inferior appendage. Inferior appendages attached subapicomeresally on sternum IX, reduced, fused mesally; in ventral view, slightly wider than sternum IX, with apical margin essentially straight, lateral margins curved; in lateral view, lobe “a” rounded and lobe “b” slightly elevated and rounded. Tergum X divided into pair of semimembranous oval lobes; in lateral view, each lobe with dorsal margin convex, posterior margin with weak mesal emargination; bearing slender setae along inner margin. Preanal appendage long, roughly parallel-sided, but narrowest basally, apex rounded, margins crenulated, surface setose. Intermediate appendage long, approximately length of preanal appendage, slender, tubular; basoventrally with short spurlike projection; mesoventrally with enlarged, very long seta; subapically with 3 enlarged setae. Phallus with sclerotized base and membranous api-

cal region; in dorsal view, lateral process of phallus enlarged and curved basally with a short mesodorsal spurlike projection bearing 2 apical setae; apically, lateral process long, slender, straight, bearing a curved, enlarged, rugose seta apically; dorsally, phallus with a short projection bearing an enlarged seta; in lateral view, apicoventral lobe of phallus long, very slender, darkened.

Type material.—*Holotype*: Male, Costa Rica: Alajuela: Reserva Forestal San Ramón, Río San Lorencito and tribs., 10.216°N, 84.607°W, 980 m, 24–27.ii.1987, I. & A. Chacón (NMNH). *Paratype*: Costa Rica: Guanacaste: Parque Nacional Guanacaste, Maritza, Río Tempisque Sur, 10.95°N, 85.84°W, 600 m, 30.viii.1990, Huisman & Quesada, 1 male (in alcohol) (UMSP).

Etymology.—Named for the Instituto Nacional de Biodiversidad de Costa Rica or “INBio” and dedicated to the parataxonomists, curators, collaborators and administrators who have helped us during our studies. The goal of this unique institution is to survey and document the biodiversity of Costa Rica.

Austrotinodes contubernalis

Flint and Denning

Fig. 3

Austrotinodes contubernalis Flint and Denning 1989: 116, figs. 25–27, male, Panamá (NMNH).

Distribution.—Panamá, Costa Rica (new record).

Diagnosis.—This species is close to *A. inbio*, new species, and *A. fortunata* Flint and Denning from Panamá. The apicoventral lobes of the phalli are similar among the three species, but in *A. contubernalis* it is curved, with an enlarged and rounded apex. Also, *A. contubernalis* can be distinguished from the other species by the straight, subapical seta of the lateral process of the phallus; in the other species these setae are apical. The intermediate appendage of *A.*

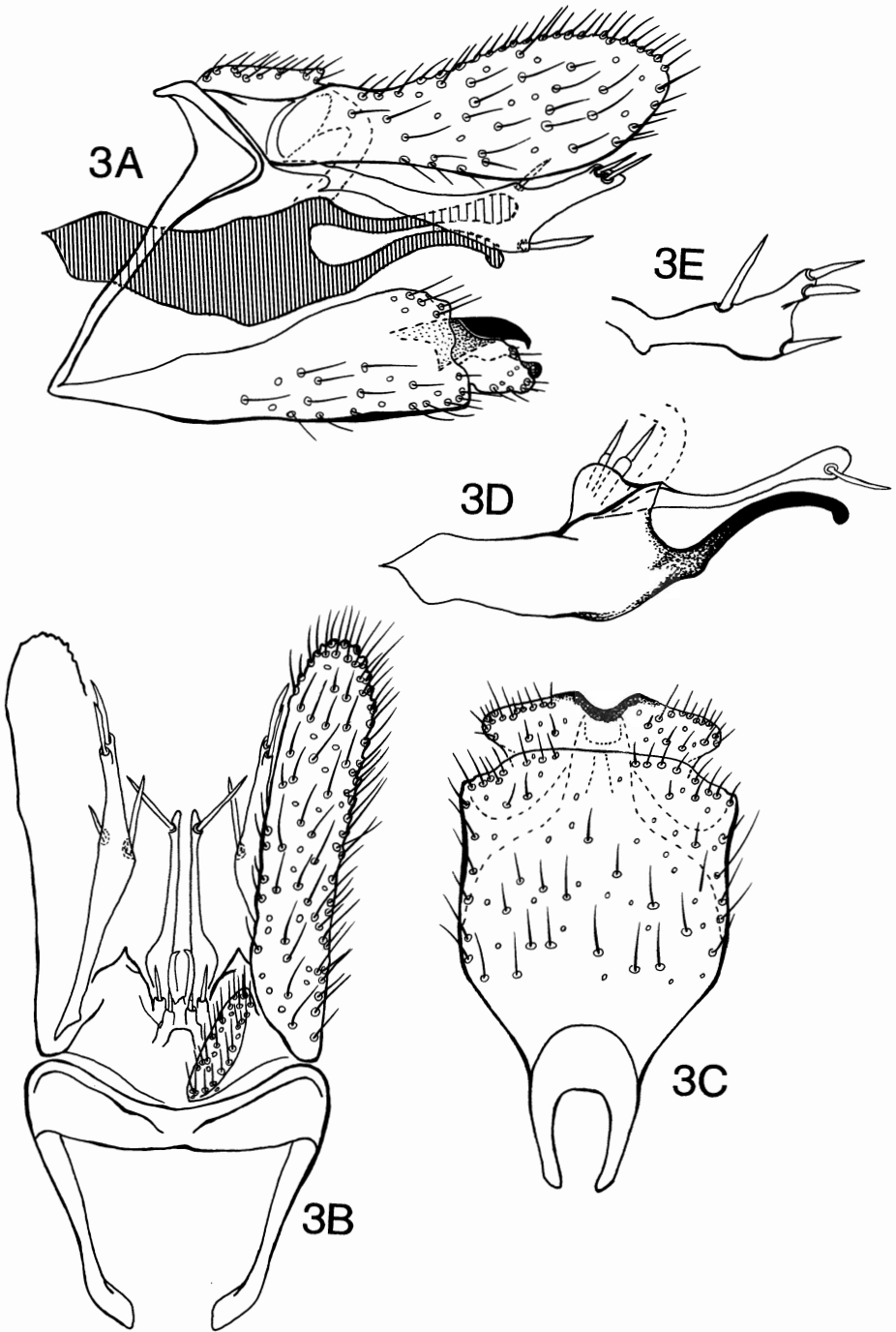


Fig. 3. *Austrotinodes contubernalis*, Flint and Denning, male genitalia: A, lateral view. B, dorsal view. C, ventral view. D, phallus, lateral view. E, intermediate appendage (from Río Jaba), lateral view.

contubernalis has a mesodorsal seta that is absent in the other two species. Finally, the example from Río Jaba varies from the other examples in the form of the intermediate appendage, in that it is very enlarged apically (Fig. 3E). Also, the apex of the apicoventral lobe of the phallus is slender and pointed.

New distribution records.—Costa Rica: Cartago: Reserva Tapantí, Quebrada Palmitos and falls, 9.72°N, 83.78°W, 1400 m, 2–3.vi.1990, Holzenthal, Blahnik, Muñoz, 2 males, 2 females (UMSP); same, except 23.viii.1990, Holzenthal, Huisman, 1 male (INBio); Puntarenas: Parque Nacional Corcovado, Piedra el Arco, 8.582°N, 83.709°W, 20 m, 10–11.iv.1989, Holzenthal and Blahnik, 1 male (UMSP); Río Jaba at rock quarry 1.4 km W (air) Las Cruces, 8.79°N, 82.97°W, 1150 m, 9.viii.1990, Holzenthal, Blahnik, Muñoz, 1 male, 1 female (UMSP).

Austrotinodes panamensis Flint

Fig. 4

Austrotinodes panamensis Flint 1973: 138, figs. 25, 26, male, Panamá (USNM); Flint and Denning 1989: 109, 112.

Distribution.—Panamá, Costa Rica (new record).

Diagnosis.—This species is closest to *A. sedmani* Flint. It differs most from *A. sedmani* in the shape and setation of the intermediate appendage. In *A. panamensis*, the intermediate appendage, in lateral view is curved and enlarged apicoventrally; in dorsal view, the apical margin has a curved emargination and bears three apical setae. Also, in *A. sedmani*, the intermediate appendage is narrow throughout its length in lateral view and, in dorsal view, is abruptly bent mesally and bears three apical setae that are shorter than in *A. panamensis*.

New distribution records.—Costa Rica: Guanacaste: P[arque] N[acional] Guanacaste, Estación Maritza, Río Tempisque, 10.958°N, 85.497°W, 550 m, 30–31.viii.1990, Huisman, Blahnik, Quesada, 1 male

(in alcohol) (UMSP). Puntarenas: Parque Nacional Corcovado, Estación Sirena, Río Camaronal, 8.482°N, 83.589°W, 30 m, 13.iv.1989, Holzenthal and Blahnik, 1 male (INBio); Reserva Biológica Carara, Quebrada Bonita, 9.775°N, 84.605°W, 35 m, 18–20.v.1990, Holzenthal and Blahnik, 5 males (3 in alcohol) (UMSP).

Austrotinodes sedmani Flint

Fig. 5

Austrotinodes sedmani Flint 1973: 140: figs. 21–24, male, Guatemala (USNM); McElravy et al. 1981: 152 (as *Austrotinodes* undescribed sp. "A"); McElravy et al. 1982: 307; Flint and Denning 1989: 109, 110, figs. 7–9 (redescription).

Distribution.—Guatemala, Panamá, Costa Rica.

Diagnosis.—This species is closest to *A. panamensis* Flint, differing from that species in the shape and setation of the intermediate appendage as described in the diagnosis of *A. panamensis*. According to Flint and Denning (1989), there is variability of the genitalia of the species, but there does not appear to be any pattern in the variations. Variation occurs in the intermediate appendage, the lateral process of the phallus, and the inferior appendage. The intermediate appendage varies in the apical region where it may be very enlarged and with or without an apical emargination. The lateral processes of the phallus vary principally in the shape of the apical setae, which are enlarged in the Costa Rican example from Quebrada Sanguijuela. The inferior appendages of the newly collected material are similar to the northern examples, but with a slight mesal emargination in ventral view.

New distribution record.—Costa Rica: Puntarenas: Reserva Biológica Carara, Quebrada Binita, 9.775°N, 84.605°W, 35 m, 11.iii.1991, Holzenthal, Muñoz, Huisman, 1 male (UMSP); San José: Parque Nacional Braulio Carrillo, Estación Carrillo, Quebrada Sanguijuela, 10.160°N, 83.963°W, 800

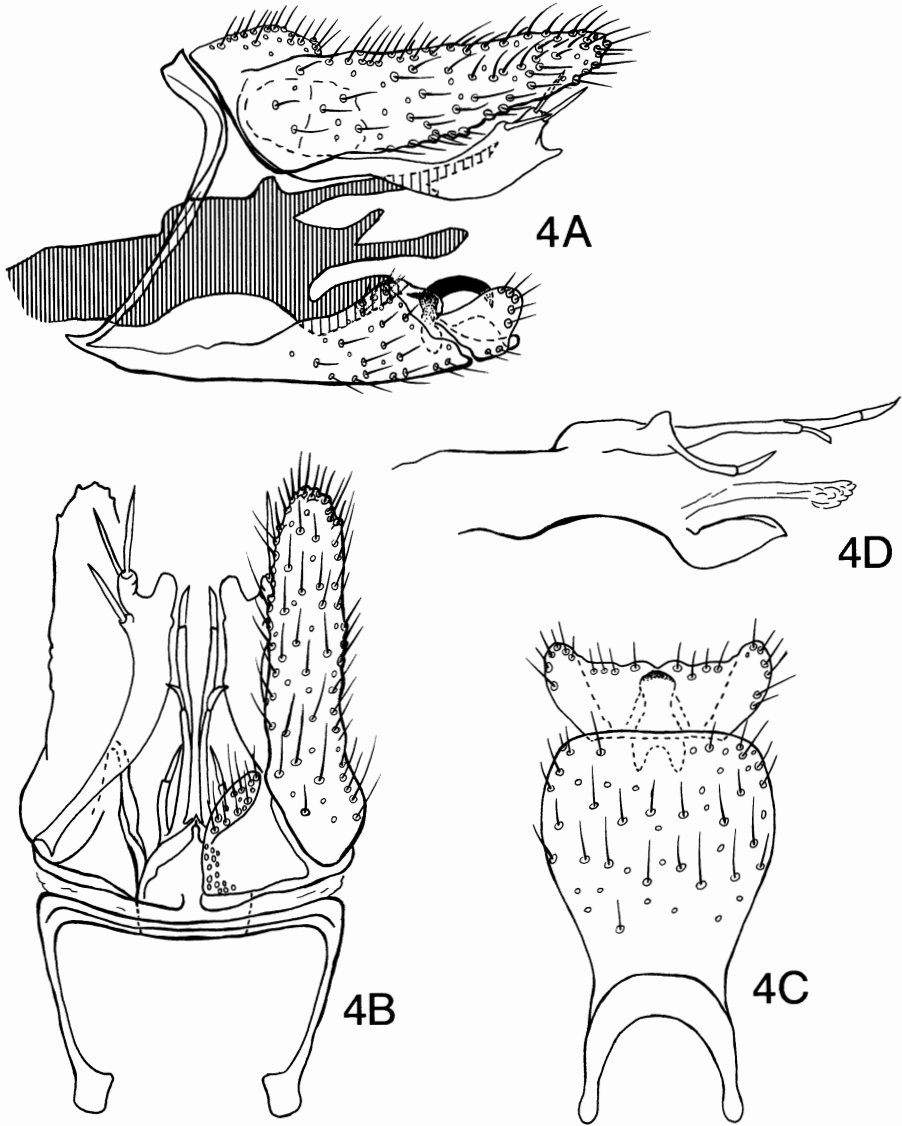


Fig. 4. *Austrotinodes panamensis*, Flint, male genitalia: A, lateral view. B, dorsal view. C, ventral view. D, phallus, lateral view.

m, 22–28.viii.1986, I. and A. Chacón, 1 male (UMSP).

KEY TO THE MALES OF COSTA RICAN
AUSTROTINODES

- 1. Intermediate appendage long, slender throughout its length, simple, bearing only a single apical seta; phallic guide very large, very dark (Fig. 1) *A. doublesi*

- Intermediate appendage long, generally enlarging apically, bearing several apical and sub-apical setae; phallic guide much smaller than above, dark 2
- 2. Phallus with apicoventral lobe short, rounded, lightly sclerotized; two pairs of lateral processes of phallus, each slender and straight (best seen dorsally) and a pair of short, dorsobasal processes 3
- Phallus with apicoventral lobe long, slender,

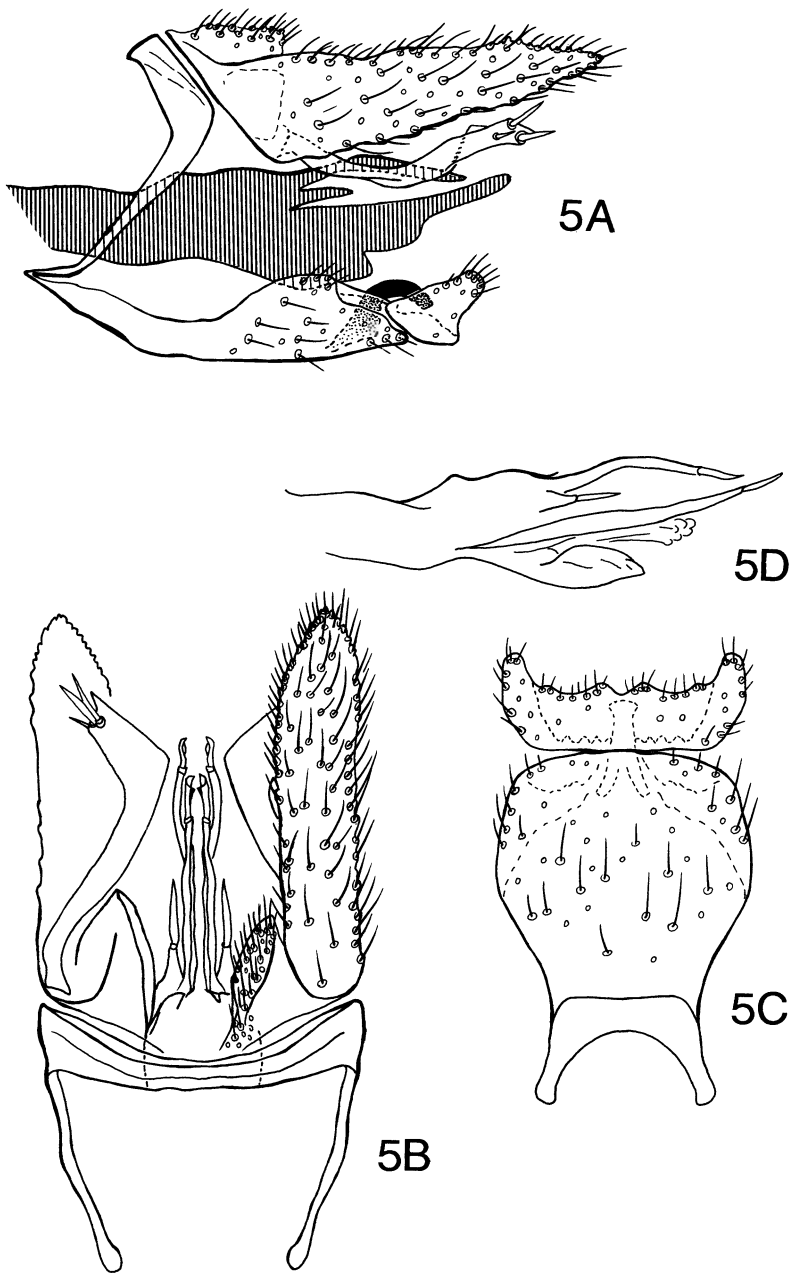


Fig. 5. *Austrotinodes sedmani*, Flint, male genitalia: A, lateral view. B, dorsal view. C, ventral view. D, phallus, lateral view.

very dark; one pair of lateral processes of phallus, which are enlarged and curved basally, when viewed dorsally

3. Intermediate appendage curved, enlarging apically, with three terminal setae, apically with

4) U-shaped emargination (best seen dorsally) (Fig. 4) *A. panamensis*

4 - Intermediate appendage slightly twisted mesoventrally and sharply curved mesally at apical third, when viewed dorsally, with three ter-

- minal setae, apical emargination variable (Fig. 5) *A. sedmani*
- 4. Intermediate appendage with one mesoventral seta, two apical setae, and a short mesodorsal seta (Fig. 3) *A. contubernalis*
- Intermediate appendage with three subapical setae and a very long mesoventral seta (Fig. 2) *A. inbio*

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