

## Studies in aquatic insects XIV: Description of eight new species of *Ochrotrichia* Mosely (Trichoptera: Hydroptilidae), from Costa Rica

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*Abstract.*—The species of the following microcaddisflies are described and their male genitalia are figured: *Ochrotrichia membrana*, *O. silva*, *O. avis*, *O. quebrada*, *O. dulce*, *O. vieja*, *O. ramona*, and *O. quinealensis*. These species were collected during an inventory of the Costa Rican Trichoptera fauna.

The exclusively New-World Tribe Ochrotrichiini was established by Marshall (1979) for the genera *Ochrotrichia* (*Ochrotrichia*), *Ochrotrichia* (*Metrichia*) and *Rhyacopsyche*. Wiggins (1996), noting larval characteristics that differentiated the two subgenera of *Ochrotrichia*, raised *Metrichia* to generic status, which we also accept. The species of *Ochrotrichia* are found from southern Canada to central Brazil and Peru, including all of the larger islands of the West Indies. Ross (1944), Denning & Blickle (1972), Blickle (1979), and Morse (1993) provided major reviews and checklists of the described North American species.

During the last 25 years, many new records and descriptions of new species in the genus *Ochrotrichia* Mosely from the Neotropical Region have been published (Botosaneanu & Alkins-Koo 1993; Botosaneanu 1991, 1995; Bueno-Soria & Santiago-Fragoso 1992, 1997; Flint 1972, 1981; Harris & Moulton 1993; Holzenthal 1988; Morse 1993). We are certain, however, that many more Neotropical species of *Ochrotrichia* remain to be described. Other species of *Ochrotrichia* described previously from Costa Rica are: *O. filiforma* Flint, *O. pacifica* Flint, and *O. tenanga* Flint.

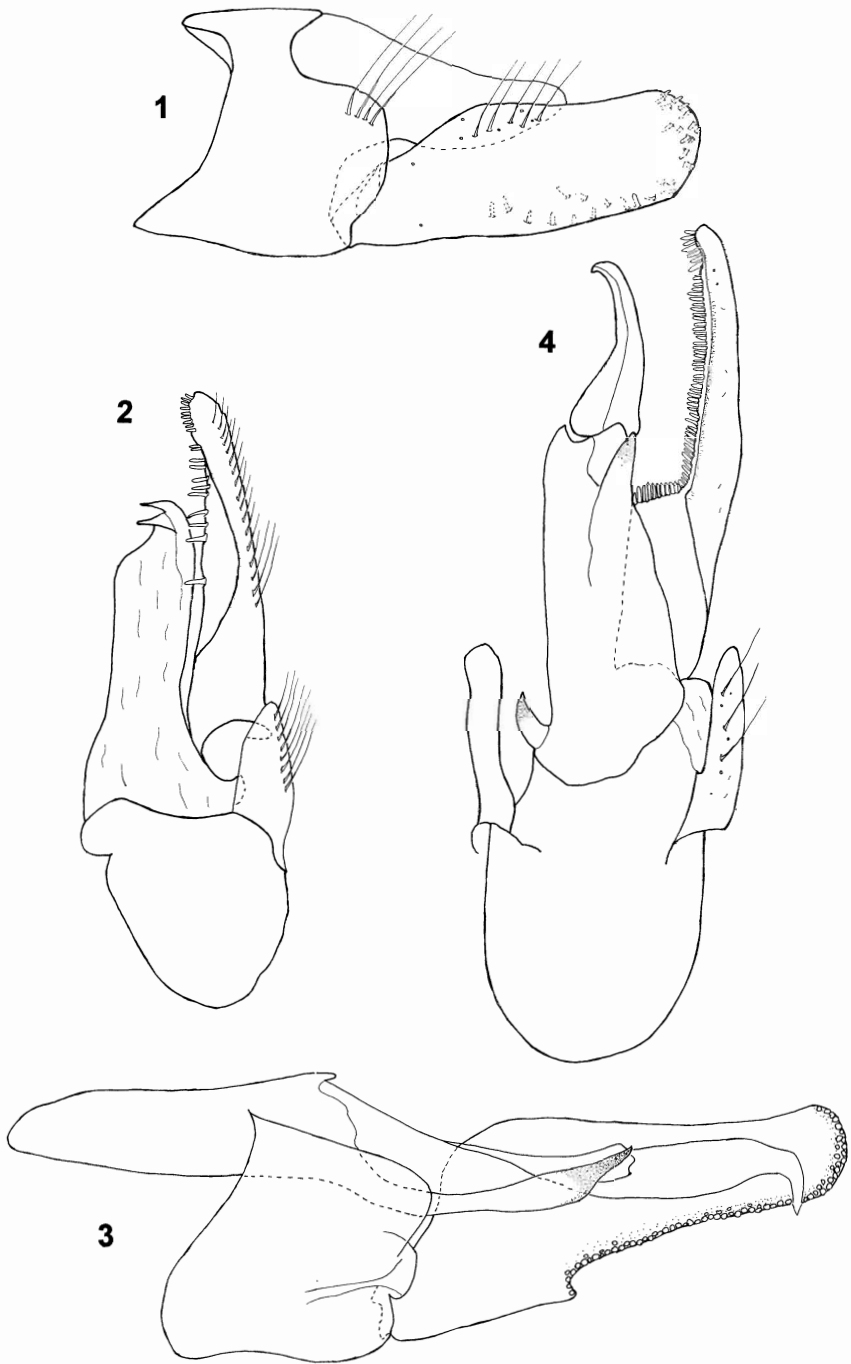
In the present paper we describe eight new species, thereby increasing to 11 the number of species known from Costa Rica. The species described in this paper were

collected during an inventory of the Trichoptera from Costa Rica conducted by Ralph Holzenthal and associates from 1986–1992. Morphological terminology used in the descriptions follows Marshall (1979). The holotypes will be deposited in the National Museum Natural History, Smithsonian Institution (USNM), Washington, D.C., and paratypes will be deposited in the collections of the University of Minnesota, St. Paul (UMSP) and Instituto de Biología, Universidad Nacional Autónoma de México (IBUNAM).

### *Ochrotrichia membrana*, new species Figs. 1–2

*Diagnosis.*—This species seems to be related to *Ochrotrichia flagellata* Flint, due to the shape of the simple, elongate membranous lobe of tergum X. However, *Ochrotrichia membrana*, can be distinguished from *O. flagellata* by the presence of 2 short hooklike processes on the left side of the apical process of tergum X.

*Description of adult.*—Length of forewing 2 mm. Color in alcohol stramineous. Male genitalia: Segment IX tubular, tergum slightly depressed but not produced anteriorly. Tergum X a large, elongate membranous lobe, appearing as a cylindrical flat plate in dorsal view, with 2 short apical hooklike processes on the left side; in lateral view, tergum X ellipsoidal, apex round-



Figs. 1-4. Male genitalia of *Ochrotrichia membrana*. 1, Lateral view; 2, Dorsal view. Male genitalia of *Ochrotrichia silva*. 3, lateral view; 4, Dorsal view.

ed. Inferior appendage in lateral view, elongate, apex rounded; with clusters of black, peglike setae apicomesally and a row of black peglike setae ventromesally, ending in a few setae at the midbasal ridge. Phallus long, basal portion wide; apical portion narrow, apex truncate.

*Material*.—Holotype ♂; Costa Rica. Alajuela: Reserva Forestal San Ramón, Río San Lorencito and tribs. 10°12'96"N, 84°36'42"W, 30 Mar–1 Apr 1987, 980 m, Holzenthal, Hamilton, Heyn (USNM).

*Etymology*.—The species epithet, *membrana*, is Latin for membrane, in reference to membranous aspect of the tergum X.

*Ochrotrichia silva*, new species

Figs. 3–4

*Diagnosis*.—Based on the simple structure and shape of tergum X, *O. silva* appears distantly related to *O. quebrada*, new species. However, *O. silva* can be distinguished by the presence of a short, strong, hooklike process on the right side of the basal portion of tergum X, and by the presence of a long spinelike process on the left side, with its apex darker and touching the base of the apical process.

*Description of adult*.—Length of forewing, 2 mm. Color in alcohol stramineous. Male genitalia: Tergum IX depressed and produced anteriorly. Tergum X in dorsal view with a short, strong hooklike process, situated on base of right side; middorsal portion appears membranous and cylindrical, with 1 long spinelike process on left side; apical process heavily sclerotized, slightly curved in dorsal view; in lateral view, apical process strongly curved ventrad apically. Inferior appendage in lateral view, elongate with mid portion narrower than anterior portion, apex rounded; apical and ventral margins with a row of black, peglike setae, ending in a midbasal ridge. Phallus long and threadlike.

*Material*.—Holotype ♂; Costa Rica. Alajuela: Reserva Forestal San Ramón Río San Lorencito and Tribs. 10°12'96"N,

84°36'42"W, 30 Mar–1 Apr 1987, 980 m, Holzenthal, Hamilton, Heyn (USNM).

*Etymology*.—The species epithet, *silva*, is a Latin word for forest, in reference to the type locality, Reserva Forestal San Ramón. The name is treated as a noun in apposition.

*Ochrotrichia avis*, new species

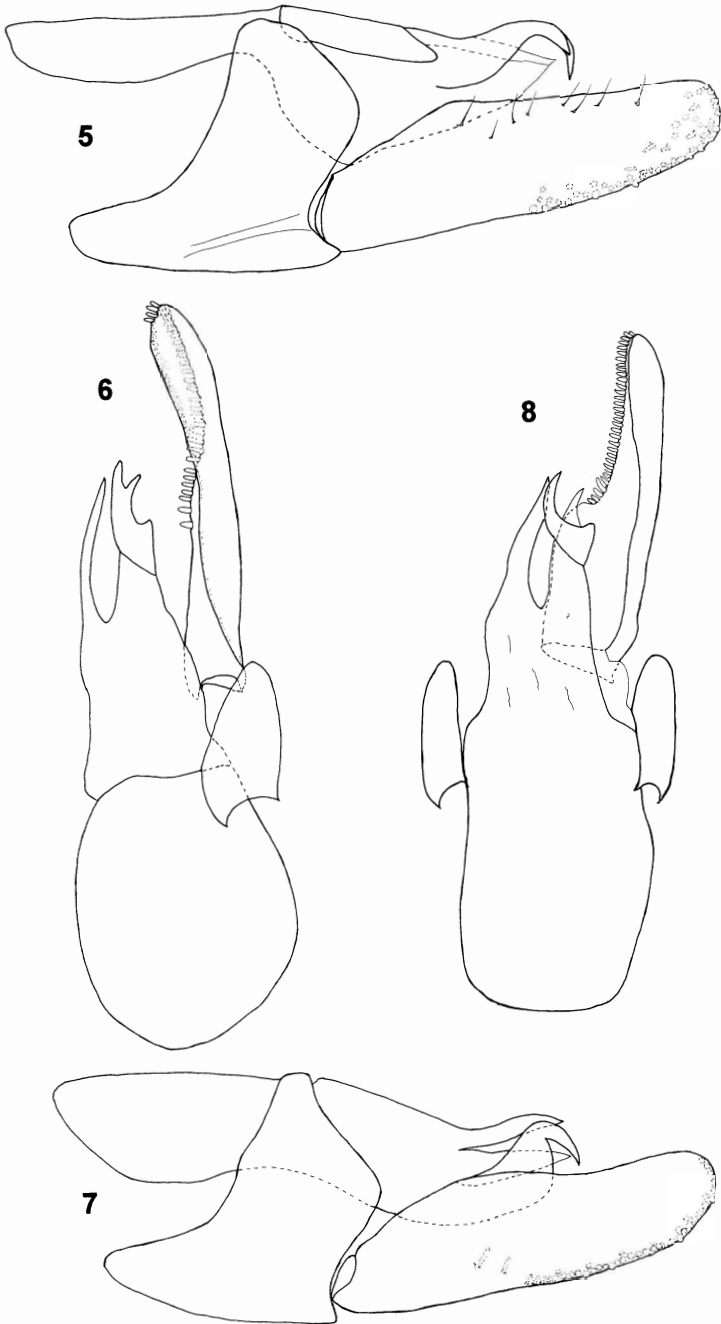
Figs. 5–6

*Diagnosis*.—Because of the shape of the inferior appendages in lateral view and the presence of a long spinelike process on the right side of the tergum X, *O. avis* is related to *O. quebrada*, new species. However, *O. avis* can be distinguished from that species by tergum X, which shows differences in the shape of the apical process, especially when viewed dorsally.

*Description of adult*.—Length of forewing 2 mm. Color in alcohol stramineous. Male genitalia: Sternum, IX in lateral view, produced anteriorly; tergum IX depressed and produced anteriorly. Tergum X in dorsal view with elongate middorsal spinelike process on right side, apical process bifurcated apically into 2 short hooklike processes; in lateral view, on right side, apical process appears hooklike with apex ventrally directed and elongate middorsal spinelike process almost touching apex of hooklike process; on left side, apical process appears elongate and ventrally curved, with a short preapical process giving appearance of a bird's neck. Inferior appendage in lateral view long, slender, with apex rounded; black peglike setae on apex and ventral margin. Phallus long with basal portion wider, at midlength surrounded and covered by a membranous structure; apical portion long and thin.

*Material*.—Holotype ♂; Costa Rica. Alajuela: Reserva Forestal San Ramón, Río San Lorencito and Tribs. 10°12'96"N, 84°36'42"W, 30 Mar–1 Apr 1987, 980 m, Holzenthal, Hamilton, Heyn (USNM). Paratype ♂, same data as holotype (UMSP).

*Etymology*.—The species epithet, *avis*, is



Figs. 5–8. Male genitalia of *Ochrotrichia avis*. 5, Right lateral view; 6, Dorsal view. Male genitalia of *Ochrotrichia quebrada*. 7, Right lateral view; 8, Dorsal view.

derived from the Latin *avis* meaning bird in allusion to the bird's neck shape of the apical process of tergum X. The name is treated as a noun in apposition.

*Ochrotrichia quebrada*, new species  
Figs. 7–8

*Diagnosis.*—On the basis of the presence

of an elongate spinelike process on the right side of tergum X and by the elongate inferior appendages, *O. quebrada* appears related to *O. avis*. However, *O. quebrada* can easily be distinguished from that species by the presence of a long, dextrally curved, preapical hooklike process on tergum X.

*Description of adult*.—Length of forewing 2 mm. Color in alcohol stramineous. Male genitalia: Tergum IX deeply depressed and produced anteriorly; in lateral view, sternum IX ventrolaterally produced. Tergum X in dorsal view with long pointed process on right side; on left side a broad elongate process with apex acute and also a long dextrally curved preapical hooklike process. Inferior appendage elongate, apex rounded, with a row of black peglike setae around apex, along midventral margin and midbasal ridge. Phallus long, with basal portion wider than apical portion.

*Material*.—Holotype ♂; Costa Rica. Guanacaste: P. N. Rincón de la Vieja Quebrada Zopilote, 10°45'9"N, 83°18'54"W, 3 Mar 1986, 785 m, Holzenthal & Fauth (USNM).

*Etymology*.—The species epithet, *quebrada*, alludes to the type locality, Rincón de la Vieja quebrada Zopilote. The name is treated as a noun in apposition.

*Ochrotrichia dulce*, new species

Figs. 9–10

*Diagnosis*.—Based on the presence of the long process on the right side and a hooklike apical process of tergum X, *O. dulce* seems related to *O. tenanga* (Moseley). However, *O. dulce* can be distinguished from that species by the rectangular shape of the inferior appendage in lateral view with its angled anterodorsal margin.

*Description of adult*.—Length of forewing 2 mm. Color in alcohol stramineous. Male genitalia: Segment IX deeply depressed dorsally and produced anteriorly. Tergum X in dorsal view with long, straight, rodlike process on right side; body of X with long, membranous process cov-

ering most of length of an apical process that is hooked apically; in lateral view, on left side, a dorsalmost process appears, wider, and apically curved, ventral process appears long, thinner, with its apex slightly curved upward. Inferior appendage in lateral view, anterodorsally angled, apical portion rounded, with several rows of black peglike setae; in dorsal view apex with several peglike setae and midbasal ridge with 3 black peglike setae. Phallus long, threadlike.

*Material*.—Holotype ♂; Costa Rica. Guanacaste: Río Tizate, 7.2 km N. E. Cañas Dulces, 10°43'98"N, 66°26'94"W, 28 Jun 1986, 275 m, Holzenthal, Heyn, Armitage (USNM).

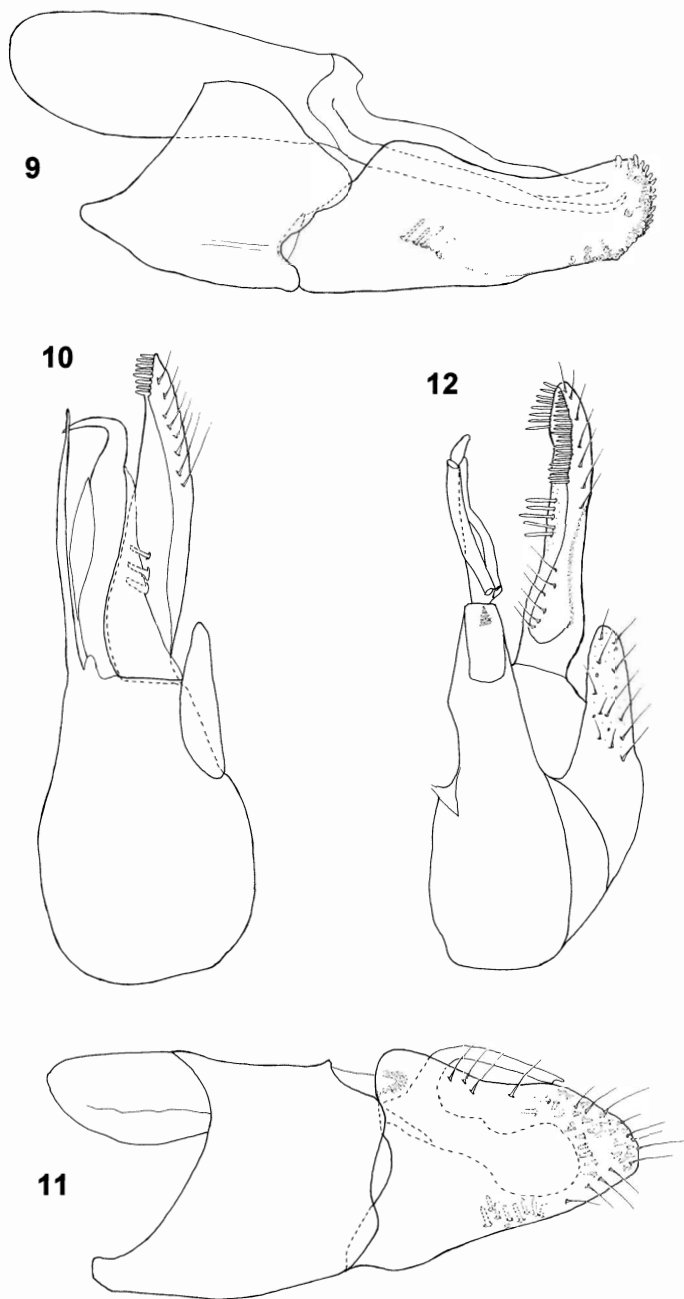
*Etymology*.—The species epithet, *dulce*, is from the Spanish dulce, in allusion to the type locality (Cañas Dulces). The name is treated as a noun in apposition.

*Ochrotrichia vieja*, new species

Figs. 11–12

*Diagnosis*.—On the basis of the triangular shape of the inferior appendages in lateral view, *O. vieja* appears closely related to *O. cruces* Flint from Mexico. However, *O. vieja* can be distinguished from that species by the shape and presence of 1 long process on tergum X.

*Description of adult*.—Length of forewing 3 mm. Color in alcohol stramineous. Male genitalia: Tergum IX depressed and produced anteriorly. Tergum X in dorsal view with first 2/3 of tergum smooth, long, apical portion rectangular; posterior 1/3 ending in a sinuous apical process; basal section of this portion with long, black tipped dorsal process, slightly curving to right apically, basal to this process is a broad thin plate mid-dorsally, with a short black-tipped spine; in lateral view posterior third of sinuous process appears wide and rounded apically and basal section of this portion bears long, black-tipped, dorsal process; basally to this process a short black-tipped spine, and a very short spur on right and left sides at



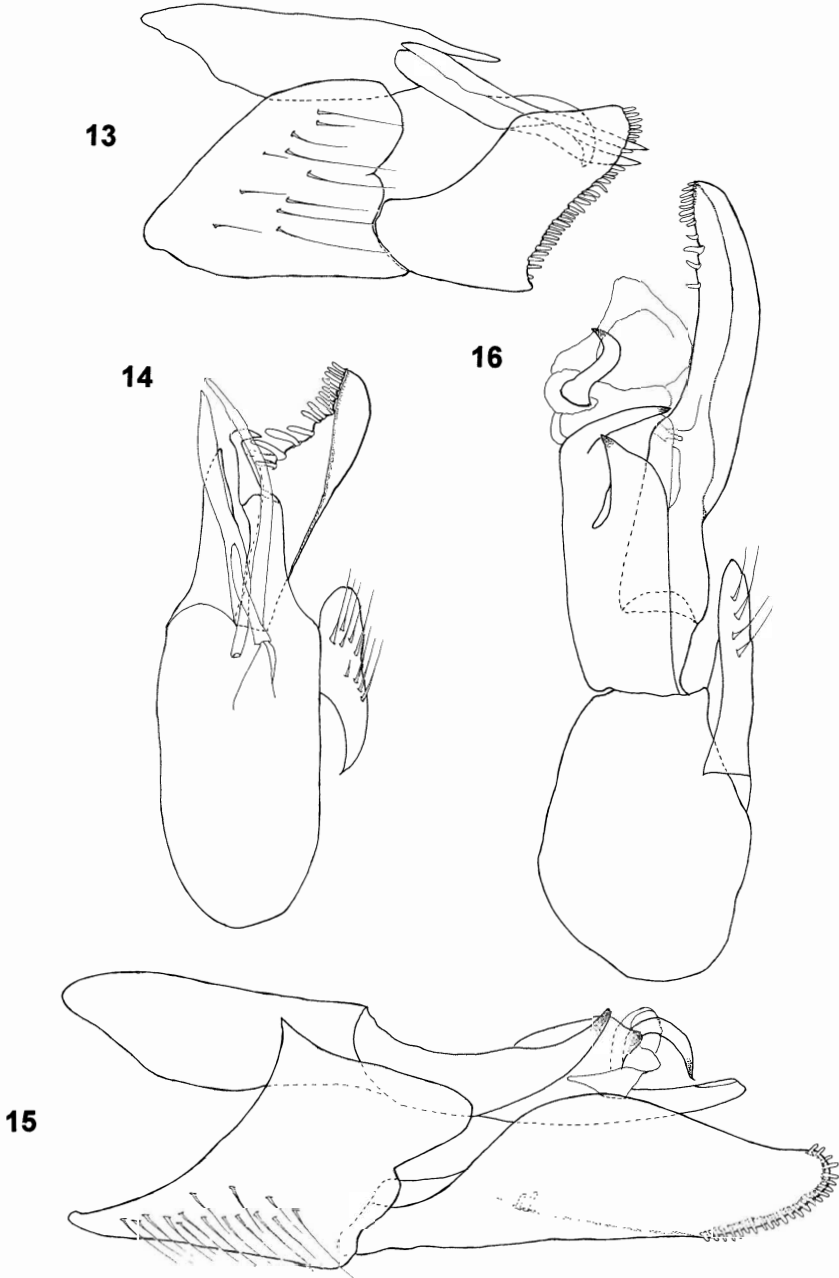
Figs. 9–12. Male genitalia of *Ochrotrichia dulce*. 9, Right lateral view; 10, Dorsal view. Male genitalia of *Ochrotrichia vieja*. 11, Right lateral view; 12, Dorsal view.

same level. Inferior appendage broadly triangular, apex rounded; with a band of black peglike setae apically and on midbasal ridge. Phallus slender, threadlike.

*Material*.—Holotype ♂; Costa Rica. Al-

ajuela 10°46'14"N, 85°16'86"W, P. N. Rincón de la Vieja, Quebrada Provisión, 4 Mar 1896, 810 m, Holzenthal and Fasth (USNM).

*Etymology*.—The species epithet, *vieja*,



Figs. 13-16. Male genitalia of *Ochrotrichia ramona*. 13, Left lateral view; 14, Dorsal view. Male genitalia of *Ochrotrichia quinealensis*. 15, Right lateral view; 16, Dorsal view.

is from the Spanish *vieja* in allusion to the name of the locality, Rincón de la Vieja Provision. The name is treated as a noun in apposition.

*Ochrotrichia ramona*, new species  
Figs. 13-14

*Diagnosis*.—Because of the presence of

2 long curved spinelike processes and 1 midbasal spine on tergum X, *O. ramona* seems to be related to *O. palitla* Flint and *O. felipe* Ross. However, *O. ramona* can be distinguished from these species by the rectangular shape of the inferior appendage in lateral aspect.

*Description of adult.*—Length of forewing 2 mm. Color in alcohol stramineous. Male genitalia: Tergum IX deeply depressed dorsally; sternum IX with a posterodorsal lobe. Tergum X in dorsal aspect with a small, basodorsal spine at center and 2 long, slightly curved, spines; membranous process ventrally, slightly twisted, with apex clearly curved to left; in lateral aspect small basodorsal spine and 2 long sinuous spines appear straight; apical portion of membranous process curved ventrad apically. Inferior appendage in lateral aspect rectangular, broadest apically with dorsal and posterior margin rectangular; posterior margin with many black, peglike setae. Phallus well developed, simple with long apical tubule.

*Material.*—Holotype ♂; Costa Rica. Alajuela: Reserva Forestal San Ramón Río San Lorencito and trib. 10°12'96"N, 84°36'42"W, 30 Mar–1 Apr 1987, 980 m, Holzenthal, Hamilton, Heyn (USNM). Paratypes: same data as holotype, 7 ♂ (UMSP).

*Etymology.*—The species epithet, *ramona*, is from Spanish 'Ramona', feminine form of 'Ramón' in allusion to the name of the type locality, Reserva Forestal San Ramón. The name is treated as a noun in apposition.

*Ochrotrichia quinealensis*, new species  
Figs. 15–16

*Diagnosis.*—Because of the presence of the spines on tergum X and the elongate and broad appearance of the inferior appendages in lateral view, *O. quinealensis* is related to *O. palitla* Flint. However, *O. quinealensis* can be easily distinguished by the presence, in dorsal view, of a heavy, dark,

spinelike process on tergum X, a character not observed in *O. palitla*.

*Description of adult.*—Length of forewing 2 mm. Color in alcohol stramineous. Male genitalia: Sternum IX in lateral view with dorsolateral lobe; tergum IX, depressed and produced anteriorly. Tergum X in dorsal view a broad, flat plate; at midlength with a heavy, basally-wide spinelike process, its apex dark and directed to right; on right side, a long, slender process ending before membranous apical section, with a dark apex curved to left; apical section with a short, slender, twisted spinelike process, with dark apex curved to right; in lateral view on right side, heavy, basally-wide, spinelike process has its dark apex curved upward; twisted spinelike process of apical section appears strongly curved ventrad and partially covered by a membranous hoodlike structure; on left side, heavy and wide spinelike process appears with its apex slightly curved to right, long and slender process looks like a wide plate with dark apex situated before apical section of tergum X, short, twisted, spinelike process of apical section seems to emerge from a hoodlike structure and is strongly curved ventrad; apical process ending in a spoonlike lobe. Inferior appendage in lateral view, elongate, broad, apex rounded, with an apical band of black peglike setae and 2, black peglike setae on midbasal ridge. Phallus long, threadlike.

*Material.*—Holotype ♂; Costa Rica. Puntarenas; Río Guineal, Ca. 1 km (air) E. Finca Helechales, 9°4'56"N, 83°5'52"W, 22 Feb 1986, 840 m, Holzenthal, Morse, Fasth, (USNM). Paratypes 2♂; Alajuela: Reserva Forestal San Ramón, Río San Lorencito and tribs. 10°12'96"N, 84°36'42"W, 30 Mar–1 Apr 1987, 980 m, Holzenthal, Hamilton, Heyn (UMSP).

*Etymology.*—The species epithet, *quinealensis*, refers to the Río Guineal, the type locality.

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