



## Ten new species and thirteen new country records for the *Neotrichia canixa* species group (Trichoptera: Hydroptilidae) in Costa Rica

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### Abstract

Formerly, only one species of *Neotrichia*, *N. esmalda* (Mosely), was recorded from Costa Rica. In this publication, we add 10 new species (*N. alajuuela* sp. nov., *N. cerberusi* sp. nov., *N. chaconorum* sp. nov., *N. doshocica* sp. nov., *N. gancho* sp. nov., *N. monika* sp. nov., *N. munozii* sp. nov., *N. paragancho* sp. nov., *N. pejensis* sp. nov., *N. trescuerna* sp. nov.) and 13 new country records, all belonging to the *Neotrichia canixa* species group, to Costa Rica's fauna. We also discuss and acknowledge transfer of all the former Neotropical members of the *Neotrichia esmalda* species group to the *Neotrichia canixa* species group. There are now 24 species of *Neotrichia* known from Costa Rica, all of which are in the same species group.

**Key words:** aquatic insects, microcaddisflies, Central America, Neotropics

### Introduction

The microcaddisfly genus *Neotrichia* (Trichoptera: Hydroptilidae: Neotrichiinae) is made up of at least 235 species (Thomson 2023; Gama Neto *et al.* 2021; Gama Neto & Passos 2023; Harris *et al.* 2023; Harris *et al.* 2024; Armitage *et al.* 2025) found throughout North, Central, and South America, including the Caribbean. However, in Costa Rica the genus is poorly known. Previously, Holzenthal (1988) listed two species, *N. esmalda* (Mosely) and *N. costaricensis* Flint, in his systematic catalogue of the Trichoptera of Costa Rica. However, the latter species was subsequently moved to the genus *Bredinia* (Flint *et al.* 1999; Harris *et al.* 2002). Therefore, only one species, *N. esmalda*, a member of the *esmalda* group, is currently reported from the country (Keth *et al.* 2015; Thomson 2023).

With this paper, we take the first steps to produce a more accurate picture of *Neotrichia* diversity in Costa Rica. We describe and illustrate 10 new species and record an additional 13 species new to Costa Rica, all of which belong to the *N. canixa* species group.

Members of the *N. canixa* species group, according to Keth *et al.* 2015, display the following synapomorphic characters: sclerotized horns projecting from the apex of segment X; slender, forked bracteoles; and, bifid inferior appendages.

The group occurs from the southwestern United States through Central America and at several localities in the Caribbean. Bueno-Soria & Vilarino (2024) described two new species of *Neotrichia* from Mexico, both in the *vibrans* group, and incorporated them into the original matrix of Keth (2002), transcribed and edited the resulting matrix, and performed parsimony analysis. Whereas, the majority of Keth's seven species groups were recovered, they noted a unique clade from southern South America and also placed the *esmalda* group within the *canixa* group,

but without discussion. We agree with the placement, but will comment on this in the Discussion section below. As a result of our concurrence, *N. esmalda* in Costa Rica is now also included in the *N. canixa* species group list.

This paper increases the number of *Neotrichia* species in Costa Rica to 24, with all species now in the *N. canixa* species group. In a subsequent paper we will continue to better define the genus for this country.

## Materials and Methods

Most of the collections were made employing pan traps (UV fluorescent tubes placed over white enamel pans containing 80% ethanol). In one case, the specimens were collected employing Malaise traps. In most cases a location was only sampled a single time. Specimens were prepared and examined following standard methods outlined in Blahnik & Holzenthal (2004). Male genitalia were soaked in 5% KOH overnight, and washed in weakly acidified alcohol prior to examination under a dissecting scope.

Morphological terminology used for male genitalia generally follows that of Marshall (1979) and Keth *et al.* (2015). Paired structures are described in the singular for simplicity. Although technically, segments V through VIII are not part of the genitalia, traditionally descriptions of these segments have been included under the genitalia heading. We follow that practice here. If segments V through VIII have distinct features, they are discussed under the male description. Total length of specimens provided in descriptions represents the length from the tip of the head to the tip of the forewing. Altitude values are given in meters above sea level (m a.s.l.).

The use of the word “*ibid.*” in the “Type material” and “Material examined” sections below implies “same as the previous record, except”. This can be rather telescopic in nature, referring to only the country name to everything in the record prior except, for example, the date or the number of individuals. Due to length and frequent repetition, we have reduced “*Neotrichia canixa* species group” to “*canixa* group” in numerous places, and have done likewise with other species groups.

Each specimen or lot was affixed with a 2D data matrix barcode label bearing a unique alphanumeric sequence beginning with the prefix UMSP to serve as a specimen identifier for upload of collection, specimen, and taxonomic data to the University of Minnesota Insect Collection’s Specify database [<https://www.specifysoftware.org/>], available via the GBIF portal [<https://www.gbif.org/dataset/8e02e1dd-ec54-405e-b4d7-7abdec29cc7>]. All type material and other specimens listed in this publication are deposited in the University of Minnesota Insect Collection (UMSP), except for a few specimens deposited at the Carnegie Museum of Natural History (CMNH) indicated herein.

## Results

Below, we describe and illustrate 10 new species of *Neotrichia*. Collection locations for the holotypes are displayed in Fig. 11. In addition, we present 13 additional species as new country records. Distribution records are provided for each, plus new collection records for *N. esmalda*. All 24 species belong to the *canixa* group. Finally, we provide a listing of all members of the *canixa* group (Table 1) in the Neotropics and their distributions. We base this list on the group assignments of the original authors and did not reevaluate the placement of species.

**TABLE 1.** List of *Neotrichia canixa* group species in the Neotropics. New species are in bold type. Former *N. esmalda* species group members are indicated by an asterisk on the left. Type countries are presented in bold type.

Species	Distribution
<i>N. aguirrei</i> Armitage, Harris & Rodriguez, 2025	Costa Rica, <b>Panama</b>
<i>N. alajuela</i> sp. nov.	<b>Costa Rica</b>
<i>N. anzuelo</i> Armitage & Harris, 2018	Costa Rica, <b>Panama</b>
<i>N. alsa</i> Oláh & Johanson, 2011	<b>Peru</b>
* <i>N. bifida</i> Flint, 1974	French Guiana, <b>Suriname</b>
<i>N. bika</i> Oláh & Johanson, 2011	<b>French Guiana</b>
* <i>N. brevispina</i> Flint, 1983	<b>Argentina</b> , Uruguay

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**TABLE 1.** (Continued)

<b>Species</b>	<b>Distribution</b>
<i>N. candela</i> Harris, Armitage & Ríos, 2024	<b>Panama</b>
<i>N. canixa</i> (Mosely, 1937)	Costa Rica, <b>Mexico</b> , Panama, USA
<i>N. cerberusi</i> sp. nov.	<b>Costa Rica</b>
<i>N. chaconorum</i> sp. nov.	<b>Costa Rica</b>
<i>N. collierorum</i> Armitage & Harris, 2018	Costa Rica, <b>Panama</b>
<i>N. corniculans</i> Flint, 1968	Costa Rica, <b>Dominica</b> , Suriname
<i>N. doshocica</i> sp. nov.	<b>Costa Rica</b>
<i>N. dubitans</i> (Mosely, 1939)	<b>Brazil</b>
* <i>N. durior</i> Flint, 1983	<b>Brazil</b> , Uruguay
* <i>N. esmalda</i> (Mosely, 1937)	Costa Rica, <b>Mexico</b> , Nicaragua, Panama
<i>N. fogaka</i> Oláh & Johanson, 2011	<b>French Guiana</b>
<i>N. gancho</i> sp. nov.	<b>Costa Rica</b>
<i>N. hajla</i> Oláh & Johanson, 2011	<b>French Guiana</b>
<i>N. harrisi</i> Bueno-Soria & Barba-Alvarez, 2018	Costa Rica, <b>Mexico</b>
<i>N. ismetla</i> Oláh & Johanson, 2011	<b>French Guiana</b>
<i>N. jarochita</i> Bueno-Soria, 1999	<b>Mexico</b>
<i>N. kehelia</i> Oláh & Johanson, 2011	<b>Peru</b>
<i>N. ketaguka</i> Oláh & Johanson, 2011	<b>French Guiana</b>
* <i>N. macuxi</i> Gama Neto & Passos, 2019	<b>Brazil</b>
* <i>N. makunaima</i> Gama Neto & Passos, 2019	<b>Brazil</b>
<i>N. majagua</i> Harris, Ríos & Aguirre, 2023	Costa Rica, <b>Panama</b>
<i>N. malickyi</i> Harris in Harris & Tiemann, 1993	<b>Panama</b>
<i>N. maria</i> Bueno-Soria & Hamilton, 1993	<b>Mexico</b>
* <i>N. matula</i> Gama Neto & Passos, 2019	<b>Brazil</b>
<i>N. maya</i> Harris & Flint, 2016	<b>Belize</b> , Costa Rica
<i>N. mindyae</i> Harris, Armitage & Ríos, 2024	<b>Panama</b>
<i>N. monika</i> sp. nov.	<b>Costa Rica</b>
<i>N. munozí</i> sp. nov.	<b>Costa Rica</b>
<i>N. olorina</i> (Mosely, 1937)	<b>Mexico</b> , USA
* <i>N. ovona</i> (Mosely, 1939)	<b>Brazil</b>
<i>N. pamela</i> Harris & Armitage, 2015	Costa Rica, <b>Panama</b>
<i>N. panamensis</i> Harris, Armitage & Ríos, 2024	<b>Panama</b>
<i>N. paragancho</i> sp. nov.	<b>Costa Rica</b>
<i>N. pejensis</i> sp. nov.	<b>Costa Rica</b>
<i>N. pinarenia</i> Botosaneanu, 1980	<b>Cuba</b>
<i>N. pulgara</i> Keth, 2004	<b>Belize</b>
<i>N. quitauau</i> Gama Neto & Passos, 2020	<b>Brazil</b>
<i>N. rancheria</i> Armitage, Harris & Rodriguez, 2025	Costa Rica, <b>Panama</b>
<i>N. serrata</i> Harris & Armitage, 2019	<b>Panama</b>
<i>N. snixae</i> Armitage, Harris & Rodriguez, 2025	Costa Rica, <b>Panama</b>
<i>N. tauricornis</i> Malicky, 1980	Brazil, Colombia, Costa Rica, Grenada, <b>Guadeloupe</b> , Matrinique, Panama, St. Lucia, Tobago, Trinidad
<i>N. tertia</i> (Mosely, 1939)	<b>Brazil</b> , Uruguay
* <i>N. teutonia</i> Flilnt, 1983	<b>Brazil</b>

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TABLE 1. (Continued)

Species	Distribution
* <i>N. trescuerna</i> sp. nov.	Costa Rica
* <i>N. tubulifera</i> Flint, 1980	Argentina, Uruguay
<i>N. unamas</i> Botosaneanu in Botosaneanu & Alkins-Koo, 1993	Tobago, Panama
<i>N. vekonyka</i> Oláh & Johanson, 2011	French Guiana
<i>N. villa</i> Oláh & Johanson, 2011	French Guiana
<i>N. xicana</i> (Mosely, 1937)	Costa Rica, Mexico, Nicaragua, Panama

## New Species

### Family Hydroptilidae Stephens, 1836

#### Subfamily Neotrichiinae Ross, 1956

#### Genus *Neotrichia* Morton, 1905

##### *Neotrichia alajuela* sp. nov.

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Figs 1A–1D

**Diagnosis.** *Neotrichia alajuela* sp. nov. appears most similar to *N. unamas* Botosaneanu and *N. canixa* (Mosely), on the basis of the prominent posterolateral rod from segment IX. The new species is separated by the elongate, widely separated dorsal horns of segment X, the shorter posterolateral rod of segment IX, the structure of the bracteole, and the curving inferior appendages.

**Description.** Total length 1.4 mm (1), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX annular, sinuate posteriorly, incomplete dorsally, sclerotized spinose process dorsolaterally which in lateral view is wide basally then tapers distally; ventrally broadly incised mesally anteriorly and posteriorly, mesal lobate process posteriorly; dorsally fused with segment X, spinose process laterally. Segment X lobate in lateral view, elongate sclerotized horn arising at midlength, widening distally to truncate apex; in dorsal view rounded apically, pair of horns arising laterally and extending posteriorly. Subgenital plate in lateral view narrow over length, posteriorly curving downward to acute apex, dorsal stout seta subapically; in ventral view wide basally, sharply tapering posteriorly to mesal spike, pair of stout setae posterolaterally. Bracteole in lateral view bifid, dorsal process thin bearing elongate seta apically, ventral process wider, with several setae on margin; in dorsal and ventral views thin over length. Inferior appendage in lateral view short, wide basally, gradually tapering distally beyond midlength to truncate apex which bears several setae, distally tapering interior process ventrally; in ventral view thin over length and curving inward to rounded apex, inner mesal process wide basally, tapering distally, bearing elongate seta apically. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, apex narrow, bifid apically, the rods similar in length and sharply curving, ejaculatory duct protruding distally.

**Holotype, male.** COSTA RICA, Alajuela Province, Reserva Forestal San Ramón, Río San Lorencito and its tributaries; 10.216°N, 84.406°W; 980 m a.s.l.; 6–10 March 1991; leg R. Holzenthal, F. Muñoz-Quesada, J. Huisman (UMSP000552062). **Paratypes**, same as type, but 1–4 May 1990; leg R. Holzenthal, R. Blahnik; 1 male • *ibid.*, Río Peje and falls, ca 1 km SE San Vicente, 10.277°N, 84.388°W, 1450 m a.s.l., 14–15 February 1992, leg R. Holzenthal, F. Muñoz-Quesada, K. Kjer; 1 male (CMNH) • *ibid.*, **Puntarenas Province**, Río Singri, ca 2 km (air) S Finca Helechales; 9.057°N, 83.082°W; 21 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, **San José Province**, Parque Nacional Braulio Carrillo, Estación Carrillo, Quebrada Sanguijuela; 10.160°N, 83.963°W; 800 m a.s.l.; 27 March 1987; leg R. Holzenthal, S. Hamilton, M. Heyn; 2 males (UMSP, CMNH).

**Female and larva.** Unknown.

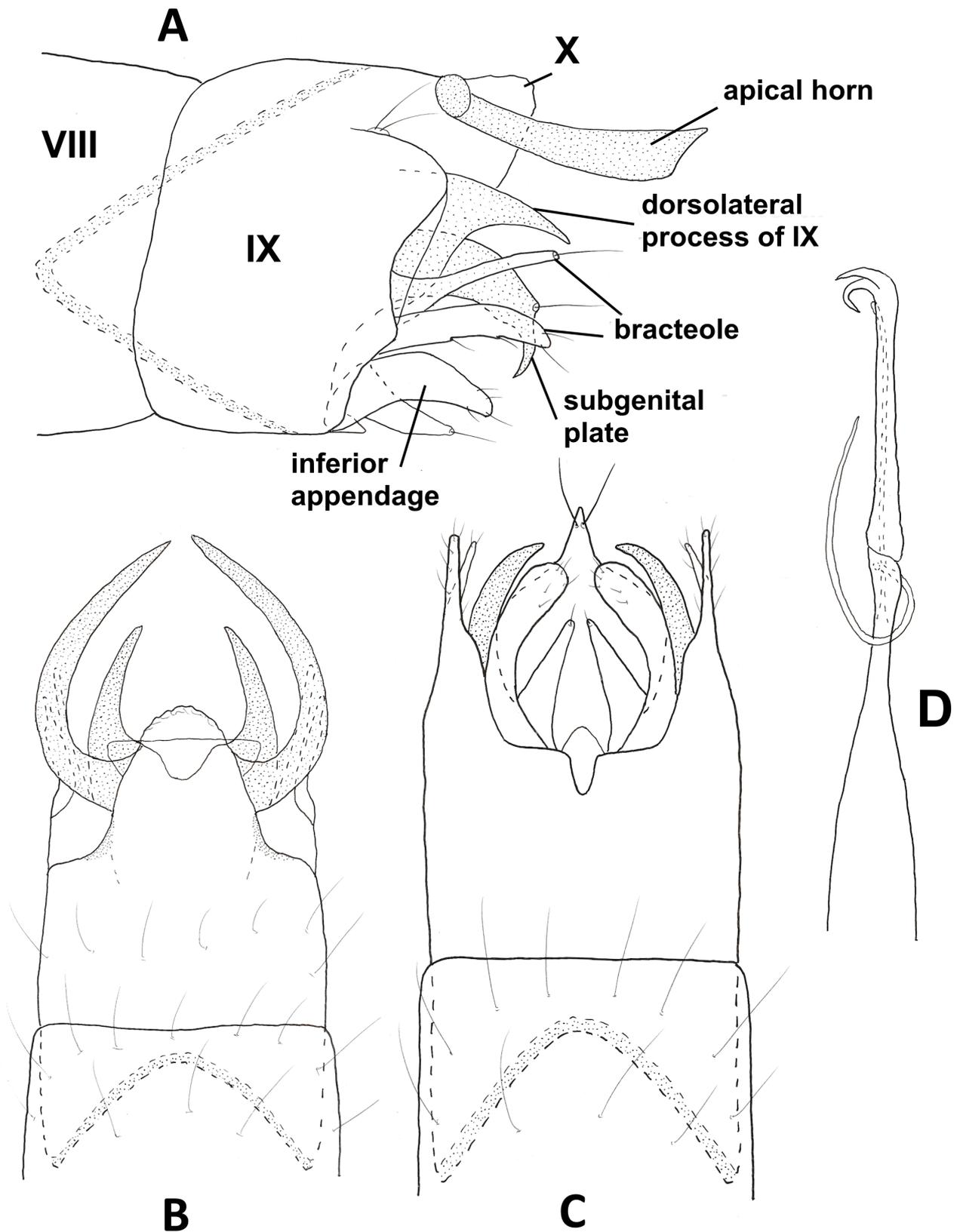


FIGURE 1. *Neotrichia alajuela* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view.

**Etymology.** Named for the Costa Rican province in which the type was collected. The specific epithet is a noun in apposition.

**Distribution.** Costa Rica.

*Neotrichia cerberusi* sp. nov.

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Figs 2A–2D

**Diagnosis.** *Neotrichia cerberusi* sp. nov. is most similar to *N. kehelia* Oláh & Johanson from Peru and *N. matula* Gama Neto & Passos, from Brazil, both of which have short curving distal horns from segment X. The new species is recognized by the 3-pronged structure of the subgenital plate and bifid apex of the phallus.

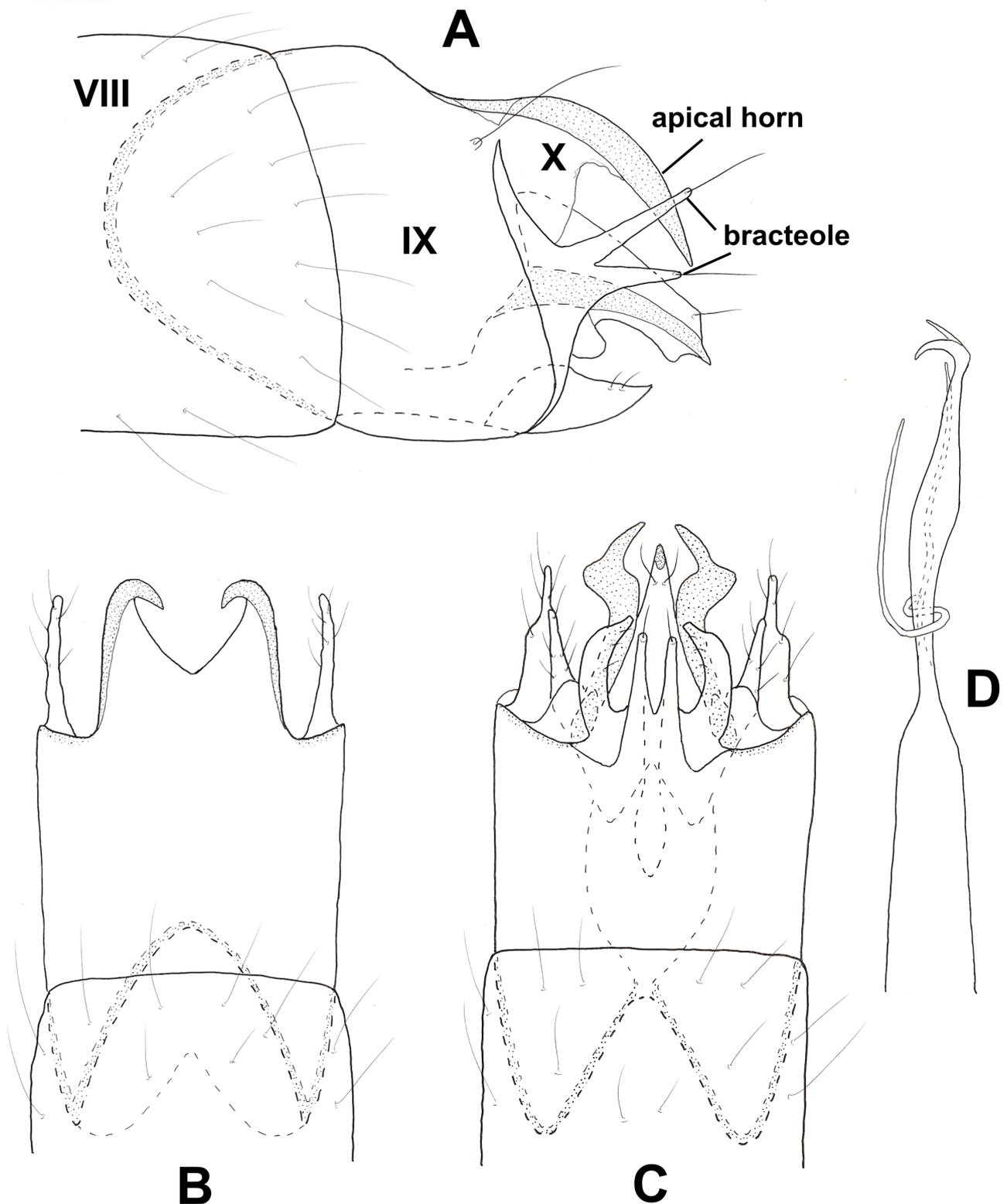


FIGURE 2. *Neotrichia cerberusi* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view.

**Description.** Total length 1.5 mm (1), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX annular, incomplete dorsally, rounded anteriorly; ventrally narrowly incised anteriorly, posteriorly incised laterally; dorsally fused with segment X. Segment X in lateral view, wide basally, tapering distally to acute apex; in dorsal view incised posteromesally, forming short distal horns which curve inward apically. Subgenital plate in lateral view wide basally, narrowing distally to median spine, thin sclerotized ridge mesally, ventral knob subbasally, dorsal stout seta subapically; in ventral view divided into three processes, medial process triangular, apex with lateral setae and downturned hook, lateral processes sclerotized, narrow over length, subapically widening then abruptly narrowing to acute apex. Bracteole in lateral view bifid, dorsal-most rod slightly longer than ventral-most, each rod tipped with elongate seta; in dorsal and ventral views thin over length. Inferior appendage in lateral view short and triangular, apex acute; in ventral view thin over length and curving inward to narrow truncate apex, inner mesal process thin and elongate, bearing elongate seta apically. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, apex narrow, bifid apically, the rods similar in length and sharply curving, ejaculatory duct protruding distally.

**Holotype, male.** COSTA RICA, Puntarenas Province, Río Bellavista, ca 1.5 km NW Las Alturas; 8.951°N, 82.846°W; 400 m a.s.l.; 8–9 April 1987; leg R. Holzenthal, S. Hamilton, M. Heyn (UMSP000552063).

**Female and larva.** Unknown.

**Etymology.** Named for the three-headed dog of Greek mythology, referring to the 3-pronged subgenital plate. The specific epithet is a noun in apposition.

**Distribution.** Costa Rica.

***Neotrichia chaconorum* sp. nov.**

urn:lsid:zoobank.org:act:E2A4E600-1816-461F-8AD0-B0012B451B8A

Figs 3A–3D

**Diagnosis.** *Neotrichia chaconorum* sp. nov. is similar to *N. harrisi* Bueno-Soria & Barba-Alvarez, as both have a pair of serrate dorsolateral processes from the base of segment X. The new species can be separated by the undivided bracteole, the apex of the phallus, and the shape of the subgenital plate.

**Description.** Total length 1.5 mm (1), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX, square, narrowing posteriorly to sinuate margin, pair of sharp spines dorsally; ventrally truncate anteromesally, mesally rounded posteriorly; dorsally fused with segment X. Segment X in lateral view elongate narrowing distally into downturned hook; lateral process originating basally, widening distally to serrate margin; in dorsal view gradually narrowing distally into a rounded mesal horn, basolateral process widening distally to serrate margin, incised laterally. Subgenital plate in lateral view wide basally, sharply narrowing distally into elongate, downturned hook, elongate seta posterodorsally; in ventral view wide basally, narrowing apically into downturned hook, pair of stout setae anterolaterally. Bracteole in lateral view wide basally, triangular distally, elongate seta dorsomesally; in dorsal and ventral views narrowing distally. Inferior appendage in lateral view rectangular basally, narrowing sharply at midlength to thin upturned apex, rugose at tip, thin ventral process from base; in ventral view wide basally, tapering distally and curving inward to rounded, rugose apex, mesal process thin and elongate bearing seta apically. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, apex narrow, divided distally into pair of processes, one short and the other elongate, both acute apically, ejaculatory duct not protruding distally.

**Holotype, male.** COSTA RICA, Alajuela Province, Parque Nacional Rincón de la Vieja, Quebrada Provisión; 10.769°N, 85.281°W; 810 m a.s.l.; 4 March 1986; leg R. Holzenthal, W. Fasth (UMSP000552064).

**Female and larva.** Unknown.

**Etymology.** This species is named for the brothers Abelardo and Isidro Chacón in recognition of and thanks for their field assistance to the third author's (RWH) NSF project during the 1980s. The name is a plural noun in apposition.

**Distribution.** Costa Rica.

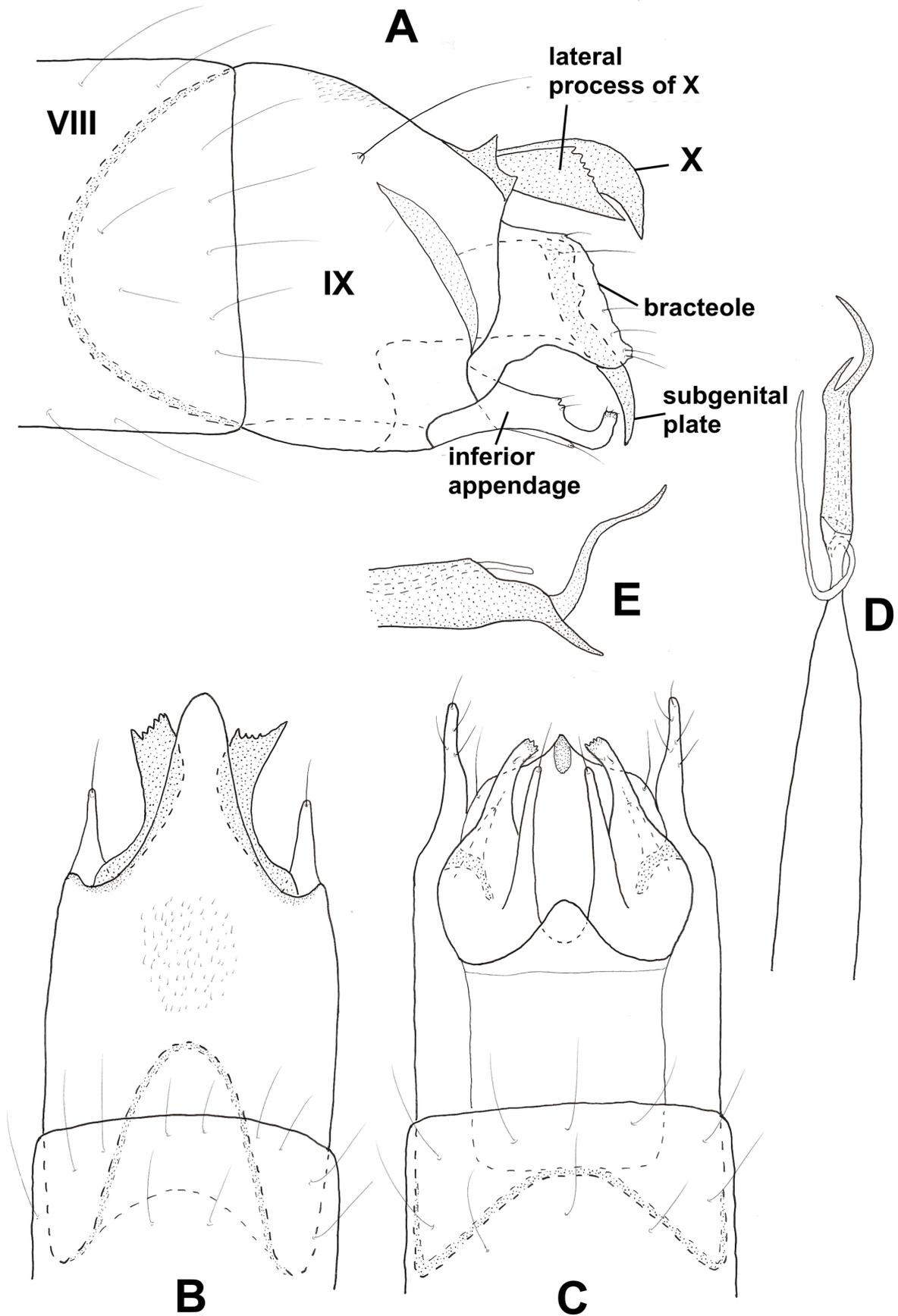


FIGURE 3. *Neotrichia chaconorum* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view.

***Neotrichia doshocica* sp. nov.**

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Figs 4A–4E

**Diagnosis.** *Neotrichia doshocica* sp. nov. is most similar to *N. chihuahua* Harris & Flint and *N. contrerasi* Harris & Flint, both occurring in Mexico, and both having short posterolateral horns from segment X. The new species is recognized by the undivided bracteole and the rectangular shape of the inferior appendage.

**Description.** Total length 1.4–1.5 mm (4), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX narrow, sinuate on posterior margin, incomplete dorsally, rounded anteriorly; ventrally narrowly incised anteriorly, posteriorly broadly incised, narrow lobate process mesally; dorsally fused with segment X. Segment X in lateral view, rounded basally, narrow process laterally which tapers to rectangular apex, dorsal margin sclerotized; in dorsal view incised posteromesally, forming short distal horns which taper distally, with sclerotized lateral margins. Subgenital plate in lateral view bifid, dorsal and ventral process narrowing distally to acute apices, dorsal process with triangular knob posterodorsally; in ventral view wide basally, rounded on margin, abruptly tapering distally to acute spine, pair of lateral setae posterolaterally, downturned hook mesally, lateral thin spinose process. Bracteole in lateral view undivided, short mesal lobe with pair of setae; in dorsal and ventral views short and triangular, with apical setae. Inferior appendage in lateral view rectangular, apically narrowing to rugose acute tip, elongate triangular process ventrally; in ventral view narrowly lobate, tapering distally to rounded apex, inner mesal process thin and elongate, tapering distally and bearing stout setae apically. Phallus in dorsal view tubular, constricted at sinuate middle and bearing thin paramere encircling shaft, apex narrow, bifid apically, the rods similar in length and intertwined, ejaculatory duct not protruding distally.

**Holotype, male.** COSTA RICA, Puntarenas Province, Río Singri, ca 2 km (air) S Finca Helechales; 9.057°N, 83.082°W; 720 m a.s.l.; 21 February 1986; leg R. Holzenthal, J. Morse, W. Fasth (UMSP000552065). **Paratypes**, same as holotype; 3 males (UMSP, CMNH).

**Female and larva.** Unknown.

**Etymology.** Named for the two snout-like dorsal, posterior horns of segment X. The specific epithet “doshocica” (Spanish, “two + snout” in English) is a noun in the genitive case.

**Distribution.** Costa Rica.

***Neotrichia gancho* sp. nov.**

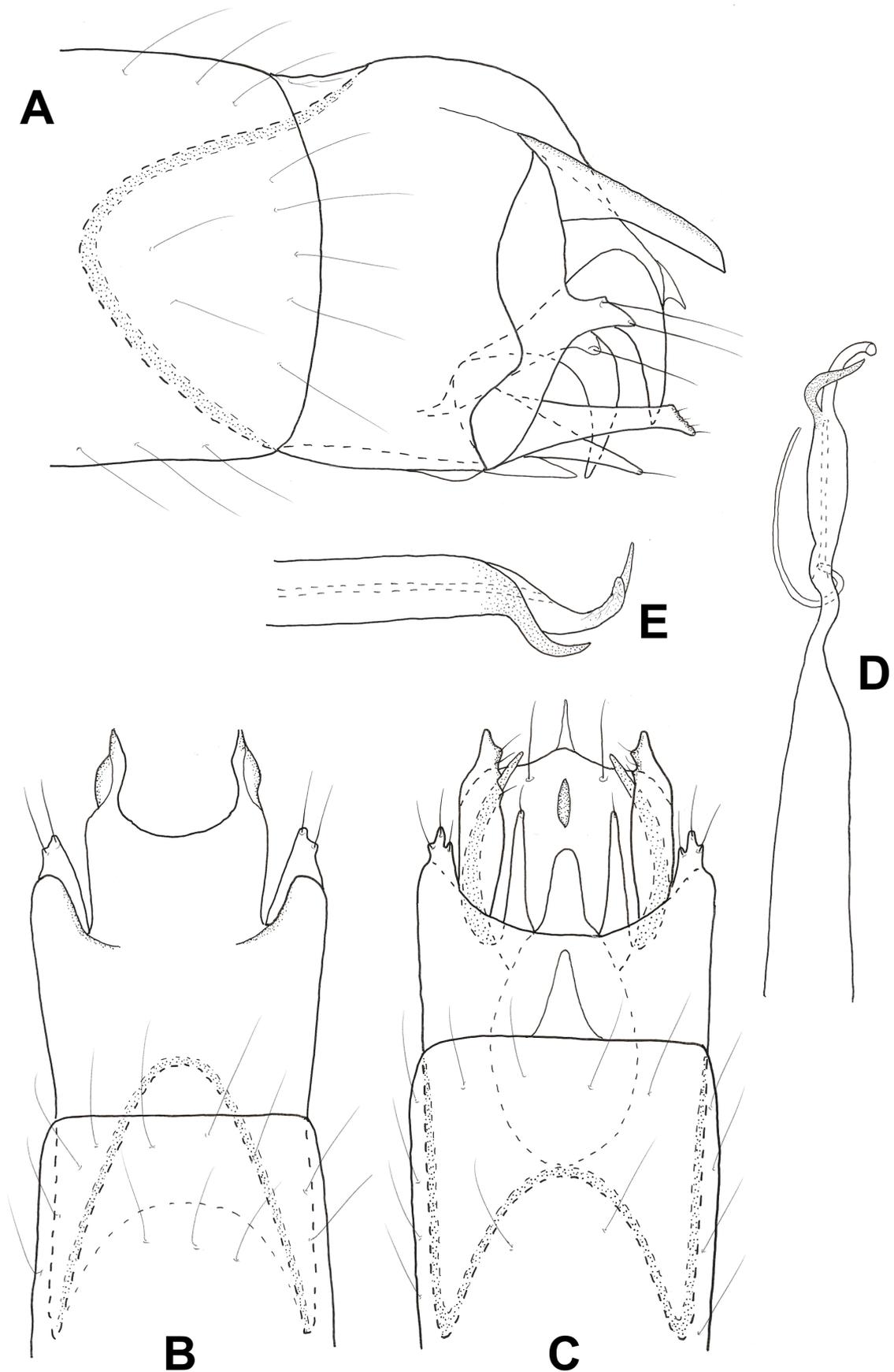
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Figs 5A–5E

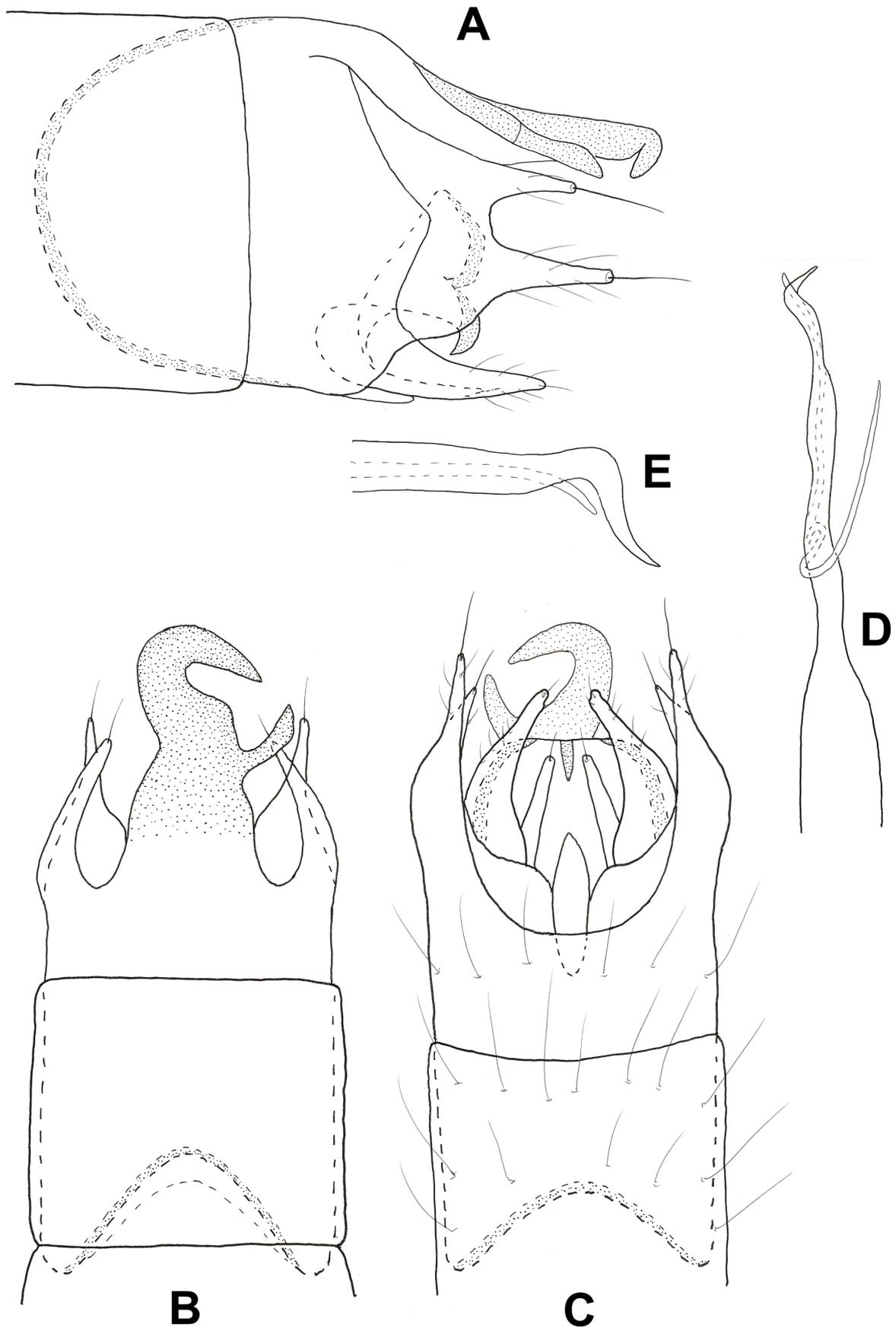
**Diagnosis.** *Neotrichia gancho* sp. nov. with the large, distinctive dorsal projection from segment X appears to be unique within *Neotrichia*, although *N. sandyae* Ruiter from Arizona also has a large projection. The new species is separated by the projection being asymmetrical and lacking an elongate process from segment IX, which is present in *N. sandyae*.

**Description.** Total length 1.6 mm (1), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX thin, widening posteromesally, incomplete dorsally, anteriorly rounded; ventrally broadly incised posteriorly and anteriorly, mesal lobate process posteriorly; dorsally fused with segment X. Segment X narrowing distally and divided into pair of horns, outer narrow and short, inner elongate, downturned at apex; in dorsal view wide basally, divided distally into pair of sclerotized horns, mesal horn tapering to acute apex and hook-like, lateral horn short and narrow. Subgenital plate in lateral view narrow, posteriorly divided into pair of lobes, dorsal-most truncate apically, ventral-most narrowing anteroventrally into acute process; in ventral view square, apically truncate with mesal sclerotized process, pair of stout setae near margin. Bracteole in lateral view bifid, dorsal process about  $\frac{3}{4}$  length of ventral process, both processes thin and tipped with elongate seta; in dorsal and ventral views narrowing distally. Inferior appendage in lateral view short, tapering distally, interior thin process ventrally; in ventral view wide basally, tapering distally, and curving inward to rounded apex, inner mesal process thin and elongate bearing seta apically. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, apex tapering and angled, ejaculatory duct protruding distally.



**FIGURE 4.** *Neotrichia doshocica* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view, E phallus apex, lateral.



**FIGURE 5.** *Neotrichia gancho* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view, E phallus apex, lateral.

**Holotype, male.** COSTA RICA, Puntarenas Province, Río Jaba at rock quarry, 1.4 km (air) W Las Cruces; 8.79°N, 82.97°W; 50 m a.s.l.; 15 March 1991; leg R. Holzenthal, F. Muñoz-Quesada, J. Huisman (UMSP000552066).

**Female and larva.** Unknown.

**Etymology.** Spanish for hook, referring to the distinctive tergum X. The specific epithet is a singular noun in the genitive case.

**Distribution.** Costa Rica.

***Neotrichia monika* sp. nov.**

urn:lsid:zoobank.org:act:1856D07B-3A2E-43D3-9880-439F6CA63C7A

Fig 6A–6E

**Diagnosis.** *Neotrichia monika* sp. nov. with the large, asymmetrical horns from tergum X is similar to *N. malickyi* Harris, *N. parajarochita* Harris, Armitage & Ríos, and *N. snixae* Harris, Armitage & Ríos, all occurring in Panama. The new species is separated by the shape of the dorsal horns from tergum X and the short bracteole.

**Description.** Total length 1.4–1.6 mm (16), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX thin, widening posteromesally, incomplete dorsally, anteriorly and posteriorly rounded, small triangular process posterodorsally; ventrally mesally incised anteriorly, laterally incised posteriorly, mesal lobate process posteriorly, small lobate process laterally; dorsally fused with segment X, small acute, lateral process on right side and lobate process on left side posteriorly. Segment X narrowing distally and divided into pair of horns, upper-most narrow and elongate, lower-most short and wide, upturned apically; in dorsal view wide basally, divided distally into pair of asymmetrical sclerotized horns, left horn narrow and elongate, right horn wide, curving inward to acute apex. Subgenital plate in lateral view wide basally, tapering distally to bifid apex, upper rod short, lower rod elongate and turning ventrad; in ventral view wide basally, sharply tapering posteriorly to mesal spike, with downward projecting spine subapically, pair of stout setae posterolaterally. Bracteole in lateral view broadly bifid, each process short and bearing elongate seta; in dorsal and ventral views narrowing distally. Inferior appendage in lateral view short, wide basally, tapering distally to rounded bifid apex, thin interior process ventrally; in ventral view thin over length and curving mesally to rounded apex, inner mesal process very thin. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, apex narrow, bifid apically, the rods similar in length, ejaculatory duct not protruding distally.

**Holotype, male.** COSTA RICA, Alajuela Province, Río Pizote ca 5 km (air) S Brasilia; 10.972°N, 85.345°W; 390 m a.s.l.; 12 March 1986; leg R. Holzenthal, W. Fasth (UMSP000552067). **Paratypes**, same as holotype; 16 males (UMSP, CMNH) • *ibid.*, Guanacaste Province, Quebrada Sur, Estación Biológica Pitilla, Área de Conservación Guanacaste; March 1994; leg F. Muñoz-Quesada; 1 male • *ibid.*, Heredia Province, Río Bijagual on road to Magsasay; 10.408°N, 84.076°W; 140 m a.s.l.; 21 March 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Limón Province, Corcori Cariari; 1000 m a.s.l.; October 1992; leg F. Muñoz-Quesada; 2 males.

**Female and larva.** Unknown.

**Etymology.** Named for Monika Springer, friend and colleague of RWH and BJA, and professor of biology at the University of Costa Rica, in recognition of her contributions to our knowledge of aquatic insects of Costa Rica. The specific epithet is a noun in apposition.

**Distribution.** Costa Rica.

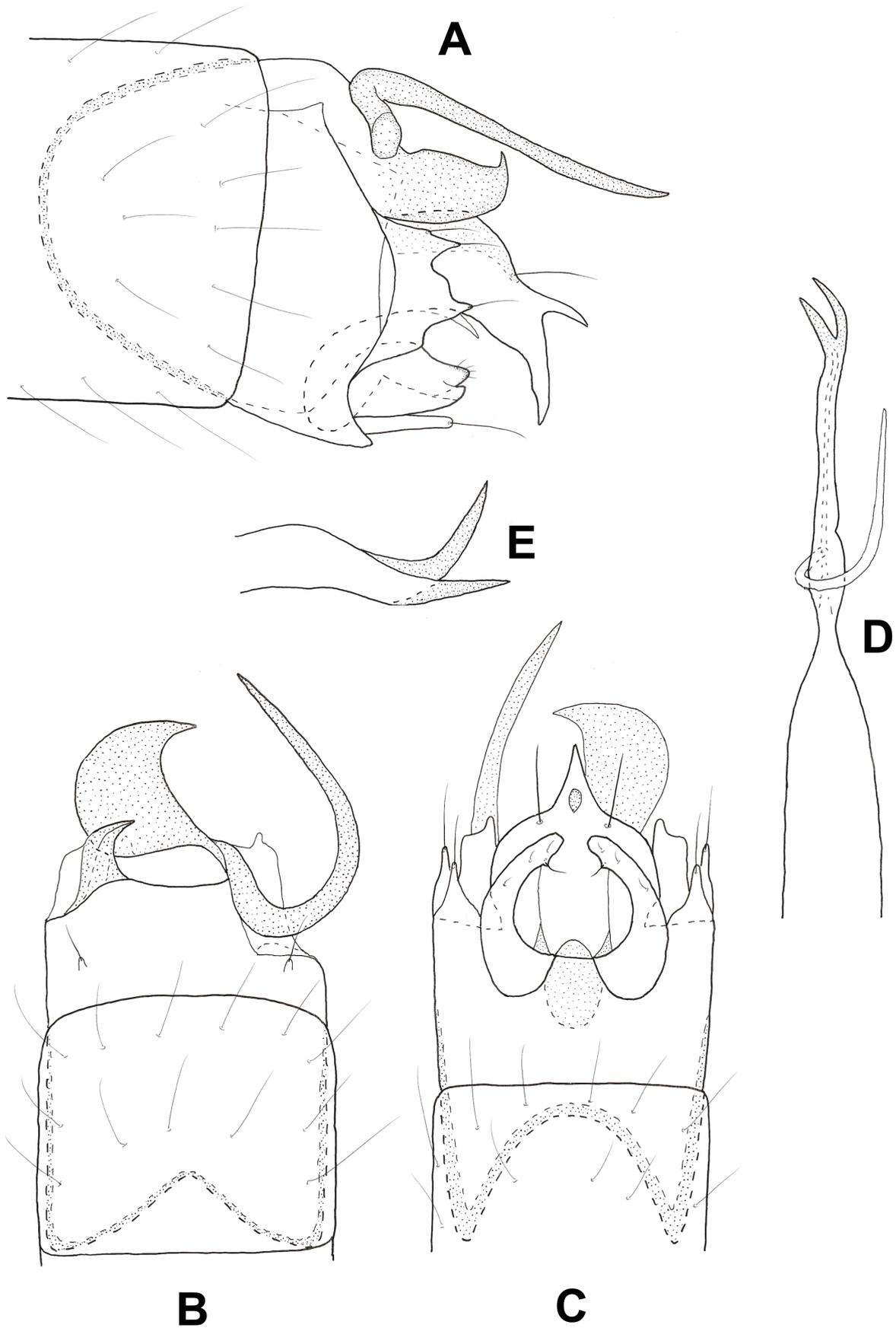
***Neotrichia munozi* sp. nov.**

urn:lsid:zoobank.org:act:874704B2-C512-479D-BD35-4A1A3EB6DDCB

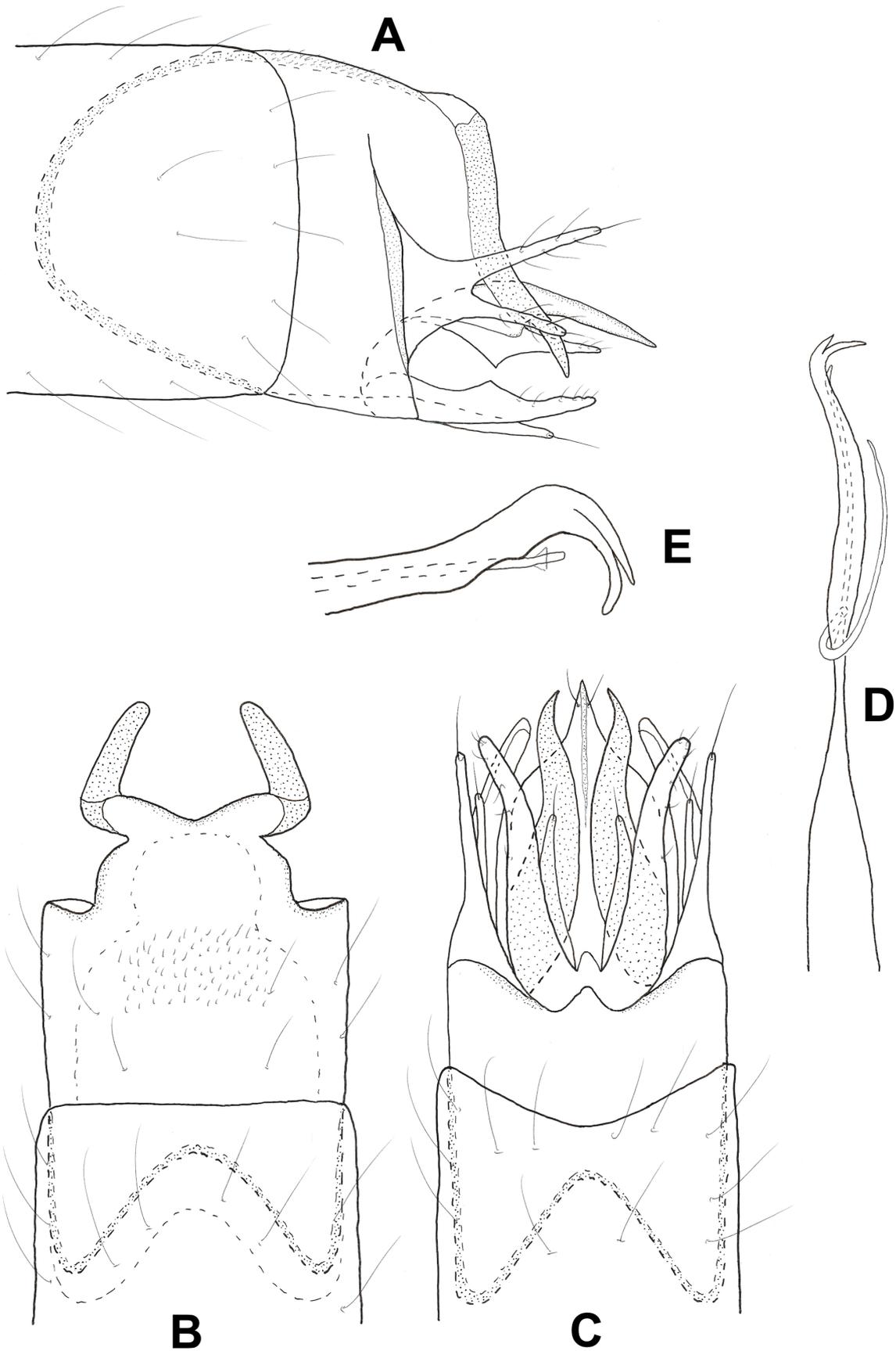
Figs 7A–7E

**Diagnosis.** *Neotrichia munozi* sp. nov. is most similar to *N. michaeli* Armitage & Harris from Panama based on the short, tubular-shaped posterior horns of segment X. The new species is separated by the bifid bracteole, and the shape of the subgenital plate and inferior appendage.

**Description.** Total length 1.4 mm (1), 18 antennal segments, wings and body brown in alcohol.



**FIGURE 6.** *Neotrichia monika* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view, E phallus apex, lateral.



**FIGURE 7.** *Neotrichia munozi* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view, E phallus apex, lateral.

**Male genitalia.** Abdominal segment VIII annular. Segment IX narrow, truncate posteriorly, incomplete dorsally, rounded anteriorly; ventrally narrowly incised anteriorly, posteriorly broadly incised laterally, small lobate process mesally; dorsally fused with segment X. Segment X in lateral view elongate, wide basally, sclerotized and tapering distally to acute apex, which turns ventrad almost reaching inferior appendage; in dorsal view broadly incised posteromesally, forming short sclerotized distal horns which are thinly rectangular, rounded apically and curving inward. Subgenital plate in lateral view bifid, dorsal and ventral processes narrowing distally to acute apices, both with ventral knob at midlength; in ventral view divided into three processes, mesal process wide basally, tapering distally to acute apex, median sclerite, pair of setae posterolaterally, pair of lateral processes, inner process sclerotized, sinuate, tapering to acute apex, outer process narrow over length, curving inward to rounded apex. Bracteole in lateral view divided into two elongate rods, dorsal-most rod longer than ventral-most, each tipped with elongate seta; in ventral view thin and elongate, tipped with elongate seta. Inferior appendage in lateral view thin, dorsal hump at midlength, tapering posteriorly to rounded apex, thin elongate triangular process ventrally; in ventral view wide basally, tapering distally and curving outward at rounded apex, inner mesal process short and thin, bearing stout seta apically. Phallus in ventral view tubular, constricted at midlength and bearing thin paramere encircling shaft, apex narrow, bifid apically, the rods dissimilar in length and curving laterally, ejaculatory duct protruding distally.

**Holotype, male.** COSTA RICA, Guanacaste Province, Quebrada Sur, Estación Biológica Pitilla, Área de Conservación Guanacaste; March 1994; leg F. Muñoz-Quesada (UMSP000552068).

**Female and larva.** Unknown.

**Etymology.** Named for the late Colombian/Costa Rican scientist, Fernando Muñoz-Quesada, a student, colleague, and friend of RWH. He collected the type specimen and also contributed to our knowledge of the caddisflies of both Costa Rica and Colombia. The specific epithet is a noun in apposition.

**Distribution.** Costa Rica.

### *Neotrichia paragancho* sp. nov.

urn:lsid:zoobank.org:act:B5FF2549-7160-4FF7-9C7B-C041F8DA3081

Figs 8A–8D

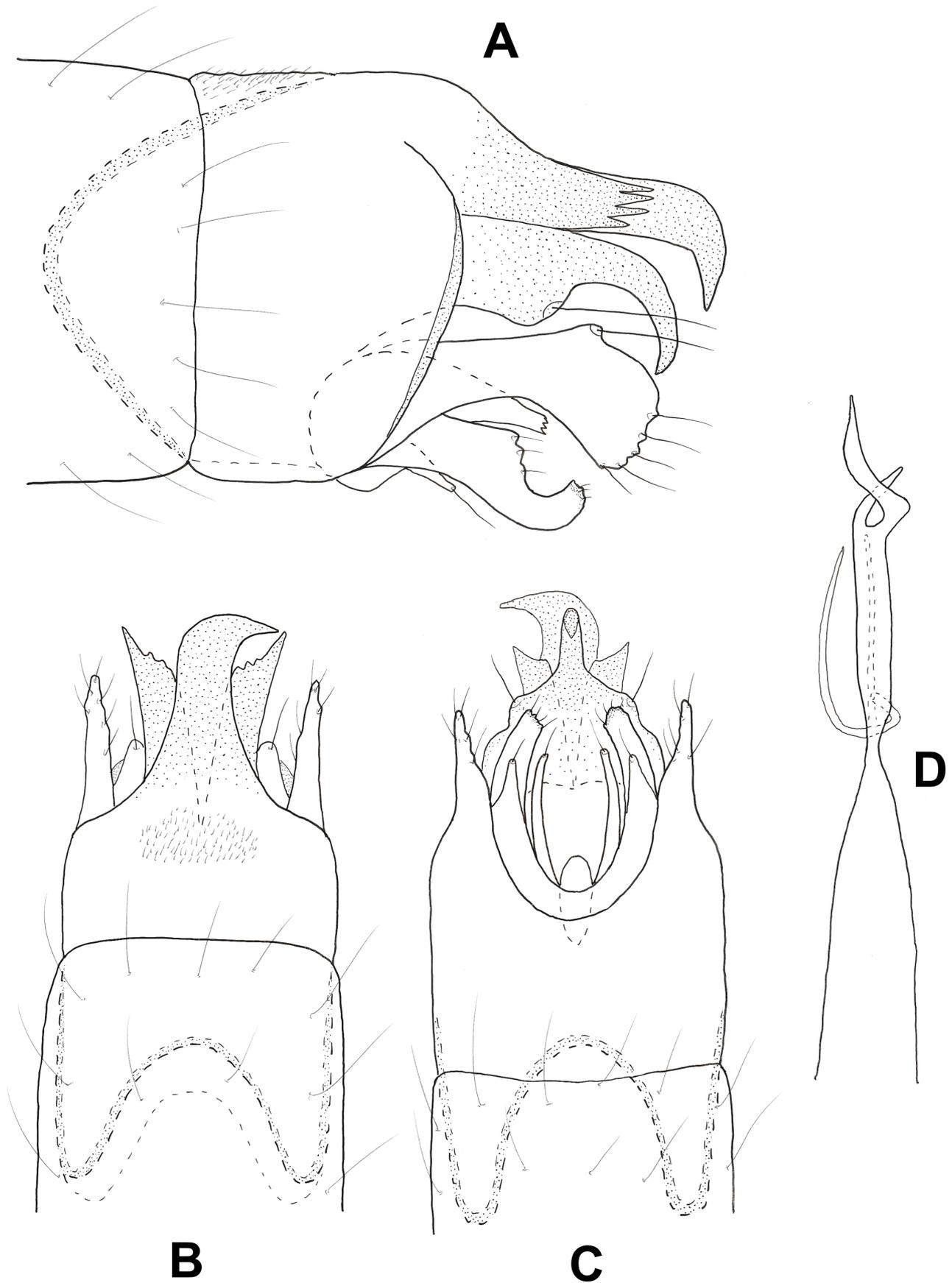
**Diagnosis.** *Neotrichia paragancho* sp. nov. is similar to *N. gancho* sp. nov., as both have a large mesal dorsal projection from segment X, although in *N. paragancho* sp. nov. this projection is not divided distally with an inner hook. There is also a pair of dorsolateral serrate processes from segment X, similar to that of *N. chachonorum* sp. nov. and *N. harrisi* Bueno-Soria & Barba-Alvarez, which is not present in *N. gancho* sp. nov.

**Description.** Total length 1.5 mm (1), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX, rounded and widening posteromesally, posterolateral process as wide as segment X and serrate apically, incomplete dorsally, anteriorly rounded; ventrally broadly incised posteriorly and anteriorly, mesal lobate process posteriorly; dorsally fused with segment X, pair of apically serrate processes nearly as long as segment X. Segment X in lateral view elongate narrowing distally into downturned hook, lateral serrate process about half length of segment; in dorsal view narrowing distally into a mesal horn which curves apically, pair of serrate processes basolaterally. Subgenital plate in lateral view wide basally, sharply narrowing distally into elongate, downturned hook, elongate seta posteroventrally; in ventral view wide basally, sinuate on lateral margin, narrowing apically into downturned hook, pair of stout setae anterolaterally. Bracteole in lateral view narrow basally, widening distally and spatulate, elongate seta dorsomesally; in dorsal and ventral views narrowing distally. Inferior appendage in lateral view wide basally, narrowing sharply to thin upturned apex, rugose at tip, dorsal process from base which is serrate apically; in ventral view narrow over length and curving inward to rounded, rugose apex, pair of basal processes, mesal process thin and elongate bearing seta apically, lateral process thicker with apical seta. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, apex narrow, divided distally into pair of processes, one short and the other elongate, both acute apically, ejaculatory duct not protruding distally.

**Holotype, male.** COSTA RICA, Guanacaste Province, Quebrada Sur, Estación Biológica Pitilla, Área de Conservación Guanacaste; March 1994; leg F. Muñoz-Quesada; (UMSP000552069).

**Female and larva.** Unknown.



**FIGURE 8.** *Neotrichia paragancho* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view.

**Etymology.** The name refers to similarity with *N. gancho* **sp. nov.** The specific epithet is an adjective in the genitive case.

**Distribution.** Costa Rica.

***Neotrichia pejensis* sp. nov.**

urn:lsid:zoobank.org:act:8C5CC572-AAD3-4F5E-AE14-0805AE97DC4D

Figs 9A–9D

**Diagnosis.** *Neotrichia pejensis* **sp. nov.** would previously have been assigned to the *esmalda* group of Keth *et al.* (2015), which is now nested in the *canixa* group (Bueno & Vilarino 2024; see Introduction and Discussion sections). This is based on the shape of the inferior appendage and the posterior projections of tergum X. Overall, there is a general similarity to *N. honda* Harris, Armitage & Ríos, but the tergum X is deeply incised posteriorly as in *N. suretka* **sp. nov.**, although each lobe ends in a sclerotized projection, and the phallic apex is undivided in the new species, but divided in *N. honda*.

**Description.** Male. Total length 1.6 mm (1), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX narrow, rounded posteriorly, sclerotized process posterolaterally, which is acute apically and denticulate on ventral margin, anteriorly with short mesal apodeme; ventrally deeply incised anteriorly and posteriorly, lateral process sinuate and projecting mesally. Segment X lobate in lateral view, terminating in short triangular process; in dorsal view fused anteriorly with segment IX, deeply incised posteromesally, each lobe tipped with sclerotized spiniform process. Subgenital plate in lateral view thin, bifid posteriorly, setal-bearing lobe dorsally; in ventral view wide basally, tapering distally to elongate mesal process, setal-bearing lobes laterally subbasally. Bracteole in lateral view wide basally, tapering distally into setal-bearing process; in dorsal and ventral views thin and sinuate, elongate seta apically. Inferior appendage in lateral view wide rectangular, abruptly narrowing subapically, dentate on dorsoapical margin; in ventral view rectangular, apically narrowing on lateral margin to rounded apex. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, apically narrowing to spine-like apex, ejaculatory duct not protruding.

**Holotype, male.** COSTA RICA, Alajuela Province, Río Peje and falls, ca 1 km SE San Vicente; 10.277°N, 84.388°W; 1450 m a.s.l.; 14–15 February 1992; leg R. Holzenthal, F. Muñoz-Quesada, K. Kjer (UMSP000552070).

**Female and larva.** Unknown.

**Etymology.** Named for the Río Peje from which the holotype was collected. The specific epithet is a noun in apposition.

**Distribution.** Costa Rica.

***Neotrichia trescuerna* sp. nov.**

urn:lsid:zoobank.org:act:571C3FFE-E1F8-4661-B7C2-8988DCB161EC

Figs 10A–10D

**Diagnosis.** *Neotrichia trescuerna* **sp. nov.** is difficult to place as the apical sclerotized horns typical of the *canixa* group arise from the base of segment X rather than the apex. This places the new species in a large group with similar structures, which includes the similar *N. haijla* Oláh & Johanson from French Guiana. The new species is separated from *N. haijla* by numerous differences in the genitalia, including the downward turning subgenital plate in lateral view, the short inferior appendage, and the lack of a bifid bracteole.

**Description.** Male. Total length 1.5 mm (1), 18 antennal segments, wings and body brown in alcohol.

**Male genitalia.** Abdominal segment VIII annular. Segment IX annular, truncate posteriorly, incomplete dorsally; ventrally deeply incised anteriorly, posteriorly shallowly incised laterally, mesal lobate process posteriorly; dorsally fused with segment X. Segment X narrowing to truncate apex in lateral view, sclerotized spinose process dorsolaterally which in lateral view is divided into three processes, a short dorsal knob, and a bifid ventral process, with the dorsal-most rod shorter than the ventral-most rod; in dorsal view tapering posteriorly to truncate apex, trifurcate basolateral processes, anteriormost lobate, posteriormost divided into pair of tapering rods. Subgenital plate in lateral view wide basally, ventrally produced into a narrow downturned process which is acute apically,

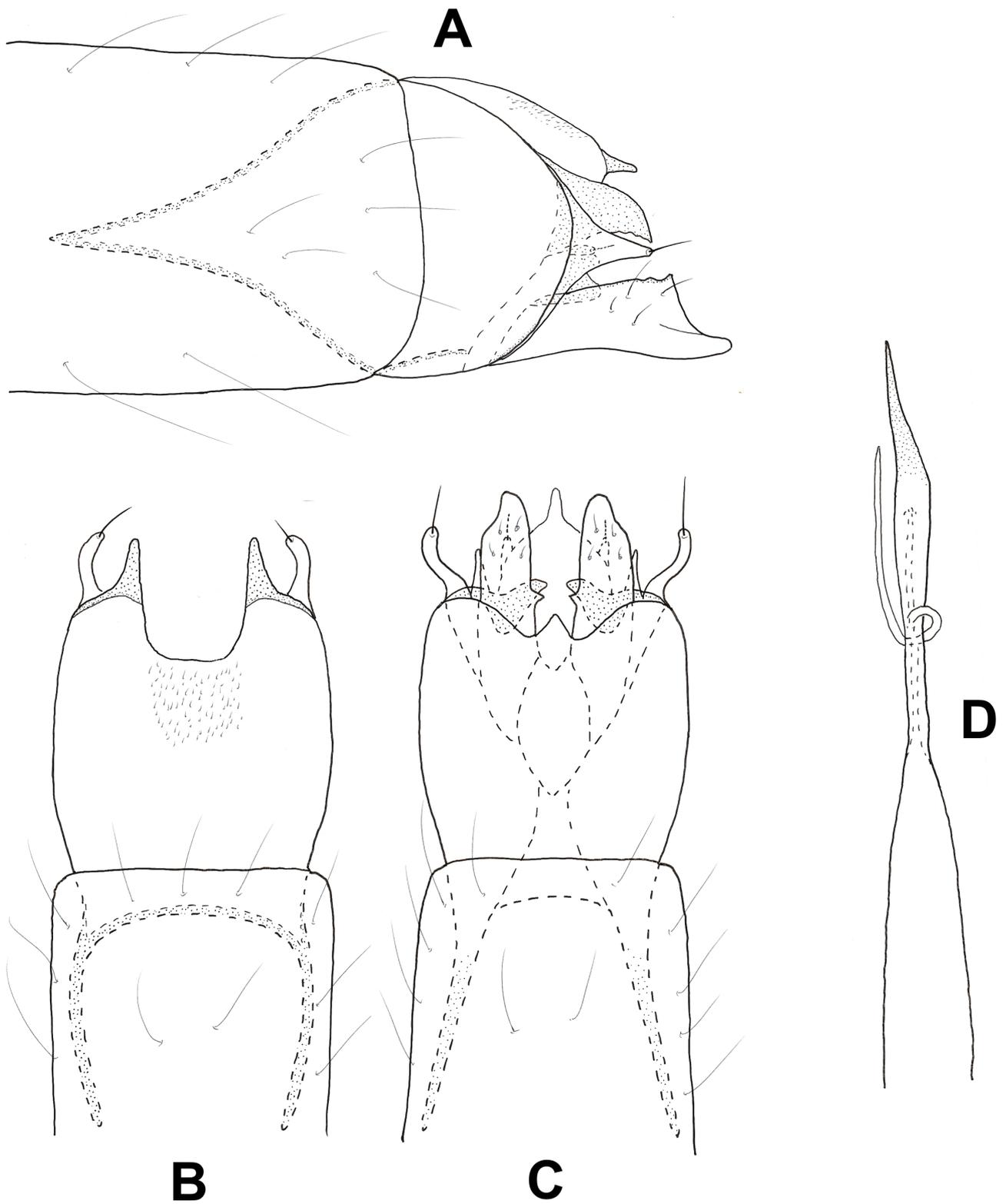


FIGURE 9. *Neotrichia pejensis* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view.

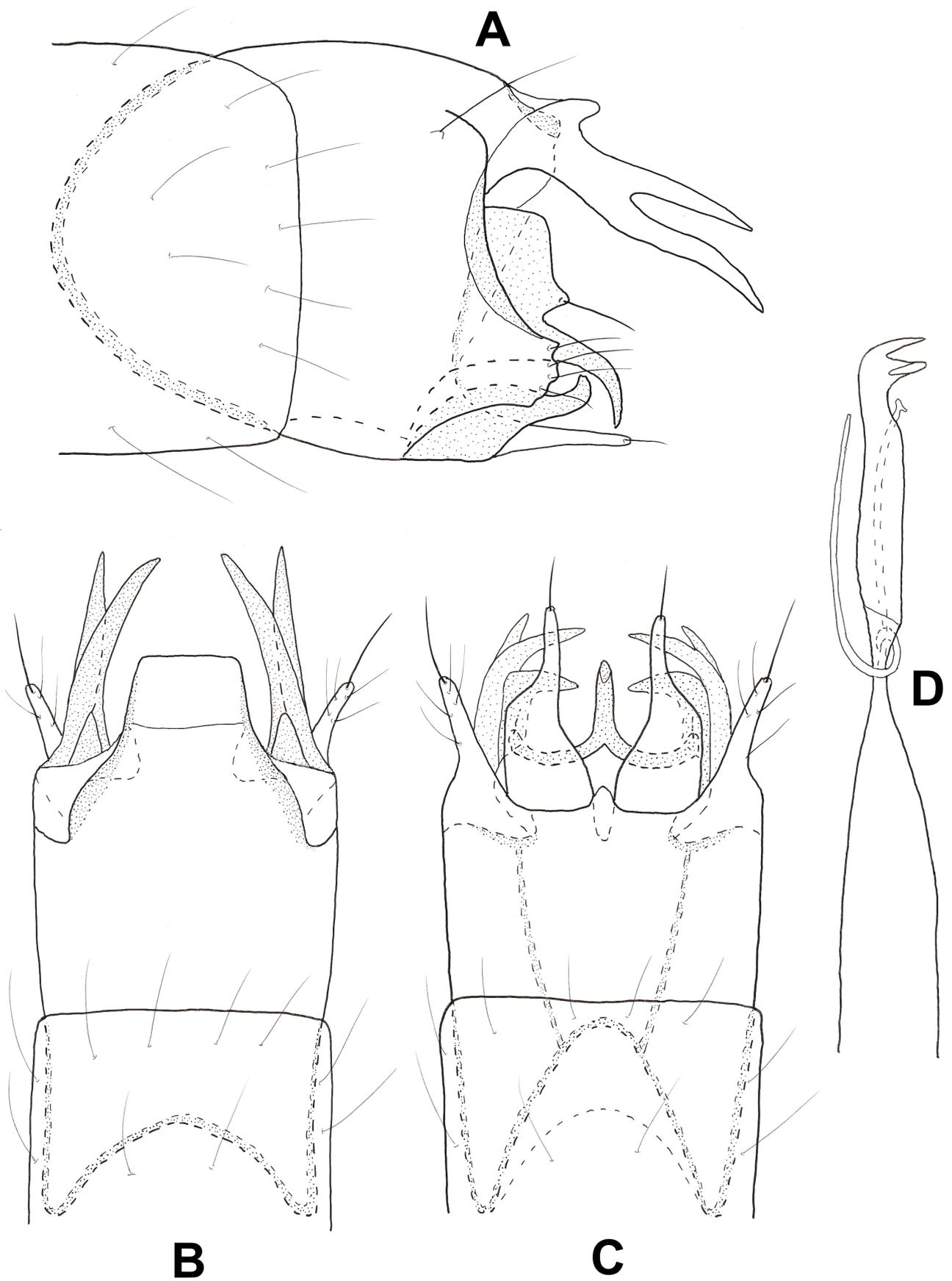


FIGURE 10. *Neotrichia trescuerna* sp. nov., genitalia—A lateral view, B dorsal view, C ventral view, D phallus, dorsal view.

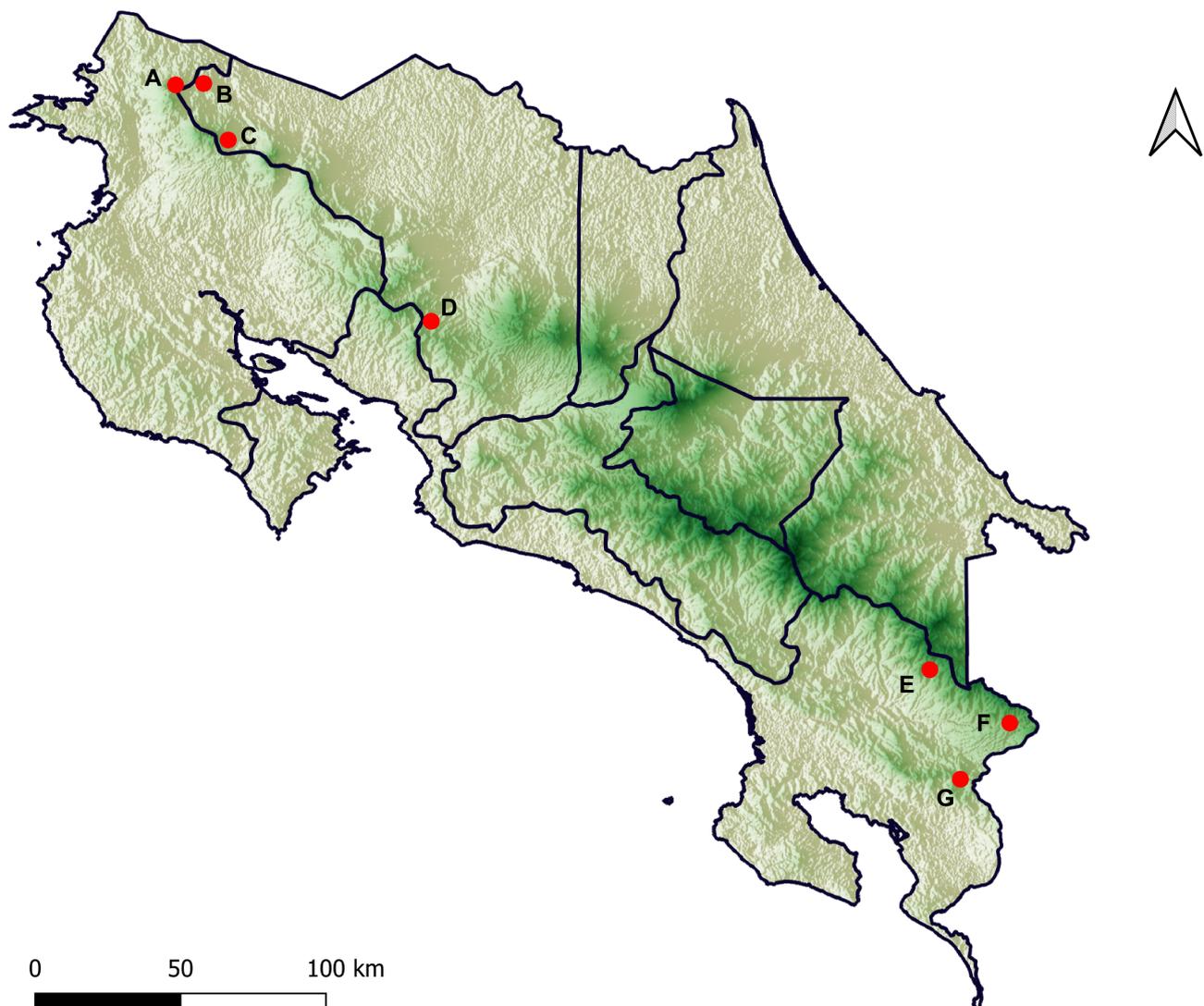
dorsomesally with stout seta; in ventral view rectangular basally, mesally produced into narrow process with downturned hook apically, stout seta posterolaterally. Bracteole in lateral view a wide posteroventral protuberance, sinuate and setose on posterior margin; in dorsal and ventral views thin over length bearing elongate seta apically. Inferior appendage in lateral view bifid, dorsal portion narrow and curving slightly upward apically, ventral portion elongate, narrowly triangular, stout seta apically; in ventral view mesal portion wide basally, abruptly tapering at midlength to narrow apex bearing stout seta, lateral portion sclerotized, narrow over length, curving sharply inward distally to acute apex. Phallus in dorsal view tubular, constricted at midlength and bearing thin paramere encircling shaft, distally narrowing to bifid apex, the rods similar in length with the lower rod sharply curving, ejaculatory duct protruding distally.

**Holotype, male.** COSTA RICA, Guanacaste Province, Quebrada Sur, Estación Biológica Pitilla, Área de Conservación Guanacaste; March 1994; leg F. Muñoz-Quesada (UMSP000552071).

**Female and larva.** Unknown.

**Etymology.** The epithet “*trescuerna*” is Spanish for “triple horn” referring to the basal rods of segment IX. The specific epithet is an adjective in the genitive case.

**Distribution.** Costa Rica.



**FIGURE 11.** Map of Costa Rica with an overlay of Provinces showing the location of holotype records.

## New Country Records

### *Neotrichia aguirrei* Armitage, Harris & Rodriguez, 2025

**Material examined:** COSTA RICA, Puntarenas Province, Agua Buena, Peninsula de Osa; September 1991; leg F. Muñoz-Quesada; 21 males; 8 males (UMSP, CMNH) • *ibid.*, Parque Nacional Corcovado, Estación Sirena, Río Camaronal; 8.481°N, 83.594°W; 5 m a.s.l.; 12–13 April, 1989; leg R. Holzenthal, R. Blahnik; 1 male • *ibid.*, Estación Quebrada Bonita, cruces de quebradas, Reserva Biológica Carara; 9.74722°N, 84.62778°W; 1990 m a.s.l.; 5 November–13 December; leg F. Muñoz-Quesada; 5 males • *ibid.*, San José Province, Reserva Biológica Carara, Río Carara, nr Carara; 9.778°N; 84.531°W; 20 m a.s.l.; 14 March 1991; leg R. Holzenthal, F. Muñoz-Quesada, J. Huisman; 1 male.

**Notes:** Previously only known from Panama.

### *Neotrichia anzuelo* Armitage & Harris, 2018

**Material examined:** COSTA RICA, Alajuela Province, Reserva Forestal San Ramón, Río San Lorencito and tributaries; 10.216°N, 84.607°W; 980 m a.s.l.; 30 March–1 April 1987; leg R. Holzenthal, S. Hamilton, M. Heyn; 1 male.

**Notes:** Previously only known from Panama.

### *Neotrichia canixa* (Mosely, 1937)

**Material examined:** COSTA RICA, Guanacaste Province, Río Tizate, 7.2 km NE Cañas Dulces; 10.773°N, 83.449°W; 275 m a.s.l.; 28 June 1986; leg R. Holzenthal, M. Heyn, B. Armitage; 1 male • *ibid.*, Murciélago, Área de Conservación Guanacaste; November 1993; leg F. Muñoz-Quesada; FM-COL-09; 8 males • *ibid.*, Murciélago; November–December 1993; leg F. Muñoz-Quesada; 16 males • *ibid.*, Río Pedregal; November 1993; leg F. Muñoz-Quesada; 3 males • *ibid.*, 14 km S Cañas; 15–22 March 1990; leg F. Muñoz-Quesada; 2 males • *ibid.*, Quebrada Sur, Estación Biológica Pitilla, Área de Conservación Guanacaste; March 1994; leg F. Muñoz-Quesada; 2 males.

**Notes:** Previously known from Mexico, Panama, and the USA.

### *Neotrichia collierorum* Armitage & Harris, 2018

**Material examined:** COSTA RICA, Puntarenas Province, Río Bellavista, ca 1.5 km NW Las Alturas; 8.951°N, 82.846°W; 1400 m a.s.l.; 8–9 April 1987; leg R. Holzenthal, S. Hamilton, M. Heyn; 1 male.

**Notes:** Previously only known from Panama.

### *Neotrichia corniculans* Flint, 1968

**Material examined:** COSTA RICA, Guanacaste Province, Parque Nacional Rincón de la Vieja, Quebrada Zopilote; 10.765°N, 85.309°W; 785 m a.s.l.; 3 March 1986; leg R. Holzenthal; 5 males.

**Notes:** Previously known from Dominica and Suriname.

### *Neotrichia harrisi* Bueno-Soria & Barba-Alvarez, 2018

**Material examined:** COSTA RICA, Guanacaste Province, Quebrada Sur, Estación Biológica Pitilla, Área de Conservación Guanacaste; March 1994; leg F. Muñoz-Quesada; 23 males.

**Notes:** Previously only known from Mexico.

### *Neotrichia majagua* Harris, Ríos & Aguirre, 2023

**Material examined:** COSTA RICA, Alajuela Province, Reserva Forestal San Ramón, Río San Lorencito and tributaries; 10.216°N, 84.609°W; 980 m a.s.l.; 1–4 May 1990; leg R. Holzenthal, R. Blahnik; 1 male • *ibid.*, Quebrada Arena, Puesto San Ramón; April 1994; leg F. Muñoz-Quesada; 1 male • *ibid.*, Guanacaste Province, Río Tizate, 7.2 km NE Canas Dulces; 10.773°N, 83.449°W; 980 m a.s.l.; 28 June 1986; leg R. Holzenthal, M. Heyn, B. Armitage; 1 male • *ibid.*, Parque Nacional Guanacaste Estación Maritza, Río Tempisquito; 10.958°N, 85.497°W; 550 m a.s.l.; 30–31 August 1990; leg R. Holzenthal, R. Blahnik, Quesada; 1 male • *ibid.*, Parque Nacional Rincón de la Vieja, Quebrada Zopilote; 10.765°N, 85.309°W; 785 m a.s.l.; 3 March 1986; leg R. Holzenthal; 1 male • *ibid.*, Limón Province, Río Bitey, ca 2.5 km S. Pandora; 9.785°N, 82.963°W; 15 m a.s.l.; 3 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Río Cerere, Reserva Biológica Hitoy-Cerere; December 1990; leg F. Muñoz-Quesada; 1 male • *ibid.*, Puntarenas Province, Río Singri, ca 2 km (air) S Finca Helechales; 9.057°N, 83.082°W; 720 m a.s.l.; 21 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 8 males • *ibid.*, Río Jaba at rock quarry, 1.4 km (air) W Las Cruces; 8.79°N, 82.97°W; 1130 m a.s.l.; 14 June 1986; leg R. Holzenthal, M. Heyn, B. Armitage; 1 male • *ibid.*, Río Guineal, ca 1 km E Finca Helechales; 9.076°N, 83.092°W; 840 m a.s.l.; 22 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 50 males.

**Notes:** Previously only known from Panama.

### *Neotrichia maya* Harris & Flint, 2016

**Material examined:** COSTA RICA, Alajuela Province, Río Pizote, ca 5 km (air) S Brasilia; 10.972°N, 85.345°W; 360 m a.s.l.; 12 March 1986; leg R. Holzenthal, W. Fasth; 17 males • *ibid.*, Limón Province, Río Telire and small trib, SE Suretka; 9.554°N, 82.892°W; 48 m a.s.l.; 1 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Puntarenas Province, Quebrada Pita, ca 3 km (air) N Golfito; 8.642°N, 83.193°W; 15 m a.s.l.; 15 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Parque Nacional Corcovado, Río Camaronal; 8.481°N, 83.594°W; 5 m a.s.l.; 12–13 February 1989; leg R. Holzenthal, R. Blahnik; 1 male.

**Notes:** Previously only known from Belize.

### *Neotrichia pamela* Harris & Armitage, 2015

**Material examined:** COSTA RICA, Limón Province, Río Telire and small trib, SE Suretka; 9.554°N, 82.892°W; 48 m a.s.l.; 1 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 4 males • *ibid.*, Reserva Biológica Hitoy-Cerere, Río Cerere; 9.671°N, 83.028°W; 90 m a.s.l.; 23–24 April 1987; leg R. Holzenthal, S. Hamilton, M. Heyn; 4 males • *ibid.*, Río Barbilla, ca 8 km W B-Line; 10.067°N, 83.369°W; 30 m a.s.l.; 11 January 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Río Barbilla, ca 5 km W B-Line; 10.067°N, 83.369°W; 30 m a.s.l.; 31 January 1986; leg R. Holzenthal, J. Morse, W. Fasth; 3 males • *ibid.*, Reserva Biológica Barbilla, Río Dantas, 15 km S Pacuarito; 9.994°N, 83.443°W; 300 m a.s.l.; 27–30 January 1992; leg R. Holzenthal, F. Muñoz-Quesada, K. Kjer; 32 males • *ibid.*, E.A.R.T.H. forest reserve arroyo, 7.5 km NW Pocora; 10.23°N, 83.56°W; 10 m a.s.l.; 4–5 February 1992; leg R. Holzenthal, F. Muñoz-Quesada, K. Kjer; 1 male • *ibid.*, Río Banano, 16 km, WSW Bomba; 9.888°N, 83.167°W; 150 m a.s.l.; 26 March 1987; leg R. Holzenthal, S. Hamilton, M. Heyn; 7 males • *ibid.*, Puntarenas Province, Parque Nacional Corcovado, Río Camaronal; 8.481°N, 83.594°W; 5 m a.s.l.; 12–13 February 1989; leg R. Holzenthal, R. Blahnik; 2 males • *ibid.*, Río Singri, ca 2 km (air) S Finca Helechales; 9.057°N, 83.082°W; 720 m a.s.l.; 21 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 23 males • *ibid.*, Río Guineal, ca 1 km E Finca Helechales; 9.076°N, 83.092°W; 840 m a.s.l.; 22 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 35 males.

**Notes:** Previously only known from Panama.

### *Neotrichia rancheria* Armitage, Harris & Rodriguez, 2025

**Material examined:** COSTA RICA, Limón Province, Reserva Biológica Hitoy-Cerere, Río Cerere; 9.671°N, 83.028°W; 23–24 April 1987; 90 m a.s.l.; leg R. Holzenthal, S. Hamilton, M. Heyn; 1 male • *ibid.*, Puntarenas

**Province**, Reserva Biológica Carara, Quebrada Bonita; 9.775°N; 84.605°W; 35 m a.s.l.; 18–20 May 1990; leg R. Holzenthal, R. Blahnik; 1 male.

**Notes:** Previously only known from Panama.

### *Neotrichia snixae* Harris, Armitage & Ríos, 2024

**Material examined:** COSTA RICA, Guanacaste Province, Quebrada García, 10.6 km, ENE Quebrada Grande; 10.862°N, 85.428°W; 470 m a.s.l.; 8 March 1986; leg R. Holzenthal, W. Fasth; 1 male.

**Notes:** Previously only known from Panama.

### *Neotrichia tauricornis* Malicky, 1980

**Material examined:** COSTA RICA, Alajuela Province, Río Peje and falls, ca 1 km SE San Vicente; 10.277°N, 84.388°W; 1450 m a.s.l.; 14–15 February 1992; leg R. Holzenthal, F. Muñoz-Quesada, K. Kjer; 1 male • *ibid.*, Río Pizote, ca 5 km (air) S Brasilia; 10.972°N, 85.345°W; 360 m a.s.l.; 12 March 1986; leg R. Holzenthal, W. Fasth; 4 males • *ibid.*, Guanacaste Province, Parque Nacional Guanacaste Maritza, Río Tempisquito Sur; 10.95°N, 85.48°W; 600 m a.s.l.; 30 July 1993; leg J. Huisman, F. Muñoz-Quesada; 4 males • *ibid.*, Parque Nacional Guanacaste, El Hacha, Quebrada Alcornoque; 11.009°N, 85.377°W; 250 m a.s.l.; 26 July 1987; leg R. Holzenthal, J. Morse, Clausen; 1 male • *ibid.*, unnamed quebrada, Estación Biológica Pitilla, Área de Conservación Guanacaste; March 1994; leg F. Muñoz-Quesada; 1 male • *ibid.*, Limón Province, Río Bitey, ca 2.5 km S. Pandora; 9.785°N, 82.963°W; 15 m a.s.l.; 3 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Puntarenas Province, Parque Nacional Corcovado, Río Camaronal; 8.481°N, 83.594°W; 5 m a.s.l.; 12–13 April 1989; leg R. Holzenthal, R. Blahnik; 4 males • *ibid.*, Estación Quebrada Bonita, cruces de quebradas, Reserva Biológica Carara; 9.74722°N, 84.62778°W; 1990 m a.s.l.; 5 September–13 December 1990; leg F. Muñoz-Quesada; 2 males • *ibid.*, Reserva Biológica Carara, Quebrada Bonita; 9.795°N, 84.605°W; 35 m a.s.l.; 11 March 1991; leg R. Holzenthal, F. Muñoz-Quesada, J. Huisman; 5 males • *ibid.*, Quebrada Potrero nr Potrero Grande; 5 July 1992; leg T. Shepard; 1 male.

**Notes:** Previously known from Brazil, Colombia, Grenada, Guadeloupe, Martinique, Panama, St. Lucia, Tobago, and Trinidad.

### *Neotrichia xicana* (Mosely, 1937)

**Material examined:** COSTA RICA, Alajuela Province, Río Pizote, ca 5 km N Dos Ríos; 10.928°N, 85.297°W; 470 m a.s.l.; 9 March 1986; leg R. Holzenthal, W. Fasth; 43 males • *ibid.*, Río Pizote, ca 5 km (air) S Brasilia; 10.972°N, 85.345°W; 360 m a.s.l.; 12 March 1986; leg R. Holzenthal, W. Fasth; 52 males • *ibid.*, Finca el Ensayo, Cerro Campana; April 1994; leg F. Muñoz-Quesada; 2 males • *ibid.*, Guanacaste Province, Quebrada García, 10.6 km ENE Quebrada Grande; 10.862°N, 85.428°W; 470 m a.s.l.; 8 March 1986; leg R. Holzenthal, W. Fasth; 4 males • *ibid.*, Río Tizate, 7.2 km NE Cañas Dulces; 10.773°N, 83.449°W; 275 m a.s.l.; 28 June 1986; leg R. Holzenthal, M. Heyn, B. Armitage; 2 males • *ibid.*, Río Mena, 4.2 km W Santa Cecilia; 11.059°N, 85.448°W; 260 m a.s.l.; 11 March 1986; leg R. Holzenthal, W. Fasth; 4 males • *ibid.*, Heredia Province, Río Bijagual on road to Magsasay; 10.408°N, 84.076°W; 140 m a.s.l.; 21 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 6 males • *ibid.*, Limón Province, Corcori, Cariari; 1000 m a.s.l.; October 1992; leg F. Muñoz-Quesada; 4 males • *ibid.*, Río Cerere, Hitoy Cere; December 1990; leg F. Muñoz-Quesada; 20 males • *ibid.*, Puntarenas Province, Río Guineal, ca 1 km E Finca Helechales; 9.076°N, 83.092°W; 840 m a.s.l.; 22 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Río Singri, ca 2 km (air) S Finca Helechales; 9.057°N, 83.082°W; 720 m a.s.l.; 21 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 41 males • *ibid.*, Estación Quebrada Bonita, cruces de quebradas, Reserva Biológica Carara; 9.74722°N, 84.62778°W; 1990 m a.s.l.; 5 September–13 December 1990; leg F. Muñoz-Quesada; 42 males • *ibid.*, Reserva Biológica Carara, Quebrada Bonita; 9.795°N, 84.605°W; 35 m a.s.l.; 11 March 1991; leg R. Holzenthal, F. Muñoz-Quesada, J. Huisman; 1 male.

**Notes:** Previously known from Mexico, Nicaragua, and Panama.

## New Location Records

### *Neotrichia esmalda* (Mosely, 1937)

**Material examined:** COSTA RICA, **Alejuela Province**, Río Pizote, ca 5 km N Dos Ríos; 10.928°N, 85.297°W; 470 m a.s.l.; 9 March 1986; leg R. Holzenthal, W. Fasth; 1 male • *ibid.*, **Cartago Province**, Río Reventazón, C.A.T.I.E., boat landing, SE Turrialba; 8 December 1987; leg D. Burdick; 1 male • *ibid.*, **Guanacaste Province**, Río Tizate, 7.2 km NE Canas Dulces; 10.773°N, 83.449°W; 275 m a.s.l.; 28 June 1986; leg R. Holzenthal, M. Heyn, B. Armitage; 3 males • *ibid.*, Río Tempisquito ca 3 km S Route 1; 10.790°N, 85.552°W; 75 m a.s.l.; 6 March 1986; leg R. Holzenthal, W. Fasth; 118 males • *ibid.*, **Heredia Province**, Estación Biológica La Selva, Quebrada Sura; 19.437°N, 84.010°W; 50 m a.s.l.; 20–21 June 1986; leg R. Holzenthal, M. Heyn, B. Armitage; 6 males • *ibid.*, Río Bijagual on road to Magsasay; 10.408°N, 84.076°W; 140 m a.s.l.; 21 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 47 males • *ibid.*, **Limón Province**, Río Telire and small tributary, SE Suretka; 9.554°N, 82.892°W; 48 m a.s.l.; 1 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 84 males • *ibid.*, E.A.R.T.H., Río Parismina; 10.248°N, 83.570°W; 5 m a.s.l.; 4 February 1992; leg R. Holzenthal, F. Muñoz-Quesada, K. Kjer; 2 males • *ibid.*, Río Cerere, Hitoy Cere; December 1990; leg F. Muñoz-Quesada; 4 males • *ibid.*, **Puntarenas Province**, Quebrada Pita, ca 3 km (air) N Golfito; 8.642°N, 83.193°W; 15 m a.s.l.; 15 February 1986; leg R. Holzenthal, J. Morse, W. Fasth; 1 male • *ibid.*, Estación Quebrada Bonita, cruces de quebradas, Reserva Biológica Carara; 9.74722°N, 84.62778°W; 1990 m a.s.l.; 5 November–13 December 1990; leg F. Muñoz-Quesada; 5 males • *ibid.*, Quebrada Potrero nr Potrero Grande; 5 July 1992; leg T. Shepard; 31 males • *ibid.*, Río Platanar, Salitre, 6.5 km E Buenos Aires; 455 m a.s.l.; 6–9 June 1992; leg F. Muñoz-Quesada; 1 male • *ibid.*, Reserva Biológica Carara, Río Carara, 4.3 km, E Constanera Sur; 9.810°N, 84.572°W; 20 m a.s.l.; leg R. Holzenthal, F. Muñoz-Quesada, J. Huisman; 1 male.

**Notes:** This species was formerly assigned to the *N. esmalda* species group. Previously known from Costa Rica, Mexico, Nicaragua, and Panama.

## Discussion

Of the many species of microcaddisflies identified and described from Costa Rica (Bueno-Soria 1986; Bueno-Soria & Holzenthal 1998, 2003, 2008; Harris & Holzenthal 1990, 1993, 1994, 1999, 2002; Holzenthal 1988; Holzenthal & Harris 1992, 1999, 2002), based on field collections organized and conducted by the third author (RWH), the relatively large genus *Neotrichia* is finally being published. It is remarkable that this genus in Costa Rica was represented by a single species for so long. Certainly, other entomologists have collected here during the 20th century. Costa Rica is not alone in this regard. Its southeastern neighbor, the Republic of Panama, until recently was only represented by three species of this genus. However, increased recent collecting, taxonomic analyses, and publications have now raised this total to 50 (Armitage *et al.* 2024, 2025). For Costa Rica, the results and records generated in this publication, and a second one in progress, will provide a much more robust, but we think still incomplete, picture for this genus.

As mentioned in the Introduction section, Bueno-Soria & Vilarino (2024) suggested that members of the *N. esmalda* species group be placed in the *N. canixa* species group. We concur for the following reasons:

(1) All of the current *esmalda* group members have extensions directed posterad from their Xth terga—this is a primary characteristic of the *canixa* group. However, there is variation in this character. Not all species have the rods from segment X apical in position. Some such as *N. hajla* and *N. trescuerna* have the rods basolateral in position, and in others, such as *N. alajuela*, they arise near the midlength of tergum X. The structure of the rods also varies. For example, in *N. pejensis* the rods are small projections, while in *N. trescuerna* and *N. alajuela* they are thin and elongate.

(2) Most of the members of the *canixa* group have bifid bracteoles and a distinctive phallus apex; but, not all of them. Some species, such as *N. pinarenia* Botosaneanu and *N. sonora* Ross, for example, have an undivided bracteole, and *N. maria* Bueno & Hamilton and *N. pejensis* have an undivided phallic apex. These characters are more similar to those of the former *esmalda* group.

Therefore, we have, in agreement with Bueno-Soria and Vilarino's suggestion, incorporated all members of the *esmalda* group within the *canixa* group (Table 1). Considering the many species which cannot be placed in any of

Keth's species groups, as well as those tentatively or marginally placed, it seems appropriate to expand a relatively well-defined species group in this way. In the future, we would encourage someone to conduct molecular studies to expand our understanding of relationships among the species in this diverse genus based on or in combination with a second, distinct database.

The 10 new species described in the *Neotrichia canixa* species group in this paper, in combination with 13 previously described species herein reported from the country and the originally recorded *N. esmalda* brings the total to 24 species from this group. We believe that this total is currently the highest known for any Neotropical country. However, as is here shown for Costa Rica, and continues to be shown for Panama, we are far from finished revealing the true diversity of this genus in the Neotropics.

Finally, as a byproduct of this work, there are now 16 fewer endemic species of microcaddisflies in Panama and ten new endemics for Costa Rica. Both countries contain, comparatively, more endemic hydroptilids than are known from most other families of caddisflies. We presume this situation will be maintained until other, poorly inventoried countries in Central America are studied.

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