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# New species of microcaddisflies (Trichoptera: Hydroptilidae) from the western United States, Canada, Mexico and Belize

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New species of microcaddisflies (Trichoptera: Hydroptilidae)  
from the western United States, Canada, Mexico and Belize

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New species of microcaddisflies (Trichoptera: Hydroptilidae) from the western United States, Canada, Mexico and Belize

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**Abstract.** Nine new species of Hydroptilidae (Trichoptera) are described and illustrated from the western United States, Canada, Mexico, and Belize: Seven new species in the genus *Neotrichia* Morton, *N. buenoi*, *N. chihuahua*, *N. contrerasi*, *N. maya*, *N. palitla*, *N. pinnacles*, and *N. sandersoni*, one new species in the genus *Oxyethira* Eaton, *O. pembertonensis*, and one new species in the genus *Metrichia* Ross, *M. mastelleri*. As well, new records for *N. mobilensis* and *Mayatrichia tuscaloosa* and new illustrations of the male genitalia of *Neotrichia jarochita* Buena-Soria and *Mayatrichia tuscaloosa* Harris and Sykora are provided.

**Key words.** *Mayatrichia*, *Metrichia*, *Neotrichia*, *Oxyethira*

## Introduction

The Hydroptilidae (Insecta: Trichoptera) are the most diverse caddisfly family taxonomically with over 2,000 species described, and geographically with distribution on all continents save Antarctica (Holzenthal et al. 2007). Initially in this paper, we planned to describe several new species of hydroptilids from the western United States, but material became available to us from Canada, Mexico and Belize. We've added this material to the paper as these additional species could conceivably be found in the western United States. In this paper, we describe seven new species in the genus *Neotrichia* Morton, which is represented by 57 species in the United States and Mexico (Keth et al. 2015); one new species in the genus *Oxyethira* Eaton, represented by 45 species in the United States and Canada (Rasmussen and Morse 2014), and one new species in the genus *Metrichia* Ross, which is represented by 20 species in the United States and Mexico (Morse 2015).

## Methods

Most of the material on which this work is based was collected using UV light traps or hand-collected via sweep nets. Specimens were cleared in 10% KOH, washed, and examined under a stereozoom microscope. Drawings were made from genitalia mounted on depression slides and examined at 250X using a Leitz compound microscope, and subsequently inked by hand. Length is measured from the top of the head to the tip of the forewings and given as a range with two or more specimens. Type material is deposited in the National Museum of Natural History, Smithsonian Institution (NMNH), the University of California, Berkeley (UCB), Illinois Natural History Survey (INHS), and the University of North Texas (UNT). Terminology follows that of Marshall (1978). Only males are known for the *Neotrichia* and *Metrichia* described herein.

***Neotrichia buenoi* Harris and Flint, new species****Fig. 1**

On the basis of the reduced inferior appendages and phallus having a pair of sclerotized hooks, this species is placed in the caxima group of Keth et al. (2015) with closest similarity to *N. caxima* (Mosely) in the presence of the small lateral extensions from the tenth tergite. It differs from *N. caxima* in the rectangloid inferior appendages in lateral view and the lack of an apicolateral extension from segment IX.

**Male.** Length 1.8 – 2.1 mm. 18 antennal segments, body brown in alcohol. Segment VIII annular. Segment IX incomplete dorsolaterally, posteriorly rounded, anteriorly tapering to finger-like process; in ventral view shallowly incised on posterior margin, deeply incised on anterior margin. Tergite X posteriorly deeply incised, lateral margins produced into small ear-like processes; anteriorly fused with segment IX; laterally short, tapering to acute, upturned apex. Subgenital plate in lateral view wide basally, sharply narrowing distally with elongate seta from venter; in ventral view bulbous with narrow apical incision flanked by elongate setae. Bracteoles somewhat triangular in appearance, tapering distally to rounded apex. Inferior appendages in lateral view wide basally, tapering to an upturned rounded apex, short thin dorsal process with small setal-bearing lobe; in ventral view short and rounded apically, incised on mesal margins, pair of dorsal processes, lower truncate, upper beak-like on mesal margins. Phallus tubular, constricted near mid-length and bearing thin paramere encircling shaft, distally with pair of sclerotized rods, one elongate, other short and sharply curved, phallus apex tapered.

**Type material. Holotype, male - Mexico, Veracruz, Las Tuxtlas, Rio Palma above La Palma, 2 June 1989, A. Contreras-Ramos (NMNH). Paratypes - same as holotype, 2 males (NMNH).**

**Etymology.** We take great pleasure in naming this species for our colleague Joaquin Bueno-Soria who has contributed much to the study of caddisflies of Mexico and Central America.

***Neotrichia chihuahua* Harris and Flint, new species****Fig. 2**

*Neotrichia chihuahua* is a member of the canixa group of Keth et al. (2015) based on the apical horns of the tenth tergite and the bifid bracteoles, both characteristic of the group. The wide, parallel horns are similar to those of *N. kitae* Ross, but the structure of the bracteoles and the inferior appendages are more similar to that of *N. maria* Bueno-Soria and Hamilton. However, in ventral view, the inferior appendages of the new species are much different from those of *N. maria* and *N. kitae*.

**Male.** Length 2 mm. 18 antennal segments, body brown in alcohol. Abdominal segment VIII annular. Segment IX incomplete dorsolaterally, posteriorly truncate with setal-bearing lobe on dorsum, rounded anteriorly; in ventral view shallowly incised on posterior margin, deeply incised anteriorly. Tergite X posteriorly with deep truncate incision forming lateral horns; anteriorly fused with segment IX; in lateral view with dorsal hump giving rise to horn, which narrows to acute apex. Subgenital plate in lateral view narrowing distally to downturned apex, which bears an elongate seta; in ventral view narrow over length, sclerotized distal margin bearing pair of elongate setae. Bracteoles bifid, dorsal branch elongate, with long seta apically, ventral branch about half length of upper bearing elongate seta. Inferior appendages rectanguloid in lateral view with apex slightly upturned, ventral process about half length of appendage; in ventral view extending beyond subgenital plate, narrowing and sharply angled inward at apex, mesal processes short, slightly tapering from base and bearing apical seta. Phallus tubular, constricted at mid-length and bearing thin paramere encircling shaft, apex forked, ejaculatory duct protruding distally.

**Type material. Holotype, male - Mexico, Chihuahua, Rio Concheno at Highway 16 near Basaseachic, 25 May 1991. S. Harris and A. Contreras (NMNH).**

**Etymology.** Named for the Mexican state of Chihuahua.

***Neotrichia contrerasi* Harris and Flint, new species****Fig. 3**

*Neotrichia contrerasi* is another member of the canixa group of Keth et al. (2015) with some similarity to *N. tauricornus* Malicky in the structure of the subgenital plate and the inferior appendages. It differs from *N. tauricornus* and other members of the canixa group in the combination of small, widely spaced horns of the tenth tergite, the evenly divided branches of the bracteoles, and the elongate ventral process of the subgenital plate.

**Male.** Length 2.0–2.2 mm. 18 antennal segments, body brown in alcohol. Abdominal segment VIII annular. Segment IX incomplete dorsolaterally, posteriorly truncate with setal-bearing lobe on dorsum, anteriorly rounded; in ventral view deeply incised on posterior and anterior margins; dorsally fused with segment X. Tergite X wide, with broad incision posteriorly creating small lateral horns; in lateral view elongate, narrowing posteriorly to acute apex. Subgenital plate in lateral view narrowing distally to elongate process, which extends ventrad to tip of inferior appendages; in ventral view narrow over length, T-shaped apically with pair of elongate mesal setae. Bracteoles bifid, dorsal branch slightly longer than the ventral branch, each with long seta apically. Inferior appendages wide basally, tapering distally, ventral process about half length of appendage; in ventral view nearly extending to tip of subgenital plate, wide basally, tapering distally and curved mesad, mesal processes short and stout bearing apical seta. Phallus tubular, constricted at mid-length and bearing thin paramere encircling shaft, apex divided into pair of elongate processes, which are at an angle to the shaft, ejaculatory duct protruding distally.

**Type material. Holotype, male - Mexico,** Nuevo Leon, Municipio de Santiago, Rio Ramos at Los Adjuntas, 4.5 km southeast Puerto Genovevo, N25°18', W100°08', 12 May 1989, S. Harris and A. Contreras (NMNH). **Paratypes -** same as holotype, 4 males (INHS, NMNH), **United States,** Arizona, Coconino County, West Fork Oak Creek, A79-17, 9 August 1979, M. Sanderson, 1 male (INHS).

**Etymology.** Named for Atilano Contreras-Ramos who collected the species with the senior author and has contributed much to our knowledge of the aquatic insects of Mexico.

***Neotrichia maya* Harris and Flint, new species****Fig. 4**

*Neotrichia maya* is another member of the canixa group of Keth et al. (2015) with similarities to *N. corniculans* Flint, *N. pamela*e Harris and Armitage, *N. sandyae* Ruitter, and *N. vekonyka* Olah and Johanson, in the shortened lower portion of the bracteoles. It differs from these species in the elongate posteroventral extension of abdominal segment IX and in the ventral aspect of the inferior appendages.

**Male.** Length 1.5 - 1.7 mm. 18 antennal segments, body brown in alcohol. Abdominal segment VIII annular. Segment IX incomplete dorsolaterally, posteriorly sinuate with setal-bearing lobe on dorsum, posteroventrally extended into tapering sclerotized process, anteriorly rounded; in ventral view shallowly incised on posterior margin, medially a narrow plate, which tapers posteriorly, deeply incised anteriorly; dorsally fused with segment X. Tergite X narrow, with elongate pair of symmetrical, sclerotized horns distally, which may cross or be widely separated, basally fused with segment IX, with small, lateral setal-bearing lobes; in lateral view elongate, with apical horns about half length of segment. Subgenital plate in lateral view narrowing distally to downturned apex, which bears an elongate seta; in ventral view wide basally, narrowing distally to sharp medial point, which is flanked by a pair of elongate setae. Bracteoles bifid, dorsal branch elongate, with long seta apically, ventral branch greatly reduced, bearing short seta. Inferior appendages thin and elongate in lateral view with apex slightly upturned, ventral process about same length of appendage; in ventral view extending nearly to tip of subgenital plate, narrowing and sharply angled apically, mesal processes elongate, wide basally, narrowing distally and bearing apical seta. Phallus tubular, constricted at mid-length and bearing thin paramere encircling shaft, apex divided into pair of short processes, ejaculatory duct protruding distally.



**Type material. Holotype, male - Belize**, Stann Creek District, Cockscomb Wildlife Preserve, Cockscomb A, B4, Maya Mountains, el.200 m, N16-80, W88-55, 10 – 11 May 1990, subtropic wet forest, M. Adams and L. Dow (NMNH). **Paratypes** - same as holotype, 2 males (NMNH).

**Etymology.** Named for the Maya Mountains where the species was collected whose name reflects the Maya people living in the region.

### ***Neotrichia palitla* Harris and Flint, new species**

#### **Fig. 5**

A member of the canixa group, *Neotrichia palitla* is similar to *N. jarochita* Bueno-Soria based on the asymmetrical horns of the tenth tergite. It differs from this species in that the left side horn is longer than that of the right side, which is the opposite of what is seen in *N. jarochita* (Fig. 6). There are also differences in the subgenital plate and the inferior appendages in *N. palitla*.

**Male.** Length 1.5 – 1.7 mm. 18 antennal segments, body brown in alcohol. Abdominal segment VIII annular. Segment IX incomplete dorsolaterally, posteriorly tapering ventrally with margins sclerotized with setal-bearing lobe on dorsum, anteriorly rounded; in ventral view deeply incised on posterior and anterior margins. Tergite X with pair of posterior asymmetrical horns, left longer than right, anteriorly fused with segment IX; in lateral view elongate, with apical horns short. Subgenital plate in lateral view bifid distally, ventral branch much longer than dorsal and tapering to acute apex, elongate seta laterally; in ventral view wide basally, narrowing distally to elongate medial process, which is flanked by a pair of elongate setae. Bracteoles bifid, dorsal and ventral branches similar in length, each with elongate apical seta. Inferior appendages thin and elongate in lateral view, curving slightly dorsad over length, ventral process about half length of appendage; in ventral view extending short of tip of subgenital plate, nearly parallel-sided, rounded apically, mesal processes about half length of appendages, wide basally, narrowing distally and bearing apical seta. Phallus tubular, constricted at mid-length and bearing thin paramere encircling shaft, apex divided into pair of processes of unequal length, ejaculatory duct protruding distally.

**Type material. Holotype, male - Mexico**, San Luis Potosi, Palitla, 5 June 1966, O.S. Flint, Jr. (NMNH). **Paratype**, same as holotype, 1 male (NMNH).

**Etymology.** Named for the Mexican town of Palitla where the species was collected.

**Notes.** We have provided new illustrations of *N. jarochita* Bueno-Soria (Fig. 6) for comparison. This specimen was collected by O. and C. Flint, Jr. from the Las Tuxtlas area near Balzapote, Mexico between 9 -13 May 1981 and kindly verified by J. Bueno and is deposited at the NMNH.

### ***Neotrichia pinnacles* Harris and Flint, new species**

#### **Fig. 7**

This species appears to be a member of the okopa group of Keth et al. (2015) having a posterolateral extension of segment IX, a tapered tenth tergum, simple tapered inferior appendages, and simple phallus apex. *Neotrichia pinnacles* is similar to *N. osmena* Ross in having short, triangular inferior appendages in ventral view, but differs in these appendages being elongate and narrow in lateral view.

**Male.** Length 2.0 mm. 18 antennal segments, body brown in alcohol. Segment VIII annular. Segment IX fused dorsally with segment X, posteriorly rounded with sclerotized extension, which tapers to downturned acute process and ventral point basally, anteriorly rounded; in ventral view shallowly incised on anterior margin, sclerotized lateral extensions, which taper posteriorly. Tergite X tapering posteriorly to shallow apical incision, lateral processes tapering to acute apices; laterally elongate, dorsum narrowing to acute apex, thin lateral process extending about half length of segment. Subgenital plate in lateral view wide basally, narrowing distally with elongate seta at apex; in ventral view wide

basally, tapering to narrow rounded apex, which bears pair of setae, subapically with two pair of elongate setae. Bracteoles spatulate, gradually widening distally and curving dorsad; in dorsal and ventral views narrow basally, widening distally and sharply curving inward. Inferior appendages thin in lateral view, wide basally, narrowing mesally to widened tapered apex, truncate process on inner surface basally; in ventral view short and trianguloid, wide basally, incised on inner margins to rounded apices, short truncate processes on inner basal margins. Phallus tubular, slightly constricted near mid-length and bearing thin paramere encircling shaft, internally with narrow rectangular plate, bifid distally and enclosing ejaculatory duct, phallus apex rounded.

**Type material. Holotype, male - United States**, California, San Benito County, Pinnacles National Monument, Chalone Creek, 1.4 km NW Bear Creek, 28 August 2003, P. Johnson III (NMNH)

**Etymology.** Named for the Pinnacles National Monument where the species was collected.

### ***Neotrichia sandersoni* Harris and Flint, new species**

#### **Fig. 8**

This species appears to be a member of the vibrans group of Keth et al. (2015) with closest similarity to *N. labios* Keth in the presence of a sclerotized process from the subgenital plate and the ventral aspect of the inferior appendages. There is also some similarity to *N. alyshae* Keth and *N. halia* Denning in the deep apical incision of tergite X. It differs from these species in the complex structure of the phallus with multiple processes, the narrow configuration of the subgenital plate, and the sclerotized lateral processes from segment X.

**Male.** Length 2.0 – 2.2 mm. 18 antennal segments, body brown in alcohol. Segment VIII annular. Segment IX complete laterally, posteriorly rounded, anteriorly tapering to finger-like process; in ventral view shallowly incised on posterior margin, deeply incised on anterior margin. Tergite X posteriorly deeply incised producing lateral ears, posterolateral processes sclerotized, thin and apically acute; laterally short, dorsum narrowing to acute apex, venter produced into narrow, sclerotized process, which is upturned to acute apex. Subgenital plate in lateral view wide basally, abruptly narrowing distally with elongate seta at apex, heavy sclerotized spine projecting ventrally at midlength; in ventral view wide basally, tapering to bifid apex, ventrally with rectangular, medial sclerite ending with pair of elongate setae, lateral spines projecting mesad near midlength. Bracteoles narrow basally, widening distally to rounded apex. Inferior appendages in lateral view oval, wide basally, gradually tapering to an acute apex; in ventral view elongate, wide basally, curving mesally and tapering to truncate apices, bearing numerous stout setae. Phallus tubular, constricted near mid-length and bearing wide setose paramere, distally with numerous elongate processes, apex divided into pair of thin processes.

**Type material. Holotype, male - United States**, Arizona, Coconino County, West Fork Oak Creek, A79-17, 9 August 1979, M. Sanderson (INHS). **Paratypes** - same as holotype, 2 males (INHS, NMNH).

**Etymology.** Named for the late Milton W. Sanderson of the Illinois Natural History Survey who collected the new species and also many other interesting western species of microcaddisflies.

### ***Oxyethira pembertonensis* Harris and Flint, new species**

#### **Fig. 9, 10**

A member of the subgenus *Oxytrichia* in the dualis group (Kelley 1984), the new species is most similar to the nominal species *O. dualis* Morton in the dorsum of segment IX being reduced to a single band and the phallus apex bearing short spines. It differs in the venter of segment X being asymmetrically divided into elongate, sclerotized processes.

**Male.** Length 3.3 – 3.8 mm. 38 antennal segments, extending beyond length of body, which is brown in alcohol. Segment VII annular with elongate ventromesal process. Segment VIII somewhat



rhomboid in shape, tapering posterodorsally; in ventral view shallowly incised on posterior margin; dorsally with posterior margin deeply incised. Segment IX rectanguloid and enclosed within segment VIII, anterodorsal bridge connecting with segment X, narrowing posteroventrally to rounded apex; ventrally incised on anterior margin, posteriorly produced as a truncate plate. Segment X in lateral view basally divided into series of three thin, elongate processes, which extend beyond the length of the segment, posteriorly lobate and membranous; tergum tapering to rounded, membranous apex, elongate lateral processes from left side of tergum. Subgenital plate strongly arched in lateral view, rounded apically and bearing a short rectangular process dorsally. Phallus tubular, constricted at midlength, apex bearing four spines.

**Female.** Length 3.0 – 3.8 mm; antennae and color as in male. Segment VI annular with short ventromesal process. Segment VII annular, posterior margin shallowly incised mesally. In lateral view, dorsum segment VIII anteriorly extended as thin apodeme, posteriorly fused with segments IX and X, tapering distally, bearing apical tubercle; venter segment VIII triangular, narrowing to acute apex distally. Segment X dorsally rounded posteriorly, bearing pair of short tubercles. Bursa copulatrix in lateral view thin and membranous; in ventral view cup-shaped, posteroventral corners membranous, spermathecal process key-hole shaped, thin crescent-shaped sclerite posteriorly.

**Type material. Holotype, male - Canada,** British Columbia, Pemberton, Pemberton Creek N50 18.9', W122 48.2', 16 June 2004, C. and O. Flint, Jr. (NMNH). **Paratypes** - same as holotype, 2 males, 50 females (NMNH).

**Etymology.** Named for the town and creek in British Columbia where the species was collected.

### ***Metrichia mastelleri* Harris and Flint, new species**

#### **Fig. 11 - 13**

This species is placed in the genus *Metrichia* on the basis of its having abdominal pouches and characters typical of the genus, unmodified head and antennae, 5 segmented maxillary palps, with the first two segments small, simple tenth tergum, button-like cerci, and a phallus having large hooks, but lacking complex medial structures. The new species differs from other members of the genus in the presence of very short inferior appendages, although some species of *Metrichia*, such as *M. yalla* (Flint) and *M. sencilla* Harris and Armitage, also have relatively short inferior appendages, and in the bifid dorsolateral processes. The posterior pair of internal glands each has a large sclerotized spike, which is also seen in *M. rawlinsi* (Flint and Sykora). Based on the presence of internal glands between abdominal segments V and VI and the pair of medial phallic hooks, *M. mastelleri* should tentatively be placed in the *nigritta* group of Flint (1972).

**Male.** Length 3.2 mm. Head without modification, 3 ocelli; antennae simple with 18 segments. Body brown in alcohol, mesoscutellum with medial furrow, metascutellum triangular; wings appearing to have lightly sclerotized, setose bands, veins few and reduced; legs with spinal formula of 1,3, 4, spine on foreleg small and apex of fore femur produced into small lobe. Abdominal segment V with pair of internal sacs posterodorsally, cluster of stout setae ventrally. Segment VI with small, inconspicuous internal sacs posterodorsally, each bearing a thick, sclerotized spine and band of stout setae. Segments VII annular, short ventromesal process on posterior margin. Segment VIII in lateral view wide dorsally, narrowing ventrally; dorsally annular, ventrally deeply incised. Segment IX in lateral view tapering posterodorsally and fused with tergum X, tapering posteroventrally to acute apex, tapering anteroventrally to rounded apex; in dorsal view ovate, slightly incised on posterior margin; dorsally fused with tergum X. Preanal appendages (cerci) in lateral view ovate, narrow basally, widening distally; in dorsal view button-like and setose. Dorsolateral process elongate and narrow, slightly curving ventrad to narrow apex; in ventral view bifid with narrow arms, left arm with thin ventral lobe apically. Segment X elongate and rectangular in lateral view, membranous distally; in dorsal view wide basally, narrowing to emarginated apex. Inferior appendages in lateral view very short, narrow basally, widening distally to truncate apex; in ventral view widening posteriorly to truncate apex, curved on outer margins. Phallus tubular in dorsal view, wide basally, narrowing mesally and distally, pair of sclerotized hooks mesally,

elongate tube encasing the ejaculatory duct apically; in lateral view wide basally and in mid-section bearing pair of sclerotized hooks, narrowing distally, apex an elongate thin tube.

**Type material. Holotype, male - United States**, Arizona, Yavapai County, Fossil Creek, 7.5 km (air) NW Strawberry, N34° 25.4', W111° 34.4', 13 May 2002, O. Flint, Jr. and E. Masteller (NMNH).

**Etymology.** We take great pleasure in naming this species for our colleague Edwin C. Masteller, who along with the junior author collected this species, in recognition of his many contributions to the study of caddisflies in North America.

**Notes.** As the genus *Metrichia* is rare in North America, with only two species known *M. nigritta* (Banks) and *M. arizonensis* (Flint) (Rasmussen and Morse 2014), both of which occur in the southwest, we have provided drawings of the body of the adult male as well as the genitalia.

### New records and range extensions

*Neotrichia mobilensis* Harris, which was previously known from only Alabama and Texas (Rasmussen and Morse 2014), was collected in Mexico as follows: Veracruz, Tamuin, 13 April 1975, J. Bueno, 2 males (NMNH).

*Mayatrichia tuscaloosa* Harris and Sykora, previously known from a single specimen collected in Alabama, was collected in Texas and Mexico as follows: Texas, Travis County, Bull Creek at Saint Edwards Park, N30.405826, W97.793553, 9 July 2014, L. Pulliam 1 male (UNT) and Mexico, Neuvo Leon, 18 mi W Linares, 12 September 1976, blacklight, J. Powell and J. Chemsak, 2 males (UCB). As this species was originally described from a single specimen, we have provided new illustrations (Fig. 14).

### Acknowledgments

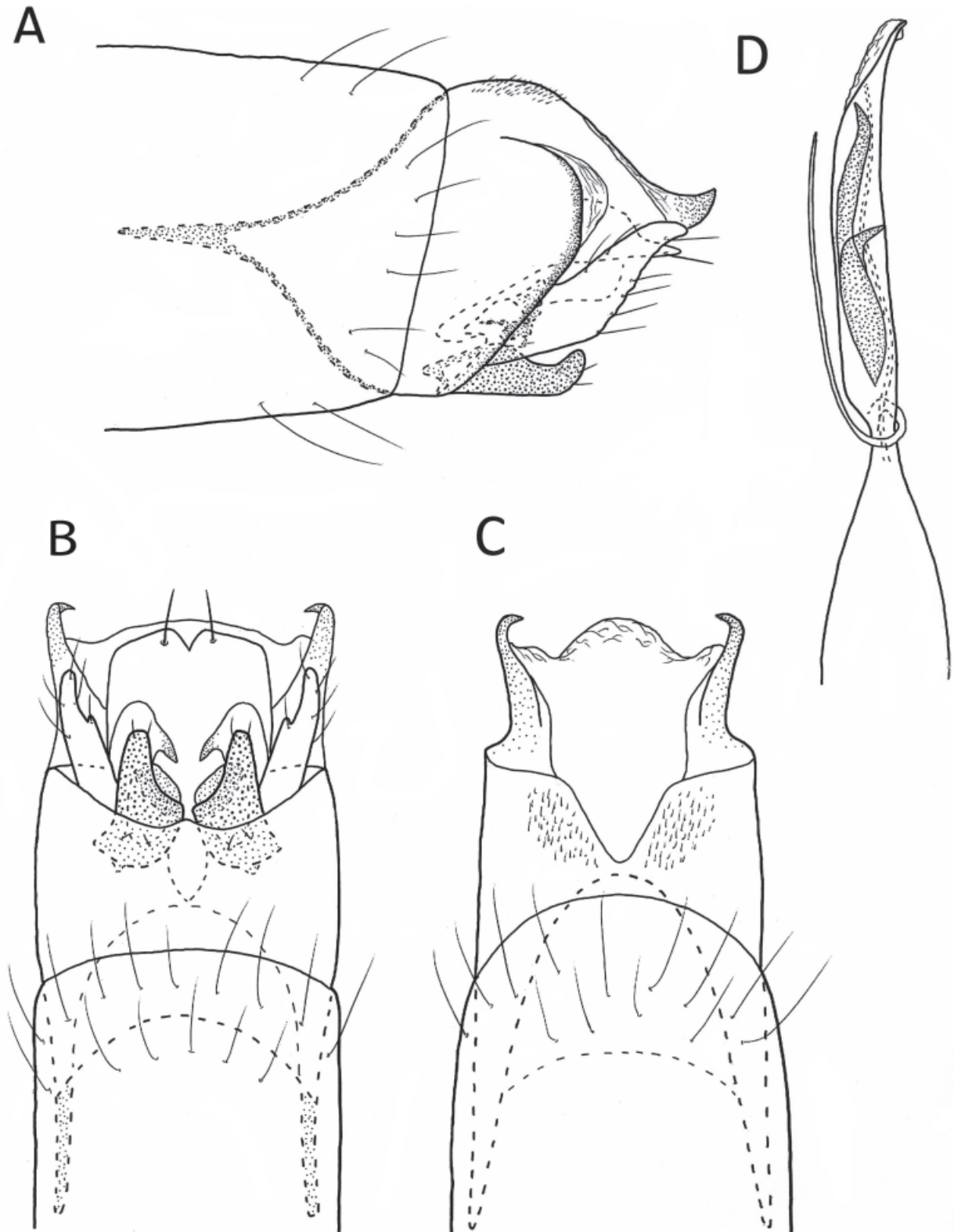
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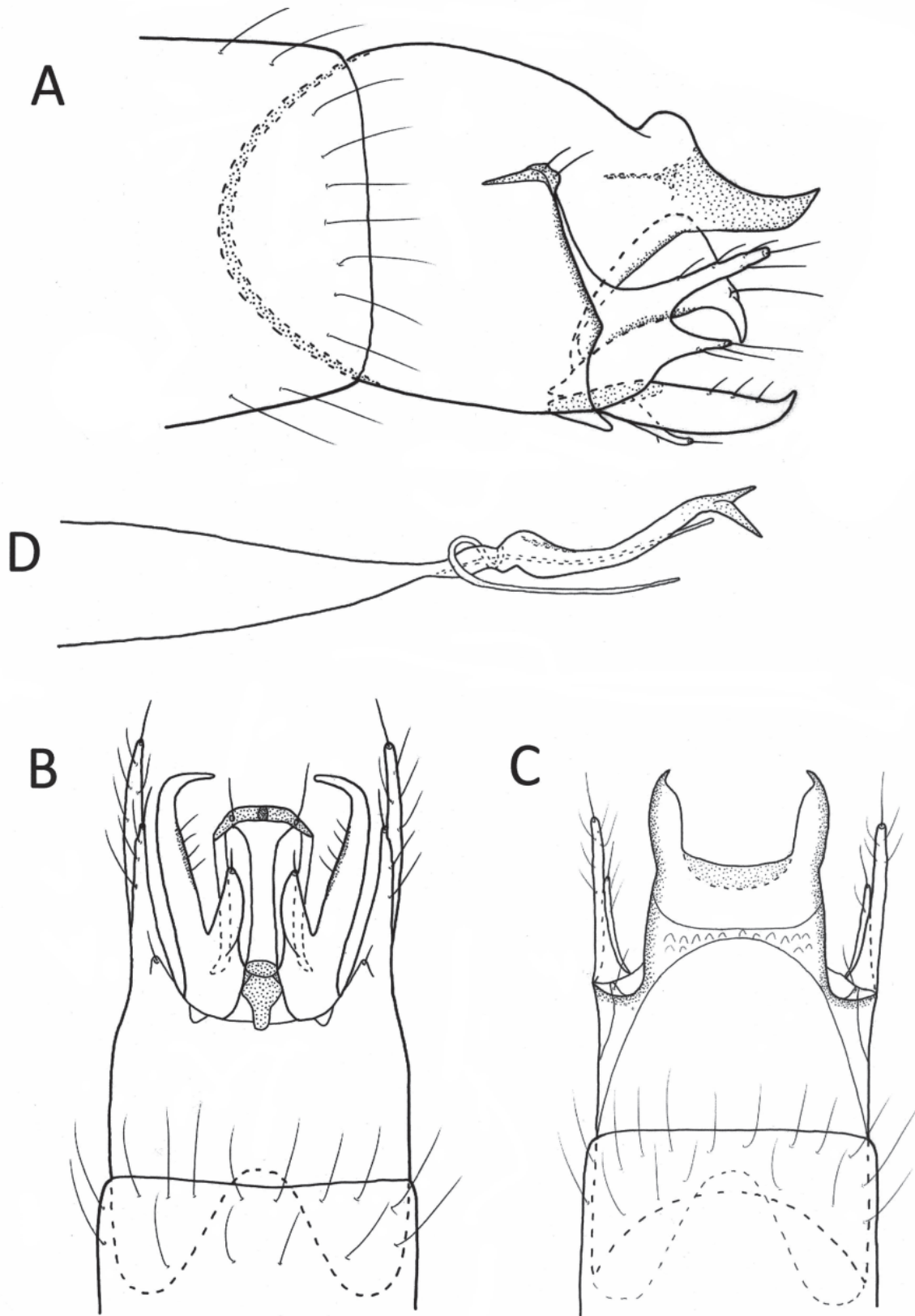
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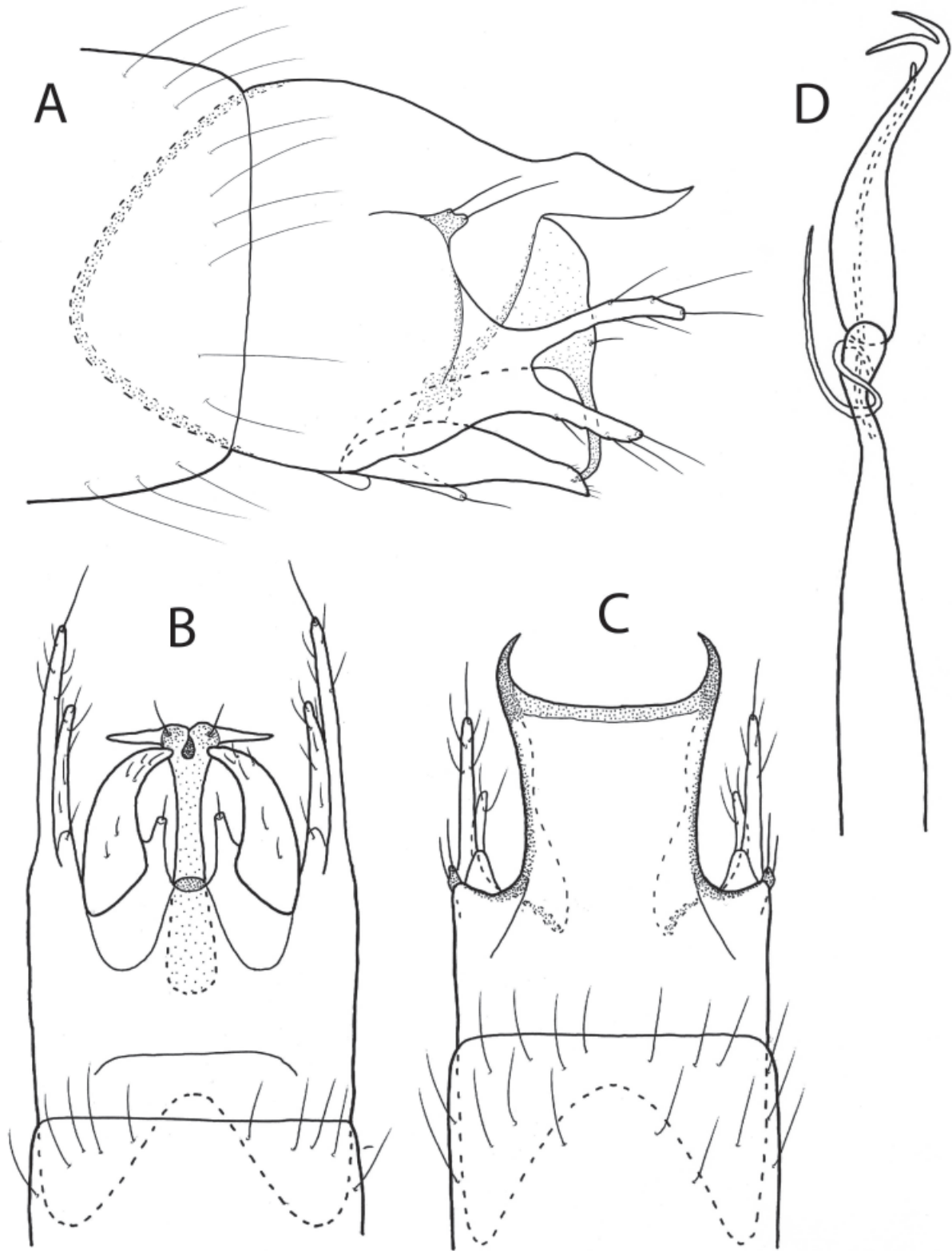
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**Figure 1.** *Neotrichia buenoi*, n. sp. Male genitalia. A. Lateral view; B. Ventral view; C. Dorsal view; D. Phallus, lateral.

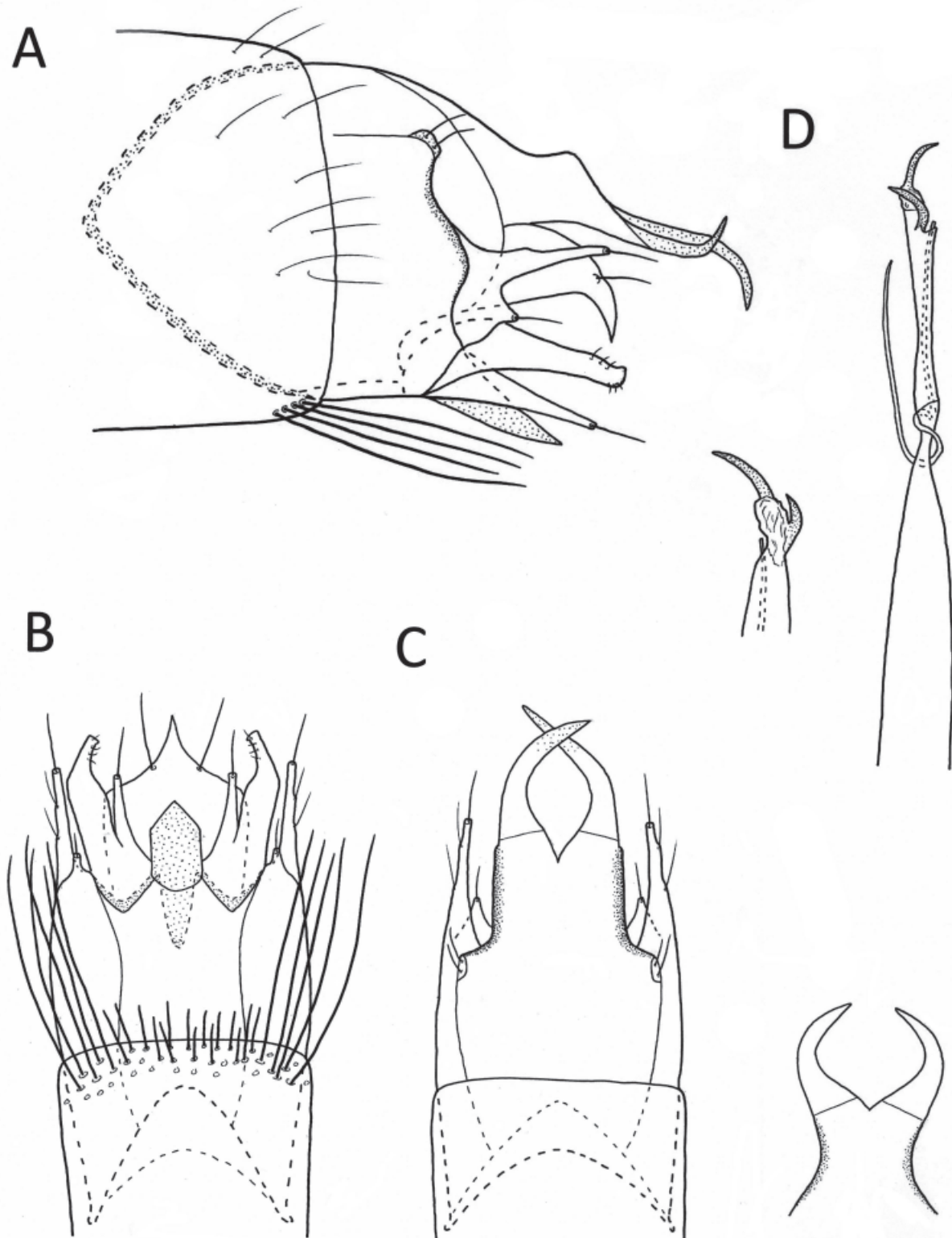


**Figure 2.** *Neotrichia chihuahua*, n. sp. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, dorsal.

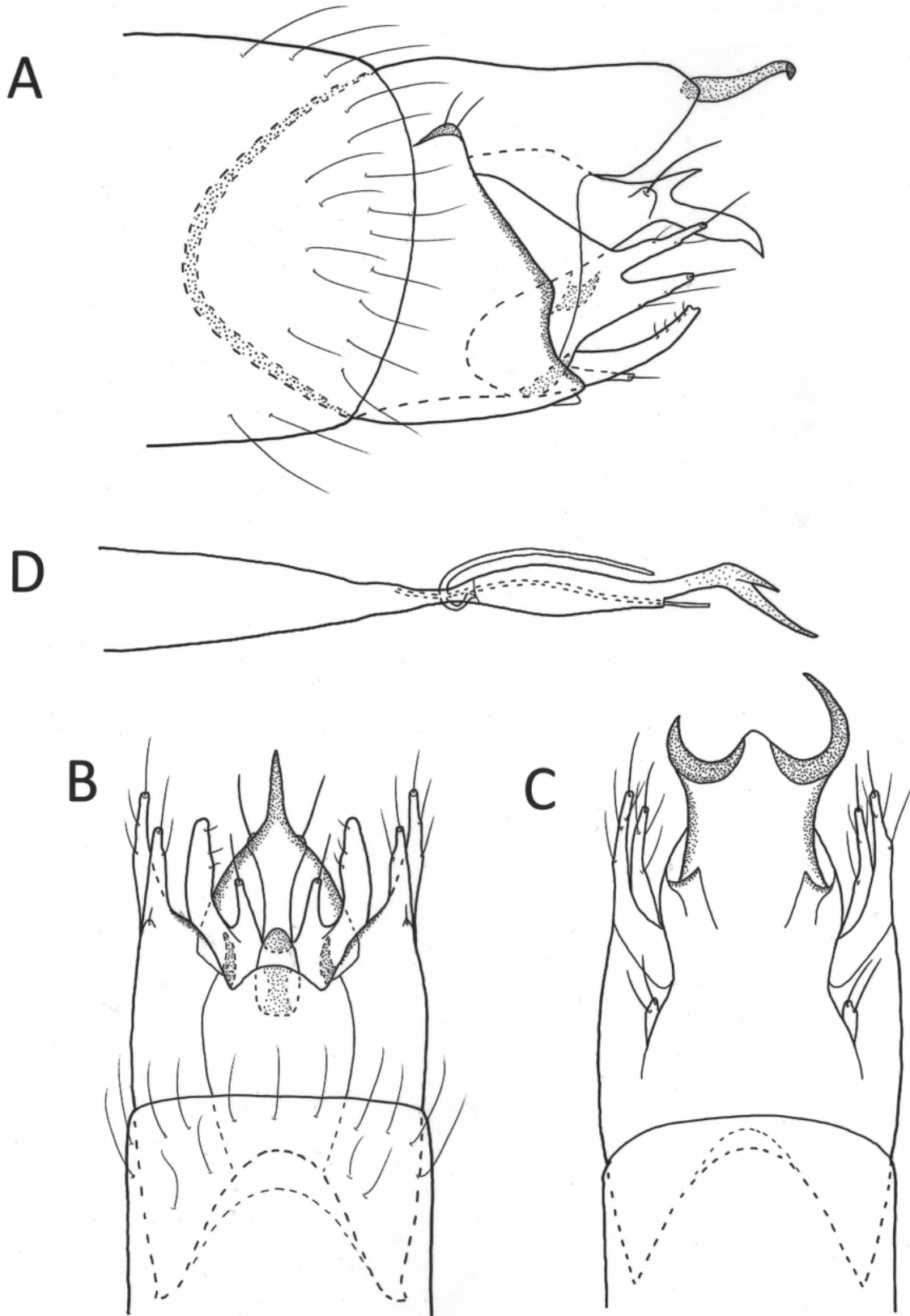


**Figure 3.** *Neotrichia contrerasi*, n. sp. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, ventral.

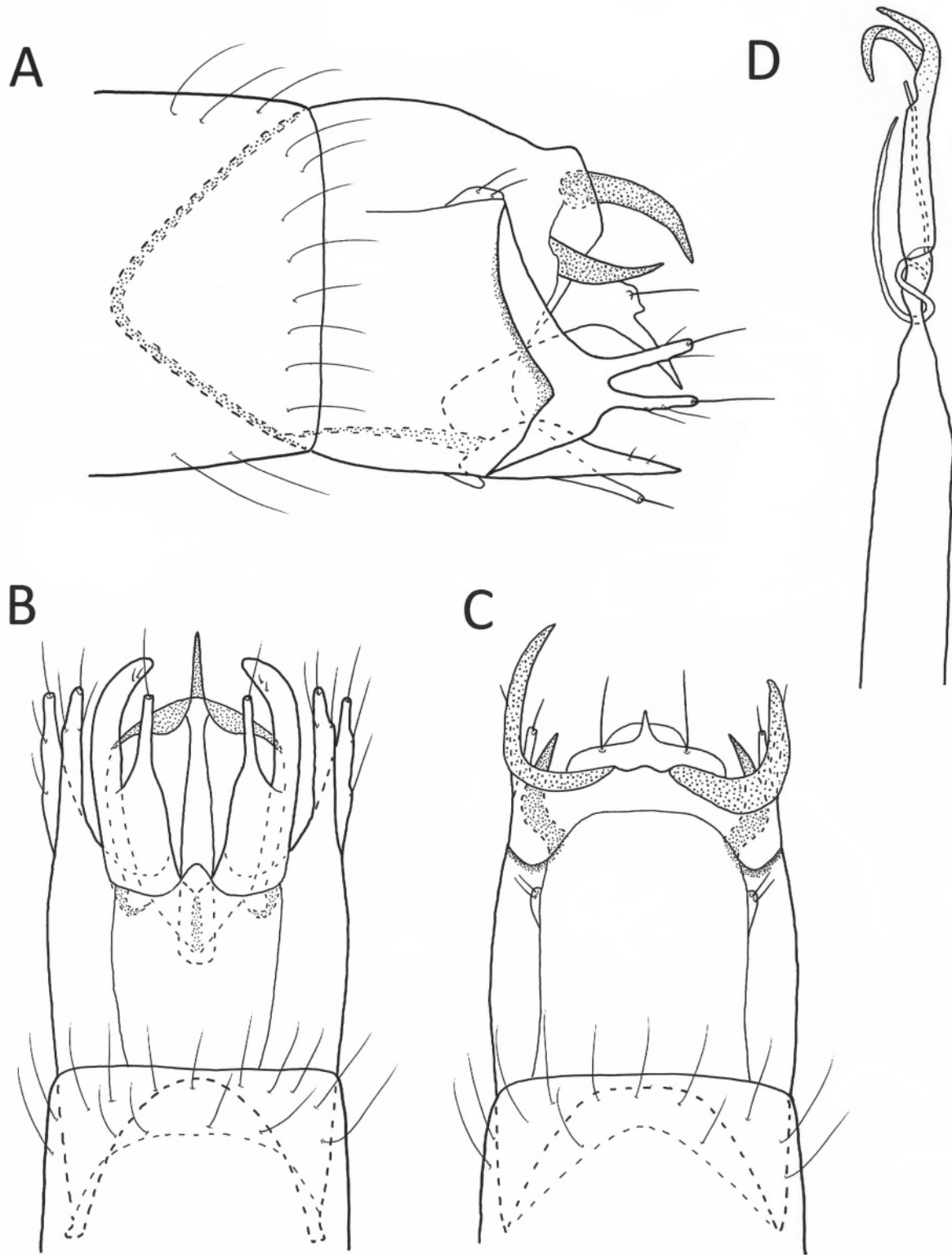




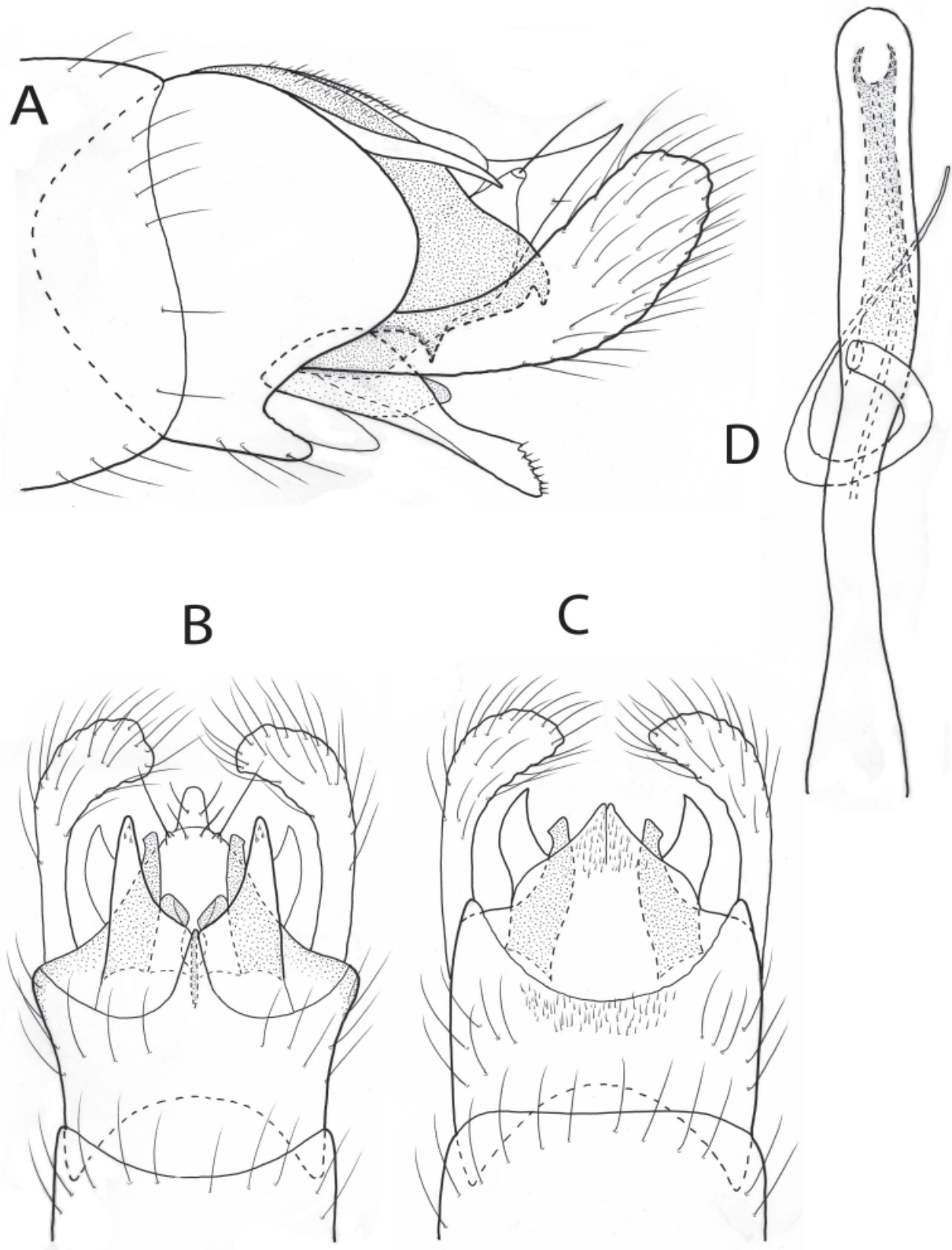
**Figure 4.** *Neotrichia maya*, n. sp. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view, variation of dorsal horns in insert; **D.** Phallus, ventral, enlarged apex, lateral.



**Figure 5.** *Neotrichia palitla*, n. sp. Male genitalia. A. Lateral view; B. Ventral view; C. Dorsal view; D. Phallus, dorsal.

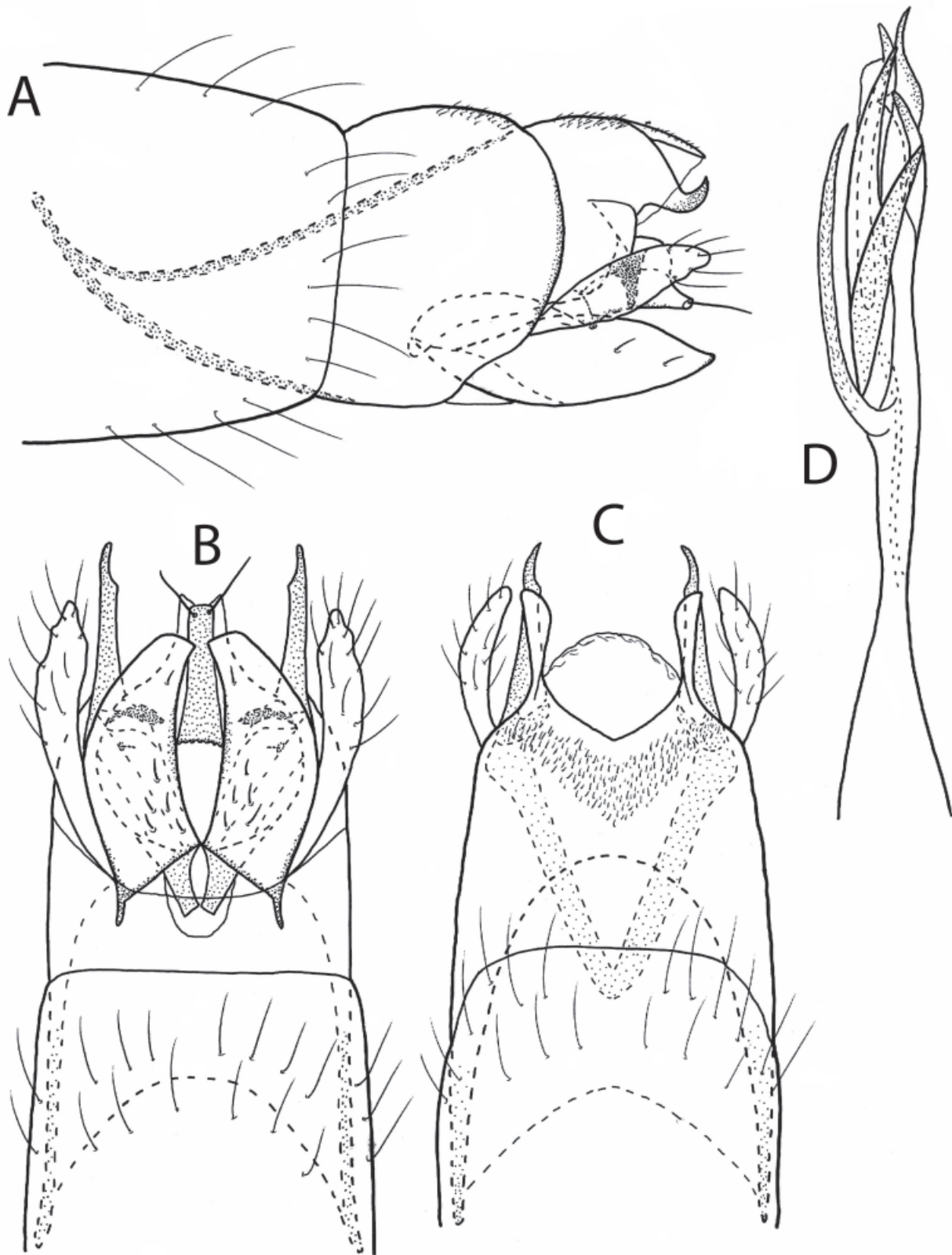


**Figure 6.** *Neotrichia jarochita* Bueno-Soria. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, lateral.

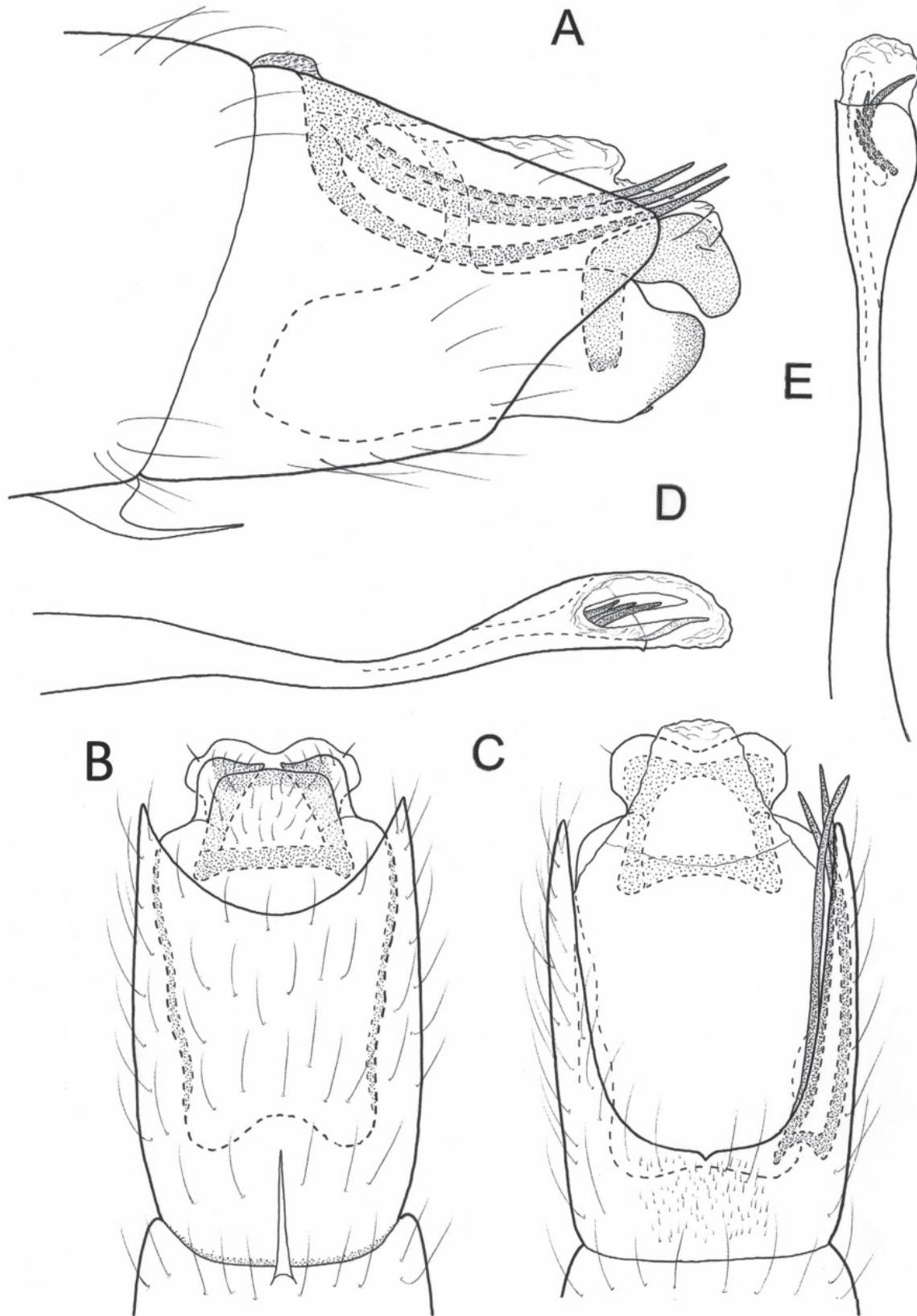


**Figure 7.** *Neotrichia pinnacles*, n. sp. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, dorsal.





**Figure 8.** *Neotrichia sandersoni*, n. sp. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, dorsal.



**Figure 9.** *Oxyethira pembertonensis*, n. sp. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, lateral, **E.** Phallus, ventral.



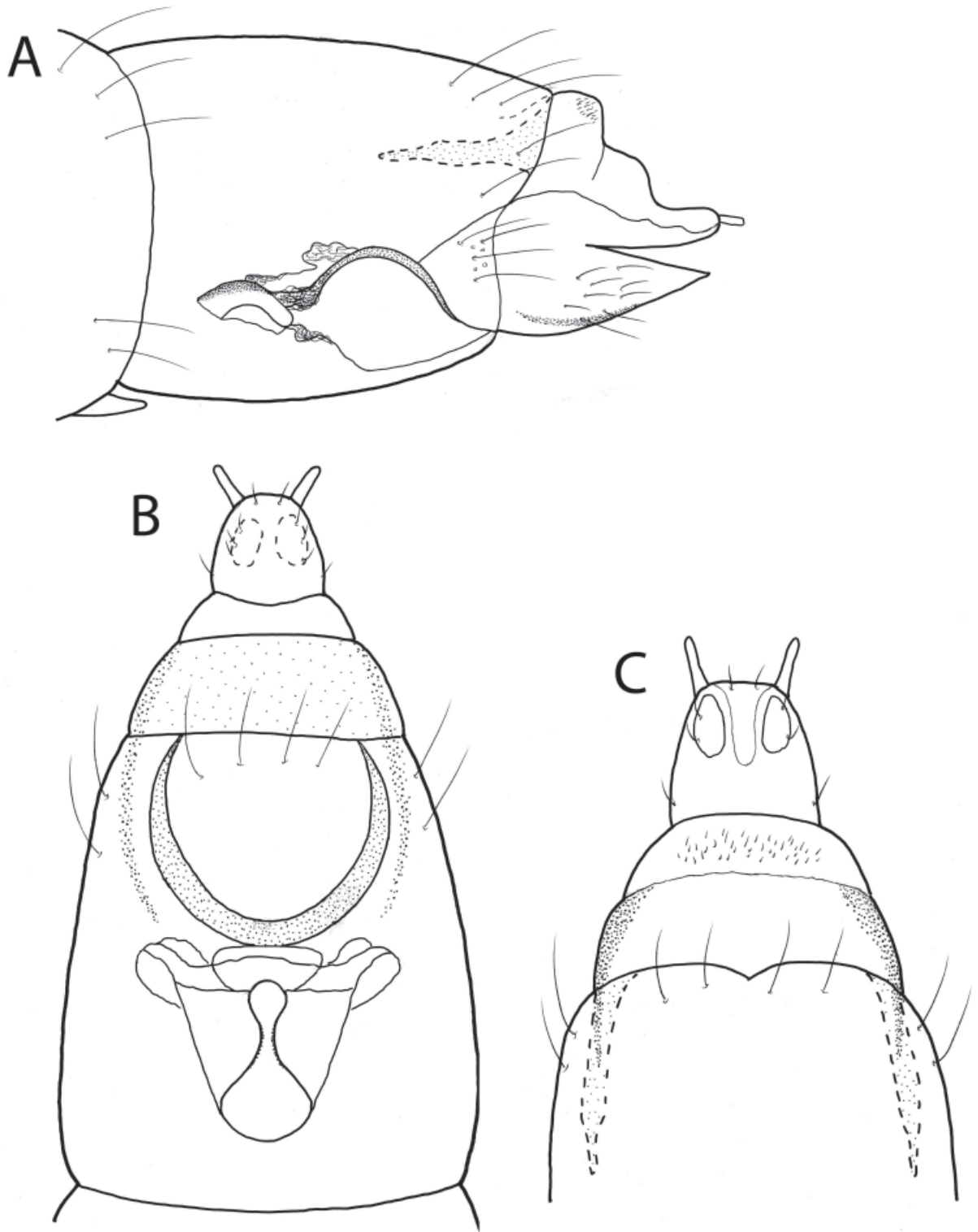
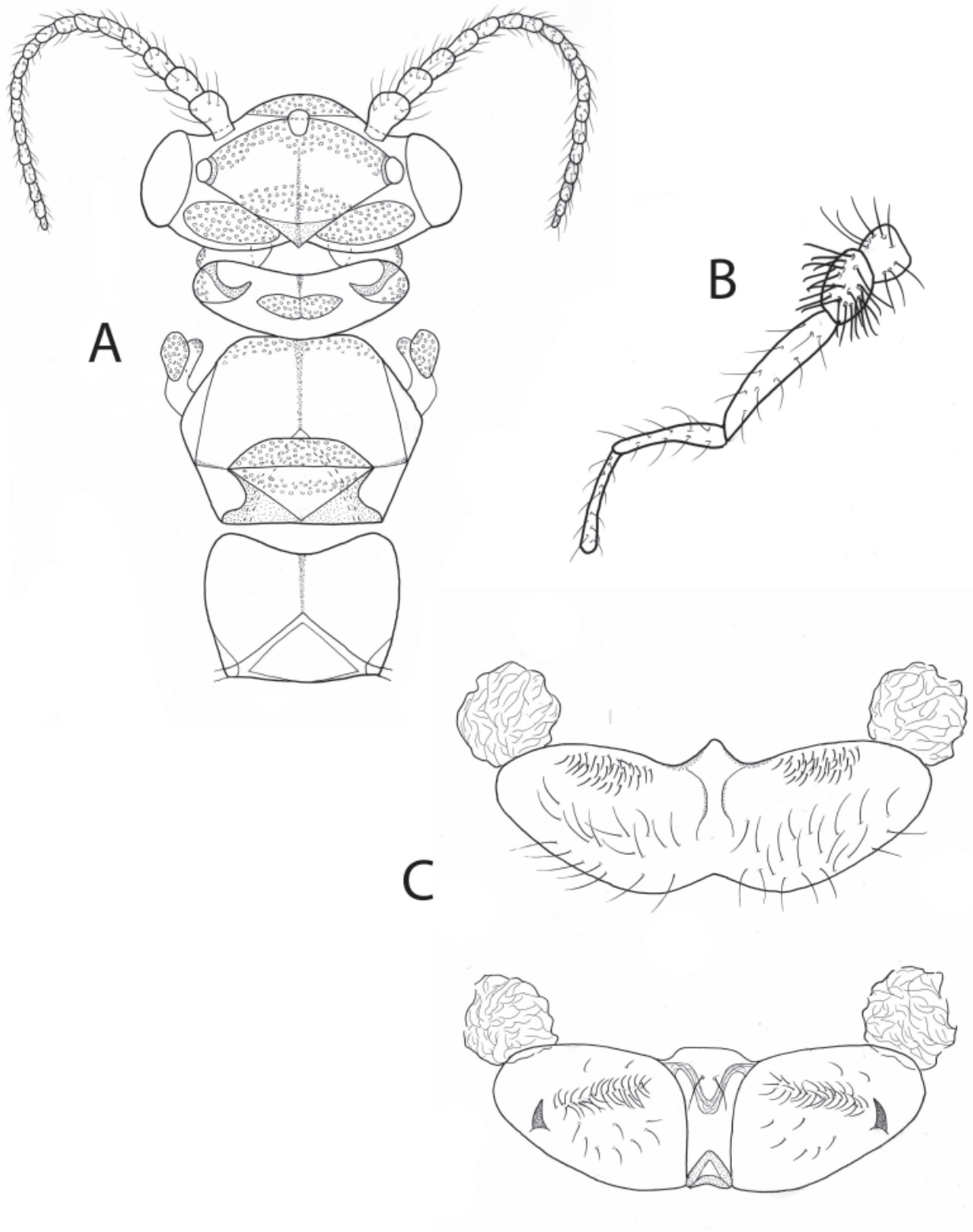


Figure 10. *Oxyethira pembertonensis*, n. sp. Female genitalia. A. Lateral view; B. Ventral view; C. Dorsal view.



**Figure 11.** *Metrichia mastelleri*, n. sp. Adult male. **A.** Head and thorax, dorsal view; **B.** Maxillary palp, ventral view; **C.** Abdominal segments V and VI, dorsal view.

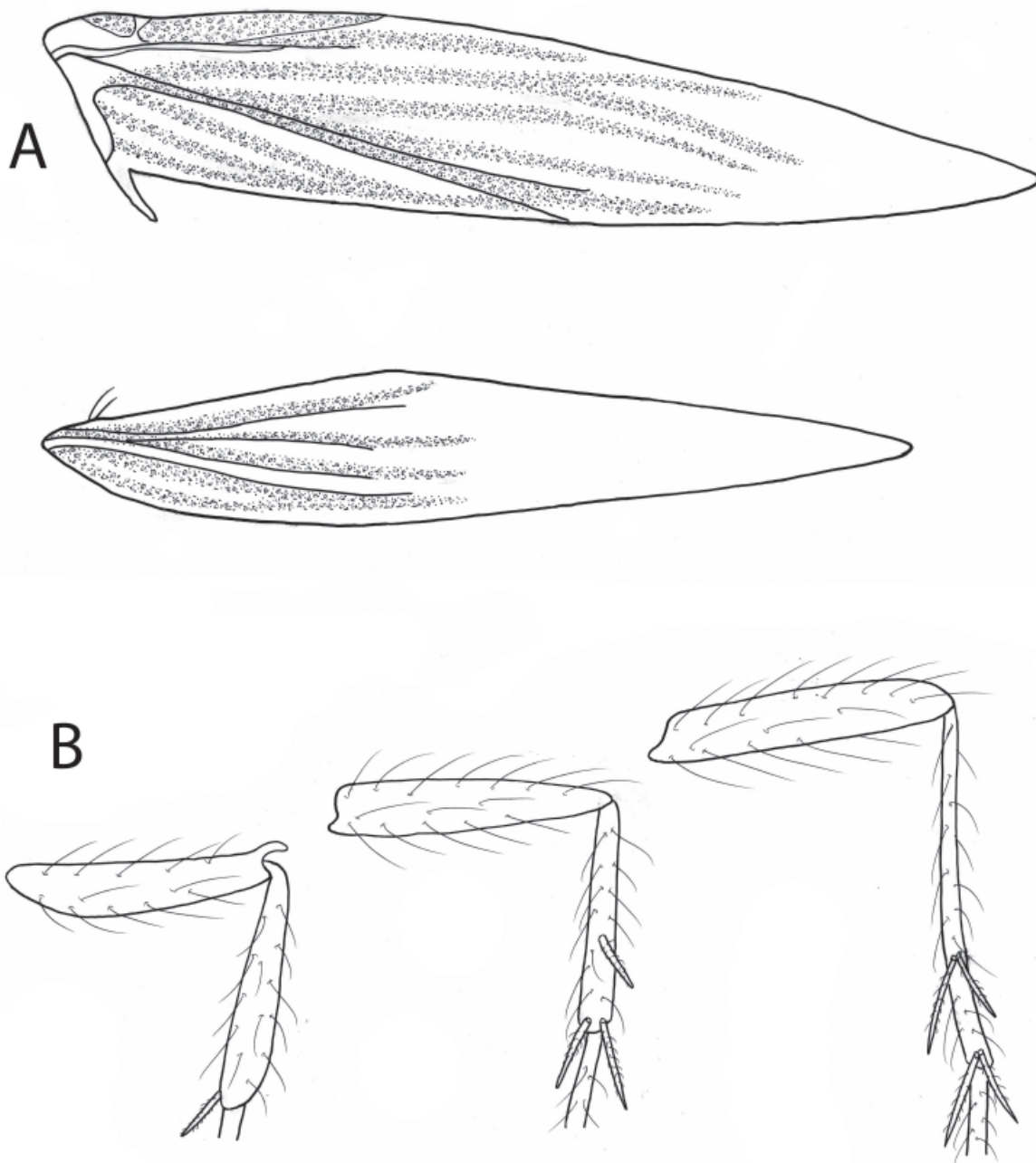
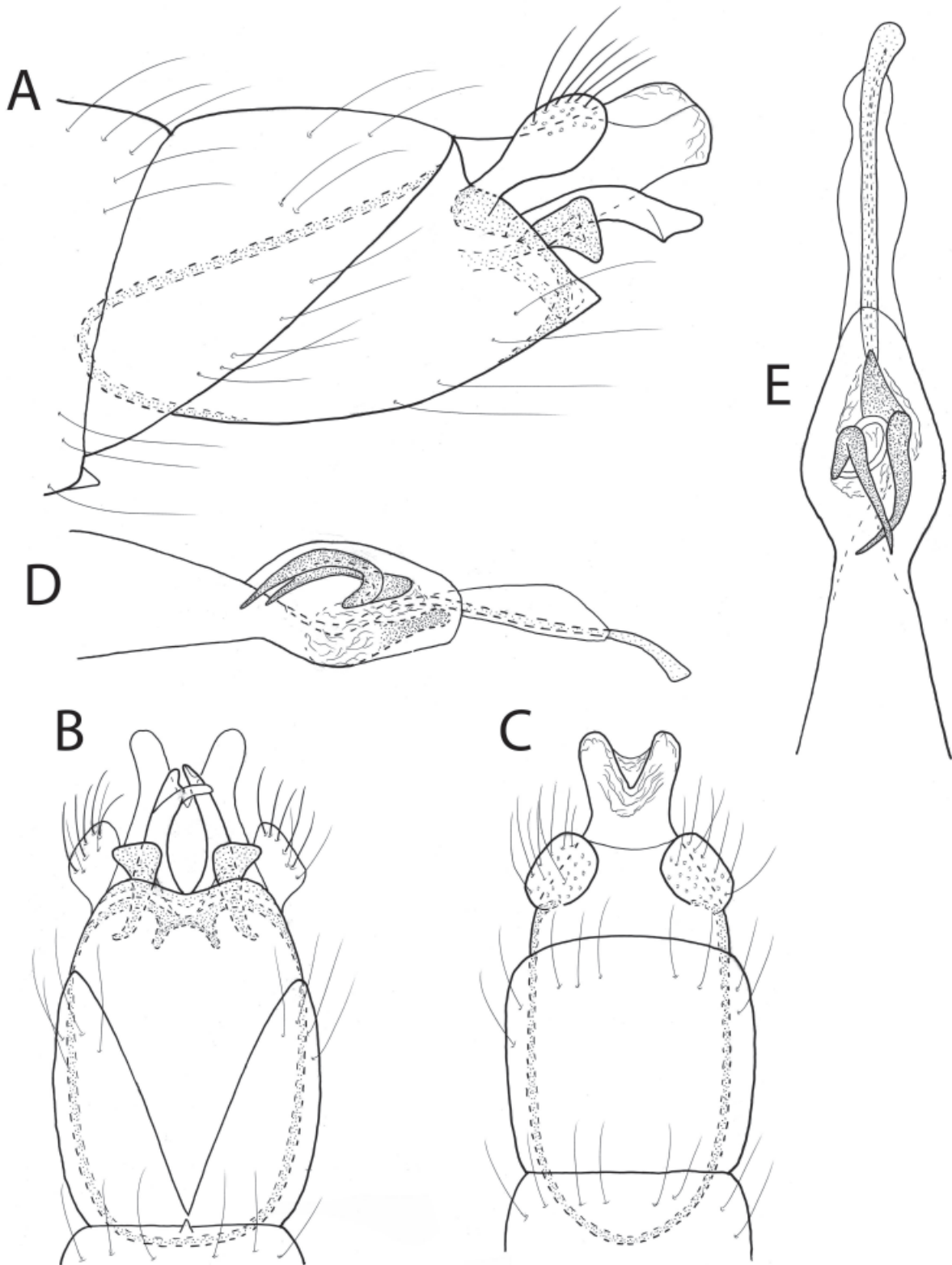
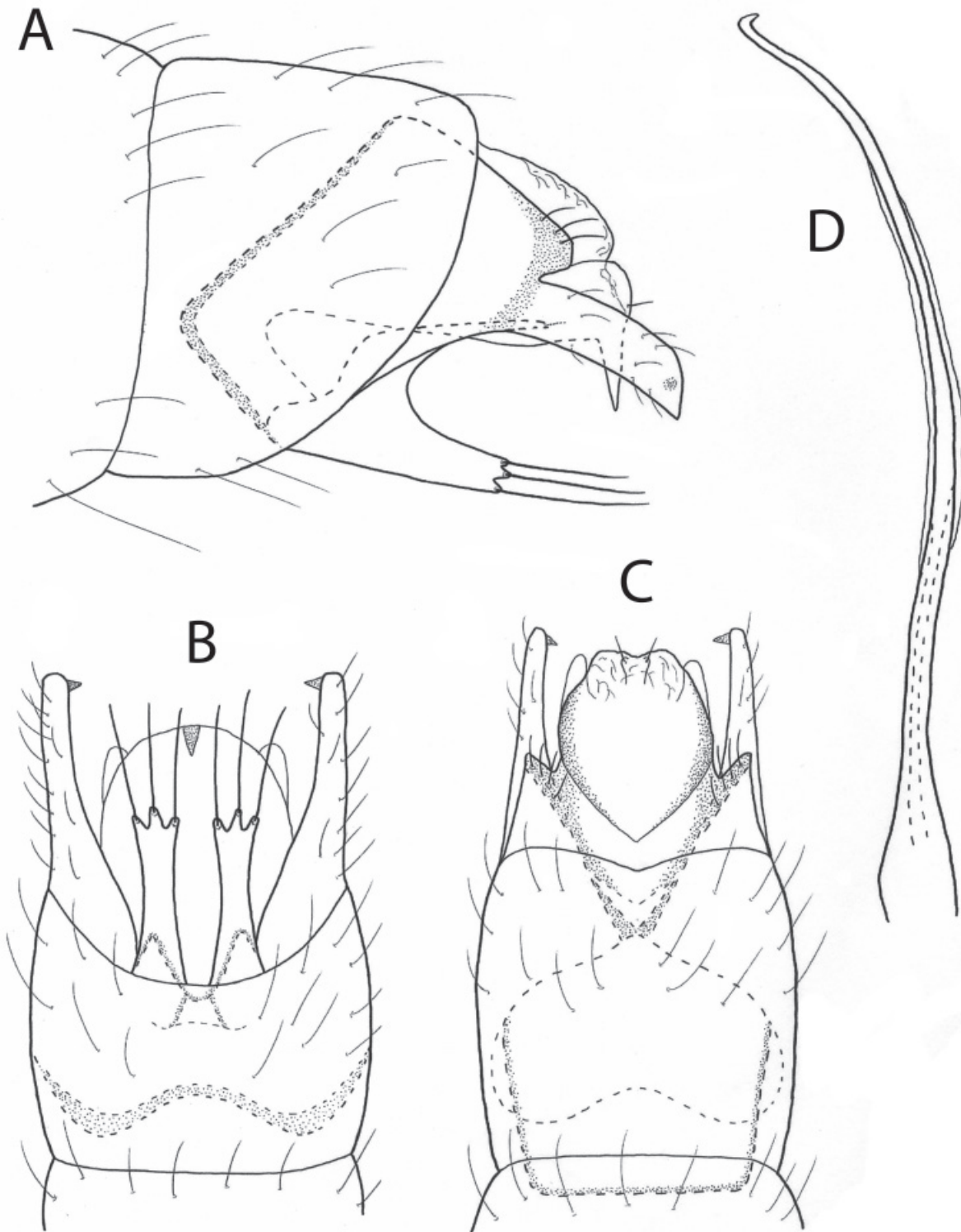


Figure 12. *Metrichia mastelleri*, n. sp. Adult male A. Fore and hind wing; B. Fore, middle and hind leg, ventral view



**Figure 13.** *Metrichia mastelleri*, n. sp. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, lateral; **E.** Phallus, dorsal.



**Figure 14.** *Mayatruchia tuscaloosa* Harris and Sykora. Male genitalia. **A.** Lateral view; **B.** Ventral view; **C.** Dorsal view; **D.** Phallus, lateral.