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Review of the subgenus *Euthraulus* (Ephemeroptera, Leptophlebiidae, genus *Choroterpes*) from the Western Ghats (India)

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NIKITA KLUGE, PANDIARAJAN SRINIVASAN, M. VASANTH, T. SIVARUBAN, S. BARATHY, RAJASEKARAN ISACK
REVIEW OF THE SUBGENUS *EUTHRAULUS* (EPHEMEROPTERA, LEPTOPHLEBIIDAE, GENUS *CHOROTERPES*) FROM THE WESTERN GHATS (INDIA)
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Abstract

The subgeneric name *Monochoroterpes* Kluge & Jacobus 2015 is regarded here to be a junior synonym of *Euthraulus* Barnard 1932 (**syn. n.**), based on a wider understanding of more species from each group. Based on male and female imagines reared from larvae, the following species are described or re-described: *Choroterpes* (*Euthraulus*) *alagarensis* Dinakaran *et al*. 2009, *Ch.* (*E.*) *armillatus* **sp. n.**, *Ch.* (*E.*) *latus* **sp. n.**, *Ch.* (*E.*) *atelobranchis* **sp. n.**, *Ch.* (*E.*) *unicolor* **sp. n.**, *Ch.* (*E.*) *nambiyarensis* Selva-Kumar *et al*. 2013, *Ch.* (*E.*) *angustifolius* **sp. n.** and *Ch.* (*E.*) *nandini* Selvakumar & Sivaramakrishnan 2015. All these species are distributed in southern India. One of them, *Ch.* (*E.*) *latus* sp. n., was collected in a plains river, Vaigai, in Madurai and in several localities in Sri Lanka, including a plains river, Malvatu, in Anuradhapura; formerly it was confused with another Ceylonese species, *Ch*. (*E*.) *signatus* (Hagen 1858). Here the characters separating *Ch*. (*E*.) *signatus* from *Ch.* (*E.*) *latus* sp. n. are reported and illustrated. Other species listed above were collected in mountain rivers in south of Western Ghats. One more species of *Euthraulus* is described without a formal name based a on mature male larva collected near Mumbai. The species description of *Choroterpes* (*Euthraulus*) *kalladaensis* Rekha *et al*. 2019 was based on specimens belonging both to *Indialis rossi* and *Ch.* (*E.*) *angustifolius*; since the type specimens are lost, and the description is based mainly on characters of *Indialis rossi*, we propose the following synonymy: *Indialis rossi* Peters 1975 = *Choroterpes* (*Euthraulus*) *kalladaensis* Rekha *et al*. 2019, **syn. n.**

Key words: mayflies, systematics, India, Western Ghats, Sri Lanka

Introduction

The taxon *Euthraulus* Barnard 1932 was originally established as a genus related to *Thraulus* Eaton 1881; according to the original description, larvae of *Euthraulus* are characterized by having three processes on each of two lamellae of tergalii II–VII. Such larvae were known earlier (Uéno 1928), being placed in the genus *Choroterpes* Eaton 1881. Based on similarity between *Choroterpes* s. str. and *Euthraulus*, Peters & Edmunds (1964) accepted these two taxa as subgenera of the genus *Choroterpes* s. l. At present, 25 species of the subgenus *Euthraulus* are described from Africa, Asia and Europe, mostly from tropical areas. Among them, 4 species are reported from India; these are (1) *Choroterpes* (*Euthraulus*) *parvulus* (Gillies 1951) described as imagines only; (2) *Ch.* (*E.*) *alagarensis* Dinakaran *et al*. 2009 described as larvae and subimagines (wrongly reported as imagines); (3) *Ch.* (*E.*) *nambiyarensis* Selva Kumar *et al*. 2013 described as larvae only; (4) *Ch.* (*E.*) *kalladaensis* Rekha *et al*. 2019 described as larvae and male subimagines.

The taxon *Monochoroterpes* Kluge & Jacobus 2015 (objective synonym *Monophyllus* Kluge 2012, nom. praeocc.) was established as a subgenus of the genus *Choroterpes* s. l.; according to the original diagnosis, it differs from

Euthraulus only by presence of a single lamella of tergalii II–VII. Based on this diagnosis, Selvakumar *et al*. (2015) placed in this subgenus the Indian species *Ch.* (*M*.) *nandini* Selvakumar & Sivaramakrishnan (in Selvakumar *et al*.) 2015, which they described as larvae only.

Rearing imagines from larvae allows us to complete descriptions of *Ch.* (*E.*) *alagarensis*, *Ch.* (*E.*) *nambiyarensis* and *Ch*. (*M*.). *nandini*, correct errors done in the description of *Ch.* (*E.*) *kalladaensis*, reveal 5 new species and revise status of *Monochoroterpes*.

Material and methods

Larvae, imagines and subimagines were associated by rearing. For this purpose subimagines were reared from larvae in cages placed in natural current water or in containers with stagnant water; imagines were reared from subimagines in a wide glass tubes closed with wet cotton and protected from direct sun light. Slides are made in Canadian balsam.

Material reported in this paper, is deposited in the following institutions: (1) **ZIN**: Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia; now this material is temporarily located in the Department of Entomology of Saint Petersburg State University; (2) **AMC**: American College (Department of Zoology), Madurai, India; (3) **ZSI**: Southern Regional Centre, Zoological Survey of India, Chennai, India.

In the lists of material examined, the following arbitrary signs are used: **L**—larva; **S**—subimago; **I**—imago; **L-S-I**♂—male imago reared from larva, with larval and subimaginal exuviae; **L-S**♂—male subimago reared from larva, with larval exuviae; **S-I**♂—male subimago reared from subimago, with subimaginal exuviae.

The term «microlepides» is used according to Kluge & Novikova (2014), Kluge (2022); the term «protopteron» according to Kluge (2005); terms connected with subimaginal mesothoracic cuticle, according to Kluge (2020: fig. 94a); term «microtrichial circle» according to Kluge *et al*. 2022; other terms according to Kluge (2004). The noun «blank» is used to describe an unpigmented area of cuticle. Sides of leg are shown in Fig. 66.

Systematic position of *Euthraulus*

Euthraulus belongs to the genus *Choroterpes* s. l., which in its turn belongs to subsequently subordinated taxa (Kluge 2012): Leptophlebiidae > Atalophleboadentata Kluge 2009 > Atalophlebopectinata Kluge 2009 > Atalophleboculata Kluge 2009 > Atalophlebomaxillata Kluge 2009 > Atalophlebolinguata Kluge 2009 > tribe Choroterpini Kluge 2012.

Subgenus *Euthraulus* Barnard 1932

(Figs 1–425)
= *Monophyllus* Kluge 2012 (nom. praeocc.)
= *Monochoroterpes* Kluge & Jacobus 2015, **syn. n.**

Type species: *Euthraulus elegans* Barnard 1932.

Diagnosis. Each of two lamellae of tergalii II–VII terminated with 3 equally slender, pointed processes (in certain species tergalius VII with less number of processes; in certain species ventral lamellae of all tergalii lost).

Synonymy of *Euthraulus* and *Monochoroterpes*. The subgenus *Monochoroterpes* (= *Monophyllus*, nom. praeocc.) differs from *Euthraulus* by a single character—loss of the ventral lamellae of tergalii II–VII. It was originally established for a single species *Ch*. (*Monophyllus*) *monophyllus* Kluge 2012 from Hainan Island (China), which is known as larvae and male subimago extracted from mature larva. The second species placed in *Monochoroterpes*, was *Ch*. (*Monophyllus*) *nandini* Selvakumar *et al*. 2015 originally described as larvae from the Western Ghats in southern India. Our recent investigation reveals that *Ch*. *nandini* and a new sympatric species *Ch*. (*Euthraulus*) *angustifolius* sp. n. share common characters: (1) larval labrum has unusually deep median incision (Figs 346–350 and 398–399), in contrast to incision of a usual form in *Ch. monophyllus* (Kluge 2012: fig. 119); (2) tergalii are very narrow and parallel-sided (Figs 345, 366–372 and 397), in contrast to wider and oval in *Ch. monophyllus* (Kluge

2012: figs 120–126); (3) penis has gonopores in distal part and apices blunt and smooth (Figs 14 and 15), in contrast to proximal gonopore and apices pointed and dentate in *Ch. monophyllus* (Kluge 2012: figs 117); (4) subinaginal gonostylus has inner-apical angle sharply projected (Figs 387 and 422), in contrast to poorly expressed in *Ch. monophyllus* (Kluge 2012: fig. 117). These facts testifies that *Ch. nandini* has a closer relationship with *Ch.* (*Euthraulus*) *angustifolius* sp. n., than with *Ch.* (*Monochoroterpes*) *monophyllus*. Probably, the loss of the ventral lamella of tergalii II–VII took place independently in *Ch. monophyllus* and *Ch. nandini*; thus the subgenus *Monochoroterpes* is polyphyletic. Because of this, the subgeneric name *Monochoroterpes* should be treated as a subjective synonym of *Euthraulus*.

Notes about *Euthraulus*

Stout setae on larval abdomen. In larvae of all examined species of *Euthraulus*, the abdomen has no stout setae. Among *Choroterpes* s. l., such setae are found only in *Choroterpes* (s. str.) *mercatorius* Kluge 2012, where they form longitudinal rows on lateral margins of abdominal segments.

Terms applied to tergalii. Tergalii of *Euthraulus* are differentiated: tergalius I consists of a single thread-like lamella [only in *Ch.* (*E.*) *atelobranchis* sp. n. absent]; each tergalius II–VII consists of 2 lamellae, the **dorsal lamella** and the **ventral lamella**; each lamella is terminated with 3 narrow processes [in some species certain lamella of tergalius VII terminated with 2 processes; in *Ch.* (*E.*) *nandini* ventral lamellae are absent]. Bellow, three processes are termed as following (Figs 320, 367): **middle process**—the middle of three processes; **costal process**—the side process located anteriad (if tergalius is directed laterally) or laterad (if tergalius is directed posteriorly) of the middle process; **anal process**—the side process located posteriad (if tergalius is directed laterally), or mediad (if tergalius is directed posteriorly) of the middle process.

Eggs. Surface of egg chorion has the following relief peculiar for *Choroterpes* s. l.: there are **papillae** evenly arranged on egg surface; convex **ridges** are stretched from one papilla to another and form broken lines in such a manner that each papilla is surrounded by a crown of several acute angles formed by these ridges. Usually papillae located near one pole (called here **polar papillae**) are larger than others and can have different configuration. In some species relief formed by the papillae and the ridges occupy the whole egg surface (Fig. 339); in some species a part of egg surface lacks regular relief, and only a part of surface demonstrates the relief formed by the papillae and the ridges (Fig. 109); in this case an egg viewed from certain side looks as lacking this relief (Fig. 110).

Previous data about *Euthraulus* of India

***Choroterpes* (*Euthraulus*) *parvulus*.** Based on male and female imagines from West Bengal, Gillies (1951) described a species originally named *Thraululus parvulus* Gillies 1951. Later Gillies (1957) moved this species in the genus *Euthraulus*, and Peters & Edmunds (1964) treated it in the subgenus *Euthraulus* of the genus *Choroterpes*. The larva of this species remains unknown. This species undoubtedly belongs to the genus *Choroterpes* s. l.; it is placed in the subgenus *Euthraulus* based on general similarity with other species of *Euthraulus*; however, reliable determination of subgenus is possible only based on larval characters. According to the original description, wings and genitalia are similar to those of the south Indian species described below (Gillies 1951: figs 3, 4, 6, 8). Leg coloration is characterized as «fore femur dark brown, tibia and tarsus yellowish ...; mid and hind femora brown with a dark spot in the middle third and the apex, tibiae and tarsi amber» (Gillies 1951: 124). By the coloration of fore femur this species differs from the Indian species described below, whose fore femora have maculation similar to that of the middle and hind femora (Figs 51, 100, 150, 220, 260, 272, 330, 382, 418). Coloration of imaginal femora is caused by hypodermal pigmentation and in all species is equally expressed in larva, subimago and imago. So, this character allows to distinguish *Ch. parvulus* not only from the species whose imagines are known, but also from *Ch.* (*E.*) sp. n. «Mumbai» known as larva and subimago. Based on this, we conclude that all species from the Western Ghats described in this paper are not conspecific with the northern species *Ch. parvulus*.

«*Choroterpes* (*Euthraulus*) *kalladaensis*». Rekha, Anbalagan, Dinakaran, Balachandran and Krishnan (2019) described the species named *Choroterpes* (*Euthraulus*) *kalladaensis* Rekha *et al*. 2019 based on larvae and reared subimagines from the Western Ghats in southern India. Judging by illustrations, this description was based on indi-

viduals belonging to different species, one of which is a species described below as *Choroterpes* (*Euthraulus*) *angustifoluis* sp. n., and another is *Indialis rossi* Peters 1975, belonging to the unrelated endemic Indian genus *Indialis* Peters & Edmunds 1970. Till now, *Indialis rossi* was known as a single male imago; one of us (N. Kluge) collected its larvae and reared male and female imagines, which will be described in another publication.

Photographs of detached mouth parts given in the original description of «*Ch.* (*E.*) *kalladaensis*» (Rekha *et al*. 2019: figs 2A–G) belong to *Indialis rossi*; about this testify peculiar species-specific shape of the labrum and absence of stout blunt setae on apices of glossae, which are present in all *Euthraulus* (Fig. 71). The leg indicated as «hind leg» of «*Ch.* (*E.*) *kalladaensis*» (Rekha *et al*. 2019: figs 2H–I) is actually a middle leg of *Indialis rossi*. The abdomen (Rekha *et al*. 2019: fig. 2J) also belongs not to *Choroterpes*, but to *Indialis*, that is testified by structure of its tergalii. Among photos of tergalii, the photo indicated as «gill II» (Rekha *et al*., 2019: fig. 2L) also belongs to *Indialis rossi*, but the photos indicated as «gill III», «gill IV» and «gill VII» (Rekha *et al*. 2019: figs 2M–O) belong to *Choroterpes* (*Euthraulus*) *angustifolius* sp. n.

Details of subimaginal structure are illustrated by hand drawings, which are inaccurate and do not allow to determine the species.

The narrative description of «*Ch.* (*E.*) *kalladaensis*» agrees with the photos belonging to *Indialis rossi*.

The holotype (called «holotypes») is said to be «deposited at Department of Biochemistry, Central University of Rajasthan»; however, this department has no taxonomic collection. The paratypes are said to be deposited «at Department of Zoology, The Madura College, Madurai, Tamil Nadu province, India». At present, all this material is lost by the same reason, as the type specimens of *Choroterpes* (*Euthraulus*) *alagarensis* (see below).

Since the description of «*Ch.* (*E.*) *kalladaensis*» is based mostly on specimens belonging to *Indialis rossi*, we propose here the following new synonymy: *Indialis rossi* Peters 1975 = *Choroterpes* (*Euthraulus*) *kalladaensis* Rekha *et al*. 2019, **syn. n.**

South Indians species of *Euthraulus*. From the mountains of the Western Ghats in southern India, Dinakaran *et al*. (2009) described *Choroterpes alagarensis*; Selva-Kumar *et al*. (2013) described *Choroterpes* (*Euthraulus*) *nambiyarensis*; and Selvakumar *et al*. (1915) described *Choroterpes* (*Monophyllus*) *nandini*. Redescriptions of these species are given below.

Key to larvae of *Euthraulus* distributed in Western Ghats

1(2) Each tergalius II–VII consists of single lamella; tergalius II terminated with 2 processes, each tergalius III–VII terminated with 3 processes (Fig. 397). . . . . *Ch.* (*E.*) *nandini*

2(1) Each tergalius II–VII consists of 2 lamellae, each lamella terminated with 3 or 2 processes (Figs 34–39, 89–94, 134–139, 197–202, 252–257, 290–293, 319–324, 366–372). 3

3(4) Tergalius I absent. . . . . *Ch.* (*E.*) *atelobranchis* **sp. n.**

4(3) Tergalius I present, consists of 1 slender filament (Fig. 33). 5

5(8) Each tibia with brown band at middle (cuticular coloration only) (Figs 28–32, 78–80). 6

6(7) Labrum with proximal transverse setal row about 5 times shorter than distal transverse setal row, less than 2 widths of median incision (Fig. 69–70). Stout setae forming row along outer margin of hind tibia mostly short (Fig. 80). Cuticular coloration: each abdominal tergum mostly light, with brown markings adjacent to posterior margin (Fig. 67) . . *Ch.* (*E.*) *armillatus* **sp. n.**

7(6) Labrum with proximal transverse setal row about 2 times shorter than distal transverse setal row, several times longer than width of median incision (Figs 21–23). Stout setae forming row along outer margin of hind tibia mostly long (Fig. 32). Cuticular coloration: abdominal terga with extensive brown coloration (Figs 19–20). . . . . *Ch.* (*E.*) *alagarensis*

8(5) Tibiae without dark band at middle. 9

9(12) Ventral lamella of tergalii II–VII narrow; its both tracheae entering side processes arise from main trachea, among them trachea entering costal process arises proximad of trachea entering anal process (Figs 319–324, 366–372). 10

10(11) Dorsal lamella of tergalius VII terminated with 2 processes (Fig. 324). . . . . *Ch.* (*E.*) *nambiyarensis*

11(10) Dorsal lamella of tergalius VII terminated with 3 processes (Figs 371–372) . . . . . *Ch.* (*E.*) *angustifolius* **sp. n.**

12(9) Ventral lamella of tergalii II–VII wide, with several tracheae arising from base; its tracheae entering side processes either independently arise from base of lamella, or bifurcate in any sequence (Figs 134–139, 252–257, 290–293). 13

13(14) Ventral lamella of tergalii II–VII or at least part of them with prominent anal-proximal expansion projected far proximad of tergalius base (Figs 134–139). In anterior part of abdomen, terga significantly wider and shorter than terga in posterior part of abdomen (Fig. 113). . . . . *Ch.* (*E.*) *latus* **sp. n.**

14(13) Ventral lamella of tergalii II–VII with anal margin not projected or only slightly projected proximad of tergalius base (Figs 252–257, 290–293). Terga of anterior part of abdomen only slightly wider and shorter than terga of posterior part of abdomen (Figs 230, 275) 15

15(16) Dorsal lamella of tergalii II–VIII wide, significantly widened distally (Figs 290–293). Median incision of labrum very sharp, deep and narrow (Figs 278–279). . . . . *Ch.* (*E.*) sp. «Mumbai»

16(15) Dorsal lamella of tergalii II–VIII narrow, nearly parallel-sided (Figs 252–257). Median incision of labrum wider and shallower (Figs 234–235) . . . . . *Ch.* (*E.*) *unicolor* **sp. n.**

Species of *Euthraulus* distributed in Western Ghats

1. *Choroterpes* (*Euthraulus*) *alagarensis* Dinakaran *et al*. 2009

(Figs 1, 16–61)

Choroterpes alagarensis: Dinakaran & Anbalagan 2007: 171 (nomen nudum).
Choroterpes alagarensis Dinakaran, Balachandran & Anbalagan 2009: 22 (subimagines and larvae).
Euthraulus/g2 *alagarensis* [*Choroterpes*]: Kluge 2012: 288.

Material examined. INDIA: TAMIL NADU state: Madurai district, Alagar hills, 23.VII–2.VIII.2021, coll. P. Srinivasan & R. Isack: 2 L-S-I♂, 2 L-S♂, 1 L-S♀, 17 larvae (AMC; new species register number 224); Tirunelveli district, Courtallam, Chittar river near Peraruvi (= Main Falls), 3–7. II.2013, coll. N. Kluge & L. Sheyko: 1 L/S♀, 9 larvae (ZIN); Tirunelveli district, Nambiyar river, 15.VIII.2019, coll. M. Vasanth & K.A. Subramanian: 3 larvae (ZSI); Theni district, Suruli colony, Upper Manalar stream, Megamalai, 4.III.2019, coll. M. Vasanth: 11 larvae (ZSI); Theni district, Suruli Falls, 25.I.2016, coll. N. Kluge & L. Sheyko: 1 larva (ZIN); Theni district, Veerapandi Koil river, 24.X.2017, coll. M. Vasanth: 11 larvae (ZSI); Dindugal district, Poolandur section near Kodaikanal, 20.X.2017, coll. M. Vasanth: 2 larvae (ZSI); Dindugal district, on the way to Dum Dum Falls of Kodaikanal, 21.X.2017, coll. M. Vasanth: 10 larvae (ZSI).

KERALA state, Kollam district, Kallar coconut estate, 23.I.2019, coll. M. Vasanth: 4 larvae (ZSI).

Descriptions

Larva. CUTICULAR COLORATION: Head mostly brown; exposed side of mandible brown with ochre blank (Fig. 17). Pronotum with contrasting brown and ochre areas; mesonotum and fore protoptera mostly brown (Fig. 18). Femur of each leg ochre with contrasting brown bands at base, at middle and near apex; tibia of each leg ochre, with contrastingly brown base and contrasting brown band at middle; tarsus of each leg contrastingly brown proximally and ochre distally (Figs 16, 28–32). Abdominal terga with contrasting brown and ochre areas; each sternum mostly ochre, which brown markings laterally-anteriorly (Figs 19–20). Caudalii ochre with joinings brown.

HYPODERMAL COLORATION: Femur of each leg with contrasting brown bands at middle and near apex (as in imago—as in Figs 51–53), coinciding with cuticular coloration. Dark markings on abdominal terga appear only with developing of subimaginal tissues under larval cuticle.

SHAPE AND SETATION: *Labrum* (Fig. 20) with median emargination sharply incised, with denticles smoothed out or absent (Fig. 21); distal transverse setal row arched, as long as about 1/2 of labrum width (Fig. 22); proximal transverse setal row arched, about 2 times shorter than distal transverse setal row (Fig. 23). *Mandibles* with outer margin moderately convex (Fig. 17). *Maxillae*: Medio-apical projection of maxilla poorly expressed, not crosses base of comb-like dentiseta; subapical ventral row of about 12–13 comb-like setae reaches apex of medio-apical projection and divided by curvation into median portion with larger sockets and lateral portion with smaller sockets (Fig. 24). Inner margin of maxillary palp with 1–2 setae on apex of 2nd segment, 3 setae on 3rd segment (Fig. 24).

Fore femur: widest proximally; margins and anterior side with stout setae, partly smooth and blunt, partly pectinate and pointed. *Middle femur*: widest at middle; margins and anterior side with stout setae, partly smooth and blunt, partly pectinate and pointed. *Hind femur*: margins and anterior side with stout, non-pectinate, blunt setae; pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, dense, as long as stout setae on inner margin (as in Fig. 77).

Fore tibia: stout, pointed, pectinate setae on inner side form irregular and dense stripe with 2–4 setae in cross section, occupy whole tibia length; setae heavily bipectinate (Figs 28–29). *Middle tibia*: stout setae on inner side long, pointed and pectinate, form one regular row occupying whole tibia length; besides it, inner-anterior side with irregularly situated shorter stout setae varying from pointed and bipectinate to blunt and smooth (Figs 30–31). *Hind tibia*: stout setae forming longitudinal row on outer side numerous, not longer than tibia width; stout setae on inner and inner-anterior sides similarly dense and long, situated irregularly, mostly blunt and non-pectinate (Fig. 32); pointed, bipectinate setae on posterior side dense nearly all along tibia (as in Fig. 81).

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae; smaller stout setae proximad of them and on inner sides of fore and middle tarsi (Figs 28, 30, 32).

Abdomen: In anterior part of abdomen, terga significantly wider than sterna of the same segments, significantly wider and shorter than terga in posterior part of abdomen (Fig. 19). Posterior margins of abdominal terga: terga I–II with minute denticles (Fig. 25); terga III–X with triangular pointed denticles increasing from tergum III to tergum X (Figs 26–27); sterna without denticles. Posterolateral spines of terga VIII–IX incised (Fig. 1).

Tergalii (Figs 33–46): Tergalius I unilamellate and thread-like. Tergalii II–VII bilamellate, with both dorsal and ventral lamellae wide; ventral lamella wider than dorsal lamella, with proximal-anal expansion slightly projected proximad of tergalius base; all lamellae of all tergalii (including tergalius VII) terminated with 3 processes. Dorsal lamella pigmented except costal margin, ventral lamella lighter pigmented except costal and anal margins; tracheae of both lamellae pigmented by blackish. In ventral lamella, tracheae entering side processes either independently arise from base of lamella, or bifurcate in any sequence.

Subimago. CUTICULAR COLORATION: Pronotum light brown. Mesonotum with both chromozones and achromozones of scutum light brown (Fig. 50). Thoracic pleura and sterna with light brown and colorless areas. Wings with microtrichial circles very light brownish. Legs nearly colorless, apex of femur and base of tibia tinged with light brown (Fig. 55). Abdominal terga light brownish, sterna lighter.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), 2nd–5th tarsomeres covered with sharply narrowed, pointed microlepides (as in Figs 239–240).

Imago, male. (Figs 47–48) Head ochre with brown. Scape and pedicel ochre proximally and brown distally, flagellum ochre. Dorsal eyes not elevated, brownish-orange. Thorax ochre. On fore wing base with brown, other membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt (as in Fig. 108). Legs ochre; on each leg cuticle of knee area (apex of femur and base of tibia) colored with brown; fore femur with 3 large black hypodermal maculae—proximal, middle and apical ones; middle and hind femora without proximal macula, others as on fore leg (Figs 51–53). Each abdominal tergum mostly brown, with smaller ochre areas; each sternum ochre, with pair of small brownish maculae laterally (Fig. 48). Caudalii ochre, with longitudinal brown stripe in proximal part (Fig. 54).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus with inner-apical angle right, with length equal to width (Figs 56–57, 59). Penes narrowed toward apex; portion distad of gonopores short; apices rounded, without denticles (Fig. 58).

Imago, female. Coloration as in male. Posterior margin of abdominal sternum IX rounded.

Egg (Figs 60–61). Irregularly oval. Chorion partly covered with relief formed by papillae and ridges (see Notes about *Euthraulus*) (Fig. 60); large part of egg surface lacks regular relief, so that egg viewed from certain side looks as lacking this relief (Fig. 61). Few polar papillae enlarged and projected, most other papillae small and non-projected.

Dimension. Fore wing length (and approximated body length) 5–7 mm.

Distribution. Mountains of the Western and Eastern Ghats of southern India (Tamil Nadu state).

Comments. The species was originally described from Alagar Hills based on specimens which were reported as male and female imagines, subimagines and nymphs; certain imagines were said to be reared from nymphs, with associated nymphal and subimaginal exuviae; a specimen reported as male imago was designated as the holotype. However, judging by the drawing of genitalia (Dinakaran *et al*. 2009: fig. 5), a specimen reported as male imago, is in reality a male subimago, that testifies that these authors did not distinguish imagines from subimagines. All type material (the holotype and the paratypes) was preserved in alcohol and deposited in the Centre for Research in Aquatic Entomology Laboratory (CRE), the Madura College, Madurai, India. However, this institution is not suitable to deposit type specimens; its staffs do not understand significance of type specimens for zoological nomenclature: they pushed away all type specimens of *Choroterpes alagarensis* when decided that their condition was not good enough, only on that reason that the alcohol was dried out from the tubes. According to the International Code of Zoological Nomenclature (Recommendation 16C), type specimens should be deposited «in an institution that maintains a research collection, with proper facilities for preserving them and making them accessible for study (i.e. one which meets the criteria in Recommendation 72F)»; in its turn, the Recommendation 72F states: «Every institution in which name-bearing types are deposited should ... take all necessary steps for their safe preservation». This means that the type specimens should be preserved independently of their condition.

The original description of *Choroterpes alagarensis* is confused, because imaginal characters are mixed with subimaginal ones, larval cuticular coloration is mixed with its hypodermal coloration and the drawings are inaccurate. We determined our material examined as belonging to *Ch.* (*E.*) *alagarensis*, because it was collected in Alagar Hills where other species of *Euthraulus* have not been found, and because its characters do not contradict the original description of *Ch.* (*E.*) *alagarensis*.

2. *Choroterpes* (*Euthraulus*) *armillatus* sp. n.
(Figs 2, 10, 62–110)

Etymology. From «armillatus» (Lat.)—bracelts-bearind; allusion of contrasting dark cross bands on cuticle of larval tibia (Figs 64–66, 78–81); the same coloration occurs only in *Ch*. (*E*.) *alagarensis*.

Material examined. Holotype: L-S-I♂ {specimen [XI](4)2013}, INDIA, Karnataka state, border of Shivamogga and Udupi districts near Agumbe and Nadpal, 26.I.2013, coll. N. Kluge & L. Sheyko (ZIN). **Paratypes:** the same locality and collectors, 11–31.I.2013: 1 L-S♂, 1 L-S-I♀, 1 L-S♀, 8 larvae (ZIN).

Descriptions

Larva. CUTICULAR COLORATION: Head mostly brown; exposed side of mandible brown with roundish ochre blank, which can be either closed (Fig. 62) or opened medially. Pronotum with contrasting brown and ochre areas; mesonotum and fore protoptera mostly brown (Fig. 63). Femur of each leg ochre with contrasting brown bands at middle and near apex; tibia of each leg ochre, with contrastingly brown base and contrasting brown band at middle; tarsus of each leg contrastingly brown proximally and ochre distally (Figs 64–66). Abdomen mostly ochre; each tergum with contrasting brown markings adjacent to posterior margin (Fig. 67). Caudalii ochre with joinings brown.

HYPODERMAL COLORATION: Femur of each leg with contrasting brown bands at middle and near apex (as in imago—as in Figs 100–102), coinciding with cuticular coloration. Dark markings on abdominal terga appear only with developing of subimaginal tissues under larval cuticle.

SHAPE AND SETATION: *Labrum* with median emargination moderately deep, with denticles smoothed out or absent; distal transverse setal row as wide as 1/2 of labrum width (Fig. 68); proximal transverse setal row unusually small, about 5 times shorter than distal transverse setal row, less than 2 times longer than width of median incision, consists of 6–12 setae (Figs 69–70). *Mandibles* with outer margin moderately convex (Fig. 62). *Maxillae*: Medio-apical projection of maxilla poorly expressed, not crosses base of comb-like dentiseta; subapical ventral row of about 10–15 comb-like setae reaches apex of medio-apical projection and divided by curvation into median portion with larger sockets and lateral portion with smaller sockets (Fig. 73). Inner margin of maxillary palp with 1–2 setae on apex of 2nd segment, 3–5 setae on 3rd segment (Fig. 72).

Fore femur: widest proximally; margins and anterior side with stout setae, partly smooth and blunt, partly pectinate and pointed (Fig. 74; as in Fig. 123). *Middle femur*: widest distally; margins and anterior side with stout, non-pectinate, blunt setae (Fig. 75). *Hind femur*: widest at middle; margins and anterior side with stout, non-pectinate, blunt setae (Fig. 76); pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, nearly as long as stout setae on inner margin (Figs 77, 85).

Fore tibia: stout, pointed, pectinate setae on inner side form dense stripe with 2–4 setae in cross section, partly arranged in regular longitudinal rows, occupy whole tibia length; setae heavily bipectinate (Fig. 78). *Middle tibia*: stout setae on inner side long, pointed and pectinate, form one regular row occupying nearly whole tibia length (Fig. 79); besides it, inner-anterior side with few very small, blunt, stout setae (Fig. 82). *Hind tibia*: stout setae forming longitudinal row on outer side, blunt and mostly very short, only 1–2 of them long (but not longer than tibia width); stout setae forming longitudinal row on inner side, longer; stout setae forming longitudinal row on inner-anterior side, short and blunt (Figs 80, 83); pointed, bipectinate setae on posterior side dense nearly all along tibia (Figs 81, 84).

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae; smaller stout setae proximad of them and on inner sides of fore and middle tarsi (Figs 78–80).

Abdomen: Terga of anterior part of abdomen slightly wider, but significantly shorter than terga of posterior part of abdomen (Fig. 67). Posterior margins of abdominal terga: terga I–III with minute denticles (as in Fig. 25), terga IV–X with small, triangular, pointed denticles increasing toward tergum X (Figs 86–87); sterna without denticles. Posterolateral spines of terga VIII–IX incised (Fig. 2).

Tergalii (Figs 88–94): Tergalius I unilamellate and thread-like. Tergalii II–VII bilamellate, with both dorsal and ventral lamellae wide; ventral lamella wider than dorsal lamella, with proximal-anal expansion slightly projected proximad of tergalius base; all lamellae of all tergalii (including tergalius VII) terminated with 3 processes. Both lamellae nearly colorless; tracheae pigmented by blackish. In ventral lamella, tracheae entering side processes either independently arise from base of lamella, or bifurcate in any sequence.

Subimago. CUTICULAR COLORATION: Pronotum light brown with blanks. Mesonotum with chromozones brown, achromozones contrastingly colorless (Fig. 97). Thoracic pleura and sterna with light brown and colorless areas. Wings with microtrichial circles very light brownish. Femora in middle area colorless, at base, apex and margins brown; tibiae mostly colorless, with base and outer margin brown (Figs 98–99). Abdominal terga, sterna and gonostyli light brownish.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), 2nd–5th tarsomeres covered with sharply narrowed, pointed microlepides (as in Figs 239–240).

Imago, male. Head brown. Scape and pedicel brown, flagellum lighter. Dorsal eyes not elevated, brownish-orange (Fig. 95). Thorax brown. On fore wing base including costal brace brown, veins light, membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt (Fig. 108). Legs light ochre; on each leg cuticle of extreme femur base and knee area (apex of femur and base of tibia) colored with brown; fore femur with 3 large black hypodermal maculae—proximal, middle and apical ones; middle femur with proximal macula small, others as on fore leg; hind femur without proximal macula, other macula as on fore and middle legs (Figs 100–102). Each abdominal tergum mostly brown, with smaller ochre areas; sterna ochre (Fig. 96). Caudalii ochre, with longitudinal brown stripe in proximal part (Fig. 105).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus with inner-apical angle right, with length equal to width (Figs 106–107). Penes gradually narrowed toward apex; portion distad of gonopores short; apices rounded, without denticles (Fig. 10).

Imago, female. Coloration as in male (Figs 103–104). Posterior margin of abdominal sternum IX rounded.

Egg (Figs 109–110). Irregularly oval. Chorion partly covered with relief formed by papillae and ridges (see Notes about *Euthraulus*) (Fig. 109); most part of egg surface lacks regular relief, so that egg viewed from certain side looks as lacking this relief (Fig. 110). Few polar papillae enlarged and projected, most other papillae small and non-projected.

Dimension. Fore wing length (and approximated body length) 4–5 mm.

Distribution. Mountains of the Western Ghats in southern India (Karnataka).

Comparison. Larva of the new species *Ch*. (*E*.) *armillatus* sp. n. is similar to *Ch*. (*E*.) *alagarensis* in cuticular coloration of legs, especially by dark band at middle of tibia (Figs 64–66), not found in other species. Larva of *Ch*. (*E*.) *armillatus* sp. n. differs from *Ch*. (*E*.) *alagarensis* by greatly reduced proximal setal row of labrum and shallower median incision of labrum (Figs 69–70), very small stout setae on inner-anterior side of middle tibia (Fig. 82), mostly small stout setae on outer side on hind tibia (Fig. 83), less extensive dark coloration on abdominal terga (Fig. 67). Imago of *Ch*. (*E*.) *armillatus* sp. n. is similar to that of *Ch*. (*E*.) *alagarensis*.

3. *Choroterpes* (*Euthraulus*) *latus* sp. n.

(Figs 3, 11, 111–163)

Choroterpes (*Euthraulus*) *signatus*: Kluge 2012 (partim: figs 107–113).

Etymology. From «latus» (Lat.)—wide; allusion of relatively wide and short terga of anterior part of larval abdomen (Fig. 113).

Material examined. Holotype: L-S-I♂ {specimen [XX](1)2016}, INDIA, Madurai, river Vaigai, 12.II.2016, coll. N. Kluge & L. Sheyko. **Paratypes:** the same locality and collectors, 10–13.II.2016: 3 L-S-I♂, 2 L-S♂, 3 L-S-I♀, 2 L-S♀, S-I♀, 12 larvae (ZIN).

SRI LANKA: boundary between Uva province and Central province, tributary of river Uma near Randenigala dam, 13–14.I.2011, coll. N. Kluge & L. Sheyko: 1 L-S-I♂, L-S-I♀, 16 larvae (ZIN); Central province, river Mahaveli Ganga in Ginigathhena, 4.II.2011, coll. N. Kluge & L. Sheylo: 1 L-S-I♂ (ZIN); Anuradhapura, river Malvatu

oya below dam, 30–31.I.2020, coll. N. Kluge & L. Sheylo: 4 L-S-I♂, 1 L-S♂, 3 L-S-I♀, 27 I♂, 10 I♀, 23 larvae (ZIN).

Descriptions

Larva. CUTICULAR COLORATION: Head mostly brown; exposed side of mandible brown with roundish ochre blank (Fig. 111). Pronotum mostly brown with contrasting ochre blanks; mesonotum and fore protoptera mostly brown (Fig. 112). Femur of each leg ochre with contrasting brown maculae at middle and near apex; tibia of each leg ochre, with brown band near base; tarsus of each leg ochre, more or less darkened with brown in proximal part (Figs 114–116). Abdominal terga with characteristic ornament of brown and ochre areas; sterna ochre (Fig. 113). Caudalii ochre with joinings brown.

HYPODERMAL COLORATION: Femur of each leg with contrasting brown maculae at middle and near apex (as in imago—as in Figs 150–152), coinciding with cuticular coloration. In larvae of various instars, abdominal terga with brown maculation more or less resembling that of imago; each abdominal sternum I–VIII with pair of roundish or oblique, contrasting, brown spots laterally, resembling that of imago (as in Figs 142–144).

SHAPE AND SETATION: *Labrum* with median emargination shallow, with 5 blunt denticles (Fig. 117; Kluge 2012: fig. 107); distal transverse setal row arched, as long as about 1/2 of labrum width; proximal transverse setal row straight, about 1.5 times shorter than distal transverse setal row (Fig. 118). *Mandibles* with outer margin moderately convex (Fig. 111). *Maxillae*: Medio-apical projection of maxilla moderately expressed, overlaps base of comb-like dentiseta, apically truncated; subapical ventral row of about 10–15 comb-like setae nearly reaches apex of medio-apical projection and divided by curvation into median portion with larger sockets and lateral portion with smaller sockets (Fig. 120). Inner margin of maxillary palp with 3–4 setae on 2nd segment, 1 seta on 3rd segment (Fig. 119).

Fore femur: widest proximally; margins and anterior side with irregularly situated stout setae, partly smooth and blunt, partly pectinate and pointed (Fig. 124). *Middle femur*: widest distally; margins and anterior side with stout, non-pectinate, blunt setae; few small, pectinate setae on posterior side (Figs 125–126). *Hind femur*: widest at middle; margins and anterior side with stout, non-pectinate, blunt setae, forming stripe nearly all along anterior side (Fig. 127); pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, nearly as long as stout setae on inner margin (Fig. 128; as in Fig. 85).

Fore tibia: stout, pointed, pectinate setae on inner side form irregular and dense stripe with 2–4 setae in cross section, occupy whole tibia length (Fig. 129); setae heavily bipectinate (as in Fig. 29). *Middle tibia*: stout setae on inner side long, pointed and non-pectinate, form one regular row occupying whole tibia length; besides it, inner-anterior side with sparse longitudinal row of shorter stout setae (Fig. 130). *Hind tibia*: stout setae forming longitudinal row on outer side numerous, not longer than tibia width; stout setae on inner and inner-anterior sides situated irregularly, partly blunt and non-pectinate, partly pointed and bipectinate (Fig. 131); pointed, bipectinate setae on posterior side dense nearly all along tibia (Fig. 132).

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae; smaller stout setae proximad of them and on inner sides of fore and middle tarsi (Figs 129–131).

Abdomen: In anterior part of abdomen, terga significantly wider than sterna of the same segments, significantly wider and shorter than terga in posterior part of abdomen (Fig. 113). Posterior margins of abdominal terga: terga I–X with small, narrow, pointed denticles increasing toward tergum X (Figs 121–122); sterna without denticles. Posterolateral spines of terga VIII–IX incised (Fig. 3).

Tergalii (Figs 133–139): Tergalius I unilamellate and thread-like. Tergalii II–VII bilamellate, with both dorsal and ventral lamellae wide; ventral lamella wider than dorsal lamella, with proximal-anal expansion significantly projected proximad of tergalius base (at least on middle pairs of tergalii); all lamellae of all tergalii (including tergalius VII) terminated with 3 processes. Both dorsal and ventral lamellae slightly pigmented; tracheae of both lamellae pigmented by blackish. In ventral lamella, tracheae entering side processes either independently arise from base of lamella, or bifurcate in any sequence.

Subimago. CUTICULAR COLORATION: Pronotum light brown. Mesonotum with both chromozones and achromozones of scutum brown (Fig. 141). Thoracic pleura and sterna with light brown and colorless areas. Wings with microtrichial circles very light brownish. Femora mostly brown; tibiae mostly brownish, on fore leg slightly darkened basally, on middle and hind legs non-darkened basally (Figs 148–149). Abdominal terga light brownish, sterna lighter, gonostyli and caudalii darker brown.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), 2nd–5th tarsomeres covered with sharply narrowed, pointed microlepides (as in Figs 239–240).

Imago, male (Fig. 140). Head ochre with brown. Scape and pedicel brown, flagellum lighter. Dorsal eyes not elevated, brownish-orange. Thorax brown. On fore wing base including costal brace brown, veins light, membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt (as in Fig. 108). Legs light ochre; on each leg cuticle of knee area (apex of femur and base of tibia) colored with brown; each femur with 2 large black hypodermal maculae—middle and apical ones; third, proximal macula small or absent (Figs 150–152). Abdominal tergum I brown; terga II–IX with contrasting pattern of dark brown and light ochre areas; each abdominal sternum ochre, with pair of more or les expressed, oblique, dark brown maculae laterally (Figs 140, 143–144). Caudalii light ochre, in proximal part with contrasting dark brown maculae on joinings (Fig. 153).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus with inner-apical angle right, with length equal to width (Figs 145–147). Penes relatively wide, widest at middle; portion distad of gonopores shorter than half of length from proximal constriction to apex; apices rounded, without denticles (Fig. 11).

Imago, female. Coloration as in male (Figs 142, 154–155). Posterior margin of abdominal sternum IX medially rounded or very slightly incised.

Egg (Figs 156–163). Irregularly oval. Chorion partly covered with relief formed by papillae and ridges (see Notes about *Euthraulus*), partly lacks regular relief. Polar papillae enlarged and projected, some of them with crown formed by petal-like projections (Figs 159,161).

Dimension. Fore wing length (and approximated body length) 4–5 mm.

Distribution. Plains of southern India and Sri Lanka.

Comparison. Formerly (Kluge 2012), this species was confused with *Ch*. (*E*.) *signatus* (Hagen 1858), because both species are found in Sri Lanka and have similarly widened ventral lamellae of tergalii III–VII (compare Figs 134–139 and Kluge 2012: figs 100–104). These species differ as follows: (1) Larva of *Ch*. (*E*.) *latus* sp. n. has widened and shortened terga of anterior part of the abdomen (Fig. 113), while abdominal terga of *Ch*. (*E*.) *signatus* are not widened (Fig. 164). (2) Labrum of *Ch*. (*E*.) *latus* sp. n. has median incision shallow and retaining 5 blunt denticles (Fig. 117; Kluge 2012: fig. 107), while in *Ch*. (*E*.) *signatus* the median incision of labrum is narrower, sharp and lacks denticles (Fig. 169). (3) Hypodermal coloration of abdominal terga (especially well expressed in male imago) in *Ch*. (*E*.) *latus* sp. n. consists of dark brown areas contrastingly alternating with colorless areas (Figs 143–144), while in *Ch*. (*E*.) *signatus* hypodermal coloration of abdominal terga is mostly uniformly dark brown (Fig. 165). (4) In *Ch*. (*E*.) *latus* sp. n. the first segment of the gonostylus has a right inner-apical angle, and in imaginal stage retains length equal to width (Figs 145–147; Kluge 2012: figs 111–113), while in *Ch*. (*E*.) *signatus* the first segment of the gonostylus has an obtuse inner-apical angle (Figs 166–167), and in imaginal stage has length exceeding width (Fig. 167; Kluge 2012: figs 14–16).

Material recently determined as *Ch*. (*E*.) *signatus*: SRI LANKA: Uva province, Badulla district, Haputale Forest and river Lemastota Oya, 15–23.I.2011, coll. N. Kluge & L. Sheyko: 5 L-S-I♂, 3 L-S-I♀, 2 L-S♀, 20 larvae. Sabaragamuwa province, river Seetha Sangula, Dalhausie near Sri Pada (Adam's Peak), 24–26.I.2011, coll. N. Kluge & L. Sheyko: 14 larvae; the same locality, 2–10.II.2020, , coll. N. Kluge & L. Sheyko: 1 L-S-I♂, 1 L-S/I♂, 1 L-S-I♀, 1 larva; Sabaragamuwa Province, Ratnapura District, Belihuloya, rivers Belihul oya and Kirikatu oya, 15–26.I.2020, coll. N. Kluge & L. Sheyko: 5 larvae.

Comments. Here it is necessary to clarify which of the two Ceylonese species of *Euthraulus* was originally described by Hagen (1858) as *Cloe signata*, and which represents a new species *Ch*. (*E*.) *latus* sp. n. The syntype of *signata* Hagen 1858 [*Cloe*] should be deposited in the Museum of Comparative Zoology of Harvard University, but at present its disposition is unknown. Imagines of the two Ceylonese species can be distinguished by coloration of abdomen. The original description of *Cloe signata* is the following: «Caplte nigro, thorace fusco aenco, abdomune fusco, subtus, segmentarumque basi pallidis; pedibus albidis, femoribus mediis et genubus nigro annulatis, setis albidis, incisuris nigris» (Hagen 1858: 177). According to more detailed redescription by Eaton (1884), its «dorsum of abdomen purplish sepia-brown; segments 2–6 translucent, paler at the base and sides, but opaque at the joinings, and blackish at the stigmata». This characteristic of the abdomen is in agreement with the high-mountain Ceylonese species, whose abdominal terga are mostly dark brown (Fig. 165), but not with the lowland species described here as *Ch*. (*E*.) *latus* sp. n., whose abdominal terga have composite ornamentation of brown markings and colorless blanks (Fig. 144).

According to the original description, the type specimens were collected in Rainbodde; according to Eaton (1884), it is «at altitudes of upwards of 4000 feet», that is more than 1200 m above sea level; recently this place is known under the name Ramboda. This habitat agrees with the habitat of the species determined here as *Ch*. (*E*.) *signatus*, which were collected in Haputale and foot of Sri Pada (both about 1300 m s.l.) while the species described here as *Ch*. (*E*.) *latus* sp. n. is found in lower areas: about 600 m a.s.l. in Ginigathhena; about 140 m a.s.l. near Randenigala dam; about 80 m a.s.l. in Anuradhapura; about 100 m a.s.l. in Madurai.

Probably, *Ch*. (*E*.) *latus* sp. n. is adopted for inhabitancy in plains rivers of warm lowlands, which allows it to be distributed both in southern India and Sri Lanka. In contrast to it, other species of *Euthraulus* are adapted to mountain streams and have areas of distribution limited by certain mountain systems, such as the Western Ghats in India or Central Highlands in Sri Lanka.

4. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n.

(Figs 4, 169–227)

Etymology. From «άτελής» (Gr.)—incomplete, and «branchiae» (Lat.)—gills; allusion of absence of the first pair of tergalii.

Materials examined: Holotype: L-S-I♂: INDIA, Tamil Nadu state, Theni district, Veerapandi River, 27.IV.2021, coll. P. Srinivasan, R. Isack (AMC; new species register number 245). **Paratypes:** the same locality and collectors, 21–27.IV.2021: 1 L-S♂, 2 L-S-I♀, 12 larvae (AMC; new species register number 246).

Descriptions

Larva. CUTICULAR COLORATION: Head, pronotum and mesonotum with diffusive brown and ochre areas; exposed side of mandible brown with ochre blank (Fig. 174). Femur, tibia and tarsi of all legs light brown-ochre (Figs 175–177). Abdominal terga and sterna uniformly brown-ochre.

HYPODERMAL COLORATION: Femur of each leg with contrasting brown bands at middle and near apex (as in imago—as in Figs 220–222).

SHAPE AND SETATION: Labrum with median emargination shallow, with 5 blunt denticles (Fig. 170); distal transverse setal row arched, as long as about 1/2 of labrum width; proximal transverse setal row slightly arched, about 1.5 times shorter than distal transverse setal row (Fig. 169). Mandibles with outer margin moderately convex (Fig. 174). *Maxillae*: Medio-apical projection of maxilla poorly expressed, not crossing base of comb-like dentiseta, apically truncated; subapical ventral row of about 15 comb-like setae nearly reaches apex of medio-apical projection and divided by curvation into median portion with larger sockets and lateral portion with smaller sockets (Fig. 172). Inner margin of maxillary palp with 4–5 setae on 2nd segment, 4 setae on 3rd segment (Fig. 171).

Fore femur: widest proximally; margins and anterior side with irregularly situated stout setae, partly smooth and blunt, partly pectinate and pointed (Figs 175, 181, 185–186). *Middle femur*: widest distally; margins and anterior side with stout, non-pectinate, blunt setae (Figs 176, 182, 187). *Hind femur*: widest at middle; margins and anterior side with stout, non-pectinate, blunt setae, forming stripe nearly all along anterior side (Figs 177, 183, 188); pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, nearly as long as stout setae on inner margin (Fig. 184).

Fore tibia: stout, pointed, pectinate setae on inner side form dense stripe with 2–4 setae in cross section, partly arranged in regular longitudinal rows, occupying whole tibia length; setae heavily bipectinate (Fig. 189). *Middle tibia*: stout setae forming longitudinal row on inner side and longitudinal row on inner-anterior side equally moderately long, blunt, and non-pectinate (Figs 190–191). *Hind tibia*: stout, apically curved setae forming longitudinal row on outer side, numerous, shorter than tibia width; stout setae on inner and inner-anterior sides situated irregularly, non-pectinate (Figs 192–193); pointed, bipectinate setae on posterior side dense nearly all along tibia (Fig. 195).

Tarsi: inner side of hind tarsus with several stout setae (Fig. 180); inner side on middle tarsus with fewer stout setae (Fig. 179).

Abdomen: Terga of anterior part of abdomen slightly wider and shorter than terga of posterior part of abdomen (Fig. 196). Posterior margins of abdominal terga: terga I–II with minute denticles (Figs 203–204), of terga III–X with long, pointed denticles increasing toward tergum X (Figs 205–212); sterna without denticles. Posterolateral spines of terga VIII–IX incised (Fig. 4).

Tergalii (Figs 197–202): Tergalii of 1st pair absent. Tergalii II–VII bilamellate, with both dorsal and ventral

lamellae wide; ventral lamella wider than dorsal lamella, with proximal-anal expansion slightly projected proximad of tergalius base; all lamellae of all tergalii (including tergalius VII) terminated with 3 processes. Dorsal lamella brownish and ventral lamella slightly pigmented; tracheae of both lamellae pigmented by blackish. In ventral lamella, tracheae entering side processes either independently arise from base of lamella, or bifurcate in any sequence.

Subimago. CUTICULAR COLORATION: Pronotum light brown. Mesonotum with both chromozones and achromozones of scutum light brownish (Fig. 218). Thoracic pleura and sterna with light brown and colorless areas. Legs and abdomen nearly colorless.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), 2nd–5th tarsomeres covered with sharply narrowed, pointed microlepides (as in Figs 239–240).

Imago, male (Figs 213–214). Head ochre with brown. Scape and pedicel ochre proximally and brown distally, flagellum ochre or brown. Dorsal eyes not elevated, brownish-orange. Thorax brown (became ochre in alcohol). On fore wing base brown, other membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt. Legs ochre; on each leg cuticle of knee area (apex of femur and base of tibia) colored with brown; fore femur with 3 large black hypodermal maculae—proximal, middle and apical ones; middle femur with proximal macula small; hind femur without proximal macula (Figs 220–222). Each abdominal tergum mostly dull brown (Fig. 216); each sternum ochre (as in Fig. 217). Caudalii light ochre, in proximal part with contrasting dark brown maculae on joinings (Fig. 219).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus with inner-apical angle blunt, widest at base; in imago its length slightly exceeds width (Figs 223, 226–227). Penes with proximal parts nearly parallel-sided, distally sharply narrowed; apices rounded, with denticles (Fig. 225).

Imago, female. Coloration as in male (Fig. 217). Posterior margin of abdominal sternum IX medially rounded or very slightly incised.

Dimension. Fore wing length (and approximated body length) 4–5 mm.

Distribution. Mountains of the Western Ghats in southern India (Tamil Nadu state).

Comparison. The new species *Ch.* (*E.*) *atelobranchis* sp. n. differs from all other species of *Euthraulus* by absence of the first pair of tergalii (which are thread-like in other species). By uniform cuticular coloration of abdomen and wide tergalii, larva of *Ch.* (*E.*) *atelobranchis* sp. n. resembles *Ch.* (*E.*) *unicolor* sp. n.; but differs from it, besides the absence of first tergalii, by shorter medio-apical projection of maxilla, equally long stout setae of the inner and the inner-dorsal rows on middle tibiae, wider dorsal lamella of tergalii II–VII and presence of all 3 terminal processes on dorsal lamella of tergalius VII.

Male imago of *Ch.* (*E.*) *atelobranchis* sp. n. differs from other species except *Ch.* (*E.*) *unicolor* sp. n. by the presence of denticles in the apices of penis. In contrast to *Ch.* (*E.*) *unicolor* sp. n., in *Ch.* (*E.*) *atelobranchis* sp. n. the 1st segment of gonostylus is elongate and widened at base.

5. *Choroterpes* (*Euthraulus*) *unicolor* sp. n.

(Figs 5, 12, 228–270)

Etymology. Allusion of uniform coloration of larval abdominal cuticle (Fig. 230) and nearly uniform hypodermal coloration of larval, subimaginal and imaginal abdomen (Fig. 258).

Material examined. Holotype: L-S/I♂ {specimen [XIV](9)A 2013}, INDIA, Karnataka state, border of Shivamogga and Udupi districts near Agumbe and Nadpal, 30.I.2013, coll. N. Kluge & L. Sheyko (ZIN). **Paratypes:** the same locality and collectors, 11–31.I.2013: 2 L-S-I♂, 3 L-S♂, 1 L-S/I♀, 1 L-S♀, 5 larvae (ZIN).

Descriptions

Larva. CUTICULAR COLORATION: Head, pronotum and mesonotum with diffusive brown and ochre areas; exposed side of mandible brown with roundish ochre blank (Figs 228–229). Femora of all legs light brown-ochre, with diffusive lighter and darker areas; tibiae and tarsi brown-ochre (Figs 231–233). Abdominal terga and sterna uniformly ochre (Fig. 230).

HYPODERMAL COLORATION: Femur of each leg with contrasting brown maculae at middle and near apex (as in imago—as in Figs 260–262). In immature larvae, each abdominal tergum with narrow brownish band on posterior margin; each abdominal sternum with pair of transverse brown spots laterally. With developing of subimaginal tissues, abdominal terga get more extensive hypodermal coloration, resembling that of imago (Figs 258–259).

SHAPE AND SETATION: *Labrum* with median emargination sharply and narrowly incised, without denticles (Fig. 235); distal transverse setal row arched, as long as about 1/2 of labrum width; proximal transverse setal row straight, about 1.5 times shorter than distal transverse setal row (Fig. 234). *Mandibles* with outer margin moderately convex (Fig. 228). *Maxillae*: Medio-apical projection of maxilla moderately expressed, overlaps base of comb-like dentiseta, apically with point bent proximally; subapical ventral row of about 12–13 comb-like setae nearly reaches apex of medio-apical projection and divided into median portion with larger sockets and lateral portion with smaller sockets (Fig. 242). Inner margin of maxillary palp with 2–3 setae on 2nd segment, 2 setae on 3rd segment (Fig. 241).

Fore femur: widest proximally; margins and anterior side with stout non-pectinate setae, partly blunt, partly pointed (Fig. 243). *Middle femur*: widest at middle; margins and anterior side with stout, non-pectinate setae, partly blunt, partly pointed (Fig. 244). *Hind femur*: widest at middle; margins and anterior side with stout, non-pectinate setae, partly blunt, partly pointed (Fig. 245); pointed, curved, pectinate setae forming irregular row on posterior side of hind femur small, about twice shorter than stout setae on inner margin (Fig. 246).

Fore tibia: stout, pointed, pectinate setae on inner side form dense stripe with 1–3 setae in cross section, partly arranged in regular longitudinal rows, occupy whole tibia length; setae heavily bipectinate (Fig. 247). *Middle tibia*: stout setae on inner side pointed, non-pectinate, form very sparse row of 2–6 longer and several shorter setae; besides it, inner-anterior side with few small stout setae (Fig. 248). *Hind tibia*: stout setae forming longitudinal row on outer side, numerous, mostly shorter than tibia width, some setae longer than tibial width; stout setae on inner and inner-anterior sides shorter than tibia width, blunt or pointed, non-pectinate (Fig. 249); pointed, bipectinate setae on posterior side absent on proximal half of tibia, dense on distal part of tibia (Fig. 250).

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae (Fig. 249).

Abdomen: Terga of anterior part of abdomen only slightly wider and shorter than terga of posterior part of abdomen (Fig. 230). Posterior margins of abdominal terga: terga I–III with minute denticles (as in Fig. 25), terga IV–VIII with narrow, pointed denticles increasing toward tergum VIII (Figs 236–237); terga IX–X with larger pointed denticles (Fig. 238); sterna without denticles. Posterolateral spines of terga VIII–IX slightly incised (Fig. 5).

Tergalii (Figs 251–257): Tergalius I unilamellate and thread-like. Tergalii II–VII bilamellate; ventral lamellae wider than dorsal lamella, with proximal-anal expansion slightly projected or non-projected proximad of tergalius base. On tergalii II–VI both lamellae terminated with 3 processes; on tergalius VII dorsal lamella with 2 processes, ventral lamella with 3 processes. Each tergalius with dorsal lamella dark gray, ventral lamella lighter gray; tracheae of both lamellae pigmented by blackish. In ventral lamella, tracheae entering side processes either independently arise from base of lamella, or bifurcate in any sequence.

Subimago. CUTICULAR COLORATION: Pronotum light brownish. Mesonotum with chromozones light brown (Fig. 269). Thoracic pleura and sterna with light brown and colorless areas. Wings with microtrichial circles very light brownish. Legs light brownish, femora darkened at apex and margins; tibiae slightly darkened at base (Figs 263–164). Abdominal terga, sterna, gonostyli and caudalii light brownish.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), 2nd–5th tarsomeres covered with sharply narrowed, pointed microlepides (Figs 239–240).

Imago, male (Fig. 258). Head ochre with brown. Scape and pedicel ochre proximally and brown distally, flagellum ochre or brown. Dorsal eyes not elevated, brownish-orange. Thorax brown. On fore wing base including costal brace brown, other membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt (as in Fig. 108). Legs ochre; on each leg cuticle of knee area (apex of femur and base of tibia) colored with brown; fore femur with 3 large black hypodermal maculae—proximal, middle and apical ones; middle femur with proximal macula small; hind femur without proximal macula (Figs 260–262). Each abdominal tergum mostly dull brown, with smaller ochre areas; each sternum ochre, with pair of small brownish maculae laterally (Fig. 259). Caudalii ochre; in proximal part of caudalius each segment with brown joining and brown longitudinal stripes on ventral and dorsal sides (Fig. 265–266).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus narrowed at base, with length equal to width, inner-apical angle right (Figs 267–268). Penes narrow, in proximal part parallel-sided; portion distad of gonopores sharply narrowed, shorter than half of length from proximal constriction to apex; apices with very small denticles (Fig. 12).

Imago, female. Coloration as in male. Posterior margin of abdominal sternum IX medially very slightly incised.

Egg (Fig. 270). Irregularly oval. Chorion nearly entirely covered with relief formed by papillae and ridges (see Notes about *Euthraulus*), but ridges partly irregular or substituted by irregular rugosity. Polar papillae slightly larger than others.

Dimension. Fore wing length (and approximated body length) 4–5 mm.

Distribution. Mountains of the Western Ghats in southern India (Karnataka state).

Comparison. Larva of *Ch.* (*E.*) *unicolor* sp. n. differs from *Ch.* (*E.*) *alagarensis*, *Ch.* (*E.*) *armillatus* sp. n. and *Ch.* (*E.*) *latus* sp. n. by uniformly light cuticle of abdominal terga and non-widened terga of anterior abdominal segments; in this respect it resembles *Ch.* (*E.*) *nambiyarensis* and *Ch.* (*E.*) *angustifolius* sp. n., from which it differs by wide ventral lamella of tergalii II–VII with tracheae arising from base. Male imago of *Ch.* (*E.*) *unicolor* sp. n. differs from other species by narrower penis with parallel sides in proximal part (Figs 12, 267–268).

6. *Choroterpes* (*Euthraulus*) sp. «Mumbai»

(Figs 6, 271–293)

Material examined. L/S♂, INDIA, Maharashtra state, Mumbai, park Santhya Gandi, 3 km E Boryvali, near bridge of road to Kanhery Cave, river from lake Tulsi, 23.XII.2008, coll. M. Chertoprud (ZIN).

Descriptions

Larva. CUTICULAR COLORATION: Head, pronotum and mesonotum brown, with diffusive lighter areas (Figs 271, 277). Femora of all legs light brown-ochre, with diffusive lighter and darker areas; tibiae and tarsi brown-ochre (Figs 272–274). Abdominal terga brown with light ochre longitudinal median stripe widened from tergum I to tergum X; sterna medially light ochre, laterally-anteriorly brown (Fig. 275).

HYPODERMAL COLORATION: Femur of each leg with contrasting brown maculae at middle and near apex (Figs 272–274). In larva ready to subimago, abdominal terga nearly uniformly colored with brown, sterna with lateral brown markings (Fig. 276).

SHAPE AND SETATION: *Labrum* with median emargination sharp and deep, without denticles (Fig. 279); distal transverse setal row arched, as long as about 1/2 of labrum width; proximal transverse setal row slightly arched, about 1.5 times shorter than distal transverse setal row (Fig. 278). *Mandibles* with outer margin moderately convex (Fig. 271). *Maxillae*: Medio-apical projection of maxilla moderately expressed, overlaps base of comb-like dentiseta; subapical ventral row of 14–16 comb-like setae not reaches apex of medio-apical projection and divided by curvation into median portion with larger sockets and lateral portion with smaller sockets (Fig. 281). Inner margin of maxillary palp with 3–4 setae on 2nd segment, 3 setae on 3rd segment (Fig. 280).

Fore femur: widest proximally; margins and anterior side with stout setae, mostly non-pectinate and blunt, few setae pectinate and pointed (Figs 272, 284). *Middle femur*: widest at middle (Fig. 273); margins and anterior side with stout setae, mostly non-pectinate and blunt, few setae pectinate and pointed (as in Figs 284). *Hind femur*: widest at middle (Fig. 274); margins and anterior side with stout, non-pectinate, blunt setae; pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, nearly as long as stout setae on inner margin (as in Fig. 85).

Fore tibia: stout, pointed, pectinate setae on inner side of fore tibia form dense stripe with 2–4 setae in cross section, partly arranged in regular longitudinal rows, occupy whole tibia length (Fig. 286). *Middle tibia*: stout setae on inner side of middle tibia few and relatively small, situated irregularly (Fig. 287). *Hind tibia*: stout setae forming longitudinal row on outer side, mostly longer than tibia width; stout setae on inner and inner-anterior sides shorter than tibia width, blunt or pointed, non-pectinate (Fig. 288); pointed, bipectinate setae on posterior side absent on proximal 1/3 of tibia, dense on distal 2/3 of tibia.

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae; smaller stout setae proximad of them and on inner sides of fore and middle tarsi (Figs 286–288).

Abdomen: Terga of anterior part of abdomen only slightly wider and shorter than terga of posterior part of abdomen (Fig. 275). Posterior margins of abdominal terga: tergum I with minute denticles (as in Fig. 25); terga II–X with narrow, pointed denticles increasing from tergum II toward tergum X (Figs 282–283); sterna without denticles. Posterolateral spines of terga VIII–IX non-incised (Fig. 6).

Tergalii (Figs 289–293): Tergalius I unilamellate and thread-like. Tergalii II–VII bilamellate; ventral lamellae wider than dorsal lamella, with proximal-anal expansion slightly projected or non-projected proximad of tergalius base. On tergalii II–VI both lamellae terminated with 3 processes; tergalius VII unknown. Each tergalius with dorsal lamella dark gray, ventral lamella lighter gray; tracheae of both lamellae pigmented by blackish. In ventral lamella, tracheae entering side processes either independently arise from base of lamella, or bifurcate in any sequence.

Subimago. TEXTURE: On fore leg of male, 1st tarsomere covered with microtrichia (as tibia), 2nd–5th tarsomeres covered with sharply narrowed, pointed microlepides (as in Fig. 239–240). On middle and hind legs, 1st–2nd tarsomeres covered with microtrichia; 3rd tarsomere covered partly with microtrichiae, partly with narrowed, pointed microlepides; 4th–5th tarsomeres covered with narrowed, pointed microlepides.

Imago, male. Unknown.

Imago, female. Unknown.

Egg. Unknown.

Dimension. Body length 5 mm.

Distribution. Known from Mumbai only.

Comparison. The unnamed species from Mumbai is similar to *Ch*. (*E*.) *unicolor* sp. n., but differs by the shape of the median incision of the labrum, the light median line on abdominal terga and the wider dorsal lamella of tergalii II–VII.

7. *Choroterpes* (*Euthraulus*) *nambiyarensis* Selva Kumar *et al*. 2013

(Figs 7, 13, 294–339)

Choroterpes (*Euthraulus*) *nambiyarensis* Selva Kumar, Arunachalam & Sivaramakrishnan 2013: 171 (larva).

Material examined. INDIA: KARNATAKA state, border of Shivamogga and Udupi districts near Agumbe and Nadpal, 11–31.I.2013, coll. N. Kluge & L. Sheyko: 3 young larvae (ZIN).

KERALA state: Trivandrum, Bonacade tea estate, 19.I.2019, coll. M. Vasanth, 4 larvae (ZSI); Kerala state, Trivandrum district, Peppara wildlife sancruary, Pattankulichapara, 20.I.2019, coll. M. Vasanth, 7 larvae (ZSI); Kollam district, Shendurney wildlife sanctuary, Rosemala, 20.I.2019, 7 larvae (ZSI).

TAMIL NADU state: Dindugal district, Moolaiyar, 21.III.2016, coll. R. Babu: 7 larvae (ZSI); Dindugal district, tributary of Manjalaru river, 21.III.2016, coll. R. Babu: 13 larvae (ZSI); (ZSI); Theni district, Moolavaigai River, Vellimalai, 23.II.2019, coll. M. Vasanth: 71 larvae (ZSI); Theni district, Gudalur range, Anjathu stream, 28.II.2019, coll. M. Vasanth: 30 larvae (ZSI); Theni district, Megamalai wildlife sanctuary, Chinnasuruli, 7.III.2019, coll. M. Vasanth: 131 larvae (ZSI); Theni district, Suruli Falls, 25.I.2016, coll. N. Kluge & L. Sheyko: 1 L-S-I♀, 2 larvae (ZIN); Theni district, Suruli Falls, Venniyar, 27.II.2019, coll. M. Vasanth: 43 larvae (ZSI); Virudhunagar district, Rajapalayam, Sastha Kovil Falls, 22.VI–24.VI.2021, coll. P. Srinivasan & R. Isack: 1 L-S-I♂, 2 L-S-I♀, 7 larvae (AMC); Tirunelveli district, Nambikovil river, 31.III.2017, coll. R. Venkitesan: 3 larvae (ZSI); Tirunelveli district, Nambikovil river, 27.IX.2018, coll. R. Venkitesan: 4 larvae (ZSI); Tirunelveli district, Gadana River, Kallar, 28.III.2019, coll. M. Vasanth & K.A. Subramanian: 37 larvae (ZSI); Tirunelveli district, Courtallam, Chittar river near Peraruvi (= Main Falls), 3–7. II.2013, coll. N. Kluge & L. Sheyko: 4 L-S-I♂, 4 L-S-I♀, 1 L-S♀, 32 larvae (ZIN).

Descriptions

Larva. CUTICULAR COLORATION: Head, pronotum and mesonotum brown, with diffusive lighter areas (Figs 294, 297). Femora of all legs light brown-ochre, with diffusive lighter and darker areas; tibiae and tarsi brown-ochre (Figs 298–300). Abdominal terga either uniformly brown-ochre, or with diffusive lighter and darker areas (Fig. 296); sterna medially light ochre, laterally-anteriorly diffusively colored with brown (Fig. 295).

HYPODERMAL COLORATION: Femur of each leg with contrasting brown maculae at middle and near apex (as in imago—as in Figs 330–332). In immature larvae, posterior part of each abdominal tergum more or less extensively colored with brown; each abdominal sternum with pair of more or less extensive brown spots laterally. In last larval instar, abdominal terga and sterna colored as in imago (as in Figs 325–329).

SHAPE AND SETATION: *Labrum* with median emargination deep and narrow; without 5 denticles and 4 sensilla separating them (Fig. 306); distal transverse setal row arched, as long as about 1/2 of labrum width; proximal transverse setal row slightly shorter than distal transverse setal row and forms 2 arcs, either connected (Fig. 304),

or disconnected medially (Fig. 305). *Mandibles* with outer margin moderately convex (Fig. 294). *Maxillae*: Medio-apical projection of maxilla poorly expressed, directed distally, not overlaps base of comb-like dentiseta; subapical ventral row of comb-like setae extremely short, not divided into median and lateral portions, consists of 4 setae with larger sockets and 2 setae with smaller sockets located just on medio-apical projection (Fig. 303). Inner margin of maxillary palp with 2–4 setae on 2nd segment, 2 setae on 3rd segment (Fig. 302).

Fore femur: widest proximally; margins and anterior side with stout non-pectinate setae, partly blunt, partly pointed (Fig. 310). *Middle femur*: widest at middle; margins and anterior side with stout, non-pectinate, blunt and pointed setae (Fig. 311). *Hind femur*: widest at middle; margins and anterior side with stout, non-pectinate, blunt and pointed setae (Fig. 312); pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, nearly as long as stout setae on inner margin (Fig. 307).

Fore tibia: stout, pointed, pectinate setae on inner side of fore tibia form dense and irregular stripe with 2–4 setae in cross section, occupy whole tibia length (Fig. 313). *Middle tibia*: stout setae on inner side of middle tibia pointed, non-pectinate, form very sparse row of 3–5 longer and several shorter setae; besides it, inner-anterior side with few small stout setae (Figs 314–315). *Hind tibia*: stout setae forming longitudinal row on outer side, mostly longer than tibia width; stout setae on inner and inner-anterior sides shorter than tibia width, blunt or pointed, non-pectinate (Fig. 316); pointed, bipectinate setae on posterior side absent on proximal 1/3 of tibia, dense on distal 2/3 of tibia (Fig. 317).

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae (Fig. 316).

Abdomen: Terga of anterior part of abdomen only slightly wider and shorter than terga of posterior part of abdomen (Fig. 296). Posterior margins of abdominal terga: terga I–VIII with minute denticles (Fig. 308), tergum IX with triangular, pointed denticles (Fig. 309); tergum X with longer pointed denticles; sterna without denticles. Posterolateral spines of terga VIII slightly incised, on tergum IX non-incised (Fig. 7).

Tergalii (Figs 318–324): Tergalius I unilamellate and thread-like. Tergalii II–VII bilamellate, with both dorsal and ventral lamellae narrow; ventral lamella slightly wider than dorsal lamella. On tergalii II–VI both lamellae terminated with 3 processes; on tergalius VII dorsal lamella with 2 processes, ventral lamella with 3 processes. Each tergalius with dorsal lamella dark gray, ventral lamella lighter gray; tracheae of both lamellae pigmented by blackish. In both lamellae, tracheae entering side processes arise from main trachea which passes along middle of lamella; in ventral lamella, trachea entering costal process always arises proximad of trachea entering side process; other tracheae smaller.

Subimago. CUTICULAR COLORATION: Pronotum light brownish. Mesonotum with chromozones light brown (Fig. 333). Thoracic pleura and sterna with light brown and colorless areas. Wings with microtrichial circles very light brownish. Legs light brownish; tibiae not darkened at base (as in Figs 379–381). Abdominal terga, sterna, gonostyli and caudalii light brownish.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), at least 5th tarsomere covered with sharply narrowed, pointed microlepides; on fore legs of male all 2nd–5th tarsomeres covered with such microlepides (as in Figs 239–240); on middle and hind legs of male and on all legs of female 2nd–4th tarsomeres with mixture of such microlepides and microtrichia.

Imago, male (Figs 325–326). Head ochre with brown. Scape and pedicel brown, flagellum lighter. Dorsal eyes not elevated, brownish-orange. Thorax brown. On fore wing base including costal brace brown, other membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt (as in Fig. 108). Legs light ochre; on each leg cuticle of knee area (apex of femur and base of tibia) colored with brown; each femur with 2 large black hypodermal maculae—middle and apical ones; middle macula more or less stretched in proximal direction (Figs 330–332). Each abdominal tergum mostly brown, with smaller ochre areas; each sternum ochre, with pair of small brownish maculae laterally (Figs 325–326, 328–329). Caudalii ochre, with joinings contrastingly brown; in proximal part of caudalius each segment with brown longitudinal stripes on ventral and on dorsal sides (Figs 337–338).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus with inner-apical angle right, with length equal to width (Figs 334–335). Penes widest in proximal part; portion distad of gonopores narrowed toward apex, about half of length from proximal constriction to apex; apices smooth (Figs 13, 335–336).

Imago, female. Coloration as in male (Fig. 327). Posterior margin of abdominal sternum IX medially very slightly incised.

Egg (Fig. 339). Irregularly oval. Chorion entirely covered with relief formed by papillae and ridges (see Notes about *Euthraulus*); polar papillae enlarged and projected, most other papillae non-projected and completely hidden under angles of ridges.

Dimension. Fore wing length (and approximated body length) 5 mm.

Distribution. Mountains of the Western Ghats in southern India (Karnataka, Kerala and Tamil Nadu states).

Comments. Originally, *Ch.* (*E.*) *nambiyarensis* was described as larvae and compared only with *Ch*. (*E*.) *alagarensis*, from which it clearly differs by narrower tergalii. The original description was illustrated by inaccurate drawings and photos, whose proportions seem doubtful. Judging by the photo of tergalius VII (Selva Kumar *et al*. 2013: fig. 15), its dorsal lamella has only two terminal processes, which distinguishes this species from *Ch.* (*E.*) *angustifolius* sp. n. and some other species.

8. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n.

(Figs 8, 14, 340–391)

Choroterpes (*Euthraulus*) *kalladaensis*: Rekha *et al*. 2019, partim: tergalii III, IV, VII (Rekha *et al*. 2019: figs 2M, 2N, 2O) (see above)

Etymology. From «angustus» (Lat.)—narrow, and «folium» (Lat.)—leaf; allusion of especially narrow dorsal and ventral lamellae of tergalii II–VII (Figs 345, 366–372).

Material examined. Holotype: L-S-I♂ {specimen [XIV](8)2013}, INDIA, KARNATAKA state, border of Shivamogga and Udupi districts near Agumbe and Nadpal, 30.I.2013, coll. N. Kluge & L. Sheyko (ZIN). **Paratypes:** the same locality and collectors, 11–31.I.2013: 1 L-S/I♂, 3 L-S♂, 1 L-S♀, 9 last instar larvae, 1 young larva (ZIN).

KERALA state: Ernakulam district, Malayatoor, river Periyar, 15.II.2016, coll. N. Kluge & L. Sheyko: 1 larva (ZIN); Kottayam district, Erumeli, river Manimala, 20–23.I.2016, coll. N. Kluge & L. Sheyko: 3 L-S-I♂, 1 L-S♂, 2 S-I♂, 1 L-S-I♀ (ZIN); Kollam district, Shendurney wildlife sanctuary, Rosemala, 8°34′12″N, 77°6′30″E, h=555 m, 22.I.2019, coll. M. Vasanth: 7 larvae (ZSI: No.I/E/516); Trivandrum district, Pattankulichapara near Vithura, 8°41′18″N, 77°5′57″E, h=96 m, 20.I.2019, coll. M. Vasanth: 8 larvae (ZSI: No.I/E/514, 515).

Descriptions

Larva. CUTICULAR COLORATION: Head, pronotum and mesonotum with diffusive brown and ochre areas; exposed side of mandible brown with roundish ochre blank (Figs 340–341). Legs either light brown-ochre, with diffusive lighter and darker areas, or nearly colorless (Figs 342–344). Abdominal terga and sterna uniformly light ochre (Fig. 345).

HYPODERMAL COLORATION: Femur of each leg with contrasting brown maculae at middle and near apex (as in imago—as in Figs 382–384). In immature larvae, posterior part of each abdominal tergum more or less extensively colored with brown; each abdominal sternum with pair of more or less extensive brown spots laterally. In last larval instar, abdominal terga get coloration as in imago (as in Figs 373–378).

SHAPE AND SETATION: *Labrum* with median emargination deep and wide (Fig. 346–347, 350); distal transverse setal row arched, as long as about 1/2 of labrum width (Fig. 349); proximal transverse setal row straight, slightly shorter than distal transverse setal row (Fig. 348). *Mandibles* with outer margin moderately convex (Fig. 340). *Maxillae*: Medio-apical projection of maxilla moderately expressed, projected medially and slightly bent proximally overlapping base of comb-like dentiseta; subapical ventral row of comb-like setae extremely short, consists of 3 setae (Fig. 352). Inner margin of maxillary palp with 1 seta on apex of 2nd segment, 2 setae on 3rd segment (Fig. 351).

Fore femur: widest proximally; margins and anterior side with stout non-pectinate setae, partly blunt, partly pointed (Fig. 357). *Middle femur*: widest at middle; margins and anterior side with stout, non-pectinate, blunt and pointed setae (Fig. 358); *Hind femur*: widest at middle; outer margin with stout, non-pectinate, blunt and pointed setae (Fig. 359); anterior side with row of shortly truncated setae parallel to inner margin and few such setae proximally (Fig. 353); pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, located mostly in proximal part of femur (Fig. 354); in distal part sparse and small.

Fore tibia: stout, pointed, pectinate setae on inner side form irregular stripe with 1–3 setae in cross section, occupy only middle 1/3 of tibia length and form separate group on tibia apex (Fig. 360). *Middle tibia*: stout setae on

inner side of middle tibia small and few (Fig. 361). *Hind tibia*: stout setae forming longitudinal row on outer side, mostly longer than tibia width; stout setae forming longitudinal row on inner side few and shorter than tibia width; stout setae forming longitudinal row on inner-anterior side, widened distally and blunt (Fig. 362–363); pointed, bipectinate setae on posterior side few and present on distal half of tibia only (as in Fig. 364).

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae (Fig. 362).

Abdomen: Terga of anterior part of abdomen only slightly wider and shorter than terga of posterior part of abdomen (Fig. 345). Posterior margins of abdominal terga: terga I–VIII with minute denticles (Fig. 355); terga IX–X with larger, triangular, pointed denticles (Fig. 356); sterna without denticles. Posterolateral spines of terga VIII incised, on tergum IX non-incised (Fig. 8).

Tergalii (Figs 365–372): Tergalius I unilamellate and thread-like. Tergalii II–VII bilamellate, with both dorsal and ventral lamellae narrow. On tergalii II–VII dorsal lamella terminated with 3 processes; ventral lamella terminated either with 3 processes, or less number of processes (Fig. 371). Each tergalius with dorsal lamella gray, ventral lamella lighter; tracheae of both lamellae pigmented by blackish. In both lamellae, tracheae entering side processes arise from main trachea which passes along middle of lamella; in ventral lamella, if all three processes present, trachea entering costal process always arises proximad of trachea entering anal process; other tracheae smaller.

Subimago. CUTICULAR COLORATION: Pronotum light brownish. Mesonotum with chromozones light brown (Fig. 385). Thoracic pleura and sterna with light brown and colorless areas. Wings with microtrichial circles very light brownish. Legs light brownish; tibiae not darkened at base (Figs 379–381). Abdominal terga, sterna, gonostyli and caudalii light brownish.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), at least 5th tarsomere covered with sharply narrowed, pointed microlepides; on fore legs of male all 2nd–5th tarsomeres covered with such microlepides (as in Figs 239–240); on middle and hind legs of male and on all legs of female 2nd–4th tarsomeres with mixture of such microlepides and microtrichia.

Imago, male (Figs 373–374). Head ochre with brown. Scape and pedicel ochre proximally and brown distally, flagellum ochre or brown. Dorsal eyes not elevated, brownish-orange. Thorax brown. On fore wing base including costal brace brown, other membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt (as in Fig. 108). Legs light ochre; on each leg cuticle of knee area (apex of femur and base of tibia) colored with brown; each femur with 2 black hypodermal maculae—apical and middle ones; proximal macula either absent (Figs 382, 384), or present and separated from middle macula (Fig. 383). Abdominal terga usually mostly ochre with brown maculae laterally (Fig. 374), rarely with more extensive brown maculation (Fig. 377); sterna ochre. Caudalii ochre; several most proximal segments with black dots in joinings (Fig. 388).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus with inner-apical angle right, with length equal to width (Figs 386–387). Penes widest in proximal part; portion distad of gonopores narrowed toward apex, about half of length from proximal constriction to apex; apices smooth (Fig. 14).

Imago, female. Coloration as in male (Fig. 375–376). Posterior margin of abdominal sternum IX medially very slightly incised.

Egg (Figs 389–391). Irregularly oval. Chorion partly covered with relief formed by papillae and ridges (see Notes about *Euthraulus*) (Fig. 389); most part of egg surface lacks regular relief, so that egg viewed from certain side looks as lacking this relief (Fig. 391). Some papillae enlarged.

Dimension. Fore wing length (and approximated body length) 4–5 mm.

Distribution. Mountains of the Western Ghats in southern India (Karnataka and Kerala states).

Comparison. Larva of the new species *Ch.* (*E.*) *angustifolius* sp. n. resembles *Ch.* (*E.*) *nambiyarensis* by having a narrow ventral lamella of tergalii II–VII, in which the trachea entering the costal process always arises from the main trachea proximad of the trachea entering the anal process. In contrast to *Ch.* (*E.*) *nambiyarensis*, tergalii of *Ch.* (*E.*) *nambiyarensis* are usually narrower and lighter, but the dorsal lamella of tergalius VII always retains all 3 terminal processes (while in *Ch.* (*E.*) *nambiyarensis* it always has only 2 terminal processes). The labrum of *Ch.* (*E.*) *angustifolius* sp. n. has the median incision deeper than in *Ch.* (*E.*) *nambiyarensis*, which resembles *Ch.* (*E.*) *nandini.* The maxilla of *Ch.* (*E.*) *angustifolius* sp. n. has the subapical ventral row of comb-like setae more reduced and the medio-apical projection better developed than in *Ch.* (*E.*) *nambiyarensis*. Imagines and subimagines of *Ch.* (*E.*) *angustifolius* sp. n. usually have the dorsal side of the abdomen lighter than in *Ch.* (*E.*) *angustifolius* sp. n. (that is determined by hypodermal pigmentation).

Comments. Under the name «*Choroterpes* (*Euthraulus*) *kalladaensis*» Rekha *et al*. 2019 described larvae belonging to *Indialis rossi* (see above). Judging by the pictures (Rekha *et al*. 2019: figs 2M–O), some of these larvae belong to *Ch.* (*E.*) *angustifolius* sp. n.

9. *Choroterpes* (*Euthraulus*) *nandini* Selvakumar & Sivaramakrishnan 2015

(Figs 9, 15, 392–425)

Choroterpes (*Monophyllus*) *nandini* Selvakumar & Sivaramakrishnan (in Selvakumar, Janarthanan & Sivaramakrishnan) 2015: 285 (larva).

Material examined. INDIA, Karnataka state, border of Shivamogga and Udupi districts near Agumbe and Nadpal, 11–31.I.2013, coll. N. Kluge & L. Sheyko: 3 L-S-I♂, 1 L-S/I♂, 2 L-S♂, 1 L-S-I♀, 1 L-S♀, 24 larvae (ZIN). Kerala state, Poothumoola stream, Wayanad district, 20.III.2021, coll. M. Vasanth: 12 I♂, 6 S♂, 6 I♀ 12 larvae (ZSI).

Descriptions

Larva. CUTICULAR COLORATION: Head, pronotum and mesonotum with diffusive brown and ochre areas (Figs 392–293). Femora of all legs light brown-ochre, with diffusive lighter and darker areas; tibiae and tarsi brown-ochre (Figs 394–396). Abdominal terga and sterna light ochre, some terga diffusively darkened laterally (Fig. 397).

HYPODERMAL COLORATION: Femur of each leg with contrasting brown maculae at middle and near apex (as in imago—as in Figs 418–420). In immature larvae, posterior part of each abdominal tergum more or less extensively colored with brown; each abdominal sternum with pair of more or less extensive brown spots laterally. In last larval instar, abdominal terga get coloration as in imago (as in Figs 412–415).

SHAPE AND SETATION: *Labrum* with median emargination deep and sharp, with 5 denticles smoothed out or absent (Fig. 399); distal transverse setal row arched, as long as about 1/2 of labrum width; proximal transverse setal row arched, slightly shorter than distal transverse setal row (Fig. 398) *Mandibles* with outer margin moderately convex (Fig. 392). *Maxillae*: Medio-apical projection of maxilla well-expressed, overlaps base of comb-like dentiseta, directed medially; subapical ventral row of comb-like setae reduced to 6–9 setae, far not reaches apex of medio-apical projection and divided by curvation into median portion with larger sockets and lateral portion with smaller sockets (Figs 401–402). Inner margin of maxillary palp with 1–2 setae on apex of 2nd segment, 2–3 setae on 3rd segment (Fig. 400).

Fore femur: widest proximally; margins and anterior side with stout non-pectinate setae, partly blunt, partly pointed (Fig. 405). *Middle femur*: widest at middle; margins and anterior side with stout, non-pectinate, blunt and pointed setae (Fig. 406); *Hind femur*: widest at middle; outer margin with stout, non-pectinate, blunt and pointed setae; anterior side with row of shortly truncated setae parallel to inner margin and few such setae proximally (Fig. 407); pointed, curved, pectinate setae forming irregular row on posterior side of hind femur, located mostly in proximal part of femur; in distal part sparse and small (as in Fig. 354).

Fore tibia: stout, pointed, pectinate setae on inner side form irregular stripe with 1–3 setae in cross section, occupy most part of tibia length and form separate group on tibia apex (Fig. 408). *Middle tibia*: stout setae on inner side pointed, non-pectinate, form very sparse row of 3–6 longer setae and several shorter setae (Fig. 409). *Hind tibia*: stout setae forming longitudinal row on outer side, mostly longer than tibia width; stout setae on inner and inner-anterior sides shorter than tibia width, blunt or pointed, non-pectinate (Fig. 410); pointed, bipectinate setae on posterior side absent on proximal 1/3 of tibia, sparse on distal 2/3 of tibia (Fig. 411).

Tarsi: inner side of hind tarsus with one preapical and one apical stout setae; smaller stout setae proximad of them and on inner sides of fore and middle tarsi (Figs 408–410).

Abdomen: Terga of anterior part of abdomen only slightly wider and shorter than terga of posterior part of abdomen (Fig. 397). Posterior margins of abdominal terga: terga I–VIII with minute denticles (Fig. 403); terga IX–X with larger pointed denticles (Fig. 404); sterna without denticles. Posterolateral spines of terga VIII incised, of tergum IX non-incised (Fig. 9).

Tergalii (Fig. 392): Tergalius I unilamellate and thread-like. Tergalius II consists of one narrow lamella terminated with 2 processes; tergalii III–VII each consist of one narrow lamella terminated with 3 processes. Each lamella gray, tracheae pigmented by blackish.

Subimago. CUTICULAR COLORATION: Pronotum light brownish. Mesonotum with chromozones light

brown (Fig. 423). Thoracic pleura and sterna with light brown and colorless areas. Wings with microtrichial circles very light brownish. Legs light brownish; tibiae not darkened at base (Figs 416–417). Abdominal terga, sterna, and caudalii light brownish; gonostyli darker brown.

HYPODERMAL COLORATION: As in imago.

TEXTURE: On all legs of both sexes, 1st tarsomere covered with microtrichia (as tibia), at least 5th tarsomere covered with sharply narrowed, pointed microlepides; on fore legs of male all 2nd–5th tarsomeres covered with such microlepides (as in Figs 239–240); on middle and hind legs of male and on all legs of female 2nd–4th tarsomeres with mixture of such microlepides and microtrichia.

Imago, male (Figs 412–413). Head ochre with brown. Scape and pedicel either brown, or ochre proximally and brown distally, flagellum ochre or brown. Dorsal eyes not elevated, brownish-orange. Thorax brown. On fore wing base including costal brace brown, other membrane colorless; pterostigma with simple, perpendicular crossveins. On hind wing base brown, other membrane colorless; costal projection blunt (as in Fig. 108). Legs light ochre; on each leg cuticle of knee area (apex of femur and base of tibia) colored with brown; fore femur with two black hypodermal maculae—apical macula and middle with proximal maculae fused together; middle and hind femora with 2 black hypodermal maculae—apical and middle ones, with or without smaller proximal macula (Figs 418–420). Each abdominal tergum III–VII in median part mostly ochre, laterally and posteriorly mostly brown; more anterior and more posterior terga mostly brown (Figs 413, 415); sterna ochre. Caudalii ochre with black dots in joinings (Fig. 413).

Male genitalia. Both in subimago and imago, 1st segment of gonostylus with inner-apical angle right, with length equal to width (Figs 421–422). Penes widest in proximal part; portion distad of gonopores less than half of length from proximal constriction to apex; apices smooth (Fig. 15).

Imago, female. Leg coloration as in male. Abdominal terga nearly uniformly dark brown with small blanks; sterna ochre with brown maculae laterally (Fig. 414).

Egg (Figs 424–425). Irregularly oval. Chorion partly covered with relief formed by papillae and ridges (see Notes about *Euthraulus*) (Fig. 424); most part of egg surface lacks regular relief, so that egg viewed from certain side looks as lacking this relief (Fig. 425). Some papillae enlarged.

Dimension. Fore wing length (and approximated body length) 4–5 mm.

Distribution. Mountains of the Western Ghats in southern India (Karnataka state).

Comments. This species was originally placed in the subgenus *Monophyllus* Kluge 2012, which is recently renamed to *Monochoroterpes* Kluge & Jacobus 2015, because of homonymy. However, this species is closely related to *Ch.* (*E.*) *angustifolius* sp. n., which is why we move it to the subgenus *Euthraulus*, and regard *Monochoroterpes* (the objective synonym of *Monophyllus*) to be subjective synonym of *Euthraulus* (see above).

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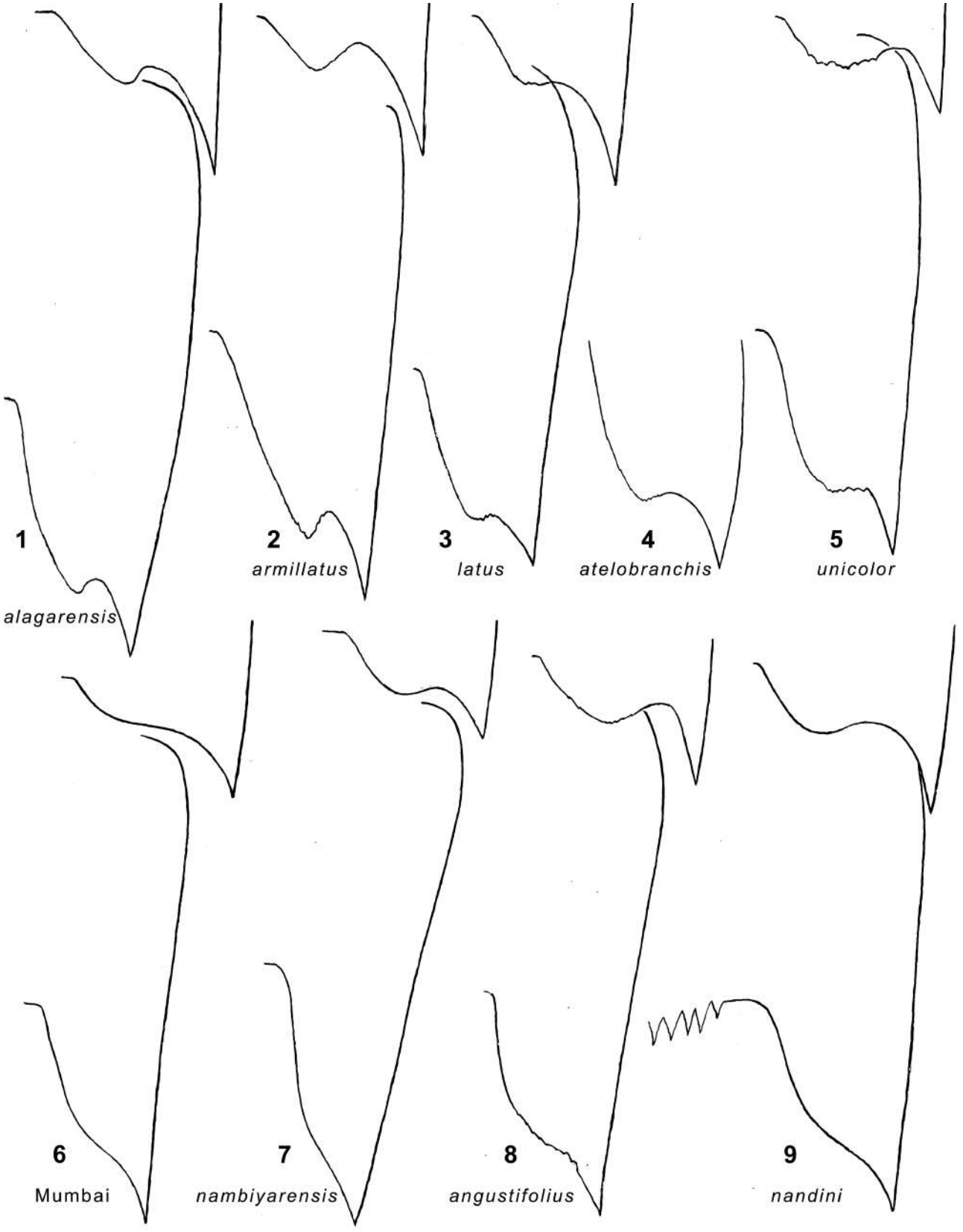
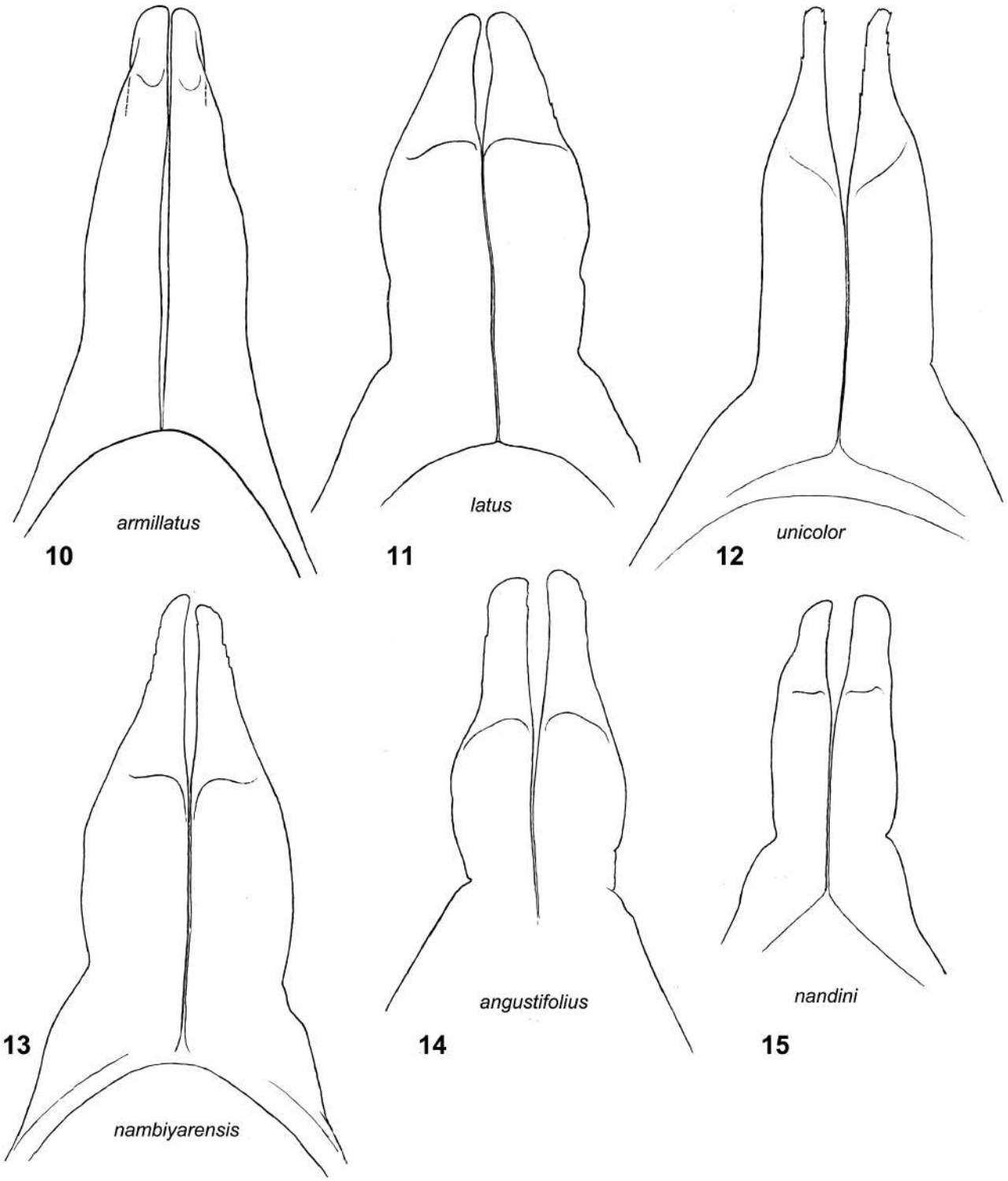
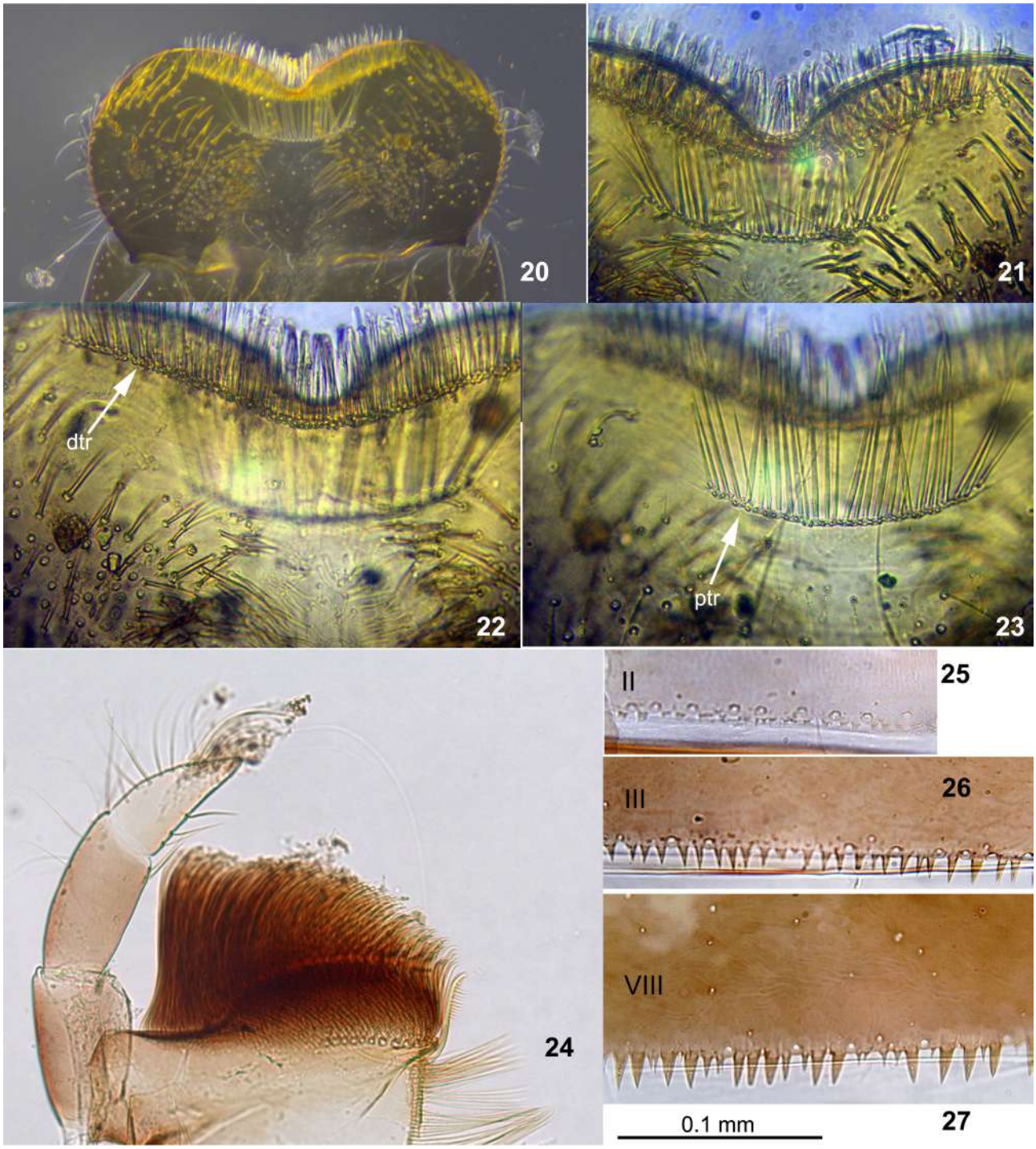


FIGURES 1–9. Posterolateral spines of larval abdominal segments VIII and IX, dorsal view. 1, *Choroterpes* (*Euthraulus*) *alagarensis*; 2, *Ch*. (*E*.) *armillatus* sp. n. (holotype); 3, *Ch*. (*E*.) *latus* sp. n. (holotype); 4, *Ch*. (*E*.) *atelobranchis* sp. n. (holotype); 5, *Ch*. (*E*.) *unicolor* sp. n. (holotype); 6, *Ch*. (*E*.) sp. «Mumbai»; 7, *Ch*. (*E*.) *nambiyarensis*; 8, *Ch*. (*E*.) *angustifolius* sp. n. (holotype); 9, *Ch*. (*E*.) *nandini*.



FIGURES 10–15. Penis of male imago, ventral view. 10, *Choroterpes* (*Euthraulus*) *armillatus* sp. n. (holotype); 11, *Ch*. (*E*.) *latus* sp. n. (holotype); 12, *Ch*. (*E*.) *unicolor* sp. n. (holotype); 13, *Ch*. (*E*.) *nambiyarensis*; 14, *Ch*. (*E*.) *angustifolius* sp. n.; 15, *Ch*. (*E*.) *nandini*.

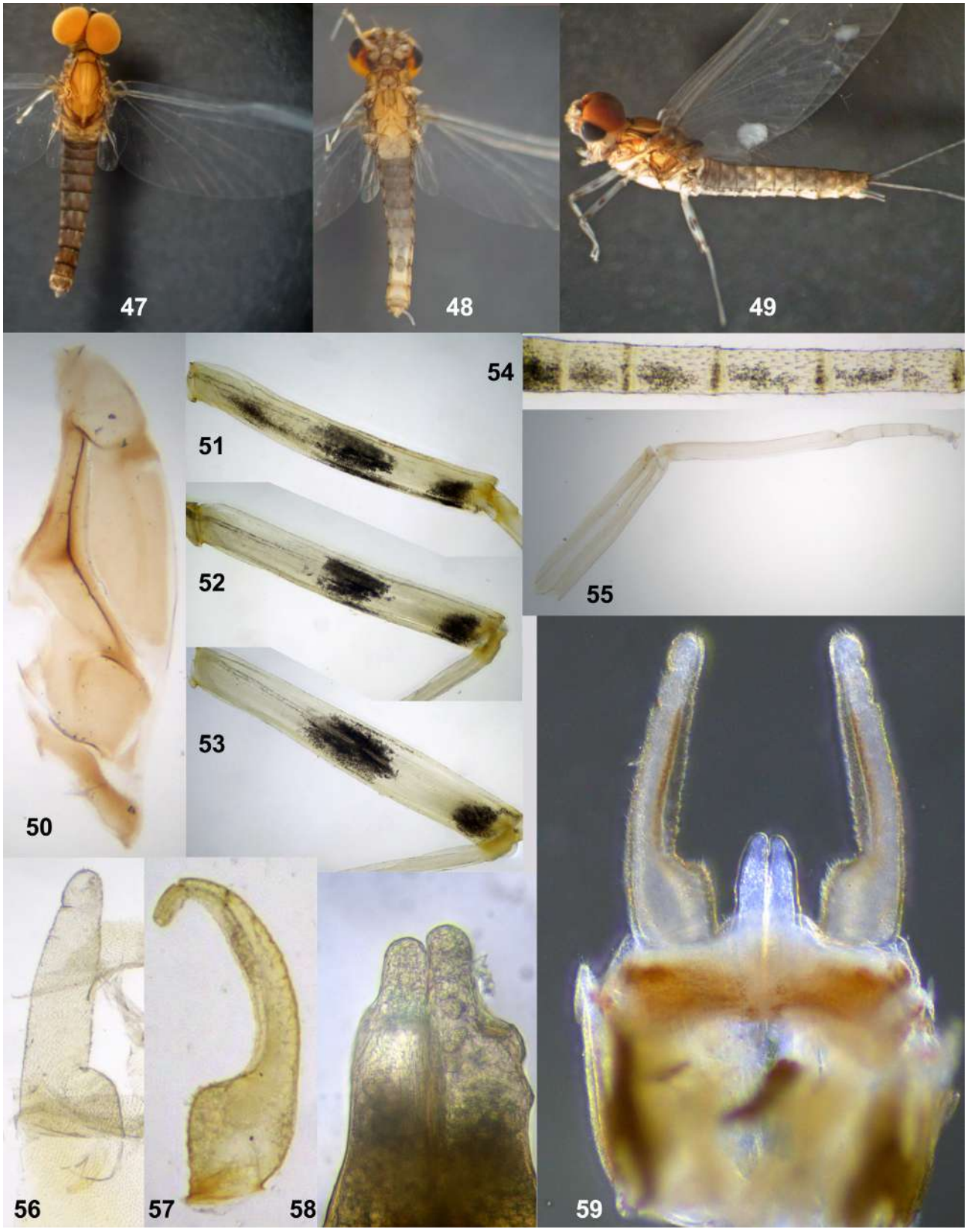
FIGURES 16–19. *Choroterpes* (*Euthraulus*) *alagarensis*, larval exuviae.



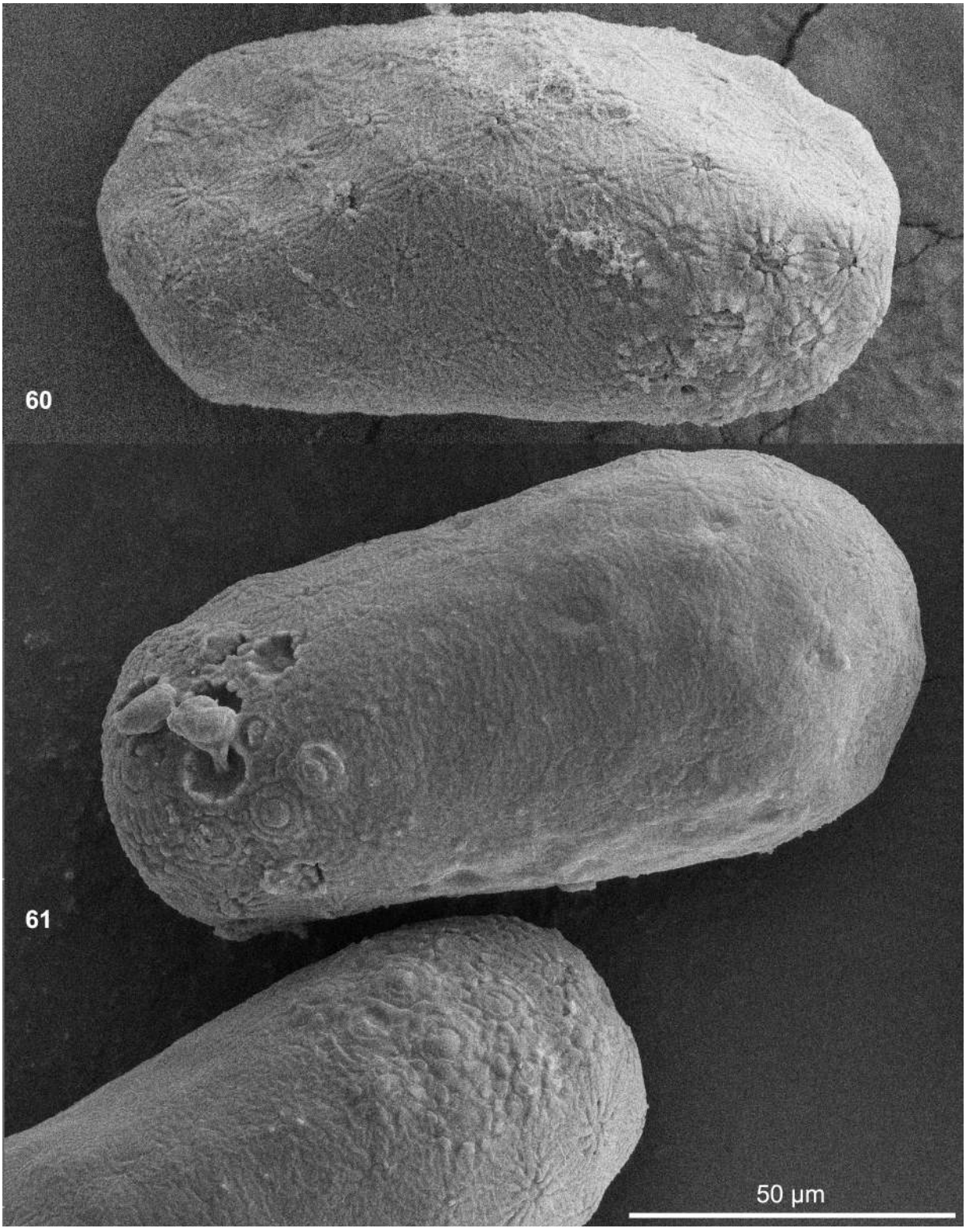
FIGURES 20–27. *Choroterpes* (*Euthraulus*) *alagarensis*, larvae. 20–23, labrum (22, with focus on distal transverse setal row; 23, with focus on proximal transverse setal row); 24, maxilla; 25–27, posterior margins of abdominal terga II, III and VIII. Abbreviations: dtr, distal transverse setal row; ptr, proximal transverse setal row.

FIGURES 28–32. *Choroterpes* (*Euthraulus*) *alagarensis*, larval tibia, tarsus and claw: 28–29, fore leg; 30–31, middle leg; 32, hind leg.

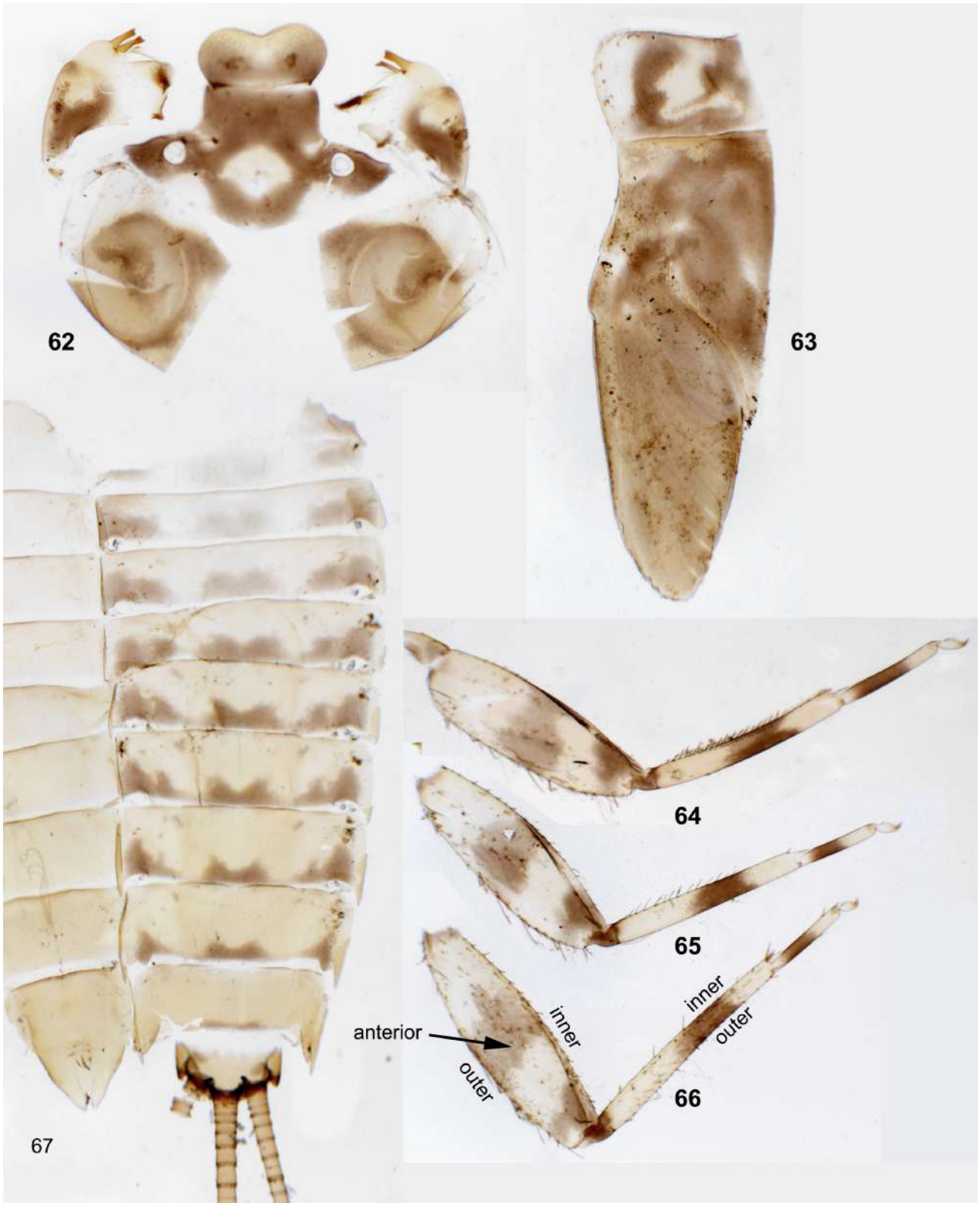
FIGURES 33–46. *Choroterpes* (*Euthraulus*) *alagarensis*, tergalii. 33–39, tergalii I–VII spread on slide; 40–46, tergalii I–VII in natural position.



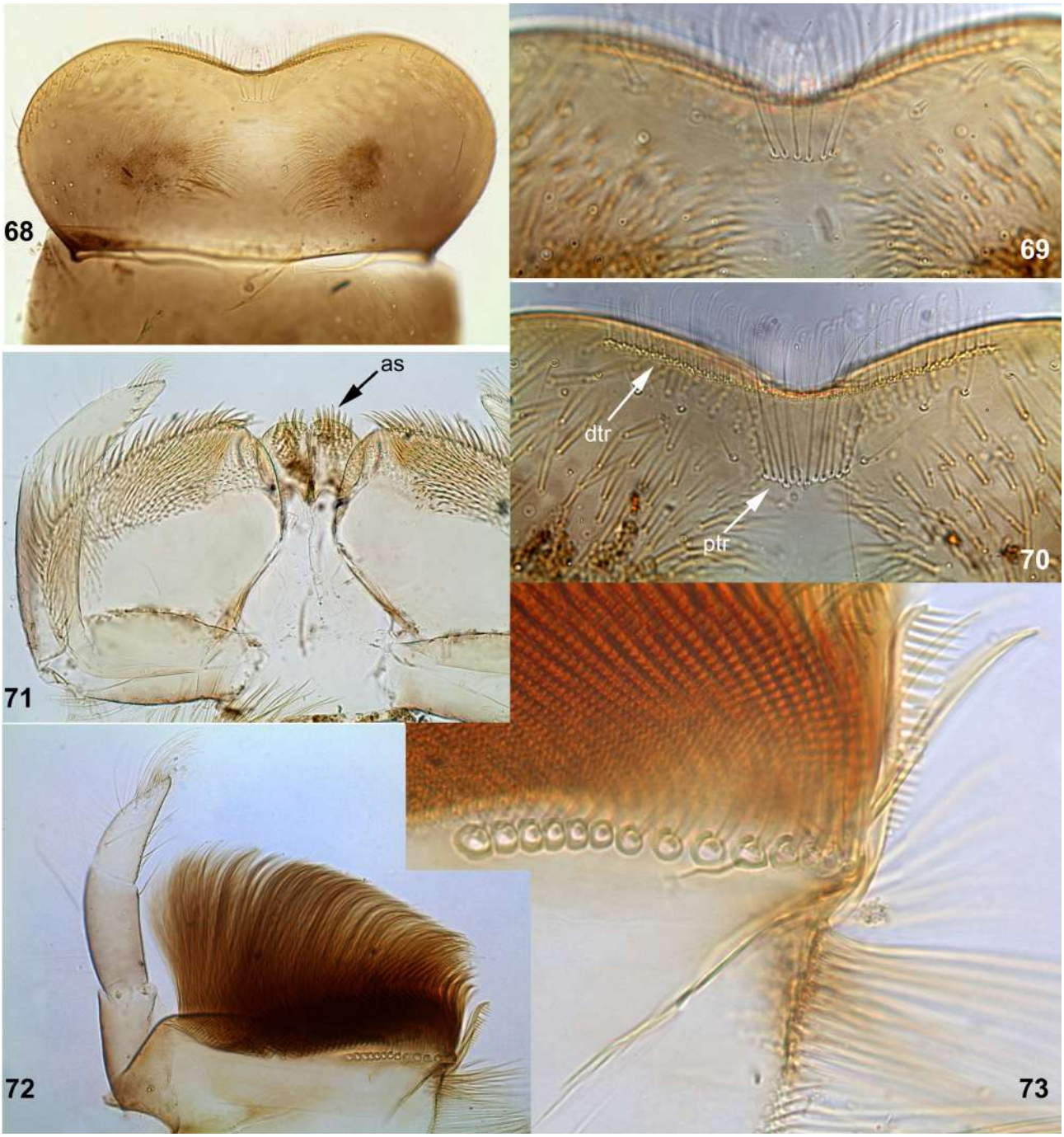
FIGURES 47–59. *Choroterpes* (*Euthraulus*) *alagarensis*. 47–48, male imago; 49, male subimago; 50, subimaginal exuviae of right half of mesonotum; 51–53, fore, middle and hind femora of male imago; 54, proximal part of caudalius of male imago; 55, subimaginal exuviae of male fore leg; 56, subimaginal exuviae of gonostylus; 57, imaginal gonostylus; 58, imagial penis; 59, subimaginal genitalia.



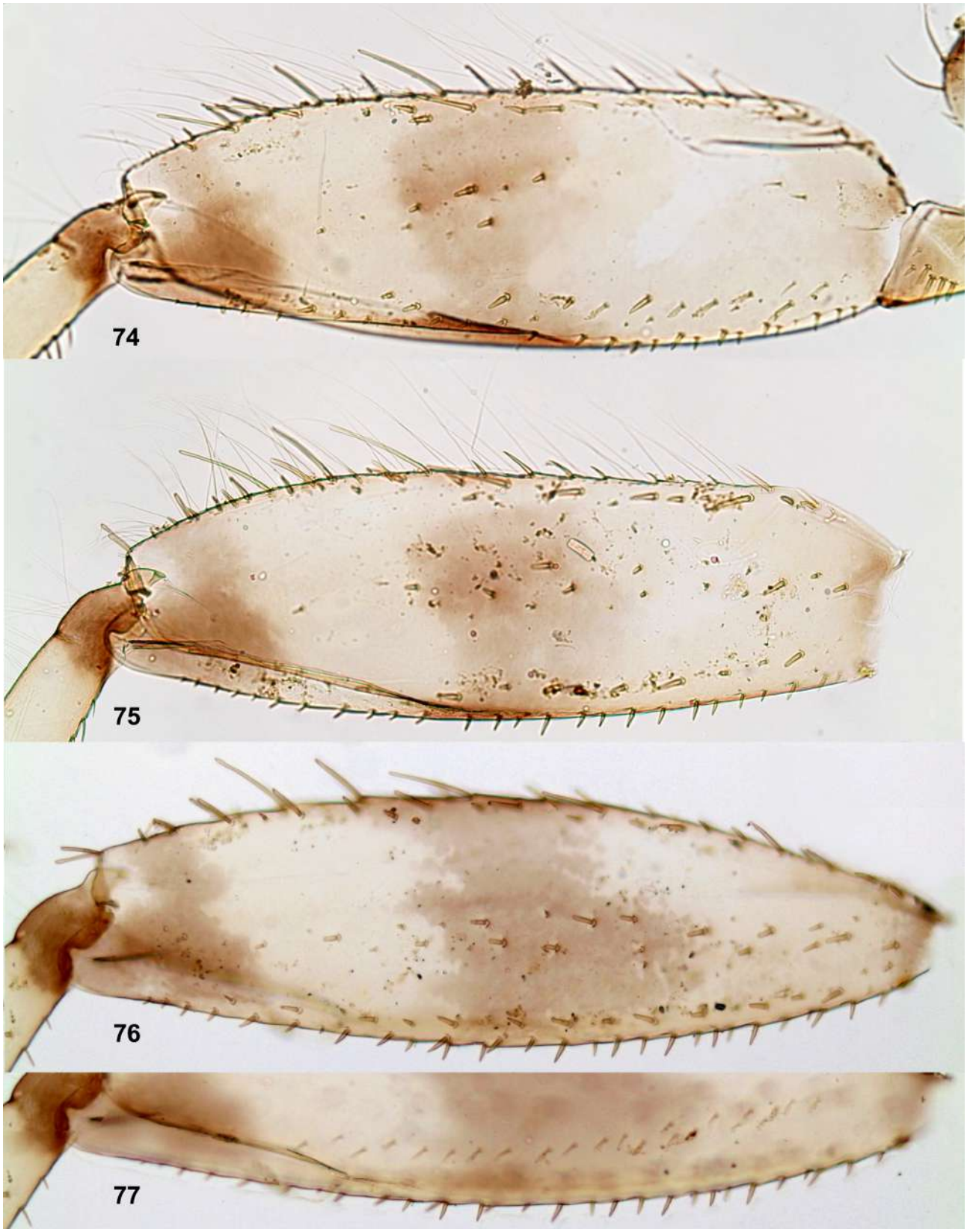
FIGURES 60–61. *Choroterpes* (*Euthraulus*) *alagarensis*, eggs.



FIGURES 62–67. *Choroterpes* (*Euthraulus*) *armillatus* sp. n., exuviae of male larva (holotype) with the same magnification: 62, head; 63, half of pronotum and mesonotum; 64–66, fore, middle and hind legs; 67, abdominal sterna and terga.

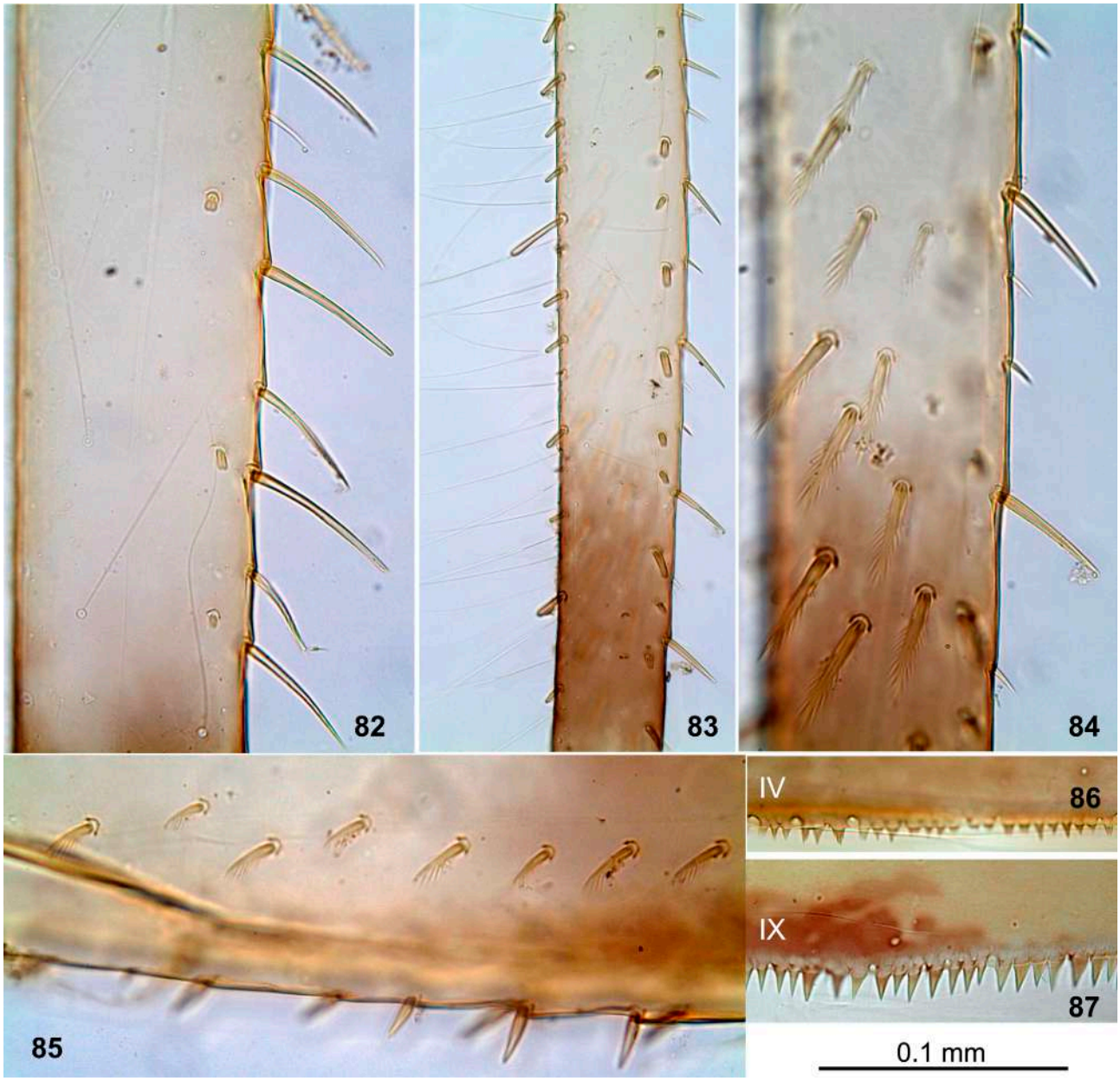


FIGURES 68–73. *Choroterpes* (*Euthraulus*) *armillatus* sp. n., larva. 68, labrum; 69–70, labrum with focus on proximal transverse setal row; 71, labium; 72–73, maxilla (68–69, 71, holotype). Abbreviations: as, apical setae of glossa; dtr, distal transverse setal row; ptr, proximal transverse setal row.

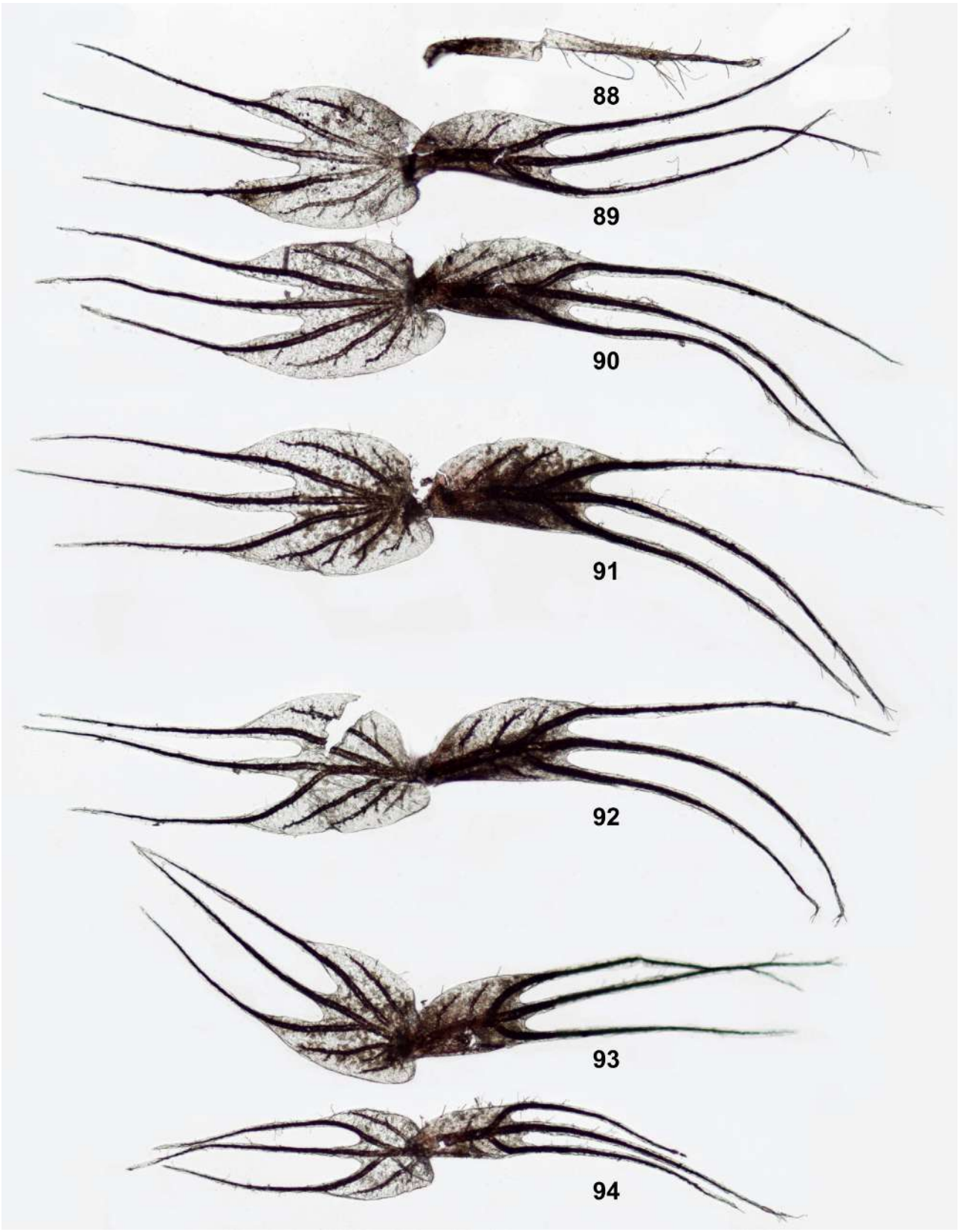


FIGURES 74–77. *Choroterpes* (*Euthraulus*) *armillatus* sp. n., larval exuviae of femora: 74–76, fore, middle and hind legs, focus on anterior side; 77, hind leg, focus on posterior side.

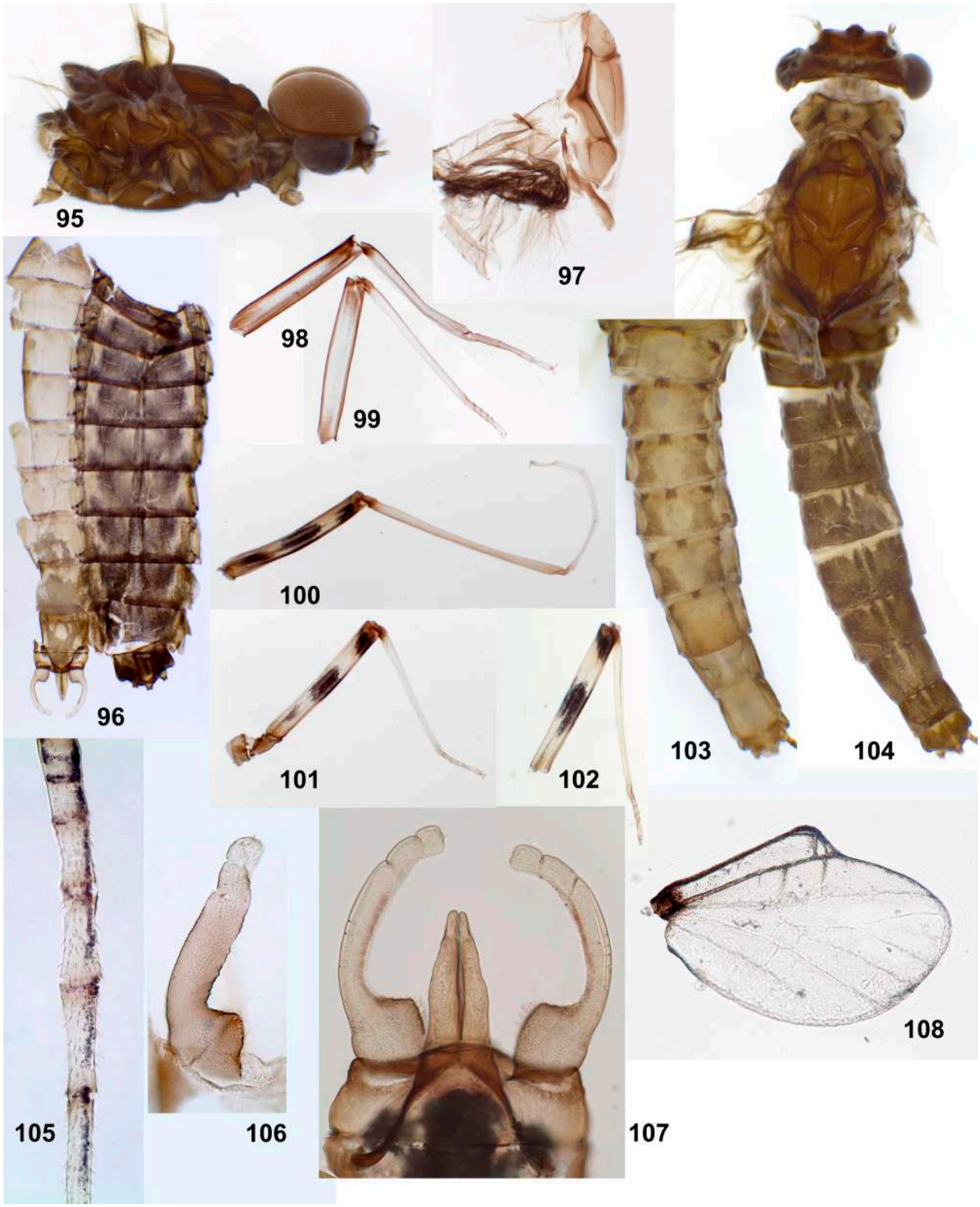
FIGURES 78–81. *Choroterpes* (*Euthraulus*) *armillatus* sp. n., larval exuviae of tibiae: 78–80, fore, middle and hind legs, focus on anterior side; 81, hind leg, focus on posterior side.



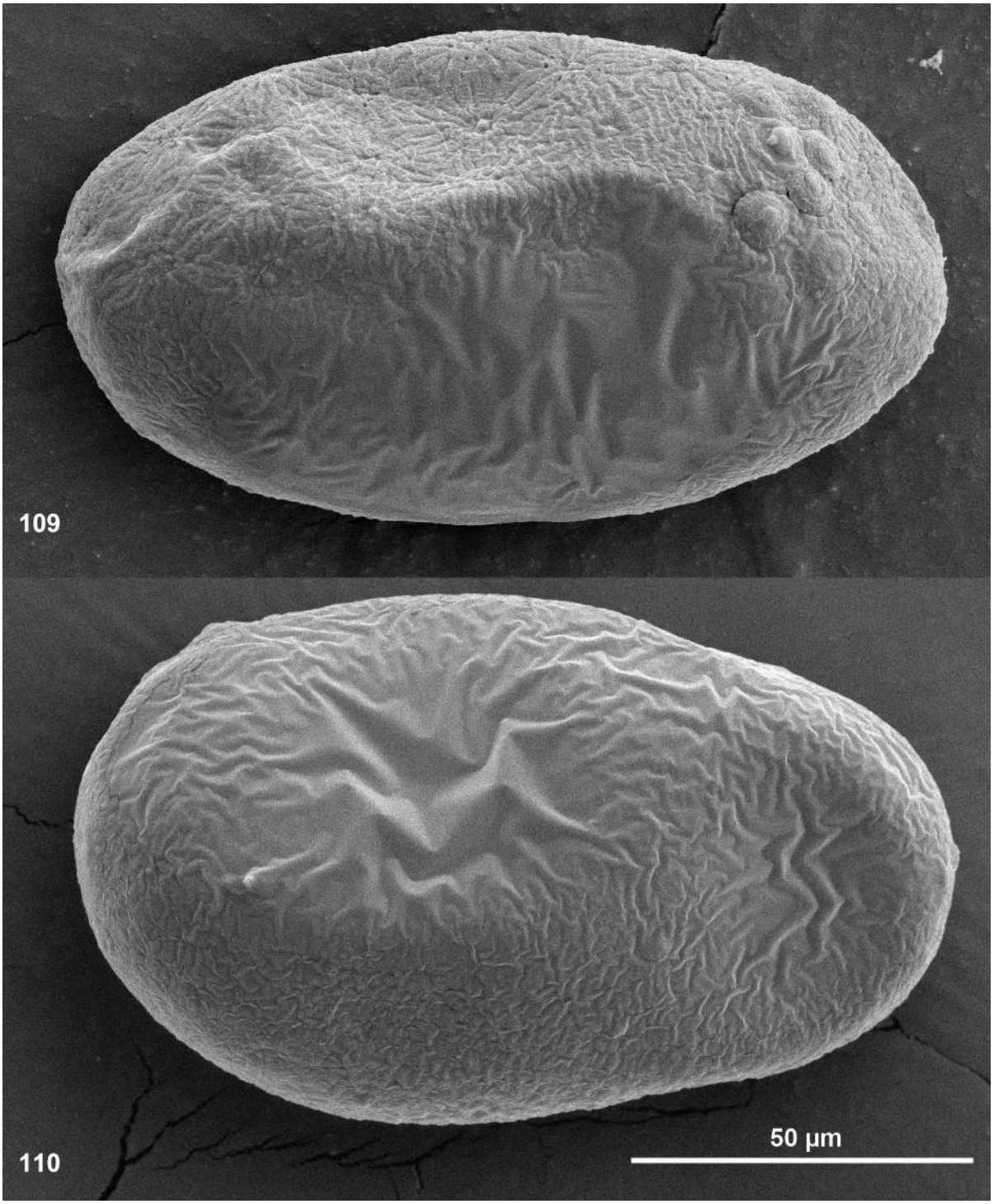
FIGURES 82–87. *Choroterpes* (*Euthraulus*) *armillatus* sp. n., larval exuviae: 82, middle tibia with focus on anterior side; 83, hind tibia with focus on anterior side; 84, hind tibia with focus on posterior side; 85, inner margin of hind femur with focus on posterior side; 86–87, posterior margin of abdominal terga IV and IX (86–87, holotype).



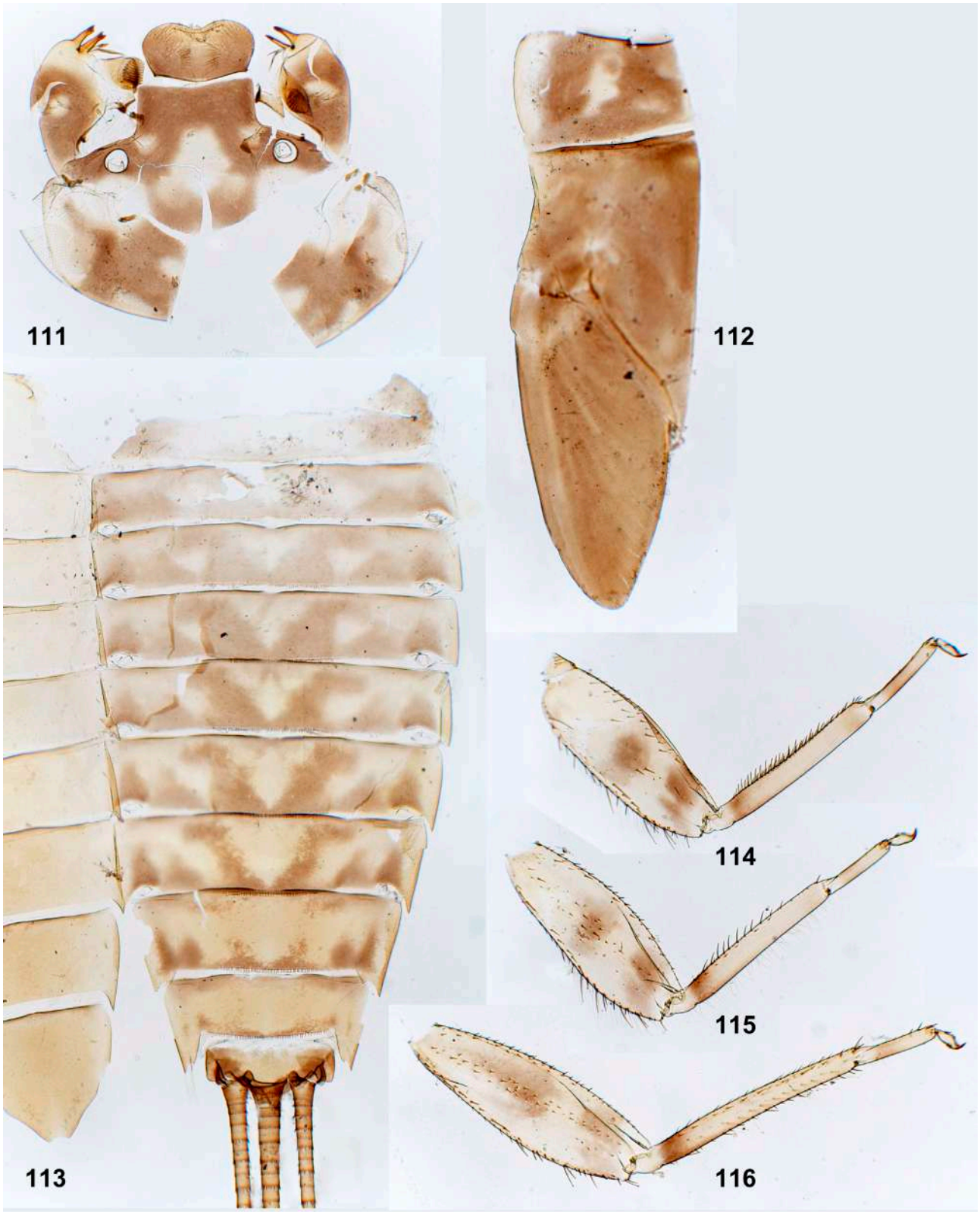
FIGURES 88–94. *Choroterpes* (*Euthraulus*) *armillatus* sp. n., tergalii I–VII (holotype).



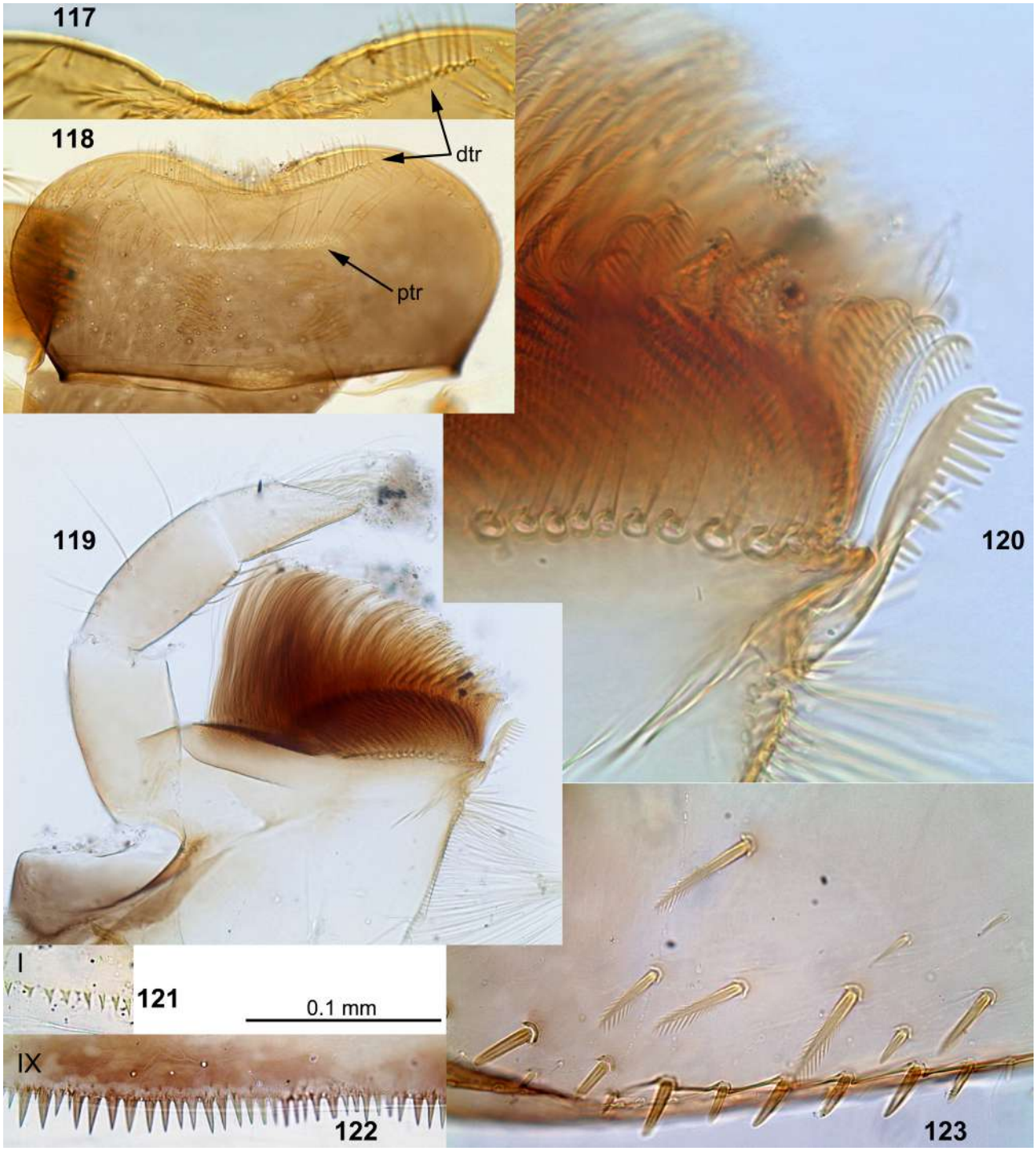
FIGURES 95–108. *Choroterpes* (*Euthraulus*) *armillatus* sp.n. 95, head and thorax of male imago; 96, abdomen of male imago; 97, subimaginal exuviae of half of mesonotum; 98–99, exuviae of male subimaginal fore and hind legs; 100–102, fore, middle and hind legs of male imago; 103–104, female imago, ventral and dorsal view; 105, proximal part of caudalius of male imago; 106, subimaginal exuviae of gonostylus; 107, imaginal genitalia; 108, hind wing (95–102, 105–108, holotype).



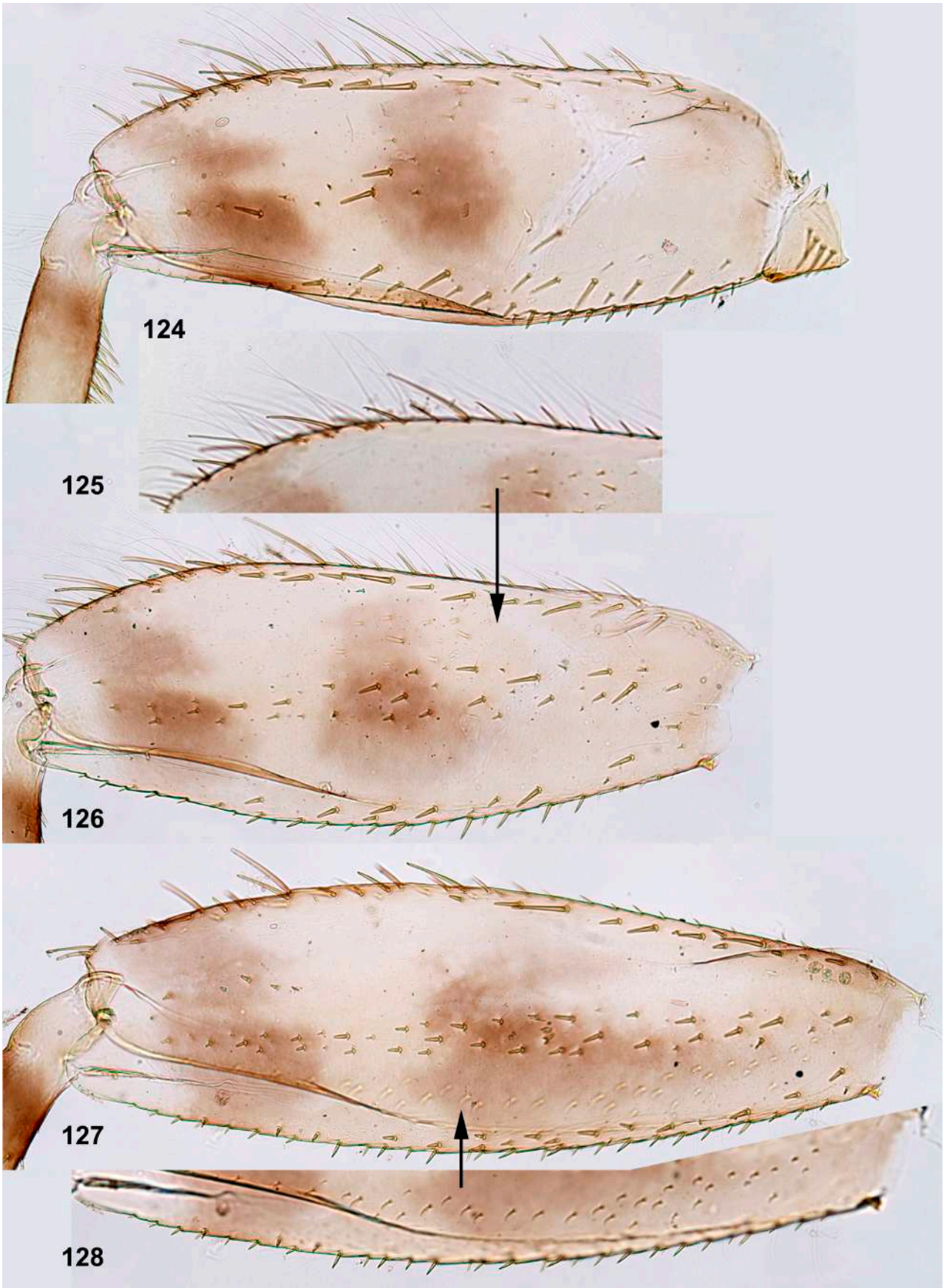
FIGURES 109–110. *Choroterpes* (*Euthraulus*) *armillatus* sp. n., eggs.



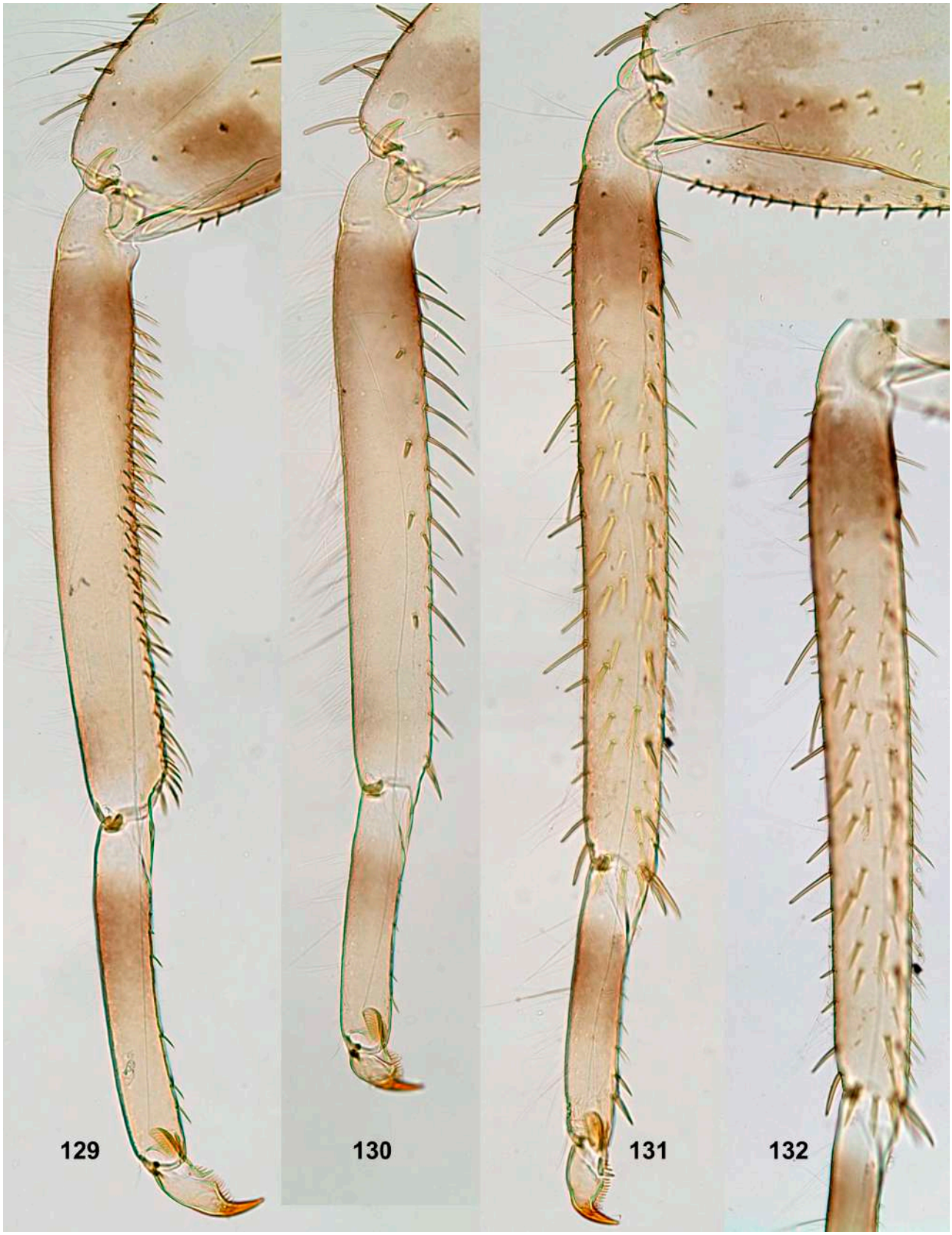
FIGURES 111–116. *Choroterpes* (*Euthraulus*) *latus* sp. n., exuviae of female larva with the same magnification: 111, head; 112, half of pronotum and mesonotum; 113, abdominal sterna and terga; 114–116, fore, middle and hind legs.



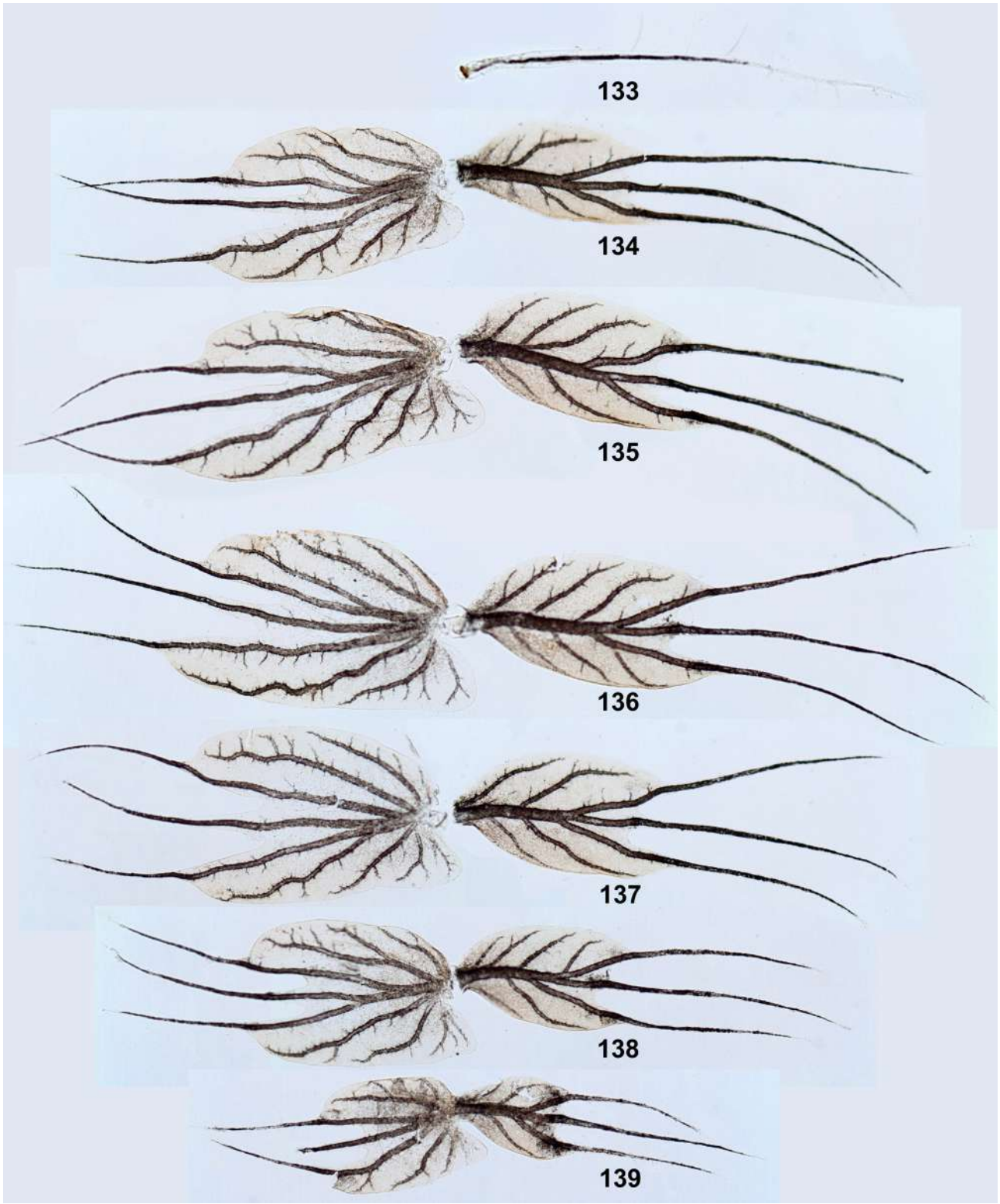
FIGURES 117–123. *Choroterpes* (*Euthraulus*) *latus* sp. n., larva. 117–118, labrum; 119–120, maxilla; 121–122, posterior margin of abdominal terga I and IX; 123, anterior side and inner margin of fore femur (117–118, 121–122, holotype). Abbreviations: dtr, distal transverse setal row; ptr, proximal transverse setal row.



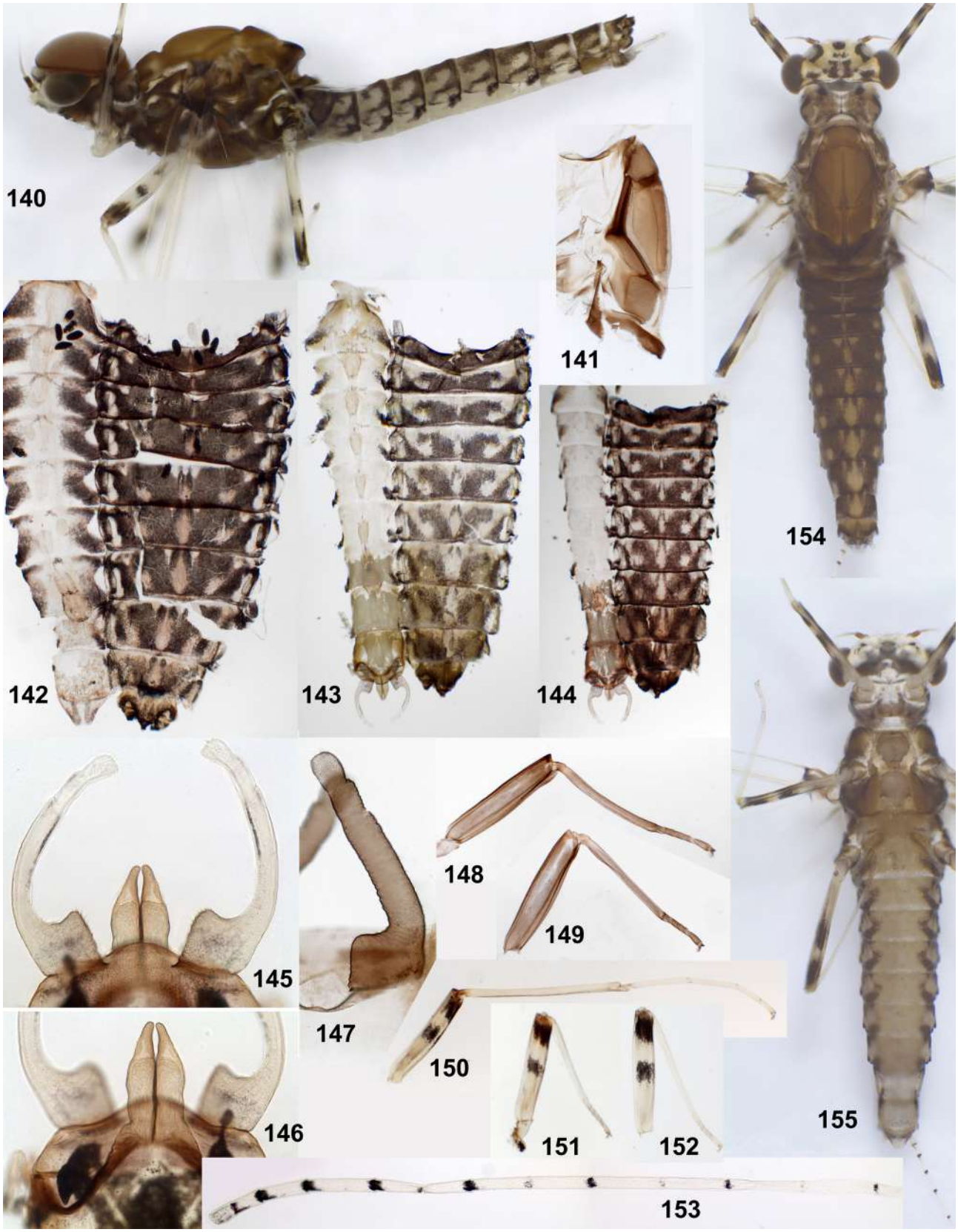
FIGURES 124–128. *Choroterpes* (*Euthraulus*) *latus* sp. n., larval exuviae of femora: 124, 126, 127, fore, middle and hind legs, focus on anterior side; 125, 128, middle and hind legs, focus on posterior side.



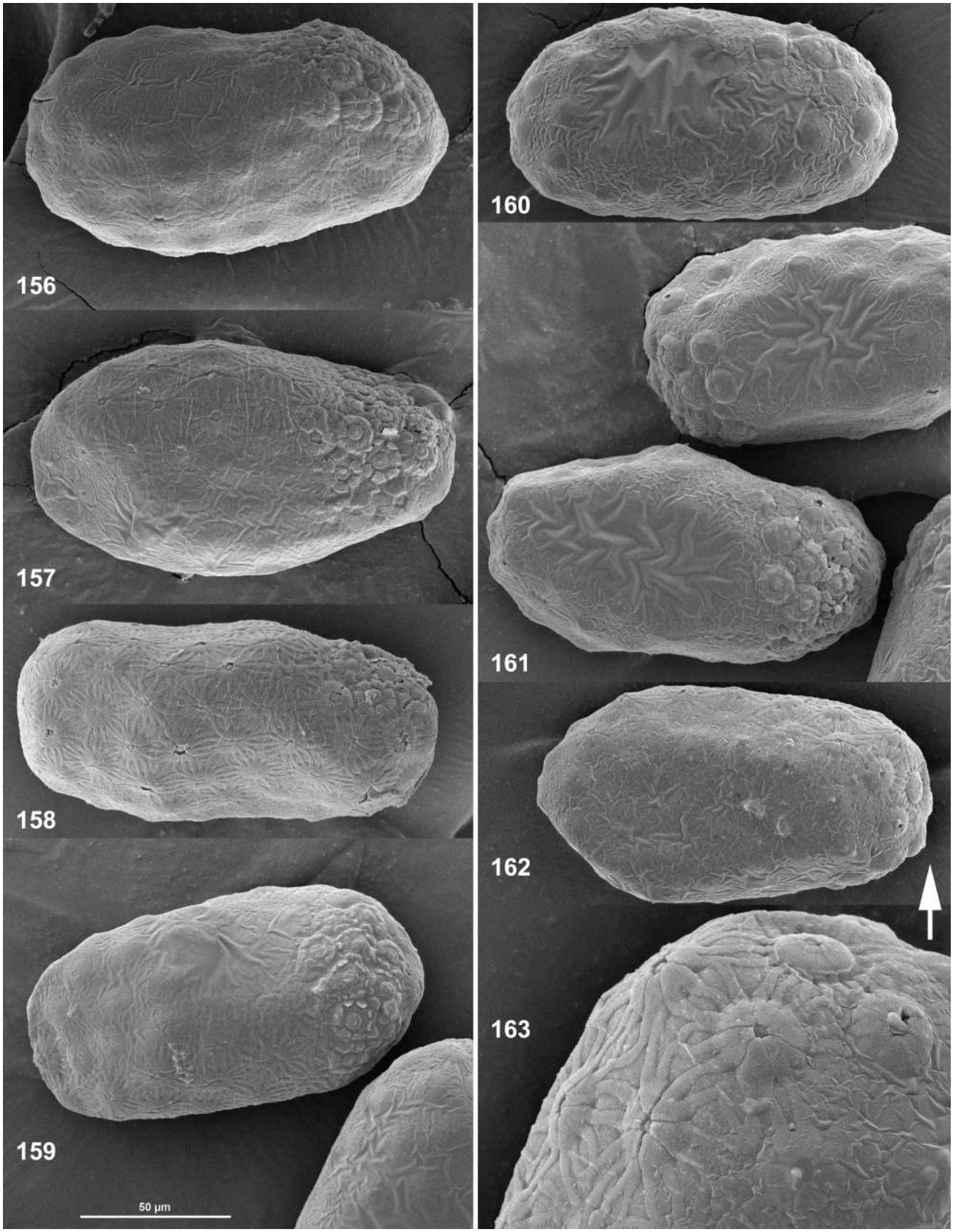
FIGURES 129–132. *Choroterpes* (*Euthraulus*) *latus* sp. n., larval exuviae of tibiae: 129–131, fore, middle and hind legs, focus on anterior side; 132, hind leg, focus on posterior side.



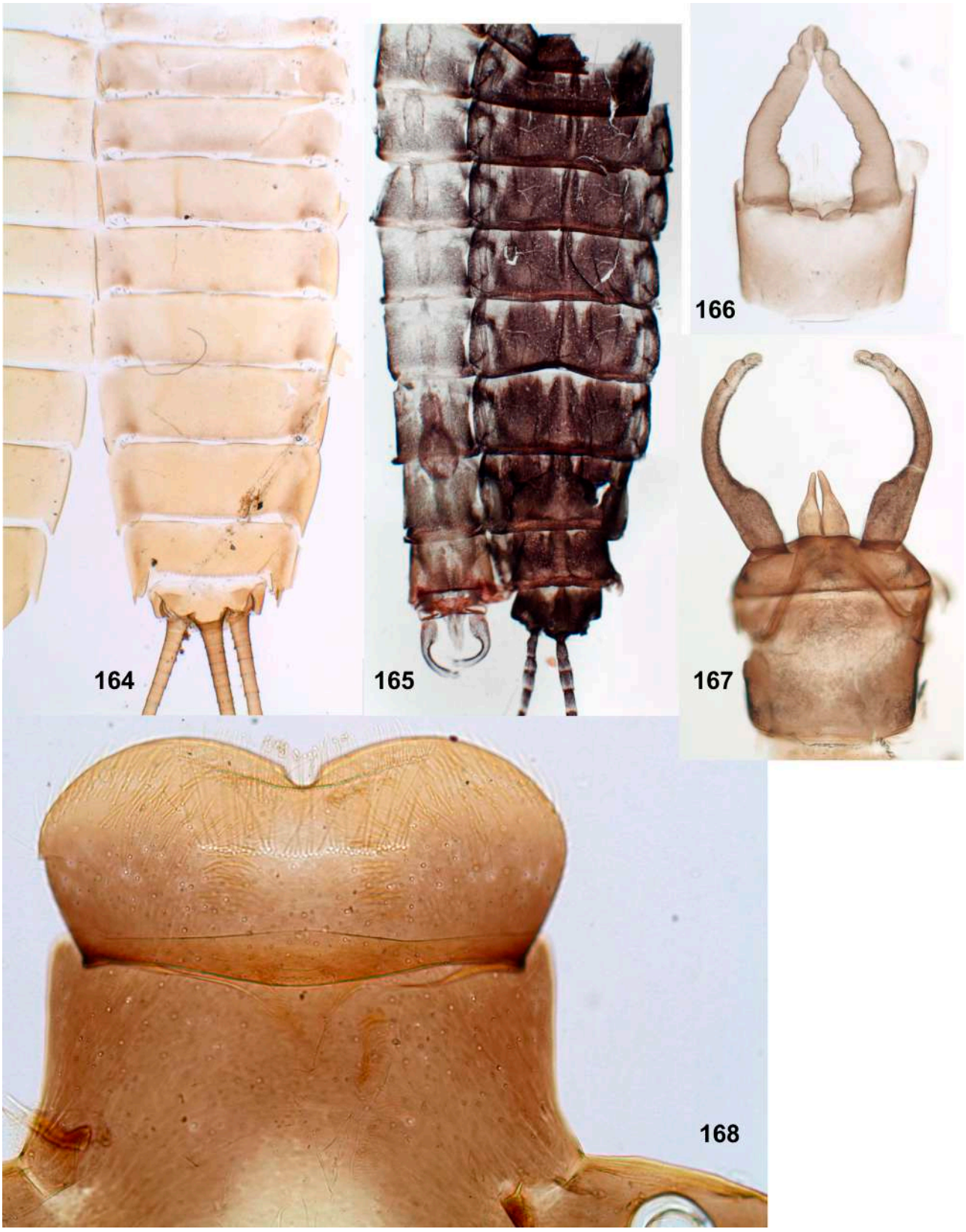
FIGURES 133–139. *Choroterpes* (*Euthraulus*) *latus* sp. n., tergalii I–VII.



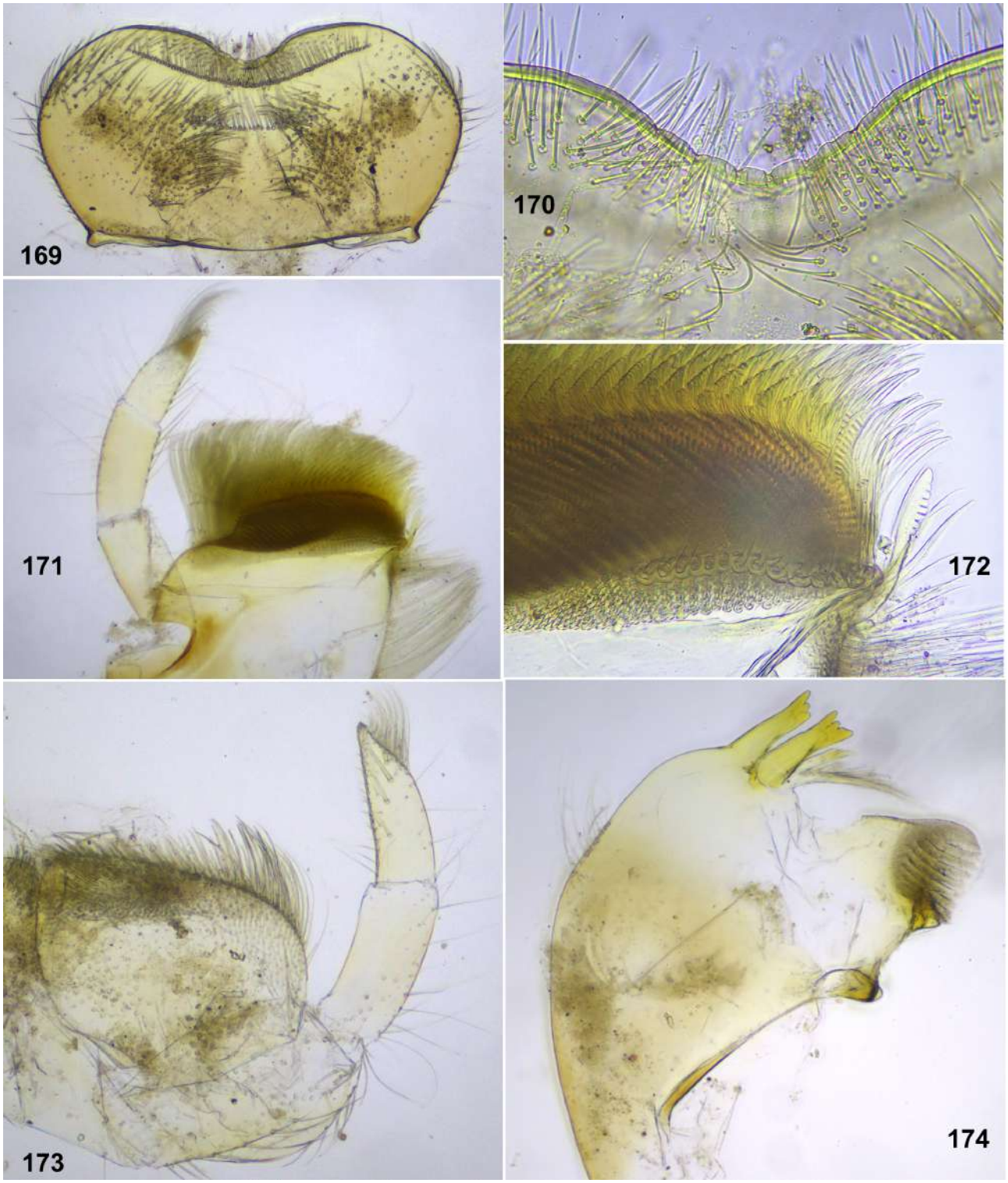
FIGURES 140–155. *Choroterpes* (*Euthraulus*) *latus* sp. n. 140, male imago; 141, subimaginal exuviae of half of mesonotum; 142, abdomen of female imago; 143–144, abdomina of male imagines; 145–146, male imaginal genitalia with focus on ventral and dorsal sides; 147, subimaginal exuviae of gonostylus; 148–149, subimaginal exuviae of female fore and middle legs; 150–152, male imaginal fore, middle and hind legs; 153, caudalius of female imago; 154–155, female imago (144, 154–155, specimens from Anuradhapura; other specimens from Madurai; 143, 145–147, holotype).



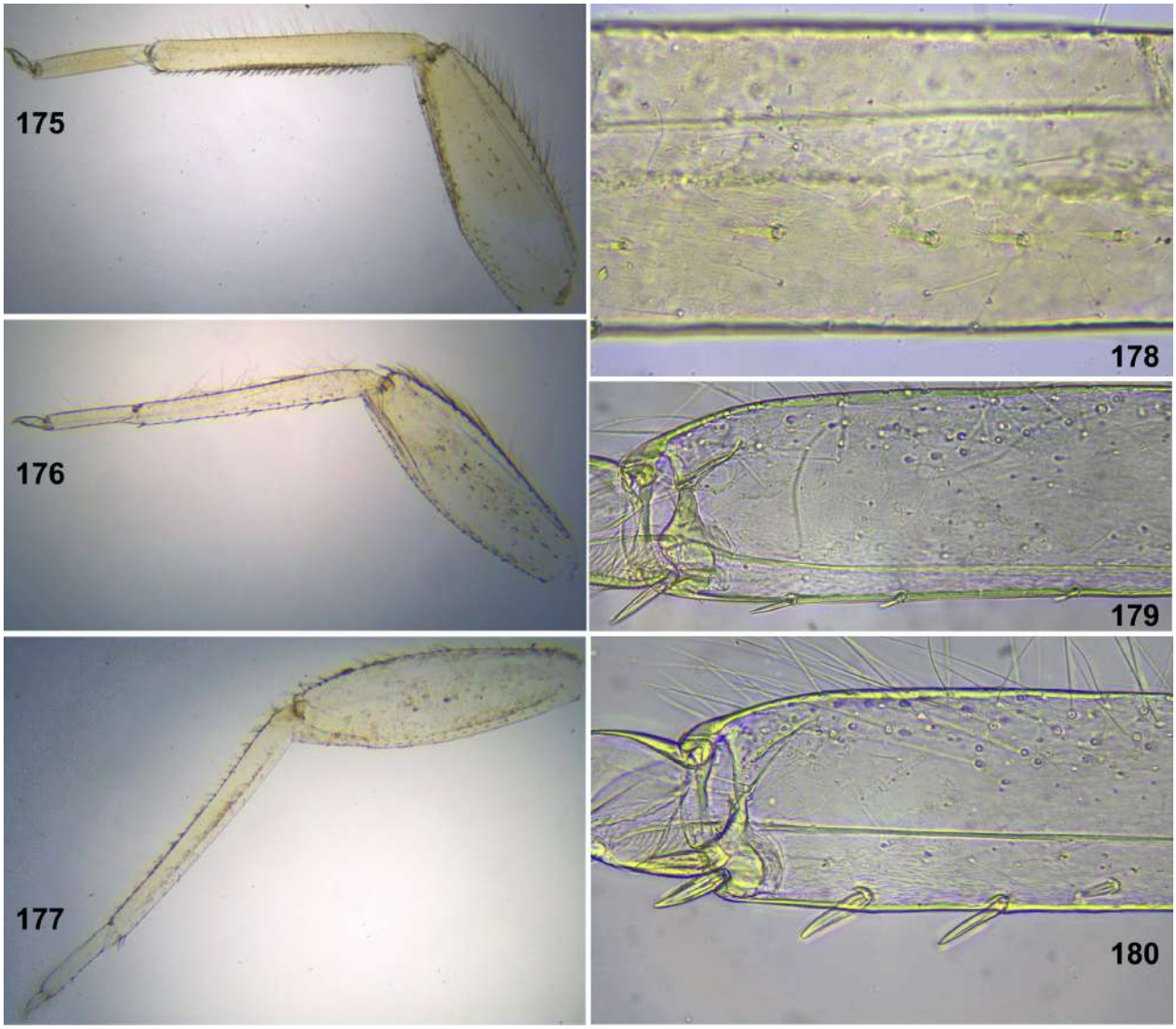
FIGURES 156–163. *Choroterpes* (*Euthraulus*) *latus* sp. n., eggs. 156–159, specimen from Madurai (India); 160–163, specimen from Anuradhapura (Sri Lanka).



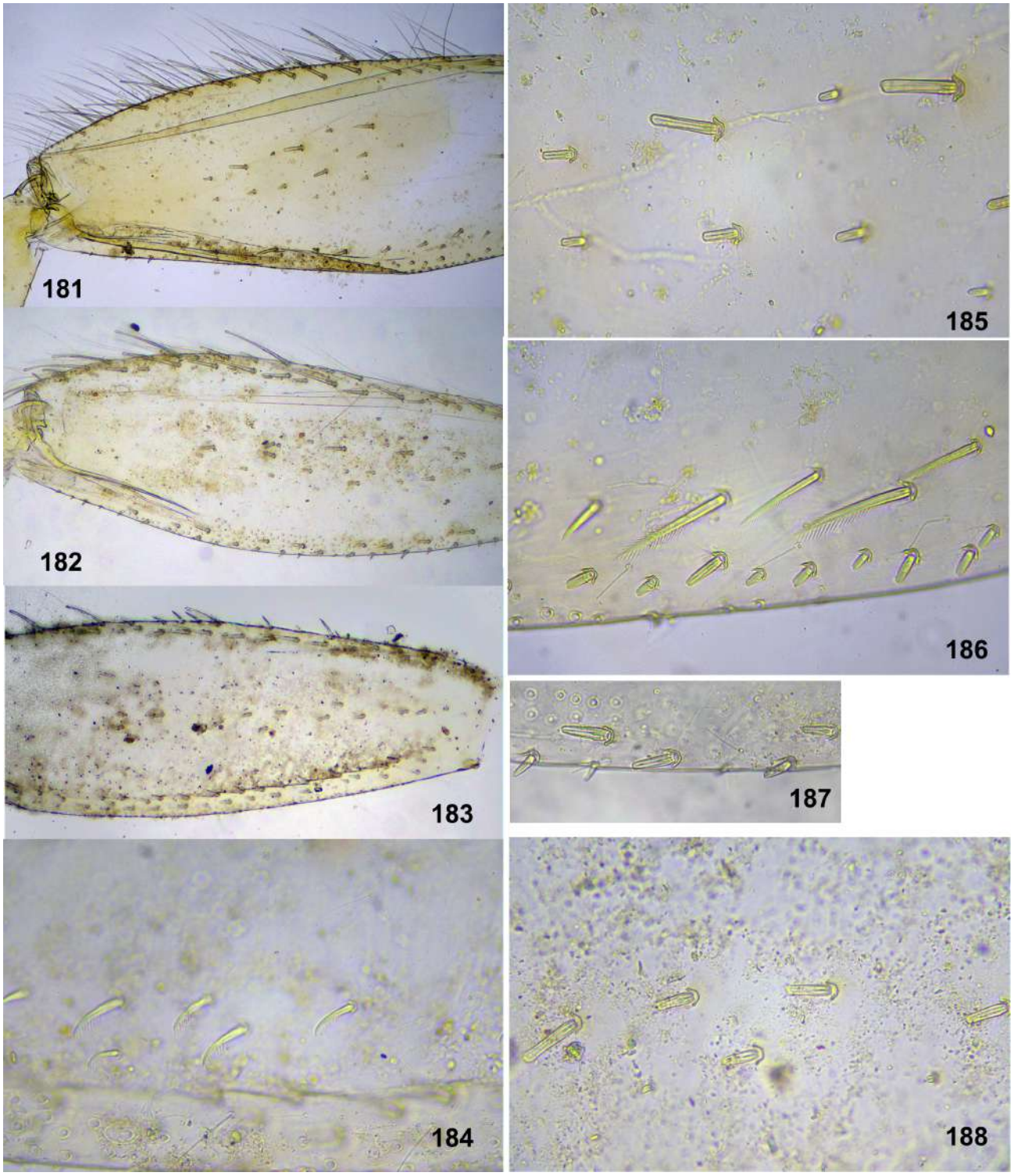
FIGURES 164–168. *Choroterpes* (*Euthraulus*) *signatus*. 164, larval exuviae of abdominal terga; 165, abdomen of male imago; 166, subimaginal exuviae of gonostyli; 167, genitalia of male imago; 168, labrum, focus on dorsal side.



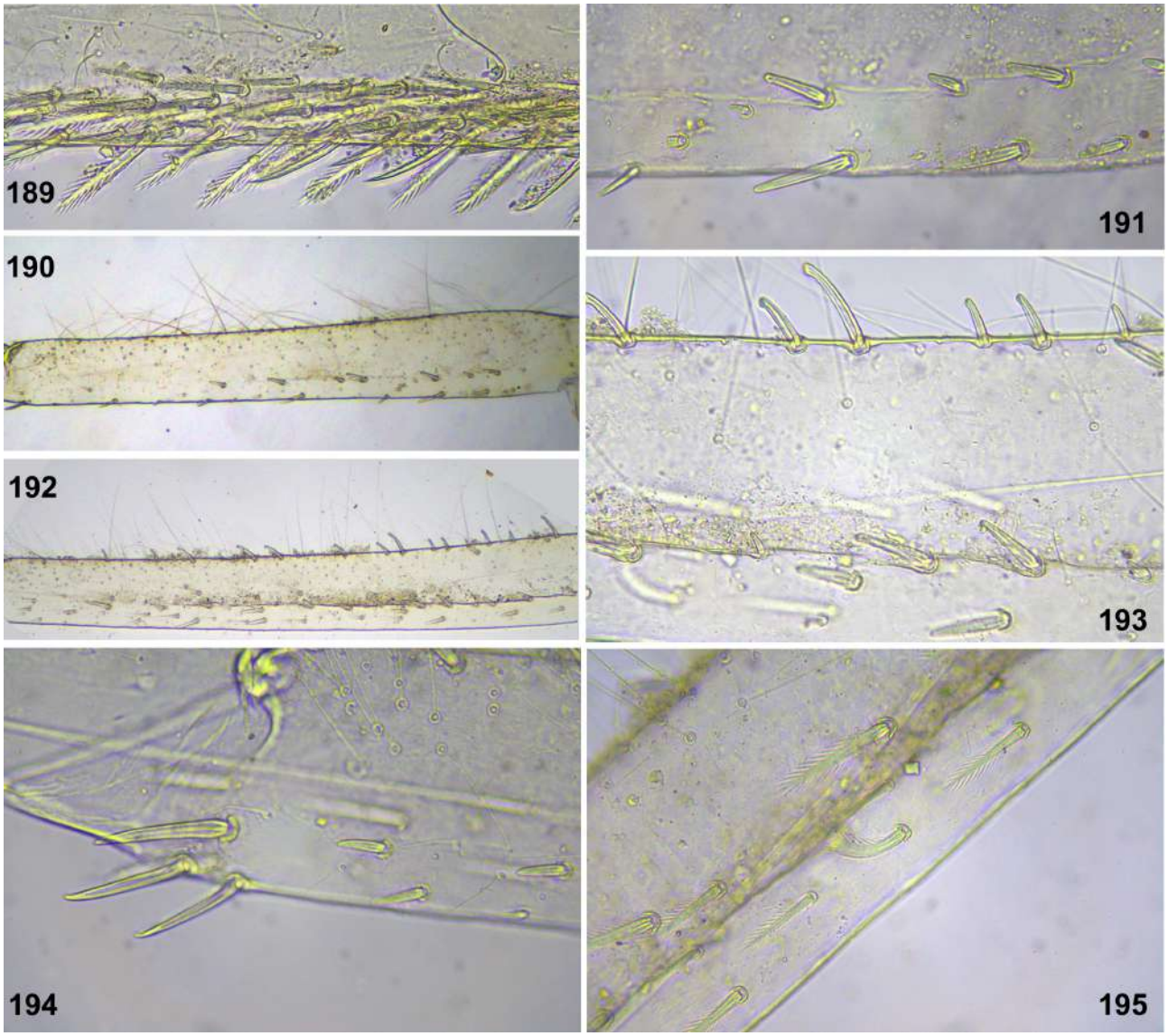
FIGURES 169–174. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n., larval exuviae. 169–170, labrum; 171–172, maxilla; 173, labium; 174, left mandible (169–174, holotype).



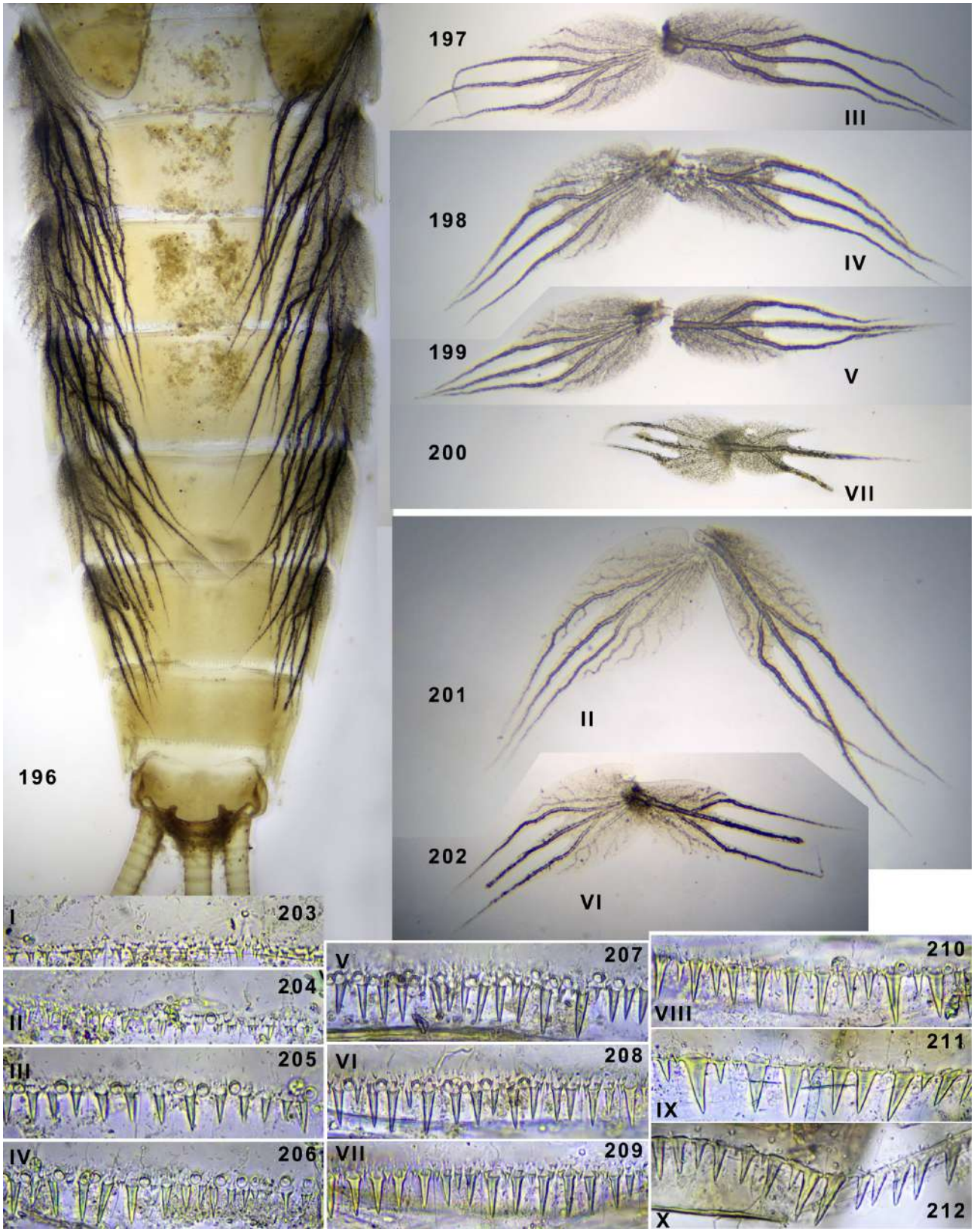
FIGURES 175–180. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n., larval exuviae (holotype): 175–177, fore, middle and hind legs; 178, fragment of fore tarsus; 179, apex of middle tarsus; 180, apex of hind tarsus.



FIGURES 181–188. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n., larval exuviae (holotype): 181–183, fore, middle and hind femora with focus on anterior side; 184, fragment of hind femur, focus on posterior side; 185–188, fragments of femora with focus on anterior side: 185–186, fore femur; 187, middle femur; 188, hind femur.

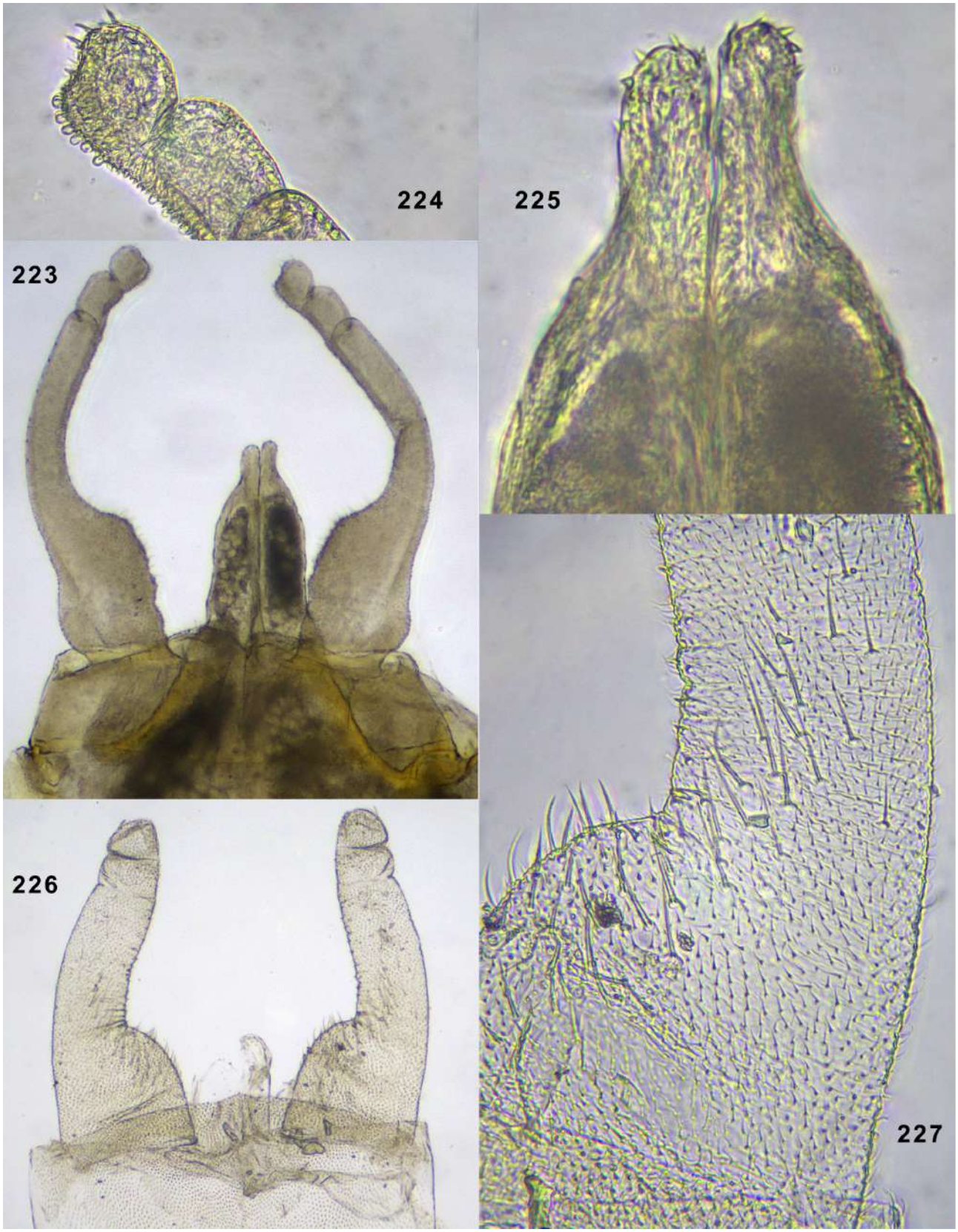


FIGURES 189–195. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n., larval exuviae (holotype): 189, fragment of inner margin of fore tibia; 190–191, middle tibia and its fragment with focus on anterior side; 192–194, hind tibia and its fragments with focus on anterior side; 195, fragment of hind tibia with focus on posterior side.

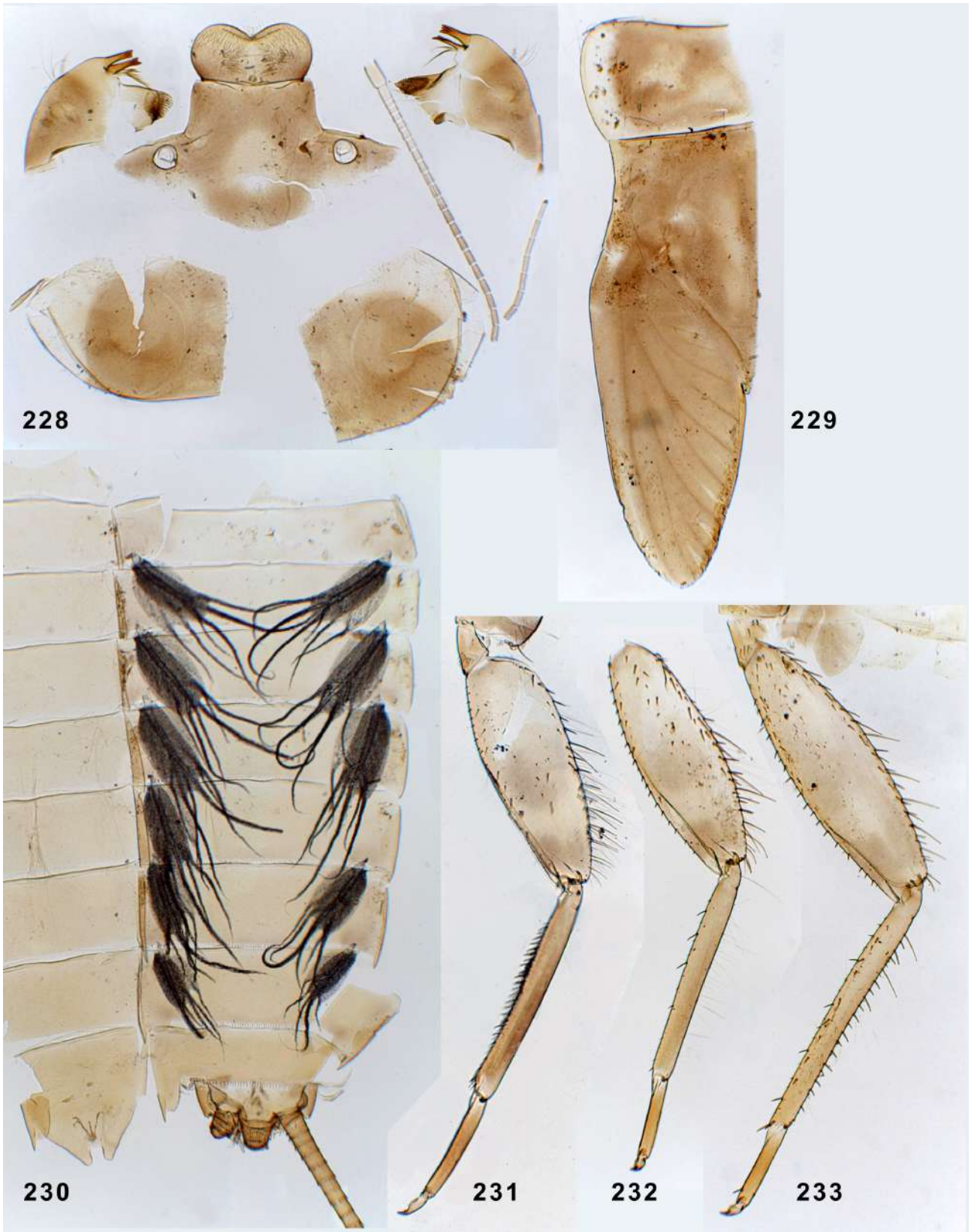


FIGURES 196–212. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n., larval exuviae: 196, abdomen with tergalii; 197–200, tergalii III–V and VII of paratype; 201–202, tergalii II and VI of holotype; 203–212, posterior margins of abdominal terga I–X of holotype.

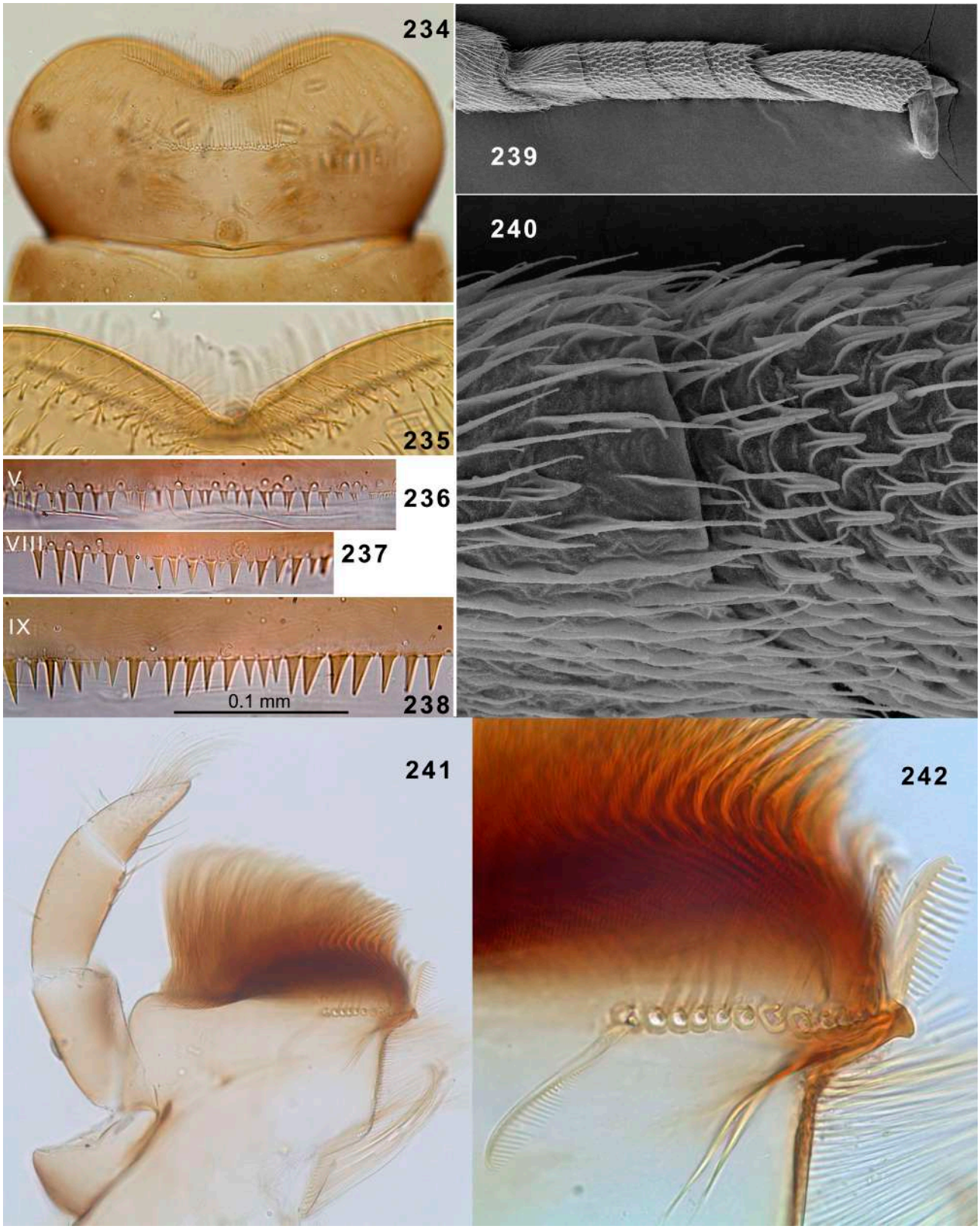
FIGURES 213–222. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n. 213, male imago; 214, the same in alcohol; 215, female subimago; 216, abdomen of male imago; 217, female imago; 218, half of subimaginal exuviae of mesonotum; 219, caudalius; 220–222, fore, middle and hind legs of male imago (213–214, 218–219, holotype).



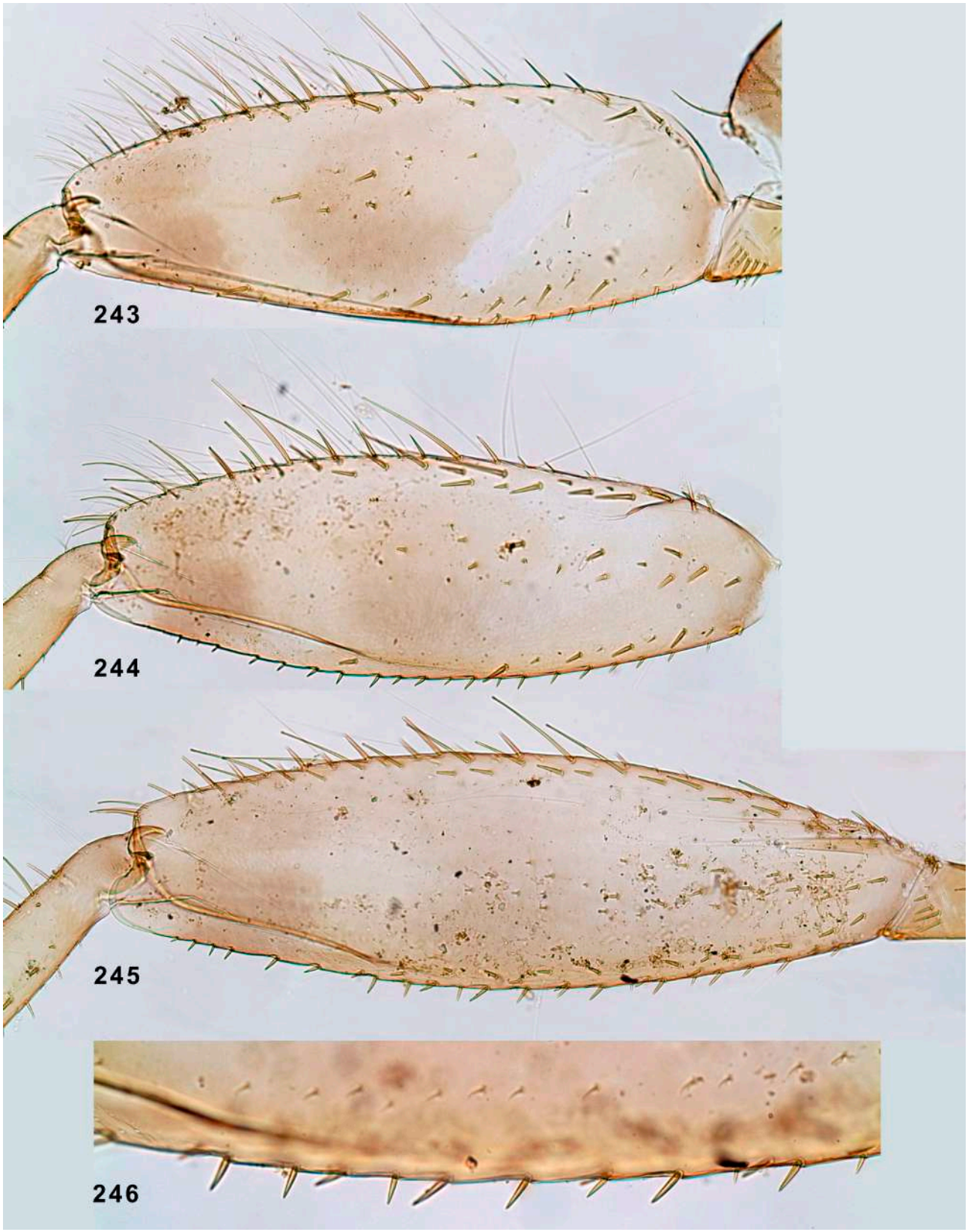
FIGURES 223–227. *Choroterpes* (*Euthraulus*) *atelobranchis* sp. n. (holotype). 223–225, genitalia of male imago and their fragments; 226–227, their subimaginal exuviae.



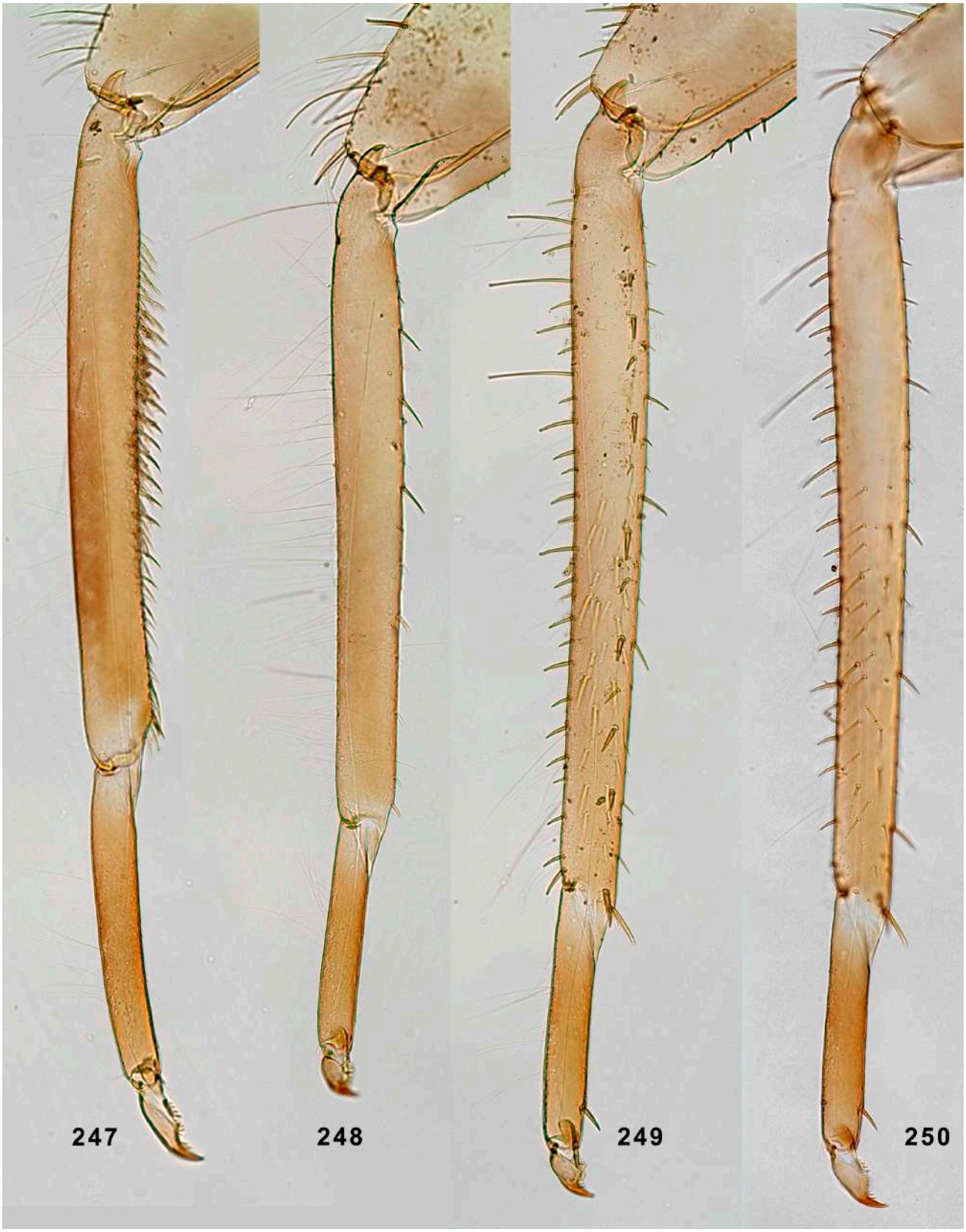
FIGURES 228–233. *Choroterpes* (*Euthraulus*) *unicolor* sp. n., exuviae of male larva with the same magnification (holotype): 228, head; 229, half of pronotum and mesonotum; 230, abdominal sterna and terga; 231–233, fore, middle and hind legs.



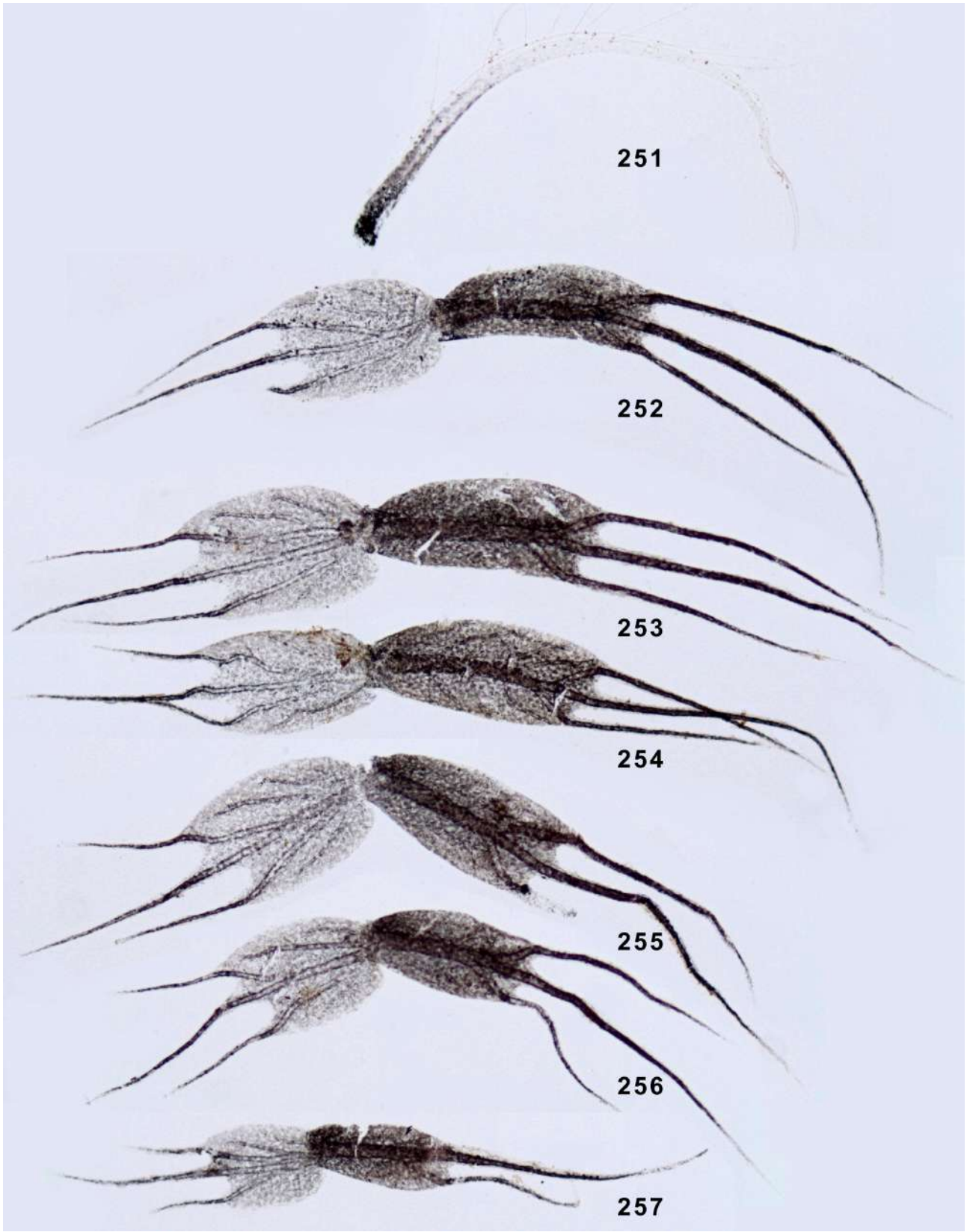
FIGURES 234–242. *Choroterpes* (*Euthraulus*) *unicolor* sp. n. 234–235, labrum; 236–238, posterior margins of larval abdominal terga V, VIII and IX; 239–240, subimaginal tarsus; 241–242, maxilla.



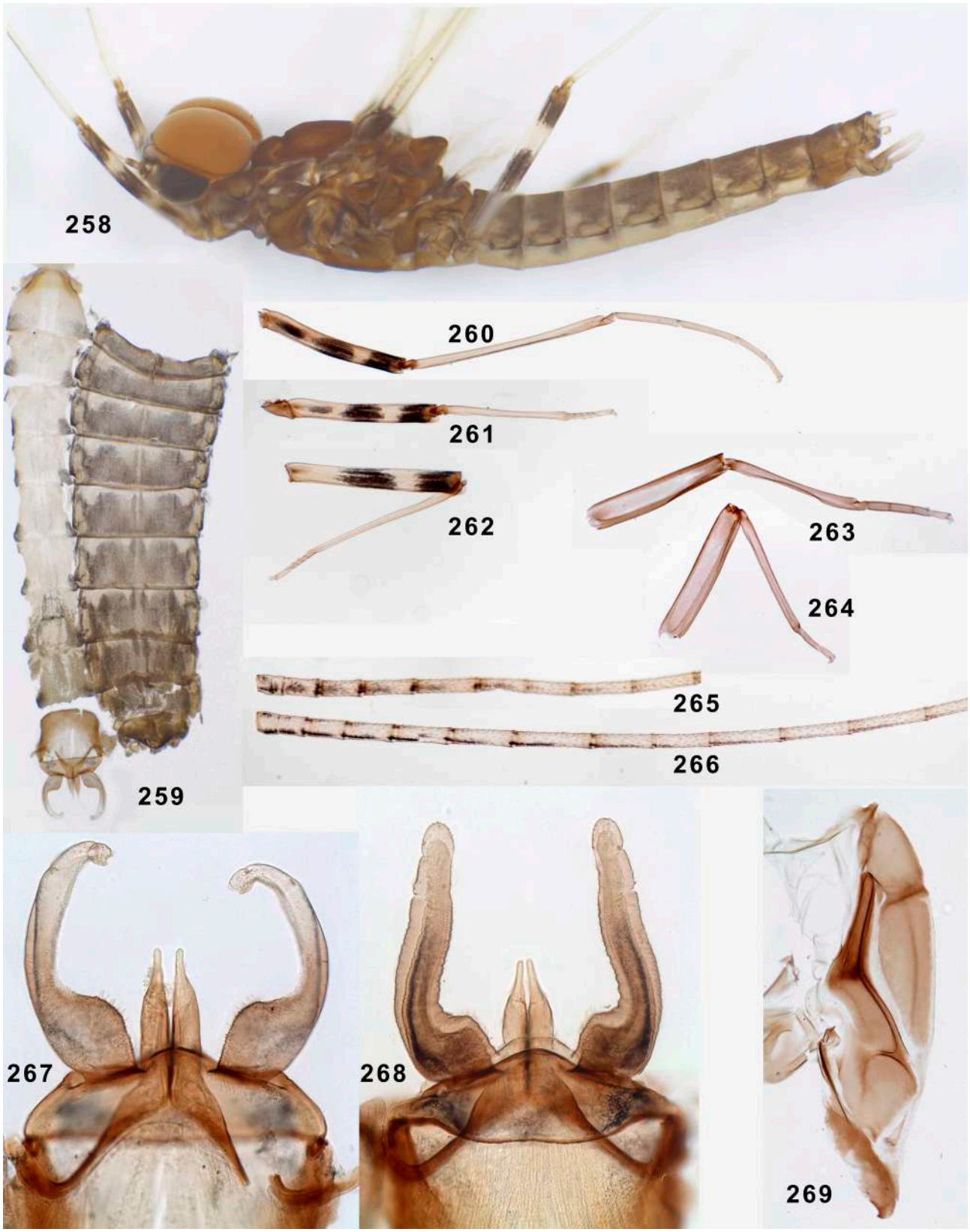
FIGURES 243–246. *Choroterpes* (*Euthraulus*) *unicolor* sp. n., larval exuviae of femora (holotype): 243–245, fore, middle and hind legs, focus on anterior side; 246, inner margin of hind leg, focus on posterior side.



FIGURES 247–250. *Choroterpes* (*Euthraulus*) *unicolor* sp. n., larval exuviae of tibiae (holotype): 247–249, fore, middle and hind legs, focus on anterior side; 250, hind leg, focus on posterior side.



FIGURES 251–257. *Choroterpes* (*Euthraulus*) *unicolor* sp. n., tergalii I–VII.



FIGURES 258–269. *Choroterpes* (*Euthraulus*) *unicolor* sp. n. 258, male imago; 269, abdomen of male imago; 260–262, fore, middle and hind legs of male imago; 263–264, their subimaginal exuviae (fore and middle legs); 265–266, caudalii of male imago; 267, genitalia of male imago; 268, genitalia of male imago visible through subimaginal cuticle; subimaginal exuviae of mesonotum (268, holotype).

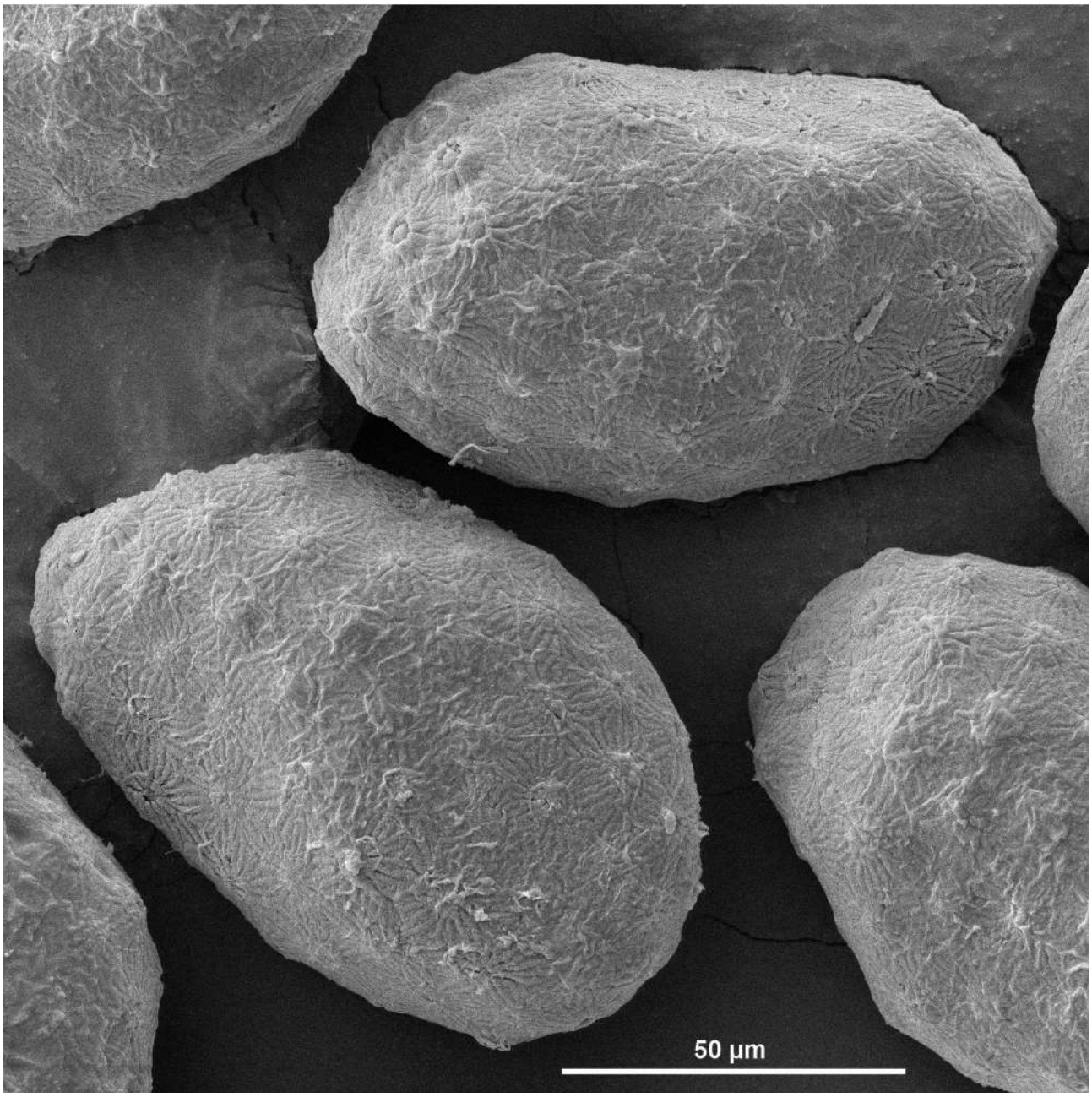
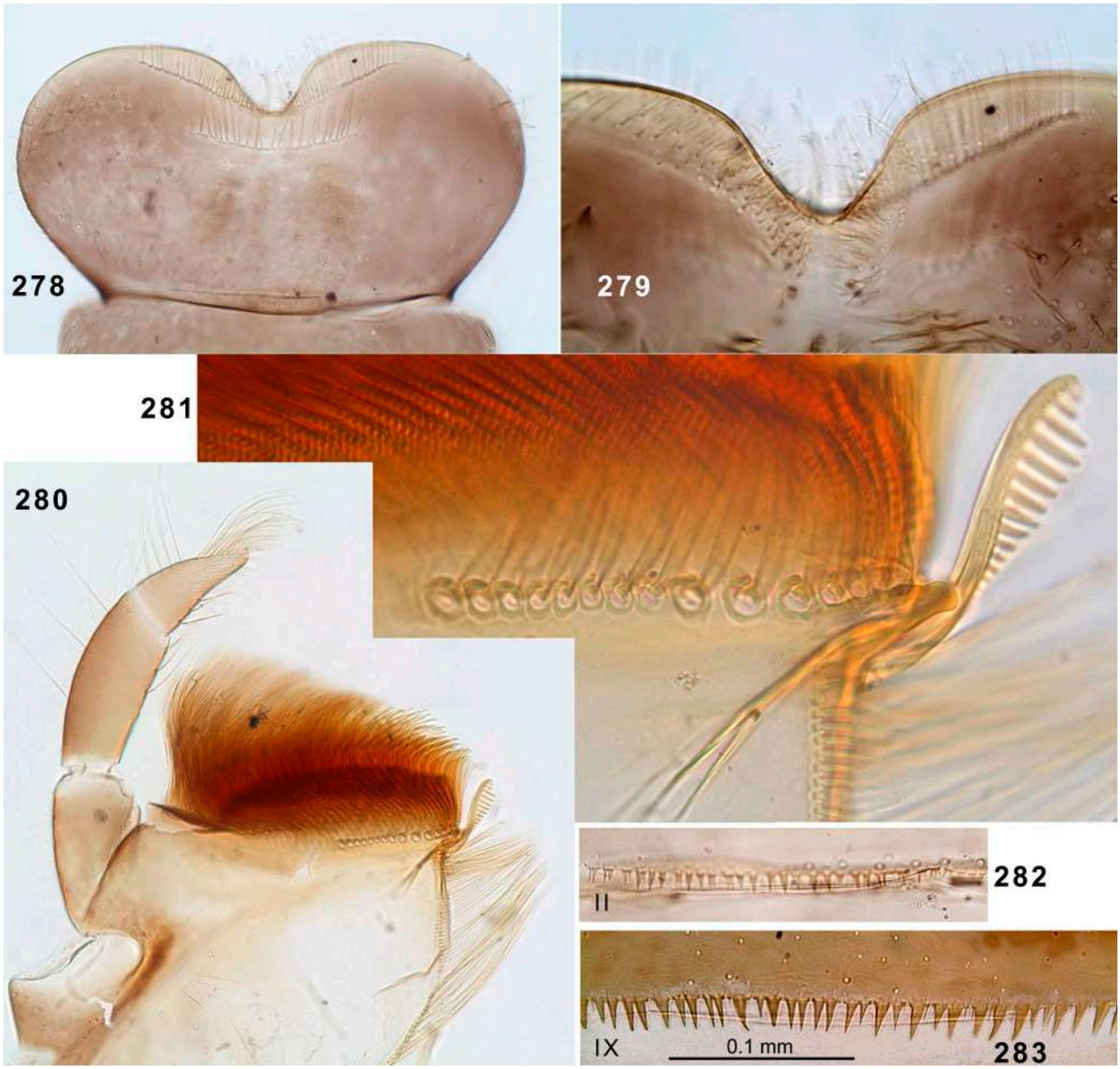


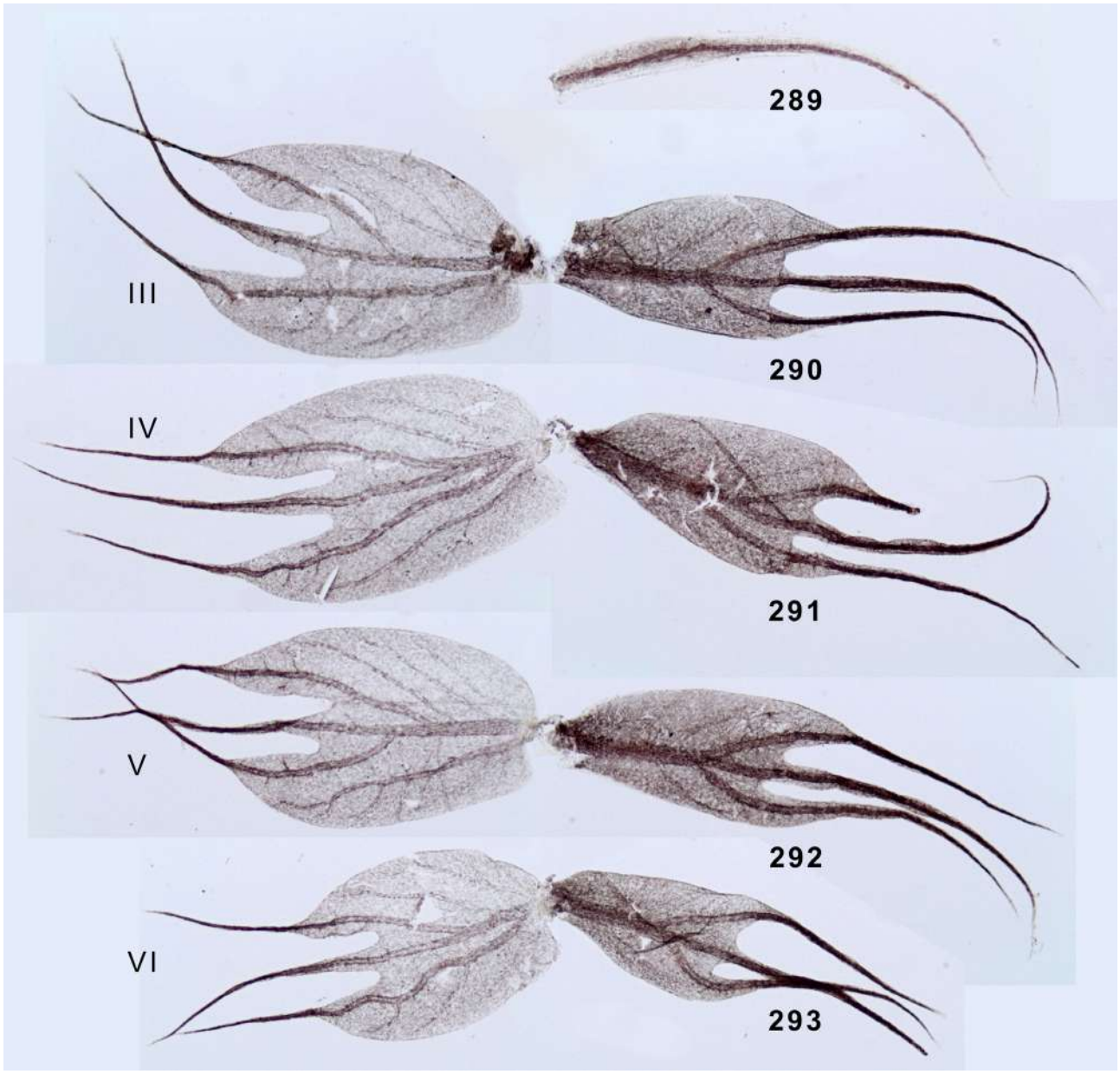
FIGURE 270. *Choroterpes* (*Euthraulus*) *unicolor* sp. n., eggs.

FIGURES 271–277. *Choroterpes* (*Euthraulus*) sp. «Mumbai» (with the same magnification). 271, cuticle of male larval head; 272–274, fore, middle and hind larval legs of male larva with subimaginal legs visible inside; 275, cuticle of abdomen of male larva; 276, subimaginal abdomen extracted from it; 277, cuticle of larval pronotum and mesonotum.

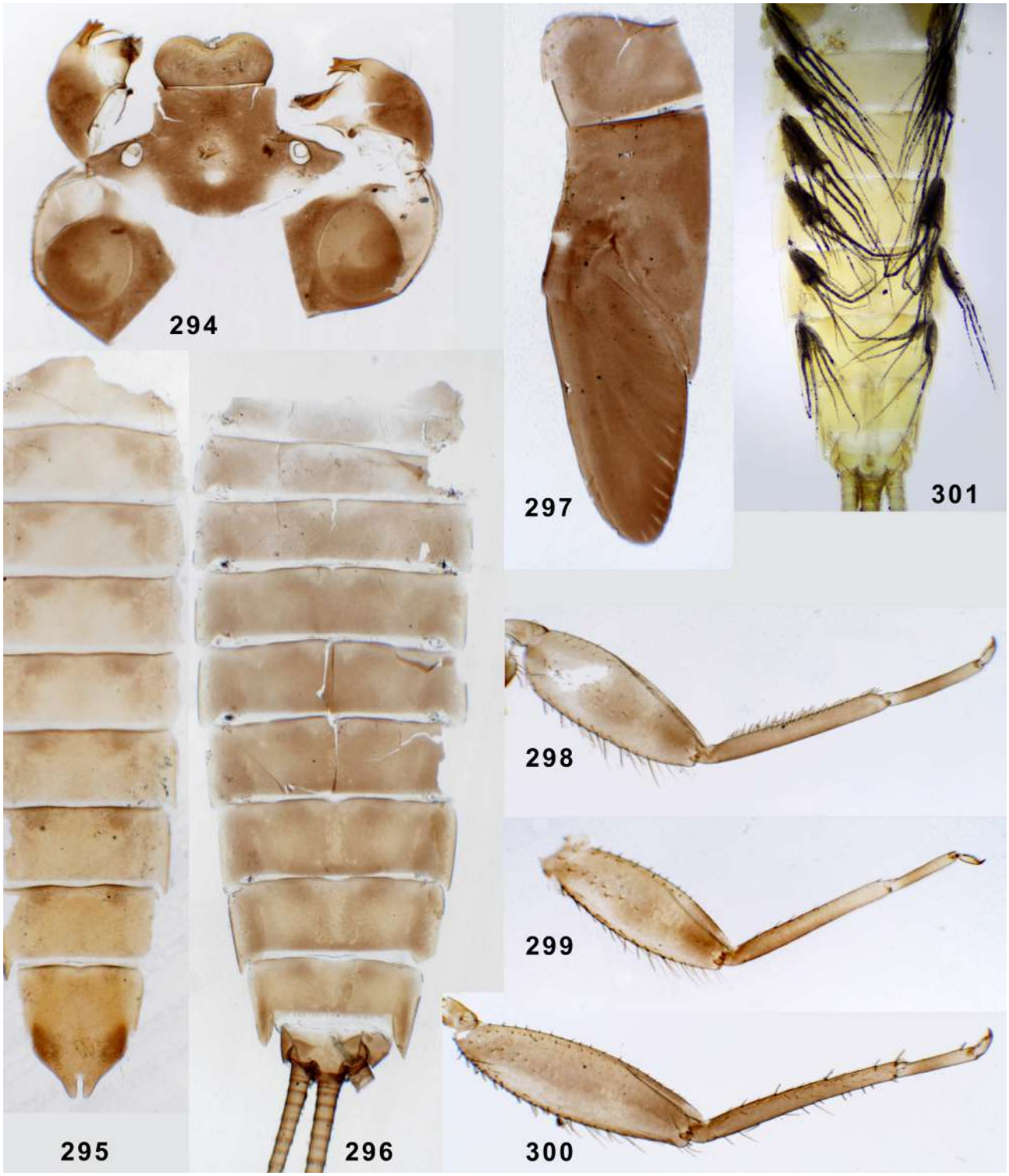


FIGURES 278–283. *Choroterpes* (*Euthraulus*) sp. «Mumbai». 278–279, labrum; 280–281, maxilla; 282–283, posterior margins of abdominal terga II and IX.

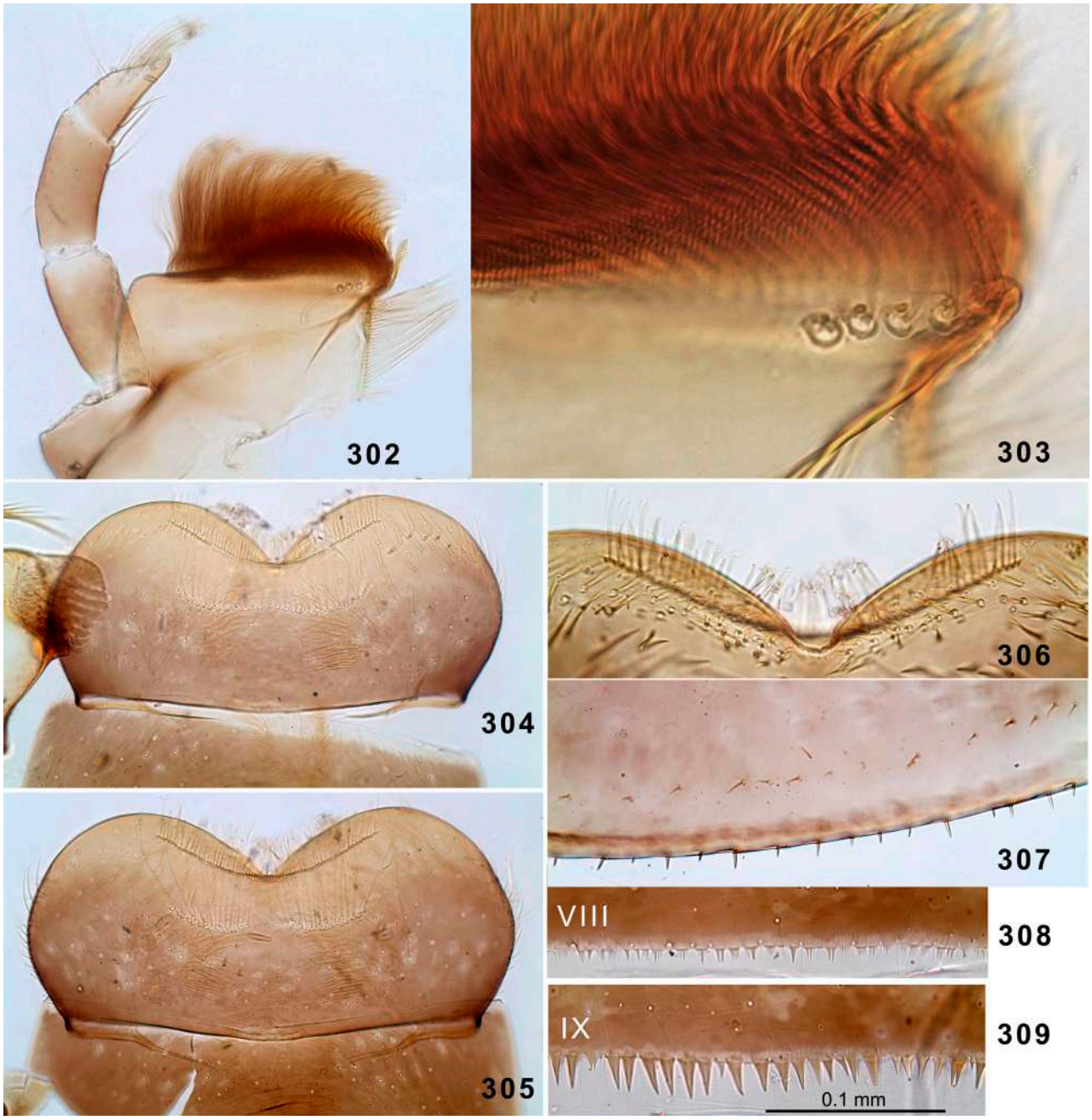
FIGURES 284–288. *Choroterpes* (*Euthraulus*) sp. «Mumbai», larval legs with subimaginal legs visible inside. 284, bipectinate seta an anterior side of fore femur near inner margin; 285, outer margin of fore femur; 286–288, tibiae of fore, middle and hind legs.



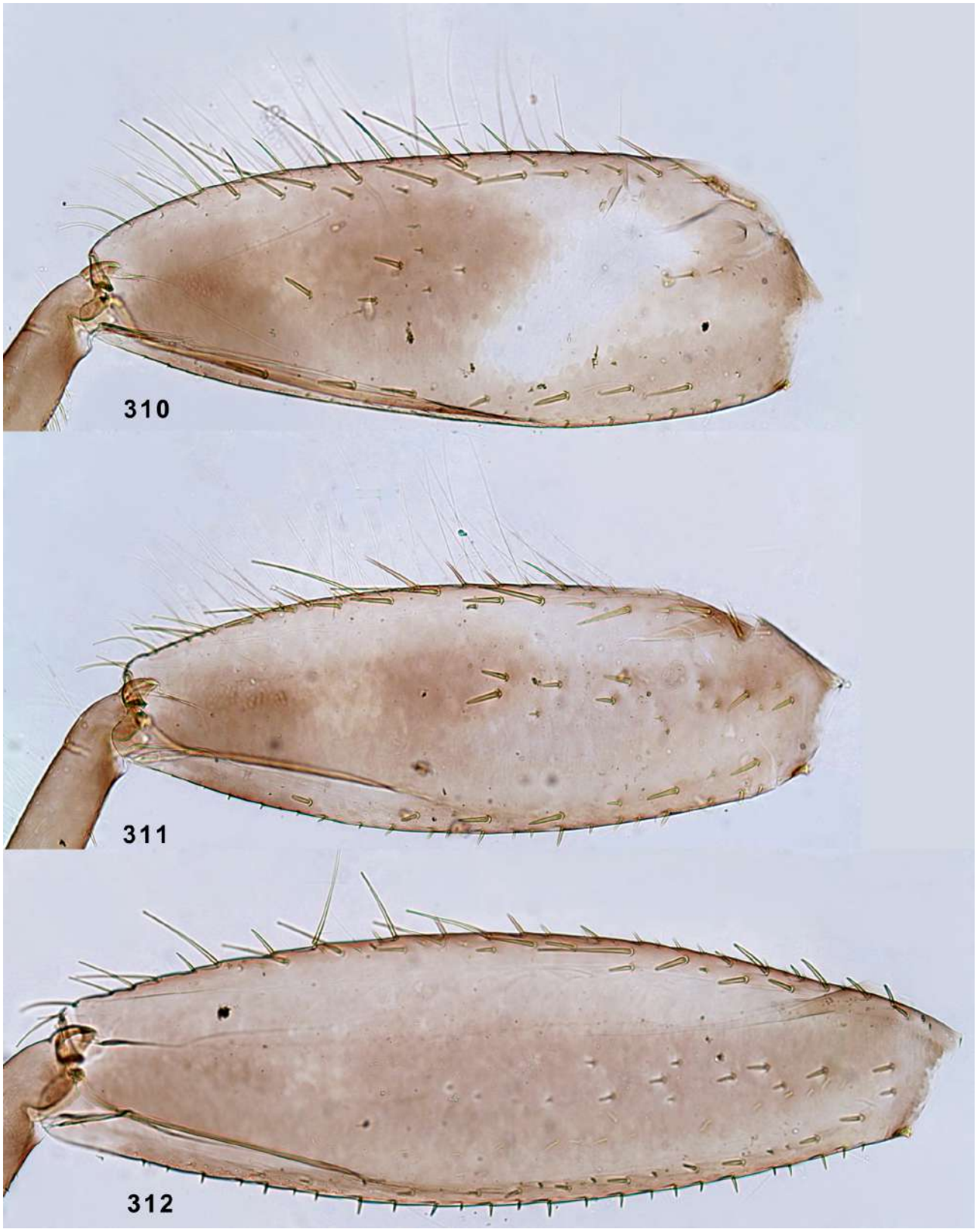
FIGURES 289–293. *Choroterpes* (*Euthraulus*) sp. «Mumbai», tergalii I, III, IV, V and VI.



FIGURES 294–301. *Choroterpes* (*Euthraulus*) *nambiyarensis*. 294–300, exuviae of male larva with the same magnification: 294, head; 295, abdominal sterna; 296, abdominal terga; 297, half of pronotum and mesonotum; 298–300, fore, middle and hind legs; 301, exuviae of abdomen with tergalii.

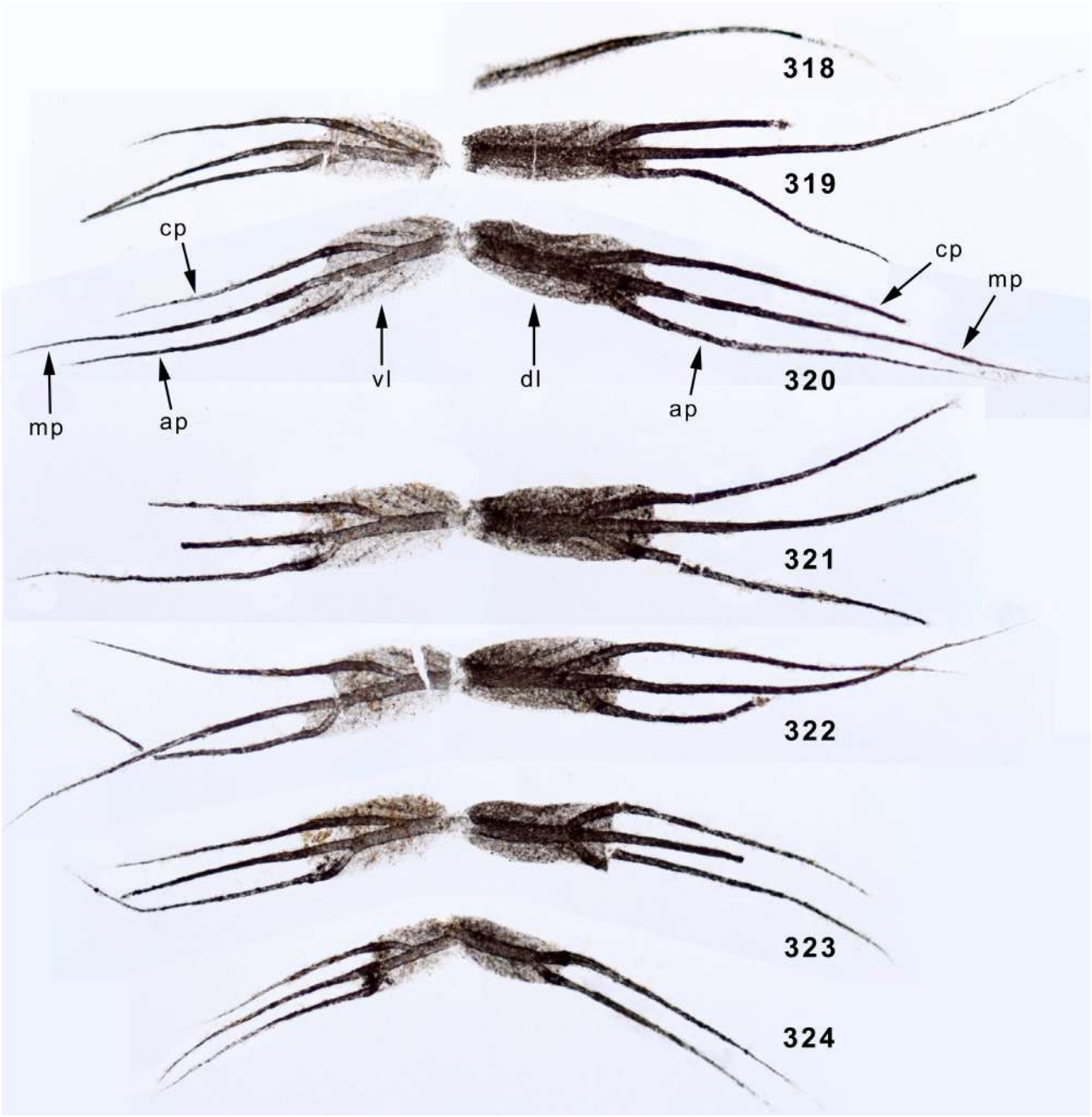


FIGURES 302–309. *Choroterpes* (*Euthraulus*) *nambiyarensis*, larval exuviae: 302–303, maxilla; 304–306, labrum; 307, inner margin and posterior side of fore femur (proximal part); 308–309, posterior margin of abdominal terga VIII and IX.

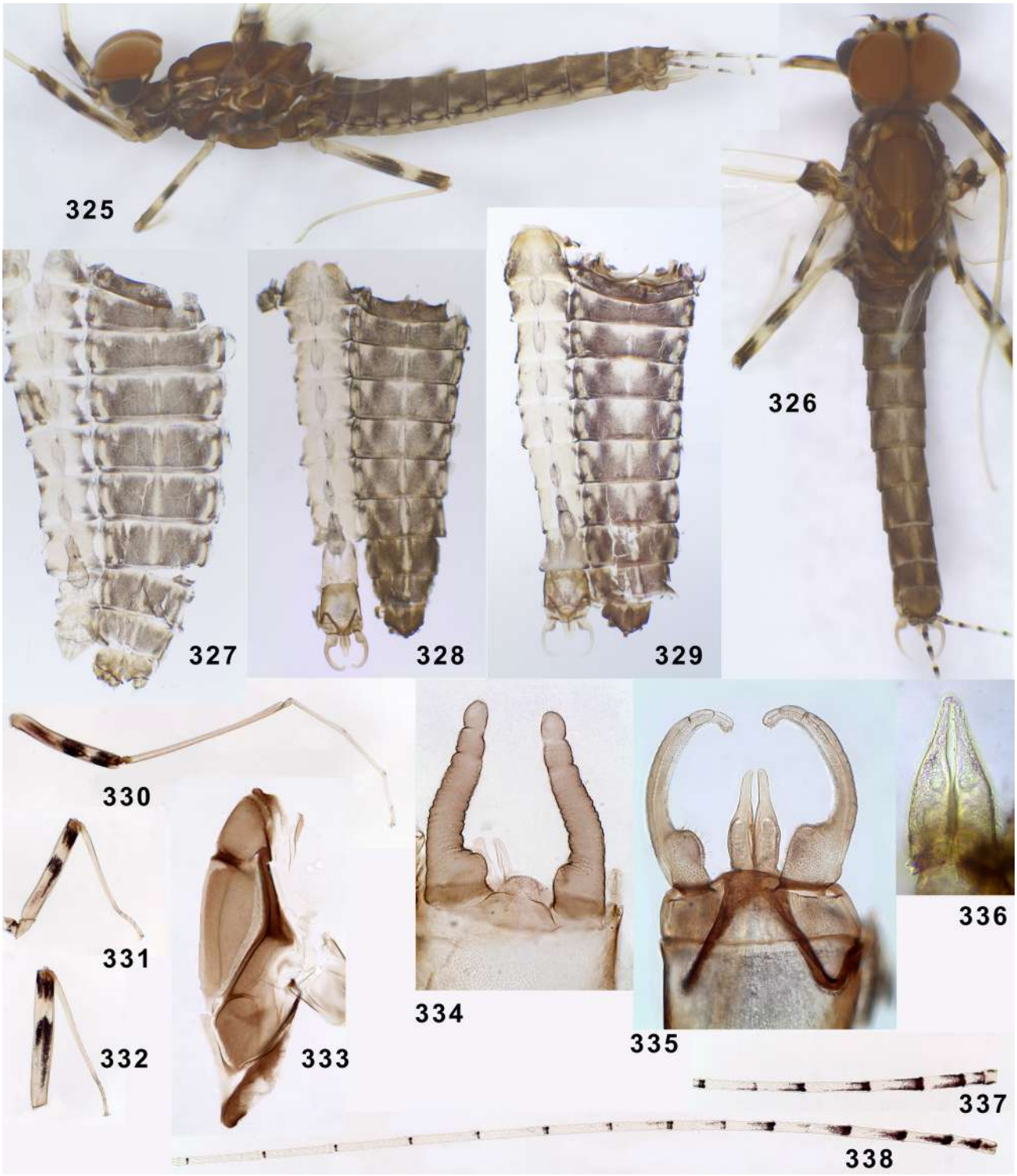


FIGURES 310–312. *Choroterpes* (*Euthraulus*) *nambiyarensis*, larval exuviae of femora of fore, middle and hind legs.

FIGURES 313–317. *Choroterpes* (*Euthraulus*) *nambiyarensis*, larval exuviae of tibiae, tarsi and claws: 313, fore leg; 314–315, middle leg (with focus on anterior side); 316–317, hind leg (316, focus on anterior side; 317, focus on posterior side).



FIGURES 318–324. *Choroterpes* (*Euthraulus*) *nambiyarensis*, tergalii I–VII. Abbreviations: ap, anal process; cp, costal process; dl, dorsal lamella; mp, middle process; vl, ventral lamella.



FIGURES 325–338. *Choroterpes* (*Euthraulus*) *nambiyarensis*. 325–326, male imagines; 327, abdomen of female imago; 328–329, abdomina of male imagines; 330–332, fore, middle and hind legs of male imago; 333, subimaginal exuviae of half of mesonotum; 334, subimaginal exuviae of male genitalia; 335, genitalia of male imago; 336, penis of another individual; 337–338, caudalii of male imago.

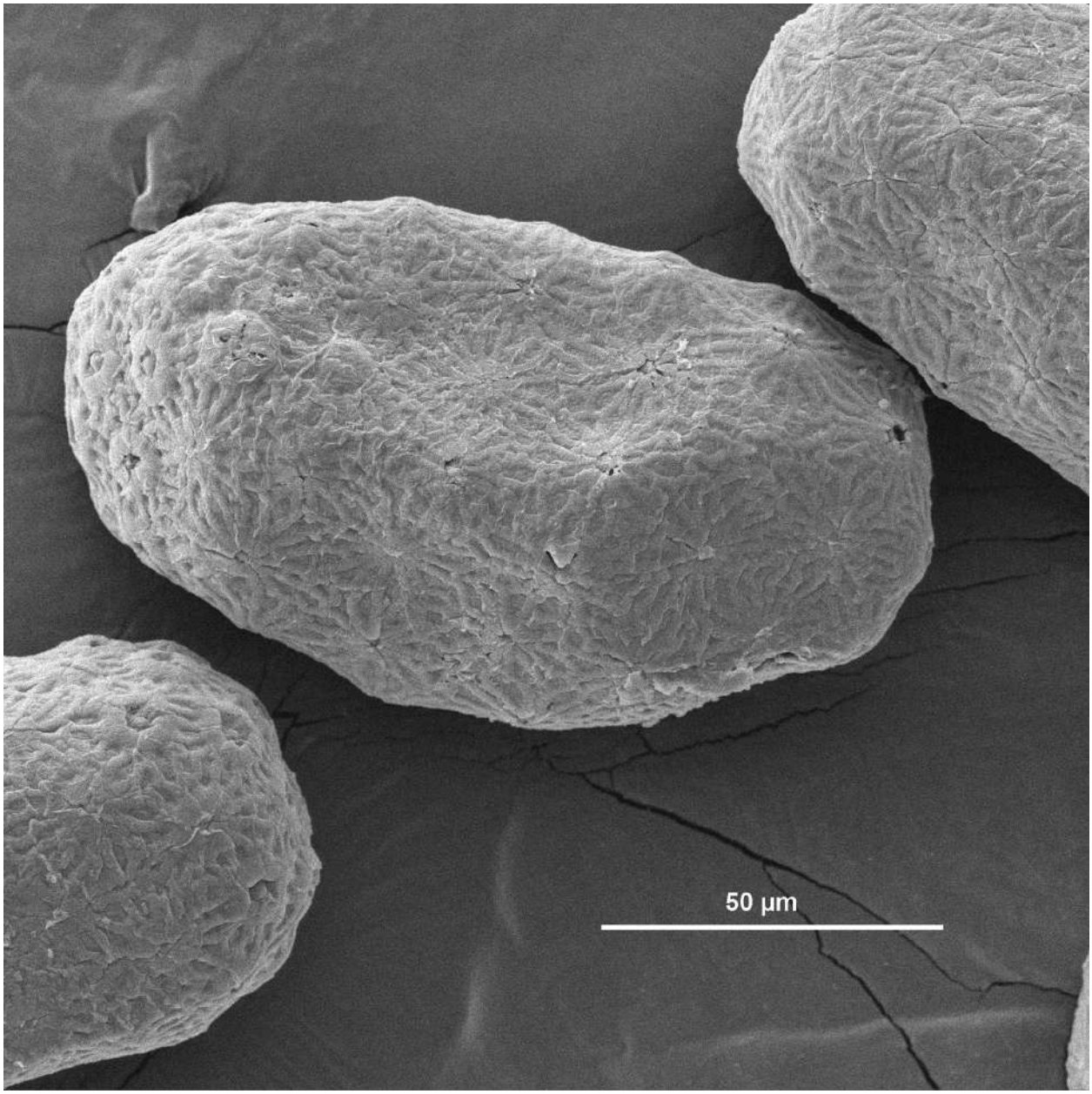
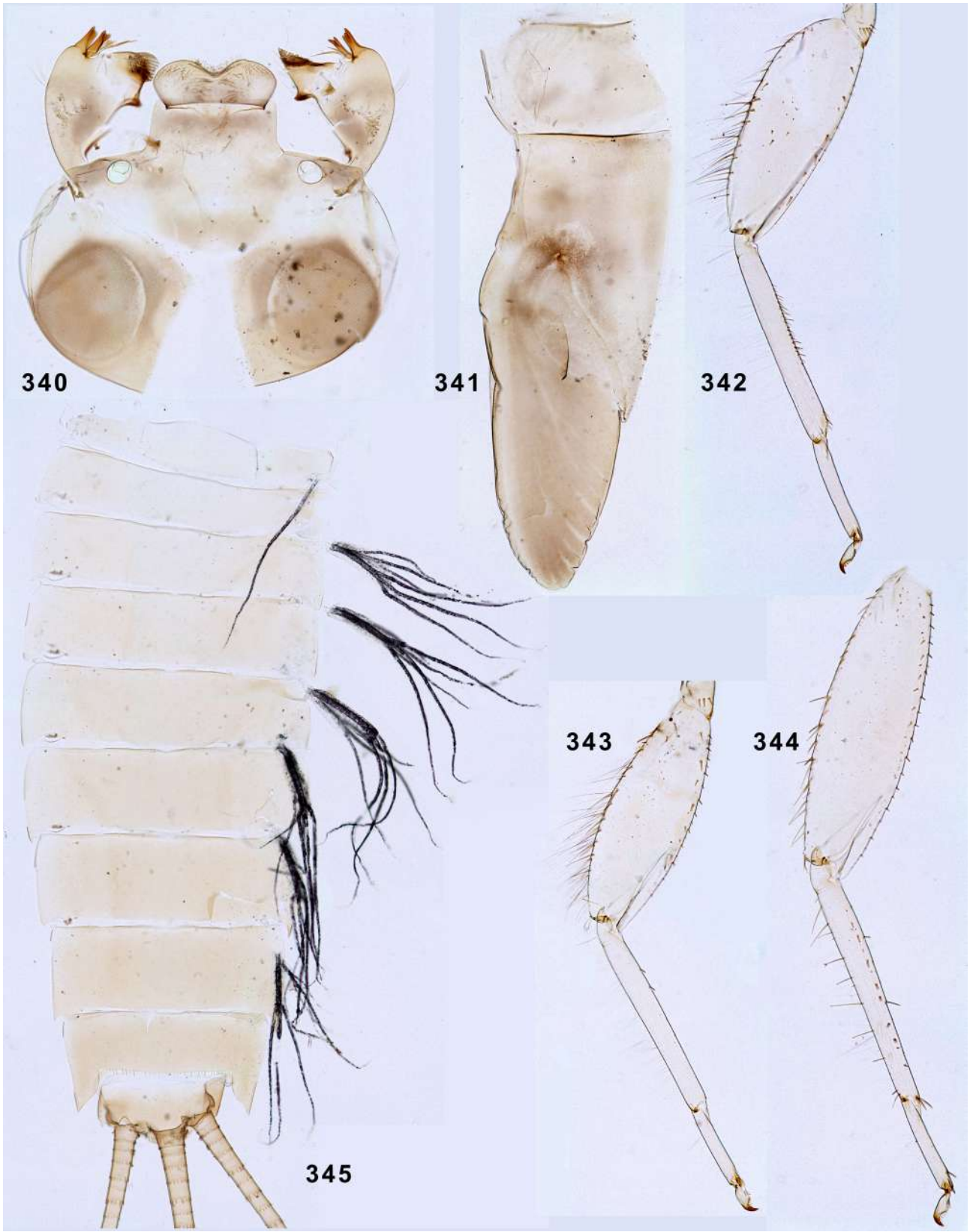
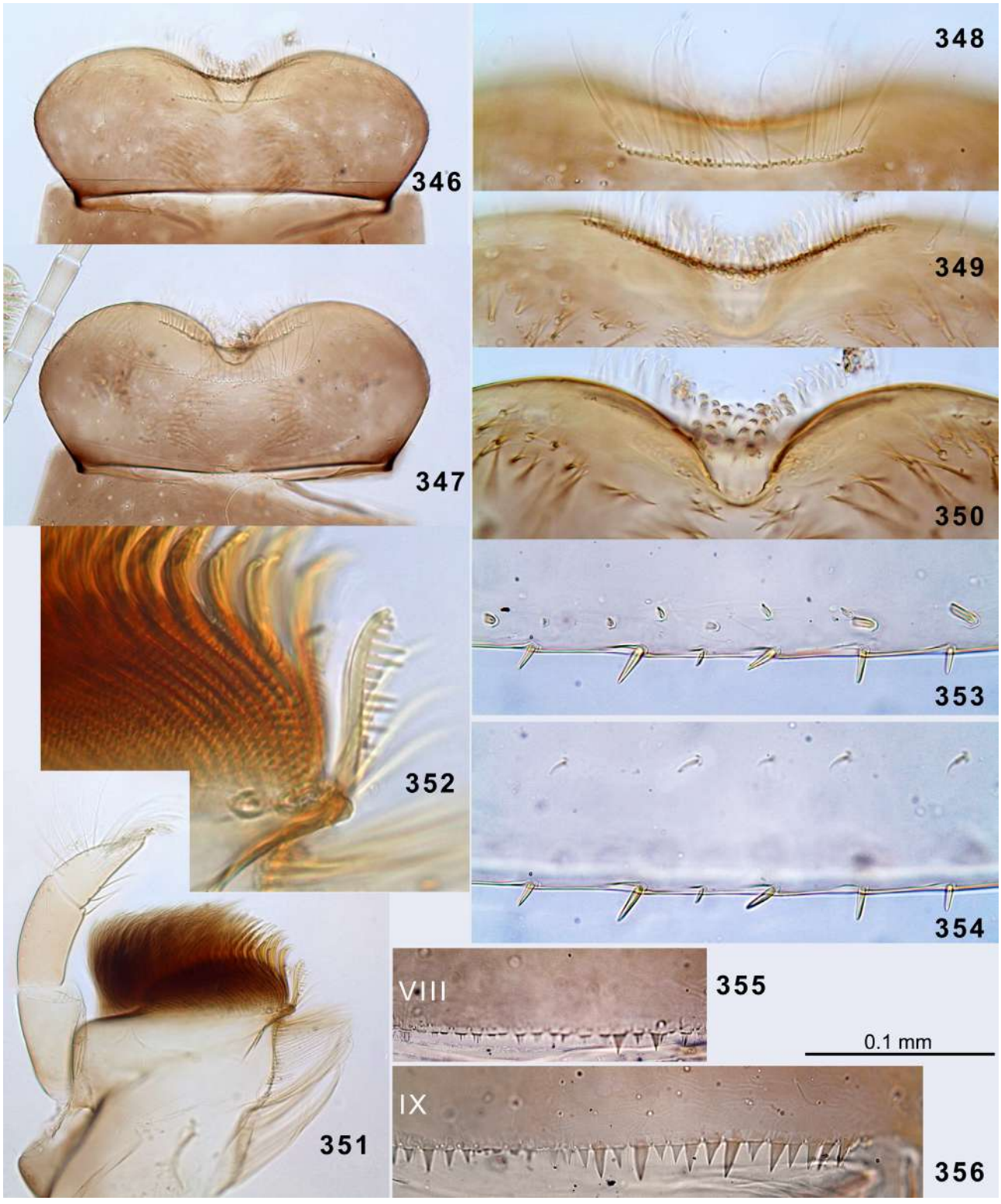


FIGURE 339. *Choroterpes* (*Euthraulus*) *nambiyarensis*, eggs.



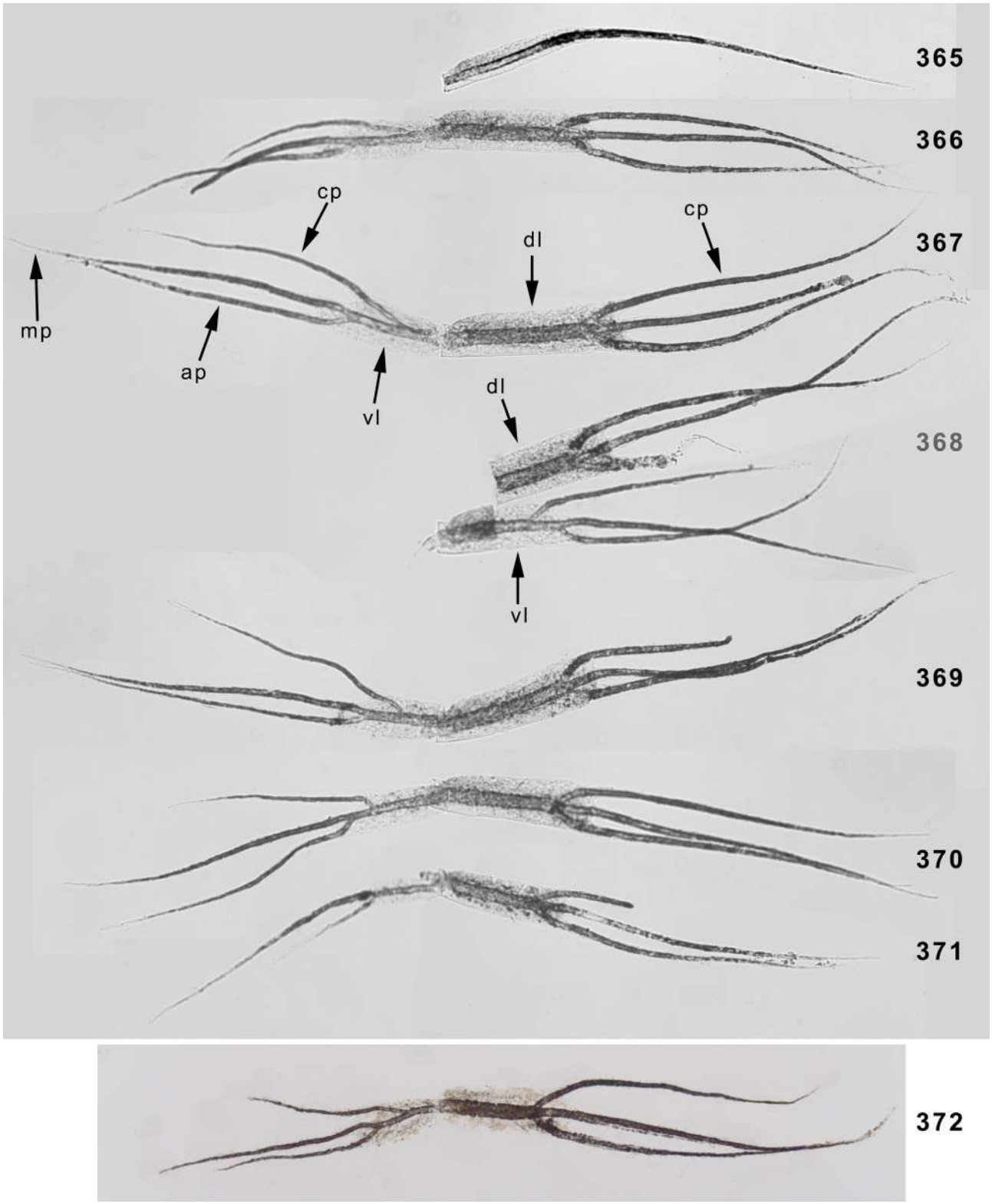
FIGURES 340–345. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n., exuviae of male larva (holotype) with the same magnification: 340, head; 341, half of pronotum and mesonotum; 342–344, fore, middle and hind legs; 345, abdominal terga with right tergalii.



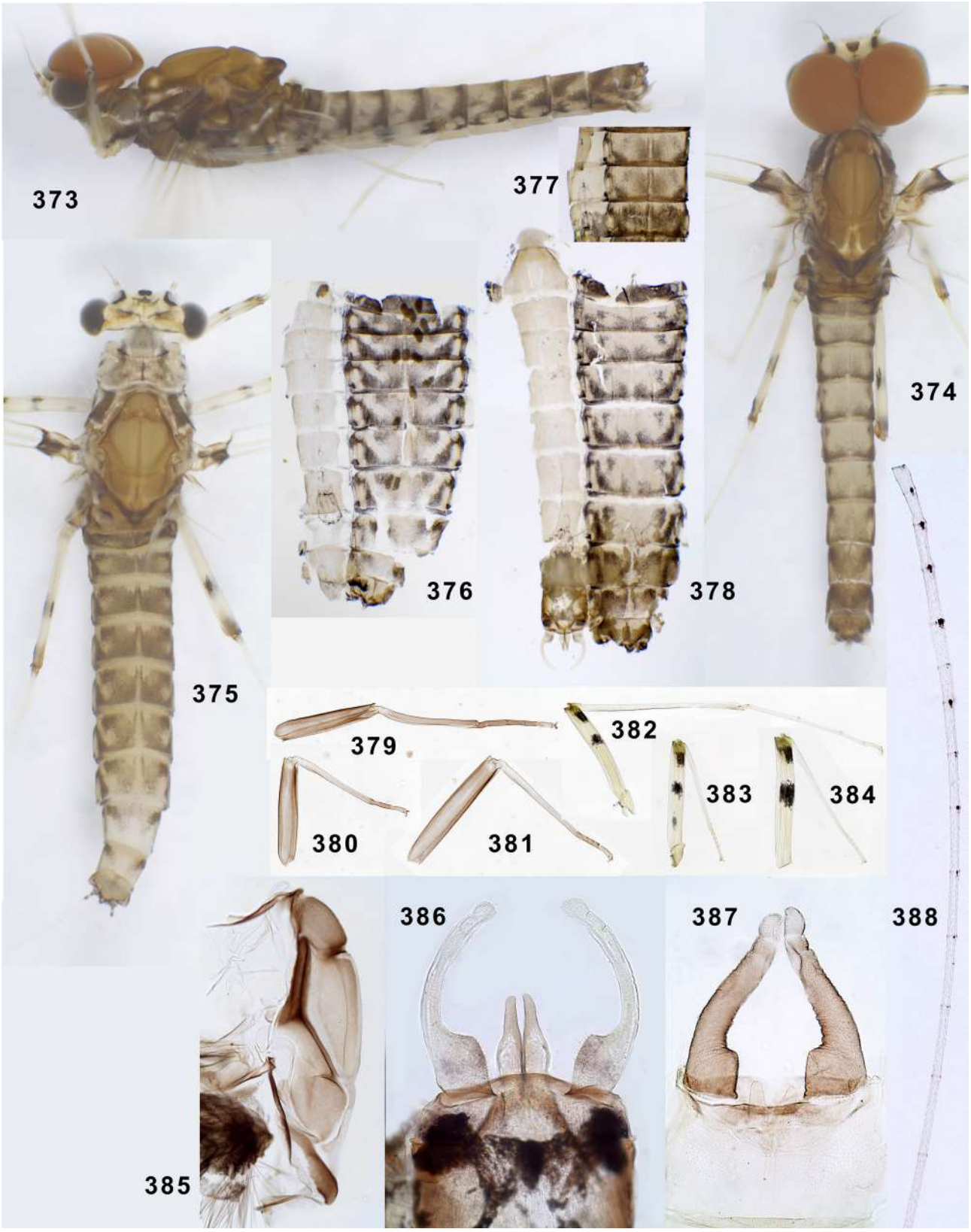
FIGURES 346–356. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n., larvae. 346–347, labrum; 348–350, apex of labrum with focus on proximal transverse setal row (348), distal transverse setal tow (349) and median emargination (350); 351–352, maxilla; 353–354, middle portion of inner margin of hind femur with focus on anterior side (353) and posterior side (354); 355–356, posterior margins of abdominal terga VIII and IX (353–356, holotype).

FIGURES 357–359. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n., exuviae of larval fore, middle and hind femora with focus on anterior side (holotype).

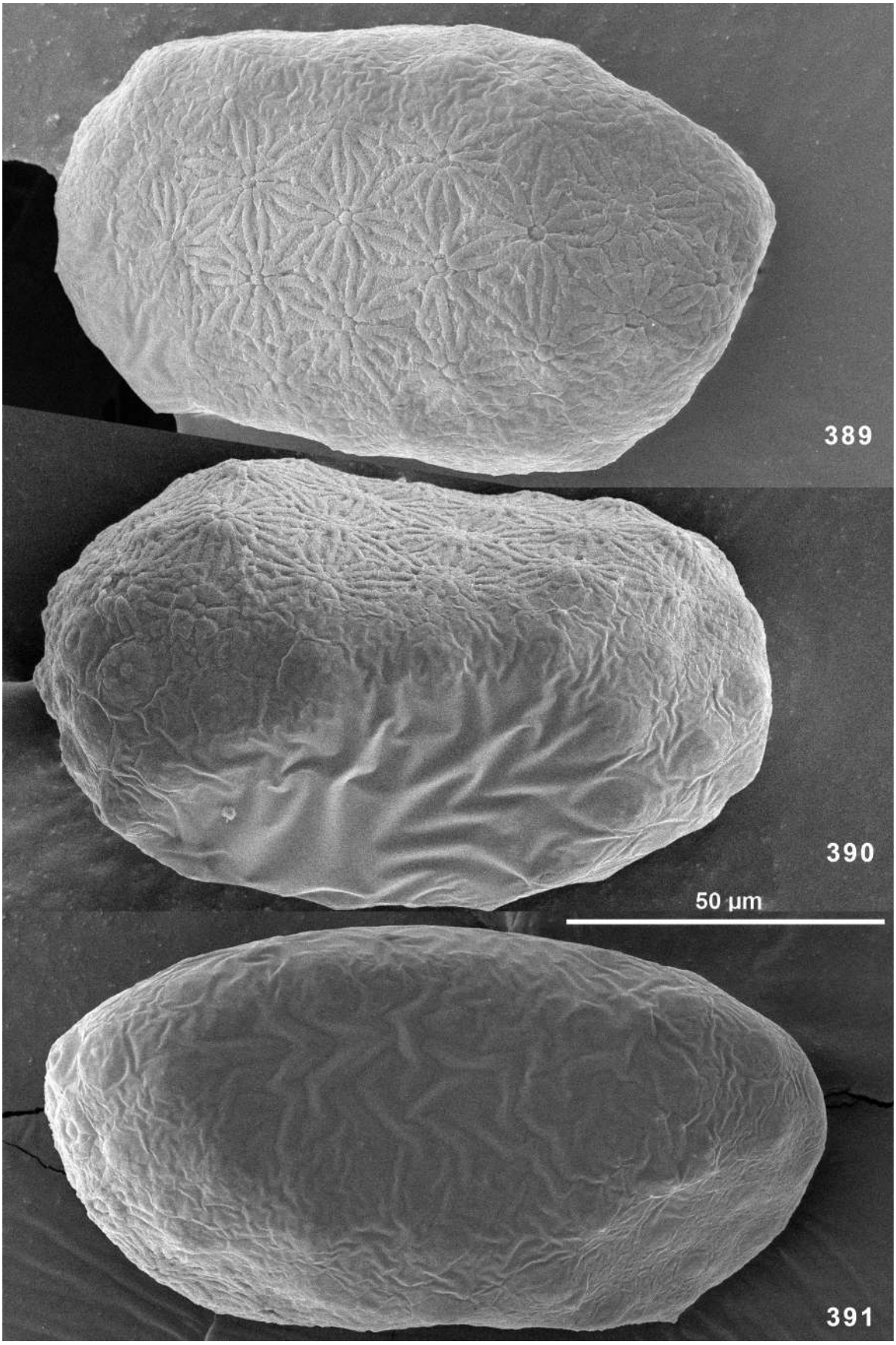
FIGURES 360–364. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n., exuviae of larval tibiae (holotype): 360–362, fore, middle and hind legs; 363–364, hind tibia with focus on anterior and posterior sides.



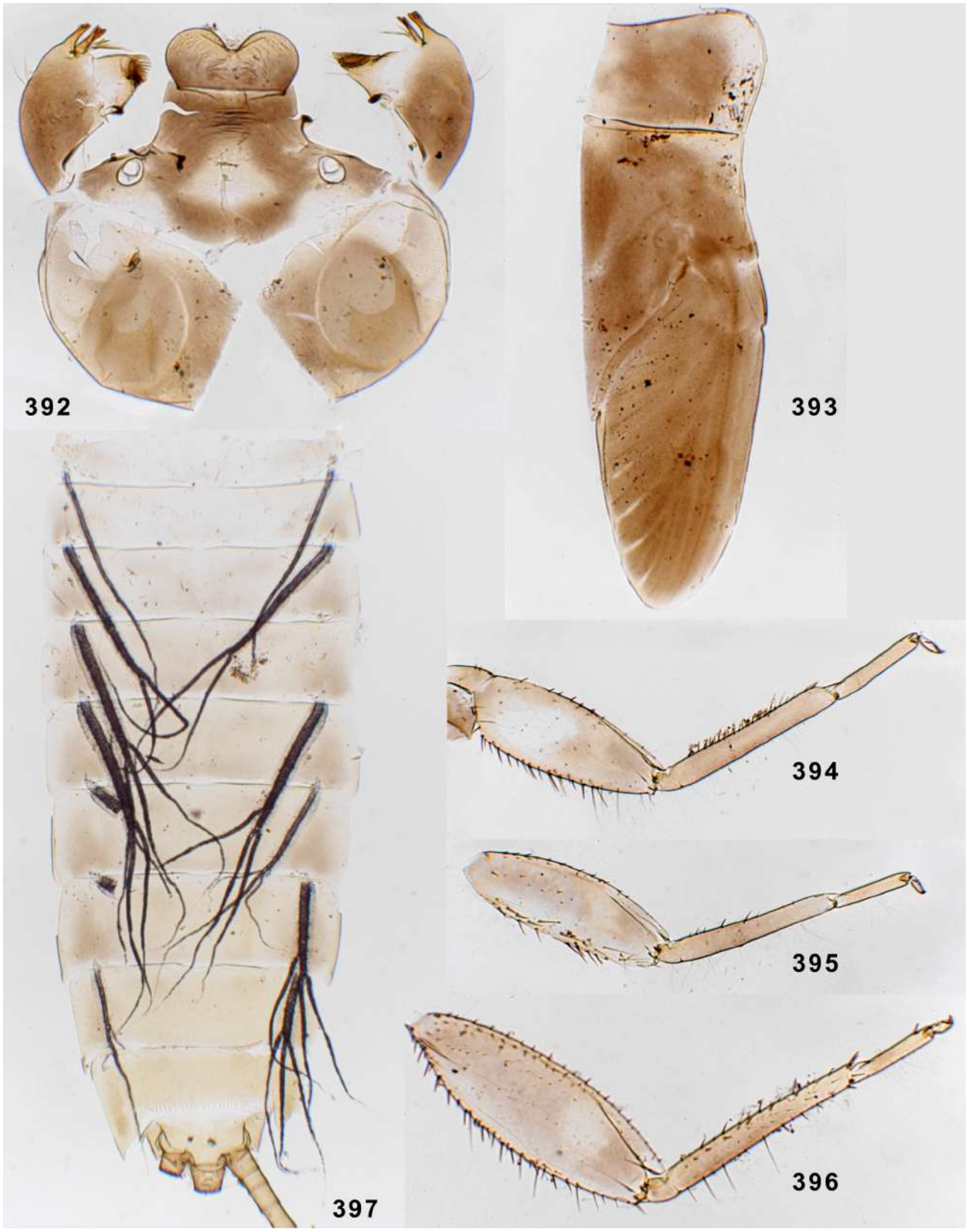
FIGURES 365–372. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n., tergalii. 365–371, tergalii I–VII of paratype; 372, tergalius VII of holotype.



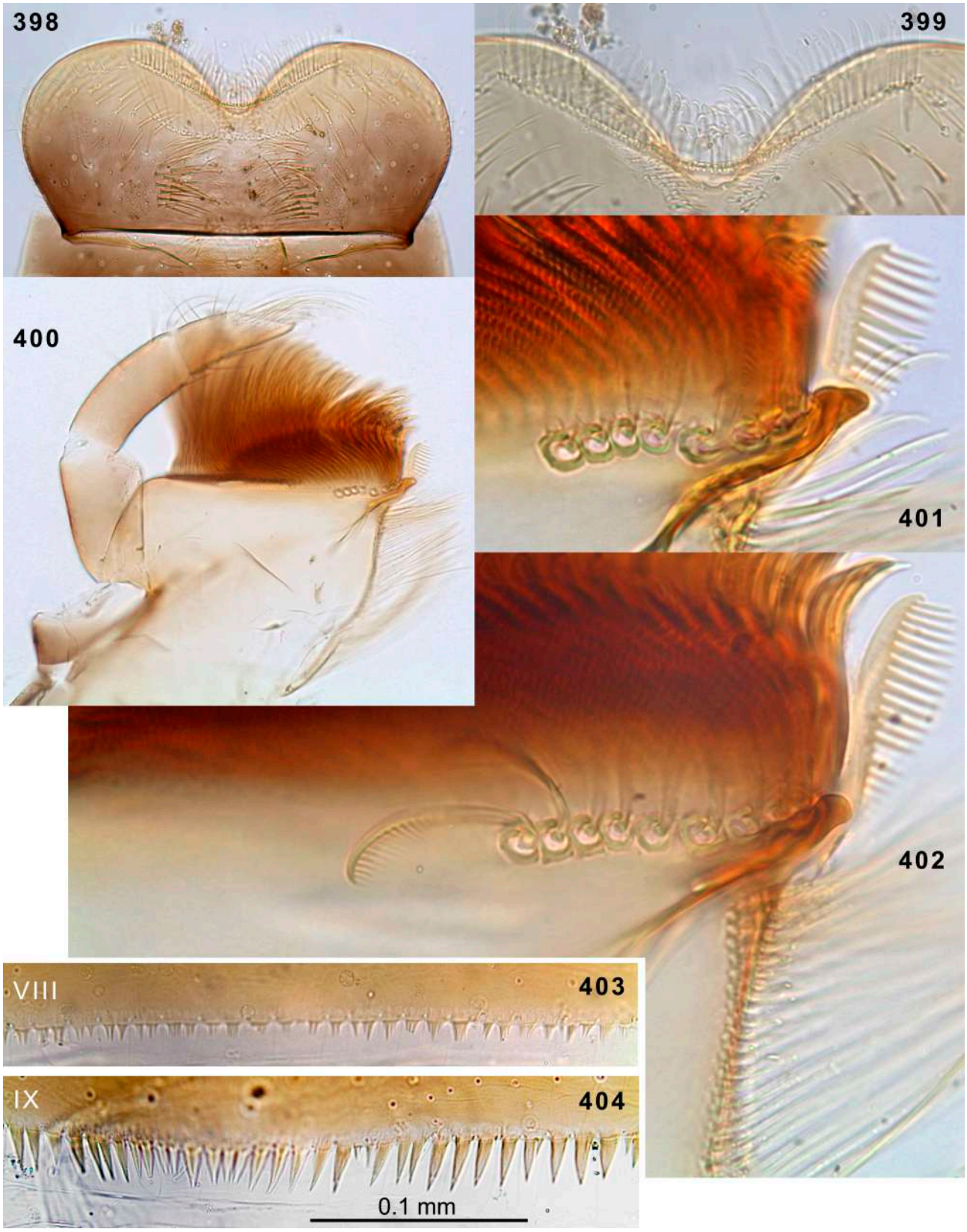
FIGURES 373–388. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n. 373–374, male imago; 375, female imago; 376, abdomen of female imago; 377, abdominal segments V–VII of male imago; 378, abdomen of male imago; 379–381, subimaginal exuviae of male fore, middle and hind legs; 382–384, fore, middle and hind legs of male imago; 385, subimaginal exuviae of half of mesonotum; 386, genitalia of male imago; 387, its subimaginal exuviae; 288, caudalius of male imago (378–388, holotype).



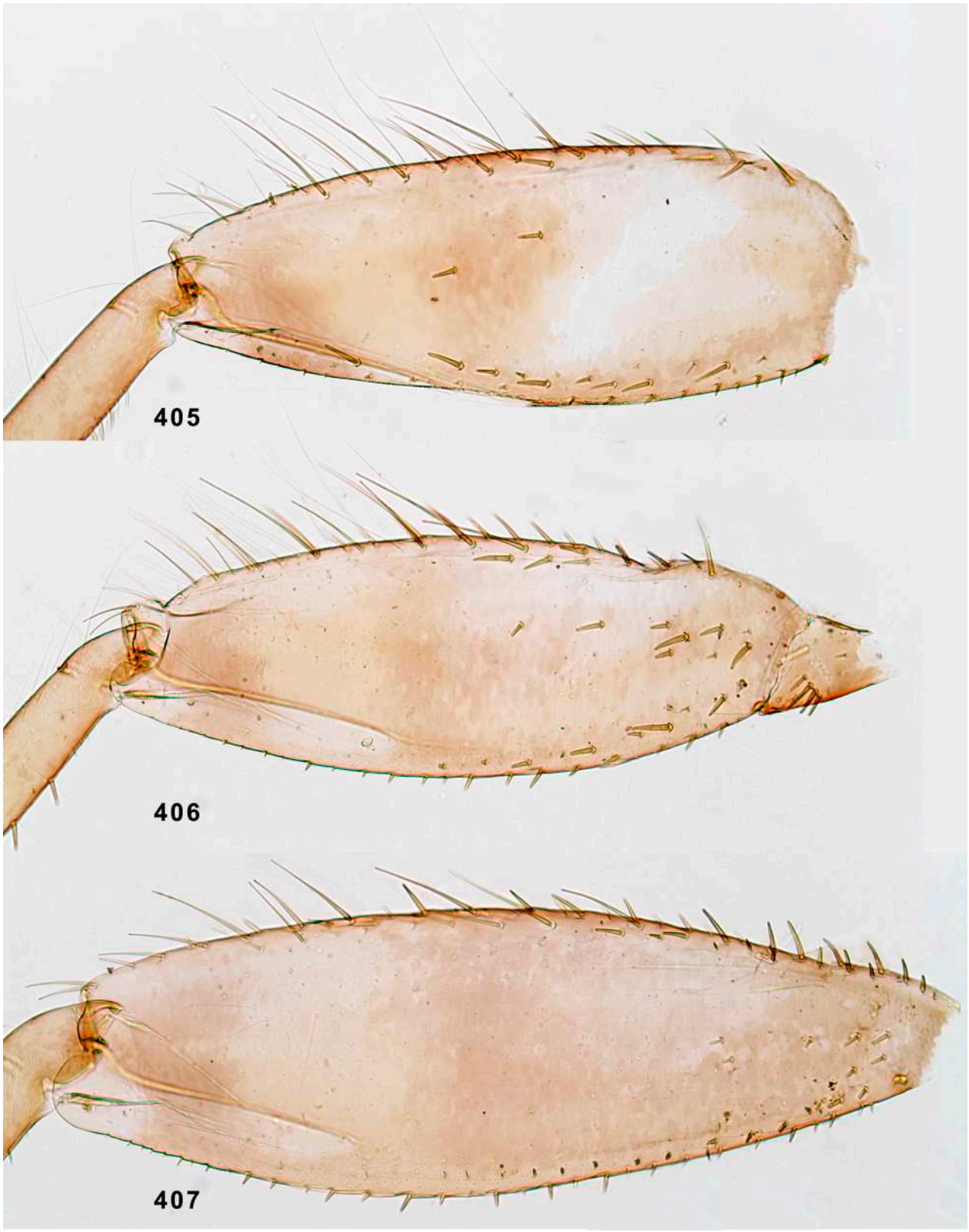
FIGURES 389–391. *Choroterpes* (*Euthraulus*) *angustifolius* sp. n., eggs.



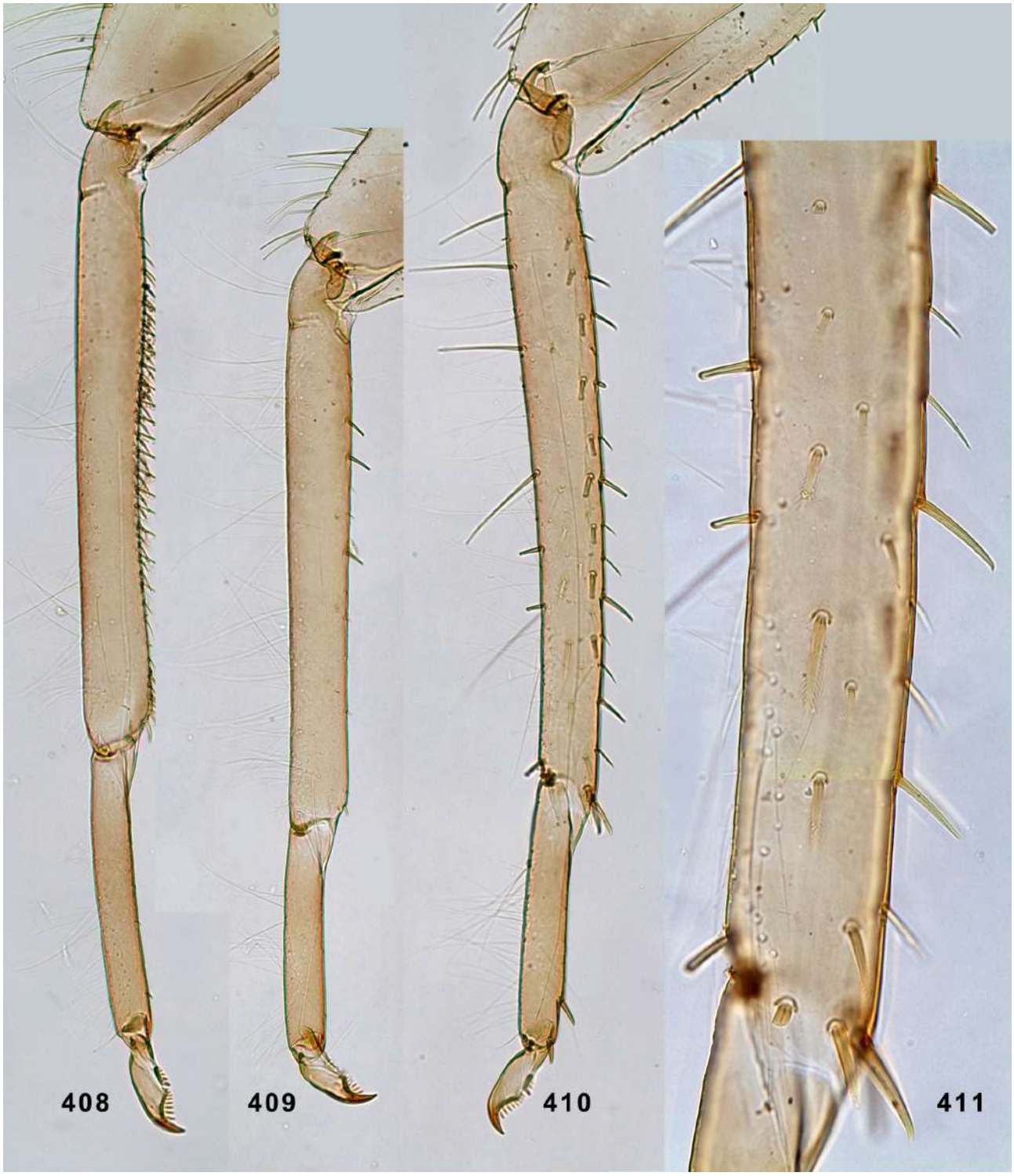
FIGURES 392–397. *Choroterpes* (*Euthraulus*) *nandini*, exuviae of male larva with the same magnification: 392, head; 393, pronotum and mesonotum; 394–396, fore, middle and hind legs; 397, abdominal tergum with tergalii.



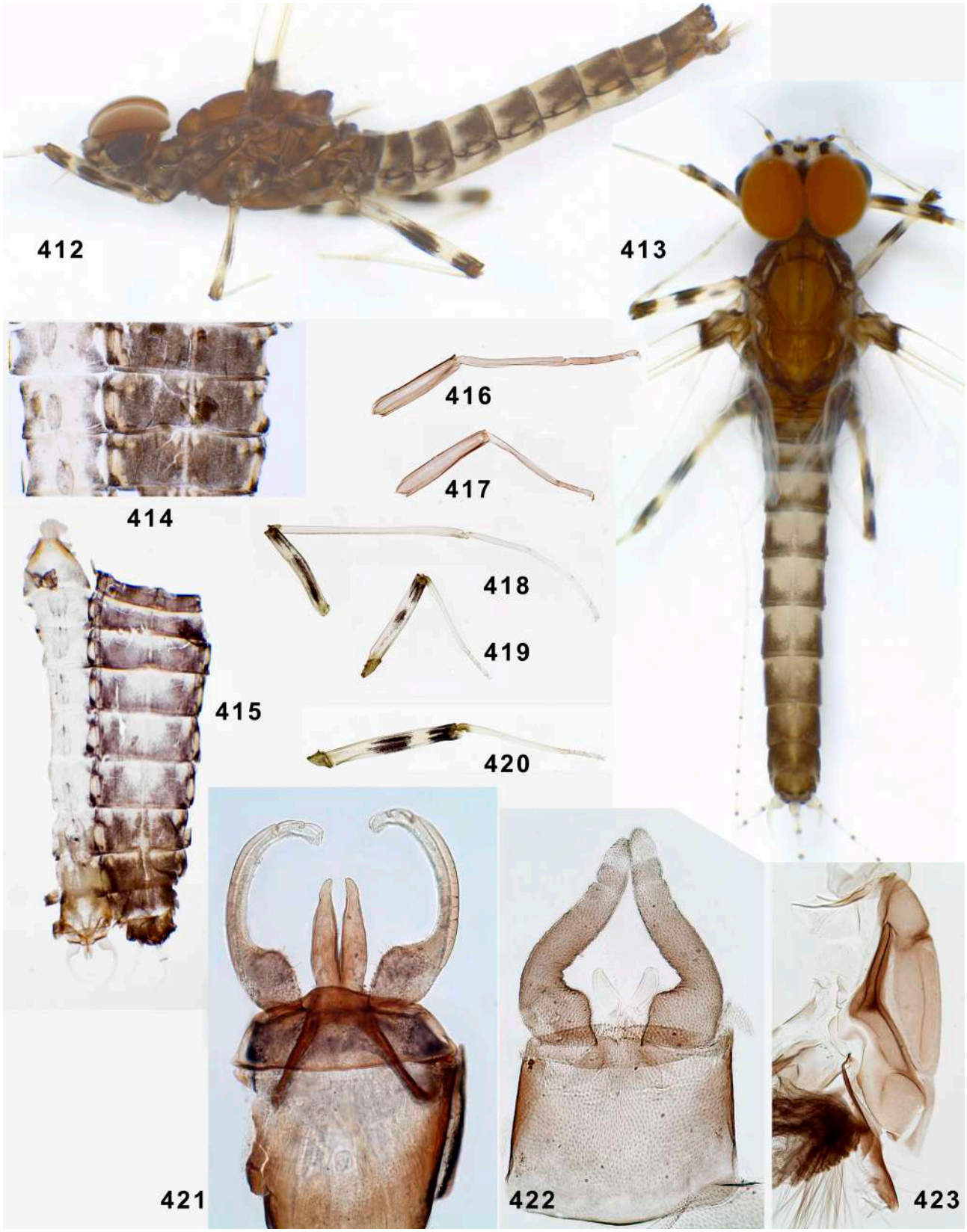
FIGURES 398–404. *Choroterpes* (*Euthraulus*) *nandini*, larvae. 398–399, labrum; 400–402, maxillae; 403–404, posterior margins of abdominal terga VIII and IX.



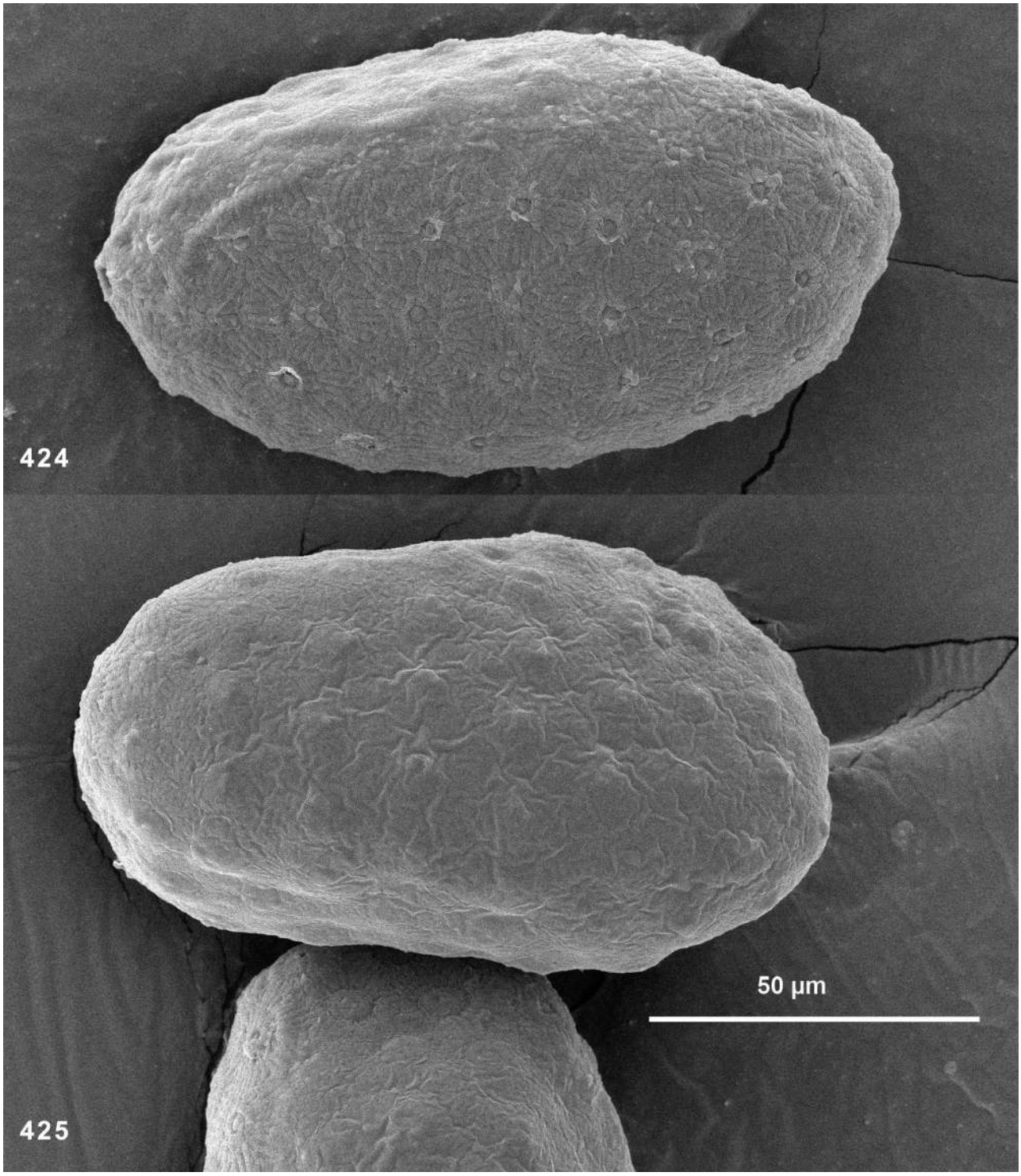
FIGURES 405–407. *Choroterpes* (*Euthraulus*) *nandini*, larval exuviae of fore, middle and hind femora, with focus on anterior side.



FIGURES 408–411. *Choroterpes* (*Euthraulus*) *nandini*, larval exuviae of tibiae, tarsi and claws. 408–410, fore, middle and hind legs, with focus on anterior side; 411, hind tibia with focus on posterior side.



FIGURES 412–423. *Choroterpes* (*Euthraulus*) *nandini*. 412–413, male imagines; 414, abdominal segments IV–VI of female imago; 415, abdomen of male imago; 416–417, subimaginal exuviae of male fore and middle legs; 418–420, fore, middle and hind legs of male imago; 421, genitalia of male imago; 422, their subimaginal exuviae; 423, subimaginal exuviae of half of mesonotum.



FIGURES 424–425. *Choroterpes* (*Euthraulus*) *nandini*, eggs.