

# A NEW EXTRAORDINARY GENUS OF RICANIIDAE FROM THE SEYCHELLES (HEMIPTERA: FULGOROMORPHA)

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**Abstract.**— A new extraordinary monotypic genus of Ricaniidae is described from Mahé Island (The Seychelles archipelago) with a new species *Mahecania trinigromaculata* gen. et sp. nov. Photographs, drawings and SEM images are presented. Discussion is provided on unique and rare characters presented for this genus.



**Key words.**— Seychelles, Ricaniinae, morphology, taxonomy, wing venation

## INTRODUCTION

The Seychelles archipelago comprising 115 mid-oceanic islands (Ministry of Foreign Affairs of the Republic of Seychelles). They are a mixture of 73 coral islands and 42 granitic islands, isolated and scattered across the area of 454 km<sup>2</sup> in the western Indian Ocean. The Seychelles are about 1600 km from the east African coast and 2900 km from south-west coast of India. The coral islands (Outer Seychelles) are recent (e.g. Aldabra group of an age of 15,000 years) in contrast to major granitic island which are geologically very ancient (formed more than 75 million years ago) and represent mainly Gondwanic fragments (Plummer and Belle 1995), scattered within a 60 km radius from the largest (8 km × 27 km) and the highest (905 meters) granitic island Mahé.

The fauna of Ricaniidae of the granitic Seychelles is relatively rich and represented by 5 genera. From these, 3 are endemic: *Armilustrium*, Distant, 1917 (with *A. gardineri* Distant, 1917 and *A. scotti* Distant, 1917), *Carmentalia*, Distant, 1917 (with *C. biformis* Distant, 1917) and *Neoprivesa*, Distant 1917 (with *N. fuscovaria* Distant, 1917) and 2 others with non-endemic and endemic species. These are *Pochazoides* Signoret, 1860 (with *P. infusca* (Distant, 1909)) and *Privesa* Stål, 1862 (with *P. melanaria* Distant, 1917).

*Pochazoides* is distributed in Madagascar and East Africa and comprises 16 recent and extant species

(Stroiński 2007). *Privesa* occurs in Madagascar, Africa and Mascarenes Islands and includes 13 species.

The new genus and species described below is endemic for the granitic Seychelles (Mahé) and clearly differs from all known ricaniids genera.

## MATERIALS AND METHODS

**Material.** The studied material comes from the entomological collections of the IRSNB – Institut royal des Sciences naturelles de Belgique, Bruxelles (J. Constant).

**Preparations and illustration.** The abdomen of the specimen examined were cut off and cleared for 30 minutes in a warm (50°C) 10% KOH solution with a few drops of black chlorazol (CAS No. 1937–37–7) for dyeing the ectodermic genital ducts based on the method introduced by Carayon (1969) and Bourgoïn (1993). Dissections and cleaning of the genital structures were done in distilled water. Final observations and drawings were made in glycerol using a camera lucida attached to Olympus microscopes (SZH10 and BX50). The photos of the habitus were taken using a stereoscopic microscope Leica MZ 16 with IC 3D camera; images were produced using Synoptics Automontage software. The photos of genital structures were taken using a light microscope Leica DM5500B with Leica DFC490 camera; final images were created using the

Helicon 5.0 software and Adobe Photoshop. The SEM photographs of uncoated specimens were taken in the Laboratory of Scanning Microscopy, MIZ PAS (Warsaw), using a scanning microscope HITACHI S-3400N under Low Vacuum conditions.

Measurements and abbreviations:

The following proportions of measurements were made and abbreviations used in this study:

- Total length – measured (in dorsal view) from the apex of head to the apex of tegmina,  
 A/B – width of vertex measured at the anterior margin/length of vertex at midline,  
 C/E – width of frons at upper margin/length of frons at midline,  
 D/E – maximum width of frons/length of frons at midline,  
 F/B – length of pronotum in mid line/length of vertex at midline,  
 G/F – length of mesonotum/length of pronotum at midline,  
 G/B+F – length of mesonotum/cumulative length of vertex and pronotum at midline,  
 G/H – length of mesonotum at midline/width of mesonotum between lateral angles,  
 I/J – length of tegmen measured from base to the apical margin in median portion/width of tegmen measured from the apex of clavus to the anterior margin.

The nomenclature of the female genitalia follows Bourgoïn (1993). Vein nomenclature after the interpretation proposed by Szwedo & Żyła (2009) and Nel *et al.* (2012).

## TAXONOMY

*Mahecania* gen. nov.  
(Figs 1–48)

**Type species.** *Mahecania trinigromaculata* sp. nov., here designated.

**Diagnosis.** *Mahecania* gen. nov. differs from all other ricanids genera by the tegmen costal area extremely narrow, without transverse veinlets along costal margin, and strongly widened, about level of claval apex, with a few transverse veinlets. Other diagnostic characters are as follow: hind wings without pre-costal cell, first metatarsomere with teeth organized in triangular zone, posterior margin of gonoplac with 3–4 rows of small teeth.

**Etymology.** The generic name is a combination of two words: Mahé (Island – *locus typicus*) and the ending of the generic name *Ricania*. Gender: feminine.

**Description.** **Head.** Head with compound eyes (in dorsal view) about as wide as mesonotum (Figs 2, 4–5).

Vertex transverse, distinctly wider than long in mid line, with all margins well carinated and elevated; disc of vertex with median carina, not reaching posterior margin (Figs 2–7, 10).

Frons (Figs 3, 9–10) at upper margin shorter than high in midline, widest below level of antennae; lateral margins carinated, covering base of pedicel, weakly incised near the level of ocelli, distinctly curved to frontoclypeal suture in lower part. Frontal disc smooth, with 3 carinae separated basally, in median upper part with 2 oblique ridges. Compound eyes, with small callus at postero-ventral margin, distinctly elongated; posterior margin of eye reaching posterior margin of pronotum (Figs 2, 4–7). Ocelli present.

Pedicel elongate, a little wider apically, with setae and plate organs on distal surface (Figs 12–16).

Clypeus distinctly narrower than frons, with weakly visible median carina, (Figs 3, 9). Rostrum with apical segment much shorter than subapical one, reaching hind coxae.

**Thorax.** Pronotum as long as vertex in midlength; disc of pronotum with median carina and two lateral impressions (Figs. 2, 4, 5–7).

Mesonotum triangular, distinctly longer in mid line than combined length of vertex and pronotum in mid line; median carina, lateral and antero-lateral carinae present; median carina and lateral carinae connected anteriorly; median reaching scutellum, lateral carinae reaching posterior margin; anterolateral carinae separated, short and not surpassing level of lateral angles of mesonotum; lateral angles placed before midlength (Figs 2, 4, 5–8).

Tegmina membranous, hyaline, flat and elongate, with distinct venation; costal and claval margins straight and subparallel, posterior margin weakly arcuate with inflexion point in the upper part; apical angle placed distad to claval angle, claval and apical angles broadly rounded; apex of clavus about at level of costal apex. Costal area extremely narrow without transverse veinlets alongside costal margin except the strongly widened apex (about level of claval apex) with a few transverse veinlets. Costal cell distinctly wider than costal area, without transverse veinlets (Figs 1, 21–26).

Basal cell relatively narrow and elongate more than twice as long as wide. Vein Sc+RA and RP branching from basal cell by short common stalk; vein Sc+RA forked a little before RP fork, vein M leaving basal cell with common stem with first fork a bit before fused point of claval veins Pcu and A1;  $M_{3+4}$  forked before  $M_{1+2}$  fork; vein CuA single (Figs 1, 21–26).

Tegmina with distinct apical line of crossveins, nodal line absent, apical cells longer than broad; base of tegmen without veinlets, median part with net of irregular transverse veinlets. Claval veins Pcu and A1 fused after the half of claval length and connected with

posterior margin; transverse veinlets present between CuP-Pcu and Pcu+A<sub>1</sub>-CuP; veinlets between Pcu and A<sub>1</sub> absent.

Hind wings hyaline, shorter than tegmen, without precostal cell; two transverse veinlets *rp-m* and *m-cua* present (Fig. 27).

Pro- and mesofemora rectangular in cross section, about as long as tibiae, both tibiae square in cross section. Metafemur almost square in cross section, shorter than metatibia; metatibia partly flattened, especially distally, subrectangular, weakly widened distally. Metatibiae with 2 lateral spines and arcuate row of 5 similar sized, well developed apical teeth. First metatarsomere longer than cumulative length of second and third metatarsomere, with teeth organized in triangular zone (Figs 17–20).

**Male.** Unknown.

**Female genitalia.** Pregenital sternite with well developed, elongately-oval lateral lobes; anterior and posterior margins almost straight (Figs 33–34, 39).

Anal tube (in lateral view, Figs 28–29, 31, 41) about as long as wide, not exceeding midlength of gonoplac; ventral margin weakly arcuate, anus placed at about midlength. Anal tube (in dorsal view, Figs 30, 32, 40) oval; anterior margin weakly concave, posterior margin in median portion sharply convex, lateral margins weakly arcuate.

Gonoplac unilobate, in general shape triangular in lateral view, oriented ventrad; posterior margin with 3–4 rows of small teeth; posterior, ventral part partly membranous (Figs 29, 31, 33–38, 42). Gonapophysis VIII horizontally flattened, with 4 large teeth at posterior margin; huge endogonocoxal process with spiniferous microsculpture, tapering apicad, reaching apex of gonapophysis VIII (Fig. 44). Gonapophyses IX and gonospiculum bridge well developed as in Figs 45–46.

Bursa copulatrix of two pouches connected by very short ductus; first pouch elongate, second pouch oval, both without cells and sclerotised ornamentation. Spermatheca well developed; ductus receptaculi elongate and ribbed, apically with small and smooth bulla; diverticulum ductus distinctly shorter than ductus receptaculi, 1/3 smooth, remaining part ribbed (Figs 47–48).

**Distribution.** Seychelles: Mahé Island.

*Mahecania trinigromaculata* sp. nov.  
(Figs 1–48)

**Etymology.** The specific species name is derived from the combination of three Latin words meaning ‘with three black dots’ and refers to the characteristic coloration of the tegmina.

**Diagnosis.** Only one species in the genus. See diagnosis of the genus.

**Description.** Total length 7.2 mm.

**Head.** Vertex: proportion A/B = 2.27; anterior margin (in dorsal view) arcuate; lateral margins almost straight and weakly subparallel; posterior margin distinctly arcuate and partly straight in median portion; posterior margin more elevated than anterior margin. Frons: proportion C/E = 0.83; proportion D/E = 1.33; median carina reaching almost frontoclypeal suture, lateral carinae arcuate, a little shorter than median carina; median part of frontal disc with 2 oblique ridges.

**Thorax.** Pronotum: proportion F/B = 1.00; disc of pronotum delicately rugose; anterior margin widely arcuate; posterior margin weakly concave. Mesonotum: proportion G/F+B = 2.27, proportion G/F = 4.54, proportion G/H = 1.00; all carinae well visible; scutellum with sharp apex. Tegmina: proportion I/J = 2.65; Sc+RA with 6 terminals, RP with 3 terminals, M with 9 terminals. Metatibia with 7 apical teeth; first metatarsomere with 9–10 teeth.

**Male genitalia.** Unknown.

**Coloration.** Vertex, pronotum and mesonotum brownish; frons, clypeus and legs yellowish; Tegmina hyaline with light brownish irregular patches in apical part and 3 black-brown dots near apical margin; anal lobe smoked brownish. Abdominal sternites yellowish, tergites orange; genital capsule brownish.

**Type material.** Holotype ♀: [Coll. R.I.Sc.N.B. Seychelles: I. Mahé riv. Caiman (Anse Boileau) 22-X-1976 (Stat. 36) G. Marlier] – (IRSNB).

**Distribution.** Seychelles: Mahé Island.

## DISCUSSION

*Mahecania trinigromaculata* gen. et sp. nov., has one exceptional feature distinguishing it from all other Ricaniidae. Its costal area is extremely narrow, without transverse veinlets along costal margin, and widened (about level of claval apex) distally with few transverse veinlets. Interestingly, this feature often appears in Lophopidae but this is the first recorded appearance in Ricaniidae.

The lack of precostal cell on hind wings is another unusual feature among Ricaniidae. The presence of the precostal cell on the anterior margin of hind wing is the most important synapomorphy proposed by Shcherbakov (1982) for Ricaniidae. However, this feature is absent in some ricaniids: macropterous *Tarundia* Stål, 1859 from Mauritius and sub-brachypterous Ricaniidae from Madagascar – *Globularica* Stroiński *et al.*, 2010, *Cyamosa* Stroiński *et al.*, 2010, *Nasatus* Stroiński *et al.*, 2010.

Also interesting are that the distal spines of the basitarsomere are organized in a triangular patch, instead of a row. They are recorded from a few

Ricaniidae such as *Isobium* Melichar, 1906 (Madagascar), some taxa from the *Pochazoides* generic group (Madagascar, revision in. prep.) and in the genus *Pochazina* Melichar, 1898 from the Philippines.

The posterior margin of the gonoplac with 3–4 rows of small teeth is also unique for Ricaniidae, which usually has a row of teeth. In contrast, the genus *Mulvia* Stål, 1866 has posterior margin thickened, without teeth and the African genus *Meliprivesa* Metcalf, 1952 possesses more than one single row (2–5) of teeth.

In summary, the unique features of *Mahecania* and characters shown in publications (Gnezdilov 2009, Stroiński *et al.* 2011) call into question our current understanding of the definition of Ricaniidae and reveal that our knowledge of the family is still unsatisfactory.

## ACKNOWLEDGEMENTS

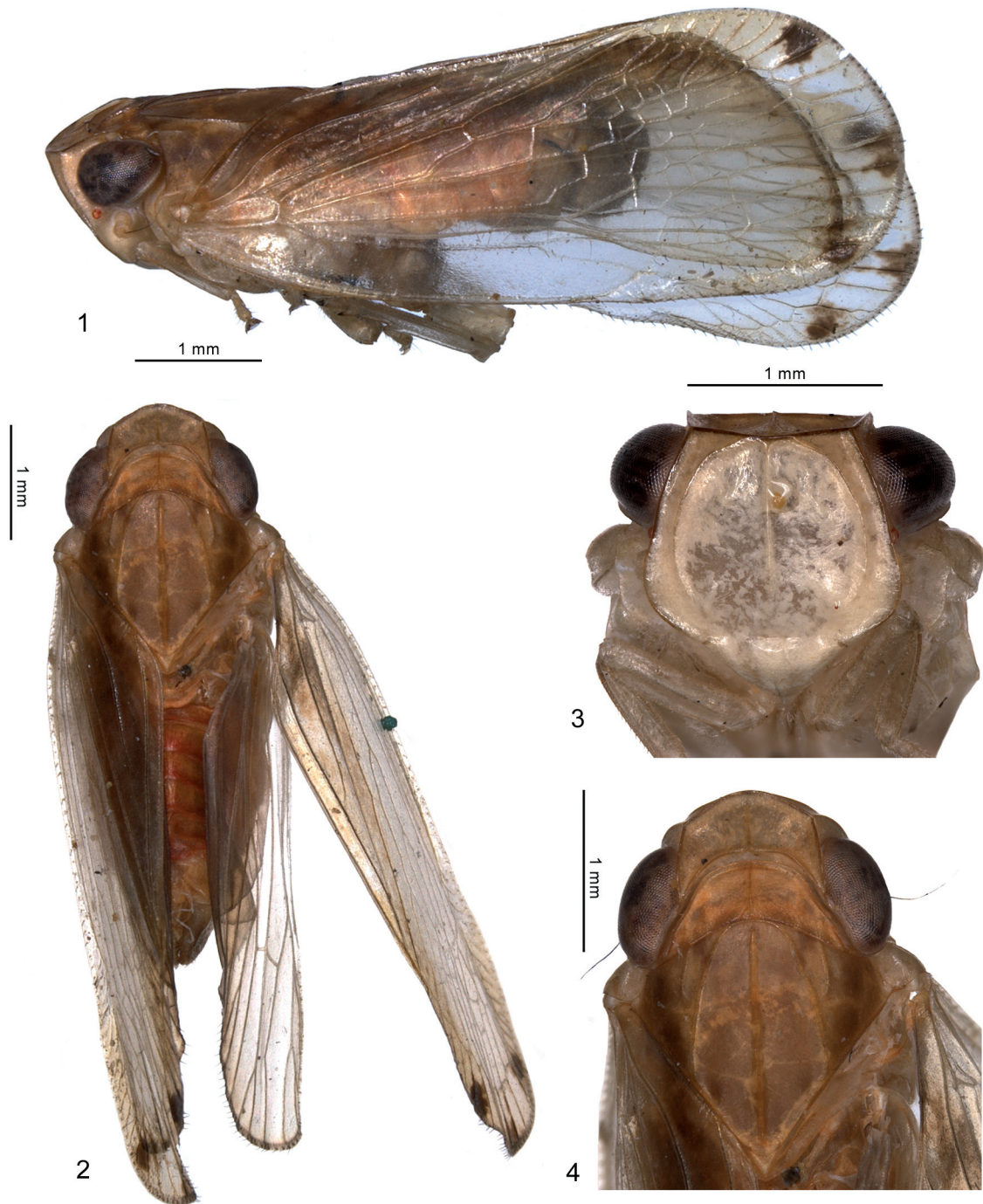
I want to express my thank to Jerome Constant (Institut royal des Sciences naturelles de Belgique, Bruxelles for the privilege of studying materials during my visit in the collection. I wish also thank Prof. Charles Bartlett (University of Delaware, Department of Entomology and Wildlife Ecology, USA), Dr. Dariusz Świerczewski (Jan Długosz University, Department of Zoology and Animal Ecology) and Dr Jacek Szwedko (MIIZ) for their valuable comments on the manuscript.

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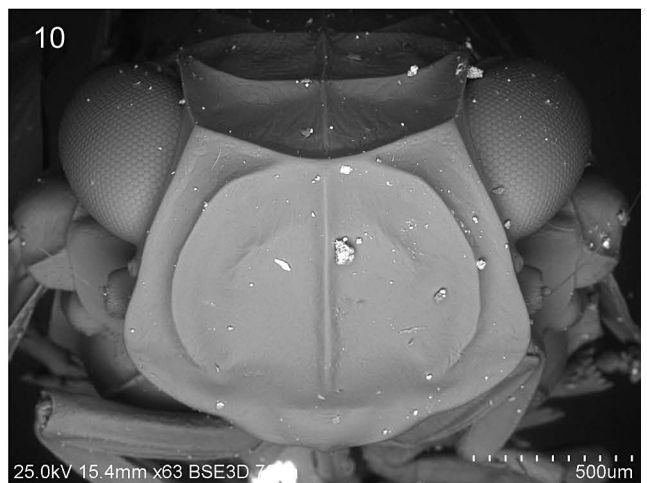
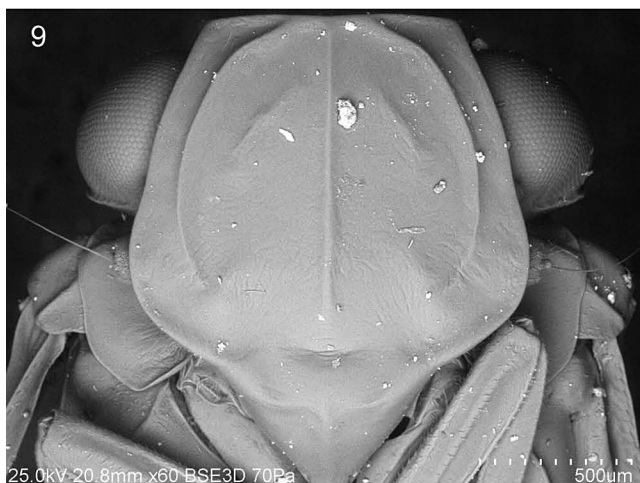
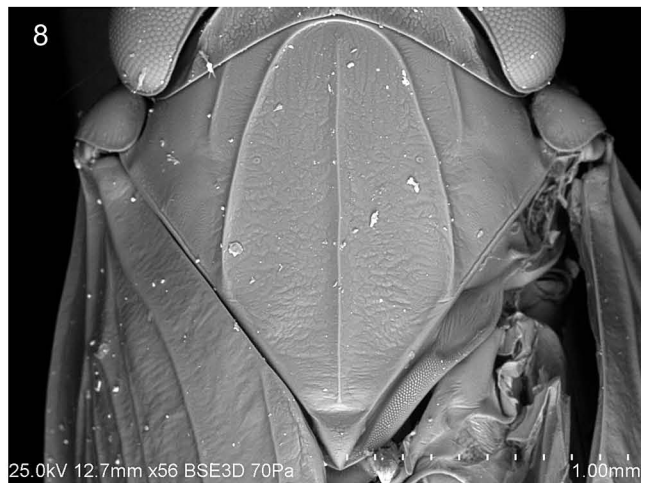
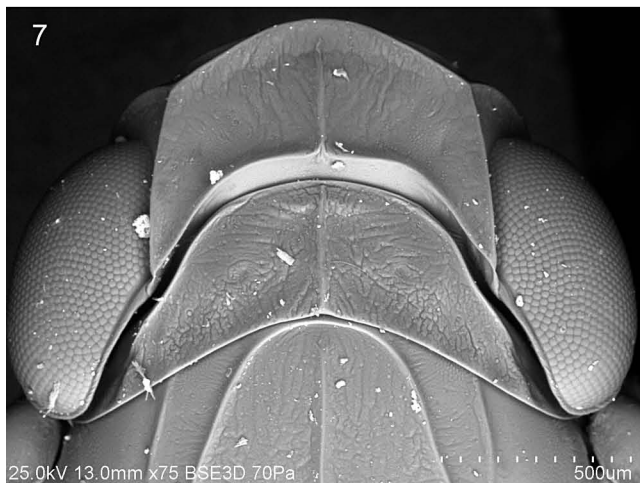
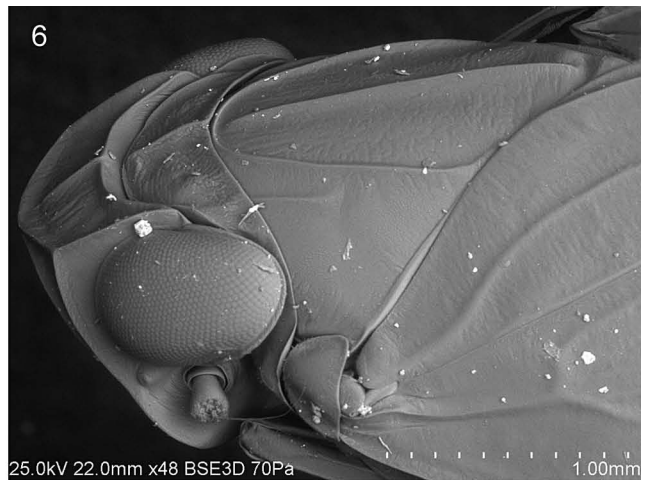
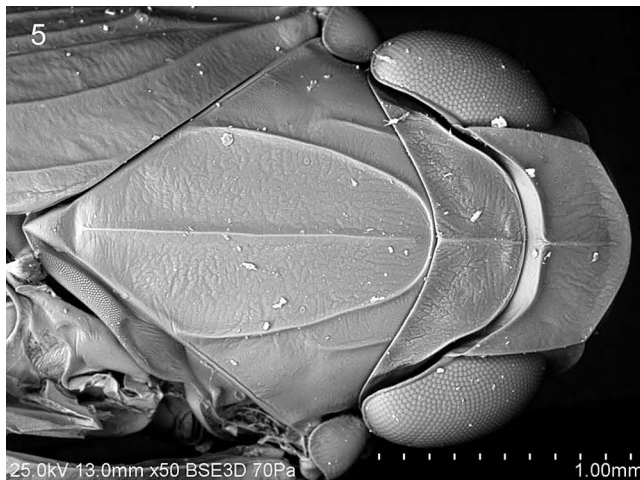
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Received: January 28, 2013

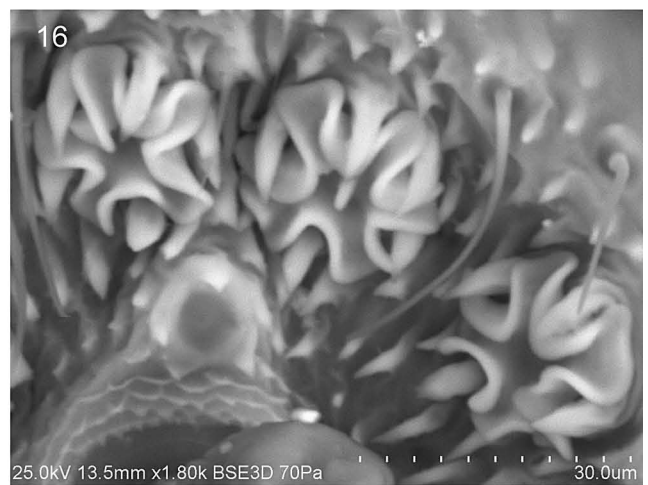
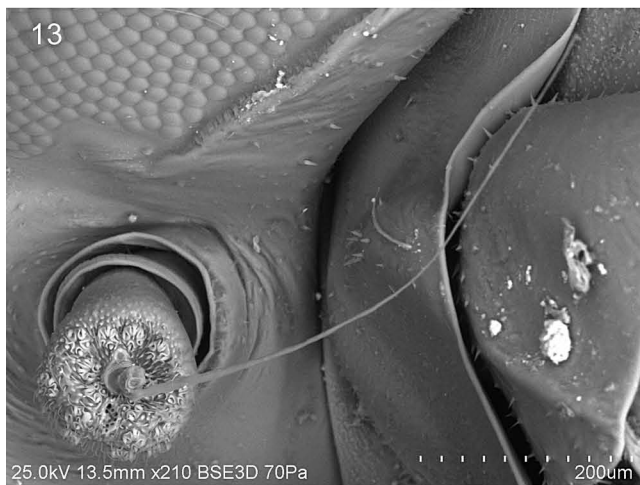
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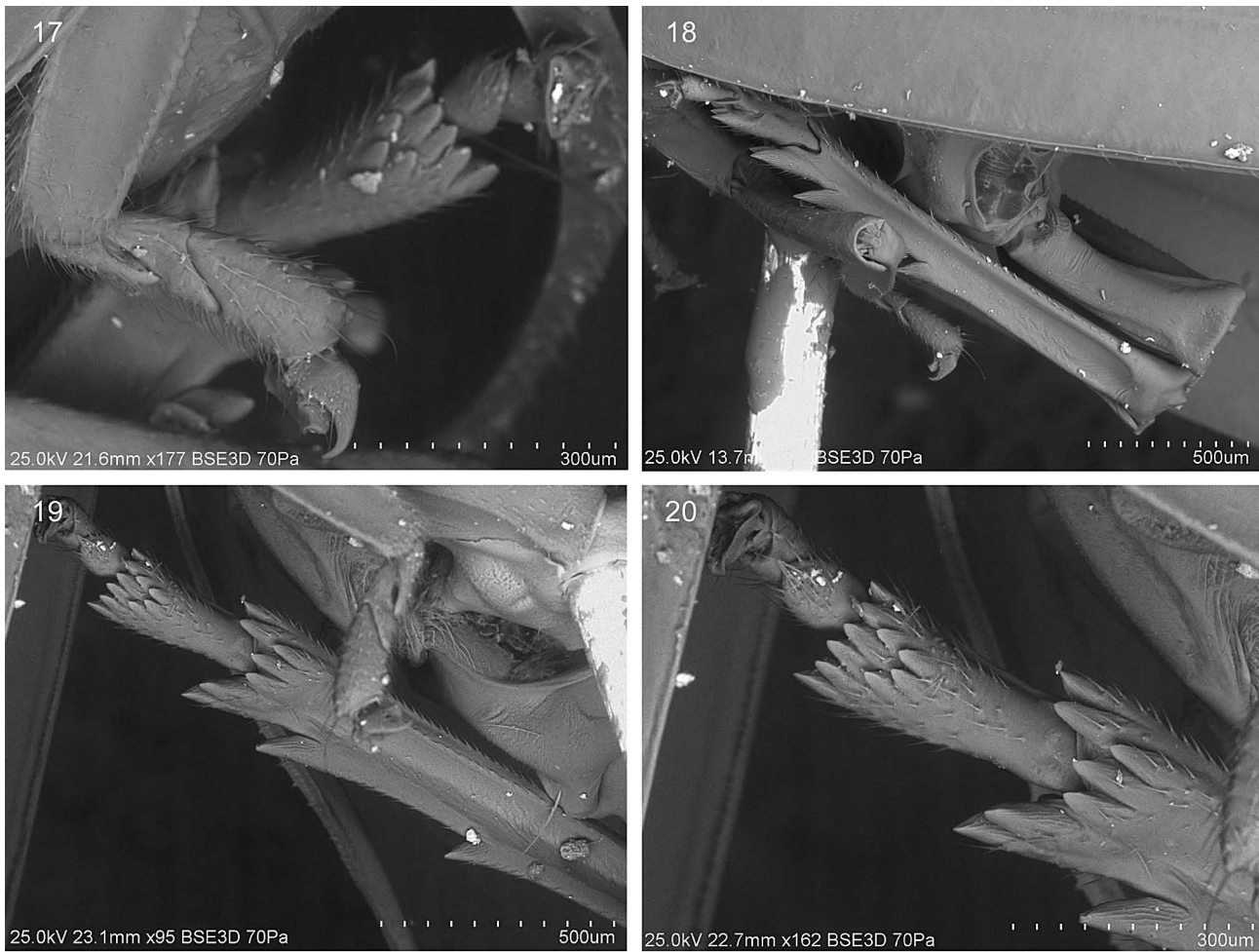
Figures 1–4. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (1) Habitus, lateral view; (2) same, dorsal view; (3) anterior part of body, frontal view; (4) same, dorsal view.



Figures 5–10. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype, SEM photos. (5) Head and thorax, dorsal view; (6) same, latero-dorsal view; (7) vertex and pronotum, dorsal view; (8) mesonotum, dorsal view; (9) frons and clypeus, frontal view; (10) frons and vertex, antero-dorsal view.

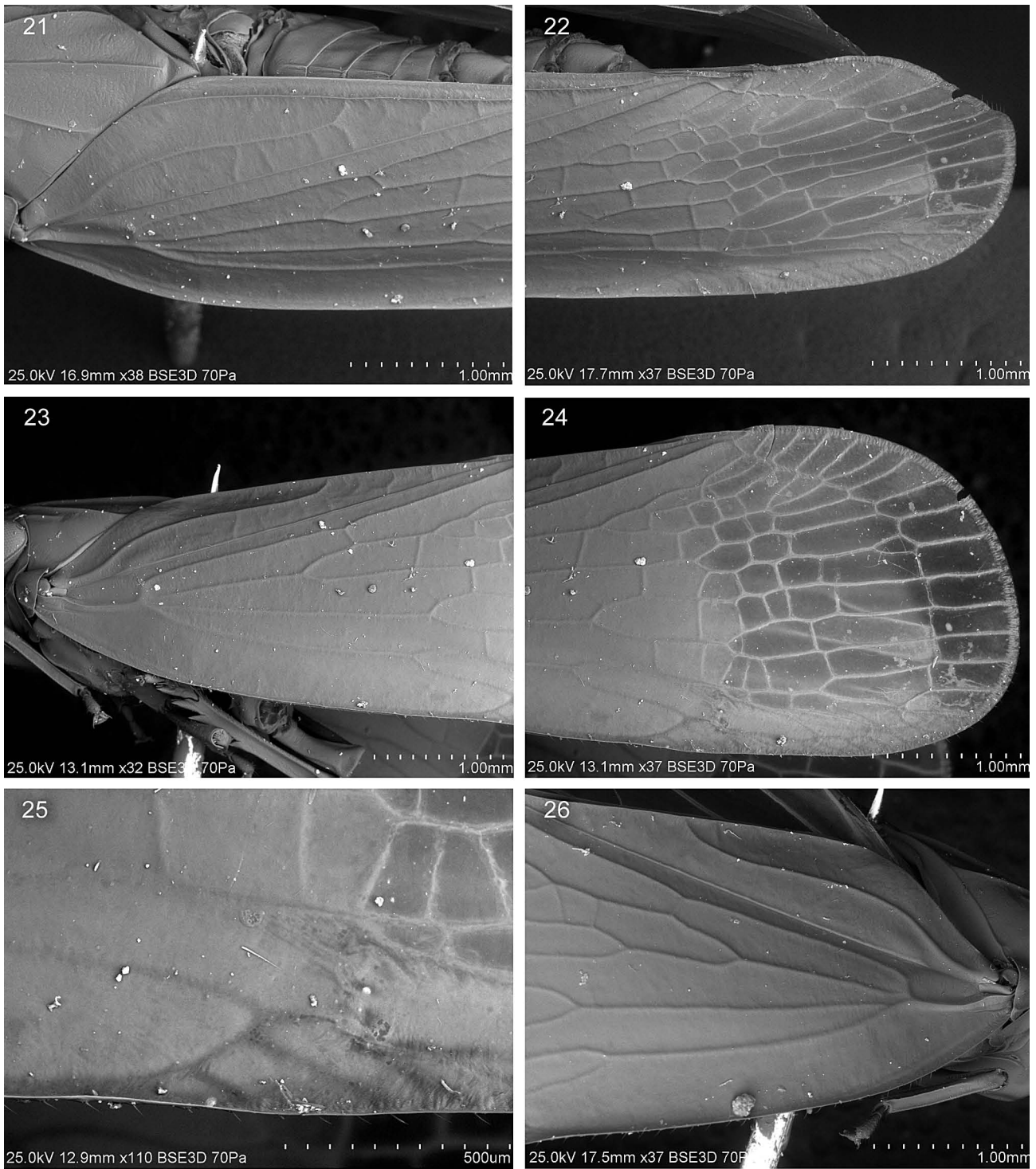


Figures 11–16. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (11) Clypeus and rostrum, ventral view; (12) anterior part of body, lateral view, (13–14) antenna; (15–16) antennal plate organs.

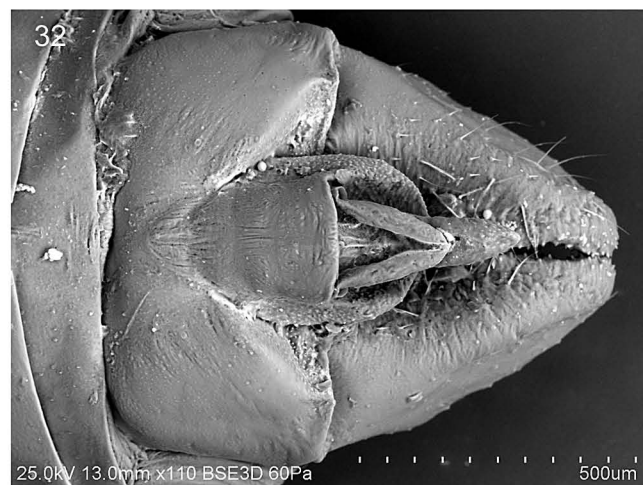
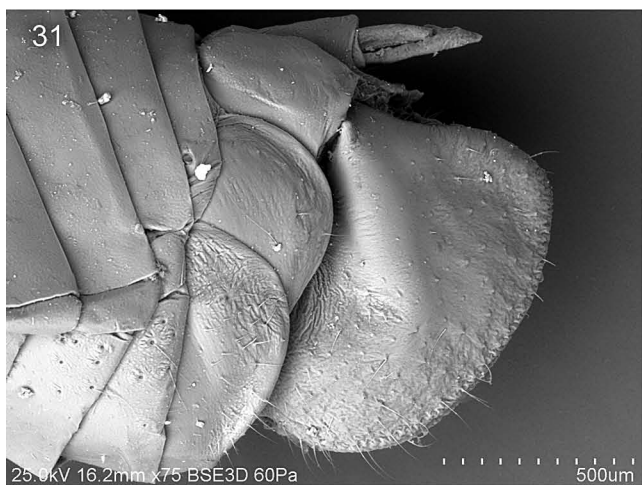
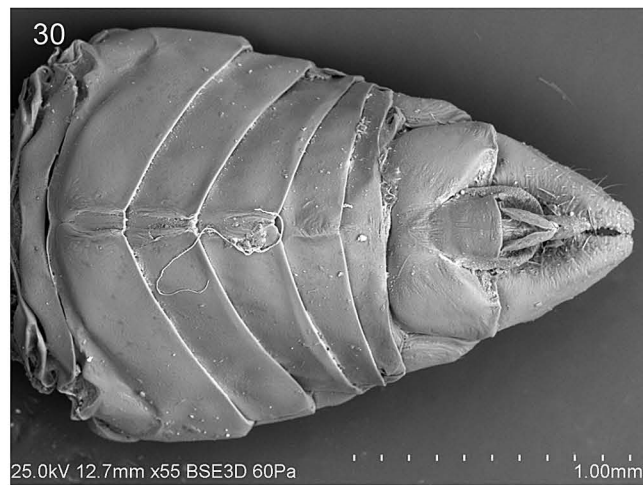
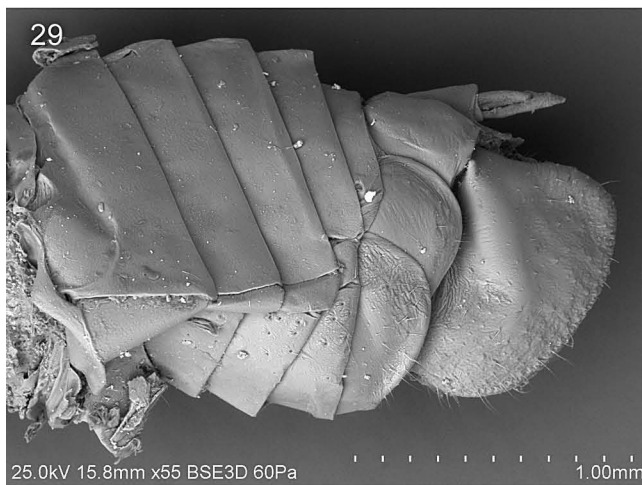
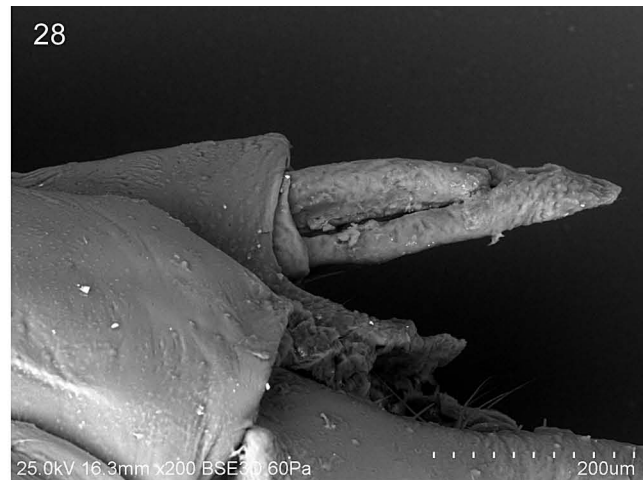
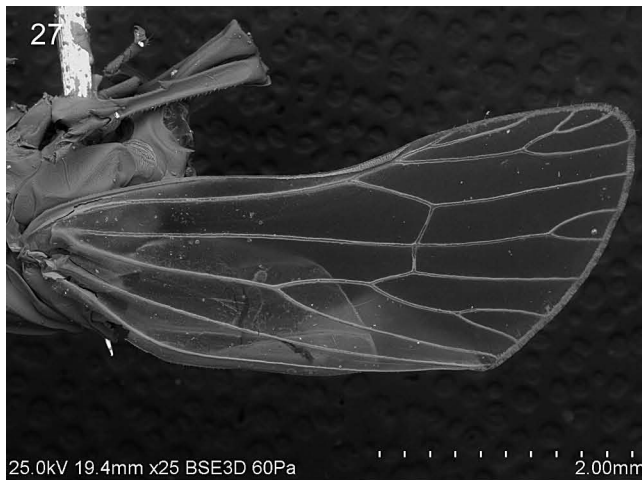


Figures 17–20. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (17) Mid tarsomere, lateral view; (18) hind tibia and tarsomeres, dorsal view; (19–20) distal part of tibia and tarsomere, ventral view.

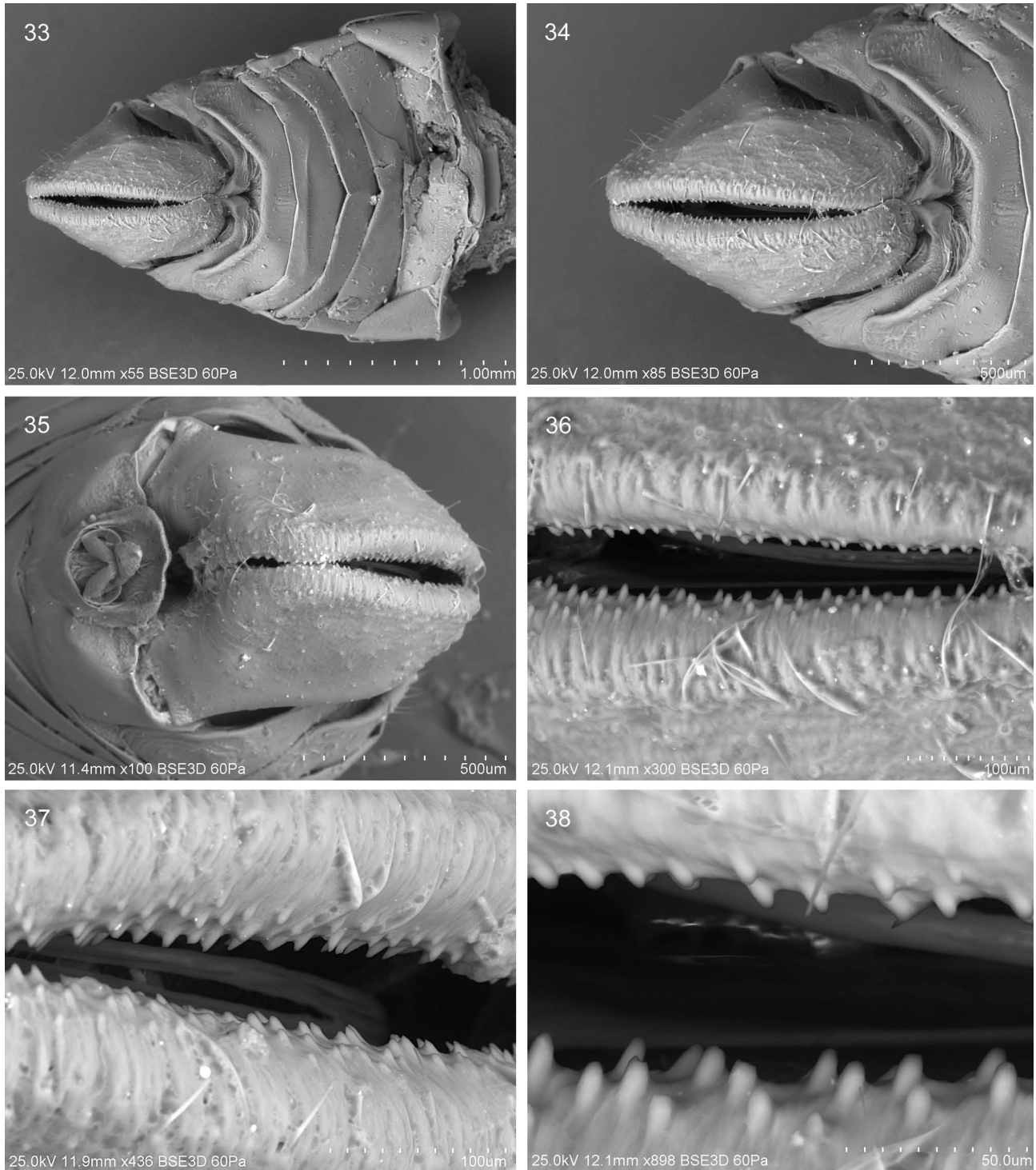




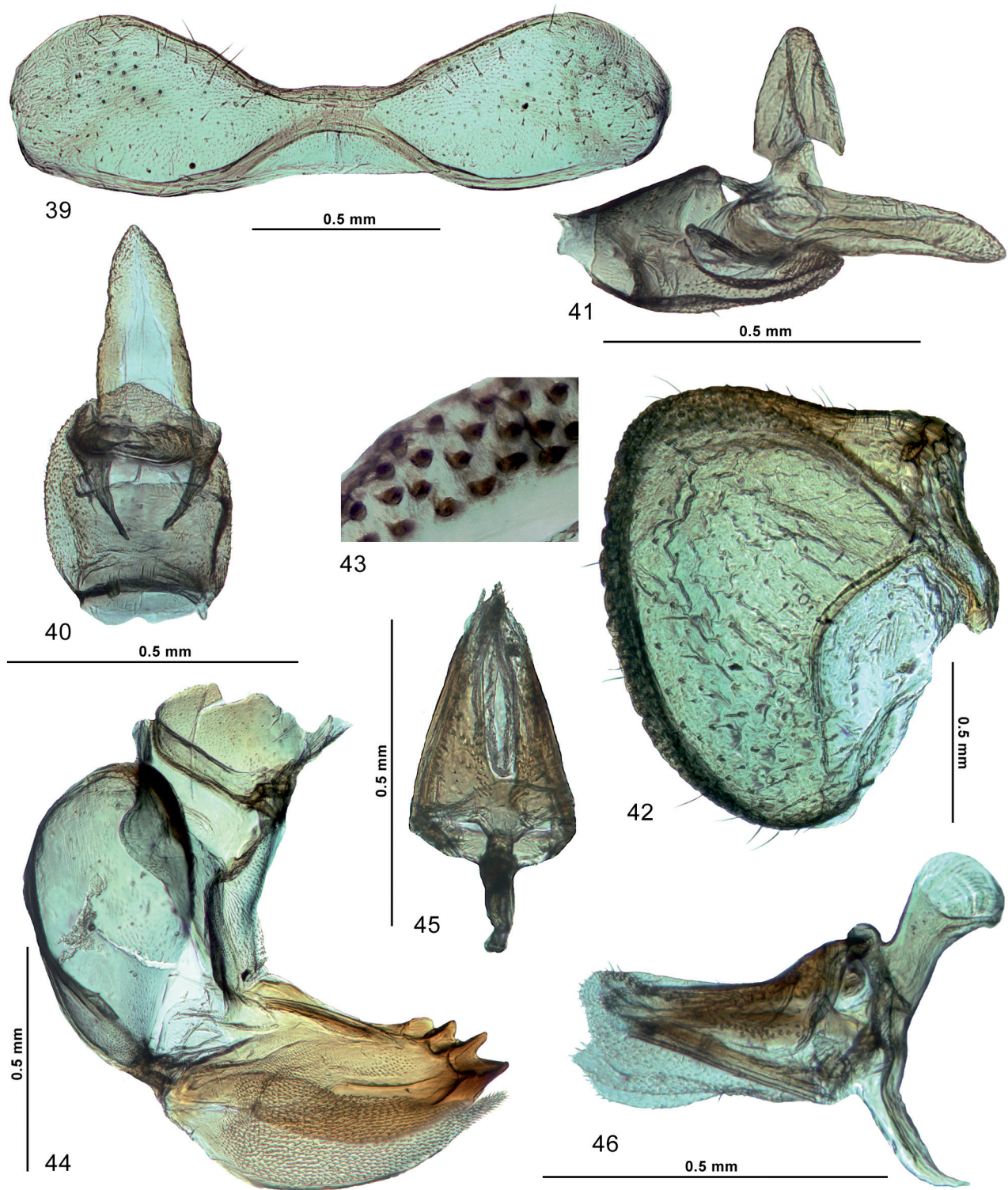
Figures 21–26. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (21) Anterior part of tegmen, dorso-lateral view; (22) posterior part of tegmen, dorso-lateral view; (23) anterior part of tegmen, lateral view; (24) posterior part of tegmen, lateral view; (25) end of costal area, lateral view; (26) venation pattern in basal part of tegmen, lateral view.



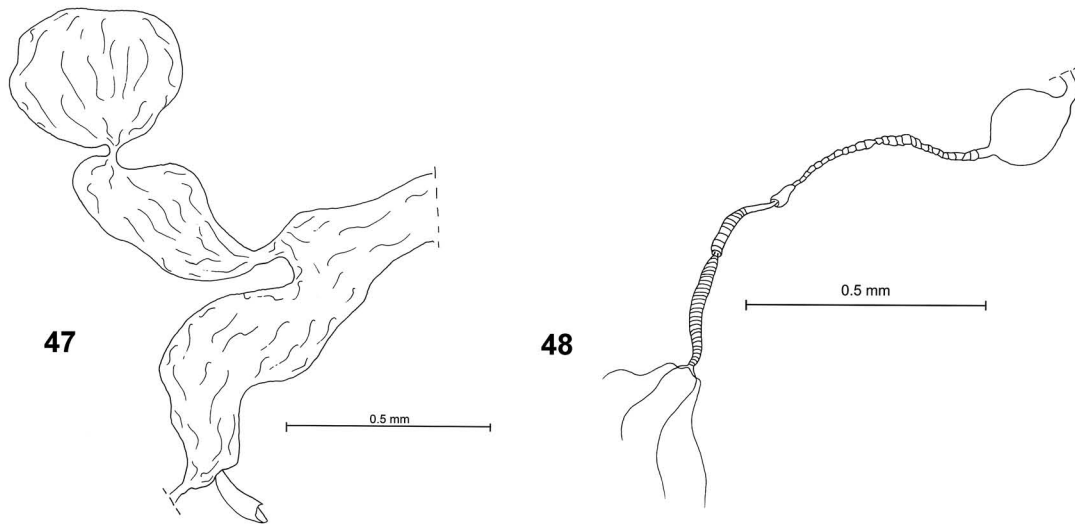
Figures 27–32. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (27) Hind wing; (28) anal tube, lateral view; (29) abdomen, lateral view; (30) same, dorsal view; (31) genital capsule, lateral view; (32) same dorsal view.



Figures 33–38. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (33) abdomen, ventral view; (34) genital capsule, ventral view; (35) same, dorso-posterior view; (36–38) posterior margin of gonoplae with teeth.



Figures 39–46. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (39) Pregenital sternite, flattened; (40) anal tube, dorsal view; (41) same, lateral view; (42) gonoplac, external view; (43) internal part of upper posterior margin of gonoplac; (44) gonapophysis VIII, lateral view; (45) gonapophyses IX and gonospiculum bridge, dorsal view; (46) same, lateral view.



Figures 47–48. *Mahecania trinigromaculata* gen. et sp. nov., female, holotype. (47) Bursa copulatrix, lateral view; (48) spermatheca.