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ARTICLE

A new species of gall midge (Diptera, Cecidomyiidae) associated with *Pleroma raddianum* (DC.) Gardner (Myrtales: Melastomatacea), an endenic plant to Brazil

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Abstract. *Lopesia pleromatis* **sp. nov.** (Lopesiini, Cecidomyiidi) is described based on material collected in Atlantic Forest areas of Bertioga (São Paulo State, Brazil). Specimens were obtained from globoid leaf galls on *Pleroma raddianum* (DC.) Gardner (Melastomataceae), an endemic plant to Brazil. *Lopesia pleromatis* is compared to other congeneric species. The most important morphological characters are illustrated.

Keywords. Atlantic forest; Lopesiini; Neotropical; Taxonomy.

INTRODUCTION

Pleroma raddianum (DC.) Gardner is an endemic plant to Brazil, restricted to the southeast and southern regions of the Atlantic Forest (Guimarães, 2020). Maia *et al.* (2008) reported insect galls on this plant, but as *Tibouchina pulchra* Cogn., a synonym of *Pleroma raddianum*. A new species of *Lopesia* Rübsaamen, 1908 (Diptera, Cecidomyiidae) that induces leaf galls on this plant is described. *Lopesia* is known from 30 species, with records in the Nearctic, Neotropical, Afrotropical, and Australasia regions, most of them from Brazil (Gagné & Jaschhof, 2021; Maia, 2019).

MATERIAL AND METHODS

Galls on *Pleroma raddianum* were collected in the municipality of Bertioga (46°08'19"W and 23°51'16"S), São Paulo, Brazil from April, 2004 to March, 2005. Adults and pupal exuviae were obtained by rearing in the laboratory and larvae by gall dissection. All specimens were mounted on microscope slides following the methods outlined by Gagné (1994) and deposited in the Entomological Collection of Museu Nacional, Rio de Janeiro (MNRJ). The gall midge genus was identified with the aid of keys in Gagné (1994).

Drawings and photos of the most important morphological characters were made with the use of a camera lucida and digital camera attached to a phase contrast microscope. All drawings were scanned and then edited using Corel DRAW®. Measures of morphological structures were obtained using a microscope slide with scale from 0.01 mm to 5.0 mm. Male body length was measured from head to terminalia, female body length from head to the distal margin of the 8th abdominal segment. In pupae, antennal horns were measured from the basal margin of the antennal sheath to the apex of horns.

RESULTS

Lopesia pleromatis Maia, sp. nov.

Diagnosis: Adult: male flagellomeres gynecoid with necks setulose; palpus three-segmented; tarsal claws with two basal teeth, one longer than the other; gonocoxites with obtuse mesobasal lobe; male 8th tergite with only one pair of trichoid sensilla as vestiture. **Pupa:** antennal horn with 2-4 apical teeth, face with lateral projection, prothoracic spiracle with 1-3 pointed apical projections, abdominal tergites each with single row of dorsal spines, each spine simple, with pointed apex and connected at its base to the adjacent spines.

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Larva: prothoracic spatula with two apical teeth, full complement of lateral papillae, 4 pairs of terminal papillae, all corniform, each on a terminal projection.

Description: Male: Body length: 2.95-3.30 mm (n = 3). **Head** (Fig. 1): globose; eyes contiguous on vertex, eye facets circular; antenna: scape conical, pedicel globoid, flagellomeres gynecoid, cylindrical with necks setulose and circumfila with two connected rings (Fig. 2); 1st and 2nd flagellomeres connate, 0.36 mm long (n = 2), 3rd-6th flagellomeres 0.16 mm long, 11th 0.13 mm long, 12th flagellomeres 0.17 mm long (n = 2), with apical process (Fig. 3); all flagellomeres 0.04 mm wide, proportion node/neck: about 3/1; 6 frontal setae (n = 2); palpus with three cylindrical segments, 1st segment 0.05-0.06 mm long, 0.03 mm-0.02 mm wide, 2nd segment, 0.07 mm long, 3rd segment, 0.10-0.12 mm long, 2nd and 3rd segments 0.02 mm wide, all setose (n = 2). **Thorax:** tarsal claws with two teeth, one shorter than the other, empodia surpassing claw midlength (Fig. 4); wing 2.50-2.60 mm long (n = 2), R5 reaching C, M4 vestigial, CuA forked (Fig. 5); anepimeron with setae; other pleura bare. **Abdomen** (Fig. 6): 1th-7th tergites rectangular with distal row of setae, few lateral setae, anterior pair of trichoid sensilla, mostly covered elsewhere with scales, 8th tergite narrow with only anterior pair of trichoid sensilla as vestiture, 2nd-8th stermites rectangular with distal row of setae, many setae near midlength, few lateral setae, anterior pair of trichoid sensilla, mostly covered elsewhere with scales. **Terminalia** (Fig. 7): gonocoxite longer than wide, mesobasal lobe wide, obtuse, microtrichose, gonostylus claviform, with a basal group of sensillae, setulose basally, mostly striated elsewhere, cercus wide, rounded apically, hypoproct bilobed, lobes rounded apically, and aedeagus conical with several asetose papillae.

Female: Body length: 4.0-4.5 mm (n = 4). **Head** (Fig. 8): antennae: 1st-11th flagellomeres cylindrical, 12th flagellomere conical, necks setulose, circumfila with two connected rings (Fig. 9), 1st and 2nd flagellomeres connate, 0.34-0.38 mm long (n = 4) (Fig. 10), 3rd-6th flagellomeres 0.16-0.18 mm long (n = 3), 7th-9th flagellomeres 0.14-0.15 mm long (n = 2), 10th and 11th flagellomeres 0.14 mm long (n = 1), 12th flagellomere 0.18 mm long, apical process setulose, 0.07 mm long (Fig. 11), all flagellomeres 0.04 mm wide (n = 4); palpus: 1st segment 0.07-0.09 mm long, 2nd segment 0.07 mm long, 3rd segment 0.11-0.14 mm long, all cylindrical, 0.03 mm wide and setose (n = 2). **Thorax:** wing 3.0-3.5 mm long (n = 3). **Abdomen** (Figs. 12-13): 1st-7th tergites rectangular, with a row of posterior setae, few setae near midlength, lateral setae, anterior pair of trichoid sensilla, mostly covered elsewhere with scales, 8th tergite not sclerotized with anterior pair of trichoid sensilla as vestiture; 2nd-7th sternites rectangular with a row of posterior setae, several setae near midlength, few lateral setae, anterior pair of trichoid sensilla, mostly covered elsewhere with scales, 8th sternite not sclerotized with anterior pair of trichoid sensilla as vestiture. **Ovipositor** barely protrusible; cerci ovoid, longer than wide, with setae more concentrated apicoventrally, hypoproct with apical setae (n = 2) (Fig. 14).

Table 1. *Lopesia pleromatis* **sp. nov.**: number of dorsal spines by abdominal segments (pupa).

Abdominal segments	Number of dorsal spines				
	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5
Segment 2	8	9	9	8	11
Segment 3	9	8	9	10	10
Segment 4	10	8	9	9	10
Segment 5	8	9	8	8	8
Segment 6	10	6	7	7	8
Segment 7	8	6	6	6	8
Segment 8	6	5	5	5	5

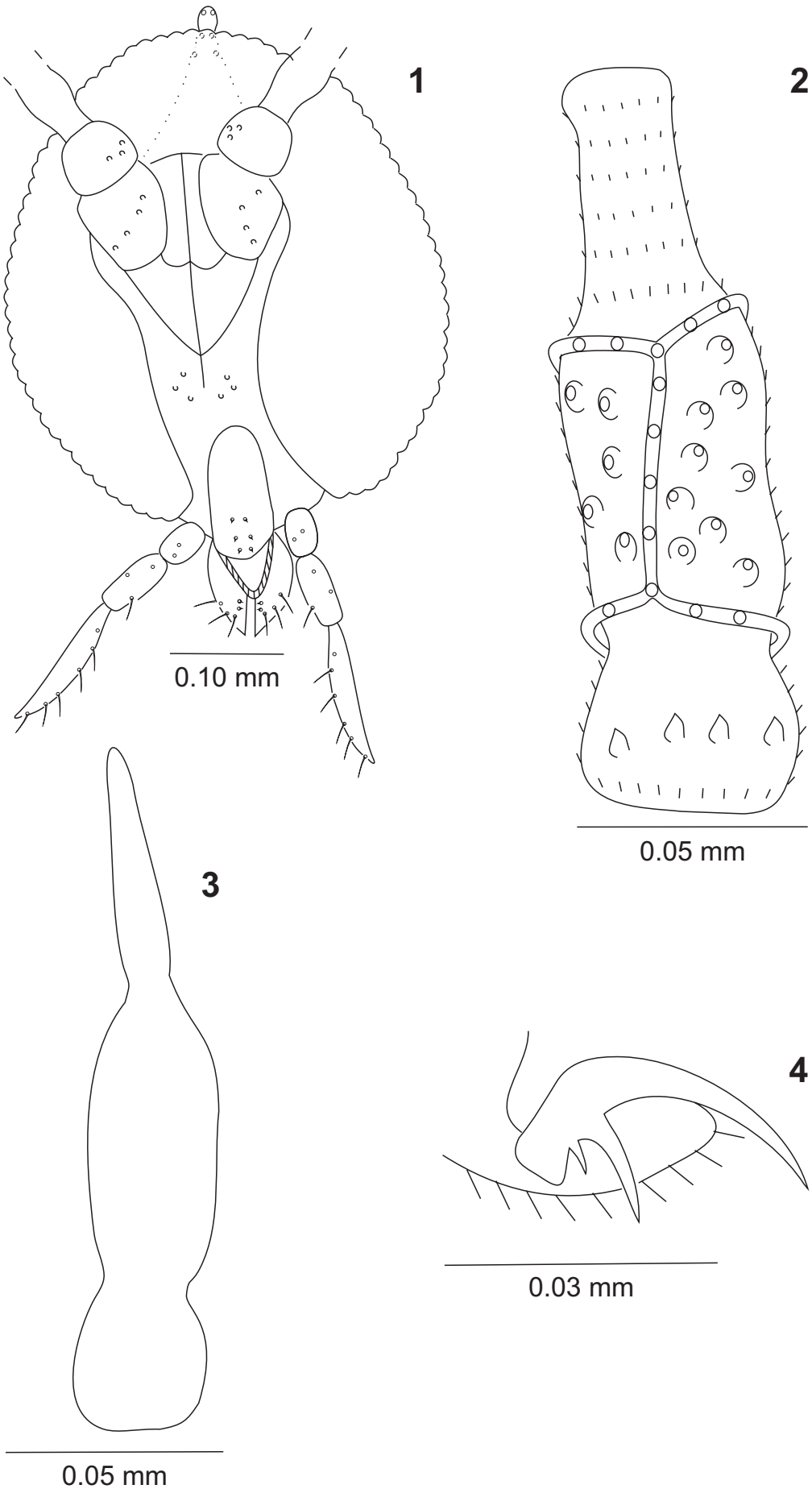
Pupal exuviae: Body length: 3.4-4.8 mm (n = 5). **Head** (Fig. 15): dorsal plate with two pairs of papillae, one of each pair with seta 0.09-0.10 mm long (n = 5), the other bare; antennal horn conical, with 2-4 apical teeth (variable among specimens) (Fig. 16); facial integument smooth, face with lateral projection, pair of lower facial papillae, one with seta and one bare (very short) on each side of the clypeus and a triplet of papillae (two with setae and one bare) near base of each palpus, palpus sheath reaching lateral facial projection (n = 5). **Thorax:** prothoracic integument grainy, mainly around spiracle and centrally, prothoracic spiracle elongate and setiform, 0.33-0.43 mm long, 3.5-4.33 times the length of apical setae (n = 5), with 1-3 pointed apical projections (variable among specimens), trachea reaching the apex (Fig. 17). **Abdomen:** 2th-8th tergites with a single row of dorsal spines simple and connected (Fig. 18); number of spines per row varying 5 to 11 (Table 1), terminal segment bilobed (Fig. 19), lobes with spiny integument.

Third instar larva: Body length: 3.8-3.1 mm (n = 2), 0.74 mm wide at spatula base, 0.30 mm wide at basal margin of the last segment, cephalic capsule 0.06 mm long and 0.07 mm wide at base, antenna 0.01 mm long, prothoracic spatula 0.21 mm long, two-toothed, full complement of lateral papillae (Fig. 20), terminal segment with two apical lobes, each lobe with 4 terminal papillae, all corniform, each on a terminal projection (Fig. 21).

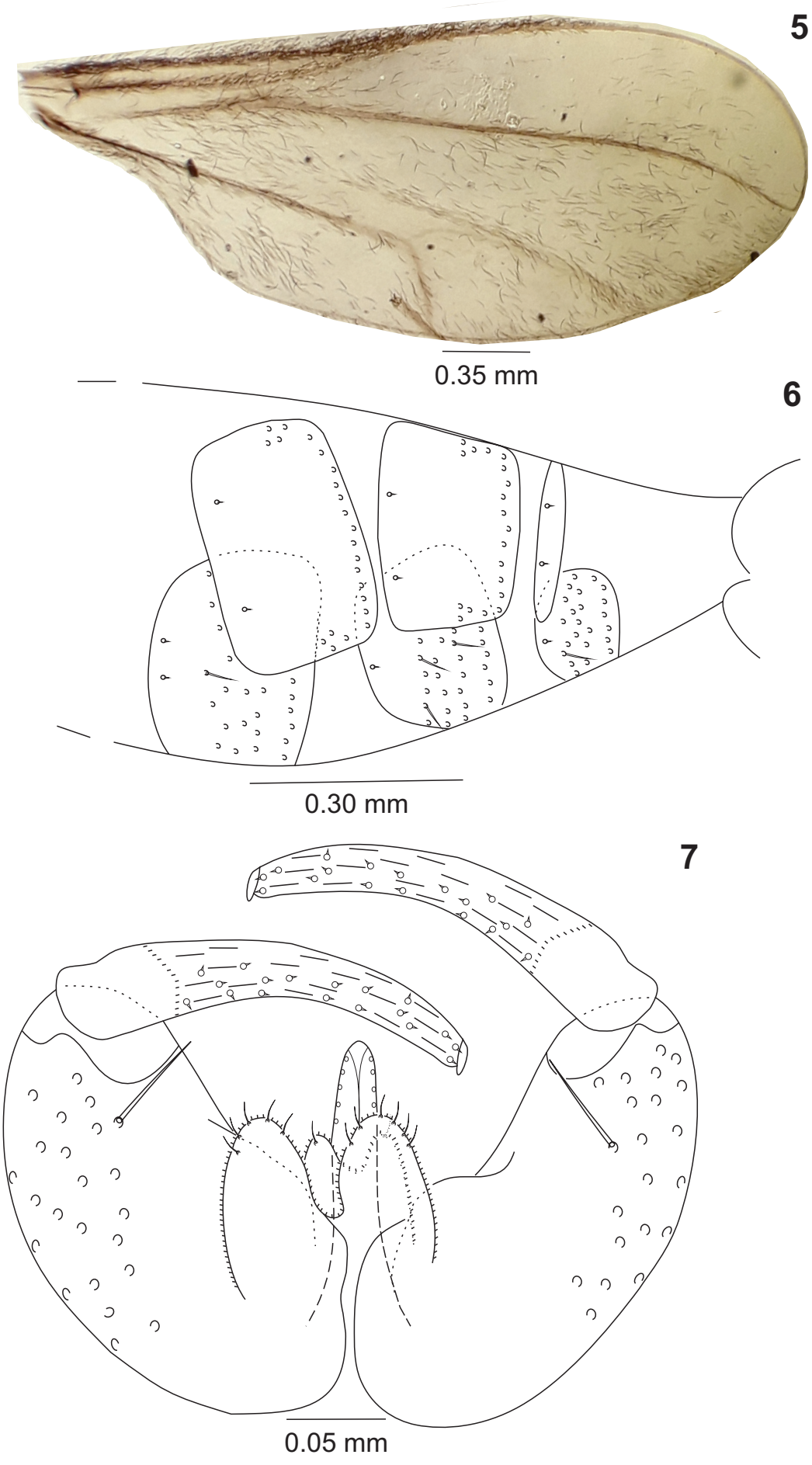
Gall: Spheroid, green, with a dense covering of green trichomes, one-chambered, on leaves of *Pleroma raddianum* (Melastomataceae) (Fig. 83 of Maia *et al.* 2008). The gall chamber shelters a single gall-inducing larva.

Etymology: The specific epithet is the genitive of the host plant genus.

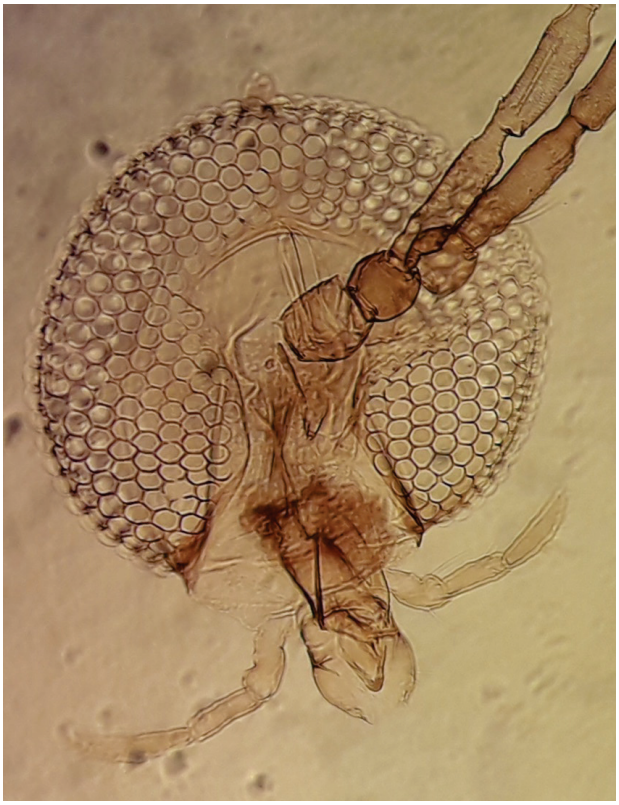
Material examined: Holotype, male, BRAZIL: São Paulo state, Bertioga municipality, Itaguaré, 23.V.2004, V. Maia col., MNRJ-Ent 1-67810. Paratypes: same locality and collector, 30.VII.2004, 1 male, MNRJ-Ent 1-67811, 3 pupal exuviae, MNRJ-Ent 1-67803, 2 pupal exuviae, MNRJ-Ent 1-67806, 24.VII.2004, 1 female, MNRJ-Ent 1-67797, 24.VIII.2004, 1 female and 1 pupal

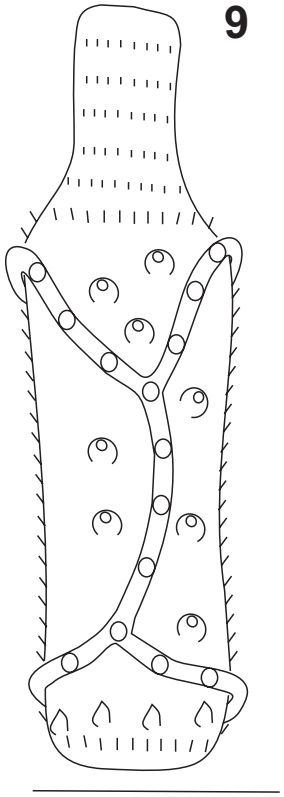


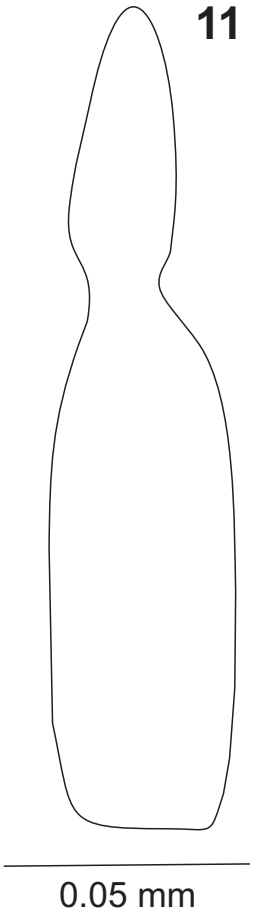
Figures 1-4. *Lopesia pleromatis,* **sp. nov.** Maia, male: (1) Head (ventral view); (2) 5th flagellomere; (3) Last flagellomere; (4) Hindleg, tarsal claw and empodium (lateral view).



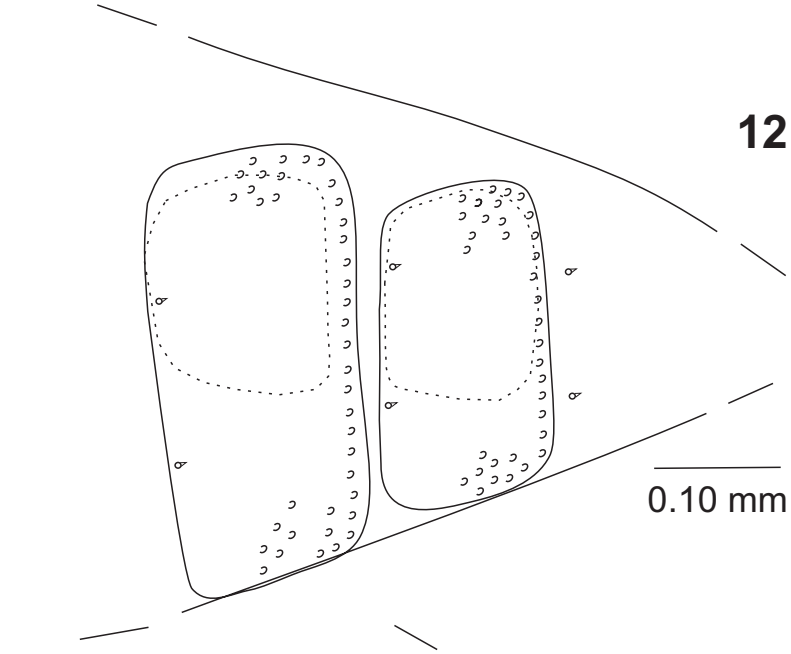
Figures 5-7. *Lopesia pleromatis,* **sp. nov.** Maia, male: (5) Wing; (6) 6th-8th abdominal segments (lateral view); (7) Terminalia, dorsal view.

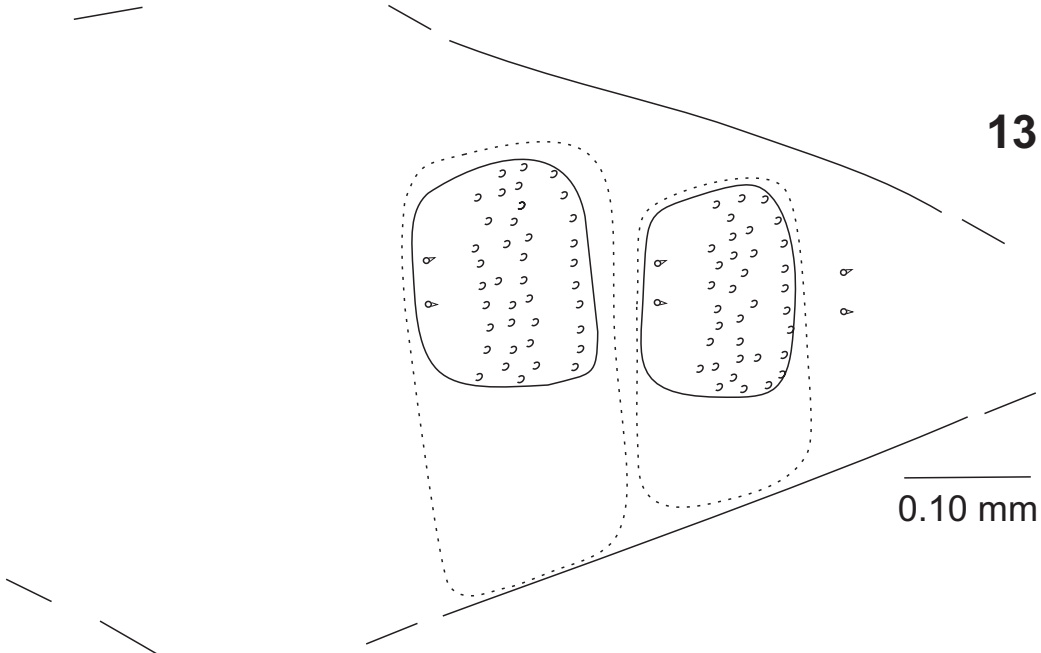


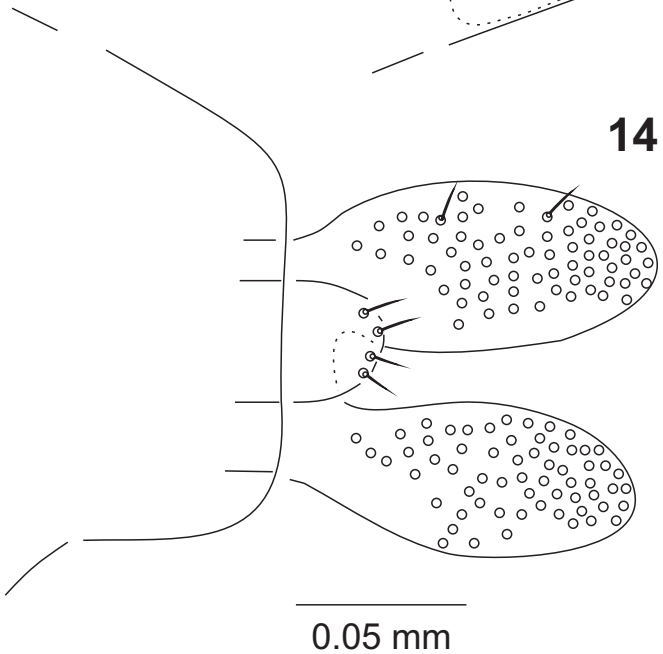




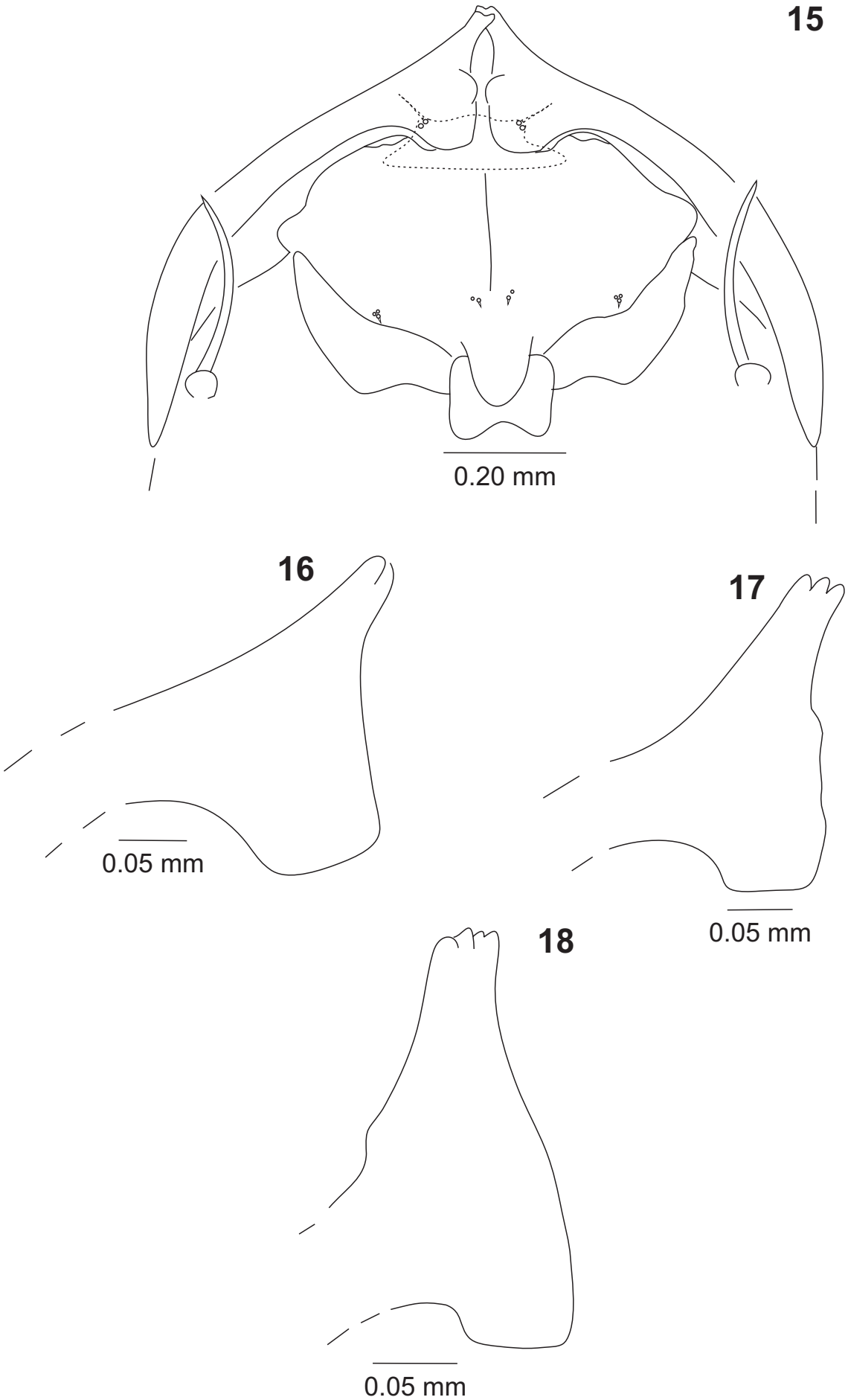
Figures 8-11. *Lopesia pleromatis,* **sp. nov.** Maia, female: (8) Head (ventral view); (9) 5th flagellomere; (10) 1st and 2nd flagellomeres; (11) Last flagellomere.



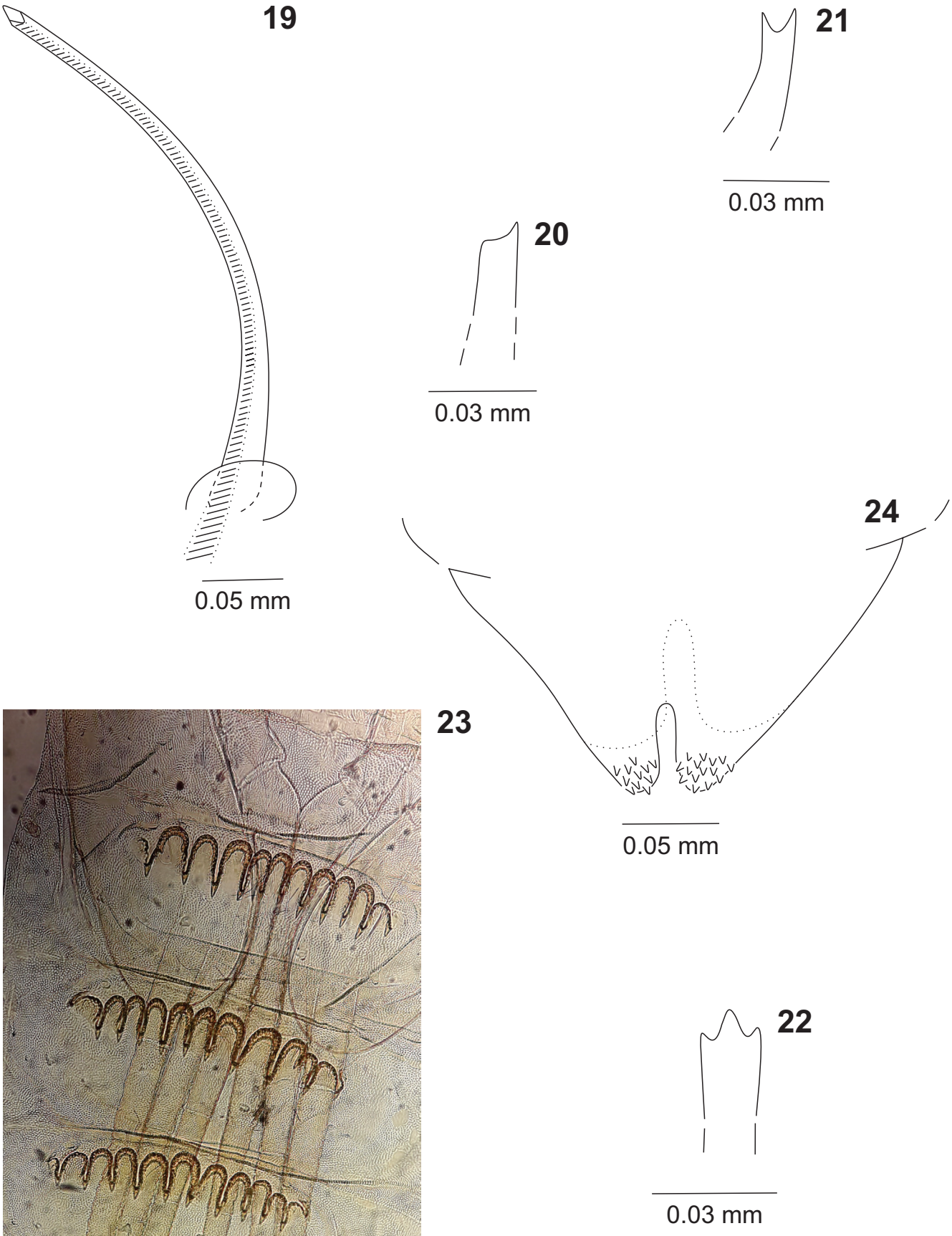




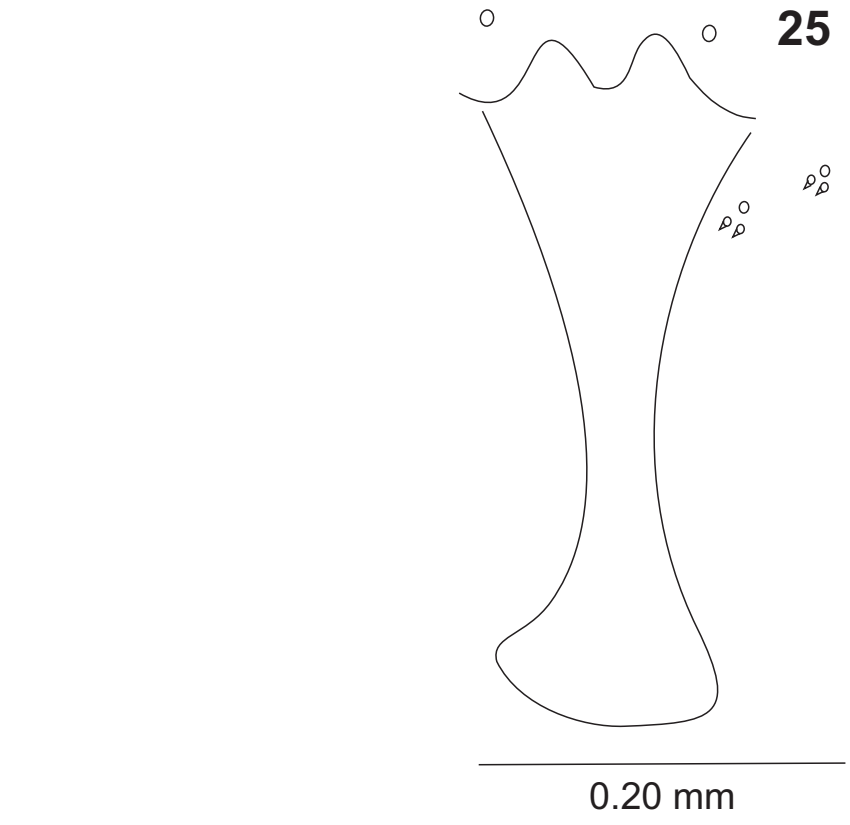
Figures 12-14. *Lopesia pleromatis,* **sp. nov.** Maia, female: (12) 6th-8th abdominal segments (dorsal view); (13) 6th-8th abdominal segments (ventral view); (14) Cerci (ventral view).

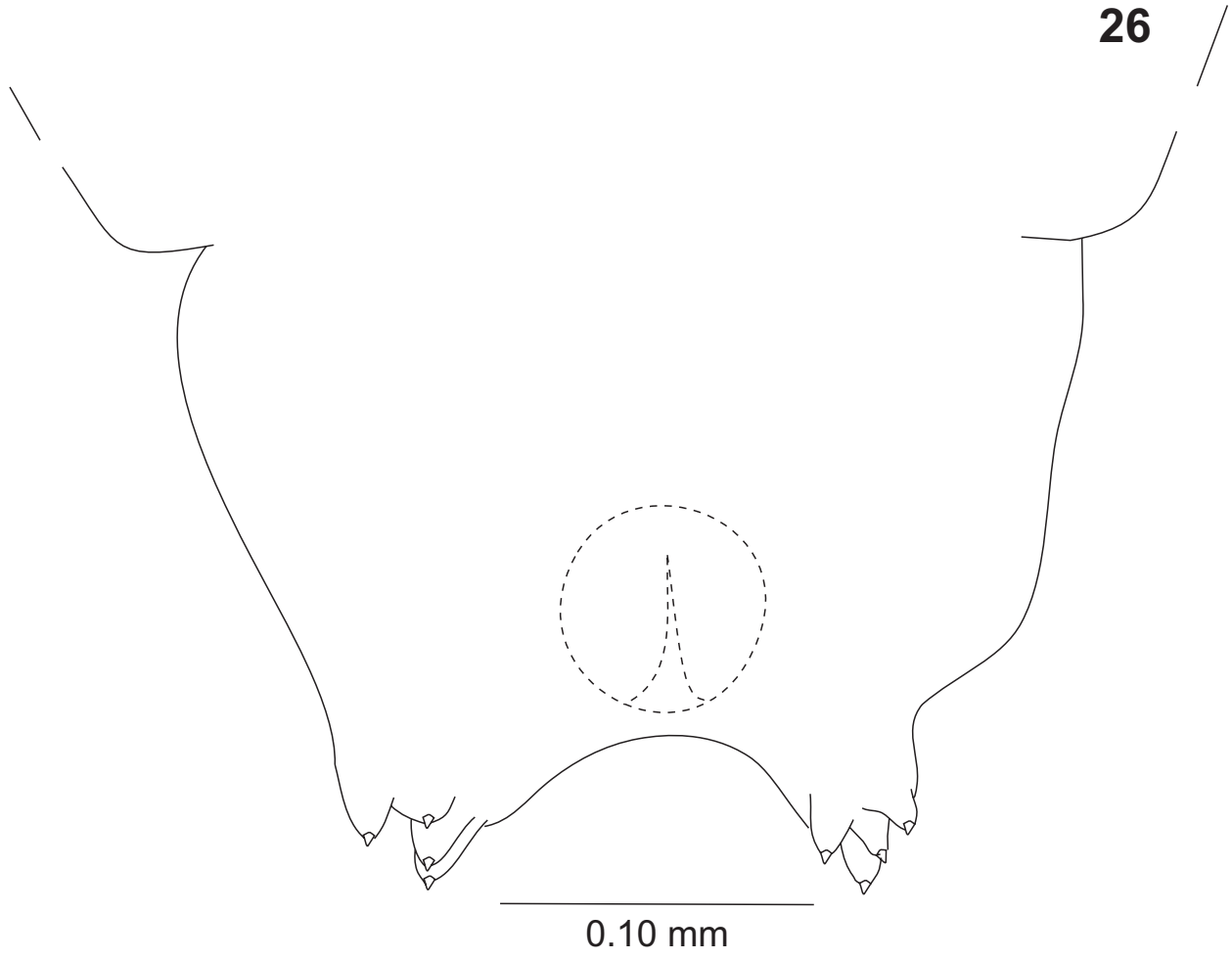


Figures 15-18. *Lopesia pleromatis,* **sp. nov.** Maia, pupa: (15) Head (frontal view); (16-18) Antennal horns.



Figures 19-24. *Lopesia pleromatis,* **sp. nov.** Maia, pupa: (19) Prothoracic spiracle; (20-22) Apex of prothoracic spiracle; (23) 2nd-4th abdominal segments (dorsal view); (24) terminal segment (dorsal).





Figures 25-26. *Lopesia pleromatis,* **sp. nov.** Maia, larva: (25) Prothoracic spatula and associated papillae (ventral view); (26) Terminal segment (dorsal view).

exuviae, MNRJ-Ent 1-67798, 16.V.2005, 1 male, MNRJ-Ent 1-67808, 1 female, MNRJ-Ent 1-67812, 1 pupal exuviae, MNRJ-Ent 1-67804, 1 pupal exuviae, MNRJ-Ent 1-67805, Bertioga: Fazenda Pinto, same collector, 22.V.2004, 1 pupal exuviae, MNRJ-Ent 1-67809, 25.VI.2004, 2 larvae, MNRJ-Ent 1-67802, 26.VIII.2004, 1 female, MNRJ-Ent 1-67800, 27.IV.2005, female, MNRJ-Ent 1-67801, 1 female, MNRJ-Ent 1-67799, 1 pupal exuviae, MNRJ-Ent 1-67807.

Type-locality: Bertioga municipality, São Paulo state, Southeastern Brazil

Comments: *Lopesia pleromatis* was placed in this genus by presenting R5 curved at its juncture with Rs, Rs situated near the midlength of R1, short female postabdomen and its cerci with many short, sensory setae, and larva with corniform terminal papillae, each on a terminal projection. The new species is morphologically more similar to *L. caulinaris* Maia, 2002 and *L. elliptica* Maia, 2002. Only these species share gynecoid male antennae, flagellomere necks setulose in both sexes, tarsal claws with two basal teeth, spatula two-toothed and four pairs of corniform terminal papillae. However, the new species differs from both in the following way: its pupa has antennal horn with apical teeth (variable in number), the prothoracic spiracle has pointed apical projections (variable in number), each abdominal dorsal each spine is connected at its base to the adjacent spine, and only its larva has bilobed terminal segment, each with four papillae. In addition, adults differ in the number of segments of the palpus (three in the new species and four in the others), and gonocoxites have obtuse mesobasal lobe in *Lopesia pleromatis* (acute in *L. caulinaris* and *L. elliptica*).

CONFLICTS OF INTEREST: Author declare that there is no conflicts of interest.

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