Three New Species of Lopesia Rübsaamen (Diptera: Cecidomyiidae) from Brazil

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Three new species of *Lopesia* Rübsaamen (Diptera: Cecidomyiidae) from Brazil

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Abstract

Three new gall-maker species of *Lopesia* Rübsaamen, 1908 (Diptera: Cecidomyiidae) found in the Brazilian Cerrado ecoregion (Brazilian savanna) in Chapada dos Guimarães, Mato Grosso State, and Atlantic Forest in Ubatuba, São Paulo State, are described in this paper. Larvae, pupae, males, females, and the galls of the new species and are described and illustrated.

Key Words: Atlantic Forest; Cerrado; gall maker; Lopesiini; Neo-tropical region; taxonomy

Resumen

En este documento se describen tres nuevas especies de *Lopesia* Rübsaamen, 1908 (Diptera: Cecidomyiidae), que producen agallas, encontradas en la región ecológico del Cerrado Brasileño en Chapada dos Guimarães, estado de Mato Grosso y Mata Atlántica en Ubatuba, estado de São Paulo. Se describen e ilustran las larvas, pupas, machos, hembras y las agallas de las nuevas especies.

Palabras Clave: Bosque atlántico; Cerrado; fabricante de hiel; Lopesiini; Región Neotropical; taxonomía

Three new gall-maker species of *Lopesia* Rübsaamen, 1908 (Diptera: Cecidomyiidae) are described in this paper. Two species were associated with plant hosts from Cerrado (Brazilian savanna): *Matayba guianensis* Aubl. (Sapindaceae) and *Andira vermifuga* (Mart.) (Fabaceae). The other induced galls in an unidentified species of *Clidemia* D. Don (Melastomataceae) from an area of Atlantic Forest vegetation.

Lopesia is a genus with 26 species; 21 of them are found in the Neotropical region, plus 1 in the Nearctic, 3 in the Afrotropical, and 1 in the Australasian regions (Gagné & Jaschhof 2017; Maia & Monteiro 2017; Garcia et al. 2017). Eleven families of plants are reported as hosts of *Lopesia* galls: Burseraceae, Clusiaceae, Chrysobalanaceae, Erythroxylaceae, Euphorbiaceae, Fabaceae, Melastomataceae, Nyctaginaceae, Pontederiaceae, Sapotaceae (Gagné & Jaschhof 2017), and Dilleniaceae (Maia & Monteiro 2017). All 21 species described in the Neotropical region are from Brazil, and found in the States of Amazonas, Bahia, Mato Grosso, Minas Gerais, Rio de Janeiro, São Paulo, and Pernambuco (Gagné & Jaschhof 2017; Urso-Guimarães et al. 2014).

Matayba guianensis is a tree or shrub, and quite common in the Cerrado region. The species is popularly known as "cambotã," "olho-de-cotia," or "canela-de-negro." This species plays an important ecological role as a source of food to ants and bees (Bao et al. 2014) and is widely distributed in Brazil, occurring in several phytogeographic domains, including Amazon rainforest, Cerrado, Atlantic Forest, and Pantanal (Somner et al. 2015). This is the first record of *Lopesia* inducing galls on species of Sapindaceae, although the gall of *M. guianensis* was described before by Isaias et al. (2014).

Andira vermifuga is a tree popularly known as "angelim-preto," "angelim-branco," or "mata-barata." The *Andira* species are commonly used for their anthelmintic properties (Silva et. al. 2006). *Andira vermifuga* is widely distributed in Brazil, and occurs in the Amazon rainforest, Caatinga, Cerrado, and Atlantic Forest phytogeographic domains (Pennington 2015). Four other *Lopesia* (Diptera: Cecidomyiidae) species are associated with Fabaceae species in Brazil: *Lopesia aldinae* Fernandes & Maia on *Aldina heterophylla* Spruce ex Benth. (Fernandes et al. 2010); *Lopesia grandis* Maia on *Dalbergia ecastaphyllum* (L.) (Maia 2001); *Lopesia mimosae* Maia on *Mimosa hostilis* Benth. (Maia et. al. 2010); and *Lopesia andirae* Garcia, Lima, Calado & Urso-Guimarães on *Andira humilis* (Fabaceae) (Garcia et al. 2017). This is the first record of *Lopesia* inducing galls on *Andira vermifuga*.

Clidemia has about 175 species in the Neotropical region, mostly erect shrubs living in shady environments. It occurs from southern Mexico to Paraguay and in southern Brazil, with 6 species reported from the State of São Paulo, and it has been introduced to Africa (Michelangeli & Reginato 2015). Four species of *Lopesia* have been found inducing galls on Melastomataceae: *Lopesia brasiliensis* Rübsaamen on *Ossaea* sp. from Fabrica, Rio de Janeiro State, and Tubarão, Santa Catarina State; *L. tibouchinae* Maia on *Tibouchina candolleana* (DC.) Cogn. from Tiradentes, Minas Gerais State; *Lopesia* sp. on *Tibouchina pulchra* Cogn.; and *Lopesia* sp. on *Leandra cf. ionopogon* (Mart.) Cogn. from Sao Paulo State (Maia et al. 2008). This is the first record of *Lopesia* inducing galls on *Clidemia*, although Tavares (1917) made reference to a cecidomyiid inducing hairy, spherical galls on twigs and leaves of *Clidemia* sp. from Serra do Caraça, Minas Gerais.

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Materials and Methods

Samples of *M. guianensis* and *A. vermifuga* were collected between 08 to 20 Jul 2012, in 2 localities of Cerrado vegetation in Chapada dos Guimarães, Mato Grosso State: *M. guianensis* in Cachoeira Véu da Noiva (15.4361°S, 55.7897°W) and *A. vermifuga* in Vale do Eco (15.4093°S, 55.8330°W). Samples of *Clidemia* were collected on 26 Mar 2016 in Praia do Cedro, Ubatuba, São Paulo State (23.5391°S, 45.1713°W), from an urban Atlantic Forest area.

Branches with galls were transferred to individual plastic bags for rearing the adults. Some of the galls were dissected under a stereomicroscope to obtain immature stages. All material obtained was stored in 70% alcohol and mounted according to the methodology described in Gagné (1994). Morphological terminology follows Gagné and Jaschhof (2009). Illustrations and photographs were made using a compound optical microscope. The types are deposited in the Museu de Zoologia of the Universidade of São Paulo, São Paulo, Brazil. Voucher specimens of the host plant species are deposited in the Herbarium of the Universidade Federal de São Carlos, campus Sorocaba.

Taxonomy

Cecidomyiidae Macquart, 1838
Cecidomyiinae Rondani, 1840
Lopesia Rübsaamen 1908: 29

Diagnosis. R_5 joining C beyond the wing apex; Rs closer to the end of R_1 than to the arculus; palpi 3- or 4-segmented; antennae with binodal or gynecoid flagellomeres, and 3 separate circumfila (in male) or interconnected circumfila (in female); tarsal claws curved near basal third, toothed; ovipositor short, barely protrusible and female cerci separate (Maia et al. 2010; Maia 2015).

Lopesia mataybae **sp. nov.** Garcia & Urso-Guimarães (Figs. 1–12)

DESCRIPTION

Adult. Male – Light brown. Body: 1.3 mm long (male, n = 4); 1.6 mm long (female, n = 1). Head: Eyes black, holoptic, facets hexagonal, closely adjacent. Occipital process present. Frontoclypeus with 6 long setae; labrum triangular with 4 pairs of setae; hypopharynx of the same shape as labrum; labella convex, each with 6 long lateral setae; palpi total length, 0.1 mm, palpi 4-segmented. Antennae: Scape and pedicel, 0.05 mm long and maximum length; scape broader distally; 12 binodal tricircumfilar flagellomeres; circumfila whorls regular in length in males (Fig. 1) and 12 cylindrical flagellomeres with interconnected circumfila in females (Fig. 2); apical process present (Fig. 3); setulose necks in both sexes. Thorax: Scutum and scutellum dark brown. Scutum with 2 rows of dorsocentral setae, anepimeron with 10 setae, laterotergite with 2 trichoid sensilla, other sclerites bare. Legs: long, thick, first tarsomere without spur; tarsal claws simple, bend near midlength; empodia shorter than claws (Fig. 4). Wings: 1.2 mm long and 0.5 mm wide in males (n = 4), and 1.3 mm long and 0.6 mm wide in female (n = 1) (Fig. 5). Abdomen: Tergites 1–7 rectangular completely sclerotized, with a complete row of posterior setae in males and females; tergite 8 not sclerotized in males and only caudally in females. Trichoid sensilla absent in males and in the female. Sternites 1–7 weakly sclerotized in males and female with a complete row of posterior setae. Sternites 8–9 not sclerotized in female. Trichoid sensilla absent in sternites in males and female. Male terminalia (Fig. 6): Gonocoxites narrow with discrete rounded mesobasal lobe; gonostylus narrow; longer than gonocoxite, sparsely covered with setae and microsetulae, group of 10 trichoid sensillae at the basal region; gonostylus teeth entire. Cerci setose and bilobed, outer lobe longer than the inner; hypoproct short, not deeply bilobed, with 1 strong setae at apex of each lobe, and as long as inner cercus lobe; parameres absent; aedeagus elongate, tapering gradually to the apex, and 1.5 longer than hypoproct. Apex of aedeagus with an irregular edge. Ovipositor (Fig. 7): 0.1 mm long; protrusible, cerci ovoid, separate and setose, 2 setae longer than the others; hypoproct slightly bilobed and covered by setulae.

Pupa. Light brown. Body: 1.65 mm long (n = 3). Head: Antennal horns, 0.07 mm long, triangular, smooth edges, and sclerotized. Cephalic setae short (0.05 mm); upper frontal horn present and lower frontal horn absent, 2 pairs of lower facial papillae per side, 1 pair asetose and 1 setose, lateral facial papillae absent; edge of cephalic capsule thickening and sclerotized (Fig. 8). Thorax: Prothoracic spiracle cylindrical, 0.06 mm long (Fig. 9). Wing reaching third abdominal segment; all pairs of legs reaching sixth abdominal segment. Abdomen: Abdominal tergites 1–2 with tiny dorsal spines, tergites 3–8 with short and medium dorsal spines (Fig. 10). Terminal segment 0.2 mm long; 0.3 mm wide. Integument rough.

Larva 3rd instar. Yellowish. Body: 0.7 mm long (n = 1). Anterior region not visible in the slide mounting. Terminal segment with 3 pairs of papillae of equal size, ventral anus in cleft (Fig. 11).

Type Material. HOLOTYPE male, Chapada dos Guimarães (Parque Nacional Chapada dos Guimarães), Mato Grosso, Brazil (Cachoeira Véu da Noiva, 15.4361°S, 55.7897°W), reared from leaf galls of *M. guianensis*, 9 Jul 2012 by Maria Virginia Urso-Guimarães, emerged 11 Jul 2012 (Museu de Zoologia of the Universidade of São Paulo, São Paulo, Brazil). PARATYPES, 3 males, 1 female, 2 pupal exuviae, 1 larva collected and reared with holotype (Museu de Zoologia of the Universidade of São Paulo, São Paulo, Brazil).

Etymology. The specific epithet refers to the generic name of the host plant.

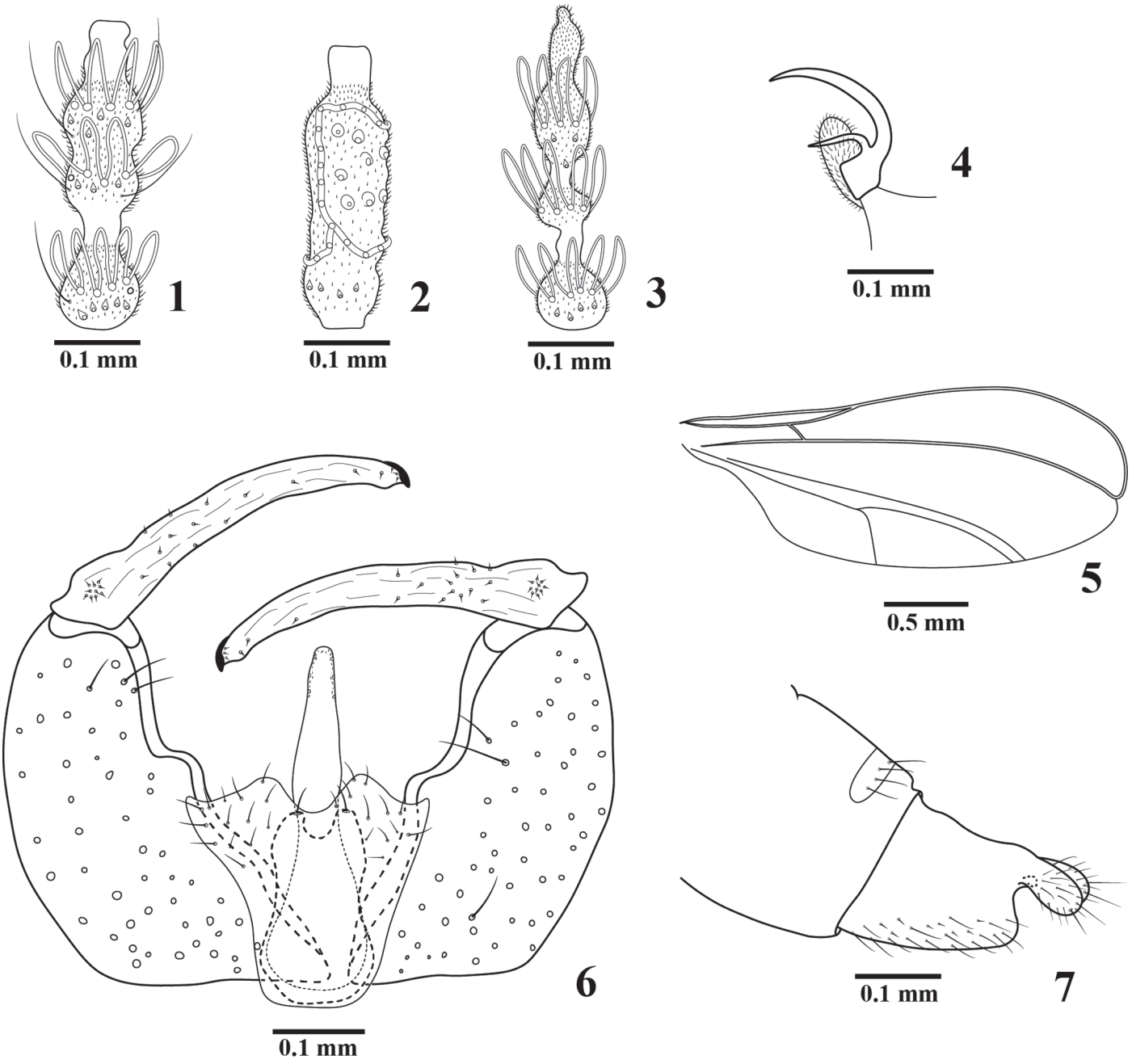
Gall and biology. Cylindrical, green, unilocular, orange trichoma densely distributed on top of the gall on *M. guianensis*. Orange trichoma closes the top of gall forming an inner capsule that protects the immature (Fig. 12). Pupation occurs in the gall.

Remarks. Running the key to segregation of *Lopesia* species (Rodrigues & Maia 2010), we observed that the specimens studied do not belong to any described species, although *L. mataybae* **sp. nov.** shares setulose flagellomere necks (couplet 1), narrow gonocoxites (couplet 2'), gynecoid male flagellomere (couplet 7), and wing with Rs joining R_1 after its midlength (couplet 8) with *L. elliptica* Maia, 2003 (Madeira et al. 2003); tarsal claws 1-toothed with (couplet 8') *L. maricaensis* Rodrigues & Maia, 2010 (Rodrigues & Maia 2010), and antennal horn of pupa developed (couplet 1), conspicuous apical setae of pupa, 0.05 mm long (couplets 2 and 3'), simple dorsal abdominal spines of pupa present, (couplets 4' and 6) with *L. spinosa* Maia, 2004. Despite the similarities, the following set of characteristics differentiates *L. mataybae* **sp. nov.** from its congeners: palpi 4-segmented; male cerci bilobed, with outer lobe longer than inner; male hypoproct short, as long as inner cercus lobe; aedeagus 1.5 times longer than hypoproct; apex of aedeagus with irregular edge; and inducing galls on *M. guianensis*.

Lopesia chapadensis **sp. nov.** Garcia & Urso-Guimarães (Figs. 13–20)

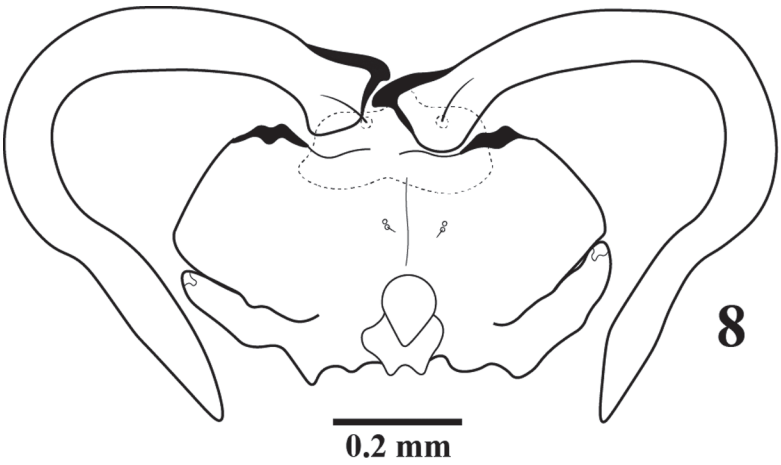
DESCRIPTION

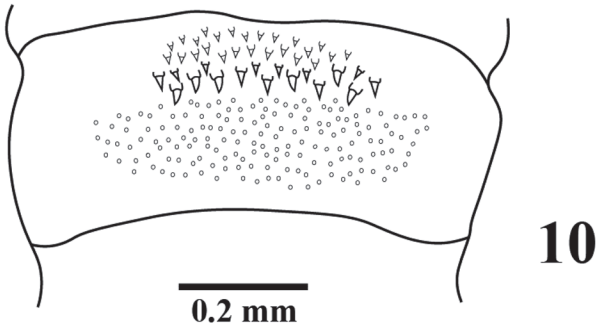
Adult. Male – Light brown. Body: 1.5 mm long (male, n = 2); 1.7 mm long (female, n = 1). Head: Eyes black, holoptic, facets circular,

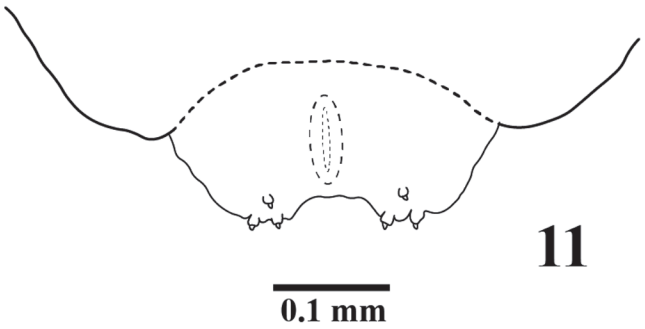


Figs. 1–7. *Lopesia mataybae* **sp. nov. (1).** Third male flagellomere (frontal view). **(2).** Third female flagellomere (frontal view). **(3).** Twelfth male flagellomere with apical process (frontal view). **(4).** Male tarsal claws and empodia. **(5).** Male wing. **(6).** Male terminalia (dorsal view). **(7).** Female postabdomen (lateral view).

closely adjacent. Occipital process present. Frontoclypeus with 8–10 long setae; labrum triangular with 3 pairs of setae; hypopharynx of the same shape as labrum; labella elongate-convex, each with 8–10 long lateral setae; palpi total length, 0.1 mm, 4-segmented. Antennae: Total length, 0.9 mm (male); scape and pedicel, 0.06 mm long and maximum wide; scape broader distally; 12 binodal tricircumfilar flagellomeres; circumfila whorls regular in length (Fig. 13). Female flagellomeres cylindrical with interconnected circumfila (Fig. 14); apical process present (as in Fig. 23); setulose necks in both sexes. Thorax: Scutum and scutellum dark brown. Scutum with 2 rows of dorsocentral setae, anepimeron with 14 setae, laterotergite with a pair of trichoid sensilla near the halter base, other sclerites bare. Legs: First tarsomere without spur; tarsal claws 1-toothed and bent near midlength, empodia reaching bend in claws (Fig. 15). Wings (as in Fig. 5): 1.2 mm long and 0.5 mm wide in male, and 1.6 mm long and 0.5 mm wide in the female. Abdomen: Tergites 1–7 rectangular, completely sclerotized, and a complete row of posterior setae in male and female; tergite 8 not sclerotized in males and female. Trichoid sensilla present at tergites 6–7 in males and absent in females. Sternites 1–8 sclerotized in males and with a complete row of posterior setae. Sternites 8–9 not sclerotized in the female. Male terminalia (Fig. 16): Gonocoxites narrow and with mesobasal lobe rounded and discrete, with setae placed only on external surface; gonostylus clavate, shorter than gonocoxite and sparsely covered with setae and microsetulae, group of 8 sensillae at basal region; gonostylus teeth entire and discrete; cercus bilobed and triangular-shape with straight apex; hypoproct deeply bilobed and setose, with apex rounded; each lobe with few strong setae at tip; parameres absent, aedeagus wide and elongated; rounded at apex and 1.5







Figs. 8–11. *Lopesia mataybae* **sp. nov. (8).** Pupal head (ventral view). **(9).** Prothoracic spiracle. **(10).** Sixth pupal abdominal tergite (dorsal view). **(11).** Larval terminal segment (dorsal view).

longer than hypoproct. Ovipositor (as in Fig. 7): 0.08 mm long; slightly protrusible, cerci separate, ovoid and setose, 2 setae longer than the others; hypoproct short and covered by setulae.

Pupa. Dark brown. Body: 1.4 mm long (n = 1). Head: Antennal horns, 0.07 mm long, triangular, sclerotized at the base; upper horn present (Fig. 17). Due to the developed pupal stage, some structures were not visible such as cephalic setae, and facial lower and lateral papillae. Thorax: Wing reaching third abdominal segment; foreleg and midleg reaching third abdominal segment and hind leg reaching sternite 8. Prothoracic spiracle cylindrical, 0.16 mm length (Fig. 17). Abdomen: Abdominal tergites with dorsal spines absent. Integument smooth. Terminal segment 0.15 mm long; 0.1 mm wide.

Larva 3rd instar. Cream. Body length, 1.4 mm (n = 1). Spatula 2-toothed with long sclerotized stalk, length 0.15 mm, enlarged in the posterior region (Fig. 18). Lateral papillae in 2 groups of 3 papillae without setae. Terminal segment with 2 corniform papillae each side, ventral anus in cleft (Fig. 19).

Types. HOLOTYPE male, Chapada dos Guimarães (Parque Nacional Chapada dos Guimarães), Mato Grosso, Brazil (Vale do Eco, 15.4093°S, 55.8330°W), reared from leaf galls of *A. vermifuga*, 10 Jul 2012 by Maria Virginia Urso-Guimarães, emerged 15 Jul 2012 (Museu de Zoologia of the Universidade of São Paulo, São Paulo, Brazil). PARATYPES, 1 male, 1 female, 1 pupal exuvia, 1 larva collected and reared with holotype (Museu de Zoologia of the Universidade of São Paulo, São Paulo, Brazil).

Etymology. The specific epithet refers to the type locality of the new species, the Chapada dos Guimarães municipality.

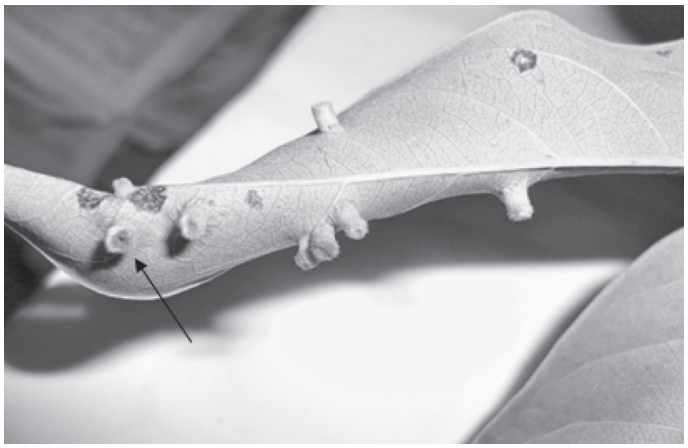
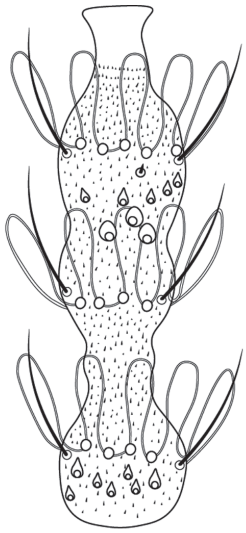
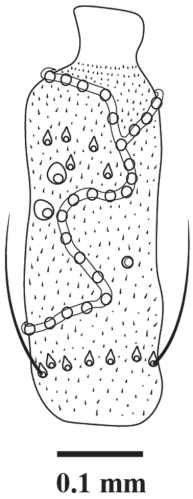
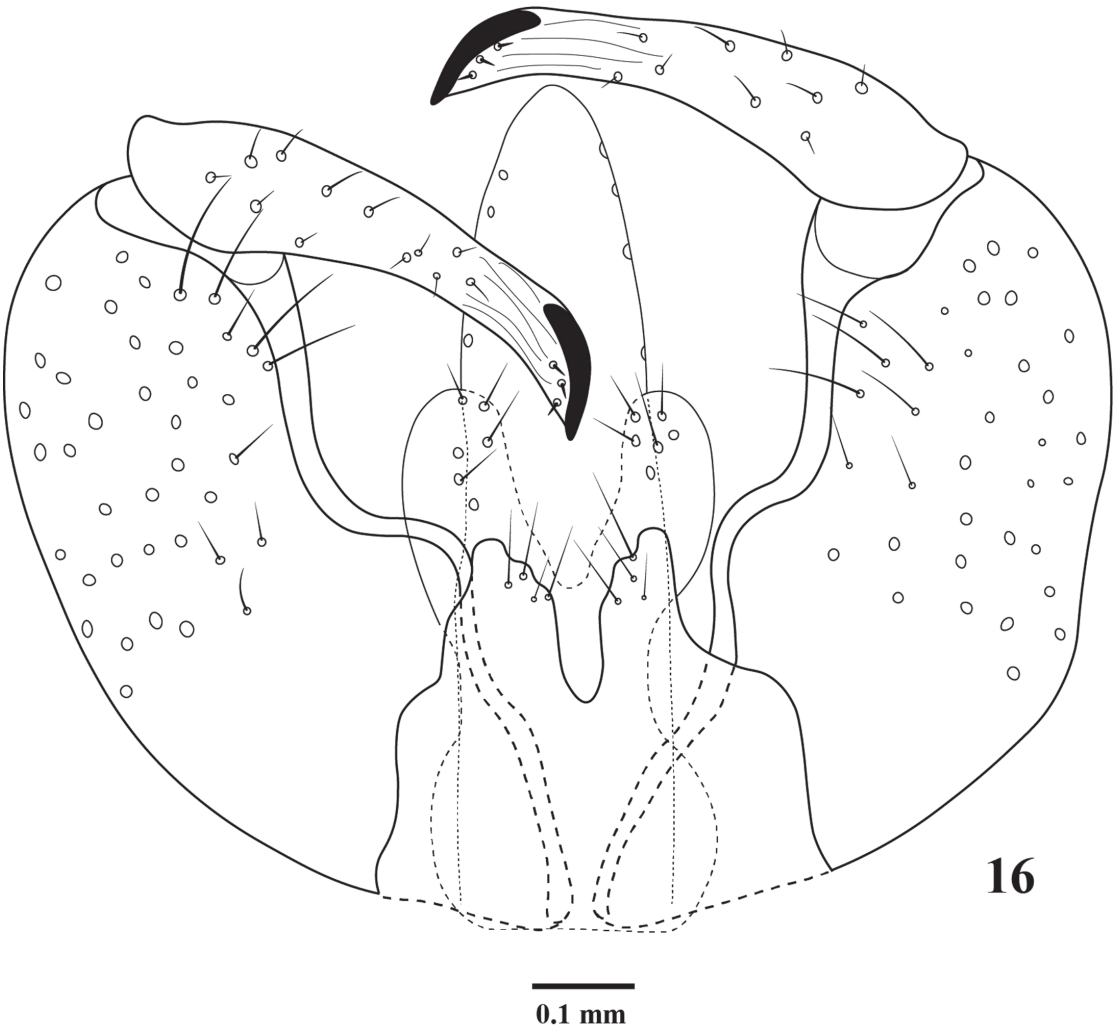


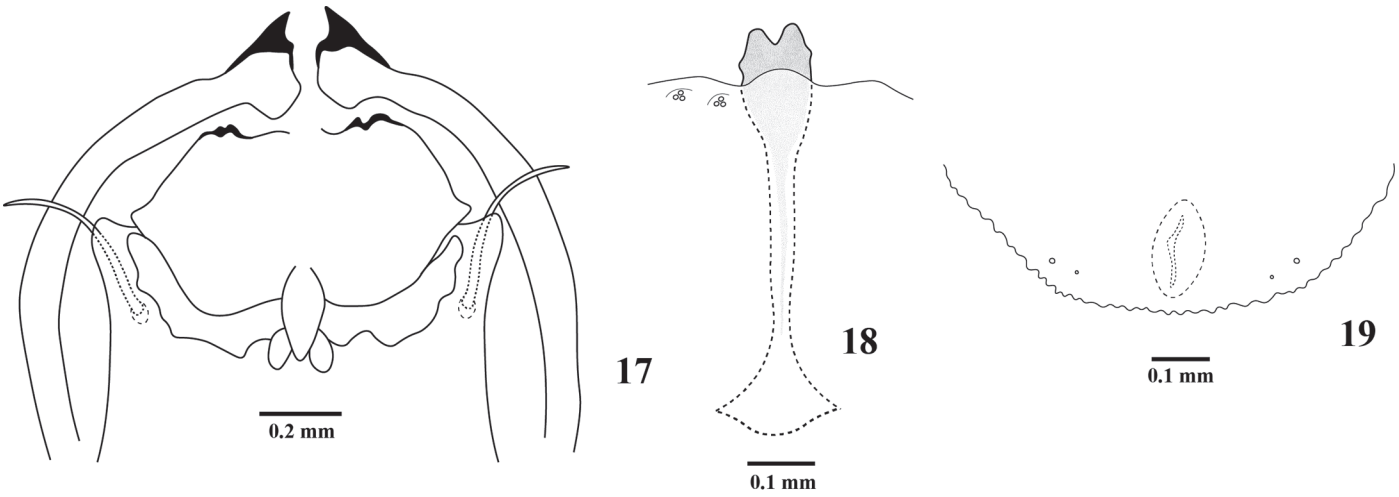
Fig. 12. Cylindrical leaf galls of *Lopesia mataybae* **sp. nov.** on *Matayba guianensis* (Sapindaceae). Arrow marks gall.







Figs. 13–16. *Lopesia chapadensis* **sp. nov. (13).** Third male flagellomere. **(14).** Third female flagellomere. **(15).** Tarsal claw and empodia. **(16).** Male terminalia (dorsal view).



Figs. 17–19. *Lopesia chapadensis* **sp. nov. (17).** Pupal head (ventral view). **(18).** Larval prothoracic spatula. **(19).** Larval terminal segment (dorsal view).

Gall and biology. Globoid shape, smooth, light green, unilocular leaf gall on *A. vermifuga* (Fig. 20). Pupation occurs in the gall.

Remarks. Running the key key to segregation of *Lopesia* species (Rodrigues & Maia 2010), we observed that the specimens studied do not belong to any species described, although *L. chapadensis* **sp. nov.** shares with *L. caulinaris* Maia, and *L. mataybae* **sp. nov.** the setulose flagellomere necks (couplet 1), narrow gonocoxites (couplet 2'), and male flagellomere gynecoid (couplet 7); wing with Rs joining R_1 after its midlength (couplet 8) with *L. elliptica* Maia, 2003 (Madeira et al. 2003), tarsal claws 1-toothed with (couplet 8') with *L. maricaensis* Rodrigues & Maia, 2010 (Rodrigues & Maia 2010); presence of larval prothoracic spatula with 2 teeth (couplets 1, 2', and 3), terminal segment of larva without reentrancy and terminal papillae equally long (couplets 4 and 5'), posterior margin of larval prothoracic spatula large and teeth of prothoracic spatula spaced apart, with lateral process and rounded at apex (couplets 7, 8', and 9) with *L. linearis* Maia, 2003.

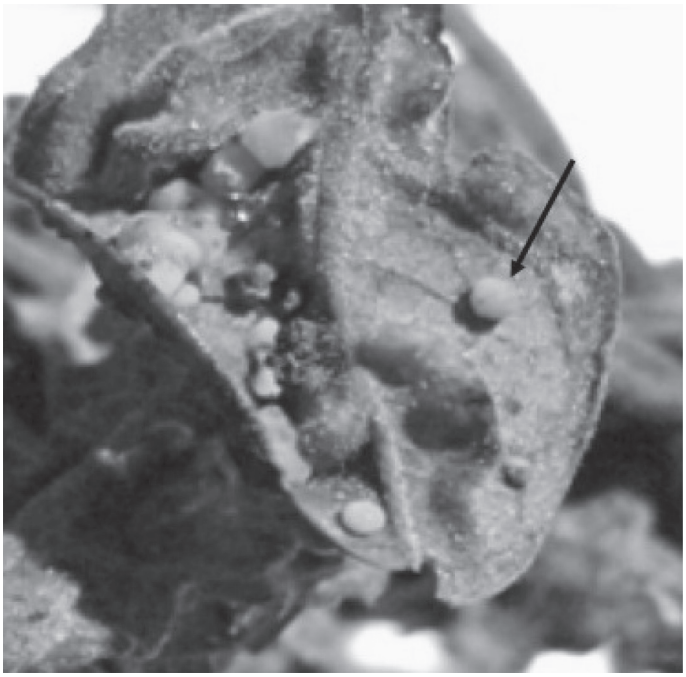


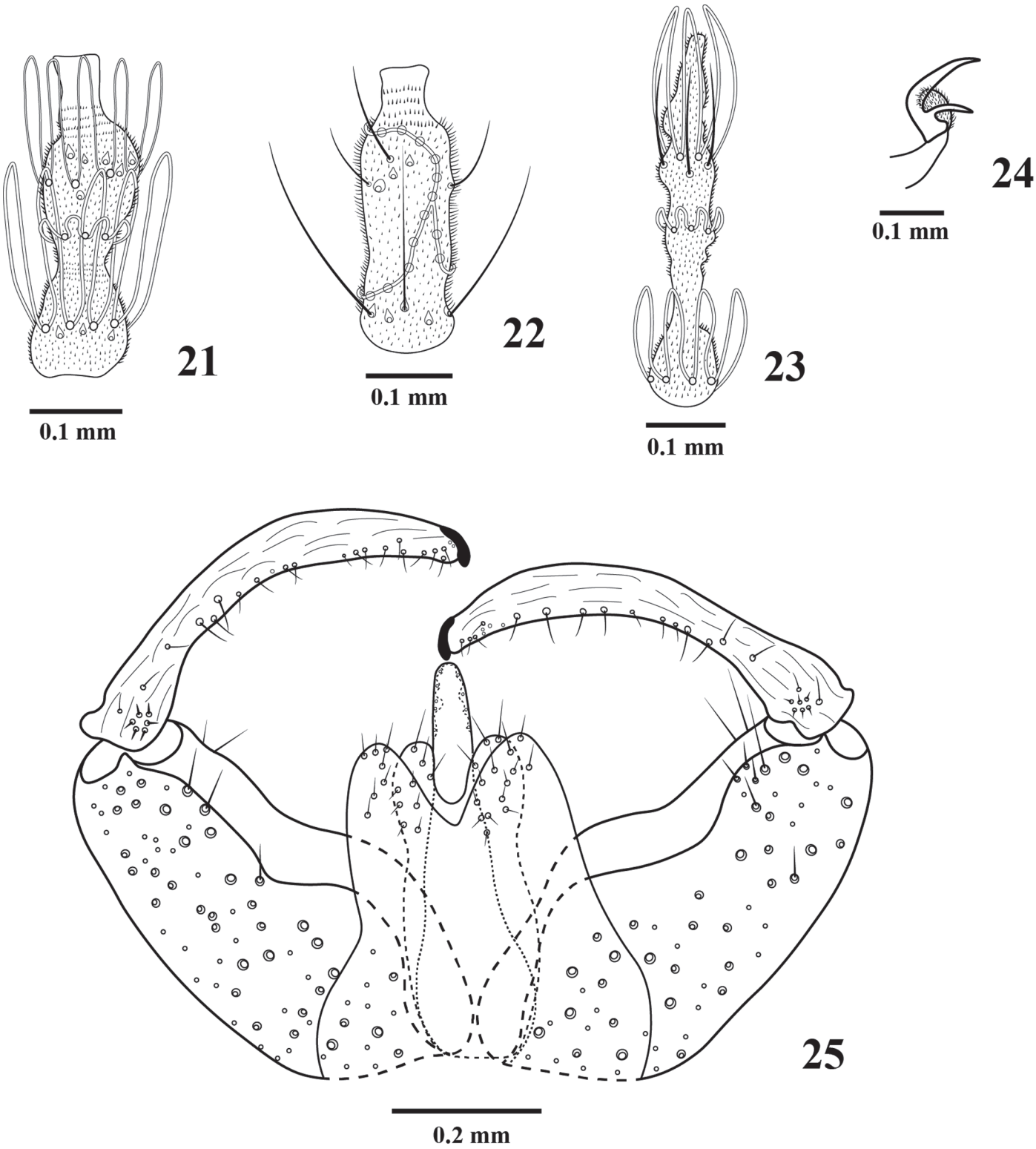
Fig. 20. Leaf galls of *Lopesia chapadensis* **sp. nov.** on *Andira vermifuga* (Fabaceae). Arrow in gall.

Despite those similarities, the following set of characteristics differentiates *L. mataybae* **sp. nov.** from its congeners: male cerci triangular and bilobed with rounded apex; aedeagus large and wide, larval terminal segment with 2 corniform papillae each side (as *L. davillae* Maia) and inducing galls on *A. vermifuga*.

Lopesia ubatubensis **sp. nov.** Garcia & Urso-Guimarães (Figs. 21–30)

DESCRIPTION

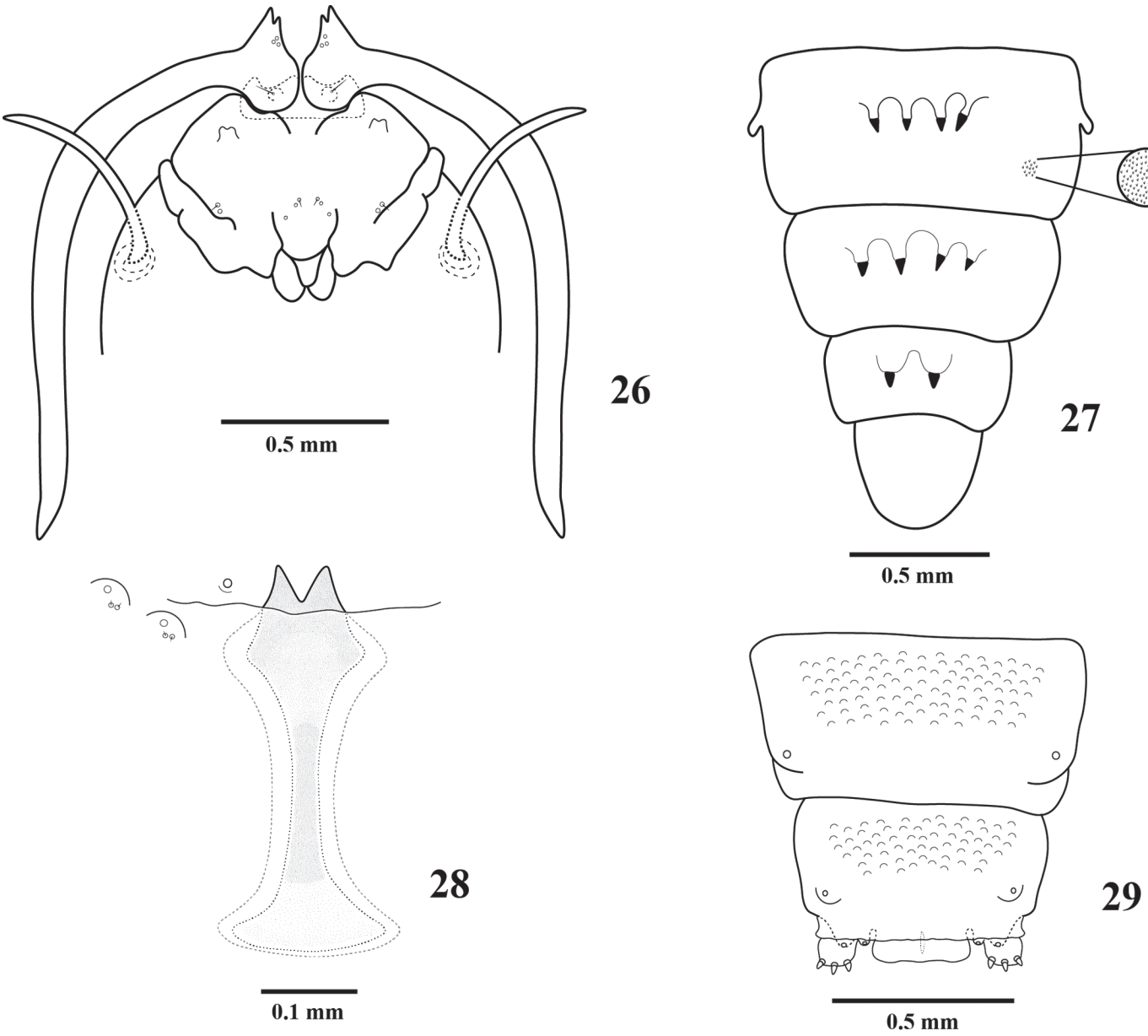
Adult. Male – Light brown. Body: 1.7 mm long (male, n = 2); 1.8 mm long (female, n = 5). Head: Eyes black, holoptic, facets circular, closely adjacent. Occipital process present. Frontoclypeus with 5 long setae; labrum triangular with 3 pairs of setae; hypopharynx of the same shape as labrum; labella elongate-convex, each with 6 lateral setae; palpi total length, 0.3 mm, palpi 4-segmented. Antennae: Total length, 0.9 mm in male and 0.7 in female; scape and pedicel length, 0.2 mm; 12 binodal flagellomeres; tricircumfilar, circumfila whorls basal and distal long, regular in length and mesal circumfila appressed to flagellomere body (Fig. 21); female flagellomeres cylindrical, with interconnected circumfila (Fig. 22); setulose necks and apical process present (Fig. 23); in both sexes. Thorax: Scutum and scutellum brown. Scutum with 1 row of dorsal setae and 1 row of lateral setae, anepimeron with 10 setae, katepisternum and anepistenum bare, laterotergite bare, mediotergite bare. Legs: First tarsomere without spur; tarsal claws toothed and bent near the base. Empodia reaching the bend in claws. Tarsal claws bent near midlength and toothed; empodia as long as the bend in claws (Fig. 24). Wings (as in Fig. 5): 1.3 mm long and 0.5 mm wide (male); 1.5 mm long and 0.5 mm wide (female). Abdomen*:* Tergites 1–7 rectangular, sclerotized with a complete row of posterior setae in males and female; tergite 8 not sclerotized in males and female. Trichoid sensilla absent. Sternites 1–6 weakly sclerotized in males and females with a complete row of posterior setae. Sternites 7–8 not sclerotized in both sexes. Male terminalia (Fig. 25): Gonocoxites elongated, narrow and with mesobasal lobe rounded and discrete; gonostylus clavate, bigger than gonocoxite, presence of several setae at lower margin, group of 6 sensillae at basal region; gonostylus teeth entire and discrete; cercus wide, bilobed with rounded apex; hypoproct deeply bilobed and setose, lobes apex rounded, same size as cercus, each lobe with some strong setae at tip; aedeagus narrow and elongated; rounded at apex and 1.5 longer than hypoproct; parameres absent. Ovipositor (as in Fig. 7): length, 0.15 mm; slightly protrusible,



Figs. 21–25. *Lopesia ubatubensis* **sp. nov. (21).** Third male flagellomere. **(22).** Third female flagellomere. **(23).** Twelfth male flagellomere. **(24).** Tarsal claws and empodia. **(25).** Male terminalia (dorsal view).

cerci separate, ovoid and setose, 2 setae longer than the others; hypoproct short and covered by setulae.

Pupa. Dark brown. Body: 1.9 mm long (n = 6). Head: Antennal horns, 0.1 mm long, triangular, dentate and sclerotized, presence of 3 asetose papillae on each horn (Fig. 26). Cephalic seta short (0.02 mm); 2 pairs of lower facial papillae, 1 asetose and 1 setose; 2 pairs of lateral facial papillae (1 asetose and 1 setose). Cephalic lateral spine rectangular. Thorax: Wing reaching second abdominal segment; foreleg, midleg, and hind leg reaching fourth abdominal segment. Prothoracic spiracle setiform and well developed (length: 0.23 mm). Abdomen: Abdominal tergites 1–8 completely covered with micro spines. Abdominal tergite 1 without dorsal spines. Abdominal tergites 2–6 with 1 row of con-



26–29. *Lopesia ubatubensis* **sp. nov. (26).** Pupal head (ventral and dorsal views). **(27).** Pupal abdominal tergites 6–9 with dorsal spines in the distal area. All tergites covered by micro spines as shown in the 5th segment. **(28).** Larval prothoracic spatula and lateral papillae. **(29).** Larval terminal segments.

spicuous spines varying in number. Spiracles present in dorsal tergites 2–6 and absent in tergites 7–9. Integument smooth. Terminal segment, 0.1 mm in length and width (Fig. 27).

Larva 3rd instar. Cream. Body length, 1.7 mm (n = 2). Spatula 2-toothed with long stalk, 0.1 mm long. Stalk strongly sclerotized in the upper and middle region, posterior region enlarged. Lateral papillae in 2 groups of 3 papillae, 2 setose and 1 asetose (Fig. 28). Terminal segment with 3 pairs of corniform papillae and 2 pairs of ventral papillae without setae, ventral anus in cleft (Fig. 29). Integument rough.

Types. HOLOTYPE male, Ubatuba, São Paulo, Brazil (Praia do Cedro, 23.5391°S, 45.1713°W), reared from leaf galls of *Clidemia* sp. (Melastomataceae), 26 Mar 2016 by Maria Virginia Urso-Guimarães, emerged 29 Jul 2016 (Museu de Zoologia of the Universidade de São Paulo, São Paulo, Brazil). PARATYPES, 1 male, 5 female, 2 pupal exuvia, 1 larva collected and reared with holotype (Museu de Zoologia of the Universidade of São Paulo, São Paulo, Brazil).

Etymology. The specific epithet refers to the type locality of the new species, the Ubatuba municipality.

Gall and biology. Globoid shape, green, red hairy, unilocular leaf gall in *Clidemia* sp. (Melastomataceae) (Fig. 30). Tavares (1917) made references to a cecidomyiid as inducer of hairy, spherical galls on twigs and leaves of *Clidemia* sp. from Serra do Caraça, Minas Gerais State, Brazil. Despite the entire plant being collected, their specific identification was not possible because the plant was collected without the reproductive organs. Pupation occurs in the gall.

Remarks. Running the key to segregation of *Lopesia* species (Rodrigues & Maia 2010), we observed that the specimens studied resemble *Lopesia erythroxyli* (Rodrigues & Maia) in the setulose flagellomere necks (couplet 1), narrow gonocoxites (couplet 2'), male flagellomere not gynecoid (couplet 7'); mesal circumfila with reduced circumfilar loops (couplet 9'); *L. ubatubensis* **sp. nov.** shares the narrow gonostylus with *L. conspicua* Maia, 2003, and the short mesobasal lobe with *L. similis* Maia, 2004 (Narahara et al. 2004; Madeira et al. 2003). Also it is

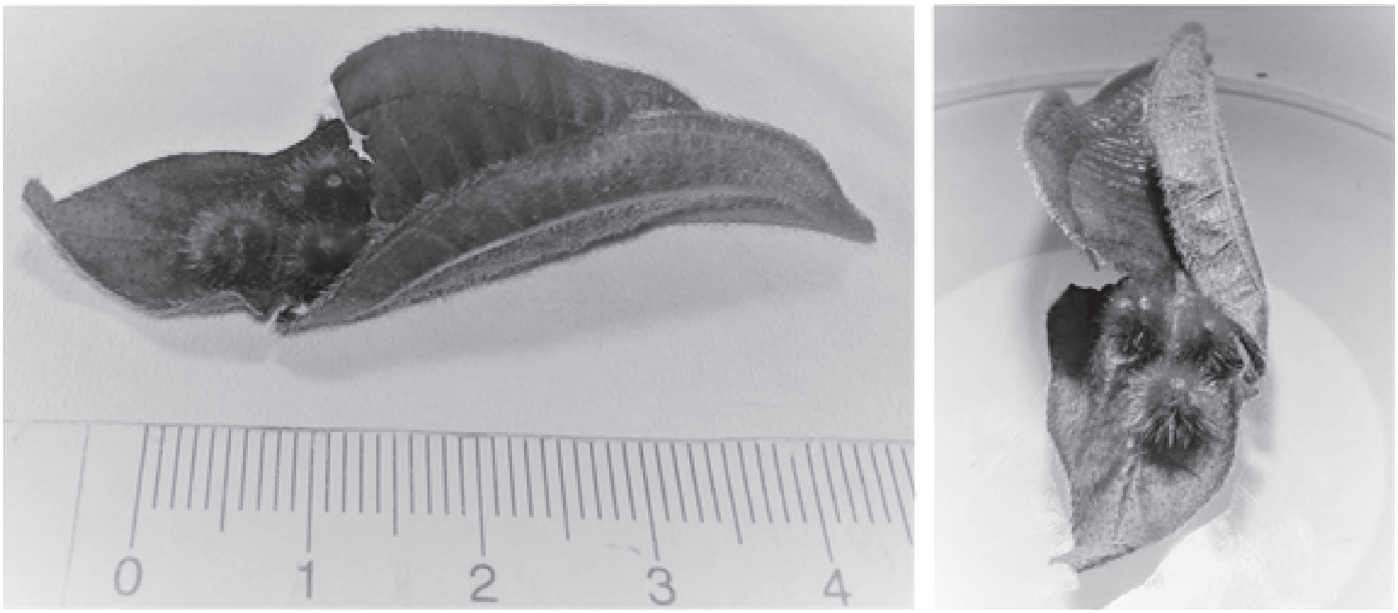


Fig. 30. Leaf galls of *Lopesia ubatubensis* **sp. nov.** in *Clidemia* sp. (Melastomataceae).

similar in the developed pupal antennal horn (couplet 1), conspicuous apical setae of pupa, 0.02 mm long (couplets 2 and 3'), pupal dorsal abdominal spines present and simple (couplets 4 and 6) with *L. spinosa* Maia, 2004; and shares with *L. caulinaris* Maia, 2003, the presence of larval prothoracic spatula with 2 teeth (couplets 1, 2', and 3), terminal segment with weak reentrancy and with terminal papillae equally long (couplets 4' and 5'), posterior margin of larval prothoracic spatula large and with sharp teeth spaced apart, with lateral process at apex (couplets 7', 8', and 9'), larval terminal segment with 2 lateral lobes at the posterior end (couplet 10) (Madeira et al. 2003).

The following set of characteristics differentiates *L. ubatubensis* **sp. nov.** from its congeners: pupal antennal horns dentate and sclerotized with 3 papillae on each horn and cephalic lateral spine rectangular in pupae, male flagellomeres tricircumfilar; with mesal circumfila appressed to flagellomere; gonocoxites without medial constriction; and inducing galls in leaf of *Clidemia* sp.

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