Gall midges (Diptera, Cecidomyiidae) associated with *Aldina heterophylla* Spr. ex Benth. (Fabaceae) from Brazil

Sheila Patricia Carvalho Fernandes[1,3], Valéria Cid Maia[2] & José Albertino Rafael[1]

[1]Coordenação de Pesquisas em Entomologia, Instituto Nacional de Pesquisas da Amazônia – INPA, Av. André Araújo, 2936, CEP 69011970 CP 478, Manaus, AM, Brasil
[2]Departamento de Entomologia, Museu Nacional, Quinta da Boa Vista, São Cristóvão, CEP 20940-040 Rio de Janeiro, RJ, Brasil
[3]Corresponding author: Sheila Patricia Carvalho Fernandes, e-mail: sheilapcfernandes@gmail.com

FERNANDES, S.P.C., MAIA, V.C. & RAFAEL, J.A. **Gall midges (Diptera, Cecidomyiidae) associated with *Aldina heterophylla* Spr. ex Benth. (Fabaceae) from Brazil**. Biota Neotrop. 10(1): http://www.biotaneotropica.org.br/v10n1/en/abstract?article+bn02410012010.

Abstract: Gall midges (Diptera, Cecidomyiidae) associated with *Aldina heterophylla* Spr. ex Benth. (Fabaceae) are recorded. We found three galls morphotypes induced by Cecidomyiidae (Diptera) on leaflets of *A. heterophylla*. A new species of Cecidomyiidae - *Lopesia aldinae* is described and ilustrated based on material collected at Reserva Biológica da Campina, Manaus, Amazonas, Brazil. One inquiline species - *Contarinia* sp., one predator species - *Lestodiplosis* sp. and eleven parasitoids species being four Eulophidae species, five Eurytomidae species and two Pteromalidae species were recorded in *Lopesia aldinae* galls.
Keywords: *insect galls, campina, Amazon Forest, Lopesia, taxonomy.*

FERNANDES, S.P.C., MAIA, V.C. & RAFAEL, J.A. **Mosquitos galhadores (Diptera, Cecidomyiidae) associados com *Aldina heterophylla* Spr. ex Benth. (Fabaceae) do Brasil.** Biota Neotrop. 10(1): http://www.biotaneotropica.org.br/v10n1/pt/abstract?article+bn02410012010.

Resumo: Mosquitos galhadores (Diptera, Cecidomyiidae) associados com *Aldina heterophylla* Spr. ex Benth. (Fabaceae) são registrados. Foram encontrados 3 morfotipos de galhas induzidos por Cecidomyiidae (Diptera) em folíolos de *A. heterophylla*. Uma nova espécie de Cecidomyiidae – *Lopesia aldinae* é descrita e ilustrada baseada em material coletado na Reserva Biológica da Campina, Manaus, Amazonas, Brasil. Uma espécie inquilina - *Contarinia* sp., uma predadora – *Lestodiplosis* sp. e onze espécies de parasitóides, sendo quatro de Eulophidae, cinco de Eurytomidae e duas de Pteromalidae foram registradas em galhas de *Lopesia aldinae*.
Palavras-chave: *galhas de insetos, campina, Floresta Amazônica, Lopesia, taxonomia.*

Introduction

Aldina heterophylla Spr. ex Benth. (Fabaceae) is a common tree of Amazon forest, intensively present in campina and campinarana environments. This tree is popular known as "macucu" and belongs to forest dossel (10-15 m), but in campina this plant is smaller (2-3 m). It is usually covered by epiphytes and distributed in Central Amazon (Ribeiro et al. 1999).

We describe the galls and one new species associated with *A. heterophylla*. The new species belongs to *Lopesia* Rübssamen (1908). This genus is the single of the Lopesiini with distribution not exclusively Neotropical, being found also in the Afrotropical and Neartic regions (Gagné 2004). So far five described species of *Lopesia* are known on Fabaceae (including Mimosoideae): *L. armata* Gagné, 1993 on *Acacia tortilis* (Forsk.) Hayne., *L. grandis* Maia, 2001 on *Dalbergia ecastophylla* L. Taub., *L. niloticae* Gagné, 1993 on *Acacia nilotica* (L.) Willd. ex Del., *L. mimosae* Maia, 2010 and *L. pernambucensis* Maia, 2010 on *Mimosa tenuiflora* (Willd.) Poir. (Gagné & Marohasy 1993, Maia 2001, Maia et al. 2010). Besides that, we report the entomofauna associated with the new species of *Lopesia*.

Methods and Materials

The Reserva Biológica da Campina is located 45 km north of Manaus, Amazonas, Brazil (2° 35' 26" S and 60° 01' 49" W), with 900 ha of area. The reserve has a small area of campina characterized by a nutrient-limited environment with low plant diversity. The vegetation is dominated by a very peculiar flora, with two predominant species *Aldina heterophylla* and *Pradosia schomburgkiana* (A. DC.) Cronquist (Sapotaceae) (Roberts et al. 1998).

We collected galls directly on *A. heterophylla*. The surveys were done in August of 2008 and June and July of 2009. The galls were taken to laboratory for rearing of insects. Each gall morphotype was kept individually in plastics pots layered at the bottom with damp cotton and covered by fine screening. The pots were checked daily. Immature insects were obtained by dissecting the galls. All specimens were preserved in 70% ethanol. The larvae and adults of Cecidomyiidae were mounted in slides following the methodology of Gagné (1994) and morphological terminology for immatures and adults followed the same author. Some biological data are given.

The field and the laboratory work were done by Sheila P. C. Fernandes and the taxonomic descriptions were made by Sheila P. C. Fernandes and Valéria C. Maia.

Part of material was deposited in the Invertebrates Collection of National Institute for Amazon Research (INPA), Manaus, Amazonas, Brazil, and part in the Diptera Collection of Museu Nacional/UFRJ.

Results

Three morphotypes of galls were found on *Aldina heterophylla*, all on leaves. The first gall is a marginal leaf roll (Figure 1), green, glabrous and one-chambered with one larva per chamber (material obtained: 1 larva, 1 pupal exuviae and 1 male). The second is a cylindrical gall (Figure 2), green, glabrous, one-chambered and one larva per chamber (material obtained: 2 larvae). The third is a globoid gall and it is described below (Figure 3). All galls were induced by Cecidomyiidae: the formers by two undetermined Cecidomyiidae species (the material obtained was insufficient for identification) and the globoid gall by *Lopesia aldinae*, n. sp. described below.

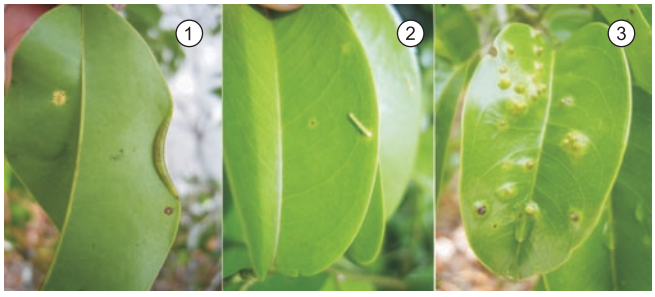
Lopesia aldinae Fernandes & Maia new species (Figures 4-19)

Adult – Head: occipital process present (Figure 4). Eyes facets circular, all closely approximated. Antenna: male flagellomeres binodal, 12 flagellomeres, bi-circumfilar, circumfilar loops regular in length, flagellomeres necks bare and subequal in length (Figure 5). Female flagellomeres cylindrical with circumfila as in Figure 6. Twelfth flagellomere with apical process in both sexes. Scape and pedicel globoid, the former longer than the latter. Frontoclypeus with 6 - 8 setae (n = 4). Labrum triangular, long-attenuate. Hypopharynx as long as labrum. Labellae elongate-convex, each with some lateral setae and two pairs of short mesal setae. Palpus with four setose cylindrical segments. Length of palpus: segment I: 0.03 - 0.05 mm; II: 0.02 - 0.04; III: 0.02 - 0.04 and IV: 0.02 - 0.05 (n = 4).

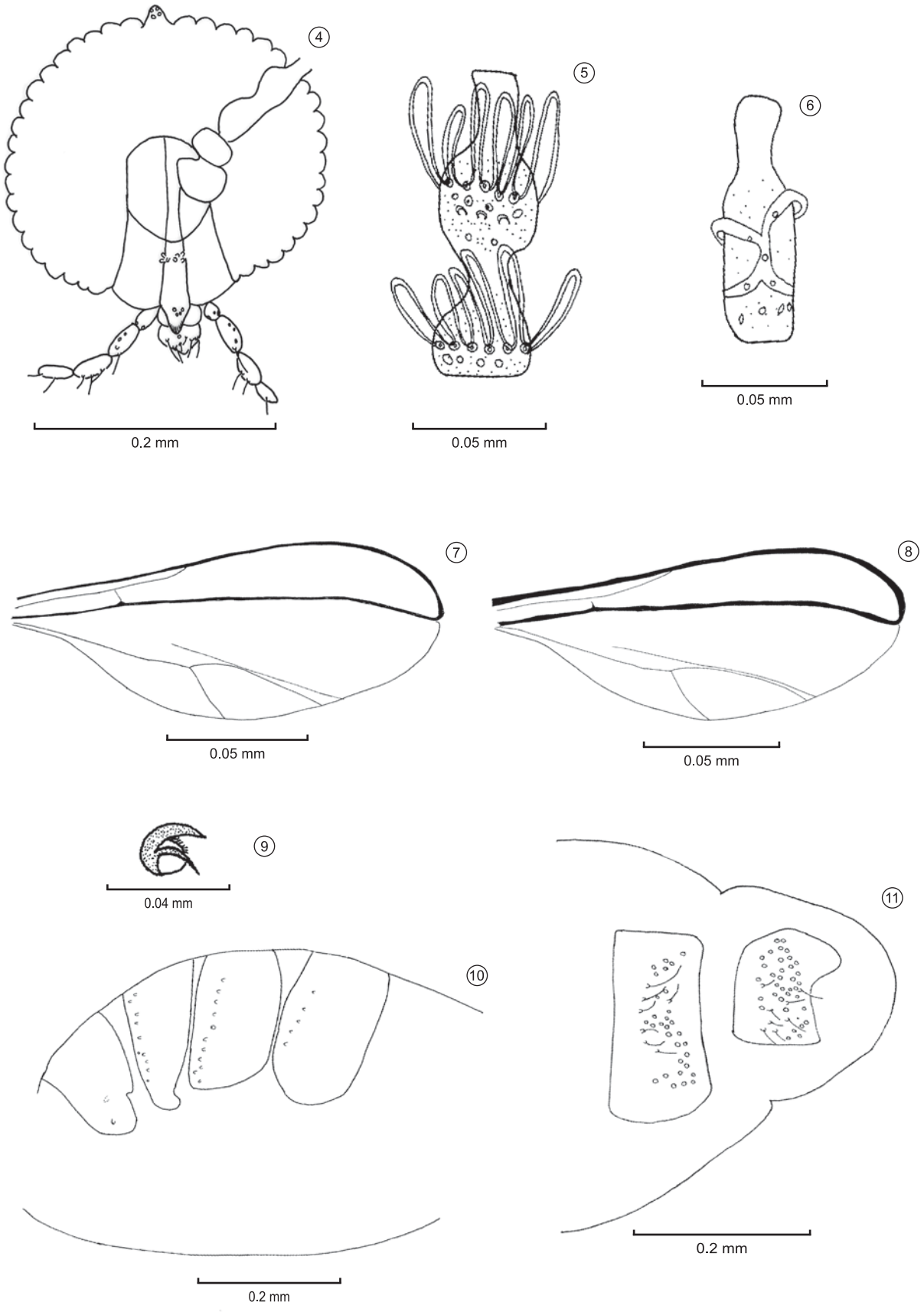
Thorax. Anepimeron with 3-6 setae (n = 4). Anepisternum bare. Wings: length: 1.75-1.86 mm (n = 5). Rs situated after midlength of R_1, weaker than R_1 and complete (Figure 7) or incomplete (Figure 8). R_5 slightly bent at juncture with C. R_5 joining C after wing apex. Cu forked and M_3 present. Legs: Tarsal claws bent before midlength, with one tooth (Figure 9). Empodium short reaching bent in claws.

Abdomen. Male: Tergites 1-6 rectangular with single row of caudal setae and two anterior trichoid sensilla, tergite 7 with a caudal row of setae, tapering laterally and one anterior pair of trichoid sensilla, tergite 8 not sclerotized or band-like with few setae distributed only laterally and one anterior pair of trichoid sensilla (Figure 10). Sternites 2-7 rectangular, with a caudal row of setae, irregular mesal rows of setae and one anterior pair of trichoid sensilla. Sternite 8 slightly sclerotized, rectangular with an apical lobe laterally, mesal and caudal setae irregularly distributed and one anterior pair of trichoid sensilla (Figure 11). Female: tergites 1-7 rectangular with a caudal row of setae, irregular mesal rows of setae and one anterior pair of trichoid sensilla, tergite 8 rectangular with a lateral reentrance apically (Figure 12), irregular rows of caudal and mesal setae and one anterior pair of trichoid sensilla. Sternites 2-7 rectangular with rows of caudal and mesal setae and one anterior pair of trichoid sensilla, sternite 8 with mesal and caudal setae irregularly distributed and one anterior pair of trichoid sensilla. Male terminalia (Figure 13): Gonocoxite splayed with mesobasal lobe; gonostylus elongate, thin, striate; straight (Figure 13) or with a reentrance (Figure 14), cercus larger than hypoproct, cercus and hypoproct similar in length; edeagus triangular, elongate, tapering to the apex, with an internal sclerotized canal and longer than hypoproct. Female terminalia: ovipositor not protrusible, cerci ovoid and setose, hypoproct elongate and setose (Figure 15).

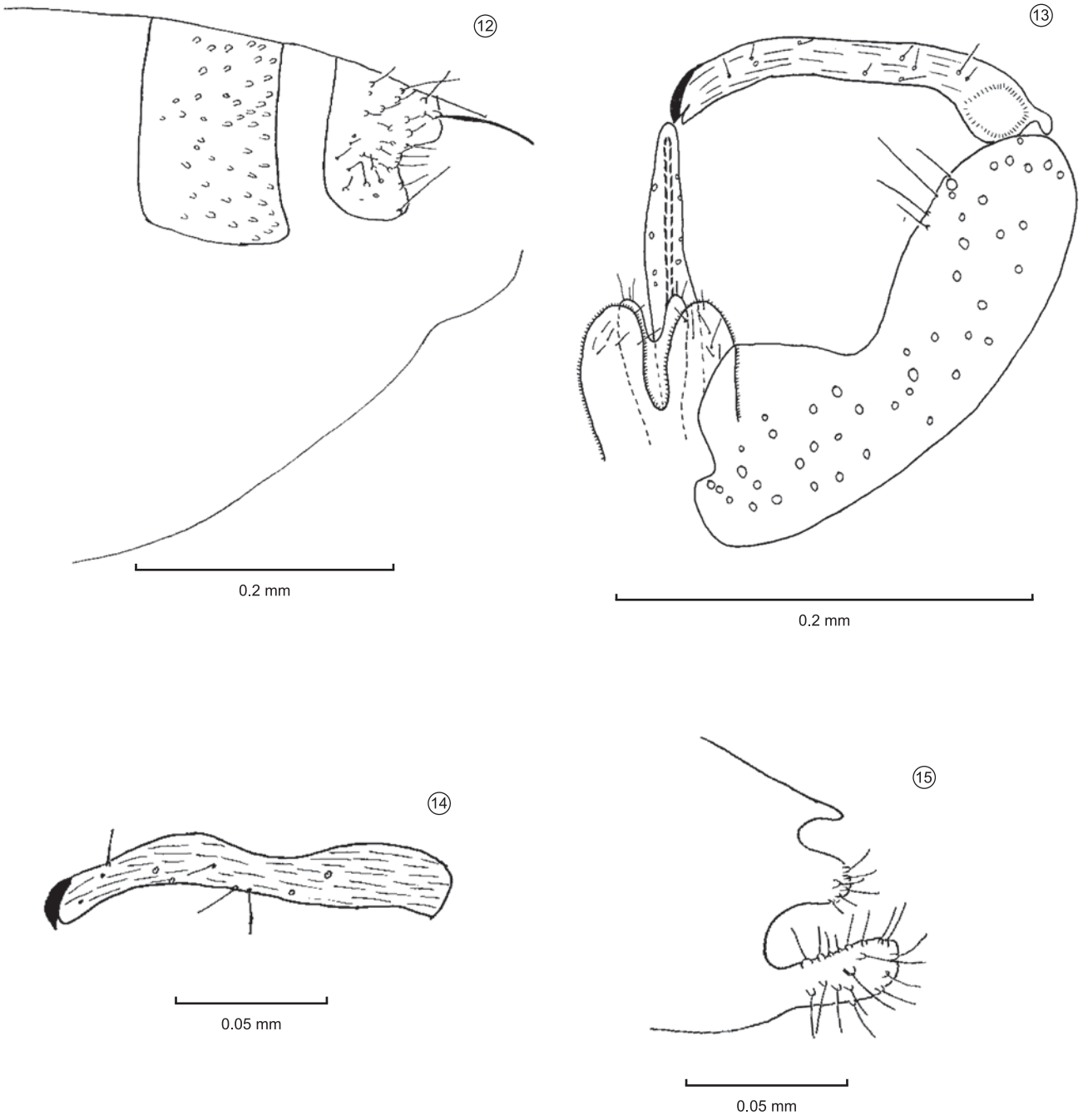
Pupa – Body length: 1.44-1.81 mm (n = 4). Colour: brownish. Cephalic tegument grainy only laterally. Cephalic region with antennal horn short (0.04 mm), triangular and serrated (Figure 16). Apical setae absent. Lower and lateral facial papillae absent. Prothoracic spiracule short with 0.035 mm of length



Figures 1-3. Insect galls associated with *Aldina heterophylla* Spr. ex Benth. (Fabaceae) at Reserva Biológica da Campina, Manaus, Amazonas, Brazil. Marginal leaf roll (1), cylindrical gall (2) and globoid gall of *Lopesia aldinae*, n. sp. (3).



Figures 4-11. *Lopesia aldinae* sp. n. Adult: 4, male, head, frontal view; 5, male flagellomere 4; 6, female flagellomere 8; 7 and 8, male, wing; 9, male, hindleg, claw and empodium; 10, male, abdomen, dorsolateral view; 11, male, abdomen apex, ventral view.



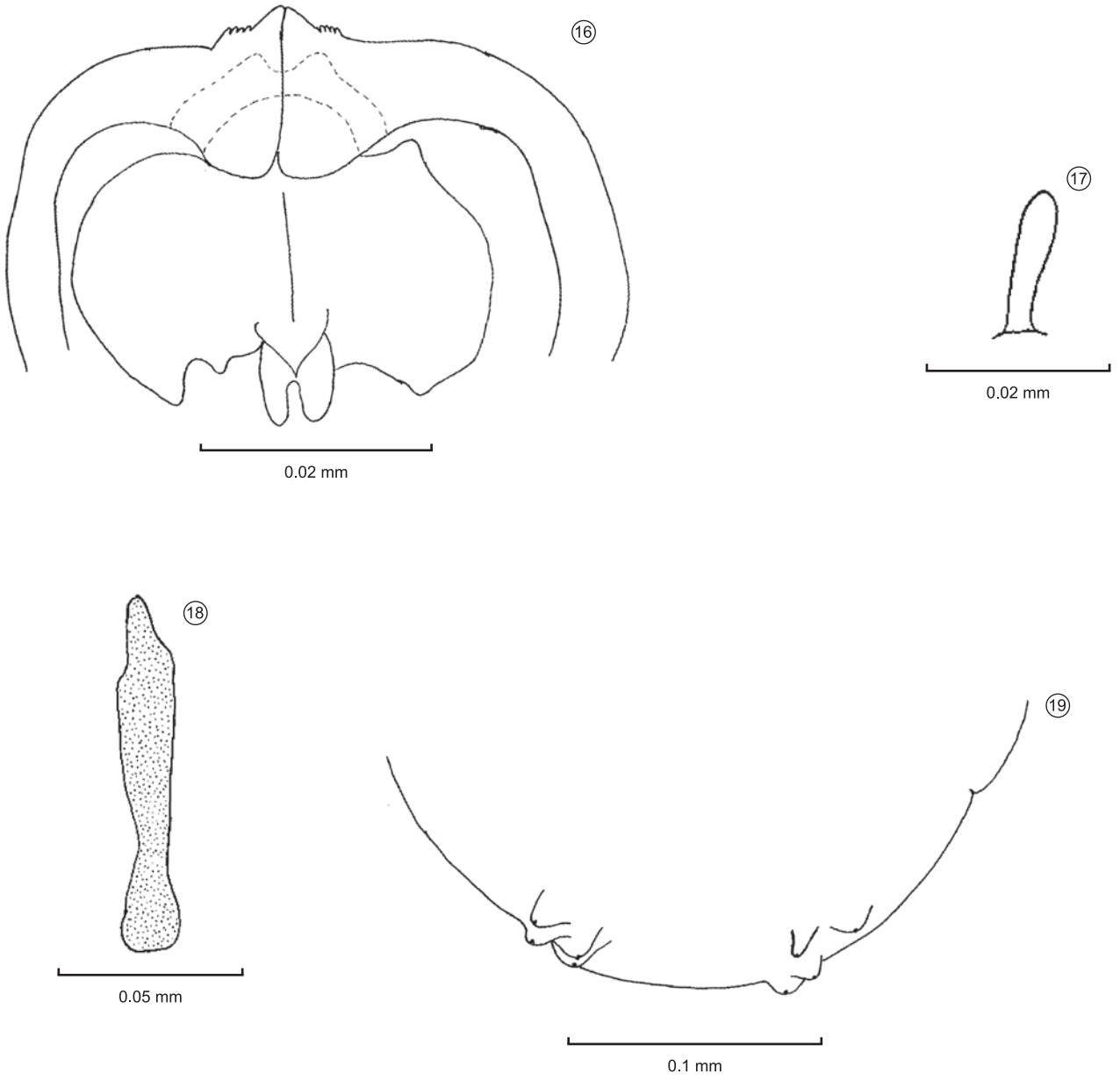
Figures 12-15. *Lopesia aldinae* sp. n. Adult: 12, female, abdomen, dorsolateral view; 13, male, terminalia dorsal view; 14, male, gonostylus, dorsal view; 15, female, terminalia, lateral view.

(Figure 17). Abdominal tergites 2-8 without spines, covered with diminutive spinules.

Larva – Body length: 0.85 mm (n = 1). Colour: white. Spatula 1-toothed (Figure 18), length: 0.11 mm (n = 1). Lateral papillae not visible. Terminal papillae with four pairs of corniform papillae (Figure 19).

Material examined – Holotype male. BRAZIL, AMAZONAS: Manaus (Reserva Biológica da Campina), 04.VIII.2008, S. P. C. Fernandes col., INPA. Paratypes, same locality and collector – 4 male, 04-07.VIII.2008 (INPA); 1 male, 04-07.VIII.2008 (Museu Nacional/UFRJ); 3 male, 05-07.VI.2009 (INPA); 2 female, 05-07.VIII.2008 (INPA); 1 female, 05-07.VIII.2008 (Museu Nacional/UFRJ); 1 female, 05-07.VI.2009 (INPA); 4 pupal exuviae, 05-07.VI.2009 (INPA); 1 pupal exuviae, 05-07.VI.2009 (Museu Nacional/UFRJ); 1 larva, 06.VIII.2009 (INPA). Additional material examined: 1 female, 05-07.VI.2009; 3 male, 05-07.VIII.2008; 1 male, 05-07.VI.2009 (INPA). All specimens slide mounted.

Gall (Figure 3): Green, globoid, glabrous and one-chambered. Pupation takes place in the gall. The gall initiates its formation with the beginning of leaves development, which occurs subsequently to the end of rainy season, between June and July. This



Figures 16 – 19. *Lopesia aldinae* sp. n. Pupa and larva: 16, pupa, cephalic region, ventral view; 17, pupa, prothoracic spiracle; 18, larva, spatula, ventral view; 19, larva, terminal segments, dorsal view.

globoid gall usually has a high density and in some leaflets the galls occupy all area. Besides the *Lopesia aldinae*, we found inquilines, predators and parasitoids. *Contarinia* sp. (Diptera, Cecidomyiidae) and Tanaostigmatidae (Hymenoptera) were found as inquilines. *Lestodiplosis* sp. (Diptera, Cecidomyiidae) was found as a predator species. Eleven parasitoids species which belong to three Hymenoptera families were recorded: four Eulophidae species, five Eurytomidae species and two Pteromalidae species. All specimens were deposited in the Invertebrate Collection of INPA.

Etymology – The name *aldinae* refers to the generic name of the host plant.

Remarks –This species is unique in having one-toothed spatula (larva), pupa with lower and lateral facial papillae absent, antennal horn simple with the basal margin serrated, male with flagellomere bi-circumfillar and female tergite 8 rectangular with a lateral reentrance apically. *Lopesia aldinae* is similar to *L. conspicua* Maia, 2003 and *L. elliptica* Maia, 2003 in such characteristics: pupa, prothoracic spiracule slightly sclerotized; adult, palpus with four segments, gonocoxite narrow, with a marked constriction, mesobasal lobe well developed and gonostylus narrow. *Lopesia aldinae* differs from *L. conspicua* and *L. elliptica* in having flagellomeres necks bare, tarsal claws with one tooth and prothoracic spiracule almost straight.

This is the first record of gall on *Aldina heterophylla* and the first species of *Lopesia* described for the Amazon region.

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