



## NEW GENUS AND SPECIES OF CECIDOMYIIDAE (DIPTERA) ASSOCIATED WITH *ARRABIDAEA* SP. (BIGNONIACEAE) FROM PERU<sup>1</sup>

(With 16 figures)

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**ABSTRACT.** A new gall midge genus *Heterodiplosis* gen. nov. and a new species, *H. peruviana* sp. nov., that induces galls on leaves of *Arrabidaea* sp. (Bignoniaceae) are described from Peru (larva, pupa, male, female, and gall).

**Key words:** Diptera. Cecidomyiidae. *Heterodiplosis peruviana* gen. et sp. nov. Bignoniaceae. *Arrabidaea*.

**RESUMO:** Novo gênero e espécie de Cecidomyiidae (Diptera) associados com *Arrabidaea* sp. (Bignoniaceae) do Peru. Um novo gênero de mosquito de galhas, *Heterodiplosis* gen. nov., e uma nova espécie, *H. peruviana* sp. nov., que induz galhas nas folhas de *Arrabidaea* sp. (Bignoniaceae) são descritos do Peru (larva, pupa, macho, fêmea e galha).

**Palavras-chave:** Diptera. Cecidomyiidae. *Heterodiplosis peruviana* gen. et sp. nov. Bignoniaceae. *Arrabidaea*.

### INTRODUCTION

*Arrabidaea* DC (Bignoniaceae) is known from about 100 species. It is widely distributed in the Neotropics, from Mexico, Caribbean Islands to Argentina (STANDLEY & WILLIAMS 1974; GENTRY 1974). Some species of *Arrabidaea* have medicinal importance, being used as digestive and stomachic (GENTRY 1992). They are also used as tincture of natural fibers in workmanship.

Leaf galls induced by Cecidomyiidae (Diptera) were found on *Arrabidaea* sp. in Peru. The gall midge belongs to a new genus and species of Cecidomyiidi, which are described herein.

### MATERIAL AND METHODS

Field work was carried out from October, 2006 to December, 2007 by J. Vásquez. The material was collected in a not floodable natural forest in the Centro de Investigaciones Jenaro Herrera (CIJH), 2.5km far from Villa Jenaro Herrera, right margin of the river Ucayali, Provincia de Requena, Departamento de Loreto, Peru.

Attacked leaves were collected and transported to the laboratory, where part of the sample was dissected under a stereoscopic to obtain larvae and pupae. The remainder was kept in plastic pots containing wet tissue paper to obtain adults.

All specimens were first preserved in 96% alcohol and later mounted on slides following the methodology of GAGNÉ (1994).

The studied material (including types) was incorporated to the Diptera collection of the Museu Nacional (MNRJ), Rio de Janeiro, Brazil and in the Museo de Entomologia (MEUNALM), Universidad Agraria La Molina en Lima, Peru.

The description of the new taxa was done by V. C. Maia.

### RESULTS

The gall midge that induces gall on leaves of *Arrabidaea* sp. belongs to the supertribe Cecidomyiidi based on the number (n=12) and shape of the male flagellomeres (binodal), but it does not fit in any known tribe.

#### *Heterodiplosis* Maia gen. nov.

**Diagnosis** – Palpus three-segmented; male flagellomeres with two nodes and three separate circumfila. Wing: R5 joining C beyond wing apex; tarsal claws simple and bent beyond midlength; empodium well developed. Male terminalia: gonocoxite with mesobasal lobe with a distinct pointed projection; hypoproct almost simple. Ovipositor short; female cerci separate. Larval spatula reduced.

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Adult – Head: occipital process absent; palpus three-segmented; male flagellomeres binodal and trircumfilar. Wing: R5 curved, joining C beyond wing apex; Rs partially as strong as R5, but weak anteriorly; base of M curved; CuP present. Legs: first tarsomeres without spur; tarsal claws simple and bent beyond midlength; empodia well developed, reaching beyond bend in tarsal claws. Male terminalia: gonocoxite with mesobasal lobes well developed, lobes rounded at basis, with a pointed projection; male cerci divergent; hypoproct almost simple, longer than cerci; aedeagus elongate; gonostylus elongate, setulose at basal third, striate elsewhere. Ovipositor short, barely protrusible; female cerci separate.

Pupa – Head: antennal horn well developed and with serrate margin; facial papillae absent; prothoracic spiracle reduced; abdominal tergites 2-8 without well developed spines; terminal segment with two similar in length apical tube like projection.

Larva – Spatula reduced with two teeth; terminal segment with four apical lobes.

Remarks – Cecidomyiidi include 37 Neotropical unplaced genera. Among them, the new genus appears to be more closely related to *Arrabidaeamyia* Maia, 2001; *Dactylodiplosis* Rübsaamen, 1916, *Dicrodiplosis* Kieffer, 1895, and *Youngomyia* Felt, 1908.

These genera and *Heterodiplosis* have similar wing venation, gonocoxites with a prominent mesobasal lobe, gonostyli of similar shape, simple hypoproct, ovipositor not protrusible and female cerci separate.

But they differ in the number of segments of the palpus (four in *Arrabidaeamyia*, *Dactylodiplosis*, *Dicrodiplosis* and almost all species of *Youngomyia*, except *Y. pouteriae* Maia, 2001 with one-toothed palpus; and three in the new genus); shape of the tarsal claws (simple only in the new genus and toothed in the others); length of the empodia (longer than the claw in *Heterodiplosis*, and shorter than the claw in the others); chaetotaxy of the gonocoxite mesobasal lobes (setose in *Dicrodiplosis*, *Youngomyia*, and in the new genus, and aetose in *Arrabidaeamyia* and *Dactylodiplosis*), and shape of the male cercal lobes (more splayed in the new genus).

Female cerci of *Arrabidaeamyia*, *Dactylodiplosis* and *Dicrodiplosis* have a peculiar chaetotaxy not observed in the new genus.

Besides, the pupal antennal horns of *Heterodiplosis*

and *Arrabidaeamyia* are similar in shape (serrate) and length (long), but they differ from those of *Dactylodiplosis* and *Youngomyia* (not serrate and short).

The pupal facial papillae are absent in the new genus, but present in *Arrabidaeamyia*, *Dactylodiplosis* and *Youngomyia* (the pupa of the only described Neotropical species of *Dicrodiplosis* is unknown).

The spatula of the new genus differs from that of *Arrabidaeamyia*, *Dactylodiplosis*, *Dicrodiplosis* and *Youngomyia*. *Arrabidaeamyia* has a four-toothed spatula with well developed stalk; *Dactylodiplosis* has a two-toothed spatula with well developed stalk; *Dicrodiplosis* has a one-toothed spatula with well developed stalk; *Youngomyia* has a two-toothed spatula with short stalk, whereas the new genus has a two-toothed spatula without stalk.

The new genus will key to *Cecidomyia* (*Cecidomyiini*) in couplet 61 of GAGNÉ, 1994, but both genera differ in the number of palpal segments (four in *Cecidomyia* and three in the new genus); aspect of flagellomeres 1 and 2 (free in *Cecidomyia* and connate in the new genus); aspect of the male terminalia (gonocoxite with a very peculiar mesobasal lobe, basally rounded and with a pointed projection in the new genus; gonocoxite without such lobe in *Cecidomyia*; gonostylus more elongate and thinner in the new genus; hypoproct clearly bilobed in *Cecidomyia* and almost simple in the new genus; cerci notably divergent only in the new genus); habit of life (larvae of *Cecidomyia* live in resin, mainly on pines, but also on spruce and fir); shape of larval hind spiracles (enlarged, caudally directed in *Cecidomyia*, not modified in the new genus); shape of terminal segment (without lobes on *Cecidomyia* and with four lobes in the new genus).

Type species – *Heterodiplosis peruviana* Maia sp.nov.

Etymology – The generic name is composed of *hetero* (a Latin prefix that means different) + *diplosis* (in reference to the male binodal flagellomeres).

*Heterodiplosis peruviana*, Maia sp.nov.  
(Figs.1-16)

Adult – Length: : 3.5-5.1mm (n=6); ♀: 5.6-5.7mm (n=2).

Head (Fig.1) – Eyes facets hexagonal, closely approximated; antennae: scape obconic, about 1.2-1.3 times longer than wide; pedicel globose

as long as wide or 1.1-1.2 times wider than long; scape about 1.4-1.6 times longer than pedicel; two first flagellomeres connate. ♂: flagellomeres 1 and 2 almost cylindrical (nodes not evident); flagellomeres 3-12 binodal and trircumfilar (Fig.2); proportion between total length of flagellomeres 3-11 and length of basal node varying from 3.0 to 3.3; proportion between total length of flagellomere 12 and length of basal node about 4.1; all flagellomeres similar in length, with about 0.20mm, except the 12<sup>th</sup> with 0.24mm; flagellomere 12 with apical process; ♀: flagellomeres cylindrical with circumfila as two undulate and connected horizontal rings (Fig.3); flagellomeres 1-6 similar in length, with about 0.20mm (antennae broken immediately after flagellomere 6); male and female flagellomeres neck bare; frontoclypeus with few long setae; labrum triangular, long-attenuate, with three pairs of ventral sensory setae and long; hypopharynx of the same shape as labrum with long, anteriorly directed lateral setulae; labellae convex, each with lateral setae and two short mesal setae (Fig.4); palpus: first segment with 0.04-0.06mm of length and 1.5-2.14 times longer than wide (n=4); second segment with 0.05-0.07mm of length; 1.6-1.8 times longer than wide and 1.78 times longer than segment 1 (n=4); third segment with 0.10-0.11mm of length; 2.2-2.75 times longer than wide and 1.34 times longer than segment 2 (n=4); third segment peculiar in shape.

Thorax – wing (Fig.5): length (from arculus to apex): ♂: 2.7-2.9mm (n=5); ♀: 3.5-3.7mm (n=3); tarsal claws: tarsal claws simple and bent beyond midlength; empodium reaching beyond bend in tarsal claws (Fig.6).

Abdomen – ♂: tergites 1-7 rectangular with single, complete row of caudal setae; two basal trichoid sensilla, elsewhere with scattered scales; tergite 8 elliptical with only two basal trichoid sensilla (Fig.8); terminalia (Fig.7): gonocoxite wide; mesobasal lobes well developed, rounded at basis and with a conspicuous pointed projection; male cerci divergent; hypoproct almost simple, much longer than cerci; aedeagus elongate with rounded margin; gonostylus accentuately curved before midlength, irregular in width, setulose at basal third and striate elsewhere. ♀: tergites and sternites not visible; ovipositor short, barely protrusible; female cerci

separate and setose (Fig.9).

Pupa – body length: 3.8-4.6mm (n=10). Head (Fig.10): apical setae short with 0.03-0.04mm of length (n=6); antennal horn well developed (length: 0.30-0.36mm, n=9), with serrate margin; facial papillae absent. Thorax: prothoracic spiracle digitiform, reduced (length: 0.06-0.08mm, n=7) (Fig.11). Abdomen: tergites 2-8 with diminute spines; terminal segment with two similar in length apical tube like projection; each projection about 0.21-0.23mm of length (Fig.12).

Larva (Fig.13): total length: 3.6mm (n=1); spatula (Fig.14): length: 0.05mm; 2-toothed; stalk absent; lateral papillae not visible; terminal segment with 4 lobes apically rounded (Fig.15).

Gall (Fig.16). Spherical, green,  $6.55 \pm 1.61$ mm long and  $4.46 \pm 0.90$  mm wide (n=20), with conspicuous, acute, white projections. Maximum number of galls per leaf: 25. Pupation in the gall. Number of larva/gall: one.

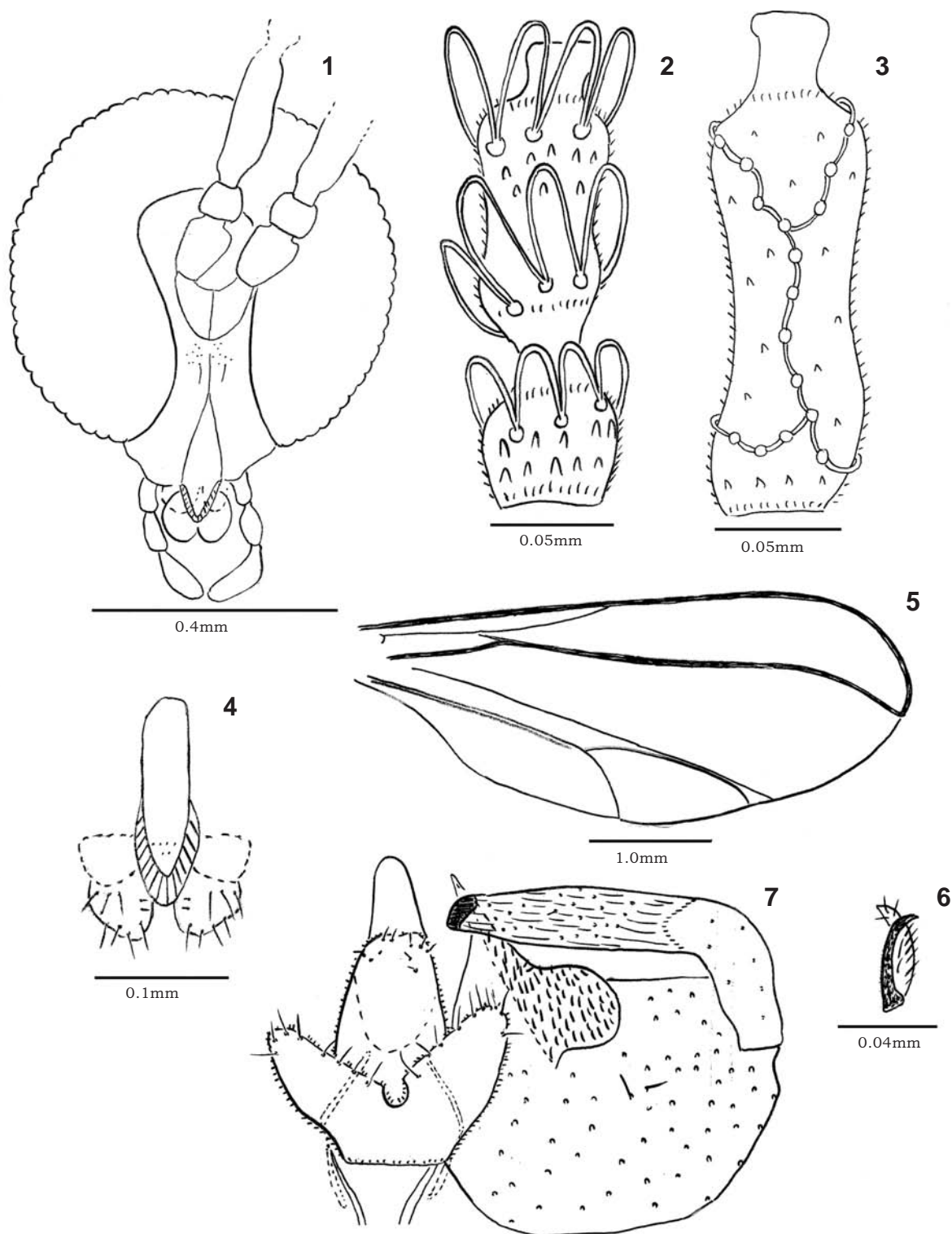
Material examined – Holotype ♂: Peru: Loreto, Iquitos, 10/X/2006, J.Vásquez col., MNRJ. Paratypes: same data as holotype, 6♂, 2♀, 12 pupal exuviae and 1 larva, MNRJ and MEUNALM.

Remarks – Other galls have been recorded on *Arrabidaea conjugata* (Vell.) Mart. (MAIA, 2001a, b): conical leaf gall (induced by *Arrabidaeamyia serrata* Maia, 2001); stem, tendril or midvein swelling (induced by *Neolasioptera* sp.), and flower gall (induced by a non-identified gall midge).

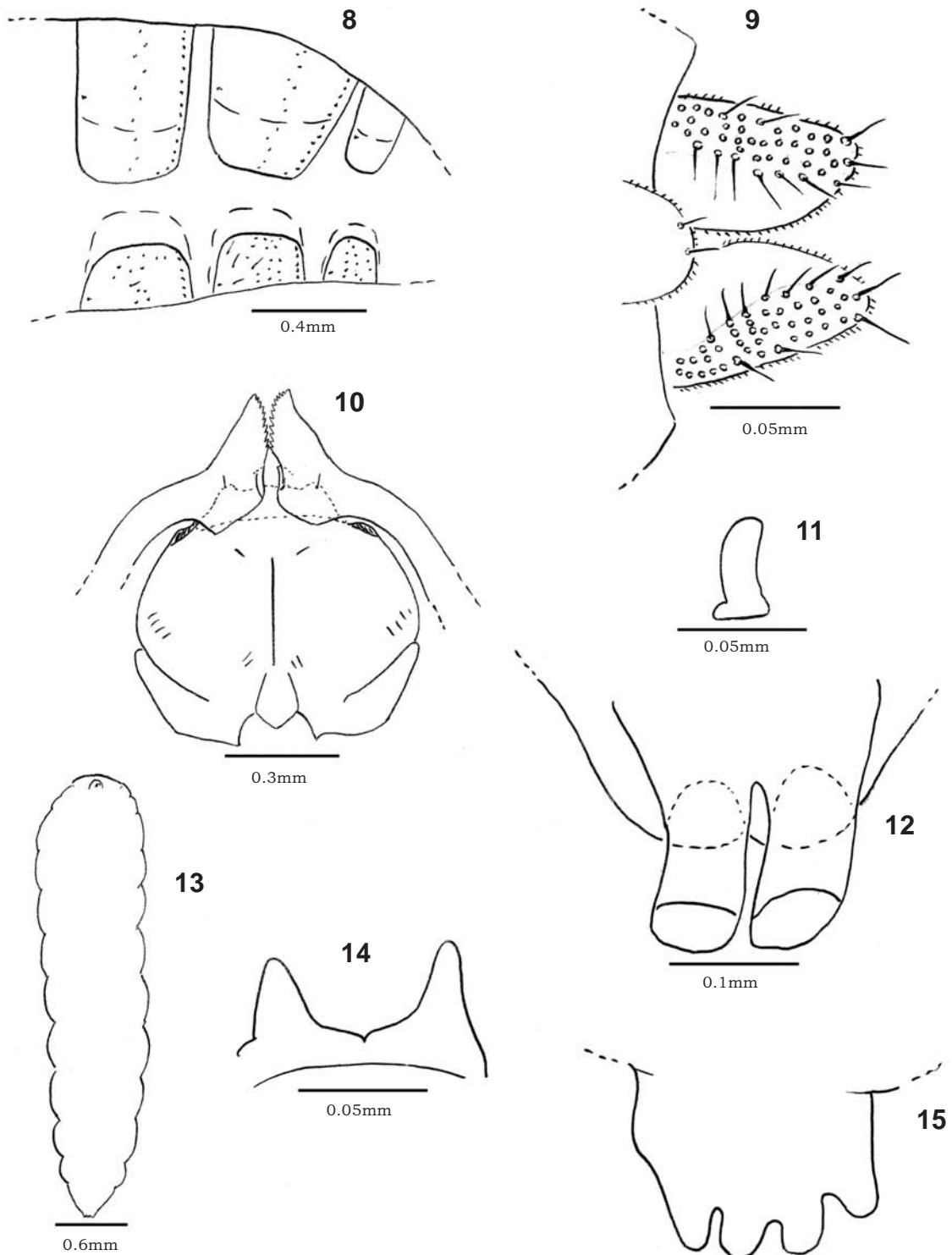
Etymology – The name *peruviana* refers to the country where the material was collected.

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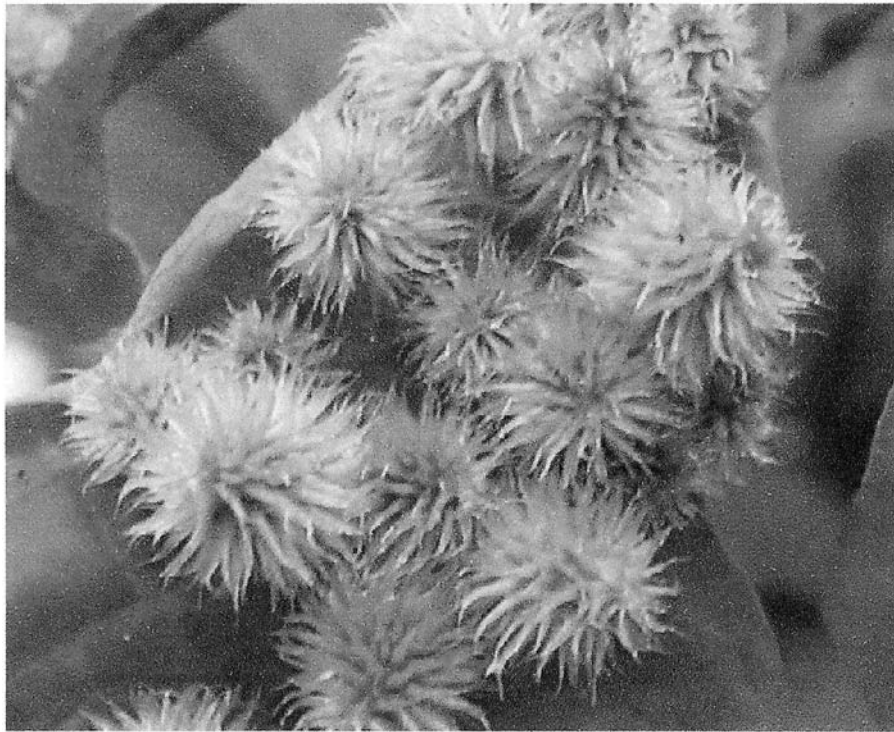
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*Heterodiplosis peruviana* sp nov.: fig.1- ♀, head, frontal view; fig.2- ♂, flagellomere 5; fig.3- ♀, flagellomere 5; fig.4- ♀, labellae, labrum and hypopharynx, ventral view; fig.5- ♂, wing; fig.6- ♂, foreleg, tarsal claw and empodium; fig.7- ♂, male terminalia, dorsal view; fig.8- ♂, abdominal segments 6-8, lateral view; fig.9- ♀, cerci and hypoproct.



*Heterodiplosis peruviana* sp.nov.: fig.10- pupa, head, frontal view; fig.11- pupa, prothoracic spiracle; fig.12- pupa, terminal segment; fig.13- larva, general aspect; fig.14-larva, spatula; fig.15-larva, terminal segment; fig.16- gall, general aspect.



*Heterodiplosis peruviana* sp.nov.: fig.16- gall, general aspect.

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