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## ECOLOGICAL NOTES OF *PACHOLENUS PELLICEUS* BOHEMAN, 1836, A STEM GALL-FORMER, WITH DESCRIPTION OF FULLGROWN LARVA (CURCULIONIDAE, MOLYTINAE)

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### ABSTRACT

*Pacholenus pelliceus Boheman, 1836 was collected in restinga of Barra de Maricá, Maricá, Rio de Janeiro State, Brazil, and reported for the first time as a stem gall-former. Galls were found on Gomidesia martiana Berg. and G. fenzliana Berg. (Myrtaceae). Some ecological aspects of weevils and galls are discussed. The full-grown larva is described and illustrated, based on reared specimens. Comparisons with other described larvae of Molytinae are made, corroborating the inclusion of Pacholenini within the Molytinae.*

Keywords: Curculionidae, gall-former, *Gomidesia*, *Pacholenus*, weevil larva.

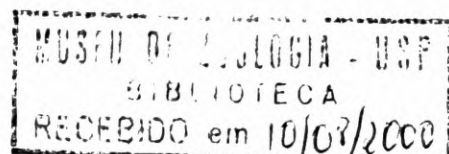
### INTRODUCTION

During gall studies conducted by the junior authors, in restinga of Barra de Maricá, Rio de Janeiro State, Brazil, some weevils were reared from

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myrtaceous stem galls. The adults were sent for identification to the senior author, who identified them as *Pacholenus pelliceus* Boheman, 1836. The Pacholenini were revised by Vanin & Reichardt (1976). *Pacholenus* Schoenherr, 1826 includes five species: three known from the Atlantic Forest along eastern coast of Brazil, and two from Central Brazil, but probably inhabiting gallery forests or forest enclaves (Vanin & Reichardt, 1976). Up to now, no biological information was published for any of the five species of *Pacholenus*, nor for the remaining species of the tribe. This discovery give us the opportunity to make the first report of the biology of a species of a Pacholenini. Some ecological aspects, the description of the full-grown larva, and comments on the taxonomic position of the Pacholenini are presented.

#### ECOLOGICAL ASPECTS OF THE GALL-FORMER *PACHOLENUS PELLICEUS*

*Pacholenus pelliceus* galls were observed and collected in restinga of Barra de Maricá, Rio de Janeiro State, Brazil, from July 1994 to July 1995. This stem gall (Fig. 1) is unicameral and presents an only larva. The gall is first apparent at the apex of a shoot but does not seem to hinder distal growth of the stems (Fig. 1).

Larva of *P. pelliceus* develops and pupates into the gall chamber and the adult emerges through a hole near the base of the gall (Fig. 1). The adult of this weevil has a slender form and a brownish-yellow color, what makes it cryptic on the stem it emerges from.

This gall was only found on *Gomidesia martiana* Berg. and *G. fenzliana* Berg. (Myrtaceae) in restinga of Barra de Maricá, the only two plant species on this genus in the area. Intensive inspections on all of the 14 myrtaceous species were made during one year and casual observations were carried out for five years in the restinga vegetation but *P. pelliceus* was never found on another host plant. *Gomidesia martiana* is more abundant and exhibit a wider distribution than *G. fenzliana* in the area. The number of galls found in each of the host plants were similar, however, *G. fenzliana* showed a significantly higher frequency of attacked plants ( $\chi^2 = 4.55$ ,  $P = 0.033$ ).

*Pacholenus pelliceus* galls were found all year long but the highest abundance occurred during the winter and the lowest numbers were detected in summer (Fig. 2). During this hot and wet season the two host plant species flower, what may affect their vegetative growth lessening the resource for the galling insect. In spite of the high frequency of parasitoids in restinga gall species (Monteiro *et al.*, 1994) only two parasitoid wasps, of the same species of Eupelmidae (Hymenoptera), were obtained from near a hundred of *P. pelliceus* galls reared in the laboratory.

After adult emergence some galls were colonized by ant species which nest inside the gall chamber.

#### DESCRIPTION OF THE FULL-GROWN LARVA

### ***Pacholenus pelliceus*** Boheman, 1836

(Figs.3-16)

Description (terminology according to Anderson, 1991 and May, 1993).

Full-grown larva (Fig. 3). Length: 13.8 mm; maximum width: 3.1 mm; head width: 1.3 mm.

Body evenly curved, with about same width from metathorax to abdominal segment VII, with all lobes prominent, color cream yellow except pronotum lightly pigmented yellowish brown. Cuticle smooth or microasperate in transverse linear series (100X). Setae yellowish; major thoracic setae about 4-5 times as long as minor setae.

Head (Fig. 4) yellowish brown with 4 pale longitudinal stripes, 2 paramedian dorsal and 2 lateral; labrum, mandibles and epistoma darker. Stemmata absent. Antenna exposed (Fig. 5), with conical accessory appendage about 2 times as long as wide, and 5 smaller processes. Epicranial suture distinct, approximately 0.6 times as long as head capsule. Frontal suture complete. Endocarina weak but distinct. Frons with 5 pairs of frontal epicranial setae (fes) and 2 pairs of sensilla, one dorsal to fes2 and other between fes3 and fes4; fs1, fs2 and fs3 small, fs4 and fs5 larger and subequal. Dorsal epicranium with 5 pairs of dorsal epicranial setae (des), 4 pairs of very minute posterior epicranial setae (pes) and 3 pairs of sensilla, first lateral to pes, second near des1, and third lateral to des5; des3 situated on epicranium, not within frontal suture or on frons. Lateral epicranium with 2 lateral epicranial setae (les). Ventral epicranium with 2 ventral epicranial setae (ves). Clypeus transversal (Fig. 7), anterior margins straight, with 2 pairs of clypeal setae (cls) and 1 pair of sensilla, each placed between cls1 and cls2. Labrum transversal (Fig. 7), anterior margin rounded, with 3 pairs of labral setae (lms), lms1 largest, lms2 and lms3 subequal. Epipharynx (Fig. 8) with 3 anterolateral setae (als) on each side, 6 anteromedian setae (ams), 2 pairs of median spines, and 2 groups of sensory spots, each group a cluster of 3 pores; labral tormae elongated, curved near middle and divergent posteriorly. Mandibles symmetrical, stout (Fig. 6), apically bidentate (teeth somewhat eroded in older specimen examined and illustrated), and with a small triangular tooth on mesal region; bearing 2 mandibular setae, aligned

longitudinally, and a sensillum. Maxilla (Figs.9-10): maxillary palpus 2-segmented, proximal segment with 1 short lateral seta and 2 sensilla; distal segment slightly shorter than precedent, with apical cluster of minute papillae but without setae or sensilla; stipes with 4 setae and 2 sensilla on ventral surface; mala with 5 ventral (Fig. 9) and 8 dorsal setae (Fig. 10). Labium (Fig. 9): labial palpi 2-segmented; segments subequal in length, each bearing a sensillum; premental sclerite strongly narrowing posteriorly; prementum with 3 pairs of setae and 2 pairs of sensilla, one pair behind and other between proximal segments of palpi; postmentum with 3 pairs of setae.

Thorax (Fig. 3). Pronotum with 9 setae on each side, 2 of which longer. Thoracic spiracle (Fig. 13) bicameral, peritreme subcircular, air tubes annulated, dorsad; spiracle encircled by a raised, lightly pigmented sclerotized ridge; thoracic spiracle larger than abdominal ones. Prodorsum of meso- and metathorax with 1 seta. Postdorsum of meso- and metathorax with 4 setae. Alar area of meso- and metathorax with 1 seta. Spiracular area of mesothorax with 1 long seta and 4 smaller setae; spiracular area of metathorax with 3 long setae. Thoracopods (Figs.11-12); mediosternal lobe (ml) with 1 seta on pro-, meso- and metathorax; ventropedal lobe (vpl) with 2 setae on prothorax and 1 seta on meso- and metathorax; pedal lobe (pl) with 5 setae on pro-, meso- and metathorax.

Abdomen (Fig. 3) with 8 pairs of bicameral spiracles (Figs.14-15), peritreme subcircular, tubes annulated, caudad; abdominal spiracles of segments I to V subequal, VI to VIII gradually increasing in size, VIII largest and situated on dorsum; all spiracles encircled by a raised, pigmented sclerotized ridge, lightly in spiracles I to V, deeply in spiracles VI to VIII. Abdominal segments I to VII each with 3 dorsal folds; folds not distinct on segments VIII and IX. Setation on abdominal segments I to VI similar (setae described on one side of body only): prodorsum with 1 seta; postdorsum with 5 setae (pds), pds3 and pds5 larger. Spiracular area with 1 seta on segments I to VII; epipleural area with 2 setae (1 long, 1 short); pleural area and eusternum with 2 setae each; sternellum distinct, with 1 seta. Abdominal segment VII with 4 pds and VIII with 3 pds. Abdominal segment IX bearing 6 setae, of which 2 dorsal of unequal length. Anus terminal, 4-lobed.

Alimentary canal (Fig. 16) with proventriculus internally 8-ridged; cardiac mycetomes absent; anterior ventriculus smooth; posterior ventriculus 2-coiled, with about 12 finger-like ceca, more or less aligned on either side of lower coil; Malpighian tubules rather thick, arranged 3+3.

Material examined. Brazil. *Rio de Janeiro*. Maricá, 28.VII.1992, Monteiro, R.F. col., host plant: *Gomidesia fenziiana* (1 immature larva); same data but 30.IV.1994 (1 full-grown larva, dissected and mounted on slides; 2 immature



larvae, one of which dissected); same locality and host, 23.X.1996, Ferraz, F.F.F. col. (1 immature larva). All specimens deposited in the Museu de Zoologia, Universidade de São Paulo, São Paulo.

#### REMARKS

This is the first larva described of the tribe Pacholenini. Vanin & Reichardt (1976) revised the genus *Pacholenus* Schoenherr, 1826 and assigned it, along with *Pileophorus* Schoenherr, 1843, *Antilophus* Kuschel, 1952 and *Lenopachus* Vanin & Reichardt, 1976, to the tribe Pacholenini, within the Hylobiinae. Wibmer & O'Brien (1986) fused the Hylobiinae, the Cholinae and a few additional taxa into an expanded Molytinae, and maintained the Pacholenini as a distinct tribe of that subfamily. Kuschel (1995) proposed a reclassification of families and subfamilies of Curculionoidea, based on a phylogenetic analysis. He considered the Curculionidae as formed by 6 subfamilies only, Brachycerinae, Curculioninae, Rhynchophorinae, Cossoninae, Scolytinae, and Platypodinae, the first two comprising most of the "subfamilies" of previous classifications. As a result, the "older" subfamilies and tribes, if maintained, must have their ranks lowered. However, as yet no phylogenetic work has been done at lower levels, a prerequisite for nomenclatural or status changes.

May (1993) presented an overview of the larvae of superfamily Curculionoidea, based chiefly on specimens from New Zealand. The systematic arrangement followed Kuschel's scheme of 6 families and 21 subfamilies (Kuschel, 1995). The tribe Molytini, (= Molytinae, sensu Wibmer & O'Brien, 1986), included within Curculioninae by Kuschel (1995), was represented in May's study by 5 species pertaining to 5 genera. According to May (1993), Molytini share with Curculionini the following characters: **1- cuticle microasperate in transverse linear series; 2- frontal setae 1, 2 and 3 usually minute or absent; 3- antennae conical, exposed; 4- mandibular setae aligned longitudinally; 5- labral tormae subparallel or bowed; 6- abdominal segment VIII with 3 postdorsal setae; 7- abdominal VIII spiracle on dorsum.**

May (1994) considered the Molytinae to the subfamilial rank and studied 6 species representing 4 genera. The author proposed 4 features "dominant" in Molytinae, but which also apply to Curculioninae and some Cossoninae: **1- dorsal epicranial seta 3 (des3) situated on epicranium, not within frontal suture or on frons; 2- mandibular setae longitudinal** (equal to characteristic 4 of May, 1993); **3- abdominal segment IX having 2 or 3 dorsal setae, usually of unequal length; 4- frontal setae 4 and 5 (fs4 and fs5) subequal.**

The larva of *Pacholenus pelliceus* shares all features reported by May

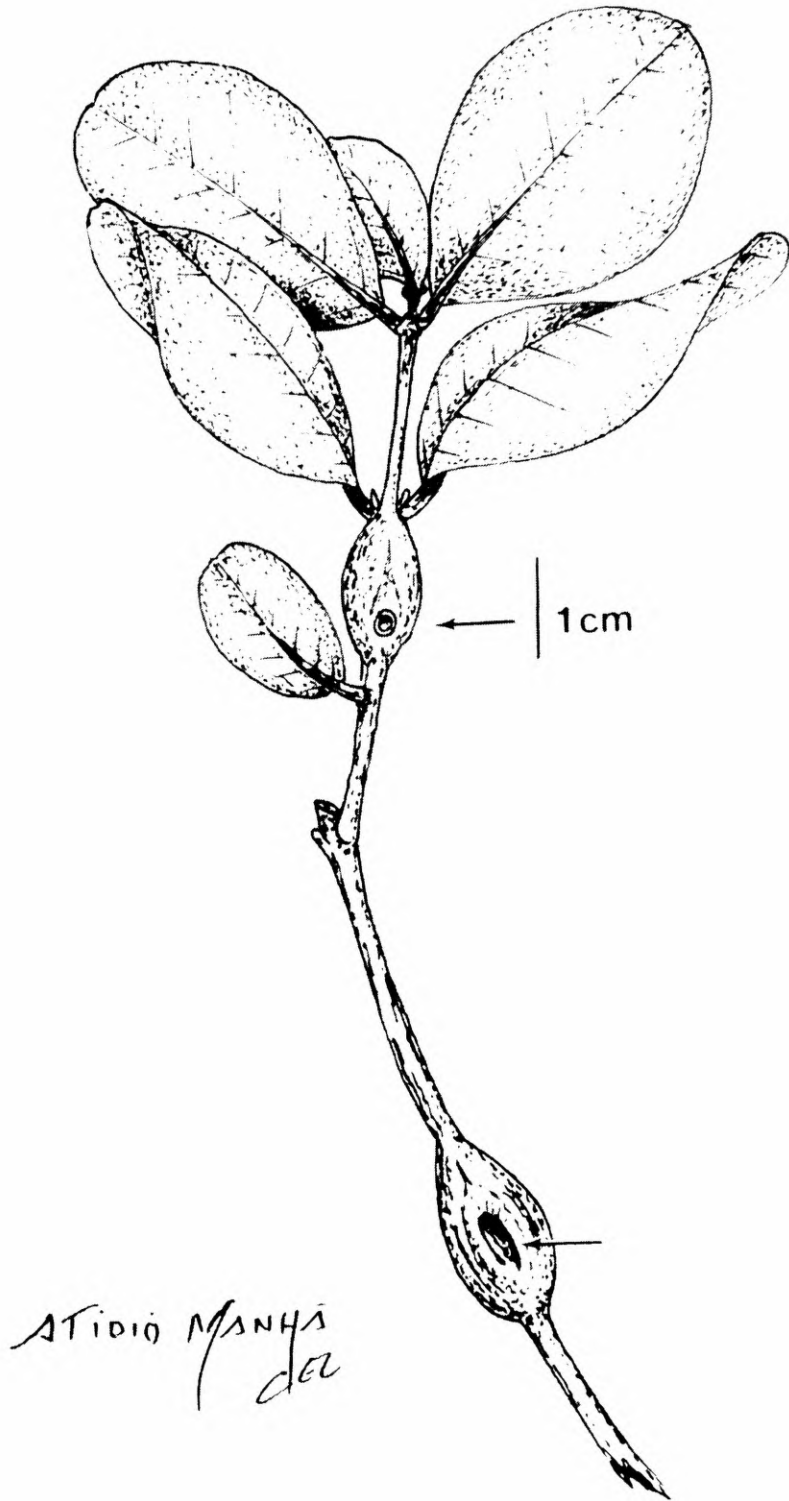


Fig. 1. Branch of *Gomidesia fenzliana* Berg. (Myrtaceae) with 2 stem galls of *Pacholenus pelliceus*. Note the emergence hole of the weevil at the base of the galls.

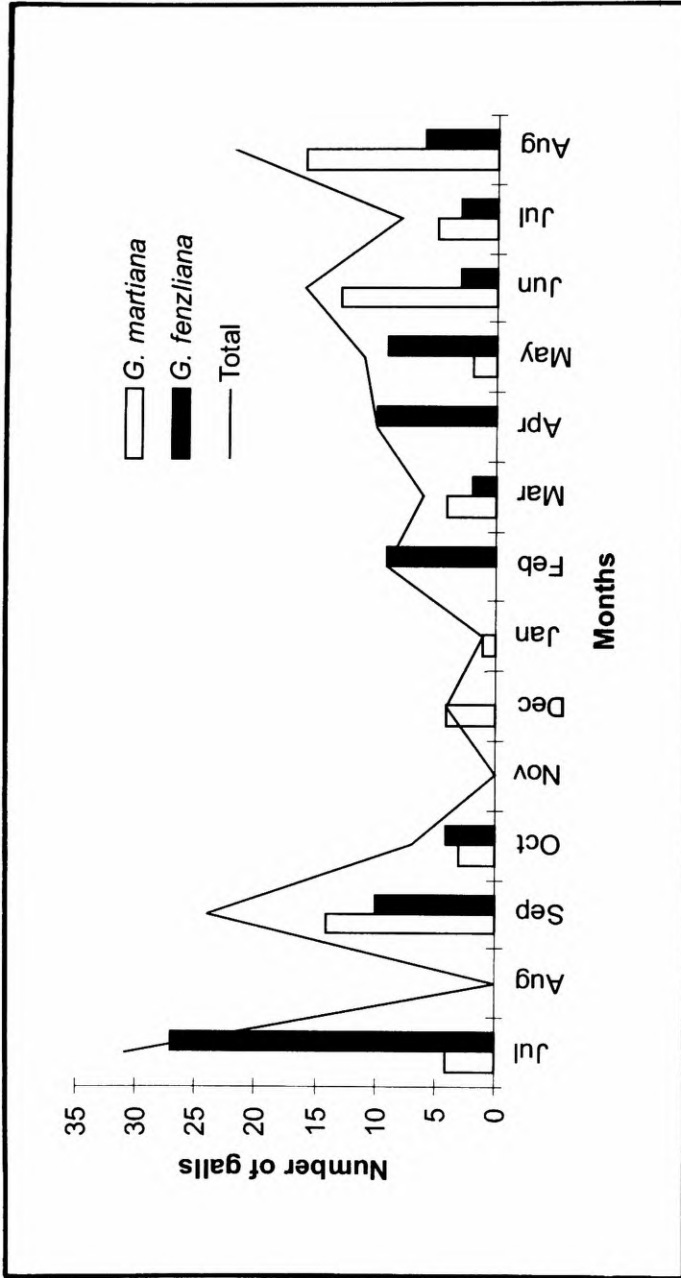
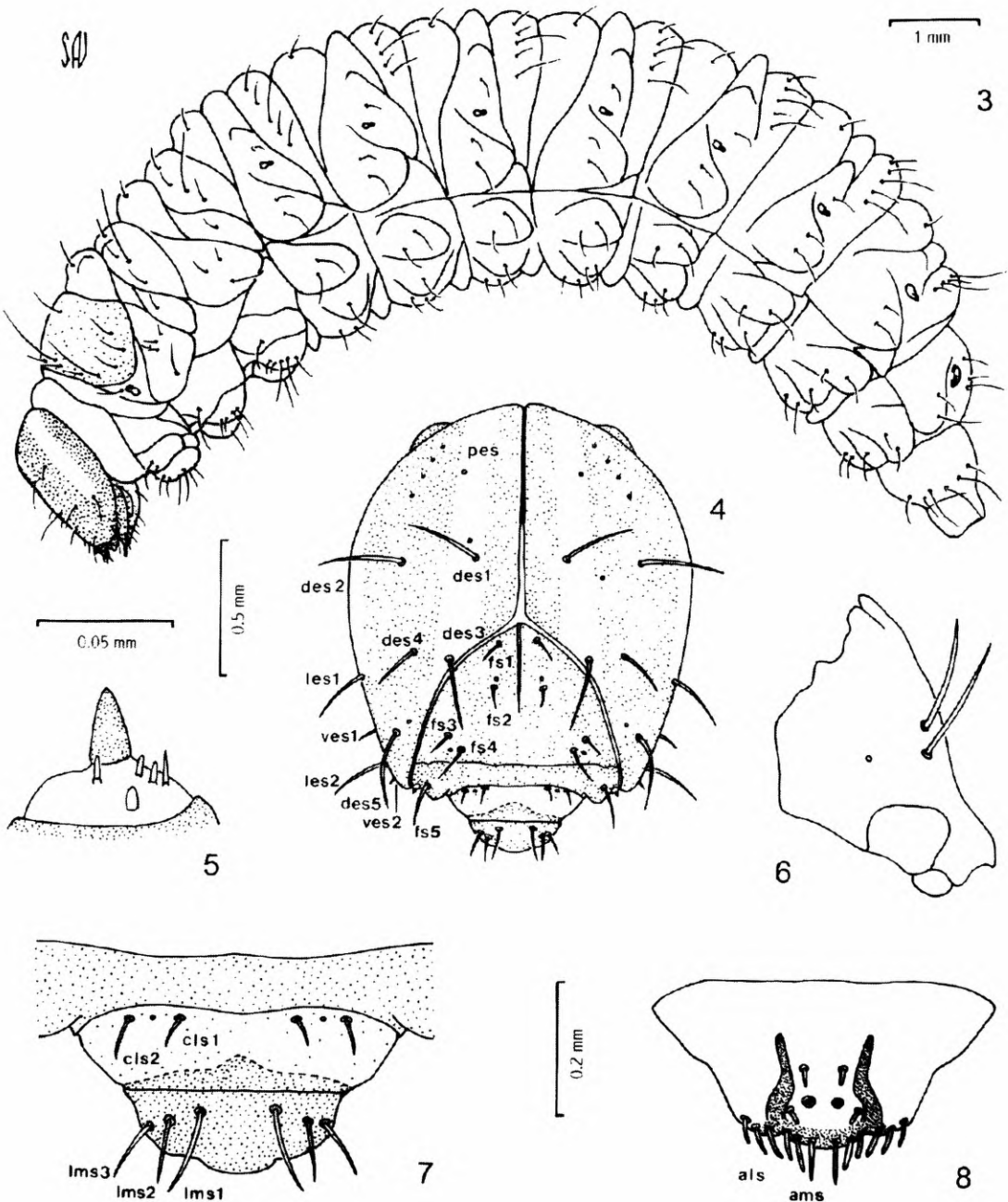
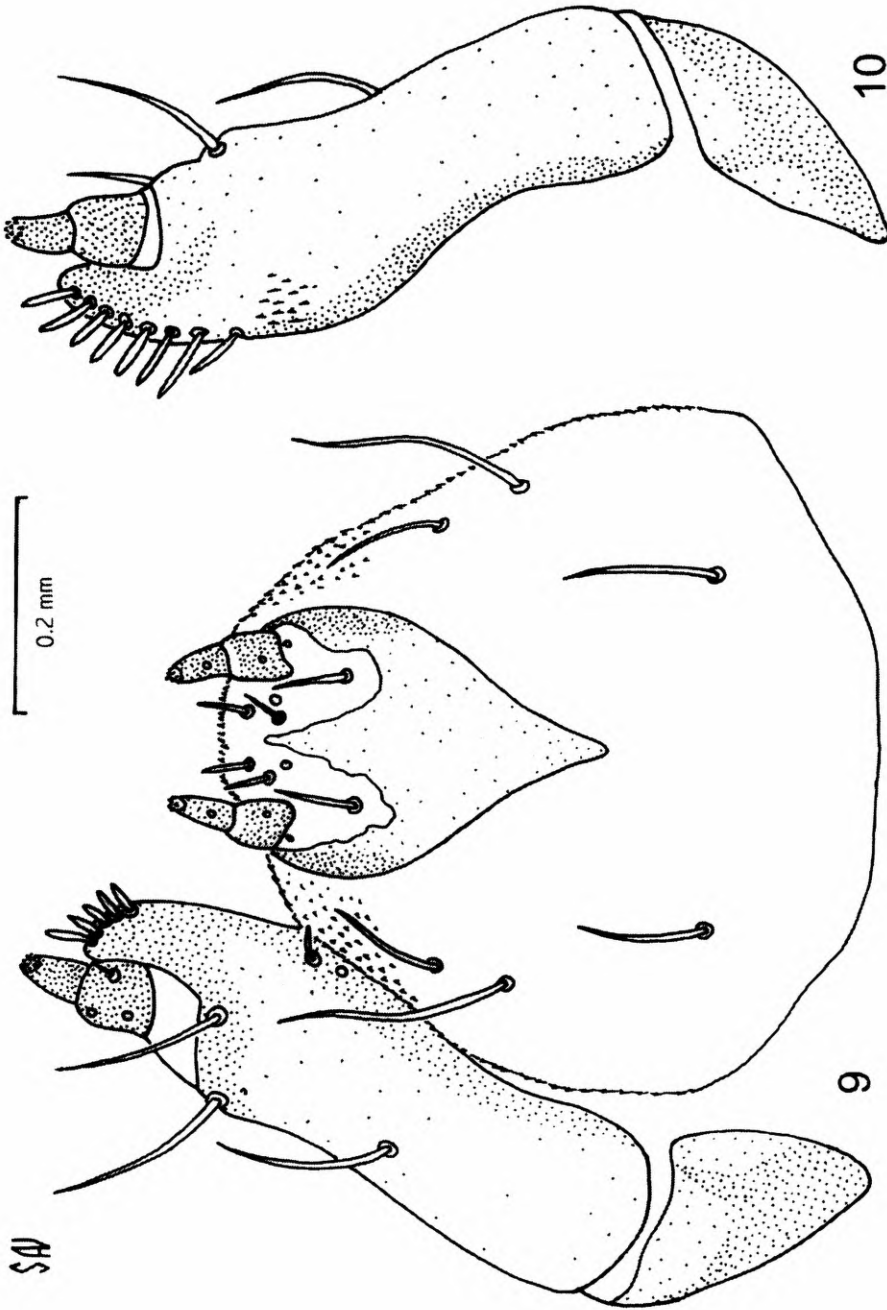


Fig. 2. Monthly variation in gall numbers of *Pacholenus pelliceus* on host plants, *Gomidesia fenzliana* Berg. and *G. martiana* Berg., in restinga of Barra de Maricá, Rio de Janeiro State, Brazil, from July 1994 to July 1995.

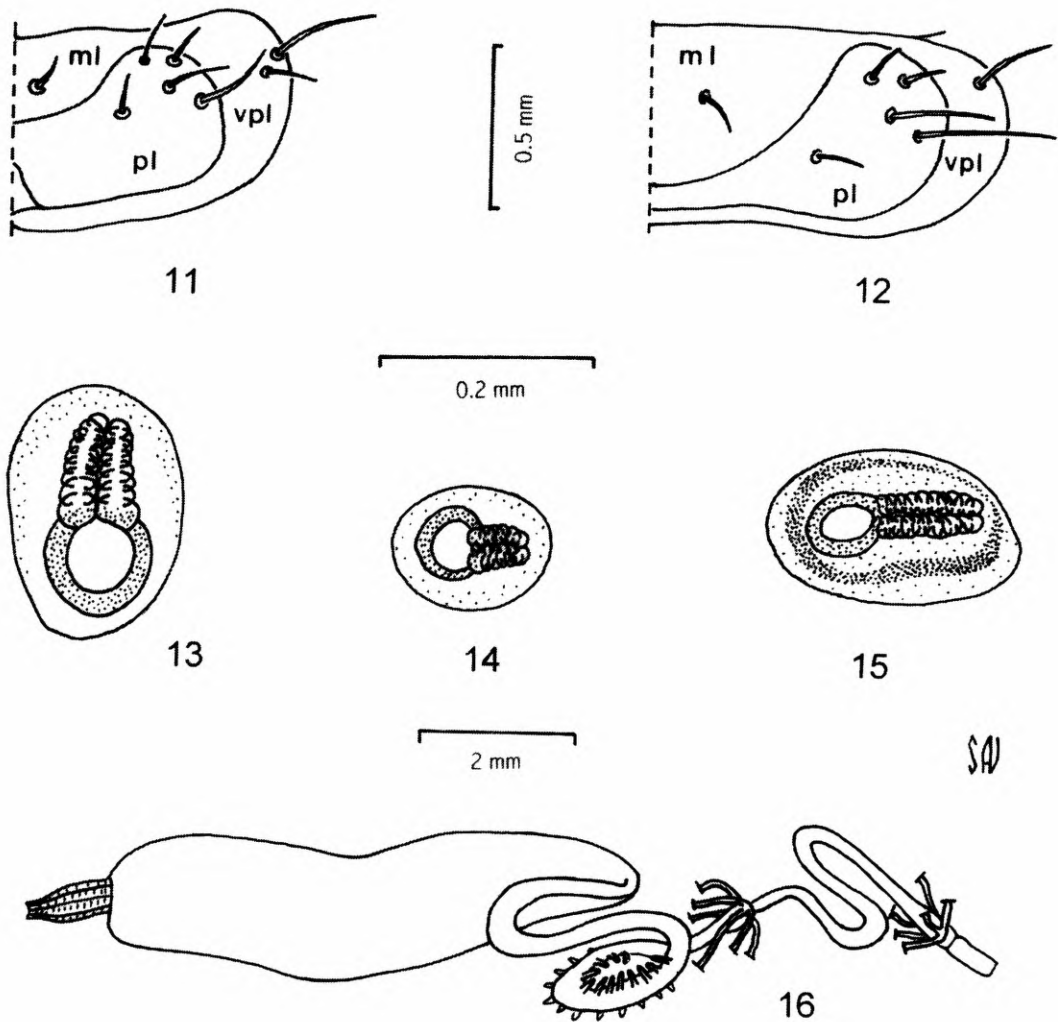


Figs. 3-8. *Pacholenus pelliceus*, mature larva from Maricá, RJ. 3, habitus, lateral; 4, head, dorsal (des, dorsal epicranial seta; fs, frontal seta; les, lateral epicranial seta; pes, posterior epicranial setae; ves, ventral epicranial seta); 5, right antenna; 6, right mandible, dorsal; 7, labrum, clypeus and epistoma (cls, clypeal seta; lms, labral seta); 8, epipharyngeal lining (als, anterolateral setae; ams, anteromedian setae). Figs. 6-8 to same scale.





Figs. 9-10. *Pacholenus pelliceus*, mature larva from Maricá, RJ. 9, right maxilla, ventral, and labium; 10, right maxilla, dorsal.



Figs. 11-16. *Pacholenus pelliceus*, mature larva from Maricá, RJ. 11, thoracopod I (ml, mediosternal lobe; pl, pedal lobe; vpl, ventropedal lobe); 12, thoracopod II; 13, prothoracic spiracle; 14, abdominal spiracle IV; 15, abdominal spiracle VIII; 16, alimentary canal.

(1993; 1994) for the Molytinae, indicated above by bold typing, and corroborate the placement of the Pacholenini (sensu Vanin & Reichardt, 1976) within the Molytinae (sensu Wibmer & O'Brien, 1986). However, the relationships within the Molytinae remain uncertain, and the proposition of a phylogenetic hypothesis depends on further analysis, including representatives of the different subgroups.

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