

# DESCRIPTION OF THE LARVA OF *Amblyomma longirostre* (KOCH, 1844) (ACARI: IXODIDAE) BY LIGHT AND SCANNING ELECTRON MICROSCOPY\*

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**ABSTRACT:**- BARROS-BATTESTI, D.M.; ARZUA, M.; REBELLO, V.M.M.; BARBIERI, F. DA S.; FAMADAS, K.M. **Description of the larva of *Amblyomma longirostre* (Koch, 1844) (Acari: Ixodidae) by light and scanning electron microscopy.** [Descrição da larva de *Amblyomma longirostre* (Koch, 1844) (Acari: Ixodidae) por microscopia ótica e eletrônica de varredura.] *Revista Brasileira de Parasitologia Veterinária*, v. 14, n. 2, p. 51-57, 2005. Instituto Butantan, Laboratório de Parasitologia, Av. Vital Brasil 1500, São Paulo, SP 05503-900, Brazil. E-mail: dbattesti@butantan.gov.br

The description of the larva of *Amblyomma longirostre* (Koch, 1844) is based on optical and scanning electron microscopy. Larvae (F1) were obtained under laboratory conditions from an engorged *A. longirostre* female, which had been collected on a *Coendu prehensilis* (Linnaeus) (Rodentia: Erethizontidae) from the Jaraguá Mountain, São Paulo municipality, State of São Paulo, Brazil. Several characters are presented including the chaetotaxy of idiosoma, palps and Haller's organ, campaniform sensillum on festoons and measurements. In addition, the relationship of *A. longirostre* larva to other Neotropical *Amblyomma* spp. larvae is discussed.

**KEY WORDS:** *Amblyomma longirostre*, larva, morphology, *Coendu prehensilis*, Rodentia.

## RESUMO

A larva de *Amblyomma longirostre* (Koch, 1844) foi descrita com base em microscopia óptica e eletrônica de varredura. As larvas (F1) foram obtidas sob condições de laboratório a partir de uma fêmea ingurgitada de *A. longirostre* coletada em *Coendu prehensilis* (Linnaeus) (Rodentia: Erethizontidae), no Pico do Jaraguá no município de São Paulo, Estado de São Paulo, Brasil. Caracteres como quetotaxia do idiossoma, palpos e órgão de Haller, assim como sensillum campaniforme presente nos festões e medidas são apresentadas. A larva de *A. longirostre* é comparada com outras larvas de *Amblyomma* spp. da região neotropical e suas relações são discutidas.

**PALAVRAS-CHAVE:** *Amblyomma longirostre*, larva, morfologia, *Coendu prehensilis*, Rodentia.

## INTRODUCTION

There are a few more than 100 *Amblyomma* species worldwide of which 57 are found in the Neotropical region and 45 species are restricted to this region (GUGLIELMONE et al., 2003). While morphological descriptions are available for most of African and Australian *Amblyomma* immature ticks, these are at best fragmentary for immature Neotropical species. Of the 53 species from the New World, morphological descriptions are either available for adult specimens, but very incomplete for immature stages (CAMICAS et al., 1998). The specific determination of the larval stage of ixodid ticks has been a troublesome problem for systematists. It is because few species reared from identified females are known (KEIRANS, 1992). According to Clifford and Anastos (1960), the deficiencies in our knowledge of larval tick systematics could be attributed to some factors: few consistent characters for inclusion in keys; inadequate descriptions and drawings; relative few species reared in the laboratory from identified females; and the virtual impossibility of associating larvae collected in the

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deposited in the Acari Collection of the Instituto Butantan (IBSP 7480).

## DESCRIPTION

### *Amblyomma longirostre* Koch, 1844, LARVA

**IDIOSOMA** (Figs. 1, 2, 6, 8, 9) *Dorsal surface* (Figs. 1, 8, 6) - length from apices of scapulae to posterior margin of body  $0.797 \pm 0.054$  (0.625-0.773); greatest width  $0.689 \pm 0.057$  (0.625-0.773); outline oval, with 11 festoons. Presence of two pairs of campaniform sensilla, SCd<sub>1</sub> between Md<sub>1</sub> and Md<sub>2</sub> and SCd<sub>2</sub> above the first festoon near to Md<sub>3</sub>. *Setae*: 3 central pairs (Cd<sub>1</sub>-Cd<sub>3</sub>); 8 marginal pairs (Md<sub>1</sub>-Md<sub>8</sub>) with Md<sub>1</sub> and Md<sub>2</sub> pairs before SCd (Figs. 1, 8), and Md<sub>3</sub> pair located in the inner side close to the sensillum (SCd<sub>2</sub>), and the remaining (Md<sub>4</sub>-Md<sub>8</sub>) pairs posterior to sensillum, each one in a different festoon. *Scutum*: outline subtriangular; length  $0.374 \pm 0.013$  (0.355-0.395), breadth  $0.553 \pm 0.030$  (0.510-0.593) up to the eyes' line. Integument with irregular hexagonal ornamentation. Eyes slightly bulging and shallow; cervical grooves extending parallel to the proximities of setae Sc<sub>3</sub>, but slightly diverging at the end. *Setae*: 3 scutal pairs (Sc<sub>1</sub>-Sc<sub>3</sub>).

*Ventral surface* (Fig. 2, 9) - with 4 pairs of campaniform sensilla; 1 pair located on the outer margin of the coxa I, 1 pair behind coxa II and 1 pair behind coxa III. In addition there are more 2 pairs of campaniform sensilla on the 4th and 5th festoons (SCf). Central festoon without seta, greatest width  $0.101 \pm 0.001$  (0.100-0.103). *Setae*: 3 sternal pairs (St<sub>1</sub>-St<sub>3</sub>); 2 preanal pairs (Pa<sub>1</sub>, Pa<sub>2</sub>); 4 premarginal pairs (Pm<sub>1</sub>-Pm<sub>4</sub>); 5 marginal

ventral pairs (Mv<sub>1</sub>-Mv<sub>5</sub>). Anal aperture on central portion of opisthosoma with 1 pair of setae on the valva (A<sub>1</sub>).

**GNATHOSOMA** (Figs. 3, 4, 7, 10): *Dorsal: Basis capituli* (Figs. 3, 7) - triangular in outline; length from palpal apices to posterior margin  $0.255 \pm 0.009$  (0.238-0.269), width  $0.241 \pm 0.014$  (0.225-0.265). Posterior margin straight, cornua absent. Basis capituli on median line with 1 sensillum pair. Palpal grooves segment well defined. Palpi length from apices of tibiotarsal segment (IV) to posterior margin of trochanter  $0.185 \pm 0.006$  (0.173-0.191); femur (II) 4.0 times longer than trochanter (I); combined length of femur and genu (III)  $0.165 \pm 0.007$  (0.150-0.174). Femur with sensillum near seta Fa<sub>1</sub>.

*Ventral: Basis capituli* as illustrated (Figs. 4, 10). *Hypostome* - compact, spatulate, length from apices to post hypostomal seta (Ph1)  $0.128 \pm 0.008$  (0.113-0.137), dental formula 2/2, 5 teeth per file, apical corona with 9 denticles. *Palpal setae* - 12 setae on tibiotarsus, 8 terminal (Tt<sub>1</sub>-Tt<sub>8</sub>), 2 paraxial (Ttp<sub>1</sub>, Ttp<sub>2</sub>) and 2 antiaxial (Tta<sub>1</sub>, Tta<sub>2</sub>); 6 genual setae, 1 paraxial (Gp<sub>1</sub>), 1 antiaxial (Ga<sub>1</sub>), 3 dorsal (Gd<sub>1</sub>-Gd<sub>3</sub>), and 1 ventral (Gv<sub>1</sub>); 6 femoral setae, 1 paraxial (Fp<sub>1</sub>), 2 antiaxial (Fa<sub>1</sub>, Fa<sub>2</sub>), 1 dorsal (Fd<sub>1</sub>) and 2 ventral (Fv<sub>1</sub>, Fv<sub>2</sub>); trochanter 0.

**LEGS** (Figs. 2, 9, 11, 12): Coxa I with 1 triangular sharp-pointed spur; coxa II and III each with 1 short spur (Figs 2, 9). *Setae* - 3 on coxa I; coxa II e III each with 2 setae. Trochanter lacking spur. *Tarsus I* (Fig. 12)  $0.277 \pm 0.007$  (0.262-0.284) long. *Setae*: *Dorsal* - 2 in dorsal I group (dI<sub>1</sub>, dI<sub>2</sub>), 7 dorsal II (dII<sub>1</sub>-dII<sub>7</sub>) (Fig. 11), 2 dorsal III (dIII<sub>1</sub>, dIII<sub>2</sub>), 2 dorsal IV (dIV<sub>1</sub>, dIV<sub>2</sub>), 0 dorsal V and 2 dorsal VI (dVI<sub>1</sub>, dVI<sub>2</sub>); *Ventral* - 2 ventral I (vI<sub>1</sub>, vI<sub>2</sub>), II (vII<sub>1</sub>, vII<sub>2</sub>), III (vIII<sub>1</sub>, vIII<sub>2</sub>); *Lateral anterior* - 1 in I group

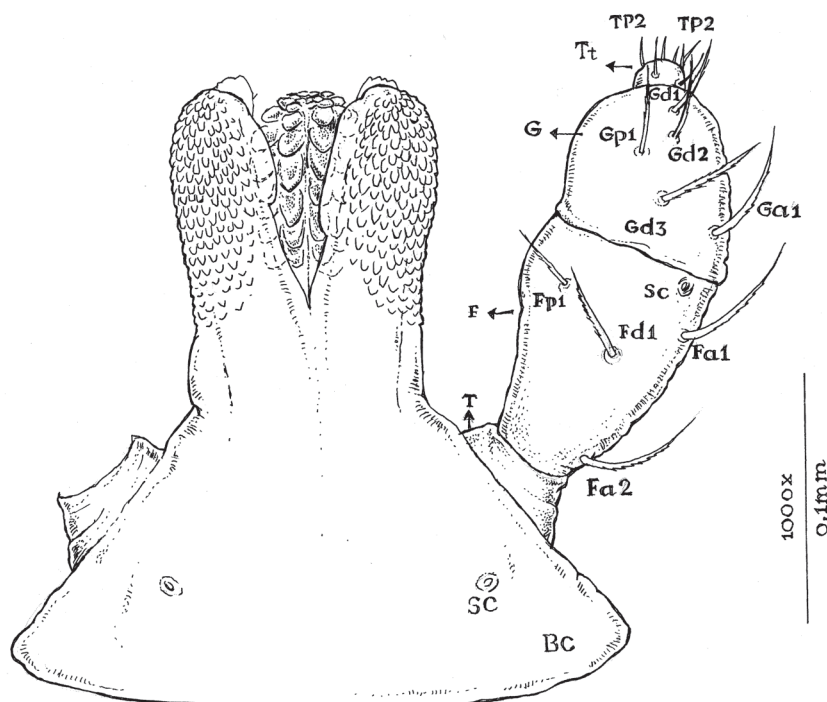


Figura 3. *Amblyomma longirostre*, larva (IBSP 7758d), Gnathosoma dorsal. Abbreviations: a, antiaxial; p, paraxial; T, trochanter; F, fêmur; G, genu; Tt, tibiotarsus; PH, post hypostomal setae; SC, campaniform sensillum.

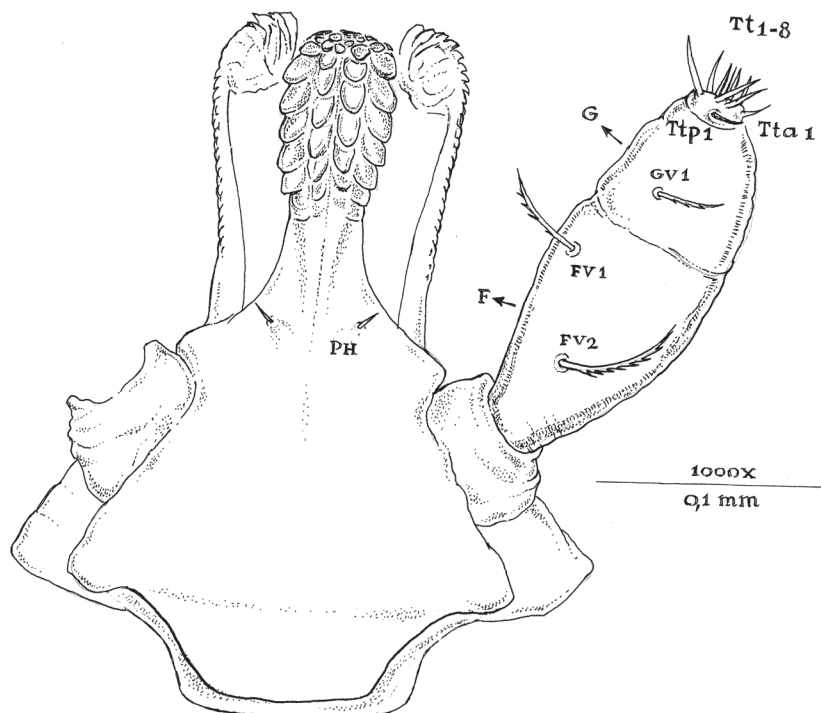


Figura 4. *Amblyomma longirostre*, larva (IBSP 7758d), Gnathosoma ventral. Abbreviations: a, antiaxial; p, paraxial; T, trochanter; F, fêmur; G, genu; Tt, tibiotarsus; PH, post hypostomal setae; SC, campaniform sensillum.

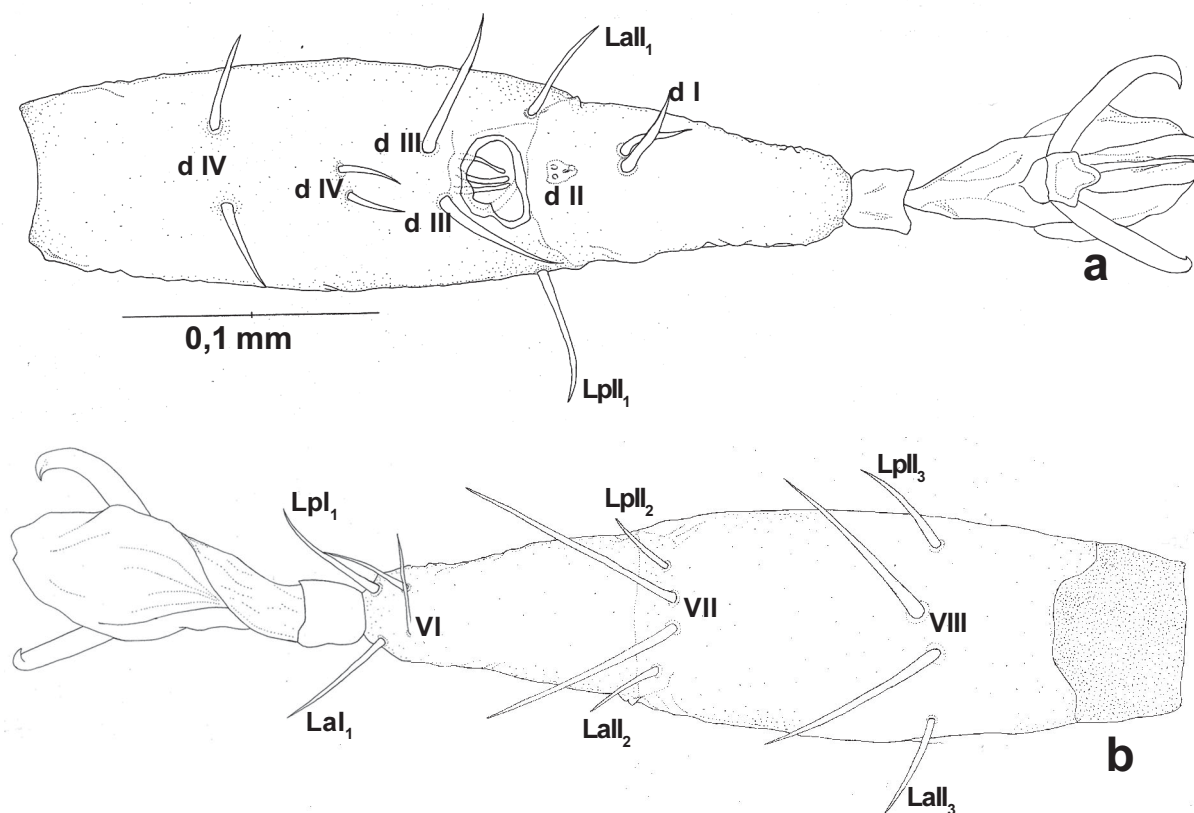


Figura 5. *Amblyomma longirostre*, larva (IBSP 7758d), Tarso I, 5a dorsal; 5b ventral. Abbreviations: d, dorsal; v, ventral; la, lateral anterior; lp, lateral posterior.



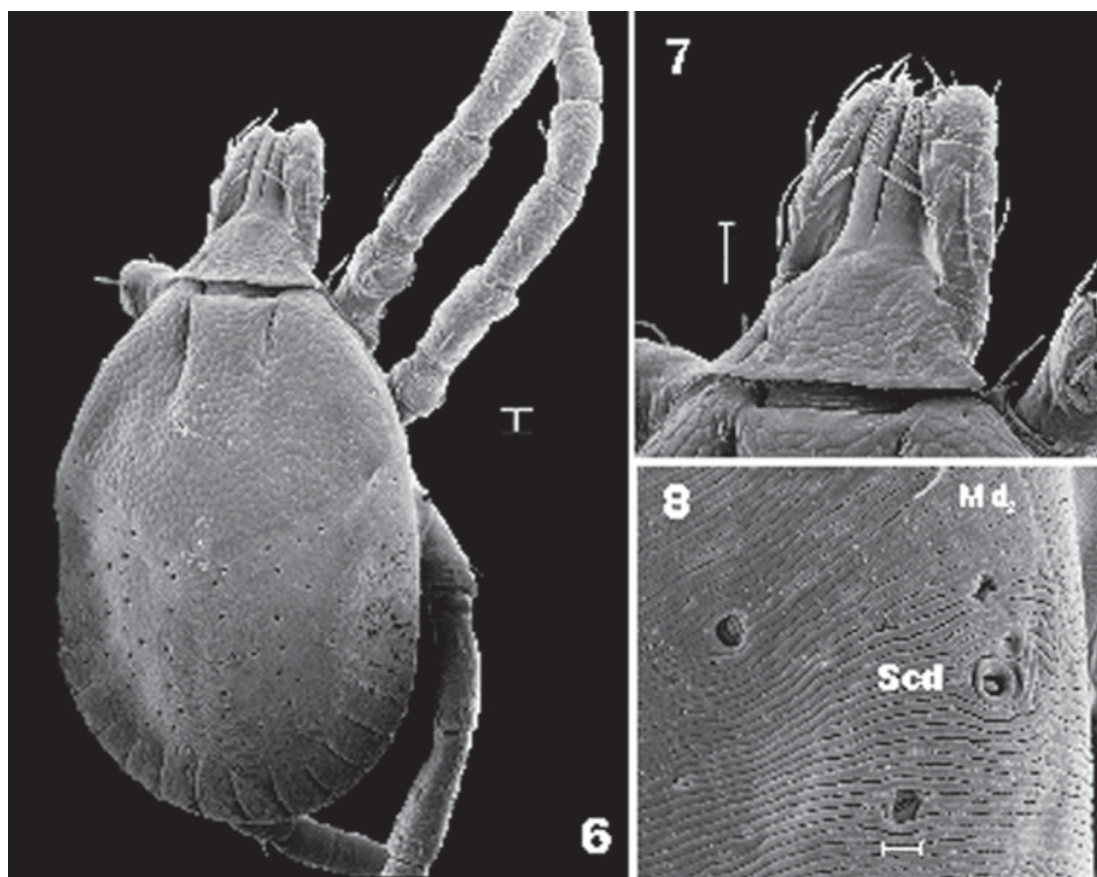


Figura 6-8. *Amblyomma longirostre*, larva, dorsal view (IBSP 7758d) 6. Idiosoma; 7. Gnathosoma; 8. Detail of campaniform sensillum on lateral margin of alloscutum. Abbreviations: Md2, marginal dorsal seta; Scd, campaniform dorsal sensillum. Scale bars: 6 = 30µm; 7 = 10µm; 8 = 9µm.

(IaI<sub>1</sub>) and 3 in II group (IaII<sub>1</sub>-IaII<sub>3</sub>); *Lateral posterior*- 1 in I group (IpI<sub>1</sub>) and 3 in II group (IpII<sub>1</sub>-IpII<sub>3</sub>). Ambulacrum as illustrated (Fig.5).

## DISCUSSION

The measurements of the idiosoma, gnathosoma, and tarsus I of larva of *A. longirostre* were compared to other previously described species such as *A. parvum*, *A. pseudoparvum* (GUGLIELMONE et al., 1990), *A. tigrinum*, *A. testudines*, *A. neumanni* (ESTRADA-PEÑA et al., 1993), *A. triste* (ESTRADA-PEÑA et al., 2002), *A. varium* (AMORIM; SERRA-FREIRE 1996), *A. cajennense* (FAMADAS et al., 1997), *A. dubitatum* (AMORIM; SERRA-FREIRE 1999a), *A. dissimile* (AMORIM; SERRA-FREIRE 1999b), and *A. aureolatum* (ARZUA, 2002). It was observed that the larva of *A. longirostre* is larger than the other species of *Amblyomma*, but its dimensions are very close to those of *A. varium*, *A. testudinis*, and *A. neumanni*. The chaetotaxy of larvae of *A. longirostre* and *A. cajennense* palpi is similar, but both species differ from those larvae of *A. aureolatum*, *A. varium*, *A. dubitatum*, *A. parvum* and *A. pseudoparvum* by having two additional setae on the tibiotarsus segment (article IV). They also differ from *A. parvum* and *A. pseudoparvum* that present 5 setae and *A. neumanni* with 3 setae on the genu segment (article III) rather than 6.

For the first time, a third pair of setae (Cd<sub>3</sub>) was observed on the central dorsal region of an *Amblyomma* tick. The percentage of occurrence of Cd<sub>3</sub> pair was 1.5% (3/20).

Clifford and Anastos (1960) described the presence of four pairs of sagittiform sensilla (= campaniform; DASGUPTA; RAY, 1949) on the idiosoma. One pair located dorsally on the posterior lateral margin of the body, whereas, the others are located behind each coxae. Posteriorly, Famadas et al. (1997) recorded, for the first time, a pair of this campaniform sensillum on the 5th festoon of *A. cajennense* and Arzua (2002) has observed these sensilla on the 5th and also on the 4th festoons of *A. aureolatum*. For the first time is observed a second pair of campaniform sensillum on dorsal surface of idiosoma in larva of *Amblyomma* tick.

Of the all species studied until now, only *A. aureolatum* and *A. longirostre* present the campaniform sensilla on the 5th and 4th festoons. Both species can be separated by the presence of only one pair of campaniform sensillum on dorsal surface of idiosoma *A. aureolatum* whereas in *A. longirostre* two pairs are present.

All other sensilla (on palpi, on dorsal basis of capituli, and located on the outer margin of the coxa I, and behind coxa II and III) are present in *A. longirostre*. But the presence of two pairs of post hypostomal setae on larvae



Figura 9-12. *Amblyomma longirostre*, larva (IBSP 7758d). 9. Idiosoma ventral; 10. Gnathosoma ventral; 11. Detail of Haller's organ; 12. Tarsus I, dorsal view. Scale bars: 9 = 120 $\mu$ m; 10 = 30 $\mu$ m; 11 = 120 $\mu$ m; 12 = 40 $\mu$ m.

of *A. dubitatum* (described as *A. cooperi*), *A. geayi*, and *A. auricularium* (described as *A. auriculare*) (AMORIM; SERRA-FREIRE, 1996), and the three pairs of central dorsal setae on *A. longirostre* as well as the differences present on palpi of some species, show that the chaetotaxy can not be ruled out as taxonomic character until more data are collected.

On the other hand, the larger dimensions of *A. longirostre* larva (only similar to *A. varium*, *A. testudinis*, and *A. neumanni* larvae) as well as the presence of a supplementary pair of sensilla on the idiosoma in addition to the morphology could be enough to separate it from the other species. However it

would be also necessary to use these characters with caution because most larvae of the *Amblyomma* genus from Neotropical region are still unknown.

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