

## SHORT COMMUNICATION

# First description of the worker of *Planicapritermes longilabrum* with notes on the nest of *Planicapritermes planiceps* (Blattaria: Isoptera: Termitidae)

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## ABSTRACT

*Planicapritermes* Emerson, 1949 is a South American termite genus with two nominal species: *Planicapritermes planiceps* (Emerson, 1925) and *Planicapritermes longilabrum* Constantino, 1998. The soldiers of this genus are characterized by strongly asymmetrical mandibles. *Planicapritermes planiceps* was described from soldiers and workers, and *P. longilabrum* only from soldiers. Here we describe and illustrate workers of *P. longilabrum* based on specimens collected in Rondônia state, Brazil. We also present a comparison between workers and soldiers of *P. planiceps* and *P. longilabrum*, and describe the nest of *P. planiceps*.

**KEYWORDS:** Amazon forest, gut anatomy, taxonomy, termites

## Primeira descrição dos operários de *Planicapritermes longilabrum*, com notas sobre o ninho de *Planicapritermes planiceps* (Blattaria: Isoptera: Termitidae)

### RESUMO

*Planicapritermes* Emerson, 1949 é um gênero de cupins da América do Sul com duas espécies nominais: *Planicapritermes planiceps* (Emerson, 1925) e *Planicapritermes longilabrum* Constantino, 1998. Os soldados deste gênero são caracterizados por ter mandíbulas fortemente assimétricas. *Planicapritermes planiceps* foi descrita com base em soldados e operários, e *P. longilabrum* somente em soldados. Aqui nós descrevemos e ilustramos os operários de *P. longilabrum* com base em espécimes coletados em Rondônia, Brasil. Também comparamos operários e soldados de *P. planiceps* e *P. longilabrum*, e descrevemos o ninho de *P. planiceps*.

**PALAVRAS-CHAVE:** Floresta Amazônica, anatomia intestinal, taxonomia, térmita

Termitinae is one of the four subfamilies of Termitidae in the Neotropical realm, with 105 living, and five fossil species (Constantino 2019). Some genera of Termitinae are characterized by having soldiers with asymmetrical mandibles, such as *Neocapritermes* Holmgren and *Planicapritermes* Emerson (Constantino 1999). The soldier of *Planicapritermes* is morphologically more similar to the soldier of *Neocapritermes* than to any other Termitinae genus. This similarity has been explained in a recent phylogenetic study, in which these two genera are considered sister groups (Bourguignon *et al.* 2017).

*Planicapritermes* was described by Emerson (in Snyder 1949) to accommodate a single South American species, *P. planiceps*, previously included in the subgenus *Neocapritermes* of the genus *Capritermes* (Constantino 1998). Posteriorly, *Neocapritermes* had its status changed to genus in Snyder's

(1949) catalog, and Constantino (1998) described *Planicapritermes longilabrum*. The genus is characterized by soldiers with dorso-ventrally flattened heads in addition to the strongly asymmetrical mandibles. *Neocapritermes* also have soldiers with asymmetrical mandibles, but in *Planicapritermes* the left mandible forms an angle of less than 90° at the proximal third, while in *Neocapritermes* the left mandible forms an angle over 90° at the proximal third (Constantino 2002).

Of the two species of *Planicapritermes*, only *P. planiceps* had its worker described, as this caste was missing in the type series of *P. longilabrum*. The description of the digestive tube of *P. longilabrum* was based on soldiers (Constantino 1998). Here we describe the worker of *P. longilabrum*. In addition, we describe the nest of *P. planiceps*, as termite nests can be very complex structures, with taxonomic and phylogenetic

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information value (Constantino 1995), and so far no nest of *Planicapritermes* had been found.

Material of *Planicapritermes planiceps* and *Planicapritermes longilabrum* was collected in Vila Teotônio, Porto Velho, Rondônia state, Brazil (8°50'18"S, 64°03'56"W) and is deposited in the invertebrate collection of Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brazil. The samples are maintained in vials containing 80% ethanol.

Dissections were made under a stereomicroscope following Constantino (1998), with forceps and entomological styllet. Four workers of *P. longilabrum* were dissected in a Petri dish containing 80% ethanol. The mandibles were dissected first, then the body wall and fat tissue were removed with tweezers, exposing the gut. The segment containing the insertion of Malpighian tubules was cut out and the gut content was removed through repeated pressure with tweezers. The enteric valve armature was exposed by a longitudinal section, mounted with polyvinyl alcohol – PVA on a microscope slide, and examined under a compound microscope.

Images were taken with a Leica DFC500 digital camera connected to a Leica MZ205 stereomicroscope linked to a computer with the Leica Application Site software with an Auto-Montage module included. The drawings were made in the vector-drawing program Inkscape Vector Graphics Editor 0.92. Terminology follows Noirot (2001) for the digestive tube and Fontes (1987) for the mandibles. Measurements were taken with an ocular micrometer following Roonwal's system (Roonwal 1970), when applicable: HW, head capsule width; HL, head capsule length until the end of the labrum; PW, mean pronotum width; HT, length of the hind tibia.

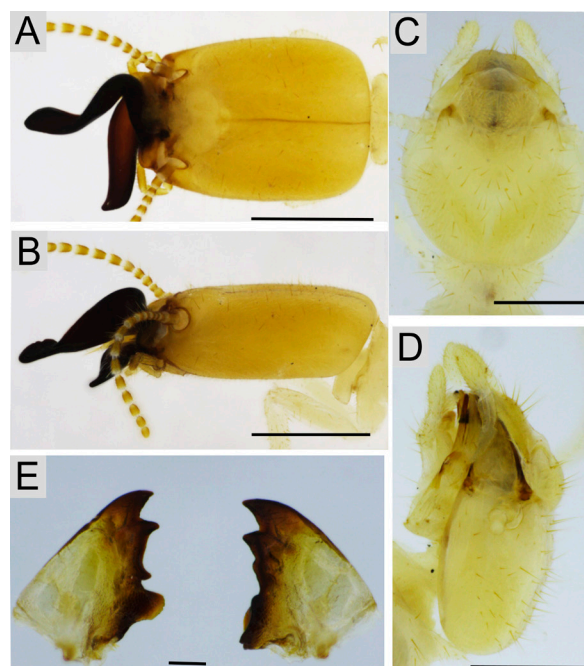
***Planicapritermes longilabrum* Constantino, 1998**

Soldier (Figure 1a-b) (described by Constantino 1998).

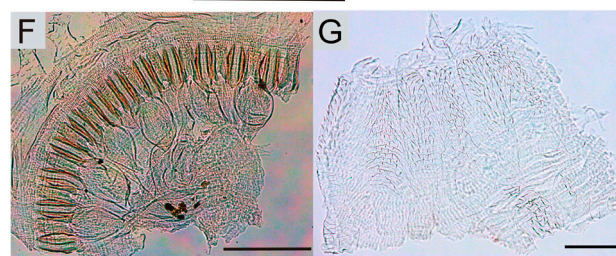
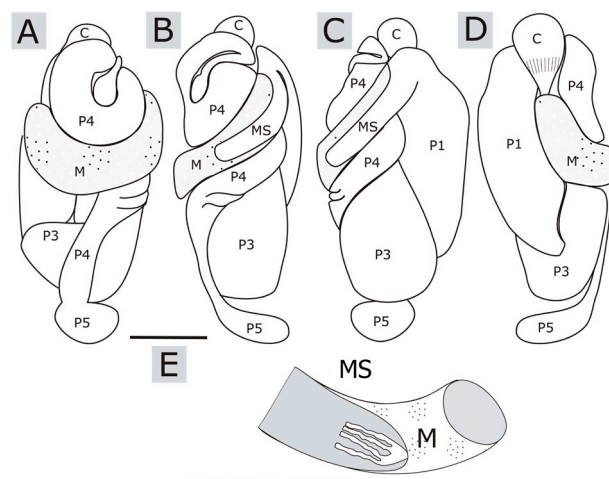
Measurements of three soldiers (mm): HW average 1.24 (range 1.22–1.25); HL 1.72 (1.7–1.74); PW 0.71 (0.7–0.72); HT 0.77 (0.77–0.79).

**Worker (Figure 1c-e)**

Head capsule yellowish with long bristles over the dorsal surface (Figure 1c-d). Fontanelle slightly noticeable. Postclypeus moderately inflated with few long bristles. Labrum with long scattered bristles. Antennae with 13 articles. Articles: I > II < III, and the following gradually increasing in length and width. Left mandible with an apical tooth smaller than the first + second marginals; third marginal present. Right mandible with apical tooth of the same size as the first marginal; second marginal undeveloped; molar plate lacking ridges (Figure 2e). Thorax whitish; pro-, meso- and metanotum with few long bristles on edges. Procoxae with few short bristles on the external face; protibia densely covered



**Figure 1.** Soldier and worker of *Planicapritermes longilabrum*. A – Head of soldier in dorsal view; B – Head of soldier in profile; C – Head of worker in dorsal view; D – Head of worker in profile; E – Mandibles in dorsal view. Scale bar: A–B = 1 mm, C–D–E = 0.5 mm. This figure is in color in the electronic version.



**Figure 2.** Digestive tube of worker of *Planicapritermes longilabrum*. A – Dorsal view; B – Right view; C – Ventral view; D – Left view; E – Insertion of Malpighi tubules; F – Gizzard; G – Enteric valve. C, crop; G, gizzard; M, mesenteron; P1, first proctodeal segment; P2, enteric valve; P3, paunch; P4, colon; P5, rectum; MS, mixed segment. Scale bar: A–E = 0.5 mm; F = 0.2 mm; G = 0.1 mm. This figure is in color in the electronic version.

by long bristles. Abdomen translucent, tergites and sternites covered by many bristles of different sizes.

Digestive tube (Figure 2a-g). Gut forming a dense and long mass. Crop located between P1 and P4, funneling into the gizzard (Figure 2d). Gizzard only visible in left lateral view (Figure 2d); pulvillar belt with six pulvilli of the first order, six pulvilli of the second order; columnar belt with six folds of the first order, six of the second order and 12 of the third order; the ornamentation of the gizzard is well developed, both columns and pulvilli (Figure 2f). Mesenteric tongue long and external to the mesenteric arch. Two pairs of Malpighian tubules inserted at the same point as the mesenteron. Ileum parallel to the longitudinal body axis, longer than mesenteron; in ventral view, beginning at the left side of the anterior region and ending at the left side of the posterior region, where it connects with the paunch. The connection between ileum and paunch visible in the left lateral view (Figure 2d). Paunch globular, connecting to the colon in right lateral view by isthmus (Figure 2b). Enteric valve with six cushions conspicuous and symmetrical, each cushion with many spines distributed uniformly on the surface of the valve, with a proximal ring of cushions in the lower right corner (Figure 2g). Colon with the same width as the mesenteron. In dorsal view, colon C-shaped above the mesenteron, partially involving the final portion of the paunch. Folds present on colon surface of all dissected specimens, located posteriorly to the mesenteron and anteriorly to the rectum connection, not visible only in the left lateral view (Figure 2d).

Measurements of 17 workers (mm): HW average 0.86 (range 0.85–0.88); HL 1.02 (0.95–1.09); PW 0.46 (0.4–0.56); HL 0.79 (0.69–0.77).

Material examined: 3 soldiers and 17 workers of one sample labelled as: “Brazil, Rondônia, Usina Hidrelétrica de Santo Antônio, Vila de Teotônio. T2 500 (90) L D. 8°50'18”S, 64°03'56”W. Coleta manual. 21-31.vii.2014. R.A. Azevedo col”.

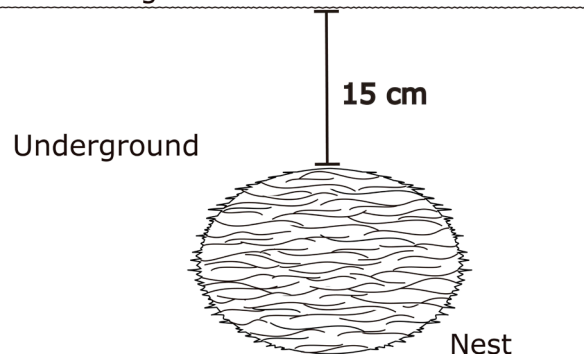
Distribution and habitat: The specimens used in this work represent the first record of *P. longilabrum* for the state of Rondônia, approximately 2,000 km south from the first record of the species, in French Guiana. Both locations are within Amazon rainforest.

### ***Planicapritermes planiceps* (Emerson, 1925)**

#### **Nest**

Two nests of *P. planiceps* were found in Rondônia, near the city of Porto Velho, at the margins of the Madeira River. Up until now, *P. planiceps* has been described as only found in decayed trunks on soil (Constantino 1999). The nests had an ellipsoid shape and were found at almost 15 cm underground (Figure 3). The nests had a carton texture and each contained soldiers, workers and one queen. Only a few species make

#### **Above the ground**



**Figure 3.** Schematic drawing of the cross section of a nest of *Planicapritermes planiceps* found in Rondônia state, Brazil.

carton nests underground (Noirot 1970), so this is an unusual characteristic of *P. planiceps*.

#### **Comparison between species**

Workers of *P. longilabrum* and *P. planiceps* have different shapes of the head capsule. In *P. longilabrum*, the head capsule is oval, whereas in *P. planiceps* the head capsule has parallel sides and width and length are equivalent. *Planicapritermes longilabrum* has bristles on the head capsule longer and in lower quantity than *P. planiceps*. The postclypeus in *P. longilabrum* is more inflated than in *P. planiceps*. Worker mandibles differ in size – in *P. longilabrum*, the left apical tooth has the same size as the left P1+2 (Figure 1e), whereas in *P. planiceps*, the left apical tooth is slightly shorter than the left P1+2, as illustrated by Krishna (1968).

The worker gut differs by the presence of folds in the colon in *P. longilabrum* (Figure 2a), which are absent in *P. planiceps*. In right lateral view, the mixed segment of *P. longilabrum* is longer and tubular (Figure 2b), while in *P. planiceps* it is shorter and broader. In *P. longilabrum*, the isthmus extends to the right, not visible in dorsal view, (Figure 2b), whereas in *P. planiceps* the isthmus is visible in dorsal view. The enteric valve of *P. longilabrum* has three cushion pairs in triradial symmetry, with long and dense spines disposed longitudinally, and a proximal ring of cushions in the lower right corner (Figure 2g), whereas *P. planiceps* has three cushion pairs, with short and sparse spines disposed longitudinally and the proximal ring of cushions in the lower right corner is absent.

*Planicapritermes planiceps* and *P. longilabrum* are similar in the connection of Malpighian tubules, with two paired tubules with the same insertion point at the mixed segment (Figure 2e). We also observed an intraspecific variation in the workers of *P. longilabrum*, as some specimens had a well noticeable crop in dorsal view, while others had the crop partially covered by the colon.



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