

Key to the soldiers of *Atlantitermes* Fontes 1979, with a new species from Brazil (Isoptera Termitidae Nasutitermitinae)

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A soldier-based key for the identification of the species of the neotropical termite genus *Atlantitermes* Fontes 1979 is presented. The diagnostic characters for the genus are reviewed and discussed, and the upturned nasus is excluded because it is not present in the soldier of every species. *A. stercophilus* n. sp., from the cerrado vegetation of Minas Gerais, Brazil, is described and illustrated. *A. osborni* (Emerson 1925) is recorded for the first time in the cerrado vegetation of southeastern Brazil. Drawings of the soldier of *A. kirbyi* (Snyder 1926) are presented for the first time.

KEY WORDS: *Atlantitermes*, key, Nasutitermitinae, taxonomy, termites.

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INTRODUCTION

The neotropical genus *Atlantitermes* Fontes 1979 was described based on two species from the Brazilian Atlantic forest. Later, FONTES (1982) transferred to this genus five other species previously described as *Subulitermes* Holmgren 1910, four of

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them from Guyana and one from Panama. FONTES (1987a, 1987b) also described the morphology of the mandibles of the imago and worker and the digestive tube of the worker.

The study of new collections from the Amazon expanded the known distribution of some species (CONSTANTINO & CANCELO 1992). *A. varipilus* (Emerson 1925) and *A. snyderi* (Emerson 1925) seem to be widely distributed in the Amazon while *A. osborni* (Emerson 1925) and *A. oculatissimus* (Emerson 1925) are known only from a few localities.

In this paper we present a key to the species of *Atlantitermes* based on the soldier caste, the description of a new species from the cerrado vegetation of Minas Gerais, Brazil and notes on *A. osborni* and *A. kirbyi*.

MATERIAL AND METHODS

Material examined in this study is deposited in the American Museum of Natural History (AMNH), New York; U.S. National Museum of Natural History (USNM), Washington D.C.; Museu de Zoologia da Universidade de São Paulo (MZSP), Brazil; Museu de Entomologia da Universidade Federal de Viçosa (MEUV), Brazil; and Museu Paraense Emílio Goeldi, Brazil.

The key was prepared based on the descriptions available in the literature and examination of type and non-type material, except in the case of *A. guarinim* Fontes 1979 and *A. ibitiriguara* Fontes 1979, for which only the original descriptions were used. The key should be used with care because it was based on the limited material available and some species may show more variation than currently known. Also, there are good chances of finding new species of this genus.

Specimens were drawn using stereomicroscope and camera lucida. Terms used for hairs are comparative. Bristles are long, with well-marked bases, and found on top of head, posterior margins of tergites and sternites and legs. Hairs are shorter and less conspicuous. Microscopic hairs are those visible only with magnifications greater than 60 \times (usually not visible with a dissection microscope). Measurements were taken with a micrometric reticle. The correspondence with ROONWAL's (1970) system is as follows: (1) length of head with nasus = no. 12; (2) width of head = no. 17; (3) height of head = no. 21; (4) width of pronotum = no. 68; (5) length of nasus = 13; (6) length of hind tibia = no. 85.

KEY TO THE SOLDIERS OF ATLANTITERMES

- | | | |
|---|--|--|
| 1 | Top of head with 6 bristles and only microscopic hairs; surface of tergites (excluding posterior margin) without hairs or with scattered microscopic hairs | 2 |
| — | Top of head with 4-6 bristles and short hairs; surface of tergites with numerous hairs | 5 |
| 2 | Posterior margin of tergites without bristles; top of head convex in profile (Amazonia) | <i>A. varipilus</i> (Emerson 1925) |
| — | Posterior margin of tergites with a row of 4 bristles; top of head straight or slightly concave in profile | 3 |
| 3 | Ratio of length of hind tibia to length of head less than 0.6; head in dorsal view with slight constriction behind antennae; fourth article of antenna longer than second | 4 |
| — | Ratio of length of hind tibia to length of head more than 0.6; head in dorsal view with conspicuous constriction behind antennae; fourth article of antenna equal to second (Amazonia) | <i>A. oculatissimus</i> (Emerson 1925) |
| 4 | Nasus slightly upturned in profile (less than 10° relative to the longitudinal axis of head); third article of antenna equal to second (Amazonia and Cerrado) | <i>A. osborni</i> (Emerson 1925) |
| — | Nasus conspicuously upturned in profile (more than 10° relative to the longitudinal axis of head); third article of antenna shorter than second (Panama) | <i>A. kirbyi</i> (Snyder 1926) |

- | | | |
|---|---|---|
| 5 | Proximal half of nasus with a few hairs; length of head more than 1.3 mm; nasus conical, conspicuously upturned in profile (more than 10° relative to the longitudinal axis of head); head capsule yellow | 6 |
| — | Proximal half of nasus with numerous hairs; length of head less than 1.3 mm; nasus cylindrical, not upturned in profile; head capsule pale yellow | 7 |
| 6 | Top of head straight or slightly concave in profile; third article of antenna equal to second, fourth longer than second (Brazilian Atlantic forest) | |
| — | Top of head conspicuously concave in profile; third article of antenna shorter than second, fourth equal to second (Brazilian Atlantic forest) | |
| | <i>A. guarinim</i> Fontes 1979 | |
| | <i>A. ibitiriguara</i> Fontes 1979 | |
| 7 | Antenna with 11 articles; length of head less than 1.1 mm; third article of antenna equal to second (Amazonia) | |
| — | Antenna with 12 articles; length of head more than 1.1 mm; third article of antenna shorter than second (Cerrado) | |
| | <i>A. snyderi</i> (Emerson 1925) | |
| | <i>A. stercophilus</i> n. sp. | |

TAXONOMY

Genus *Atlantitermes* Fontes 1979

Type species: *Atlantitermes guarinim* Fontes 1979, by original designation.

Atlantitermes FONTES 1979: 220 [imago, soldier, worker]; FONTES 1987a [digestive tube of worker]; FONTES 1987b [mandibles of imago and worker].

Diagnosis. Soldier. Small-sized neotropical nasutes (length of head 0.9 to 1.7 mm) with yellow or pale yellow head. Vestigial mandibles without points. Head in dorsal view, with slight to conspicuous constriction behind antennae. In most species (but not in all), nasus slightly to conspicuously upturned relative to the longitudinal axis of head in profile. Top of head with four bristles on the base of nasus (except in *A. ibitiriguara*) and two on vertex. Very small or microscopic hairs usually present on top of head. Antennae with 11-12 articles.

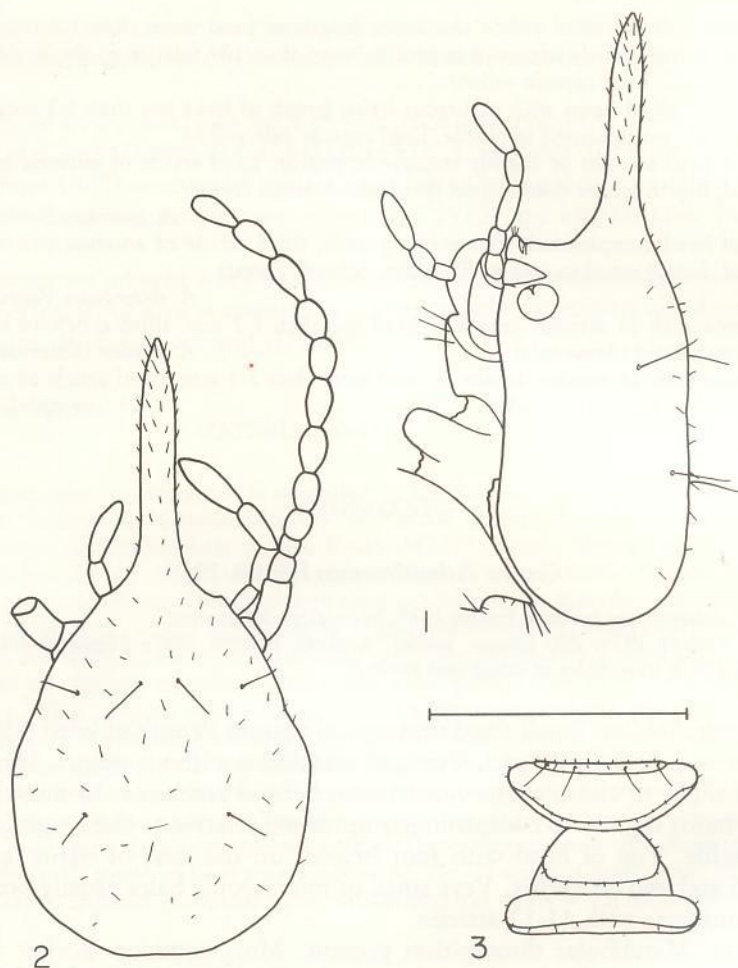
Worker. Mandibular dimorphism present. Most common worker type with a narrower gap between molar prominence and 3rd marginal tooth on left mandible. Left mandible index about 0.77 for workers with "narrow gap" and about 0.68 for workers with "wide gap" (FONTES 1987b). Cutting edge between 1st plus 2nd and 3rd marginal teeth of left mandible sinuous. Second marginal tooth of right mandible conspicuous but much smaller than 1st marginal. Enteric valve armature with six sclerotized swellings, three large ones alternating with three smaller ones, all bearing both long and short spines.

Atlantitermes stercophilus n. sp.

Type material. Holotype soldier, Brazil, Minas Gerais, Rio Paranaíba, cerrado vegetation, 22.XI.90, Og F.F. Souza coll. (MZSP). Paratypes, soldiers and workers, same data as holotype (MEUV and MZSP).

Description. Imago unknown.

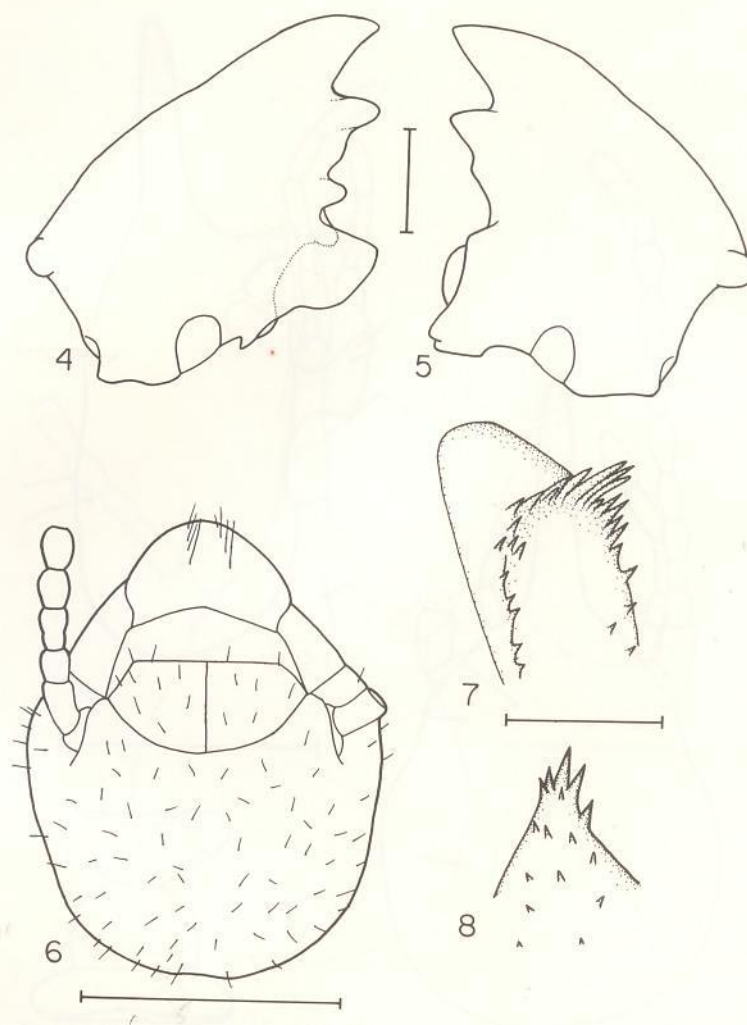
Soldier (Figs 1-3). Head, in dorsal view, with slight constriction behind antennae. Nasus not upturned relative to the longitudinal axis of head. Top of head straight



Figs 1-3. — *Atlantitermes stercophilus* n. sp., soldier. Fig. 1: head in dorsal view; Fig. 2: head in profile; Fig. 3: thorax. Scale = 0.5 mm.

or slightly concave in profile. Antenna with 12 articles, third article shorter than second, fourth article equal to second. Head capsule pale yellow. Nasus yellow orange. Abdominal cuticle transparent. Top of head with four bristles at base of nasus, two bristles on vertex and many short hairs. Tergites each with four perpendicular bristles on posterior margin. Sternites with a row of bristles oriented forward. Surfaces of tergites and sternites with numerous short hairs. Nasus with numerous short hairs, becoming longer toward tip. Tibial spurs 2:2:2.

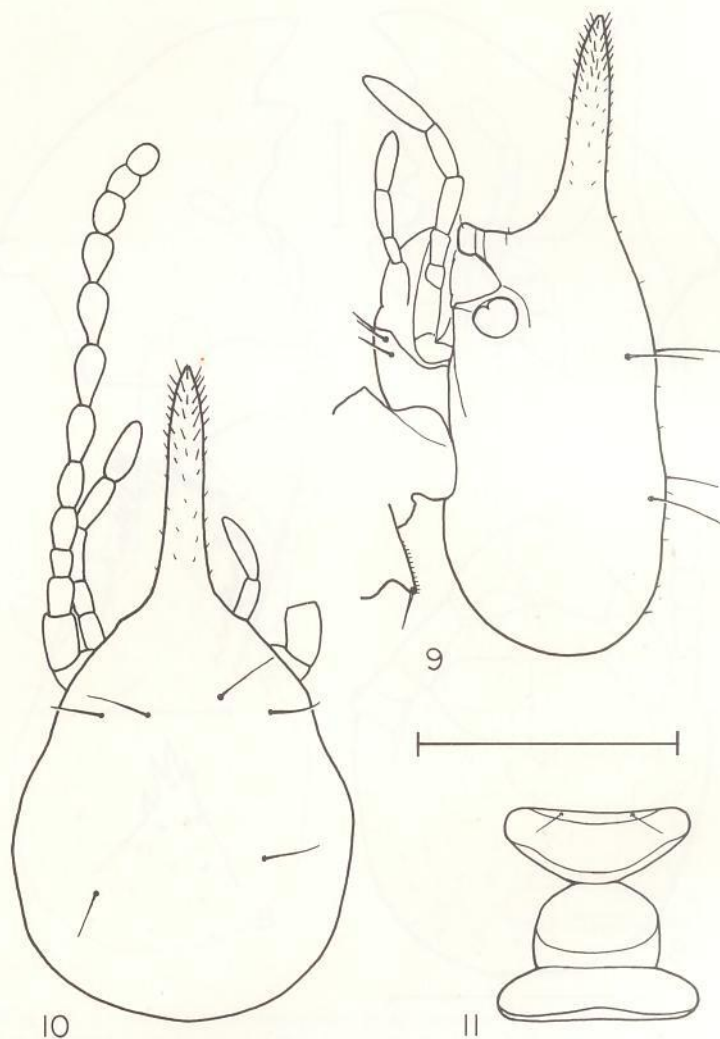
Measurements (in mm) of 15 soldiers from one colony. Width of head 0.53-0.59. Length of head including nasus 1.14-1.25. Length of nasus 0.43-0.49. Height of head 0.35-0.39. Length of hind tibia 0.59-0.65. Width of pronotum 0.4 ($n=1$). Ratio of width of head to length of head including nasus 0.46-0.49. Ratio of length of nasus to



Figs 4-8. — *Atlantitermes stercophilus* n. sp., worker. Fig. 4: left mandible; Fig. 5: right mandible; Fig. 6: head in dorsal view; Fig. 7: one major swelling of the enteric valve armature; Fig. 8: one minor swelling of the enteric valve armature. Scales are: Figs 4-5 = 0.1 mm; Fig. 6 = 0.5 mm; Figs 7-8 = 0.05 mm.

length of head excluding nasus 0.59-0.68. Ratio of length of hind tibia to length of head including nasus 0.50-0.56.

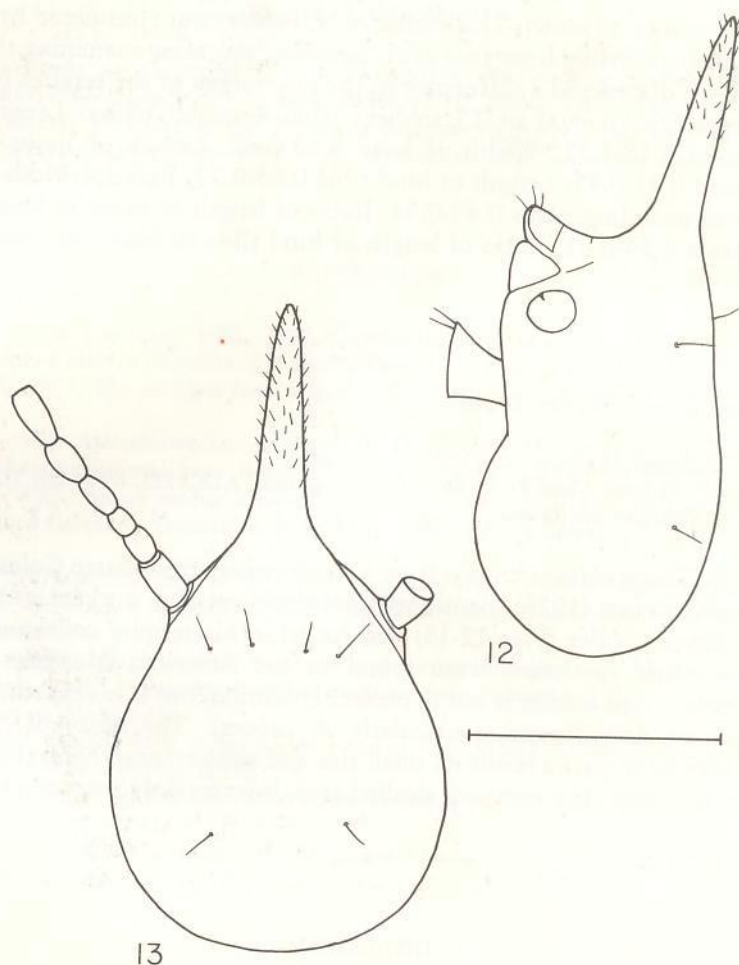
Worker (Figs 4-8). Head capsule yellowish white, abdominal cuticle transparent. Top of head with numerous short hairs. Chaetotaxy of abdomen similar to that of soldier. Antenna with 13 articles. Mandibles as in Figs 4 and 5. Enteric valve armature as in Figs 7 and 8.



Figs 9-11. — *Atlantitermes osborni*, soldier from Minas Gerais, Brazil. Fig. 9: head in dorsal view; Fig. 10: head in profile; Fig. 11: thorax. Scale = 0.5 mm.

Comparisons. In terms of the overall similarity of the soldier, the closest species is *A. snyderi*, which is conspicuously smaller and has only 11 antennal articles. Differences from other species are in the key.

Biology. The type material was collected in a bait of cow dung in cerrado vegetation; the nest is probably subterranean.



Figs 12-13. — *Atlantitermes kirbyi*, holotype soldier (head capsule slightly damaged and antennae broken). Fig. 12: head in dorsal view; Fig. 13: head in profile. Scale = 0.5 mm.

***Atlantitermes osborni* (Emerson 1925)**

Nasutitermes (Subulitermes) osborni EMERSON 1925: 404 [imago, soldier, fig. 67].

Material examined. Soldiers, workers, and one alate ("metatypes"), Kartabo, Guyana, 15.V.1924, collected and determined by A.E. Emerson (AMNH). Soldiers and workers, Brazil, Minas Gerais, Rio Paranaíba, cerrado vegetation, 5.XII.1990, Og F.F. Souza coll. (MEUV).

Remarks. This species was previously recorded only from Guyana, and this new record expands considerably its known distribution. The soldiers from Minas Gerais (Figs 9-11) seem to be a little smaller than Emerson's specimens, but with some

overlap (measurements below). The soldier of *A. osborni* was considered by EMERSON (1925) as indistinguishable from that of *A. raripilus*, but, after examining the types of both species, we discovered a difference in the chaetotaxy of the tergites (see key).

Measurements (in mm) of 15 soldiers from a single colony. Length of head including nasus 1.18-1.31. Width of head 0.61-0.67. Length of nasus 0.43-0.49. Height of head 0.41-0.45. Length of hind tibia 0.65-0.73. Ratio of width of head to length of head including nasus 0.49-0.54. Ratio of length of nasus to length of head excluding nasus 0.54-0.61. Ratio of length of hind tibia to length of head including nasus 0.52-0.60.

Atlantitermes kirbyi (Snyder 1926)

Nasutitermes (Subulitermes) kirbyi SNYDER 1926: 14 [soldier].

Holotype (soldier): Panama, Canal Zone, Barro Colorado Island, 3.IX.1925, Kirby coll. (USNM: condition poor). Paratypes not located.

Remarks. This species is known from a single colony from Barro Colorado Island, and, although SNYDER (1926) mentioned more soldiers and workers in the sample, only the holotype soldier (Figs 12-13) was found in his termite collection. Also, no paratypes or other specimens were found in the American Museum of Natural History. The holotype soldier is not in perfect condition, but it is very similar to some other species of *Atlantitermes*, particularly *A. osborni*. The rarity of *A. kirbyi* in collections may be in part a result its small size and subterranean habit, but, since the Canal Zone of Panama is a very well studied area, it is certainly not a common species.

DISCUSSION

Atlantitermes is clearly related to a group of soil-feeding neotropical nasute termites composed of *Subulitermes* Holmgren 1910, *Convexitermes* Holmgren 1910, *Araujotermes* Fontes 1982, *Coatitermes* Fontes 1982, *Agnathotermes* Snyder 1926, and possibly *Ereymatermes* Constantino 1991. However, the phylogenetic relations between these genera are obscure and apparently the analysis of morphological characters alone cannot provide enough information for a serious phylogenetic analysis. Also, *Atlantitermes* is not defined by clearly apomorphic characters, with the possible exception of the armature of the enteric valve, which was not studied for every species. Further studies, based on larger series, will be necessary to clarify the systematics of this genus.

It should be emphasized that one of the main diagnostic characters for the soldiers of *Atlantitermes* presented by FONTES (1979) in the original description, the upturned nasus, is not present in every species. The upturned nasus was also used as a diagnostic character in a key for the identification of the neotropical genera of Nasutitermitinae presented by MILL (1983).

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