



## ***Tropidomyrmex elianae*, a new myrmicine ant genus and species from Brazil, tentatively assigned to Solenopsidini (Hymenoptera, Formicidae)**

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### **Abstract**

A new myrmicine ant, *Tropidomyrmex elianae* **gen. n. & sp. n.**, is described from southeastern and central Brazil, based on workers, ergatoid gynes, males and larvae. *Tropidomyrmex* workers are relatively small, monomorphic, characterized mainly by the feebly pigmented and extremely thin integument; subfalcate mandibles bearing a single apical tooth; palpal formula 1,2; clypeus relatively broad and convex; reduced compound eyes; propodeum unarmed and with a strongly medially depressed declivous face; double and bilobed well developed subpostpetiolar processes; and peculiarities in the sting apparatus. A colony fragment of *T. elianae* containing workers, ergatoid gynes, males, and brood was found inside a ground termite nest (*Anoplotermes pacificus* Apicotermitinae) in a montane rocky scrubland in the state of Minas Gerais, southeastern Brazil. *Tropidomyrmex elianae* is known also from two workers collected in leaf litter samples processed with a Winkler extractor, from the state of Tocantins, central-north Brazil. Despite the differences from the accepted solenopsidine genera, *Tropidomyrmex* is tentatively assigned to this tribe. Within the solenopsidine ants, the genus is apparently related to *Tranopelta*. *Tropidomyrmex* is marked by extreme reductions, perhaps reflecting adaptations to particular habits and habitats.

**Key words:** taxonomy, *Tropidomyrmex*, *Tranopelta*, termites, Brazilian biomes

### **Introduction**

Although the Neotropical Region continues to contribute numerous new ant species, only a few genera have been recently described. Since 2000, only the myrmicine *Cryptomyrmex* Fernández (2004) and the dolichoderine *Gracilidris* Wild & Cuzzo (2006) were described.

Tropical wet forests have received the bulk of the recent sampling effort, but arid and semi-arid areas of South America remain relatively under-sampled for ants (Wild & Cuzzo, 2006). The ecologically heterogeneous “Cerrado” biome is a savanna-like ecosystem, originally covering c. 2.5 million square kilometers, with its core area in the center of Brazil. It is possible to recognize Cerrado areas in distinct successional stages, ecotones with other ecosystems, and Cerrado islands surrounded by different formations; within the Cerrado, a net of streams and rivers support gallery forests that act as important corridors for the dispersal of organisms inhabiting other neighboring ecosystems. The Cerrado supports a rich and generally unappreciated biodiversity; it is one of the world's biodiversity hotspots (Klink & Machado, 2005; Lewinsohn *et al.*, 2005). It is under severe anthropocentric pressure, as it is presently being replaced by soybean monoculture. The Brazilian montane rocky scrublands in general occupy areas with altitudes over 900 m above sea level (Giulietti & Pirani, 1988), and have been considered as a particular type of Cerrado; they have also been overlooked in recent surveys.

We describe here a new genus of ants, characterized by several unusual morphological characters, possibly representing reductions, and discuss its possible affinities with other myrmicine genera. We base the description on material assigned to one species, collected both in Cerrado *sensu stricto* and in a montane rocky scrubland.

## Material and methods

The terms for external morphology and surface sculpturing follow Bolton (1994, 2000) and Harris (1979). Terms for larvae morphology follow Wheeler & Wheeler (1976). Terms for wing venation and sting apparatus follow Brown & Nutting (1950) and Kugler (1978). The reproductive female is here called “gyne” (gynes for the plural) as a neologism in the English language (Feitosa & Brandão, 2008), as suggested by Wheeler (1908) and De Andrade & Baroni Urbani (1999). Entomological collections are referred to by the following acronyms (Brandão, 2000):

BMNH	The Natural History Museum, London, UK.
CASC	California Academy of Sciences, San Francisco, CA, USA.
CPDC	Centro de Pesquisas do Cacau, Itabuna, BA, Brazil.
ICNC	Instituto de Ciencias Naturales de la Universidad Nacional de Colombia, Bogotá, Colombia.
MZSP	Museu de Zoologia da Universidade de São Paulo, São Paulo, SP, Brazil.
USNM	National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA.

We recorded a number of standard morphometric characters and indices. Head measurements were taken with the head in full mesosoma in dorsal view, with the anterior clypeal margin and the posterior border of the head in the same focal plane. We consider ant heads to be prognathous, so the clypeus is anterior and the frontal area is dorsal. Measurements were made with a micrometer and recorded to the nearest 0.001mm. All measurements are given in millimeters, and the abbreviations used are:

HL	Head length. The maximum length of head capsule excluding the mandible, measured in full face view, in a straight line from the midpoint of the anterior clypeal margin to the midpoint of the vertexal margin.
HW	Head width. The maximum width of the head capsule, measured in full face view, at a median transverse line that touches the superior margins of the compound eyes.
ML	Mandible length. In full face view taken with the mandibles in closed position, the distance from the anteriormost portion of head to apex of closed mandibles.
SL	Antennal scape length. The chord length of the antennal scape, excluding the basal condyle and its peduncle.
EL	Eye length. Maximum diameter of compound eye, in lateral view.
PRW	Pronotum width. In dorsal view, the maximum pronotum width.
WL	Mesosoma length (Weber length). In lateral view, the distance between the anterior margin of the pronotum, exclusive of the collar, to the posterior margin of the metapleural bulla.
FL	Metafemur length. In posterior view, measured along the longitudinal axis from the apex to the junction with the trochanter.
PL	Petiole length. In lateral view, the axial distance from the dorsal corner of the posterior peduncle to the nearest edge of the propodeal lobe.
PPL	Postpetiole length. In lateral view, the axial distance from base of node in front to the tip of posterior peduncle.
PW	Petiole width. Maximum transverse distance across the node in dorsal view.
PPW	Postpetiole width. Maximum transverse distance across the postpetiole in dorsal view.

GL	Gaster length. In lateral view, from anterior edge of first tergum (fourth abdominal tergum) to posterior edge of the last visible tergum.
TL	Total length. The summed length of HL, ML, WL, PL, PPL, GL.
OI	Ocular index; $100 \cdot EL / HW$ .
SI	Scape index: $100 \cdot SL / HW$ .
CI	Cephalic index: $100 \cdot HW / HL$ .

In addition to morphometric measurements, Scanning Electron Microscope images of *Tropidomyrmex elianae* were made at MZUSP with a LEO 440<sup>®</sup> scanning electron microscope on gold coated specimens. Because of the exceeding fragility of the *Tropidomyrmex* integument, the dry mounted specimens collapsed, including those observed under SEM. However, the diagnostic characters of the genus and species are clearly visible.

High resolution digital images of *Tropidomyrmex* are here presented thanks to the kind permission of Dr Brian L. Fisher. These images are available on Antweb ([www.antweb.org](http://www.antweb.org)).

## Taxonomic account

### *Tropidomyrmex* gen. n.

(Figs. 1–11)

**Type species:** *Tropidomyrmex elianae* sp. n., by present designation.

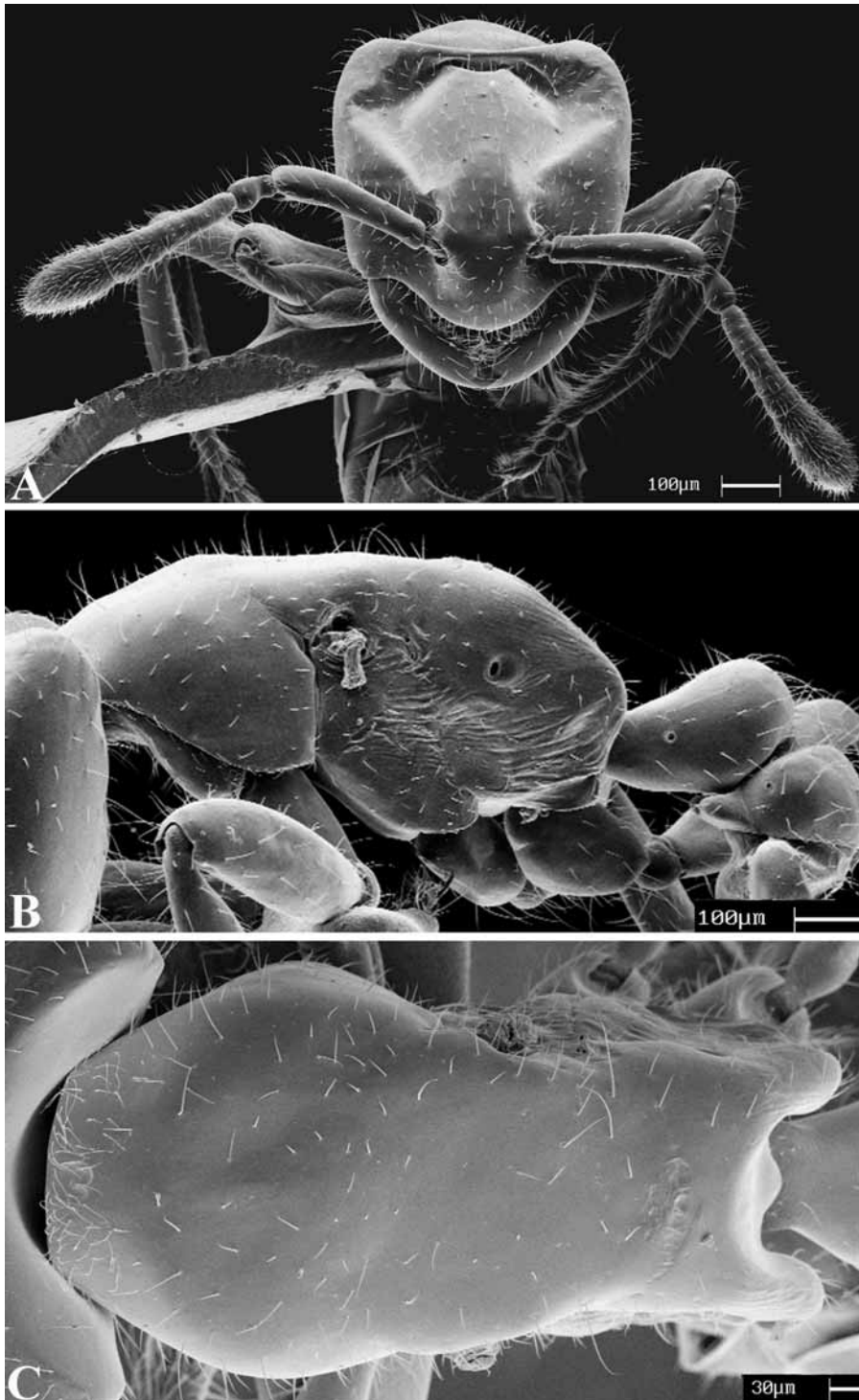
**Worker.** Monomorphic myrmicine ants. Size relatively small (TL 2.15–2.57). Body color pale-yellowish, with appendages somewhat lighter. Integument extremely thin, predominantly smooth and rather opaque, with the inferior portions of meso- and metapleuron finely striate. Pilosity composed mainly of short to long, flexuous, suberect hairs.

Head subquadrate, in full face view; lateral borders and dorsal surface slightly convex; vertexal margin strongly concave medially; posterolateral corners rounded. Mandibles narrow, weakly convex dorsally, and with external margins considerably curved inwards; masticatory margins very short and mostly edentate, except for the apical tooth which is extremely developed. Palpal formula 1,2. Maxillae stipes without transverse crest. Clypeus very broad and convex dorsally, posteriorly emarginate; lateral portions set lower than central disc; anterior margin very pronounced anteriorly at the median portion. Frontal lobes very reduced, exposing the antennal insertions. Toruli visible in full-face view, their maximum exposure anterior to point of maximum width of frontal lobes. Frontal triangle indistinct. Compound eyes relatively small, occupying some 5% of the head capsule, and set at the same level as the surrounding surface of head. Antennae 11-segmented, segments gradually increasing in size without a noticeable club; apical segment as long as the four preceding ones; antennal condyle exposed; scapes with dorsal surface convex apically and failing to reach the vertexal margin.

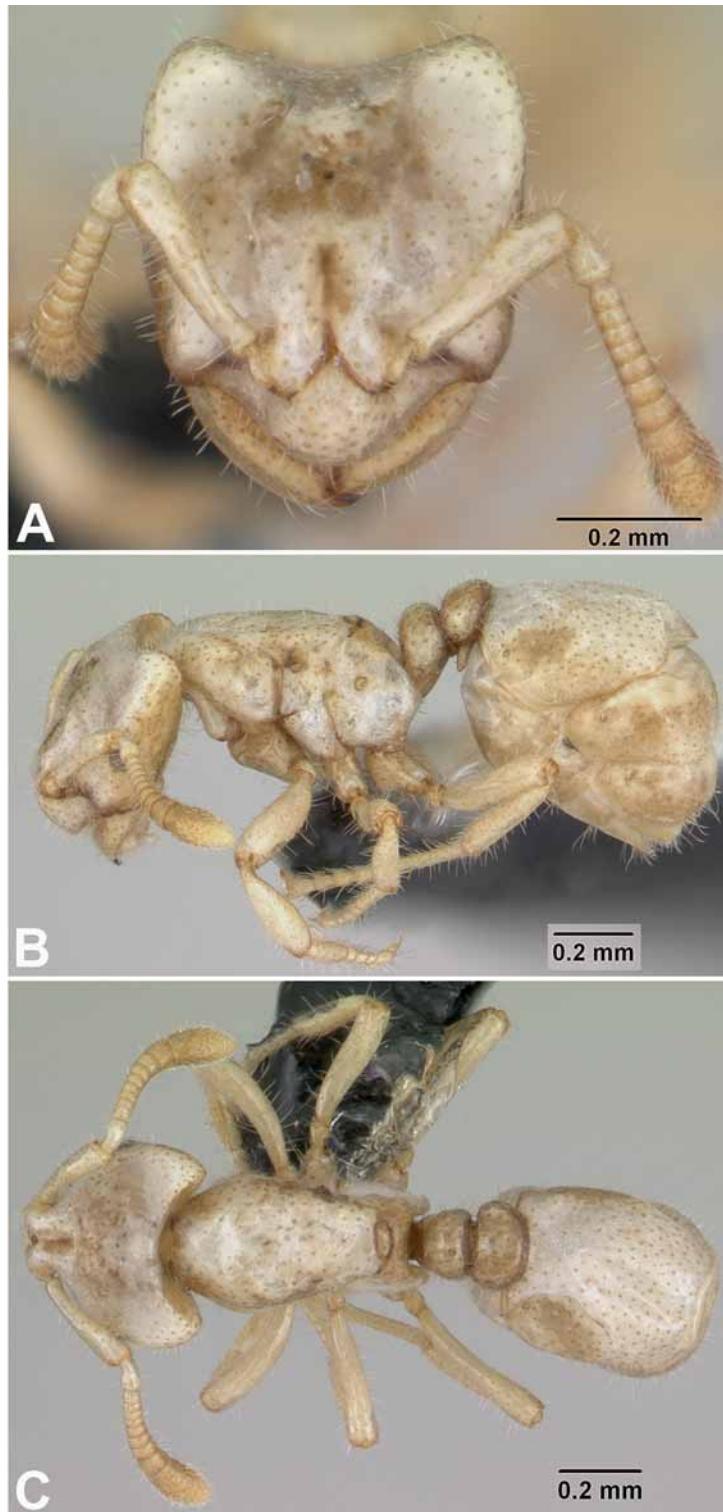
Mesosoma compact; pronotum relatively large; promesonotal suture distinct under SEM (Fig. 10C); propleuron well developed; dorsal surface of mesonotum separated from anepisternum by a distinct suture; metanotal suture vestigial; propodeum unarmed and with the dorsal surface strongly sloped posteriorly, propodeal spiracle relatively large, posterior declivity strongly concave, so that it can receive the entire petiole when it is closed against the mesosoma, propodeal lobes reduced, not visible in side view. Legs relatively short and robust, middle and hind tibiae without apical spurs; tarsal claws simple.

Petiole short, without a ventral carina or processes, node distinct, high, and dorsally convex in profile; postpetiole broader than long in dorsal view and relatively narrow in lateral view, ventral process well developed, as broad as postpetiole, and formed by two divergent lobes, when seen in ventral view. Gaster moderately elongate, with the first segment (IV abdominal) larger than the posterior ones; tergite of abdominal segment IV (first gastral) broadly overlapping sternite on ventral surface of gaster; gastral shoulder inconspicuous.

Sting apparatus. Spiracular plate subrectangular; dorsal notch absent; spiracle relatively wide; anterior apodeme narrow; ventral edge weakly pronounced. Quadrate plate with the dorsal region as broad as ventral region; dorsal margin convex; posterior margin complete. Oblong plate with posterior apodeme long. Triangular plate longer than broad. Gonostylus with body virtually fused to the oblong plate, with a single sclerotized anterior segment. Anal plate small and subtriangular. Lancet short, with functional valves; dorsal and ventral margins converging towards the apex. Sting sclerotized, with acute apex; body of bulb slender in lateral view. Furcula with dorsal arm fused to the base of the sting bulb.



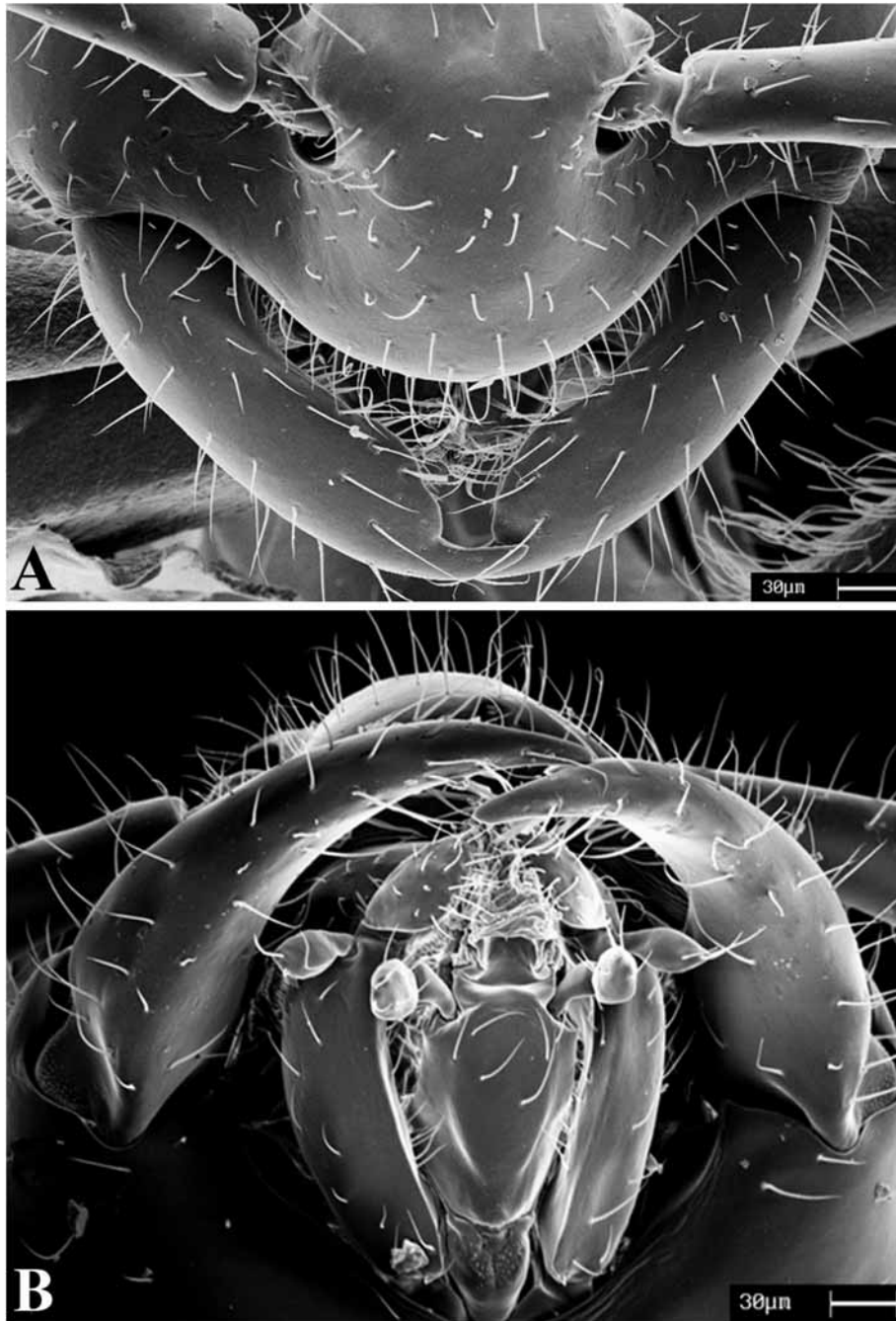
**FIGURE 1.** SEM images of *Tropidomyrmex elianae* gen. & sp. n. paratype gyne. A, head in full face view; B, mesosoma in lateral view; C, mesosoma in dorsal view.



**FIGURE 2.** Auto-Montage images of *Tropidomyrmex elianae* gen. & sp. n. paratype gyne. A, head in full face view; B, lateral view; C, dorsal view. Images by April Nobile, specimen CASENT0173620.

**Gyne.** Ergatoid. Virtually identical to the conspecific worker except for the presence of the ocelli and wing buds, and the absence of a promesonotal suture.

**Male.** Body dark brown. Dorsum of head densely punctate; body predominantly smooth and weakly shiny. Short, subdecumbent, whitish hairs sparsely covering the body; appendages with fine appressed pubescence.

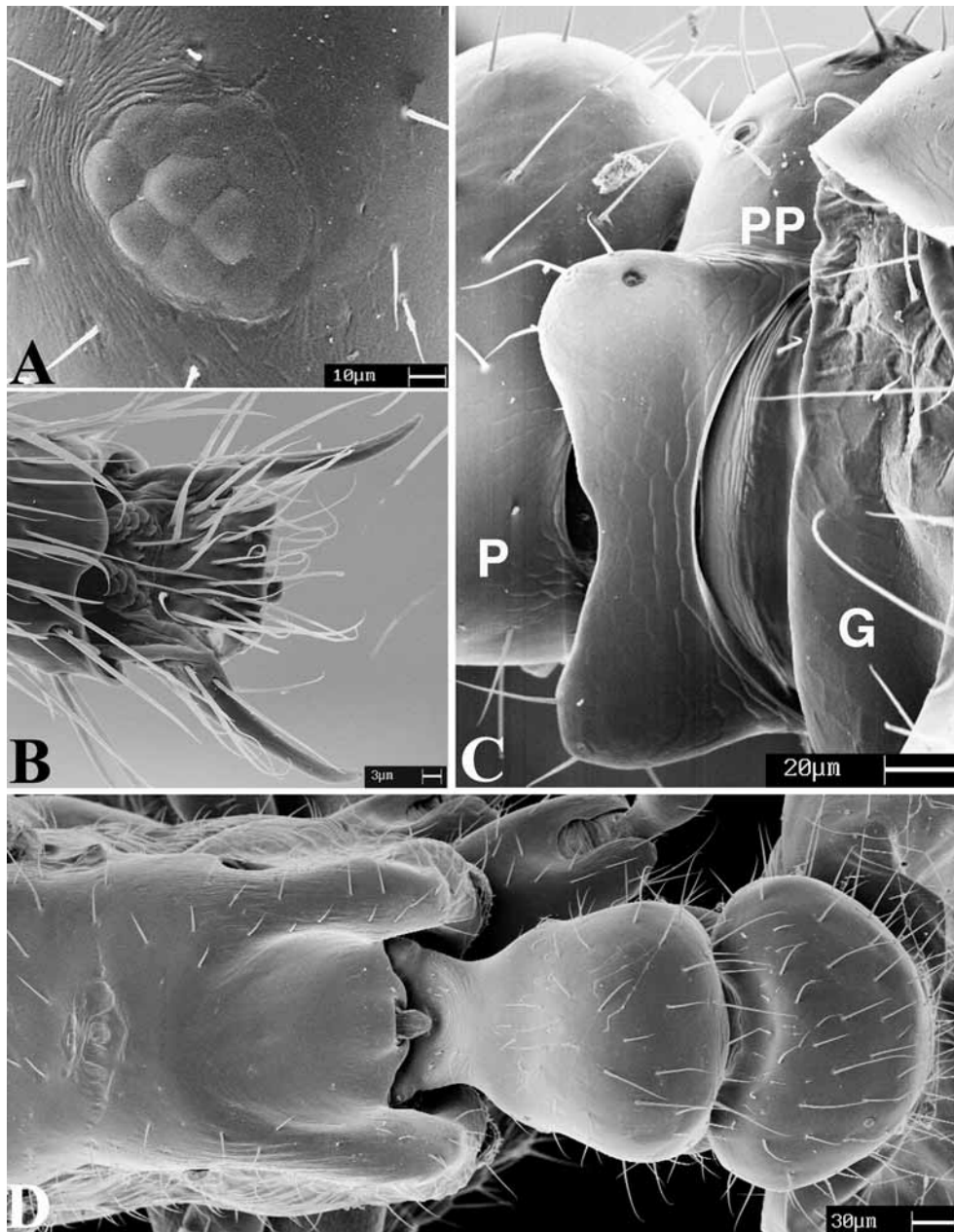


**FIGURE 3.** SEM images of *Tropidomyrmex elianae* gen. & sp. n. paratype gyne. A, detail of clypeal area in frontal view; B, detail of mouthparts in ventral view.

Head rounded. Mandibles falcate and relatively well developed, with a single tooth at apex. Palpal formula 1,2. Frontal lobes obsolete exposing the basilar condyle of antennae. Antennae 12-segmented; scape very short, pedicel enlarged. Ocelli present.

Pronotum reduced; scutum large and rounded, parapsidal lines distinct; prescutellum narrow; propodeum unarmed, with short dorsal face and distinctly concave declivous face in dorsal view, convex in side view; propodeal spiracle small, propodeal lobes reduced. Legs more elongate than in the conspecific females. Wing venation reduced; longitudinal veins Sc+R, Rs, M, Cu, and A present; cells C, R and SR closed. Hind wing with R cell only; four sub-median hamuli.

Petiole pedunculate, ventral processes absent. Postpetiole broader than long in dorsal view, attached to gaster by almost its full width. Gaster elongate, with rounded gastral shoulder.

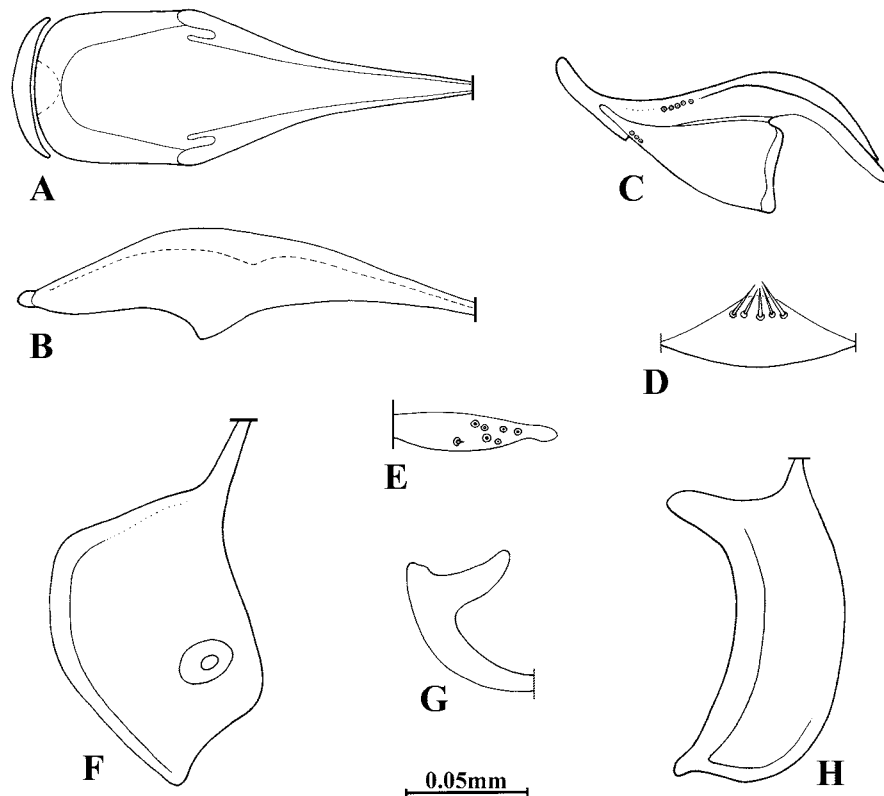


**FIGURE 4.** SEM images of *Tropidomyrmex elianae* **gen. & sp. n.** paratype gyne. A, detail of eye in lateral view; B, pretarsal claws of left hind leg; C, detail of subpostpetiolar process in ventral view (P: petiole, PP: postpetiole, G: gaster); D, detail of the declivous face of propodeum in dorsal view.

**Larvae.** Profile pheidoloid, although the head does not protrude ventrally as much as in *Pheidole* larvae. Head subcircular; irregular, very reduced mandibles, apices do not meet, edentate; prothorax and abdomen relatively short, no protuberances. Body pilosity sparse and formed by smooth unbranched and short anchor-tipped hairs.

**Etymology.** The generic epithet refers to the keels under the female postpetiole; from Greek *tropidos* (τροπιδος) = keel, which, by virtue of being double (Fig. 4C), clearly differentiate these ants from all others, as far as we know.





**FIGURE 5.** Line drawings of *Tropidomyrmex elianae* gen. & sp. n. sting apparatus (paratype worker). A, sting and furcula in dorsal view; B, sting and furcula in profile; C, oblong plate; D, anal plate; E, gonostylus; F, spiracular plate; G, triangular plate; H, quadrate plate.

***Tropidomyrmex elianae* sp. n.**

(Figs. 1–11)

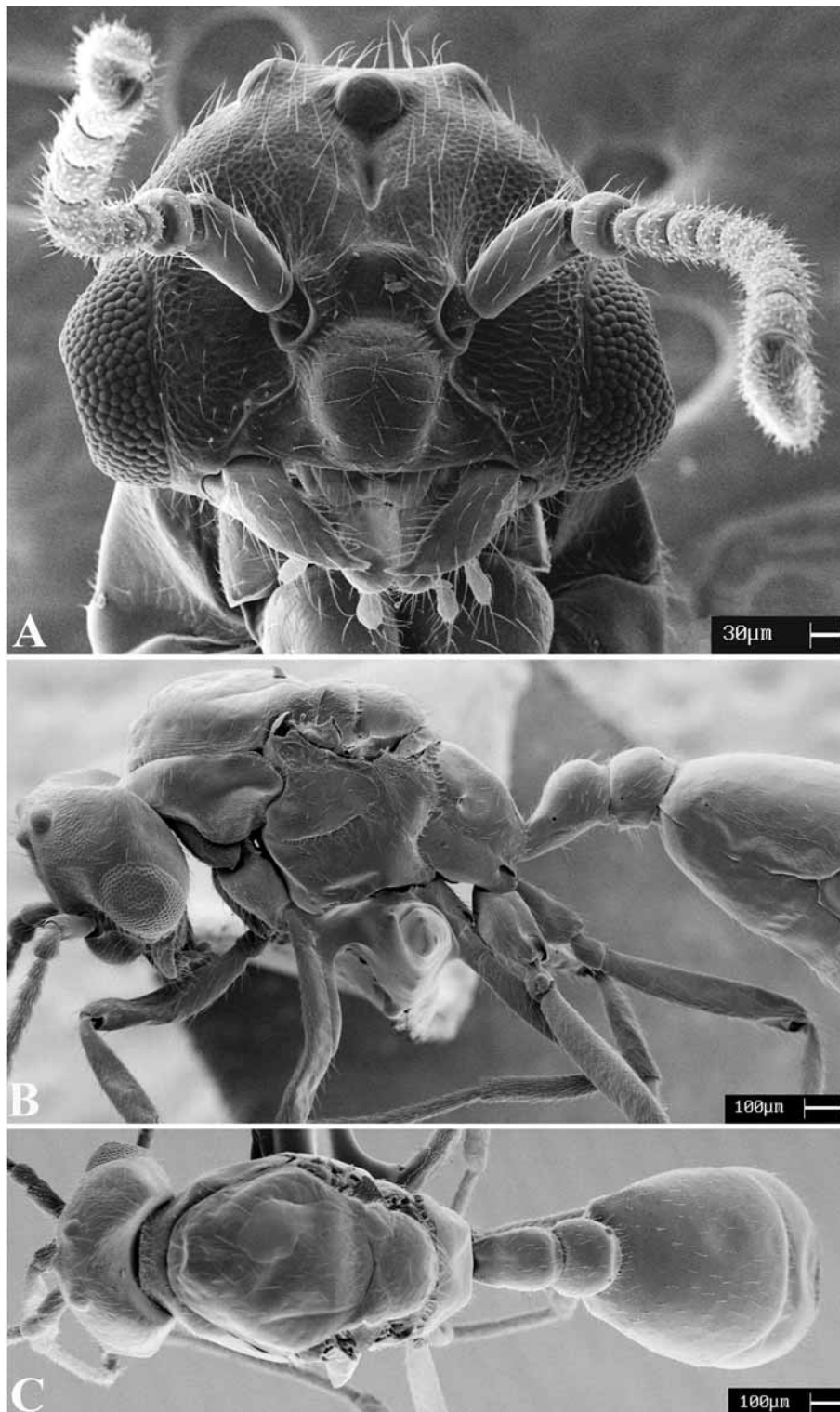
**Holotype worker.** BRAZIL: MG, Tiradentes, Serra de São José [21°05'30"S 44°10'36"], 12.iv.2007, 1267m, Canello, E.M. & Menezes, M.A. cols. No. 12. Apicotermitinae [MZSP].

**Paratypes.** same data as holotype (1 gyne and 1 male) [CASC]; (1 male) [CPDC]; (1 male) [BMNH]; (1 male) [ICNC]; (3 workers, 3 gynes, and 5 males) [MZSP]; (1 gyne and 1 male) [USNM].

**Worker.** Holotype (paratypes within brackets): HW 0.51 (0.53–0.55); HL 0.55 (0.55–0.56); ML 0.27 (0.26–0.28); EL 0.031 (0.028–0.038); SL 0.27 (0.26–0.28); PRW 0.27 (0.26–0.28); WL 0.65 (0.64–0.66); FL 0.34 (0.30–0.37); PL 0.15 (0.15); PW 0.17 (0.17); PPL 0.11 (0.09–0.11); PPW 0.21 (0.21); GL 0.78 (0.73–0.81); TL 2.51 (2.42–2.57); OI 4.28 (3.87–5.25); SI 52.4 (51.7–53.6); CI 98.3 (96.5–100). Color pale yellow, with dark punctuations at the hair insertions. Body predominantly smooth and opaque; lateral faces of mesopleuron and propodeum with short, longitudinal rugulation, better seen in SEM. Body covered by abundant, whitish, short, suberect hairs, denser on appendages and anterior portion of pronotum; long, flexuous hairs present on ventral face of head.

Basal margins of mandibles not touching the anterior margins of clypeus when mandibles are closed (intramandibular space present). Compound eyes with four minute facets at the maximum diameter. Pronotum slightly inclined anteriorly; metapropodeal groove not strongly depressed; propodeal spiracle set lower than the adjacent surface of propodeum, directed posterad. Postpetiole broader than petiole and with the anterior margin weakly concave medially, in dorsal view.

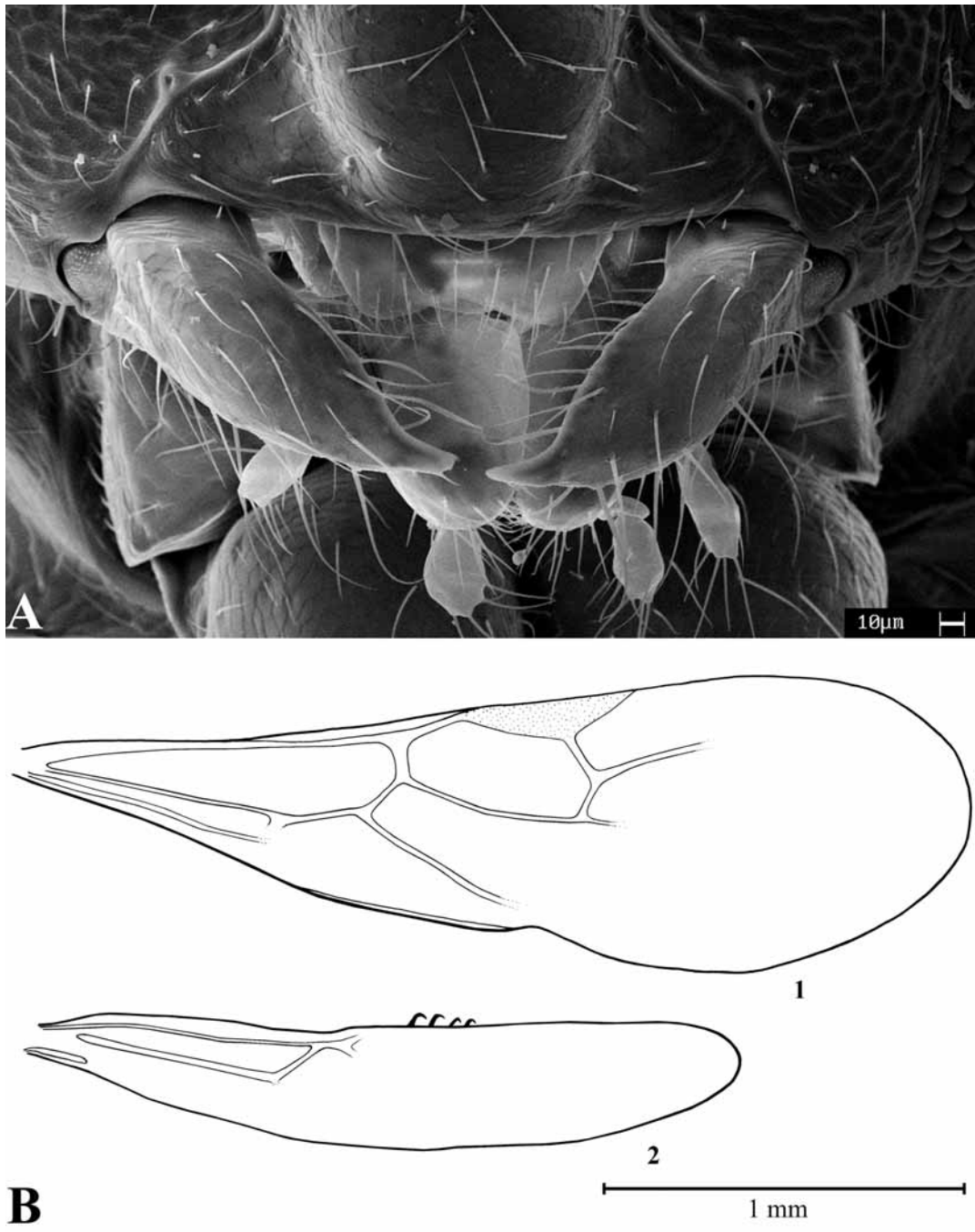




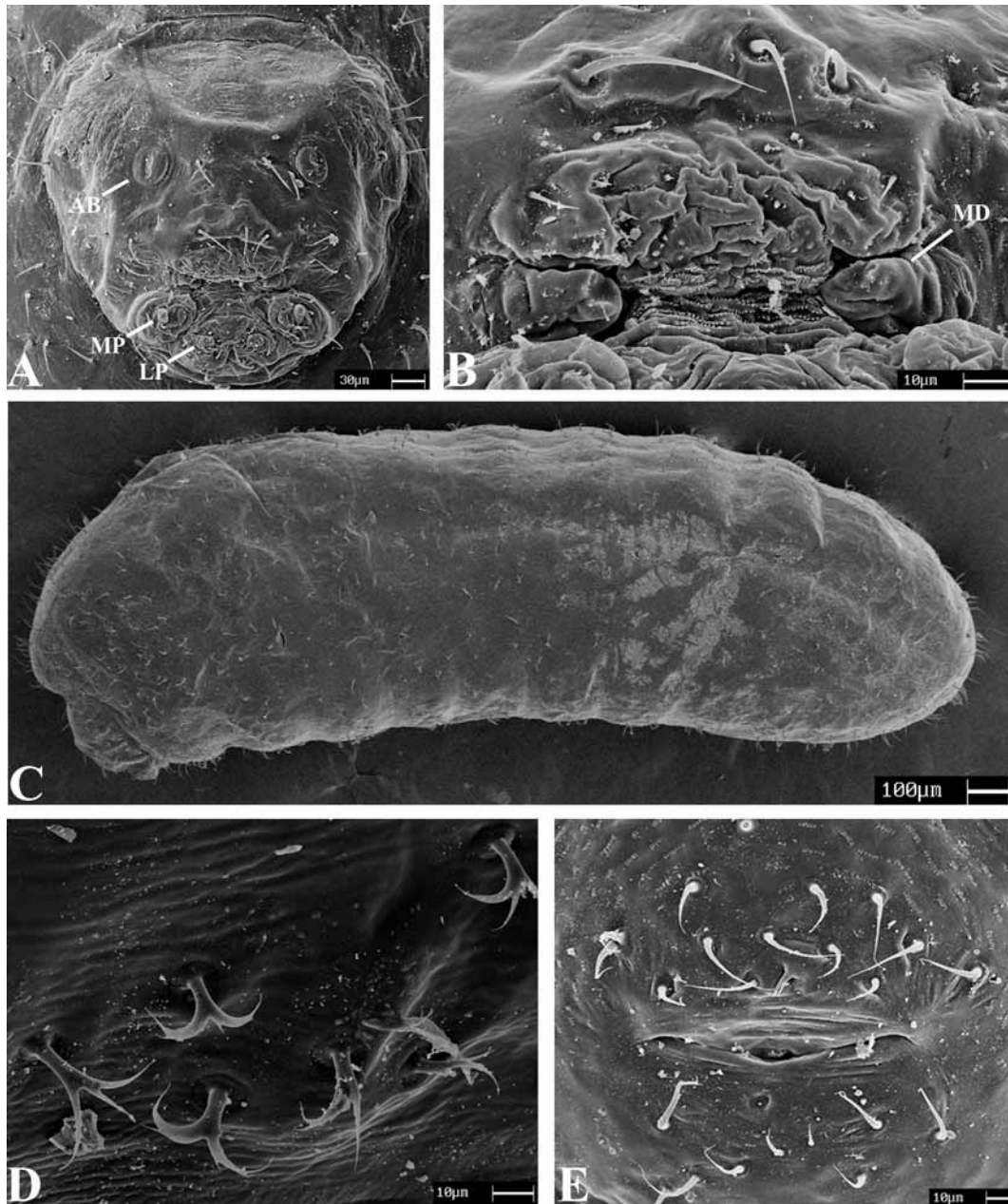
**FIGURE 6.** SEM images of *Tropidomyrmex elianae* gen. & sp. n. paratype male (wings excluded). A, head in full face view; B, lateral view; C, mesosoma in dorsal view..

Sting apparatus (Fig. 5). Spiracular plate subrectangular, extending towards the medial connection; margin of medial connection sclerotized; dorsal notch absent; spiracle relatively wide and set close to the posterior margin of plate; anterior apodeme narrow and largely angulate medially; ventral edge weakly pronounced. Quadrate plate with the dorsal region as broad as ventral region, except for the apodeme; apodeme area smaller than the plate body; dorsal margin convex; apex of anterodorsal corner rounded;

posterior margin complete. Oblong plate with posterior apodeme long; subterminal tubercle apically rounded; postincision shallow. Triangular plate longer than broad, without projections. Gonostylus with body virtually fused to the oblong plate, with a single sclerotized anterior segment; eight chaetae present, subequal in length. Anal plate small and subtriangular; arc rounded and sclerotized basally; body of plate not sclerotized; apical margin distally rounded; anal sensillae scarce and restricted to the apex of plate. Lancet short, with functional valves; dorsal and ventral margins converging towards the apex. Sting sclerotized, with acute apex; bulb base continuous, dorsally convex, laterally rounded, and distinct from the sting shaft in profile; body of bulb slender in lateral view; internal apophysis absent; anterolateral processes absent; articular processes distinct; basal notch considerably broad. Furcula with dorsal arm fused to the base of the sting bulb; lateral arms distinct.



**FIGURE 7.** SEM images of *Tropidomyrmex elianae* gen. & sp. n. paratype male. A, detail of mouthparts in frontal view; B, line drawings of (1) fore and (2) hind wings.

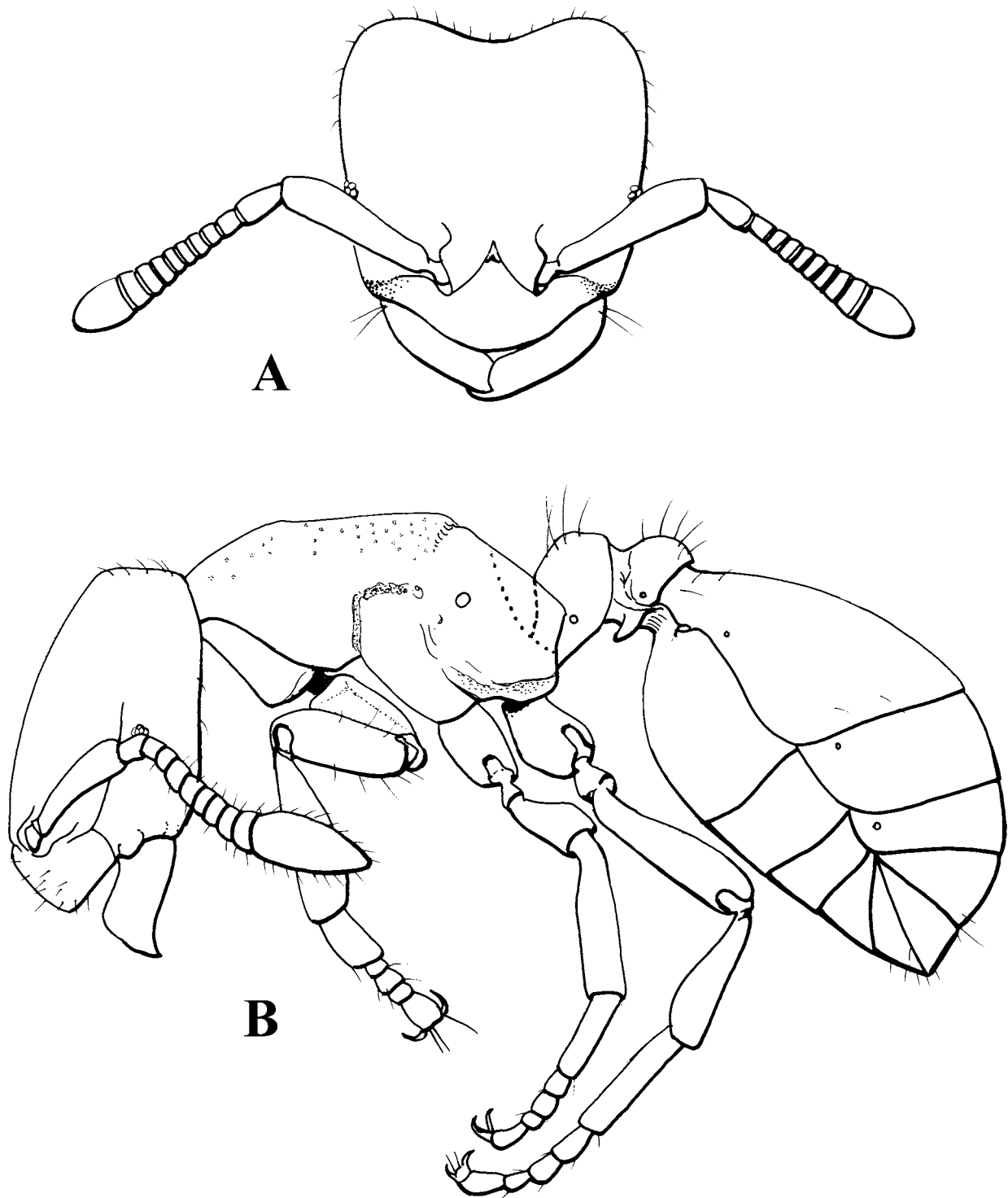


**FIGURE 8.** SEM images of *Tropidomyrmex elianae* gen. & sp. n. larvae. A, head in full face view (AB: antennal buds, MP: maxillary palps, LP: labial palps); B, detail of mouth area (MD: mandibles); C, body in profile; D, detail of ventral anchor-like hairs; E, detail of anal area in posterior view.

**Gyne.** Paratypes: HW 0.53–0.56; HL 0.51–0.56; SL 0.24–0.32; ML 0.26–0.30; EL 0.03–0.05; PRW 0.28–0.36; WL 0.64–0.73; FL 0.36–0.39; PL 0.17–0.21; PW 0.17–0.19; PPL 0.10–0.13; PPW 0.21–0.24; GL 0.56–1.02; TL 2.24–2.95; OI 4.14–6.90; SI 46.4–58.6; CI 96.6–103.7. Ergatoid. Differing from the conspecific worker by the slightly larger size, presence of three relatively small ocelli and wing buds, and by the absence of a promesonotal suture.

**Male.** Paratypes: HW 0.57–0.66; HL 0.48–0.58; SL 0.11–0.15; ML 0.17–0.21; EL 0.23–0.28; PRW 0.46–0.69; WL 1.01–1.14; FL 0.45–0.58; PL 0.22–0.28; PW 0.14–0.22; PPL 0.14–0.17; PPW 0.17–0.28; GL 0.96–1.31; TL 2.98–3.69; OI 31.75–38.65; SI 20.0–25.0; CI 105.2–129.6. Body dark brown to blackish, with head slightly darker and appendages somewhat lighter. Head densely punctate; body mostly smooth and shining with some areas finely punctate at inferior portion of pronotum and mesonotum. Short, subdecumbent, whitish hairs sparsely covering the body, more abundant at the dorsum of prescutellum,

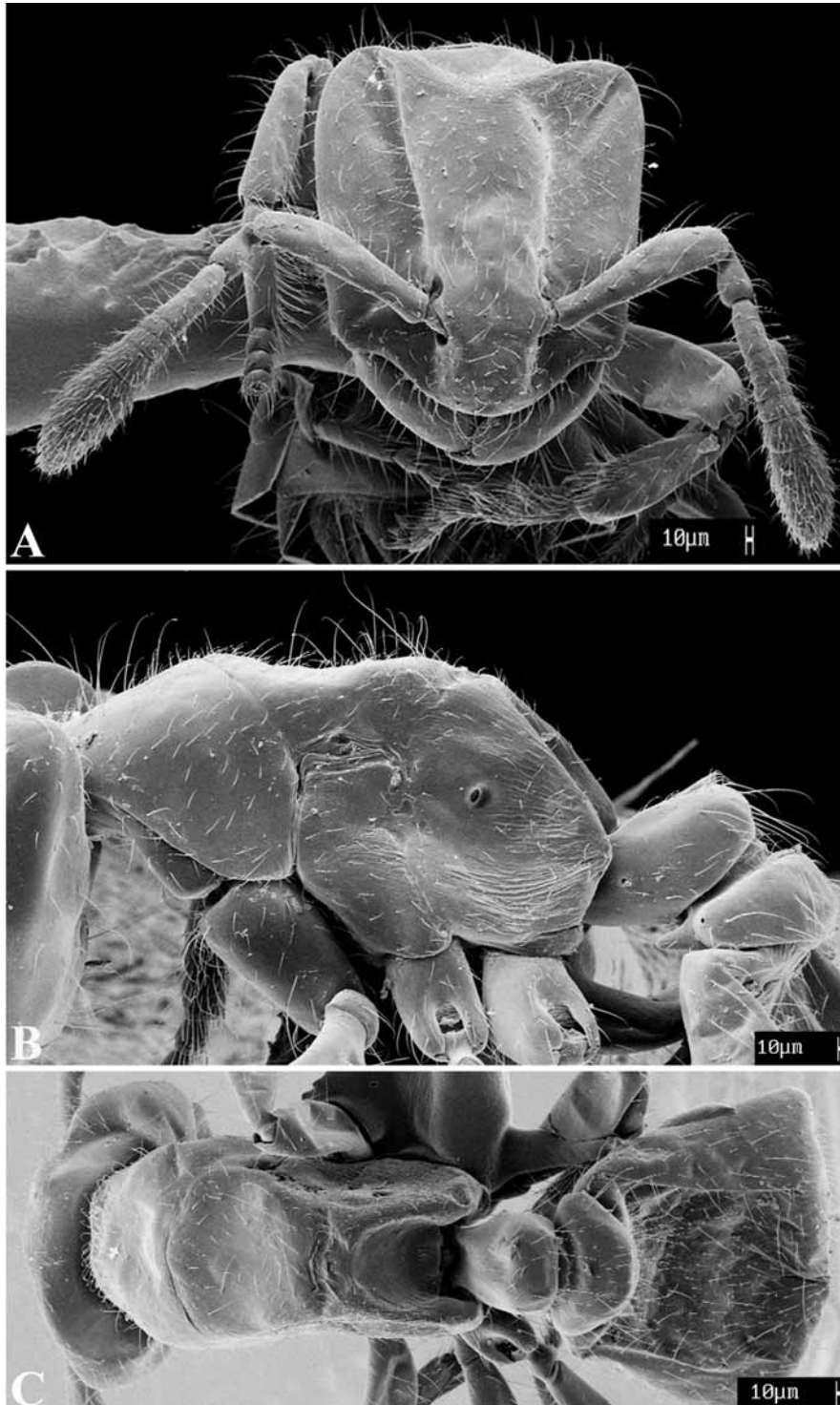
petiole and postpetiole. Antennal scape and pedicel with only scattered long hairs, while the other segments are covered by minute, dense, pubescence.



**FIGURE 9.** Line drawings of *Tropidomyrmex elianae* gen. & sp. n. worker from Tocantins. A, head in full face view; B, habitus.

Head broader between the superior margins of the bulging compound eyes; posterior margin flat. Mandibles relatively well developed and gently curved ventrally, with a single, acute tooth at apex. Clypeus narrower than in the conspecific gynes, extending posteriorly between the antennal insertions; median area of clypeus elevated, swollen, diamond shaped, with rounded corners, its posterior margin produced and

diagonal. Anterior tentorial pits clearly visible (Fig. 7A), about halfway between the antennal sockets and the lateral margins of the clypeus. Labrum emarginate. Dorsal surface of head depressed near the antennal insertions. Apical segment of antennal funiculus as long as the two preceding ones. Ocelli subequal in size.



**FIGURE 10.** *Tropidomyrmex eliana* gen. & sp. n. worker from Tocantins. A, head in full face view; B, mesosoma in lateral view; C, dorsal view.

Pronotum extremely reduced, almost entirely concealed by the scutum; parapsidial lines diverging slightly anteriorly; prescutellum with laterally rounded axillae; scuto-scutellar sulcus shallowly set; scutellum subrounded with the anterior margin wider than posterior; mesopleuron broad, anepisternum triangular, clearly separated from katepisternum by a suture; katepisternum broad, transverse; metanotum reduced to a

narrow longitudinal stripe, straight in lateral view; dorsal face of propodeum very short, declivous face almost vertical in lateral view, propodeal spiracle placed far from posterior declivity; metapleuron divided by an oblique groove; metapleural gland opening wide and placed at superior portion of metapleuron. Forewing with a narrow and weakly colored stigma. Longitudinal vein Rs surpassing the stigma but not reaching the distal border of wing; M extending short beyond SR cell; Cu not reaching the inferior margin of wing; A relatively short, not forming the Cu cell.

Petiole with a low, rounded node in lateral view. Postpetiole with anterior and posterior margins subparallel in dorsal view; postpetiolar sternite slightly projected and gently concave medially. Gaster with the segments decreasing in size towards the apex, its maximum width at the gastral segment II.

**Larvae** (n=4) (Fig. 8). Body profile pheidoloid. Head subcircular, ventral, near the anterior end, mounted on short stout prothorax neck; abdomen short, stout and straight; ends rounded. Head with lateral margins gently converging towards the mouthparts; very short mandibles, lobose, slightly curved medially and without distinct apical teeth; labrum narrow and weakly concave anteriorly; clypeus narrow and with dorsal surface bearing three long setae. Trophorhinium clearly visible (Fig. 8B), with dorsal spicules twice as large as ventral ones. Irregular, short, semicircular labrum. Irregularly lobose maxillae with a single apical sensilla, which bears a small spinule. Labium deeply notched in the middle, without spinules; palps anterior. Hypopharynx without spinules. Antennae shape typical of ant larvae in general, only slightly elevated from the cranial surface, without base, well separated, closer to the clypeus than to the occipital margin. Less than 40 unbranched head hairs. Body pilosity sparse and composed of three kinds of hairs: (1) simple, relatively long, slightly curved, filiform hairs, concentrated mainly on body extremities (Fig. 8E); (2) long, suberect, apically bifurcate sometimes tripartite, scarcely distributed on the median segments of body; (3) anchor-like, apically tripartite, short, and arranged in transverse rows on the ventral segments of body (Fig. 8D). Body spiracles not visible in the specimens examined herein; however, this could have been caused by the collapse of larval integument during preparation for SEM. Anus area bears spicules arranged in rows (Fig. 8E).

**Etymology.** This species is named after the prominent Brazilian termitologist Dr Eliana Canello, a long term colleague of the MZSP and collector of *T. elianae* type series.

**Additional examined material:** BRAZIL: TO: Goiatins, 07°56'28.9"N 47°09'31.3"W, 03–08.v.2005, Winkler 08, Silva, R.R. & Dietz, B. cols, (1 worker) [MZSP]; same locality, 07°58'45.4"N 47°15'02.6"W, 10–13.vi.2005, Winkler, Silva, R.R. & Feitosa, R.M. cols, (1 worker) [MZSP].

**Comments.** The types of this species were collected by our colleague Dr Eliana M. Canello, while searching for termites in Serra de São José, Tiradentes, state of Minas Gerais, southeastern Brazil. She found several ant individuals inside small chambers (c. 2 x 1cm) of a ground nest of *Anoplotermes pacificus* Fr. Mueller (Isoptera, Apicotermatinae). In the field, Dr Canello noticed that the ants and termites, and their immatures, shared the same nest chambers. This is a very peculiar observation, as most ant species inquiline in termite nests are known to occupy isolated cavities (Higashi & Ito, 1989; Delabie, 1995; Dejean & Féneron, 1999).

A fragment of the *Anoplotermes pacificus* nest was brought to the MZSP laboratory, where individuals of both termites and ants were observed interacting and even antennating each other in different chambers. No signal of agonistic behavior was observed. In total three ant workers, six ergatoid gynes, ten alate males, 19 pupae (all males) and four larvae were found. Out of the four larvae, one was singled out for SEM. Two of the three remaining larvae seem to be full grown (length 2.485 and 2.342 mm), while another one showed length of 1.914 mm, possibly representing an earlier stage.

Only two workers are known from collections other than the type series. Both were recovered from different 1 m<sup>2</sup> leaf litter samples using Winkler extractors. The first worker came from a sample taken in May, 4, 2005, from relatively deep leaf-litter along a secondary dirt road, bordering a secondary gallery forest along the Vaca Velha stream, a tributary of the Manuel Alves Grande River, in Serra da Cangalha, northeastern state of Tocantins, central Brazil. Out of seven litter samples studied, just one produced a specimen of this species. In a second expedition to the area, we studied 51 similar leaf-litter samples collected some 10 km west of the first locality, out of which another single worker was found. The second locality was covered by a very much

altered forest, adjacent to an open Cerrado. It is not easy to imagine the original coverage, but judging from the surrounding environment, it seemed to us that this was originally a full grown Cerrado, also called “Cerradão”. From the same group of samples, we collected, for the first time in central Brazil, workers of the worldwide tramp ant *Monomorium pharaonis* Linnaeus.

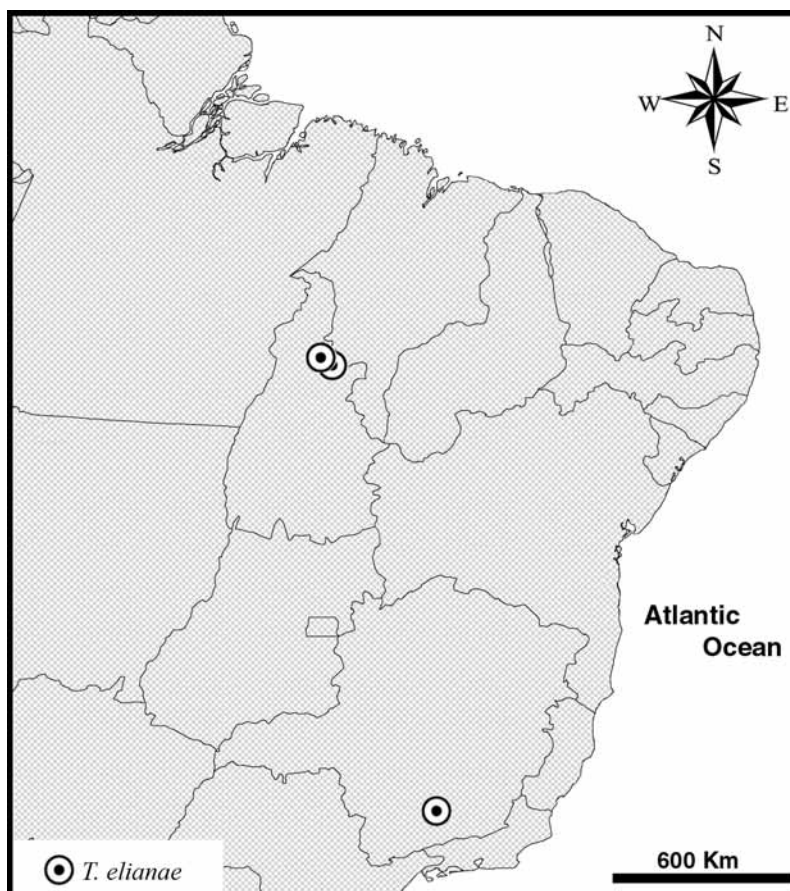


FIGURE 11. Distribution map of *Tropidomyrmex* gen. n.

## Discussion

*Tropidomyrmex* can be easily distinguished from all other ant genera by the bilobed subpostpetiolar process, hence the generic name we chose for this ant. Bolton (2003) diagnosed the solenopsidine tribe group, which includes Solenopsidini, Stenammini and Adelomyrmecini (Bolton *et al.*, 2006), as having, primarily, the clypeus constricted posteriorly, with median portion narrowed and elevated, without an isolated longitudinal carina, and the ventral surface of the metathorax simple. From the combination of characters that define Solenopsidini according to Bolton (2003), *Tropidomyrmex* does not have the short subtriangular mandibles, the dental count is different from 2–6, the clypeus is not bicarinate, and the maximum exposure of toruli is posterior to the maximum width of frontal lobes, characters that may vary in some genera. Still, according to Bolton (*op. cit.*), most solenopsidine genera have a single stout median clypeal seta. Interestingly, although adult females of *Tropidomyrmex* do not have a stout median clypeal seta, the larvae of *T. elianae* clearly present a median seta accompanied by two similar ones at the anterior clypeal margin (Fig. 8B). The male has a row of setae at the anterior clypeal margin, although the median seta is not particularly different or stouter than the others in the row (Fig. 6A). Solenopsidines in general have a strongly differentiated antennal club of 2–4 segments. The funicular segments of *Tropidomyrmex* increase quite regularly in size until the obviously enlarged apex, different from all other solenopsidine or even stennamine ants; even the socially parasitic



species, which tend to have very reduced dentition, retain a strong antennal club.

The mandibles of *Tropidomyrmex* are completely different from all other solenopsidine genera, with only a single curved apical tooth. Most of these differences may be related to the evident reductions that characterize *Tropidomyrmex*. The most striking character, however, is the presence in *T. elianae* workers of a clearly visible promesonotal suture (Figs. 10B, 10C), which is completely lacking in ergatoids.

Bolton (2003) recognized three genus groups within the Solenopsidini; *Tropidomyrmex* fits better within the *Carebara* genus-group. Judging from Ettershank's scheme (1966), *Tropidomyrmex* would be classified in his *Megalomyrmex* genus group within Solenopsidini, based on the antennal count, clypeus shape, and relative position of the anterior tentorial pits. *Tropidomyrmex* shares some characteristics with the solenopsidine *Tranopelta* Mayr and the recently described *Dolopomyrmex* Cover & Deyrup (2007): delicate and unpigmented female integument; strongly convex, non-carinate clypeus; antennal count; comparatively reduced wing venation; a broad attachment of postpetiole to gaster; specialized larval morphology (not known for *Dolopomyrmex*), and the apparent cryptobiotic habits. However, *Tropidomyrmex* workers differ from these genera in having a single apical tooth on the mandibles instead of four to five, a palpal formula of 2,1 instead of 3,2 or 4,3, and an antennal club with a single segment instead of three.

The venom apparatus of *Tropidomyrmex elianae* is extremely delicate, and it was very hard to dissect without losing the connections among plates. This is why in Figure 5, some parts do not have their ends depicted. Comparing the venom apparatus of *T. elianae* with other Myrmicinae studied by Kugler (1978), it seems closer to *Solenopsis* and related genera, by the square spiracular plate, the one-segmented gonostylus and the overall shape of the oblong, triangular and quadrate plates. However, Kugler's classification of genera is very different from Bolton's scheme (2003), which hinders these comparisons.

According to Wheeler & Wheeler (1976), *Tranopelta* larval mandibular shape is classified as pristomyrmecoid, shared with the Ponerinae *Pachycondyla* (*Hagensia*), Pseudomyrmecinae (*Pseudomyrmex* and *Tetraponera*), and several unrelated Myrmicinae. The closest mandibular shape to *Tropidomyrmex*, using Wheeler and Wheeler (*op. cit.*) criteria, is anergatidoid [recorded only in *Pheidole* (= *Anergatides*)], although in *Tropidomyrmex* the mandible does not bear an apical denticle. Following these authors, only *Bothriomyrmex*, *Technomyrmex* and *Apterostigma* present larval mandibles so short that they do not even meet, as in *Tropidomyrmex*.

Overall, most of the distinctive characters of this new genus appear to represent reductions in characters normally present in females of solenopsidine genera: fewer ommatidia, reduced mandibular dentition, reduced body size and shape, the fragility of the integument, fused and reduced structures of the venom apparatus, and reduced male wing venation. This may be related to the special habits adopted by these ants. It is noteworthy that *T. elianae* has been collected inside a chamber within a ground termite nest, but it is known also from two free-living workers extracted from the leaf-litter of two very close sites in central Brazil. From the very scanty information we have, it is not possible to ascertain whether the type series represents a whole colony or a fragment, and also it is not possible to be sure whether these ants always live inside termite nests.

Dr Phillip Ward is presently engaged in a broad molecular phylogenetic analysis of a wide variety of Myrmicinae. He kindly sequenced a sample of the genus described here, and his preliminary results justify both our treatment of it as a distinct genus and placement in Solenopsidini. *Tropidomyrmex* falls into a clade with *Solenopsis*, *Monomorium* and related taxa, i.e., Solenopsidini *sensu stricto*, but it is not in *Solenopsis*; rather it is positioned as sister to several other solenopsidine genera (including *Monomorium* and *Anillomyrma*) (Ward, pers. comm.).

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