

**Revisionary Studies on the Attine Ant Genus
Trachymyrmex Forel. Part 1: Definition of the Genus and
the *Opulentus* Group (Hymenoptera: Formicidae)**

by

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ABSTRACT

We hereby diagnose the fungus-growing ant genus *Trachymyrmex* and, in a first paper of a series, revise the *Opulentus* group of species. We present a diagnosis for the group, a taxonomic list, the description of *Trachymyrmex compactus* n. sp. (worker), redescriptions of workers of *T. dichrous* Kempf, *T. opulentus* (Mann), and females (worker and queen) of the *T. relictus* Borgmeier; we also describe for the first time the females of *T. opulentus* and the males of *T. relictus*. We present a key for the identification of the species in the group, discuss the information on the biology, and comment their distribution pattern.

INTRODUCTION

Father Walter Wolfgang Franz Kempf (1920 - 1976) was engaged in a revision of the fungus-growing ant genus *Trachymyrmex* at the time of his sudden death, in Washington, D.C., while attending the International Congress of Entomology. We have found parts of incomplete manuscripts dealing with groups of species, along with original figures and descriptions of many forms.

When the Kempf-Borgmeier collection was transferred to the Museu de Zoologia da USP in 1977, all *Trachymyrmex* material loaned to Kempf was returned by one of us (CRFB) to the pertinent institutions, asking curators to keep the samples as Kempf organized them to facilitate consultation in the future. Recently, we asked for a second loan of this material, and take this opportunity to thank all curators for their patience and collaboration.

Trachymyrmex, although economically not very important, is distinctive by its great number of species, with 83 species-level names proposed in the past. The genus is a key group for the understanding of the higher attines, but its taxonomy is far from clear, and the identification of these ants remains, in most cases, extremely laborious

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if not uncertain. Even the separation of *Trachymyrmex* from cognate genera, such as *Sericomyrmex*, *Cyphomyrmex*, *Mycetosoritis*, *Atta*, and *Acromyrmex*, is still beset with serious doubts.

Creighton (1950) and Weber (1958, 1967) have already done some revisionary work in *Trachymyrmex*. Recent accounts (Bolton 1995; MacKay & MacKay 1997) recognize 27 synonyms or species transferred to other genera and reduce the group to 42 valid species (34 Neotropical, 8 Nearctic), leaving intact 13 subspecies and varieties. Baroni Urbani (1980) described *Trachymyrmex primaevus* from the Dominican amber and MacKay & Elias (1993) commented on an undescribed, less than 1,000 years old fossil of a *Trachymyrmex* of the *Septentrionalis* group they found in packrat (*Neotoma* spp.) middens from the Chihuahuan Desert.

The present paper is the first of a series of taxonomic studies on the New World fungus-growing ants of the genus *Trachymyrmex* Forel. At the beginning of our studies we could either work out the taxonomy of all species, identifying potential synapomorphic traits, organizing then our work according this, or accept, as a working hypothesis, the proposal in Kempf's unfinished manuscripts, proposing a phylogenetic reconstruction of the genus and a formal classification of the species into groups at the end of this series of papers. We have adopted the latter approach in order to speed up publication.

MATERIAL AND METHODS

Terminology follows Bolton (1994). Measurements follow Kempf (1967). The abbreviations for the measurements are: TL, total length; HL, head length (without mandibles); HW, head width (including eyes); IFW, inter frontal width (distance between the lateral margins of frontal lobes); ScL, scape length; TrL, alitrunk length (= Weber's length); HfL, hind femora length; FWL, fore wing length; HWL, hind wing length.

Acronyms for collections follow Brandão (2000). We have deposited properly labeled identified specimens in several collections, recording where specimens are deposited from now on. Reference citations follow Ward *et al.* (1996).

CECL - Coleção Entomológica Angelo Moreira da Costa Lima. Instituto de Biologia, Universidade Federal Rural do Rio de Janeiro Seropédica, RJ, Brazil. Note: Recently, researches at this institution have adopted this new acronym, cited as IBUS in Brandão (2000).

INPA - Instituto Nacional de Pesquisas da Amazônia, Manaus, AM, Brazil.

CPDC - Centro de Pesquisas do Cacau, Comissão Executiva do Plano da Lavoura Cacaueira (CEPLAC), Itabuna, BA, Brazil.

MCZC - Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA.

MIZA - Museo del Instituto de Zoología Agrícola, Universidad Central de Venezuela, Maracay, Venezuela.

MNRJ - Museu Nacional do Rio de Janeiro, RJ, Brazil.

MZSP - Museu de Zoologia da Universidade de São Paulo, São Paulo, SP, Brazil.

USBC - Departamento de Biología de Organismos, Universidad Simón Bolívar, Caracas, Venezuela.

USNM - United States National Museum of Natural History, Washington, DC, USA.

When citing label data, we present comments and/or additional information between brackets, as for explanation of codes in the labels, eventual corrections to the misprints, and references to the notebooks from which we took information regarding the localities and/or the biology of the species.

Workers of all species (recorded at the proper sections below), except for the only known specimen of *T. compactus* n. sp., were cleaned in acetone using a Thornton ultrasound for 30 minutes, then coated with gold in a Balzer critical point dryer for 90 seconds at 50 mA. The scanning electron micrographs were prepared in a Leo 440 Scanning Electron Microscope.

GENUS *TRACHYMYRMEX* FOREL

Oecodoma (in part): Buckley 1867: 346.

Atta (in part): McCook 1881: 359.

Atta subgenus *Acromyrmex* (in part): Emery 1888: 359; E. André 1893: 149.

Atta subgenus *Trachymyrmex* Forel 1893: 600.

Cyphomyrmex subgenus *Trachymyrmex*: Emery 1913: 251.

Acromyrmex subgenus *Trachymyrmex*: Forel 1914a: 618.

Trachymyrmex: Wheeler 1916: 11.

Generic diagnosis (females): Dorsal mesosomal spines multidentate or multituberculate (Fig. 1), often transformed into small blunt hillocks, bristling with secondary tubercles. Frontal carinae strongly diverging caudad reaching or nearly reaching the lateral angles of the occiput, forming laterad a sometimes shallow but always present scrobe for part of the scapes. Inter frontal width close to or less than 2/3 of the head width (including eyes). Worker caste monomorphic or nearly so, size variation slight; major workers absent.

Comments: Forel (1893) proposed the name *Trachymyrmex* as a subgenus of *Atta* Fabricius to include *T. urichi* described by him,

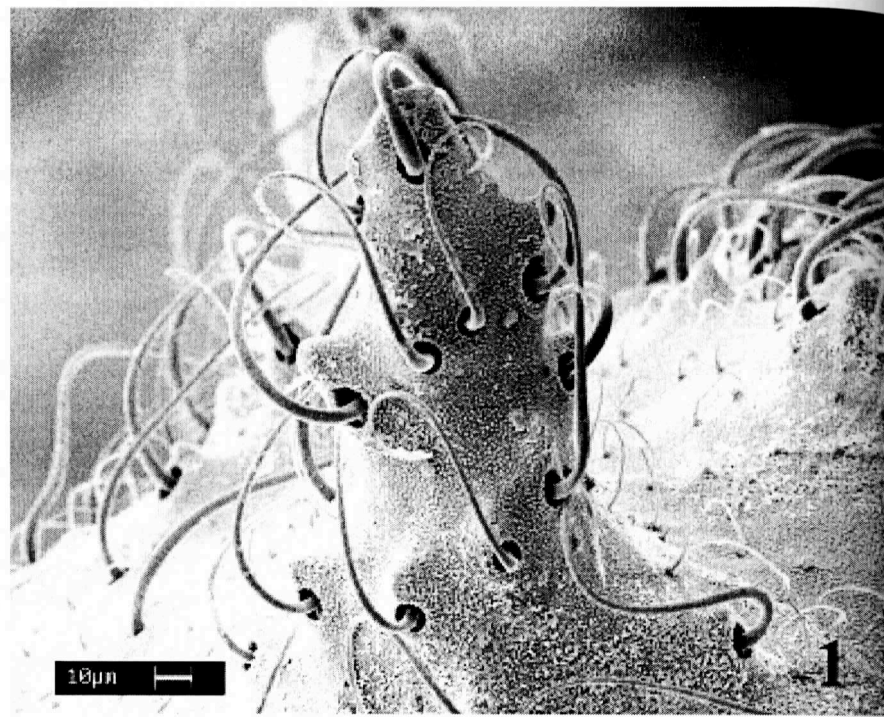


Fig. 1. *Trachymyrmex relictus* Borgmeier, worker, Brazil, AM: Manaus. Lateral spine of pronotum.

comparing it with two species, originally assigned to *Oecodoma* and *Atta* (*Acromyrmex*), respectively: *T. tardigrada* (Buckley 1867), a junior synonym of *T. septentrionalis* (McCook 1881) and *T. saussurei* (Forel 1885). Other two species, *T. jheringi* (Emery 1888) and *T. jamaicensis* (André 1893), that are now considered to belong to *Trachymyrmex* were also described as *Atta* (*Acromyrmex*).

After 1893, the combination *Atta* (*Trachymyrmex*) was adopted by authors of *Trachymyrmex* species. Surprisingly, however, Forel (1914a, b) described *T. jheringi* var. *tucumanus* and *T. gaigei* in *Acromyrmex* (*Trachymyrmex*). Bruch (1921) followed the last move describing *T. tucumanus cordovanus*, ignoring the raise of *Trachymyrmex* to generic rank by Wheeler (1916).

Only Santschi (1916) described a *Trachymyrmex* citing it as a subgenus of *Cyphomyrmex* (*T. fiebrigii*), following Emery (1913). Mann (1922) proposed *Myrmicocrypta cucumis*, now a junior synonymous of *T. bugnioni*, and *T. opulentus* as *Sericomyrmex*; Weber (1937) also described *T. wheeleri* in the latter genus. Since 1938 all the other species now included in *Trachymyrmex* have been correctly assigned.

Discussion: The most clear feature to distinguish the monomorphic *Trachymyrmex* from other attine cognate genera is the always present mesosomal projections on the dorsum of pronotum and/or mesonotum, surmounted by secondary tubercles or minute teeth, that in some species are transformed in small blunt hillocks. All species of *Atta* lack dorsal projections on the pronotum, and show in addition a strong variation of total body length amongst workers of the same colony. *Acromyrmex* and *Mycetosoritis*, the probable closest genera to *Trachymyrmex*, share with most *Trachymyrmex* the tuberculated dorsal surface of the first gastric tergite. There are some *Trachymyrmex* species that look very similar to *Acromyrmex* workers, which are, nonetheless, almost as polymorphic as in *Atta*. On the other hand, *Trachymyrmex* differs from the enigmatic *Mycetosoritis* by their relatively shallow antennal scrobes (deeply impressed in *Mycetosoritis*) only comparable to the scrobes found in the Strigatus group of *Cyphomyrmex*. Most *Cyphomyrmex* of the Rimosus group have the frontal lobes very expanded laterally, clearly surpassing two thirds of the head width, although two species of this group, *C. longiscapus* Weber and *C. foxi* André, show weakly expanded frontal lobes while, in the Strigatus group, *C. lectus* Forel and *C. bruchi* Santschi present extremely expanded frontal lobes.

The extremely homogeneous *Sericomyrmex* differs from the strikingly heterogeneous *Trachymyrmex* in the females by having heart-shaped head, broadest posteriorly, broader than long, lacking any trace of occipital tooth and supraocular tumulus; the preocular carina fades out before or at the level of posterior orbit of eye; the frontal lobes are always triangular and inconspicuously expanded laterad, the interfrontal width about one half of head width as measured across the eyes; the antennal scapes are relatively short, never quite reaching the occipital border in full-face view when laid back over the head as much as possible; thorax compact; piligerous tubercles practically absent.

Trachymyrmex is mostly Neotropical, occurring in the Nearctic region mostly in the southern parts of Florida, Texas and Arizona, except for one species, *T. septentrionalis* (McCook) that occurs up to New York in the North, Illinois, Texas, and Louisiana in the west, and south to Florida and the West Indies. Long Island and Staten Island in New York are the northernmost records for an attine ant.

Group *Opulentus*

Figs. 1-22

Diagnosis: Peculiar pilosity, consisting of dense, long, more or less inclined and apically usually not recurved and generally dark hairs,

mixed with an extremely low, fine and abundant lighter pubescence which is either appressed, or curved, or suberect; both types of hairs are evenly distributed on body and appendages, such as in all *Sericomyrmex* and in some *Apterostigma* species, although better seen in the apical dorsum of the female hind femora. The midpronotal teeth are lacking or at most vestigial, and the occipital tooth is usually weak and inconspicuous, or sometimes entirely absent. All species of the present group except *T. relictus*, have very short and rudimentary propodeal spines.

Inasmuch as on account of its pilosity, the present species group is closest to *Sericomyrmex* (*T. opulentus* and *T. wheeleri* were even originally assigned to this genus), but they can be separated by the features listed above.

All species in the present group share a very impressed frontal area, which is not the case in some species of other groups, although we are not certain for the time being if this is a good defining feature for this taxonomic level.

Included species:

Trachymyrmex compactus **n. sp.** (Suriname)

Trachymyrmex dichrous Kempf 1967 (central and southeastern Brazil)

Trachymyrmex opulentus (Mann 1922) (from Guatemala to northern Brazil)

= *Trachymyrmex wheeleri* (Weber 1937) **nov. syn.**

= *Trachymyrmex wheeleri pakeelai* (Weber 1937) (syn. Weber 1958: 54)

Trachymyrmex relictus Borgmeier 1934 (from Trinidad to northern Brazil)

= *Trachymyrmex relictus fitzgeraldi* Weber 1937 **nov. syn.**

KEY TO TRACHYMYRMEX SPECIES OF THE OPULENTUS GROUP (WORKERS):

1. Lateral projections on the pronotum lower than anterior mesonotal projections (Figs. 6, 9) ... 2

1'. Lateral projections on the pronotum higher than anterior mesonotal projections (Figs. 3, 12) ... 3

2. Superior corners of the head with a spine or teeth on each side; pair of blunt but distinct carinae on vertex (Fig. 8) ... *T. opulentus* (Mann)

2'. Superior corners of the head rounded, without spines or teeth; carinae on vertex absent (Fig. 5) ... *T. dichrous* Kempf

3. Propodeal spines slender; border of frontal lobes smooth (Figs. 11, 12) ... *T. relictus* Borgmeier

3'. Propodeal spines stouter and shorter, smaller than the distance between its base and the propodeal spiracle; border of frontal lobes strongly crenate (Figs. 2, 3) ... *T. compactus* n. sp.

Trachymyrmex compactus new species

Figs. 2-4

Holotype: Worker, SURINAME: Maripaheuvel, [September] 1959, J. van der Drift col. (WWK 14-XX-15) [we were not able to secure coordinates for this locality in the several printed and electronic consulted gazetteers] (MZSP; examined).

Etymology: The name was chosen by Kempf in reference to the alitrunk of this species, which is more compact than in other species of the *Opulentus* group.

Description: Worker (measurements in mm). TL 3.8; HL 0.86; HW 0.86; IFW 0.57; ScL 0.73; TrL 1.21; WL 1.21; HfL 0.97. Medium brown, head more reddish brown. Integument finely and indistinctly shagreened, opaque. Body and appendages clothed with more or less curved, oblique to decumbent hairs of variable length, longest on clypeus, occiput, dorsum of alitrunk, petiole, postpetiole and tergum I of gaster. Trunk hairs arising from more or less prominent piligerous tubercles. Fine and dense pubescence appressed on antennae and legs, suberect or strongly curved elsewhere, quite distinct on tergum I of gaster, but never masking the integument.

Head (Fig. 2). Mandibles smooth and shining except laterally on base where they are finely transversely striate, and near the masticatory margin, which bears with an apical tooth and approximately 8 regularly developed teeth. Clypeus with a pair of minute teeth, each arising near the base of the frontal lobes. Frontal lobes semicircular, lateral borders strongly crenate, strongly expanded laterad, the interfrontal width exceeding one half of the head width across the eyes. Frontal carinae diverging caudad, fading out a little before the apex of scrobe. Front and vertex irregularly to longitudinally rugulose, without isolated piligerous tubercles. Preocular carinae not curving mesad above eyes, but extending strictly caudad, fading out halfway between posterior orbit of eyes and apex of scrobe. Posterior third of antennal scrobe vestigially delimited, its apex only slightly projecting in a tuberos fashion. Supraocular tumulus vestigial; occipital corners angular and dentate in full-face view. Occiput shallowly notched in the middle. Carinae of vertex vestigial. Occipital tooth absent. Inferior occipital corner indistinctly marginate or rounded. Eyes moderately convex, not more than 10 facets in a row across the greatest diameter. Antennal scapes shorter than head capsule, only shortly surpassing the occipital corner when

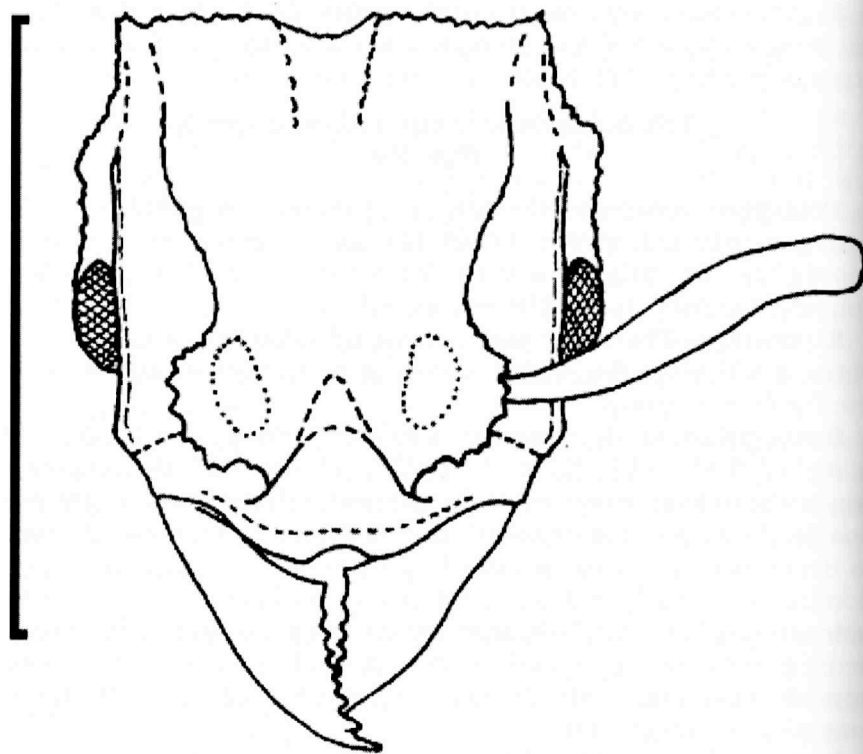


Fig. 2. *Trachymyrmex compactus* sp.n., worker holotype (Kempf del.), Suriname: Maripaheuvel. Head in frontal view. Scale bar = 1mm.

laid back over head as much as possible. Funicular segments II-VIII slightly longer than broad.

Alitrunk (Fig. 3) covered by more or less prominent piligerous tubercles. Pronotum with an indistinct humeral angle, its antero-inferior corners rounded, the lateral spines pointed. Mesonotum with both the first and second pair of dorsal projections very low, the third pair represented by minute teeth. Alitrunk constricted dorso-laterally at the deeply impressed metanotal groove. Basal face of propodeum narrow, laterally delimited by a row of tubercles; propodeal spines low, about as high as the lateral pronotal spines. Hind femora shorter than length of alitrunk.

Waist and gaster (Figs. 3-4). Petiole pedunculate, the node proper a bit longer than broad, lacking a dorsal armature; supetiolar process absent. Postpetiole broader than long, shallowly excavate above, with a deep excision on the postero-dorsal border, the postero-lateral corners slightly tuberos. Gaster opaque with dense, minute piligerous

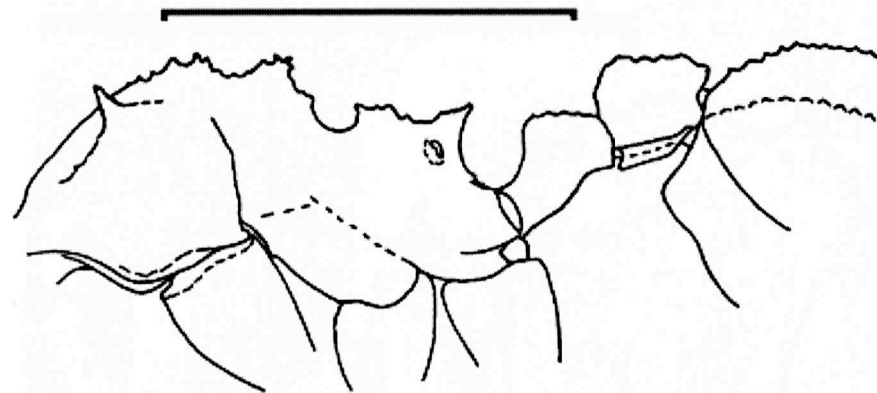


Fig. 3. *Trachymyrmex compactus* sp.n., worker holotype (Kempf del.), Suriname: Alitrunk in lateral view. Scale bar = 1mm.

tubercles rather evenly distributed. Tergum I of gaster laterally sharply marginate and ridged in almost the entire length.

Female and male. Unknown.

Discussion: Even though represented by a single specimen, this species is sufficiently distinct to be described and named. It differs from *T. dichrous* by being unicolored, of much smaller size, by having the frontal lobes rounded and much more expanded laterad, shorter antennal scapes, better developed supraocular tumulus and paired carinae on vertex; the lateral pronotal spines are higher than the anterior mesonotal ones, and the gaster is distinctly marginate on sides. The differences from *T. opulentus* and *T. relictus* are as follows: antero-inferior corner of pronotum not angular nor dentate, but rounded; second pair of mesonotal projections very low; postero-dorsal border of postpetiole broadly excised.

We have found the following information in Kempf (1961) regarding the type locality: "primary forest on sand, slope of the hill", located "about 130 Km south of Paramaribo, in the interior, on the eastern side of Sarakreek near Dam".

Trachymyrmex dichrous Kempf

Figs. 5-7

Trachymyrmex dichrous Kempf 1967: 126-7, Figs. 7-9 worker; type-locality: Brasil: Goiás: Anápolis. Kempf 1972: 252 (cat.). Bolton 1995: 420 (cat.).

Type material: holotype and 6 paratypes from type locality, one paratype from Brasil: Mato Grosso, Chapada dos Guimarães, and one paratype from Brasil: São Paulo, Agudos at MZSP (examined).

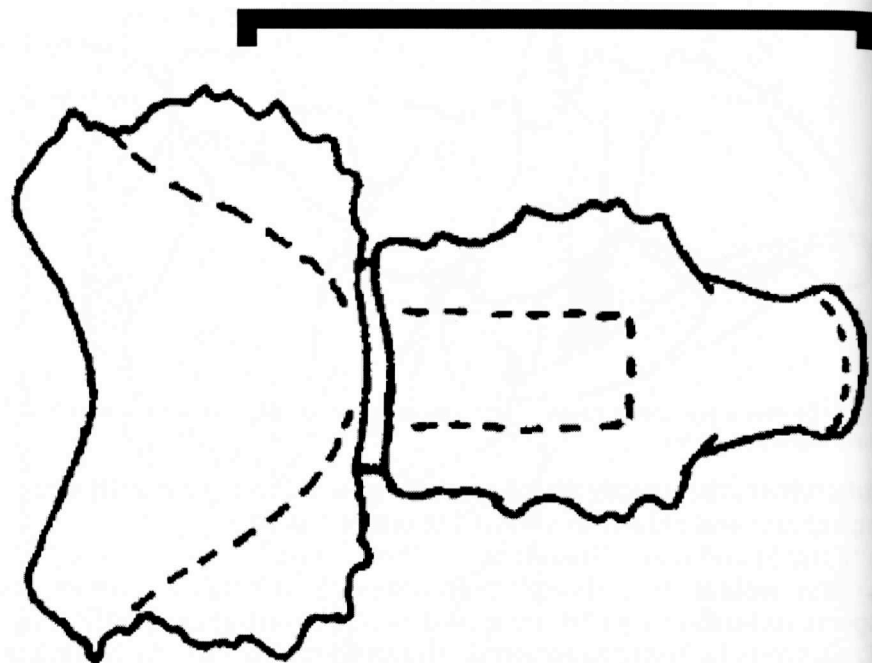


Fig. 4. *Trachymyrmex compactus*, worker holotype (Kempf del.), Suriname: Maripaheuvcl. Waist in dorsal view. Scale bar = 500 μ m.

Description: Worker (measurements in mm). TL 4.5-5.1; HL 0.99-1.07; HW 1.03-1.11; IFW 0.51-0.57; ScL 0.93-1.07; TrL 1.51-1.70; WL mm; HfL 1.49-1.70. Strikingly bicolored, head capsule deep brown, body and appendages medium brown or ferruginous. Integument finely but indistinctly shagreened, opaque. Long, dense, mostly curved or inclined hairs on head, alitrunk, and pedicel; same hairs but denser and less curved and more uniformly inclined on gaster, scapes and legs. Alitrunk hairs not arising from prominent tubercles which are lacking. Dense and much shorter pubescence of lighter color, inclined or appressed on head, pedicel, gaster and appendages, erect or suberect on thorax, never masking the integument.

Head (Fig. 5). Mandibles smooth and shining except laterally on base where they are finely longitudinally striate; masticatory margin with apical tooth and approximately 8 teeth, slightly smaller towards the base. Frontal lobe triangular, little expanded laterad, interfrontal width scarcely or not at all surpassing one half of head width across the eyes. Frontal carinae diverging caudad, fading out at posterior fourth of head. Front and vertex inconspicuously tuberculate. Preocular carinae slightly curving mesad above eye but not intersecting the antennal scrobe,

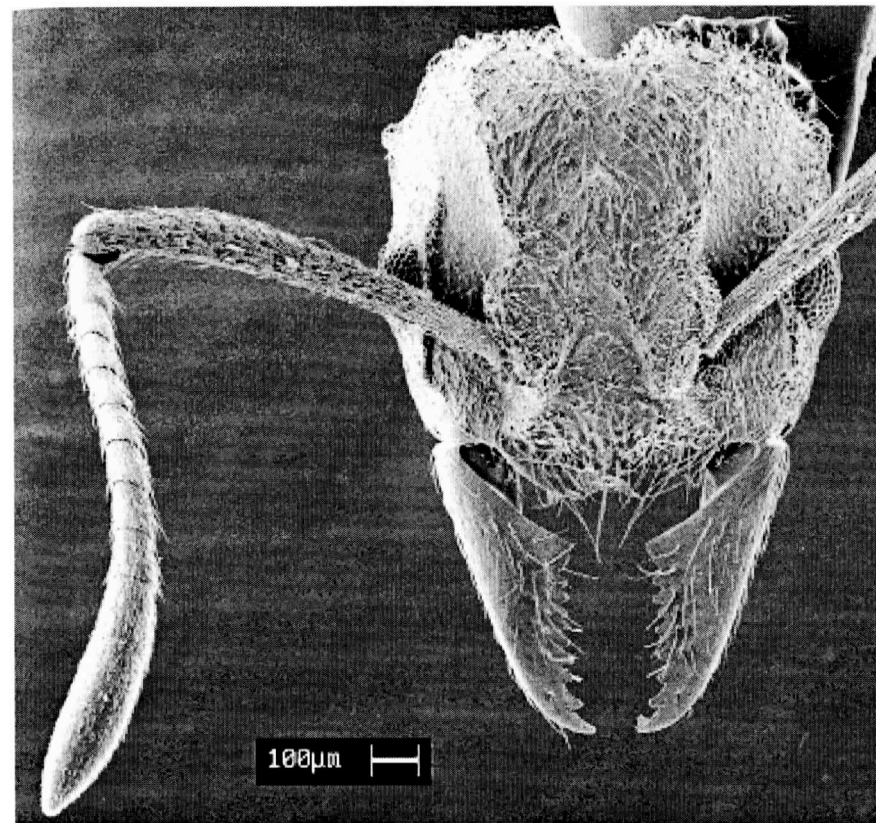


Fig. 5. *Trachymyrmex dichrous*, worker, Brazil: DF: Brasília. Head in frontal view.

fading out shortly behind eyes. Posterior half of antennal scrobe indistinct, the apex not projecting in a tuberos fashion on occiput; supraocular tumulus vestigial. Occipital corners rounded and edentate. Occipital tooth absent. Occiput in full-face view distinctly notched in the middle. Vertex lacking paired carinae. Inferior occipital corner indistinctly marginate and rounded. Eyes moderately convex, with about 13 facets across the greatest diameter. Antennal scapes as long, or nearly as long, as head capsule, without prominent spicules, surpassing the occipital corner when laid back over the head as much as possible by one fifth of its length. All funicular segments distinctly longer than broad.

Alitrunk (Fig. 6). Prominent piligerous tubercles lacking. Pronotum with indistinct humeral angles, its antero-inferior corners rounded and toothless, the lateral spines very low and tubercular. Mesonotum with a pair of high anterior conical spines, facing obliquely laterad, followed

by two pairs of very low and little distinct denticulate tubercles, the posterior pair almost obsolete. Alitrunk shallowly impressed at metanotal groove. Basal face of propodeum narrow, lateral borders indistinctly marginate, bearing a few piligerous tubercles. Propodeal spines very short and inconspicuous. Hind femora about as long as alitrunk.

Waist and gaster (Figs. 6-7). Petiole pedunculate, the node proper longer than broad, the dorsal armature obsolete; anterior ventral process developed as a small blunt spine. Postpetiole not much broader than long, flattened above, the postero-dorsal border broadly excised between the non-tubercular corners. Gaster opaque; tergum I with dense, minute and evenly distributed piligerous tubercles; vestigially marginate on sides in the anterior half.

Female and male. Unknown. Note: In Kempf's notebook (# 11806) we found a mention to a complete series of this species, including workers, females, males, pupae and larvae, from Distrito Federal, Brasília, northwestern city limit, 21.x.1975, W.W. Kempf & J. Diniz leg. (see detail in Biology). Despite several attempts we were not able to locate this sample, even with the help of Reginaldo Constantino at Universidade de Brasília, where Kempf's collection was deposited before being transferred to the MZSP, and of Jorge Diniz (Universidade de Goiás), a student of Kempf at the time of his death.

Material examined: BRASIL, Goiás: Anápolis, 7.i.1966, W. W. Kempf leg. 7 workers (holotype and paratypes, WWK # 4230) [16° 20' S, 48° 58' W]; *ibid.*, 4.i.1966, W. W. Kempf leg. 2 workers (paratypes, WWK # 4199); *ibid.*, 17.i.1969, W. W. Kempf leg. 1 worker (WWK # 5471); Distrito Federal: Brasília, Campus UnB, 22. xi. 1975, W. W. Kempf leg. 3 workers (WWK # 11923); *ibid.*, Parque Nacional, 14.v.1971, W. L.



Fig. 6. *Trachymyrmex dichrous* Kempf, worker, Brazil: DF: Brasília. Habitus (headless) in lateral view.

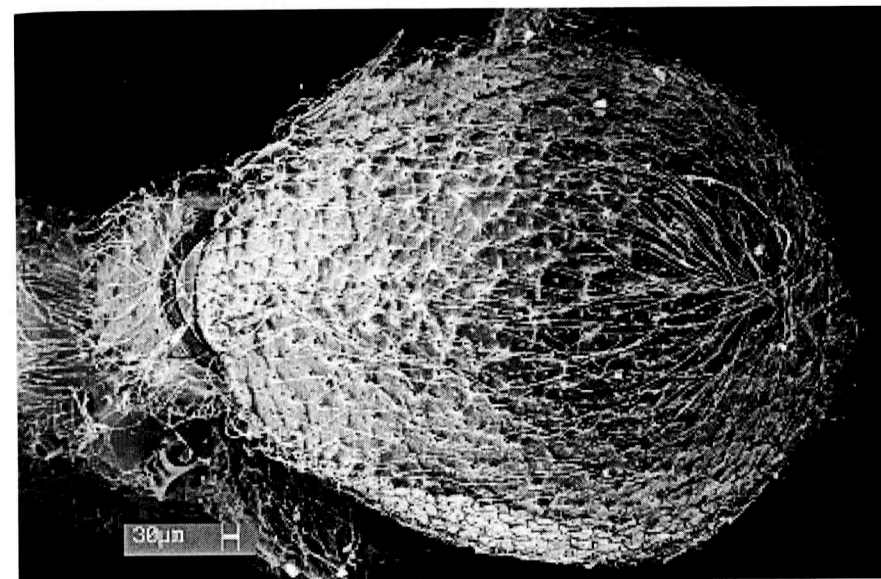


Fig. 7. *Trachymyrmex dichrous* Kempf, worker, Brazil: DF: Brasília. Postpetiole and gaster in dorsal view.

Brown & D. E. Brown leg. 2 workers; Estação Ecológica Águas Emendadas, 24.v.1992, A. Reis col. 3 workers (1 prepared for SEM); Águas Emendadas, cerrado, 19.v.1993, J.H. Schoereder col. 3 workers (CECL) [15° 40' S, 54° 20' W]; Mato Grosso: Chapada dos Guimarães, v.1959, Frei Canuto Amann, O.F.M. leg. 1 worker (paratype) [15° 26' S, 55° 45' W]; Minas Gerais: Paraopeba, março de 1990, J.A. Barcelos 1 worker (CECL) [19° 18' S, 44° 25' W]; São Paulo: Agudos, Fazenda S[an]to. Antonio, Parque do Seminário, 13.xii.1955, W.W. Kempf leg. 1 worker (paratype, WWK # 1493) [22° 28' S, 49° 00' W]; Moji-Guaçu, Fazenda Campininha, 24.ix.1995, I.R. Leal leg. 2 workers; *ibid.*, 20.ii.1997, *idem* 1 worker (CECL) [22° 22' S, 46° 56' W].

Discussion: This is perhaps the most aberrant species both in the entire genus and in the present species-group. Within the latter, the worker (and female) may be distinguished by the following features: bicolored, head dark brown, body and appendages brown; frontal lobes subtriangular, slightly expanded laterad, the interfrontal width not exceeding one half of head width; supraocular tumulus indistinct; antennal scrobe not delimited postero-laterally behind eyes, nor projecting posteriorly in a tuberosus fashion; occiput rounded laterally; vertex lacking paired carinae; anterior half of sides of tergum I of gaster weakly to indistinctly marginate. The following characters are shared only with *T. compactus* n. sp.: occipital tooth absent; antero-inferior

corner of pronotum rounded, not angular nor dentate; second and third pairs of mesonotal projections vestigial; postero-dorsal border of postpetiole broadly excised.

Variation: Specimens from Águas Emendadas, northern Brasília, have the propodeal teeth more developed than in the other samples.

Biology: We have found the following account by W. W. Kempf in the MZSP collection: "Recently, on October 21, 1975, at the beginning of the rainy season, Jorge Diniz and myself located several nests of this species in a small, already disturbed and recently burned "cerrado" at the northern limit of the city of Brasília. Although not prepared for a careful excavation, we tried nevertheless to dig out one nest with a small gardener's shovel. We were able to find the nest chamber with the fungus garden and to secure nearly the total population of the colony, although the chamber itself was destroyed before we could make out its size and shape, and verify if the fungus garden was a suspended one from rootlets, in the true *Trachymyrmex*-fashion. The results of our findings may be summarized as follows:

The nest entrance was marked by a circular orifice of about 5 mm in diameter, around which the excavated soil had been heaped up in low and irregular mounds by the ants, not forming a regular crater. From the nest entrance, a vertical canal went down for nearly one meter, to open in the nest chamber with the fungus garden. 384 workers, 2 dealate queens, 23 alate males, 8 pupae and 39 larvae of different sizes and instars were retrieved from the nest, which probably represents the total population, inasmuch as at the moment of our digging no activity was going on at the outside of the nest, and we examined carefully any lump of earth taken out by our digging. The fungus-garden, secured only in somewhat smashed condition, seemed to contain cut-up stems of grasses or other plants. Probably there was no second chamber, because several visits to the excavation site after taking out the nest did not reveal any further activity".

Trachymyrmex opulentus (Mann)

Figs. 8-10

Sericomyrmex opulenta Mann 1922: 48-49, Fig. 21 a-b (worker; Honduras: San Juan Pueblo; biology).

Sericomyrmex wheeleri Weber 1937: 396-398, Fig. 8 (worker, female; Guiana: Forest Settlement, Mazaruni River). Weber 1946: 143-144 (biology). Wheeler 1949: 670-671, pl. II, Figs. 9-13 (larva).

Sericomyrmex wheeleri pakeelai Weber 1937: 398, Fig. 9 (worker; Guiana: Oko River nr. Cuyuni River). Weber 1946: 144 (biology). Weber 1958: 54 (syn.).

Trachymyrmex opulenta: Weber 1958: 51 (comb.).

Trachymyrmex wheeleri: Weber 1958: 54 (comb., syn., variation). Weber 1972: 17, 28, 32, 55, 58, Figs. 81, 90 (biology; nest; fungus garden; Colombia, Antioquia: Rio Porce). Kempf 1972: 254 (cat.). Bolton 1995: 421 (cat.). **nov. syn.**

Trachymyrmex opulentus: Kempf 1972: 253 (cat.). Bolton 1995: 421 (cat.). Schultz & Meier 1995: 357, Figs. 11.7 and 11.8 (larva).

Type material: worker lectotype and 11 workers paralectotypes of *T. opulentus*, MZSP (here designated, examined); worker syntype ("cotype") of *T. wheeleri*, MZSP (examined).

Description: Worker (measurements in mm). TL 5.1-5.8; HL 1.03-1.27; HW 1.03-1.19; IFW 0.65-0.76; ScL 0.89-1.00; TRL 1.59-1.87; HfL 1.40-1.59. Uniformly ferruginous. Integument finely reticulate-punctate, opaque. Long, dense, flexuous hairs abundant on head, alitrunk and waist, where they are more or less strongly curved throughout, curved only at base but more or less decumbent on gaster, oblique to subdecumbent on scapes and legs. Dense, very short and fine pubescence of lighter color curved or inclined on head, alitrunk, waist and gaster, appressed on scapes and on legs, on the latter also on the extensor face.

Head (Fig. 8). Mandibles either finely striate, except on apical third which is smooth and shining or nearly smooth; masticatory with apical tooth and approximately 9 teeth, gradually smaller towards the mandibular base. Frontal lobes subsemicircular at apex, but anteriorly more or less narrowed and drawn out forward along the posterior half of median apron of clypeus. Frontal carinae diverging caudad, fading out just in front of the horn-like and projecting apex of antennal scrobe. Preocular carinae not curving mesad above eyes, continuing straight backwards, and becoming faint on posterior third but nearly reaching the apex of scrobe which is distinctly delimited both mesially and laterally except by the horn-like apex. Supraocular tumulus usually well developed, tumuliform. Occiput in full-face view distinctly notched in the middle. Paired carinae of vertex blunt but distinct, curving laterad in front, joining the frontal carinae. The longitudinal impression between these carinae extends laterad in front, forming a transverse groove across the frons just behind the frontal lobes. Occipital tooth usually inconspicuous in the form of a very low and blunt tumulus. Eyes moderately convex, with about 12 facet rows across the greatest diameter. Antennal scapes shorter than length of head capsule, but their apex either attaining or distinctly surpassing the horn-like tip of the scrobe when lodged in the same. All funicular segments distinctly longer than broad.

Alitrunk (Fig. 9). Pronotum with an inconspicuous humeral tumulus

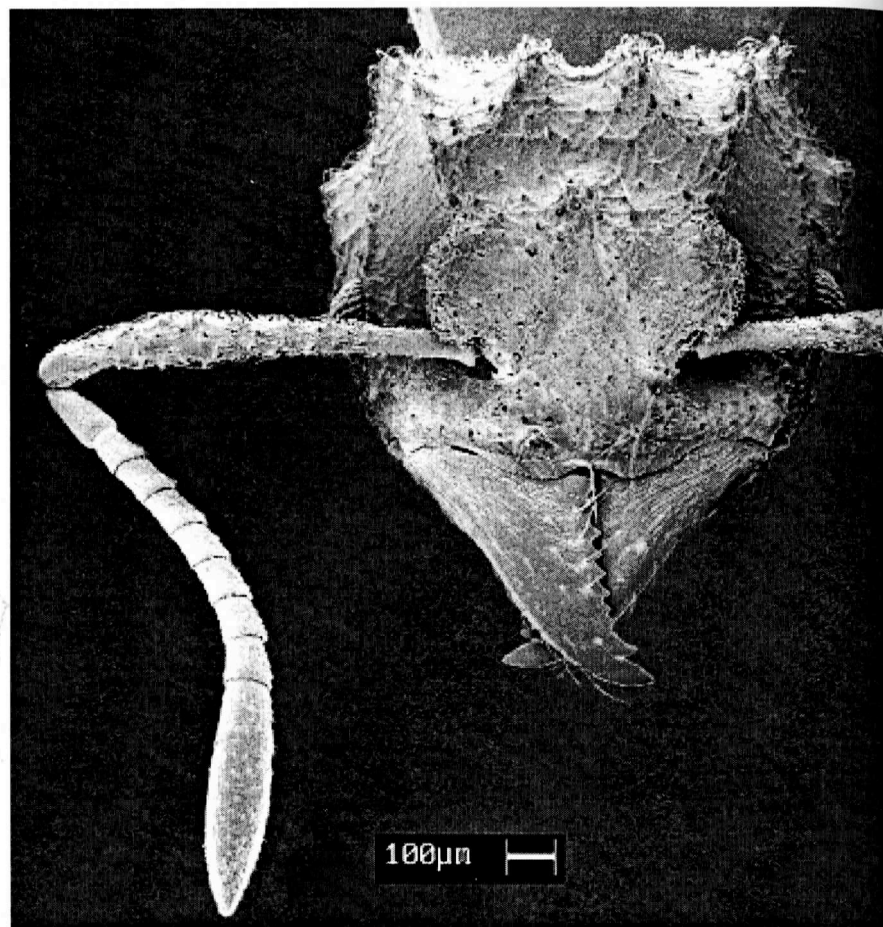


Fig. 8. *Trachymyrmex opulentus* (Mann), worker, Brazil, PA: Belém. Head in frontal view.

on each side; the antero-inferior corner strongly spinous; the lateral spines of the pronotal dorsum in the form of low and blunt tumuli; the mesial teeth vestigial or absent. Mesonotum with a pair of stout anterior conical spines, facing obliquely laterad, followed by a pair of much lower, multituberculate tuberosities facing caudad, the third pair of mesonotal projections similar to the second but much smaller and lower. Alitrunk shallowly impressed at metanotal groove. Basal face of propodeum narrow, bordered at each side by a low denticulate ridge; propodeal spines very low, pointed or subrectangular. Hind femora shorter than length of alitrunk.

Waist and gaster (Figs. 9-10). Petiole pedunculate, the node proper as seen from above slightly longer than broad, the dorsal face with a pair



Fig. 9. *Trachymyrmex opulentus* (Mann), worker, Brazil, PA: Belém. Habitus (headless) in lateral view.

of very faint, longitudinal and tuberculate ridges, practically unarmed; supetiole process absent. Postpetiole broader than long, its dorsum shallowly excavate both postero-mesially and postero-laterally between two very broad and blunt, posteriorly diverging ridges; the postero-dorsal border straight. Gaster opaque; tergum I with a shallow sagittal groove flanked by a pair of broad, low, and rather indistinct median ridges, the sides distinctly marginate by lateral ridges, shallowly excavate below these ridges; the dorsal surface rather densely covered with piligerous tubercles, connecting rugulae between these tubercles either absent or vestigial or quite distinct.

Female (measurements in mm). TL 6.4; HL 1.35; HW 1.27; IFW 0.81; ScL 0.95; TRL 2.03; HfL 1.62. Color, sculpture, pilosity, pubescence, and diagnostic characters as in worker. The following should be noted: Ocelli small, the antero-median ocellus just behind the transverse groove in front of the strong, paired vertical ridges; the lateral ocelli placed on the outside of these ridges, facing laterad. Occipital tubercle well developed and of approximately the same size as the supraocular tubercle. Tip of antennal scapes not quite attaining the apex of the hornlike posterior projection of the scrobe, when lodged in the same. Pronotum with a pair of low and truncated subtriangular scapular spines, tumuliform with blunt apex directed out and forwards. Mesoscutum without notable dorsal projections. With the alitrunk in oblique dorsal view, shallow parapses delimited by the parapsidial furrows; mesothoracic paraptera impressed. Mesonotal scutellum with

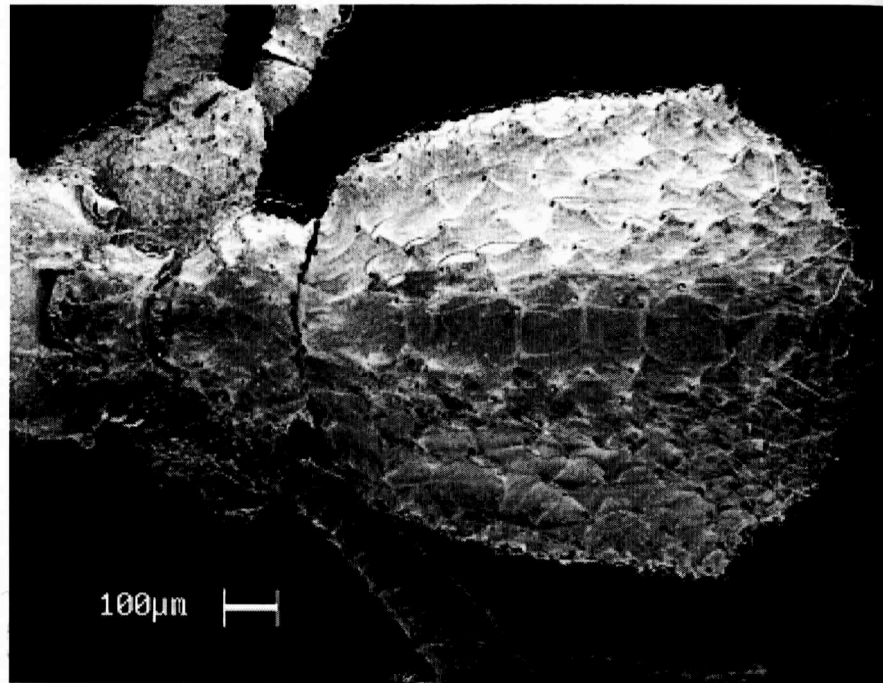


Fig. 10. *Trachymyrmex opulentus* (Mann), worker, Brazil, PA: Belém. Waist and gaster in dorsal view.

a longitudinal groove, the posterior end distinctly bidentate, the blunt teeth directed backwards with parallel sides. Propodeal spiracles orifices visible, spines short, toothlike; the basal face longitudinally excavate between the teeth and subcontinuous with the declivous face. Petiolar node proper distinctly broader than long. Dorsum of tergum I of gaster coarsely reticulate-rugose. Wings unknown.

Male. Unknown.

Material examined: BRAZIL: Amazonas: Manaus, Br 174 2F3 Km 41, Res. 1501 PDBFP, 3.x.1991, G.A.R. Melo leg. 3 workers (#105 Mayhé's notebook, CECL) [03° 08' S, 60° 01' W]; *ibid.*, Reserva Ducke, 15.viii.1991, A. Brescovit leg. 1 worker (CECL); *ibid.*, 3.iv.1994, R. Didham leg. 2 workers (MZSP); Pará: Belém, 3.xi.1974, D. Dias leg. 15 workers (1 prepared for SEM), 1 female [01° 27' S, 48° 29' W]; GUATEMALA: Bobos, v. 1927, W. M. Mann coll. 6 workers [15° 21' N, 88° 48' W]; GUIANA: Forest Settlement, R. Mazaruni, 3.ix.1935, N. A. Weber leg. 1 worker # 339 (cotype of *T. wheeleri*, MZSP) [06° 25' N, 58° 38' W]; HONDURAS: San Juan Pueblo, 2.iii.1920, W. M. Mann leg. 12 workers (syntypes of *T. opulentus*, MZSP) [15° 35' N, 87° 14' W]; PANAMÁ: Changuinola Distr., Bocas del Toro, 1924, G. C. Wheeler col. 3 workers

312 [07° 30' N, 80° 37' W]; SURINAME: Paramaribo 1930/1931, G. Buenzli # 763 3 workers (# 5450 Kempf's notebook) (MZSP) [05° 50' N, 55° 11' W]; VENEZUELA: Bolívar, C.A. talud N. O. de Amaraway Tepui, 21.v.86, J. Lattke col. 2 workers (USBC) [5° 55' N, 62° 15' W]; Yaracuy, Aroa, 2.viii.1993, A. Mayhé and J. V. Hernandez leg. 107 workers (#143 and 152 Mayhé's notebook, 37 CECL, 10 CPDC, 10 INPA, 10 MCZC, 10 MIZA, 10 MZSP, 10 USNM, 10 USBC) [10° 26' N, 68° 54' W].

Discussion: *T. opulentus* differs from *T. dichrous*, *T. compactus* and *T. relictus* in the strongly projecting and hornlike apex of the antennal scrobe. The strongly spinous antero-inferior corner of pronotum and the straight, not excised postero-dorsal border of the postpetiole separate it at once from *T. dichrous* and *T. compactus*. Additional differences from *T. relictus* consist in the low and tumuliform lateral pronotal projections, shorter than the anterior mesonotal ones, in the very short propodeal spines, and in the practically unarmed dorsum of the petiolar node.

Variation: The worker from Guiana (= *T. wheeleri*) differs slightly from the syntypes from Honduras by the vestigial third pair of mesonotal projections, the bigger horn-like projections at the apex of the antennal scrobes, and the smaller propodeal spines. These characters also shown some variation in the other samples examined. Workers from the Venezuelan samples have less produced antennal scrobes apices.

Biology: The first information is from Mann (1922:49) on the type series: "... large colony. The nest was in the ground, alongside a trail in thick woods. The entrance was in the form of a turret, loosely constructed of earth and about 6 inches in height; a foot beneath the surface was a large cavity, containing a fungus garden, pendulous and 4 or 5 inches in diameter". Gabriel A. R. Melo has collected in Manaus three workers following a forage trail, carrying dry leaves (personal communication, recorded in Mayhé's notebook # 105). Antonio Mayhé and Jose V. Hernandez found two nests in Aroa, Venezuela, in a secondary forest, at 865m of altitude. The entrance of the first (Mayhé's notebook # 143) was at the side of a human trail and presented a turret made by rigid earth coming out of the litter, 1cm diameter and 3 cm height; the unique chamber was 20 cm deep. The second one (Mayhé's notebook # 152) presents also a turret, although smaller, and its unique irregular chamber was 16 cm deep, with the fungus garden hanging from the roof. Due to the intricate root system around both nests, it was impossible to study their architecture. The ants feign death when disturbed, in a conspicuous cryptic behavior.

Synonymy: On account of the unusually long and silky pilosity, *T. opulentus* was originally described in the genus *Sericomyrmex*, but

correctly transferred to *Trachymyrmex* by Weber (1958: 51). Weber described *Sericomyrmex wheeleri* and *Sericomyrmex wheeleri pakeelai* (1937: respectively 396 and 398), but recognized in 1958 (p. 54) that they in fact belong to *Trachymyrmex*, are identical, and that *T. wheeleri* may "be no more than a subspecies of" *Trachymyrmex opulentus* Mann. Our studies show that the characters used by Weber to differentiate these forms represent local variations and have no taxonomic value.

Trachymyrmex relictus Borgmeier

Figs. 1 and 11-21

Trachymyrmex relictus Borgmeier 1934:107-108, Figs. 6, 7 (worker; female; Suriname: Paramaribo; Brazil, Pará: Belém). Kempf 1961:519 (Suriname: Dirkshoop). Weber 1968:143 (Tobago Island; biology). Kempf 1972: 254 (cat.). Bolton 1995: 421 (cat.).

Trachymyrmex relictus fitzgeraldi Weber 1937:401-402 (worker; Trinidad: Nariva Swamp). Weber 1945:57 (biology). Kempf 1972: 254 (cat.). Brandão 1991: 382 (cat. correction). Bolton 1995: 420 (cat.). **nov.**

syn.

Type material: paratypes of *T. relictus*: 3 workers (MNRJ); 3 females, 40 workers (MZSP); 1 female, 2 workers (CECL) (examined); syntypes of *T. relictus fitzgeraldi*: 1 worker (MZSP); 3 workers (USNM) (examined).

Description: Worker (measurements in mm). TL 3.5-4.7; HL 0.84-1.05; HW 0.81-1.03; IFW 0.49-0.60; ScL 0.76-0.89; TRL 1.19-1.54; HfL 1.11-1.35. Light medium brown, head and gaster darker with reddish hues. Integument opaque, indistinctly shagreened. Hairs of variable length, yellowish brown, abundant yet conspicuously scarcer than in *T. opulentus*, short and strongly curved on sides of head and alitrunk, on femora and gastric sternum, also on dorsum of head and gastric tergum where they are interspersed among more numerous, longer hairs; hairs on scapes and legs oblique to subdecumbent but not appressed. Dense, very short pubescence of lighter color curved or inclined on head, alitrunk, pedicel and gaster, appressed on scapes and on legs, including the extensor face of the latter.

Head (Fig. 11). Mandibles smooth and shining except laterally on base and mesially on proximal half of masticatory margin, where they are finely striate; masticatory margin with one apical and 8 subapical teeth, gradually smaller towards the mandibular base. Frontal lobes semicircular, conspicuously expanded laterad, the interfrontal width well surpassing one half of head width across the eyes. Frontal carinae straight, diverging caudad, fading out at posterior fourth of head. Front, vertex and occiput with sparse piligerous tubercles. Preocular carinae very slightly curving mesad above eyes, not intersecting the antennal

scrobe, fading out behind eyes at a distance from the posterior orbit which is less than the diameter of the latter. Posterior half of antennal scrobe indistinctly delimited, its apex scarcely projecting in a tuberos fashion, but marked by a small tooth. Supraocular tumulus rather vestigial. Occiput in full-face view nearly rounded laterad, shallowly notched in the middle. Carinae of vertex distinct but blunt, the longitudinal groove between the carinae and the transverse groove in front of them distinct but shallow. Occipital tooth conspicuous, although very small is more developed than in any other species in the group. Inferior occipital corner rounded. Eyes moderately convex, about 10-11 facets in a row across the greatest diameter. Antennal scapes shorter than length of head capsule, little surpassing the occipital corner when lodged in the scrobe. All funicular segments distinctly longer than broad.

Alitrunk (Figs. 1 and 12). Pronotum with vestigial humeral angles, its antero-inferior corners spinous, the dorsolateral spines high, well-developed. Mesonotum with a pair of very low, multituberculate anterior tumuli followed, in side view, by a similar still lower pair of rather spinous projections; the third pair in the form of very small denticles.

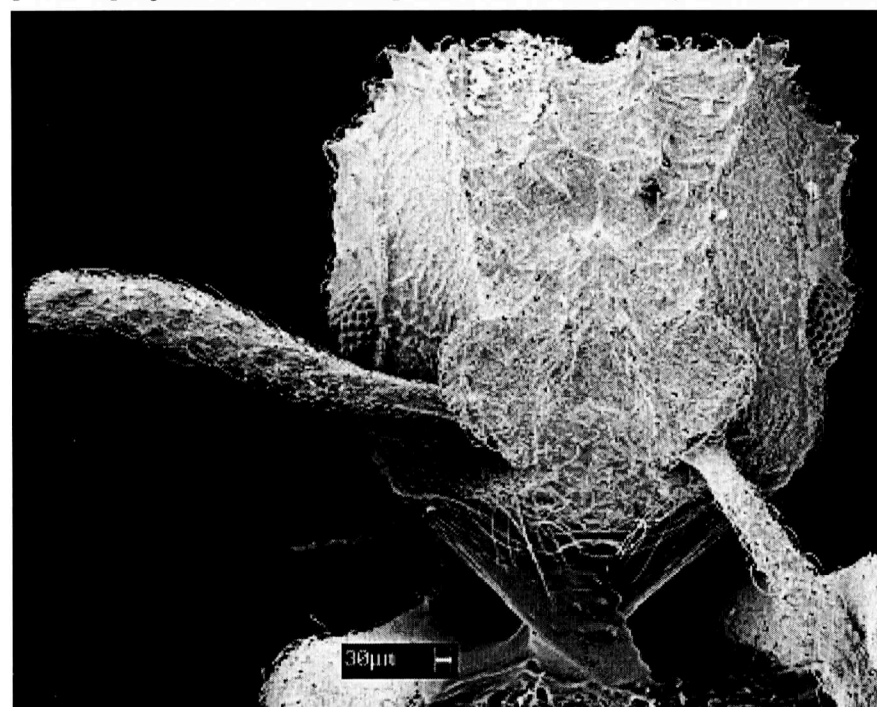


Fig. 11. *Trachymyrmex relictus* Borgmeier, worker, Brazil, AM: Manaus. Head in frontal view.

Metanotal groove impressed. Basal face of propodeum narrow, laterally partly marginate by an incomplete denticulate ridge. Propodeal spines well developed, slender, oblique, pointed, apically usually a bit deflected downward, but longer than the lateral pronotal spines. Hind femora shorter than length of thorax.

Waist and gaster (Figs. 12-13). Petiole pedunculate, node proper about as broad as long, the dorsal armature of two pairs of denticles always developed, the first pair often vestigial, the second pair always strong. Antero-ventral process of petiole absent. Postpetiole shallowly excavate above postero-mesially, the postero-dorsal border not excised. Tergum I of gaster with minute, evenly distributed but rather indistinct piligerous tubercles; its dorsum antero-laterally marginate.

Female (Figs. 14-18; measurements in mm). TL 5.5-6.1; HL 1.13-1.24; HW 1.16-1.24; IFW 0.67-0.73; ScL 0.95-1.00; TRL 1.73-1.97; HfL 1.46-1.54. With the same general distinguishing characters as the workers, with the following differences: three ocelli on vertex, the lateral ones smaller. Pronotum with a pair of strong and truncated scapular spines, directed out and forwards, and with a pair of inferior spines pointed down and forwards, smaller than the scapular ones. Mesoscutum surmounted by minute piligerous tubercles, without notable dorsal projections. With the alitrunk in oblique dorsal view, shallow parapses delimited by the parapsidial furrows; mesothoracic paraptera more or less impressed, with a narrow median portion; scutellum ending in two stout and blunt spines, directed backwards, with the sides converging

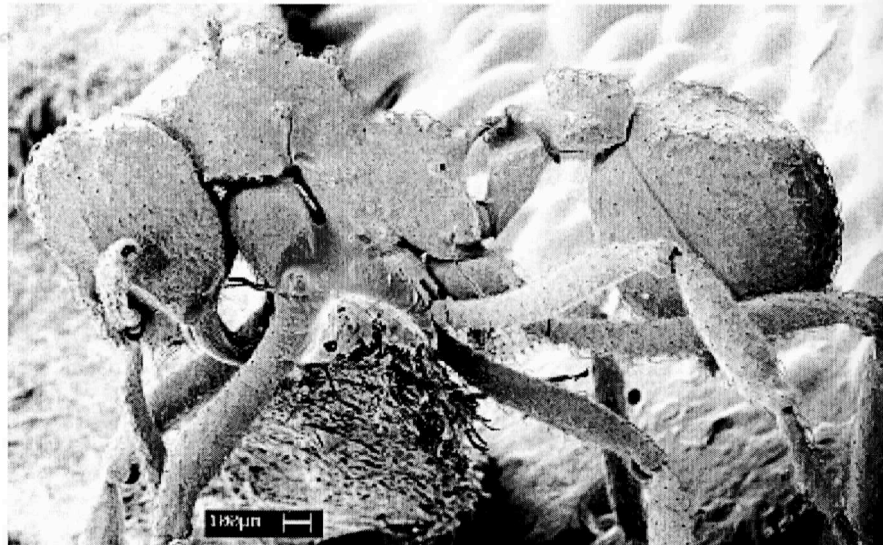


Fig. 12. *Trachymyrmex relictus* Borgmeier, worker, Brazil, AM: Manaus. Habitus in lateral view.

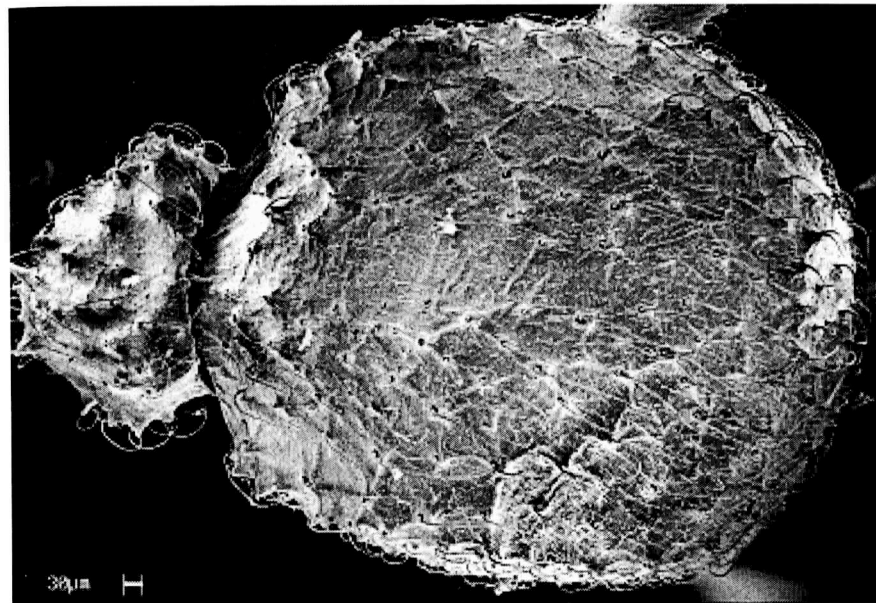


Fig. 13. *Trachymyrmex relictus* Borgmeier, worker, Brazil, AM: Manaus. Postpetiole and gaster in dorsal view.

obliquely inwards; metathoracic paraptera concealed by the scutellum; propodeal spiracle orifices visible. Two strong acute spines on propodeum. Petiolar dorsum with a pair of small teeth. First gastric tergite with a longitudinal ridge on each side; disk with two longitudinal series of small piligerous tubercles, absent in the middle of the segment.

Wings pale brown, completely covered by microtrichia. Fore wing with 5 closed cells (submedian, median, costal, submarginal and marginal); anal vein turned up and fusing with cubito-anal vein, not prolonged beyond the junction. Pterostigma conspicuous, although not pigmented. Hind wing with 5 complete veins, and 2 closed cells; 7 hamuli on anterior margin.

Male (undescribed; measurements in mm). TL 4.0; HL 0.71; HW 0.78; IFW 0.76; ScL 0.76; TRL 1.41; HfL 1.70; FWL 3.8; HWL 2.7 (only one specimen measured). Ferruginous; occipital half of head a bit darker; antennae and legs testaceous. Pilosity as in worker and female, longer inclined or recurved hairs mixed with very fine and short pubescence on body and appendages.

Head (Fig. 19). Mandibles finely punctuated on dorsal surface; masticatory margin with only the five basal teeth evident, gradually diminishing toward base (the three additional teeth rudimentary); external margin slightly sinuous. Median border of clypeus moderately

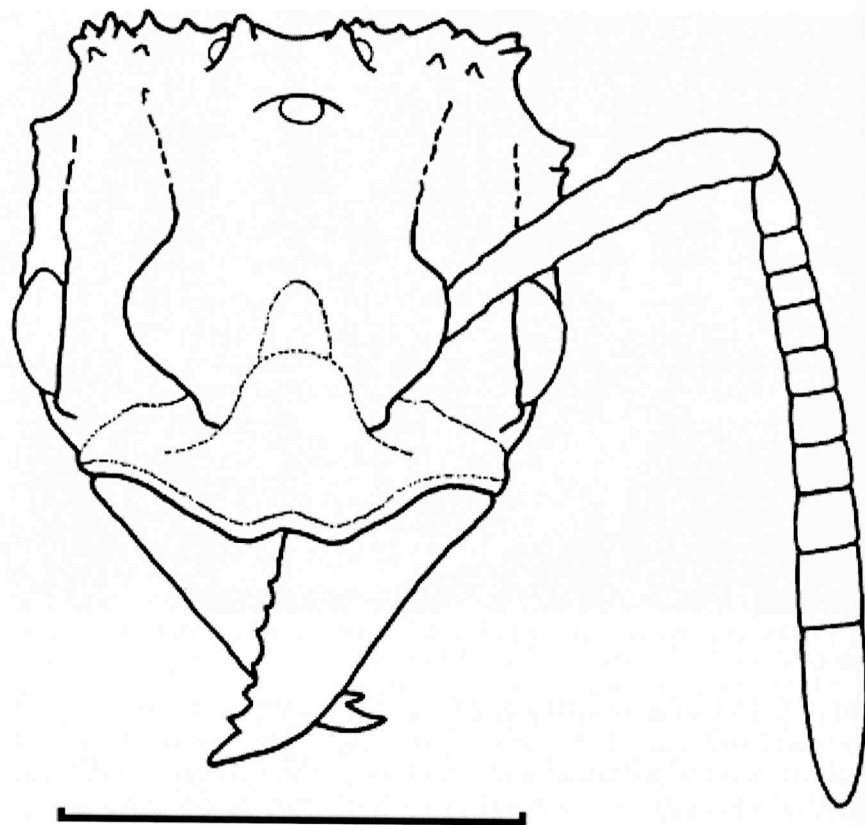


Fig. 14. *Trachymyrmex relictus* Borgmeier, female paratype, Suriname: Paramaribo. Head in frontal view. Scale bar = 1mm.

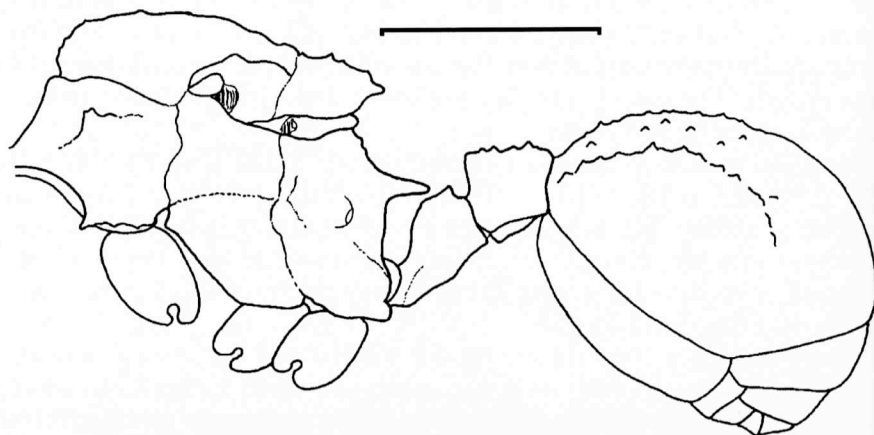


Fig. 15. *Trachymyrmex relictus* Borgmeier, female paratype, Suriname: Paramaribo. Habitus (headless) in lateral view. Scale bar = 1mm.

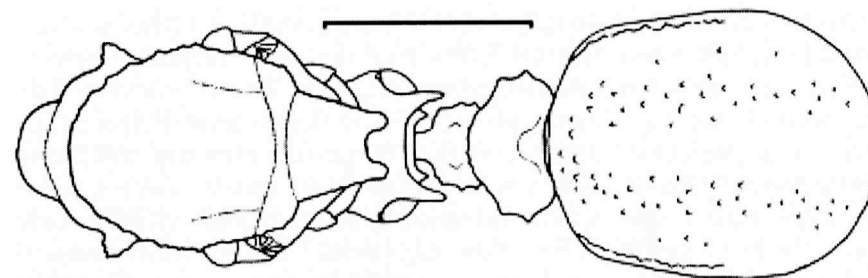


Fig. 16. *Trachymyrmex relictus* Borgmeier, female paratype, Suriname: Paramaribo. Habitus (headless) in dorsal view. Scale bar = 1mm.

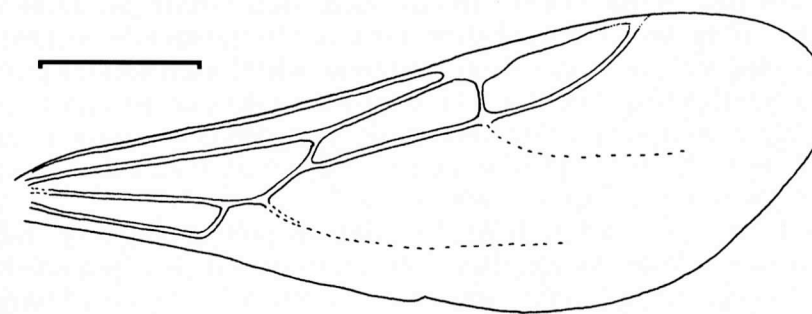


Fig. 17. *Trachymyrmex relictus* Borgmeier, female paratype, Suriname: Paramaribo. Fore wing. Scale bar = 1mm.

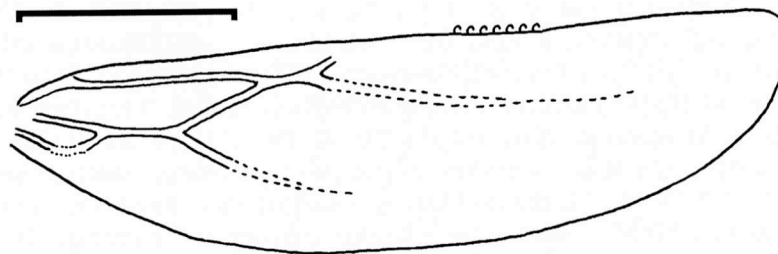


Fig. 18. *Trachymyrmex relictus* Borgmeier, female paratype, Suriname: Paramaribo. Hind wing. Scale bar = 1mm.

convex, with a small anterior notch; dorsal disk of clypeus without notable projections. Frontal lobes rounded and directed forwards, leaving part of the antennal insertions exposed. Frontal carinae diverging caudad, not reaching the occiput. Preocular carinae distinct, fading out at the posterior border of eyes. Compound eyes big and convex, filling some 1/2 of the sides of head. Ocelli prominent. Antennae with 13 segments; scape clearly surpassing the occipital corners, nearly three times longer than funicular segments I-III combined; funicular segment I slightly longer than II. Occipital corners rounded, without projections in frontal view. Occipital margin gently concave in the middle between the lateral ocelli.

Alitrunk (Figs. 20-21): Pronotum with a scapular spine in form of a short, acute tooth. Scutum narrow and superficially impressed Mayrian furrows; parapsidial furrows and parapsis rudimentary. Mesothoracic paraptera, in dorsal view, slightly narrowed in the middle, where it is impressed and presents a short longitudinal keel, without side projections. Scutellum without dorsal projections, ending as two short, stout and blunt spines, pointing backwards. Metathoracic paraptera concealed by the scutellum in dorsal view. Propodeum with a pair of blunt spines between basal and declive faces.

Waist and gaster (Figs. 20-21): Dorsum of petiole without projections. Postpetiole a little broader than petiole, in dorsal view, superficially impressed above, with the posterior border concave. First gastric tergite without lateral ridges or piligerous tubercles.

Wings as described to the female, above, but smaller.

Material examined: BRAZIL: Amazonas: Manaus, 8-10.i.1985, J. C. Trager leg. "Gardens of Tropical Hotel, nest in pathway", 16 workers (1 prepared for SEM) (MZSP) [03° 08' S, 60° 01' W]; Goiás: Colinas do Sul, Serra da Mesa, 2-15.xii.1995, 14° 01' S, 48° 12' W, 1 worker, Silvestre, Dietz & Campaner col. ("cerrado"); Pará, Belém, 24.xi.1957, C. R. Gonçalves leg. 1 female, # 1682 [01° 27' S, 48° 29' W]; FRENCH GUIANA: Cayenne, vii.1959, Jeal Pastel 3 workers (WWK # 3385) [04° 56' N, 52° 20' W]; SURINAME: Paramaribo Bot[anical] Gard[ens], 30.x.[19]39, D. C. Geijkes, 31 workers, 6 males [05° 50' N, 55° 11' W]; Paramaribo, G. H. Buenzli 27, n. 5450, 3 workers (paratypes of *T. relictus* MNRJ); *ibid.*, 1930/31, # 7635, G. H. Buenzli leg., 4 females, 42 workers (paratypes of *T. relictus* MZSP); Suriname without further information, D. C. Geijkes, 1 female, 6 workers, 2 males (CTB # 5957); Suriname without further information, G. H. Buenzli, 1932 1 female, 1 worker, 1 male; Dirkshoop, v. 1959, J. v. d. Drift col. 2 females, 20 workers [05° 47' N, 55° 29' W]; TRINIDAD: Nariva Swamp, 22.iv.1935, N. A. Weber [leg.] # 139, 4 workers (syntypes of *T. relictus fitzgeraldi*) (1 MZSP; 3 USNM) [10°

25° N, 61° 04' W]. VENEZUELA: Bolivar, Canaima, 5.vi.1993, A. Mayhé leg., 1 worker (CECL) [06° 07' N, 62° 55' W]; Zulia, El Tucuco, 51km SO de Machiques, 24.vi.1979, Laughlin and Grigarick [leg.], 1 worker (MIZA) [09° 50' N, 72° 45' W];

Discussion: Both worker and female of *T. relictus* may be separated at once from the remaining species of the present group by the presence of long propodeal spines, the dorsally armed petiolar node, and the rather scarce hairs. The relatively long lateral pronotal spines (longer than the anterior mesonotal ones) are shared with *T. compactus*, which is nevertheless quite distinct by the postero-dorsally excised postpetiolar node and by the presence of one spine at each side of the antero-inferior corner of pronotum. The projecting, hornlike apex of antennal scrobe

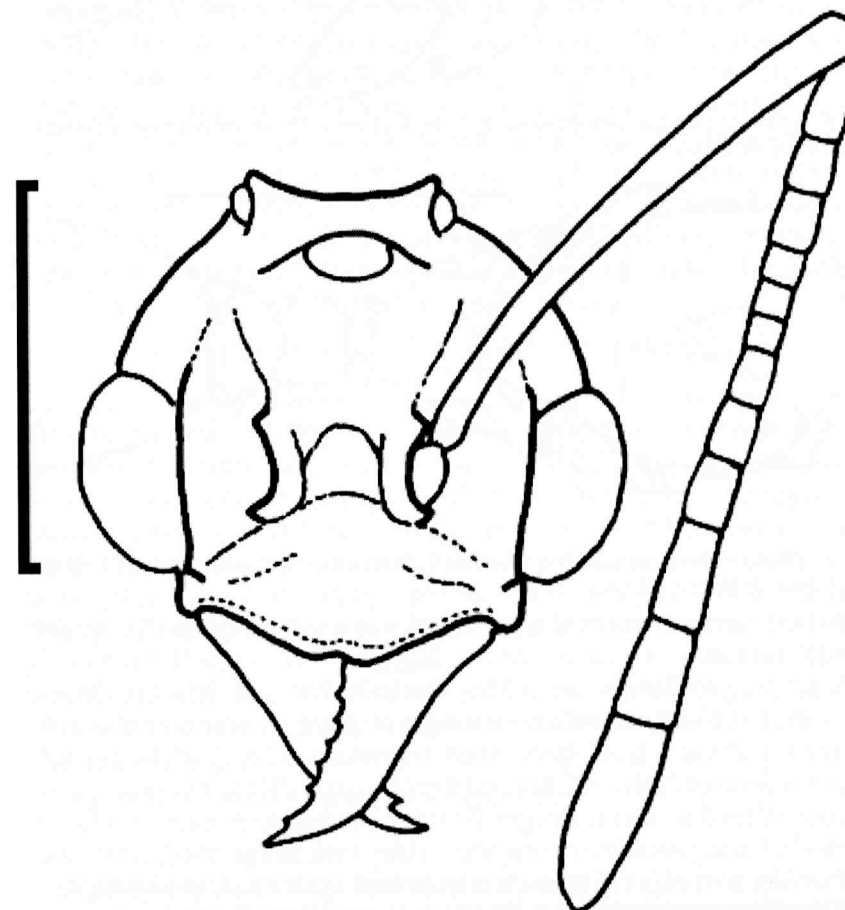


Fig. 19. *Trachymyrmex relictus* Borgmeier, male, Suriname: Paramaribo. Head in frontal view. Scale bar = 500µm.

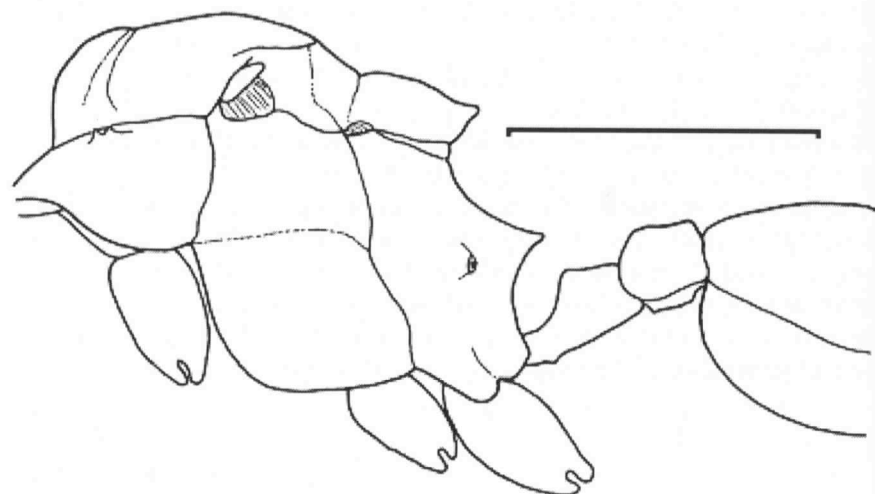


Fig. 20. *Trachymyrmex relictus* Borgmeier, male, Suriname: Paramaribo. Habitus (headless) in lateral view. Scale bar = 1mm.

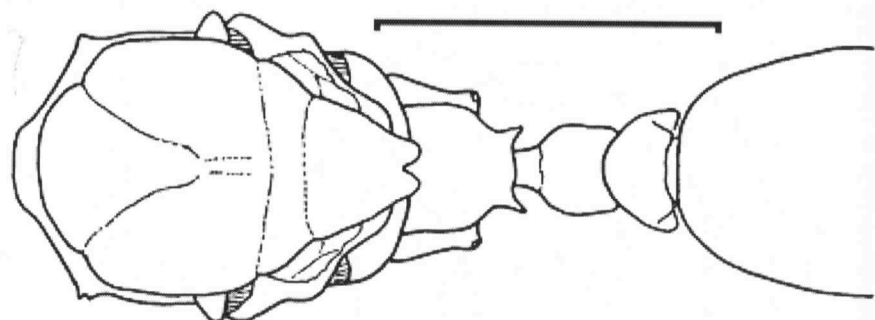


Fig. 21. *Trachymyrmex relictus* Borgmeier, male, Suriname: Paramaribo. Habitus (headless) in dorsal view. Scale bar = 1mm.

and the high and conical mesonotal spines distinguish *T. opulentus* from *T. relictus*.

According to Borgmeier (1934) the holotype of *T. relictus* should be deposited at the "Instituto de Biologia Vegetal"; as far as we know this collection should have been first transferred to São Bento, Rio de Janeiro, then to Pinheiral, RJ and finally to the CECL. However, we were unable to find it there. Borgmeier also reproduces part of a letter he received from Menozzi confirming that the Borgmeier's Paramaribo specimens correspond to an undescribed species, and saying that he had another specimen from Pará.

Variation: In all examined samples the workers have the second pair

of mesonotal projections variable, from blunt teeth to small spines; the slender propodeal spines are thickened in some specimens, and the posterior pair of denticles of the petiole is absent in the Zulia, Venezuela sample.

Biology: This species occurs both in primary forest and in open, cultivated fields, and its nests are often found within the limits of *Atta* nests. The number of nest chambers is unknown, but at least in one case the upper chamber was at a depth of 20 cm beneath the surface. The nest of a colony discovered by Weber (1968:143) had as an entrance a bare hole of 10 mm in diameter. Alate forms (sexes not indicated) were present in the latter colony on August 31, 1967. These are timid animals that feign death upon touch.

Synonymy: Weber's *T. relictus fitzgeraldi* is doubtless identical with *T. relictus*, and the distinguishing features given by the author fall within the limits of the normal variation in the same colony, although the petiolar anterolateral spines are much more developed in the syntypes of *T. relictus fitzgeraldi* in comparison with other samples. However we consider this as insufficient to support a separate taxon. This was already implicitly admitted by Weber (1968:143) who named his Tobago specimens simply *T. relictus*, adding that this species occurs both in the Guianas and Trinidad. The only conclusion is to place *T. relictus fitzgeraldi* into the synonymy of *T. relictus*.

COMMENTS ON THE DISTRIBUTION PATTERN

Three species of the *Opulentus* group occur in the northern part of South America (Fig. 22), taking in consideration that the single known specimen of *T. compactus* does not allow deriving any comment on the species distribution. Two species, *T. opulentus* and *T. relictus*, are widespread in equatorial forests; the first is the only taxon of the group found in Central America. Due to the wide sympatry shown by their know distributions and hence their probable similar environmental demands, the sample of *T. relictus* from Brazilian savanna ("cerrado") suggests that *T. opulentus* may also occur in higher latitudes of the Southern hemisphere. *T. dichrous* seems to be a typical inhabitant of the vast savannas of central Brazil, although it has also been found in open parkland at Agudos, in central São Paulo State.

ACKNOWLEDGMENTS

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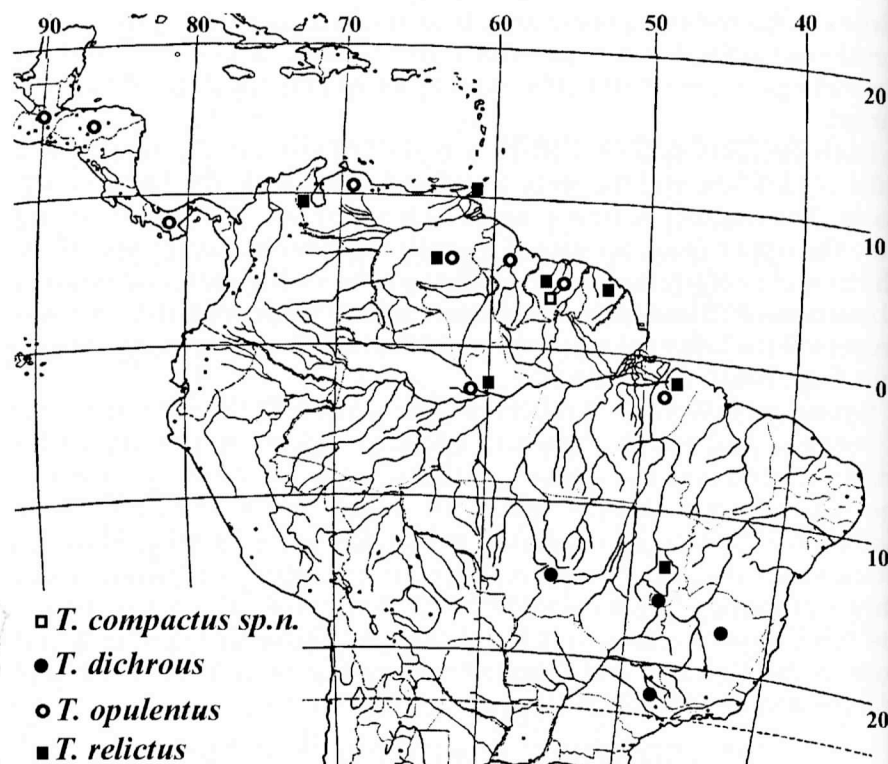


Fig. 22. Geographic distribution of the genus *Trachymyrmex* Forel (Opulentus group).

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Efficacy of Actara® 25WG on Three Species of Brazilian Termite (Isoptera, Nasutitermitinae) Crop Pests

by

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ABSTRACT

The efficacy of thiamethoxam, a new neonicotinoid insecticide used as trade name Actara® 25WG, has been tested for the first time on three species of Brazilian termites (Nasutitermitinae): *Cornitermes snyderi* (Emerson), *Syntermes molestus* (Burmeister), *Nasutitermes costalis* (Holmgren) which are pests of important economical crops. Toxicity tests show that thiamethoxam is very efficient against such pest species at very low doses of 0.07g a.i. m⁻³ of soil. Excluding *Syntermes molestus* which consumed the product, thiamethoxam proved to be anti-feedant but not repellent to *N. costalis* and *C. snyderi* in feeding deterrence test. For all species studied, mortality was not dependent on consumption of the product, which acts by contact.

Key words: Brazilian termites, crop pests, termites control, Actara® 25WG, *Cornitermes snyderi*, *Nasutitermes costalis*, *Syntermes molestus*.

INTRODUCTION

For a long time, the problem of termites as tropical crop pests has given rise to plenty of interest (Harris 1954, 1969; Sands 1973a; Mill 1992). In the New World, the order Isoptera numbers 86 genera and 544 species grouped in 5 families: Kalotermitidae, Rhinotermitidae, Serritermitidae, Termitidae and Termopsidae (Araujo 1977; Constantino 1998). However, it is the family of Termitidae (381 species) and more precisely the subfamily of Nasutitermitinae (248 species) which contain the most harmful agricultural species in South America (Sands 1973b). In Brazil, the affected crops are numerous and diverse. For example more than 200 species are harmful to sugar cane, their attack cause a yield loss from 10 to 20 tons/ha/year (Sands 1973b; Novaretti *et al.* 1988; Berti Fihlo *et al.* 1993; Novaretti *et al.* 1995; Melo Fihlo & Veiga 1997). Brazilian termites, particularly the genera *Syntermes*, *Cornitermes* and *Procornitermes* have been also mentioned in literature as the major pests on rice, millet, coffee or cacao trees (Hempel 1920; Elias 1967; Czepak *et al.* 1993; Cancelli 1989; Fernandes & Alves 1992a; Dario &

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