

The ant genus *Thaumatomyrmex* in Cuba (Hymenoptera: Formicidae) with description of two new species

CESARE BARONI URBANI & MARIA L. DE ANDRADE

Universität Basel, Institut für Natur-, Landschafts- und Umweltschutz (NLU), Biogeographie, Neuhausstrasse 31, CH-4057 Basel, Switzerland.

cesare.baroni-urbani@unibas.ch; maria.deandrade@unibas.ch

Two species of *Thaumatomyrmex*, *T. nageli* sp. n. and *T. mandibularis* sp. n. are described from Cuba. *T. nageli* resembles the Cuban endemic *cochlearis* Creighton but differs from it by the integument more sculptured, and by the pilosity shorter and sparser. *T. mandibularis* resembles *bariay* Fontenla but differs from it by its larger size, broader head and longer mandibles. With the descriptions of these two new species, the genus *Thaumatomyrmex* appears to comprise 8–11 species (according to the classification adopted) scattered between British Honduras and SE Brazil, four of which are endemic to Cuba. If the different species density between Cuba and the South American mainland would be confirmed, the Cuban diversity of *Thaumatomyrmex* should be interpreted as a case of explosive insular speciation.

Keywords: Hymenoptera, Formicidae, *Thaumatomyrmex*, new species, Cuba.

INTRODUCTION

The ant genus *Thaumatomyrmex* is restricted to the Neotropics with a handful of rare and poorly known species ranging from British Honduras to SE Brazil. Kempf (1975) recognises the following eight species within the genus: *atrox* Weber, 1939, *cochlearis* Creighton, 1928, *contumax* Kempf, 1975, *ferox* Mann, 1922, *manni* Weber, 1939, *mutilatus* Mayr, 1887, *paludis* Weber, 1942, and *zeteki* Smith, 1944, all based exclusively on worker characters. In the same paper Kempf (l. c.) grouped these eight *Thaumatomyrmex* species in three species groups: *mutilatus* group from extra Amazonian Brazil and including *contumax* and *mutilatus*; *cochlearis* group, endemic to Cuba and including *cochlearis* only; *ferox* group from the Amazon basin, northern South America and Central America, including *atrox*, *ferox*, *manni*, *paludis* and *zeteki*.

The male of *T. mutilatus* is the sole reproductive caste described to date (Kempf 1954). Gynes are apparently very rare and only one Panamanian gyne probably belonging to *T. zeteki* is mentioned in the literature but remains still undescribed (Kempf 1975).

Longino (1988), on the basis of variability of some biometric traits (head length vs. head width and head width vs. mandible length), considered that the allometric characters used by Kempf (1975) to differentiate the members of the *ferox* group were insufficient to support species-level separations. Longino (l. c.) went even further by adding that the genus *Thaumatomyrmex* could comprise only a single geographically variable species with a continuous distribution, a hypothesis sustained by the fact that all described species appeared to be allopatric. Following this

reasoning, Longino (1988) proposed the synonymy of *T. paludis* and *T. sp.* of Kempf (1975) with *T. ferox*, and *T. manni* and *T. zeteki* with *T. atrox*.

Shortly afterwards Brandão et al. (1991) reported the first case of sympatry among two *Thaumatomyrmex* species in the same cocoa field in Ilhéus (Brazil). Longino, in a Web document of 1999, reports another case of sympatry of two Panamanian species recognising in this way, that many species co-occur locally and that size and head shape may be significant species-level characters. Nonetheless, Longino (l. c.) maintains the synonymies proposed in 1988 and adds that the current nomenclature may be not consistent.

According to all successive cataloguers (Bolton 1995; Longino 1999; Delabie et al. 2000), the genus *Thaumatomyrmex* comprises 5 species. As a matter of fact Fontenla (1995) described a sixth new species from Cuba, *T. bariay*, based on a single worker. The genus *Thaumatomyrmex* to date comprises hence 6 species.

Diniz & Brandão (1989) and Brandão et al. (1991) portrayed for the first time the predatory behaviour of *Thaumatomyrmex* on polyxenid millipedes. The peculiar, apically forked mandibles of these ants are used to strip the barbed setae of the polyxenids before eating them.

The recent opportunity to collect two specimens of *Thaumatomyrmex* with puzzling affinities in two localities during a short trip to Cuba motivated the present work.

MATERIAL AND METHODS

Our search for additional Cuban *Thaumatomyrmex* in different collections permitted us to examine material from the following institutions.

IESC. Instituto de Ecología y Sistemática de la Academia de Ciencias de Cuba, Boyeros, La Habana, Cuba. Courtesy Dr. Nayla García.

LACM. Natural History Museum of Los Angeles County, USA. Courtesy of Roy R. Snelling.

MCZC. Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA. Courtesy of Stefan P. Cover.

MNHNC. Museo Nacional de Historia Natural Cuba, La Habana, Cuba. Courtesy of Dr. Jorge Luis Fontenla Rizo. We were unable to examine another five specimens preserved in this collection as listed in the web page of the Museo Nacional. We requested them to Dr. Jorge Luis Fontenla Rizo who was unable to send us them due to problems with the labels.

MZSP. Museu de Zoologia, Universidade de São Paulo, Brazil. Courtesy of Dr. Carlos Roberto Ferreira Brandão.

Measurements and indices used in this study as defined by Kempf (1975):

Head Length (HL): distance between two parallel lines drawn through the anteriormost point of the projecting frontal lobes and the posteriormost point of vertex in full face-view.

Head Width 1 (HW1): the maximum width of the head in front of the eyes, in full-face view.

Head Width 2 (HW2): the maximum width of the head behind the eyes, in full-face view.

Eye Length (EL): maximum length of the eye.

Mandible Length (ML): the chord length of the mandibles, excluding the basal articular condyle.

Scape Length (SL): the chord length of the antennal scapes, excluding the articular condyle and the thin stalk that connects it with the scape proper.

Weber's Length of thorax (WL): the length of mesosoma measured in profile between the anteriormost point of the pronotum, excluding the collar-shaped neck, and the metasternal angle, i. e. the postero-infero-lateral corner of thorax just behind the metasternal gland.

Additional measurements and indices used in the present paper:

Hind Femur Length (HFEL): the maximum length of hind femur.

Hind Tibia Length (HTiL): the maximum length of hind tibia.

Hind Basitarsal Length (HBaL): the maximum length of hind basitarsi.

Petiolar Length (PeL): maximum length of the petiole in profile.

Petiolar Width (PeW): maximum width of the petiole in dorsal view.

Total Length (TL): the sum of the head length + mandible length + Weber's length + petiole length + length of extended gaster excluding the sting.

Cephalic Index 1 (CI1): $HW1/HL \times 100$.

Cephalic Index 2 (CI2): $HW2/HL \times 100$.

Mandibular Index (MI): $ML/HL \times 100$.

Scape Index (SI): $SL/HL \times 100$.

DESCRIPTIONS

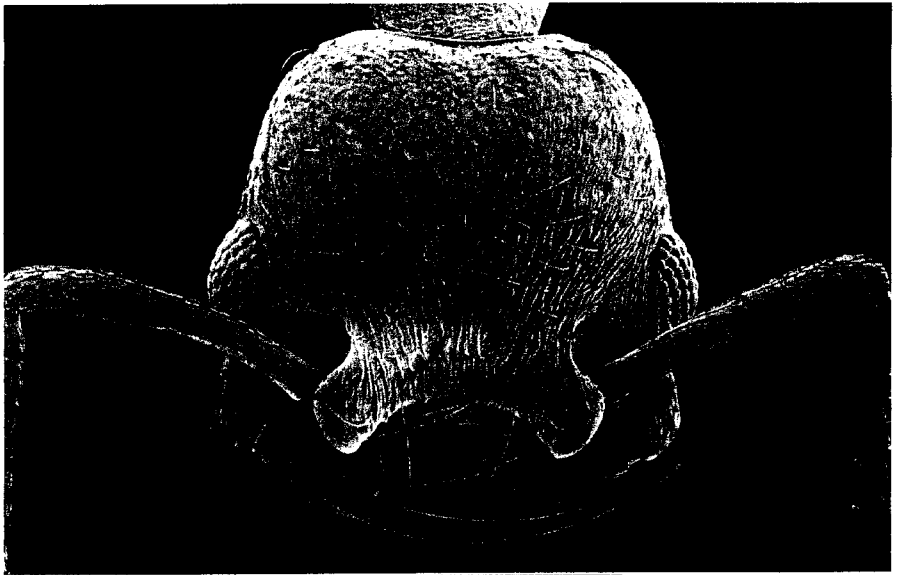
Thaumatomyrmex nageli sp. n.

(Fig. 1)

Derivatio nominis. This species is named after Prof. Dr. Peter Nagel who inspired and supported our trip to Cuba.

Diagnosis. Resembling *T. cochlearis* but differing from it, in the worker, by the broader head width behind the eyes, by the sides of the mesosoma minutely punctate-reticulate instead of largely and sparsely punctuated, by the sides of the petiole and of the gaster with dense anastomosing canaliculation and rare piligerous foveae instead of piligerous punctures denser and anastomosing canaliculation rare, and by the hairs shorter and sparser.

Worker. Head subquadrate, broader anteriorly and with the sides gently converging posteriorly. Vertex margin poorly concave medially and with a narrow carina. Frontal lobes developed, largely surpassing the median clypeal border and slightly shorter than the antero-lateral head sides. Median clypeal border anteriorly straight. Eyes large, slightly less than 1/3 of the head length (mandibles excluded) and placed almost entirely on the anterior half of the head. Scapes not reaching the vertexal margin. First funicular joint slightly longer than broad. Joints 2–7 much broader than long, joints 8–10 slightly broader than long and last joint about as long as joints 6–10. Mandibles with 3 long spiniform teeth. Basal teeth absent, only a subround swelling is present before the proximal teeth. Proximal teeth crossing each other on the clypeus. Intermediate teeth slightly hidden by the frontal lobes. Apical teeth reaching or slightly surpassing the maximum antero-lateral head width.



00028036

— 100 μ m

REM-Labor
Uni Basel



00025953

— 500 μ m

Z M B
Uni Basel

Fig. 1. *Thaumatomyrmex nageli* sp. n. Worker (paratype) from the road Viñales to Pinar del Rio, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).

Mesosoma about 1/3 longer than the maximum head length (mandibles included). Mesonotum very short and only superficially differentiated from the propodeum in dorsal view. Propodeum gently convex in profile. Area between basal and declivous propodeal faces superficially marginated laterally, with the margins diverging posteriorly. Petiole thick, 1/5 or 1/6 broader than long. Petiole in profile with convex dorsum and truncate anterior and posterior faces. Petiole in dorsal view with gently concave anterior face, with the sides subround and diverging posteriorly. Ventral process of petiole anteriorly with a round tooth and posteriorly straight and minutely crenulated. First gastral tergite in dorsal view with perpendicular anterior face and with strongly convex sides.

Legs elongate. Hind tibiae about 1/8 or 1/9 shorter than the hind femora. Hind basitarsi about 1/5 shorter than the hind tibiae. Fore and hind tibiae with a pectinate spur each. Spur of fore legs with a basal spine each. Mid tibiae with a small, simple spur.

Sculpture. Head dorsum covered with minute, dense punctures, thin, longitudinal rugosities and sparse piligerous foveae, the rugosities thinner posteriorly. Ventral face of the head smooth with very sparse, large piligerous punctures on the genae. Mesosoma minutely punctate-reticulate and with sparse piligerous foveae, these sculptures missing on the center of pronotum, of the propodeum and on the mesopleurae. Declivous face of the propodeum with thin, transversal rugosities. Anterior half of the metapleurae with additional, thin, longitudinal rugosities. Petiole with dense, very superficial anastomosing canaliculation, very sparse on the dorsum of the node. Sides of the gastral tergites with canaliculation similar to the one of the petiole, but sparser, rare on their upper part. In addition the petiole and gaster with very few piligerous foveae. Legs minutely punctate.

Pilosity. Head, mesosoma, petiole and postpetiole with sparse subdecumbent or decumbent, truncate long hairs. Antennae and legs with appressed short hairs. Funicular joints, neck and antennal fossae with very short, appressed hairs. Clypeus dorsally with two pairs of hairs close to the frontal lobes, the lower external pair longer.

Colour. Head, mesosoma, petiole and gaster black. Antennae, frontal lobes, mandibles and legs ferruginous-brown.

Measurements in mm and indices: TL 4.12–4.28; HL 0.76–0.77; HW1 0.86–0.88; HW2 0.80–0.83; EL 0.23–0.24; SL 0.59–0.61; ML 0.79–0.82; WL 1.22–1.24; PeL 0.47–0.49; PeW 0.60; HFeL 0.78–0.80; HTiL 0.68–0.70; HBaL 0.54–0.55; CI1 113.1–114.3; CI2 105.3–107.9; SI 77.6–79.2; MI 103.9–106.5.

Material examined. CUBA: El Moncada, ca. 17 km from Viñales, 12.XII.2000, leaf litter (Winkler sieving), 1 worker (holotype), C. Baroni Urbani & M. L. de Andrade [LACM]; Road between Viñales and Pinar del Rio, 11.XII.2000, leaf litter (Winkler sieving), 1 worker (paratype), C. Baroni Urbani & M. L. de Andrade [LACM].

T. nageli sp. n. belongs to the *cochlearis* group as defined by Kempf (1975). As already mentioned in the diagnosis, *T. nageli* sp. n. resembles *T. cochlearis* but the sculpture and pilosity allow easy separation of these two species.

Thaumatomyrmex cochlearis Creighton

(Fig. 2)

Diagnosis. Resembling *T. nageli* sp. n. but differing from it, in the worker, by the head width behind the eyes narrower, by the sides of the mesosoma with larger



Fig. 2. *Thaumatomyrmex cochlearis* Creighton. Worker (holotype) from Mina Carlota, Cumanayagua, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).

and sparser piligerous punctures instead of minutely punctate-reticulate, by the sides of the petiole and of the gaster with piligerous punctures denser and with anastomosing canaliculation rare instead of dense anastomosing canaliculation and rare piligerous foveae, and by the hairs longer and denser.

Worker. Head subquadrate, broader anteriorly and with the sides gently converging posteriorly. Vertex margin poorly concave medially and with a narrow carina. Frontal lobes developed, largely surpassing the median clypeal border and slightly shorter than the antero-lateral head sides. Median clypeal border anteriorly straight. Eyes large, slightly less than 1/3 of the head length (mandibles excluded) and placed almost entirely on the anterior half of the head. Scapes not reaching the vertex margin. First funicular joint slightly longer than broad. Joints 2–7 much broader than long, joints 8–10 slightly broader than long and last joint about as long as joints 6–10. Mandibles with 3 long spiniform teeth. Basal teeth absent, only a minute subround swelling is present before the proximal teeth. Proximal teeth crossing each other on the clypeus. Intermediate teeth slightly hidden by the frontal lobes. Apical teeth reaching or slightly surpassing in length the maximum antero-lateral head width.

Mesosoma slightly shorter than 1/3 of the maximum head length (mandibles included). Mesonotum very short and only superficially differentiated from the propodeum in dorsal view. Propodeum gently convex in profile. Dorsal area between the basal and declivous propodeal faces with a superficial diverging margin. Petiole thick, 1/5 broader than long. Petiole in side view with convex dorsum and truncate anterior and posterior faces. Petiole in dorsal view with gently concave anterior face, with the sides subround and diverging posteriorly. Ventral process of petiole anteriorly with a round tooth and posteriorly straight and minutely crenulated. First gastral tergite in dorsal view with perpendicular anterior face and with convex sides.

Legs elongate. Hind tibiae about 1/8 shorter than the hind femora. Hind basitarsi about 1/5 shorter than the hind tibiae. Fore and hind tibiae with a pectinate spur each. Spur of fore legs with a basal spine each. Mid tibiae with a small simple spur.

Sculpture. Anterior half of the head dorsum covered with thin, longitudinal rugosities and sparse piligerous foveae. Posterior half of the head dorsum smooth and with piligerous foveae, the foveae very superficial on the center. Ventral face of the head smooth with rare piligerous foveae. Mesosoma smooth and with piligerous foveae, the foveae smaller, sparse and more superficial on the center of the pronotum, on the anterior half of the propodeal dorsum, rare or very sparse on the mesopleurae and on the anterior half of the metapleurae. Declivous face of the propodeum with thin, transversal rugosities. Petiole smooth and with piligerous foveae smaller than on the mesosoma, the foveae very sparse on its dorsum. Gastral tergites smooth and with very sparse minute piligerous foveae. Legs minutely punctate.

Pilosity. Head, mesosoma, petiole and postpetiole with sparse subdecumbent or decumbent, truncate long hairs. Antennae and legs with appressed short hairs. Funicular joints, neck and antennal fossae with very short, appressed hairs. Clypeus dorsally with two pairs of hairs close to the frontal lobes, the lower external pair longer.

Colour. Head, mesosoma, petiole and gaster black. Antennae, frontal lobes, mandibles and legs orange-ferruginous.

Measurements in mm and indices: TL 3.86 (last gastral tergite and sternite missing) –4.20; HL 0.72–0.78; HW1 0.79–0.86; HW2 0.74–0.80; EL 0.22–0.24; SL 0.55–0.59; ML 0.73–0.80; WL 1.14–1.24;

PeL 0.46–0.50; PeW 0.58–0.63; HFeL 0.72–0.78; HTiL 0.63–0.68; HBaL 0.51–0.55; CII 107.7–111.7; C12 101.4–102.7; SI 74.3–76.7; MI 98.6–102.6.

Material examined. CUBA: Mina Carlota, Cumanayagua, 2.XI.1927, 1 worker (holotype), W. J. Clench & W. S. Creighton [LACM]; Limones Saboruco, Soledad, VII, 1 worker, Bates & Fairchild [MZSP]; Blanco's Woods, Soledad, L.V., 20. VII.1953, dry lowland deciduous forest berlesate of soil cover, 1 worker, E. O. Wilson [MCZC]; Baragua, Camaguey, 1932, 1 worker, Bates & Fairchild [MCZC]; El Mogote, Jumagua, Sagua la Grande, III.1973, 1 worker, L. Armas [MNHC].

According to Wheeler (1937) the single worker from Limones was also collected with Berlese funnel. The specimen from El Mogote differs from the other *cochlearis* specimens by the mesosoma and petiole with much sparser piligerous foveae than the other specimens of *cochlearis* examined.

Thaumatomyrmex bariay Fontenla

(Fig. 3)

Diagnosis. A *Thaumatomyrmex* species sharing with *T. mandibularis* sp. n. the long mandibles and marked body sculpture but differing from *mandibularis* sp. n. by the smaller size (TL 4.20 mm instead of > 4.87 mm), by the HW1 narrower (CII 126.3 instead of > 133.7), by the shorter mandibles (MI 131.6 instead of > 141.2) and by the shorter scapes (SI 84.2 instead of > 88.2).

Worker. Head anteriorly 1/5 broader than long and with the sides gently converging posteriorly. Vertexal margin gently concave and carinate. Frontal lobes developed, largely surpassing the median clypeal border and slightly shorter than the lateral clypeal border. Median clypeal border straight. Eyes large, about 1/3 of the head length (mandibles excluded) and placed almost entirely on the anterior half of the head. Scapes shortly surpassing the vertexal margin. First funicular joint about 1/3 longer than broad. Joints 2–7 broader than long, joints 8–10 about as long as broad and last joint about as long as joints 7–10. Basal teeth small. Proximal teeth crossing each other on the clypeus. Intermediate teeth hidden apically by the frontal lobes. Apical teeth largely surpassing the maximum anterior head width and the eyes.

Mesosoma slightly longer than the maximum head length (mandibles included). Mesonotum very short and only superficially differentiated from the propodeum in dorsal view. Propodeum convex in profile. Dorsal area between the basal and declivous propodeal faces with traces of a superficial diverging margin. Petiole thick, 1/4 broader than long. Petiole in side view with convex dorsum and truncate anterior and posterior faces. Petiole in dorsal view with gently concave anterior face, the sides diverging on the anterior fourth and convex on the remaining sides. Ventral process of petiole anteriorly with a subround tooth and posteriorly straight and minutely crenulated. First gastral tergite in dorsal view with perpendicular anterior face and with convex sides.

Legs elongate. Hind tibiae about 1/8 shorter than the hind femora. Hind basitarsi about 1/7 shorter than the hind tibiae. Fore and hind tibiae with a pectinate spur each. Spurs of fore legs with a basal spine each. Mid tibiae with a small simple spur.

Sculpture. Head dorsum covered with very thin, longitudinal rugosities and minute, superficial piligerous punctures. Ventral face of the head smooth with very sparse, piligerous punctures on the genae. Mesosoma with small, piligerous foveae, sparser on the center of the pronotum and on the anterior half of the propodeal dorsum, smaller and more superficial on some parts of the pleurae. Declivous

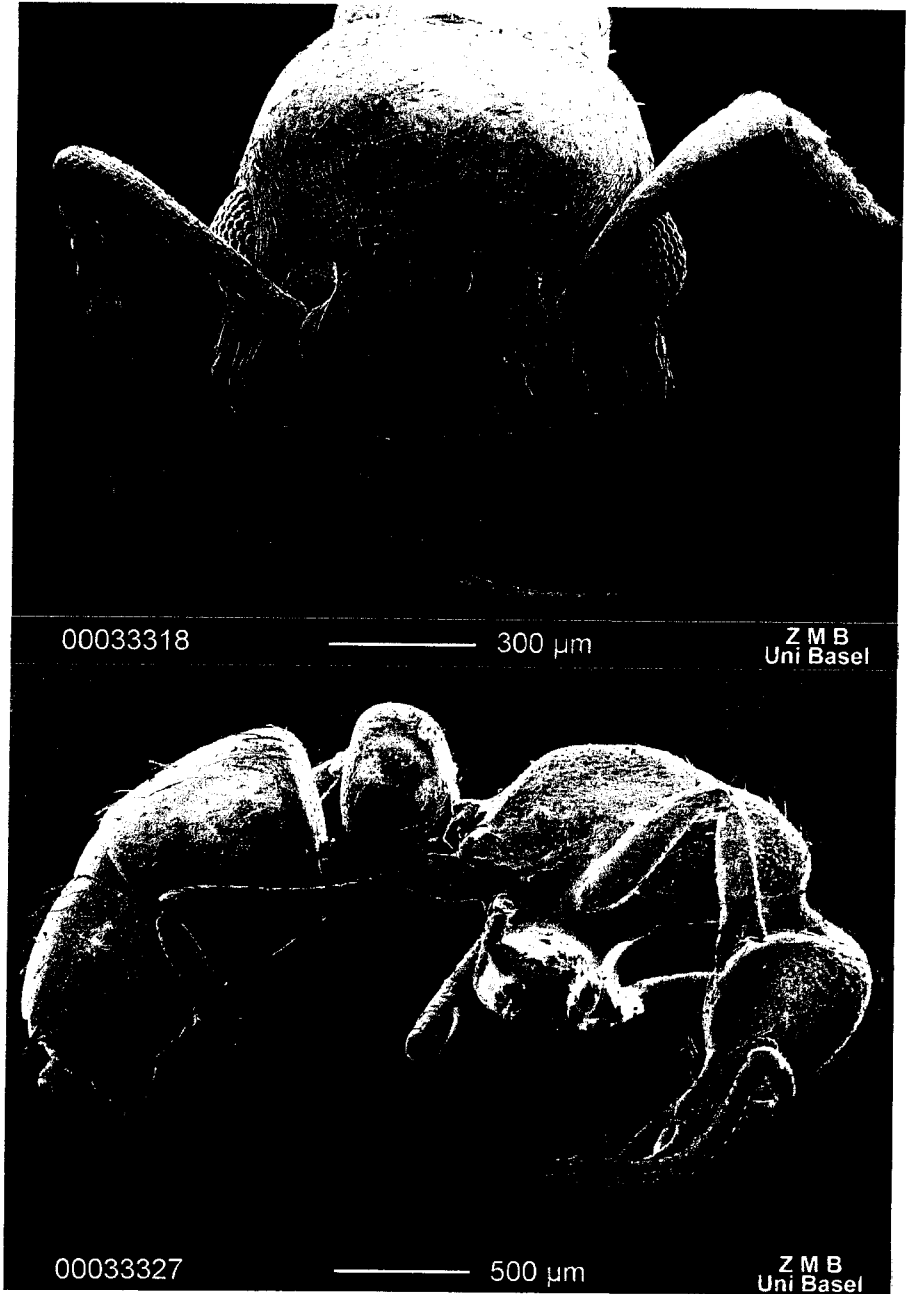


Fig. 3. *Thaumatomyrmex bariay* Fontenla. Worker (holotype) from 6 km NE Siboney, Santiago Province, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).

propodeal face with faint transversal rugosities. Anterior face, sides and dorsum of the petiole with sparse and minute piligerous punctures. Posterior face of the petiole with small piligerous punctures. Gastral tergites with sparse anastomosing canaliculation and piligerous foveae, the canaliculation denser on their sides. Legs minutely punctate.

Pilosity. Head, mesosoma, petiole and postpetiole with sparse subdecumbent or decumbent, truncate long hairs. Antennae and legs with appressed short hairs. Funicular joints, neck and antennal fossae with very short, appressed hairs. Clypeus dorsally with two pairs of hairs close to the frontal lobes, the lower external pair longer.

Colour. Head, mesosoma, petiole and gaster black. Antennae, frontal lobes, mandibles and legs orange-ferruginous.

Measurements in mm and indices: TL 4.20; HL 0.76; HW1 0.96; HW2 0.88; EL 0.24; SL 0.64; ML 1.00; WL 1.16; PeL 0.45; PeW 0.60; HFeL 0.80; HTiL 0.70; HBaL 0.61; CI 1 126.3; CI2 115.8; SI 84.2; MI 131.6.

Material examined. CUBA: Yaguajay Abajo, Banes, Holguín Province, 11. IV.1984, 1 worker (holotype), L. F. Armas [IESC].

Fontenla (1995) attributed *T. bariay* to the *T. cochlearis* group of Kempf (1975). According to this author, *bariay* differs from *cochlearis* by the smaller size and longer scapes and legs. The examination of five specimens of *cochlearis* and the holotype of *bariay* shows that among these three characters the length of the scapes is the safest one to separate the two species. Tab. 1 summarizes the biometric differences between *T. bariay* and *T. cochlearis*.

Besides the differences above, the sole specimen of *T. bariay* differs from *T. cochlearis* also by the presence of a pair of basal mandibular teeth and by the sculpture, more impressed. Among the *Thaumatomyrmex* material examined, the basal teeth of the mandibles appear to be variable in size and we do not attribute much taxonomic value to this character.

We consider *T. bariay* to be closer to the new species to be described in this paper as *T. mandibularis* sp. n. (see discussion under the latter). According to Fontenla (1995) *T. bariay* was collected in "hojarasca de bosque semideciduo".

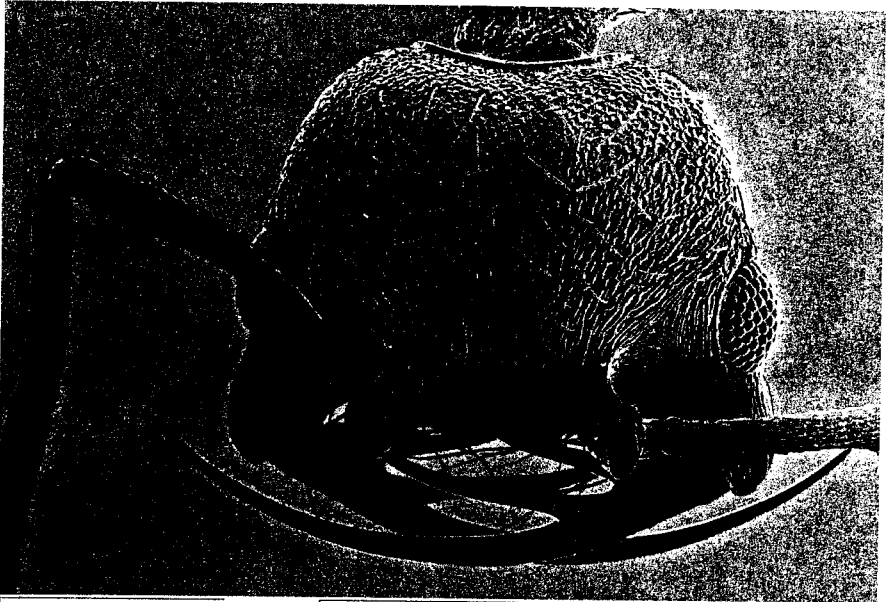
Thaumatomyrmex mandibularis sp. n.

(Figs 4 & 5)

Derivatio nominis. This species is named for its long mandibles, the longest ones among Cuban *Thaumatomyrmex* so far.

Diagnosis. A *Thaumatomyrmex* species sharing with *T. bariay* the long mandibles and the marked body sculpture but differing from *bariay* by its larger size (TL > 4.87 mm instead of 4.20 mm), by the larger HW1 (CI1 > 133.7 instead of 126.3), by the longer mandibles (MI > 141.2 instead of 131.6), and by the longer scapes (SI > 88.2 instead of 84.2).

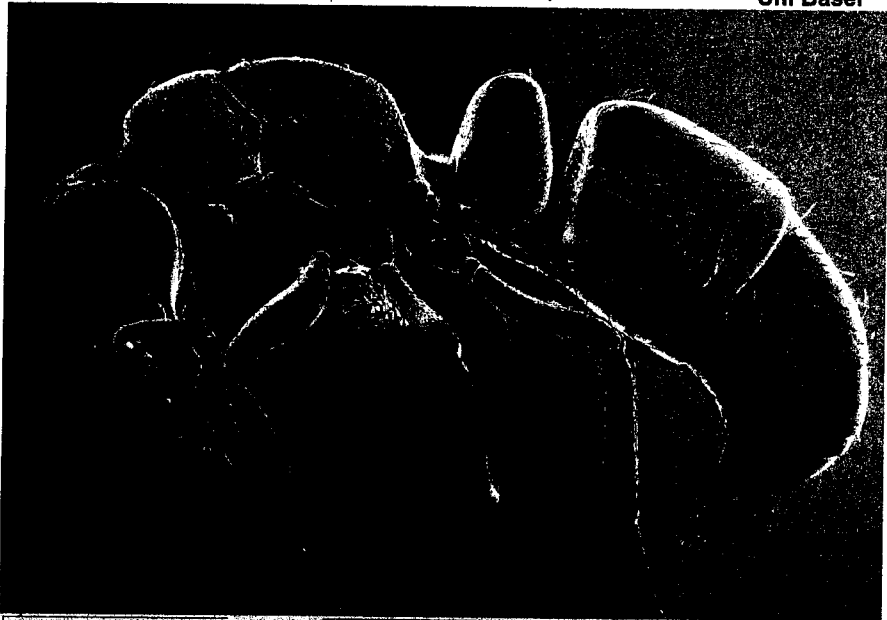
Worker. Head anteriorly 1/4 broader than long and with the sides gently converging posteriorly. Vertexal margin weakly concave and carinate. Frontal lobes developed, largely surpassing the median clypeal border and slightly shorter than the lateral clypeal border. Median clypeal border straight. Eyes large, slightly less than 1/3 or more than 1/4 of the head length (mandibles excluded) and placed almost



00028040

— 300 μ m

REM-Labor
Uni Basel



00028041

— 500 μ m

REM-Labor
Uni Basel

Fig. 4. *Thaumatomyrmex mandibularis* sp. n. Worker (paratype) from Gran Piedra, Santiago Province, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).

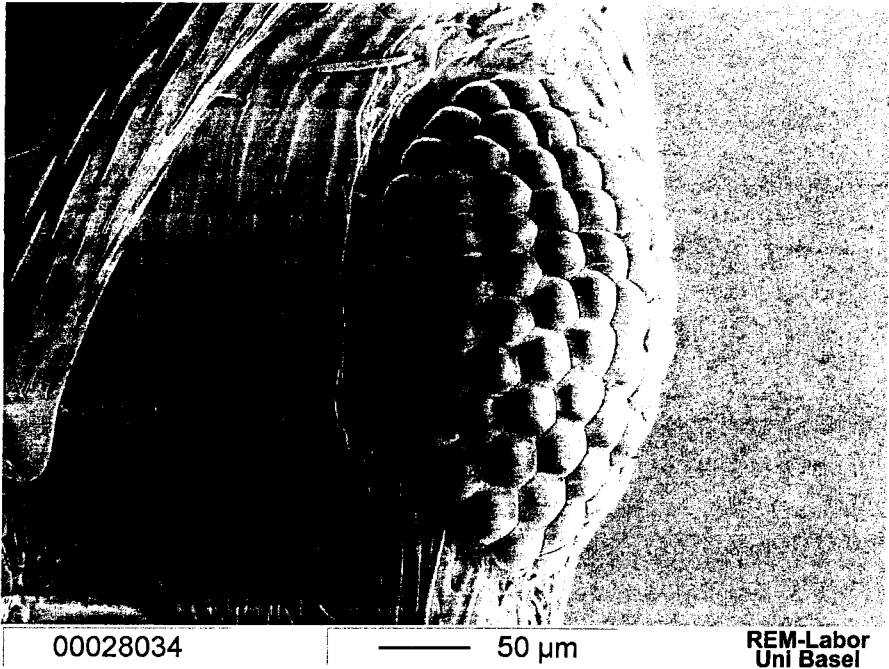


Fig. 5. *Thaumatomyrmex mandibularis* sp. n. Worker from 6 km NE Siboney, Santiago Province, Cuba: left eye showing also interommatidial pilosity.

entirely on the anterior half of the head. Scapes shortly surpassing the vertexal margin. First funicular joint about $1/3$ longer than broad. Joints 2–7 slightly broader than long, joints 8–10 slightly longer than broad and last joint slightly longer than the sum of joints 8–10. Basal teeth small or transformed in a minute swelling. Proximal teeth crossing each other on the clypeus. Intermediate teeth hidden apically by the frontal lobes. Apical teeth largely surpassing the maximum anterior head width and the eyes.

Mesosoma about $1/5$ or $1/6$ longer than the maximum head length (mandibles included). Mesonotum very short and only superficially differentiated from the propodeum in dorsal view. Propodeum gently convex in side view. Dorsal area between basal and declivous propodeal faces with traces of a superficial diverging margin. Petiole thick, about $1/4$ broader than long. Petiole in side view with convex dorsum and truncate anterior and posterior faces. Petiole in dorsal view with gently concave anterior face and convex or diverging sides. Ventral process of petiole anteriorly with a subround tooth and posteriorly straight and minutely crenulated. First gastral tergite in dorsal view with perpendicular anterior face and with strongly convex sides.

Legs elongate. Hind tibiae about $1/7$ or $1/8$ shorter than the hind femora. Hind basitarsi about $1/6$ shorter than the hind tibiae. Fore and hind tibiae with a pectinate spur each. Spurs of fore legs with a basal spine each. Mid tibiae with a small simple spur.

Sculpture. Anterior two thirds of the head dorsum covered with thin, longitudinal rugosities and sparse piligerous punctures, the rugosities slightly divergent and resembling irregular reticulation behind the frontal lobes and posterior border of the eyes. Posterior third of the head dorsum covered by variably impressed small reticulation, sometimes the reticulation sparse and resembling piligerous punctures mixed with very thin, sparse rugosities. Ventral face of the head smooth with very sparse, piligerous punctures on the genae. Mesosoma with dense, minute reticulation and piligerous foveae, the foveae sparse on the metapleurae and declivous face of the propodeum, rare on the mesopleurae. Center of the propodeum with very thin, short, transversal rugosities. Metapleurae with additional very thin, longitudinal rugosities. Declivous face of the propodeum with thin, transversal rugosities. Anterior half of the propleurae with additional, thin, longitudinal rugosities. Petiole with sparser and smaller piligerous punctures than on the mesosoma. Gastral tergites with anastomosing canaliculation and with very sparse piligerous foveae, the canaliculation denser on their sides. Legs minutely punctate.

Pilosity. Head, mesosoma, petiole and postpetiole with sparse subdecumbent or decumbent, truncate long hairs. Antennae and legs with appressed short hairs. Funicular joints, neck and antennal fossae with very short, appressed hairs. Clypeus dorsally with two pairs of hairs close to the frontal lobes, the lower external pair longer.

Colour. Head, mesosoma, petiole and gaster black. Femora dark brown-black. Antennae, frontal lobes, mandibles and legs brown.

Measurements in mm and indices: TL 4.87–5.47; HL 0.85–0.95; HW1 1.14–1.30; HW2 1.03–1.15; EL 0.24–0.28; SL 0.75–0.87; ML 1.20–1.36; WL 1.36–1.48; PeL 0.51–0.55; PeW 0.64–0.73; HFeL 0.92–1.04; HTiL 0.81–0.92; HBaL 0.70–0.77; CI1 133.7–136.8; CI2 120.0–122.8; SI 88.2–91.6; MI 141.2–143.5.

Material examined. CUBA: Santiago Prov., Gran Piedra, Met. Radar, 6.XII.1995, 1100 m elfin, for. litter, 2 workers (holotype and paratype), 95-75 S. Peck [MCZC]; Santiago Prov., Gran Piedra, Isabelica, 14.XII.1995, 1100 m elfin, for. litter, 2 workers, 95-95, S. Peck [MCZC]; Santiago Prov., 6 km NE Siboney, Rio Juragua, 150 m, 16.XII.1995, log & leaf litter, 1 worker, 95-96, S. Peck [MCZC]; Santiago Prov., 10 km NE Caney, Arroyo Grovert, 300 m, 9-12.XII.1995, leaf and log litter, 1 worker, 95-93, S. Peck [MCZC].

T. mandibularis sp. n. appears to be the sister species of *bariay*. Both, *bariay* and *mandibularis* sp. n. appear to be members of the *cochlearis* group as defined by Kempf (1975). This group previously containing only one species, *cochlearis*, possesses the following combination of characters: frons and vertex with posteriorly diverging rugulae and punctures, gular surface smooth and shining, thorax and petiole with punctures, mesonotum and propodeum continuous, without transversal notch, angle between basal and declivous propodeal faces obtuse, petiole cubiform, disc of clypeus without close-set setae. *T. bariay*, *T. mandibularis* sp. n., *T. nageli* sp. n., and *T. cochlearis* share all these characters. *T. mandibularis* sp. n. and *bariay* differ from *cochlearis* and *nageli* sp. n. by the longer mandibles and scapes. From Tab. 2 one can notice that the indices of *bariay* approach more to those of *mandibularis* sp. n. than to the indices of *nageli* sp. n. and *cochlearis*.

T. mandibularis sp. n. and *T. bariay* share with the members of the *ferox* group and with the subgroup 2 as defined by Kempf (1975) the head much broader than long and the mandibles at rest largely surpassing the genae laterally. *T. mandibularis* sp. n. and *T. bariay* differ from the species of this subgroup 2 mainly by the head and mesosoma strongly sculptured instead of smooth and by the obtuse angle between the basal- and declivous propodeal faces.

KEY TO THE *THAUMATOMYRMEX* WORKERS OF CUBA

1. Mandibles at rest surpassing laterally the genae and the eyes (Figs 3 & 4). Mandibular length (ML) > 1.00 mm. Hind femora (HFe) at least 1/5 shorter than length of the mandibles2
 - Mandibles at rest surpassing at most the genae but never the eyes (Figs 1 & 2). Mandibular length (ML) < 0.82. Hind femora (HFe) subequal in length to the mandibles.....3

2. Head very broad anteriorly (HW1 > 1.14) (Fig. 4). Scape length (SL) > 0.75. Total length > 4.87 mm.....*mandibularis* sp. n.
 - Head narrower anteriorly (HW1 < 0.96) (Fig. 3). Scape length (SL) < 0.64. Total length = 4.20 mm.....*bariay*

3. Sides of the mesosoma minutely punctate-reticulate. Sides of the petiole and of the gaster with dense anastomosing canaliculation and rare piligerous foveae. Hairs short and sparse (Fig. 1). CI2 > 105.....*nageli* sp. n.
 - Sides of the mesosoma with large and sparse piligerous punctures. Sides of the petiole and of the gaster with dense piligerous punctures and rare anastomosing canaliculation. Hairs long and dense. (Fig. 2). CI2 < 103.....*cochlearis*

Tab. 1. Summary of biometric overlap and differences between *T. bariay* and *cochlearis*.

	<i>T. bariay</i>	<i>T. cochlearis</i>
TL	4.20	3.86-4.20
HFeL	0.80	0.72-0.78
HTiL	0.70	0.63-0.68
HBaL	0.61	0.51-0.55
SL	0.64	0.55-0.59
ML	1.00	0.73-0.80
HL	0.76	0.72-0.78
HW1	0.96	0.79-0.86
HW2	0.88	0.74-0.80

Tab. 2. Some indices useful to differentiate the Cuban *Thaumatomyrmex*.

	<i>T. nageli</i>	<i>T. cochlearis</i>	<i>T. bariay</i>	<i>T. mandibularis</i>
CI1	113.1-114.3	107.7-111.7	126.3	133.7-136.8
CI2	105.3-107.9	101.4-102.7	115.8	120.0-122.8
MI	103.9-106.5	98.6-102.6	131.6	141.2-143.5
SI	77.6-79.2	74.3-76.7	84.2	88.2-91.6

CONCLUDING REMARKS

The genus *Thaumatomyrmex* is frequently cited by myrmecologists as rare. It is represented by less than one hundred specimens in the Museum collections (Brandão et. al., 1991). Delabie et. al. (2000) attributed the rarity of *Thaumatomyrmex* to inadequate sampling methods. They showed that in southeast Bahia, Brazil the Winkler sack is an efficient method to collect litter ants and allows a better collection of *Thaumatomyrmex* and other cryptic species.

Thaumatomyrmex's apparent strong preference for litter or underground living, however, sharply contrasts with one of its salient morphological traits: the large, protruding eyes (see e. g. Fig. 5). One might expect that, in such cryptic surroundings, there should be little light and few objects to watch from far distance.

These considerations pose another problem: Do the four Cuban *Thaumatomyrmex* species represent a case of explosive insular speciation? The genus, in Cuba, has a density of ca. one species per 27 km². In the remaining 20.3 million km² of the Neotropical region this density falls to roughly one species per 2.5 million km² (Kempf's 1975 classification) or to one species per 3.8 million km² (Longino's 1998 classification). These figures need no statistical treatment to convince about the difference between the Cuban and the remaining Neotropical fauna. To be reliable, however, the figures should be drawn from comparable samplings, a fact far from being demonstrated.

ACKNOWLEDGEMENTS

We would like to express our warmest thanks to all persons who helped us during our trip to Cuba and to the curators listed in the material and methods chapter for sending material in study. Lindomar del Castillo Suarez (researcher from the Institute of Systematic and Ecology of La Havana) and Dr. Sophia B. Twichell (from the Trillium Group, Inc.) kindly helped us by carrying and sending important specimens from Cuban Institutions. Marcel Düggelin and Daniel Mathys of the Laboratory of Scanning Electron Microscopy of the Basel University helped competently with all SEM photographs. An anonymous referee improved a first draft of this paper with several useful comments.

REFERENCES

- Bolton, B. 1995. A new general catalogue of ants of the world. — Harvard University press, Cambridge, Massachusetts, 504 pp.
- Brandão, C.R.F., Diniz, J.L.M. & Tomotake, E.M. 1991. *Thaumatomyrmex* strips millipedes for prey, a novel predatory behaviour in ants and the first case of sympatry in the genus. — *Ins. soc.* 38: 335–344.
- Creighton, W.S. 1928. A new species of *Thaumatomyrmex* from Cuba. — *Psyche* 35: 162–166.
- Delabie, J.H.C., Fresneau, D. & Pezon, A. 2000. Notes on the ecology of *Thaumatomyrmex* spp. (Hymenoptera: Formicidae: Ponerinae) in Southeast Bahia, Brazil. — *Sociobiology* 36: 571–584.
- Diniz, J.L.M. & Brandão, C.R.F. 1989. Feeding behavior of *Thaumatomyrmex*. — *Notes from Underground* 2: 13.
- Fontenla, J.L. 1995. Nueva especie de *Thaumatomyrmex* Mayr (Hymenoptera: Formicidae) de Cuba. — *AvaCient* 13: 20–23.
- Kempf, W.W. 1954. A descoberta do primeiro macho do gênero *Thaumatomyrmex* Mayr. — *Rev. bras. Ent.* 1: 47–52.
- Kempf, W.W. 1975. A revision of the Neotropical ponerine ant genus *Thaumatomyrmex* Mayr (Hymenoptera: Formicidae). — *Studia ent.* 18: 95–126.
- Longino, J.T. 1988. Notes on the taxonomy of the neotropical ant genus *Thaumatomyrmex* Mayr (Hymenoptera: Formicidae). — In: Trager, J.C. (ed.), *Advances in Myrmecology*, pp. 35–42, E. J. Brill and W. S. Heinman Co., New York.
- Longino, J.T. 1999. The genus *Thaumatomyrmex* in Costa Rica. — 2 pp. http://www.evergreen.edu/user/serv_res/research/genera/Thaumatomyrmex/specieslist.html. World Wide Web document.
- Wheeler, W.M. 1937. Ants mostly from the mountains of Cuba. — *Bull. Mus. Comp. Zool.* 81: 441–465.

(received July 27, 2003; accepted October 13, 2003)

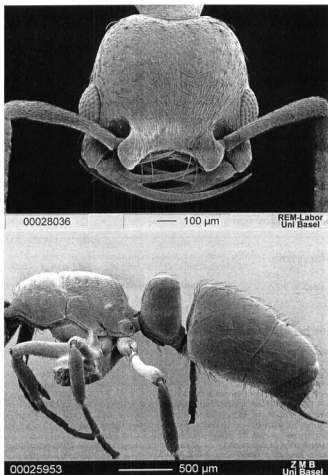


Fig. 1. *Thaumatomyrmex nageli* sp. n. Worker (paratype) from the road Viñales to Pinar del Rio, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).

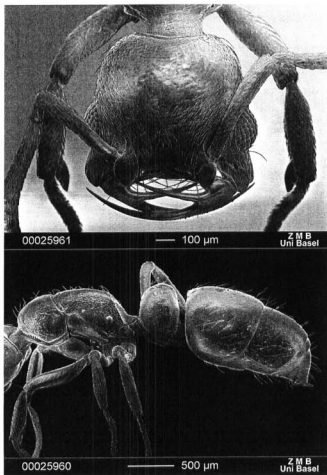


Fig. 2. *Thaumatomyrmex cochlearis* Creighton. Worker (holotype) from Mina Carlota, Cumanayagua, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).

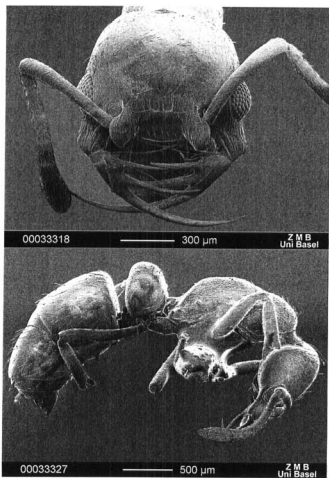
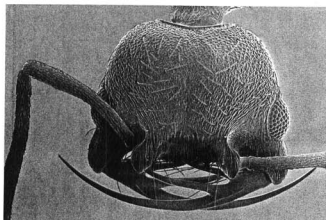
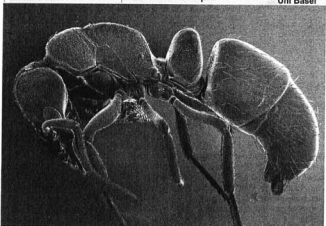


Fig. 3. *Thaumatomyrmex bariszi* Fontenla. Worker (holotype) from 6 km NE Siboney, Santiago Province, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).



00028040

— 300 μ mREM-Labor
Uni Basel

00028041

— 500 μ mREM-Labor
Uni Basel

Fig. 4. *Thaumatomyrmex mandibularis* sp. n. Worker (paratype) from Gran Piedra, Santiago Province, Cuba: head in dorsal view (top) and mesosoma in profile (bottom).

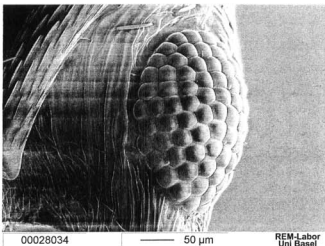


Fig. 5. *Thaumatomyrmex mandibularis* sp. n. Worker from 6 km NE Siboney, Santiago Province, Cuba: left eye showing also interommatidial pilosity.

entirely on the anterior half of the head. Scapes shortly surpassing the vertexal margin. First funicular joint about $1/3$ longer than broad. Joints 2–7 slightly broader than long, joints 8–10 slightly longer than broad and last joint slightly longer than the sum of joints 8–10. Basal teeth small or transformed in a minute swelling. Proximal teeth crossing each other on the clypeus. Intermediate teeth hidden apically by the frontal lobes. Apical teeth largely surpassing the maximum anterior head width and the eyes.

Mesosoma about $1/5$ or $1/6$ longer than the maximum head length (mandibles included). Mesonotum very short and only superficially differentiated from the propodeum in dorsal view. Propodeum gently convex in side view. Dorsal area between basal and declivous propodeal faces with traces of a superficial diverging margin. Petiole thick, about $1/4$ broader than long. Petiole in side view with convex dorsum and truncate anterior and posterior faces. Petiole in dorsal view with gently concave anterior face and convex or diverging sides. Ventral process of petiole anteriorly with a subround tooth and posteriorly straight and minutely crenulated. First gastral tergite in dorsal view with perpendicular anterior face and with strongly convex sides.

Legs elongate. Hind tibiae about $1/7$ or $1/8$ shorter than the hind femora. Hind basitarsi about $1/6$ shorter than the hind tibiae. Fore and hind tibiae with a pectinate spur each. Spurs of fore legs with a basal spine each. Mid tibiae with a small simple spur.