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Descriptions of the male and queen of the north Andean ant *Pheidole unicornis* Wilson, 2003 (Hymenoptera: Formicidae)

Abstract: The winged reproductives of the north Andean ant *Pheidole unicornis* Wilson, 2003 are described for the first time.

Key words: Ecuador, ants, *Pheidole unicornis*, male, queen, description.

Riassunto - Descrizione del maschio e della regina della specie di formica delle Ande settentrionali *Pheidole unicornis* Wilson, 2003 (Hymenoptera: Formicidae).

Vengono descritti per la prima volta i riproduttori alati della specie di formica delle Ande settentrionali *Pheidole unicornis* Wilson, 2003.

Parole chiave: Ecuador, formiche, *Pheidole unicornis*, maschio, regina, descrizione.

Introduction

In his monumental revision of the New World species of the genus *Pheidole* Westwood, 1839 Wilson (2003) described *Pheidole unicornis* on the basis of worker and soldier castes collected from three localities of Colombia and Ecuador and assigned his new species to the large *tristis*-group. Wilson (l.c.) designated as holotype a soldier collected in Salidido, near Cali (Colombia), and mentioned two further type localities: Pichindé (near Cali as well) and Cochancay (along Guayaquil-Tambo highway, Cañar, Ecuador). *Pheidole unicornis* lives at 1600-2100 m a.s.l. in mountain rainforests and it is chiefly characterized by the lobe-like median clypeal carina of the soldier.

In summer 2006, during a scientific expedition to Ecuador of the WBA (World Biodiversity Association, an Italian no-profit association) in collaboration with Prof. Giovanni Onore (Fundación Otonga and Pontificia Universidad Católica del Ecuador - Museo de Zoología), I collected several specimens from a large, polygynous colony of *Pheidole unicornis* in Otonga forest (Cotopaxi province). The nest, located in the ground at the base of a banana tree, contained all sexes and castes. As male and queen of this species are still unknown, they are described in this paper.

Material and Methods

The specimens are stored in alcohol (10 workers, 7 soldiers, 8 wingless queens, 16 males, 1 worker pupa), or dry mounted (2 wingless and 1 winged queens, 2 males, 10 workers, 7 soldiers,). Their locality data are: Ecuador, Cotopaxi, Otonga, m 2065, 00° 25' 01.2" S 79° 00' 14.0" W, 21.VII.2006 leg. Scupola A (nest code: ECU06-202D). The material is deposited in the collections of the Museo di Storia Naturale di Milano (MSNM, Italy), in the J.T. Longino's (Evergreen College, USA) and in the author's collections.

Measurements, in millimetres, were taken by means of an ocular grid, mounted on a Leica-Wild MB3 stereomicroscope, at 60X magnification. The results are reported in brackets as minimum and maximum value.

Three queens and three males have been sorted out for measurements, including the largest and smallest available specimens.

The following standard measurements and indices have been taken:

CL = cephalic length (the maximum length of the head in full face view excluding the mandibles, measured from the most prominent point of the anterior clypeal margin to a line drawn across the most prominent portions of the cephalic posterior margin);

CW = cephalic width (the maximum width of the head in full face view excluding the eyes);

CW2 = cephalic width (the maximum width of the head in full face view including the eyes measured only in the male);

MH = mesosoma height (the maximum height of the mesosoma in lateral view measured as in Fig. 1);

ML = mesosoma length (the maximum diagonal length of the mesosoma in lateral view, measured as in Fig. 1);

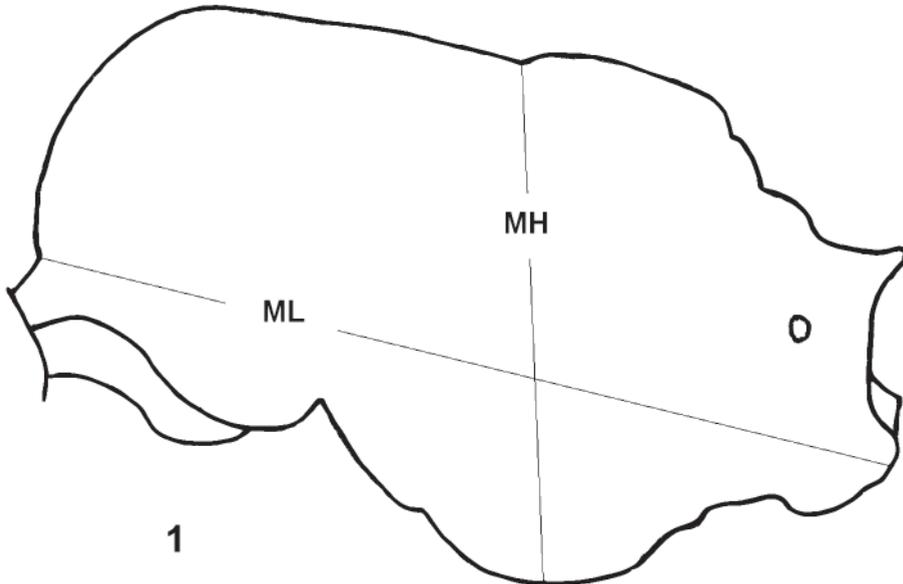


Fig. 1 - Measurements of mesosoma in lateral view.

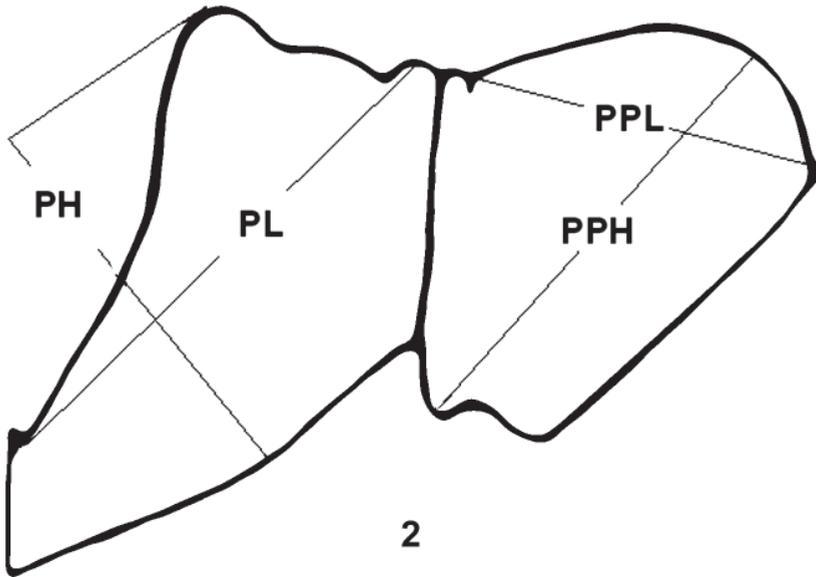


Fig. 2 - Measurements of petiole and postpetiole in lateral view.

MW = mesonotum width (maximum width of the mesonotum in dorsal view, measured on scutum in front of the tegulae);

OL = ocular length (the maximum diameter of a compound eye);

PH = petiolar height (the maximum height of the petiole in lateral view, see Fig. 2);

PL = petiole length (the maximum length of the the petiole in lateral view, see Fig. 2);

PW = petiolar width (the maximum width of the petiole in dorsal view);

PPH = postpetiolar height (the maximum height of the postpetiole in lateral view, see Fig. 2);

PPL = postpetiolar length (the maximum length of the postpetiole in lateral view, see Fig. 2);

PPW = postpetiolar width (the maximum width of the postpetiole in dorsal view, see Fig. 2);

SL = scape length (maximum length of the scape excluding the basal condylar neck and bulb).

Indices

CI = cephalic index: $(CW \times 100 / CL)$;

OI = ocular index: $(OL \times 100 / CW)$;

SI = scape index: $(SL \times 100 / CL)$;

SI2 = scape index (male): $(SL \times 100 / CW^2)$;

PI = petiolar index: $(PH \times 100 / PL)$;

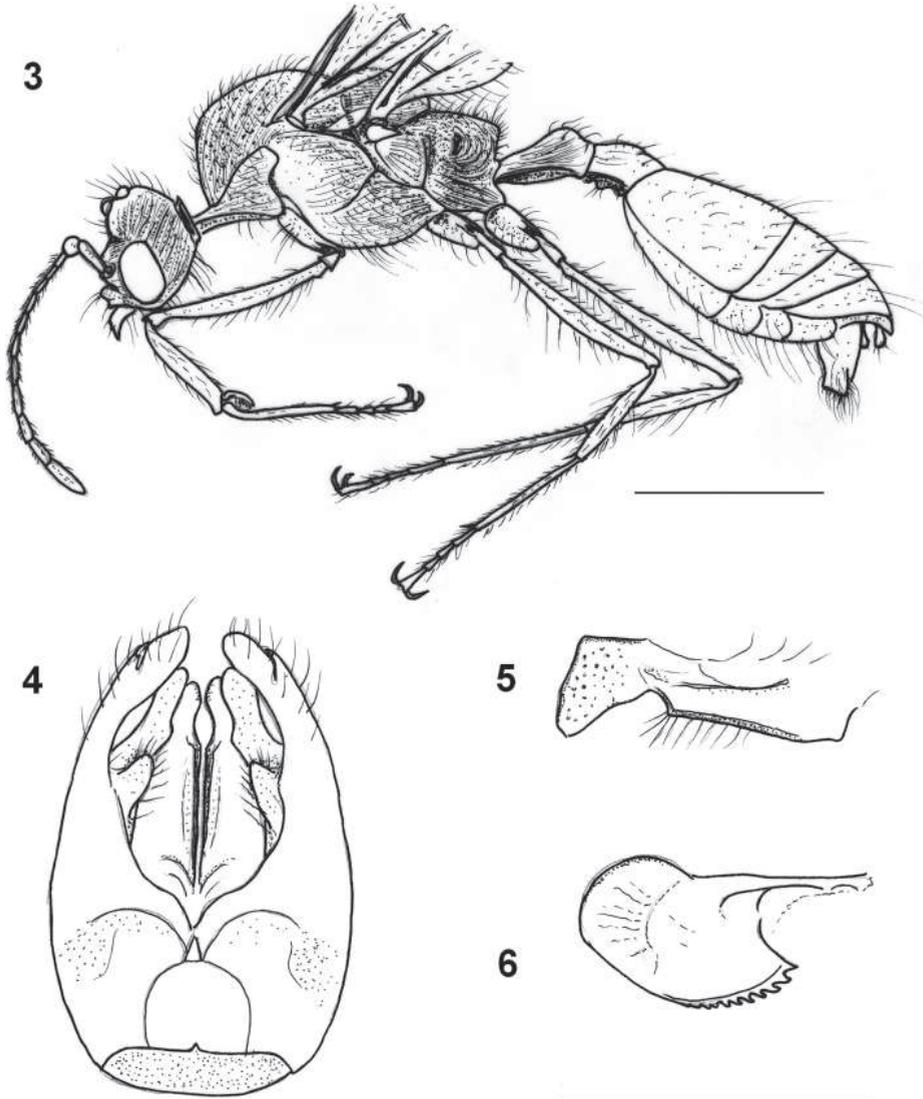
PPI = postpetiolar index: $(PPH \times 100 / PPL)$;

PPI2 = postpetiolar dorsal index $(PPW \times 100 / PPL)$.

Pheidole unicornis Wilson, 2003**Male**

Measurements (n = 3)

CL: (0.59-0.61); CW: (0.51-0.59); CW2: (0.66-0.72); CI: (86-100); CI2: (97-112); SL: (0.21); SI: (34-36); SI2: (29-32); OL: (0.27-0.29); OI: (49-54); ML: (1.52-1.55); MH: (0.85-0.88); MW: (1.02-1.10); PL: (0.41-0.43); PH: (0.27-0.29); PPL: (0.21); PPH: (0.24-0.26); PPI: (114-124).



Figs. 3-6 - *Pheidole unicornis*, male. 3) profile; 4) aedeagus (ventral view); 5) digitus (profile); 6) sagitta (profile). Scale bar: 0.5 mm (Figs. 4-6) and 1mm (Fig. 3).

♂ (Figs. 3, 4, 5, 6). Total length 4.2-4.3 mm. Head small, rounded posteriorly in full face view. Vertex gibbous with well developed ocelli. Mandibles 5- or 6-toothed. Head finely longitudinally rugulose and with a silky glimmer. A median longitudinal strong ruga present on the frons, reaching the median ocellus. Compound eyes large, convex and protruding. Clypeus gibbous, transversally incised basally; and with fine transverse rugulae. Scape as long as the flagellar segments I + II. Pedicel globose. The remaining funicular joints thin. The last four joints gradually increasing in length.

Mesosoma with strongly convex scutum and scutellum. Notauli well marked. Scutum medially with a dense longitudinal rugulation, antero-medially unsculptured. Scutellum transversally rugulose, laterally finely longitudinally rugulose. Anepisternum anteriorly smooth, finely rugulose posteriorly; katepisternum finely rugulose. Propodeum angular in profile, but unarmed. Propodeal sides mostly rugulose; the rugulae encircling the spiracle. Legs long and thin, with elongate procoxae. Wing venation as in the queen.

Petiole, postpetiole and gaster smooth. Penicilli well developed. Aedeagus (Fig. 4) with large digitus (Fig. 5); sagitta rounded apically and with upper border serrated, bearing twelve denticles (Fig. 6).

Body with abundant long and flexuous standing setae, especially on ventral head surface, mesosternum, posterior gastral sternites, flexor surface of femora and posterior surface of meso- and metatibiae. Shorter setae occur on scutum, petiole and postpetiole, tibiae, tarsi and gastral tergites.

Head, scutum and scutellum dark brown, the remaining parts of the body dark testaceous. Scutum with a silky glitter. Legs testaceous with yellow tarsi. Penicilli and aedeagus yellow. Wings fuscous with brown veins and pterostigma.

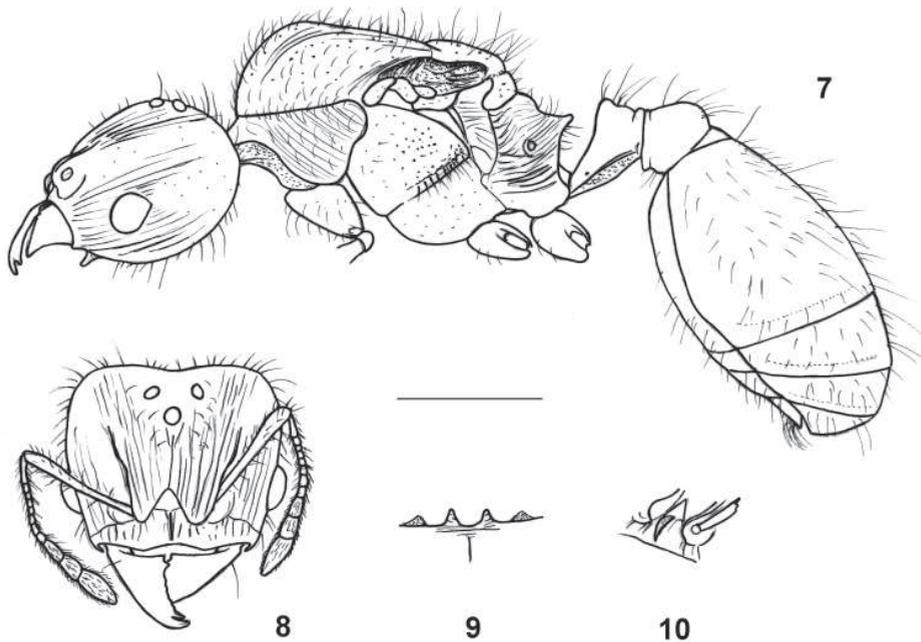
Queen

Measurements. (n = 3)

CL: (1.22-1.23); CW: (1.31-1.34); CI: (107-109); SL: (0.75-0.76); SI: (60-63); OL: (0.29-0.32); OI: (22-24); ML: (2.13-2.18); MH: (1.26-1.30); MW: (1.34-1.38); PL: (0.70-0.77); PH: (0.50-0.51); PW: (0.40-0.43); PI: (66-71); PPL: (0.38-0.42); PPH: (0.48-0.50); PPW: (0.64-0.67); PPI: (114-132); PPI2: (159-168).

♀ (Figs. 7, 8, 9, 10). Total length 6.3-6.4 mm. Head cordiform in full face view (Fig. 8), with anteriorly convergent sides and weakly concave posterior margin. Eyes located in front of the midlength of the head sides. Frontal carinae reaching the level of the posterior margins of the eyes. Clypeus with a strongly protruding, lobiform median carina (Fig. 10). Anterior clypeal margin sinuous, shallowly and widely notched in the middle. Hypostoma with two strong and protruding paramedian teeth and a pair of lateral teeth located on the inner margin (Fig. 9). Cephalic surface strongly longitudinally rugose, except the smooth sides, behind the level of the eyes, and the vertex. Scape short, not reaching the posterior margin of the head when laid back. Antennal pedicel longer than I+II+III funicular joints. Antennal club 3-jointed, elongate.

Mesosomal dorsum depressed. Pronotum transversely rugose; a small humeral gibbosity is present near the promesonotal suture. Scutum in dorsal view broad and mostly longitudinally rugose; its mid-anterior portion and the parapsides are smooth and shiny, the latter with sparse puncturation. Axilla with longitudinal



Figs. 7-10 - *Pheidole unicornis*, queen. 7) profile; head, 8) full face view; 9) hypostoma, ventral view; 10) clypeus, dorso-lateral view. Scale bar: 1mm.

rugae; scutellum smooth. Anepisternum smooth and shiny, but punctate in the middle; katepisternum smooth and shiny. Propodeal sides longitudinally rugose. Propodeal teeth short and strong.

Petiole pedunculate, in profile with a triangular node, whose posterior face is weakly concave. Anterior face of the petiolar node weakly longitudinally rugulose; posterior face transversely rugulose; dorsum smooth. Petiolar sternite finely rugulose. Postpetiole in dorsal view trapezoidal with rounded sides. Postpetiolar sternite with a small protruding lobe. Gaster smooth.

Very long erect setae occur on the cephalic ventral surface, scutellum, dorsal surface of petiole and postpetiole, and are sparse on the gaster. Much shorter subdecumbent setae mostly abundant on the posterior margin of the head and on the scutum. A row of ordinary suberect setae is present near the base of anepisternum along the suture with the katepisternum.

Colour dark brown; legs, coxae, antennal funiculi and the space between the propodeal teeth testaceous. Wings fuscous with typical pheidoline venation (Bolton, 1982); veins and pterostigma brown.

Discussion

About 650 species of *Pheidole* occur in the New World (Wilson, 2003; Longino, 2009), but all castes and sexes are known from 53 species only; queens are known in 122 species and males in 62 species only.

Males have been mostly briefly described, and a serious morphological analysis of this sex is still lacking. The knowledge of the reproductives would be useful in order to better define species-groups as well as to understand the limits of closely related species/populations.

Pheidole unicornis belongs to the large *tristis*-group, as defined by Wilson (2003), containing 132 species. In this group all castes and sexes are known for 7 species only. Queens are known in: *alpinensis*, *antillana*, *auropilosa*, *aper*, *bambusarum* (sub *bambusarum* and sub syn. *oglobini*), *carapuna*, *cephalica* (sub syn. *opaca*), *dyctiota*, *fabricator*, *godmani*, *guilelmimulleri* (sub *guilelmimulleri* and sub syn. *gustavi*), *moseni*, *pullula*, *risii*, *rosae* (sub syn. *silvestris*), *spininodis* (sub syn. *pencosensis*, *lucifuga*, and *solaris*), *stenheili*, *stulta* (sub syn. *campioni*), *subarmata* (sub syn. *cornutula* and *elongatula*), *trachyderma*, *tristis* (sub syn. *fumipennis*). The queen of *P. unicornis* shares with the soldier caste the distinctive well developed clypeal lobe-like carina, the hypostomal dentition (Fig. 7), and the antennae with the pedicel as long as the three following funicular joints taken together.

According to Wilson (2003), in the *tristis*-group males are known only from 7 species: *antillana*, *auropilosa*, *carapuna* (sub syn. *chaquimayensis*), *fabricator*, *risii*, *spininodis* (sub syn. *pencosensis* and syn. *solaris*), *stenheili*, *subarmata* (sub syn. *cornutula* and syn. *elongatula*). The male of *P. unicornis* has the highest number of mandibular teeth (6, 5) when compared with the other known males of the group, which have 2 or 3-toothed mandibles.

The worker and soldier of *P. unicornis* are similar to those of *P. rhinoceros* Forel, 1899. J.T. Longino (pers. comm.) compared workers and soldiers of both species and his opinion is that my Ecuadorian specimens of *P. unicornis* exactly match the paratypes from Colombia he examined.

As *P. rhinoceros*' reproductives are still unknown, the main differences between *P. unicornis* and *P. rhinoceros* may be summarized as follows: 1) minor worker's head sparsely obliquely striate behind the eyes in the former versus minor worker's head smooth and shining behind the eyes in the latter; 2) major worker's scrobes longitudinally rugulose in *unicornis* versus major worker's scrobes with faint concentric arched rugulosity in *rhinoceros* (J.T. Longino, pers. comm.).

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