

## A new species of *Carebara* Westwood (Hymenoptera: Formicidae) and taxonomic notes on the genus

Una nueva especie de *Carebara* Westwood (Hymenoptera: Formicidae) y notas taxonómicas sobre el género

FERNANDO FERNÁNDEZ<sup>1</sup>

**Abstract.** A new ant species, *Carebara coqueta* sp.nov. from Colombia, is described, based on the soldier and worker castes. *Carebara semistriata* Fernández is considered a junior synonym of *Carebara reina* Fernández (syn. n.). *Carebara guineana* is proposed as a new name for *Oligomyrmex silvestrii* Santschi, 1914.

**Key words:** *Carebara coqueta*, new species, Neotropics, taxonomic notes

**Resumen.** Se describe una nueva especie de hormiga, *Carebara coqueta* n. sp. de Colombia, basada en soldado y obrera. *Carebara semistriata* Fernández se coloca como sinónimo menor de *Carebara reina* Fernández (n. sin.). *Carebara guineana* se propone como nuevo nombre para *Oligomyrmex silvestrii* Santschi, 1914.

**Palabras clave:** *Carebara*, nueva especie, Neotrópico, notas taxonómicas.

### Introduction

The recent revision of the myrmecine ant genus *Carebara* Westwood for the Western Hemisphere (Fernández 2004) broadened the generic limits of this name with the incorporation of *Oligomyrmex*, *Paedalgus*, *Afroxyidris* and *Neoblepharidatta*, as synonyms of *Carebara*. The genus in its new sense was split in three sections, the *concinna*, *lignata* and *escherischi* species groups. The first one, the *concinna* species group, corresponds to the concept of *Oligomyrmex*; the second, the *lignata* species group to the traditional *Carebara* s. str., and the *escherischi* species group to *Paedalgus*. The first two groups are probably paraphyletic taxa, with only the *escherischi* species group apparently monophyletic (Bolton and Belshaw 1993). This paper includes the description of a new species along with some other taxonomic changes and comments.

### Materials and Methods

Measurements were made using a micrometer in a Nikon SMZ 2T stereomicroscope at 80X magnifications, with a fiber ring lamp. All measurements are in mm: HL - Head length: Maximum length, in full face view, from the apex of the clypeal apron to the middle of vertex; HW - Head width: Maximum width in full face view; SL - Scape length (excluding basal condyle and neck), in straight line distance; PW - Pronotal width: Maximum width across pronotum in dorsal view; WL - Weber's length: In lateral view of mesosoma, the line from

posteroventral corner of mesosoma to farthest point on anterior face of pronotum; GL - Gaster length: In lateral view, the line from anterior edge of first gastral tergum to posteriormost point; TL - Total length (HL + Mandible length + WL + Petiole length + Postpetiole length + GL); CI - Cephalic index: HW/HL; SI - Scape index: SL/HW.

### Collections

IvH. Insect Collection, Instituto Humboldt, Claustro de San Agustín, Villa de Leyva, Colombia.

INBio. Instituto Nacional de Biodiversidad, San José, Costa Rica.

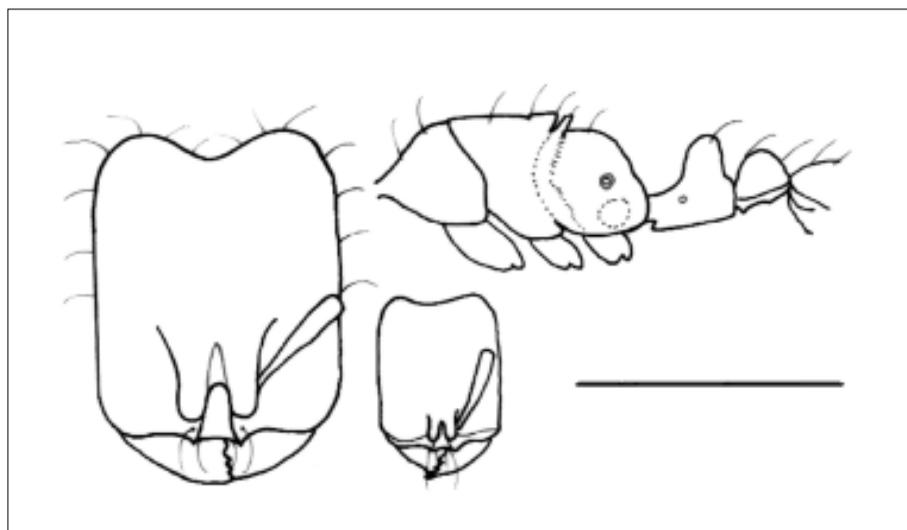
### Taxonomic section

#### *Carebara lignata* species complex

This complex comprises those dimorphic and monomorphic *Carebara* whose minor workers are always eyeless. In the *Carebara* revision (Fernández 2004) the name of the group was incorrectly written as "*Carebara concinna* species complex" in the heading of the section of this group in the page 211, the name must be changed to *Carebara lignata* species complex.

#### *Carebara coqueta* new species (Fig. 1)

Description (major worker). Head longer than broad, posterior border semicircularly



**Figure 1.** *Carebara coqueta* new species. Major worker head (left, HW 0.48 mm), mesosoma, petiole and postpetiole in lateral view (top); head of minor worker in full face view (lower right, HW 0.26 mm). Scale bar 0.5mm

<sup>1</sup> Profesor Asociado, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Apartado 7495, Bogotá D.C., Colombia, ffernandezca@unal.edu.co

excised, sides straight, parallel. Masticatory border with five stout teeth. Clypeus narrow, medial portion slightly concave. Frontal triangle well-defined. Frontal lobes somewhat continued posteriorly as short longitudinal rugulae. Scapes very short. Ocelli and eyes absent. In lateral view mesosoma flat, mesonotum slightly higher, propodeum lower. Pronotal suture feebly impressed dorsally. Metanotum narrow. Dorsal face of propodeum sloping and then curving into the posterior face, without spines or angles. Propodeal spiracle relatively large, rounded, close to metapleural gland bullae. Petiole with short peduncle, lateral swellings and ventrally with strong spine. Postpetiole in posterior view campanuliform, ventrally with anterior carinae. Body smooth, somewhat shining. Head, promesonotum, sides of pronotum and mesopleura with longitudinal rugae. Metapleuron, propodeum, petiole and postpetiole (except dorsal sides) with fine reticulation. Pubescence very sparse over body except propodeum. Long hairs (about 0.13 mm) dense on head; several on promesonotum, petiole, postpetiole and gaster. Body brown.

Holotype major worker measurements: HW 0.48 HL 0.64 SL 0.25 PW 0.25 WL 0.53 GL 0.49 TL 2.03 CI 75 SI 52.

**Description (minor worker).** Head longer than wide. Posterior border slightly concave, lateral margins faintly concave. Mandibles with 4 teeth. Median portion of clypeus nearly flat. In frontal oblique view, clypeal lateral carinae strongly narrowed posteriorly and between frontal lobes, then continued as frontal triangle. Scapes fail to reach posterior border by 1/2 of head length. In side view, mesosoma slightly convex, interrupted by deep metanotal groove. Dorsal face of propodeum curving into posterior face. Propodeal spiracle relatively large, circular, high and very close to propodeal margin. Propodeal metapleural lobes reduced to narrow lamellae that reach the propodeal dorsum. Petiole with short peduncle, evenly continuous with the dorsal rounded node. Subpetiolar process produced as anterior spine directed forward, spine normally not visible in mounted specimens. Postpetiole dorsally concave, lower than petiole. In dorsal view petiole longer than wide, postpetiole globose, more or less as long as wide. Anterior margin of first tergum in side view straight. Body smooth and shining. Mandibles with several scattered punctures, head with scattered punctures (except in the central longitudinal area), each punctum

with a small hair. Anterior sides of head with very fine longitudinal striation. Sides of mesosoma (except pronotum), petiole, postpetiole and dorsum of petiolar peduncle with a faint to moderate reticulation. Short curved hairs (less than 0.03 mm) relatively abundant over body, especially dorsum. Medium length hairs (about 0.04 mm or longer): Four on clypeus projecting forward, four on promesonotum (two anteriorly, two posteriorly), two on petiole, four on postpetiole. Body yellow brown.

Minor worker measurements (n=1) Paratype. HW 0.26 HL 0.31 SL 0.18 PW 0.15 WL 0.29 GL 0.35 TL 1.04 CI 84 SI 69.

**Female, Male:** Unknown.

**Type data.** Holotype major worker: Colombia: Caquetá, Chiribiquete National Park, Mesay River, "Blue Green" Forest, site 5, 00°14'N 72°56'W, 8.ii.2000, Winkler 64 in Terra Firme forest, 300 m.o.s.l., F. Quevedo (Deposited in IAVH). Paratypes: 1 major worker, 2 minor workers, same data (Deposited in IAVH).

**Distribution.** Known only from the type locality.

**Comments.** The major worker of this species is smaller than that of *C. tenua* or *C. coeca*, and on the basis of size is more closely related to *C. panamensis*. Nevertheless, *C. panamensis* is even smaller (according to Wheeler 1925) with total length of 1.30 mm (vs. 2.03 mm in *C. coqueta*). The sculpturing differs between the two species, and is more extensive in *C. coqueta*. The *panamensis* major worker/ergatoid has eyes and a median ocellus, although this might be associated in some way with its ergatoid condition. The minor workers of the two species are undistinguishable, at least based on Wheeler's (1925) description. As I pointed out in a recent paper (Fernández 2004:212), there are several undescribed species in this complex whose limits and variation are not well understood, additionally, the minor workers are practically useless for species identification. Thus, I think that is better to postpone a key to species until more material (with soldiers and minor workers associated) are studied.

Longino (2004) calls attention to the paucity of samples of *Carebara (lignata)* group) with both workers and soldiers. In other myrmicine ants like *Pheidole* or *Solenopsis* it is not difficult to find workers and soldiers in the field, which suggests that soldiers of *Carebara* are not

present in the same foraging strata as workers. This suggests that, to obtain soldiers of *Carebara*, we need to dig in the soil or look for them in rotten logs (Longino 2004). The fact that many museums only have minor workers of the typical *Carebara* (that is, the *lignata* species group) could be due to the reason pointed out above, and in reality all of the species of this complex may be dimorphic. The exasperating monotony of the minor workers of the *lignata* species group (some of them only 0.90 mm long!) makes it desirable to obtain and to study collections that include soldiers, besides females and males. If my prediction is correct, and all the species of the *lignata* group possess major workers (although difficult to collect), it should be possible to revise the group on a global scale.

Finally, I want to call attention to the interesting intercaste phenomenon in this group. Kusnezov (1952) and Wheeler (1925) pointed out and described cases of intermediates between major workers (soldiers) and females. The great plasticity in the external attributes of the soldiers of the *lignata* species group (such as the presence / absence of ocelli and eyes, and vestigial alary sclerites) make this an ideal group for the study of the evolution of caste intergradations; as proposed by Baroni Urbani and Passera (1996), who suggest that in some cases the soldier developed not from the worker, but from the female (see Ward 1997 for a reply).

#### ***Escherischi* species complex**

The species in this complex (except by the enigmatic *C. intermedia* Fernández) correspond to the previously recognized genus *Paedalgus sensu* Bolton & Belsaw (1993). The head is slightly narrower anteriorly, the eyes, always present, are reduced to a few ommatidia and the propodeum is very short. In the treatment of the species of this complex (Fernández 2004) there is an error in the description of *Carebara reina*; moreover, new recent evidence throw suspicion on the validity of *Carebara semistriata* as good species. For these reasons, it is included the complete description of *C. reina*, below.

#### ***Carebara reina* Fernández**

*Carebara reina* Fernández, 2004:228 (worker)

= *Carebara semistriata* Fernández, 2004:229 (worker) **syn. nov.**

Eyes reduced to 1 ommatidium. Lamellae of metapleural lobes low. Dorsum of head densely sculptured with very small,

shallow foveolate punctures, broadly separated; mid dorsum to almost all of promesonotum with dense, fine longitudinal striations mixed with scattered small punctures, periphery of promesonotum, dorsal and posterior face of propodeum and petiole densely reticulated. Postpetiole and gaster smooth and shining. Scapes, dorsum of head, promesonotum and legs with appressed pubescence, denser on head. Body nearly naked of long hairs, with only few (about 0.05 mm) distributed as follows: four on clypeal area; two on each frontal lobe; two on head (each one near occipital corner), eight on promesonotum, two on propodeum, none on legs; two on petiole, four on postpetiole, several on first tergal dorsum. Body brown, appendages lighter, most of gaster dark brown.

*Female, male:* Unknown

**Distribution.** Nicaragua to Colombia (Bolívar, Valle del Cauca).

*New records:* 2 workers, COSTA RICA, Cartago, 4 km E Turrialba, 9°54'N 83°39'W, 550 m, 13 may 1987, J. Longino No. 1644-S, INBio CRI00 2280244; 1 worker, COSTA RICA, Limón, Hitoy-Cerere Biological Reserve, 9°40'N 83°02'W, 500 m, 30 aug 1985, J. Longino No. 970-S, INBio CRI00 2279068.

**Comments.** John Longino (2004) correctly notes an incongruence in part of the description of *Carebara reina*, and observes that the extension of the longitudinal striation on the promesonotal dorsum of *C. reina* and *C. semistriata* is a variable attribute, and I support his opinion, based on new material. The type material of *C. reina* has a distribution of erect hairs clearly as in the description above. Since in this group of species the hair patterns are the most reliable trait to recognize species. I accept the weakness of the striation extension as a good trait and I place *C. semistriata* as junior synonym of *C. reina*.

The key for the species in this complex (Fernández 2004) should be modified as follow:

9. Mid and hind tibiae without standing hairs ..... 10
- 9'. Mid and hind tibiae with standing hairs (Southwestern Colombia) ..... *C. kofana*
10. Standing hairs: none on dorsum of head, four in promesonotum, none on propodeum, two on first tergum of gaster (Colombia, Trinidad, Perú, Brazil) ..... *C. striata*
- 10'. Standing hairs: two in head dorsum, eight in promesonotum, two in propodeum, several in first tergum of gaster (Nicaragua, Costa Rica, Colombia) ..... *C. reina*

#### *Carebara inca* Fernández

Originally described from workers from Perú, Longino (2004) records this species for first time for Central America.

*New record:* 1 w, COSTA RICA, Puntarenas, Osa, Rancho Quemado, 8°42'N 83°33'W, 2-300m, 15 dec 1990, J. Longino No. 2760-S, INBio CRI001, 280880.

#### Final note

Gary Alpert (Museum of Comparative Zoology, Cambridge) and Barry Bolton (The Natural History Museum, London) alerted me to a unresolved junior secondary homonym between *Carebara silvestrii* Santschi and *Aneleus silvestrii* Santschi. The name *Carebara guineana* is proposed as new name for *Carebara silvestrii* Santschi 1914:362.

#### Acknowledgements

Special thanks are due to Dr. John T. Longino (INBio) and Mauricio Alvarez (IAvH) for the loan of critical material. Partial support came from NSF grant DEBS Nos. 9972024 and 0205982 to Dr. Michael Sharkey (University of Kentu-

cky) and Dr. Brian Brown (LACM) by way of the Instituto Humboldt, Colombia. Thanks to Fernando Gast (General Director), Mauricio Alvarez (Biodiversity Inventories Program) and GEMA team of the Humboldt Institute for their continuous support and the Parks Unit of the Ministerio del Medio Ambiente de Colombia for collecting and maintaining facilities in Colombia. William P. MacKay (University of Texas at El Paso) offered several corrections and suggestions and improve the English of the text. Thanks also to three anonymous reviewers for their comments. This paper is dedicated to the memory of my friend Favio Quevedo, collector of the samples from Chiribiquete, who recently past away in an accident in Caquetá.

#### Literature cited

- BARONI URBANI, C. PASSERA, L. 1996. Origin of ant soldiers. *Nature* 383: 223.
- BOLTON, B., BELSHAW, R.. 1993. Taxonomy and biology of the supposedly lestobiotic ant genus *Paedalgus* (Hym.: Formicidae). *Systematic Entomology* 18:181-189.
- FERNÁNDEZ, F. 2004. The American species of the myrmicine ant genus *Carebara* Westwood (Hymenoptera: Formicidae). *Caldasia* 26(1): 191-238.
- KUSNEZOV, N. 1952. El género *Oligomyrmex* Mayr en la Argentina (Hymenoptera, Formicidae). *Acta Zoológica Lilloana* 10: 183-187.
- LONGINO, J.T. 2004. *Ants of Costa Rica* Web Page: <http://www.evergreen.edu/ants/genera/carebara> (visited 12.XII.2005)
- SANTSCHI, F. 1914. Formicides de l'Afrique occidentale et australe du voyage de Mr. le Professeur F. Silvestre. *Bolletino del Laboratorio di Zoologia generale e agraria della R. Scuola superiore d'Agricoltura in Portici* 8:309-385.
- WARD, P.S. 1997. Ant soldiers are not modified queens. *Nature* 385:494-495.
- WHEELER, W. M. 1925. A new guest-ant and other new Formicidae from Barro Colorado Island, Panama. *Biological Bulletin* 49: 150-181.

Recibido: 03-ene-06 • Aceptado: 31-ene-06