



## RESEARCH ARTICLE - WASPS

## A New Species of the Neotropical Social Swarming-Wasp *Chartergellus* Bequaert (Hymenoptera: Vespidae: Epiponini)

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### Abstract

A new species of *Chartergellus*, collected in Acre State, is described and comparative remarks are given.

### Introduction

*Chartergellus* is a small genus of social wasps with nine species described [*C. afoveatus* Cooper, *C. amazonicus* Richards, *C. atectus* Richards, *C. communis* Richards, *C. golfitensis* West-Eberhard, *C. nigerrimus* Richards, *C. punctatior* Richards, *C. sanctus* Richards, and *C. zonatus* (Spinola)], extending from southeastern Brazil to northern Costa Rica. (Hanson & Gauld, 1995; Carpenter & Marques, 2001; West-Eberhard et al., 2010). Hitherto, six species were distributed in Brazil, two being endemic (Carpenter & Marques, 2001). From Acre State only *C. nigerrimus* had been recorded.

The genus is diagnosed by a prominent curved bristle on the third labial palpomere, the maxillary palp five-segmented and labial palpi three-segmented, lacking an occipital carina, the mesepisternum lacking a dorsal groove, and the metanotum rounded (Carpenter, 2004 *apud* West-Eberhard et al., 2010).

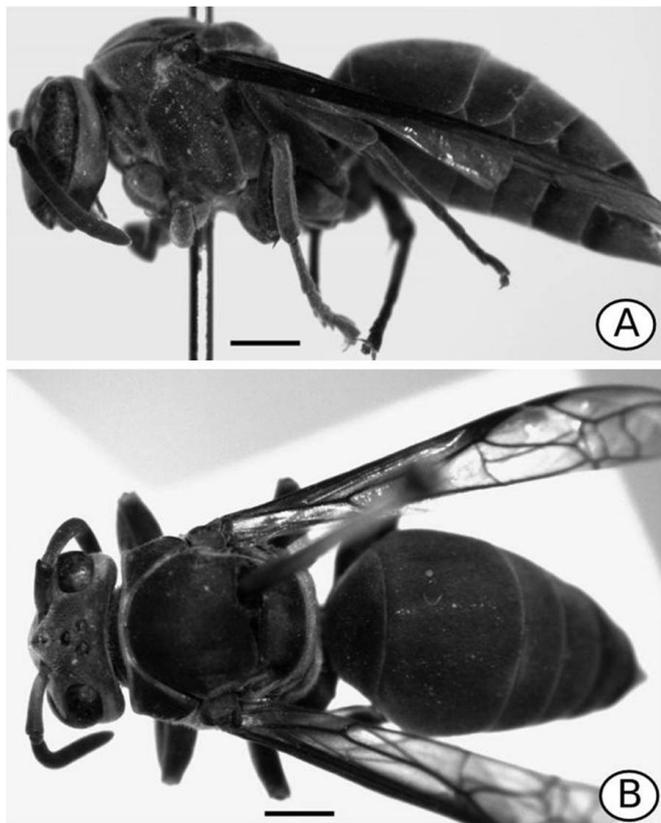
In this paper, the female, nest and males of a new species are described. Comparative notes with *C. atectus*, *C. punctatior* and *C. communis* are given.

*Chartergellus zucchii* sp. n. Mateus and Andena (Fig 1A and B)

#### Diagnosis

The new species is similar to *C. atectus* and *C. punctatior*, in general coloration; however it is similar to *C. communis* in terms of the size. Differently of *C. atectus* and *C. communis*, *C. zucchii* and *C. punctatior* have the propodeal valve narrow throughout. The mandible rises more abruptly than in *C. communis*, *C. punctatior* and in *C. atectus*, recalling that of *C. afoveatus*; the basal rim is absent in *C. zucchii* and in *C. atectus*. *Chartergellus zucchii* is less hairy than *C. punctatior*, sharing it with *C. atectus* and *C. communis*.





**Fig 1.** *Chartergellus zucchii*. A= lateral view; B= dorsal view. Scale bars = 1.0 mm.

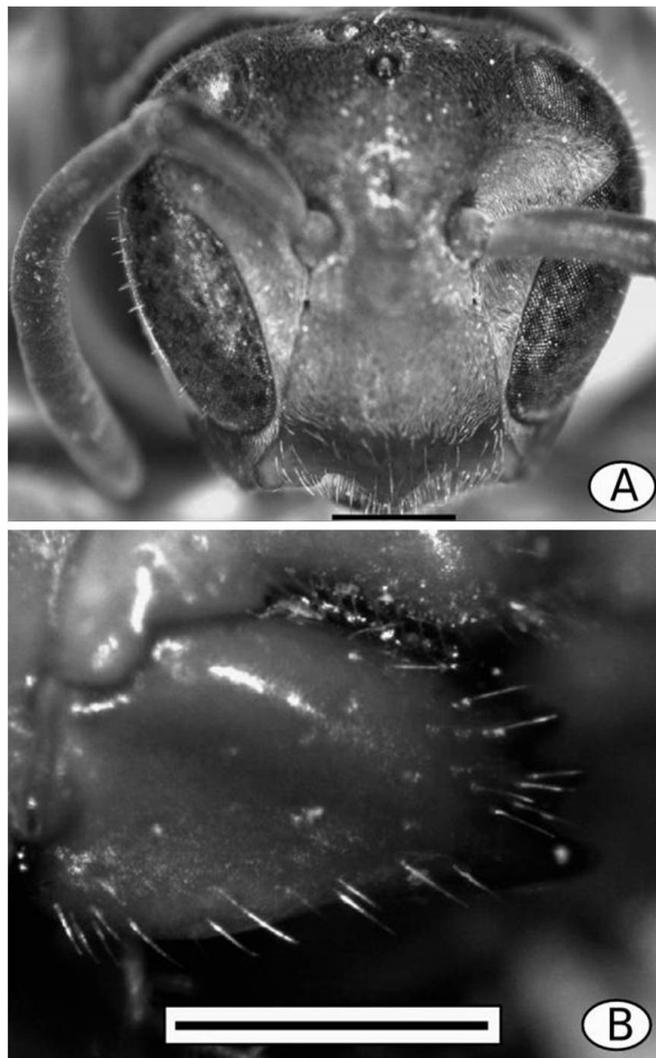
### Description

Size: 8.0 – 9.0 mm

Color: black species with reddish marks on frons, clypeus, mandible, gena and malar space; yellowish bands on upper part of gena, extending to middle region; scape blackish above, reddish beneath, the rest of antennomeres are blackish; yellow band on pronotal carina and dorsal margin of the pronotum; metanotum with yellow band on anterior region; metasoma blackish, without yellow bands.

Variation: Some specimens have the frons, clypeus and mandible yellowish; pubescence on clypeus covering little less than a half; the ventral corner of the pronotum with a yellow spot; upper region of the gena blackish, becoming reddish toward inferior region; tarsomeres yellowish.

Head (Fig 2A): (1) clypeus as long as wide, convex in profile, laterally sinuous; separated from the eyes; pubescence covering top half, bristles longer and denser on lower half than on top half; punctuation deep, spaced, separated by more than 2.0 diameters; (2) eyes with short and spaced hairs; (3) frons and vertex with medial size punctuation, deep, spaced, separated by more than 2.0 diameters; very short and spaced hairs; (4) malar space longer than 4th antennal article; (5) medial region of gena equal to eyes, narrowing toward upper region; punctuation very spaced and shallow; pubescence present on top  $\frac{3}{4}$ , lower  $\frac{1}{4}$  shinning, without pubescence; (6) mandible with very spaced and shallow punctuation; raising abruptly, not forming a rim (Fig 2B).



**Fig 2.** *Chartergellus zucchii*. A= head, frontal view; B= mandible, frontal view. Scale bars = 1.0 mm.

Mesosoma: (1) pronotum with short and dense pubescence, concentrated on upper part; punctuation medium sized, separated by about 1.0 diameter; pronotal carina produced, slightly lamellated, extending to medial region; pronotal fovea oval, deep; ventral corner bulging; (2) mesopleura with very short and spaced pubescence; punctuation medium sized, separated by about 1.0 diameter; dorsal groove shallow and wide; (3) upper plate of metasoma longer than wide, with large punctuation separated by about 1.0 diameter; pubescence very short and spaced; lower plate with punctuation very shallow and spaced, separated by more than 2.0 diameter; (4) scutum with very short and spaced pubescence, coriaceous; punctuation medium sized, dense, separated by less than 1.0 diameter, becoming more spaced on central region; (5) scutellum with the same pattern of punctuation and pubescence as that of scutum; (6) metanotum flat, with very spaced pubescence, very small, shallow and spaced punctures, separated by much more than 2.0 diameters; (7) propodeum with dense pubescence; spaced long hairs centrally, laterally more spaced; propodeal valve narrow throughout; (8) propodeal concavity shallow, wide.

Metasoma: (1) tergum I as long as wide, cap-shape;

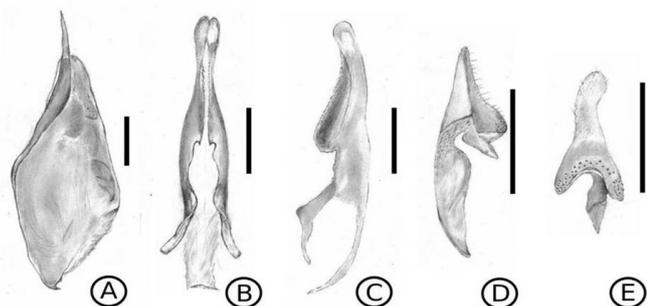
(2) tergum II wider than long, coriaceous (3) sternum with the same pattern than tergum.

Fore wings: 7.5-8.0 mm, infuscated, costal region darker, venation brown; prestigma as long as wide.

Male: like female except that the gena and clypeus are narrower and entirely yellow; the mandible is blackish; the clypeus is covered with a silver pubescence; the frons is also yellowish with a central area becoming reddish; yellow marks are present beneath of the coxae and femur; yellow spot on upper region of mesopleuron.

Male genitalia: (1) Paramere longer than wide, basal angle obtuse, apical angle truncate, long and curved spine, without bristles (Fig 3A); (2) aedeagus with small triangular and irregular serration beneath, ventral process forming a "U", area near serration darker (Fig 3 B and C); (3) cuspis rounded apically, with small and spaced hairs (Fig 3D); (4) digitus pointed apically, with small and spaced hairs (Fig 3E).

Nest: We found two similar nests into the Catuaba



**Fig 3.** Male genitalia. A= paramere, lateral view; B= aedeagus, ventral view; C= aedeagus, lateral view; D= cuspis, lateral view; E= digitus, lateral view. Scale bars = 0.5 mm.

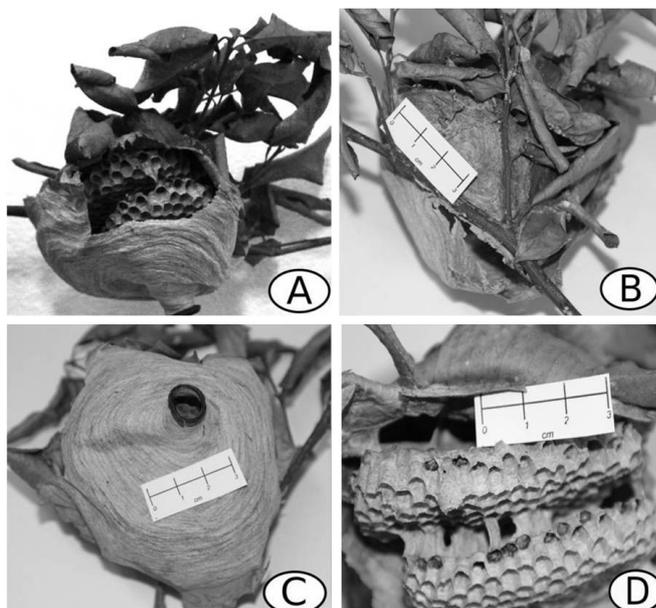
Reserve, one populated and the other not. The description and photos refer to the populated nest.

The nest is spherical, about 10 cm of diameter and 6 cm high (Fig 4A), built on twigs with leaves incorporated on the top (Fig 4B); the envelope is predominantly yellowish/grayish; long vegetable fibers; the construction lines are parallel giving a grooved aspect to the surface of the envelope; the entrance is short, (about 1,2 cm in diameter) located downward spout, forming a ring externally, measuring 10mm height (Fig 4C); The combs are horizontal suspended from center to margins by multiple pedicels fused or buttressed sheet in the substrate, the second comb are fixed in the first one by the same structures, multiple pedicel fused or buttressed sheet (Fig 4D).

Nest composition: two combs were found, one with 256 cells and the other with 226 cells, totaling 482 cells. One hundred seventy-two adults were collected, being 141 females and 31 males. Due the great number of males, we classified the colony phase as "male producing".

Etymology: The name *zucchii* is named in honor to Prof. Dr. Ronaldo Zucchi, in gratitude for his advice for many students' in behavioral works over many years, a wasp worker and friend.

Distribution: A single populated nests was collected in



**Fig 4.** Nest of *Chartergellus zucchii*. A= spherical nest with envelope opened; B= detail of the nest attached on twigs with leaves incorporated; C= entrance with dark vegetal resin around the ring; D= combs connected by multiple pedicel fused or buttressed sheet.

27/xi/2002 by Nascimento, F.S., in Catuaba experimental farm (UFAC), Rio Branco municipality, Acre State, northern Brazil (10° 04' 36."S 67° 37' 40.2"W). It was found in a small orchard, hanging on a twig of a *Citrus* sp., about 1.9 meters from the ground.

Holotype: 1 female- Catuaba experimental farm (UFAC), Rio Branco municipality, Acre State (10° 04' 36."S 67° 37' 40.2"W); Nascimento, F.S. col. [Museu de Zoologia da Universidade de São Paulo – São Paulo, Brazil (MZUSP)]

Paratype: the paratypes belongs to the same nest of holotype and are deposited in the following institutions: 3 females and 3 males [Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil - (MZUSP)]; 3 females and 3 males [American Museum of Natural History, New York, USA (AMNH)]; 3 females and 3 males [Museu de Zoologia da Universidade Estadual de Feira de Santana, Feira de Santana, Brazil (MZFS)]; 3 females and 3 males [Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto da Universidade de São Paulo, Ribeirão Preto, Brazil (FFCLRP-USP)]; 3 females and 3 males [Natural History Museum, London, UK (NHM)].

## Remarks

*Chartergellus zucchii* is grouped within those species in which the clypeus is separated from the eyes, however some aspects deserve consideration. *Chartergellus zonatus*, *C. communis*, *C. nigerrimus* and *C. zucchii* have the eyes narrowly separated from the clypeus, while *C. sanctus* has the eyes widely separated from the clypeus. Within the genus, *C. amazonicus*, *C. atectus*, *C. golfitensis* and *C. punctatior* have the clypeus touching the eyes, although, as pointed out by Carpenter (pers. comm.) some specimens of *C. punctatior* have the clypeus narrowly separated from the eyes. Such variation

is not uncommon in Epiponini as cited by Cely and Sarmiento (2011) and Carpenter et al. (2013) for the genus *Synoeca*. The clypeus of *C. zucchii* is convex, like in *C. punctator* and *C. sanctus*, and the pubescence cover the top half as all species within the genus, except *C. amazonicus* and *C. atectus*, which have the pubescence covering only the top third.

The new species *Chartergellus zucchii*, would be placed within couplet 3 of the Richards's key sharing the face reddish and the malar space longer with *C. punctator*, *C. communis* and *C. atectus*, although, as cited above, *C. zucchii* may have the face yellowish. *Chartergellus communis* and *C. punctator* have the mandible forming a basal rim, a feature absent in *C. zucchii* and *C. atectus*. Except *C. communis*, which has the eyes bare, the other three species have eyes with short and spaced hairs. The propodeal valves are narrow throughout in *C. zucchii*, *C. punctator* and *C. communis*, and little wider in *C. atectus*. *Chartergellus punctator* has the scutum and pronotum with long and dense hairs, an exclusive feature of this species within the genus.

We do not observe camouflage in the nest color, which differs from *C. communis* (Richards, 1978; Wenzel, 1998; Mateus et al., 1999), *C. golfitensis* (Chavarría-Pizarro & West-Eberhard, 2010) and *C. punctator* (Wenzel, 1998). The grooves are not evident like in *C. communis* (Richards, 1978; Wenzel 1998; Mateus et al., 1999). The entrance is similar to that of *C. atectus* (Richards, 1978), different from others *Chartergellus* species studied, the external ring of the entrance was impregnated with dark vegetal resin measuring 2 mm large, probably related to ant defense, a strategy also recorded in *Leipomeles dorsata*, which uses ant guards on the leaf petiole (Wenzel, 1998). Such a strategy of ant defense was also seen in two nests of this species collected by SRA and SM in Presidente Figueiredo, Amazon State in 2005. Both nests have dozens of small balls of resinous material attached to the leaf petiole. A similar strategy was observed in the related genus *Nectarinella*: on the nest entrance and around the envelope of *Nectarinella xavantinensis* a resinous material was impregnated (personal observation S.M.).

Cells may be lengthened after adult emergence due to accumulation of meconium layers.

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