Sociobiology
An international journal on social insects

RESEARCH ARTICLE - WASPS

A new species of the social wasp genus *Chartergellus* Bequaert from Trinidad, (Hymenoptera: Vespidae, Polistinae, Epiponini)

JM Carpenter[1], SR Andena[2], CK Starr[3]

1 - American Museum of Natural History, Division of Invertebrate Zoology, New York, NY, USA
2 - Universidade Estadual de Feira de Santana, Museu de Zoologia. Divisão de Entomologia, Feira de Santana, Bahia, Brazil
3 - University of the West Indies, Department of Life Sciences, St. Augustine, Trinidad and Tobago

Article History

Edited by
Gilberto M. M. Santos, UEFS, Brazil
Received 28 August 2018
Initial acceptance 15 October 2018
Final acceptance 25 October 2018
Publication date 25 April 2019

Keywords
Epiponini, new species, West Indies.

Corresponding author
Sergio R. Andena
Universidade Estadual de Feira de Santana
Dept. C. Biológicas, Museu de Zoologia
Av. Transnordestina s/nº, CEP: 44036-900
Feira de Santana-BA, Brasil.
E-Mail: sergioricardoandena@gmail.com

Abstract

A new species of the social wasp genus *Chartergellus* is described, *Chartergellus trinitatis* Carpenter and Andena, NEW SPECIES. Male genitalia and nest architecture are described and comparative remarks are given.

Introduction

Chartergellus has been described as one of the least abundant genera of neotropical social wasps (Jeanne, 1991), being rarely collected and seldom found in collections. The colonies are small, with few individuals, except *C. communis* Richards, 1978, a nest of which collected by Mateus et al. (1999) had 1342 cells. *Chartergellus* resembles other relatively small-colony swarming social wasps in usually having more than one well-developed queen in a colony (West-Eberhard et al., 2010). The study of the genus has received little attention, and consequently there have been few publications about the biology of the species (Richards, 1978; Mateus et al., 1999; Chavarría-Pizarro & West-Eberhard, 2010).

The nests of *Chartergellus* are typically arboreal, the pedicel is fibrous, cell-marginal, horizontal to margin of downward-facing comb. The carton is composed of long fiber, the combs are multiple, growing gradually at margins, suspended from substrate one below the other, not in contact with envelope, which is a single sheet (Wenzel, 1998). According to Richards (1978) the nest of *C. atectus* Richards, 1978, is constructed between leaves and lacks a full envelope.

Bequaert (1938) described *Chartergellus* as a subgenus of *Chartergus sensu* Bequaert [=*Parachartergus* von Ihering], designating *Vespa frontalis* Fabricius, 1804, as its sole species. Richards (1978) raised it to genus, described five new species and designated *C. amazonicus* Richards, 1978, as a replacement name for *Vespa frontalis* Fabricius, which was preoccupied by *Vespa frontalis* Latreille, 1802. He remarked that it is uncertain whether this species is identical with *C. frontalis sensu* Bequaert, but as discussed by Carpenter and van der Vecht (1991), there are no grounds for considering Bequaert to have misidentified this species. Later, four more species were described: *C. afoveatus* Cooper (Cooper, 1993), *C. golfitensis* West-Eberhard (West-Eberhard et al., 2010), *C. jeannei* Andena and Soleman (Grandinete et al., 2015) and

C. zucchii Mateus and Andena (Mateus et al., 2015). West-Eberhard et al. (2010) also established that *C. zonatus* (Spinola, 1851), treated as unrecognized by Richards (1978), is a good species. Thus, there are 11 species recognized up to the present

The new species, here described and named *Chartergellus trinitatis,* was collected by C. K. Starr in Trinidad. It is the species referred to as *Chartergellus* nr. *atectus* in Starr and Hook (2003).

Description

Chartergellus trinitatis Carpenter & Andena (Figs 1-2, 3A, C, E, 4A, C, 5-7)

Diagnosis: This is one of the largest species of *Chartergellus,* ranging from 10.0 – 10.3mm in length, a little bigger than *C. sanctus* Richards, 1978. The species is easily diagnosed by the dorsal pronotal carina little raised and sharp, extending to middle of pronotum; the pronotal fovea deep and oval, ventral corner bulging, very produced (see Fig 4 C and D); the punctures on the scutum very small and spaced (Fig 4 A).

Female:

Size: 10.0 – 10.3 mm

Fore wing: 10.1- 10.3 mm in length; infuscate, venation blackish, pterostigma as long as wide, tip truncate.

Color: Blackish species; yellow marks on: lower part of clypeus, extending to middle region – "U-shape"; spots on inner part of eyes and two spots on inter-antennal area; a large stripe from top to bottom of gena, extending to malar space area; mandible with a strip on top region; dorsal region of pronotum, margin of the scutum; a spot on ventral corner of pronotum, extending to fovea; mesopleuron with a dorsal spot; tegula with a spot posteriorly; scutellum and metanotum with a band on anterior region; propodeal concavity with two bands extending from top to bottom; tergum I and II with yellow bands; sternum II-V also with yellow bands, evanescent; yellow band extending from top to bottom on tibia and a spot on last tarsomere of anterior leg; antenna blackish, bottom of the last three antennomeres reddish.

Variation: workers may have yellow stripes, on tergum I and II, opaque or vanishing (see arrows in Figs 1 and 2).

Castes: The castes in this species are readily distinguishable by slight but reliable color characters. The queen have their yellow marks with a brownish tinge, while those of the workers are more clearly yellow.

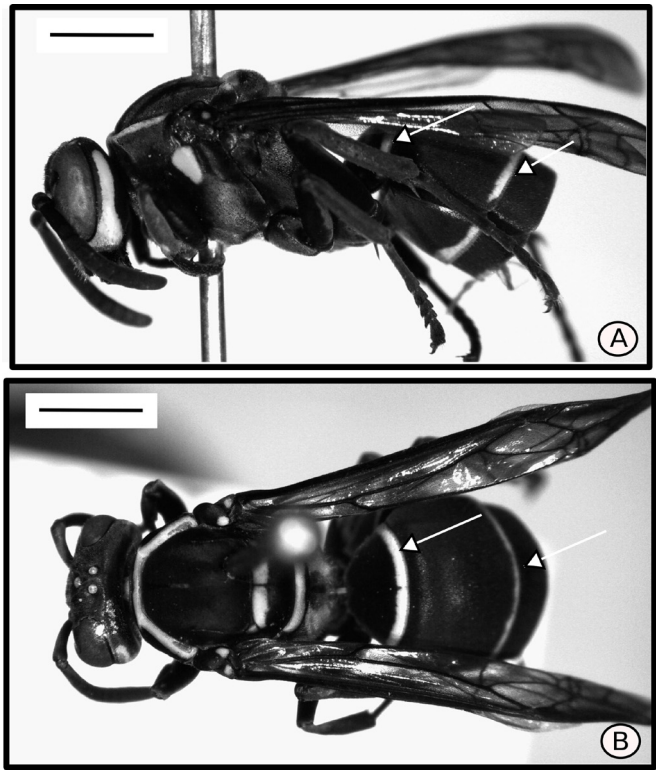

Fig 1. Worker of *Chartergellus trinitatis* (A) lateral view; (B) dorsal view. Arrows pointing to yellow bands on metasoma. Scale bar = 2.0 mm.

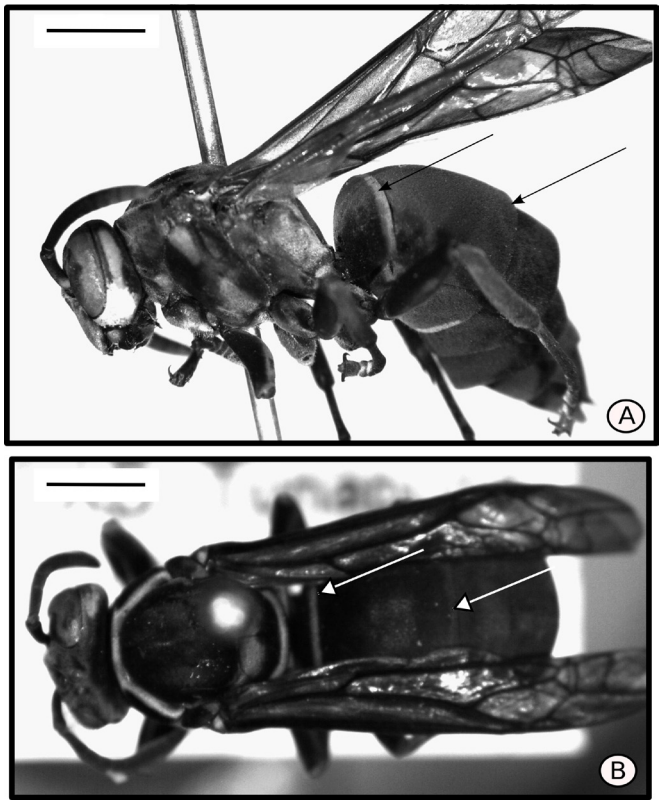

Fig 2. Worker of *Chartergellus trinitatis* (A) lateral view; (B) dorsal view. Arrows pointing to yellow bands on metasoma. Scale bar = 2.0 mm.

Head (Fig 3 A and C)**:** (1) clypeus 1.3 times wider than long; compressed; lateral margin straight, touching eyes for less than antennal socket diameter; pubescence all over, except on the pointed tip, which is bare; bristles all over, longer on dorsal half; punctation of medium size, shallow, spaced. (2) frons and vertex with moderately long hairs, punctation medium sized, shallow, spaced; (3) eyes with short and spaced hairs; (4) malar space about 0.6 of the fourth antennomere; (5) gena about 0.7 of the width of eyes on medial region; pubescence all over; short bristles evident on lower half; punctation very

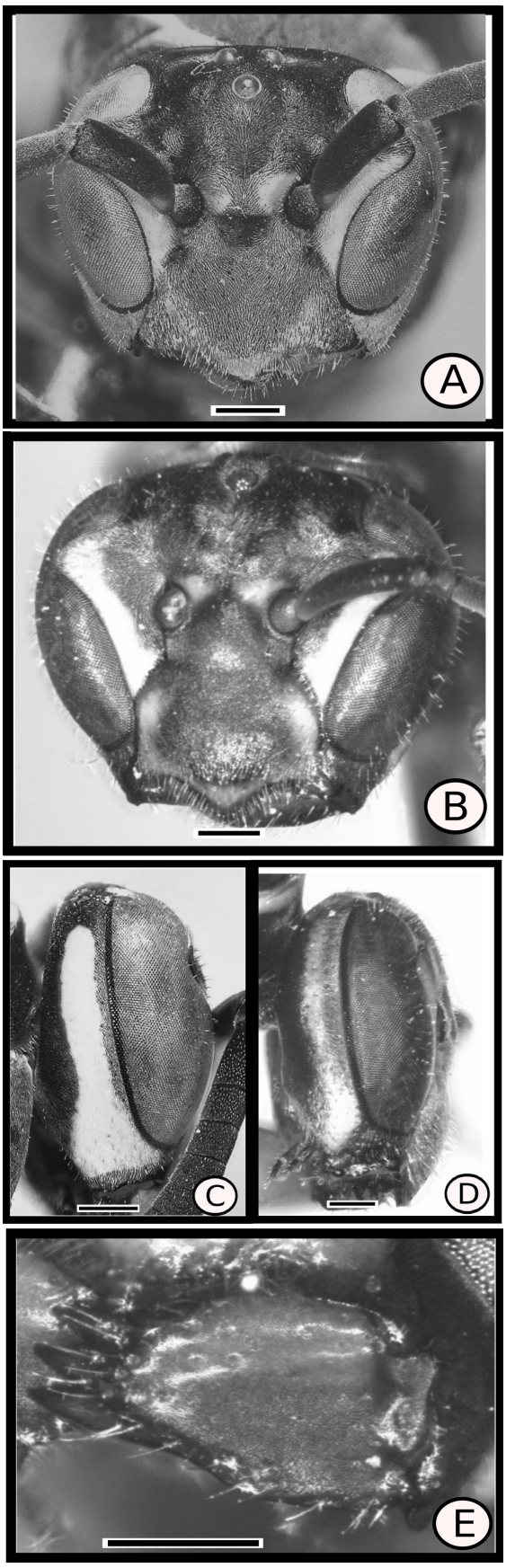

Fig 3. A, C and E: head in frontal view, head in lateral view and mandible in frontal view of *Chartergellus trinitatis,* respectively; B and D: head in frontal view, head in lateral view of *Chartergellus afoveatus,* respectively. Scale bar = 0.5 mm.

shallow and spaced; (6) ocellus separated by more than the diameter of one ocellus; (7) mandible little raised, not forming a rim, with short bristles, punctures shallow, scattered (Fig 3 E); (8) antenna with short bristles.

Mesosoma: (1) pronotum with dense pubescence, with short bristles anteriorly; pronotal carina little raised, sharp, extending to middle of pronotum, slightly produced forward; pronotal fovea in a deep concavity; ventral corner prominent (bulge); punctation evanescent dorsally (Fig 4 C); (2) mesopleuron concave, pubescence less dense than that of pronotum; punctures small, shallow and spaced, becoming sparser laterally; scrobal furrow wide and shallow; (3) metapleuron unpunctured; dorsal plate about 1.2 times longer than wide; (4) scutum with evanescent pubescence, with short and erect hairs, punctures very shallow and spaced (Fig 4 A); (5) scutellum rounded with the same pattern of pubescence and hairs as that on scutum; punctation very spaced, evanescent; medial line extending anteriorly only; (6) metanotum rounded anteriorly only, punctation, pubescence and bristles with same pattern as on scutum; (7) propodeum with dense pubescence, becoming weaker laterally; spaced bristles dorso-laterally; punctation very spaced and shallow on propodeal concavity becoming denser laterally; (8) propodeal concavity wide and shallow; (9) propodeal valvula wide anteriorly.

Metasoma: (1) Tergum I cap-shaped, coriaceous, with few and short erect hairs; (2) Tergum II about 1.3 times wider than long.

Male: Like female except the gena and clypeus are narrower; the clypeus has only a blackish spot centrally and is covered with silver pubescence; bristles on frons and vertex longer;

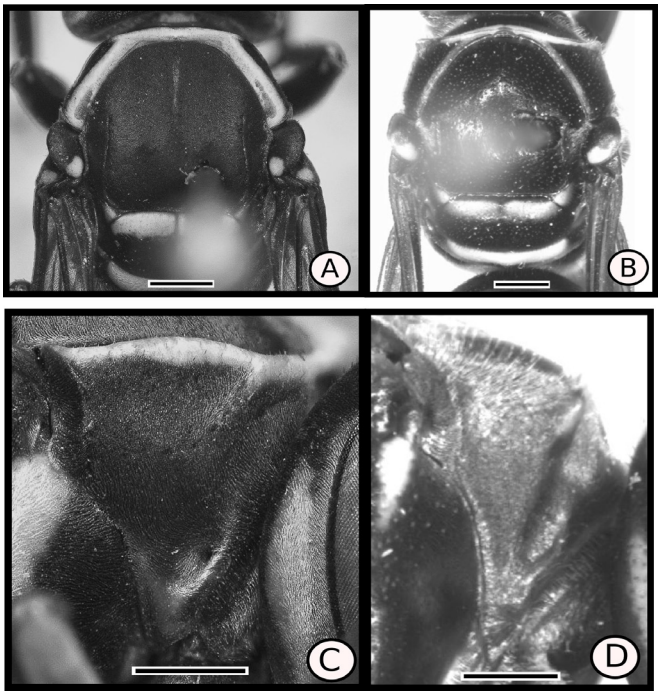

Fig 4. A and C: scutum in dorsal view and pronotum in lateral view of *Chartergellus trinitatis,* respectively; B and D: scutum in dorsal view and pronotum in lateral view of *Chartergellus afoveatus,* respectively. Scale bar = 1.0 mm.

anterior coxae almost entirely yellow; tibiae and tarsi with bigger yellow marks; tergum III-V with evanescent yellowish spots on lateral region; sternum III-VI with yellow bands.

Male genitalia: (1) Paramere 1.8 times longer than wide, apical angle truncate, basal angle obtuse, short spine (Fig. 5 A); (2) aedeagus with small teeth, serration extending ventro-laterally, ventral process projected, rounded (Fig 5 B and C); (3) cuspis pointed apically with spaced and long hairs Fig 5 D); (4) digitus pointed apically with few and scattered short hairs (Fig 5 E).

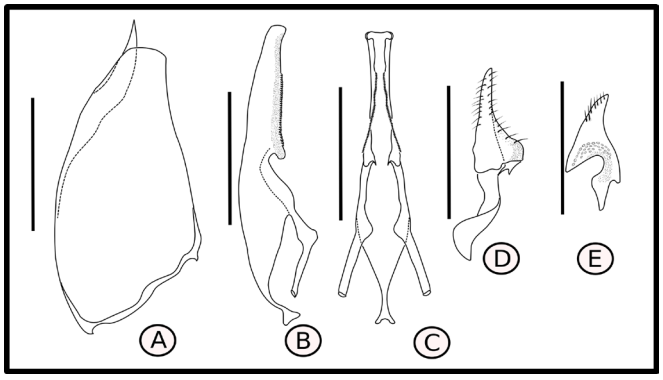

Fig 5. Male genitalia of *Chartergellus trinitatis.* (A) paramere in lateral view; (B) aedeagus in lateral view; (C) aedeagus in ventral view; (D) cuspis in lateral view; (E) digitus in lateral view. Scale bar = 1.0 mm.

Nest Architecture (Figs 6 and 7)**:** The following description is based on examination of three nests of varying maturity, all beyond the incipient stage. Each was attached to a single thin branch high in a tree. The nest comprises multiple horizontal combs. The largest nest had seven combs with a total of 2159 cells. The uppermost comb is connected to the envelope above it by an irregular mass of mostly laminar carton. Adjacent combs are connected by one or several stout vertical petioles, with a variable wasp space between adjacent combs usually of 9-13 mm. The uppermost comb is distinctly irregular and appears to have no brood-rearing function. The side to side width of each cell in other combs is 4.5 mm. Surrounding the set of combs is a relatively smooth envelope of light-gray carton with a single entrance hole of about one centimeter diameter below. The envelope is free of all except the first comb. It comprises several layers, touching each other in many places, with a separation of about one millimeter between adjacent layers. The number of layers is greatest above, reducing to one toward the bottom.

Fig 6. Early nest of *Chartergellus trinitatis.*

Etymology: The species epithet is taken from the place of origin, the Caribbean island of Trinidad.

Distribution: This species is known only from the Northern Range of Trinidad.

Holotype: 1 female (queen) TRINIDAD: Tunapuna-/Piarco, Caura Valley/21 May 2013/C. K. Starr & J. N. Sewlal. Deposited in the American Museum of Natural History (AMNH).

Paratypes: same data as the holotype: 1 female in AMNH; 1 female in Museu Zoologia Universidade de São Paulo (MZUSP); 1 female in Museu de Zoologia da Universidade Estadual de Feira de Santana (MZFS); 2 males in AMNH; 2 males in MZFS. TRINIDAD, WI:/Caura Valley/21 May 2013, C. K./Starr, J. N. Swelal: 20 females 30 males in AMNH. TRINIDAD, W. I./Lopinot Valley/21 Feb. 2017/G. White: 39 females in AMNH; four females, two males in University of the West Indies Zoology Museum (UWIZM).

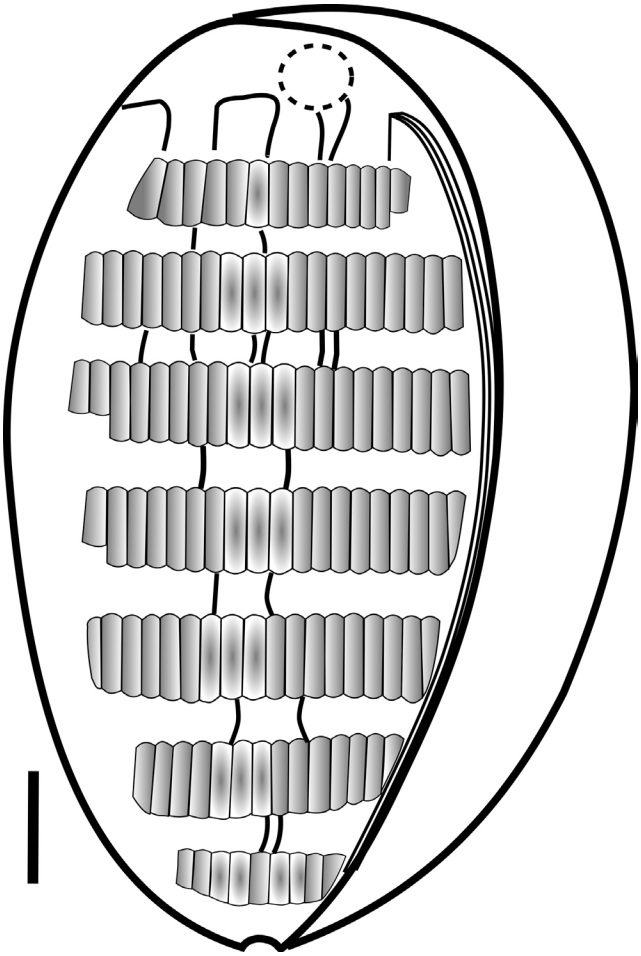

Fig 7. Mature nest of *Chartergellus trinitatis* in partial cut-away view. Scale bar = 2.0 cm.

Comparative Remarks

The new species resembles *Chartergellus afoveatus,* in color and general aspects, however the punctures are much smaller and less evident (see Fig 3 A, B, C and D, and Fig 4 A, B, C and D). Also it has a fovea, which is deep; the ventral corner is prominent (bulging) and the dorsal pronotal carina is less raised, sharp and extending to middle of pronotum (Fig 4 C and D). The mandible is slightly produced as in *C. afoveatus*. The rim of the mandible is a variable feature, ranging from very feeble, as in *C. sanctus,* to strongly produced, as in *C. communis*. In *C. trinitatis* the rim is absent as in *C. atectus, C. jeannei, C. nigerrimus* Richards, 1978, and *C. zucchii.*

Chartergellus atectus, C. amazonicus, C. golfitensis, C. afoveatus, C. punctatior Richards, 1978, and *C. trinitatis* have the clypeus touching the eyes, although, as pointed out by Mateus et al. (2015), *C. punctatior* may have the clypeus narrowly separated from the eyes. Only *C. zucchii, C. sanctus* and *C. punctatior* have the clypeus convex, and, as in the remaining species of the group, *C. trinitatis* has the clypeus compressed. The pubescence covering the top half, or more, of the clypeus is another feature of *C. trinitatis* shared with *C. afoveatus, C. communis, C. nigerrimus, C. punctatior, C. sanctus, C. zonatus,* and *C. zucchii. Chartergellus afoveatus* and *C. trinitatis* have the pubescence covering the entire clypeus, with only the tip bare (Fig 3 A and B).

The scutum is less punctured than in *C. afoveatus,* and the anterior margin of pronotum (dorsal view) is more "square" (Fig 4 A and B); the humeri are not produced. The propodeal valvula is widened anteriorly, as in *C. nigerrimus* and *C. amazonicus.* Also, despite the yellow bands on the metasomal tergum being very similar to *C. afoveatus,* they are narrower.

The pendant nest is quite different from all other nests known in the genus. Externally, it resembles a *Pseudopolybia* nest with an envelope composed of multiple sheets, rather than a single sheet, as in other *Chartergellus*. Internally the combs are supported from one another by petioles, rather than connected to the substrate directly, as in other *Chartergellus*.

Acknowledgments

We thank Graham White for the photograph of the nest, and John Wenzel for highlighting points of comparison between the nests of *Chartergellus* and *Pseudopolybia*.

References

Bequaert J. (1938). A new *Charterginus* from Costa Rica, with notes on *Charterginus, Pseudochartergus, Pseudopolybia, Epipona,* and *Tatua* (Hymenoptera, Vespidae). Revista de Entomologia, 9: 99-117.

Carpenter, J.M. & van der Vecht, J. (1991) A study of the Vespidae described by William J. Fox (Insecta: Hymenoptera), with assessment of taxonomic implications. Annals of the Carnegie Museum of Natural History, 60: 211-241.

Chavarría-Pizarro, L. & West-Eberhard, M.J. (2010). The behavior and natural history of *Chartergellus*, a little-known genus of neotropical social wasps (Vespidae Polistinae Epiponini). Ethology, Ecology and Evolution, 22: 317-343. doi: 10.1080/03949370.2010.510035

Cooper, M. (1993). A new species of *Chartergellus* (Hym., Vespidae, Polistinae, Polybiini) from Bolivia. Entomologist's Monthly Magazine, 129: 165-166.

Grandinete, Y.C., Andena, S.R.; Soleman, S.A. & Noll, F.B. (2015). *Chartergellus jeannei,* a New Species of the Swarming Social Wasps from the Amazon Forest (Hymenoptera: Vespidae: Epiponini). Sociobiology, 62: 120-123. doi: 10.13102

Mateus, S., Nascimento, F.S., Aragão, M. & Andena, S.R. (2015).A new species of the Neotropical social swarming-wasp *Chartergellus* Bequaert (Hymenoptera: Vespidae: Epiponini). Sociobiology, 62: 105-108. doi: 10.13102.

Mateus, S., Noll, F. B. & Zucchi, R. (1999). Caste differences and related bionomic aspects of *Chartegellus communis*, a neotropical swarm-founding polistinae wasp (Hymenoptera: Vespidae: Polistinae: Epiponini). Journal of the New York Entomological Society, 107: 390-405.

Richards, O. W. (1978). The Social Wasps of the Americas excluding the Vespidae. British Museum (Natural History), London. 580 p.

Starr, C., K. & Hook, A., W. (2003). The aculeate Hymenoptera of Trinidad, West Indies. Occasional Papers of the Department of Life Sciences of the University of the West Indies, 12: 1-31.

Wenzel, J., W. (1998). A generic key to the nests of hornets, yellowjackets, and paper wasps worldwide (Vespidae: Vespinae, Polistinae). American Museum Novitates, 3224: 1-39.

West-Eberhard, M., J., Carpenter, J.M., Gelin, L.F.F. & Noll, F.B. (2010). *Chartergellus golfitensis* West-Eberhard: a new species of Neotropical swarm-founding wasp (Hymenoptera: Vespidae, Polistinae) with notes on the taxonomy of *Chartergellus zonatus* Spinola. Journal of Hymenoptera Research, 19: 84-93.