

CREMATOGASTER GHONEIMI, SP. NOV., A NEW ANT SPECIES (HYMENOPTERA: FORMICIDAE) FROM THE KINGDOM OF SAUDI ARABIA

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Abstract.— *Crematogaster ghoneimi*, sp. nov. is described from the southwestern mountains of the Kingdom of Saudi Arabia (KSA) based on the worker caste. The new species is most similar to *C. chiarinii* Emery, 1881, type locality Ethiopia, and can be readily distinguished from all other regional congeners by the long, thin, and acute propodeal spines, presence of a single pair of hairs on the promesonotum, and lacking a subpetiolar process.



Key words.— Afrotropical Region, Asir Mountains, Arabian Peninsula, key, Middle East, Myrmicinae.

INTRODUCTION

Members of the genus *Crematogaster* have established a wide range of ecological association with plants (Hölldobler and Wilson 1990), e.g. *Macaranga* (Fiala 1988) and *Acacia* (Palmer *et al.* 2013), by nesting in hollow tree trunks and branches (Brown 2000), and defending plants against herbivores (Fiala *et al.* 1989, Stanton and Palmer 2011), for extrafloral nectaries (Blaimer 2021), while numerous species tend plant sap sucking hemipterans (e.g. mealybugs, scale insects, or aphids) for honeydew (Kaplan and Eubanks 2005, Rico-Gray and Oliveira 2007, Styrsky and Eubanks 2010, Blaimer 2021).

Crematogaster is one of the most species rich genera of the Myrmicinae with 515 described species, 262 valid subspecies, and three fossil species (Bolton 2020) distributed worldwide in tropical and subtropical regions (Brown 2000, Blaimer 2021). The genus

includes a large number of species and subspecies with a remarkable infraspecific variations, which make species boundaries difficult to be assessed, in addition to the nearly complete lack of the taxonomic revisions for most of zoogeographical regions except for the Malagasy (Blaimer 2010, 2012a, 2012b, Blaimer and Fisher 2013) and the Nearctic regions (Ward and Blaimer 2022). Other important contributions to the taxonomic knowledge of *Crematogaster* have been made by Blaimer (2012c, d).

A synopsis on the history of the Arabian *Crematogaster* has been presented by Sharaf *et al.* (2019). In this study the genus was reviewed, seventeen species were recognized, keyed, and two new species were described, *C. jacindae* Sharaf & Hita Garcia 2019 from Dhofar (Oman), and *C. grylli* Sharaf & Hita Garcia, 2019 from southwestern mountains of the Kingdom of Saudi Arabia (KSA). In the present work, another new species is described from the southwestern mountains of the KSA based on the worker caste.

MATERIAL AND METHODS

The terminology used to describe surface sculpture of the new species follows Harris (1979). Measurements, indices and morphological terminology follow Sharaf *et al.* (2019), Blaimer (2010), and Longino (2003). Digital color images of full-face view of the head, profile and dorsal views of the body the new species were created using a Leica DFC450 digital camera with a Leica Z16 APO microscope and LAS (v3.8) software.

Measurements

EL = Eye Length; maximum diameter of eye in lateral view,
 HL = Head Length; maximum length of head, excluding mandibles in full-face view,
 HW = Head Width; maximum width of head behind eyes in full-face view,
 ML = Mesosoma Length (=Weber Length); length of mesosoma in lateral view; from a point at which pronotum meets cervical shield to posterior base of propodeal lobes or teeth,
 PPL = Postpetiole Length; maximum length measured in dorsal view,
 PSL = Propodeal spine length; length of propodeal spine from the tip of the measured spine to the centre of the propodeal spiracle in profile,
 PSP = Propodeal spiracle diameter in profile,
 PTL = Petiole Length; maximum length measured in dorsal view, from anterior margin to posterior margin,
 PPW = Postpetiole Width; maximum width measured in dorsal view,
 PTW = Petiole Width; maximum width measured in dorsal view,
 PW = Pronotal Width; maximum width in dorsal view,
 SL = Scape Length, excluding basal neck.
 TL = Total Length, sum of lengths of head, mesosoma, petiole, postpetiole in profile.

Indices

CI = Cephalic Index ($HW/HL \times 100$),
 EI = Eye Index ($EL/HW \times 100$),
 PSI = Propodeal Spine Index ($PSL/ML \times 100$),
 SI = Scape Index ($SL/HW \times 100$).

RESULTS

Crematogaster ghoneimi Sharaf sp. nov. (Fig. 1)

Holotype: pinned worker, KSA: Al Bahah, Shada Al 'Ala, 19°51.762'N, 41°18.089'E, 1225 m, 08.xii.2014, (Al Dhafer *et al.*) (CASENT0746645, King Saud University Museum of Arthropods).

Paratypes: pinned workers, KSA: Al Bahah, Shada Al 'Ala, 19°51.066'N, 41°18.037'E, 1325 m, 08.xii.2014, (Al Dhafer *et al.*), 1w; Al Bahah, Shada Al 'Ala, 19°50.329'N, 41°18.604'E, 1563 m, 15.ii.2014, (Al Dhafer *et al.*), 1w; Al Bahah, Shada 'Al Ala, 19°51.762'N, 41°18.089'E, 1225 m, 15.xi.2015, (Al Dhafer *et al.*), 1w; Dhi Ayn village, 19.931°N, 41.441°E, 728 m, 11.iv.2016, (Sharaf MR), 3w; Dhi Ayn village, 19.929°N, 41.441°E, 741 m, 18.v.2010, (Sharaf MR), 3w; Dhi Ayn village, 19.929°N, 41.441°E, 741 m, 15.v.2011, (Sharaf MR), 2w; Wadi Dafa, near Eiban, 17.374°N, 43.075°E, 888 m, 12.xi.2012, (Sharaf MR), 3w; Al Bahah, Amadan, Al Mandaq, 20.202°N, 41.231°E, 1881 m, 19.v.2010, (Sharaf MR), 1w, (King Saud University Museum of Arthropods).

Holotype Worker. Measurements. EL 0.22; HL 0.87; HW 0.92; ML 1.05; PPL 0.25; PSL 0.3; PSP 0.05; PTL 0.27; PPW 0.30; PTW 0.25; PW 0.52; SL 0.77; TL 2.45. Indices: CI 106; EI 24; PSI 29; SI 84.

Paratype Workers (n=12). Measurements. EL 0.20; HL 0.75–0.82; HW 0.80–0.95; ML 0.9–1.05; PPL 0.17–0.25; PSL 0.20–0.30; PSP 0.02–0.07; PTL 0.22–0.27; PPW 0.22–0.27; PTW 0.25; PW 0.50–0.60; SL 0.50–0.75; TL 2.20–2.60. Indices: CI 100–127; EI 21–25; PSI 22–29; SI 57–84.

Diagnosis. *Crematogaster ghoneimi* sp. nov. is distinguished from related congeners by the combination of the following characters: promesonotum with a single pair of hairs; subpetiolar process absent; propodeal spines exceptionally thin, long and acute, distinctly more than three times longer than its base; at least twice longer than propodeal spiracle diameter.

Worker. Head. As long as or slightly broader than long with convex sides and shallowly concave posterior margin; antennae 12-segmented; in full-face view antennal scapes when laid back from their insertions just reach posterior margin of head; eyes of moderate size (EI 21–25), located nearly at mid-length of head in full-face view and with about 13 ommatidia in the longest row; anterior clypeal margin broadly convex in full-face view. **Mesosoma.** Mesonotum in profile with a tubercle on promesonotal suture; metanotal groove deeply impressed; propodeal spines exceptionally thin, long and acute, distinctly more than three times longer than its base; at least twice longer than propodeal spiracle diameter; propodeal spiracle circular located at the base of the propodeal spines. **Petiole.** In profile petiole distinctly longer than high; broader anteriorly than posteriorly in dorsal view; subpetiolar process absent. **Postpetiole.** Postpetiolar node distinctly bilobed in dorsal view; nearly as high as petiole in profile. **Pilosity.** Cephalic surface with abundant scattered fine pale hairs; anterior clypeal margin and mandibles with several long yellow hairs; antennae and legs with abundant appressed pubescence; promesonotum with a single pair of hairs; promesonotum, mesonotum and

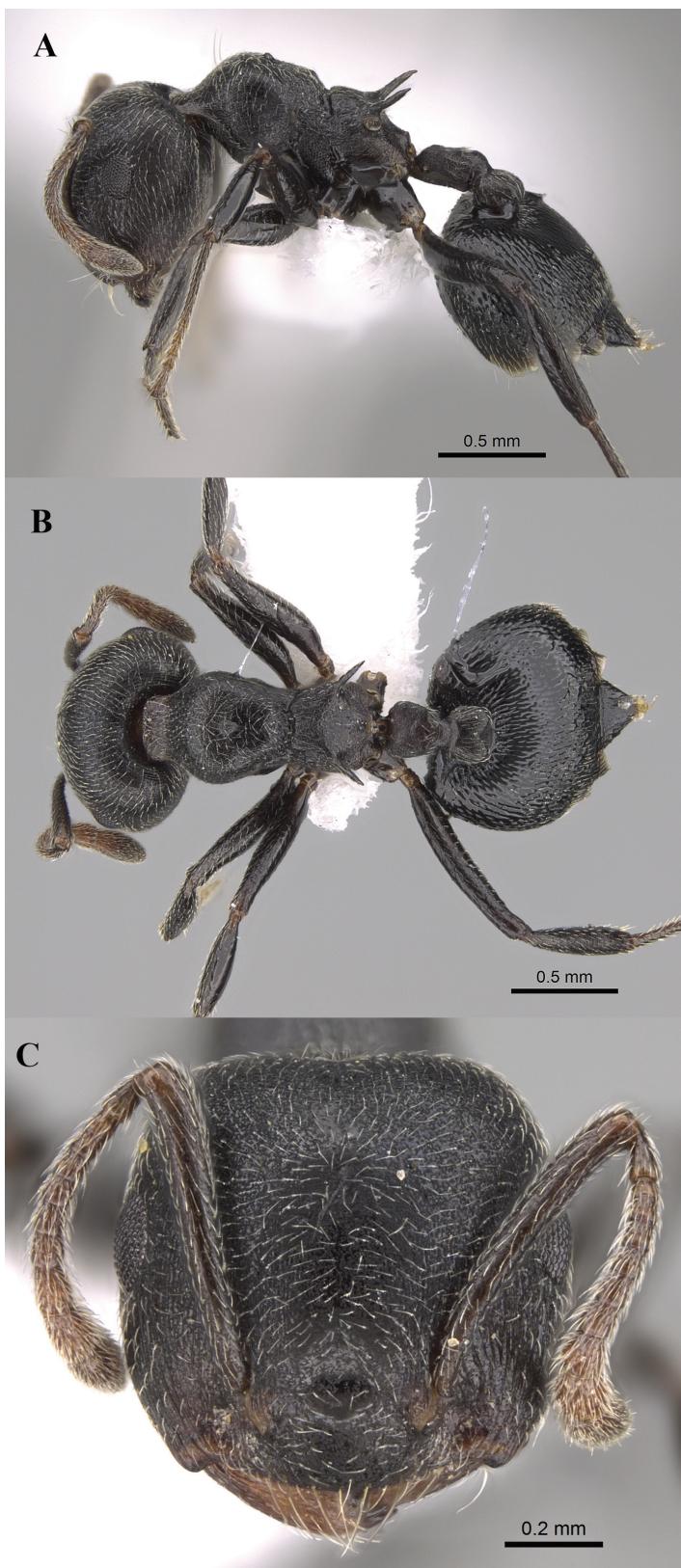


Figure 1 A–C. *Crematogaster ghoneimi* sp. nov. (A) body in profile, (B) body in dorsal view, (C) head in full-face view, CASENT0746645, (Michele Esposito), www.AntWeb.org.

propodeum dorsum with appressed pale pubescence; no hairs or pubescence on propodeum; petiole and postpetiole each with several pairs of posteriorly directed hairs; gastral pilosity restricted to few pairs on posterior margins of gastral tergites; gastral tergites with scattered appressed pubescence. **Sculpture.** Mandibles longitudinally striated; clypeal finely punctulate; area in front of eyes finely longitudinally striated; cephalic surface feebly and densely punctulate; mesosoma lateral sides, petiole and postpetiole faintly punctulate; gastral tergites smooth and shining. **Color.** Uniform black to black-brown, antennae dark brown.

Etymology. The patronymic epithet has been selected in honor of the Egyptian urologist Prof. Mohamed Ghoneim in recognition of his medical achievements.

Geographic range. This new species is only known from KSA.

Ecological and biological notes. The new species was collected by pitfall trap next to a tree, *Adenium obesum* (Forssk.) Roem. & Schlt. (Apocynaceae). The type locality (Fig. 2 A–B) is characterized by a high floral diversity. Common taxa include *Juniperus procera* Hochst. Ex Endle. (Cupressaceae), *Acacia gerrardii* Benth (Fabaceae) and *Aloe officinalis* Forssk. (Aloeaceae). (Ghazanfar and Fisher 1998; Zohary 1973; Thomas 2016, El-Hawagry *et al.* 2016).

In Sharaf *et al.* (2019)'s key to Arabian species, *C. ghoneimi* will key to couplet 8 along with *C. acaciae* Forel, 1892 and *C. chiarinii* Emery, 1881. Herein, Couplet 8 is modified for the separation of the three species (Fig. 3A–F).

Key

- 8. Body uniform yellow; propodeal spine in profile distinctly shorter than its base (Fig. 3A); propodeum dorsum seen from above faintly longitudinally striated (Fig. 3B). *C. acaciae* Forel
- . Body Brown-black to black; propodeal spine distinctly longer than its base (Fig. 3C); propodeum dorsum seen from above faintly punctate (Fig. 3D) 9
- 9. Promesonotum without hairs (Fig. 3C); propodeal spine in profile nearly twice longer than its base and tapering apically; subpetiolar process present (Fig. 3C) *C. chiarinii* Emery
- . Promesonotum with a single pair of hairs (Fig. 3E); propodeal spine in profile distinctly more than three times longer than its base and not tapering apically; subpetiolar process absent (Fig. 3F) *C. ghoneimi* sp. nov.

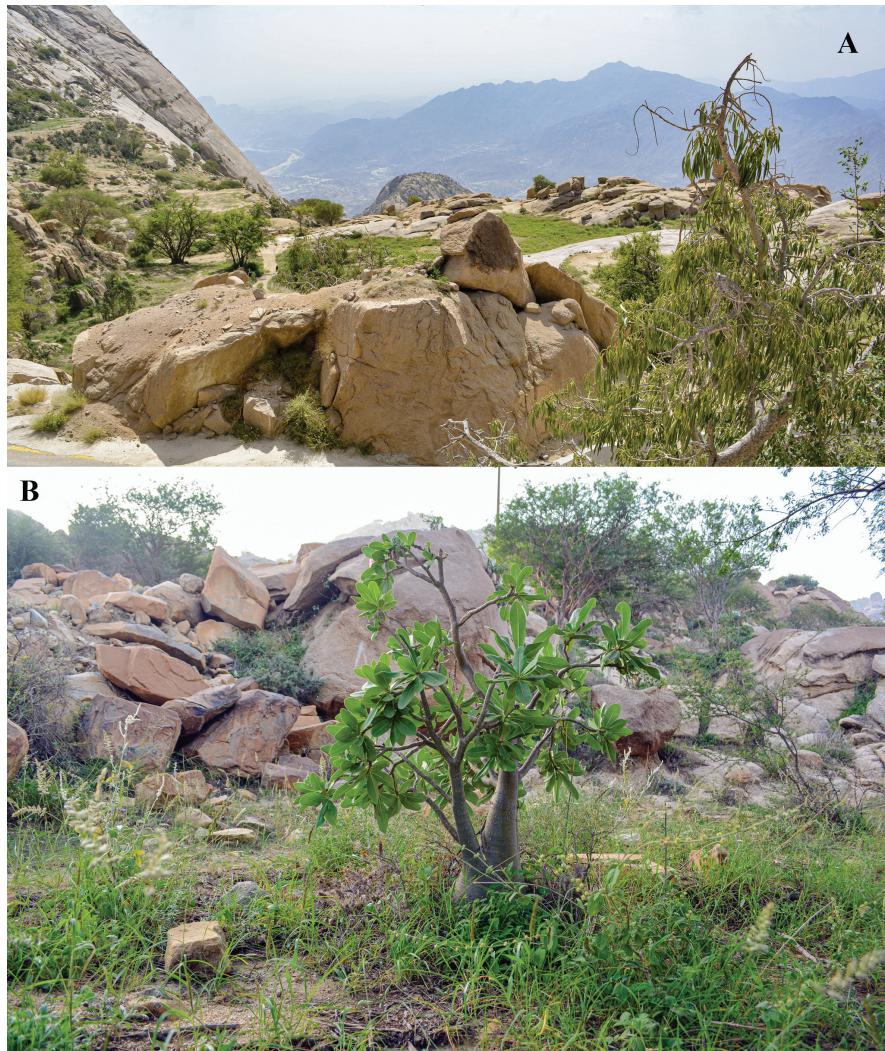


Figure 2 A, B. Shada Al 'Ala Mountain, the type locality of *Crematogaster ghoneimi* sp. nov. (A. Shams Al 'Ola).

DISCUSSION

Crematogaster ghoneimi is closely related to *C. chiarinii* described from Ethiopia from which it can be easily distinguished by the remarkably longer and thinner propodeal spines that are more than $3 \times$ longer than its base; the presence of a single pair of hairs on promesonotum, and absence of the subpetiolar process, whereas *C. chiarinii* has shorter propodeal spines, about $1.5 \times$ longer than their base, an acute subpetiolar process and the lack of promesonotum hairs. In addition, the propodeal spines are tapering apically in *C. chiarinii* (Fig. 3C), but not tapering apically in *C. ghoneimi* (Fig. 3E). Comparing *C. ghoneimi* with type material of *C. affabilis* Forel, 1907, (currently treated as a junior synonym of *C. chiarinii*), the former can be isolated by the longer scape that reaches the posterior margin of the head in full-face view,

whereas the latter has the scape clearly not reaching the posterior margin of head.

Through the present work, the total number of *Crematogaster* species hitherto known from the Arabian Peninsula includes 18 species. Most of these species are distributed in the *Juniperus* and *Acacia* woodlands of the mountain ranges of southwestern KSA that extend onto Yemen (Collingwood 1985, Collingwood and Agosti 1996, Sharaf *et al.* 2019). This characteristic distributional pattern is apparently related to the rich floral diversity of this region, dominated by *Juniperus* and *Acacia* (e.g. Madden and Young 1992, Martins 2010, Palmer and Brody 2013, Ward and Blaimer 2022). The discovery of *C. ghoneimi* supports a previous contention of Sharaf *et al.* (2019) that new species of *Crematogaster* will be discovered in the poorly collected regions of the vast Arabian Peninsula.

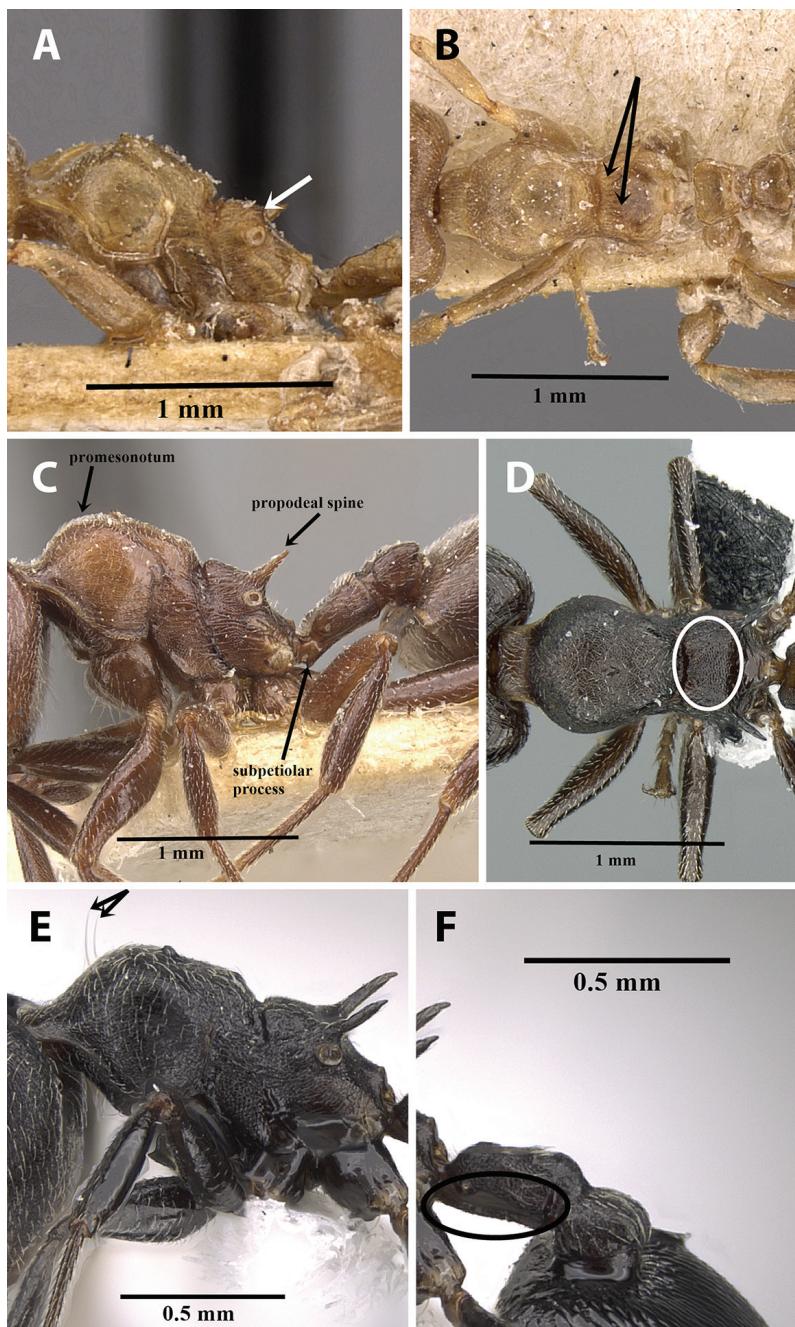


Figure 3 A–F. Key's illustrations, (A) Mesosoma in profile of *C. acacia*, CASENT0908494, (Zach Lieberman); (B) Mesosoma in dorsal view of *C. acacia*, CASENT0908494 (Zach Lieberman); (C) Mesosoma in profile of *C. chiarinii*, CASENT0908514 (Will Ericsen); (D) Mesosoma in dorsal view of *C. chiarinii*, CASENT0906371, (Estella Ortega); (E) Mesosoma in profile of *Crematogaster ghoneimi* sp. nov., CASENT0746645, (Michele Esposito); (F) Petiole of *Crematogaster ghoneimi* sp. nov., CASENT0746645, (Michele Esposito).

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Conflict of Interest. The authors declare that they have no conflict of interest.

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