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Crematogaster bonnieae (Hymenoptera, Formicidae), a new acrobat-ant species from the Western Ghats, India

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A new species of the acrobat-ant genus *Crematogaster*, *C. bonnieae*, is described from the Western Ghats, India based on workers. The morphology of the new species is fairly distinguishable from other congeners by the following combination of characters: relatively large eyes; long antennal scapes, surpassing posterior head margin; propodeal spines reduced, tuberculate; 11-segmented antennae, and 3-segmented club. An identification key to the 33 Indian species/subspecies of *Crematogaster* is also provided.

Introduction

The mega diverse ant genus *Crematogaster* Lund, 1831, also known as, one of the 'giant genera of ants' (Bolton 1995), is currently represented by 519 extant species, 260 subspecies and 3 extinct species (*see* https://www.antweb.org). Roughly distributed between latitudes of ~50°N and ~40°S ranges, *Crematogaster* has the highest diversity recorded in tropical, subtropical, and savannah habitats of the Neotropical and the Palaeotropical regions, and warmer temperate climates of the southern Holarctic region (Blaimer 2012a). Despite their impressive diversity and ecological significance, the *Crematogaster* is one of the taxonomically neglected, hyper-diverse ant genus with majority of species poorly described (Sharaf *et al.* 2019). With a unique connection of the postpetiole to the dorsal surface of the gaster (an acrobat position), these species are easily identified, but species delimitation is less clearly demarcated with remarkable intraspecific variations. However, numerous infraspecific names based on slight variation have further burdened the taxonomy of the genus with already 326 synonyms, 13 homonyms, 17 unavailable names, 204 obsolete combinations, and 1 unavailable misspelling (Brown 1973, Blaimer 2012a; *see* also http://antcat.org).

Traditionally the genus consisted of 13 subgenera, which were recently revisited and merged into two: *Crematogaster* Lund, 1831, *sensu stricto* (with few circumscribed species-groups) and *Orthocrema* Santschi, 1918 (Blaimer 2012a, 2012b). The comprehensive studies of Blaimer (2012a, 2012b), in addition to clearing the subgeneric confusion, also highlighted the existing knowledge gaps among the Asian species and signified need for further studies. The Asian region, however, a vast composite of the eastern part of

http://zoobank.org/References/9255B5FC-B3A1-4DE6-A458-D64F833A7050

the Palaearctic, the Oriental, and the western part of the Indo Australian regions (Hosoishi & Ogata 2009a), will require much work for framing general idea about the actual diversity of the genus. With recent revisions of *Crematogaster* in some parts of South East Asia their knowledge has improved. However, on the whole, the genus is in a dire need of a global revision in general and for the Asian region in particular (Hosoishi & Ogata 2008, 2009b, 2015, 2017).

Here, we describe a new species which we placed within the subgenus *Crematogaster sensu stricto* characterised by petiole moderately flared in dorsal view, postpetiole bilobed, having a broad distinct median impression, propodeal spiracle circular (not oval or compressed oval as it should be for the subgenus), occipital carinae reduced, antennae 11-segmented, with 3-segmented club (Blaimer 2012a). The new species appears distinct with reduced propodeal spines and seems uncommon in the Western Ghats range, since it was not encountered from any other locality. We also provide a list of the known Indian species of the genus, and a key to facilitate species identification. We recognise 33 valid species/subspecies including the new one described herein.

Material and methods

The specimens were collected by hand picking. Morphological analysis was conducted using a Nikon SMZ 1500 stereo zoom microscope. For digital images, an MP evolution digital camera was mounted on the same microscope and the Auto-Montage (Syncroscopy, Division of Synoptics, Ltd.) software was used. Description and morphological terminology for measurements and indices follow Blaimer (2010) and Blaimer and Fisher (2013) and include:

CI = cephalic index: HW/HL.
EL = eye length (measured along the maximum diameter).
HL = head length (perpendicular distance from line tangent to rearmost points of vertex margin to line tangent to anterior most projections of clypeus, in full face view).
HW = maximum head width including eyes in full face view.
LBI = leg/body index: WL/LHT.
LHT = length of metatibia, excluding the proximomedial condyle.
OI = ocular index: EL/HL.
PPL = postpetiole length; measured in dorsal view at an angle that maximizes length.
PPI = postpetiole width index: PPW/PPL.
PPW = postpetiole width; measured in same view as and perpendicular to postpetiole length.
PTH = petiole height; measured in lateral view as vertical distance from ventral margin to highest point of dorsoposterior margin.
PTHI = petiole height index: PTH/PTL.
PTL = petiole length; measured in lateral view as the distance from dorsoposterior margin of segment to anterior inflection point where petiole curves up to condyle.
PTW = petiole width (maximum width of petiole in dorsal view).
PTWI = petiole width index: PTW/PTL.
SI = scape index: SL/HW.
SL = scape length (length of scape shaft from apex to basal flange, not including basal condyle and neck; if scape is strongly arched, this measurement is taken as the chord length from the basal flange to the apex).
SPI = propodeal spine index: SPL/WL.
SPL = propodeal spine length (measured from tip of propodeal spine to closest point on outer rim of propodeal spiracle, maximizing spine length in lateral view).
WL = Weber's length (measured in lateral view of mesosoma, distance from approximate inflection point, where downward sloping pronotum curves into anteriorly projecting neck, to posteroventral propodeal lobes).
Other abbreviation: PUAC = Punjabi University Patiala, Ant Collection, Punjab, India.

Crematogaster (*Crematogaster*) *bonnieae* *sp. nov.* (Fig. 1)

Material examined. **Holotype**: worker (PUAC0015). India. Kerala, Periyar Tiger Reserve, Manalar, 9°35′N, 77°18′E, 1630 m a.s.l., 24 October 2011, hand collected, leg. Shahid A. Akbar. **Paratypes**: 2 workers (PUAC0016, PUAC0017), same data as holotype.

Etymology: The specific epithet is a Latinized noun in genitive, derived from the first name of Bonnie B. Blaimer in honour of her significant contributions to studies of the

Fig. 1. *Crematogaster bonnieae* ***sp. nov***. — **A**: Head, frontal view. — **B**: Habitus, lateral view. — **C**: Habitus, dorsal view. — **D**: Type locality (photo by Lakshmi Chandrakanth).

genus. The word 'bonnie' is also coincidentally a Scots English dialect word meaning 'pretty' or 'beautiful', which seems appropriate in respect of the new species.

Diagnosis. The new species differs from its congeners by the following combination of characters: relatively large eyes (OI = 0.28–0.29); long antennal scapes (0.86–0.87 mm), surpassing posterior head margin; propodeal spines reduced, tuberculate; 11-segmented antennae, and 3-segmented club. Worker measurements (mm, n = 3; given are ranges; holotype measurements in parentheses): HW = 0.66–0.68 (0.67), HL = 0.68–0.70 (0.70), EL = 0.20–0.21 (0.20), SL = 0.58–0.59 (0.58), WL = 0.75–0.78 (0.76), SPL = 0.03–0.04 (0.04), PTH = 0.15–0.16 (0.16), PTL = 0.19–0.20 (0.20), PTW = 0.24–0.25 (0.24), PPL = 0.12–0.13 (0.13), PPW = 0.20–0.21 (0.21), LHT = 0.57–0.60 (0.59), CI = 0.96–0.97 (0.96), OI = 0.28–0.29 (0.29), SI = 0.86–0.87 (0.87), SPI = 0.04–0.05 (0.05), PTHI = 0.79–0.80 (0.80), PTWI = 1.20–1.26 (1.20), PPI = 1.61–1.66 (1.62), LBI = 1.29–1.31 (1.29).

Description. Small sized species (HW = 0.66–0.68 mm, WL = 0.75–0.78 mm); head almost as long as broad, sides converging anteriorly and posteriorly (CI = 0.97), rounded, posterior margins straight, occipital carina reduced with weakly defined ridge; antennae 11-segmented, in full-face view antennal scape when laid back surpasses posterior margin of head; masticatory margin of mandibles with four teeth; anterior clypeal margin straight to slightly concave; eyes relatively large (OI = 0.28–0.29), protruding, located above the mid-length of head in full-face view with ca. 20 ommatidia in the longest row.

In lateral view, pronotum, angular; promesonotum demarcated, promesonotal suture distinct, pronotum raised, mesonotum dome shaped and moderately convex; in dorsal view, promesonotum dome shaped with median mesonotal carina present; metanotal groove well developed; propodeal dorsum flat, short; propodeal declivity truncate, propodeal spines reduced, tuberculate; propodeal spiracle distinct, circular; petiole in lateral view distinctly longer than high (PTHI = 0.79–0.80, PTWI = 1.20–1.26); in dorsal view slightly broader anteriorly than posteriorly; angulate, dorsoposterior tubercules feebly marked; subpetiolar process absent; postpetiole node bilobed, merely impressed in dorsal view; slightly higher than petiole in lateral view; subpetiolar process absent.

Cephalic surface with fine pale hairs scattered throughout; anterior clypeal margin and mandibles with several long setae; posterior half of clypeus without setae; antennae and legs with abundant pubescence, mostly appressed with several erect setae also present; mesosoma dorsally with several long setae, small and several long setae also present on propodeum, declivity smooth and shiny; petiole with dorsoposterior erect setae, postpetiole with few pairs of posteriorly directed setae, in addition to appressed pubescence; gaster with abundant short erect setae, and regular appressed to decumbent pubescence.

Cephalic surface mostly smooth with few striations present near antennal fossae and gena; clypeal surface smooth; mandibles longitudinally striate; mesometanotum, propodeum laterally, and pronotum dorsally longitudinally striate, emarginate along the margins; propodeal declivity smooth; petiole and postpetiole imbricate; gastral tergites faintly imbricate.

Head and mesosoma brownish orange, gaster dark brown.

Distribution and habitat: Type locality, Upper Manalar, part of Periyar Tiger Reserve is one of the border regions between Kerala and Tamil Nadu. It includes about 49 km^2 of protected forest area, forming a fascinating green hill landscape. One side of the hill is covered by completely intact forest, while commercial tea gardens of Tamil Nadu are on its other side (Fig. 1D). Several rare ant species have been previously reported from the region (Bharti & Akbar 2013, 2014a, 2014b, Dad *et al.* 2019). The specimens were collected from a tree branch while moving downward. The occurrence of foraging individuals was low and this species seems uncommon in the Western Ghats, since it was not encountered again from any other locality.

Remarks. Among the known Indian species, *Crematogaster bonnieae* appears distinct with its reduced propodeal spines, 11-segmented antennae and the relatively larger eyes (OI = 0.28–0.29). It is similar to African *C. sewellii* Forel, 1891, but differs from it in having straight posterior margin of head; propodeal spines tuber-

culate; basal level portion of metanotum longitudinally striate; petiole broadly oval, dorsolaterally angulate, dorsoposterior tubercules present and postpetiole bilobed, merely impressed posteriorly (*C. sewellii* has posterior margin of head weakly concave; propodeal spines mainly absent; basal level portion of metanotum smooth; petiole weakly flared, dorsolaterally rounded, without posterolateral tubercules; postpetiole bilobed with a broad median impression). The invasive *C. subdentata* Mayr, 1877, also appears to resemble the new species in having reduced propodeal spines and similar body colouration but it can be easily separated from *C. subdentata* by abundant body hairs, flared petiole, pointed subpetiolar process and raised propodeum.

Key to the Indian species of *Crematogaster* based on worker caste (modified from Bingham 1903, Hosoishi & Ogata 2008, 2009a, 2009b, 2012, 2019, Blaimer 2012a, Hosoishi 2015, 2020)

1. Postpetiole globular, lacking median impression. Petiole in dorsal view more or less elongate-rectangular. Propodeal spiracle circular or subcircular. Antennae 11-segmented, antennal scapes often surpassing head margin, and antennae usually with a 2-segmented club, or lacking distinct club. Posterior head margin usually rounded (subgenus *Orthocrema*) 2
1. Postpetiole bilobed, with more or less distinct median impression. Petiole in dorsal view flared to broadly oval, but not rectangular or ovo-rectangular. If petiole elongate-rectangular as above, then propodeal spiracle compressed oval. Antennae usually 11-segmented, rarely 10-segmented, antennal scapes of variable length; if antennae distinctly clubbed, then usually club 3-segmented (subgenus *Crematogaster sensu stricto*) 3
2. Posterior portions of mesonotal dorsum forming short triangle-shaped process. Standing pilosity long and abundant on head, mesosoma, petiole, postpetiole and remains of the gaster. Basal flagellar segment (antennal segment III) longer than broad ..... *C. binghamii*
2. Posterior portions of mesonotal dorsum not forming short triangle-shaped process. Standing pilosity short and sparse. Basal flagellar segment (antennal segment III) broader than long ..... *C. biroi*
3. Reduced number of segments in maxillary and labial palps (palp formula 3, 3, 3, 2 or 2, 2). Ridge separating the lateral and ventral portions of the mesopleuron indistinct. Steeply raised pronotum, smooth and shiny body surface, short, appressed body setae (*ranavalonae*-group) 4
3. Maxillary and labial palp segments in workers not reduced usually 5, 3. Ridge separating the lateral and ventral portions of the mesopleuron distinct. Pronotum may or may not be as above, varying shape 8
4. Scape with sparse setae. Propodeal spiracles as small as mesothoracic spiracles ..... *C. aberrans*
4. Scape with abundant setae. Propodeal spiracles large; diameter ca. 2 × as large as mesothoracic spiracles 5
5. In dorsal view, postpetiole strongly bilobed, more than 2 × as broad as long (PPI 212–236) 6
5. In dorsal view, postpetiole weakly bilobed, generally ca. 1.2 to 2 × as broad as long (PPI 125–200) 7
6. Gena striated; pilosity prominent; propodeal spines relatively larger ..... *C. travancorensis*
6. Gena smooth; pilosity reduced; propodeal spines relatively smaller ..... *C. ebenina*
7. Propodeal spines short; their length equal to or shorter than diameter of propodeal spiracles ..... *C. dalyi*
7. Propodeal spines long; distinctly longer than diameter of propodeal spiracles ..... *C. sikkimensis*
8. Occipital carina reduced but with distinct ridge; 3-segmented antennal club; postpetiole weakly bilobed 9
8. Undeveloped occipital carina not forming a distinct ridge; 2-segmented antennal club; postpetiole strongly bilobed ..... *C. walshi*
9. Petiole diamond-shaped, broadest at mid-length, distinctly wider than postpetiole (PTWI 73–92); propodeal spines elongate, divergent (0.21–0.63 mm); postpetiole subglobular but without distinct longitudinal median sulcus; dorsal surface of head smooth and shiny; promesonotum smooth and shiny; mandible with four teeth; antennal club three-segmented; metanotal groove deep (*ransonneti* group) ..... *C. ransonneti*
9. Petiole not diamond shaped as above; spines not strongly developed as above; other character combination not as above 10
10. Propodeum greatly inflated or mesonotum with posterolateral denticles; head large and broad, often medially depressed; postpetiole globular with a faint posterior impression (*inflata* group) 11
10. Propodeum not greatly inflated neither mesonotum with posterolateral denticles; head not as large and broad as above; postpetiole of various shapes 12
11. Metanotum remarkably broad, massive and swollen; mesonotum without projections ..... *C. inflata*
11. Metanotum not swollen; mesonotum tuberculate ..... *C. wroughtonii*
12. Strongly sculptured body; metanotal groove deep; postpetiole distinctly bilobed; body setae stout; mandible with four teeth; 3-segmented antennal club; propodeal spines developed; petiole broader anteriorly (*rothneyi* group) ..... *C. rothneyi*
12. Character combination not as above 13
13. Petiole flared with sharp dorsolateral margin; postpetiole bilobed, with a broad median longitudinal impression; pronotum with angular margins; mesonotum convex and posterolaterally margined (*rogenhoferi* group) 14
13. Character combination not as above 15
14. Head coarsely striate, fronto clypeal sulcus crescent shaped; propodeal spines directed downward ..... *C. rogenhoferi*
14. Head finely striate, fronto clypeal sulcus pointed; propodeal spines upcurved ..... *C. flava*

15. Head smooth and shining, at most with fine striae 16
15. Head entirely sculptured 25
16. Propodeal spines short 21
16. Propodeal spines relatively long 17
17. Propodeal spines slender, not thick at base .. *C. subnuda*
17. Propodeal spines thick at base 18
18. Propodeal spines cone shaped, straight 19
18. Propodeal spines horn shaped, down curved (*brunnea* species complex) ..... *C. brunnea*
[*C. brunnea* is a complex species group consisting of six species. General characters are reddish brown colouration, head smooth and shining with faint striations near base of antennae and gena, head wider than the mesosoma, the vertex slightly emarginated; mesosoma in lateral view finely striated longitudinally, metanotum deeply concave with acute spine; petiole heart shaped, flattened above; postpetiole globose and biturberculate dorsally; gaster smooth and shining. *C. b. contemta* is a light bicoloured yellowish subspecies with darker brown gaster, propodeal spines small sharply pointed, thick at the base, directed downward. *C. b. nicevillei* is a darker subspecies with smaller spines, deep metanotal groove, raised mesonotum and faintly striate gena. *C. b. nilgirica* is restricted to southern India with prominent striations on head and mesosomal dorsum, propodeal spines large, diverging, fronto clypeal sulcus more or less pointed. *C. b. rabula* is a dull brownish coloured subspecies with pronotum and propodeum dorsally feebly striate, propodeal spines short, pointed, thick at base diverging outwards. *C. b. ruginota* is a light yellowish brown coloured subspecies with deep metanotal groove, strongly raised pro- and mesonotum, propodeal declivity truncate, popodeal spines smaller, pointed, thick at base, directed upward]
19. Reddish brown species; mesosomal dorsum longitudinally striate; propodeal spines larger and thicker ..... *C. hodgsoni*
19. Blackish brown species; mesosomal dorsum reticulate, propodeal spines smaller and thinner 20
20. Pronotum flat dorsally, rounded anteriorly; pro-mesonotal suture obsolete; mesonotum medially depressed ..... *C. pradipi*
20. Pronotum raised, angular anteriorly; pro-mesonotal suture prominent; mesonotum medially raised ..... *C. anthracina*
21. Propodeal spines reduced, tuberculate ..... *C. bonnieae* ***sp. nov.***
21. Propodeal spines well-developed, never tuberculate ... 22
22. Pronotum sculptured ..... *C. buddhae*
22. Pronotum not sculptured, smooth 23
23. Basal portion of metanotum sculptured 24
23. Basal portion of metanotum smooth ..... *C. politula*
24. Dark coloured with dense pilosity; propodeal spines longer ..... *C. sagei*
24. Light coloured with reduced pilosity; propodeal spines smaller ..... *C. sagei laevinota*
25. Propodeal spines distinctly longer than metanotum; mesosoma finely sculptured 26
25. Propodeal spines short; mesosoma strongly sculptured 27
26. Dark maroon species; petiole diamond shaped; postpetiole heart shaped, abdomen strongly striate longitudinally ..... *C. kirbii*
26. Light brown species; petiole heart shaped; postpetiole globular, abdomen smooth not striate longitudinally ... 28
27. Dorsum of petiole strongly angular; pronotum rugose ... . *C. dohrni*
27. Dorsum of petiole rounded; pronotum rugulose .... *C. dohrni artifex*
28. Pronotum striate; propodeal spines thick at base with apex upcurved ..... *C. perelegans*
28. Pronotum reticulate; propodeal spines uniform sized, slender, with straight apex ..... *C. himalayana*

Discussion

Bharti *et al.* (2016) mentioned the presence of 41 *Crematogaster* species in India. Of these, three taxa — *C. aitkenii* Forel, 1902, *C. biroi smythiesii* Forel, 1902, and *C. urvijae* Bharti, 2003 — are now junior synonyms of *C. biroi* Mayr, 1897, whereas *C. rothneyi civa* Forel, 1902, is a junior synonym of *C. rothneyi* Mayr, 1879, (Hosoishi & Ogata 2016, 2019). The original descriptions of three species *C. abdominalis* Motschoulsky, 1863, *C. diffusa* (Jerdon, 1851) and *C. rufa* (Jerdon, 1851) are exceedingly inadequate and their type material is apparently lost. Moreover, many taxa described by Jerdon and Motschoulsky are invalid and have been synonymized or treated as *incertae sedis* (Kerzhner & Jansson 1985, Wachkoo & Bharti 2014). In view of the lack of sufficient information to ascertain their status and with no type material or type images available, authors argue for their doubtful status and consider them *species inquirenda.* Further, no occurrence records of *C. betapicalis* Bolton, 1995, are currently known from modern India. Previous Indian occurrence citations (e.g., Smith 1878, Bharti *et al.* 2016) refer to the type locality, Jhelum Valley (Punjab Hills), which was located in pre-partition British India but is now part of Pakistan. With these exclusions the number of valid *Crematogaster* species/subspecies in India is reduced to 33 (*see* Table 1).

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Table 1. Distribution of *Crematogaster* species in India.

Species	Distribution in India
Crematogaster aberrans Forel, 1892	Arunachal Pradesh, Assam, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Nagaland, Sikkim, West Bengal
Crematogaster anthracina Smith, 1857	Arunachal Pradesh, Assam, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Manipur, Meghalaya, Mizoram, Punjab, Sikkim, Tamil Nadu, Uttarakhand, West Bengal
Crematogaster binghamii Forel, 1904	Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir, Sikkim, Uttarakhand, West Bengal
Crematogaster biroi Mayr, 1897	Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir, Karnataka, Meghalaya, Odisha, Punjab, Sikkim, Uttarakhand, West Bengal
Crematogaster brunnea Smith, 1857	Tamil Nadu
Crematogaster brunnea contemta Mayr, 1879	Arunachal Pradesh, Assam, Gujarat, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Nagaland, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal
Crematogaster brunnea nicevillei Emery, 1922	Sikkim, West Bengal
Crematogaster brunnea nilgirica Emery, 1922	Tamil Nadu, West Bengal
Crematogaster brunnea rabula Forel, 1902	Karnataka, Maharashtra, Tamil Nadu, West Bengal
Crematogaster brunnea ruginota Santschi, 1928	Madhya Pradesh, West Bengal
Crematogaster buddhae Forel, 1902	Andaman and Nicobar Islands, Arunachal Pradesh, Delhi, Kerala, Manipur, Sikkim, West Bengal
Crematogaster dalyi Forel, 1902	Haryana, Karnataka, Tamil Nadu, West Bengal
Crematogaster dohrni Mayr, 1879	Haryana, Karnataka, Kerala, Manipur, Tamil Nadu, Tripura
Crematogaster dohrni artifex Mayr, 1879	Andaman and Nicobar Islands, Arunachal Pradesh, Karnataka, Meghalaya
Crematogaster ebenina Forel, 1902	Arunachal Pradesh, Assam, Karnataka, Kerala, Maharashtra, Manipur, Nagaland, Sikkim, West Bengal
Crematogaster flava Forel, 1886	Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, Tamil Nadu, Tripura, Uttarakhand, West Bengal
Crematogaster himalayana Forel, 1902	Himachal Pradesh, Manipur
Crematogaster hodgsoni Forel, 1902	Haryana, Karnataka, Meghalaya
Crematogaster inflata Smith, 1857	Manipur
Crematogaster kirbii (Sykes, 1835)	Maharashtra
Crematogaster perelegans Forel, 1902	Himachal Pradesh, Karnataka, Maharashtra, Punjab, Tamil Nadu
Crematogaster politula Forel, 1902	Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Sikkim, West Bengal
Crematogaster pradipi Tiwari, 1999	Tamil Nadu
Crematogaster ransonneti Mayr, 1868	Haryana, Karnataka, Maharashtra, Sikkim, West Bengal
Crematogaster rogenhoferi Mayr, 1879	Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Goa, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Sikkim, Tamil Nadu, Uttarakhand, West Bengal
Crematogaster rothneyi Mayr, 1879	Bihar, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal
Crematogaster sagei Forel, 1902	Arunachal Pradesh, Haryana, Himachal Pradesh, Jammu & Kashmir, Sikkim, Uttarakhand, West Bengal
Crematogaster sagei laevinota Forel, 1902	Himachal Pradesh, Madhya Pradesh
Crematogaster sikkimensis Forel, 1904	Sikkim, West Bengal
Crematogaster subnuda Mayr, 1879	Arunachal Pradesh, Assam, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Maharashtra, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal
Crematogaster travancorensis Forel, 1902	Kerala, Manipur, Meghalaya, West Bengal
Crematogaster walshi Forel, 1902	Arunachal Pradesh, Assam, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, West Bengal
Crematogaster wroughtonii Forel, 1902	Andaman and Nicobar Islands, Haryana, Karnataka, Kerala, Maharashtra, Tamil Nadu, West Bengal

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References

Bharti, H. & Akbar, S. A. 2013: Taxonomic studies on the ant genus *Cerapachys* Smith (Hymenoptera, Formicidae) from India. — *ZooKeys* 336: 79–103, https://doi.org/10.3897/zookeys.336.5719.

Bharti, H. & Akbar, S. A. 2014a: *Tetraponera periyarensis*, a new pseudomyrmecine ant species (Hymenoptera: Formicidae) from India. — *Asian Myrmecology* 6: 43–48.

Bharti, H. & Akbar, S. A. 2014b: Taxonomic studies on the genus *Myrmoteras* Forel (Hymenoptera: Formicidae), with description of two new species from India. — *Journal of Entomological Research Society* 16: 71–80.

Bharti, H., Guénard, B., Bharti, M. & Ecomono, E. P. 2016: An updated checklist of the ants of India with their specific distributions in Indian states (Hymenoptera: Formicidae). — *ZooKeys* 551: 1–83, https://doi.org/10.3897/zookeys.551.6767.

Bingham, C. T. 1903: *The fauna of British India, including Ceylon and Burma. Hymenoptera*, vol. II: *Ants and Cuckoo-wasps*. — Taylor and Francis, London.

Blaimer, B. B. 2010: Taxonomy and natural history of the *Crematogaster (Decacrema)*-group in Madagascar. — *Zootaxa* 2714: 1–39, https://doi.org/10.11646/zootaxa.2714.1.1.

Blaimer, B. B. 2012a: A subgeneric revision of *Crematogaster* and discussion of regional species-groups (Hymenoptera: Formicidae). — *Zootaxa* 3482: 47–67, https://doi.org/10.11646/zootaxa.3482.1.3.

Blaimer, B. B. 2012b: Acrobat ants go global — origin, evolution and systematics of the genus *Crematogaster* (Hymenoptera: Formicidae). — *Molecular Phylogenetics and Evolution* 65: 421–436, https://doi.org/10.1016/j.ympev.2012.06.028.

Blaimer, B. B. & Fisher, B. L. 2013: Taxonomy of the *Crematogaster degeeri*-species-assemblage in the Malagasy region (Hymenoptera: Formicidae). — *European Journal of Taxonomy* 51: 1–64, https://doi.org/10.5852/ejt.2013.51.

Bolton B. 1995: *A new general catalogue of the ants of the world.* — Harvard University Press, Cambridge.

Brown, W. L. 1973: A comparison of the Hylean and Congo-West African rain forest ant faunas. — In: Meggers, B. J., Ayensu, E. S. & Duckworth, W. D. (eds.), *Tropical forest ecosystems in Africa and South America: a comparative review*: 161–185. Smithsonian Institution Press, Washington, DC.

Dad, J. M., Akbar, S. A., Bharti, H. & Wachkoo, A. A. 2019: Community structure and ant species diversity across select sites of Western Ghats, India. — *Acta Ecologica Sinica* 39: 219–228, https://doi.org/10.1016/j.chnaes.2018.12.008.

Hosoishi, S. 2015: Revision of the *Crematogaster ranavalonae*-group in Asia, with description of two new species (Hymenoptera, Formicidae). — *Journal of Hymenoptera Research* 42: 63–92, https://doi.org/10.3897/JHR.42.8758.

Hosoishi, S. 2020: Taxonomic review of the *Crematogaster ransonneti*-group in Asia, with description of a new species from Malaysia (Hymenoptera: Formicidae: Myrmicinae). — *Raffles Bulletin of Zoology* 68: 759–768, https://doi.org/10.26107/RBZ-2020-0087.

Hosoishi, S. & Ogata, K. 2008: The ant genus *Crematogaster* Lund, subgenus *Physocrema* Forel, in the Indochinese Peninsula (Hymenoptera: Formicidae). — *Asian Myrmecology* 2: 1–10.

Hosoishi, S. & Ogata, K. 2009a: A check list of the ant genus *Crematogaster* in Asia (Hymenoptera: Formicidae). — *Bulletin of the Institute of Tropical Agriculture Kyushu University* 32: 43–83.

Hosoishi, S. & Ogata, K. 2009b: A taxonomic revision of the Asian endemic subgenus *Physocrema* of the genus *Crematogaster* (Hymenoptera: Formicidae). — *Zootaxa* 2062: 15–36, https://doi.org/10.11646/zootaxa.2062.1.2

Hosoishi, S. & Ogata, K. 2012: Revision of the *Crematogaster brevis* complex in Asia (Hymenoptera: Formicidae). — *Zootaxa* 3349: 18–30, https://doi.org/10.11646/zootaxa.3349.1.2.

Hosoishi, S. & Ogata, K. 2015: Review of the *Crematogaster popohana*-group with the description of a new species from the Indochinese Peninsula (Hymenoptera: Formicidae). — *Asian Myrmecology* 7: 11–18.

Hosoishi, S. & Ogata, K. 2016: Systematics and biogeography of the ant genus *Crematogaster* Lund subgenus *Orthocrema* Santschi in Asia (Hymenoptera: Formicidae). — *Zoological Journal of the Linnean Society* 176: 547–606, https://doi.org/10.1111/zoj.12330.

Hosoishi, S. & Ogata, K. 2017: Phylogenetic analysis and systematic position of two new species of the ant genus *Crematogaster* (Hymenoptera, Formicidae) from Southeast Asia. — *European Journal of Taxonomy* 370: 1–17, https://doi.org/10.5852/ejt.2017.370.

Hosoishi, S. & Ogata, K. 2019: Cryptic diversity of the widespread Asian ant *Crematogaster rothneyi* (Hymenoptera: Formicidae) inferred from morphological and genetic evidence. — *Zoological Studies* 58, 11, https://doi.org/10.6620/ZS.2019.58-11.

Kerzhner, I. M. & Jansson, A. 1985. The type-specimens of Heteroptera described by V. Motschulsky. — *Annales Entomologici Fennici* 51: 33–45.

Sharaf, M. R., Aldawood, A. S. & Hita Garcia, F. 2019. Review of the Arabian *Crematogaster* Lund (Hymenoptera, Formicidae), synoptic list, distribution, and description of two new species from Oman and Saudi Arabia. — *ZooKeys* 898: 27–81, https://doi.org/10.3897/zookeys.898.37531.

Smith, F. 1878: *Scientific results of the Second Yarkand Mission; based upon the collections and notes of the late Ferdinand Stoliczka, Ph.D. Hymenoptera.* — Superintendent of Government Printing (Government of India), Calcutta.

Wachkoo, A. A. & Bharti, H. 2014. First description of the worker caste of *Nylanderia smythiesii* (Hymenoptera: Formicidae). — *Biodiversity Data Journal* 2, e1163, https://doi.org/10.3897/BDJ.2.e1163.