

First Record of *Camponotus japonicus* Mayr, 1866 (Hymenoptera: Formicidae) from India

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Abstract

Camponotus japonicus Mayr, 1866 is recorded for the first time from India. Formerly, it was documented from China, Japan, Mongolia, North Korea, Pakistan, Philippines, Russia and South Korea.

Keywords: *New record, Formicinae, India.*

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Introduction

The *Camponotus* Mayr, 1861 is a diverse genus which belongs to subfamily Formicinae. The genus has a wide distribution and occupies almost all biogeographical regions of the World (Bolton *et al.*, 2007). At present 1,053 valid species and 443 subspecies are described from all over the world (Bolton, 2021). From India the genus is represented by 75 species (Bharti *et al.*, 2016).

The significant contributions to the taxonomy of genus *Camponotus* from all over the globe include Mayr (1861), Emery (1896, 1920, 1925), Forel (1912, 1914), Arnold (1922), Wheeler (1922) and Santschi (1926, 1928). Whereas, Blaimer *et al.* (2015) and Ward *et al.* (2016) revised the classification of the genus on the basis of molecular phylogeny.

From India, taxonomic contributions include Bingham (1903), Datta & Raychaudhuri (1985), Karmaly & Narendran (2006), Bharti & Wachkoo (2014, 2015), Wachkoo (2015), Bharti *et al.* (2016), Wachkoo & Akbar (2016).

Camponotus japonicus was described by Mayr, 1866 from Japan. It has been classified as subspecies of *Camponotus pennsylvanicus* (Forel, 1879, 1904; Ruzsky, 1905) and subspecies of *Camponotus herculeanus* (Emery, 1908; Wheeler, 1906, 1909, 1921; Ruzsky, 1925; Kuznetsov-Ugamsky, 1929; Yasumatsu & Brown, 1951). Later, it was raised to species level (Bingham, 1903; Santschi, 1920, 1925;

Emery, 1925; Ruzsky, 1926; Wheeler, 1927, 1928; Karavaiev, 1929; Stitz, 1934; Yasumatsu & Brown, 1957; Arnoldi, 1967; Kupyanskaya, 1990). The species is classified as senior synonym of *Camponotus japonicus miltotus*, *Camponotus sanguinea* and *Camponotus japonicus wui* by Yasumatsu & Brown (1951). Radchenko (1997) sited it as senior synonym of *Camponotus aterrimus* (and its junior synonym *Camponotus japonicus manczshuricus*).

Mostly the colonies of *C. japonicus* are monogynous, but in some cases large colonies are found to be polygynous (Wang *et al.*, 1991). The workers prey upon small arthropods and honey dew collected from aphids (Wu & Wang, 1995). Abe (1973) mentioned that the species nests in soil in open habitats and nest entrance's open directly without a surrounding mound.

This species displays a symbiotic association with myrmecophilous *Lycaenid argyrognomon*. The caterpillars of *Lycaenid argyrognomon* pupate within the nests of *C. japonicus* in the field to protect themselves from predators (Watanabe & Hagiwara 2009 ; Mizuno *et al.*, 2018).

During the present study, we redescribed *Camponotus japonicus* Mayr, 1866 from India complemented with digital images.

Materials and Methods

Taxonomic and morphometric analysis

First Record of *Camponotus japonicus* Mayr, 1866 from India

was conducted using a Nikon SMZ 1500 stereo zoom microscope. Digital images of the specimens were captured using a Nikon SMZ 1500 stereomicroscope fitted with an MP (Micro Publisher) digital camera and Auto Montage (Syncroscopy, a division of synoptics Ltd.) software. All the images were cleaned with Adobe Photoshop CS5 and Helicon Filter 5. Morphological terminology and standard measurements follow Salata *et al.* (2020). Specimens examined are deposited at “Punjabi University Patiala Ant Collection” (PUAC) at Department of Zoology and Environmental Sciences, Punjabi University, Patiala, Punjab, India.

Abbreviations used

HL: head length; measured in a straight line from mid-point of anterior clypeal margin to mid-point of posterior margin of head in full-face view;

HW: head width; measured in full-face view directly above the eyes;

SL: scape length; maximum straight-line length of scape excluding the basal condylar bulb;

PW: pronotum width; maximum width of pronotum in dorsal view;

PRL: propodeum length; measured in lateral view, from metanotal suture to posterior-most point of propodeum;

PRW: propodeal width; maximum width of propodeum in dorsal view;

PTH: petiole height; the chord of ventral petiolar profile at node level is the reference line perpendicular to which the maximum height of petiole is measured in lateral view;

PTW: petiole width; maximum width of the petiolar node in lateral view;

WL: Weber's length; measured as diagonal length from the anterior end of the neck shield to the posterior margin of the propodeal lobe.

Ratios

CI: cephalic ratio, HL/HW;

SI: scape ratio, SL/HL;

PI: petiole ratio, PTH/PTW.

Result

Material examined: INDIA, Arunachal Pradesh, Tawang [27.5866°N, 91.8582°E], 1700

m, Hand picking, 08.ix.2019, 3w. Tarun Dhadwal leg. (PUAC).

Description of Worker (Figs: 1-6):

Measurements (in mm):

Major Worker: HL: 2.34-2.58, HW: 2.13-2.40, SL: 2.28-2.38, WL: 2.07-2.17, PW: 1.35-1.38, PRL: 0.63-0.65, PRW: 0.39-0.43, PTH: 0.66-1.01, PTW: 0.60-0.80, CI: 1.09-1.07, SI: 0.97-0.92, PI: 1.11-1.26 (n = 2).

Minor Worker: HL: 1.74, HW: 1.53, SL: 1.77, WL: 2.4, PW: 1.29, PRL: 0.57, PRW: 0.3, PTH: 0.72, PTW: 0.54, CI: 1.13, SI: 1.01, PI: 1.33 (n=1).

In major worker, head is longer than broad, with slightly convex lateral margins and an emarginated posterior margin. Scape long, surpasses the posterior border of head by more than a quarter of its length. Anterior margin of clypeus is convex rather than carinate. Eyes are small and prominently situated before the midlength of the head. Mandibles are short and have 6 teeth. While in the case of minor worker, head is relatively small and sub-rectangular in shape. Mandibles have 5 teeth.

Head in both major and minor worker opaque, densely microreticulate punctate. Mandibles are gleaming and punctured. Major workers have more hair on their bodies than minor workers. Short erect hair covers the posterior margin of the head. The anterior border of the clypeus is covered with long erect setae.

Mesosoma of both major and minor workers is not consistently convex, with a noticeable suture between the pronotum and the mesonotum. The mesosoma of a major worker is strong and obliquely truncate at the propodeum. In minor workers, the slope of the metanotum is less steep. Propodeal spiracle elongate. The whole surface of the mesosoma is covered in long erect and sub erect hair. Petiole node in Major worker is quite thick, anteriorly convex, and posteriorly flat. Petiole having 2 or 3 standing hair on dorsal surface.

Gaster is swathed in long golden recumbent hair. The hindtibia is prismatic, having 9 to 12 spines on the inner side of the tibia.

Body coloration: Both major and minor workers are black in colour.

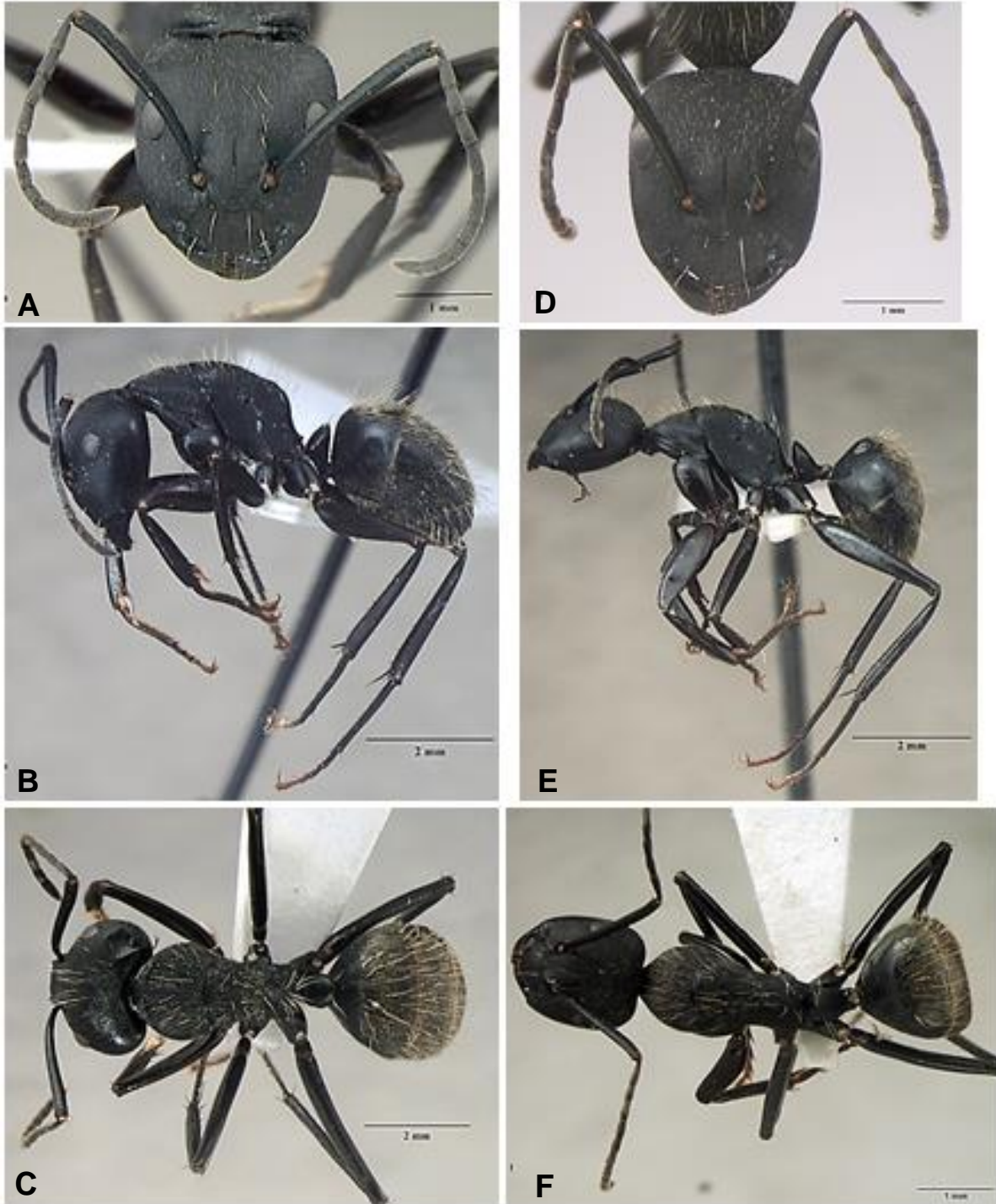


Figure 1: *Camponotus japonicus* Mayr, 1866: **A:** Major worker Head, full face view; **B:** Major worker Body, lateral view; **C:** Major worker Body, dorsal view; **D:** Minor worker Head, full face view; **E:** Minor worker Body, lateral view; **F:** Minor worker Body, dorsal view.

Distribution: The species is widely distributed in China, Japan, Mongolia, North Korea, Pakistan, Philippines, Russia and South Korea.

Bionomics: The workers were collected by hand picking method over the grass near Kitpi lake from Tawang district of Arunachal Pradesh. The

First Record of *Camponotus japonicus* Mayr, 1866 from India

lake is situated at an elevation of 1700 meters, with an average daily temperature of 20°C.

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First Record of *Camponotus japonicus* Mayr, 1866 from India

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