



A NEW RECORD OF TERMITE *COPTOTERMES EMERSONI* AHMED

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ABSTRACT

The *Coptotermes* Wasmann (1896), is a highly scattered genus, which is represented by nine species. *Coptotermes emersoni* Ahmad (Isoptera: Rhinotermitidae: Coptotermitinae) is a species first time reported from Southern Haryana, India, with specimens trapped from banyan tree. Morphometric analysis of soldiers like body length, head length without mandibles, head length with mandibles, body pigmentation, antennae segments, tibial spur, tarsal segments, head width, and body width has been made. These reveals that *C. emersoni* has crenulations present on each of the mandibles, right mandible with two crenulation and left mandible with five crenulations which make it unique among other species of the genus *Coptotermes*.

Key words: *Coptotermes*, *emersoni*, Rhinotermitidae, Haryana, soldiers, morphometrics, mandible, tarsi, tibial spur, crenulations, head, antenna, body, pigmentation

Termites are ecosystematically dynamic insects belonging to the order Isoptera, of which 3106 species under 330 genera and 12 families are known (Krishna et al., 2013a; Singla et al., 2013; Singla et al., 2016; Kakkar et al., 2017; Paul et al., 2018; Murthy, 2020; Effowe et al., 2021). Of these, only 300 species are from India under 37 genera and 7 families (Saha et al., 2016; Vidhyashree et al., 2018; Amina et al., 2020). The termites of Haryana state are poorly known- its diversity reported varies, as 11 (Verma, 1989), 19 (Thakur, 1992), 15 (Kumar and Thakur, 2010) or 20 species, ranked under ten genera and three families (Thakur, 2007). The maximum of 37 species under 3 families (Termitidae, Rhinotermitidae and Kalotermitidae) and 11 genera were reported in the subsequent work (Poonia, 2019; Poonia, 2020). Of these *Coptotermes emersoni* (Ahmed) had not so far been reported in Haryana. According to ICZN (International Code of Zoological Nomenclature) genus *Coptotermes* Wasmann (Rhinotermitidae: Coptotermitinae) comprises of 110 subterranean species that are widely scattered in nature because they nest their colony in woody items (Krishna et al., 2013b). Out of these, only 9 species have been identified from India (*Coptotermes beckeri*, *C. ceylonicus*, *C. emersoni*, *C. formosanus*, *C. gaurii*, *C. gestroi*, *C. heimi*, *C. kishori* and *C. travians*) (Roonwal and Chhotani, 1989), whereas, 4 species (*Coptotermes beckeri*, *C. ceylonicus*, *C. heimi*, and *C. kishori*) are from the southern part of India and 4 are from the northern India (*C. kishori*, *C. gestroi*, *C. heimi* and *C. travians*) (Roonwal and Chhotani, 1989; Ranjith and Kalleshwaraswamy, 2021).

Systematic account of *Coptotermes emersoni* Ahmad reveals the chronology as follows: 1953. *Coptotermes emersoni* Ahmad, SpoL ZeyL, 21(1): 37-38. Type-locality: Colombo, Sri Lanka.

1958. *Coptotermes emersoni* Ahmad, Biologio, Lahore, 4(1&2): 65; 1962. *Coptotermes emersoni* Roonwal and Chhotani, Indian Species Termite Genus *Coptotermes* (ICAR Ent. Monogr. 2): 9; 1983. *Coptotermes emersoni* Chhotani, Orient. Insects, 17: 117; 2012. *Coptotermes emersoni* Hemachandra, Edirisinghe, Karunaratne and Gunatilleke, J Natl Sci Found of Sri Lanka, 1-29; and 2013. *Coptotermes emersoni* Krishna, Grimaldi, Krishna and Engel, Bulletin of the American Museum of Natural History, 3(377): 623-973. This study analyses the morphometrics of this new record of the species from southern Haryana. According to recent mentioned data a total of, 37 termite species have been reported from Haryana, which is counted as 10.97% of the total Indian termite fauna (Gupta and Nidhi, 2015; Poonia, 2019).

MATERIALS AND METHODS

Termite samples were collected from Abhepur village, Sohna, Gurgaon district, Haryana (28°17' 38.39208" N, 77° 6' 10.28196" E). Specimens were picked up from banyan tree with forceps and tree trunk was explored with screwdriver, and preserved in 70% alcohol. These vials were carefully labeled with time, date of collection and site of collection (Takematsu and Vongkaluang, 2012; Murthy et al., 2015, 2016;

Kakker et al., 2016, Arif et al., 2019). During collection, main emphasis was given to soldiers, as soldiers are the basis of species identification, and these identified with morphometrics of body and head length with and without mandibles, body pigmentation, antennae segments, tibial spur, tarsal segments, and head and body width (Roonwal and Chhotani, 1989; Scheffrahn et al., 2006; Engle et al., 2009; Saha et al., 2016; Amina et al., 2016; Mahapatro et al., 2018). Five individuals of the caste were used to calculate mean and standard deviation for species identification. The specimens were examined under a light compound microscope and dissecting microscope.

RESULTS AND DISCUSSION

The results revealed the presence of the subterranean genus *Coptotermes* having nine species in India (Roonwal and Chhotani, 1989) and 110 species globally (Krishna et al., 2013b). This genus contributes 8.18% of the world termite fauna, of which three species are from Haryana (Poonia, 2019). This genus is distributed over India, China, Africa, Southeast Asia, Australia, and the Neotropics (Chouvenc et al., 2016) due to their mound construction activity inside woody logs. Therefore, nest erection activity marks this genus as a most common invader in new locality on earth surface. A total of 30-50 individuals of termite were collected and these were identified as *Coptotermes emersoni* Ahmad using identification keys (Roonwal and Chhotani, 1989). As a member of the subterranean termite family Rhinotermitidae, *C. emersoni* is unique termite species with two crenulations present on the right mandible found in India. This species was first reported in Sri Lanka (Roonwal and Chhotani, 1989; Krishna et al., 2013b). These identified individuals were placed under (Inward et al., 2007; Jones and Eggleton 2011).

The morphometrics reveal that total body length of the soldier caste is 4.5-6 mm) comparatively smaller than other species. It has a pale brown oval head with red to brown colored mandibles. Mandibles are less curved and smaller than the head with range of 0.8-0.9 mm. A total of 13 antennae segments are present with 3rd antennal segment smallest; labrum is subtriangular with a pointed apex; left mandible has 4 small crenulations and one large, whereas the right is denoted by only two crenulations, and number of crenulations on the right mandible makes this species unique from other *Coptotermes* species. Three pairs of moving legs having tibial spurs (3:2:2 ratio) and tarsal

segments (4) are present (Fig. 1a-h). The measurements are as follows: Total body length 5.18 ± 0.54 ; head length without mandibles 1.1 ± 0.1 ; head + mandibles length 1.96 ± 0.11 ; mandibles length 0.86 ± 0.05 ; head width 0.96 ± 0.11 ; and body width 1.08 ± 0.08 .

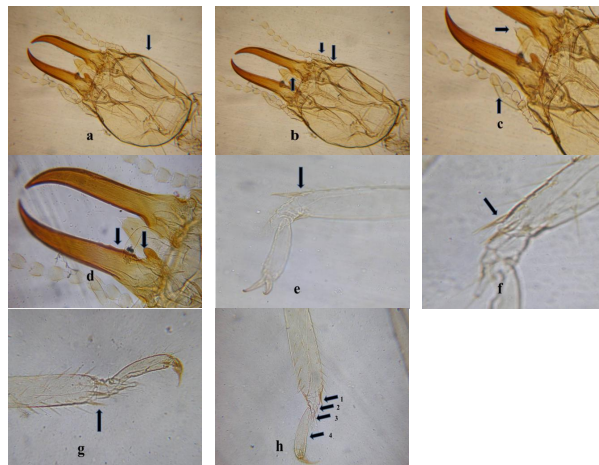


Fig. 1a-h. *Coptotermes emersoni* soldier: a) Head with oval shape, b) Right mandible with 2 crenulations, 1st largest and 3rd smallest antennal segments, c) Labrum with a pointed apex, 13 segmented antennae, d) Left mandible with 4 short crenulations and 1 largest present at base, e) Foreleg with 3 tibial spur, f) Midleg with 2 tibial spur, g) Hind-leg with 2 tibial spur, h) Tarsal segments (4).

AUTHOR CONTRIBUTION STATEMENT

All authors contributed to the idea and design of this manuscript. Literature explorations, data study, and first manuscript draft were done by BP. The final manuscript was revised, edited and approved by all authors.

CONFLICT OF INTEREST

The authors declare that there is no competing interest.

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