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SUBTERRANIAN TERMITE GENUS *ODONTOTERMES* (BLATTARIA: ISOPTERA: TERMITIDAE) FROM CHHATTISGARH, INDIA WITH ITS ANNOTATED CHECKLIST AND REVISED KEY

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Abstract: The paper deals with eight subterranean species of termites of the genus *Odontotermes* from Chhattisgarh, India. Taxonomic descriptions along with photographs and key to all species have been provided. Among them six species are reported for the first time from the state. These six species are added to the previously known eight species resulting in a total of 14 species of termite belonging to four genera under the family Termitidae from Chhattisgarh.

Keywords: Central India, Chhattisgarh, new records, *Odontotermes*, subterranean Termite.

Abbreviations: BadWS - Badalkhol Wildlife Sanctuary; BarWS - Barnawapara Wildlife Sanctuary; BhorWS - Bhoramdev Wildlife Sanctuary; GGNP - Guru Ghasidas National Park; TPWS - Tamor-Pingla Wildlife Sanctuary; coll. - Collected by; Dist. - District; Ex. - Extracted from; sev. S. and W. - Several soldiers and workers; ZSI - Zoological Survey of India; * - new records.

The forest ecosystem is composed by a large majority of insects. Among the known ones, termites (Order: Blattaria; Infraorder: Isoptera) are one of the most interesting biological agents. Termites being decomposers play a vital role in forest growth and hence act as excellent indicators of soil and forest health. They

play a significant role in increasing soil fertility besides being food for several animals including man. These insects are predominantly distributed in the tropics, more so in the humid tropics and sub-tropical regions.

India is rich in termite diversity; harbors 286 species belonging to 52 genera under six families representing almost 10% of the world's termite fauna (Krishna et al. 2013). Except for a few scattered works the termite fauna of central India is insufficiently documented. Sarma et al. (1975) while studying the wood destroying termites of India, recorded 21 species under 10 genera. Termite fauna of Kanha National Park was studied by Chhotani (1997). Verma & Thakur (1982) studied termite fauna of Madhya Pradesh and recorded 18 species under six genera of which six species were recorded for the first time. Recently, Saha & Basak (2011) published a detailed taxonomic account of 35 termite species under 14 genera and three families from central India including eight species from the state of Chhattisgarh. From India, 41 species under the genus *Odontotermes* are: *adampurensis* Akhtar, *anamallensis* Holmgren

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& Holmgren, *assmuthi* Holmgren, *bellahunisensis* Holmgren & Holmgren, *bhagwati* Chatterjee & Thakur, *boveni* Thakur, *brunneus* (Holmgren), *ceylonicus* (Wasmann), *distans* Holmgren & Holmgren, *escherichi* (Holmgren), *feae* (Wasmann), *feaeoides* Holmgren & Holmgren, *ganapati* Bose, *giriensis* Roonwal & Chhotani, *girnarensis* Thakur, *globoicola* (Wasmann), *guptai* Roonwal & Bose, *gurdaspurensis* Holmgren & Holmgren, *horai* Roonwal & Bose, *horni* (Wasmann), *kapuri* Roonwal & Chhotani, *kulkarnii* Roonwal & Chhotani, *latigula* (Snyder), *latiguloides* Roonwal & Verma, *malabaricus* Holmgren & Holmgren, *microdentatus* Roonwal & Sen-Sarma, *mirganjensis* Holmgren & Holmgren, *mohandi* Verma & Purohit, *obesus* (Rambur), *paralatigula* Chatterjee & Sen-Sarma, *paralatiguloides* Thakur, *parvidens* Holmgren & Holmgren, *profeae* Akhtar, *proformosanus* Ahmad, *prolatigula* Bose, *redemanni* (Wasmann), *sasangirensis* Thakur, *singsiti* Bose, *vaishno* Bose, *wallonensis* (Wasmann), and *yadevi* Thakur. The present paper is based on the taxonomic study of eight species of termites, among them six species are new records to the state, thus six species are added to the previously recorded eight species by Saha & Basak (2011), resulting in a total of 14 species of termites from Chhattisgarh.

MATERIALS AND METHODS

Study period

The specimens were collected from different parts of Chhattisgarh during faunistic surveys conducted by ZSI (Fig. 1), Kolkata from July 2011 to December 2012. Collections were mostly made during the monsoon (July to September) and post monsoon (October and November) seasons.

Study Area

Chhattisgarh is a newly carved out state from the state of Madhya Pradesh, in 2001. The state extends between 17°46'–24°8'N & 80°15'–84°24'E in the central Indian landscape having a total area of 1,35,194km². Nearly 44% of the state area is covered by forests and a major part (35736.239km²) is outside protected areas. Biogeographically, the state is in the Deccan Plateau and includes 6D-Chota Nagpur Plateau, 6C-Eastern Highland and 6E-Central Highland (Rodgers et al. 2002).

The state is surrounded by the upper Gangetic Plains in the north, Godavari Valley in the south, Madhya Pradesh in the west, and Odisha and Jharkhand in the east. The state has a rich repository of natural resources and biological wealth but is under severe threat due to rapid encroachment of forests for agriculture,

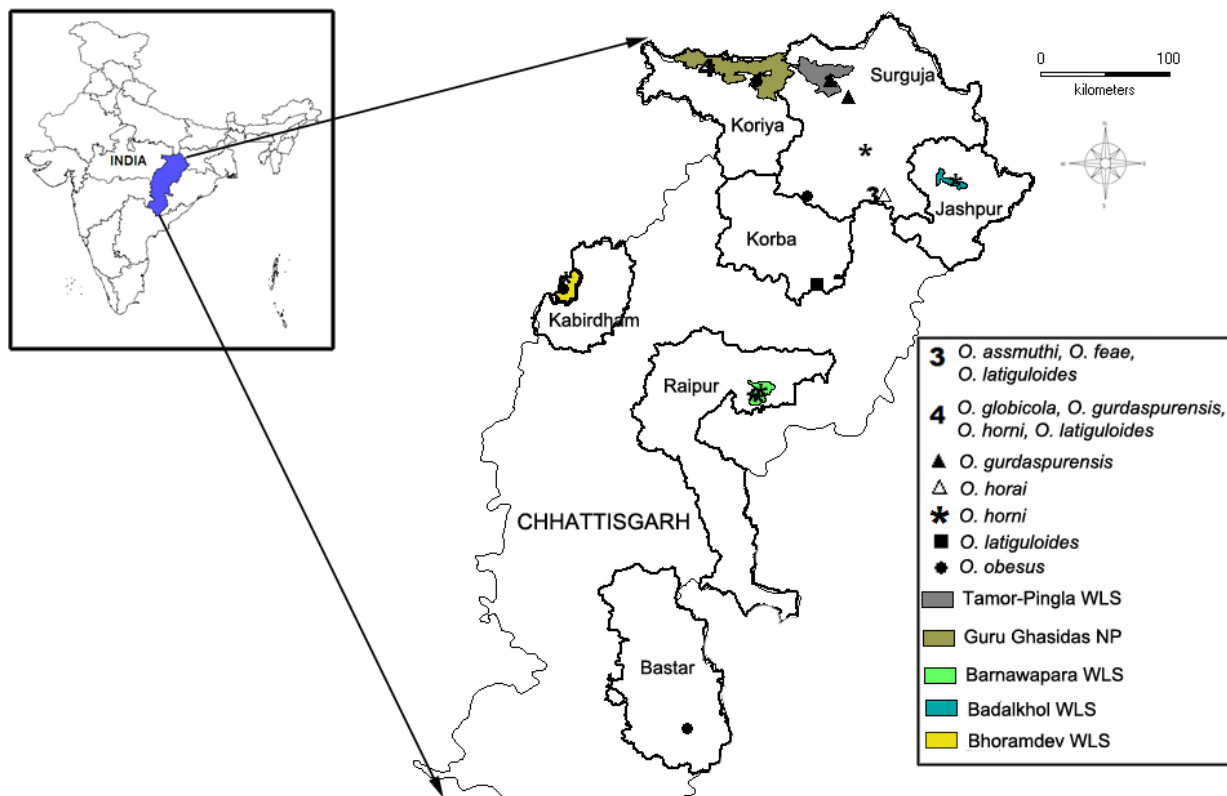


Figure 1. The distribution sites of termites.

urbanization and from hunting. Till date no serious attempt has ever been made to explore the fauna of the state in a systematic manner.

Data Collection and Analysis

Termite specimens were collected from mounds, fallen logs, below leaf litter and cow dung by using brush moistened with alcohol (Image 1a–d). Specimens collected from different sites were preserved separately in 70% alcohol in 5ml glass vials. Attempts were made to collect soldiers specifically, since termite taxonomy is based mainly on the head morphology of the soldiers for all species. During each collection event different habitat parameters such as vegetation type, ground cover, shrub density, distance from water body etc. were collected along with the geographic coordinates of the site with the help of Garmin Oregon 550 GPS device. Coordinates thus gathered were further used to prepare maps of collection localities in the program DIVA-GIS version 7.5.0 (Fig. 1). The collected specimens were brought back to ZSI Kolkata laboratory for identification and further study. Identification was done following Roonwal & Chhotani (1989) and Chhotani (1997).

RESULTS

Family: Termitidae Westwood

Subfamily: Macrotermitinae Kemner

1. **Odontotermes assmuthi* Holmgren (Image 2)

1913. *Odontotermes* (*Odontotermes*) *assmuthi* Holmgren, J. Bombay Nat. Hist. Soc., 22(1): 112-113.

2013. *Odontotermes assmuthi*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1138-1141.

Material examined: 4157/H11. 12.ix.2012, Surguja District, Mainpat, Jaljali, 1 vial with several soldiers and worker (sev. S and W.), coll. A. Raha & party, ex. soil under leaf litter.

Diagnosis: Soldier: Head-capsule, antennae and labrum pale yellow to pale brown. Head capsule sub-rectangular, sides slightly convex (length to base of mandibles 1.45–1.53, maximum width 1.12–1.30 mm), anteriorly very slightly converging at base of mandibles (width at base of mandibles 0.78–0.98 mm, head-convergence index 0.68–0.78). Antennae with 16 (rarely 17) segments; 4th segment shortest. Mandible stout and short, apically weakly incurved (length 0.77–0.95 mm), very slightly longer than half of head-length (index: mandible length/head length 0.51–0.57). Left mandible with a prominent, anteriorly directed tooth a little behind apical third. Post mentum sub-rectangular (0.94–1.25, Maximum width 0.45–0.60 mm). Pronotum length 0.48–0.58 mm, width 0.75–0.95 mm.



Image 1. Different habitats where termites collected



Image 2. Mandible and head structure of *Odontotermes assmuthi* (Wasmann)



Image 3. Mandible and head structure of *Odontotermes feae* (Wasmann)

Distribution: India: Chhattisgarh (Surguja), Assam, Bihar, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Tamil Nadu, West Bengal, Uttar Pradesh; Bangladesh, Pakistan.

Remarks: The species is quite common in the Indian subcontinent. The species has been collected from wooden structures, fallen logs of important timber species (Sharma et al. 1975; Chhotani, 1997; Saha & Basak 2011).

2. *Odontotermes feae* (Wasmann) (Image 3)

1896. *Termes feae* Wasmann, Ann. Mus. Civ. Stor. Nat. Genova, (2)16(36): 625, 626. S. and W. Type locality: Carin Cheba, Myanmar.

1912. *Odontotermes feae*: Holmgren, J. Bombay Nat. Hist. Soc., 21(3): 786-787.

2013. *Odontotermes feae*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1169-1173.

Material examined: 4158/H11. 12.ix.2012. Surguja District, Mainpath, Jaljali, 1 vial with sev. S. and W., coll. A. Raha & party, ex. soil under leaf litter.

Diagnosis: Soldier: Head capsule yellow to reddish-brown. Total body length 6.5–9.0 mm. Head capsule sub-rectangular, longer than wide (head length with mandibles 3.65–4.75 mm and length to base of mandibles 2.53–3.00 mm, maximum width 2.15–2.45 mm); widest in posterior region, width more than 3/4th of length. Antennae with 17 segments; segment three shortest. Mandible stout, strong, saber shaped;

a little longer than head length (length 1.20–1.65 mm, mandible/head index 0.51–0.59). Left mandible with a medium-sized tooth near middle, tooth distance from tip of mandible 0.67–0.90 mm (tooth index: 0.50–0.54). Postmentum sub-rectangular, somewhat swollen near basal 3rd (length 1.30–2.0 mm, maximum width 0.73–0.98 mm). Pronotum length 0.75–1.0 mm, width 1.40–1.83 mm.

Distribution: India: Chhattisgarh (Surguja), Arunachal Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Manipur, Mizoram, Meghalaya, Nagaland, Assam, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, Uttarakhand, Andhra Pradesh, Daman, Goa, Haryana, Himachal Pradesh, Kerala, Maharashtra, Punjab; Bangladesh, Bhutan, Myanmar, Nepal, Thailand, Sri Lanka and Vietnam.

Remarks: Common soil inhabiting species but found in underground nest in South and Southeast Asia. The species is a variable species and morphologically very similar to *O. horni*. It attacks any sort of material of cellulosic origin.

3. **Odontotermes globicola* (Wasmann) (Image 4)

1902. *Microtermes globicola* Wasmann, Zool. Jb. Syst., 17(1): 116-117. S and W. Type locality: Anuradhapura, Sri Lanka.

1987. *Odontotermes globicola*: Chhotani & Bose, Bull. Zool. Surv. India, 8(1-3): 61-64.

2013. *Odontotermes globicola*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1184-1186.



Image 4. Mandible and head structure of *Odontotermes globicola* (Wasmann)



Image 5. Mandible and head structure of *Odontotermes gurdaspurensis* Holmgren & Holmgren

Material examined: 4159/H11. 16.ix.2012. Surguja District, Tara, Gaddaghat, 1 vial with sev. S. and W., coll. A. Raha & Party, Ex. from mound; (ii) Reg. No.: 4160/H11, 4161/H11. 11.v.2013, Koriya District, GGNP, Behrapani, 2 vials with sev. S. W., Reg. No.: 4162/H11, 4163/H11, 4164/H11, 12.v.2013, Khirki Beat, 3 vials with sev. S. and W., coll. A. Raha & Party, Ex. from cow dung and soil under the stone.

Diagnosis: Soldier: Head capsule yellowish to dark golden brown, roundly oval converging anteriorly, widest behind middle (length to base of mandibles 0.90-1.03 mm, maximum width 0.83-0.95 mm, width at mandible base 0.53-0.58 mm, index maximum width/length 0.86-0.94, index width at mandible base/maximum width 0.61-0.618). Total body length 3-4 mm. Antennae 15-16 segmented, 4th shortest. Mandible length 0.60-0.69 mm, shorter than head (index: mandible length/head length 0.60-0.73. Tooth distance from tip 0.13-0.15 mm (tooth index: tooth distance/mandible length 0.21-0.25).

Distribution: India: Chhattisgarh (Koriya, Surguja), Delhi, Jammu & Kashmir, Karnataka, Kerala, Nagaland, Rajasthan, Tamil Nadu, Uttar Pradesh; Pakistan and Sri Lanka.

Remarks: The species is a variable one since a number of species have been synonymised under it (Chhotani 1997). In the study area the species was collected from soil under cow dung and stone. On one occasion it was also collected from a mound, which is an unusual abode, since it is not known as a mound-builder species in India (Roonwal & Chhotani 1989).

4. *Odontotermes gurdaspurensis* Holmgren & Holmgren (Image 5)

1917. *Odontotermes* (*Cyclotermes*) *obesus* f. *gurdaspurensis* Holmgren & Holmgren, Mem. Dept.

Agric. Sci., 5: 149-150. S. and W. Type locality: Gurdaspur, Punjab, India.

1997. *Odontotermes gurdaspurensis*: Chhotani, Fauna of India: Isoptera (Termites), 2: 490-493.

2013. *Odontotermes gurdaspurensis*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1191-1193.

Material examined: 4165/H11, 4166/H11, 4167/H11, 14.v.2013, Surguja District, TPWS, Ramkola, 3 vials with sev. S. and W., ex. mound in mango orchard, coll. A. Raha & party; 4168/H11, 18.v.2013, Jajabal, 1 vial with sev. S. and W., coll. A. Raha & party.

Diagnosis: Soldier: Head-capsule golden yellow to dark brown, sub-rectangularly oval, sides sub-parallel and weakly converging in front of antennae (length to base of mandibles 1.42-1.63 mm, max. width 1.20-1.40, width at base of mandibles 0.73-0.95 mm, index: maximum width/length 0.80-0.89, index: width at base of mandibles/maximum width 0.58-0.68). Antennae 16 segmented, 4th segment shortest. Mandible length 0.98-1.08 mm, longer than half of the head length (index: mandible length/head length 0.63-0.72). Left mandible with sharp tooth at little behind distal third (tooth distance 0.33-0.45 mm, tooth index: tooth distance/mandible length 0.33-0.40). Postmentum sub-rectangular, sides weakly convex (length 0.80-1.0 mm, max. width 0.40-0.55 mm).

Distribution: India: Chhattisgarh (Koriya, Surguja), Gujarat, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Punjab, Haryana, Rajasthan, Uttarakhand, Uttar Pradesh, West Bengal; Pakistan.

Remarks: One of the most common mound building species in northern India and recorded from a mound in a mango orchard.



Image 6. Mandible and head structure of *Odontotermes horai* Roonwal & Chhotani



Image 7. Mandible and head structure of *Odontotermes horni* (Wasmann)

5. **Odontotermes horai* Roonwal & Chhotani (Image 6)

1962. *Odontotermes horai* Roonwal and Chhotani, Proc. Natn. Inst. Sci. India, (B) 28(4): 289-296, 346-349, Pls. 30, 31. S. and W. Holotype: S, in ZSI. Type Locality: Bank of Nong priang Stream, Khasi Hills, Meghalaya, India.

2013. *Odontotermes horai*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1195-1196.

Material examined: 4169/H11, 11.ix.2012, Surguja District, Mainpat, Sankarghat, 1 vial with sev. S. and W., coll. A. Raha & party, ex. soil under leaf litter.

Diagnosis: Soldier: Head capsule and labrum brownish-yellow; sub-rectangular; sides slightly narrowed in front; longer than wide (length to base of mandibles 1.65–1.85 mm, maximum width 1.28–1.65 mm, index: width/length 0.74–0.89). Antennae 15–16 segmented, 4th shortest. Mandibles saber-shaped, slightly incurved near tips (mandible length 1.05–1.23 mm, index: mandible length/head length to base of mandibles 0.55–0.65). Left mandible with a small tooth in proximal part of middle third, tooth index: tooth distance/mandible length 0.60–0.66. Postmentum sub-rectangular (length 1.13–1.38, maximum width 0.53–0.70 mm), Pronotum much broader than long (length 0.55–0.75 mm, max. width 0.90–1.25 mm).

Distribution: India: Chhattisgarh (Surguja), Arunachal Pradesh, Gujarat, Meghalaya, Nagaland, Sikkim, West Bengal, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Assam; Nepal, Pakistan.

Remarks: The species was found in soil under leaf

litter in the study area and is more common in the Himalayan region of India (Mukherjee et al. 2008).

6. **Odontotermes horni* (Wasmann) (Image 7)

1902. *Termes horni* Wasmann, Zool. Jb. Syst., 17(1): 111. S. and W. Lectotype: Sin NHM, Maastricht. Type locality: Nalanda, Sri Lanka.

1953. *Termes (Termes) horni* Wasmann: Rattan Lal and Menon. Cat. India. Insects, Isoptera - Pt. 27: 79-80.

2013. *Odontotermes horni*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1197-1200.

Material examined: Reg. No.: 4170/H11, 14.ix.2012, Surguja District, Ambikapur FRH, 1 vial with sev. S. and W., coll. A. Raha & party, ex. mud plaster in the wooden fence; 4171/H11, 11.v.2013, Koriya District, GGNP, Behrapani, 1 vial with sev. S. and W., coll. A. Raha & party, ex. fallen log; 4172/H11, 05.xi.2011, Raipur District, Bar WS, Hardipathar, 1 vial with sev. S. and W., coll. Anil & A. Gangopadhyay; 4173/H11, 06.xi.2011, Dond Forest, 1 vial with sev. S. and W., coll. Anil & A. Gangopadhyay; 4174/H11, 09.xi.2011, Nawapara Forest, coll. Anil & A. Gangopadhyay; 4175/H11, 22.xi.2011, Kabirdham District, Bhor WS, Jamunpani Forest, 1 vial with sev. S. and W., coll. Anil & A. Gangopadhyay; 4176/H11, 24.ix.2013, Jashpur District, Bad WS, Archesia, 1 vial with sev. S. W., coll. A. Raha & Party.

Diagnosis: Soldier: Head yellow to reddish-brown, subrectangular, sides substraight very slightly converged in front of antennae (length to base of mandibles 2.50–3.00 mm, width 1.80–2.20 mm). Antennae with



Image 8. Mandible and head structure of *Odontotermes latiguloides* Roonwal & Verma



Image 9. Mandible and head structure of *Odontotermes obesus* (Rambur).

17 segments. Mandibles strong, stout, saber-shaped (length 1.27–1.60 mm; tooth index mandible length/head length 0.53–0.66), left mandible with a large tooth near the base of middle third (tooth distance 0.70–1.00 mm, index: tooth distance/mandible length 0.57–0.64). Postmentum subrectangular (length 1.50–2.00 mm, max width 0.75–0.93 mm). Pronotum length 0.80–1.03 mm, width 1.40–1.80 mm

Distribution: India: Chhattisgarh (Jashpur, Kabirdham, Koriya, Raipur, Surguja), Andhra Pradesh, Tamil Nadu, Odisha, Tripura, Karnataka, Kerala, Sikkim, Manipur, Arunachal Pradesh, Uttar Pradesh, Meghalaya, Nagaland, West Bengal, Madhya Pradesh, Assam; Sri Lanka, Vietnam, Bhutan, Cambodia, Pakistan.

Remarks: The species causes severe damage to dried up bark of numerous plants and to dead wood (Sharma et al. 1975) and is also a pest of tea and rubber plantations.

7. **Odontotermes latiguloides* Roonwal & Verma (Image 8)

1973. *Odontotermes latiguloides* Roonwal & Verma, J. Indian Acad. Wood. Sci., 4(2): 83-86.

2013. *Odontotermes latiguloides*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1211-1212.

Material examined: 4177/H11, 12.ix.2012, Surguja, District, Mainpat, Jaljali, 1 vial with sev. S. and W., coll. A. Raha & party, ex. soil under leaf litter; 4178/H11, 05.vi.2012, Korba District, Mahulpani, 1 vial with sev. S. and W., coll. A. Raha & party.

Diagnosis: Soldier: Head-capsule yellowish-brown; broadly oval narrowed anteriorly; width almost equal to length (length to base of mandibles 1.00–1.26 mm,

max. width 1.0–1.21 mm, head index: width/length 0.96–1.0). Antennae with 16–17 segments, 3rd segment shortest. Mandibles saber shaped strongly incurved apically (length 0.79–0.89 mm, index: mandible length/head length 0.75–0.79), left mandible with tooth at about distal 1/3rd of the total length. Postmentum strongly arched and swollen, width slightly shorter than length (length 0.53mm, maximum width 0.47mm, index: width/length 0.92). Pronotum length 0.47–0.58, width 0.79–0.95 mm.

Distribution: India: Chhattisgarh (Korba, Koriya Surguja), Gujarat, Haryana, Karnataka, Punjab, Rajasthan.

Remarks: The species is still confined in Western India including Karnataka (Rathore & Bhattacharya 2004) and recorded for the first time from the study area. The species was collected from wet soil under leaf litter.

8. **Odontotermes obesus* (Rambur) (Image 9)

1842. *Termes obesus* Rambur, History Nat. Insectes, Nevropteres : 304 1n.

1965. *Odontotermes obesus* (Rambur) Am. Mus. Novit., No. 2210: 24-25.

2013. *Odontotermes obesus*: Krishna, et al., Bull. Am. Mus. Nat. Hist., 4: 1129-1138.

Material examined: 4179/H11, 02.viii.2011, Koriya District, GGNP, Khekramara, 1 vial with sev. S. and W., coll. A. Parida; 4180/H11, 16.xi.2011, Kehrpani Forest, 1 vial with sev. S. and W., Kabirdham District, Bhor WS, coll. S.K. Gupta & party; 4181/H11, 01.xii.2011, Rajadhar Forest, 1 vial with sev. S. and W., Kabirdham District, Bhor WS, coll. S.K. Gupta & party; 4182/H11, 13.xii.2011,

Bastar District, Jagdalpur, Marenga, 1 vial with sev. S. and W., coll. Renu Kujur; 4183/H11, 17.ix.2012, Surguja District, Tara, Fatehpur Talab, 1vial with sev. S. and W., coll. A. Raha & party, ex. soil near water body.

Diagnosis: Soldier: Head capsule yellowish to dark reddish-brown; oval, converging in front (length 1.10–1.47 mm, width 1.07–1.37 mm); Antennae with 16–17 segments, third segment shortest; Mandibles thin, saber shaped, left mandible with a prominent tooth at base of distal 3rd. Pronotum length 0.50–0.65 mm, width 0.80–1.07 mm.

Distribution: Chhattisgarh- Bastar, Koriya, Kabirdham, Surguja. Widely distributed in Oriental region including Palearctic region.

Remarks: Common mound building species in the Oriental region including some parts of the Palearctic region. It has been reported as a serious pest of several crop plantations and forests including wood works in building (Roonwal & Chhotani 1989; Maiti & Saha 1998).

DISCUSSION

The subterranean genus *Odontotermes* is a very common genus containing 41 species in India (Thakur 1981; Chhotani 1997; Maiti & Saha 1998) against a world total of 199 species (Krishna et al. 2013). The genus is widely distributed covering Ethiopian, Oriental, Palearctic and Papuan region. The record of so many species is no surprise for a vast ecologically varied subcontinent like India, where many more are awaiting discovery. The record of eight species from the study area is quite possible in the primary survey, since the area is very dry with lateritic soil that serves as the limiting factor for termite distribution. The morphological taxonomy in termites is based on minor differences that are often difficult to appreciate, so that species taxonomy remains problematic than that of higher taxa. For example, the closely related species

Odontotermes horni and *O. feae* are identified based on relative placement of tooth on the inner face of the left mandible. However, other morphological features of this species are less convincing to isolate. Most species of termites obviously differ in their feature of biology, ecology and behavior, which are least studied so far in India. Hence, all these aspects need careful investigation in the backdrop of taxonomic studies.

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Key to species of the genus *Odontotermes* from Chhattisgarh

- 1 Tooth on left mandible situated at middle or below the middle 2
 - Tooth on left mandible situated at distal half, from about distal third to further in front 4
- 2 Head length to base of mandible 1.65–1.85 mm; left mandible with a minute tooth in proximal part of middle third; mandible-tooth index, 0.65 *O. horai* Roonwal & Chhotani
 - Head length to base of mandible more than 2.00mm; left mandible with large tooth and situated on or little below of middle 3
- 3 Left mandibular tooth placed near the middle, mandible- tooth index: 0.50–0.54; head-capsule widest near posterior third, sides weakly but distinctly converging anteriorly; head-length, 2.53–3.00 mm, head-width 2.15–2.45 mm
 *O. feae* (Wasmann)
 - Left mandibular tooth placed near proximal end of middle one-third, mandible- tooth index: 0.57–0.64; head- capsule widest almost at the middle, sides parallel, indistinctly converging anteriorly; head length 2.50–3.00, max. head-width, 1.80–2.20 mm *O. horni* (Wasmann)
- 4 Antennae uniformly colored; inner margin of left mandible anterior to tooth wavy (out curved), parrot's beak like, head capsule subrectangular, head- length 1.45- 1.53 mm, and max head width 1.12- 1.30 mm...*O. assmuthi* Holmgren
 - Antennae darker in colour distally and paler basally 5
- 5 Postmentum extraordinarily wide, sides strongly outcurved [left mandibular tooth situated anterior to distal third mandible- tooth index 0.21–0.25 or 0.33 to 0.38] 6
 - Postmentum not extraordinarily wide, sides sub-parallel to weakly outcurved [left mandibular tooth situated at about distal third, mandible-tooth index: 0.30–0.40] 7
- 6 Species smaller, head- length to base of mandibles 0.90- 1.03 mm; mandible head index: 0.60–0.73 and mandible tooth index: 0.21–0.25 *O. globicola* (Wasmann)
 - Species comparatively large, head-length to base of mandibles 1.00–1.26; mandible head index: 0.75–0.79 and mandible tooth index: 0.33 to 0.38 *O. latiguloides* Roonwal & Verma
- 7 Head-capsule subrectangularly oval with lateral sides almost parallel upto the base of antennae; head- length to base of mandibles 1.42–1.63, max. head width, 1.20–1.40 mm; mandibles comparatively longer (0.98–1.08 mm), mandibular head index: 0.63–0.72 *O. gurdaspurensis* Holmgren & Holmgren
 - Head- capsule oval, distinctly narrowed anteriorly; head length to base of mandibles 1.10-1.47, max. head width, 1.07–1.37; mandibles comparatively shorter (0.75–0.90 mm) mandibular head index: 0.59–0.68.....*O. obesus* (Rambur)

