



## First record of *Ahmaditermes emersoni* Maiti (Isoptera, Termitidae, Nasutitermitinae) from Meghalaya, India

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**ABSTRACT:** The nasutiform termite species *Ahmaditermes emersoni* Maiti is reported from Meghalaya, India for the first time. All the studied samples of the species were collected from betel nut plantation in Mawlynnong area of East Khasi Hill district of the state. Morphology of both the soldier and worker castes of the species was studied in detail and the identification was done based on their morphological characteristics. Redescription of morphology and revision of morphometric of both the soldier and worker castes are provided in this article. With the record of this species, the genus *Ahmaditermes* is also reported for the first time from the state. © 2023 Association for Advancement of Entomology

**KEYWORDS:** Nasutiform species, soldier and worker castes, morphometrics, taxonomy

Termites are eusocial insects that comprise the infraorder Isoptera under the order Blattaria with around 2,933 living species under 282 genera that belong to 9 families that occur world widely across the habitats (Inaward *et al.*, 2007; Krishna *et al.*, 2013a). As new species of termites are being described from different parts of the world, the total number of known species may be more than 3,138 (Mahapatro *et al.*, 2015). Termitidae is the largest family among all the known termite families with about 2,077 species known globally under 7 subfamilies. The subfamily Nasutitermitinae is the second largest in terms of species composition among all the subfamilies of Termitidae with about 596 known species under 77 genera (Krishna *et al.*, 2013a). The genus *Ahmaditermes* is the fourth largest genus among the genera of the subfamily Nasutitermitinae. It comprises 22 species out of which 21 species are known from the Oriental

region and one from the Palaearctic region (Krishna *et al.*, 2013a). The Indian region which consists of India, Bangladesh, Pakistan, Sri Lanka, Bhutan, Nepal and Burma harbours only four species of the genus which are found in India, Bangladesh and Bhutan. Two *Ahmaditermes* species are known from India namely *Ahmaditermes emersoni* (also occur in Bhutan) and *Ahmaditermes sikkimensis* which is only known from India from its type locality Sikkim (Chhotani, 1997; Krishna *et al.*, 2013b). The species *Ahmaditermes emersoni* Maiti is reported for the first time from the state Meghalaya, India identified based on the soldier and worker castes morphology. With this species the genus *Ahmaditermes* is also reported for the first time from the state.

The termite samples, collected from a betel nut plantation of Mawlynnong area, Pynursla, East

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Khasi Hills district, Meghalaya, India, were preserved at 80% alcohol for their identification and further taxonomic studies. Some of the collected colonies of the species are deposited in the national repository of Zoological Survey of India (ZSI) at the North Eastern Regional Centre, Shillong (NERCS), Meghalaya, India and few collected colonies are preserved in the research collection of the entomology laboratory, department of Zoology, North-Eastern Hill University (NEHU), Shillong, Meghalaya, India. The samples were studied under Leica S8AP0 stereo zoom microscope fitted with a GT 5.0 camera and the mosaic V.2 photographic software. All the measurements were taken based on the micrograph using the Image J software (latest available version). All morphological measurements, terminologies and indices used here for both the soldier and worker castes are based on Roonwal and Chhotani (1989) and identification is based on Chhotani (1997).

### *Systematic account*

Infra-order: Isoptera Brullé, 1832

Family: Termitidae Latreille, 1802

Subfamily: Nasutitermitinae Hare, 1937

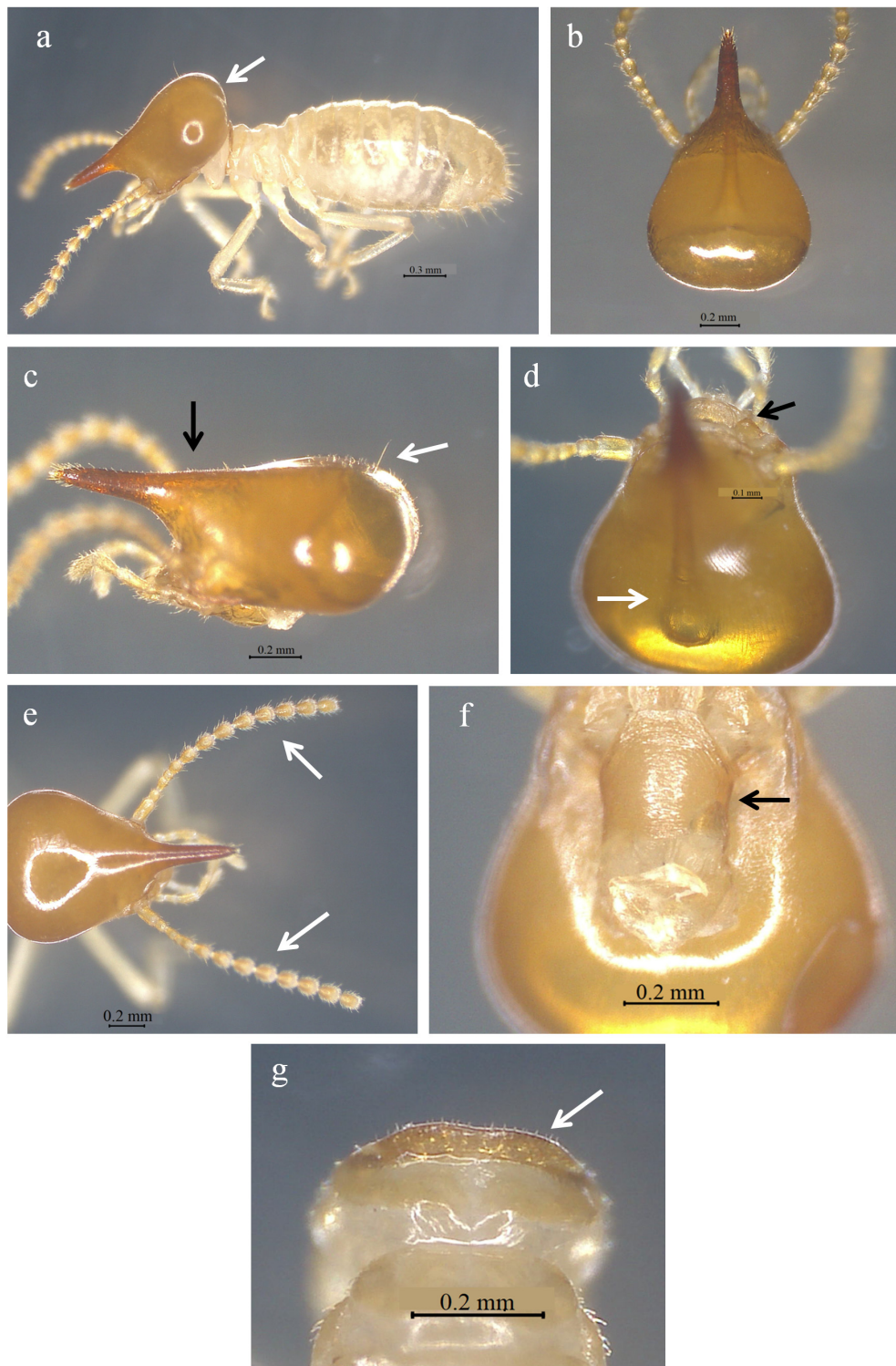
Genus: *Ahmaditermes* Akhtar, 1977

Species: *Ahmaditermes emersoni* Maiti, 1977

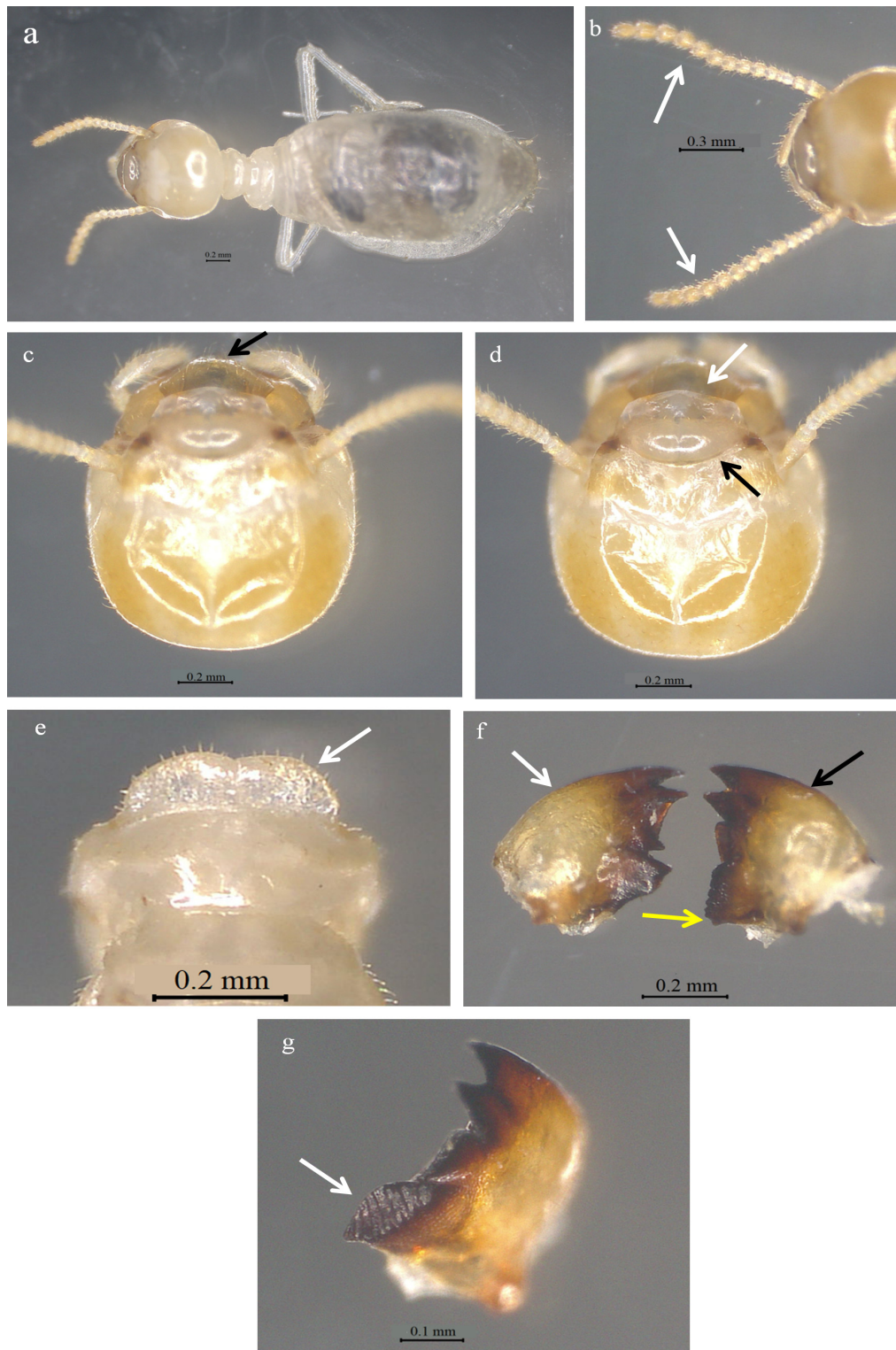
**Materials examined:** ISOP/ENT/ZOO/NEHU/BPM-305: 10 soldiers, 3 workers, 20.xii.19; I/ISOP/ERS/4433: 1 soldier, I/ISOP/ERS/4434: 25 soldiers and 3 workers, ISOP/ENT/ZOO/NEHU/0196: 29 soldiers and 2 workers, 16.x.2021, collected from a tree stump in the betel nut plantation of Mawlynnong area, Pynursla, East Khasi Hill District, Meghalaya, India (25° 20' 17.183° N; 91° 54' 40.55° E; Altitude 530 m). Deposited in the Zoological Survey of India, NERCS, Shillong-03 and preserved in the Entomology Laboratory, department of Zoology, NEHU, Shillong 22.

Table 1. Revised morphometric (in mm) of the soldier of *Ahmaditermes emersoni* (in combination of Chhotani, 1997 and the present study)

Characteristics	Chhotani	Study	Revised
Total body length	3.50–4.20	3.04–3.87	3.04–4.20
Head length with rostrum	1.37–1.58	1.36–1.43	1.36–1.58
Head length without rostrum	0.90–1.00	0.88–0.93	0.88–1.00
Head width	0.83–0.93	0.83–0.90	0.83–0.93
Head width / Head length without rostrum	–	0.90–0.98	0.90–0.98
Rostrum length	0.46–0.60	0.46–0.52	0.46–0.60
Rostrum length / Head length without rostrum	0.51–0.53	0.51–0.58	0.51–0.58
Head width at constriction	0.57–0.61	0.53–0.59	0.53–0.61
Head width at constriction / Head width	–	0.60–0.67	0.60–0.67
Head Height	–	0.51–0.62	0.51–0.62
Pronotum length	0.14–0.20	0.13–0.15	0.13–0.20
Pronotum width	0.37–0.53	0.39–0.44	0.37–0.53
Postmentum length	–	0.27–0.28	0.27–0.28
Postmentum width	–	0.28–0.29	0.28–0.29
Posterior head bulge	–	0.30–0.38	0.30–0.38
Posterior head bulge / Head length	–	0.34–0.42	0.34–0.42



**Fig. 1:** Soldier of *Ahmaditermes emersoni* Maiti, a) Whole body (Arrow shows emarginated posterior margin of head), b) Soldier head in dorsal view, c) Soldier head in lateral view (white arrow shows long bristle at posterior end of the head and black arrow shows the weak dorsal hump), d) Vestigial mandible without spine like process (black arrowed) and fontanelle tube (white arrowed) of soldier, e) Antennae of soldier (arrowed), f) Postmentum of soldier (arrowed), g) Pronotum of soldier (arrowed).



**Fig. 2:** Worker of *Ahmaditermes emersoni* Maiti, a) Whole body, b) Antennae of worker (arrowed), c) Labrum, d) Worker head in dorsal view showing anteclypeus (white arrowed) and postclypeus (black arrowed), e) Pronotum of worker (arrowed), f) Mandibles of worker. Left mandible (white arrowed) and right mandible (black arrowed). Yellow arrow shows the Cockroach notch, g) Molar ridges of right mandible (arrowed).

**Diagnosis:****Imago:** Unknown

**Soldier (Fig. 1a–g; Table 1):** Monomorphic. Head capsule is straw yellow in color and sparsely hairy; pyriform shaped; strongly constricted behind the antenna and widest and rounded at the posterior end with a pair of long bristles on it. Posterior margin is depressed medially. In profile, head capsule is weakly depressed behind the rostrum and with a weak hump. One bristle is prominent on the hump at its end. Rostrum is cylindrical in shape with four slightly longer bristles and many shorter hairs; dark brown in color except the basal portion which is somewhat paler. In length, slightly longer than half of the head length without rostrum. Antennae are yellowish in color and little bit darker distally; 13 segmented, segment 3<sup>rd</sup> longer than 2<sup>nd</sup>, 4<sup>th</sup> shortest. Mandibles are vestigial and without any lateral spine-like mandibular process. Fontanelle gland and tube are prominent. Pronotum are saddle shaped; paler than head in color; anterior lobe weakly raised and darker than the posterior lobe; anterior margin indistinctly emarginated and with minute hairs; posterior margin too indistinctly emarginated with a broad depressed medial line dividing the posterior margin indistinctly. Abdomen are densely hairy and paler than head in color. Legs are yellowish white in color (Adapted from Chhotani, 1997).

**Worker (Fig. 2 a–g; Table 2):** Monomorphic. Head capsule is subsquarish with distinct epicranial suture; fuscous brown in color with slightly paler anteriorly and fairly hairy. Fontanelle plate is distinct. Antenna 14 segmented; segment 3<sup>rd</sup> shorter than 2<sup>nd</sup>; 4<sup>th</sup> shortest; paler in color than head. Postclypeus swollen and hairy; length is less than half of its width. Pronotum saddle-shaped, weakly emarginate at the anterior margin and indistinctly emarginated at the posterior margin. Abdomen and legs whitish in color and fairly hairy (Adapted from Chhotani (1997)).

**Distribution:** Oriental region: India: Arunachal Pradesh, West Bengal and Meghalaya: East Khasi Hills, Mawlynnong, betelnut plantation (New records).

Table 2. Revised morphometric (in mm) of the worker of *Ahmaditermes emersoni* (in combination of Chhotani (1997) and the present study)

Characteristics	Chhotani	Study	Revised
Total body length	3.75–4.50	3.05–3.86	3.05–4.50
Head length	0.76–0.88	0.69–0.88	0.69–0.88
Head width	0.92–1.00	0.80–1.00	0.80–1.00
Pronotum Length	0.21–0.23	0.19–0.24	0.19–0.24
Pronotum width	0.50–0.57	0.46–0.54	0.46–0.57
Postclypeus length	0.14–0.18	0.14–0.19	0.14–0.19
Postclypeus width	0.35–0.42	0.34–0.44	0.34–0.42

**Remarks:** The species *Ahmaditermes emersoni* is recorded only from India and Bhutan till now. Earlier it was described as *Bulbitermes emersoni* by Maiti (1977) (which was actually published in the year 1979) from West Bengal, India. Later, the species was transferred to the genus *Ahmaditermes* by Chhotani (1997) based on the characteristics such as pyriform head with emarginated posterior margin, constriction behind the antennae and mandibles without any lateral spine like processes. Variations in the morphology and morphometrics of few taxonomically important characters in both the soldier and worker castes of the species were observed in comparison to its earlier description in Chhotani (1997). In case of soldiers, rostrum length and head length without rostrum index is slightly more, total body length and head length without rostrum are less than its earlier report. In case of worker caste, total body length, head length and head width are slightly less than its earlier report in Chhotani (1997).

**Redescription:** In case of soldier caste, the posterior margin of head is either moderately emarginated with two long bristles posteriorly or substraight or indistinctly emarginated without any long bristles. In case of the antennal segments, segment 3 is either longer than 2 or subequal to 2. In case of worker caste, the anteclypeus is either pentagonal or triangular in shape, antenna with the

segment 3<sup>rd</sup> either shorter than 2<sup>nd</sup> or subequal. In case of the mandibles, the second marginal tooth of left mandible is slightly longer and prominent and the second marginal tooth of right mandible is slightly protruded and prominent in appearance. Furthermore, the right mandible with seven well developed molar ridges and with or without a weak cockroach notch.

This is first report of the genus *Ahmaditermes* and the species *Ahmaditermes emersoni* from the state Meghalaya, India. It is an addition to the existing termite species and genera of the state.

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