

**A RECORD OF OPEN-AIR PROCESSIONAL
COLUMN TERMITE *LONGIPEDITERMES*
MANDIBULATUS THAPA FROM SUMATRA**

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ABSTRACT

Since the original description by Thapa (1981), *Longipeditermes mandibulatus* has not been recorded either from the type locality (Borneo) or other areas in the Indo-Malayan subregion. In 2006 and 2007, fifteen colonies of the species were found in different habitats of central-western and southwestern Sumatra, Indonesia. This species was only found in the central-western and southwestern parts of the island between 50 m to 1.350 m in altitude. Bionomics and its distribution are mentioned briefly.

Key words: Termite, *Longipeditermes*, new record, Sumatra.

ABSTRAK

Sejak diperihalkan kali pertama oleh Thapa (1981), *Longipeditermes mandibulatus* belum pernah direkodkan lagi di lokaliti tip (Borneo) mahupun kawasan lainnya di kawasan Indo-Malayan. Pada tahun 2006 dan 2007, lima belas koloni spesies

telah berjaya ditemukan di pelbagai habitat yang berbeza di kawasan Sumatra tengah mahupun selatan pada ketinggian antara 50 m sehingga 1.350 m. Bionomik dan taburannya juga turut dijelaskan secara ringkas.

Kata kunci: Anai-anai, *Longipeditermes*, rekod baru, Sumatra.

INTRODUCTION

The island of Sumatra is 476,000 km² in area, and is one of the islands with the richest biota in Indonesia. The species number for mammals and birds on Sumatra, 201 and 580 respectively, can be the second largest after New Guinea among the islands of Indonesia (Whitten et al. 2000). New species of mammals are still being discovered (Bermans & Hill 1980; Muser 1979). Large size, past connection with the Asian mainland, and great variety of habitats makes the island one of the most important places for biodiversity (Whitten et al. 2000).

Open-air processional column termites consist of the genera *Longipeditermes*, *Lacessititermes* and *Hospitalitermes*, the members of which forage above the ground or on leaf litter in processional columns (Tho 1992; Jones and Gathorne-Hardy 1995; Miura and Matsumoto 1998). Two types of soldier castes found in the *Longipeditermes*, the largest and smallest castes (dimorphism) differ markedly in size (Thapa 1981; Tho 1992; Gathorne-Hardy 2001; Miura and Matsumoto 1998), while the presence of dimorphism for both *Lacessititermes* and *Hospitalitermes* are questionable. The taxonomy of these open-air processional species are problematic and their phylogeny poorly understood.

Longipeditermes has long been nominated a distinct genus within the nasute termites (Holmgren 1913). So far three species have been described in this genus, i.e., *L. longipes* (Haviland 1898), *L. mandibulatus* Thapa 1981 and *L. kistneri* Ahmad & Akhtar 1985. All of them are confined to Southeast Asia. The species of this genus forage above the ground in exposed processional columns (Jones and Gathorne-Hardy 1995) or on the leaf litter (Miura and Matsumoto 1998). For all of these species, the workers typically forage in the afternoon and evening *en*

masse. They are conspicuous in the forests of South East Asia and occupy nest subterraneanly (Miura and Matsumoto 1998). These foraging parties are composed of a minority of defensive nasute soldiers that protect a majority of workers. In this paper we report a first record of *Longipeditermes mandibulatus* Thapa from a series of specimens collected from Sumatra, Indonesia.

The genus is characterized by the following features: soldier caste dimorphic with the largest and smallest differing markedly in size (Thapa 1981; Tho 1992; Miura and Matsumoto 1998; Gathorne-Hardy 2001), while worker caste di- or trimorphic with antenna composed of 15 segments. Head capsule pale brown to blackish; antenna much paler than head capsule in coloration, with the basal segments (first and second) generally darker than subsequent ones; pronotum paler than or similar to head capsule in coloration; abdominal tergites pale brown to dark sepia brown; coxae yellowish to pale brown; femora yellow to brown; tibiae pale yellow to yellow.

In dorsal view head capsule excluding rostrum pear-shaped to somewhat triangular, weakly constricted behind antennal sockets; its posterior margin weakly to strongly convex; dorsal outline in profile weakly to strongly concave; rostrum generally somewhat cylindrical in shape; antenna long, with fourteen segments; third segment twice as long as fourth or more; mandible relatively long with sharp apical processes; legs are very long.

Since the original description by Thapa (1981), *L. mandibulatus* has not been recorded either from the type locality (Borneo) or other areas in the Indo-Malayan subregion. The behavior and ecology of the species is still poorly documented. In this paper we redescribe the species based on the largest soldiers and workers to show its recognition characteristics.

MATERIALS AND METHODS

Material examined in this study was collected by a standardized sampling protocol (Jones and Eggleton 2000), but casual collection and colony search were also employed. I laid straight belt-transects, 100 m long and 2 m wide, at random through the forest. Each transect was divided into 20 sections, 5 m long each,

and each section took one hour by one person for finding out termites: (1) twelve samples of surface soil, approximately 50 cm² and 5 cm deep, with associated leaf litter, were scraped up, and termites examined, (2) dead wood with a diameter of > 1 cm was broken open and termites were removed, (3) tree trunks and buttress roots were examined, with particular attention was paid to the deep accumulations of litter and organic-rich soil between buttresses, (4) any carton sheeting or runways were examined, up to a height of two meters, nests were opened and termites collected, (5), all the specimens collected were kept in 90% alcohol. During casual collection termite colonies were searched for at any potential site for nesting. All the castes were sampled, with records on nesting site and other behavioral information.

Specimens of *L. mandibulatus* were collected from an undisturbed forest, 300 m in altitude, Sungai Manau, Merangin, Jambi (SYK2006-KSNP-0011, 0019, 0080, 0091, 0093, 0095, 0096, 0097, 0104, 0206); soldiers and workers from a disturbed forest, 50 m altitude, Maestong, Batang Hari, Jambi (SYK2006-AL-0100, 0101, 0102, 0103); and soldiers and workers from an undisturbed forest, 1350 m altitude, Sumber Jaya, Kota Bumi, Lampung (SYK2007-LP-0019). Type material was not examined.

The largest soldiers were photographed at the Biodiversity Laboratory, Kagoshima University (Japan). I photographed the head, body (in profile) and pronotum of the soldier caste (preserved specimens in 80% ethanol) using a digital microscope (HFVH-8000, KEYENCE, Osaka Japan). Further, I removed representative antenna, mandibles and antenna of the worker caste. I then examined these diagnostic characters on glass slides mounted with Euparal 3C 239 (Waldeck GmbH & Co. KG, Muenster Germany). I photographed the mounts using a conventional digital camera (Coolpix 3340, Nikon, Tokyo Japan) attached to a Nikon Eclipse E600 lense. From these images, I constructed a multi-focused montage using Helicon Focus 4.03 Pro software (Helicon Soft Ltd. Kharkov Ukrain). General morphological terminology used for describing soldiers and workers is consistent with the convention of Gathorne-Hardy (2001) and Sands (1998).

Measurements

Measurements of the soldier body parts follow those in Roonwal and Chhotani (1989) and Tho (1992). Measurements were made for the soldier caste as follows: head length including nasus (HLN), head length to base of mandibles (HL), nasus length (NL), maximum head width at anterior part (HWA), maximum head width at posterior part (HWP), maximum height of head excluding postmentum (HH), and length (PL) and width of pronotum (PW). We also consider the ratio of NL to HL.

DESCRIPTION

Alates. Not available

Soldier (Figs. 1-3).

Largest soldier

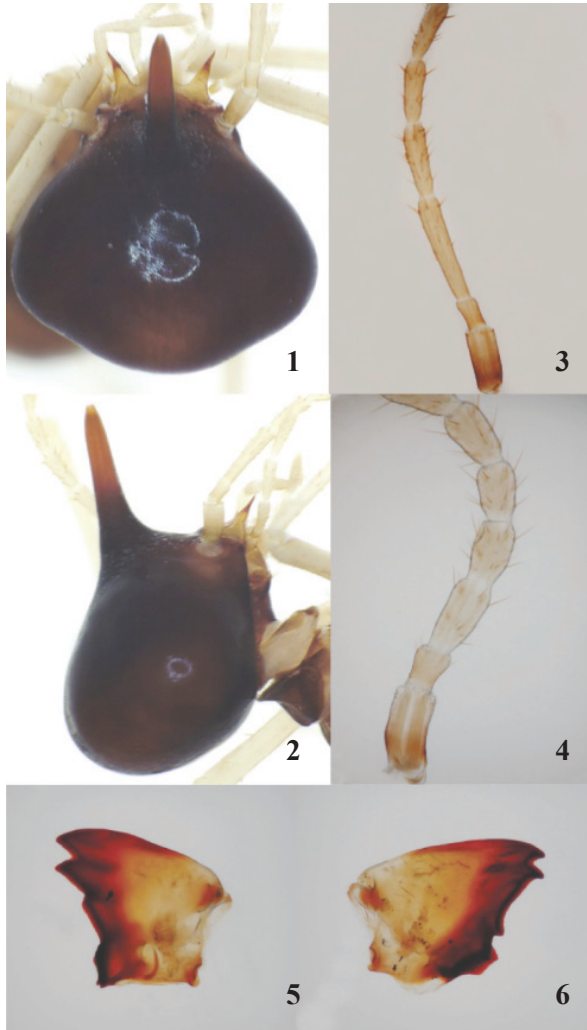
Head: head capsule blackish; rostrum with approximately apical two-thirds lighter and basal third darker; antenna much paler than head capsule; first segment darker than the subsequent which are uniformly colored. Head capsule somewhat triangular, weakly constricted behind antennal socket; its posterior margin strongly emarginated in dorsal view, and dorsal outline (including rostrum) in profile weakly or moderately concave; mandible in dorsal view with very long apical processes; antenna with 14 segments; third segment nearly twice as long as fourth; fifth shorter than fourth; 6th-14th gradually shortening toward apex. **Thorax:** pronotum seen from above paler than head capsule in coloration; its anterior margin weakly indented, and posterior margin moderately indented in the middle; coxae and femora pale brown to brown; tibiae pale yellow to yellow. **Abdomen:** tergites pale brown to dark brown.

Largest worker

Figs. 4-6.

Antenna: whitish yellow to yellow with the first segment darker than the subsequent; consisting of 15 segments; third segment clearly longer than fourth; fourth longer than fifth; 6th-15th gradually shortens towards apex. **Left mandible:** apical tooth shorter than first marginal tooth; third marginal moderately protruding from cutting edge; fourth completely hidden behind

molar prominence. **Right mandible:** posterior edge of second marginal tooth nearly straight; inner layer of molar plate very weakly concave; notch weakly to moderately developed.



Figs. 1-6. *L. mandibulatus* (largest soldier & largest worker). Soldier (1-3) and worker (4-6). Head in dorsal view (1), head in profile (2), antennae (3, 4), left (5) and right (6) mandibles. Scale bar: 0.3 mm (1, 2), 0.1 mm (3-6).

BIONOMICS AND DISTRIBUTION

Soldiers of this species are distinguished from *L. longipes* by having a blackish and somewhat triangular head capsule, mandible with very long apical processes, rostrum cylindrical in shape, with approximately apical two-thirds lighter and basal third darker; and maximum head width 2.07-2.10 mm (Table 1). Soldier caste of *L. longipes* differ from this species by having head capsule sepia brown to dark sepia brown; rostrum with apical two-thirds lighter and basal third darker; anterior margin of pronotum nearly straight. Head capsule pale brown to dark brown; rostrum with apical two-thirds darker and basal third lighter; anterior margin of pronotum strongly indented in the middle separating *L. kistneri* to both *L. mandibulatus* and *L. longipes*.

Table 1. Measurements for 15 largest soldiers of *L. mandibulatus*.

Characters	Size range (mm)
Head length including nasus (HLN)	2.52-2.65
Head length measured to base of mandible (HL)	1.50-1.61
Nasus length (NL)	1.02-1.12
Nasus index = NL/HL	0.66-0.73
Minimum head width at anterior part (HWA)	0.98-1.10
Maximum head width at posterior part (HWP)	2.07-2.10
Maximum height of head excluding postmentum (HH)	1.25-1.32
Pronotum length (PL)	0.35-0.40
Pronotum width (PW)	0.77-0.85
Head length including nasus (HLN)	2.52-2.65

In Parentak, Jambi Province, nests were generally found inside huge rotten logs on the ground. Soldiers and workers foraged on the ground surface during the daytime, particularly in early morning, being protected by numerous soldiers. They fed on leaf litter. Other colonies were probably situated underground on

the forest floor. The smallest soldiers are more aggressive than the largest ones when the column is disturbed. Thapa (1981) reported two cases from underground and rotten wood in Sabah (Borneo).

In 2006 and 2007, fifteen colonies of the species were found in different habitats of central-western and southwestern Sumatra (Fig. 7). This species has been found from tropical rainforests in Sumatra (Jambi & Lampung) and Borneo (Sabah), while *L. kistneri* has been found from Java, and *L. longipes* has been found from Java, Sumatra, Borneo and Thailand (Thapa 1981; Tho 1992; Gathorne-Hardy 2001; Jones et al., 2003).

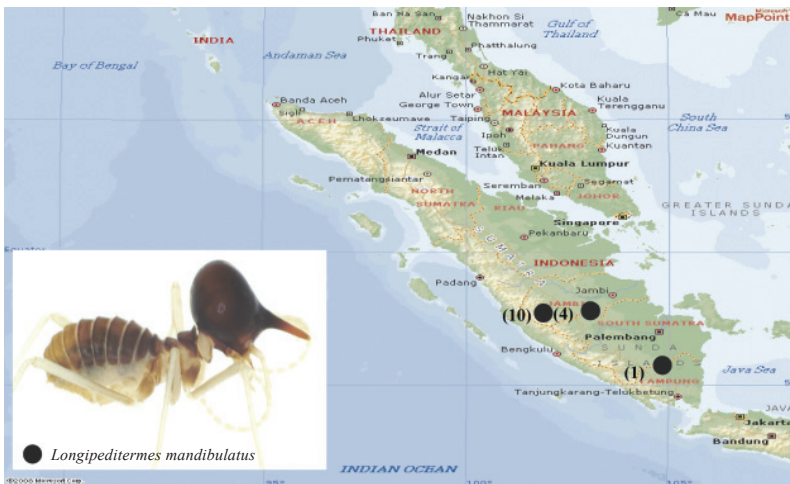


Figure 7. Distribution of *Longipeditermes mandibulatus* and number of colony collected on Sumatra. Map cited from http://www.encarta.mns.com/map_701516832/Sumatra.htm. Insert: Habitus of the largest soldier of *L. mandibulatus* from Sumatra.

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