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Diversity of termites with reference to their morphometrics in Dakshin Kamrup College Campus, Mirza, Kamrup, Assam

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Abstract
Termites are small insects belonging to the order Blattodea. They are sometimes reffered to as white ants due to their social organization and strucutural similarity to ants. The present study aims to discover different termite species as well as their morphometric variations found in the campus of Dakshin Kamrup College, Mirza, Kamrup, Assam. The termites are collected from different microhabitats around the college campus. The termite species discovered in the study area were Odontotermes obesus and Odontotermes parvidens. The total body length of the soldiers of Odontotermes obesus and Odontotermes parvidens were found in the range (5-5.5) mm and (6.9-7.6) mm respectively. The head indices of the soldiers of Odontotermes obesus was found to be in the range of (0.83-0.86) while that of Odontotermes parvidens was found to be (0.75-0.86). The number of antennal segments of the soldiers of Odontotermes obesus is 16 while that of Odontotermes parvidens is either 16 or 17.

Keywords: Termites, taxonomy, morphometric

Introduction
Termites are hemimetabolous, eusocial insects belonging to the order Blattodea (Inward *et al*., 2007) [4]. They are white, tan or black orthopteroid insects that can seriously harm crops, buildings, and wooden structures (Paul *et al*., 2018) [7]. They are mainly cellulose digesting insects. Termites are highly social insects that live in colonies of anywhere between a few hundred and several million individuals. A typical colony of termite includes 3 major castes namely reproductive, soldiers and workers (Watanabe *et al*., 2014). Termites are divided into two major groups' namely higher termites and lower termites. The higher termites consist of a single family "Termitidae" and the lower termite consists of the families "Hodotermitidae, Kalotermitidae, Mastotermitidae, Rhinotermitidae, Serritermitidae, and Termopsidae" (Krishna *et al*., 2013) [6]. A total of 14 subfamilies of termites are found within the higher and lower termites (Kambhapati & Eggleton, 2000) [5]. A total of 312 genera comprising of 2994 species (Constantino, 2020) [3] are found worldwide.

A total of 76 species of termites were recorded from the North-Eastern region of India, out of them only 25 species of termites have been recorded from the state of Assam (Bose, 1999). However the diversity of termite species from the town of Mirza, Kamrup, Assam has not
been yet reported. The current study aims to provide an insight of the termite species composition of Dakhsin Kamrup College Campus, Mirza, Kamrup as well as to analyze the morphometrics of the termite species found.

Study Area
The Dakshin Kamrup College is located in the town of Mirza of Kamrup district of Assam which is 6 kms away from Lokpriya Gopinath Bordoloi International Airport (LGBI). D.K. College Campus is situated in close proximity with the Maliyata Reserve Forest. The campus has an area of about 5973.27 sq.m. The vegetation of the campus is a mix of both tropical and sub-subtropical type. Different types of shrubs, climbers as well as trees like Teak, Gamari, Sal, Indian rose chestnut and fruit trees can also be found in the campus.

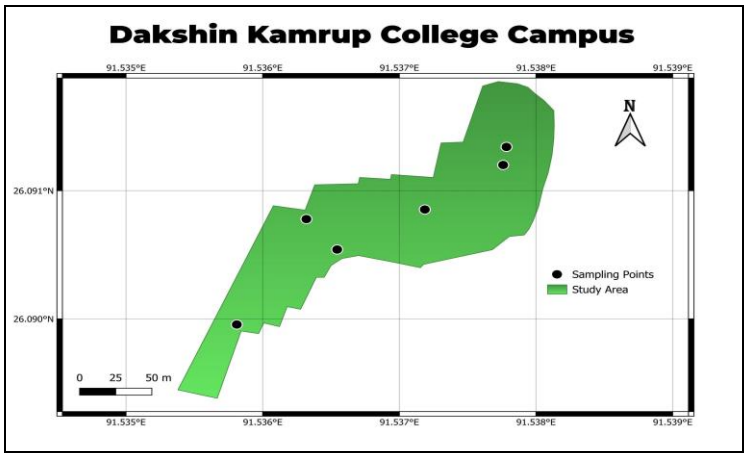

Fig 1: Study area with pointed sampling sites.

Materials and Method

The termites (soldiers and workers) were collected from different sites of the study area by looking for various microhabitats like decaying wood, leaf litter, soil tubes, mounds etc. The collections were done from the month of December 2023 to March 2024. The method of collection and preservation given by Pearce (2006) is followed for the present study.

Termites are mostly identified on the basis of morphological characteristics of the soldier caste. Soldiers are observed under stereo zoom microscope and different morphological measurements were taken with the help of a stage micrometer. Photographs of important features were taken using a Canon 200D Mark II camera. Taxonomic identification of the specimens was carried out by using the keys given by Roonwal and Chhotani (1989), Chhotani (1997) and Bose (1999) [1].

Result and Discussion

From the collected 6 samples 2 different species of termite belonging to the family "Termitidae" was found. The species found were the Odontotermes obesus and Odontotermes parvidens. Table 1 lists the termite species that were found from various sampling locations, and Table 2 lists the measurements of the different body parts of the termite species found in the study area.

1. Taxonomic description of Odontotermes obesus (Rambur)

Head-capsule pale yellow to brown; mandibles light brown to deep reddish brown; body pale yellow to pale brownish. Total body-length 5.0-5.5 mm. Head capsule oval, weakly converging anteriorly (length to base of mandibles 1.2-1.4mm, max. width 1.0-1.2 mm, index width/length 0.83-0.86). Antennae with 16 segments. Labrum tongue shaped. Mandibles long, slender, sabre-shaped (length 0.8-0.9 mm). Left mandible with a sharp, prominent tooth at distal third. Pronotum saddle shaped (length 0.50-0.65, width 0.80-1.07 mm).

2. Taxonomic description of Odontotermes parvidens (Holmgren)

Head-capsule yellowish; antennae and body creamy white to straw yellow; mandibles blackish brown. Total body-length 6.9-7.4 mm. Head-capsule large, subrectangularly oval, converging anteriorly (length to base of mandibles 1.8-2.3, max. width 1.6-2.0 mm). Antennae 16 to 17 –segmented. Labrum triangularly tongue-shaped. Mandibles strong; half as long as or a little longer than half headlength (length 1.2-1.4 mm); slightly incurved at tips. Pronotum saddle shaped (length 0.7-0.9 mm width 1.3-1.5 mm)

During the current survey Odontotermes obesus was found to construct mound while the termite Odontotermes parvidens was found mostly in live tree barks. The species Odontotermes obesus was found to be smaller compared to Odontotermes parvidens.

Table 1: List of termite species discovered in different sites of D.K. College Campus.

Sites	GPS Location	Collected from	Name of Species
Site 1	N-26.0909 E-91.5366	Mound	Odontotermes obesus (Rambur)
Site 2	N-26.0906 E-91.5369	Soil Tubes	Odontotermes obesus (Rambur)
Site 3	N-26.0909 E-91.5375	Decaying wood log	Odontoter mes parvidens (Holmgren)
Site 4	N-26.0914 E-91.538	Tree bark	Odontotermes parvidens (Holmgren)
Site 5	N-26.0913 E-91.538	Tree bark	Odontotermes parvidens (Holmgren)
Site 6	N-26.0901 E-91.5362	Tree bark	Odontotermes parvidens (Holmgren)

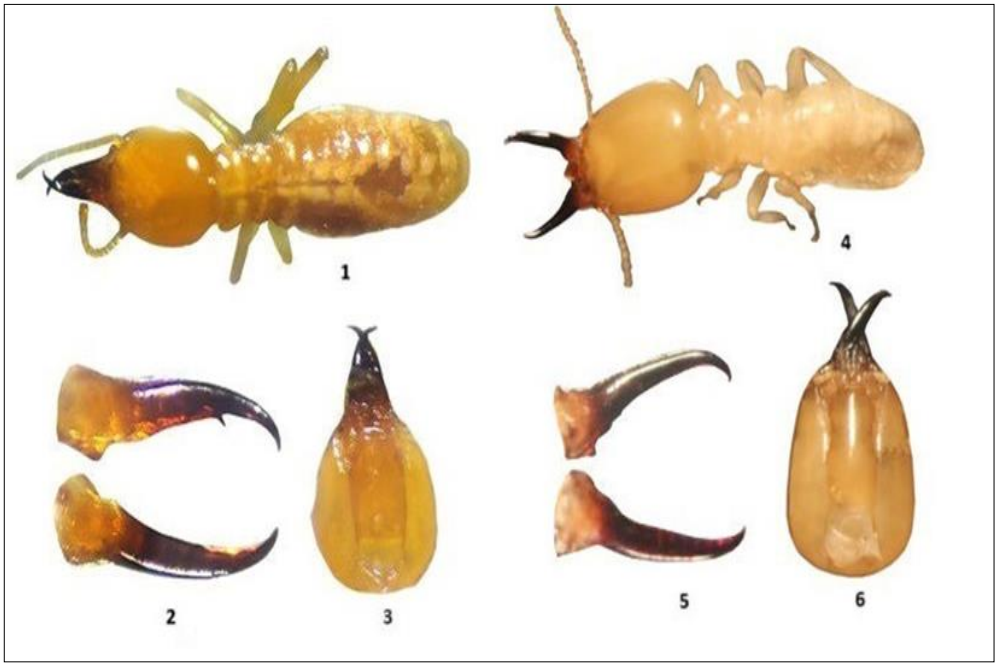

Fig 2: Different body parts of the soldiers of Odontotermes obesus- 1. Dorsal view of body 2. Left and right mandibles 3. Ventral view of the head and Odontotermes parvidens. – 4. Dorsal view of body 5. Left and right mandibles 6. Ventral view of the head.

Fig 3: Different microhabitats of collection of termites in D.K. College Campus.

Table 2: Measurements (mm) of different body parts of soldier of the termite species discovered.

Sl.	Parameters	Obtained Range of Measurements(mm)	
		Odontotermes obesus	Odontotermes parvidens
1	Total body length	5-5.5	6.9-7.4
2	Length of the head from lateral base of the mandibles	1.2-1.4	1.8-2.3
3	Head Width	1-1.2	1.6-2.0
4	Head Index(width/length)	0.83-0.86	0.75-0.86
5	Length of mandibles	0.8-0.9	1.2-1.4
6	Antennal Segments	16	16,17
7	Length of the pronotum	0.5-0.6	0.7-0.9
8	Width of the pronotum	0.9-1.0	1.3-1.5
9	Position of tooth at the left mandible	Distal third	Minute tooth at the middle third

Conclusion

From the current study it has been concluded that the campus of D.K. College has been infested by the termites Odontotermes obesus and Odontotermes parvidens. These species exhibit notable differences in their morphological characteristics, including body size, coloration, and mandible structure. These findings contribute valuable insights into termite taxonomy and ecology, providing a basis for further research on their behavior, taxonomy and implications for pest management and biodiversity conservation.

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