

DISTINCTIVE MORPHOLOGICAL CHARACTERS OF TERMITES IN HIGH AND MID GROWN TEA IN SRI LANKA *

K. Thirugnanasuntharan and I.C.R. Jayachandran

(Tea Research Institute of Sri Lanka, Talawakele, Sri Lanka)

The morphological characters of soldiers and winged alates of two live wood termites, *Postelectrotermes militaris* Desneux and *Neotermes greeni* Desneux and four scavenging termites, *Odontotermes*, *Hypotermes* and two unidentified genera found in the high and mid grown tea areas were studied in detail with a view to adopt a quick method of identification of these termite species. The parts studied mainly involved the mandible, antenna, fontanelle, ocelli, compound eyes (head), pronotum, wing scales, wing span, tibial spines, tarsal segments (thorax) and the cerci (abdomen).

INTRODUCTION

Three species of live wood termites and many species of scavenging termites attack the tea plants in many planting districts. The live wood termites, which attack the heart wood are, *Postelectrotermes militaris* Desneux (up-country live wood termite), *Glyptotermes dilatatus* Bungnion and Popoff (low-country live wood termite) and *Neotermes greeni* Desneux, which occur in low and mid regions. There are many species of scavenging termites that attack the dead and rotted wood of the tea plants, mainly in mid and lower regions of tea planting districts.

Two live wood termites *Postelectrotermes militaris* and *Neotermes greeni* and four scavenging termites, namely *Odontotermes* sp., *Hypotermes* sp., and two unidentified genera, were found to occur in tea in Maskeliya, Dimbula, Uda-pussellawa, New Galway, Ambegamuwa and Badulla districts.

It has been noted, in the recent past, that damage done by scavenging termites has very often been attributed to that of live wood termites. Besides most of the species of live wood and scavenging termites have been observed to swarm regularly in the above districts except for *P. militaris*. This too has strengthened the idea that the damage in a particular locality was due to live wood termites. In view of such confusion, it has become necessary to adopt a method of quick identification of these termites that occur in any locality which would help to eliminate any misinterpretations.

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MATERIALS AND METHODS

For this study only the soldiers and winged alates of the termites were utilised. Other castes such as larvae, nymphs (workers) and neotenics were not considered.

The termites collected from various estates in the high and mid grown tea districts were :

(A) Live wood termites:

Postelectrotermes militaris from Laxapana, Moray, Strathspey estates (In the Maskeliya planting district), Clarendon (Dimbula); *Neotermes greeni* from Blairlmond (Udapussellawa).

(B) Scavenging termites :

Odontotermes sp. (1) from Kenilworth (Ambegamuwa), Welimada (New Galway); *Odontotermes* sp. (2) and *Hypotermes* sp. from Aislabay (Badulla); Unidentified genus (1) and (2) from Laxapana (Maskeliya) and St. Coombs (Dimbulla) respectively.

The parts of the body examined for morphological characters were:

- (a) *Head* — mandible (shape, dentition, colour), antenna, fontenelle, ocelli, compound eye, shape, colour of head ;
- (b) *Thorax* — pronotum, wing scales wing span, tibial spines, tarsal segments ;
- (c) *Abdomen* — number of segments in cerci ;
- (d) *Body (entire)*— total body size, shape.

Terminology used in text

Antennae : a pair of segmented appendages located on the head above mouth parts and usually sensory in function.

Cereus (pl cerci) : one of a pair of appendages at the posterior end of the abdomen.

Fontenelle : a small opening on the front of the head between the eyes.

Mandible : jaw ; one of the anterior pair of paired mouth part structures.

- Ocellus (pl ocelli)** : a simple eye of an insect.
- Pronotum** : the dorsal part of first thoracic segment.
- Tarsal segment** : the leg segments immediately beyond the tibia.
- Tibial spine** : Spines found on the distal end of the fourth segment of the leg.
- Wing scale** : Anterior part of a wing from which the wing is shedding off the remaining part thus leaving behind the stump termed as wing scale.

RESULTS AND DISCUSSION

The distinctive morphological characters found by examination of various parts of body are shown in Tables 1 and 2.

The specific parts of termite body used in easy identification are :
(a) Soldier heads (Fig. 1), Middle tibial spines (Fig. 2), Alate head (Fig. 3) and Alate wings.

The correct identification of tea termites, as in most insects, is time consuming. Harris (1961) and Krishna (1970) have studied the taxonomy and identification of all termites in general; the former utilised workers, soldiers and winged alates while the latter examined soldiers and winged alates. Ranaweera (1962), who examined the tea termites of Sri Lanka in greater detail confined his study only to soldier heads. These studies though extensive and with appropriate keys do not fulfil the present objective of quick and accurate identification of tea termites. The present study helps to quickly identify a termite species found in estates and categorise it as a live wood termite or as a scavenging termite. If planters and the field staff familiarise themselves with the termites found in their locality based on the results of this study it will help in their correct identification. If one comes across a termite colony which usually will have soldiers in it, one could identify the species from an examination of the characteristics described in Table 1. On the other hand, if flying adults (alates) are encountered at any time identification of the species is readily done by reference to Table 2. The correct identification will also help to undertake relevant control measures.

REFERENCES

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- KRISHNA, K. (1970). Taxonomy, physiology and distribution of termites. In: *Biology of Termites*, Vol. 1, eds Kumar Krishna and Frances M. Weesner, Academic Press, London, 598 pp.
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TABLE I—Distinctive morphological characters of termite soldiers in high and mid grown tea

Species and family	Kalotermitidae			Termitidae	
	<i>Postelectrotermes militaris</i>	<i>Neotermes greeni</i>	<i>Odontotermes horni</i>	<i>Odontotermes redemani</i>	<i>Hypotermes obscuriceps</i>
Characters					
(a) Head					
1. Colour	Brown-pale brown	Dark brown-pale brown	Pale brown	Pale brown	Brown
2. Shape	sub-rectangular	rectangular	sub-rectangular	pear shape	oval
3. 'Y' suture	indistinct	distinct	indistinct	indistinct	indistinct
4. Mandible dentition (No.)					
i. left-Apical : Marginal	1 : 4	1 : 5	1 : 1	1 : 1	1 : 3 serrations
ii. right-A:M	1 : 2	1 : 2	1 : smooth	1 : 1	1 : smooth
*5. Fontenelle	absent	absent	present	present	present
6. Antennal segments	16 — 18	14 — 16	15 — 16	15 — 16	15 — 16
7. Head length with mandibles (mm)	4.5 — 5.0	4.5 — 5.0	3.5 — 4.0	1.5 — 2.0	2.0
(b) Thorax					
* Pronotum					
i. Shape	sub-rectangular	sub-rectangular	saddle shape with lobes	saddle shape with lobes	saddle shape with lobes
ii. Anterior margin	concaved	concaved with medium notch	shallow concave	shallow concave	shallow concave
iii. Posterior margin	shallow straight	shallow convexed			
2. Leg-Distal tibial spines (No.)Fore: Mid: Hind	3 : 4 : 3	3 : 3 : 3	2 : 2 : 2	2 : 2 : 2	2 : 2 : 2
(c) Abdomen					
Shape	elongate	elongate	oblong	oblong	oblong
(d) Entire body					
Length (mm)	10.5 — 12.0	9.0 — 11.0	9.5 — 10.0	5.5 — 6.5	5.0 — 6.0
*Family characters					

TABLE 2 — Distinctive morphological characters of termite alates in high and mid grown tea

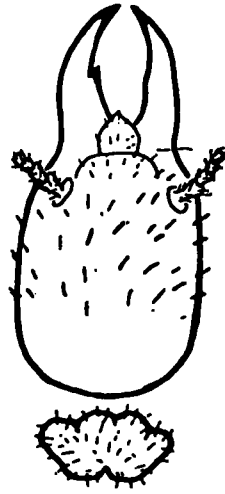
Species and family	Kalotermitidae		Termitidae	
	<i>Postelectrotermes militaris</i>	<i>Neotermes greeni</i>	Unidentified genus(1)	Unidentified genus (2)
Characters				
(a) Head				
*1. Fontenelle	absent	absent	present	present
2. Antennal segments	19 — 20	17 — 19	19 — 20	15 — 17
3. Mandible dentition (No.)				
right-Apical : Marginal	1 : 2	1 : 2	1 : 2	1 : 1
(b) Thorax				
1. Wing				
(i) Pigmentation	present	absent	present	present
* (ii) Scale (Fore)	large overlaps hind one	large overlaps hind one	small not overlapping hind one	small not overlapping hind one
(iii) Spines	present	absent	absent	very minute
* (iv) Reticulation of membrane	present	present	absent	absent
(v) Length (mm)				
Fore : Hind	17 : 16	13 : 12	23 : 22	12 : 11
2. Leg-Middle tibial spines (No.)				
	3 + 1	3	2	2
(c) Pronotum				
Shape and width	rectangular larger than head width	rectangular sub-equal to head width	saddle shape equal to head width	saddle shape sub-equal to head width
(d) Entire body				
Length (mm)	10.0 — 12.0	7.5 — 9.5	14.0 — 14.5	7.0 — 7.5
*Family characters				



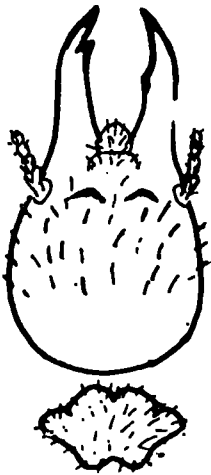
P. militaris



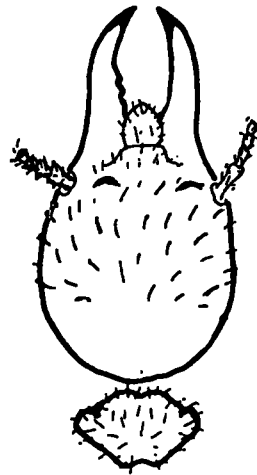
N. greeni



O. horni

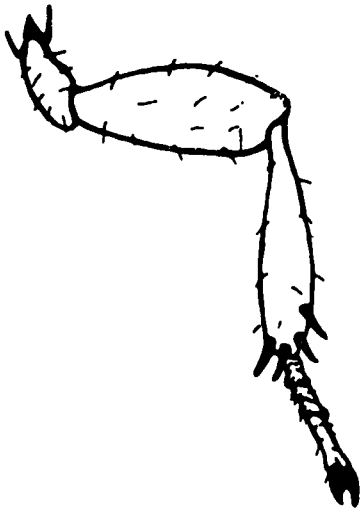


O. redemanni

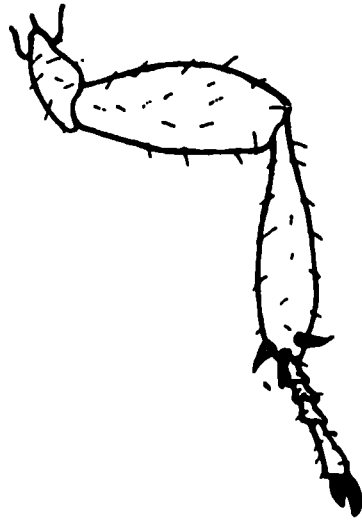


H. obscuriceps

Fig. 1 — Distinctive Morphological characters of termites (soldier heads)



P. militaris



N. greeni



Odontotermes sp. and H. obscuriceps

Fig. 2 — Distinctive morphological characters of termites (middle tibial spines)

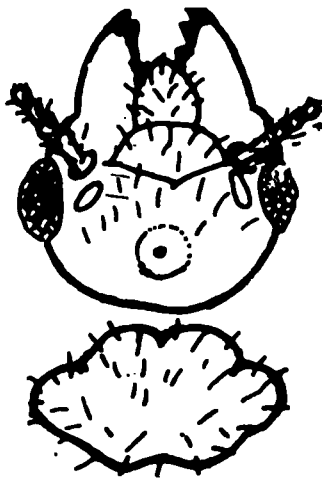


Fig. 3 - Distinctive morphological characters of termites (Unidentified genus alate head).