

DISTRIBUTION OF VARIOUS CASTES IN DIFFERENT PARTS OF THE MOUND OF THE TERMITES ODONTOTERMES OBESUS RAMBUR (ISOPTERA-TERMITIDAE)

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ABSTRACT

Population density(per 100 gm unit of fungus garden) of workers, soldiers and nymphs of the termite *Odontotermes obesus* from different parts of the viz., Peripheral fungus garden, Ground level fungus garden, the royal chamber were investigated. The percentage of major workers in peripheral fungus garden was higher compared to the fungus garden around the royal chambers 70.37%, 61.45%, respectively. However, percentage of soldiers and nymphs were found high in the fungus around royal chambers than the peripheral fungus garden workers, soldiers and nymphs 16.35%, 9.75% and 9.66% respectively. It is evident from the above results that various castes of this species in different parts of the mound are distributed according to their functional behavior. It is apparent that the proportion of workers in a colony varies with the season on which also depend the foraging activities of the subterranean termites. It has further been observed that soldier population is invariably associated with an increase in population of nymphs.

KEY WORDS

Termites, Fungus garden, Density, Foraging, and Royal chamber.

INTRODUCTION

Population of various castes and their relative percentage in different species of termites has been studied by Holdaway *et al* (1935)¹. *Coptotermes lactens* by Mukharjee and Mitra (1949)². *Odontotermes redemanni* by Gupta (1953)³, *O. assumuthi* and *O. wallonensis* by Agarwal (1976)⁴, some observations on the nesting behavior of *O. obesus* and *O. wallonensis* from North India have been studied Mathur (1960)⁵, Roonwal (1970)⁶. *O. obesus* and *O. microdentatus* Blum (1977)⁷, Veeranna and Basalingappa (1981)⁸ have studied the total population and relative percentage of foraging forms of *O. wallonensis* from the covered runway raised on the eucalyptus trees. The size of relationship in nest population and mound parameters in the termite *Macrotermes*

michaelseni in Kenya (Darlington and Dransfield, 1987)⁹. Population in nests of the termite (Darlington, 1990)¹⁰. Abundance, distribution and colony size estimates *Reticulitermes sp.* (Howard *et al.*, 1982)¹¹. The total populations, proportion of various castes and seasonal fluctuation have been studied in detail especially in the family *Termitidae* (Darlington, 1990; Aktar and Rashid, 2001)¹². Since there are more reports regarding the distribution of various castes in different parts of the mounds in this semi – arid zone of peninsular India population density of various castes in different parts of the mound of the termites *Odontotermes wallonensis* studied by Vasantkumar and Vijaykumar (2010)¹³. Soldier are sometimes larger than workers, with darker heads. Nesting pattern of the termites *Odontotermes* studied by Farzaua *et al.*,

(2010)¹⁴. Since there are more reports regarding the distribution of various castes in different parts of the mound in this semi-arid zone of peninsular India. Hence the present investigation was under taken to study the population density of *Ondototermes obesus*

OBJECTIVES

The present investigation was under taken to study the diversity and population density of various castes in different parts of the termite mound with following objectives

- 1) To know the diversity and population pattern of various castes.
- 2) To know the distribution pattern of soldiers, workers, nymphs in different parts of the mound that helps to assess the activity of these members during the foraging etc., activity that inter help the to know the infestation of these members over the different plant species during different seasons.
- 3) To know the structural pattern of the mound

MATERIALS AND METHODS

The *Odontotermes obesus* mounds were cut opened by digging the mound soil sampling was carry out at different ranging from Above (peripheral) ground level fungus garden, ground level fungus garden, Below ground fungus garden. Freshly collected royal chamber, fungus gardens (from Above ground level, Ground level, Below ground fungus gardens) from the mound nests in the field, the workers, soldiers and nymphs from covered. Population density of major and minor workers, soldiers and nymphs from the royal chamber was determined by "whole count" method. Population size of various castes from different parts of the fungus garden was estimated according to the "hand sorting" method and flotation technique. For the comparison of various castes in different parts of the mound, the P values were less than 0.05 which was statistically significant.

RESULTS AND DISCUSSION

Population density of workers, soldiers and nymphs of the termite, *Odonototermes obesus* from foraging covered runways and from different parts of the mound, namely, above ground level fungus garden, ground level fungus garden, below ground fungus gardens itself is given in Table 1.

Table-1 Number of workers, soldiers and nymphs from fungus combs distributed in different parts of mound *O. obesus* (Rambur) in Bhadrachalam forest region

Different parts of the Mound	Population Count			Average total	Weight of fungus Combs
	Workers	Soldiers	Nymphs		
Above ground level fungus gardens	349.2 ± 8.12	42.8 ± 2.03	40.4 ± 1.32	432	103
Ground level fungus gardens	173.4 ± 7.15	45.4 ± 3.69	63.01 ± 4.59	281	100
Below ground level fungus gardens	122.0 ± 4.30	82.0 ± 3.39	1107.6 ± 23.97	1311	106

The number of workers, soldiers and nymphs from fungus combs distributed in different part of the mound of *O. obesus* in Bhadrachalam forest region. The number of different casts in fungus garden at above ground level of the mound (peripheral) recorded 349.2 ± 8.12 , 42.8 ± 2.03 , and 40.4 ± 1.32 workers, soldiers and nymphs respectively. The fungus garden weight was 103 grams recorded in the peripheral region of the mound. The average total number of workers, soldiers, nymphs was recorded 432. The number of workers, soldiers and nymphs at ground level fungus garden 173.4 ± 7.15 , 45.4 ± 3.69 , and 63.01 ± 4.59 were recorded respectively. The weight of ground level fungus garden was 100g. The total populations of workers, soldiers, nymphs were recorded 281. At below ground level fungus garden 122.0 ± 4.30 , 82.0 ± 3.39 and 1107 ± 23.97 workers, soldiers and nymphs respectively. The weight fungus comb was 106g was recorded and total number (1311) of workers, soldiers, nymphs were recorded

CONCLUSION

- 1) In the present investigation the population density of *O. Obesus* the percentage of minor workers was high in the royal chamber when compared to other parts of the mound.
- 2) The high percentage of minor workers might be for the purpose of feeding the royal couple and young ones and for transporting eggs from the royal chamber to fungus garden.
- 3) High percentage of soldiers in the royal chamber was presumably for guarding the royal couple and to get food from minor workers.
- 4) Though the royal pair all the time was found well protected in.
- 5) The royal chamber, the presence of high percentage of soldiers might be for facing the

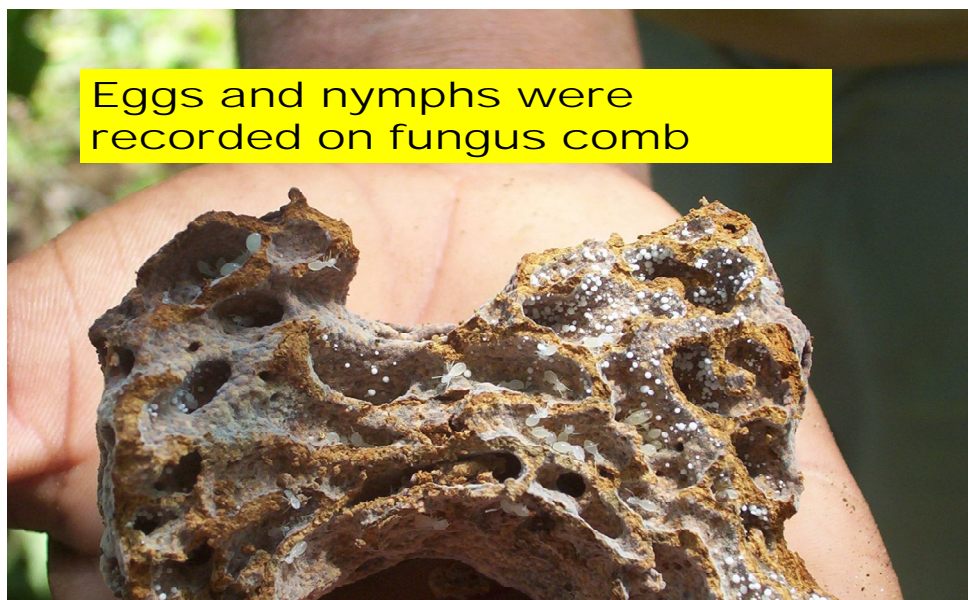
rare invasion (s) of predatory ants as found in *odontotermes obesus*.

- 6) High percentage of nymphs population in the fungus garden around the royal chamber is reasonable because thousands of eggs laid per day by the large physogastric queen were to be transported from the royal chamber and stocked in masses for incubation.
- 7) Thus it is an evident in the present investigation the various castes of this species in different parts of the mound are distributed according to their functional behavior, that helps the understand activity in the different seasons of this species. During different activities like foraging, defensive, mound repair work etc.,

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Early stage of fungus garden surrounding of royal chamber below ground level.



Queen of *O.obesus* in broken royal chamber at bottom of the mound



The mound of *O.obesus* above ground level distribution of fungus comb



The mound of *O.obesus* surrounding royal chamber distribution of fungus combs.

