

# WELCOME TO THE KINGDOM OF TERMITES



**KING & QUEEN**

# POPULATION DENSITY OF VARIOUS CASTES IN DIFFERENT PARTS OF THE MOUND OF THE TERMITE *ODONTOTERMES WALLONENSIS* WASMANN (ISOPTERAN: TERMITIDAE)

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# 1. INTRODUCTION :

- Ø Termites are polymorphic, Social insects which leave in nests (Termitaria) of their own construction. The termitaria serve to house & protect the colony, store food & maintain optimum environment.
- Ø Total population of various castes and their relative percentages in different species of termites have been studied by Holdaway et. al. In *Eutermes exitiosus* Gray and Greaves, in *Coptotermes lacteus*. Mukharjee and Mitra in *Odontotermes redemnni*, Gupta in *O. obesus*: Basalingappa on *O. assamuthi* and *O. wallonensis*. Agarwal in *O. obesus* and *O. microdentatus*.

Ø Blum Reported that the behavior of individuals in a colony is often correlated with specific morphological or physiological characteristics which are often emphasized on the individuals within a caste.

Ø Veeranna and Basalingappa have studied the total population and relative percentage of foraging forms of *O. wallonensis* from the covered runways raised on the eucalyptus trees.

Ø The present investigation was undertaken to study the population density of *O. Wallonensis, in the semi arid zone (Gulbarga) of peninsular India.*

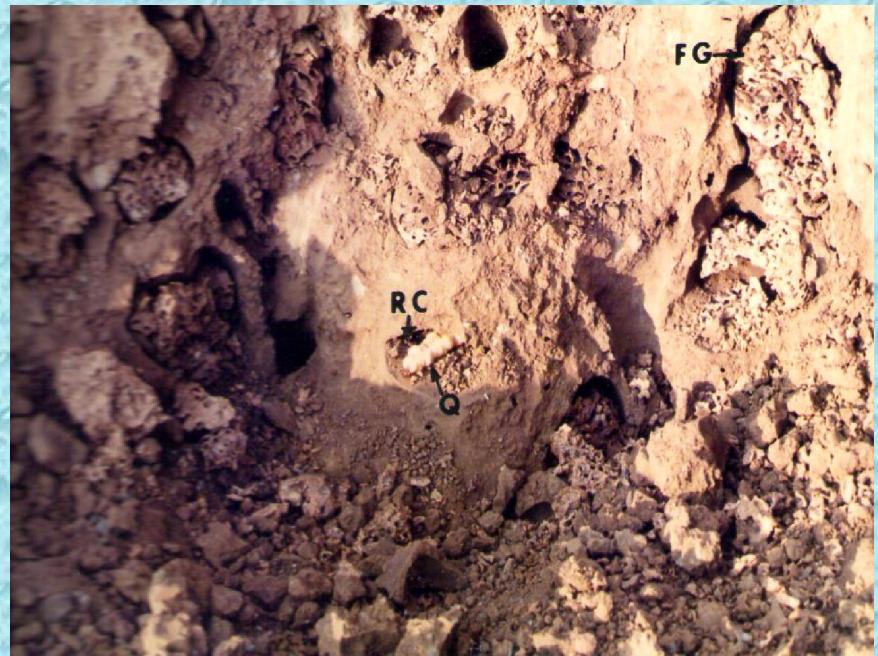
## 2. OBJECTIVES :

- § The present investigation was undertaken to study the diversity and population density of various castes in different parts of the termite mound with following objectives.
- § To know the diversity and population pattern of various castes.
- § 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 to know the infestation of these members over the different plant species during different seasons.
- § To know the structural pattern of the mound

### **3. MATERIALS AND METHODS :**

- Freshly collected royal chamber, fungus garden (from peripheral region and around the royal chamber) from the mound nests in the field, the workers and soldiers from covered runways on eucalyptus trees were the materials for the present study.
- Population density of major and minor workers and soldiers 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, and the population of foraging forms from covered runways was assessed according to the sampling unit of  $10\text{ cm}^2$  area.

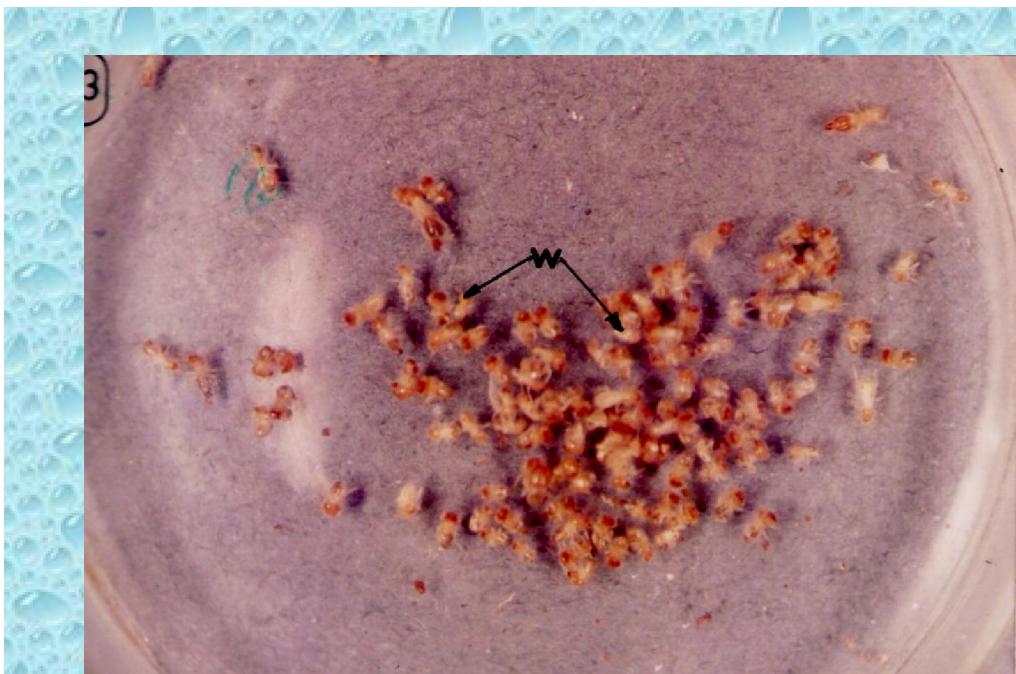
# STRUCTURE OF THE MOUND OF THE *ODONTOTERMES WALLONENSIS* AT STUDY AREA

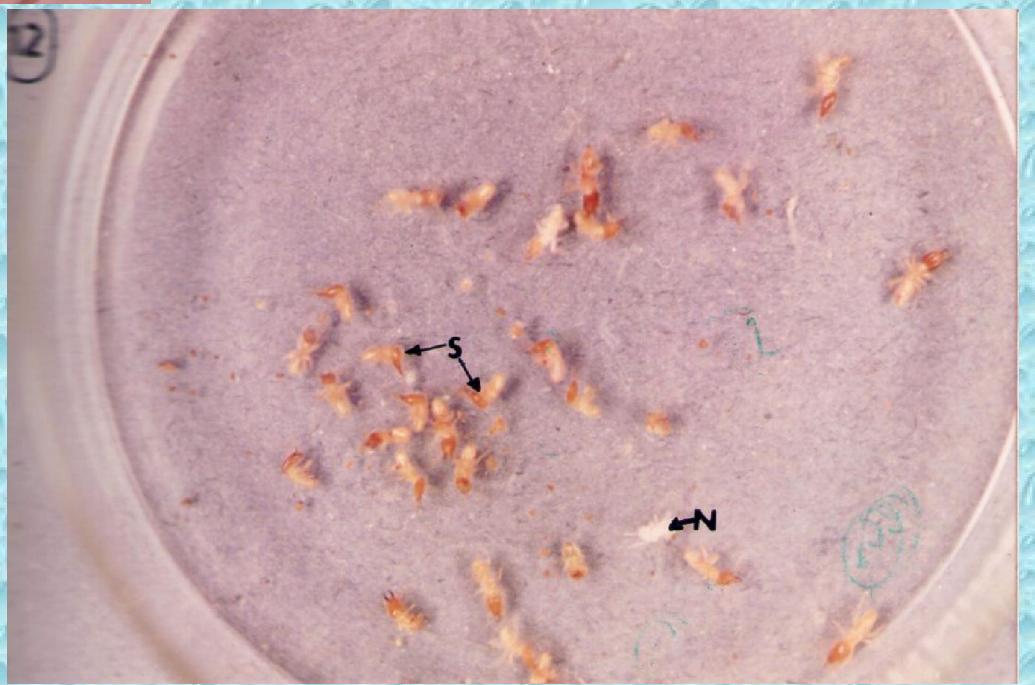
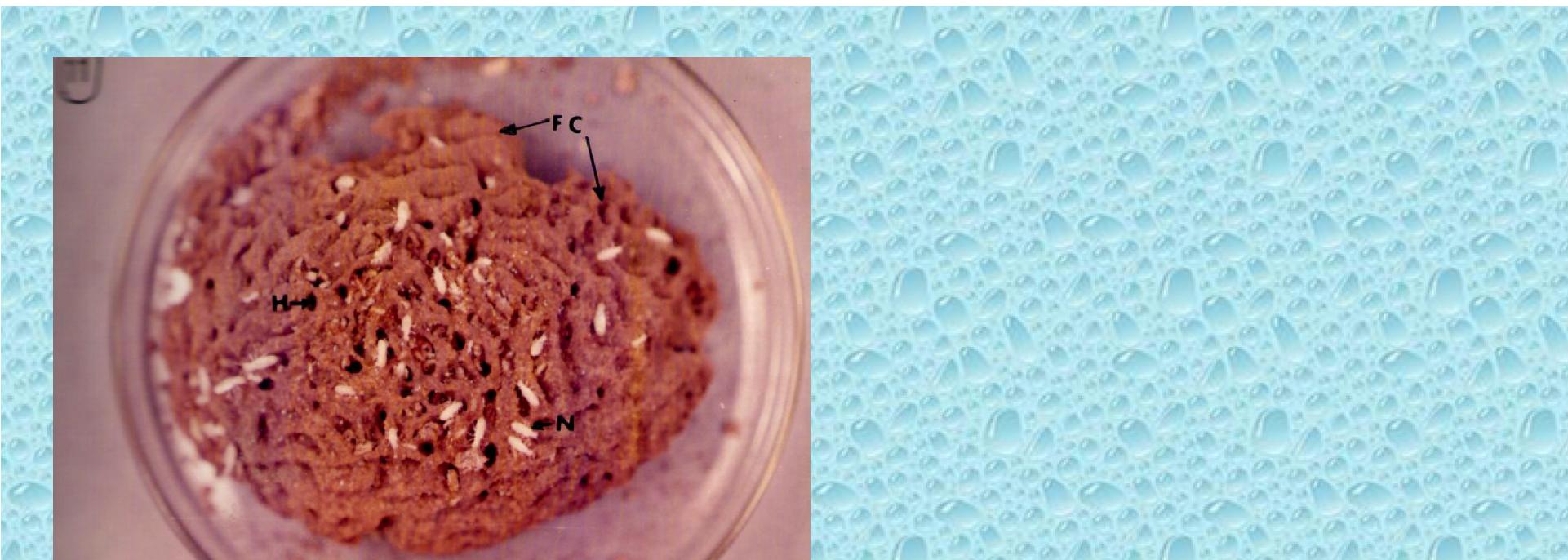


Vertical Section of the Termite mound showing possession of Royal Chamber









Ø For the comparison of various castes in different parts of the mound, student test was applied, the P values were less than 0.05 which was statistically significant.

## 4. RESULTS AND DISCUSSION :

Ø Population density of workers, soldiers and nymphs of the temite, *O. Wallonensis* from foraging covered runways and from different parts of the mound, namely, peripheral fungus garden, fungus garden around the royal chamber and royal chamber itself is given in Table 1.

**Table No.1. Distribution of workers, solders and nymphs in different parts of the mound nest and covered run ways of the ter mite  
*Odontotermes Wallonensis***

Different parts mound nest	Percentage of								
	Major Workers	Minor workers	Soldiers	Nymphs	Total	Major Workers	Minor Workers	Soldiers	Nymphs
Peripheral fungus Garden	490 $\pm$ 65	319 $\pm$ 36	90 $\pm$ 13	1124 $\pm$ 32	2023 $\pm$ 123	23.11 $\pm$ 1.21	5.76 $\pm$ 0.73	4.4 $\pm$ 0.20	55.56 $\pm$ 1.07
Fungus garden around	318 $\pm$ 11	458 $\pm$ 23	35 $\pm$ 1.0	9482 $\pm$ 376	10293 $\pm$ 375	3.09 $\pm$ 0.11	4.44 $\pm$ 0.28	0.34 $\pm$ 0.01	92.12 $\pm$ 0.67
Royal Chamber	162 $\pm$ 51	740 $\pm$ 85	347 $\pm$ 32	29 $\pm$ 1	1278 $\pm$ 155	12.67 $\pm$ 1.00	57.90 $\pm$ 2.10	2715 $\pm$ 2.10	2.26 $\pm$ 0.20
Covered runways	128 $\pm$ 16	11 $\pm$ 1.0	5 $\pm$ 1.0	Nil	144 $\pm$ 14	88.88 $\pm$ 0.63	76.3 $\pm$ 0.40	3.47 $\pm$ 0.26	Nil

- q Percentage of major workers in the peripheral fungus garden and foraging covered runways was higher ( $p<0.001$ ) than that of royal chamber and fungus garden around the royal chamber.
- q High percentage of major workers in the above mentioned regions might be due to the foraging, construction and repairing of the mound.
- q According to Darlington (10) in *Macrotermes Subhyalinus* the peripheral fungus garden consisted of mainly workers with minor workers slightly outnumbering the major workers, and the soldiers less than 5% of the total.
- q In the trunk galleries, the percentage of major workers was more (70%) than the minor workers and the soldiers.

- q In *O. Wallonensis* the percentage of minor workers was high ( $P<0.001$ ) in the royal chamber when compared to other parts of the mound. This 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.
- q High percentage of soldiers ( $p<0.001$ ) in the royal chamber was presumably for guarding the royal couple and to get food from minor workers.
- q Though the royal pair all the time was found well protected in the royal chamber, the presence of high percentage of soldiers might be for facing the rare invasion (s) of predatory ants as found in *O. assamuthi*(11).

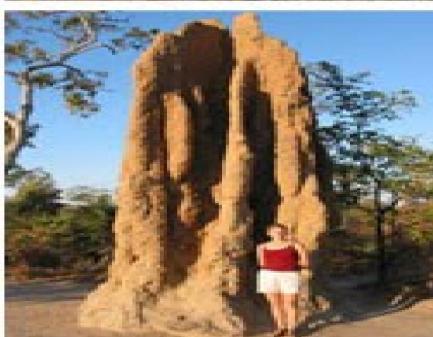
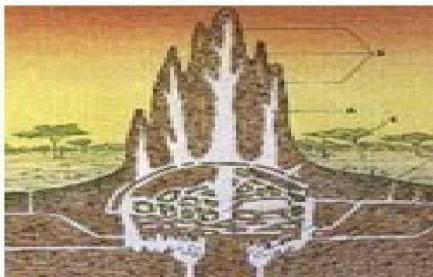
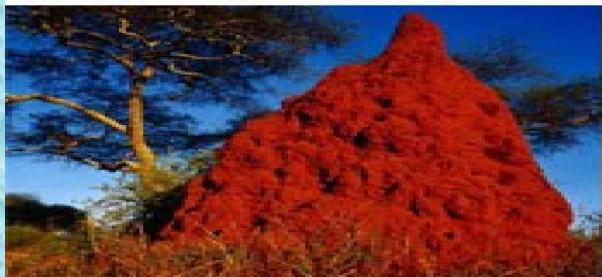
q High percentage of nymphal population in the fungus garden around the royal chamber is reasonable because thousands of eggs laid per day by the large physogastric queen were to be transported from the royal chamber and stocked in masses for incubation.

q Evidently, various castes of this species in different parts of the mound are distributed according to their functional behavior.

## 5. CONCLUSION :

- 1. In the present investigation the population density of *O. Wallonensis* 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 *o. assamuthi*.
6. High percentage of nymphal 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 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 to understand activity in the different seasons of this species. During different activities like foraging, defensive, mound repair work etc.,



• Thank you.