The Asian Journal of Animal Science (June, 2011), Vol. 6 Issue 1 : 43-45 | *RESEARCH ARTICLE*

Population dynamics of termites with special reference to *Odontotermes obesus* (Desneux)

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ABSTRACT

Odontotermes obesus is a widely distributed mound building termite in Kerala. Mound density varied from 8-10 mounds /ha. The total population was directly proportional to the size of the mound and weight of the fungus garden. Mound of *o.obesus* varying in height from 2-50cm and 20-116 cm in circumference at the base ,contained a population ranging from 71-1828 individuals.The population showed seasonal fluctuation.Mature alates were recored during March,April,September and October.The proportion of workers inside the mound (25.1% to 42.8%) was low during August-November.This is attributed to increased foraging during the rainy season.High percentage of larvae were found during August, October and March (9.9% to 24.4%) indicating peak egg production during the monsoon season.

Key words : *Odontotermes obesus,* Population, Seasonal fluctuation

Termites are one of our planet's most diverse and abundant animal groups. There are 2600 termite species (Kambhampati and Eggleton, 2000). Termites are social insects that are primarily wood-feeders, but also feed on a variety of other organic substrates,such as living trees, leaf litter, soil, lichens and animal faeces. They occur throughout the tropics and sub tropics, as well as in many temperate areas of the world. In natural ecosystems, they perform a beneficial role in nutrient cycles by accelerating decomposition. The Oriental Zoogeographical Region has a rich termite fauna, comprising 1059 species as reported by Ahmad and Akhtar (2002).In Kerala though there is a rich termite fauna,absolutely no study on the population of any species has been carried out so far.

MATERIALS AND METHODS

The study was carried out in 1500 ha of land in Mayanad, Kollam district, Kerala, for a period of one year ie from June 2009 to May 2010.To determine the density of the mounds in the study site, ten plots of one ha each were selected at random and the mounds were directly counted from each plot.To determine the population density, ten mounds varying in height and basal circumference were selected. Each one was quickly broken open and five samples of fungus garden (100g each) from different parts of the mound at random were taken carefully and quickly before the termites could respond to the disturbance. Each sample was kept in a separate tray and the various castes such as workers , soldiers, pre-soldiers and larvae were separated by hand sorting. Individuals of each caste were counted from all the five samples and the mean value was determined. The entire fungus garden from the mound was collected and air- dried the same day of collection to prevent degradation. When the combs were dry and hard, they were broken up and cleaned with a dry paint brush to dislodge dead termites and soil particles. These were oven dried at 50^0C and weighed. The total population was calculated on the basis of the total weight of the fungus garden.

To study the seasonal fluctuation in the population , mature mounds of *O.obesus* were chosen (maturity was determined solely on the production of a large brood of alates the previous year).Six mounds varying from 22-27 cm in height were selected. Population estimation per 100 g of fungus garden was made at monthly intervals for one year. By the principle of least squares, the relationship between the height /circumference of the mound (X) and total population (Y) can be established by the curve of the form $Y= AB^X$ where A and B are population parameters estimated from the sample.Regression analysis to ascertain the relationship between the weight of the fungus garden and the height/circumference of the mounds was carried out using the statistical package ' Statistix 4.1'.

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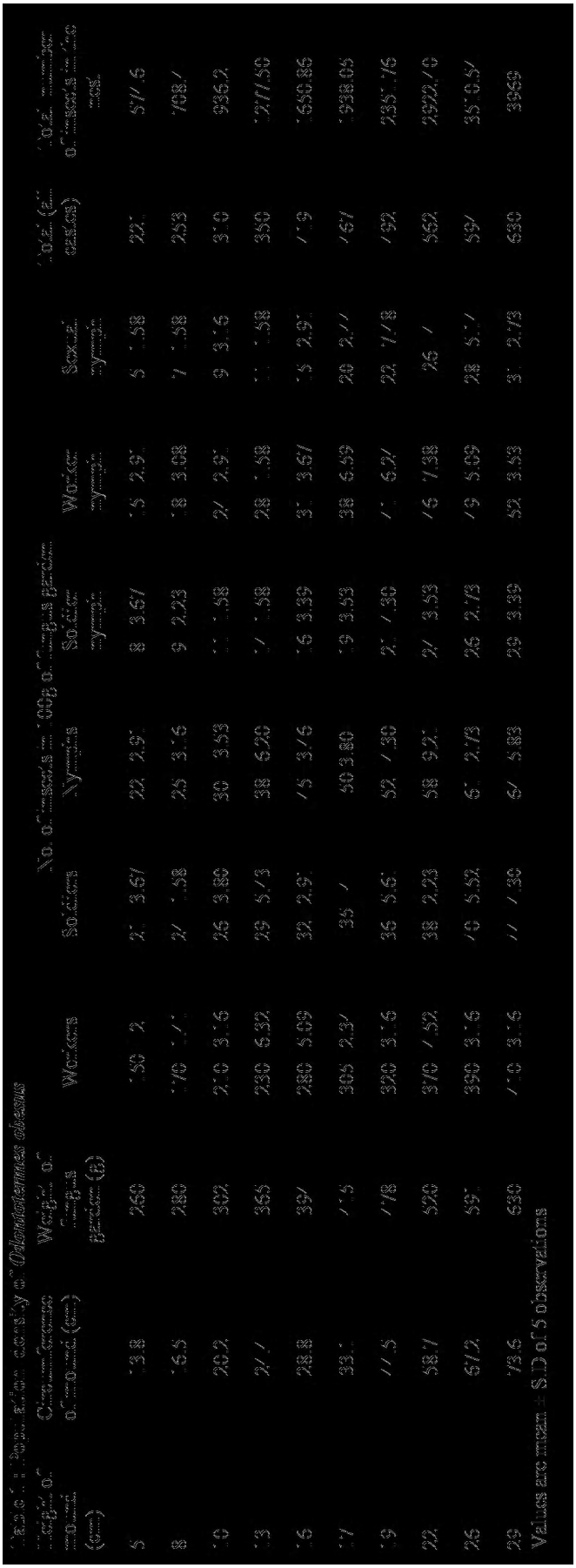
RESULTS AND DISCUSSION

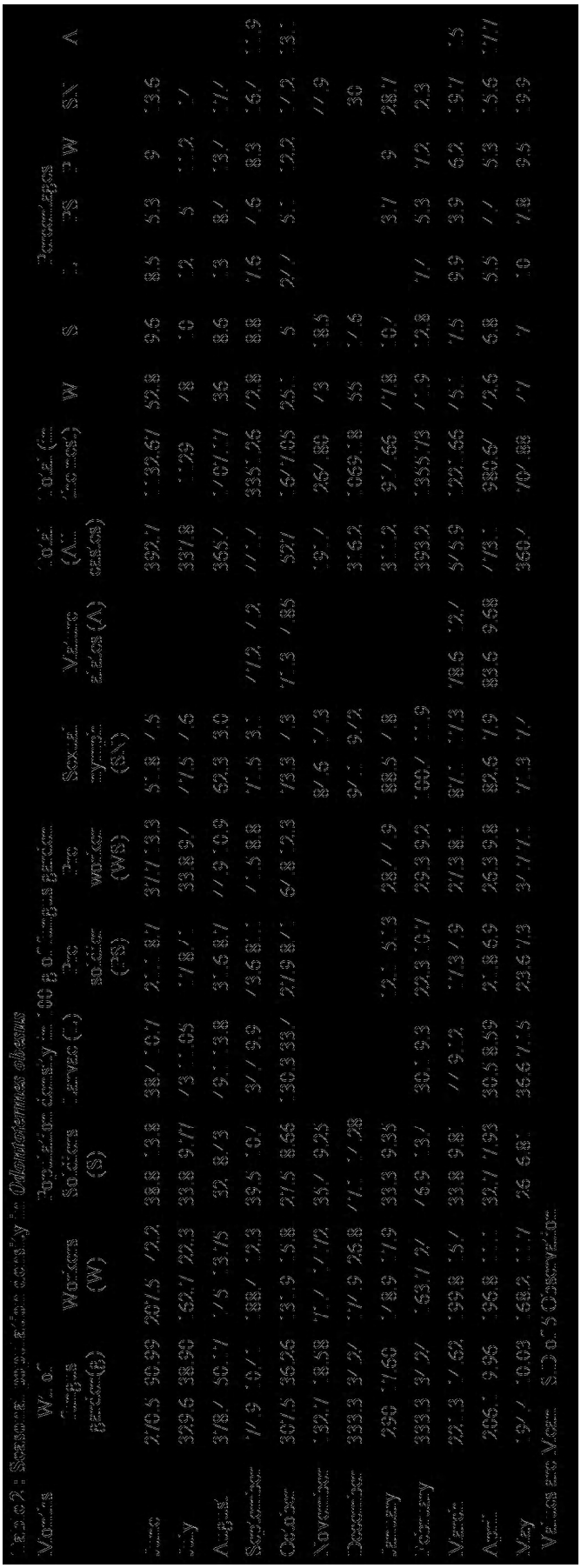
Direct counting of mounds recorded a density of 8-10/ha. Mounds were varying in height from5-29 cm and 13.8-73.6 cm in circumference at the base, contained a population ranging from 574.6-3969 individuals (Table 1). High significant positive correlation ($p< 0.01$) was obtained between the population and the height/ circumference of the mound ($Y= 0.075x9.405^x$ and $Y= 6.903x2.726^x$). A positive linear correlation ($p< 0.01$) was obtained between the weight of the fungus comb and the height/circumference of the mound ($Y=0.039x211.5^x$and $Y= 151.4x16.48^x$).

The present study also revealed seasonal fluctuation in the population (Table 2).High population (1129-3351.26 individuals) was recorded during June- October. During this period the percentage of workers (25.1-52.8%) was significantly lower ($p<0.05$) while the percentage of larvae (5.5-24.4%) was high inside the nest. The proportion of soldiers and pre- soldiers did not show significant variation during the different months of the year. Mature alates were recorded during September, October, March and April whereas sexual nymphs were found throughout the year.

Termites play an important role in the ecosystem and some species certainly improve the fertility of soil (Pearce, 1997). Some species cause extensive damage to woodworks in buildings and agricultural crops (Akhtar and Shahid 1988, 1990). Detailed studies about the abundance of different species of termites in different habitats have not been carried out. Akhtar and Shahid (1989) while studying the population dynamics of *Macrotermes mycophagus, M. obesi, M. uni color* and *E. paradoxalis*, reported that high population density of termites in October in cotton fields.Akhtar and Sarwar (1997) reported high population density in four termites species, *M.mycophagus, M. obesi, O. guptai* and *E. paradoxalis*, foraging on wheat crop, in Bahawalpur division. They attributed this to the easy availability of food. Studies involving soil cores from Bahawal Nagar revealed that population density varied from 2.407 to 124.44 m^2. Species diversity tends to be low in physically controlled ecosystems and high in biologically controlled ecosystems (Owen, 1971).

In the present study total population increased corresponding to the size of the mound coupled with increase in the weight of the fungus comb.This is probably necessary for providing nutrition and accommodation to the growing population. The present study showed high population during June-October in *O. obesus*. During this period the proportion of workers was significantly lower





while the percentage of larvae was high inside the nest.Low percentage of workers may be due to the fact that in *O. obesus* foraging increased during the rainy months resulting in reduced number of workers inside the nest.High percentage of larvae during July and August can be attributed to peak egg production in the monsoon season. However,the proportion of soldiers and pre-soldiers did not show significant variation during the different months of the year.The presence of the reproductive brood did not affect the sterile brood in this species.The weight of the fungus comb was closely related to the size of the sterile brood and did not vary seasonally as in *Odontotermes smeathmani* or *Microtermes* sp. which showed a reduction in comb weight during dry seasons.

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