CHAPTER II

REVIEW OF LITERATURE

Termite popularly known as white ant and are social insect belonging to the order Isoptera. Earlier researchers are contributed the study of termites in different aspects such as nesting pattern, population studies, swarming, colony founding foraging behavior, termite damage to structural wood as well as various plant and agricultural crops. The following workers contributed much of information regarding above aspects.


Most of the termites live underground and enter the home through plumbing outlet construction and foundation wall allowing termite Odontotermes species damage wood and wood product lefceroy (1909). Andrews (1911) has studied on population of evolved termite, besides total population and relative percentage of various cast.

In nature colony founding among thousand of alate O.wallonensis issued into swarm only few become successful establishing colonies. Thompson (1919) stated that they developed only in the flourishing colonies with thick population.

Termite are known for their destructive in nature as they cause great damage to structural timber, paper cloth and varieties of plant and tress and agricultrual crops, The annual loss according to Fletcher (1912) several million of rupees per annum in India. The mounds are classified into two type such as unilocular and multilocular. The uniocular in which there is single large cavity and large fungus garden is present where as in a multilocular mound there are several cavities each containing fungus garden. Annandale (1924) reported that unilocular type of nest also found in the established nest of Odontotermes in different species of macrotermitinae. Holdway et. al, (1935) and Hussain (1935) recorded that population of termite shows a variation per nest. Emerson (1937) described the strong and well protected nest which built by the termites is so secure against attack by enemies.

Further in (1938) he also reported that, the chief food of the termite is cellulose which is obtained from living and dead trees and vegetation. Grasse (1939) has made the studies of total population and relative percentage of various caste of termite. Niort (1948) has illustrated the structure of nest. Grasse (1949) mention that the termite in nest live where the living atmosphere is calm the moisture remains high throughout the year.

Light never penetrate into the mound it shows that excellent architectural nest of the termite. Mitra and Mukharji (1949) found that the percentage of soldier workers and nymph in fungus garden of O. wallonesis is varied. Heim (1942) stated that comb was merely a part of architecture.
Fonseca (1950) reported that, the 70% loss of Eucalyptus seedling due to attack of termite. Luscher (1951) have suspected the omittance of scent signals in a few species of the termite and Niort (1951) reported that other species of termite ready to acceptable male and female and form a pair sometime pair fail to construct of copularium such individual ultimately die. Gupta (1953) recorded the height and diameter of the mound while estimating population and relation between mound size and density. Luscher (1956) studied the process of construction of the mound by the termite.

Emerson A. E. (1956) stated that, termite are of beneficial value as they form the prey for many animals, the presence of appreciable amount of lipid and protein in the termite has attracted verity of animals due to rich content of protein, fat and carbohydrate in their bodies. Gay et al (1955) reported that moisture rather then the temperature as the main factor influencing the termite and also mention that swarming of the reproductive alate is meant for the dispersal and founding of new colonies. Brain (1957) opinion that they developed only in the flourishing colonies with thick population.

According Coatan (1958) Foraging take place open ground without any protection was adopted by different grops of termites among the Hodotermitinae and Hodotermes and Microhodotermes in Africa. Agrawal S.B.D. (1955) mention that maize is one of the major staple cereal crop grown through out region gradual increased in the intensity of attack by termite from the month of November. Haris M. V. (1956) has observed the issuing out alate of Anacathotermes from the emergence hole from the mud brick wall.

Weesner (1960) observed that, the genera Odontotermes construct surface mound which vary in structure among difference species and some time within the same species from different area. Mathur (1962) noticed that, the Swarm of termite are Preyed upon by many insectivoruous predator as they fly during the post swarming period.

Sensarm (1962) reported that swarming in a O.assmuthi at Dehradun took place only once in a year and also provides stimulus for swarming and swarming occur after heavy shower in other species of termitidae the attraction of the male and female appears to be visual but not due to scent signal. Agarwal (1964) reported that in foraging behaviour of termite is for food collection mainly wood cellulose, which is
digested with help of some protozoan. Roonwal and Chhotani (1962) reported that *Odontotermes* species is one of the destructive termite of the indoor woodwork.

Bodot (1967) however reported that the climatic factor have influenced the foraging activity and also mention that foraging varies periodically with the season. There is no report on the food storing habit of fungus growing mound building termite. Mehta and Verma (1968) reported that termite are known for their destructive in nature at they cause great damage to structural timber and various plant. Sand (1965a) reported seasonal fluctuation of different caste of termite in different months of the year.

Miller and Noirote C. H. (1969) reported that *Odontotermes* species among various caste shows fluctuation only in the soldier caste in a colony.

Basavalingappa (1970) reported that the important predator to *O. wallonensis* are frog, lizards, Dogs etc. Nutting (1969) mention that, rise of temperature in atmosphere as a factor for operating for the issue of swarm and also sudden drops in temperature increase in humidity also act as stimulus for swarming. Edger and william (1969) mention that, termite dug to a depth of 3 to 4 feet from the centre of mound is adopted. At the mouth holes and mound large number of workers and soldier has been observed by Noirot C.H. (1970). Bouillon (1970) stated that foraging tend to occur at the time when environmental condition are more or less similar. Lee and wood (1971) observed that some species of termite forage in the open without covered runway usually during night. Harrish (1971) noticed that the wooden article made from the soft wood have been damaged more than hard wood. Kapur and Bose (1972) stated that, termite not only damage the structural wood but also damage books and other materials. William (1973) noticed that, intensities of the damage and deterioration and assessed by visual observation.

Agrawal (1976) found considerable fluctuation of nymph population in other *Odontotermes* species. Darlington (1977) studied the distribution of various caste of termite in different parts of the mound nest. According to him the peripheral fungus comb consist mainly workers and minor workers. Wood (1978) observed that, foraging of termites in the open ground without any protection. Roonwal (1979) reported that termite as a pest of households materials and caused great economic impact on wood use in and around building.
Chhotani (1980) reported the species of termite damaging ground nut in India the loss of plant due to the termite. Johnson et al (1971) reported that, the termite damage to the ground nut plant, a significant relationship has been recorded between rainfall and \textit{microtermes} species infestation to the ground nut. Apart from crops they also attack crop left over (root stubble) fallen leaves no report are available on the loss caused except for report of Raj Gopal and Veeresh (1983). Reddy (1982) It has been reported that termite mainly \textit{Odontotermes} species damage of wood and wood product. Veeranna (1982) the distribution various caste in different part of the mound nest in \textit{O. Wallonensis}.

Jonsen (1983) the rule of termite in ecosystem in less effective due to difficulties in measuring termite population. Holldobler and Wilson (1990) stated the general pattern which remains inside nest they maintain activity. Rajagopal and Veeresh (1984) reported that the increase in weight of the fungus garden to commensurate with the growth of the population in the colony. Edward and miller (1986) \textit{O. wallonensis} were recorded as structural wood destroying pest and causing significant damage all over world. Bhattacharyya (1989) stated that, the population of fluctuation of different polymorphic forms in fungus garden.