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STUDIES ON INERT BARRIERS TO PREVENT ENTRY OF SUB-TERRANEAN TERMITES IN BUILDINGS

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ABSTRACT

In order to find alternative of conventional methods of termite control which provide chemical barrier in the foundation, investigations were carried out to study the efficacy of physical barrier. Inert materials viz. Flyash, Badarpur sand, Solani sand, Ennore sand and Marble chips were studied for penetrability of termites through them. It was found that termites were unable to penetrate through marble chips.

Key words: Termite, Physical Barrier, Marble chips, Ecofriendly

INTRODUCTION

Protection of Buildings from sub-terranean termites is conventionally achieved by providing chemical barrier in the soil in the foundation. The technique is found quite effective. However, the pesticides used for this purpose are toxic and are sources of environmental pollution. There may also be chances of contamination of under ground water if water level is high. Therefore, a need was felt to develop alternative eco-friendly techniques for controlling termites in buildings.

Among various methods tried for this purpose, the use of physical barriers to prevent termite access into buildings has been investigated for quite sometime. For this purpose earlier Snyder (6) developed 'Termite Shield' or Ant-Caps to place on the top of the foundation. They are still used in the timber framed housed in Australia. Ebelling and Pence (3) have demonstrated that sub-terranean temrites did not tunnel or penetrate sand barrier with particle size ranging from 2.4 to 1.7 mm in diameter. Similarly, Tamashiro et al. have developed physical barrier for termites using Basalt aggregate. Su and Co-workers (7) studied the penetration of *Coptotermes formosanus* and *Reticulitermes flaviceps* into sand treated with some pesticides in low concentrations. It has already been reported that granite gradings were impenetratable to sub-terranean termites (1, 2, 4).

Recently, research was carried out in this Institute to evaluate various inert materials to study their penetratibility by termites and the results are reported in this paper.

MATERIALS AND METHODS

Inert materials taken for this study were Fly ash. Badarpur sand Solani sand, Ennore sand and Marble Chips. Their particle size are reproted in Table – I.

Table I. Particle size of the different materials evaluated

Materials Evaluated	Particle Size
1. Ennore sand	Passing through 0.30mm and retained on 0.15 mm sieve
2. Badarpur sand	Passing through 1.18mm and retained on 0.60mm sieve
3. Solani sand	Passing through 0.30mm and retained on 0.15mm sieve
4. Marble chips	Passing through 2.36mm and retained on 1.18mm sieve
5. Flyash	Passing through 45 micron sieve

Rectangular glass bottles (capacity 1500 ml, x 20 x 8.5 cm) provided with tin lids were used for the study. Bottles were thoroughly washed and dried and then filled with 250 gm of air dried soil up to one third capacity, which was moistened with distilled water up to 15-20% moisture content. The soil was collected from the upper parts of mounds of *Odontotermes obesus* (Rambur) having a uniform texture and pH ranging from 6.0-6.7. In the laboratory lumps of soil were broken crushed and passed through fine sieve. It was then sterlised in an autoclave at 15 psi for two hours.

A small empty nest piece of *Microcerotermes beesoni* collected earlier from the broken nests was kept in each bottle which was filled with soil. The height of the nest was just equal to the height of bottle. Out of these bottles three bottles were filled with each inert material up to two third of their capacity.

Thin feeder strips of the size 2.5 x 2.5 cm were cut from mango (Mangifera indica) wood. They were air dried to 10 precent moisture content.

Termite species used were *Microcerotermes beesoni* Snyder of which major active workers were sorted out for experimental purposes. Approximately 1000 active termite workers preconditioned at low relative humidity (5-10%) were released inside the bottles. Preconditioning in the dry environment induces test termites to enter into the moist culture medium quickly(9).

RESULTS AND DISCUSSION

Figures 1-5 show the penetration trend of the termites in flyash, Solani sand, Badarpur sand, Ennore sand and Marble chips. In the plates the gallaries formed by the termites show their movement. However, maximum galleries above the soil are formed in fig. 1 which is of fly ash. The galleries formed in Solani sand were less then the galleries formed in the Fly ash. The trend is further lowered in figures 3 and 4 which are of Badarpur sand and Ennore sand. As evident from fig. 5 the termites were unable to penetrate in the marble chips.

FLY ASH

SOLANI SAND

BADARPUR SAND

Figures
1) Penetration of Termites in Flyash; 2) Penetration of Termites in Solani Sand; 3) Penetration of Termites in Badarpur Sand

ENNORE SAND

MARBLE CHIPS

Figures
4) Penetration of Termites in Ennore Sand; 5) Termites unable to penetrate in marble chips

CONCLUSION

Thus termite workers belonging to *Microcertermes beesoni* are unable to penetrate in the Marble chips of which particles were passing through 2.36mm and retained on 1.18 sieve. This study reveals that particle size distribution is important for the movement of termites. The marble chips being coarser retard the penetration of termites while in flyash a fine material, the formation of termite galleries is maximum. Therefore marble chips may be used at the foundation level as physical barrier to prevent entry of termites in buildings. However it is necessary that some low cost technology should be developed.

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