AN IMPROVED TECHNIQUE FOR DETECTING SAND SUBTERRANEAN TERMITE INFESTING DESERT AREAS IN EGYPT

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ABSTRACT: *An improved technique for detecting sand subterranean termite infestations psammotermes hybostoma (Deseneux) in desert areas was designed. This new technique overcomes the disadvantages of commonly known termite traps and supports studies on termite populations, foraging activity, and limits the experimental areas to carried out the ecological studies successfully as well as to obtain the best methods in the control of the sand subterranean termites. This technique was considered as environmentally friendly, because it uses very small quantities of termiticides in control operation, and decrease the chemical contamination of the soil.*

Key words *: Improved , trap, subterranean termites, detecting infestation, Psammotermes hybostoma*

INTRODUCTION

Sand subterranean termites *Psammotermes hybostoma* are among the most widespread and destructive insect pests allover the world, especially in the tropical regions and Egypt (Eldossoki *et al.*, 2009). They consist a group of social insects comprising the Order Isoptera. Subterranean termites feed on any cellulose containing material but they do not attack living wood trees except for the genus *Coptotermes* spp. which can damage plantations. Harris (1961) mentioned that, about 1900 termite species are recognized, at least 53 of these species are regarded as serious pests, cause damage to buildings, village houses, sleepers, mats, carpets, grain stores, books, clothes,....*etc.*, .Subterranean termites also attack wood and fruit trees as well as many varieties of field crops especially in the late maturation stage. According to Ebeling (1968), the total loss due to subterranean termite infestation in U.S.A. amounted up to $1.5 million every year. In Egypt, El-Sebay (2008) mentioned that, the annual loss of buildings due to termite infestation at Aswan Governorate amounted 6 million Egyption pounds while at Fayoum Governorate, this damage exceeded 5 million Egyption pounds (Ahmed 1997). The early detection of termites infestation play a significant importance in integrated pest management (IPM), as it can decrease injury before it reaches threshold economic level and subsequently, cut down the cost of control operation, and avoid environmental pollution. The significant of termites infestation lies in the natural of their hidden damage, therefore, a lot of termites detecting methods had been developed by several authors, such methods, mainly depended upon the feeding behaviour of subterranean termites on cellulose materials. Beal, 1979 used wooden traps different in shapes and measurements. Lafage *et.al* (1973), Said (1979), Dangerfield and Mosugelo (1997) used toilet paper rolls. Wood (1974) used the corrugated cardboard rolls. French, and Ewartt (1986) used fallen rolls. Su, and Scheffrahn (1986), and El-Sebay (1991) suggested a modification on the corrugated cardboard rolls trap. The previous mentioned detection methods suffered certain disadvantages including high economic cost, limited capability in filed applications, difficulty of collecting data and non efficiency in studying the various ecological aspects of subterranean termites *e.g.*, foraging, population fluctuations surface and subsurface activities and construction activity, and caste of colony. In addition, such methods are more or less descriptive rather than quantitative. In these

traps, the cellulose material is directly in contact with soil thus, growing a chance to the growth of rot microorganisms. From these points of view, there was a need to improve these method of traps to cover the disadvantages of these traps.

MATERIALS AND METHODS

Description of the trap:

According to Fig. (1), the modified trap consists of cylindrical plastic tube (Poly Vinyl Chloride, P.V.C.), 12cm length and 7cm in diameter with 6-9 side holes distributed on its sides and filled internally coated with a corrugated cardboard roll with the same measurements to serve a source of cellulose material (represent the main food for subterranean termites).

Burring the trap into the soil:

In order to explore subterranean termite infestations in the desert areas, an experiment was carried out in Youssef El-Sediek district, Fayoum Governorate, from January 2009 to December 2009, in an area of 600 m^2(20 length x 30 wide). All superficial and partially buried of dead and debris were removed from the area to prevent any nutrient interferences with the traps .The area was straighted and irrigated then left to full dry. 50 P.V.C. traps were distributed randomly all over the area and arranged as 5 columns and 10 rows with 2m intervals between each ones. Corrugated card board rolls were wetted, and P.V.C. traps were vertically buried into the soil to 12cm depth with their tip at soil surface at distances of 2m from all directions. All traps were collected every fortnightly and replaced by new ones, and kept in tightly closed plastic bags then transported to the laboratory for examination of the population density (seasonal abundance and activity). Traps were inspected and individuals were separated from the traps by using a small fine brush, then the workers caste was counted. (Figs 2 & 3).

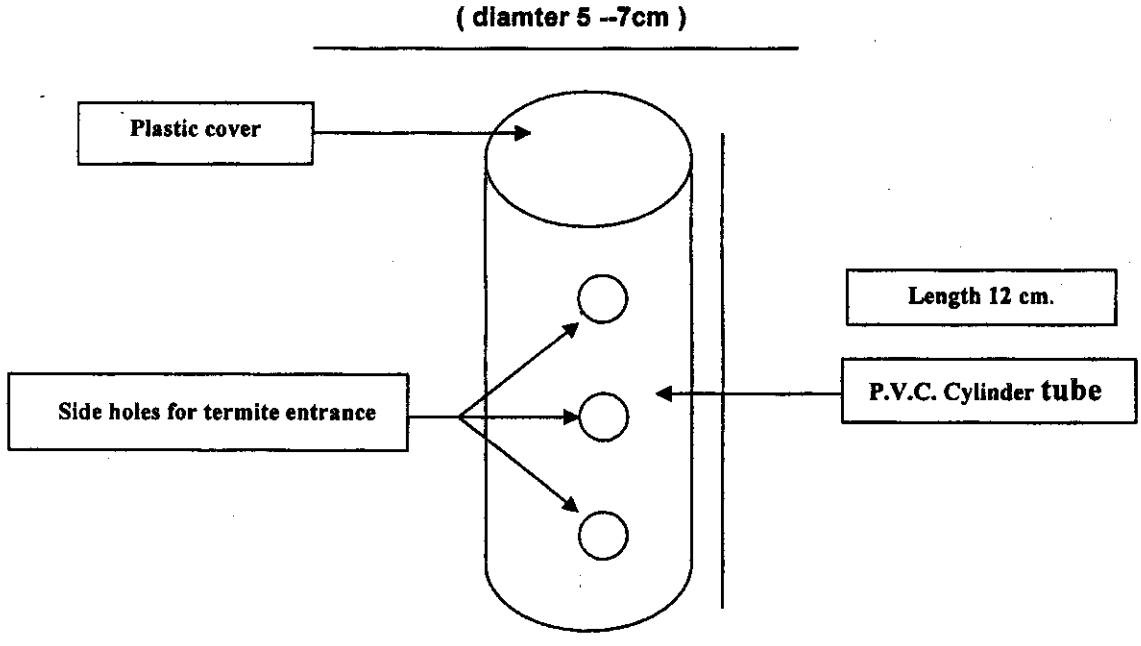

Fig. (1): Description of the developed subterranean termites trap.

Fig. (2): Trap ready for use

Fig. (3): P.V.C Trap after being buried into soil for 2 weeks

RESULTS AND DISCUSSION

Obtained data in Table (1) reported that, the maximum number of traps with attracted insects was 46 traps during March and 45 traps in September, while the least number was 8 traps during January. The number of traps with attracted insects fluctuated during the remaining periods from 8 traps in January to 45 traps in September. According to data in Table (1) it was found that, the mean percentages of P.V.C. infested traps were 16.0 % in January and 32.0 % in February, whereas in March, infested traps were 92.0 % by sand subterranean termite *Psammotermes hybostoma*. The percentage of infested traps increased gradually to 92.0 % in March and 90.0 % in September. From March until September the mean percentage of infested traps recorded the maximum values as 92.0 % then decreased to 34.0 % in December. Obtained data in Table (1) indicate that, the total number of captured caste of workers were 5361, 4872 during spring and autumn seasons, while the least number was 5131 during summer season. The monthly trap catch of workers caste, were recorded between the beginning of January and the end of December. In January the cached workers was recorded as 1125 workers /50 traps .In March, caste of workers population increased to 2680 /50 traps then decreased to 624 / 50 traps in August. Workers caste population were comparatively high during October and November (2695 and 1874 /50 traps) respectively. the grand mean number of captured workers /trap was 412.66 during the four seasons. These results was confirmed by Said (1979) who mentioned that, the average number of subterranean termite *Anacanthotermes ochraceus* was 0.25 termite per trap, while, Abd El-Latif (2003) indicated that, the mean number of captured workers per trap was 29.41 in 1997.

Advantages of the P.V.C. trap:

The improved P.V.C. trap has the following advantages: 1) Collecting a large number of sand subterranean termites. 2) Remains immobile in position and the card board roll easily replaced whenever necessary 3) Preserve card board rolls against adverse environmental effects. 4) Facilitates counting of trapped termite individuals and the assessment of their food consumption and soil construction. 5) Provides protection against birds, rodents and true ants. 6) Friendly for the environment.

Table (1): Monthly percentages of P.V.C. traps infested with the sand subterranean termite *Psammotermes hybostoma* (Deseneux) and numbers of captured workers

Season	Month	No. of infested P.V.C traps	% Infested P.V.C traps	No. of captured workers/50 traps
Winter	Jan.	8	16.0	1125
	Feb.	16	32.0	1326
	March	46	92.0	2680
	Total	70	46.7	5131
Spring	April	39	78.0	2145
	May	26	52.0	1864
	June	21	42.0	1352
	Total	86	54.0	5361
Summer	July	24	48.0	1987
	August	18	36.0	624
	Sept.	45	90.0	2658
	Total	87	58.0	5269
Autumn	Oct.	42	84.0	2395
	Nov.	38	76.0	1734
	Dec.	17	34.0	743
	Total	97	64.7	4872
	Grand Total	340	55.9	20633

Data were counted every two weeks

Scope of usage

P.V.C traps are suitable for used in the following 1- Ecological studies on termites especially in the fields of population activity, release and recapture, foraging, food consumption and soil construction investigations. 2- Evaluation of the efficacy of insecticides for termites control. 3- Detection of termite infestation such as (wood and papers factories, stores products, and reclamation desert). 4- A poison baits especially in the circumstances that liquid cannot be applied with liquid insecticides.

REFERENCES

Abd El- Latif, N.A. (2003). Ecological and control studies on certain subterranean termite species. Ph.D.Thesis Fac. Agric., Cairo Univ., pp260

Ahmed, H.M. (1997). Ecological studies and control of harvester subterranean termite, Anacanthotermes ochraceus (Burm.) at Fayoum Governorate. M.Sc. Thesis. Fac. Agric., Cairo Univ., El- Fayoum Branch, pp77.

Beal, R.H. (1979). Preventing termite attack by adding insecticides to particle board, hard board and plywood adhesive in

U.S.A. Frost Product Journal, 29 (12): 29-34.(Rev. Appl. Entomol., 75: 312-321.)

Eldossiki, S.A., S.M. Elawady, Y. Elsebay, and A.R. Elbassiouny (2009). Studies on some ecological aspects of sand termite, *Psammotermes hybostoma* at Ismailia Governorate . Egyption Journal of Agric. Research 87 (1) p.85 (Abstract).

Dangerfield, J. M. and D.K. Mosugelo (1997). Termite [Isoptera: Termitidae] foraging on toilet roll baits in semi-arid savanna, South-East Botswana. Sociobiology 30 (2): 133-143.

Ebeling, W. (1968). Termites identification, biology and control of termites attacking buildings. J.Econ. Entomol.,59 (3) 239-248.

El-Sebay, Y. (1991). A modified trap for El-Sebay subterranean termite. Fourth Arab Congress of Plant Protection. Cairo. 1-5. Dec., 1991 pp. 245-247.

El-Sebay, Y. (2008). Studies on subterranean termite in Aswan, survey and damage assessment. Egypt. J. Agric. Res., 86 (1) 225-236.

Frensh, K.L. and J. H. Ewartt (1986). An easy method for collecting subterranean termites *Anacanthotermes ochraceus* (Burm) from filleen. Sociobiology. 7(3): 311-314.

Harris, W.V. (1961). Termites and their recognition and control.Longmans, London, 187pp.

Lafage, J. P., N.Y. Su, M.J. Jones and R. Esenther (1973). A rapid method for collecting large numbers of subterranean termites from wood. Sociobiolgy 7 (3): 305- 309.

Said, W. A. (1979). Ecological and toxicological studies on Fam. Hodotermitidae M.Sc. Thesis, Fac. of Agric., Ain Shams Univ., pp. 128.

Su, N.Y. and R.H. Scheffrahn (1986). A method to access, trap and monitor filed population of the formosan subterranean termite (Isoptea: Rhinotermitidae) in the urban enviroment. Sociobiology, 12: 299-304.

Wood, T. G. (1974). Field investigations of the decompostion of leaves of *Eucalyptus delegatensis* in relation to environmental factors. Sociobiology 2 (3): 115-124.

تكنيك محسن للتنبؤ بالاصابه بالنمل الأبيض تحت الارضى فى المناطق الصحراويه فى مصر

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الملخص العربي

إستهدفت هذه الدراسة إجراء تصميم لتكنيك محسن لمصيده يمكن بها التنبؤ بالاصابه بالنمل الابيض تحت الارضى فى المناطق الصحراويه . والمصيده صممت بحيث تعالج العيوب وأوجه القصور فى المصائد الموجوده حيث أن لها دلالات رقميه ملموسه وليست وصفيه فقط بمعنى انها تعطى دلالات حقيقيه عن التعداد ونشاط السروح و تحديد مساحة المستعمرات للنمل الأبيض تحت الارضى وبالتالى يتم إجراء الدراسات البيئيه بنجاح ونصل فى النهايه الى افضل الطرق السليمه والصحيحه فى مكافحة هذه الافه فضلا عن كون المصيده صديقه للبيئه من خلال إمكانية تقنين كمية المبيدات المستخدمه بها فى حال إستخدامها فى عملية المكافحه للنمل الابيض تحت الارضى بالمقارنه بالطرق التقليديه وبالتالى تقلل من التلوث البيئى للتربه.