

STUDIES ON THE CONTROL OF SUBTERRANEAN TERMITES ATTACKING GROUNDNUT CROP (*ARACHIS HYPOGEA* L.) BY TENEKIL IN COMPARISON WITH HEPTACHLOR AND CHLORDANE

A H Shah^{*a}, M W Roomi^a, S A Khan^a, D H Roomi^b and S A Qureshi ^a

^aPCSIR Laboratories Complex, Off University Road, Karachi-75280, Pakistan

^bDepartment of Botany, University of Karachi, Karachi-75270, Pakistan

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Field trials were undertaken with a view to promoting the use of an indigenous pesticide Tenekil (A polychlorinated hydrocarbon of PCSIR origin) on agricultural crops as a termiticide. Ground-nut or peanut (*Arachis hypogea* L.) plots were treated with Tenekil at the rate of 6 litre per acre and its further application of 1st and 2nd booster doses at an interval of one month through irrigation technique were found to be effective against subterranean termite attack until harvest caused an increase in annual yield. Heptachlor and Chlordane used as standard termiticides with the same concentrations and methodology, produced similar results, whereas control plots severely infested by termites, resulted in reduced yield.

Key words: Tenekil, Termites, Heptachlor, Chlordane.

Introduction

Groundnut or peanut is an essential cash crop. It is high in protein and contains essential nutrients, such as carbohydrates, trace elements and vitamins. Its raw material is also used in the manufacturing of vegetable fats (Banaspati ghee) all over the world (Bajaj 1984).

Termites or white-ants are ancient pests of agricultural crops and young forest plantations and damage wooden fixtures in the buildings (Chaudhry and Ahmed 1980). As recorded in 1973, 17 different species of termites damaged the groundnut crops throughout the season all over the world (Feakin 1973). Termite species *Odontotermes obesus* Rambur and *Trinervitermes biformis* Wasmann cause huge losses of groundnut in Pakistan. These small mound-building termites of Pakistan are surface defoliators, as they attack the plants above and below the ground level and devour buried nuts. In case of severe infestation, the annual yield decreases significantly (Roonwal 1973). The annual losses to this particular crop by termites has been estimated 10-45% in the whole sub-continent (Sharma 1966). According to our survey conducted in the months of May to October, 1996 in the Sindh region of Pakistan, it was revealed that termites damage the groundnut crops starting from the seedling stage until harvest. This is confirmed by our earlier studies on *Microtermes obesi* Holmgren, and *Coptotermes heimi* Wasmann which attack and damage groundnuts throughout the season.

The present investigation deals with the control of termites attacking groundnut crop by Tenekil (Roomi *et al* 1991; Shah *et al* 1994; Seema *et al* 1994) in comparison with Heptachlor and Chlordane (used as standard termiticides) currently being used in our country for the control of various agricultural pests of economic importance.

Materials and Methods

After a survey conducted in the months of May and June, 1995 of termite-infesting groundnut (*Arachis hypogea* L.) growing fields in the Sindh region of Pakistan, a termite infested site was selected for experimentation. Fifteen plots each measuring 16 sq. meters consisting of 40 day-old plants were demarcated by making one foot high boundary line of soil around each plot, which were then tagged with iron plates. The water emulsion of Tenekil^R (A PCSIR product - polychlorinated hydrocarbon), Heptachlor and Chlordane (Alam 1965) were used. The insecticides were prepared at the rate of 6 litres per acre at room temperature (28°C). Each plot was treated via the irrigation technique, using the above mentioned concentrations. Three replicates were used for each treatment in a randomized block design, similarly six plots were assigned as controls. If termite attack was noticed after one month, 1st and 2nd booster doses of each termiticide were also applied at the rate of 4 and 2.5 litres per acre at an interval of one month. Treated and Control plots were kept under observations, and samples were collected monthly from each plot for pest population dynamic studies during the course of our experiment (Table 1).

*Author for correspondence

Table 1

The effectiveness of Tenekil against termites attacking ground nut plantations (*Arachis hypogea* L.) in Sindh region of Pakistan in comparison with Heptachlor and Chlordane (used as standard termiticides)

Termiticides	Dosages in litres per acre through irrigation technique*			Replicates	Mean yield per 16 sq meters (kg)	Mean yield (%)
	Initial treatment	Ist booster dose	2nd booster dose			
Tenekil	6	4	2.5	3	14.66 ± 0.66	195.0 ± 10.40
Heptachlor	6	4	2.5	3	13.33 ± 0.33	176.0 ± 8.32
Chlordane	6	4	2.5	3	13.34 ± 0.34	176.0 ± 8.33
Control	-	-	-	6	4.91 ± 0.22	-
L.S.D P = 0.05					1.3990	25.6267
L.S.D P = 0.01					1.9370	35.3358

*Treated plots with initial dose of each termiticide were found to be slightly infested by termites after one month, hence booster doses were applied through irrigation technique in each case.

Results and Discussion

The control and treated groundnut (*Arachis hypogea* L.) plots were observed monthly and the infested samples from soil were collected for studying the pest population dynamics. The data from each replicate was statistically analysed for significance. The peak population of termites species (*Odontotermes obesus* and *Microtermes obesi*) was noted in the months of August and November, 1996 primarily in the control plots. During the course of these investigations another soil inhabiting parasite i.e. root knot nematodes (*Meloidogyne* sp.) was also observed in some control plots in association with termites. *Meloidogyne* larvae feed inside vascular system of the plants resulted in stunting and wilting. The joint infestation of termites and nematodes at the same time caused severe damage induced by the pests rather than individual attack.

Groundnut plots treated with Tenekil at the rate of 6 litres per acre through irrigation technique and its booster doses at the rate of 4 and 2.5 litres at an interval of one month prevented termite attack upto 4 months till harvesting of ripe crops resulting an increase in yield upto 195% i.e. 14.66 % kg per 16 sq meters at the level of L.S.D=0.01 significantly (Table 1). Tenekil treated plots were also found to be free from root-knot nematodes infestation for the test period. Heptachlor and Chlordane used as standard termiticides in the same concentration were also found to be effective against termite attack for upto four months and the annual yield increased 176% (13.33 kg) and 176% (13.34 kg) respectively per 16 sq. meters at the level of L.S.D=0.01. Minor infestations of root-knot nematodes was also noticed in some cases. Tenekil has low mammalian and avian toxicity (Siddiqui 1964) and proved to be effective when compared with Heptachlor and Chlordane at 1% level. On the other

hand control plots were severely damaged by termites within four months resulting a tremendous decline in the annual yield (Table 1).

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