
EFFICACY OF INSECTICIDES AGAINST SUBTERRANEAN TERMITES IN PROTECTING THE EUCALYPT SAPLINGS

Hanif Gul, Systematic Entomologist and *M. Ismail Chaudhry*, Director Forest Entomology, Pakistan Forest Institute, Peshawar.

ABSTRACT

Preventive control experiments were laid out during May, 1989 against termites attacking eucalypts sapling at Ratta Kulachi (D.I. Khan) and Pakistan Forest Institute, Peshawar with BHC WP 12.5%, BHC 10% dust, Sevin 85% WP and Malathion 57% EC applied in 0.06, 0.12 and 0.25% dilutions in four replications keeping five plants in each treatment. A total of 243 plants were found dead at D.I.Khan during the period of experiment out of which termite damage was recorded on 27 plants only.

At Peshawar mortality of plants was less than that at D.I.Khan. A total of 175 plants died over a period of a year and half which is only 20% of the total number of plants at this site. There was no termite damage to the plants at Peshawar.

INTRODUCTION

Due to population growth demand for fuelwood and wood products has increased significantly. Establishment of plantations and protection of forests has a high priority in many countries of the world to meet the increased demand of fuelwood and industrial forest products. Afforestation programmes fulfill these requirements in which the fast growing tree species like poplars and eucalypts are being planted. In most tropical countries where eucalypt have been introduced root feeding termites are known to cause large scale mortality of young saplings.

Dhamadhera and Rawat (1978) have reported termites as major pests of forests in India, causing damage to the roots and bark of standing trees. Soil application of 5% aldrin EC, chlordane or BHC and the application of 1-2% DDT or BHC, paste to the bark was recommended for control of this damage.

Parihar (1981) found *Odontotermes gurdaspurensis* and *O. obesus* damaging *Eucalyptus* spp. in the arid regions of Western Rajasthan, India. Seedlings were more susceptible to attack than mature trees. The application of either 0.25% aldrin EC at 0.5g/seedling or 10g aldrin dust/seedling was found to give effective control for over two years.

Field trials on eucalypt in some African countries apparently provided the theoretical basis for some of the earlier recommendations (Parry 1959, Lowe 1961, Sands 1962, Wilkinson 1964, Brown 1965).

Veeresh *et al* (1981) presented experimental data to show effectiveness of heptachlor, chlordane and DDT when mixed in container soil.

Nair and Varma (1981) evaluated aldrin, chlordane, heptachlor and BHC for termite control on *Eucalyptus tereticornis* in Kerala, India. Aldrin, heptachlor and chlordane were found effective when applied in the planting pit or container soil as dust or liquid treatment (0.03 g a.i. per container).

In the present study organochlorine wettable powder and dusts have been tested alongwith phosphatic and carbamate insecticides for comparison of their efficacy in different doses for replacing the organochlorines for protection of seedlings in plantations.

Chaudhry and Ahmad (1980) have found chlordane, heptachlor, dieldrin, agritox, aldrin and BHC effective when all were applied in 0.12%, 0.25% and 0.5% dilutions to:-

- i. Plant pits before planting at the rate of 1 litre of each dilution per pit.
- ii. Soil in polythene bags containing seedlings at the rate of 50 cc of dilution per bag.
- iii. Soil before filling and sowing of seeds in polythene bags at the rate of 50 cc of dilution per bag.

The replacement of organochlorine insecticides with other less persistent chemicals for termite control have been explored recently by some workers. Many chemicals belonging to carbamates, phosphatic, chlorinated terpene and synthetic pyrethroids have been tested (Beal and Smith 1972, Selander and Nkunya 1981, Oliveria 1983, Inone 1983).

BHC 12.5% WP, BHC 10% dust, Sevin 85%, Malathion 57%EC were tested in 0.06, 0.12 and 0.25% dilutions in four replications keeping five plants in each treatment to:-

- i. Plant pits before planting at the rate of 1 litre of each dilution per pit.
- ii. Soil in polythene bags containing seedlings at the rate of 50 cc of dilution per bag.
- iii. Plant pits of the already planted plants.

The distance between plants and rows was kept as one metre. The experiment was laid out on randomized split plot design at PFI, Peshawar and Ratta Kulachi (D.I.Khan).

RESULTS AND DISCUSSION

The observations recorded on the efficacy of different insecticides in protecting the eucalypt saplings from the attack of termites are tabulated below:-

The data on mortality of eucalypt plants and termite infestation shown in the above table indicate that maximum mortality occurred soon after planting when 210 plants were replaced in June, 1989 and in October, 1989 when 243 plants died. As very little termite damage (5 plants) was noticed in June, 1989 the mortality appears to be mainly due to transplanting and dry weather in May/June. Similarly, high casualty of plants was again recorded in October, 1989 is due to very severe shot and dry condition during July to October, 1989 in arid conditions of D.I.Khan. In spite of heavy mortality of plants, termites damaged only 27 plants out of 243 recorded dead in October, 1989. In June, 1990 the mortality of 38 plants is much less than that in June, 1989 due to establishment of plants but no termite damage to living or even dead plants was observed.

Table 1. Mortality of Seedlings and Termites Damage in Termites Control Experiment at D.I.Khan.

Treatments	Dose %	Plant No.	No. of dead Plants					
			June, 1989	July, 1989	Oct. 1989	Jan. 1990	March, 1990	June 1990
Sevin 85%SP	0.06	60	10(0)*	0 0	14 2	0 0	2 0	2 0
	0.12	60	16 0	2 0	22 4	3 0	1 0	2 0
	0.25	60	13 0	4 0	15 1	2 0	4 0	3 0
BHC 12.5%WP	0.06	60	18 0	0 0	17 1	0 0	1 0	8 0
	0.12	60	21 0	0 0	26 2	0 0	0 0	0 0
	0.25	60	18 0	0 0	18 1	0 0	0 0	3 0
BHC dust 10%	0.06	60	7 0	0 0	14 0	0 0	0 0	4 0
	0.12	60	10 0	0 0	10 1	0 0	0 0	2 0
	0.25	60	16 0	4 0	14 0	0 0	0 0	1 0
Malathion 57% EC	0.06	60	6 0	0 0	10 2	0 0	1 0	4 0
	0.12	60	19 2	0 0	13 5	0 0	3 0	1 0
	0.25	60	14 0	0 0	10 2	1 0	2 0	4 0
Check	-	45	10 2	0 0	7 0	0 0	0 0	0 0
	-	45	13 0	0 0	14 3	0 0	1 0	2 0
	-	45	12 1	0 0	20 1	1 0	0 0	0 0
	-	45	7 0	0 0	19 2	0 0	2 0	2 0
Total:-	-	900	**210 5	10 0	243 27	8 0	18 0	38 0

* = Termite infested seedlings

** = Restocked seedlings

Mortality of seedlings and Termites Damage in Termite Control Experiment at Peshawar.

Treatments	Dose %	Plant No.	No. of dead Plants				
			May, 1989	July, 1989	Nov. 1989	March. 1990	Oct, 1990
Sevin 85%SP	0.06	60	6	0	0	1	6
	0.12	60	3	3	0	0	5
	0.25	60	0	5	0	0	3
BHC 12.5%WP	0.06	60	7	4	0	0	9
	0.12	60	1	2	0	0	8
	0.25	60	5	6	4	0	2
BHC Dust 10%	0.06	60	3	2	3	0	2
	0.12	60	4	3	0	0	6
	0.25	60	1	5	0	0	0
Malathion 57%EC	0.06	60	4	1	0	2	6
	0.12	60	2	2	0	1	10
	0.25	60	3	0	1	1	10
Check	-	45	1	0	2	1	1
	-	45	0	0	2	0	1
	-	45	2	1	1	0	6
	-	45	0	0	0	0	5
Total	-	900	42	34	13	6	80

At Peshawar mortality of plants was less than that at D.I.Khan probably because of better soil and irrigation facilities and less severe climate at Peshawar. A total of 175 plants died over a period of a year and a half which is only 20% of the total. There was no termite damage to the plants at Peshawar although heavy damage to fence posts around the experiment showed heavy activity of termites in the area.

Statistical analysis indicated that only period of treatment and interaction of treatment and period are significantly different. Statistically, all treatment and dose effects are equal and there is no interaction between treatments and doses.

CONCLUSION

Mortality of eucalypt transplants occurred in treated as well as control in the study. Termites damage was noticed in a few plants at D.I.Khan while no termite infestation occurred at Peshawar although dead and dying plants were present. Mortality of transplants cannot therefore, be attributed to termite infestation.

As far efficacy of various insecticides is concerned, BHC dust gave best results as there was no termite infestation in all the treatments with BHC dust except one plant, whereas few plants

were infested in other treatments. At Peshawar termites did not appear even on dead plants in control.

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