Journal of Plantation Crops 3 (2): 71–72, 1975

EVALUATION OF SEVEN INSECTICIDES FOR CONTROL OF RED PALM WEEVIL *RHYNCHOPHORUS FERRUGINEUS* FABR.

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ABSTRACT

Seven insecticides, *viz.*, dichlorvos, phosphamidon, methyl-o-demeton, trichlorphon, parathion, malathion, and arprocarb, were tested in the laboratory in various concentrations for their effectiveness against the grubs of red palm weevil *Rhynchophorus ferrugineus*. Dichlorvos at 0·25%, methyl-o-demeton, phosphamidon, and arprocarb at 0·5%, trichlorphon and malathion at 1·0%, and parathion at 2·0% gave 100% mortality on the seventh day. The three insecticides, with the lowest LC 90 values, dichlorvos, trichlorphon, and arprocarb, were tested in the field on naturally infected palms and trichlorphon gave the best results with 92% recovery of infested palms.

INTRODUCTION

THE red palm weevil, *Rhynchophorus ferrugineus* Fabr. (Coleoptera, Curculionidae), is one of the most important pests of coconut palms of the age group 5–20 years. If timely diagnosis and treatment are not resorted to, an infested palm eventually dies. Nirula (1956) recommended injection of 1% pyrethrins-piperonyl-butoxide to control the pest in the field. Mathen and Kurian (1962) reported 92% mortality of grubs at 0·5% and complete mortality of adults at 1·0% concentration of endrin in the laboratory on the seventh day. They (Mathen and Kurian, 1967) cured 93% of the infested palms in the field with 1·0% carbaryl. Subba Rao, Subramaniam, and Abraham (1973) recommended aluminium phosphide for the control of the pest. In this paper are presented the results of trials conducted in the laboratory using seven insecticides against the grubs of the pest and in the field with three of the most promising ones.

MATERIALS AND METHODS

Methods adopted in these trials were the same as those described by Mathen and Kurian (1967). The doses of insecticides tested ranged from 0·005% to 2·0% in geometrical progression. Data were recorded one, three, and seven days after administration of seven insecticides on percentage normalcy, paralysis, and mortality of grubs and they were statistically analysed.

For field trials with three promising insecticides, naturally infested palms with entry of the pest through stem or leaf axil were used. Insecticides diluted in 1000 ml water were administered into the infested portion of the palms. These palms were then observed for three months for recovery or mortality.

RESULTS AND DISCUSSION

The results of laboratory trials are presented in Table 1. Cent per cent knock down (paralysis + mortality) was obtained within 24 hr with 0·5% methyl-o-demeton, 0·5% phosphamidon, 0·5% arprocarb, 0·125% dichlorvos 0·075% malathion, 1·0% trichlorphon, and 1·0% parathion. On the third day, all the insecticides at all the strengths exhibited proportionate increase in the rate of mortality. The increase in mortality with phosphamidon, dichlorvos, and trichlorphon was higher than in other cases when compared to the initial mortality. On the seventh day, 100% death was recorded with 2·0% parathion, 1·0% trichlorphon, 1·0% malathion, 0·5% methyl-o-demeton, 0·5% phosphamidon, 0·5% arprocarb, and 0·25% dichlorvos.

Based on LC 50 data on the third day, the insecticides in the order of relative toxicity were arprocarb, phosphamidon, trichlorphon, dichlorvos, malathion, methyl-o-demeton, and parathion. The order of relative toxicity based on LC 90 on seventh day was dichlorvos, arprocarb, trichlorphon, phosphamidon, malathion, methyl-o-demeton, and parathion. The

TABLE I

Laboratory insecticidal trials against the grubs of Rhynchophorus ferrugineus *Fabr.*

Sl. No.	Insecticide	Toxic ingredient	LC 50 and fiducial limits (based on observations on third day)		LC 90 and fiducial limits (based on observations on seventh day)	
1.	Dichlorvos	0, 0-dimethyl-2, 2-dichloro-vinyl phosphate	0·1501	0·0725 and 0·3107	0·0649	0·0361 and 0·1167
2.	Phasphamidon	O-[2-chloro-2-(diethyl carbomyol)-1-methyl-vinyl]-O, O-dimethyl phosphate	0·060	0·016 and 0·224	0·0976	0·0509 and 0·1614
3.	Methyl-o-demeton	2-(ethylthio) ethyl dimethyl phosphoro-thionate	0·1261	0·0913 and 0·7466	0·2361	0·1706 and 0·3266
4.	Trichlorphon	2, 2, 2 dimethyl-trichloro-1-hydroxyethyl phospho-nate	0·1290	0·045 and 0·372	0·0721	0·0392 and 0·1329
5.	Arprocarb	2-iso-propoxy-phenyl-N-methyl carbamate	0·020	0·001 and 0·075	0·0664	0·0372 and 0·1186
6.	Parathion	diethyl 4-nitrophenyl phosphorothionate	0·4806	0·2896 and 0·7976	0·7134	0·3861 and 1·3180
7.	Malathion	S-[1, 2-di (ethoxy carbonyl) ethyl] dimethyl phos-phoro thiolothionate	0·159	0·076 and 0·329	0·1131	0·0691 and 0·2018

concentration for obtaining LC 90 with dichlorvos, trichlorphon, methyl-o demeton, and malathion on seventh day was lower than that for obtaining LC 50 on third day.

The three insecticides, dichlorvos arprocarb, and trichlorphon, which showed the lowest LC 90 values on the seventh day, were tested in field trials. Dichlorvos and arprocarb at 0·5% each and trichlorphon at 0·2% were tested on 15, 50 and 50 naturally infested palms, respectively. Trials were discontinued with dichlorvos as 5 out of 15 palms treated with this insecticide died within one month. Treatment with arprocarb resulted in 75% recovery of tested palms and with trichlorphon in 92% recovery.

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