Journal of Plantation Crops 2 (1): 34–36. 1974

CHEMICAL CONTROL OF BLACK PEPPER 'POLLU' BEETLE, *LONGITARSUS NIGRIPENNIS* MOTS. (COLEOPTERA: CHRYSOMELIDAE)

G. B. PILLAI AND V. A. ABRAHAM

Central Plantation Crops Research Institute, Kasaragod 670 124, *Kerala, India*

ABSTRACT

The 'pollu' or hollow berry in pepper, caused by the flea beetle *Longitarsus nigripennis* Mots., is responsible for 30–40% losses in yield. Field control trials with different insecticides showed that dimethoate 0·1%, quinalphos 0·1% or endsoulfan 0·1%, when sprayed twice in July and October, is effective in reducing pest infestation. The results are important in that these insecticides can replace the presently recommended DDT for the control of pepper "pollu" beetle.

INTRODUCTION

THE 'pollu' or flea beetle, *Longitarsus nigripennis* Mots. is the most serious pest of pepper (*Piper nigrum* L.). It is prevalent in majority of the pepper growing tracts of Kerala State, which is the main pepper growing area of India. The adult beetle lays eggs in small holes or depressions made on the rind of developing tender berries. The eggs hatch and the pale yellow grubs bore into the berries, feed on the inner pulp and make them hollow. Such hollow berries are known in the local Malayalam language as "pollu" and hence the name 'pollu' beetle to the pest. The pest-infested berries become brown in colour and finally dry up. One grub damages 3–4 berries before completing its larval phase. The fully grown grubs drop to the ground for pupation. The intensity of 'pollu' beetle infestation assumes severe proportions in certain endemic areas and the extent of losses may then go even up to 30–40% of the total yield (Sayeed, 1968). The pest appears in the field after the onset of south-west monsoon synchronising with the emergence of spikes and berry-setting. The pest population reaches its peak during October–November and remains active in the field upto January–February.

The control measures of 'pollu' beetle suggested by earlier workers included spraying with Bordeaux mixture on vines as a repellent and tilling the soil to destroy the pupae or pupating grubs (Ayyar *et al.*, 1921). Reddy (1968) recommended dusting the vines with 5% BHC, or soil application with 5% DDT or BHC, or spraying the vines with 0·16% DDT. Nambiar and Kurian (1962) and Rehiman and Nambiar (1967) found that 0·2% DDT, sprayed in July and again 40 days later, gave effective control of the pest. DDT 0·2% sprays twice, in July and October, are now being adopted by farmers for the control of 'pollu' beetle.

In view of the high residual effect of DDT, investigations for working out suitable control schedules were taken up with alternative insecticides which are not likely to leave harmful residues in the harvested crop. The results are presented here.

MATERIALS AND METHODS

The field experiment was laid out in cultivators' fields in Taliparamba area (Cannanore District, Kerala State) in a randomised block design with seven treatments replicated thrice and a plot size of six standards of pepper vines per treatment. Guard rows were also maintained. The insecticides tried were: (1) quinalphos (0, 0–diethyl–0–[quinoxalinyl–(2)–thionophosphate]; (2) malathion + fenitrothion [0, 0–dimethyl–phosphorodithioate of diethyl mercaptosuccinate + 0, 0–dimethyl–0–(3–methyl–4–nitrophenyl) – phosphorothioate]; (3) dimethoate [0, 0–dimethyl S–(N–methyl carbamoyl-methyl) phosphorodithioate]; (4) phosphamidon [0–(2–chloro–2–diethyl-carbamoyl–1–methyl–vinyl)–0, 0–dimethyl phosphate]; (5) endosulfan [$\alpha - \beta$ –1, 2, 3, 4, 7, 7–hexachlorobicyclo–(2, 2, 1)–heptane–(2)–*bis*–(oxymethylene)–5, 6–sulphite]; and (6) DDT

TABLE I

Effect of different insecticides on the incidence of pepper 'pollu' beetle

Treatment Nos.	Treatment	Infested spikes			Infested berries		
		Percentage (original values)	Transformed values	Percentage reduction over control	Percentage (original values)	Transformed values	Percentage reduction over control
T_1	Quinalphos 0·1% ..	18·9	24·7	56·8	2·0	7·2	70·1
T_2	Malathion+Fenitrothion 0·1% ..	24·5	28·8	49·6	2·4	8·7	63·7
T_3	Dimethoate 0·1% ..	12·6	19·2	66·4	0·9	4·5	81·3
T_4	Phosphamidon 0·1% ..	29·5	31·7	44·6	3·4	10·1	57·7
T_5	Endosulfan 0·1% ..	16·8	22·9	60·0	2·3	8·0	66·6
T_6	DDT 0·2% ..	35·8	36·1	36·9	5·6	13·0	45·8
T_7	Control (check) ..	68·5	57·2	..	17·6	24·0	..
	General Mean ..	29·5	31·5	..	4·9	10·8	..
	S.E./plot ..	..	6·8	..	..	3·25	..
	F. ratio for treatment differences ..	..	10·46**	..	..	11·56**	..
	C.D. (at 5% level) ..	..	12·0	..	..	5·78	..

** Significant at P = 0·01.

(dichloro-diphenyl trichloroethane). DDT was included as a standard for comparison of the results. The first five insecticides at 0·1% and DDT at 0·2% were applied as high volume sprays at 3 l/standard, first in July synchronising with the berry setting and the second one in October. The guard rows were also sprayed with the respective insecticides.

Fifty healthy spikes were selected at random from each standard prior to the insecticide treatment. They were harvested in February and the number of "pollu' infested spikes, total number of berries in each spike and the total number of 'pollu' infested berries were recorded. The data were statistically analysed.

RESULTS AND DISCUSSION

The results are summarised in Table I. The percentage of infested spikes and berries were significantly less in all treatments as compared to those in untreated control. Among the different treatments, T_3 (dimethoate 0·1%), T_1 (quinalphos 0·1%), and T_5 (endosulfan 0·1%) were significantly effective in the control of 'pollu' beetle infestation. DDT was significantly superior to control, but it was less effective than the other insecticides tested.

The present recommendation for the control of pepper 'pollu' beetle is 0·2% DDT spray in July and October (Nambiar and Kurian, 1962; Rehiman and Nambiar, 1967). The results presented in this paper indicate that dimethoate or quinalphos or endosulfan 0·1% can be employed for the field control of 'pollu' beetle replacing a residual insecticide DDT.

The timing of insecticide application is a most important factor in the effective control of 'pollu' beetle incidence. The first spraying may be done when berry setting is almost completed and well in advance before the beetles have already laid eggs into tender berries. Our observations on seasonal abundance and fluctuations in population density of *L. nigripennis* have shown that the activity of the pest begins from early August in northern parts of Kerala. As such, the first round of

RP-7

spraying may be given towards the end of July itself. But in southern parts of Kerala, spike emergence and berry setting in pepper occur much earlier depending on early receipt of premonsoon showers and the timing of spray operations in those areas may be fixed accordingly. The second round of spraying is to be done in early October.

ACKNOWLEDGEMENTS

The authors are greatly indebted to Mr. M. C. Nambiar, Project Co-ordinator (Spices and Cashew) and Mr. K. V. Ahamed Bavappa, Director, for their guidance and keen interest in the above investigation. Thanks are also due to Mr. P. K. Venugopalan Nambiar, Pepper Research Officer and his colleagues at the Pepper Research Station, Panniyur, for providing necessary facilities for conducting the trials. They are also grateful to M/s. Jacob Mathew and M. V. George, Junior Statistician and Senior Research Assistant, respectively, for the statistical analysis of the data.

REFERENCES

AYYAR, T. V. R., SUSAINATHAN, P. S. AND MULIYIL, J. A. 1921. Preliminary investigation on the 'pollu' disease of pepper in North Malabar. *Madras Agri. Dept. Year Book* **18**: 31.

NAMBIAR, P. K. V. AND KURIAN, K. C. 1962. Pepper and its 'pollu' beetles. *Indian Fmg.* **12**: 17.

REDDY, D. B. 1968. *Plant Protection in India.* Pp. 454. Allied Publishers, Bombay.

REHIMAN, P. V. A. AND NAMBIAR, P. K. V. 1967. Insecticidal trials on the control of 'pollu' beetle (*Longitarsus nigripennis* M.). *Madras Agri. J.* **54**: 39–40.

SAYEED, P. M. 1968. *Pepper Cultivation.* Pp. 22. Agricultural Information Services, Kerala State.