Pakistan J. Sci. Ind. Res. Vol. 27, No.4, August 1984

LABORATORY EVALUATION OF SOME INSECTICIDES FOR THE CONTROL OF PAINTED BUG, *BAGRADA HILARIS* (BURM.) (HETEROPTERA: PENTATOMIDAE)

(Received April 28, 1983; revised 9-8-1984)

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Laboratory studies on the effectiveness and residual toxicity of six insecticides were carried out against *Bagrada hilaris* using 0.025 and 0.05% concentrations. The results showed that Dimecron, Azodrin and Metasystox gave significantly higher mortality and persistency. Phosdrin gave significantly higher initial kill but dissipated sharply while Vapona and Nexion proved significantly less effective.

INTRODUCTION

Bagrada hilaris (Burm.), commonly known as painted bug, is an important pest of vegetables and oil seed crops. It has been recorded to attack many cash crops and vegetables such as natal indigo *(Indigofera tinctora)*, cofee (*Cofea* Spp.), paddy *(Oryza sativa)*, mustard *(Brassica* Spp.), cabbage *(B. oleracea)*, cauliflower *(B. oleracea* var. botrytis), turnip *(B. rapa)*, radish *(Raphanus sativus)* and knol khol *(B. oleracea* var. caulorapa) [1-4]. Narayanan *et al.*[5] have reported it as a minor pest of maize *Zea mays)*.

The information regarding chemical control of this pest with new insecticides is meagre, except Khan [6]. The present research was, therefore, undertaken with the objectives to evaluate the most effective and economical insecticide which could be incorporated in field trials for its immediate control.

MATERIALS AND METHODS

Cabbage plants of an improved cultivar "Golden Acre" were raised in glazed earthen pots. At a uniform growth and height of 40 cm the plants were sprayed with an atomizer at 0.025 and 0.05% E.C. by standard technique using a spray volume of 400 ml per treatment formulation. The desired concentrations of the insecticides viz:– Dimecron (Phosphamidon), Azodrin (Mono-crotophos), Metasystox (Methyl-Demeton), Phosdrin (Mevinphos), Vapona (Dichlorovos) and Nexion (Bromophos- Methyl) were obtained by diluting their 1% stock solution in the required amount of acetone in order to increase the uptake and absorption as reported by Ridgway and Raudolph [7]; and Chaudry and Kabir [8]. Adults of uniform age were taken from the laboratory reared culture with an aspirator and released in glass petri dishes. They were starved for four hours. Then twenty insects were released in a barrel type polyethylene cum muslin cage 10 x 20 cm on a leaf of a plant after half an hour of the spray. The experiment was designed in seven treatments with four replicates including control. The pots were kept in the laboratory at 30 ± 2°C and 60 ± 5% R.H. with 12 hours light: dark cycle. Observations were recorded after every 24 hours on the basis of mortality observed in each treatment. A new batch of starved insects was introduced daily into the sprayed plants and data were recorded on the following day. The experiment was continued till the mortality was zero in all the treatments. The data obtained for percent adult mortality were statistically analysed by the analysis of variance. When a significant "F" ratio was obtained, Duncan's New Multiple Range Test was applied to the treatment means.

RESULTS

The survival of *B. hilaris* was significantly affected by all the insecticides at both the levels of concentration (Table 1). In general the pattern of their effectiveness was similar, however, the relative toxicity and residual persistency varied significantly with the type of insecticides.

At the concentration of 0.025%, Dimecron, Azodrin and Metasystox gave significantly higher mortality of the pest after 1 day. Their lethal effect was markedly pronounced throughout the period of observation which was gradually reduced to zero on the 8th and 9th day of the experiment. Phosdrin and Vapona gave more than 60% mortality on the first day but their toxicity sharply dissipated to zero on the 4th day while significantly minimum lethal effect was recorded in case of Nexion where there

Table 1. Percent mortality of *Bagrada helaris* (Burm) adults at different concentrations of various insecticides upto ten days.

Insecticide	% mortality at indicated days and concentration									
	1	2	3	4	5	6	7	8	9	10
					0.025%					
Dimecron	91.50 a	86.20 a	80.00 a	73.60 a	65.00 a	57.00 a	41.22 a	32.00 a	0	–
Azodrin	87.33 ab	82.50 ab	75.16 ab	70.18 a	60.00 ab	53.29 a	35.40 a	20.17 b	0	–
Metasystox	85.15 ab	80.25 ab	70.00 b	61.24 b	55.13 b	46.00 b	30.30 b	0 c	0	–
Phosdrin	73.00 c	52.70 c	17.26 c	0 c	0 c	0 c	0 c	–	–	–
Vapona	65.63 d	31.24 d	6.00 d	0 c	–	–	–	–	–	–
Nexion	54.00 e	20.25 e	0 e	–	–	–	–	–	–	–
					0.05%					
Dimecron	100.00 a	92.17 a	87.73 a	78.00 a	70.25 a	64.03 a	52.40 a	38.25 a	25.00 a	0
Azodrin	100.00 a	88.55 ab	81.40 ab	73.00 ab	66.00 ab	60.00 ab	40.00 b	30.33 b	16.00 b	0
Metasystox	100.00 a	85.38 ab	77.43 b	67.00 b	60.45 b	54.00 b	35.00 b	13.00 c	0 c	0
Phosdrin	100.00 a	75.45 c	23.00 c	0 c	0 c	0 c	0 c	0 d	0 c	0
Vapona	70.21 b	47.00 d	14.50 d	0 c	–	–	–	–	–	–
Nexion	62.46 c	35.00 e	0 e	–	–	–	–	–	–	–

N-B. Means followed by the same letter are not significantly different at 1% level of significance (New Duncan's Multiple Range Test)

was a drastic fall to 20% on the second day which declined to zero on the third day of the test.

All the insecticides at the concentration of 0.05% gave 100% mortality of the insect after 1 day, except Vapona and Nexion where the initial kill was 70 and 62% respectively. Dimecron, Azodrin and Metasystox were the most persistent insecticides by giving significantly higher mortality in descending order throughout the period of observations. Phosdrin being a short residual insecticide gave 100% mortality on the first day but it linearly dropped to 23% on the 3rd day and finally to zero on the 4th day of the treatment. Though the performance of Vapona and Nexion was not significantly better like lower concentration i.e. 0.025%, however, their residual effect continued only upto 3rd and 2nd day respectively.

DISCUSSION

The uptake of the feeding insects from the insecticide treated plants is probably influenced by the concentration of the insecticide in plant tissue; concentration of the insecticide depends upon the plant species, age and stage of the growth, temperature and humidity, light condition, the properties of the chemical used and the method of application of the insecticide. Variation in insect age, physical structure and species are also factors of considerable importance in this respect.

Menzer and Ditman [9] obtained Dimecron residue of less than 0.1 ppm after 4-5 days when applied on cabbage. Our results regarding its persistency are not in agreement with them in the sense that we recorded mortality upto 9 days. The reason for this may be the different concentrations used and the ecological environment under which the experiments were conducted.

According to CIBA [10] Dimecron is an insecticide of medium persistency. Its residue decreases to less than1 ppm within 10 days. The present results fully support this contention. Similarly our findings on the residual persistency of Azodrin, Vapona and Nexion are in close conformity with those of previous workers [11-14].

Our results reveal that all the insecticides, except phosdrin, Vapona and Nexion, resulted in significantly higher mortality of the test insect, for a greater period of time. However, Phosdrin, being a short residual insecticide with high initial kill can safely be used against all sucking insects of fruits and vegetables. In case of Dimecron, since

it is a water soluble insecticide, therefore, any residue left on the surface of the fruits and vegetables will be further reduced by washing, cooking, canning and freezing.

On the basis of these small scale experiments, Dimecron and Phosdrin, being effective, safe and non-hazardous pesticides are recommended for the control of *Bagrada hilaris*.

REFERENCES

1. W.E. Distant, *Fauna of British India* (Indian Rhynchota) **1**, 193 (1902).
2. T.J. Anderson, *Notes on the Insects Injurious to Coffee.* Deptt. Agric. Br. East Africa, Nairobi, Agri. Bull. 2, 20 (1917).
3. N.K. Pillai, 1923. Insect pests, Reports. Dept. Agric. and Fisheries, Travancore 1921-22: 19-20 (Vide. Ind. J. Entomol. **11**, 16 (1949).
4. R. Rakshpal, Notes on the biology of *Bagrada cruciferarum* kirk. Ind. J. Entomol, **11**, 11 (1949).
5. E.S. Narayanan, F.N.I; B.R. Suba Rao, and R.N. Katiyar Proc. Nat. Inst. Sci.Ind., **85**, 315 (1959).
6. A.R. Khan, Some Studies on the Bionomics and Chemical Control of *Bagrada cruciferarum* kirk at Lyallpur. M.Sc. Thesis WPAU, Lyallpur (1966).
7. R.L. Ridgway, and N.M. Raudolpha, J. Econ. Entomol., **61**, 581 (1968).
8. S.A. Chaudhry, and S.M.H. Kabir. Pakistan J. Sci. Ind. Res., **13**, 88 (1970).
9. R.E. Menzer, and L.R. Ditman, J. Econ. Entomol., **56**, 88 (1963).
10. CIBA. *Various Residue Reports on Dimecron. CIBA. Agrochemical Division.* CIBA Limited Basle, Switzerland, 62.0. (1967).
11. R.L. Ridgway, Rwwues. B.G; L.H. Wilkes; and D.A. Lindquist. J. Econ. Entomol, **52**, *315 (1966).*

    Lindquist. J. Econ. Entomol, **52**, 315 (1966).
12. T. Yanev., 1967. Testing Two Preparations of Monocrotophos Against Tobacco Thrips; Rastit zesht 15 pt. (1) : 34-39 (Rev. appl. Ent. A; 57: 43-39, (1969).
13. CIBA-GEIGY. Various residues reports on Nogos (dichlorvos) 1963-69. (Nogos- Nuan), CIBA-GEIGY Ltd. Basle - SWITZERLAND. Agrochemical Division 30 p. (1969).
14. E.L. Sebae, and M.K. Sayed. 1969. Persistance of Bromophos (Nexion) and Malathion on bean and clover crops. Zeils chrift. fur. Angewandte. Ento. Mologie 64 (4): 378-84 (Rev. appl. Ent. 60 (A): 578, 1972).