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RESIDUAL TOXICITY OF INSECTICIDES TO EPILACHNA VIGINTIOCTOPUNCTATA FABRICIUS

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Epilachna vigintioctopunctata F. is a major pest of brinjal, often taking a heavy toll of the crop. Much work has already been done on the use of insecticides in controlling it on brinjal (Bunting and Milsum 1930, Krishnamurthi 1932, Cohic 1950, Puttarudriah and Krishnamurthi 1954, Sengupta and Panda 1958, Shi and Satpathy 1960, Shi *et al* 1960 and David 1963). But no information is available on the residual toxicity of the various insecticides to the grubs and adults of *E. vigintioctopunctata.* Such an information will be useful in deciding the frequency of application to ensure an effective suppression of the pest and the minimum destruction of its natural enemies. The present investigations were hence undertaken to ascertain the residual toxicity of 11 insecticides to the adults and grubs of *E. vigintioctopunctata* on brinjal.

Material and Methods

To ascertain the residual action of the insecticides, adults and 3rd instar grubs of *E. vigintioctopunctata* were exposed to potted brinjal plants sprayed with the insecticides, at regular intervals following the insecticidal application. The potted plants were enclosed within muslin bags to prevent the escape of the insects. The plants were sprayed with an atomizer worked with a pressure pump at a constant pressure using 30cc of the spray fluid per plant. Mortality of the insects was observed 48 hours after exposure. The details of the insecticides used are given in the table of the results. Proprietory formulations were used in all the cases.

Results

Results are given in Tables 1 and 2.

It may be seen that when exposed to the plants one hour after spraying there was no survival of the adults on these plants treated with parathion and sevin. The survival of the adults on plants treated with malathion, phosphamidon, dichlorvos, trithion and trichlorphon also was very low (3.4 to 3.7 percent); a survival ranging between 10 and 36.7 per cent was observed on plants treated with endrin, DDT, imidan and BHC (Table 1).

As regards the residual actions of the insecticides to the adults it will be observed that sevin had the maximum residual action which persisted to a very great extent upto 21 days after its application. Next to sevin came DDT and trithion which maintained their residual action to an extent of about 50 percent upto 14 days after application. In the case of the rest of the insecticides the residual toxicity was lost drastically taking it down to very low levels even within 7 days after their application (Table 1).

Table 1

Percent survival of adults of *E. vigintioctopunctata* exposed for 48 hours to brinjal plants at different intervals after spraying with different insecticides.

Insecticides	1 hour	7 days	14 days	21 days
DDT 0.2%	15.0	29.6	51.6	88.9
BHC 0.2%	36.7	100.0	100.0	100.0
Endrin 0.025%	10.0	36.7	86.7	100.0
Parathion 0.025%	0.0	63.4	100.0	100.0
Malathion 0.1%	3.7	100.0	100.0	100.0
Phosphamidon 0.03%	3.4	70.0	100.0	100.0
Dichlorvos 0.05%	3.4	100.0	100.0	100.0
Imidan 0.1%	20.0	63.4	100.0	100.0
Trithion 0.1%	3.4	29.7	53.4	76.7
Trichlorphon 0.1%	3.4	59.3	66.7	100.0
Sevin 0.1%	0.0	0.0	3.4	6.7

Table 2

Percent survival of grubs of *E. vigintioctopunctata* exposed for 48 hours to brinjal plants at various intervals after spraying with different insecticides.

Insecticides	1 hour	7 days	14 days	21 days
DDT 0.2%	3.4	18.6	33.4	80.0
BHC 0.2 %	23.4	81.6	100.0	1000
Endrin 0.025%	17.7	50.0	93.4	100.0
Parathion 0.025%	3.4	44.7	100.0	100.0
Malathion 0.1%	6.7	77.7	100.0	100.0
Phosphamidon 0.03%	20.0	77.8	100.0	100.0
Dichlorvos 0.05%	16.7	100.0	100.0	100.0
Tmidan 0.1%	20.0	59.3	83.4	100.0
Trithion 0.1%	3.4	22.3	56.7	76.7
Trichlorphon 0.1%	26.7	85.1	100.0	100.0
Sevin 0.1%	6.7	15.0	36.7	46.7

Survival of the grubs exposed on the plants treated with DDT, parathion, trithion, sevin and malathion one hour after application was very low (3.4 to 6.7 per cent), while survival of the grubs on the plants treated with the rest of the insecticides was relatively high (16.7 to 26.7 percent). As regards the residual toxicity to the grubs the maximum persistance was seen for sevin which maintained more than 50 percent of its initial toxicity upto 21 days after application; DDT ranked next closely followed by trithion manifesting substantial residual toxicity upto 14 days after application; all the rest of the insecticides lost their residual action within that period (Table 2).

Summary

Immediate and residual toxicity of the deposits and residues respectively of sprays of DDT 0.2%, BHC 0.2%, endrin 0.025%, parathion 0.025%, malathion 0.1%, phosphamidon 0.03%, dichlorvos 0.05%, imidan 0.1%, trithion 0.1%, trichlorphon 0.1% and sevin 0.1% to adults and grubs of *E. vigintioctopunctata* was determined. Initial deposits of all the insecticides (excepting BHC to adults and BHC and trichlorphon to grubs) were highly effective in killing the pest; BHC, dichlorvos, phosphamidon and malathion showed low residual toxicity to the adults and grubs while sevin, DDT and trithion showed high residual toxicity.

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