Research Paper :

Study of relative toxicity of synthetic insecticides and biopesticides to *Maruca vitrata* on pigeonpea

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SUMMARY

The laboratory experiment was conducted at Department of Entomology, to find out relative toxicity of synthetic insecticides and bio pesticides to *M.vitrata*. The studies revealed that dichlorvos was highly toxic followed by acephate and spinosin at 1 and 3 DAT further showing cent per cent mortality at 7 DAT. The performance of *Bacillus thuringiensis* and NSKE was poor initially at 1 and 3 DAT later exhibiting more than 70% mortality at 7 DAT.

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The incidence of legume pod borer, *M.vitrata* is now-a-days causing serious concern to major determinate and early maturing pigeonpea varieties grown in scarcity zone of Maharashtra. In pigeonpea, losses due to *M.vitrata* has been estimated to be $ US 30 million annually (ICRISAT, 1992).

Regular and indiscriminate use of insecticides has led to the development of insecticide resistance, pest resurgence and secondary pest outbreak in most of the insects (Mehrotra, 1992). In this context, selective synthetic, microbial pesticides and botanicals are found to be most promising. Keeping this in view and considering economic importance the of pigeonpea, the present investigation was undertaken to know the relative toxicity of synthetic insecticides and biopesticides against *M.vitrata* on pigeonpea.

MATERIALS AND METHODS

An experimental research work was carried out in the laboratory of Dept. of Entomology, from where 'ICPL-87 'pigeonpea variety was also made available. Separate plots as per the treatments were sown at the Instructional farm of PGI Rahuri. The treatments included dichlorvos 500 g a.i./ha, acephate 500 g a.i./ha, spinosad 12.5 g a.i./ha, NSKE 25 kg/ha and *Bacillus thuringiensis* 500 g/ha.Later the flower buds were brought to the laboratory from the treated plots every day after the application of insecticides for providing food to the larvae. These flower buds and flowers were kept in plastic containers. Ten first / second instar larvae were introduced by camel hair brush on flower buds, which were replicated four times. Mortality observations were recorded at 1, 3 and 7 days after treatment. Larval mortality was corrected by Abbott's formula (1925). The data on percentage mortality were transformed into are sin values and subjected to statistical analysis.

RESULTS AND DISCUSSION

The toxic effect of synthetic insecticides and biopesticides observed in the experiment revealed that, at 1 DAT the maximum mortality percentage of *M.vitrata* larvae was obtained in the treatment of dichlovos (79.44%). The superiority of dichlorvos against *M.vitrata* cannot be discussed due to lack of literature. It was followed by acephate which recorded 69.17%. mortality. The effectiveness of acephate as observed in the present

Table 1: Relative toxicity of synthetic insecticide and biopesticide to *M. vitrata*

Sr. No.	Treatments	Dose	Corrected mortality (%)		
			1 DAT	3DAT*	7DAT*
1.	Dichorvos	500 g a.i./ha	79.44 (63.10)	97.50 (81.13)	100.00 (88.19)
2.	Acephate	500 g a.i./ha	69.17 (56.29)	94.72 (76.95)	100.00 (88.19)
3.	Spinosin	12.5 g a.i./ha	43.41 (41.19)	87.22 (69.27)	100.00 (88.19)
4.	NSKE	25 kg /ha	2.50 (7.78)	15.28 (22.93)	74.44 (59.67)
5.	*Bacillus thuringiensis*	500 g/ha (formulated)	5.00 (12.89)	17.50 (24.70)	79.45 (63.12)
	S.E.±	-	1.65	1.38	1.03
	C.D. (P=0.05)	-	5.09	4.27	3.19
	C.V (%)	-	4.56	2.52	1.33

Figures in parenthesis represent angular transformed values while those outside represent original means
* Cumulative mortality

investigation is in conformity with Dharmasena (1993). Next to follow were spinsosin and *Bacillus thuringiensis*. In contrast to the gained results *Bacillus thuringiensis* has been reported effective against legume pod borer (Karel and Schoonhoven, 1986). While NSKE gave the lowest effect which are controversial as to the findings of Jackai *et al.* (1992) and Singh *et al.* (1985) who reported the effectiveness of NSKE.

Almost, similar trend was noticed at 3 DAT, but there was no significant difference between dichlorvos (97.50%) and acephate (94.72%) .

The cumulative mortality recorded at 7 DAT indicated that, dichlorvos, acephate and spinosin gave 100% mortality while, *Bacillus thuringiensis* and NSKE recorded 79.45%and 74.44% mortality of *M.vitrata* larvae, respectively.

In view of the above, considering the performance of insecticides and biopesticides tested, it is summarized that dichlorvos proved to be highly toxic to *M.vitrata* larvae followed by acephate. It is, however, necessary to evaluate the performance of these synthetic insecticides and biopesticides under high pest pressure conditions.

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