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EFFICACY OF SEED, SOIL AND FOLIAR APPLICATION OF CERTAIN INSECTICIDES AGAINST PEA LEAF MINER & PEA POD BORER INFESTING FIELD PEA

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Seed treatment with phorate and carbofuran delayed the seed germination by 4-6 and 2-4 days, and flowering by 4 and 2 days, respectively. Seed treatment with 4 and 2% phorate provided maximum protection against pea leaf miner followed by soil treatment with phorate 1.5kg a. i./ha and foliar spray of monocrotophos (0.04%). Folier application with endosulfan (0.07%) at pod initiation provided maximum control against pod borer, followed by monocrotophos (0.04%). Plots treated with endosulfan (0.07%) gave maximum mean grain yield i. e. 1733kg/ha, followed by monocrotophos (0.04%), seed treatment with phorate (1.5kg a. i./ha.) (4%) and soil treatment with phorate (1.5kg a.i./ha.)

One of the reasons for low yields in *Pisum sativum* L. is the susceptibility of the crop to number of insect pests viz., leaf miner, *Chromatomyia horticola* (Goureau), stemfly, *Ophiomyia centrosematis* de Meijere and pea pod borer, *Etiella zinckenella* (Tr.).

Soil application of aldicarb and mephospholan granules and foliar spraying of methyl demeton, phosphomidon and monocrotophos have been recommended for controlling pea leaf miner and pea pod borer (Sohi and Verma, 1967; Bindra and Singh, 1971; Singh *et al*, (1977) and Kooner and Singh, 1979). Field studies conducted to evaluate relative efficacy of seed, soil and foliar application of selected insecticides against leaf miner and pea pod borer infesting pea are presented.

MATERIALS AND METHODS

A trial was conducted for the control of pea leaf miner and pea pod boror on field peas (Variety T 163) during 1981-82 and 1982-83. Phorate and carbofuran were applied as seed treatment @ 2 and 4% a. i. by weight and as soil treatment @ 1.0 and 1.5kg a. i./ha at the time of sowing. Monocrotophos (0. 04%) and endosulfan (0.07%) were applied as a foliar spray, first at 30 days after sowing and next at the time of pod initiation (i e. 85-90 days after sowing). The crop was sown in 4.5mx4m (10 rows of 4.5m length) in a randomised block design replicated thrice. A path of 1.5m was kept on all the sides of the plot. All the leaflets from five plants selected at random in each replication of a

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treatment were examined for the incidence of the leaf miner, 60 days after sowing and subsequently at 4 weeks interval. At maturity, pods from ten plants selected at random in each plot were examined for pea pod borer damage and per cent grain damage was worked out. Observations on germination, flowering and grain yield were also recorded.

RESULTS AND DISCUSSION

Effect on germination and flowering :

Seed treatment with phorate delayed the seed germination by 4-6 days and carbofuran treatment delayed seed germination by 2-4 days. Flowering was delayed by 4 days with 4% and 2% dosage of phorate. In control the normal germination and flowering was on 14 and 10 oays and 60 and 62 days after sowing in 1981-82 and 1982-83, respectively.

Effect on leaf-miner :

Seed treatment with 4% phorate provided maximum protection against pea leaf miner and was significantly superior over other treatments except 2% phorate. Seed treatment with 2% phorate was found to be on par with monocrotophos (0.04%). The seed treatment with phorate was found to be significantly superior over soil treatment of phorate. Seed treatment with phorate provided effective control against pea leaf miner upto 60 days and also exhibited good residual effect upto 90 days. Though the effectiveness was found to decrease after 60 days, but it maintained its superiority over other treatments even after 90 days of application at higher dosage.

The pooled analysis for both the years showed that differences in pea leaf miner damage at 60 days after sowing were significant whereas at 90 days after sowing the differences were non-significant (Table 1).

Effect on pea pod borer :

Treatment endosulfan (0.07%) provided maximum control (11 3% mean grain damage) against pod borer followed by soil treatment with phorate 1.5kg a i./ha and monocrotophos (0.04%) However, differences amongst various treatments were found to be nonsignificant (Table 1).

Effect on grain yield :

Plots treated with endosulfan (0.07%) exhibited maximum mean grain yield of 1733kg/ha followed by monocrotophos, phorate (4% seed treatment) and phorate (1.5kg a. i/ha soil treatment) which produced significantly more yield than rest of the treatments including control (Table 1).

Overall performance

It is seen from the results that seed treatment with 4% phorate proved to be best treatment against pea leaf-miner, even superior over soil

Table 1. Effect of different insecticidal treatments on the control of pea leaf miner, pea pod borer and grain yield (1981-83) on the basis of pooled analysis.

Treatment	Dosage	Per cent damaged leaves due to pea leaf miner (D. A. S.) (Mean values) 60	90	Per cent grain damage due to pod borer (Mean values)	Grain yield (Kg/ha (mean values)
Phorate seed treatment	2% by weight	4.6 (12.1)	46.1 (42.0)	11.0 (19 1)	1268
do	4% by weight	1.7 (7.4)	30.8 (33.2)	5.4 (13.3)	1514
Carbofuran seed treatment	2% by weight	11.9 (19.9)	47.8 (43.8)	9.1 (17.4)	1235
-do-	4% by weight	10.5 (18.7)	42.3 (40.5)	6.5 (14.6)	1368
Phorate soil treatment	1kg a. i./ha	10.3 (18.6)	55.9 (48.9)	9.1 (17.3)	1421
-do-	1 5 -do-	9.6 (17.4)	46.4 (42.9)	5.1 (12.7)	1448
Carbofuran soil treatment	1kg -do-	14.1 (21.9)	52.4 (46.4)	9.5 (17.7)	1274
-do-	1.5 -do-	14.4 (21.2)	50.8 (45.4)	6.1 (14.7)	1445
Monocrotohos foliar application	0.04%	8.5 (16.4)	48.4 (44.0)	5.5 (13.1)	1602
Endosulfan foliar application	0.07%	12.5 (20.6)	54.0 (47.3)	4.3 (11.3)	1733
Control	—	19.3 (25.8)	57.9 (49.9)	9.9 (18.4)	1213
C. D. at 5%		(4 89)	N. S.	N. S.	80

DAS = Days after sowing. Figures in parenthesis are angular transformed values.

treatment with phorate (1.5kg a i /ha). The seed treatment is not only environmentally more safe but comparatively also more simple to apply than soil treatment Since seed treatment with phorate has been found to have better bioefficiency effect also it will be interesting to switch more on seed treatment than cn soil treatment to provide protection against leafminer in the early and vegetative phase of the crop.

From pod borer control and grain yield point of view endosulfan (0.07%) proved superior followed by monocrotophos (0.04%) in comparison to seed and soil treatment of phorate and carbofuran.

The effectiveness and superiority of phorate as seed treatment against pea leaf-miner is a new finding of this experiment whereas that of phorate soil treatment and endosulfan and monocrotophos as foliar spray both against leaf-miner and pod borer is in close conformity to the findings reported by AL-Azavi (1966), Sarup *et al.*, (1974), Singh *et al.*, (1977) and Kooner and Singh (1979).

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