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Chemical Suppression of Serpentine Leafminer

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Abstract: An experiment was conducted at Agricultural Research Station Sankeshwar during 1995-96 and 1996-97 to evaluate the efficacy of various insecticides against serpentine leafminer on watermelon. The studies revealed that imidacloprid 200 SL and acephate 75 SP sprays at 25,50 and 75 days after sowing were found effective to manage the pest.

Introduction

After the introduction to India in 1990-91 through *Chrysanthemum* cut flower the leaf miner *Liriomyza trifolii* (Burgess) has widely spread and assumed pest status including watermelon, (Anonymous, 1991, Spencer, 1973). In recent years it has assumed serious proportion in various crops. The pest has wide host range attacking 120 plant species occuring in 21 families (Viraktamath *et al.,* 1993). This insect has been observed by ICAR team on vegetable, ornamental and fibre crops in an epiphytotic manner in various states of India. The wider host range coupled with a phenomenal increased insecticidal resistance has created difficulty in the management of the pest on a number of crops (Robb and Perrelia, 1984). Injury by leaf miners results when adults females punchtures leaves for feeding and oviposition.Female fly oviposit below the epidermis of leaves. After 2 to 3 days of incubation period maggots start feeding on the internal tissues of the leaves by mining for 15 to 30 days as a result leaves gets twisted, crumbled and reduced in size. Since the leaf miners are found in a secure position i.e., between the epidermial layer of leaves, studies were undertaken to determine the superior efficacy of insecticides in the effective management of this pest.

Material and Methods

The experiments were carried out during rabi seasons of 1995-96 and 1996-97 under randomised block design involving nine treatments with three replications to evaluate the bio efficacy of chemical toxicants for the suppression of leaf miner on water melon. Water melon variety Arka manik was sown in 6m x 4.8m plot with a spacing of 60 cm between the plants. Insecticides were applied starting from 25 days after sowing. Observations for per cent infestation were recorded 10 days after each spray. Five plants were selected randomly from each treatment and were tagged for recording observations. The efficacy of insecticides was assessed based on the reduction in the percentage of mines or infested leaves after each spray. Finally total number of fruits and fruitweight was recorded. Observations collected over the period were pooled and statistically analysed.

Results and Discussion

The bio-efficacy results of various insecticides against the serpentine leaf miner are presented in table 1 and 2. The population of leaf miner represented by the per cent mined leaves ranged between 21.85 and 27.65 per cent (Table 1).

Table 1. Bio -efficacy of various insecticides against leaf miner *Liriomyza trifolii* in watermelon

Treatment	1995-96				1996-97			
	Percent infested leaves							
	Before	10 days after			Before	10days after		
	1st Spray	1st Spray	2nd Spray	3rd Spray	1st Spray	1st Spray	2nd Spray	3rd Spray
Imidacloprid 200 SL @ 0.25 ml/l	24.31	14.49	11.52	08.71	24.01	17.18	13.55	08.08
Acephate 75 SP @ 1 gm/l	24.01	15.00	13.13	11.32	22.79	17.99	15.00	08.51
Oxydemeton methy 125 Ec@ 2m/l	24.11	27.15	29.65	28.47	23.17	22.85	17.15	13.69
Phosphoamidon 85 WSC @ 0.5 ml/l	21.85	20.80	17.20	15.45	22.77	20.91	13.92	09.38
Methomyl 12.5L @ 1.0 ml/l	25.96	19.09	18.30	19.15	24.11	19.06	15.68	13.50
DDVP76 EC @ 1.0ml/l	23.61	18.27	15.46	13.86	21.84	20.07	15.74	10.67
Neem oil @ 5 ml/l	27.65	28.54	21.66	18.86	23.95	21.77	17.43	15.39
Monocrotophas 36 SL @ 2.0 ml/l	23.97	18.35	16.10	12.75	22.58	19.88	14.54	09.02
Control (UTC)	22.30	44.64	54.70	60.53	23.89	24.11	36.68	41.65
S.Em.±	--	00.67	00.88	08.50	--	00.15	01.52	00.64
CD at 5%	NS	02.33	02.66	25.49	NS	00.47	04.56	01.63
C.V.%	--	08.00	07.84	24.51	--	01.09	12.11	08.52

The highest incidence of 44.64 per cent of leaf miner was recorded in untreated check as against 14.49 per cent in imidacloprid treated plot indicating its superiority over other treatments in suppressing the pest. Acephate spray @ lg/litre recorded 15.00 per cent incidence followed by DDVP (18.27%) monocrotophos (18.35%). Similar trend persisted even after second spray.

After imposition of 3 rd spray, imidacloprid retained only 8.71 per cent infested leaves indicating its superiority, while acephate registered 11.32 per cent incidence. Among the chemicals tried against miner, all the chemicals were effective, however, oxydemeton methyl spray retained 28.47 per cent infested leaves against 60.53 per cent in untreated check. The application of neem oil spray (18.86%) and methomyl spray (19.15%)were found to be on par with each other in suppressing the leaf miner.

The performance of imidacloprid in suppressing the leaf miner during second year proved to be best (8.08%) among the chemicals tested followed by acepthate (8.51%), monocrotophos (9.02%), phosphamidan (9.38%), DDVP (10.67%), methomyl (10.67%) and oxydemeton methyl (13.69%). The findings of this study are in conformity with Epsino *et al.*, (1988) who observed the effectiveness of acephate against *L. trifolii.*

The influence of different chemicals on yield parameters revealed that imidacloprid treatment retained 7.0 fruits/treatments followed by acephate (6.6), phosphamidan (6.0) (Table 2) as against 3.3 fruits in untreated check (UTC). The present study has clearly indicated the increased retention of fruits (4 fruits/treatments), when imidacloprid was used as against no spray.

The weight of fruits retained in untreated check were 15.33, per treatment while imidacloprid recorded double the bearing of UTC (32.2/fruits/treatment). All the treatments (Table 2) proved superior over UTC in recording

Table 2. Influence of different insecticides on yield parameters of water melon (mean of two seasons)

Treatments	No. fruits/ treatment	Total wt.of fruits/treatment	Total weight of fruits(MT/ha)	Percent yield loss due to pest
Imidacloprid 200 SL @ 0.25 ml/1	7.00	32.20	11.18	–
Acephate 75 SP @ 1 gm/1	6.60	30.66	10.65	04.74
Oxydemeton methyl 25 Ec@ 2m/1	3.66	16.73	05.85	47.60
Phosphoamidon 85 WSC @ 0.5 m1/1	6.00	27.60	09.05	19.05
Methomyl 12.5L @ l.0 ml/l	5.00	23.00	07.45	33.36
DDVP76 EC @ 1.0ml/l	4.66	21.46	07.45	33.36
Neem oil @ 5 ml/l	4.66	21.46	07.45	33.36
Monocrotophas 36 SL @ 2.0 ml/l	5.66	26.06	09.05	19.05
Control (UTC)	3.33	15.33	03.31	70.39
S.Em.±	0.65	9.20	3.41	
CD at 5%	1.39	6.43	8.44	
C.V. %	18.11	17.99	20.69	

increased weight of fruits/unit area by effective suppression of the pest. Application chemicals especially imidacloprid recorded trifold increase in yield (11. 18 mt/ha) followed by acephate (1 0.65 mt/lia).

The varied level of loss due to serpentine leaf miner is presented table 2. The maximum (70.30%) loss was documented in UTC as against 47.60 per cent in the application of oxydemeton methyl. The least loss of 4.74 per cent was recorded in the acephate treated plot. The loss due to application of methomyl, DDVP neem oil spray were at par with each other and recorded 33.36 per cent loss. Phosphamidan and monocrotophas were found *to be on par* (19.05%) *in recording* yield loss. The present study clearly suggested effective management of *L.trifolii* by chemical means in watermelon.

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