

Efficacy of insecticides and plant products against the fruit borer and fruit fly in ber under rainfed condition

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ABSTRACT

The field experiments were conducted during 2002-03 and 2003-04 rabi season at Regional Research Station, Aruppukottai to study the effect of chemicals and plant products against the fruit borer and fruit fly complex on ber in four replications. Treatments include the spraying of fenthion 0.1%, endosulfan 0.07%, malathion 0.045%, monocrotophos 0.03%, dichlorvas 0.1%, phosphamidan 0.03%, azadiractin 1%, *Ocimum sanctum* 1% and untreated control. The results revealed that the chemicals fenthion 0.1% recorded the lowest mean fruit damage of 26.46 per cent and is on par with endosulfan 0.07% (26.67 per cent) and both are equally effective in controlling the fruit borer and fruit fly complex, whereas the untreated control recorded the highest damage of 58.96 per cent. The azadiractin 1% and *Ocimum sanctum* extract 1% are also effective only up to 10 days after spray.

Key words: Ber, Fruit borer, Fruitfly, Chemicals

INTRODUCTION

Now a day's ber (*Ziziphus maruritiana*) is cultivated under arid zone in large scale. The estimated area in India under regular plantations of improved varieties is about 70,000 ha (Pareek, 1996). The major ber growing states are Haryana, Punjab, Uttar Pradesh, Rajasthan, Gujarat, Madhya Pradesh, Bihar, Maharashtra, Andhra Pradesh and Tamil Nadu. In Tamil Nadu, the ber is mainly cultivated in Tirunelveli, Ramathanapuram, Dharpuri and Salem. Praveen *et. al.*, (1998) reported that ten insect's species belonging to four different orders were found feeding in ber. Among them, the fruit borer (*Meridarchis scyrodes* Meyr.) and fruit fly (*Carpomyia vesuviana* Costa) are the important pests. *C. vesuviana* has been observed to damage as much as 80 % of the crop under severe infestations (Cherian and Sunderam, 1941). Infestation starts with the onset of fruit setting. The adult female lays eggs singly by inserting its ovipositor in the developing fruit. After 2 to 5 days, the larva hatches out and starts feeding on the pulp making galleries in it. Generally, only one larva is found in one fruit. The excreta of the larva accumulate in the galleries, which may sometimes result in rotting of the fruit. Infested fruits become deformed and their growth becomes checked. A large number of such fruits drop off. There may be 2 or 3 generations of the pest during the active period (Batra, 1953) while the fruit matures (from November to April in north India). To prevent infestation, prophylactic sprays should be carried out with 0.03 % oxidematon or dimethoate starting from the stage when 70-80 % fruits attain pea size and then repeating the spray at one-month intervals (Pareek and Vishal Nath, 1996). During the maturity of fruits, if necessary, spraying should be done with 0.5 % Malathion at weekly intervals since, malathion has been observed to dissipate quickly in ber fruits decreasing well below the tolerance level of 3 ppm within 2 days after spraying (Popli *et. al.*, 1980). Damage by fruit borer (*Meridarchis scyrodes* (Lepidoptera: Carposinidae)) has been observed mainly in southern and western India (Sonawane and Pareek and Vishal Nath, 1996). The reddish larvae bore into the fruit and feed on the pulp. Its moth is dark brown. Based on multilocation trials in India, a chemical control schedule consisting of first spray at pea stage with monocrotophos (0.03 %), second spray after 15 days with fenthion (0.05 %) and a third spray 15 days after the second spray with 0.01 % carbaryl has been recommended (Pareek and Vishal Nath, 1996).

So this present investigation was take-up to find out the suitable management practice with insecticide or natural plant product against the fruit borer and fruit fly in ber complex under dry farming condition.

MATERIALS AND METHODS

The field experiments were conducted during 2002-03 and

2003-04 rabi season at Regional Research Station, Aruppukottai to study the effect of chemicals and plant products against the fruit borer and fruit fly complex on ber in four replications. Treatments include the spraying of fenthion 0.1%, endosulfan 0.07%, malathion 0.045%, monocrotophos 0.03%, dichlorvas 0.1%, phosphamidan 0.03%, azadiractin 1%, *Ocimum sanctum* 1% and untreated control. The first spraying was given at the peanut stage of the fruit and the second spray was given on 30 days after the first spray. The observations were made by counting the total and affected number of fruits in each tree will assess the incidence of fruit borer or fruit fly. The data were transferred to arsine transformation and analysed.

RESULTS AND DISCUSSION

The observations recorded during 2002-03 and 2003-04 revealed that the endosulfan 0.07% was found effective up to 20 days after spraying (46.25 and 43.75 per cent during 2002-03 and 21.25 and 26.25 per cent during 2003-04 respectively) (table 1 and table 2) and is on par with fenthion 0.1% (47.50 and 43.75 per cent during 2002-03 and 23.75 and 26.25 per cent during 2003-04 respectively) while, the untreated control registered the maximum damage of 62.50 and 56.25 per cent during 2002-03 and 2003-04 respectively. Whereas, the observation on 30 days after spraying, the chemical fenthion 0.1% (50.00 and 27.50 per cent during 2002-03 and 2003-04 respectively) was found to be effective than endosulfan 0.07% (51.25 and 31.25 per cent during 2002-03 and 2003-04 respectively) and is on par with each other. The untreated control registered the highest damage of 82.50, 82.50 and 83.75 per cent during 2003-04 and 53.75, 56.25 and 55.00 per cent during 2003-04 on 10, 20 and 30 days after spraying respectively. The results were in confirmation with the findings of Patel *et. al.*, (1989) and Dashad *et. al.*, (1999) and they also reported that fenthion at 0.1% applied three times was the most effective against these pests, followed by endosulfan and malathion. Ragumoorthi and Arumugam (1992) reported that two applications (at the pea stage of the fruits and 15 days later) of 0.1% dichlorvos gave the best results (in terms of reduced fruit infestation), followed by 0.036% monocrotophos, 0.05% malathion and 0.07% phosalone against *Carpomyia vesuviana* on ber.

Regarding the yield during 2002-03, due the failure of monsoon, fruit set was very low and yield could not be recorded. During 2003-04, the spraying of fenthion 0.1% recorded the highest mean yield of 17.970 kgs per tree (table 6), which was followed by the spraying with endosulfan 0.07 % and malathion 0.045 % (17.770 and 17.055

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Table 1 : Efficacy of insecticides and plant products against the ber fruit borer during 2002-03

	Fruit borer damage					
	10 DAS		20 DAS		30 DAS	
	%	TV	%	TV	%	TV
Fenthion 0.1%	47.50	43.56	43.75	41.36	50.00	45.03
Endosulfan 0.07%	46.25	42.84	43.75	41.33	51.25	45.75
Malathion 0.045	53.75	47.20	52.50	46.61	60.00	50.97
Monocrotophos 0.03%	53.75	47.30	53.75	47.34	57.50	49.36
Dichlorvas 0.1%	52.50	46.58	55.00	47.92	61.25	51.69
Phosphamidan 0.03%	56.25	48.67	55.00	47.92	65.00	54.29
Azadiractin 1%	66.25	54.83	62.50	52.74	67.50	55.47
<i>Ocimum sanctum</i> 1%	71.25	58.04	62.50	52.52	73.75	59.47
Untreated control	82.50	66.94	82.50	58.18	83.75	66.67
SE		1.70		2.18		1.67
Sed		2.40		3.08		2.37
CD		4.95		6.37		4.88

kgs per tree respectively). While the untreated control registered only 9.330 kgs per tree.

The pooled analysis also revealed that the chemicals fenthion 0.1% recorded the lowest mean fruit damage of 36.46 per cent and is on par with endosulfan 0.07% (36.67 per cent) and both are equally effective in controlling the fruit borer and fruit fly complex (table 3), whereas the untreated control recorded the highest damage of 58.96 per cent. Patel *et. al.*, (1989) also found that fenthion at

0.1% applied 3 times was the most effective against the pest, followed by endosulfan at 0.07%, also applied 3 times.

The azadiractin 1% and *Ocimum sanctum* extract 1% are also effective only up to 10 days after spray. In general, the control of fruit borer and fruit fly complex was only 50 per cent as compared to untreated control, since, the developmental period of egg and larvae are within the fruit itself and rarely exposed to the chemicals.

Table 2 : Efficacy of insecticides and plant products against the ber fruit borer during 2003-04

Treatment	Fruit borer damage						Yield kgs/tree
	10 DAS		20 DAS		30 DAS		
	%	TV	%	TV	%	TV	
Fenthion 0.1%	23.75	28.53	26.25	30.72	27.50	31.10	17.970
Endosulfan 0.07%	21.25	25.61	26.25	30.38	31.25	33.85	17.770
Malathion 0.045	27.50	31.21	31.25	33.29	37.50	37.45	17.055
Monocrotophos 0.03%	21.25	26.76	31.25	33.29	31.25	33.81	16.530
Dichlorvas 0.1%	22.50	26.81	35.00	35.89	30.00	32.95	16.490
Phosphamidan 0.03%	25.00	29.55	35.00	36.00	33.75	35.36	16.340
Azadiractin 1%	37.50	37.15	47.50	43.50	37.50	37.52	14.850
<i>Ocimum sanctum</i> 1%	42.50	40.50	47.50	43.53	47.50	43.42	12.555
Untreated control	53.75	46.76	56.25	48.75	55.00	47.95	9.330
SE		2.36		2.37		1.85	0.338
Sed		3.33		3.35		2.61	0.477
CD		6.88		6.91		5.39	0.988

Table 3 : Efficacy of insecticides and plant products against the ber fruit borer during 2002-03 and 2003-04

	Fruit borer damage					
	2002-03		2003-04		Mean	
	%	TV	%	TV	%	TV
Fenthion 0.1%	47.08	43.32	25.83	30.12	36.46	36.72
Endosulfan 0.07%	47.08	43.31	26.25	29.95	36.67	36.63
Malathion 0.045	55.42	48.26	32.08	33.98	43.75	41.12
Monocrotophos 0.03%	55.00	48.00	27.92	31.29	41.46	39.64
Dichlorvas 0.1%	56.25	48.73	29.17	31.88	42.71	40.31
Phosphamidán 0.03%	58.75	50.29	31.25	33.64	45.00	41.96
Azadiractin 1%	65.42	54.35	40.83	39.39	53.13	46.87
<i>Ocimum sanctum</i> 1%	69.17	56.68	45.83	42.48	57.50	49.58
Untreated control	82.92	63.93	55.00	47.82	68.96	55.87
SE		0.90		0.97		1.15
SEd		1.28		1.36		1.63
CD		2.63		2.82		3.76

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