Efficacy of Some Plant Products against Spotted Leaf Beetle (*Hadda* beetle), *Henosepilachna vigintiooctopunctata* (F.) in Brinjal.

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ABSTRACT

Ten plant products were evaluated against *Henosepilachna vigintioctopunctata*. They were: *Azadirachta indica* (Neem) leaf extract (@ 5.0 %), *Calotropis gigantea* leaf extract @ 5.0 %, *Lantana camera* leaf extract @ 5.0 %, Neem cake extract @ 5.0 % neem oil @ 2.0 %, Nimbecidine® @ 2 ml /lit %, *Pongamia glabra* (Pungam) leaf extract @ 5.0 %, *Prosopis juliflora* L. leaf extract @ 5.0 %, *Vitex negundo*(Notchi) L. leaf extract (@ 5.0 %), and *Allium sativum* (Garlic) extract (@ 5.0 %. The standard check, carbaryl (Sevin 50 WP) (@ 0.1%) and an untreated check were included. The plant products were able to bring about higher reduction in population of *H. vigintioctopunctata* from 87.86 to 71.97 % on the third day after spray. However, the efficacy was reduced with the increase in days after spray. Higher reduction in population of *H. vigintioctopunctata* was observed in neem oil and was on a par with *C. gigantea* , Nimbecidine and *L. camera* ; *P. glabra* neem cake extract and *V. negundo* stood next. However, the plant products were less effective than the standard check carbaryl but better than the untreated check.

INTRODUCTION

Under sustainable farming, brinjal provides regular daily income to meet the day-to-day expenditure like wages for the labour, service charges for the machinery *etc*. Among the list of insects troublesome to brinjal, the key ones are, fruit borer, *Leucinodes orbonalis* and spotted beetle popularly known as hadda beetle, *Henosepilachna vigintiocto punctata* (Feb). According to Kirtani (1979), ecofriendly less costly measures such as, cropping system approach, botanicals are more advantageous over insecticides, as they fit well in IPM.

METHODOLOGY

In the present investigation, fish oil rosin soap (FORS) and ten botanicals were evaluated – at Agricultural College and Research Institute (TNAU), Killikulam - for their efficacy against the hadda beetle *H. vigintioctopunctata* in brinjal. The standard check, carbaryl (Sevin 50 WP) (@ 0.1%) and an untreated check were included. The Brinjal variety KKM 1 was used in this experiment. 12 treatments were manintained with three replications. They were: T_1- *Azadirachta indica A. Juss*. leaf extract (5.0%),T_2- *Calotropis gigantean*. R.Br. leaf extract (5.0%), T_3- *Lantana camera* L. leaf extract (5.0%), T_4-*Neem cake* extract(5.0%), T_5-Neem oil(2.0%), T_6-Nimbecidine (2 ml l^{-1}),T_7- *Pongamia glabra* L.leaf extract(5.0%), T_8-*Prosopis juliflora* L.leaf extract (5.0%), T_9-*Vitex negundo* L.leaf extract(5.0%), T_{10}- Garlic *(Allium sativum* L.) extract(5.0%), T_{11}-Carbaryl (Sevin 50 WP)(0.1%) and T_{12}-Untreated check. The treatments were applied as foliar spray.

Preparation of extracts

Leaves from various plants were collected and shade dried. When well dried, they were ground with a mixie. Then calculated quantity of well powdered leaf material was soaked in one-third of water and kept overnight. Stirring was done frequently. Then the material was filtered through a clean muslin cloth and the clear filtrate was mixed with the remaining two-third portion of water. Neem cake extract was also prepared in the same way. The observations on *H.vignitioctopunctata* were made on three, seven and 14 days after each spray. The number of grubs and adults of *H.vigintioctopunctata* were recorded from three leaves, one each from top, middle and bottom part of ten randomly selected plants; mean was worked out and expressed as number/three leaves. The fruit was harvested at seven days interval commencing from 60 DAT and continued up to 125 DAT. The yield in grams was recorded.

STATISTICAL ANALYSIS

The data gathered were transformed into angular or square-root values for statistical scrutiny, wherever necessary (Gomez and Gomez,1984). The experiments were subjected to statistical scrutiny following the method of Panse and Sukhatme (1989) and Gomez and Gomez (1984)

Table 1. Efficacy of plant products against *H. vigintioctopunctata* poputation.

Treatment	Percent reduction in population			
	Days after spray (DAS)			Mean
	3	7	14	
T_1	78.21 (62.34) ^{Aa}	60.84 (51.32) ^{Aa}	38.30 (38.18) ^{Aa}	59.06 (50.61) ^{d}
T_2	86.77(69.97) ^{Aa}	70.22 (57.02) ^{Aa}	50.65 (45.38) ^{Aa}	69.22 (57.46) ^{b}
T_3	85.19 (68.63) ^{Aa}	68.88 (56.56) ^{Aa}	48.21 (43.97) ^{Aa}	67.43 (56.39) ^{b}
T_4	80.97 (64.89) ^{Aa}	63.78 (53.05) ^{Aa}	42.46 (40.64) ^{Aa}	62.21(52.86) ^{c}
T_5	87.86 (70.77) ^{Aa}	70.31(57.07) ^{Aa}	51.52(45.67) ^{Aa}	69.77(57.84) ^{b}
T_6	85.52(69.44) ^{Aa}	68.25(55.68) ^{Aa}	48.44(44.09) ^{Aa}	67.59(56.40) ^{b}
T_7	81.68(65.19) ^{Aa}	64.06(53.36) ^{Aa}	41.86(40.30) ^{Aa}	62.37(52.95) ^{c}
T_8	71.97(58.14) ^{Aa}	53.72(47.15) ^{Aa}	30.02(33.20) ^{Aa}	51.87(46.17) ^{e}
T_9	78.48(62.56) ^{Aa}	62.86(52.52) ^{Aa}	40.97(39.78) ^{Aa}	60.39(51.62) ^{cd}
T_{10}	78.20(63.17) ^{Aa}	60.04(51.16) ^{Aa}	36.65(37.21) ^{Aa}	58.74(50.51) ^{d}
T_{11}	100.00(87.14) ^{Aa}	95.98(79.64) ^{Aa}	79.99(62.77) ^{Aa}	91.99(77.31) ^{a}
Mean	83.17(67.48) ^{A}	67.18(55.87) ^{B}	46.28(42.84) ^{c}	65.51(55.39)

Figures in parentheses are angular transformed values, in a column/row means followed by a common letter are not significantly different at 5% level (LSD).

and the means were compared with Least Significant Difference (L.S.D.).

RESULTS

The results of the investigation with ten plant products against Shoot and fruit borer, *L. orbonalis* are presented hereunder (Table 1 & 2). Variability in the population of *H. vigintioctopunctata* was significant among the treatments, periods of observation and spray rounds. Significant interaction could not be observed between treatment and spray round. The plant products were able to bring about higher reduction in population of *H. vigintioctopunctata* from 87.86 per cent to 71.97 per cent on third day after spray. However, the efficacy was reduced with the increase in days after spray. Overall treatment means indicated that the higher reduction in population of *H. vigintio ctopunctata* was observed in neem oil (69.77 percent) and was on a par with *C. gigantea* (69.22 per cent), Nimbecidine (67.59 per cent) and *L. camera* (67.43 per cent). *P. glabra* (62.37 per cent) neem cake extract (62.21 per cent) and *V. negundo* (60.39 per cent) stood next. However, the plant products were less effective than the standard check, carbaryl (91.99 percent).

Fruit Yield

The plant products were able to increase the fruit yield significantly over untreated check; but the yield increase was more than 2 t ha^{-1} , only in neem oil treated plots (Table 2). Neem oil recorded a fruit yield of 14.38 t/ha. Nimbecidine was the next best treatment with 13.99 t/ha.

Table 2. Effect of plant products on fruit yield

Treatment	Yield	
	T ha^{-1}	Increase over UTC (%)
T_1	13.05 ^{g}	6.44
T_2	13.79 ^{d}	12.48
T_3	13.54 ^{e}	10.44
T_4	13.89 ^{cd}	13.31
T_5	14.38 ^{b}	17.29
T_6	13.99 ^{c}	14.11
T_7	13.25 ^{f}	8.07
T_8	12.51 ^{i}	2.04
T_9	12.85 ^{h}	4.81
T_{10}	12.95 ^{gh}	5.63
T_{11}	16.89 ^{a}	37.77
T_{12}	12.26 ^{j}	-
Mean	13.61	-
Significance	0.01	-
CD (P=0.05)	0.19	-

In a column/row means followed by a common letter are not significantly different at 5% level (LSD)

The yield in control plot was 12.26.The standard check carbaryl recorded 16.89 t/ha.

DISCUSSION

Brinjal is an important dietary vegetable crop and is scourged by a wide range of insect pests. In the recent years, the leaf beetle, *Henosepilachna vigintiocto punctata* (F.) is emerging as a serious pest. It damages the leaves as well as fruits; the scarifications made on the fruit surface reduce the market value. Usually the management of insect pests in brinjal has been insecticide-oriented. However, the obvious limitations and hazards associated with the insecticide applications restrict their use in pest control programmes. Evidently, the safer plant products proved useful in developing sound pest management strategies.

The studies on plant products revealed that some of the plant products were moderately effective in bringing down the damage by *H. vigintioctopunctata*, besides increasing the yield, though not as effective as that of the standard check carbaryl. Neem oil, Nimbecidine were consistently moderately effective.

Neem oil, *C. gigantea,* Nimbecidine, *L. camera*, *P. glabra,* neem cake extract and *V. negundo* were effective . Neem oil and Nimbecidine treated plots had higher yields too, atleast two tones ha-1 more. Several earlier workers have also demonstrated the effectiveness of neem oil against *H. vigintioctopunctata* (Mishra *et al.,* 1990; Udaiyan and Ramarathinam, 1994; Shanmugaraj, 1995), Nimbecidine (Udaiyan and Ramarathinam, 1994), *C. gigantean* against *H. vigintioctopunctata* (Rao *et al.,* 1990; Chitra *et al.,* 1992) and *L. camera* against *H. vigintioctopunctata* (Mehta *et al.,* 1995). The present investigation has brought out the efficacy of neem oil, Nimbecidine, *Calotropis gigantea, Lantana camera, Pongamia glabra,* neem cake extract and *Vitex negundo* against the spotted leaf beetle, *H. vigintiooctopunctata* in Brinjal.

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