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BIO-EFFICACY OF IPM MODULES AGAINST PEST COMPLEX OF OKRA WITH SPECIAL REFERENCE TO JASSAID, *AMRASCA BIGUTTULA BIGUTTULA* (ISHIDA)

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ABSTRACT

Bioefficacy of IPM modules against the jassid, *Amrasca biguttula biguttula* ishida infesting okra revealed that all the modules were significantly superior over untreated check. None of the biopesticide modules could perform better than the insecticidal standard check, which was found significantly superior to all other tested modules. Among the biopesticide modules M-2 (Kamdhenu at 5% and Novaluron 10 EC at 500 ml/ha) was superior to other modules with 71.06 per cent mean reduction in jassid population and 65.40 q/ha marketable yield with net return of Rs. 33800.00/ha.

Key word: *Amrasca biguttula biguttula*, Okra, jassid, modules, population.

INTRODUCTION

Okra, *Abelmoschus esculentus* (L.) Moench an important vegetable crop is cultivated all over Inida and other parts of the world. It is extensively cultivated during *kharif* season. In India, okra is cultivated in 0.31 million hectares with the production of 3.65 million tones (Anonymous, 2007), of which Rajasthan shares 4456.0 hectares with the production of 11470.00 tones (Anonymous, 2006). Production of okra is adversely affected by several insect pests, including the jassid, *Amrasca biguttula biguttula* (Ishida); mite, *Tetranychus urticae* (Koch); aphid, *Aphis gossypii* (Glover); whitefly, *Bemisia tabaci* (Genn.); shoot and fruit borer, *Earias* spp. (Boisd) and other minor pests. Out of these, jassid and shoot and fruit borer are the most serious pests of the crop in all parts of the country (Pareek and Bhargava, 2003). Jassid suck cell sap from the leaves, adversely affect photosynthetic activity, which ultimately reduces the fruit yield. Indiscriminate use of insecticides in the crop has resulted in adverse effect on natural enemies and resulted in epidemic occurrence of the fruit borer. With this background, the present studies were conducted to identify suitable alternate methods for the control of shoot and fruit borer on okra.

A field experiment was conducted for three consecutive seasons during 2005 to 2007 to evaluate IPM modules selected with the aim to minimise the use of synthetic chemicals for the control of jassid by using safe insecticides in conjunction with some alternative botanicals, bioagents and oil etc.

MATERIALS AND METHODS

The experiment was conducted on okra crop grown during *Kharif* season of 2005 to 2007, at the Agricultural Research Station, Durgapura, Jaipur (Rajasthan). The experiment was laid out in a randomized block design with three replications, 2m × 2m plots each measuring. Row to row and plant to plant spacings of 45 cm and 30 cm was maintained, respectively. Okra variety Prabhani kranti was sown in July during all the three years. All agronomical practices recommended in the state package of practices were used. Seven IPM modules consisting of three biopesticides (Neem seed kernel extract, Btk., Kamdhenu) two chitin inhibitors (Novaluron and Diflubenzuron), one oil (D-C tron plus) and one insecticide (Methyl demeton, standard check) were evaluated. Each module consisted of three components. First spray was given at ETL of pest population and subsequent sprays were given at fortnightly intervals. In all, three sprays were applied. Observations on the population of jassid were recorded from five randomly selected plants in each plot on three leaves *i.e.* one each from upper, middle and lower portion of the plant. The pre treatment count was done 24 hr prior to spray and post treatment counts after 1, 3, 7 and 14 days. The last count was considered as the pre count for the second spray.

Data for three seasons were pooled and population counts were transformed to square root value before subjecting to analysis of variance. The yield data in various treatments were also recorded during three seasons and pooled.

Table 1: Bioefficacy of IPM modules against Jassid population on okra (Three sprays, 15 days interval, in each treatment Pooled 2005, 2006 and 2007)

S. No.	Treatments	Per cent reduction in jassid population*				Mean after treatment	Yield (q/ha)	Net Profit (Rs.)
		1 DAS	3 DAS	7 DAS	14 DAS			
M_1	NSKE at 10% NSKE at 10% Btk at 1500 ml/ha	66.74 (55.43)**d	71.8 (58.79)de	65.6 (54.53)d	30.53 (32.81)d	58.67 (50.39)d	50.28d	14725.00
M_2	Kamdhenu at 5% Kamdhenu at 5% Novaluron 10 EC at 500 ml/ha	79.63 (63.26)d	83.99 (66.69)ab	75.97 (61.01)b	44.63 (41.89)b	71.06 (58.21)b	65.40b	33800.00
M_3	NSKE at 10% Kamdhenu at 5% Diflubenzuron 25 WP at 400 g/ha	72.7 (58.66)cd	76.53 (61.25)cd	70.79 (57.47)bcd	36.00 (36.83)c	64.00 (53.55)cd	54.23d	17960.00
M_4	Kamdhenu at 5% NSKE at 10% NSKE at 10%	77.76 (61.87)bc	81.91 (64.85)bc	70.31 (56.99)cd	42.00 (40.38)bc	67.99 (56.02)bc	55.59cd	23200.00
M_5	NSKE at 10% NSKE at 10% NSKE at 10%	79.00 (62.75)bc	84.37 (66.72)ab	73.90 (59.33)bc	43.76 (4141)b	70.26 (57.55)bc	61.22bc	23880.00
M_6	D-C-Tron Plus oil at 2000 ml/ha D-C-Tron Plus oil at 2000 ml/ha D-C-Tron Plus oil at 2000 ml/ha	67.26 (55.11)d	69.10 (56.24)e	37.87 (37.96)e	15.03 (22.69)e	47.32 (43.00)e	41.14e	11630.00
M_7	Methyl demeton 25 EC @ 1250 ml/ha Methyl demeton 25 EC @ 1250 ml/ha Methyl demeton 25 EC @ 1250 ml/ha	86.98 (68.92)a	89.56 (71.36)a	84.45 (66.92)a	54.21 (47.42)a	78.80 (63.65)a	73.60a	43460.00
M_8	Control	0.00 (0.00)e	0.00 (0.00)f	0.00 (0.00)f	0.00 (0.00)f	0.00 (0.00)f	27.58f	–
	SEm ± CD at 5%	1.48 4.47	1.58 4.77	1.36 4.11	1.30 3.94	1.43 4.32	2.05 6.20	

* Mean of three replications, DAS-Days after spray
** Figures within parentheses are angular transformed value of percentage
Mean followed by the same letter in column are not significantly different

RESULTS AND DISCUSSION

Each tested module consisted of three sprays with different combination of biopesticides, chitin inhibitors, oil and insecticide at 15 days interval commencing from pest reaching the economic threshold level. One day prior treatment the population of jassid was almost same in all the treatments, and there was no significant difference. Seven modules were evaluated against jassid in okra and results were compared with standard check (three sprays of Methyl demeton 25 EC at 1250 ml/ha) and untreated check. Three years pooled data revealed that all the modules were significantly superior over untreated check. None of the biopesticide module could perform better than the insecticidal check (three sprays of Methyl demeton 25 EC at 1250 ml/ha), which was found significantly superior to all the other tested modules, in terms of protection as well as production. Among the biopesticides modules M-2 (Kamdhenu at 5%, Kamdhenu at 5% and Novaluron 10 EC at 500 ml/ha) was superior to other modules, which caused 71.06 per cent reduction of jassid population and yielded highest marketable yield 65.40 q/ha. This module provided a net return of Rs. 33800.00/ha. However, M-5 (three spray of NSKE 10%) was found at par with M-2 found. Standard check consisting of three sprays of methyl demeton (M-5) caused highest mean reduction of 78.80 per cent after three spray besides highest marketable yield of 73.00 q/ha. The highest ret returns of Rs. 43460/ha was also recorded in case of three sprays of methyl demeton. Similar findings were made by Patel and Patel (1996) and Rosaiash (2001), who reported neem products to be effective in reducing jassid population. Samuthirravelu and David (1991), Ambekar *et al.* (2000) and Rosaiash (2001) found NSKE (Neem seed kernal extract) 5 and 10% effective against shoot and fruit borer. The present results also conform to the report by with Sannaveerappanavar *et al.* (2003), who observed that novaluron was most effective against diamondback moth of cabbage.

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