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PJBS

ISSN 1028-8880

**Pakistan
Journal of Biological Sciences**

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Comparative Efficacy of Insecticides, Insect Growth Regulator and M.Y. Strategy Against Insect Pests of Okra (*Abelmoschus esculentus*)

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Abstract: The efficacy of Azodrin and Pirate (insecticides), Cascade (insect growth regulator) and Pressurized water spray (M.Y. strategy) was evaluated against insect pests of okra. Cascade was found to be the best efficient against *Helicoverpa emigrata* and *Earias* spp. Pirate showed maximum efficacy against *Amrasca biguttula biguttula*, whereas, against *Bemisia tabaci*, the most effective treatment was Azodrin followed by M.Y. strategy.

Key words: Okra, american bollworm, spotted bollworm, jassid, cotton whitefly, azodrin, pirate, cascade and M.Y. Strategy

Introduction

Okra is a favourite summer vegetable in Pakistan. Its immature fruit is used as vegetable either boiled or fried and added to soups. Its fruit have mucilage content and ripe seed contain 20% edible oil (Hill, 1983). Its fruit have nutritive value as 100 gms contains water 90 ml, carbohydrate 6 gms, protein 2 gms, fiber 1 gm, calcium 70 mg, iron 1 mg, vitamin A 1501.V. (variable), thiamin 0.1 mg, riboflavin 0.1 mg, nicotinamide 1 mg, ascorbic acid 25 mg and fat negligible (Tindall, 1978).

Among insect pests of okra, jassid (*Amrasca biguttula biguttula*), cotton whitefly (*Bemisia tabaci*), American bollworm (*Helicoverpa armigera*) and spotted bollworm (*Earias* spp.) are the notorious insect pests (Singh *et al.*, 1993). These pests are difficult to control with insecticides because they are more hazardous to human being. New insecticides, insect growth regulator and mechanical methods are being used to control insect pests these days.

Among the previous investigations about the control of insect pests of okra by different workers include Sammour and Abdalla (1989) who evaluated insect growth regulators, diflubenzuron and triflumuron and found that triflumuron was more toxic than diflubenzuron. Bagle and Verma (1991) applied monocrotophos to the okra and found that monochrotophos gave 60% mortality of nymphs. Watkins and Head (1994), Townsend (1995) and Whitehead and Treacy (1995) evaluated that Pirate controlled *Helicoverpa armigera* and other bollworms successfully. Yousuf (1995) developed and evaluated M.Y. Strategy and found that pressurized water spray reduced the *Bemisia tabaci* population below economic threshold level. Castle *et al.* (1998) used sprinkler and furrow irrigation to control the cotton whitefly and found that cotton whitefly population was significantly reduced with sprinkler irrigation. Fazal (1998) evaluated M.Y. strategy and noticed that pressurized water spray reduced *Bemisia tabaci* population upto 70-80%.

Keeping in view the importance of this crop and resistance in insect pests, the present project was planned to study the

effectiveness of Azodrin and Pirate (insecticide). Cascade (insect growth regulator) and pressurized water spray (M.Y. Strategy) as a better choice in future.

Materials and Methods

The trials were laid out in Randomized Complete Block Design (ROM) and there were five treatments including an untreated check, having four repeats of each.

The insecticides and Insect growth regulator were applied at an interval of fifteen days with the help of knapsack hand sprayer and for M.Y. Strategy, solo power sprayer were used and water was sprayed at an interval of 7 days. Data were recorded before one day of application and 24, 48 and 72 hours after application. The population of jassid and whitefly were recorded from upper, middle and lower leaves of fifteen randomly selected plants. The infestation of American and spotted bollworms was recorded from fifteen selected plants in three sets of five consecutive plants. The data so obtained were subjected to analysis of variance and Duncan's New Multiple Range Test as described by Steel and Torrie (1980).

Results and Discussion

The treatments showed significantly better results over the untreated check. Cascade was proved to be the most effective against *H. armigera* and *Earias* spp. in lowering the fruit infestation upto 9.63 and 10.52%, respectively, as compared with 13.72 and 16.99%, respectively, in the check. Pirate showed maximum efficacy in controlling the cotton jassid population level upto 3.86 per leaf as compared with 13.63 per leaf in the check. With the treatments, viz., Cascade, Azodrin and M.Y. strategy, cotton jassid population was found to be 3.99, 4.53 and 16.15 per leaf, respectively. Azodrin was found to be the most effective in lowering the *Bemisia tabaci* population level upto 0.60 per leaf as compared with 1.85 per leaf in the untreated check and it was followed by M.Y. Strategy, Cascade and Pirate in controlling the whitefly population upto 0.67, 0.75 and 0.86,

Table 1: Effect of different control measures against insect pests of okra

Treatments	Fruit infestation (%)		per Leaf Population	
	<i>H. armigera</i>	<i>Earias</i> spp.	<i>A. biguttula biguttula</i>	<i>B. tabaci</i>
Azodrin	9.03 B	11.47 B	1.83 B	0.60 C
Cascade	6.72 C	5.73 C	2.19 B	0.75 BC
Pirate	7.22 C	8.24 C	1.38 B	0.86 B
M.Y. strategy	11.81 A	15.21 A	17.08 A	0.87 C
Check	11.81 A	14.44 A	16.77 A	1.85 A

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respectively. These results are similar to those of earlier workers, viz., Sammour and Abdalla (1989), Bagle and Verma (1991), Watkins and Head (1994), Townsend (1995), Whitehead and Treacy (1995), Yousuf (1995), Castle *et al.* (1998) and Fazal (1998) who got effective control of these pests by using the Azodrin, Pirate, Cascade and M.Y. Strategy treatments (Table 1).

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