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An Evaluation of Biopesticide *Beauveria Bassiana* and PFP (Preptual Fungal Power) to Control Pomegranate Fruit Borer, *Rapala Varuna*

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Abstract – In order to find an alternative** to **chemical pesticides organophosphates, which are proven hazardous in long term use, the present study was conducted to evaluate the efficacy of some biopesticides for the management of the pomegranate fruit borer, Rapala Varuna. The biopesticides namely Beauveria Bassiana, and PFP available online for sale evaluated. Beauveria bassiana was less efficacious where the fruit infestation recorded was 30.56 per cent, while more than 90% in case of PFP respectively. The higher benefit cost ratio (BCR) was recorded in case of PFP.

Key Words: Rapala Varuna, Pomegranate, Beauveria Bassiana, PFP.

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INTRODUCTION

In the tropical and sub-tropical regions of the world Pomegranate (Punica granatumL.) is one of the important commercial fruit crop. In case of India, pomegranate has a production of 26,13,000 MT[1] while net shown area is 2,16,000 ha. According to a report by Butani, 1979 in India, pomegranate is attacked by more than 45 insects. From these all insects *Rapala varuna* is one of the main pest infesting both cultivated and wild pomegranate. It shows its regular occurrence, the caterpillars of *Rapala varuna* eating on the bark of tree and bore into developing fruit and feed on the seeds and pulp. This hole carved by the larva invites secondary infection of fungus and other pathogens causing fruit to rot and drop. The loss due to *Rapala varuna* varies between 50 to 90 per cent. To control its population the organophosphates and pyrethroids[16,7,15,6] are used. Many problems like resistance, adverse effect on human health, environmental degredation etc. are associated with these insecticides is proved by many standard studies. So there is a great requirement of a environmently and human health wise alternative to control the fruit borer.Therefore the present study was carried out to test some new locally available biopesticides against pomegranate fruit borer, *Rapala varuna*.

MATERIALS AND METHODS

The bioefficacy studies were carried out in a 2 year old well managed orchard of pomegranate (var. Kandhari and var.Ganesh, var.Bhagwa) in the pomegranate Charkhi Dadri Haryana.The biopesticides viz. Beauveria bassiana and a consortium of entamopathogenic fungi trade name PFP were evaluated and were compared with each other. In control, however, foliar application of water was given. Both the biopesticides were sprayed on the selected trees with the help of a tractor driven sprayer upto run off stage. The second and third spray was given after the 20 and 40 days of first spray, respectively. The observations on fruit infestation in different treatments were recorded before the application of the first spray and thereafter the data were recorded 7, 14 and 21 days after each spray application by randomly selected 20 fruits/ tree.

RESULTS AND DISCUSSION

Bioefficacy studies

The mean data of each spray presented in Table 1 reveals that after first spray application, were at par and effective in managing the fruit borer infestation B. bassiana 5.57% and PFP 2.34%.

Both the biopesticide treatments, were at par and better than control. When fruit infestation was recorded after second spray application, the maximum infestation was recorded in control 49.44%, PFP proved more efficacious recording only 1.04 per cent infestation while B. bassina showed 13.27 percent, after the third spray application, where the maximum fruit infestation was recorded in control 76.11%, in B. bassiana 28.68% and in PFP only the few 0.01 percent. All the test treatments were found superior to control. In the present study use of PFP with the minimum fruit infestation and maximum yield were the most effective treatments.

Table 1: Bioefficacy of insecticides and biopesticides against pomegranate fruit borer, *Rapala varuna*

Treatment	Conc. (%) /quantity	Average fruit infestation (%) before spray	Mean fruit infestation (%) after		
			First spray	Second spray	Third spray
B. bassiana	10g/L	1.67	5.57	13.27	28.68
PFP	**100 ml/L**	1.67	2.34	1.04	0.01
Control	Water	0.00	16.67	49.44	76.11

Table 2: Avoidable loss in yield due to application of biopesticides against pomegranate fruit borer, *Rapala varuna*

Treatment	Mean Yield (kg/tree)	Increased in yield over control (kg)	Avoidable loss (%)
B. bassiana	8.00	4.00	50.00
PFP	15.40	11.40	285.00
Control	4.00	-	-

Avoidable loss

Among the local bio insecticide evaluated in the present study (Table 2), the highest marketable yield and maximum losses were avoided with the treatment of PFP that is 285.00 %, while in case of B. bassiana it is 50%.

Table 3: Benefit cost ratio of biopesticides application against pomegranate fruit borer, *Rapala varuna*

Treatment	Mean yield (kg/tree)	Increased in yield over control (kg	Cost of increased yield @ Rs 100/kg	Cost of the test treatment (Rs)	Net monetary return (Rs)	Benefit Cost Ratio (BCR)
B. bassiana	8.00	4.00	400	120.00	280.00	2.33:1
PFP	**15.40**	**11.40**	**1140**	**22.0**	**1118**	**50.81:1**
Control	**4.00**	-	-	-	-	-

Benefit cost ratio

When cost of increased yield and cost of treatments were taken into consideration to calculate the BCR (Table 3), the value obtained for PFP is 50.81:1while in case of B.bassiana it is 2.33:1. So in case of PFP benefit is far more then B.bassiana

CONCLUSIONS

Among the locally available biopesticides PFP is found far more effective in checking the pomegranate borer, *Rapala varuna* infestation. Overall the biopesticides PFP may found much more effective then its corresponding chemical pesticides if a further study will do. From economic point of view, this also may emerge as the most effective insecticide in managing the pest, due to its lower cost of the treatments and can yield high benefit cost ratio.

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