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Effect of Bio-Rational Insecticides on Lady Bird Beetles of Sunflower Ecosystem

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ABSTRACT

Several insecticides have been recommended against sunflower insect-pests for their effective management. But according to several reports many of these label claimed insecticides were reported harmful to the natural enemies. Hence to evaluate the bio-safety of these label claimed insecticides with some new insecticides, a field experiment was conducted at Experimental Farm of Department of Entomology, College of Agriculture, Latur during summer season of year 2014. Experiment was laid out in RBD and replicated thrice. The experimental results revealed that all the insecticides reported harmful to the population of lady bird beetle. The significantly lowest population of lady bird beetle was noted in the plots treated with imidacloprid 0.003 per cent (1.18 lady bird beetle per plant) followed by flubendiamide 0.007 per cent (1.32 lady bird beetles per plant), indoxacarb 0.005 per cent (1.53 lady bird beetles per plant), chlorantraniliprole 0.005 per cent (1.82 lady bird beetles per plant) and fenpropathrin 0.01 per cent (1.94 lady bird beetles per plant) at 14 days after treatment. However, spinosad 0.005 per cent and emamectin benzoate 0.002 per cent found less harmful recorded 2.18 and 1.96 lady bird beetles per plant, respectively at 14 days after treatment. The overall results exhibited that imidacloprid 0.003 per cent, indoxacarb 0.005 per cent and flubendiamide 0.007 per cent had detrimental effect on lady bird beetle population as compared to other chemistries in the studies.

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INTRODUCTION

Sunflower (*Helianthus annuus* L.) belongs to family compositae originated in Mexico and Peru, introduced into India in the 16th century. Sunflower is one of the most important oilseed crops. The oil is used for culinary purposes, in the preparation of vanaspati ghee and in the manufacture of paints, soaps and cosmetics. The seed yield and oil content are important parameters in sunflower because sunflower oil is a good source of vegetable oil, for cooking and manufacture of margarine.Sunflower ranks third in the total area cultivated and fourth in total production. In India, during 2011-12 sunflower was cultivated in 7.2 lakh ha area with a production of 0.62 MT. In India the average yield is 692 kg/ha. Maharashtra ranks third in area and production. In Maharashtra, during 2011-2012 sunflower was grown on an area of 1 lakh ha with the productivity of 586 kg/ha (Anonymous, 2012).

Sunflower serves as host for more than 50 insect-pests in India. However, twenty insect-pests were reported to feed on sunflower in Marathwada (Belapate *et. al*., 1994). In the sunflower ecosystem several species of coccinellids, viz., *Brumus suturalis* Fab., *Chilocorus nigritus* F., *Coccinella septumpunctata* L., *Menochilus sexmaculata* F., and *Scymnus nubilus* Mulls. Keep a good check on sucking pests like thrips, aphids and leaf hopper nymphs (Sandhu et al., 1973 and Goel and Kumar, 1990).

Several insecticides have been recommended against sunflower insect-pests for their effective management. But according to several reports many of these label claimed insecticides were reported harmful to the natural enemies. Hence to evaluate the bio-safety of these label claimed insecticides with some new insecticides against lady bird beetle.

MATERIAL AND METHODS

A field experiment was conducted at the department of agricultural entomology, college of agriculture, Latur (ms) during the *Summer* 2013-14. The experiment was conducted in a randomized block design with three replications each replication has five plant. There were eight treatments viz.T1: Fenpropathrin 0.01 per cent, T2: Indoxacarb 0.005 per cent, T3: Imidacloprid 0.003 per cent, T4: Spinosad 0.007 per cent, T5: Flubendiamide0.007 per cent, T6: Emamectin benzoate 0.002 per cent, T7: Chlorantraniliprole 0.005 per cent and T8: control. Effectiveness of insecticides was judged on the basis of level of lady bird beetle population on randomly selected sunflower plant. The pre-count of adults of lady bird beetle was recorded on a day prior to application and post-counts at 1, 3, 7 and 14 days after spray. The mortality was worked for 1, 3, 7 and 14 days after application of insecticides. The generated data on survival of lady bird beetle was transformed into d n+1 values and subjected for statistical analysis.

RESULT AND DISCUSSION

The observations on population of lady bird beetle were recorded on sunflower at different intervals after first spray and the data are presented in Table

It is seen from Table that at 1 day after treatment insecticides except spinosad 0.005 per cent and emamectin benzoate 0.002 per cent were found to be less harmful to the population of lady bird beetle. The highest population of lady bird beetle to the extent of 1.40, 1.60, 1.87 and 2.18 per plant was observed in spinosad 0.005 per cent and 1.33, 1.49, 1.77 and 1.96 per plant observed in emamectin benzoate 0.002 per cent at 3, 7, 14 days after first spray. The significantly lowest population of lady bird beetle was recorded in the plots treated with imidacloprid 0.003 per cent (0.31 lady bird beetle per plant) followed by flubendiamide0.007 per cent (0.47 lady bird beetle per plant), indoxacarb 0.005 per cent (0.82 lady bird beetle per plant), chlorantraniliprole 0.005 per cent (1.07 lady bird beetle per plant) and fenpropathrin 0.01 per cent (1.16 lady bird beetle per plant).

At 3 days after spray, significantly minimum populations of lady bird beetle (0.53 per plant) were recorded from the plots treated with imidacloprid 0.003 per cent followed by flubendiamide0.007 per cent (0.74 lady bird beetle per plant), indoxacarb 0.005 per cent (1.04 lady bird beetle per plant), chlorantraniliprole 0.005 per cent (1.27 lady bird beetle per plant) ,fenpropathrin 0.01 per cent (1.50 lady bird beetle per plant), emamectin benzoate 0.002 per cent (1.49 lady bird beetle per plant) and spinosad 0.005 per cent (1.60 lady bird beetle per plant).

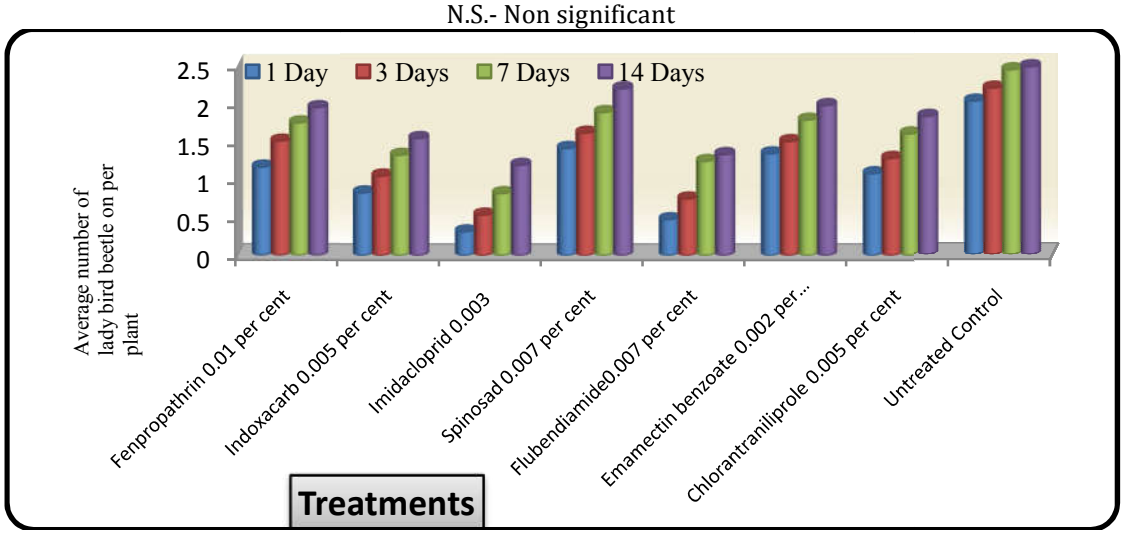
At 7 and 14 days after spray, significantly minimum populations of lady bird beetle (0.81 and 1.18 per plant) were recorded from the plots treated with imidacloprid 0.003 per cent followed by flubendiamide0.007 per cent (1.23 and 1.32 lady bird beetle per plant), indoxacarb 0.005 per cent (1.31 and 1.53 lady bird beetle per plant), chlorantraniliprole 0.005 per cent (1.59 and 1.82 lady bird beetle per plant) ,fenpropathrin 0.01 per cent (1.74 and 1.94 lady bird beetle per plant), emamectin benzoate 0.002 per cent (1.77 and 1.96 lady bird beetle per plant) and spinosad 0.005 per cent (1.87 and 2.18 lady bird beetle per plant) respectively.

Table : Effect of different insecticides on the population of sunflower Lady bird beetle (first spray)

Treatments	Mean number of larva				
	1 day before Treatment	Days after treatment			
		1	3	7	14
Fenpropathrin 0.01 per cent	1.89 (1.55)	1.16 (1.28)	1.50 (1.42)	1.74 (1.49)	1.94 (1.56)
Indoxacarb 0.005 per cent	2.11 (1.62)	0.82 (1.14)	1.04 (1.24)	1.31 (1.39)	1.53 (1.42)
Imidacloprid 0.003 per cent	2.13 (1.63)	0.31 (0.90)	0.53 (1.01)	0.81 (1.15)	1.18 (1.29)
Spinosad 0.007 per cent	2.00 (1.58)	1.40 (1.37)	1.60 (1.44)	1.87 (1.53)	2.18 (1.63)
Flubendiamide0.007 per cent	2.44 (1.71)	0.47 (0.98)	0.74 (1.12)	1.23 (1.32)	1.32 (1.35)
Emamectin benzoate 0.002 per cent	1.91 (1.55)	1.33 (1.35)	1.49 (1.41)	1.77 (1.50)	1.96 (1.60)
Chlorantraniliprole 0.005 per cent	2.00 (1.59)	1.07 (1.25)	1.27 (1.32)	1.59 (1.45)	1.82 (1.53)
Untreated Control	2.02 (1.58)	2.19 (1.64)	2.21 (1.64)	2.43 (1.71)	2.47 (1.73)
S.E. $\pm$	0.14	0.05	0.07	0.10	0.08

C.D. at 5%	NS	0.06	0.07	0.11	0.08
C.V. (%)	4.84	2.76	3.34	4.38	3.06

Figures in parentheses are square root transformed values
N.S.- Non significant



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