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Effect of chemicals on natural enemies of insect pests in rice field under agro-climatic condition of Allahabad

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Abstract
An experiment was conducted during *Kharif* season in 2016 at the Central Research Farm, SHUATS, Naini, Allahabad to observe the three applications of seven insecticides viz Imidacloprid 17.8% SL, Trizophos 25% SP, Monocrotophos 36% SL, Thiamethoxam 25% WG, Acephate 75% SP, Carbaryl 50% SP, Malathion 50% EC on natural enemies of insect pests in rice field under agro-climatic condition of Allahabad. Results were revealed that all the treatments were effective significantly to suppress the population of Coccinellids as compared with control (1.36 Coccinellids/hill). The treatment Monocrotophos was recorded lowest population of Coccinellids with (0.54 Coccinellids/hill) and found to be superior among all other treatments. This was followed by Triazophos (0.65Coccinellids /hill), Carbaryl (0.76Coccinellids /hill), Thimethoxam (0.83Coccinellids/hill), Malathion (0.87Coccinellids /hill), Imidacloprid (0.91Coccinellids/hill), Acephate (1.07Coccinellids/hill) respectively.

Keywords: coccinellids, insecticides, insect pests, rice

Introduction
Rice (*Oryza sativa* L.) is the most important staple food crop with more than half of the world’s population relying on rice as the major daily source of calories and protein (Khanjani, 2006) [6]. It is a cereal crop, belongs to the family Gramineae andit has one of the largest germplasm collections in the world. Human selection and adaptation to diverse environments have created a large number of cultivars and it is estimated that about 1,20,000 varieties of rice exist in the world (Khush, 1997) [7].
Asia accounts for about 90% of world's rice area and production. In Punjab, Haryana, U.P., A.P., Telangana, Odhisha, Tamil nadu, West bengal, and Chhattisgarh under rice production of follows 8106, 2405, 1127, 3647, 4130, 2819, 617, 1087, 4289 million tonnes (Anonymous, 2011) [1].
Scientists increasingly prefer the names of ladybird beetles or lady beetles, as they have great economic importance as predators to many pests and environmental or bio-indicator. They may be entomophagous or phytophagous and expose both potential and real effects on the life of their hosts. Ladybird beetles or Lady beetles or Coccinellids are bright in colors. Female is larger than males. The haemolymph is repellent by having a repulsive smell with containing various alkaloid toxins. The bright red on black or black on red color of some adults is aposematic. Both are defensive mechanisms against predators. They are associated with good fortune in many myths and legends.
On many plants throughout the garden and landscape, feeding on soft-bodied insects or flowering plants. Look especially on leaf undersides. Garden crops on which lady beetles are commonly found include potatoes, sweet corn, peas, beans, cole crops, tomatoes, and asparagus. Grow flowering plants that produce the nectar and pollen eaten by adult lady beetles. This is especially important in late spring before the insects they feed on become abundant. Avoid or reduce use of broad-spectrum insecticides. Horticultural oils and insecticidal soaps are less harmful to lady beetles than some residual conventional pesticides (Kumar *et al*. 2013) [8].

Materials and Methods
The experiment was conducted during the *kharif* 2016 at the Central Research Farm, SHUATS,

Naini, Allahabad. In the experiment, the variety under supervision '*Rupali*' was grown for this study. The rice variety *Rupali* was shown on 10 July 2016. Later the seedlings of sufficient age were transplanted to main field. Transplanting was done on 31 July 2016 with spacing row to row 20 cm and plant to plant 10 cm with two plants per hill at depth of 5 cm and all the agronomical practices viz. irrigation, fertilizer application and intercultural operations were followed as recommended for rice crop in this area to raise the crop.

Seven formulations of insecticides viz., Imidacloprid 17.8% SL @ 300g/ha, Thiamethoxam 25% WG @ 100g/ha, Traizophos 25% @ 625g/h, Acephate 75% SP, @ 800 ml/ha, Carbaryl 50% SP @ 1000g/h, Malathion 50% EC @ 1150 ml/h with Monocrotophos 36 % SL @ 1390 ml/ha were evaluated the effect of chemicals on natural enemies of insect pests in rice field. The trial was laid out in randomized block design with three replications.

Observations on the incidence of Coccinellids population was calculated by counting per hill of Coccinellids from each plot, on five randomly selected plants at 1 day before and 3, 7 and 14 days after imposing treatment. Data was recorded in the different treatments were subjected to statistical analysis after suitable transformation by following standard procedures of RBD experiment (Kalita *et al*. 2015) [4].

Results and Discussions

The results showed under the following ways

Population of Coccinellids per hill on 3rd DAS

All insecticides were effective over control in reducing the population of Coccinellids recorded on 3rd day after insecticidal applications. Monocrotophos (0.50) was found significantly superior which is at par with Triazophos (0.60) followed by Carbaryl (0.73), Thiamethoxam (0.80) and Malathion (0.82) are found at par with each other and Imidacloprid (0.86) also found statistically at par with each other. Then the treatment Acephate (1.20) is least effective among all other treatments.

Population of Coccinellids per hill at 7th DAS

On 7th day after insecticidal applications. Monocrotophos (0.40) was found significantly superior followed by Triazophos (0.55) and Carbaryl (0.70). Thiamethoxam (0.77) and Malathion (0.80) were found at par with each other, also Imidacloprid (0.83) and Acephate (0.90) found statistically at par with each other and are least effective among all other treatments.

Population of Coccinellids per hill at 14th DAS

On 14th day after insecticidal applications Monocrotophos (0.73) was found significantly superior followed by Triazophos (0.80), Carbaryl (0.86) and Thiamethoxam (0.93). Malathion (1.00) and Imidacloprid (1.06) were found at par with each other, followed by Acephate(1.13) found statistically at par with each other and are least effective among all other treatments.

The mean populations of Coccinellids of spray were calculated and the result represented in the table reveals that all the treatments were significantly superior over control. Among all the treatments recorded on 3rd, 7th and 14th day after insecticidal applications showed in Table 1: Monocrotophos (0.54) was found significantly superior followed by Triazophos (0.65), Carbaryl (0.76), Thiamethoxam (0.83) and Malathion (0.87) at par with each other and also Imidacloprid (0.91) found statistically at par with each other. Acephate (1.07) was least effective among all other treatments. The spray revealed that Monocrtophos was found to be more effective than other Insecticides. Monocrtophos and Traizophos were at par with each other, Thaimethoxam were also at par with each other and Carbonyl and Imidaclorpride were also at par with each other.

Similar finding were observed by researchers Rath *et al.* 2014; Ashokappa 2015, Girish *et al.* 2015; Karthick *et al*. (2015) and Rath *et al.* 2015) [10, 9, 2, 3, 5].

Table 1: Effect of certain chemical insecticides on Coccinellids in rice field during *kharif* season 2016

Treatment No.	Treatment	Population of Coccinellids/hill				
		One day Before Spray	After spray			
			3rd Day	7th Day	14th Day	Mean
T_0	Control	2.20 (7.26)	1.40 (6.77)	1.20 (6.26)	1.50 (7.01)	1.36 (6.70)
T_1	Imidacloprid 17.8% SL	1.60 (6.11)	0.86 (5.29)	0.83 (5.19)	1.06 (5.87)	0.91 (5.48)
T_2	Triazophos 25% SP	1.00 (3.54)	0.60 (4.35)	0.55 (4.38)	0.80 (5.11)	0.65 (4.60)
T_3	Monocrotophos 36% SL	1.20 (5.34)	0.50 (4.00)	0.40 (3.54)	0.73 (4.86)	0.54 (4.19)
T_4	Thiamethoxam 25% WG	1.40 (5.54)	0.80 (5.11)	0.77 (4.99)	0.93 (5.51)	0.83 (5.27)
T_5	Acephate 75% SP	1.23 (5.13)	1.2 (6.28)	0.90 (5.42)	1.13 (6.07)	1.07 (5.94)
T_6	Carbaryl 50% SP	1.07 (4.91)	0.73 (4.86)	0.70 (4.75)	0.86 (5.29)	0.76 (5.00)
T_7	Malathion 50% EC	1.50 (5.92)	0.82 (5.17)	0.80 (5.09)	1.00 (5.71)	0.87 (5.35)
	F test	NS	S	S	S	S
CD (5%)		1.04	0.42	0.24	0.17	0.34
S.Ed.		0.34	0.058	0.019	0.010	0.040
CV %		10.55	4.59	2.76	1.77	3.74

Figures in parenthesis are arc sin transformed values.

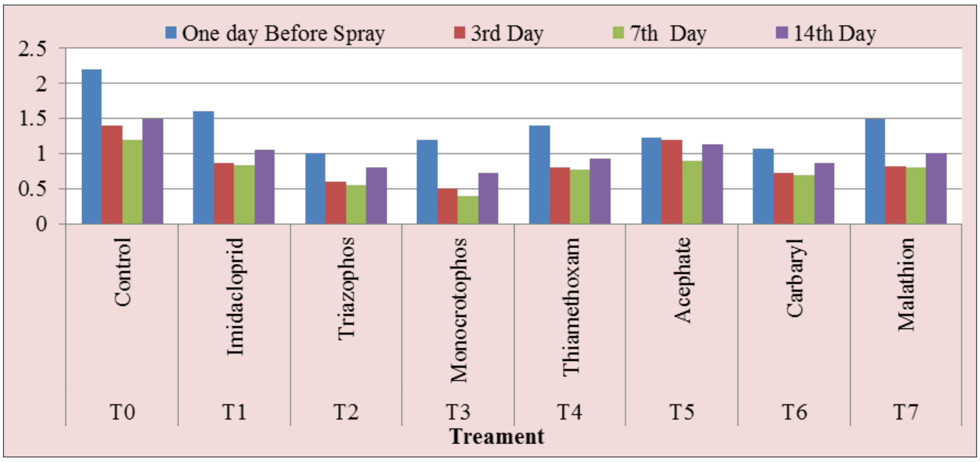

Fig 1: Effect of certain chemical insecticides on Coccinellids in rice field during *kharif* season 2016

Conclusion

It is concluded that all chemicals caused mortality of Coccinellids. Monocrotophos were the most toxic insecticides in our experiment and it caused highest mortality to Coccinellids. In our experiment Acephate was safest insecticide as caused lowest mortality of the Coccinellids and this can be included in the integrated pest management (IPM) for the best control of insect pests.

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References

1. Anonymous. Statistics of Agriculture, Agricultural and Horticultural Crops, Ministry of Agriculture, Department of Economic Planning. Bureau of Statistics and Information Technology, Delhi. 2011; 1.
2. Ashokappa. Management of Rice Earhead Bug, *Leptocorisa oratorius* Fabricius (Hemiptera; Alydidae). Journal of Experimental Zoology India. 2015; 18(1):177-179.
3. Girish VP, Balikai, RA. Efficacy of Botanicals, Biopesticides and Insecticide Molecules against Ear Head Bug, *Leptocorisa acuta* (Thunb.) in Paddy and their effect on Yield. Journal of Experimental Zoology India. 2015; 18(2):943-946.
4. Kalita H, Avasthe RK, Ramesh K. Effect of Weather Parameters on Population Buildup of Different Insect Pests of Rice and Their Natural Enemies. Indian Journal of Hill farming. 2015; 28(1):69-72.
5. Karthick KS, Kandibane M, Kumar K. Effect of newer insecticides to natural enemies in the coastal rice ecosystem of Karaikal district, Union Territory of Puducherry. Asian Journal of Bio Science. 2015; 10(1):39-42.
6. Khanjani M. Crop pests of Iran. Buali Sina University Press, 2006.
7. Khush S. Life table and population dynamics of a major pest, *Leptocorisa acuta* (Thunb.) (Hemiptera: Alydidae), on rice and non-rice system. International Journal of pure & Applied Bioscience. 1997; 4(1):199-207.
8. Kumar L, Yogi MK, Jaba J. Habitat manipulation for biological control of insect pest. Research Journal of Agriculture and Forestry Science. 2013; 1(10):27-31.
9. Rath PC, Chakraborty K, Nandi P, Moitra, MN. Field efficacy of some new insecticides against rice stem borer and Gundhi bug in irrigated rice ecology. International Journal of Plant, Animal and Environmental Sciences. 2015; 5(2):94-97.
10. Rath PC, Lenka S, Mohapatra SD, Jena M. Field evaluation of selected insecticides against insect pests of wet season transplanted rice. Indian Journal of Plant Protection. 2014; 51(4):324-326.