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Research Paper

Effect of Triton X-100 on the persistence toxicity of Melathion

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Abstract: Sorghum is considered the most prevalent and widely grown cereal in India. The attribute of being drought tolerant and adjustable to tropical climates makes it more significant and versatile than other cereals. Moreover, sorghum fulfills the demand of food supply by means of providing nutritional substances particularly plant based protein, vitamins, carbohydrates and fibre etc. However, the growth and development of sorghum is not accessible in the climatic conditions of India since numerous insect pests are found to destroy the crop in field as well as in storage conditions. *Oxya velox* is one of the severe insect pests of sorghum during farming conditions. It's inappropriate feeding habits on leaf blades and shoots gradually damage the plant. Furthermore, during the peak season, the delicate stems of sorghum are also vulnerable to *Oxya velox*. This infestation can adversely harm the stems and leaves so that plants are not able to recover. In the last few decades, attempts have been made to protect the sorghum from the infestation of *Oxya velox* in a diverse manner. In this order, the promising method of management has been tested. This research paper stated the results of investigations which were carried out to determine the efficacy of the emulsion of Malathion and Triton X - 100 against grasshopper, *Oxya velox*.

Keywords: Sorghum, infestation, pesticides

Introduction:

Indian agriculture encompasses the cultivation of different crops including rice, wheat, maize, sorghum, oats, barley and a broad variety of vegetables. These crops occupy consequential positions from both an economic as well as nutritional perspective. Sorghum is specified as a widely grown cereal after wheat and rice. It points out the characteristic of being a staple food source for mankind; moreover it can also be utilized as fodder and a cheap source of fuel. India is one of the major producers of sorghum in the world after America and Nigeria. It is cultivated in both the kinds of Rabi and Kharif crops in India (Mishra et al., 2012). However, the environment consolidates the

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distribution of more than 150 species of insect pests which abundantly damage the sorghum crop in the period from sowing to harvesting. The major insect pests of sorghum during the farm conditions involve white grub (*Holotrichia consanguinea*), stem borer (*Chilo partellus*), midge (*Stenodiplosis sorghicola*), grasshopper (*Oxya velox*), caterpillar (*Helicoverpa armigera*), earhead bug (*Calocoris angustatus*), Shoot fly (*Atherigona soccata*) (Guo et al., 2011; Okosun et al., 2021). The grasshopper, *Oxya velox has* been reported to be the severe insect pest of sorghum as causing oblique cavities on leaves (Humayoon et al., 2012). In comparison to other pests, oxya species are more infectious as they start infestation during the nymphal stage of their life cycle (Sultana et al., 2012). Insecticides are primary tools that are constituted under the top listed pest management categories to prevent the infestations on crops from which Malathion is one of the reliable pesticides to inhibit the infesting activities of hazardous insect pests. Blasiak et al., 1999 reported that malathion could be used for pest management in both dust as well as in the form of liquid. Over the past few decades, the continuation of pesticidal control leads to a slight reduction in their toxicity against pests which demonstrates a serious concern in the criteria of pest management. The inclusion of emulsifiers was found to be effective in magnifying insecticidal toxicity (Feng et al., 2018). Formulations of pesticides as emulsifiers play a key role in plant protection. An emulsifier is employed in an emulsion to increase the concentration and stability of the emulsion. An emulsifier also increases the persistence toxicity of an insecticide. In the present study, an experiment has been conducted to evaluate the effect of emulsifier Triton X - 100 on the persistence toxicity of insecticide Malathion against a polyphagous insect pest *Oxya velox* (Fabr).

Materials and Methods:

Experimental site: The experiment was conducted at C.S. Azad University of Agriculture and Technology, Kanpur during 2021 - 2022.

Test insect: *Oxya velox* (Fabr), a polyphagous pest found abundantly from July to September was used as a test insect during the experiments.

Pesticides: Emulsifier Triton X - 100 and Malathion were used with three replications. Stock and spray solutions were made and the solution was sprayed on the plot.

The spraying was carried out on each sorghum leaf uniformly. The leaves were plucked and replicated 3 times. 5 adult grasshoppers were released on each replication and their mortality was recorded after keeping the insects on the treated leaves for 24, 48, 72, 96, 120, 144 and 168 hours. Mortality percentage was calculated and the persistence toxicity of this combination was evaluated by the method described by Pradhan, 1967.

Results and Discussion:

Data in table 1 indicated the mortality percentage of the first replication which was recorded 60, 60, 40, 20, 20 and 10 % after 1, 24, 48, 72, 96 and 120 hrs respectively. However, there was no mortality recorded after 144 and 168 hrs. The persistence toxicity (PT) was found to be 4200

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Table 1. Persistence toxicity of Malathion with Emulsifier Triton X - 100

Rep	1 hr	24 hrs	48 hrs	72 hrs	96 hrs	120 hrs	144 hrs	188 hrs	P.	T.
R1	60	60	40	20	20	10	-	-	120	35
R2	60	40	20	20	-	-	-	-	72	35
R3	40	40	20	20	2	-	-	-	96	28

PT.	Log PT.	Av Log PT.	Anti ev Log.	ORE
4200	3.6234	3.48458	3052.7385	2
2520	3.401/40			
2688	3.42942			

In the second replication, mortality was recorded to be 60,40,20 and 20 percent after 1, 24, 48 and 72 hrs respectively. Mortality was found nil after 72 hrs and persistent toxicity (PT) was found to be 2520 in second replications.

Persistence Toxicity (PT) was observed to be 2688 in the third replication and mortality was recorded 50,40,20,20 and 20 percent after 1, 24, 48, 72 and 96 hrs respectively. So it is concluded that the persistence of 5 % Malathion with emulsifiers was effective up to 120 hrs for polyphagous insects. The addition of a suitable emulsifier enhanced the prolongation of the toxicity of insecticide. It was also stated that toxicity is amplified by the combination of two or more pesticides (Pankey et al., 2004; Cloyd et al., 2007). Triton X-100 approximately gave about 5 times more PT value than the Malathion without any addition of the emulsifier. The Malathion in combination with Triton X-100 treated against (*sitophilus oryzae*) gave the highest percent of mortality in comparison to other emulsifiers. Similar results had also been obtained by Shojaei et al., 2018 during the observation of the efficacy of amitraz on imidacloprid and malathion against cotton aphid, *Aphis gossypii*.

Conclusion:

Sorghum is an ancient crop cultivated distinctly under irrigated conditions. The loss of yields has been primarily attributed to insect infestations. Therefore the insecticides were found to be efficient in preventing crops. Along with utilization, insecticides need to be updated under appropriate management systems. In this order, the addition of suitable emulsifiers escalates the persistent toxicity of insecticide. The present study deals with the use of Triton x - 100 to enhance the prolongation of the toxicity of Malathion against grasshopper, *Oxya velox* (Fabr), a significant insect pest of sorghum.

References:

Mishra J. S., Ravindrachary G. and Patil J. V. (2012) An overview of agronomic research in sorghum (*Sorghum bicolor*) in India. Indian Journal of Agronomy, 57 (3s), 38-44.

Guo C., Cui W., Feng X., Zhao J. and Lu G. (2011) Sorghum insect problems and management. Journal of integrative plant biology. 53 (3), 178-192.

Okosun O. O., Allen K. C., Glover J. P. and Reddy G. V. (2021) Biology, ecology, and management of key sorghum insect pests. Journal of Integrated Pest Management. 12 (1), 4.

Humayoon M., Usmani M. K., Nayeem M. R. and Kumar H. (2012) Species Diversity and abundance of Grasshopperfauna (Orthoptera) in the rice ecosystem. Annals of Biological Research. 3(5), 2190-2193.

Sultana R., Bughio A., Panhwar W.A. and Khan H. (2012) Studies on the immature stages of *Oxya velox* (Fabricius) a rice grasshopper from district Jamshoro, Sindh, Pakistan. FUUAST Journal of Biology. 2(1), 57-62.

Blasiak J., Jaloszynski P., Trzeciak A., and Szyfter K. (1999) *In vitro* studies on the genotoxicity of the organophosphorus insecticide malathion and its two analogues. Mutation Research. 445(2), 275-283.

Feng J., Zhang Q., Liu Q., Zhu Z., McClements D. J. and Jafari S. M. (2018) Application of nanoemulsions in formulation of pesticides. Nanoemulsions, pp. 379-413.

Pradhan, S. (1967) Studies on the toxicity of insecticidal films. Bull. Ent. Res. 40 (1), 1-26.

Pankey J. H., Griffin J. L., Leonard B. R., Miller D. K., Downer R. G. and Costello R. W. (2004) Glyphosate–insecticide combination effects on weed and insect control in cotton. Weed Technology. 18 (3), 698-703.

Cloyd R. A., Galle C. L. and Keith S. R. (2007) Greenhouse Pesticide Mixtures for Control of Silverleaf Whitefly (Hom: Aleyrodidae) and Two Spotted Spider Mite (Acari: Tetranychidae). Journal of Entomological Science. 42, 375–382.

Shojaei A., Talebi K., Hosseininaveh V. and Sabahi G. 2018. Synergistic effects of amitraz on imidacloprid and malathion against cotton aphid, *Aphis gossypii* (Hem: Aphididae). Journal of Agricultural Science and Technology. 20(2), 299-308.