Comparative Study of Insecticidal Activities by Formulated Fish Emulsified Bio-Fertilizer on The Growth and Productivity of *Solanum Lycopersicum L.* (Tomato)

Yusra Faiz[1], Nasreen Khan[2]
Department of Zoology, Jinnah University for Women Karachi, Pakistan.
*E-mail: yusra.faiz123@gmail.com

ABSTRACT

The purpose of this research is to achieve nutrient rich fertilizer from fish emulsion for dealing insect pest infestation and faster growth of *Solanum lycopersicum* L. (tomato) and *Solanum melongena* L. (Bringal) by decomposing waste fishes and it comparison with normal organic fertilizer and chemical fertilizer. According to the observations and result it is concluded that fish emulsion has higher efficacy against insect pest because of anti-pest control activity of fish residues. This research was conducted in Jinnah University for Women from the months of June to December 2019. Preparation of fish emulsion fertilizer was done in laboratory of Zoology Department. There were some major and minor variations in the growth rate, leaves, flowers, and fruit emergence duration. Higher rate of insect infestation were observed in chemical fertilizers replicates and controlled plant. Moderate rate of insect infestation was appeared in organic fertilizer replicates. Minimal mealy bug's infestation was recorded on fish emulsion replicates. The fish replicates shows a large number of fruits. This research was done with the fertilizers in small scale and it shows that the pots with fish emulsion have resistivity to toxic substances like pesticides and salinity etc. Because of the essential elements the plant shows higher growth of plant and leaves.

Keywords: *Solanum Lycopersicum L.,* fish emulsion, faster growth rate, chemical fertilizer.

INTRODUCTION

Acetamiprid and imidacloprid applied at massive level for management of sucking pests including solenopsis mealybug *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae). Acetamiprid toxicity is higher than imidacloprid and that both insecticides have negative effects on the oviposition, fecundity, and feeding behavior of *P. solenopsis* when applied at sub lethal dosages. But these both insecticides are now consider as harmful and highly toxic towards surrounding environment and on human health (Waqas et al. 2019, 1314-1321). Moreover, common application of byproducts of fishes also used as nutrient supplier near fishing industry. The waste generated from the fish is known to be enriched in nutrients and control the activities performed by the plant cells (Balraj et al. 2014,58-66). Chemical fertilizers are less beneficial as compared with Bio fertilizers which provide a wide range of economically and ecologically significant for both the soil and farmers. It is assumed that the use of chemical fertilizers can be decreased by the use of Bio fertilizers encourage plant to produces nitrogen, phosphorous for plant growth (El-Habbasha et al. 2007,966-971). Biological characteristics and chemical control of mealy bug *P.solenopsis*. *P,solenopsis* infestation effectively controlled by imidaxloprid which is approximately 35% by using increased dose of imidacloprid with addition of laundry detergent (Huang et.al. 2012, 179-185).

In the recent research, synthesis of fish emulsified bio-fertilizer were done and efficient application of formulated fertilizer in management of tomato mealy bugs as well as produce healthy tomato yeild than chemical fertilizer.

Objectives

The main aim of this research is to prepare a fertilizer that is organic in nature as well as eco-friendly and have a alternative green solution against pest infestation. This emulsified bio fertilizer maintains the fertility of soil without disturbing their biological and chemical processes.

METHODOLOGY

This research was based on the formation of organic fertilizer by the utilization of waste fishes. These fishes were both oven and left for decomposition but they were not completely dried. So to overcome with this problem some amount of organic fertilizer were added to the partially decomposed fishes. When these fishes were completely they were mixed with cow dunk. There

were total 3 sets of pots consisting 3 replicates. This process was conducted under the premises of Jinnah University for Women during the months of June to December. Seeds sown equally in all pots and their replicates but they have major variations in different categories.

RESULT AND CONCLUSION

The Bio fertilizer was made by decomposing fishes naturally and hence compared with other fertilizers to observe the growth rate, efficiency and productivity of plants. It is observed that Bio emulsified fish fertilizer shows higher resistivity to mealy bugs and other insect infestation because of the beneficial microorganisms in the fish emulsified biofertilizer which continuously breaks down the complex molecules into simpler one and aids in the growth of the plants. Whereas, the chemical fertilizer replicates and controlled pot shows higher susceptibility to insect infestation due to the eggs and larvae of pest in it. It is concluded that the mixture of fish compost with organic fertilizer is the best source for cultivating tomatoes.

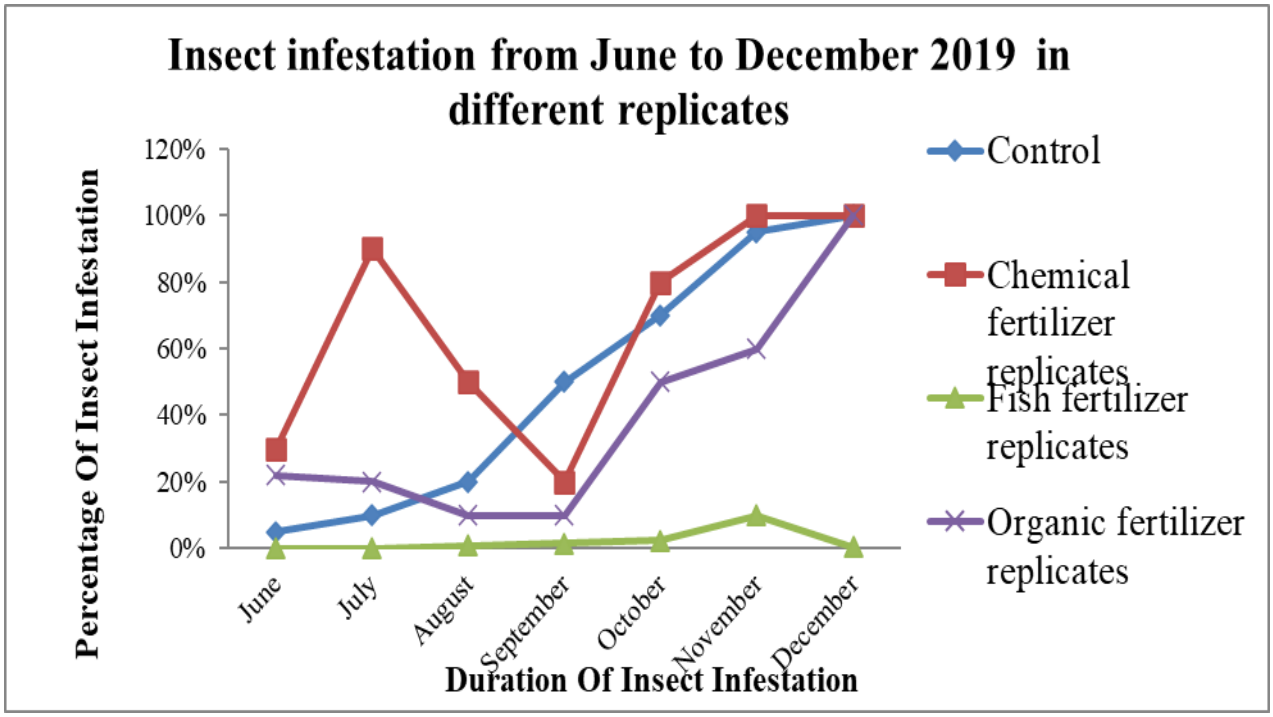

Figure 1. Insect infestation in fish emulsified bio fertilizer in comparison with control, chemical.

CONCLUSION

By the reason and results of the respective research it was concluded that fish emulsified biofertilizer has a great source of potassium, nitrogen and phosphorus in it which helps in the growth and increases its biological and chemical processes. The recent research showed that formulated fish emulsified fertilizer effectively manage tomato mealy bugs infestation without harming surrounding environment and have an eco friendly nature due its organic origin the chemical fertilizer replicates showed higher mealy bugs infestation rate.

ACKNOWLEDGEMENT

Authors were highly appreciated the work and support of all the staff members of Department of Zoology of Jinnah University for Women. The love, support and facilities provided by the staff throughout the research work makes us able to do our work smoothly.

REFERENCES

1. Waqas, M. S., Qian, L., Shoaib, A. A. Z., Cheng, X., Zhang, Q., Elabasy, A. S. S., & Shi, Z. Lethal and Sub lethal Effects of Neonicotinoid Insecticides on the Adults of Phenacoccus solenopsis (Hemiptera: Pseudococcidae) on Tomato Plants. Journal of economic entomology, . (2019), 112(3), 1314-1321.
2. Balraj, T.H., Palani, S. and Arumugam, G. Influence of Gunapaselam, a liquid fermented fish waste on the growth characteristics of Solanum melongena. Journal of Chemical and Pharmaceutical Research: (2014.), 6(12): 58-66.
3. El-Habbasha SF, Hozayn M, Khalafallah MA.. Integration effect between phosphorus levels and biofertilizers on quality and quantity yield of faba bean (Vicia faba L.) in newly cultivated sandy soils. Research Journal of Agriculture and Biological Science. (2007), 3(6) 966-971.
4. Huang, J., Zhang, J., Yu, Y. M., Lu, Y. B., & Luan, J. B. Biological characteristics and chemical control of the invasive mealybug, Phenacoccus solenopsis (Hemiptera: Pseudococcidae) on tomato in the laboratory. Journal of the Kansas Entomological Society, (2012), 85(3), 179-185