Biosc.Biotech.Res.Comm. Special Issue Vol 13 No 12 (2020) Pp-89-91

BBRC
Bioscience Biotechnology Research Communications

An Overview of Bio-Rational Approaches for Brinjal Insect Pest Management

Ajit Kumar Sahu*, Deepayan Padhy, V. Ramalaxmi and Lipsa Dash
Centurion University of Technology and Management, Paralakhemundi, Odisha, India

ABSTRACT

Bio-rational insecticides have been introduced to control insect pests since chemical insecticides are highly toxic to living organisms and to the environment. Bio-rational insecticides have low toxic effect or no toxic effect to plant,as it is the prerequisite to control insect pest by different bio-rational approaches rather than conventional insecticide and to give emphasize on bio-rational approaches. Again, the chemical ones are adversely affected the natural enemies as wellas human beings. The resistance developed against the conventional chemicals surge for the approach towards the bio-rational insecticides. A diversity of new botanical insecticides with special activity on insect pests is in the process of development as well as their importance are very much high to control effectivelyinsect pests of Brinjal.

KEY WORDS: BIO-RATIONAL, ENVIRONMENT, RESISTANCE DEVELOPED.

INTRODUCTION

Egg plant or Brinjal (*Solanum melongena*) has a considerable economic importance in our country in regard to agriculture. Particularly,Brinjal plant is affected by various insect species like shoot and fruit borer, leaf eating insects like Epilachna beetle and sucking insects like thrips, whiteflies, aphids etc very easily.It is estimated that every year around 70-92 percent yield loss is happening due to the major pestsof Brinjal(Reddy and Srinivasa, 2004; Chakraborti and Kanti, 2011; Jagginavar et al., 2009). Most of the farmers depend on synthetic chemical insecticides for the management of these pests. Butusage of chemical pesticidesis undesirable due to high cost, high toxicity, possibility to develop resistance among pest species, resurgence of certain pest populations and adverse effect on beneficial organisms such as pollinators and natural enemies etc. So,it is necessary to adopt such bio-rational approaches for brinjal insect pests, which match into IPM strategy and will be much safe, economical as well as selective. The primary objective is to evaluate the efficiency of microbial preparations, bio-rational and neem-based insecticides against major pests of brinjal.

RESULTS AND DISCUSSION

Bio-rational pesticide may be referred as"any type of insecticide that act against target insect pests but less deleterious to non target organism like pollinators and natural enemies. They have systemic action and less residual toxicity also. The different types of Bio-rational Pesticides Botanicals, Microbial, Insect Growth Regulators (IGR), Bacterial Fermentation Products.

Brinjal shoot and fruit borer Leucinodes orbonalis (Pyralidae; Lepidoptera): It is one of the devasting pest on eggplant. Varma et al., (2009) observed that the fruit damage and weight loss of fruit varied from 3.76 to 45.45 % and 3.00 to 67.71 % in Ist year and 5.71 to 44.26 per cent and 3.00 to 51.33 per cent in IInd year due to Brinjal shoot and fruit borer.

ARTICLE INFORMATION

*Corresponding author email: sahuajitkumar838@gmail.com
Received 11th Oct 2020 Accepted after revision 30th Dec 2020
Print ISSN: 0974-6455 Online ISSN: 2321-4007 CODEN: BBRCBA

Thomson Reuters ISI Web of Science Clarivate Analytics USA and Crossref Indexed Journal

Clarivate Analytics
crossref

NAAS Journal Score 2020 (4.31) SJIF: 2020 (7.728)

Online Contents Available at: http//www.bbrc.in/

Management by parasitoids: The releasing of egg parasitoid, *Trichogramma chilonis*@1g parasitized eggs/ha/week and larval parasitoid, Bracon habetor @ 800-1000 adults/ha/week could be followed (Alam,et.al, 2006).The bio-rational pesticides reduce its population on brinjal. The lowest shoot and fruit infestation were obtained from the parasitoid applied plot (23.75 & 20.45%), whereas the highest in chemical applied plot (36.72 and 29.65%). The infestation status of bio-rational pesticide and non treated plots reflects in the yield. Comparative higher yield was obtained from treated plots (20.24 t/ha) than non treated (14.76t/ha)which was 37.12% higher compared to non treated.

Management by Microbial: Mostly,B. thuringiensis(Bt) is utilized as a bio-pesticide. The proteins Cry and Cyt generated by the bacteria are highly toxic to insect pest but not to mammals or for the environment. To combat the infestation of Brinjal shoot and fruit borer, scientist gave efforts to develop the natural resistance or tolerance against the pest. They insert Cry1 Ac gene from soil bacterium, *Bacillus thuringiensis* into brinjal. Hence,two local brinjal cultivars namely,ISD006 and Uttara were transformed under ABSP-II program (BARI, 2014).

Leaf eating insect pest of brinjal: Epilachna beetles *E. vigintioctopunctata* (Coccinellidae, Coleoptera): *Epilachna* beetles are polyphagous pest and mostly distributed around Asia and Australia.

Management: Saxena and Sharma (2005) studies on insecticidal activity of Neem leaves extract againstfirst instars of *E. vigintioctopunctata*. However,Satpathi and Ghatak (1990) have observed 90 percent mortality of the beetle with same concentration of *T. nerifolia* root extract.It was recorded 1.0 percent concentration of *N. indicum* seed and *E. globulus* flower extractsgive most significant mortality. However, the extracts of lower concentrations did not see any significant effect on larval survivalist exhibiting mortality.

Sucking insect pests of brinjal: Leaf hopper Amrasca devastans Distant (Cicadellidae; Hemiptera): Both nymphs and adults damage the plants by sucking the sap by their piercing and sucking mouthparts from the lower leaf surfaces. The symptom of damages iscrinkling, bronzing, and drying, or "hopper burn"(Srinivasan,2009).

Management: The nymphs and adults are predated by ladybird beetles and green lacewings generally. Parasitoids such as *Anagrus flaveolus* and *Stethynium triclavatum* are efficacious against leafhopper. Neem-based bio pesticideslike Neem seed kernel extract (NSKE) @ 5%can be sprayed.

Aphid Aphis gossypii (Aphididae; Hemiptera): It is a polyphagous pest attacking feeding on cotton, cucurbits, brinjal, and okra.

Management: The predators like ladybird beetles (Coccinella sp.) and green lacewings are mostly effective against aphids. Augmentive release of ladybird beetles @ 200 pairs per ha at 15days interval canreduce the aphid population.

Red spider mite Tetranychus urticae (Tetranychidae; Acarina): It is considered as a polyphagous pest attackingsolanaceous as well as field crops. They use their long, needle- like mouthparts and extract the cell sap from the leaves.

Management; Under protected and humid condition predatory mites are effective to control spider mites. The third instars grubGreen lacewings (*Chrysoperla carnea*) can effectively consume25–30 spider mite adults per day; however, it needs supplemental food for long-term survival (Hazarika et al., 2001).

CONCLUSION

Vegetable production is one of the more dynamic sectors of agriculture in view of the economic value of the production.And, Brinjal crop is attacked with various types of insect pest throughout the year. The adverse effect of chemicals such as insect resurgence and secondary out breaks make bio-rational approaches more prominent. The use of botanicals, microbial as well as natural enemies can be the novel approaches to manage the pest intensively. From different review findings, it is observed that combine approach of different bio rational management are more successful against brinjal shoot and fruit borer infestation. For management of leaf eating insects like *Epilachna* as well as sucking pests like aphids, leaf hopper, whitefly the microbial agents and botanical extracts can give most suitable result without causing any adverse secondary effects. So, it can be recommended based on this study that a combine bio rational approach is effective against the pest complex of brinjal crop.

REFERENCES

Alam, S. N., Dutta, N. K., Ziaur Rahman, A. K. M., & Sarker, M. A. (2006). Annual Report 2005-2006. Division of Entomology, BARI, Joydebpur, Gazipur.

BARI, (2014).Bangladesh Agricultural Research Institute :varietal development and cultivation technology of Bt Brinjal. A booklet published by BARI.

Chakraborti, S., & Sarkar, P. (2011). Management of Leucinodes orbonalis Guenee on eggplants during the rainy season in India. Journal of Plant Protection Research, 51(4).

Hazarika L. K., Puzari, K. C., and Wahab,S. (2001). Biological control of tea pests. In: UpadhyayR. K., MukerjiK. G., Chamola B. P.(eds.), Biocontrol potential and its exploitation in sustainable agriculture: Insect pests. Springer: USA. 159–180pp.

Jagginavar, S. B., Sunitha, N. D., & Biradar, A. P. (2009). Bioefficacy of fluben diamide 480 SC against brinjal fruit and shoot borer, Leucinodes orbonalis Guen. Karnataka Journal of Agricultural Sciences, 22(3), 712-

713pp.

Satpathi, C. R., and Ghatak, S. S.(1990). Evaluation on the efficiency of some indigenous plant extracts against *Henosepilachna vigintioctopunctata* (Coleoptera: Coccinellidae), a pest of brinjal. Environment & Ecology, 8(4): 1293-1295pp.

Saxena, R., & Sharma, A. K. (2005). Insecticidal potentialities of *Ageratum conyzoides* and *Nerium indicum* leaves extracts against *Epilachna* 28-*punctata* (F.). Vegetos, 18(1&2), 43-45pp.

Srinivasan, R. (2009). Insect and mite pests on eggplant. AVRDC-World Vegetable Centre,9(729).

Srinivasan, R.(2009). Insect and mite pests on eggplant: a field guide for indentification and management. AVRDC – The World Vegetable Center, Shanhua, Taiwan. AVRDC Publication No. 09-729. 64 pp.