International Journal on Recent Advancement in Biotechnology & Nanotechnology
Vol. 3, Issue 2 – 2020
ISSN: 2582-1571

Efficacy of Various Strengh of Tebufenozide under Residue Film Method on Biomass Cumulation in Larva of Pericallia Ricini Fab (Lepidoptera)

Nidhi Srivastava[1], Yogesh Kumar Mishra[2]
[1]*Department of Chemistry, PPN PG College, Kanpur.*
[2]*Department of Zoology, Shiv Darshan Lal Degree College, Fatehpur.*

Abstract

The treatment of adults with residue film of any strength of the tebufenozide reduced the biomass accumulation on the 5th day in larva as compared to the untreated adults (P<0.05). In response to adult's treatment with the residue film of different concentrations of the tebufenozide, the larval biomass on the 5th day varied from 1.86 to 3.04 mg, tending to decrease with the increasing concentrations of the insect growth regulators but the statistical analysis revealed that the larval biomass at 0.0001 percent concentration (3.04mg) was more than that at any of concentrations from 0.001 to 0.01 (2.65 to 2.85) (P<0.05) and that the larval biomass at any of the latter concentrations was more than that at any of 0.50 and 1.00 per cent concentrations (1.86 to 1.98 mg) (P<0.05).

Keywords: Residue Film Method, Larva, Tebufenozide, Biomass.

Introduction

The suppression of the pest population by the use of insect growth regulators has already been achieved by many workers. Several insect growth regulators have been found effective in suppressing the population of *Euproctis icilia, Euproctis fraternal, Musca domestica, Pieris brassieae, Spodoptera litura, Pectinophora gossypiella, Earias insulana, Leptinotarsa decemilinata, Achoea janta, Oxya japonica, Tenebrio monitor, Utetheisa pulchella* and many other insects. *Diflubenzuron was a insectiside* which belong to benzoylurea class. Later, different groups of insect growth regulars having chitin biosynthesis inhibiting property, were identified. The different groups of insect growth regulators, though differ in their chemical structure and mode of action, have common characteristics i.e., they exhibit lethal action in juvenile stage and sterility in sexually mature adults, thus the pest population declines very rapidly. Besides, they also inhibit the food consumption and growth of individuals, which survive sublethal treatments. This becomes an additional benefit in the field of pest management as surviving pest will consume less crop, causing least damage to agro-ecosystem.

Material & Method

The reduction in food consumption, weight loss during the exposure period and reduction in growth rate occur when third and fifth instar larvae of Pericallia ricini (Fabr.) were fed on castor (Ricmaux communis) leaves dipped in different concentrations of diaminofuryl S-traizine. The maximum reduction in total food consumption noted was 63.40% at a 0.01% level, in third instar larval feeding treatment. During the exposure period, larvae lost their weight (maximum by 36.46% in third instar larvae). Maximum reduction in larval growth was also recorded in third instar larvae, which was 63.08% at 0.01% level. With the increase of concentration, the reduction in food consumption and growth rate was increased considerably. The chemical was more active on third instar than on the fifth instar larvae. In Residue Film method of treatment for 1 to 2 hr, old adults were exposed to a thin file of residue of a concentration of particular insect growth regulator. For obtaining the thin film of the chemical as residue, about 10ml of a concentration of a chemical was poured in a petri dish (10 cm dia) and the petri dish was tilted in different ways to spread the chemical on the whole floor area of the petridish and its raised periphery. Thereafter, the petri dish was kept in the air for the evaporation of the solvent. This led to the formation of a thin film of a concentration of insect growth regulator in the petri dish as residue. Adults were left in petri dishes having thin film of the insect growth regulator for 24 hours. The petri dishes were covered by thin muslin cloth prevent to the escape of the adults. Such treated adults were employed in the different experiments as described later on. This method of treatment will be designed as RFM in the text from here onwards. In Pupal dip method pupae were dipped in a particular concentration for 2 minutes. After dipping for the fixed duration the pupae were taken out from that concentration of the insect growth regulator. The solvent and the insecticides adhering to the surface of the pupae were soaked in the blotting paper and such treated pupae were maintained for further studies. This method form henceforth will be referred as PDM in the text.

Result & Discussion

The treatment of adults with residue film of any strength of the tebufenozide reduced the biomass accumulation on the 5^{th} day in larva as compared to the untreated adults ($P<0.05$). In response to adults treatment with the residue film of different concentrations of the Tebufenozide, the larval biomass on the 5^{th} day varied from 1.86 to 3.04 mg, tending to decrease with the increasing concentrations of the insect growth regulators but the statistical analysis revealed that the larval biomass at 0.0001 percent concentration (3.04mg) was more than that at any of concentrations from 0.001 to 0.01% (2.65 to 2.85mg) ($P<0.05$) and that the larval biomass at any of the latter concentrations was more than that at any of 0.50 and 1.00 per cent concentrations (1.86 to 1.98 mg) ($P<0.05$). The larva obtained from adults, not treated with the residue film of any concentration of the tebufenozide, was considerably heavier (22.66mg) on the 10^{th} day than that obtained from adults treated with residue film of any of the concentration of the insect growth regulator ($P<0.05$). The larval biomass on this day varied from 5.84 to 14.74 mg in response to adults treatment with the residue film of different concentrations of the tebufenozide, declining with the increasing concentration and the statistical analysis showed that the larval biomass on

this day depended on the strength of the tebufenozide (P<0.05). (Table 1). The similar result was also noticed by Aydin H and Gurkan M.O. (2006), ABD El–MAGEED A.E.M. *et. al.* (2008), Corbel V. Stankiewicz *et. al.* (2006), EL-ASWAD A.E. (2007) Efficiency of certain insecticides and insect growth regulators alone or in mixture with chlorypyrifos for the integrated control of the Egyptian cotton leafworm, Li SQ *et. al.* (2005), ML and Roxas AC (2008), Swelm E.S. and Sayed M.A. (2006), Joint action of methomyl, carbaryl, esfenvalerate and profenofos and its latent effect on the cotton leafworm, *Spodoptera littoralis.*

Table 1.Efficacy of various strength of tebufenozide under RFM modes of treatment on biomass scumulation in larvae of *Pericallia ricini* Fab. (Values are mean I.S.E.)

Mode of treatment	**Concentration (%)**	**Larval biomass (mg)+ S.E. on**			
		5th day		**10th day**	
Residue Film Method (RFM)		Value	S.E.	Value	S.E.
	.0001	3.04	0.15	14.74	0.25
	.001	2.85	0.10	11.82	0.34
	.01	2.65	0.13	11.00	0.24
	.10	2.60	0.16	10.50	0.15
	.50	1.98	0.14	8.02	0.21
	1.00	1.86	0.05	5.84	0.30

Fig. In Parentheses and Transformed value.

References

1. Aydin H; Gurkan M.O. (2006); The efficacy of spinosad on different strains of *Spodoptera littoralis* (Boisduval) (Lepidoptera; Noctuidae). *Turkish Journal of Biology*, 30; 5-9.
2. ABD El–MAGEED A.E.M. ANWAR E.M. ELGOHARY L.R.A. (2008); Biochemical side effects for some commercial biocides on cotton leafworm. *Archives of Phytopathology and Plant Protection* 41; 227-232.
3. Corbel V. Stankiewicz M. Bonnet J., Grolleau F., Hougard J.M. Lapiped B (2006); Synergism between insecticides permiethirn and propoxur occurs through activation of presynaptic muscarinic negative feedback of acetylcholine release in the insect central nervous system. *Neuro Toxicology* 27; 508-519.
4. EL-ASWAD A.E. (2007): Efficiency of certain insecticides and insect growth regulators alone or in mixture with chlorypyrifos for the integrated control of the Egyptian cotton leafworm. *Journal of Pest Control and Environmental Sciences*, 15(2); 29-48.
5. Li SQ, Fang YL, Zhang ZN (2005) studies and applications of botanical insect antifeedants, *entomal Know*l 42; 491-496.
6. Parugrug ML, Roxas AC (2008) Insecticidal action of five plants against maize weevil, *Sitophilus zeamais* Mostsch. (Coleoptera; Curculionidae) *J Sci Technol* 8; 24-38.
7. Swelm E.S. Sayed M.A. (2006): Joint action of methomyl, carbaryl, esfenvalerate and profenofos and its latent effect on the cotton leafworm, *Spodoptera littoralis. Journal of Pest Control and Environmental Science* 14: 317-331.

