

Toxicity of Neem Based Pesticide Against Diamond Back Moth, *Plutella xylostella* Linn.

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SUMMARY

Investigation were carried out to study the toxicity of neem based pesticide, 'Bioneem' against 3rd instar larvae of diamond back moth, *Plutella xylostella* by bio-assay (film technique) method and the mortality was recorded for different concentrations (0.50 to 4.00%) and result indicated that maximum mortality was observed at higher dose (4.00%) while minimum at lower dose (0.50%).

The diamond back moth, *Plutella xylostella* Linn. is a phytophagous crop pest and infests cabbage, cauliflower, radish, mustard, turnip etc. and several botanical pesticides have been tested by different workers (Jat *et al.*, 2006; Lowery and Isman, 1995). But no information is on record as regards the efficacy of neem based pesticide against this important pest. In view of this the present study was undertaken to determine the toxicity of Bioneem against *Plutella xylostella* Linn. infesting the cole crop cabbage.

MATERIALS AND METHODS

The study was carried out with neem based pesticide, Bioneem to find out its toxicity against the larvae of *Plutella xylostella* Linn. Third instar larvae were used in the investigation, obtained from a laboratory culture maintained on cabbage.

Different concentrations of neem based pesticide, 'Bioneem' was prepared by adding desired quantity of distilled water. Stock solution of 10% was prepared for each experimental compound. The desired concentration of neem based pesticide was prepared from the stock solution by diluting with desired amount of distilled water.

After conducting preliminary trial to find out the concentrations resulting 20-80 per cent mortality of experimental insects, bioassay test by film method was done to work out the LC₅₀ value. For the preparation of insecticidal films, both lids of Petridishes (10 cm. diameter) were sprayed with 1ml. each concentration of the

neem based pesticide under the Potter's tower at the constant pressure. Five concentrations in each Petridish along with the control were tried and each treatment was replicated thrice. The sprayed Petridishes were gently shaken under an electric fan for about 10-15 minutes till the liquid lids was evaporated leaving behind a uniform dry film of the pesticide on glass surface.

There after, twenty 3rd instar larvae starved for 6 hrs. were exposed to insecticidal film of the pesticide for 2 hrs. and then transferred into clean Petridishes containing the fresh tender leaves of cabbage for feeding 24 hrs. after the treatment, the mortality was recorded.

The corrected mortality percentage was calculated from the observed mortality values by the following formula as given below:

$$\text{Corrected per cent mortality} = \frac{T - C}{100 - C} \times 100$$

where,

T = Observed mortality

C = Mortality in control

The mortality data obtained were subjected to probit analysis for determination of their LC₅₀ values. The LC₅₀ and LC₉₀ values of 'Bioneem' pesticide by taking it as unity so as to work out the toxicity of neem based pesticide used in present study.

RESULTS AND DISCUSSION

Toxic effect of 'Bioneem' was calculated on the basis of probit value (Table 1 and Fig. 1). Statistical analysis of the toxicity evaluation

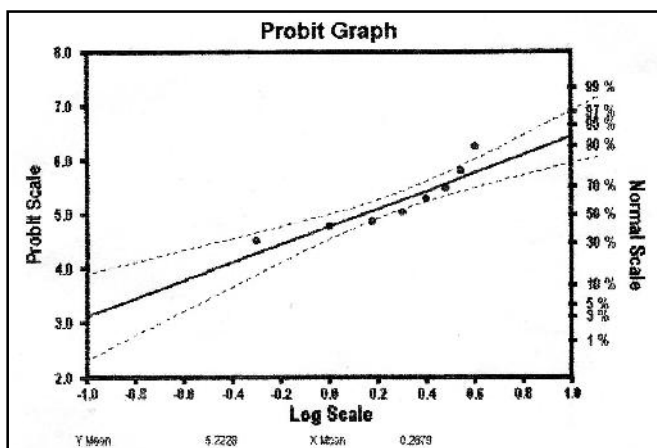
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Table 1: Toxicity of 'Bioneem' on 3rd instar larvae of *Plutella xylostella* Linn.

Sr. No.	Dose	Log dose	Subjects (n)	Effectd (%)	Emp. probit	Exp. probit	Chi-square(χ^2)	nw	Working probit
1.	0.50000	0.30103	30	8.276	4.405	18.188	1.781	14.0640	4.4476
2.	1.0000	0.0000	30	9.310	4.505	34.076	0.124	17.9600	4.5067
3.	1.5000	0.17609	30	11.379	4.693	45.257	0.650	19.0002	4.6959
4.	2.0000	0.30103	30	12.414	4.783	43.484	1.767	19.0456	4.7829
5.	2.5000	0.39794	30	15.517	5.043	59.782	0.810	18.6768	5.0394
6.	3.0000	0.47712	30	16.552	5.130	64.752	1.206	18.1255	5.1207
7.	3.5000	0.54407	30	22.759	5.702	68.771	0.702	17.4974	5.6897
8.	4.0000	0.60206	30	25.862	6.090	72.081	2.975	16.8448	6.0055
Total							10.014		

**Fig.1: Log dose and probit kill relationship of 'Bioneem' against *Plutella xylostella***

of Bioneem shows that the regression coefficient of probit on log C was 1.6579969 and was found highly significant at 1.0 per cent level of significance. This indicates that the rate of increase of the probit with increase in concentration was significant. The value of LC_{50} was 1.3599 per cent concentration of 'Bioneem'.

A search through the pages of literature reveals that not doubt, considerable work has so far been done on bio-efficacy of neem products from different parts of the world as reviewed by Singh (1990), Gupta *et al.* (2004) and Sharma (2007).

$$\text{Regression equation } \hat{Y} = 4.7736 + 1.6579969x$$

S.E. of b 0.3090

Fiducial Limits of b 0.9020 to 2.4140

Heterogeneity (χ^2) = 5.9460

LC at 50 per cent = 1.3599

LC at 90 per cent = 8.0658

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