

Evaluation of *Bacillus thuringiensis* formulations against gram semilooper *Autographa nigrisigna* Walker (Lepidoptera: Noctuidae)

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ABSTRACT: In a laboratory trial Dipel (*B. t.*) at 0.5, 0.75, 1.0 and 2 kg/ha was found more toxic than Delfin, killing 16, 36, 76 and 88 per cent larvae of *Autographa nigrisigna* Walker. Delfin registered 8, 28, 60 and 80 per cent mortality in dosage 0.5, 0.75, 1.0 and 2.0 kg/ha, respectively. Dipel 2 kg/ha was on par with endosulfan (0.07%) after 72 h.

KEY WORDS: *Autographa nigrisigna*, *Bacillus thuringiensis*

Bacillus thuringiensis Berliner (*B. t.*) is highly pathogenic to a variety of lepidopteran pests infesting field and plantation crops (Verma and Gill, 1977; Rajamohan and Jayaraj, 1978). *Autographa nigrisigna* Walker is one of the important pests of chickpea and damage leaves, buds, flowers, pods and seeds (Rizvi and Singh, 1980; Yadava *et al.*, 1991). Saxena *et al.* (1994) reported that *B. thuringiensis* at 2.0 kg/ha is quite effective against early instar of *A. nigrisigna* and its persistence lasted up to 3 days. In the present investigation, two commercial formulations of *B. t.* were tested against *A. nigrisigna* and their performance was compared with endosulfan (0.07%) used as a standard check.

At Indian Institute of Pulses Research, Kanpur two commercial formulations of *B. thuringiensis* viz., 'Dipel' (Lupin Agrochemicals (I) Pvt. Ltd.) and 'Delfin' (Sandoz (India) Ltd.) at doses of 0.5, 0.75, 1.0 and 2.0 kg/ha were tested against second instar larvae of *A. nigrisigna* and compared with endosulfan (0.07%) during the year 1996. Chickpea leaves were sprayed with different doses of two formulations using hand atomiser and dried in shade. Twenty five second instar larvae of *A. nigrisigna* (initially starved for 6 h) were released on treated leaves in a batch of 5 in ventilated circular plastic jars (15 cm H x 15 cm D). For each treatment, 5 jars were used serving as 5 replications. After 72 h of treatments

larval mortality was recorded.

Dosage-mortality data presented in Table 1, revealed that among the two commercial formulations of *B. t.*, Dipel registered more mortality than Delfin. However, statistically, mortalities of *A. nigrisigna* larvae recorded under Dipel 1.0 and 2.0 kg, and Delfin 2.0 kg/ha were on par. In the present studies both the formulations of *B. t.* at a dose of 2.0 kg/ha were found highly toxic to test insect. Within 72 h, 80-88 per cent mortality was recorded. The performance of *B. t.* formulation Dipel at 2.0 kg a.i./ha was

xylostella.

The present findings suggest that *B. t.* at 2.0 kg/ha is highly toxic to *A. nigrisigna* larvae. Dipel at this dose is equally effective to endosulfan, the commonly recommended insecticide.

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Table 1. Effectiveness of different formulations of *Bacillus thuringiensis* against *Autographa nigrisigna*

Formulation	Dosage	Larval mortality (%) after 72 h
Dipel	0.50 Kg/ha	16.00
Dipel	0.75 Kg/ha	36.00
Dipel	1.00 Kg/ha	76.00
Dipel	2.00 Kg/ha	88.00
Delfin	0.50 Kg/ha	8.00
Delfin	0.75 Kg/ha	28.00
Delfin	1.00 Kg/ha	60.00
Delfin	2.00 Kg/ha	80.00
Endosulfan	(0.07%)	100.00
SEM ±		8.19
CD (P=0.05)		16.71
CV (%)		23.69

statistically on par with endosulfan (0.07%) spray. Justin *et al.* (1990) also reported performance of two commercial formulations of *B.t. viz.*, Bactospeine and Thuricide, more or less equal to most of the insecticides tested against *Plutella*

REFERENCES

- Justin, C. G. L., Rabindra, R. J. and Jayaraj, S. 1990. *Bacillus thuringiensis* Berliner and some insecticides against diamondback moth, *Plutella xylostella*

- (L.) on cauliflower. *Journal of Biological control*, **4**: 40-43.
- Rajamohan, N. and Jayaraj, S. 1978. Field efficacy of *Bacillus thuringiensis* and some other insecticides against the pests of cabbage. *Indian Journal of Agricultural Sciences*, **48**: 187-188.
- Rizvi, S. M. A. and Singh, H. M. 1980. *Autographa nigrisigna*, a pest of chickpea. *International Chickpea Newsletter*, **3**: 15-16.
- Saxena, H., Ahmad, R. and Sachan, J. N. 1994. Toxicity and persistence of *Bacillus thuringiensis* Berliner against gram semilooper. Paper presented at International Symposium on Pulses Research, April 2-6, 1994; New Delhi, India, 164 pp.
- Verma, G. C. and Gill, G. S. 1977. Laboratory studies on the comparative efficacy of biotic insecticides for the control of *Plutella xylostella*. *Journal of Research Punjab Agricultural University*, **14**: 304-308.
- Yadava, C. P., Lal, S. S., Ahmad, R. and Sachan, J. N. 1991. Influence of abiotic factors on relative abundance of pod borers of chickpea (*Cicer arietinum*). *Indian Journal of Agricultural Sciences*, **61**: 512-515.