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Cumulative Effect of Nuclear Polyhedrosis Virus (NPV) on Development of *Helicoverpa armigera* (Hubner) on Groundnut

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Helicoverpa armigera (Hubner) damages seriously cotton, pigeonpea, chickpea and also castor in Saurashtra (Gujarat). It also damages the vegetative phase of groundnut. Several attempts have been made in the past to control this pest with chemical insecticides and also microbials. In the present study, an attempt was made to assess the cumulative effect of nuclear polyhedrosis virus (NPV) on larval and post-larval development of *H. armigera.*

H. armigera culture was maintained in laboratory. Ha NPV was multipled on the third instar larvae. HaNPV 250 LE was prepared from the NPV infected host larvae and sprayed on groundnut plants during August-1994, from which leaves were plucked up after one hr of drying. These were exposed to instarwise larvae for 24 h and individuals were reared on fresh unsprayed groundnut leaves until moth emergence. Forty host larvae under test were splitted into four replications. The larval mortality was recorded daily upto 8th day of treatment. The larvae which pupated were kept under observation for adult emergence and number of pupae failed to emerge the moths were also recorded. The data thus obtained were analysed using Abot's formula.

a. Effect on larval survival

The mortality in first instar larvae was high at 3rd and 4th day i.e. 36.94 and 34.44 per cent and killing of host was recorded within 8 days (Table 1). Similar trend was found in case of 2nd instar, but mortality was low and total mortality was 84.72 per cent. High mortality in 3rd, 4th and one day late 4th instars was occurred on 5th and 6th days of exposure and total mortality among them was 48.26, 39.23 and 21.18 per cent, respectively. This test summed up that early instar larvae were more susceptible to NPV than late instar larvae. These findings are on conformity with the results of Teakle and Byrne (1989) and Tuan *et al.*, (1989).

b. Effect on pupal survival

The first instar larvae and second instar larvae succeeded for less pupation (Table 1). The pupae failed to emerge the moths were higher (61.30%) in one day late 4th instar, followed by the 4th instar (47.50%) and 3rd instar (41.25%), while it was low in case of 2nd instar (12.50%). This indicate that NPV infected late instars survived but mortality in

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TABLE 1

Larval mortality, pupation (%) and cumulative mortality in *Helicoverpa armigera* due to NPV infection.

Instar tested	Larval mortality (%) after days						Total larval mortality (%)	Pupation (%)	Pupae failed to emerge (%)	Cumulative (larval + pupal) mortality (%)
	3	4	5	6	7	8				
First (0 days)	37.12 (36.94)*	35.37 (34.44)	16.10 (7.50)	16.10 (7.50)	11.43 (2.50)	9.10 (0.00)	80.90 (100.00)	11.12	9.10 (0.00)	100.00
Second	33.73 (31.66)	26.58 (18.33)	21.57 (15.00)	16.10 (7.50)	9.10 (0.00)	9.10 (0.00)	67.28 (84.72)	15.28	18.10 (12.50)	97.20
Third	9.10 (0.00)	13.77 (5.00)	22.75 (15.27)	24.78 (17.77)	20.16 (12.50)	9.10 (0.00)	43.98 (48.26)	51.74	39.80 (41.25)	89.51
Fourth	9.10 (0.00)	11.43 (2.50)	23.60 (17.50)	18.13 (10.00)	18.44 (10.00)	13.77 (5.27)	38.77 (39.23)	60.77	43.55 (47.50)	86.73
One day late fourth	9.10 (0.00)	9.10 (0.00)	18.69 (10.27)	16.10 (7.50)	16.10 (7.50)	11.43 (2.50)	27.21 (21.18)	88.82	51.63 (61.30)	82.48
S. Em. ±	0.40	2.38	2.74	0.96	2.17	1.63	1.70	—	4.53	91.18
C. D. P = 0.05	1.24	7.35	N.S.	2.96	66.69	N.S.	5.24	—	13.65	(Mean)

*Figures in parentheses are actual values.

pupal stage was expressed. Dhandapani *et al.* (1993) also reported similar finding.

The cumulative mortality (larval + pupal) in tested instars was found to be 100.00, 97.20, 89.51, 86.73 and 82.48 per cent in 1st, 2nd, 3rd, 4th and late 4th instars, respectively. Overall cumulative effect was 91.18 per cent mortality of the pest. The study concluded that the microbial control of *H. armigera* on groundnut can be achieved effectively through the HaNPV application. Jayaraj *et al.*, (1987) found 250 LE as the most effective in reducing *H. armigera* population.

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