J. Biol. Control, 3 (1), 73 - 74, 1989

Effect of Contamination of Eggs of the Diamondback Moth, *Plutella xylostella* (Linnaeus) with Nuclear Polyhedrosis Virus

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Nuclear polyhedrosis viruses are transmitted through generations in two possible ways (Steinhaus, 1954; Aizawa, 1963). Transmission of virus through the contaminated egg surface is termed as transovum whereas, transmission of the virus within the egg itself is designated as transovarial (Martignoni and Milstead, 1962). The time of application of nuclear polyhedrosis virus (NPV) in relation to egg hatching is a critical factor for achieving a high degree of effectiveness as observed in *Heliothis* spp. (House *et al.*, 1976). Hence, the present investigation was taken up to study the effect of different concentrations of the virus when applied on eggs of different ages of *Plutella xylostella* (L.).

The purified concentrated suspension of polyhedra, isolated from the diseased larvae of *P. xylostella* was used as infective material. A standard haemocytometer (Neubaur improved double ruling, Germany) was used for counting the polyhedra of stock suspensions and serial dilutions prepared from the stock suspensions. The eggs representing three different stages of maturity (newly laid, one and two days old) were selected from laboratory cultures. A set of 50 eggs in each stage was smeared with the suspension of virus at concentrations of 1.7×10^9, 1.7×10^7 and 1.7×10^5 polyhedral occlusion bodies (POB)/ml of distilled water. Another set of 50 eggs in each stage smeared with distilled water served as control. Both virus and water-treated eggs were allowed to air-dry under room temperature. Each treatment was replicated six times. Hatching percentage and larval mortality rates were observed daily from the date of hatching. The data were analyzed statistically.

The incubation period (3 to 4 days) and the hatching percentages (97.33 to 99.00) were not affected when the eggs of different ages were smeared with different concentrations of the virus (Table 1). Nair and Jacob (1985) also observed that there was no effect of virus on hatching and incubation period of eggs of *Spodoptera mauritia* (Boisduval). The newly hatched larvae in the present investigation ingested the NPV contaminated egg chorion and started dying three days after hatching. According to Jayaraj *et al.* (1976), the larval mortality occurred second, third and fourth day after hatching when the eggs were sprayed with four doses of virus in case of *Amsacta albistriga* walk and it was suggested that the larvae might have ingested the POB from the egg shells. The larval mortality in *P. xylostella* was directly proportional to the virus concentrations used in this study (Table 1). Similar results were obtained by Narayanan (1979) in the case of *Heliothis armigera* Hb. Highest percentage of larval mortality was observed with higher doses of *H. armigera* NPV when applied at different concentrations on the egg surface. The results of the present study revealed that the larval susceptibility was influenced by the age of the eggs at which they were contaminated with virus (Table 1). Potter and Watson (1983) observed a similar trend in case of *Heliothis virescens* (F.) with the highest larval mortality of 79.7% when the eggs were sprayed with virus prior to hatching compared to 19.4% mortality when the same treatment was made in the newly laid eggs. Transmission of virus through egg provides an economical and self-perpetuating method of insect control. Allen *et al.* (1966) and House *et al.* (1976) reported that control of *Heliothis* was satisfactory if the virus application coincided with the hatching of the eggs in cotton field. The present investigations suggest that a similar strategy should be adopted for the control of *P. xylostella* with the NPV.

ACKNOWLEDGEMENT

The Senior author expresses her gratitude to Indian Council of Agricultural Research, New Delhi for awarding her the senior fellowship during the period of this study.

KEY WORDS : NPV, *Plutella xylostella*, eggs, control

1 Part of the Ph. D. Thesis of the Senior author approved by the University of Agricultural Sciences, Bangalore.

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TABLE 1. Mortality of *P. xylostella* larvae emerging from eggs treated with NPV at different ages

Viral concentrations (POB/ml)	No. of eggs	% eggs hatched +				% larval mortality			
		Newly laid	1 day old	2 days old	Mean	Newly laid	1 day old	2 days old	Mean
1.7×10^9	300	98.33	97.67	98.33	98.11	33.21 (35.17)	69.68 (56.64)	84.06 (66.62)	62.32 (52..81)
1.7×10^7	300	99.00	98.00	98.33	98.44	19.55 (26.17)	42.87 (40.90)	65.43 (54.00)	42.62 (40.36)
1.7×10^5	300	98.00	97.67	97.33	97.67	8.50 (16.89)	21.55 (27.63)	42.48 (40.67)	24.18 (28.40)
Control	300	98.33	97.33	97.33	97.66	1.36 (4.74)	1.03 (4.19)	0.00 (0.12)	0.80 (3.02)
Mean		98.42	97.67	97.83	97.97	15.66 (20.75)	33.78 (32.34)	47.99 (40.35)	

(Figures in parentheses are arcsin $\sqrt{\text{percentage values}}$

+ Percent of eggs hatched are excluded for statistical analysis

	S. Em	C. D. (P=0.05)
Viral concentrations	0.899**	1.797
Age of eggs	0.778**	1.556
Viral concentrations x age of eggs	5.937**	14.546

** Significant at 1% level

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