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Effect of Acquisition Feeding Period on the Mortality of *Heliothis armigera* (Hbn.) due to Nuclear Polyhedrosis Virus

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For virus control of insects, it is necessary to fix the minimum acquisition feeding period for the larvae to pick up infection by ingesting the polyhedra - treated food surface, before the virus is affected by certain environmental factors. The aim of the present study was to find out the effect of acquisition feeding period in the laboratory on the mortality of *Heliothis armigera* (Hbn.) by nuclear polyhedrosis virus (NPV).

Forty early fourth instar larvae (ten per replicate) were exposed to semi-synthetic diet which was surface-contaminated with 1.1 x 10^5 polyhedral occlusion bodies (POB) per cup of the diet for periods of 2, 4, 6, 12, 18, 24 and 48 h. The larvae were then removed from the respective containers and reared on fresh diet devoid of virus till death or pupation. Control larvae were reared on un-contaminated (virus-free) diet.

The results indicated that there was a significant influence of acquisition feeding period on percentage mortality (Table 1). Feeding the larvae on the diet contaminated with the virus for 2, 4, 6, 12, 18, 24 and 48 h after exposure and continuously exposed till their death to diet surface, caused 66.66 to 100 per cent mortality. Total mortality was achieved when the larvae were exposed for 48 h and it was on par with continuous exposure. More than 70 per cent mortality was achieved when the larvae were exposed to more than 12 h. However, it was on par with 18 h feeding. The minimum mortality of 66.66 per cent was seen when the larvae were exposed just for 2 h and it was on par with 4 and 6 h of acquisition feeding.

Table 1. Effect of acquisition feeding period on the mortality of *H. armigera* by NPV

Feeding period (h)	% Mortality
2	66.66[a]
4	70.00[a]
6	70.35[a]
12	77.19[d]
18	82.33[c]
24	87.12[b]
48	100.00[e]
Continuous	100.00[e]

That the feeding of diet surface-contaminated with NPV for 2, 4 and 6 h did not show significant difference in mortality rates is in conformity with the earlier report of Jayaraj *et al.* (1976) in the case of NPV of *Amsacta albistriga* Wlk. However, the difference between 12 and 24 h acquisition feeding was significant.

It may be due to the fact that larvae consumed a greater amount of virus - treated diet during this 12-18 h period which more or less coincided with the period of night. In most of the noctuid insects, not only the quantum of food but also the rate of feeding is more in night hours compared to day times (Smirnoff, 1972; Narayanan, unpubl. data). This reflects in the final kill. However, there was no significant difference between 24 and 48 h. Similar observation was made by David *et al.* (1971), who noticed that the mortality did not increase when larvae of *Pieris brassicae* L. were allowed to feed on cabbage leaves treated with granulosis virus for 48 h instead of 24 h. The virus which is responsible for initiation of infection is probably consumed within the first 24 h of exposure.

The minimum acquisition feeding period for *Heliothis* larvae, to pickup infection and to inflict more than 70 per cent mortality was found to be less than 16 h (Table 1). It is evident that there will be a sufficient gap between the time of virus application and its exposure to sunlight by next day, in case it is applied after 4 pm. Further, it is known that in most

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of the noctuid insects, their activities are well pronounced during late evening and early morning hours. Accordingly, the rate of feeding will be more during night when compared to day as it has been shown in the case of *Spodoptera litura* F. a noctuid caterpillar, which feeds nearly 63.6 per cent of total feeding was during night time (Narayanan, unpubl. data). Thus, the effectiveness of the virus could further be hastened by spraying the virus material in the evening hours so that the virus receives no natural sunlight until next day and the active virus is made available to the *Heliothis* larvae which is nocturnal in habit.

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KEY WORDS: *Heliothis armigera,* NPV, acquisition feeding time

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