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The effect of Nuclear polyhedrosis virus, *Baculovirus amsacta* in the control of Redhairy caterpillar *Amsacta albistriga* W., of groundnut.

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The rate of mortality of Larvae infected with NPV was studied in two laboratory tests and in one field plot test using hand operated sprayer and battery operated ULV disc applicator. Under laboratory conditions 65.35% and 82.30% mortality was noticed in a period of five days after the date of treatment. For the same period 39.09% and 43.63% mortality was observed in the case of larvae collected from the fields treated with NPV, using hand operated sprayer and battery operated ULV disc applicator respectively. Complete mortality was noticed in eleven days in the case of larvae collected from the fields while it took only nine days under laboratory conditions. No marked difference in mortality was noted due to the use of hand operated or battery operated ULV disc applicator.

Many workers have reported the occurrences of Nuclear polyhedrosis virus on various insects. Laboratory investigations were also carried out in many cases to understand the various aspects like histopathology, cross infectivity susceptibility, changes and influence in the insects etc. In quite large number of cases field experiments were carried out to utilise the disease caused by these viruses on economically important insects for their biological control. Groner *et al.* (1978) conducted field tests on the control of cabbage moth (*Mamestra brassicae* L and Carner (1977) reported the efficacy of NPV in the control of velvet bean caterpillar *Anticarsia gemmatalis* Hb. infesting Soybean. Yendol *et al.*, (1977) reported that sprays of *Baculovirus* is very effective in the control of gypsy both *Lymantria dispar* L. in Oak forests and the effect is pronounced even after one ear of treatment. Stacey *et al.*, (1977) reported the results of selective placement of *Baculovirus heliothis* on the larvae of *Heliothis zea* B. both in greenhouse and field conditions. The nuclear polyhedrosis virus (*Baculovirus amsacta*) of red hairy caterpillar *Amsacta albistriga* W. infesting groundnut, was reported for the first time, by Jacob and Subramaniam (1972). Subsequently Jayaraj *et al.*, (1976) reported the results of laboratory investigations made to study the effect of NPV applied to egg masses on the mortality of larvae, the minimum acquisition feeding period of NPV and the influence of host plants on the rate of mortality caused by the NPV. The present paper reports on the results of the preliminary laboratory aud field plot tests conducted to find out the possibility of using this virus as a biological control agent of the red hairy caterpillar on groundnut.

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MATERIAL AND METHODS

Two laboratory and one field plot tests were carried out during the rainfed season 1979. The first laboratory test was started on 16-8-79.

Third to fourth instar larvae were collected from the fields and were fed with *Calotropis* sp leaves smeared with MPV culture containing 10^7 polyhedrel inclusion bodies per ml. From the next day they were fed with normal *Calotropis* sp leaves not treated with NPV. The number of dead larvae were counted on each day and the percentage of mortality worked out. One hundred and fifty larvae were used in three replications for each experiment. The second laboratory test was started on 26-8-80 in similar lines, to confirm the results of the first experiment.

The field-plot test was carried out by spraying two plots of 400M^2 area each, using, hand operated sprayer and hand-held battery-operated spinning disc ultra low volume applicator with 10 ml of NPV culture containing 10^7 PIBs per ml. after appropriately diluting i. e. in ten litres of water for hand operated sprayer and in 100 ml. of water for battery operated ULV sprayer. Two days after spraying, 100 larvae were collected at random from each plot, kept in cages in the laboratory and fed with normal *Calotropis* sp leaves. The number of dead larvae were counted on each day and the percentage of mortality worked out.

RESULTS AND DISCUSSION

It is seen that in five days after the feeding of the infected leaves 82.30% and 65.35% larvae died in experiment I and II respectively under laboratory conditions. Table-1 In the case of larvae collected from the field after two days of treatment. the mortality for the same period was found to be 39.09% and 43.63% in respect of hand operated sprayer and ULV disc applicator respectively. In the laboratory, the complete mortality was noticed in nine days after feeding the infected leaves while it was eleven days in respect of the larvae collected from the fields. No marked difference in mortality due to the usage of handoperated or ULV disc applicator was noted in the study.

Nuclear polyhedrosis virus generally require long periods to cause mortality of affected larvae as the virus takes a certain time to multiply in the tissues of the host. The death is caused due to the cumulative action of the virus by the arrest of larval growth, moulting, food consumption and by changes in protein and fat contents of the larvae, breakdown of physiological mechanism etc. Jacob *et al*; (1974) reported that the virus infection initially increase and later decreases food intake leading to complete cessation of feeding in the case of *Spodoptera litura* F. and that the obsolute quantity of food consumed by the infested larvae after the ingestion of the virus was markedly lower. Similar observations were also made in the course of these tests, in that the larvae

became very sluggish after three days and consumed only very small quantities of leaves till their death. Hence, though the infected larvae took nine to eleven days to die, the level of damage caused to the crop would be considerably lower when compared with healthy larvae and this is an important factor while utilising this pathogen for the control of red hairy caterpillar. Vail *et al*, (1977) conducted field tests using spray applications of nuclear polyhedrosis virus on cotton leaf perforator *Bucculatrix thurberiella* Busck. and reported that 21 to 50% larvae were infected and concluded that the virus showed potential use in economic integrated control programme though economic control of large populations was not obtained.

Narayanan *et al*., (1977) found that the NPV could not tolerate the outdoor exposure for more than eight days without severe loss in activity and hence repeated application of the pathogen, particularly during evening hours could be necessary for the effective control of *Spodoptera litura* F. The nuclear polyhedrosis virus is heat susceptible and is inactivated to a certain extent under ordinary atmospheric condition due to sunlight and other factors.

Hence, though it is obvious that quick knock down effect in a short time as in the case of insecticides cannot be achieved by using the Nuclear polyhedral virus alone it can be utilised as a part of control programme for the long range solution of the problem taking into consideration the toxic hazards, environmental pollution, development of resistance in the insect and the cost involved if chemical control measures alone are resorted to continuously for a long period. A judicious combination of the use of virus along with insecticidal sprays will be both economical and offective. At the initial instar of the larvae insecticidal sprays can be adopted to kill maximum number of larvae. When the escaped caterpillars are exposed to the NPV spray, their potentiality to further multiply will be curtailed resulting in gradual decrease in emergence during subsequent years.

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Table 1 The mean rate of mortality observed are furnished below :

No. of days after the feeding of virus contaminated leves.	Mean mortality %		Field plot test,	
	Laboratory Test. I	Laboratory Test, II	Hand operated sprayer	ULV disc, applicator
1	5.87	2.45	–	–
2	17.50	8.45	–	–
3	25.12	16.67	10.91	12.73
4	20 72	24.67	14.54	16.36
5	13.09	13.11	13.64	14.54
6	9.33	14.45	25.45	15.45
7	4.16	8.22	5.45	9.09
8	3.05	8.66	3.64	3.65
9	1.16	3.32	8.18	9.09
10	–	–	10.92	9.09
11	–	–	7.27	10.0