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NUCLEAR POLYHEDROSIS OF THE RICE SKIPPER, *PARNARA MATHIAS* FABR (HESPERIIDAE: LEPIDOPTERA)

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AMONG several biocontrol agents, viruses are considered the most potential because of their high virulence, remarkable durability, host specificity and relative safety. During a survey on microbial diseases of insect pests of rice, occurrence of *Parnara* nuclear polyhedrosis was observed in the rice fields of this Institute[1]. Microscopic examination of the haemolymph and tissue smears revealed a large number of refractile polyhedral bodies which were negative to staining by Giemsa. Healthy laboratory reared larvae of *Parnara mathias*, when released on rice plants sprayed with the partially purified polyhedral suspension containing 10^5 polyhedra/ml, showed typical symptoms of polyhedrosis. The infected larvae exhibited the symptom of loss of appetite and became sluggish. Yellowish bands first developed on the intersegmental membrane which gradually spread towards the centre of each segment thus covering the entire integument. The intersegmental membrane became stretched, body became flaccid and very fragile, liberating the liquified body content. Light brown patches developed at later stages of infection which was due to bacterial contamination. The infected larvae had the tendency to climb up the plant and keep hanging from the leaves at the time of death. The yellow infected larvae could easily be distinguished from a distance against the green background foliage of the rice plants.

Cross infection tests conducted by oral feeding of the polyhedral bodies through contaminated food to healthy laboratory reared larvae of *Sesamia inferens* Walk, *Scirpophaga* (*Tryporyza*) *incertulas* Walk, *Chilo auricilius* Dudgn, *Cnaphalocrosis medinalis* Gn, *Melanitis leda ismene* Cramer, *Bombyx mori* (Kashmir strain) and *Corcyra cephalonica* Ston proved negative.

The suspension containing infected dead larvae, decomposed in distilled water for one month, was centrifuged by alternate low (1000 g) and high (5000 g) speed centrifugation for 10 and 20 min respectively. Highly purified polyhedral suspension was obtained by sucrose 20 to 60% (w/v) density gradient. These polyhedra were placed on the 'Formvar' coated grids and observed under Hitachi electron microscope with 50 kV operating voltage. The polyhedra were irregular in shape (figure 1) measuring 0.23 μm diameter. To locate the virus particles in the polyhedra, crystalized proteins of the polyhedra were selectively disaggregated by treatment with thioglycolate at pH 10 for 1 min. Dissolution was performed on the specimen holder ('Formvar' coated grid). These preparations were stained with 3% uranyl acetate and observed under electron microscope. Thioglycolate acted upon the polyhedral protein and dissolved the polyhedra, liberating the virions from the polyhedral inclusions. The virions were rod-shaped (figure 2) measuring 114.20 nm × 21.28 nm. Each virion contained a single

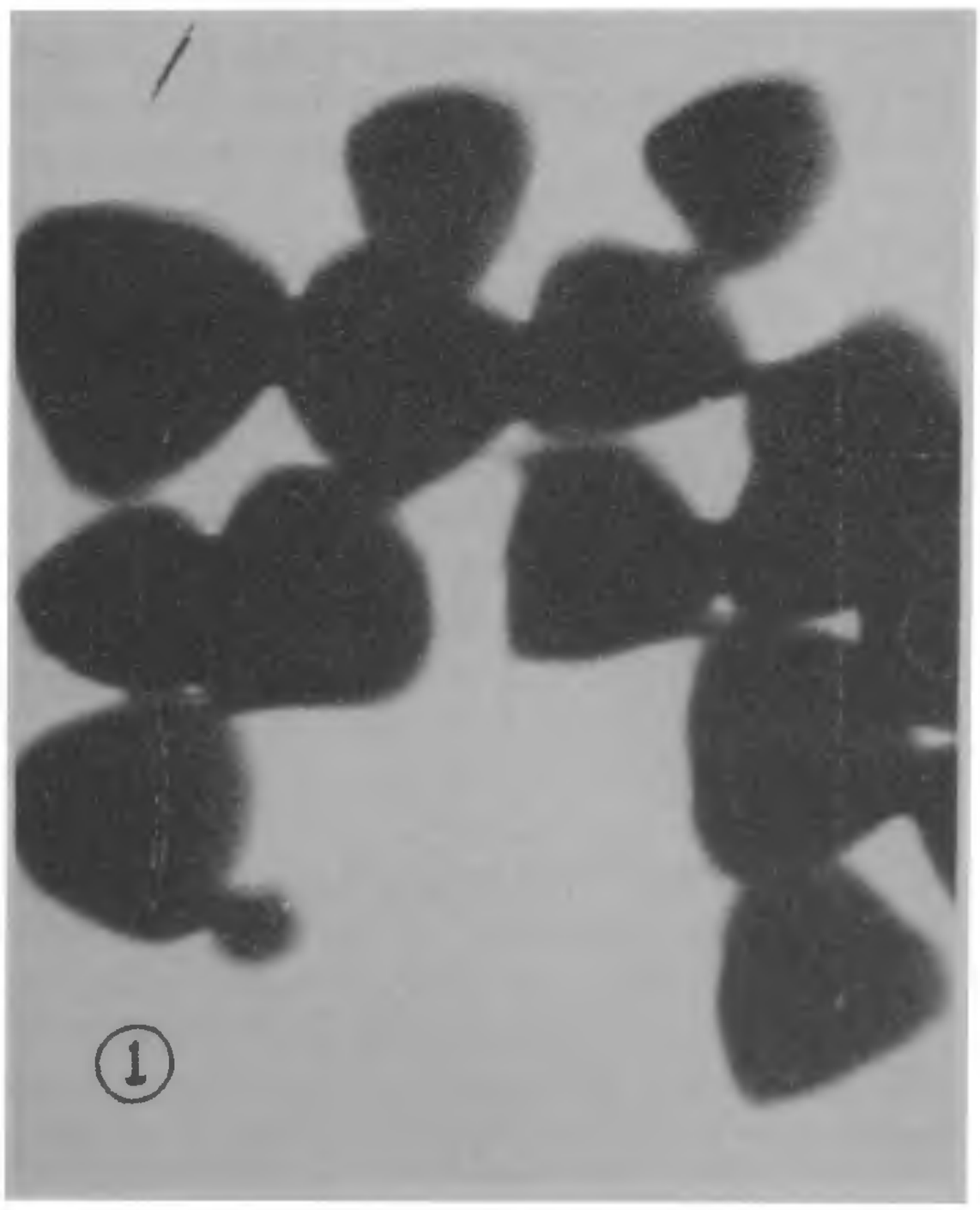

Figure 1. Polyhedral inclusion bodies of *Parnara* nuclear polyhedrosis.

Figure 2. Rod shaped virions inside the dissolved polyhedra.

rod-shaped nucleocapsid enveloped in a developmental membrane. The virions were randomly arranged in the polyhedra. In view of the high host specificity *Parnara* nuclear polyhedrosis virus has better prospects in microbial control of the rice skipper *P. mathias*.

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A STUDY OF CROSSABILITY BETWEEN WHEAT, TRITICALE AND RYE

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INTERGENERIC hybrids between wheat and rye are utilized for the transfer of desirable rye characteristics into wheat and to increase the genetic variability in the amphidiploid genus triticale (× *Triticosecale* Wittmack). However, the cross-incompatibility between most agronomically acceptable wheat cultivars and rye[1] presents a serious limitation to their successful hybridization. Immediate success of triticale as a new cultivated cereal in agriculture is rather limited due to its low spike fertility and shrivelled grains. To overcome these problems, triticales are crossed to the local wheat varieties or with rye varieties or different lines of triticales are intercrossed.

Major genetic control of crossability between wheat and rye has been attributed to two loci, Kr_1 and Kr_2, carried on chromosomes 5B and 5A of wheat, respectively[2]. The dominant alleles at these crossability loci actively inhibit the production of intergeneric hybrids[3]. Kaltsikes[4] hypothesized the existence of rye genotypes differing in reaction with the crossability inhibitor alleles of wheat. Conflicting reports concerning the effect of rye on crossability with wheat have appeared in the literature. Totu[5] found no significant differences for seed set among six rye cultivars when pollinating wheat. Marais and Pienaar[6] provided evidence of crossability differences among heterogeneous, open-pollinated rye cultivars. The present investigation reports the results of crosses between triticale, wheat and rye.

The experimental material used in the present study comprised 3 strains of hexaploid *Triticale* namely UPT 78268, UPT 75233, and UPT 7681, two varieties of hexaploid wheat namely UP 2003 and UP 262 and three varieties of diploid rye i.e. Australian rye, Russian rye and Asian rye. The above material was grown in a crossing block. Half-emerged spikes of triticale and wheat were thinned to retain only 10–12 spikelets per spike and two florets per spikelet. They were then hand-emasculated. Usually the stigma became receptive after 48 hr of emasculation. After 48 hr, hand pollination was carried out and the seed set was recorded.

The results show that the crossability varied from 11.6% (U.P. 2003 × Australian rye) to 14.7% (UP 2003 × Asian rye) in the cross involving UP 2003