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

Table 1 *Crossability between wheat, triticale and rye*

Cross	No. of florets pollinated	No.of seeds set	Crossability (%)	No. of F_1 seeds germinated
UP 2003 × Australian rye	120	14	11.6	0
UP 2003 × Russian rye	120	16	13.3	0
UP 2003 × Asian rye	115	17	14.7	0
UP 262 × Australian rye	120	10	8.3	0
UP 262 × Russian rye	110	12	10.0	0
UP 262 × Asian rye	150	14	9.33	0
UPT 7681 × Russian rye	110	20	18.1	7
UPT 78268 × UP 2003	120	0	0	0
UPT 75233 × UP 2003	140	5	3.57	3
UPT 7681 × UP 2003	120	4	3.33	2
UP 2003 × UPT 7681	105	27	25.1	0

as the maternal parent (table 1). However, in the crosses of rye with UP 262, the crossability was fairly low (8.3% to 10.9%). According to the classification of Lein[7] it is possible that UP 2003 has the genotype Kr_1kr_2 and UP 262 is Kr_1kr_2. When wheat is crossed with different rye cultivars, the seed set is variable. This indicates that rye genotype has some influence on the crossability or this variation in crossability may be due to environmental factors.

When UPT 7681 was crossed with Russian rye the seed set was 18.1% indicating low crossability of 6x triticale with rye. There was very low crossability using triticale as the maternal parent in triticale-wheat crosses, whereas the reciprocal cross showed relatively a much higher crossability. Behl *et al*[8] attributed this low seed set to severe disruptions in the embryonic development and incompatibility between the pistil tissue and the pollen tube. Further, two of the three triticale genotypes formed some seed whereas one did not produce any when crossed with the same wheat. This suggests that compatibility relationship between different triticale and wheat varieties varies from cross to cross, depending upon the genetic constitution of the parents involved. Although triticale × wheat cross showed relatively lower crossability yet the F_1 hybrids of these exhibited moderate to high field emergence whereas the reciprocal cross showing more crossability showed no emergence. This may be due to post-fertilization incompatibility.

On the basis of the results it may be suggested that UP 2003, UPT 75233, UPT 7681, Russian rye and Asian rye may be used for making crosses amongst each other for the triticale improvement programme.

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KARYOTYPES OF FIVE MORPHOLOGICALLY AND PHYLOGENETICALLY PARSIMONIOUS MEMBERS OF *DROSOPHILA*

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THE orbital sheen complex of the *nasuta* subgroup of the *immigrans* species group of *Drosophila* is an assemblage of morphologically similar forms. The members of this complex are *D. sulfurigaster sulfugiraster*, *D. s. bilimbata*, *D. s. albostrigata*, *D. s. neonasuta* and *D. pulaua*[1-3]. Morphological[1,2], cross incompatibility[3], mating behaviour differences[4], fixed inversion differences[5], isozymes[6] and ecogenetic[7] information have been used to determine the phylogenetic relationships within the orbital sheen complex of *Drosophila*. However, a detailed analysis of the metaphase chromosome configurations suitable for cytological comparisons has been lacking. Recognizing this lacuna, the present study was undertaken to evaluate the karyotypes of these morphologically indistinguishable and phylogenetically closely related members of *Drosophila*.