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Research Note

Cross infectivity of *Bombyx mori* nucleopolyhedrovirus to cabbage leaf webber, *Crocidolomia binotalis* Zeller (Lepidoptera: Pyralidae)

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ABSTRACT: **Nucleopolyhedrovirus isolated from mulberry silkworm, *Bombyx mori* (Linnaeus) was cross infective to cabbage leaf webber, *Crocidolomia binotalis*.**

KEY WORDS: *Bombyx mori* NPV, *Crocidolomia binotalis*, cross infectivity

Nucleopolyhedroviruses are insect specific and commonly used as microbial pesticides. Some nucleopolyhedroviruses are harmful to beneficial insects. Mulberry silkworm *Bombyx mori* (Linnaeus) nucleopolyhedrovirus (*Bm*NPV), causes grasserie (jaundice) in *B. mori* and is a major economic loss to the sericulturists. *Bm*NPV is a member of the Eubaculovirinae sub-family of the Baculoviridae. Among the baculoviruses, *B. mori* NPV is one of the best characterized and it is a species specific NPV. Recently, the author has reported a nucleopolyhedrovirus, from cabbage leaf webber, *Crocidolomia binotalis*, one of the major pests of an important vegetable crop (Narayanan, 2004). The present study deals with observations made on the cross infectivity of *Bm*NPV against *C. binotalis*.

During the safety study with recently isolated nucleopolyhedrovirus *from C. binotalis* against *B. mori*, some of the larvae of *C. binotalis* were found dead. Examination of the smears of dead larvae of *C. binotalis* under phase contrast microscope revealed the presence of polyhedral occlusion bodies (POBs) of typical hexagonal shape in the nucleus of cells of fat bodies, which is similar to the POBs of *Bm*NPV and different from polyhedral occlusion bodies of *C. binotalis* NPV, which are small with varying size and shape. Polyhedral occlusion bodies of *Bm*NPV were purified from NPV infected diseased larvae of *B. mori* by differential centrifugation. Twenty neonate larvae of *C. binotalis* were inoculated with polyhedral suspension containing 1×10^6 POBs/ml by way of contaminating the artificial diet. The larvae were allowed to feed the virus contaminated diet *ad libitum*. Same number of larvae treated with water contaminated diet served as check. Daily observations were made on mortality of the larvae. The dead larvae were diagnosed by microscopic examination of the squashed preparations for the presence of polyhedral occlusion bodies.

The macroscopical symptoms of orally

infected *C. binotalis* with *Bm*NPV showed typical sluggishness in their movement in contrast to very active movement of healthy larvae. In contrast to violaceous body of healthy *C. binotalis* larvae, having brown longitudinal stripes and rows of tubercles, the *Bm*NPV infected *C. binotalis* larvae become slender and pale whitish in colour mostly due to the accumulation of large numbers of polyhedral occlusion bodies. Unlike the other NPV infected lepidopterans resulting in skin breaking, the NPV infected *C. binotalis* remained intact. Further studies on the cross-infectvity of *Bm*NPV on *C. binotalis* has revealed that one day old larvae were highly susceptible recording cent per cent mortality with an incubation period ranging from 4-5 days. Smears of diseased larvae of *C. binotalis* examined under phase contrast microscope revealed the hexagonal shaped polyhedral occlusion bodies. In order to confirm the identity of the progeny virus obtained from the *C. binotalis* larvae infected with *Bm*NPV, one day old *B. mori* larvae were inoculated with progeny virus obtained from *C. binotalis* through leaf surface contamination technique. This resulted in cent per cent mortality of *B. mori* larvae. Thus the virus retained its pathogenicity for *B. mori* even after passage through *C. binotalis*. Morphological observation of POBs harvested from *B. mori* was found to be hexagonal in shape, thereby confirming true cross-infectivity nature of *Bm*NPV against *C. binotalis*.

In India, normally the various entomopathogens like fungus, virus or bacteria like *Bacillus thuringiensis* (*Bt*) including *Bt* transgenic plants are invariably subjected to the specificity and safety tests against beneficial insects general predators and parasitoids (Narayanan, 2002). Among baculoviruses the best-characterized nucleopolyhedroviruses are *Autographa californica* MNPV (*Ac*MNPV) and *Bombyx mori* NPV (*Bm*NPV) and they are very closely related. The general nucleotide sequence similarity between the two viruses is about 70 per cent where homology between well-conserved genes is over 90 per cent. In this connection it is interesting to note that in contrast to *Ac*MNPV, which has the broadest host range, infecting more than 33 species, mostly lepidopterous larvae; *B. mori* NPV is highly specific. Though, the cross infectivity of *B. mori* NPV has been reported against *Chrysoperla carnea*, a general predator (Chakraborty & Narayanan, 2003), this is the first report of NPV from *B. mori* cross infecting *C. binotalis*.

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