



Molecular and Epidemiological Studies on Maize Army Worm Densovirus

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The present work was carried out to Clarify the noctuid fauna of lucern in El-Bahareya oasis, determine the population fluctuation of surveyed noctuid species, determine the efficiency of MIDNV against the 2nd, 3rd and 4th larval instars of *Spodoptera littoralis*, investigate the natural presence of densovirus in different Egyptian geographical places and study the natural molecular diversity of some isolates. Results indicated remarkable infestations with Seven different noctuid species, *A. segetum*, *A. ipsilon*, *A. spinifera*, *H. armigera*, *A. gamma*, *S. exigua*. and *S. littoralis*. The observed fluctuation of the population showed that *S. littoralis* larvae reached its highest average of the catch in June but one infestation peak could be detected around mid May, *S. exigua* larvae reached its highest average of the catch in April and May, and two infestation peaks could be detected around May and June. The larvae of *H. armigera* were found appeared during the summer and the beginning of the autumn, where it reached its highest average of the catch in October and two infestation peaks around July and September could be detected. The larvae of the cutworms (*Agrotis* spp.) were found appeared during the end of autumn and all the winter. The highest average of the catch of the larvae of *A. ipsilon* was during January while it was in May for *A. segetum*. Bioassay of MIDNV were conducted against the 2nd, 3rd and 4th larval instars of *S. littoralis*. The values of LC50 were estimated respectively by 0.054, 0.095 and 0.191OD/ml. Screenings attempts using the total nucleic probe test and PCR amplification revealed the presence of Densovirus in the 7 surveyed noctuid species in lucern and cotton fields in different Egyptian geographical localities. Characterization of the virions and the restriction profile of the isolated viruses showed no differences between these isolates and MIDNV previously isolated in Egypt, which suggested that those viruses are different isolates of MIDNV. Result of the sequencing of the capsid gene encoding the viral polypeptides (VP) of 7 different isolates from *S. exigua* and *S. littoralis* larvae collecting from El-Bahareya Oasis was carried out comparing with the MIDNV VP, revealed 3 mutations, which suggested that those viruses are different strains of MIDNV. A new Densovirus was isolated in El-Bahareya Oasis from *H. armigera*, it was named by HaDNV. HaDNV appeared as icosahedral non-enveloped particles of 25nm in diameter. Immunodiffusion test, revealed a serological relationship between HaDNV and MIDNV. The virions of HaDNV contains the four structural proteins related to MIDNV, 91, 63, 53 and 47KDa respectively, and two extra structural proteins with molecular weight of 40 and 41KDa. The average size of HaDNV DNA molecule was estimated to be 5.95 kb. Restriction profiles of the HaDNV DNA showed essential differences between HaDNV and MIDNV. Partial sequencing for the clones of HaDNV DNA and MIDNV DNA, revealed 89 % identity between the NS region of HaDNV DNA and MIDNV DNA and 97% identity between the ITR region of HaDNV DNA. It was suggested that HaDNV is a new member of the Densovirus genus (parvoviridae family). The results showed the high efficiency, polyspecificity and the natural presence of MIDNV in the natural agricultural Egyptian environment, which confirm on the importance of MIDNV as a biocontrol agent in case of it was confirmed as safe agent for non-target organisms. The results also confirmed on the biodiversity of densoviruses.

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