

BIOLOGICAL, SEROLOGICAL AND MOLECULAR COMPARISONS OF POTYVIRUSES INFECTING POACEOUS PLANTS IN IRAN *

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Abstract

Several potyvirids infecting gramineous plants have been reported from Iran. High level of variation and similarities among these viruses has prompted us to compare them and precisely differentiate them. To this end, Iranian *Johnson grass mosaic virus* (IJMV) from Shiraz and Khuzistan, *Bermuda grass mosaic virus* (BgMV) from Bermuda grass in Shiraz, *sugarcane mosaic virus* (SCMV) from sugarcane in Khuzistan, Bermuda grass southern mosaic virus (BgSMV) from Bermuda grass in Jiroft and Safiabad (Khuzistan), and *maize dwarf mosaic virus* (MDMV) from maize in Dasht-Naz (Sari) were collected, preliminary tested serologically and compared by host range, transmission, serological and molecular studies. Serological tests of agar gel diffusion (AGD), ELISA and western blot analysis were conducted using MDMV-G (German isolate), MDMV-Ir, BgSMV, IJMV and BgMV antisera or immunoglobulins. The results showed that BgSMV has a close serological relationship with MDMV but in AGD they were differentiated from each other by spur formation. The molecular weight of the coat protein of BgSMV was higher than that of MDMV. IJMV also differed in the size of coat protein. Serological comparison revealed that IJMV, SCMV, BgSMV and MDMV showed a weak serological relationship with each other, but not with BgMV. In host range studies, all isolates, but BgMV, infected all cultivars of sorghum and maize. Pearl millet was infected only by MDMV and BgSMV isolates. BgMV only infected goose grass. Among viruses, only MDMV-Ir and IJMV were transmissible to Johnson grass. None of the virus isolates could infect wheat, barley and rye. Both IJMV and MDMV-Ir were transmitted to sorghum by *Rhopalosiphum padi*, *R. maidis* and *Schizaphis graminum*. Therefore, MDMV could not be differentiated from IJMV by these vectors. BgSMV was not transmitted by *R. maidis*. BgMV was distinct from other potyviruses as it was transmissible by *Sipha elegans* and *Hysteroneura* sp. For molecular studies a portion of the gene corresponding to CP core region was amplified by RT-PCR, cloned and sequenced. Multiple alignment was performed with some other cereal potyviruses and phylogenetic tree was depicted. Results showed that IJMV isolates were grouped with Zea mosaic virus (ZeMV) in the same clade. MDMV from Iran was grouped with European isolates of this virus. Another clade included BgSMV isolates and isolates of MDMV, although BgSMV isolates were grouped in a separate branch. Iranian isolates of SCMV were close to American and Australian isolates of this virus. In summary, five distinct potyvirus species, not to mention members of *Tritimovirus* and reed canary grass mosaic virus which infects *Phalaris arundinacea*, were detected on gramineous species in Iran. IJMV and MDMV infect Johnson grass and maize. BgSMV infects Bermuda grass and is restricted to southern warm regions of Iran. SCMV was only isolated from sugarcane in Iran. BgMV, a completely distinct virus, was detected on Bermuda grass and is widespread in temperate and cold regions of Iran. considerably.

Keywords: *Potyvirus*, *Potyviridae*, cereal potyviruses, maize, sugarcane, Bermuda grass, Johnson grass, Iranian *Johnson grass mosaic virus*, *Bermuda grass mosaic virus*, *Bermuda grass southern mosaic virus*, *Maize dwarf mosaic virus*, *Sugarcane mosaic virus*, *Zea mosaic virus*, cereal aphids.

See Persian text for figures and tables (Pages ۴۷-۴۴).

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