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Distribution and some biological and molecular properties of *Cauliflower mosaic virus* isolates from cauliflower fields in Iran

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ABSTRACT

A survey was conducted to determine the distribution of *Cauliflower mosaic virus* (CaMV) in cauliflower (*Brassica oleracea* var. *botrytis*) fields. A total of 323 symptomatic cauliflower leaf samples were collected during different growing seasons from 32 fields in six provinces of Iran. These samples were tested by enzyme-linked immunosorbent assay (ELISA) using specific CaMV-polyclonal antibody. Serological diagnosis was confirmed by biological and polymerase chain reaction (PCR) tests. Based on ELISA, 292 cauliflower samples (90.4%) were infected with CaMV, ranging between 63.6-100% in the surveyed fields. Biological diversity of 21 CaMV isolates from various regions and with different symptom severity was evaluated based on their reactions on turnip (*Brassica rapa*), jimpson weed (*Datura stramonium*) and kohlrabi (*B. oleracea var. gongylodes*) plants. These isolates caused a variety of symptoms on turnip, including local lesions followed by vein clearing, mosaic, vein banding, rugosity and stunting. The severity of systemic symptoms observed varied depending on the isolate. In contrast, symptoms produced by the same isolates in Kohlrabi plants were restricted to older leaves and were much milder. Kohlrabi plants infected by all isolates tested eventually showed recovery and became asymptomatic. Eleven isolates induced local lesions on jimpson weed, and for two isolates, these symptoms were

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followed by systemic infections. All 21 isolates studied, were transmitted by green peach aphid (*Myzus persicae*). For molecular studies, ORF VI gene of nine selected CaMV isolates were amplified using specific primers. Comparison of sequences of the amplified fragments revealed a high identity (96.9-100%) among Iranian isolates studied. Comparison of these sequences with those available at GenBank indicated the highest identities of these isolates with D/H isolate from Hungary (96.1-96.7%). Phylogenetic studies showed clustering of Iranian isolates in a separate branch, together with the non-North American isolates. The Iranian isolates were also well differentiated from other exotic isolates using *Hpy*99I restriction enzyme.

Key words: *Cauliflower mosaic virus*, *Caulimovirus*, ORF VI, nucleotide sequencing, DNA viruses, Crucifer viruses.

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