Disease Note

FIRST REPORT OF VANILLA DISTORTION MOSAIC VIRUS (VDMV) IN ORNAMENTAL *ZINNIA BICOLOR* IN INDIA

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Leaf samples of *Zinnia bicolor* plants showing virus-like symptoms such as mosaic and chlorotic rings were collected from Navsari (Gujarat), India. To characterize the presence of viruses, reverse transcription-polymerase chain reaction (RT-PCR) was carried out with a potyvirus degenerate primer pair (PNIbF1: 5'-GGBAAYAATAGTG-GNCAACC-3' and PCPR1: 5'GGGGAGGTGCCGTCTC-DATRCACCA-3') (Hsu *et al*., 2005) using total RNA obtained from symptomatic leaves. A single DNA fragment of approximately 1000 nucleotides (nts) covering the 3' end of the NIb gene and the 5' end of the coat protein (CP) gene was amplified. The DNA amplicon was cloned into pGEM-T vector and sequenced. The nucleotide sequence analysis (804 bp) revealed 82% identity with Vanilla distortion mosaic virus (VDMV). From this sequence, a specific VDMV primer pair (GKVDMVF: 5'-GGAAAGCTC-CATACATCTCGGAA-3' and GKVDMVR: 5'- CACGAG-GTGGAACCTCA CTA-3') was designed to amplify a 1100 nt RT-PCR product covering the entire CP gene (804 nts), part of the NIb region (143 nts) and part of the 5' end of the untranslated region (153 nts). The DNA amplicon was cloned, sequenced and submitted to GenBank as accession number KJ013533. Sequence analysis revealed 88% and 94% identity with VDMV from *Vanilla planifolia* (AY943945) in India at the nucleotide and aminoacid level, respectively. This is the first report of Vanilla distortion mosaic virus in ornamental *Zinnia bicolor*.

Hsu Y.C., Yeh T.J., Chang Y.C., 2005. A new combination of RT-PCR and reverse dot blot hybridization for rapid detection and identification of potyviruses. *Journal of Virological Methods* **128**: 54-60.

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Disease Note

FIRST REPORT OF *TOBACCO MOSAIC VIRUS* INFECTING CABBAGE IN IRAN

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Tobacco mosaic virus (TMV) is distributed worldwide in all areas where horticultural crops are grown. In 2011, commercial cabbage (*Brassica oleracea* var. *capitata*) fields in the Savejbolagh district of Alburz province in Iran showed mosaic and malformations on young leaves. Based on the symptoms and previous virus survey outputs in the region (Alishiri *et al*., 2013), the involvement of tobamoviruses in disease aetiology was suspected. A total of 55 symptomatic cabbage leaf samples were collected from different fields and tested by DAS-ELISA using specific TMV antisera (Bioreba, Switzerland). TMV was detected in 58% of the samples tested. Its presence was confirmed by RT-PCR using specific primers designed in the coat protein gene (Letschert *et al*., 2002) with amplification of a 694 bp fragment from ELISA-positive but not from ELISA-negative control samples. The RT-PCR product of a TMV isolate was sequenced and the nucleotide sequence was deposited in GenBank as accession No. KF527475. BLAST analysis showed 90% and 100% identity with the coat protein gene of other TMV isolates (AF516913, AJ429078, AY360447, HE818417) at the nucleotide and amino acid levels, respectively. A host range trial using infected cabbage leaf extracts as inoculum revealed characteristic TMV symptoms on mechanically inoculated *Chenopodium amaranticolor*, *Nicotiana tabacum* cv. Samsun and *Solanum lycopersicum*. TMV isolates induced chlorotic local lesions on inoculated leaves of *C. amaranticolor* and systemic mosaic and malformations in tomato and tobacco plants. Symptomatic herbaceous hosts tested positive for TMV antibodies in ELISA. To the best of our knowledge, this is the first report of TMV on cabbage in Iran.

Alishiri A., Rakhshandehroo F., Zamanizadeh H.R., Palukaitis P., 2013. Prevalence and evolutionary analyses of the coat protein gene of *Tobacco mosaic virus* in Iran. *The Plant Pathology Journal*. **29**: 260-273.

Letschert B., Adam G., Lesemann D.E., Willingmann P., Heinze C., 2002. Detection and differentiation of serologically cross reacting tobamoviruses of economical importance by RT-PCR and RT-PCR-RFLP. *Journal of Virological Methods* **106**: 1-10.

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