



# First report of potato virus M, potato virus Y and cucumber mosaic virus infection in *Solanum nigrum* in India

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Field surveys were conducted to explore the possible role of nightshade (*Solanum nigrum*) plants as reservoirs of common viruses in potato and tomato crops in the state of Punjab, India. A total of 30 nightshade plants exhibiting foliar symptoms like chlorosis, mosaic pattern, stunted growth and yellow spots were collected from three major tomato producing districts (Amritsar, Kapurthala and Patiala) in 2016 and 2017. Symptomatic plants tested positive for potato virus Y (PVY; genus *Potyvirus*, family *Potyviridae*) (three samples), potato virus M (PVM; genus *Carlavirus*, family *Betaflexiviridae*) (two samples) and cucumber mosaic virus (CMV; genus *Cucumovirus*, family *Bromoviridae*) (two samples) by DAS-ELISA using specific antibodies (Bioreba, Switzerland). Mixed infections of CMV and PVY and of PVY and PVM were observed in two samples. Virus isolates were characterized by reverse-transcription PCR (RT-PCR) using specific primers (designed from conserved regions of the capsid protein gene of respective viruses) and sequencing. Amplicons of the expected size were obtained for PVY (218 bp) (Zhang et al. 2013), PVM (524 bp) (Crosslin and Hamlin 2011) and CMV (518 bp) (De Blas et al. 1994). The sequences of PVY (MH208451), PVM (MH038049) and CMV (MH038051) isolates from nightshade plants shared 96–99% nucleotide identity with the capsid protein gene of PVY isolate S2 from potato in Colombia (MF176824.1), PVM isolate TZ:PVM12U1:11 from

potato in Tanzania (KC866622.1) and CMV subgroup II isolate WicDS from Italian honeysuckle in Poland (EU191027.1) respectively. To the best of our knowledge, this is the first report of PVM, PVY and CMV infection in *Solanum nigrum* in India.

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## Compliance with ethical standards

**Conflict of interest** Authors have no conflict of interest to declare.

**Ethical approval** This manuscript does not contain any studies with animals performed by any of the authors.

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