



First report of *Clerodendron yellow mosaic virus* on golden dewdrop (*Duranta erecta*) in India

M. Jaidi, S. Kumar, A. Srivastava and S.K. Raj*

Plant Molecular Virology Laboratory, CSIR-National Botanical Research Institute, Lucknow-226001 (U.P.), India

*E-mail: skraj2@rediffmail.com

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Golden dewdrop (*Duranta erecta*, Verbenaceae) is a species of flowering shrub and is commonly grown as an ornamental hedge plant in gardens. During a survey in August 2013, yellow mosaic disease was observed on *D. erecta* growing in several public gardens/parks at Lucknow, India (Latitude: 26° 55' N; Longitude: 80° 59' E) with disease incidence 80-90%. Infected plants exhibited severe yellow mosaic accompanied by upward leaf curl symptoms (Fig. 1A, B) and stunting in severely infected plants as compared to healthy plants (Fig. 1C). These symptoms reminiscent of a begomovirus infection reported previously on *D. erecta* in Pakistan (Iram *et al.*, 2004) and hence a similar infection was suspected. Twenty leaf samples from infected and four from healthy plants were collected from Goldmohar Park at Jankipuram, Lucknow, India and total DNA was isolated using a plant genomic DNA isolation kit (Sigma, USA). PCR amplifications were performed with begomovirus-specific degenerate primers (Rojas *et al.*, 1993) which resulted in the generation of amplicons of the anticipated size of ~1.2 kb in all samples from leaves showing disease symptoms and no amplicons from any of the four healthy samples suggestive of begomovirus infection in *D. erecta*.

To identify the begomovirus responsible for the infection, total DNA isolated from a representative sample was subjected to rolling circle amplification (RCA, TempliPhi kit, GE healthcare, USA) and the product was then digested with a range of restriction enzymes including *EcoRI*. Electrophoresis of the *EcoRI* digested product revealed a DNA fragment ~2.7 kb which was cloned into pCAMBIA1300 vector, sequenced and deposited in GenBank (Accession No. KR869857, MJGD1). Sequence analysis of isolate MJGD1 revealed 93-95% nucleotide identities with DNA-A of *Clerodendron yellow mosaic virus* (CIYMV): RKAS1 (KF704391) of *Bougainvillea peruviana* and IARI (EF408037) of *Clerodendron* spp. from India, and SA23 (HE863667) of *Croton* spp. from Pakistan. It also showed close phylogenetic relationships with these CIYMV isolates (Fig. 2) suggesting that begomovirus isolated from *D. erecta* is a new strain or species of CIYMV designated as CIYMV-ECR[IN:LKO:DE:13]. To assess the prevalence of CIYMV in *D. erecta*, total DNA was extracted from 28 symptomatic samples collected from seven public gardens at Lucknow and tested by nucleic acid spot hybridisation (NASH) tests using an α -³²P radioactive labelled probe

prepared from cloned CIYMV (KR869857). NASH resulted in positive signals from 27 out of 28 samples, indicating the prevalence of CIYMV in 96.4% *D. erecta* plants.

Begomoviruses are associated with leaf curl disease in *D. erecta* (Iram *et al.*, 2004); *Catharanthus yellow mosaic virus* in *D. repens* (Mustujab *et al.*, 2015) and *Tomato leaf curl New Delhi virus* in *D. repens* (Tahir *et al.*, 2006) from Pakistan. CIYMV has been reported on *B. peruviana* (Nehra *et al.*, 2014) and *C. inermis* (Sivalingam *et al.*, 2011) in India, but to the best of our knowledge this is the first report of natural occurrence of CIYMV on *D. erecta* in India.

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Figure 1

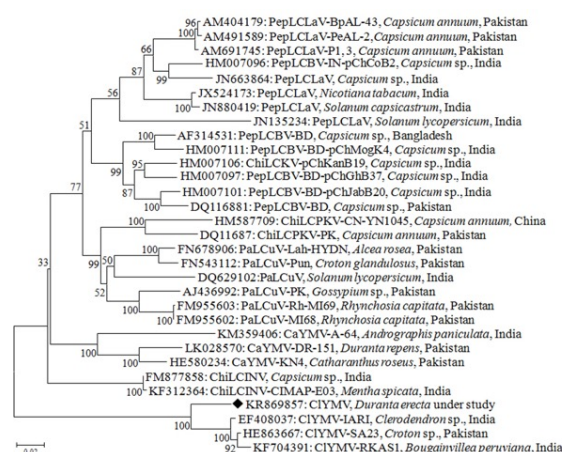


Figure 2

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