New Disease Reports

First report of *Canna yellow mottle virus* on *Canna* from India

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Canna (*Canna indica*) is a popular landscape plant known for its attractive foliage and flowers and is grown in tropical and subtropical countries including India. Various cultivars of canna are being maintained as germplasm at the Botanic Garden, NBRI, Lucknow. During a survey in September 2012, necrotic striping, severe veinal chlorosis, yellow mosaic and veinal streaking symptoms were observed on the leaves of different canna cultivars (Fig. 1a-d), with the disease incidence between 17 and 35% at NBRI. Subsequently, similar symptoms were found on canna in other gardens in Lucknow. Symptoms observed were similar to those described previously for canna yellow mottle disease and associated with *Canna yellow mottle virus* (CaYMV) (Pappu *et al*., 2008; Marino *et al*., 2008).

For virus detection, total genomic DNA was isolated from leaf samples of 13 plants with symptoms and one without, and subjected to PCR using CaYMV specific primers (CaYMV-3 and CaYMV-4; Momol *et al*., 2004). PCR resulted in an amplicon of the expected size (~550 bp) in all the 13 samples with symptoms, but not in the sample from the symptomless plant, indicating the presence of CaYMV in the diseased plants. Subsequently the 13 amplicons obtained from 10 different cultivars of *Canna indica* and *C. flaccida* were cloned, sequenced and deposited in GenBank (Table 1). These accessions, in BLASTn analysis, were shown to share 93-99% nucleotide sequence identity with the available CaYMV isolate sequences from around the world. Further, phylogenetic analysis of sequences under study by MEGA5.1 (Tamura *et al*., 2011) using a neighbour-joining method clearly clustered them together with CaYMV (Fig. 2). Based on sequence comparison and phylogenetic analysis, the virus isolates in this study were identified as CaYMV. To the best of our knowledge, this is the first report of natural occurrence of CaYMV on canna from India. CaYMV may be considered as posing a phytosanitary risk for further spread in canna since it is being propagated through suckers or rhizomes.

Figure 1

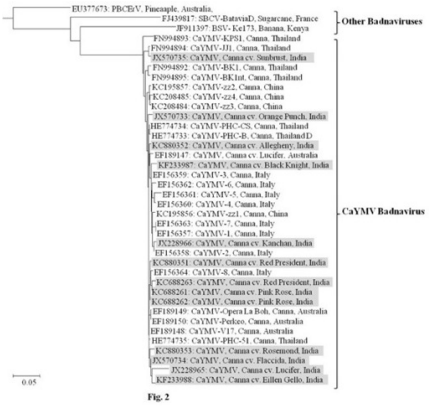

Figure 2

Table 1. Details of *Canna yellow mottle virus* sequences isolated from different cultivars of *Canna* spp., submitted to GenBank database.

Isolate	Accession number	Species/cultivars of canna	Sequence length (bp)
AK -1	JX228965	*Canna indica cv.* Lucifer	565
AK-2	JX228966	*C. indica cv.* Kanchan	565
AK-3	JX570733	*C. indica cv.* Orange Punch	565
AK-4	JX570734	*C. flaccida*	565
AK-5	JX570735	*C. indica cv.* Sunburst	565
AK-6	KC688261	*C. indica cv.* Pink Rose	441
AK-7	KC688262	*C. indica cv.* Pink Rose	529
AK-8	KC688263	*C. indica cv.* Red President	472
AK-9	KC880351	*C. indica cv.* Red President	565
AK-10	KC880352	*C. indica cv.* Allegheny	565
AK-11	KC880353	*C. indica cv.* Rosemond Coles	565
AK-12	KF233987	*C. indica cv.* Black Knight	525
AK-13	KF233988	*C. indica cv.* Eileen Gallo	486

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