



First report of '*Candidatus* Phytoplasma australasia'-related strains associated with disease of *Jasminum multiflorum* in India

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Jasminum multiflorum (cv. Star Jasmine; family Oleaceae) is an important ornamental shrub native to South-East Asia. It is cultivated across the tropics for its ornamental value, in particular its fragrant, beautiful white flowers. During February 2020, symptoms of leaf yellowing and the premature decline of inflorescences were observed on 6.5% of plants grown in home gardens (Figs. 1-2) in the Uttara Kannada district of Karnataka state, India.

Four symptomatic and two symptomless plants were subjected to genomic DNA extraction using the CTAB method. Nested PCR was performed with universal phytoplasma 16S rRNA primers P1/P7 (Deng & Hiruki, 1991; Schneider *et al.*, 1995) and R16F2n/R16R2 (Gundersen & Lee, 1996). A DNA extract from the periwinkle virescence phytoplasma of group 16SrI, '*Candidatus* Phytoplasma asteris' (MN223677) was used as the positive control. Amplification of the 16S rRNA gene was obtained only from symptom-bearing jasmine and the positive control, but not from the symptomless plants. The nested PCR products (~1.25kb) were purified and sequenced directly. Sequences were compared to those of reference phytoplasmas and subjected to *in silico* RFLP with iPhyClassifier (Zhao *et al.*, 2009) and phylogenetic analysis using the neighbour-joining method of MEGA X (Kumar *et al.*, 2018). The R16F2n/R16R2 gene sequences of the *J. multiflorum* phytoplasmas (GenBank Accession Nos. MW049328-MW049329) showed 99.9-100% sequence identity with those of the reference phytoplasmas of the former Peanut witches' broom (16SrII) group, '*Candidatus* Phytoplasma aurantifolia', including '*Ca. P. australasia*' (Y10097). The virtual RFLP profiles of both *J. multiflorum* phytoplasmas were identical to each other and to those of the '*Ca. P. australasia*' related strain (Y10097) of the 16SrII-D subgroup with a similarity coefficient of 1.00. The phylogenetic tree confirmed that the *J. multiflorum* phytoplasmas were closely related to the 16SrII-D, '*Ca. P. australasia*' strain cluster (Fig. 3). Based on the results of the 16S rDNA nucleotide sequence comparison, phylogenetic and RFLP analyses, the *J. multiflorum* phytoplasmas associated with inflorescence yellowing and premature decline were identified as strains of the '*Ca. P. australasia*', 16SrII-D subgroup.

Phytoplasmas of 16SrII, 16SrXI ('*Ca. P. oryzae*') and 16SrI ('*Ca. P. asteris*') groups have been reported previously affecting *J. sambac* in Oman and India (Al-Zadjali *et al.*, 2007; Madhupriya *et al.*, 2015; Gopala & Rao, 2018). However, this is the first report of the association of '*Ca. P. australasia*' affecting *J. multiflorum* in India. Considering the economic importance of jasmine for the ornamental industry, this report provides

significant information to support informed phytosanitary measures to prevent the spread of '*Ca. P. australasia*' to nearby jasmine and other important members of the Oleaceae.

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Figure 1



Figure 2

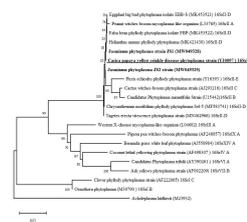


Figure 3

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