



First report of a phytoplasma associated with a witches' broom disease in tomato in Alhasa, Saudi Arabia

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Tomato (*Solanum lycopersicum*) is a very valuable crop grown in open fields and protected houses in Saudi Arabia. The cultivated area of tomato in Saudi Arabia is estimated at 15,127 hectares, with an annual production of 542,589 tonnes in 2009, with 15% grown in Alhasa (Anonymous, 2010). In 2010, leaf samples of tomato plants showing witches' broom symptoms were randomly collected from both protected houses (10 samples/protected house) and tomato in open fields (20 samples) throughout Alhasa. (Samples taken for analysis included tomato plants showing no symptoms.)

Samples were analysed for the presence of the gene coding for phytoplasmal 16S ribosomal RNA (16S rRNA). Total DNA was extracted from midribs (DNeasy Plant Mini Kit (Qiagen, UK) and used as a template in a nested PCR reaction with primers P1/P7 (Deng & Hiruki, 1991), followed by primers R16F2n/R16R2 (Gundersen & Lee, 1996) in the nested reaction. Six samples from protected houses and fourteen from tomato fields yielded PCR amplicons of expected size (1,200 bp) by nested PCR, while no PCR products were obtained for the symptomless plants. Three P1/P7 PCR products (approximately 1,800 bp) were purified (one from a protected house and two from tomato fields) (QIAquick Gel Extraction Kit, Qiagen, UK) and directly sequenced. The P1/P7 sequences obtained were 100% identical with each other and the consensus sequence was deposited in GenBank (Accession No. HM584815). Phylogenetic analysis of the 16S rDNA sequence placed the tomato witches' broom phytoplasma (TWB) as a member of the Peanut witches' broom (16SrII) group (*Candidatus Phytoplasma aurantifolia*) since its 16S rDNA sequence showed a 99% of identity with those of most of members of this group (Fig. 1). A member of the 16SrII group has been previously associated with a witches' broom disease in alfalfa in Alhasa, Saudi Arabia (Alhudaib, 2009) and Oman (Weintraub & Jones, 2010), and with witches'

broom-like diseases in other crops in the Middle East region, including Iran, Lebanon and Israel (Weintraub & Jones, 2010). To our knowledge, this is the first record of a 16SrII phytoplasma associated with a witches' broom disease in tomato in Alhasa, Saudi Arabia. The results represent significant impact on the tomato industry in Alhasa and its region.

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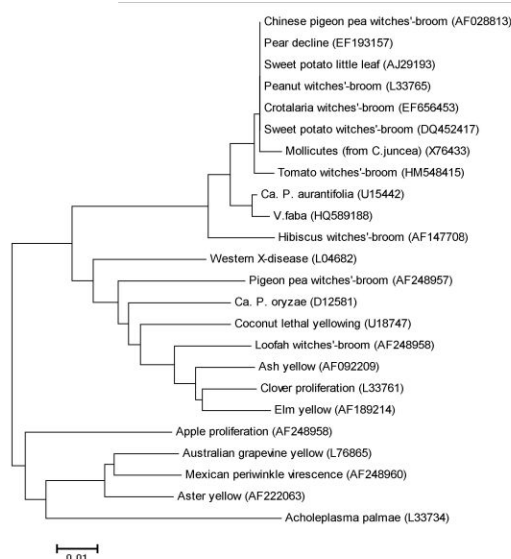


Figure 1

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