Diseases Caused by Bacteria and Phytoplasmas

Lilac Tasselflower (*Emilia sonchifolia*) Is a New Host for Peanut Witches' Broom Phytoplasma, a 16SrII-V Subgroup Strain in Taiwan

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Lilac tasselflower (*Emilia sonchifolia*) is an annual herbaceous plant that belongs to the family of Asteraceae. Lilac tasselflower is widely distributed at mid-low altitude regions in Taiwan and is commonly used as traditional herbal medicine for the treatment of inflammation, rheumatism, and dysentery and as an analgesic. In March 2020, disease symptoms such as shoot proliferation, phyllody, and witches' broom were observed on lilac tasselflower at the Sansheng community park in Mailiao, Yunlin County, Taiwan. In total, four lilac tasselflower plants were checked, and half of them were symptomatic. At the same area, similar symptoms associated with peanut witches' broom (PnWB) disease were observed (Liu et al. 2015). Samples including one healthy and two symptomatic lilac tasselflower plants were collected for total DNA and protein extraction, which were used for PCR and western blotting assays, respectively. First, two sets of phytoplasma universal

primer pairs P1/P7 and R16F2n/R16R2 were used to perform nested PCR for detection of 16S ribosomal RNA (rRNA) gene (Lee et al. 1993). A specific signal of expected size (1.2 kb) for 16S rRNA was only detected in samples of lilac tasselflower exhibiting disease symptoms. The amplified DNA fragment using primer pair P1/P7 was partially sequenced (accession no. MT420682) with P1 and a nested primer (5'-GGGTCTTTACTGACGCTGAGG-3'). The 1.4-kb nucleotide sequence shares 100% identity with that of GenBank accession NZ_AMWZ01000008 (complement [31109 to 32640]) of phytoplasma associated with PnWB disease (Chung et al. 2013). In further analysis by iPhyClassifier, the virtual restriction fragment length polymorphism pattern of MT420682 confirmed that the phytoplasma detected in symptomatic lilac tasselflower could be classified into the 16SrII-V subgroup. For western blotting, total protein of each sample was examined using the polyclonal antibody raised against Imp protein of purple coneflower witches' broom phytoplasma (Chien et al. 2020), which shares 100% identity with that (accession no. ADD59806) of PnWB phytoplasma. A specific signal of expected size (19 kDa) for Imp was detected in symptomatic lilac tasselflower but not in healthy lilac tasselflower. Subsequent PCR, DNA sequencing, and western blotting assays further confirmed that the gene encoding a SAP11-like protein detected in samples of lilac tasselflower exhibiting disease symptoms is identical to that (accession no. EMR14684) of PnWB phytoplasma. Our results indicated that lilac tasselflower, which is recognized as a common weed in Taiwan, may facilitate the spreading of phytoplasma disease by acting as an alternative natural host for PnWB phytoplasma.

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