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Evidence for translocation of Weligama Coconut Leaf Wilt Disease (WCLWD) causing phytoplasma through phloem tissues and systemic infection in affected coconut palms

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Weligama Coconut Leaf Wilt Disease (WCLWD) is currently, the most threatening coconut disease especially in Southern Sri Lanka. The pathogen causing WCLWD has been identified as *Candidatus* phytoplasma, which also causes Sugarcane White Leaf or Grassy Shoot disease. Phytoplasma moves through phloem sieve tubes and accumulate in sink tissues. As all phytoplasma are vector transmitted, the primary infection sites are the young leaves. The objectives of this study were to determine the movement of phytoplasma within the WCLWD affected coconut palms and confirm the systemic nature of the infection. Six mild to moderate symptomatic WCLWD coconut palms were selected from a disease-affected site at the Weligama area for tissue sampling. Bud leaves, young inflorescences and root tissues were sampled at each of the two sampling rounds done at one-year interval. All together 12 each of bud leaves, young inflorescences and root samples were subjected to nested PCR using previously published phytoplasma specific universal primers targeting 16S rRNA region after extracting genomic DNA. Out of the total samples tested, PCR was positive for 83% of bud leaves, 25% of young inflorescences and 8% of root tissue samples. Selected positive PCR products of 880 bp size were subjected to Sanger sequencing and BLASTn search results re-confirmed the presence of “Sugarcane White Leaf” or “Sugarcane Grassy Shoot” disease phytoplasma, which was previously identified as the causal agent of WCLWD in all three types of tissues tested with 99-100% similarity. All the sequences obtained from the current study were mostly identical to each other (MZ822428 and MZ822429). The presence of phytoplasma in young inflorescences and root tissues confirmed the movement of phytoplasma from the bud leaf to the other parts of the WCLWD affected coconut palms confirming the systemic nature of the pathogen. Findings of this study is important in planning disease management strategies.

Keywords: Coconut, Nested PCR, Phytoplasma, WCLWD