Advancing Sustainable Citrus Greening Disease Management: A Comprehensive Eco-Friendly Approach for the Management of Candidatus Liberibacter asiaticus Using Trunk Injection of Murraya koenigii Derived Biological Extract and Its Validation Through Precision Agriculture Tools

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Huanglongbing (HLB), or the Citrus Greening (Candidatus Liberibacter asiaticus), is the most destructive citrus disease worldwide and persists in threatening the sustainability of the Citrus Industry in numerous regions. Currently, no pesticide is registered to cure this disease besides the antibiotic Oxytetracycline and streptomycin sulphate under the emergency label section 18. The curry leaf tree, Murraya koenigii, is highly attractive to the Asian citrus psyllid, Diaphorina citri, which vectors the bacterial causative agent of citrus greening disease, but it is not a carrier of greening disease. In this experiment, curry leaf extract was used to treat greening infected trees through trunk injection, with Oxytetracycline as the standard control. PCR was performed at the end of the experiment, and an increase in Ct value (10%) was observed in curry leaves extract-treated trees and Oxytetracycline. NDVI index through rapid scan CS45 also showed more than a 15% increase, confirmed with canopy physical measurement where the plant height width increased by 7.5 % and 12%. LI-600 was used to measure the stomatal conductance and chlorophyll content. The chlorophyll content was higher in curry leaves extract by 23% and 4% as compared to UTC and OTC, respectively, and no difference was observed in stomatal conductance. Among the different rates (2% to 5%) of curry leaves extract, 4% rate was found to optimal. Based on the findings, curry leaves extract can be an effective and sustainable solution for citrus greening disease management, bolstering the global citrus industry. The experiment will be repeated in the coming season to validate the current findings and experimental plants will be observed for the next two years as a continuation of this experiment.

Awards Won:

First Award of $5,000

H. Robert Horvitz Prize for Fundamental Research