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Evaluation of Thermotherapy against Huanglongbing (Citrus Greening) under Laboratory Conditions

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Huanglongbing (HLB, citrus greening) is the most destructive disease of citrus. The disease is associated with "*Candidatus* Liberibacter asiaticus". Few management options are available, besides preventive measures such as the removal of affected plants, planting disease-free stock and maintaining vector-free production in quarantine areas. In this study, we assessed the efficacy of thermotherapy against the disease under controled laboratory conditions. A total of sixty, 2-year old graft-infected *Citrus reticulate* Blanco seedlings were used for the study. The plants were randomly divided into 3 treatment groups (45, 48°C, and untreated), with 5 plants/rep, 4 reps/trt. The treated plants were placed in temperature chambers for a 4-h treatment sessions, repeated weekly 3 times. Disease remission was observed beginning 8 weeks post-treatment. Real-time PCR assays revealed that pathogen "*Ca*. L. asiaticus" concentration of all HLB-affected seedlings were significantly reduced except for 8 plants under 45 and 48°C treatments at 4 weeks after treatment. In contrast, pathogen concentration in the untreated control plants exhibited a significant increase, with the highest increase of about 30-fold compared to the initial pathogen concentration (pre-treatment). Except for 7 plants (7 out of 40 total plants), pathogen concentration in the new flushes of the treated plants decreased 90% at ca. 8 weeks after treatment, compared to the initial pathogen concentration. Nested and real-time PCR were used for confirmation of HLB infection in the seedlings, and for pathogen titer assessment. Although the result is considered preliminary, it provides a foundation for further work in developing the technique for HLB management. Complementary work will include exploration of additional exposure time and temperature combinations as well as treatments using commercial field settings.