10.1 Trunk Injection of Copper Sulfate Pentahydrate (Magna-Bon) Affects Expression of HLB

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HLB is caused by a phloem-limited bacterium that is unlikely to be directly contacted by bactericides such as copper (Cu) formulations applied to the plant surface. The objective was to evaluate trunk injections of soluble Cu in Magna-Bon (M-B). The trial was located in a south Florida grove of 5-year-old Hamlin orange trees that were healthy (PCR-), asymptomatic (PCR+ without symptoms), and PCR+ with mild decline. Six treatments of 24 trees consisted of non-treated check (NTC); 1 M-B injection @ 8,000 ppm; 1 M-B injection @ 1,000 ppm; 2 M-B injections @ 1,000 ppm; 6 M-B injections @ 1,000 ppm; or 6 M-B injections @ 500 ppm. Trunk injections of 3-5 ml per tree were made at 1- or 3-month intervals, depending on treatment. Trees were assayed by PCR to estimate bacterial infection and HLB canopy symptoms were visually assessed before and at 5 months after injections began in April 2009. All M-B treatments produced changes in canopy ratings that reflected positive response compared to no change for the NTC trees. Ct values for the NTC trees indicated positive HLB status, whereas Ct’s for M-B treated trees were significantly higher and indicated negative or threshold bacterial infection. High leaf Cu in all treatments indicated overspray of the trees with Cu bactericide. Alternatively, a bioassay for systemic copper activity was conducted with expanding fall flush by injection-infiltration of detached leaves with \textit{Xanthomonas citri} subsp. \textit{citri} (Xcc). Canker lesions were reduced in leaves of M-B treated versus NTC trees, confirming Cu from M-B is systemic in the tree.