Huanglongbing: Development of Information Needed for Avoidance/Management

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This is year one of a three-year project having five objectives. The purpose of this project is to provide information that is critical to avoiding HLB in California and to gain practical information that would enable better management of HLB should it appear in California in the future.

1). Determine if thermotherapy and/or shoot tip grafting eliminates huanglongbing (HLB) in budwood: Preliminary results suggest that the standard protocol of thermotherapy for citrus is not efficient at removing HLB in sweet orange. Modifications of the protocol are being evaluated.

2). Determine seasonal fluctuations in the infectivity of psyllids in Florida where the psyllid is now flourishing: From testing of psyllids from Brazil and Florida for presence of HLB, we are finding the psyllid population corresponds with the amount of young flush on the trees, but a higher percentage of the psyllids having HLB are higher in the fall season when the psyllid population is lower.

3). Determine incidence of HLB occurring in Murraya in areas where HLB is endemic, evaluate Murraya species to determine genetic relationships between *M. paniculata* and *M. exotica*: DNA extractions from both Florida and Brazil are being tested. To determine the genetic relationships among species of *Murraya*, short fragments of chromosomal DNA and chloroplast DNA regions are being sequenced and com- pared. The DNA extractions are also being tested for presence of HLB. Preliminary results suggest that the species of *Murraya* present in California would be susceptible to HLB.

4). Fruit as a source of HLB inoculum for psyllid vectors: This evaluation has been done in Brazil with cooperators, and the results are still pending. The removal of HLB as a Select Agent on November 17, 2008 will facilitate conducting these experiments in Florida now.

5). Determine if sources of tolerance exist in diverse germplasm of Citrus and citrus relatives: Samples have been collected from the 324 citrus varieties in the Florida DPI arboretum, Winter Haven, FL, in March and October, 2008. DNA has been extracted from the plant samples and are being evaluated for presence of HLB. Thus far, four varieties have been confirmed to be HLB infected, but psyllid nymphs (which must feed on the plant they are located on and do not move from plant to plant) collected from several other varieties have been HLB positive indicating that these varieties will develop HLB symptoms and test HLB positive in the future. With Ed Stover, USDA-ARS, Ft. Pierce, FL, we are preparing 110 citrus varieties and relatives from seed sent from the Repository. These seedlings will be planted in the field this spring (2009) when the danger of frost is past, and will be evaluated for incidence of HLB on a recurring, regular schedule to determine occurrence of HLB and relative concentration of the HLB in the plants when it does occur.

Murraya paniculata *from Homestead area, Florida, which was asymptomatic in March 2008 but showing decline in October 2008. The decline appears to be associated with HLB.*