

A Rapid Field Detection of Liberibacter Bacteria using Lateral Flow Technology

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Citrus huanglongbing (HLB) is a serious disease that threatens the multi-billion dollar California citrus industry. Within ten years of introduction, it killed over fifty percent of the industry in Florida and Brazil. Known in India and China for over a century, the disease is caused by an unculturable bacterium, *Candidatus Liberibacter asiaticus*, and is spread by a psyllid vector. Since there are no methods to control the disease, early detection of the pathogen in the psyllid vector followed by management practices will help prevent HLB. Current pathogen testing requires an expensive qPCR method. I have developed a simple inexpensive dipstick method to test the pathogen in psyllids. Since the disease is not present in CA, I used a tomato model system to detect a similar Liberibacter from psyllids that spread tomato psyllid yellows disease. Pathogen DNA is amplified from crushed psyllids and detected using lateral flow technology. 'Point of need' testing developed here can be done with a \$20 set up; cost per reaction will be under \$2, enabling large scale testing by growers without requiring any expensive equipment or scientific training. Current practice of indiscriminate pesticide use to control the insect results in pollution of the environment and is not sustainable. With the method developed here, psyllids can be tested by interested people and disease control will be possible. I have also developed tests that can detect variants of the pathogen so that escapes due to limitation of the PCR test will not result in epidemics. It is vital to detect all variants of the pathogen, absence of such methods has resulted in disease outbreaks in Brazil and Colombia. 'Point of need' testing is very beneficial and can be developed for agriculturally important plant diseases.

Awards Won:

First Award of \$5,000

American Committee for the Weizmann Institute of Science: Third Award of \$1,000