Molecular Detection of the Causal Agent of
Almond Brown Line Disease

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PROJECT SUMMARY

Objectives:

The goal of this project is to develop a DNA-based method for the detection of a pathogen causing almond brown line disease, which will be a tool for certification of plant material and reduce disease incidence. Steps to accomplish this include:

- Molecular characterization of the phytoplasma associated with almond brown line disease.
- Develop specific primers for quantitative real time PCR and monitor the titer of PYLR phytoplasma in peach and almond trees maintained at UCD orchard.
- Obtain diseased leaf samples from symptomatic trees in the spring, summer, and fall to assess the best time to sample the trees for the detection of phytoplasma.

Background and Discussion:

Almond brown line disease causes death of affected young trees within a year or two. Diseased trees showed bark split, union disorder and a brown line consisting of necrotic phloem tissue.

Molecular analysis done on nucleic acid extracts using polymerase chain reaction (PCR) has indicated that the association of a phytoplasma closely related to peach yellow leaf roll phytoplasma (PYLR). There are no chemical control options to manage almond diseases caused by phytoplasmas.

Diseased almond trees have been observed primarily when rooted on Mariana 2624, a plum rootstock. Marianna is useful for marginal soils and has some resistance against a number of soil-borne pests.

Yearly surveys were conducted in 2010 and 2011 in a commercial orchard in Sutter County affected by ABL in 2008. Development of almond brown line (ABL) in fourth (Year 2010) and fifth leaf trees (Year 2011) was not seen indicating brown line disease did not spread horizontally in almond orchards. It appears that the disease is self-eliminating because trees die and removal of symptomatic trees and replanting healthy trees can overcome the impact of ABL in young almond orchards.

Given that the phytoplasmas can be transmitted via infected scion material, it would be useful to have a method for assessing the source of wood which might be infected. A sensitive detection method would permit the certification of plant material as phytoplasma-free, thus reducing transmission.

The goal of this project is to analyze DNA from symptomatic trees to develop a DNA-based method for disease detection. The CDFA Nursery Improvement Advisory Board (IAB) is co-funding this effort, as a detection method could be a tool used in clean plant certification programs.

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Project Cooperators and Personnel: Franz Niederholzer, UCCE - Yuba / Sutter & Colusa Counties; Jerry Uyemoto, USDA/ARS (emeritus), Davis

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For More Details, Visit

- 2011.2012 Annual Report CD (11.PATH9.Sudarshana); or on the web (after January 2013) at www.almondboard.com/researchreports