Identification of Almond Rootstocks with Resistance to *Armillaria* Root Disease

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PROJECT SUMMARY

Objectives:

- Identify *Armillaria*-resistant rootstocks for almond, by first screening a set of commercially-available *Prunus* rootstocks
- Determine the relationship between the results of our infection assays in the lab and field observations

Background and Discussion:

Armillaria root disease affects all almond regions of California. The causal fungus, *Armillaria mellea,* colonizes and kills the roots, and then decomposes the root wood as its source of nutrition. Such destruction to the roots significantly reduces crop yield and growth, inhibits nutrient and water uptake from the soil, and eventually kills infected trees. Fumigants like methyl bromide are only effective to the limited extent that they reach and penetrate residual roots. Systemic fungicides are also ineffective, as has been demonstrated in almond, in part because fungal decomposition of the root crown disrupts systemic movement of fungicides through the vascular tissue. Instead of re-tooling these same, ineffective tactics, we propose to identify resistant rootstocks as an effective, long-term solution.

Unfortunately, unreliable infection in the greenhouse has been a bottleneck to *Armillaria* research. The lack of a rapid and reliable infection assay is why resistant rootstocks have not been identified for the majority of tree crops.

We take a different approach to develop a rapid and reliable infection assay for screening rootstocks in the lab. We grow plants in tissue-culture medium, which supports both the plant and the pathogen. With this infection assay, we have overcome the major barriers of the greenhouse approach, namely, eliminating 'escapes', and bringing about consistent and repeatable levels of mortality.

Currently, we are micro-propagating the following rootstocks for inoculations:

Empyrean 1 (Barrier 1)
Lovell
Nemaguard
Bright 5
Hansen 536
Krymsk 1 (VVA 1)
Krymsk 86 (Kuban 86)
Marianna 2624

Screening this set of rootstocks is an important first step toward identifying *Armillaria*-resistant rootstocks for almond. It is an experiment that we can accomplish in a relatively short period of time. However, we recognize that growers need more evidence than just lab trials to have confidence that the results will hold in the field. Accordingly, a future stage of the research is to establish field trials, based on our findings in the lab.

Project Cooperators: Craig Ledbetter, USDA-ARS, Parlier; Roger Duncan, UCCE-Stanislaus County; Joe Connell, UCCE-Butte County; Javier Castillon, Duarte Nursery/Dry Creek Laboratories, Hughson, CA; Malli Aradhya, USDA-ARS, Davis

For More Details, Visit

- Poster location 19, Exhibit Hall A & B during conference; or on the web (after January 2013) at www.almondboard.com/researchreports
- Related Projects: 12.PATH1.Browne.2012 ; 11.HORT16.Aradhya/Ledbetter; 12.HORT4.Duncan