

# Identification of Almond Rootstocks with Resistance to Armillaria Root Disease

**Project Leaders: Roger Duncan<sup>1</sup> & Kendra Baumgartner<sup>2</sup>**

<sup>1</sup>University of California Cooperative Extension, Stanislaus County, 3800 Cornucopia Way (#A), Modesto, CA 95358 (209) 525-6800, raduncan@ucdavis.edu

<sup>2</sup>USDA-ARS, Dept. of Plant Pathology, One Shields Avenue, 354 Hutchison Hall, Davis, CA 95616-8680. (530) 754-7461 kbaumgartner@ucdavis.edu

## PROJECT SUMMARY

### Objectives for current year:

- Continue our large potted-tree assay to confirm results from a previous laboratory assay, which identified *Armillaria*-resistant rootstocks.
- To screen additional rootstocks that were not included in the lab assays.

### Background and Discussion:

Armillaria root disease (oak root fungus) affects all almond regions of California. The standard resistant rootstock commonly used in oak root fungus infested soils is Marianna 26-24. M 26-24 has many undesirable characteristics, including incompatibility with Nonpareil, propensity for root suckers, and low vigor, especially in sandy soils. An alternative rootstock for ORF infested soils is badly needed.

In 2012, assays from the Baumgartner Lab indicated that Krymsk 86 may be at least as resistant to oak root fungus as the standard rootstock, Marianna 26-24. Peach rootstocks, including Nemaguard, and peach x almond hybrid rootstocks, including Brights and Hansen, proved to be highly susceptible. Although the lab results were promising, the results need to be confirmed under conditions more similar to the field.

In October 2015, twenty-five potted sapling trees of each test rootstock were acquired from commercial nurseries and then replanted into large growing containers. Pots were inoculated with live cultures of *Armillaria mellea*, after which the trees were grown outside for one year.

Rootstocks being screened in this project include:

- Nemaguard (peach)
- Empyrean 1 (peach hybrid)
- Hansen (peach x almond hybrid)
- Marianna 26-24 (plum)
- Marianna-40 (plum)
- Viking (peach, almond, plum & apricot)
- Atlas (peach, almond, plum & apricot)
- Krymsk 86 (peach x plum hybrid)
- Citation (peach x plum hybrid)
- Rootpac R (plum x almond hybrid)
- SAM-1 (probably an almond hybrid)

During the spring of 2016, ten trees showed signs typical of Armillaria root rot disease (rapid decline and collapse of above-ground portion of trees). Affected trees were exhumed and sent to the Baumgartner Lab for disease confirmation. Isolation of the pathogen by the Baumgartner Lab confirmed that these trees were infected with *Armillaria mellea*. Although encouraging, infection rate was too low to reach solid conclusions regarding rootstock susceptibility. Signs of disease occurred during March and April, after which no more trees have shown signs of root disease. Trees will continue to be monitored through April, 2017. At the end of the trial, surviving trees will be harvested and examined for incidence and severity of root / crown infection by the fungus. This study will be repeated in October 2016. In addition to inoculating with lab-prepared inoculum, infected roots from a local orchard will be chipped and incorporated into the planting medium in an attempt to increase the rate of infection.

### For More Details, Visit

- Poster location 49, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- 2015 - 2016 Annual Reports CD (15-PATH7-Duncan-Baumgartner); or on the web (after January 2017) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- Related projects: 16-HORT10-Gradziel; 16-HORT16-Aradhya/Ledbetter; 16-AIR9-Doll; 16-AIR5-Gao/Doll; 16-PATH1-Browne (COC), 12-PATH7-Baumgartner