

Investigating Incidence and Type of Wood Decay Fungi in Almond

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PROJECT SUMMARY

Objectives for current year:

- Identify the main fungi associated with heart-rot diseases of almond in California
- Determine the infection process in orchards

Background and Discussion:

Wood decay fungi reduce the structural integrity of trees, leading to wind-driven collapses or “windfalls”, causing almond tree loss and lost production in many parts of California. Wood decay is caused by a wide array of fungi that colonize and digest the heartwood, and sometimes sapwood, in living trees. The last survey of heart-rot diseases in California nut and fruit crops was conducted in 1988 by Adaskaveg and Ogawa. While this survey provided information on the identity of the major fungal species associated with heart-rot, it has had limited impact on disease control. Since this survey was completed the acreage of almond has more than doubled and new production techniques are allowing an expansion of land suitable for almond cultivation. For many decay fungi, there is not a clear understanding of the early stages of infection. This includes the source of inoculum, timing of infection, possible latent period, and specific virulence. The etiology (cause) and biology of heart-rot diseases in orchard trees is overall poorly understood.

This project is investigating the main fungal associates with these diseases as well as their dissemination pathways and infection patterns within the individual tree and the orchard. It also aims to investigate infection processes as well as

factors favoring tree susceptibility to disease including tree age, environmental conditions, and cultural practices.

Cooperating growers were identified in Butte, Colusa, Yuba, and Yolo counties, and preliminary disease surveys began in the Fall of 2014. Individual fallen trees are being sampled as they become known. Using a chain saw approximately 1.5 inch wafers are cut from various points up the trunk of the tree. Additional saw-cut “cookies” are collected from one or several scaffold limbs.

A recently removed orchard was also sampled shortly when trees were still windrowed, giving us access to exposed root systems. We evaluated every tenth tree in every fifth row by assigning a disease severity rating from 0 (no evidence) to 4 (severe rot) to the root mass and each of four cuts: directly below the graft union, directly about the graft union, 24 inches above the graft, and in a scaffold branch. We collected representative samples and are currently culturing them for identification.

In early 2016 young almond trees will be inoculated with fungi identified in preliminary surveys. Trees will be observed for outward signs of the disease over the course of 2016 and the trees will be destructively sampled after one year, to determine virulence and rate of spread within the tree. The survey will allow us to reassess the fungal diversity associated with heart-rot diseases and will provide the baseline for completion of further objectives.

Project Cooperators and Personnel: Bob Johnson and Neil McRoberts, UC Davis; Franz Niederholzer, UCCE-Yuba/Sutter/Colusa Counties; Danielle Lightle, UCCE-Glenn County; Dave Doll, UCCE-Merced County; Florent Trouillas, UCCE-Kearney Ag Center; Matteo Garbelotto, UC Berkley

For More Details, Visit

- Poster location 23, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2016) at Almonds.com/ResearchDatabase