Band Canker Detection in Young Almond Trees Before Planting or Just After Planting in the Field Before Disease Symptoms Appear

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PROJECT SUMMARY

Objectives:

1. Determine latent infection by canker-causing fungi in nursery stock plants.
2. Determine latent infection 1, 2, and 3 years after planting the trees in the orchard.
3. Initiate fungicide treatments to protect nursery stock plants from such infection before planting and/or in the early age (1, 2, and 3 years) of trees after planting in the field.

Background and Discussion:

Band canker of almond is caused by seven different fungal species in the family of Botryosphaeriaceae. Approximately a decade ago, we noticed that in a 3-year-old Nonpareil/Padre almond orchard, there was a spread pattern of band canker from the pathogen's inoculum source with higher levels close to an irrigation canal and riparian trees into an adjacent orchard. In a second orchard, a 5-year-old Nonpareil/Adlrich /Peerless, again more band canker was present closer to a 15-year-old walnut orchard (loaded with Botryosphaeria) than remote from the walnuts. In the last few years, however, we noticed that very young orchards showed a uniform spread of disease even in the 1st or 2nd leaf after planting. The uniform pattern of band canker in the 1st to 3rd leaf plantings suggests that the pathogen's inoculum could have been introduced in a field with contaminated or infected plant material.

We developed a molecular sensitive assay that can detect and quantify in disease-free tissues six canker fungal pathogens among which some that can cause band canker. Specifically, the assay can detect and quantify the DNA of these fungi. The assay is called quantitative PCR (qPCR).

Symptomless shoots were collected from one each of 1st, 2nd, or 3rd leaf almond orchards, and the qPCR was used to detect putative band canker pathogens. Results of the incidence of shoots positive for the pathogens' DNA are shown in **Figure 1**.

Only fungi that have been reported in causing band canker have been recovered from latent infections in symptomless shoots in these young orchards (**Figure 1**) where there is no obvious source of inoculum. This suggests that the pathogen might have been brought in the field with the trees. We recently obtained trees from a nursery and we will check them for latent infections by band canker fungi. Also, a set of trees positive for latent infection will be treated with an effective fungicide against the Botryosphaeria fungi and compared with untreated control trees. The qPCR assay will be used to determine the efficacy of the fungicide against latent infections by band canker fungi 2 to 3 months after treatment. In conclusion, and after the completion of these studies we expect to have a recommendation on the management of band canker fungi before the appearance of the disease in the field.

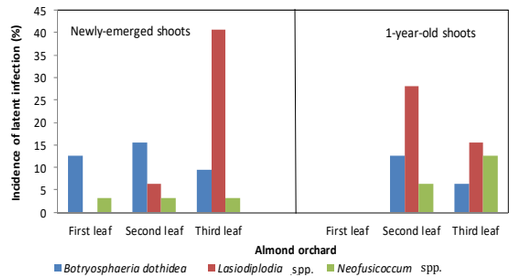

Figure 1. Incidence of latent infections in disease free, newly-emerged, and 1-year-old shoots determined by qPCR using fungal specific primers for canker fungi.

Project Cooperators and Personnel:
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For More Details, Visit

- Poster location 79, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2018) at Almonds.com/ResearchDatabase
- Related Project: 17-PATH12-Trouillas