

Trunk and Scaffold Canker Diseases of Almond in California

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PROJECT SUMMARY

Objectives for current year:

- Continue survey of almond orchards for trunk and scaffold canker diseases (TSCD)
- Characterize fungi associated with TSCD and improve diagnostics of TSCD
- Determine the main causal agent of TSCD using pathogenicity studies
- Identify the most effective fungicides for the protection of pruning wounds against TSCD

Background and Discussion:

Trunk and scaffold canker diseases (TSCD) of almond have become a major concern in the last decade. Common symptoms of TSCD include discoloration of vascular tissues, wood necrosis and extensive gumming. Dieback of scaffold branches can occur and eventually the whole tree may die. These diseases can also impact the longevity of trees in an orchard. In California, several pathogens are known to cause cankers in trunks and scaffold branches of almond including *Ceratocystis variospora* (Ceratocystis canker), *Phytophthora* spp. (Perennial canker), and *Botryosphaeriaceae* spp. (Band canker). Field diagnosis of TSCD remains challenging as symptoms delineation among these diseases is not clear. Management strategies against TSCD rely for the most part on cultural and prophylactic practices. The lack of chemical control strategies is becoming problematic as TSCD are frequent in orchards.

Surveys of orchards with TSCD were conducted in 2015 and 2016. The survey extended throughout the Central Valley region in 65 orchards across 13 counties (Butte, Colusa, Fresno, Glenn, Kern, Kings, Madera, Merced, Modesto, San Joaquin, Solano, Stanislaus, and Tulare). The survey revealed a broad diversity of

fungal pathogens associated with cankers including 11 *Botryosphaeriaceae* spp., *Ceratocystis variospora*, 2 *Collophora* spp., 3 *Cytospora* spp., 3 *Phomopsis* spp., *Eutypa lata*, and 2 *Phytophthora* spp including *P. cinnamomi*. A total of 292 isolates were obtained and identified. *Botryosphaeriaceae* spp. accounted for the largest group of pathogens associated with TSCD. In addition to Band canker, symptoms of *Botryosphaeriaceae* infections included cankers in the trunk originating at pruning wounds made for the selection of the tree primary scaffold. Symptoms expressed in young (3-4 leaf) to mature trees as gummosis near pruning wounds. *Ceratocystis* canker was one of the most common canker disease in orchards affecting trees of all ages. New species of *Cytospora* were found and pathogenicity studies revealed that these species are highly virulent in almond. The fungus *Eutypa lata* appeared to be rather common in cankers in the Sacramento Valley and Northern San Joaquin Valley region. *Phytophthora cinnamomi* was isolated for the first time in almond from aerial cankers in a young orchard in Kern County. Pathogenicity tests are on-going in the field and in a lath house to determine the most aggressive fungal pathogens to be included in our control studies. Fungicides and pastes are currently being screened in vitro and in the field for the protection of pruning wounds.

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For More Details, Visit

- Poster location 86, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at Almonds.com/ResearchDatabase
- 2015 - 2016 Annual Reports CD (15-PATH12-Trouillas); or on the web (after January 2017) at Almonds.com/ResearchDatabase