

Initial Observations From Orchards Affected With Pistachio Bushy Top Syndrome: Implications for Management

Dr. Elizabeth Fichtner, Farm Advisor, UCCE Tulare County

Craig Kallsen, Farm Advisor, UCCE Kern

Dr. Jennifer Randall, Research Associate Professor, New Mexico State University

Recovery of Rhodococcus sp. from roots of replants

In July 2014, ‘UCB-1’ clonal trees symptomatic of pistachio bushy top syndrome (PBTS) were removed from a western Fresno County orchard and replants were immediately introduced to the holes of removed trees. The replants were also ‘UCB-1’ clonal rootstocks; however, they were purchased from a nursery with no known history of infestation with *Rhodococcus*. After 6 months duration in the former bushy-top holes, 6 asymptomatic replants were destructively sampled to determine presence of *Rhodococcus*. Roots were surface sterilized in diluted bleach solution prior to maceration of root tissue for isolations. *Rhodococcus* was recovered from one out of 6 samples, thus demonstrating that the pathogen may infect root tissues. The source of primary inoculum for this root isolate is unknown. The prevalence of *Rhodococcus sp.* in California agro-ecosystems is yet unknown; however, the pathogen has been isolated from commercial walnut orchards in the Central Valley. Consequently, at this time it is unknown whether the primary inoculum inciting this root infection was from the removed PBTS-affected plants or from environmental inoculum.

Recovery of Rhodococcus fascians from rootstock suckers of trees replanted into locations previously occupied by trees with pistachio bushy-top syndrome.

As part of the objectives of a grant provided by California growers through the California Pistachio Research Board, we were able to make an initial investigation on the fate of new rootstocks or budded tree planted into holes previously occupied by trees showing advanced PBTS. We want to make it clear that this was not a scientifically designed study. Our investigation began many months after the growers in these various orchards replaced PBTS trees. The objective of this activity was to obtain some initial information associated with the risk of replanting into holes previously occupied by PBST trees. Diagnosis of *Rhodococcus fascians* was based on culturing and PCR techniques. This investigation involved three orchards. The original trees, which showed severe PBTS symptoms, all came from one nursery, the replants from other nurseries.

In Orchard 1, trees were originally planted in 2013 and the entire orchard removed approximately 8 months later based on PBTS symptoms. The holes remained vacant for approximately 4 to 5 months and then replanted with new rootstocks in 2014 and fall grafted. Three pooled or bulked samples of rootstock suckers from 10 trees each were tested for *Rhodococcus* in April 2015. Two of these samples were found to be positive for *Rhodococcus*.

In Orchard 2, the original trees were planted in 2013 and the entire orchard removed based on the prevalence of PBTS trees in the orchard in April 2014. Immediately after tree removal, rootstocks,

obtained from two different nurseries, were planted into these holes. In April of 2015, four pooled samples from 20 trees each were analyzed. One of these four samples was positive for *Rhodococcus*.

In Orchard 3, the original trees were planted in 2011. Many original trees remain in the orchard. Trees with obvious PBTS were removed in 2014 and immediately replanted with budded trees from a different nursery. Four samples of rootstock suckers from 5 to 15 trees each were analyzed and none found positive for *Rhodococcus*.

At this time, we do not know the eventual fate of large, healthy replant trees that test positive for *Rhodococcus* as a result of being planted in locations previously occupied by a PBTS trees. None of these trees tested in the three orchards had visually-obvious PBTS symptoms. A continuing concern, and previously described in the February 2015 edition of the UCCE Kern Co. newsletter (http://cekern.ucanr.edu/news_80/Pistachio_Notes_Newsletter/?newsitem=54750), are mature trees that abort most of their crop, by mid-June. To date, the only obvious difference between trees in these orchards is the presence of *Rhodococcus* on the bark, leaves and flowers of those that abort the crop. A fourth orchard with this mature tree nutlet drop was visited earlier this week.

Initial suggestions for growers with Rhodococcus-affected orchards:

Based on observational evidence gathered from farm calls and laboratory isolation of the pathogen, it is advisable for growers to mitigate the risk of potential infection of replants from residual inoculum in affected orchards. Therefore, observational evidence suggests that replants should not be placed in the same holes that were formerly occupied by symptomatic plants.

Secondly, it may be appropriate in orchards where significant tree removal occurred as a result of PBTS and in which original trees were retained and look symptomless, to closely observe these trees for early nutlet abortion as they come into bearing.

University of California
Cooperative Extension
Tulare County
4437B S Laspina St
Tulare, CA 93274-9537

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In-A-Nutshell

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Elizabeth Fichtner
Farm Advisor

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