

Mohammad Yaghmour: Area orchard systems farm advisor

I am very happy to be the UCCE orchard Systems Advisor for Kern and Kings Counties. Prior to joining UCCE Kern County, I was a Postdoctoral Scholar at UC Davis Department of Plant Pathology, performing research on fungal diseases of orchard crops with an emphasis on stone fruit diseases and thousand cankers disease of walnut. I completed my Ph.D. from UC Davis and I received my M.S. from Fresno State. Before coming to the USA in pursuit of graduate studies, I finished my undergraduate studies from The University of Jordan gaining hands-on training in plant production (Horticulture).

My interest in agriculture started at a very young age and I followed in my father's footsteps and worked with my family growing potatoes under center pivots. I was also lucky to intern for a whole season pruning peaches and nectarines among other orchard crops. I am very excited to be able to return to the central valley serving the growers and the agricultural sector, believing in our contribution to food security and human prosperity. I am also a strong believer in the mission of UCCE to provide the growers with the latest information based on applied research geared towards addressing local issues. I can be reached at UCCE Kern County office at: 1031 South Mount Vernon Avenue Bakersfield, CA 93307, phone: 661-868-6211. I can also be reached through email: mayaghmour@ucanr.edu.



Bacterial Spot of Almond

By Mohammad Yagmour, Area orchard systems advisor UCCE Kern County

During the months of April and May, I received several calls regarding gumming on almond fruits in several parts of Kern county. Samples were collected and sent for diagnosis at UC Kearney Ag center. The results from some of the samples confirmed late season infections with *Botrytis* (the causal agent of jacket rot). Later in May, however, I collected a sample from an orchard in southern Kern County with extensive amber-colored gum exuding from spots (lesions) on the hull of infected Fritz variety (Figure 1).



Figure 1: Symptoms of bacterial spot on almond in Kern County (Variety: Fritz)

Samples from the affected trees were sent to the lab of Dr. Florent Trouillas at Kearney Agricultural Research and Extension Center for isolations from the affected nuts. Dr. Trouillas isolated a bacterium characterized with yellow colonies and the disease was identified as bacterial spot caused by *Xanthomonas arboricola* pv. *pruni*.

Bacterial spot of almond was first identified in northern California in Colusa County by emeritus UCCE farm advisor John Edstorm and Dr. Themis Michilaides at Kearney Ag center who isolated the bacterium from infected leaves in 2006 (1, 2). Since 2013, the incidence of the disease has been reported from Counties in the northern *San Joaquin* valley (2, 3).

Notes on the disease:

Studies in California suggests that the bacterium overwinters in symptomatic almond mummies and its believed to be a primary source of infections for the next season (3). Like other bacterial diseases, the pathogen needs wet environment and splashing to spread and cause infection. Disease development is favored by wet and warm weather (temperatures between 60-75 °F) (2), which were experienced in Kern County in the spring of 2016. Symptoms usually develop within 7-21 days after infection (3); lesions develop on the hull that starts oozing amber-colored gum (Figure 2).

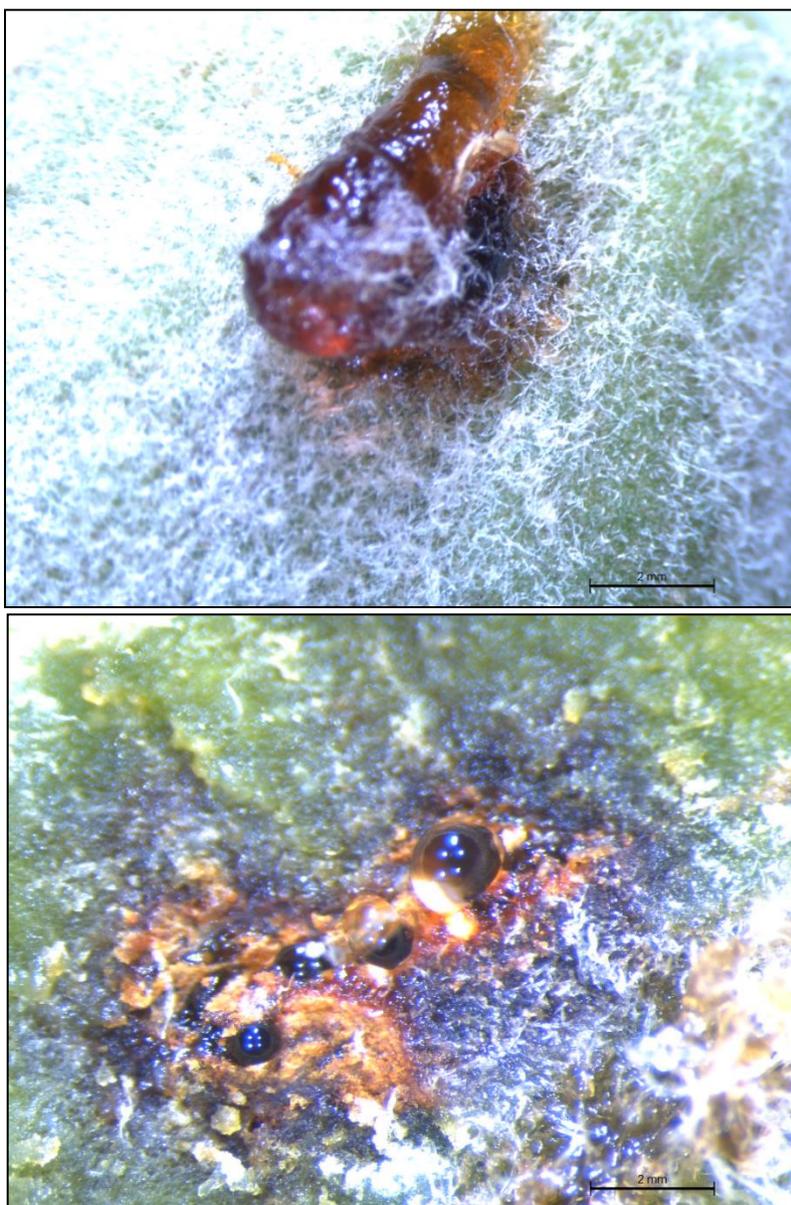


Figure 2: Lesion and gumming of bacterial spot of almond (Picture courtesy of F. Trouillas and M. Nouri)

The lesion may reach the kernel and cause the infected kernels to be of low grade or even unmarketable. The disease may also develop on almond leaves and young green twigs less than a year old. If leaves become infected, spots develop on the leaves, turn yellow, and cause premature drop. On twigs, the symptoms appear as lesions or cankers (4). While this disease is reported on many varieties, Fritz and Padre are the most affected.

The disease has been reported only from one orchard in Kern Co. in 2016. However, Joe Nunez at UCCE Kern County observed the disease in 2013 in an almond orchard and it was confirmed by a scientist at the USDA in Parlier, CA.

Management:

Studies to understand disease biology, and epidemiology help in developing a successful management program. Currently, there are preliminary IPM management guidelines in place to manage this disease in California (3, 4).

Sanitation is an important part in the management of bacterial spot. This can be achieved by reducing the sources of inoculum in the orchard and preventing the movement of the pathogen from an infected orchard to orchards with no history of bacterial spot. During the season, blow the fallen nuts to the middle of the row and grind/flail mow them to help degrade the nuts and make sure to limit pathogen movement by cleaning trailers and hoppers. After harvest, tree defoliation will help reducing the sources of inoculum from infected leaves and improve coverage of dormant sprays. Once the trees are defoliated, mummies can be detected, removed, and then mow or disc them in the soil.

Studies in California suggest that isolates collected and evaluated were sensitive to copper (3). Chemical control to manage the disease and reduce inoculum using copper or copper-mancozeb combinations is best as late dormant spray in late January and as an in-season spray to prevent new infections. The most effective sprays during the season is by applying at least one spray when conducive environmental condition favors disease development around rainfall events and warm temperatures (3).

Final remarks: The disease was first confirmed in Kern County in 2013, and we confirmed it only from one orchard in 2016 during many orchard visits this season. The findings do not suggest that this disease is widespread in Kern County, but we need to keep a closer look at trees with gumming and similar symptoms on the nuts, especially when environmental conditions are conducive to disease development for early detection and management of the disease.

References:

1. Duncan, R., Holtz, B., Doll, D., and Michailides, T. 2013. Bacterial Spot – A New Disease of Almond in the San Joaquin Valley. The Almond Doctor. (<http://thealmonddoctor.com/2013/06/26/bacterial-spot-a-new-disease-of-almond-in-the-san-joaquin-valley/>)
2. Northcutt, G. Bacterial spot taking hold in California almonds. 2013. Western Farm Press. <http://westernfarmpress.com/tree-nuts/bacterial-spot-taking-hold-california-almonds>
3. Adaskaveg, A., Holtz, B., Duncan, R., and Doll, D. 2015. Bacterial Spot of Almond in California: Update on the Disease and Management - The Almond Doctor. <http://thealmonddoctor.com/2015/01/01/bacterial-spot-of-almond-management/>
4. <http://ipm.ucanr.edu/EXOTIC/bacteriaspot.html>

Announcements:

2016 Advances in Almond Production Short Course, November 8-10, Modesto, California

Registration will be open on July 1 for this integrated orchard management short course featuring UC faculty, Cooperative Extension specialists and farm advisors, and USDA researchers who will provide an in-depth, comprehensive study of all phases of almond culture and production.

This course is designed for new and experienced growers as well as other industry members interested in commercial almond production. For more information, go to <http://ucanr.edu/almondshortcourse>

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