Biology and Management of Almond Scab and Alternaria Leaf Spot

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PROJECT SUMMARY

Objectives:

- Determine population composition of the scab pathogen (*Fusicladium carpophilum*) and if sexual reproduction occurs.
- Evaluate new and registered fungicides for their efficacy in scab and Alternaria management.
- For scab management, evaluate the effect of dormant and in-season applications on sporulation of twig lesions.
- Establish baseline sensitivities, monitor for sensitivity shifts in pathogen populations to different fungicides, and characterize mechanisms for resistance in the SDHI and DMI classes of fungicides.

Background and Discussion:

Scab (caused by *Fusicladium carpophilum);* formerly *Cladosporium carpophilum*) and Alternaria leaf spot (caused by *Alternaria alternata* and *A. arborescens* – several recent taxonomic studies indicate that *A. tenuissima* is con-specific with *A. alternata*) are economically important summer diseases of almond. Both occur especially in locations with high humidity and poor air circulation. Severity of both diseases was lower in the last three years compared to previous seasons likely due to drought conditions and reduced irrigation schedules. Treatments were based on the Disease Severity (DSV) model with sensors on the outer perimeter of the canopy at a height of 10-16 ft or a calendar-based timing beginning in late spring with warm temperatures and dew formation. Applications continue at three-week intervals.

We continue to analyze populations of the pathogen from different growing areas in the state. Using molecular population genetic approaches, we found no evidence for sexual recombination, and thus, populations of the pathogen appear to only reproduce clonally by asexual reproduction (i.e., conidia).

Less-sensitive isolates may be selected from random mutants after repeated use of a selective pressure (i.e., one FRAC group [FG]). Resistance can be managed with properly timed applications of fungicides belonging to different groups

In our trials on Alternaria leaf spot, the new pre-mixture UC-2B, as well as Luna Experience (FG 3/7), Merivon (FG 7/11), IL-54111, and the Inspire (FG 3)/Ph-D (FG 19) rotation were highly effective in reducing the incidence and severity of disease, as well as tree defoliation. The treatments R-106506, Aproach, Fontelis+Aproach (FG 7/11), Quash (FG 3), Quash+Intuity (FG 3+11), Ph-D (FG 19), and Ph-D+ EXP-1552 all performed well.

For the management of scab, dormant treatments with copper-oil, chlorothalonil (e.g., Bravo)/oil, or Syllit-oil could not be evaluated due to low disease in 2016. Among in-season treatments (two applications starting at twig sporulation onset), Quash, EXP-A, and UC-1; the tank mixtures of Quash+Intuity; and the pre-mixtures of Quadris Top (FG 3/11); Merivon, EXP-AD, EXP-AF UC-2B, and IL-54111 resulted in the lowest scab incidence and severity. Spring-time treatments that were effective in other years include chlorothalonil (proposed label change to 60 days PHI), Inspire Super (FG 3/9), Ph-D, Syllit (FG U12), and treatments with FG 7 and FG 11.

Dormant treatments are valuable and should be applied when high scab disease levels were present in the previous season and a high level of twig infections is present on previous year's shoot growth. When these dormant treatments are applied, spring-time fungicide applications may not be needed under less favorable disease conditions. Additional benefits of effective dormant treatments include 1) inoculum reductions that will maximize the efficacy of subsequent fungicide treatments, 2) an anti-resistance strategy (a smaller population is exposed to selection processes); and 3) delayed sporulation and inoculum availability aligns the application of in-season treatments for scab with those for Alternaria leaf spot and other summer diseases like rust.

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For More Details, Visit

- Poster location 89 and 90, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at Almonds.com/Research Database
- 2015 - 2016 Annual Reports CD (15-PATH3-Adaskaveg); or on the web (after January 2017) at Almonds.com/Research Database
- Related projects: 16-PATH4-Adaskaveg; 16-HORT3-Symmes