

Biology and Management of Almond Scab, *Alternaria* Leaf Spot, and Leaf Blight

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PROJECT SUMMARY

Objectives:

- Identify pathogenic species of *Alternaria* using molecular methods.
- Determine if sexual reproduction occurs within orchard populations of *F. carpophilum* using molecular methods.
- For scab management, evaluate the effect of dormant applications on sporulation of infected twig lesions.
- Evaluate new and registered fungicides for their efficacy in disease management.
- Establish baseline sensitivities and monitor for shifts in sensitivity in pathogen populations to different classes of fungicides.
- Improve the Disease Severity Value (DSV) model by using dew point and temperature for forecasting infection periods and timing of fungicide treatments.

Background and Discussion:

Scab (*Fusicladium carpophilum*) and *Alternaria* leaf spot (*Alternaria alternata* species group) have become increasingly important diseases in almond production. Recently, *Alternaria* twig infections were identified on cv. Wood Colony and thus, both diseases include twig infections. Previously, we modified the DSV model to predict infection periods and time fungicide treatments. For the last two seasons, measures of disease were correlated to dew, temperature, and total precipitation (data from CIMIS stations). Disease was related to the total number of dew periods. Orchards with fewer days of dew had lower disease levels. The distribution of days with dew over the spring season, however, varied widely and initiation of management programs based on dew period alone was not indicative of a successful program. Research is

ongoing to determine new indices based on dew periods and temperature levels. We continued to develop management programs where fungicides with different modes of action (MOA) are mixed or rotated. In the presence of QoI resistance (FRAC group or FG 11; and boscalid or FG7 resistance in *Alternaria* spp.), low disease levels can be obtained with registered materials. Rotation programs that use three or four fungicide groups (FGs) will minimize resistance development and spread. For *Alternaria* leaf spot, FG 3 and 19 and pre-mixtures (e.g., FG 7/11, 3/7, 3/11, 3/9,) are highly effective. These also fit well into a scab management program, especially with the use of delayed dormant treatments to suppress scab sporulation on twig infections until May-June.

The multi-site MOA chlorothalonil is effective against both diseases, will help prevent over-use of other fungicides, and thus, prevent resistance. Proposed label changes include shortening the PHI to 60 days and increasing rates to 6 pts/A. Delayed dormant applications with chlorothalonil/oil were outstanding in delaying sporulation. This can minimize the need for additional springtime (e.g., petal fall) treatments and allows fungicide usage for other diseases (e.g., hull rot) later in the season.

Laboratory evaluations on sensitivity of *Alternaria* and *Fusicladium* spp. to SDHI fungicides indicated that both pathogens have resistant sub-populations but there was no strict cross-resistance among the sub-groups or even within a sub-group. Still, cross resistance occurred between sub-groups and the best resistance management practice is to rotate between FGs.

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For More Details, Visit

- Poster location 25, Exhibit Hall A and B during conference; or on the web (after January 2014) at www.almondboard.com/researchreports
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