Biology and Management of Almond Brown Rot, Jacket Rot, Shot Hole, Rust, and Hull Rot

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PROJECT SUMMARY

Objectives:

- Evaluate new fungicides and organic compounds based on spectrum of activity, systemic action, and persistence for brown rot, jacket rot, shot hole, gray mold, rust, and hull rot.
- Establish baseline sensitivities of fungal pathogens against new fungicides and determine shifts in fungicide sensitivity.
- Evaluate almond genotype susceptibility to foliar diseases that develop naturally in the almond variety trial at UC Davis.

Background and Discussion:

In 2015-16, we continued to identify highly effective single-fungicides and pre-mixtures to manage major foliar and fruit diseases of almond in California. Fungicides evaluated belong to the DMI, SDHI, AP, QoI, polyoxin, isophthalo-nitrile, and guanidine classes (FRAC group or FG 3, 7, 9, 11, 19, M5, U12, respectively). Additionally, new experimental single-ingredient (UC-1, EXP-A, R106506) and pre-mixture (UC-2B, EXP-AF, EXP-AD, IL54111) fungicides were used. Biological products included were Botector, Fracture, Serenade Opti, and the experimental WXF-160001.

With awareness and fungicide stewardship, the increasing arsenal of available treatments will help prevent the selection and build-up of resistant pathogen populations when applied in rotation or mixture programs. Although FG 7 fungicides (e.g., boscalid, fluopyram, fluxapyroxad, isofetamid, penthiopyrad) belong to three sub-groups that differ in their binding affinity they still target the same site (i.e., succinate dehydrogenase) and should be rotated with other FGs. Furthermore, we continue to expand our database on baseline sensitivities and we monitor the sensitivity of pathogen populations at orchard sites where a reduction of fungicide efficacy is reported. New highly effective treatments for brown rot were Aproach (FG 11), Aproach mixed with Fontelis, Merivon, R106506, UC-2B, IL-54111, EXP-A, and EXP-AD. Among registered compounds, Rovral (FG 2), Fontelis (FG 7), Merivon (FG 7/11), and Quadris Top (FG 3/11) gave outstanding control. Quash-Intuity (FG 11), EXP-A, R106506, UC-2B, IL-54111, as well as the biologicals Botector and WXF-160001 also showed very good activity against gray mold. Quash (FG 3), Rovral, and Luna Experience (FG3/7) were highly effective. For shot hole on leaves and fruit, Quash, Luna Experience, and Luna Sensation were the most effective treatments in reducing the disease.

A new variety block was established at UC Davis in 2014. Overall, cv. Marcona was the most, and cv. Jennette the least susceptible cultivar to leaf rust evaluated. The annual report shows the ranking of all 28 varieties. We will continue to evaluate naturally occurring diseases in this orchard.

We confirmed previous studies that hull rot can be reduced by 50% to 75% on cvs. Nonpareil and Monterey with a single application at early hull split. In comparing timings, a late-May/early June timing combined with a hull split treatment was the most effective. The most effective treatments include fungicides in FG 3/7, 3/9, 7/11, 3/11, and 3+19. In trials to possibly neutralize phytotoxic fumaric acid that is produced by *R. stolonifer*, an alkaline foliar K/PO_4 fertilizer reduced the disease similar to a fungicide. Fungicides or possibly K/PO_4 should be used together with proper water management (i.e., deficit irrigation) and proper nitrogen fertilization with cut-off dates in early May.

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- Poster location 89 and 90, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at Almonds.com/ResearchDatabase
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