Improving Spray Deposition and Reducing Drift in Almond Orchards

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PROJECT SUMMARY

Objectives:

- Build a retro-fit kit that adds a thin mast and hydraulically- powered fans to a conventional axial fan air-blast sprayer that will allow spray delivery from below and above the canopy.
- Determine hull-split spray deposition and navel orange worm control efficacy within lower and upper sections of trees for the modified sprayer and the same sprayer operating without the modification.
- Determine spray drift from hull-split spray application of both modified and unmodified sprayer.
- Conduct an initial pilot study into the effects of pruning on sprayer performance and spray deposition.

Background:

This project brings together the skills and interests of three California research groups to look at spray coverage, pest control, and outreach for spray applications.

Joel Siegel, USDA-ARS, has been monitoring the efficacy of applications of pest control materials for Navel Orangeworm (NOW) control in terms of reaching the target nuts. The USDA lab is set up to measure residues on nuts or other materials.

Ken Giles is interested in the efficacy of new spray technologies for tree crops - both for efficacy and reducing off-site movement.

James Markle is interested in finding techniques applicators can implement with current equipment to improve precision. CURES is involved with helping growers meet more stringent surface water quality standards.

A conventional air-blast sprayer with an axial fan was modified by the addition of a 16-foot tower which supported two hydraulically-powered fans with radial spray nozzle manifolds. The additional fans were of a commercial design based on an Australian spray research organization. Both the original axial flow and the additional fans were fitted with standard disc-core spray nozzles and operated at typical spray pressures of approx. 100 psi.

Rotational speed of the fans and the spray pressure for the spray nozzles could be independently controlled. The proportion of spray that could be discharged from the top and bottom spray sources was adjustable.

The sprayer was tested at the Nickels Field Station for hull split sprays in July 2012. After a series of tests, evaluated with water sensitive paper for spray deposition, a setting of 70% spray from the upper fans and 30% spray from lower nozzles was found to be optimal. Total application rate was 100 gal/acre.

The modified sprayer was found to achieve not only superior spray coverage to the conventional sprayer but also significantly improved NOW control on nut samples evaluated by the USDA lab.

While initially successful in improving the application efficiency, the sprayer did not achieve NOW control at the level of spray tests in previous years of project work. It is hypothesized that this was due to the limitations of the original air blast sprayed used as the basis for modifications. Future work will investigate retrofitting the modifications onto a larger air blast sprayer.

Project Cooperators and Personnel: Dan Downey UCD; Joel Siegel, USDA ARS, Parlier; Franz Niederholzer, UCCE, Colusa/Sutter/Yuba Counties

For More Details, Visit

- Poster location 55, Exhibit Hall A & B during conference; or on the web (after January 2013) at www.almondboard.com/researchreports
- 2011.2012 Annual Report CD (11.WATER3.Giles-Markle); or on the web (after January 2013.) at www.almondboard.com/researchreports
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