

CURES action

By **LEN RICHARDSON**

WATER Board Notices of Violation get growers attention because failure to comply could result in fines up to \$1,000 per day. Such threats persuade irrigators to join coalitions and spotlight CURES efforts to use BMPs and technology to solve water issues.

Spray pattern targeting

In 2001, Ken Giles, a UC Davis engineer, notified the Coalition for Urban and Rural Environmental Stewardship about an orchard sprayer calibration instrument used in Europe. The State Water Board funded the purchase of the Austrian-built Pessl Instruments for a CURES orchard sprayer calibration program.

Robert McMurry, calibration technician, hauls the calibration instruments to grower meetings and clinics across the Sacramento Valley.

The instruments feed data to a laptop computer. One device connects to each nozzle on the spray boom to measure sprayer output; the other device is a 12-foot-tall simulated tree that collects spray as the equipment is operated and measures the sprayer deposition pattern.

McMurry performs the one- or two-hour tune-up and provides growers with a computer printout indicating:

- ✓ total output per acre,
- ✓ individual nozzle output,
- ✓ uniformity across the spray boom
- ✓ spray distribution on the tree canopy

With this instrument in Europe, sprayer efficiency was improved to 30%.

Pyrethroid stewardship

After research linked pyrethroids and sediment toxicity, those registrants (Syngenta and Bayer Crop Science) commissioned CURES to develop a pyrethroid stewardship program. Staff made educational presentations in the Central Valley and Coast describing Best Management Practices for the insecticides in orchards and row crops.



PLAUSIBLE: Vegetative drainage ditches at field edge show promise in cutting pesticide and sediment in irrigation runoff. The ditch is wet only after irrigation, thus less likely to attract wildlife.



NOZZLE CHECK: Robert McMurry, calibration technician, works with the Austrian-built Pessl Instruments.

Key Points

- CURES sprayer tuning program uses "Pessl Instruments."
- Smart sprayer reduces pesticide use 39% in study.
- Studies suggest vegetative ditches help remove pesticides.

They also provided two pyrethroid BMP booklets. The publications recommend:

- ✓ Avoid drift during pesticide or nutrient applications into waterways.
- ✓ Reduce or eliminate sediment movement off the orchard site.
- ✓ Reduce or eliminate flows of runoff water carrying dissolved pesticides and nutrients.
- ✓ Manage runoff water in sediment basins, tailwater return systems, and riser boards or dirt banks that retain winter rain runoff (after dormant sprays are applied) for a period to allow sediment to settle out.

Toxicity tests

CURES assisted an Australian company in introducing a water treatment technology to mitigate pesticide runoff. The product, Landguard OP-A, is used to break down organophosphate insecticides, including chlorpyrifos and diazinon, in sheep dips. CURES performed two studies in Stanislaus County that showed complete breakdown of Lorsban by the enzyme in irrigation water from treated fields.

Toxicity tests showed no toxicity to water flea or fat head minnow.

Smart Sprayer technology

How much less pesticide is deposited on the ground in dormant sprays when



TOWER BEAKERS:

Spray is collected in each groove and funneled into individual beakers. Electronic sensors measure volume, and data is sent to a laptop. The upright panel is a vertical test stand that simulates a tree profile. The sprayer is run at operating speed, and the panel collects nozzle discharge for approximately five seconds.

Smart Sprayer technology is used? A mature dried plum orchard in Sutter County with gaps between trees was selected for the study by C.S.U. Chico researcher David Brown. The results: a 39% reduction in applied pesticide with the Smart Sprayer compared to a conventional sprayer.

Spray deposit on the orchard floor was reduced by 54%. Concentrations of diazinon in runoff from the treated areas were reduced 44%.

Sprayer performance

Ken Giles and Dave Downey, UC Davis agricultural engineers, identified options in evaluating spray applications. Surround WP from Englehard Corp. is a wettable powder that leaves a white film on crop surfaces and gives visual indication about sprayer coverage.

Another device is a GFP-meter from Optisciences. This hand-held optical fluorometer uses a variety of dyes (rhodamine and fluorescein) and can be configured for specific dyes. The meter uses a probe to measure plant concentrations after application.

BMP efforts

The Orestimba Creek Watershed Pilot Program includes three BMP studies by Dennis Wichelns, an agricultural economist with the California Water Institute at California State University, Fresno. He also examined installation cost and maintenance for:

- ✓ irrigation recirculation systems
- ✓ sediment ponds
- ✓ vegetated ditches
- ✓ use of PAM in irrigation water
- ✓ low-pressure irrigation systems

Studies pending

CURES is coordinating more BMP studies with scientists from the University of Pacific and the Department of Pesticide Regulation, including:

1. effectiveness of vegetative ditches for removing pyrethroids from drainage water
2. effectiveness of a constructed wetland in removing OP pesticides and sediment
3. use of PAM to remove chlorpyrifos and pyrethroids from irrigation water