

Blueberry 'Mistigation'

Applying pesticides
through cooling
mistifiers pays off.

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IN 2010, after witnessing a helicopter application on blueberry for spotted wing drosophila (SWD), entomologist Lynell Tanigoshi and research associate in entomology Bev Gerdeman, both from Washington State University-Mount Vernon Northwestern Washington Research & Extension Center, discussed the notion that the real potential for aerial applications lies in their immediate knock-down of active field populations.

Farmers have responded to the threat of SWD by employing helicopter applications, but coastal weather conditions and field suitability are often incompatible with aerial applications. As fruit ripens, mature blueberry field rows close. Gerdeman decided to investigate noninvasive ideas that could duplicate the misting effect she saw produced by the helicopter applications.

They enlisted the help of an Oregon State University blueberry Extension specialist, Wei Yang. Brainstorming, the three considered ways to apply chemicals in a noninvasive way. Wei asked the question, "Why can't we chemigate at the same time we're cooling the fruit?"

Intense Pressure

Gerdeman and Tanigoshi, along with Yang, broached the idea to a blue-

berry grower in Salem, OR, Jeff Flake, who was immediately intrigued. Flake, the farm manager for Pan-American Berry Growers, said they were first hit by SWD in the fall of 2009. "We noticed the fruit was too soft — that was the first indicator of trouble," he says. "All the late fruit growers became savvy right at that point."

Blueberries are Pan-American's only crop, but they grow 400 acres. The company harvests blueberries from early July to mid-October or even later if the weather allows. There's a huge payoff for later varieties, because very few blueberries are harvested in the U.S. after September. The problem, says Flake, is that mid-September becomes particularly dangerous for blueberries because much of the fruit in the Willamette Valley has been picked, so the SWD has few

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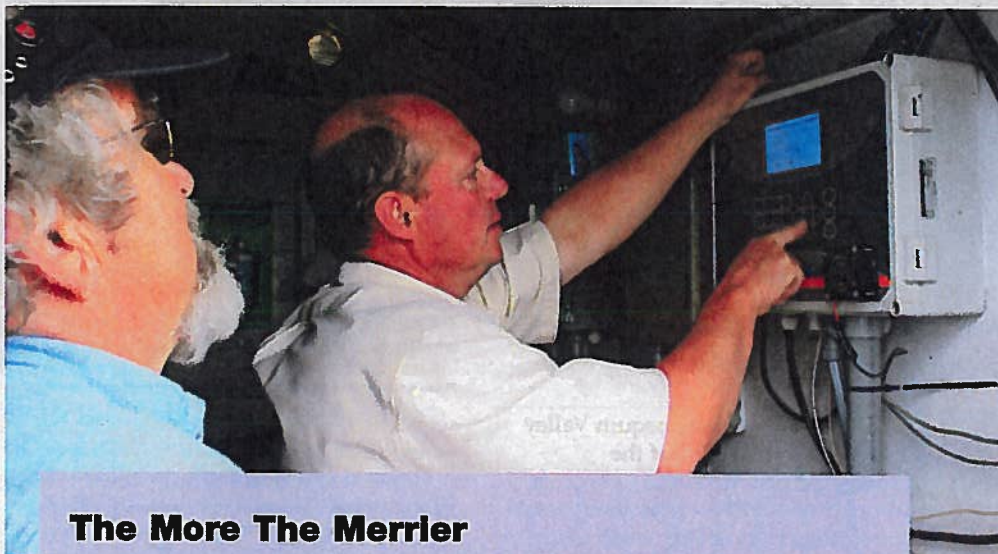
Sixteen-ounce sentinel traps (inset) containing live SWD and water sensitive paper were used to measure droplet patterns. The traps were removed from the field site after an insecticide microsprinkler application and show droplet patterns from different elevations within a blueberry bush.

other fruits to choose from. "It puts an inordinate amount of pressure on the farm; we've found the fight from late August on is a hard battle," he says. "You must do everything you can to keep your spray program on target."

However, as Gerdeman says, spraying at that time of year is a problem. "The spray rigs knock off the fruit or even if the fruit stays on," says Flake, "it gets rub marks."

There are other problems with the spray rigs, he says. It takes two airblast sprayers three days to cover the 150-acre main farm in Salem. (They have one other farm in Salem as well as one in Mossyrock, just north of Portland.) With the misters, Flake believes they will be able to cover the 80 acres that will be in this summer's trial in a matter of hours.

This Pan American Berry Growers' Salem field site was used for microsprinkler applications.



Jeff Flake (right), Pan-American Berry Growers' farm manager, is programming microsprinkler application intervals in the pump house (as WSU research technician Hoills Splitter looks on).

The More The Merrier

MANY of the blueberries grown in the Willamette Valley are harvested before it gets really hot in August. For example, the main variety, Duke, is off by then. Pan-American is keen on the misters in part because they have decided to specialize in late fruit when there is less competition, says farm manager Jeff Flake. "There's not a lot of acres of late fruit. We just planted quite a few because we want to get that higher price," he says. "Because of that, we expect to see more acreage under misters."

But that wouldn't necessarily be a bad thing. Flake says they can take the competition, and there would be one huge benefit: more products might get labeled. "We're hoping other growers will notice our success and will try (mistig)," he says. "Then maybe more (chemical) companies will get involved."

Among the benefits for growers, Flake says that besides protecting the berries from heat, they can also use the system for frost protection.

The chief benefit is the cost. Though high initially — misting systems are about \$1,500 an acre, so few growers have them — they will save a lot by preserving nice fruit from SWD damage at a low cost. Besides not having to fuel up the spray rigs, they also avoid the labor costs of running them. "With mistigation, you just need to pay for enough electricity to run the pump," he says. "There are a lot of nice savings if this works out for us."

Because it's such a huge problem, Flake encourages other growers to plan for SWD as they put in new acreage. In addition to getting invaluable help from the Oregon State University and Washington State University researchers, it really helped that their irrigation company, Stettler Supply in Salem, OR, worked with them. At the very least, Flake advises working with your irrigation supplier to have your below-ground infrastructure in place so you can install the 7-foot mister above the beds at a later date. "The superstructure could be installed later," he says. "It would be nice if you don't have to go in and dig to install the irrigation lines later."

After seeing the initial damage SWD caused a few years ago, Flake really had some doubts about the industry's future profitability. He feels a lot better since seeing the mistigation system in action. "We've got our fingers crossed that we now can keep that fly at bay."

They even tried helicopters to avoid hurting the fruit, but that proved expensive. Above 10 gallons an acre it gets too expensive to apply by helicopter, says Flake. "And at 10 gallons an acre it's tough to push a chemical deep into the bush," he says. "It doesn't help that spotted wing likes it dark and damp — the hardest place to

get that chemical in. With an airblast sprayer we put on 50 gallons an acre, but with the misters, we put on 300 to 500 gallons per acre."

SWD On Trial

The trial set up by Tanigoshi and colleagues last summer involved chemigating — though Flake prefers

the term "mistigating" — 22 acres of late-season blueberries. The plot was equipped with Netafim microsprinklers used for cooling the fruit when the temperature hits 95°F. The nozzles were 0.69 inches and when operated at 50 psi produced a 23.8 GPH flow rate with 23 feet of coverage in diameter.

Flake says they tried different rates, with a number of factors coming into play. "We could do mist at 100 gallons per acre but the particles are so fine they not only don't penetrate the canopy, they tend to drift away from the field," he says. "At 300 to 500, this is fine enough to coat the leaves without washing off, but heavy enough to reach into dense canopy."

Among the chemicals they applied was Mustang Max (zeta-cypermethrin, FMC Corp.), but there are few that could be used. About the only drawback to the mistigation, says Flake, is that there's a lack of labels because not all chemicals are labeled for chemigation. Besides Mustang Max, they currently have Imidan (phosmet, Gowan Co.) and malathion available. Flake is hoping that Dow will get their softer spinosad SWD chemicals labeled for mistigation, including Success and Delegate. In tests, Delegate works well. "It's a shame we can't include it," he says. "Especially when you consider there is a lot less human exposure to a pesticide with a mister than with an airblast sprayer."

The mistigation system came through the trial with flying colors. To test the efficacy, the scientists put small containers of SWD out in the fields with tiny holes. The mortality was well above 90%; Flake says he didn't see any emerge alive. "We're cautiously optimistic that this will be a way to stay on top of spotted-wing, and get some of the other benefits besides," he says. "Without an extremely intensive spray program you're going to lose that fruit — most of it, if not all of it." ●