

A game changer

As a leader and innovator in plant production, Oregon's nursery and greenhouse industry has an equal responsibility to make a difference on the environmental side of the coin.

We frequently remind our members of Congress and the Oregon Legislature that the industry sends ecologically friendly green products out of the state, bringing traded sector dollars back to Oregon.

The OAN and many other organizations have been working hard over the past several years to educate consumers and agriculture about pesticides. These chemicals are a tool to mitigate pests and diseases. That makes them an expensive and critical element in producing high-quality nursery stock.

We have successfully rebuffed reactionary restrictions on farm practices, as well as poorly written pesticide legislation at the state level. All the while, we have urged all sides to help solve problems rather than merely react to them.

To assure continued crop quality, economic competitiveness and production efficiency, nurseries and other crop producers (fruit, wine grapes and conventional field crops) need improved technologies.

A smarter sprayer

All the crop producers I mentioned handle a large variety of plant species with different canopy characteristics. The farms range from a few acres to several hundred acres. Unfortunately, due to large variations in canopy sizes and no rate adjustment functions in the sprayers, current spray applications for these crops frequently result in over-application and minor spray drift problems.

If a new technology can reduce pesticide use, thereby protecting workers and the environment, then all the better. Up to now, no single type of sprayer could do that and accommodate all the various special circumstances encountered in a

specialty crop environment.

But that's about to change.

Over the past six years, the U.S. Department of Agriculture – Agricultural Research Service Application Technology Research Unit (ATRU) at Wooster, Ohio — in cooperation with Oregon State University, The Ohio State University and the University of Tennessee — has developed the intelligent variable-rate precision sprayer for ornamental nursery and fruit tree crop production.

The new sprayer is guided by a high-speed laser sensor that “sees” target plants. The machine sprays those plants with a minimal amount of pesticide, and where it sees no plants, it doesn't spray at all. Spray output is automatically adjusted for plant size, shape and foliage density.

USDA-ARS ATRU scientists have built six prototype sprayers that are being field-tested for their efficacy, reliability and durability. Researchers from the four participating institutions are testing the prototypes at commercial nurseries in Ohio, Oregon and Tennessee.

This new spray system has significantly advanced pesticide application technology. Field experiments have shown that the new sprayer achieves equal or better pest control when compared to conventional sprayers. At the same time, it reduces airborne spray drift by up to 87 percent, spray loss on the ground by 68 to 93 percent, and average pesticide use by 46 to 68 percent.

Researchers estimate an annual average pesticide cost savings in excess of \$230 per acre. That does not include additional savings in fuel and labor. Extensive trials in different specialty crop types will be conducted in Oregon over the next couple of years.

Less spray, better control

These successful results merit further investigation of this technology to assess potential applications across a greater range of crops and pests. What's more, there's additional research to develop a universal intelligent spray control system (usable on any sprayer) based on the technology suc-



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cessfully developed for this new sprayer.

Key players in the effort have included Heping Zhu of USDA-ARS and two Oregon growers who have tested the sprayer extensively: J. Frank Schmidt and Son Co. and Hans Nelson and Sons.

Recently, the USDA-ARS funded the third and final phase of intelligent sprayer development. The funding request was strongly backed by the OAN and supported by our entire Oregon congressional delegation, led by U.S. Sens. Ron Wyden and Jeff Merkley.

The universal spray control system could be adapted as a retrofit for other sprayers commonly used in nursery, viticulture and fruit tree production. Furthermore, the new spray technology has a great potential to precisely apply foliar fertilizers, which can reduce fertilizer leachate and minimize water contamination.

The primary goals of this research are to improve pesticide spray applications efficiency in nursery production, and to expand this new intelligent spray technology into new cropping systems regionally and nationally. The specific objectives of this proposed project are to evaluate the performances of the new intelligent spray system that is a retrofit on conventional constant-rate sprayers in terms of: insect and disease control efficacy, spray deposition quality inside tree canopies, spray off-target losses on the ground and beyond target trees, airborne spray drift, and reduction in pesticide use.

The development of this technology will make a difference. I am proud that the OAN took a leading role to push the development funding across the finish line. ☺