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The Intelligent Sprayer System – second year evaluation of a sprayer retrofit for management of grape powdery mildew

Dr. Jay. W. Pscheidt¹, OSU Extension Plant Pathology Specialist, Brent W. Warneke¹, Faculty Research Assistant, Robin Rosetta², Extension Entomology, and Lloyd Nackley², Nursery Research and Extension, all of Oregon State University.

The [Intelligent Sprayer Project](#) consists of a multi-discipline research team across the U.S. working on improving spray application technology in specialty crops. The team has moved from proof of concept to evaluation of standard sprayers retrofitted with intelligent spray system (ISS) components.

A Rear's 50 gallon Pak-Blast sprayer was retrofitted with a LIDAR laser sensor, Doppler speed sensor, embedded computer, and individual pulse width modulation (PWM) solenoid valves at each nozzle. These components adjust pesticide application volume in real time to match plant canopy characteristics to minimize pesticide use and drift while maintaining a similar level of pest management. The retrofitted sprayer could be used with the ISS components in operation (automated mode), or without the sensors and a simple on/off switch as a standard sprayer would be operated (standard mode).

In consultation with vineyard managers, sulfur treatments were evaluated in a block of 'Pinot noir' on 5 x 8 foot spacing. Sulfur treatments were applied every 7 to 10 days depending on grape phenology and disease pressure. Application volumes ranged from 97 to 115 gal/Acre in standard mode treated plots at the slower 1.9 mph speed and 46 to 47 gal/Acre at the higher 4.5 mph speed. Volumes in automated mode ranged from 18 to 47 gal/Acre when using the default amount of spray volume per unit canopy. When automated mode settings were changed to apply more volume per unit canopy, application volumes ranged from 18 to 70 gal/Acre.

With some minor adjustments after the 2018 season, powdery mildew control on leaves or clusters in 2019 was as good when the sprayer was used in automated mode as when the sprayer was used in standard mode. Using a higher concentration of sulfur per gallon or increasing the volume per acre was the main reason the sprayer worked better in 2019. The higher concentration of sulfur in the ISS resulted in more sulfur per acre and thus better powdery mildew control. Increasing the volume of water applied with the ISS also resulted in more sulfur per acre and better powdery mildew control.

We also found that using systemic fungicides in automated mode using the default low volume settings instead of non-systemic sulfur products resulted in good control of powdery mildew using the ISS. Overall, the ISS should prove to be an effective system to reduce pesticide quantity, water, and/or labor.

For more information about intelligent sprayer systems and to view videos go to the [Smart Guided Systems](#) website.

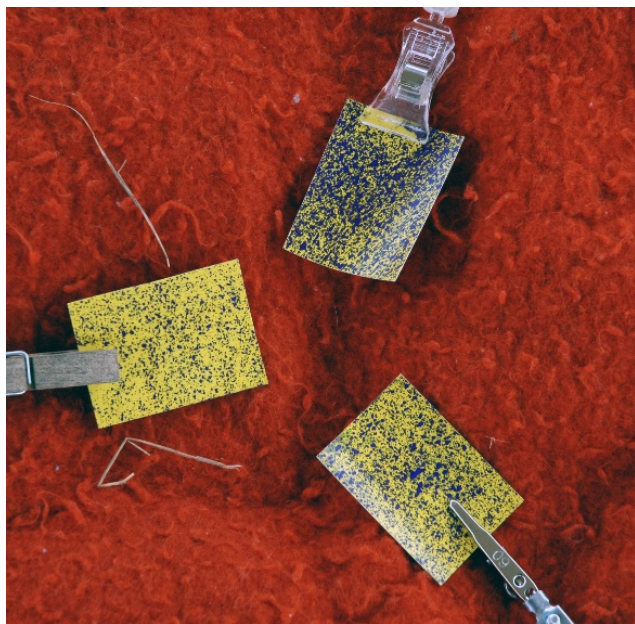


Figure 1. Yellow water sensitive spray cards turn blue when hit by water droplets. The card on top is the type of coverage obtained with a conventional sprayer (standard mode). The card on the left is the type of coverage from the intelligent spray system (ISS, automated mode) which uses less water but still results in powdery mildew control if you use systemic fungicides or a higher concentration of sulfur. The card on the bottom right is also from the ISS but with a higher volume setting. Photo credit by Jay W. Pscheidt