The Role of Sp

in Providing Spray Cover and Greenhouse Pest C

A Preliminary Investigatio

By
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Electrostatic sprayers could provi coverage than either handgun spraye

Greenhouse and floriculture crops represent an important part of agribusiness, with more than $5 billion annually in farmgate receipts. Clearly, this is an important business that must consider how to maximize efficiency in all areas of production, including pesticide application. A variety of methods are used to treat floriculture crops with pesticides, including hand-held and stationary whole-room sprayers. While few recommendations are available to help growers understand how to best use their equipment and contain costs, this preliminary study attempts to discover the best use of these sprayers based on where the spray is being deposited.

THE EQUIPMENT

Equipment used in the preliminary tests included an air-assist electrostatic handgun sprayer, a high-pressure handgun sprayer and an air-assist whole-room fogger. The electrostatic sprayer (ESS, Watkinsville, Ga.) uses a compressor to supply air that atomizes spray leaving the nozzle, as well as to help deliver spray material into the canopy. The ESS sprayer creates a negative charge on the droplets as they pass through a high-voltage ring that is located near the outlet of the handgun. It produces very small droplets, which benefit the most from charging.

The other handgun sprayer was a Dramm Coldfogger handgun sprayer (Manitowoc, Wis.). The Dramm sprayer also produces relatively small droplets because spray liquid moves through the nozzle at very high pressure. A Dramm Autofogger (Manitowoc, Wis.), a whole-room fogger, was used to treat the entire greenhouse from a stationary position at one end of the structure. The Autofogger produces smaller droplets than the other two sprayers. Because they are so light, these smaller droplets can be transported around the house by in-room, air circulation fans and the circulating fan on the fogger. The ESS sprayer, Coldfogger and Autofogger each used 2.4, 5.3 and 1.9 gallons of spray solution, respectively, to treat the 20,000-sq. ft. room.

THE SUBJECTS

All of the equipment was used to treat either poinsettia or fuchsia plants in 8-inch plastic pots. Plants were placed or hung in areas surrounded by other plants in 12 different locations around the greenhouse. Each sprayer was used to treat the entire greenhouse on a different day.

The tank mix included a fluorescent dye that can only be seen using an ultraviolet light. Following each treatment, a few leaves were taken from the top and middle of the sample plants. These leaves were examined under a microscope to measure the number of droplets on each leaf and the total area of spray Both the bottom and top surfaces of the

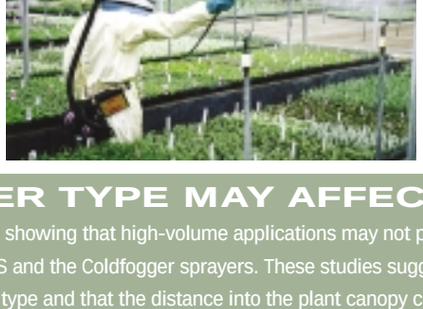
THE RESULTS

All sprayers produced much higher sp compared to the bottoms. All sprayers als leaves taken from the tops of the canopy was higher on plants taken from the rollin

The Autofogger produced the fewest d the lowest spray coverage. The whole- remarkably similar coverage results throu Plants directly in front of the fogger rece than others did; however, there was usual bottoms of leaves that it treated. More sp treated by the electrostatic sprayer than th bottoms of leaves. The Dramm Coldfogge droplets than the ESS sprayer. The Col more material on the undersides of l Autofogger, but coverage was consistentl ESS sprayer. The Autofogger produced hi than the Coldfogger both in the top and m

There were differences in the covera treatment depending on the width of the Walking down the alley between two

Left: A technician sprays crops with the Dramm co plant treated by the Dramm Coldfogger. An ultrav fluorescent marker (ortracer), which identifies the a (Photos courtesy of Richard Derksen.)



SPRAYER TYPE MAY AFFECT

Current studies are showing that high-volume applications may not provi lower-volume treatments by the ESS and the Coldfogger sprayers. These studies suggest dose is affected by the sprayer type and that the distance into the plant canopy chang Further analysis is underway with soft pesticides to understand the relationships between sp

spray pattern back and forth across these two benches produced better coverage than trying to treat between two 11-ft. benches. The same spray volume was used in each case, but the total spraying time was a little more when treating across just two 5.5-ft. benches because the operator needed to walk down more alleyways. The ESS was also used in a way that treated two 5.5-ft. benches as the operator walked down the alley between them.

WHAT IT MEANS FOR YOU

These and future studies are designed to learn how to apply greenhouse pesticides most effectively. While these initial studies have not included an examination of the biological effectiveness of each machine, they do provide lessons on where they deposit spray material and how to improve coverage, if needed. More directed sprays are able to penetrate a canopy better and can put more material on the bottoms of leaves than a stationary fogger. This may require more time, but could well improve pest management efforts. High-pressure sprays do not necessarily ensure good canopy penetration and coverage on the bottoms of leaves. Air-assist, electrostatic spraying may prov
erage on the bottoms

A portion of these
the BCPC Conference
England, in November
conference proceeding
tant to help understan
tion, it is more importa
of each pesticide used
most effective. Future
pest control each type
fate of spray material w

Product and company on available data; however rants the standard of the USDA implies no approva that may also be suitable.

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About This Research Unit

The Application Technology Research Unit (ARS) is located in Wooster, Ohio, and is a research unit of the USDA-ARS. The mission of the ATRU is to conduct basic and developmental research on new and improved methods to protect horticultural, landscape, greenhouse and field crops against damage from pests and adverse environmental conditions, while safeguarding environmental quality and food and worker safety. The ATRU has partnerships with scientists from The Ohio State University as well as other colleges, universities and industry groups.