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OSU expert: Nozzle choice can determine yield gains or declines, save growers money - Tracy Turner, Ag Answers

COLUMBUS, Ohio - An agricultural tool as small as a thumb can mean the difference between a 25 to 50 percent increase or decline in crop yields, according to an expert from Ohio State University's College of Food, Agricultural, and Environmental Sciences.

Choosing the right type of sprayer nozzle can make a huge difference in how effective pesticides are during a growing season and whether growers have to re-spray their fields or in some cases, replant, said Erdal Ozkan, an agricultural engineering professor and spray technology expert with Ohio State University Extension and the Ohio Agricultural Research and Development Center (OARDC).

Not only do farmers have to have a field clear of weeds and pests before they plant, they have to keep that field free of pests and weeds throughout the growing season. With the rising cost of pesticides and fertilizers, growers who also want to save money and spray chemicals as efficiently as possible need to make sure they choose the correct spray nozzles for their fields, weather conditions and type of chemicals they apply, Ozkan said.

"Farming is a tough business, with a very narrow margin between profit and loss," he said. "So anything we can do to widen that margin is a good thing."

The costs are significant. Farmers spend approximately \$4.1 billion on pesticides annually, according to published reports. Large self-propelled sprayers can cost more than \$250,000, according to the U.S. Environmental Protection Agency.

"Growers usually choose pesticides based on their effectiveness, not how much they cost," Ozkan said. "So one way to find savings in crop production is how we apply pesticides, and choosing the right nozzle is a part of that process.

"The more precise and accurate growers are in their applications, the more growers can have a net savings. For example, if growers are spraying more than the recommended rate, it is a waste of money."

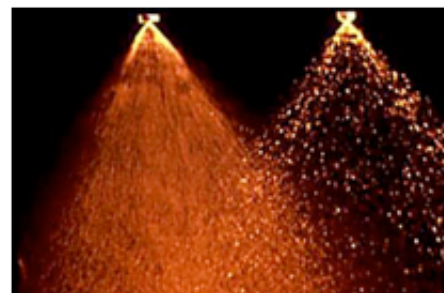


Figure 1. Sprayer nozzles can be the difference in a 25 to 50 percent crop-yield swing.

National surveys of field application results have shown that only about one out of three sprayers are applying pesticides at the recommended rates, while two-thirds are missing the mark by either over- or under-spraying, Ozkan said.

"Doing it right can result in better control and cost savings, and eliminates having to do a second application," he said. "If you don't do it right or choose the wrong nozzle, the mistakes won't show up that day, but sometime later in the growing season when weeds, insects, disease or all of the above start showing up in the crops in particular areas."

Ozkan said growers can improve the performance of sprayers if they:

- * Always calibrate the equipment with water before spraying to ensure that the sprayer is applying the chemical at the recommended rate. (For details, see the OSU Extension fact sheet "Boom Sprayer Calibration" at <http://ohioline.osu.edu/aex-fact/0520.html>).
- * Mix chemicals in a small container before pouring them into the sprayer tank to achieve a uniform mix.
- * Determine if the pesticide requires specific adjuvants to provide product efficacy, influence droplet size or solution evaporation rate, reduce drift and to improve deposit and retention on the target.
- * Understand that some pesticides are volatile and may require incorporation into the soil after application.
- * Check sprayer components to ensure they are the right size and type; check the sprayer system for leaks; and check the tank agitation system to ensure that flow to the tank for agitation is effective.
- * Make sure the pressure gauge on the sprayer is accurate and operate the sprayer within the pressure range recommended by the nozzle manufacturer.
- * Keep the boom height to a minimum to reduce drift. Setting the proper boom height for a given nozzle spacing is extremely important in achieving proper overlapping. Conventional flat-fan nozzles require 30- to 50-percent overlapping of adjacent spray patterns. Check catalogs for specific recommendations for different nozzles.
- * Maintain uniform deposition of spray material on the target across the boom. Non-uniform coverage can result from using misaligned or clogged nozzles, nozzles with different fan angles, or from uneven nozzle height across the boom. This can result in streaks, untreated areas or over-application of chemicals.
- * Watch for pattern streaks in the nozzle output, which indicate particles are in the nozzles. Remove them from the nozzle tip using a wooden toothpick or soft object and clean the nozzle filter using a soft brush.
- * Learn more about reducing spray drift as much as possible. Details are available in an OSU Extension bulletin, Reducing Spray Drift, available for purchase at <http://estore.osu-extension.org/productdetails.cfm?PC=2433>.

Prepare for Downy Mildew on Cucumbers and Melons - Sally Miller, Department of Plant Pathology

While downy mildew has NOT been reported yet in Ohio or the rest of the Great Lakes region (<http://cdm.ipmpipe.org/scripts/map.php>), and spore counts in southeastern MI have been very low so far, it is time to think about preparing to manage the disease if you are producing cucumbers or melons, particularly cantaloupes, in Ohio lake counties and down as far south as Holmes county. Downy mildew can be unpredictable in occurrence, and regardless of the location of your farm, you should be scouting for the disease. See the photos below and others at http://cdm.ipmpipe.org/index.php?option=com_content&view=article&id=61&Itemid=70. In 2012 the first report of downy mildew was on June 14 in Wayne County. However, larger outbreaks of the

disease were not reported until weeks later in other areas. 2012 was a very hot year; so far 2013 has been rather cool and rainy. Cool and overcast or rainy conditions favor development of downy mildew.

PREVENTATIVE management is very important for this disease as it cannot be controlled once it becomes well established in a field.

SUGGESTED DOWNY MILDEW MANAGEMENT PROGRAMS FOR CUCUMBERS AND MELONS:

Fungicide application:

Protection before disease appears: Apply one of the following fungicides on a 7-10 day schedule, tank mixed with Bravo, Manzate or Dithane: Presidio, Ranman, Previcur Flex, Tanos, Curzate or Gavel (Gavel already contains mancozeb). Alternate products. The application interval can be lengthened under dry conditions. Use the shorter interval under cool, moist conditions.

Management after disease appears: Apply one of the following fungicides on a 5-7 day schedule, tank mixed with Bravo or Dithane: Presidio, Ranman, Previcur Flex, or Tanos. Alternate products. The application interval can be lengthened under dry conditions. Use the shorter interval under cool, moist conditions. See product labels for fungicide rates.

Always tank mix targeted fungicides with a protectant fungicide and alternate targeted fungicides with different modes of action (see FRAC Codes below). Note that the fungicides recommended above have different pre-harvest intervals (PHI). Keep this in mind when fungicides are applied after harvesting begins.

Product	PHI (days)	FRAC Code	Comments
Chlorothalanil e.g. Bravo Weather Stik	0	M5	Protectant; tank mix with targeted fungicides below
Mancozeb e.g. Dithane or Manzate	5	M3	Protectant; tank mix with targeted fungicides below
Ranman	0	21	
Previcur Flex	2	28	Reduced activity suspected in some Ohio counties
Tanos	3	11 + 27	Up to 2 days curative activity but low residual (3-5 days)
Gavel	5	22	Contains mancozeb; see label for worker safety requirements
Presidio	2	43	Possible resistance in CDM populations in Eastern US but not documented in Midwest

Curzate	3	27	Up to 2 days curative activity but low residual (3-5 days)
Zampro	0	40 + 45	No Ohio data; moderate to low efficacy on cucumber in Eastern US



Cucumber downy mildew



Cantaloupe downy mildew

Virus Disease on Garlic - *Sally Miller, Anna Testen and Delphina Mamiro, Department of Plant Pathology*

Garlic samples from two farms in two northern Ohio counties were received in the OSU Vegetable Pathology lab (http://www.oardc.ohio-state.edu/sallymiller/t08_pageview3/Diagnostics_Services.htm) with symptoms that include long yellow stripes on the leaves and failure of the cloves to develop. Lab tests indicate at least one virus, a Potyvirus called Leek yellow stripe virus (LYSV) to be the cause of the disease. This virus is transmitted through the cloves and by aphids.

Where this disease is present in a field, **cloves should not be saved** from any plant, even those without symptoms, for the next year's crop. Plants may be infected but not yet showing symptoms. Virus-free garlic bulbs should be purchased from a reputable producer.



Image of Leek yellow stripe disease of garlic on right hand side.

High tunnel tomato harvest continues strong with outstanding quality and size with prices at wholesale auction prices still exceeding \$5 a pound for high grades. Harvest of snap and shell peas is in full swing as is harvest of lettuce, mustard greens, green onions, radishes, spinach, basil, arugula, chives, garlic scapes and other spring greens. Plasticulture strawberry harvest which began the week of May 10 is winding down for several growers with matted row harvest peaking.

Vegetable planting of all crops continues on schedule with rainfall amounts ranging from ½ to 3 inches the past week, with severe storm threats this afternoon and evening. Even with the rains some growers continue to irrigate where rainfall amounts are lighter. Sweet corn planted the end of March under plastic is in full tassel, silking and pollinating with an estimated harvest date of the 3 to 4th week of June. Pumpkin planting continues. Cultivation and side dressing of Nitrogen continues on sweet corn. Seeding of Cauliflower, cabbage and broccoli plants in the greenhouse continues in preparation for the planting of the fall crop in about 3 weeks.

Production issues have included: herbicide drift injury continues from neighboring grain farms drift injury seems greater this year than in the past, hope it is not a beginning of a trend?? ; White Mold / Timber rot is causing extensive damage and plant loss in high tunnel tomatoes where crops have been grown for 2 years or more with some disease showing up in some newly constructed high tunnels; soft fruit is being reported on summer squash and zucchini squash not sure why could be from poor pollination?; cucumber beetles continue to cause feeding damage to newly transplanted and emerged cucumber, pumpkin and squash transplants; aphids outbreaks and in particular red aphids continue in high tunnel and field crops especially tomatoes and strawberries; cutworm damage continues to be reported on sweet corn and bean crops; slug damage is being reported on strawberry crops with slug bait applications being made when possible.

**Good
Ag**

Practices Training - *Brad Bergefurd, OSU Extension, South Centers at Piketon*

There will be a GAP Educational Program coming up next week on Thursday, June 20th. The program will be offered at the Bainbridge Produce Auction, 4053 State Route 41 South Bainbridge, Ohio 45612 in Bainbridge, Ohio. The time slot for this program will be from 1:00 pm to 4:00 pm. The following will be included in the program:

- Foodborne illness
- Contamination
- Water safety
- Soil safety
- Good handling practices
- Worker training
- Restroom & breaks
- Hands & hygiene
- Ideas for traceability on the farm
- Records

- Standard operating procedures
- Receive certificate of participation

To register, you may email me at mcglothin.4@osu.edu or you may call 740.289.2017 Ext. 132. Come out and be a part of this awesome educational program!

The program is next week, so get registered today!