



# Devil in the Details

Are your sprayer nozzles and water volumes selected for each application?

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SENIOR EDITOR

One size doesn't fit all when it comes to spray nozzles. So in an era of time-saving tank mixes that blanket fairways with several products at once, many superintendents probably aren't getting the most out of many of their chemicals due to poor uniformity, especially with foliar uptake products.

In a recent survey of about 300 golf courses, 68 percent of superintendents said they use the same nozzle for everything they spray on fairways, and 59 percent use the same water volumes with every product, says Mike Fidanza, Ph.D., associate professor of horticulture at Penn State University at Reading and one of the researchers of the study, which was funded by Syngenta Professional Products.

"If you are happy with your spraying make-up right now, then don't make any changes," Fidanza told attendees at the Ohio Turfgrass

Conference and Show in December. "But if you're not, then I would start with some different nozzle types."

With the minutia that overwhelms a superintendent's day, it's easy to understand why raindrop-type and other large-droplet nozzles became the simplified standard for two out of every three golf courses. The larger droplets work well for pre-emergent herbicides and many insecticides that work best when they make contact with the soil or pest. And they reduce drift and put down enough volume that spray technicians work at a decent pace.

But without proper coverage for contact products, like many fungicides and post-emergent herbicides, you're probably not getting the best results out of some of the most expensive chemicals that cover your courses.

"We found that with these larger droplets, we're only getting about 50 percent coverage. With a disease like dollar spot, you really need



to paint the turf,” says Dennis Shepard, Ph.D., technical manager for Syngenta and lead researcher in the Syngenta study. “Nozzles are the least expensive part of the spray equipment, but they’re the last piece of equipment that the spray goes through before it hits the ground and has the biggest impact on the coverage that you get of the product to your target.”

Fine droplets forced by flat-fan nozzles have their limitations, too. The smaller droplets heighten the chance that systemic products will evaporate or displace before they reach the soil.

Boosting pressure in small-droplet nozzles to get better coverage probably shouldn’t take the place of a nozzle swap, either. Pressure must increase fourfold to double output, Fidanza says. That means pressure adjustments should be made for only minor tweaks, which are usually recommended by the product label.

Pile on the fact that all nozzles clog — not completely like pesky screens, but “the average nozzle after 50 hours has lost more than 5 percent of its efficiency,” says Rick Fletcher, director of product development for Cleary Chemical.

Changing nozzles for different products, routine cleaning and volume adjustments — and of course the obligatory recalibration required when changing specifications — might sound like just a few more tasks to add to the list of things you would do in a perfect world but probably will never get to. But it doesn’t need to be a painstaking process, either.

“You don’t need more than a couple different nozzles and setups, so it doesn’t need to be too complicated,” says David Spak, Ph.D., technical development manager for fungicides for Bayer Environmental Science. “But one nozzle isn’t going to do the job. It’s kind of like trying to paint your house inside and out with the same brush. It’s just not going to work well.”

### Where to start

Course managers need effective systems and programs when spring and summer roll around, so winter is the perfect time to evaluate spraying programs and strategize for the busy season.

First, Shepard says, determine what diseases you’re trying to control, what products you sprayed last year, water volumes, time constraints and environmental influences, such as heavy dews in the spring or prevailing winds.

Next: What worked? Did dollar spot flourish on the same fairways as the year before, or did it pop up sporadically? Are you cheating on rates or intervals?

“The first clue (that you should adjust your program) is that you’re not getting the rate of control that a chemical label says it should,” Shepard says. “It’s not always the nozzle. In some conditions, you need to be putting down the maximum rate of the chemical down at the shortest interval allowed or the chemical probably isn’t going to hold up.”

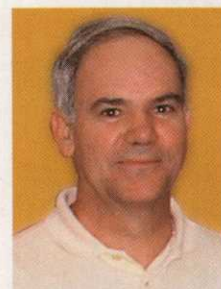
If spray volume is too low, adequate coverage probably won’t be achieved, but too much volume might dilute the product or wash it from the surface of a plant in the case of contact pesticides.

“Most pesticides have been developed through small plot testing with hand-held spray equipment,” Spak says. “Many of these sprayers are equipped with flat-fan nozzles calibrated to deliver a spray volume in the range of 2 to 4 gallons per 1,000 square feet.”

But different spraying equipment, nozzles, groundspeeds and pressure can influence performance. That means nozzles and volume are closely intertwined, and “you can’t talk about one without talking about the other,” Spak says.

Again, if products sprayed last year worked well on the problems for which you were spraying them, then there is no need to

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**DENNIS SHEPARD**

TECHNICAL MANAGER, SYNGENTA

### BEHIND DA NOZZLE CODES

The model number on most nozzles refers to its specifications. The first numbers are the spray angle, and the last two numbers represent the discharge rate at rated pressure.

For example, an 8005 has an 80-degree spray angle and will apply .5 gallons per minute at a rated pressure (typically 40 psi for a flat-fan nozzle). An 11002 nozzle has a 110-degree spray angle that applies .2 gallons per minute at rated pressure.

The letters that precede the numbers can indicate nozzle type, including flood nozzle, hollow-cone, full-cone, air-induction or flat-fan nozzles, which have many additional designations, such as extended range, off-center and twin-orifice models.

Additional designations can include details about a nozzle’s composition, such as “BR” for brass or “SS” for stainless steel.

Consult your manufacturer for exact specifications on your nozzles. ■





### You don't need more than a couple nozzles and setups.

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change your system. But if some products failed consistently, then examine the mode of action of those chemicals in conjunction with nozzles and water volume.

Systemics are more forgiving with coarse droplet sizes. Contacts typically require smaller droplets and subsequent better coverage.

When tank-mixing systemic and contact materials, Spak says it's important to make sure you select the appropriate volume and nozzle size for the most restrictive material.

Next, compare volume output to the label.

"Some of the labels that we have do recommend a specific nozzle type. But all of our labels recommend a certain spray volume," Spak says, adding that rigorous measures are taken to offer a safe and effective volume recommendation.

Luckily, technology has made superintendents' jobs a little easier with the introduction of cluster nozzles that attach to the end of each boom.

"If you're changing products or the conditions warrant it, you can spin and choose the right nozzle for the particular product and environmental condition," says Kyle Miller, market development specialist with BASF Professional Turf and Ornamentals. "Nozzles are cheap, but mistakes are expensive."

That's why it's important to conduct routine maintenance on every nozzle on every boom, sources say. It's a protocol that can be set up in the off-season, but crews will need to check spraying systems often during the year.

"A lot of golf courses will have a professional person come in and calibrate equipment twice a day every day," Miller says. "That's something people should consider if they are not comfortable with (doing it yourself).

"Or make up your mind and say, 'I'm going to get this right.' We work so hard to make sure we're applying the proper amount of product to make sure we have an adequate amount of control," he says. "But if your nozzle is off by 25 percent, you can be putting 25 percent less product on an area, and you wonder why there is disease in one spot and not another." ■