

# A Maverick's Theory

Michigan State's Joe Vargas says there's no need to rotate fungicides for proper resistance management.

So what are many superintendents to make of his notion, which goes against everything they've been taught?

BY LARRY AYLWARD, EDITOR

**T**hey all laughed at Christopher Columbus when he said the world was round. They also laughed at Michigan State University plant pathology professor Joe Vargas when he said superintendents should *not* rotate fungicides as part of their resistance-management programs to contain dollar spot.

Columbus was correct about the world being round. Vargas, who also says superintendents should only use one fungicide class until the dollar spot organism develops resistance, insists he's right. But some of his peers are still scoffing at his theory.

The maverick Vargas, however, doesn't mind that others have panned his fungicide resistance-management theory like a bad TV pilot. It's happened to the best of them.

"When Charles Darwin said he believed in evolution, did his colleagues grasp him, hug him and kiss him? No. They wouldn't even let him present his paper," says Vargas, noting that Louis Pasteur was also ostracized for his initial theory on pasteurization.

The 60-year-old Vargas, who first wrote about his research in his 1981 book, *Management of Turfgrass Diseases*, insists that superintendents use the same class of fungicide on dollar spot until the disease begins to resist it. Then they should switch to another fungicide with a different chemistry and use it until resistance develops.

At the heart of Vargas' resistance management theory is a dominant dollar spot strain he says is resistant to the benzimidazoles, dicarboximides and demethylase inhibitor chemistries. He says the strain is the result of superintendents rotating several fungicides to control other strains.

"How did that dollar spot strain become resistant to all those chemicals and become the main strain in the population?" Vargas asks rhetorically. "Because superintendents rotated fungicides."

Vargas' research, of course, discounts what most superintendents have been taught — that they should rotate or alternate fungicides for proper resistance management. The rotation/alternation method has been a popular and long-

standing turfgrass maintenance technique for controlling dollar spot and other diseases. That's why so many of Vargas' peers reject his theory and criticize him for it.

"Joe's a good buddy, but he's wrong," says Houston Couch, a professor of plant pathology at Virginia Polytechnic Institute and State University. "He doesn't have any evidence [to support his theory]. There isn't a turf pathologist in the United States, Canada or Europe that agrees with him."

Henry C. Wetzel III, BASF Professional Turf's biology project leader for fungicides and nematicides, politely says he respects Vargas' research on resistance management but disagrees with it. "I don't agree with using one fungicide [class] until it's no longer effective," he says.

Dave Ross, Syngenta's technical manager for the turf and ornamental group, also graciously disagrees with Vargas.

"We respect Joe very much, but we have a difference of opinion," he says. "If you use a single product over and over, you will have resistance occur more quickly than if you alternate and allow for less selective pressure from one single active ingredient."

Rick Fletcher, technical and regulatory manager for Cleary Chemical, says a fungicide's mode of action dictates if and when it can develop fungal tolerance. Fungicides with broad modes of action, such as chlorothalonil, mancozeb and PCNB (pentachloronitrobenzine), have low potential for developing fungal tolerance. But fungicides with more specific modes of action, such as benzimidazoles and strobilurins, have moderate to high potential for developing fungal tolerance when used repeatedly. Fletcher says the latter fungicides must be tank mixed or rotated to avoid developing this tolerance.

"If you use them in a tank mix or rotational program with other disease controls with different modes of action, you'll see repeated efficacy at an economic level that warrants re-use of the products," he adds. "This acts to delay the tolerance selection process, but not totally avoid it. New chemistry will need to be continually introduced for the future success of turfgrass disease management."

Despite his detractors, Vargas won't back down from his theory. He says he possesses data that proves it's sound. He claims more of his peers, as well as superintendents, have become open to his thinking.



Vargas sure has superintendents talking about his theory. Last December, after Vargas gave his speech on the matter at the Ohio Turf Foundation show in Columbus, several superintendents struck up an online chat about the topic on a GCSAA forum.

But Couch believes Vargas is misleading superintendents by lecturing them about his theory. He says Vargas could get superintendents in trouble if they listen to him. "A good number of superintendents know better than what

*Continued on page 42*

**Joe Vargas says his resistance management theory makes perfect sense. "We're not talking rocket science here."**

RON HALL

## A Maverick's Theory

**Not all fungi and fungicides are the same, especially when it comes to resistance. See Tips for Fungicide Use on page 78.**

Ever since his early days, Joe Vargas has been known for his independent stance on turf issues. "My whole life has been a maverick," he says.



*Continued from page 39*

Vargas is talking about, but some of them don't," Couch says.

Ross says it's Vargas' job "to look at things differently and to propose different ways of doing things." But that doesn't mean he's always right.

"I can't speak to superintendents' thought processes, but I'd be worried that [Vargas] might be confusing them [with his resistance management] theory," Ross says. "Superintendents need to listen to Vargas, but they need to listen and talk to other experts as well."

It's been more than 20 years since Vargas first presented his theory to colleagues.

"Nobody paid any attention to it," Vargas says. "I reiterated it in 1993 in the second edition of my book and still nobody paid attention to it."

For awhile in the '80s, Vargas says he quit talking about his research. He became tired of the ridicule and the jokes, such as "Where else have you seen resistance besides Vargas' lab?"

"I got beat up pretty bad by my colleagues," Vargas says. "My feelings were hurt."

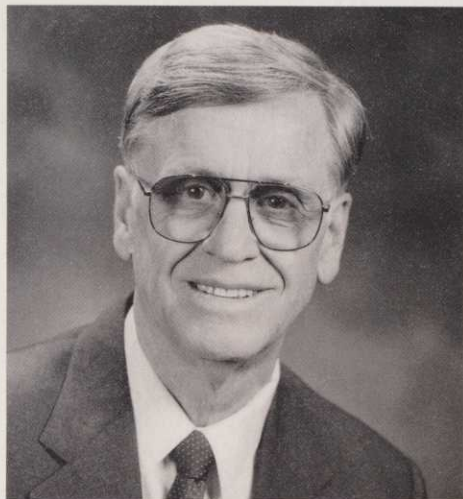
Time healed his emotional wounds, however. Vargas began to retell his theory in the mid-'90s. He says more people started paying attention to it partly because plant pathogens on other crops began to develop resistance to more than one chemistry class, which rotation was supposed to prevent. He has taken his talk on the road to several turf shows and teaches the theory in class.

Vargas pursued the research because he says he kept getting phone calls from superintendents who said the fungicides they were using in rotation weren't working anymore. His initial study focused on dollar spot on bentgrass/*Poa annua* fairways.

"When you're talking about resistance on turf, you're talking about dollar spot," says Vargas, adding that his initial study lasted seven years. "Most fungicides used on turf are for control of dollar spot."

Vargas says his colleagues will not buy into his research because their "heartfelt beliefs die hard." His colleagues, however, insist fungicide rotation is a proven resistance-management technique.

"Rotation is an essential part of resistance management," Couch says. "It's not only used in turf. It's used extensively in crop products with the same fungicides. To tell people not to



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**Houston B. Couch, Plant Pathology Professor**  
Virginia Polytechnic Institute and State University

rotate is really the ultimate in irresponsibility."

Some superintendents reject Vargas' research, but others say they're open to it.

"It definitely goes against the training we've received over the years," says Tom Athy, director of grounds for the Omaha (Neb.) CC.

While Athy says he subscribes to the rotation theory, he says he's taken a few fungicides out of his mix because they no longer perform.

"I'm not getting the control that I should get without going to super-high rates," Athy says. "A few of the fungicides just don't control dollar spot anymore."

Ted Cox Jr., superintendent of Running Fox GC in Chillicothe, Ohio, attended Vargas' talk at the Ohio Turf Foundation show. He says "it was kind of a shock" to hear Vargas' stance. He said other attendees in the audience were in disbelief.

"Vargas' theory looks good on paper," Cox says. "It's a reasonable line of thought in a laboratory, but I don't subscribe to that thought process."

Cox says his fungicide rotation program is based on timing. "We've used some of the resistance-prone fungicides for years and have never seen any resistance."

# RELIABLE DEPENDABLE PREDICTABLE

However, John Monson, superintendent of the Long Prairie (Minn.) CC, says he's used only iprodione for about 10 years and has not discovered any resistance. He sprays it about four times a year and believes Vargas' theory could be accurate.

"I've talked to some agronomists who've said, 'If a fungicide works, why switch to another?'" Monson says. "I don't have any qualms about sticking with one [class]."

Jerry Palmerton, superintendent of Widgei Creek GC in Bend, Ore., wasn't aware of Vargas' research. "But I agree with him to a point," he says.

Palmerton uses only PCNB for snow mold treatment, and it has worked for several years. "We apply it twice a year [at the high label rate] to prevent snow mold on our putting greens," he says.

Palmerton says he doesn't want to rotate other fungicides with PCNB because he has no idea how they will perform since the greens are covered with two feet of snow for a few months. But he knows he can count on PCNB.

"When the snow melts and you pull the covers off the greens and there's no disease, it's a huge relief," Palmerton says. "Why mess with what you're doing?"

How long one fungicide is effective depends on a various factors, including location and environment of the golf course, Vargas says. A superintendent might be able to apply iprodione 30 times before it's resisted. If he's spraying it three times a year that equates to 10 years, Vargas points out.

Vargas says superintendents "better pray that EPA doesn't take chlorothalonil (which has a low resistance risk) off the market."

Couch contends that superintendents who abide by Vargas' theory won't be able to use some of the most promising new fungicides introduced in several years.

In the meantime, you can bet the great rotate-or-not-to-rotate debate will continue. ■

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