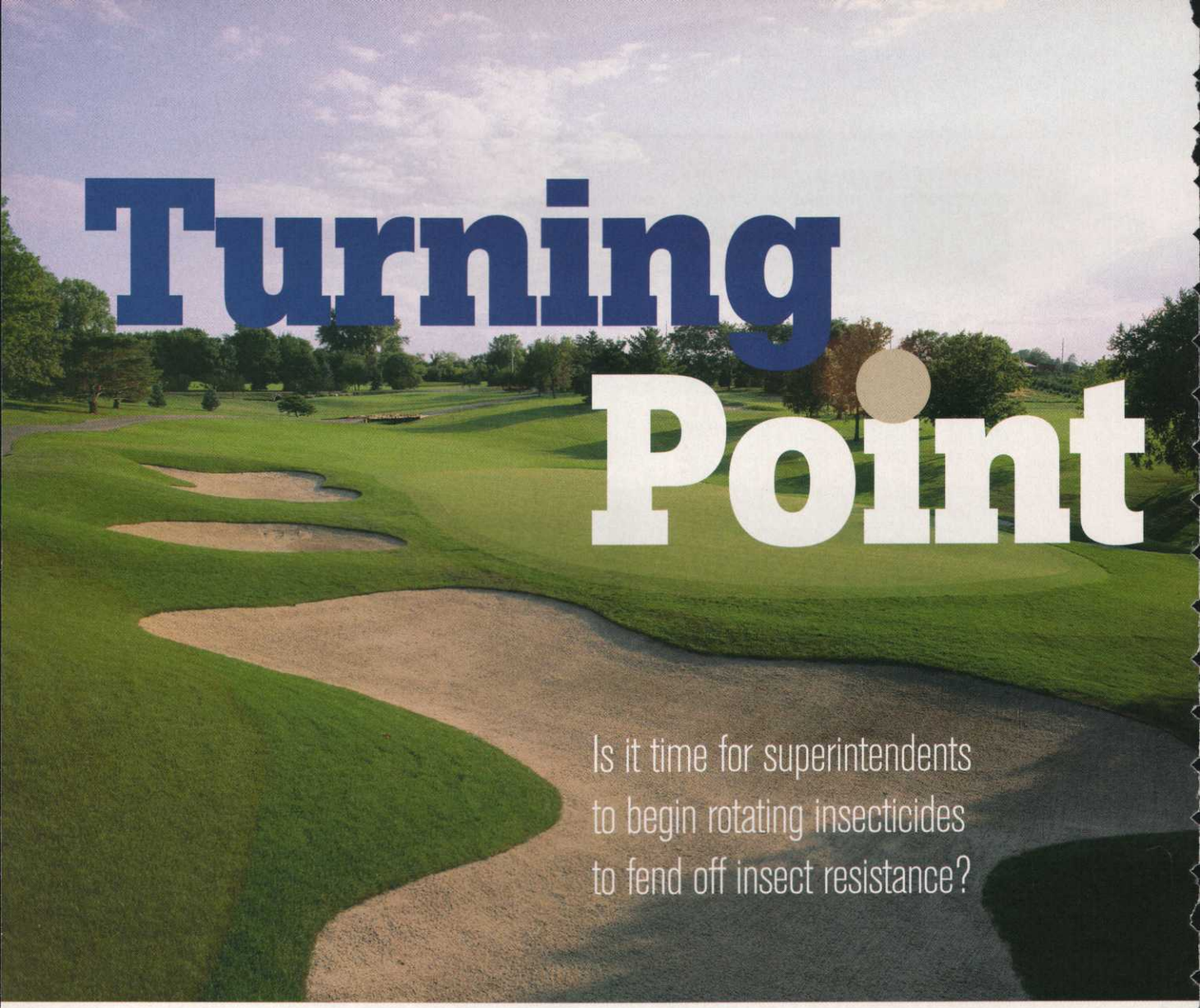
Turning Point



Is it time for superintendents to begin rotating insecticides to fend off insect resistance?

BY ANTHONY PIOPPI
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A basic tenet of golf course maintenance calls for the rotation of fungicides during the course of year to stave off turf disease resistance. Rarely, if ever, is the same rule applied to insecticide applications, and the word "resistance" is almost never mentioned. That is until now. Researchers in the Northeast have documented the resistance of pyrethroids by annual bluegrass weevils.

"Evolution happens, and resistance happens," said Rich Cowles, a scientist at The Connecticut Agricultural Experiment Station in New Haven, Conn.

Because bluegrass weevils are one of the very few pests on golf courses that receive multiple applications of insecticides, Cowles said it was just a matter of time before they developed resistance to insecticides. Back in 1980, when he saw insect resistance to pyrethroids in tree fruit systems, Cowles said he realized the same outcome was inevitable on golf turf.

"I would say that in the next two to three years, this is going to blow up in the faces of superintendents all over the Northeast," he said of bluegrass weevil resistance. "The time bomb counts off not in minutes, but in the number of applications of pyrethroids. Every turf pathologist in the Northeast is working at this problem."

Cowles said superintendents are on a "pesticide treadmill." He explained that most superintendents use one highly effective pesticide exclusively until it loses its usefulness. Then when the next great product comes along,

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superintendents switch to that chemistry exclusively, which will eventually lead to insects developing a resistance to it as well.

Chuck Silcox, DuPont's global product development manager for the green industry, stresses that bluegrass weevils are showing resistance to pyrethroids. He says DuPont has two new products in the pipeline that are not pyrethroids. They feature a new class of chemistry that will control annual bluegrass weevils without the threat of resistance.

The good news is that because the pesky bluegrass weevils do not travel far, it is unlikely resistance strains will migrate from one course to another.

Bluegrass weevils are not the first case of insect resistance in golf turf.

According to David Shetlar, extension entomologist at The Ohio State University, some species of bugs became immune to chlordane in the 1970s and 1980s. Chlordane is classified in the same category as DDT, and resistance occurred in part because it was being applied to golf courses at a massive rate of 14 pounds to 16 pounds per acre. "The insects had to adapt or die — and they adapted," Shetlar said.

Dow AgroScience's Dan Loughner says he does not expect to see resistance with any of the commonly used golf course nonpyrethroid insecticides.

Insect resistance has also been documented in other areas of the green industry. In Florida, Southern chinch bugs on St. Augustine grass, used on lawns, have developed a resistance to Talstar, an insecticide that's also used on golf turf.

Researchers surmise the resistance is a result of lawn-care professionals' repeated use of Talstar, up to five times a year. "It's a pretty small population that's affected, but big enough to catch everybody's attention," said Rick Elkins, product manager for FMC Professional Solutions, the manufacturer of Talstar.

"We've been promoting rotation in lawn care," Elkins noted, adding that substituting one application a year would make a difference.

There has been no documentation by superintendents of insect resistance to Talstar.

Dan Loughner, product technology specialist for Dow AgroSciences, the maker of Mach 2, said he does not expect to see resistance with any of the commonly used golf course nonpyrethroid insecticides, especially in cool-season areas. Loughner said because grubs, for instance, only replicate once or twice a year, multiple applications are not needed. Consequently, resistance would take much longer, perhaps decades, to occur.

Nate Royalty, the product development manager of insecticides for Bayer Environmental Science, says the company's insecticide Merit, which has been on the market for more than a decade, has shown no signs of losing efficacy to insects in golf turf. But it's a different story in agriculture where "resistance in some cropping systems" has occurred, Royalty said. He attributes the resistance to the fact that 100 percent of an area is sprayed with the insecticide. Hence, almost every bug is affected by the insecticide. On areas of a golf course that aren't sprayed, untouched bugs, which have not started to develop resistance, breed with affected bugs to slow down or even eliminate the resistance that is starting to develop, Royalty explains.

Resistance is not the only problem that manufacturers and superintendents can encounter with insecticides in agriculture. They need look no further than the rise and fall of the product Oftenal to be reminded. Introduced in the 1990s, it lost its effectiveness in many sites within three years. The problem wasn't resilient insects, but rather accelerated microbial degradation.

"Most chemistry out there is degradable by microbes," said Doug Houseworth, Arysta Life Sciences' manager of technical services for turf and ornamentals. Ohio State's Shetlar echoes his point. "If a microbe can break it up and use it, it will. You apply it today, and it is gone tomorrow."

Stewardship plays a vital role in preventing accelerated microbial degradation because the possibility always exists that the microbes could break down an insecticide before it is able to work on the targeted pests. "Once it happens, it won't go back," Loughner said.

Because of that reason, insecticide manufacturers are continually developing products fully aware that even today's most effective brands might one day be virtually useless. "It's always on our minds," Royalty said. "We're always looking for new chemistry." ■