

Putting Doesn't Pollute, Research Finds

By **STEVE TALLY**
Purdue University

Some of the most common chemicals used on golf courses -- fungicides applied to golf greens -- do not pass into surface water runoff or leach into groundwater, researchers said at the 1998 American Chemical Society meeting in Boston.

Ronald Turco, professor of agronomy and director of Purdue University's environmental Sciences and Engineering Institute, says that four years of research on fungicides at Purdue have found that fungicides do not present a problem to the environment if they are applied according to the manufacturer's recommendations.

Turco says that it is the unnatural state of the grass on the putting green that creates the need for frequent fungicide application. "Homeowners don't need fungicides," he says. "They're expensive, and the need is not there in taller grass. It's only when you start to cut grass to the short height that putting requires that you have to apply fungicides."

Fungicides make up less than 10 percent of all the pesticides used in the United States. Although they are used on many types of plants, including vegetables and fruits, they most often are used on golf courses. A 1993 study of golf courses in Iowa found that in one season, 54,000 pounds of the active ingredient of a particular fungicide were applied.

"That's what we have to do to get grass to grow at only one-eighth of an inch in height," Turco says. "In most years fungicides are only used on greens and tee boxes. These chemicals aren't cheap. They're much more expensive than herbicides."

Such heavy use in a small area led to concerns that the fungicides might run off into surface water or seep into the ground water. Prompted by these concerns, the United States Golf Association asked Purdue researchers to study the fate of fungicides applied to turf and funded the research.

In a series of experiments, both in the laboratory and out in the field, Turco and colleague Clark Throssell, professor of agronomy, examined where the fungicides went before they were broken down. They discovered that the fungicides don't wash off into the surface water or travel into the groundwater.

"The reality of any fungicide application to dense turf is that most of the fungicides doesn't reach the ground," Turco says, "About 90 percent of the fungicide remains on the grass leaf blade, where it is absorbed by the plant within 48 hours."

From there the plant degrades the chemicals internal-

ly, Turco says. The 10 percent of the fungicide that doesn't get absorbed by the grass leaf blade is caught up in the thatch layer, which is a narrow band of organic material on top of the soil.

"The thatch layer is a great binding agent," Turco says. "We've never seen any of the fungicides leaching out of the thatch layer. The fungicides get hung up before they reach the soil."

It is the chemical makeup of the fungicides themselves that causes this to happen: "They are large, sticky molecules. In the laboratory we had to take great caution not to lose them on liners and on our equipment," he says.

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Besides the extremely short height on the grass on putting greens, Turco says that there are other golf course management practices that result in heavy chemical use.

"British golf courses don't use nearly the chemicals that our courses use," he says. "British golfers have a higher tolerance for less-than-perfect greens. Theirs are managed a lot less intensively than ours are, plus their climate is not as conducive to diseases in turf."

Turco says that even the design of American courses can lead to increased chemical use: "A lot of golf courses have trees surrounding a green, because it looks really nice, but trees around the green cause air stagnation and allow fungi to develop."

For golf course superintendents who have to manage these unnatural stands of green carpet for demanding customers, fungicides are a great help. "They are one of the few chemicals that you can spray on turf and see a difference within a couple of days," Turco says. "On the other hand, fungi can cause a green to turn brown in eight or nine hours. That can cause great disappointment to paying golfers and, in turn, tremendous stress on a golf course superintendent."

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