

# Common Insecticides Used on Golf Courses Not a Threat to Golfers

Courtesy of Newswise

Maintaining golf courses requires the constant application of herbicides and insecticides. While some golfers may wonder if they are being poisoned in their pursuit of pleasure, new research from the University of Massachusetts Amherst shows that residues of two widely used insecticides picked up by golfers during a typical golf game do not pose a health risk.

"After extensive monitoring, estimated exposures to golfers following full applications of two turfgrass insecticides that are used throughout the northeastern United States were 19 to 68 times lower than levels set by the U. S. Environmental Protection Agency designed to protect human health," says John Clark, a professor of veterinary and animal sciences who specializes in toxicology.

Results were published in the July 2008 issue of the Journal of Agricultural and Food Chemistry. Additional researchers on the project include Raymond Putnam of the U.S. Environmental Protection Agency and Jeffrey Doherty of the Massachusetts Pesticide Analysis Laboratory.

**According to Clark, there are more than 16,000 golf courses** covering at least 2.4 million acres in the United States, and over 66 million private lawns. Add to that the amount of turfgrass

found in parks, athletic fields and commercial lawns, and it becomes clear that turfgrass is a major part of the American landscape.

**Maintaining the turfgrass so that it looks attractive** and is suitable for recreation requires the application of nutrients, pesticides and herbicides at rates that can be several times higher than those used in agricultural settings. According to the 1998 and 1999 Pesticide Industry Sales and Usage Report, golf courses were professionally treated with 15 million pounds of the active ingredients found in pesticides each year, and 85 million pounds of active ingredients were applied by consumers to residential lawns.

"This widespread and extensive use of pesticides has raised concern regarding the potential exposure of recreational users on turfgrass environments," says Clark.

"Because of the large amount of time people spend in turf environments, exposure to pesticides from treated turf is a potentially significant exposure pathway."

**In order to study pesticide exposures**, the team established a turfgrass plot at the UMass Amherst Turfgrass Research Center in South Deerfield. The plot was mowed and watered like a real fairway. Sevin SL, an insecticide which contains carbaryl as the active ingredient, and Dursban Pro, an insecticide which contains chlorpyrifos as the active ingredient, were applied at the maximum U.S. EPA-approved label rate and followed with irrigation.

Two groups of volunteers were then used to play 76 standardized rounds of golf on the test plot following eight applications of chlorpyrifos and two applications of carbaryl. In each round of simulated golf, the volunteers walked 6,500 yards, hit a ball 85 times and took 85 practice swings over a period of four hours.

One group was entirely covered with a "whole body dosimeter" consisting of cotton clothing, baseball caps and veils, which could be removed and tested for pesticide residue. This group also wore personal air samplers to measure how much pesticide could potentially be inhaled. A second group went through the trial wearing short sleeve shirts, shorts, ankle socks and golf shoes.

According to Clark, each group of volunteers had a different purpose. "The group wearing the cotton clothing was used primarily to determine the different routes of exposure, including how much pesticide was potentially absorbed through the skin, inhaled or ingested by each volunteer," says Clark. "By analyzing urine from the second group for the breakdown products of both pesticides, we were able to estimate the total doses actually received by golfers during a round of golf."

**The results of the study**, which represents a worst case scenario, show that estimated exposures to golfers following full rate and full course applications of carbaryl and chlorpyrifos were 19 to 68 times below current U.S. EPA values designed to protect human health.

"This study, which also included measuring insecticide residue transfer from treated turfgrass and airborne insecticide residue, provides a novel and complete database on golfer exposure," says Clark.

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