

Best Management Practices to Reduce Pesticide Runoff from Turf

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Objectives:

1. Identify post-application irrigation schedules that minimize pesticide runoff potential.
2. Quantify the relationship between the time interval from pesticide application until a runoff event and the amount of pesticide in that runoff.
3. Determine the impact of clipping removal following pesticide application on the quantity of pesticides in runoff.

Start Date: 2001

Project Duration: 2 years

Total Funding: \$59,633

Environmental groups, regulatory agencies, and the media have criticized pesticide use on golf courses for many years. This attention prompted the USGA to study pesticide leaching on golf courses during the early 1990's. The results of these studies indicated that pesticide leaching through turf was less of a concern than originally thought. Because of the high level of surface organic matter, the potential for downward movement of pesticides is much reduced compared to other cropping systems. Previous runoff research from turfgrass systems has indicated this is a pathway where some off-site transport of pesticides may occur.

The present research project seeks to examine management practices that may reduce the quantity of pesticides leaving turf via runoff. The past year was largely devoted to runoff plot construction and testing of the plots. The plot area consists of a site where the ground was already sloped at approximately 5%.

The irrigation system consists of dual mist



Plots were constructed at the University of Illinois to study how timing of irrigation following pesticide application can reduce runoff.

heads that can provide either 4.5 or 9.0 cm of simulated rain per hour. Following plot construction, the area was sodded with 'Penncross' creeping bentgrass sod. The area has been maintained under golf course fairway conditions with a mowing height of 1.2 cm.

Each individual runoff plot is 9.1 X 3 m, and there are 12 total plots with one-meter buffer strips separating each plot. The water exiting the bottom of the plots needs to be collected so that the volume can be measured and subsamples collected for pesticide residue determinations. The main challenge was connecting the runoff collection flumes to the end of the plots so that water continued to flow naturally down the slope.

The collection flumes are V-shaped sheet metal that is designed to channel the runoff into a single collection pit. Our pit is a 0.75-meter diameter hole that is 0.7 meters deep. Inside the hole is a 40-liter stainless steel container that collects the runoff. As the container fills, the contents are pumped via a sump pump into 200-liter drum. This permits us to collect all the runoff that comes from each plot. The plots were then ready for the first runoff test by late August.

The first runoff trial was initiated on August 21, 2001. The trial was set up to test the system and also to examine the impact of removing clippings following a pesticide application on the amount of pesticide available for runoff. Pesticides applied were chorothalonil at 4.6 kg a.i./ha, mefenoxam at 0.4 kg ai/ha, and propiconazole at 1 kg a.i./ha. Beginning two hours after application, the plots were mowed with a walking tee mower set at a height of 1.2 cm. Four of the plots had the clippings removed, four had clippings returned, and four plots served as controls



Dr. Bruce Branham explains to members of USGA's Turfgrass and Environmental Research Committee how the system works.

(no pesticides, no clipping treatment).

Following pesticide application, irrigation was applied and runoff produced. The first four liters that came off the plots was collected as a single sample and an additional 40 liters were collected from which a four-liter subsample was obtained. Samples were immediately taken to the lab and filtered to remove particulate matter, the water was passed through a solid phase extraction cartridge to remove the pesticides from the water. Samples from this experiment are currently being analyzed.

This project will be concluded in 2002 when we will conduct three additional runoff trials to examine other management factors that may influence the quantity of pesticide runoff from golf courses.

Summary Points

- The past year was largely devoted to runoff plot construction and testing of the plots. The plot area consists of a site where the ground was already sloped at approximately 5%.
- The first runoff trial was initiated on August 21, 2001, and samples are currently being analyzed.