Fate of Pesticides and Their Partitioning Among Water, Soil, and Biomass Elements in a Turfgrass Ecosystem

Steve Starrett
Kansas State University

Objectives:

1. To follow the fate, residence time, and partitioning of turfgrass pesticides among the water, soil, and biomass elements of a golf course ecosystem.

Start Date: 2001
Project Duration: 2 years
Total Funding: $60,000

This research is being conducted on Colbert Hills Golf Course, Manhattan, Kansas. To determine the amount of pesticides transported into the detention, we have set up two automated water samplers (ISCO samplers) to collect water samples from the main stream entering and exiting the pond.

Colbert Hills Golf Course authority presently uses herbicide and fungicide named prodiamine (Ronstar) and flutolanil (Prostar), respectively. Water samples are collected from both the inlet and outlet of the detention pond for every rainfall event. We also collected water samples from three fairway drains that directly drain into the detention pond.

Pesticide fate and transport study area, Colbert Hills Golf Course.

Custom made bottle designed to collect first flush water samples from fairways.

We used a custom made glass bottle that seals automatically after filling with runoff water. To determine the partitioning of pesticides among water, we collected twenty-one samples monthly from seven different locations in the pond and in each location three different depth (25%, 50%, and 75% of the total depth of water).

To detect the accumulations of pesticide in soil mass, we collected 54 soil samples from six directions of a fairway that drains into the detention pond. In each direction, three soil samples (1m, 2m, and 5m from fairway drainage grate) were collected.

A mass balance approach will be used to analyze the pesticide transport from fairways to the surface water. Mass loading of pesticide into detention pond and out from pond to the surrounding surface water will be analyzed from collected water samples.

All water samples collected from input and output to and from detention pond will measure the effectiveness of detention pond as pollutant retention and the overall management policy to run the golf course efficiently without deteriorating the downstream water quality standards.

Partitioning of pesticides among water and soil will be analyzed from the collected samples of soils, sediments and water. All water samples are stored in freezer and will be analyze soon.

Summary Points

- Water samples were collected from inlet and outlet of the detention pond.
- Runoff water samples were collected from fairway.
- Water samples collected from different depth of the pond.
- Soil samples collected from fairways.