

# *Fate of Pesticides and Their Partitioning among Water, Soil, and Biomass Elements in a Turfgrass Ecosystem*

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## Objectives:

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

**Start Date:** 2001

**Project Duration:** three years

**Total Funding:** \$90,000

The main objectives of this research are to follow the fate, residence time, and partitioning of turf grass pesticides among the water and soil of a golf course and to investigate the transport of turfgrass pesticides from their site of application and their accumulation in soils and detention ponds. This research is being conducted on Colbert Hills Golf Course, Manhattan, Kansas.

To determine the amount of pesticides transported into the detention pond, 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 planned the use of herbicides oxadiazon (Ronstar), dithiopyr (Dimension) and 2,4-D (Momentum).

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 drains of the fairway that drains directly into the detention pond by a special type of glass bottle that seals automatically after filling with runoff water.

To determine the partitioning of



A special type of glass bottle that sealed automatically after filling with runoff was used to detect pesticides.



Sampling set-up at the inlet of the detention pond

pesticides among water and soil, we collected 21 samples monthly from seven different locations in the pond and in each location at three different depths (25%, 50%, and 75% of the total depth of water in the detention pond).

To detect the accumulations of pesticide in soil mass, we collected 54 soil samples from six directions from the fairway that drained into the detention pond. In each direction, three soil samples (1, 2, and 5 meters from the fairway drainage grate) were collected. We collected sediment samples from the bottom of the pond. All water samples collected from the input and output and from the detention pond will give the effectiveness of the detention pond for pollutant retention and the overall management policy to run the golf course efficiently without deteriorating the downstream water quality standards.

Partitioning of pesticides between water and soil will be analyzed from the collected samples of soils, sediments, and water. All water, soil, and sediment samples are stored in a freezer. Recently, some

of the samples were analyzed in the laboratory.

It was learned that the original herbicides in this study had not been applied as planned. Work is now underway to determine which other pesticides have been applied and to develop methods for testing those. As soon as we finish the methods development, we will analyze the rest of the samples. Similarly we will collect the samples for the next year and analyze the fate of transport of these pesticides.

## Summary Points

- Water samples were collected from inlet and outlet of the detention pond.
- Runoff water samples were collected from fairway.
- Water samples were collected from different depths of the pond.
- Soil samples were collected from fairways.
- Sediment samples were collected from bottom of the pond.
- Few samples were tested in the laboratory.