

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

Our project was delayed during 2002 because of a death of graduate students to conduct this research project. Finally, during the summer of 2002, a decision was made to move to “plan B”. A part-time postdoctoral researcher with expertise in organic chemistry was hired to assist in the analysis of samples collected from runoff experiments. With this hurdle surmounted, the months of August and September were spent refining the techniques necessary to process and analyze the samples generated in the runoff experiments.

The runoff plots themselves deserve a brief description. The plots have a uniform 5% slope and are 150 feet wide by 35 feet long. Within this area, individual runoff plots are 30 feet long by 10 feet wide for a total 12 runoff plots. At the base of each plot is a collection flume that funnels the runoff into a small pit. Each pit holds a 37-liter stainless steel collection vessel. The runoff area was sodded to 'Penncross' creeping bentgrass in the spring of 2001



General view of the experimental runoff area.

and has been maintained at a fairway (0.5") height of cut.

On October 24, 2002, our first runoff experiment of the season was initiated. The study was designed to determine the impact of removing clippings following a pesticide application on the quantity of pesticide runoff. In this experiment, nine of the 12 runoff plots were utilized for three clippings treatments. The clipping treatments were clippings removed, clippings returned, or no mowing.

Pesticides were applied to all three clipping treatments at 10:30 AM on 10/24. Following a one-hour drying period, clippings were collected from three of the plots, returned to three of the plots, and three plots were not mowed following pesticide application. An additional plot was used as an untreated control.

The pesticides applied were chlorothalonil (Daconil Ultrex) at 10.1 kg product/ha (9 lbs product/acre), propiconazole (Banner Maxx) at 5.8 liters product/ha (4 ounces product per 1000 ft²), and mefenoxam (Subdue Maxx) at 1.4 liters product/ha (1 ounce of product per 1000 ft²). At 1:30 PM, simulated rainfall was applied for one hour and 15 minutes. This delivered the equivalent of 4.5" of rain during that 75-minute period.

The sample collection protocol was to collect the first 37 liters of runoff then collect a 4-liter grab sample from this first runoff water. The next 37 liters of runoff yielded a second 4-liter sample, and finally the third 37 liters collected yielded another 4-liter subsample. Plots produced runoff at different rates. Several plots produced runoff beginning after 20 minutes of simulated rain. Other plots took up to 45 minutes before runoff began.



At the base of each plot is a collection flume that funnels the runoff into a small pit.

The runoff samples (4 liters volume) produced from each plot were filtered immediately to remove sediment and then passed through solid-phase extraction (SPE) cartridges to remove the pesticides from the water samples. The SPE cartridges are then extracted with ethyl acetate, the ethyl acetate removed by rotary evaporation, and the resulting samples are resuspended in methanol and analyzed by HPLC.

This process has been completed for the first experiment.

Summary Points

□ Although the project was delayed due to a death of a graduate student, the months of August and September were spent refining the techniques necessary to process and analyze the samples generated in the runoff experiments.

□ Runoff sample protocols have been established and the first experiment involving chlorothalonil (Daconil Ultrex), propiconazole (Banner Maxx), and mefenoxam (Subdue Maxx) was performed.