Further Evaluation and Modeling of Pesticide Partitioning Data From Putting Green Lysimeters

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Objectives:

1. Measure the site-specific critical water flow and pesticide transformation.
2. Simulate pesticide fate using the measured hydraulic properties and pesticide parameters as model inputs and compare the model outcomes with measured data.
3. Summarize the modeling predictions and measurements.

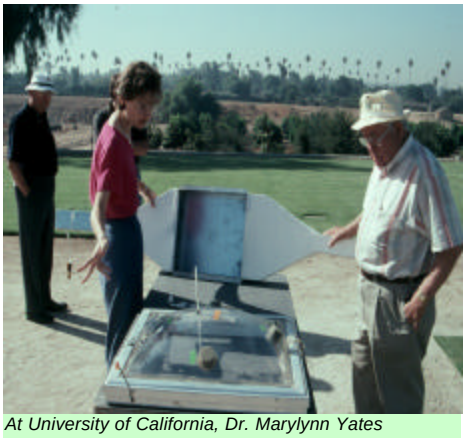
Start Date: 2000
Project Duration: 2 years
Total Funding: $24,934

The fate of pesticides and fertilizers applied to putting green and fairway soils were determined at University of California, Riverside.

Studies are underway at the University of California to determing the fate and degradation of pesticides commonly used on golf courses. Undisturbed soil core samples and bulk soil samples were collected in November 1999. Core samples were taken from surface and subsoil layers and bulk samples were taken from thatch, mat, and subsoil layers. Bulk density, water retention characteristics, and saturated hydraulic conductivity were measured from the undisturbed cores.

No significant differences were observed in bulk density and saturated hydraulic conductivity between the surface and bottom layers. Differences were observed in water retention characteristics between the surface and bottom layers.

A pesticide degradation experiment was conducted in the laboratory using the bench equilibrium methods. Results showed that the dylox, chlorothalonil, chlorpyrifos, and metalaxyl can be divided into two groups with respect to their degradation rates. The half-lives of dylox and chlorothalonil are much shorter than the half-lives of chlorpyrifos and metalaxyl.



At University of California, Dr. Marylynn Yates describes how pesticide volatilization was determined on putting green and fairway research plots. This information is being to evaluate pesticide fate models.

It is interesting to note that dylox degrades fastest in the subsoil layer, while chlorothalonil degrades fastest in the thatch layer. The laboratory study showed that the half-life of chrorpyrifos and metalaxyl are relatively long. However, this may not be applicable to the field conditions due to differences in microbial activity.

Two models to be used for this study are CHAIN-2D and PRZM-3. The two models have been successfully installed in our computer. Runs have been conducted to test the models and their sensitivity to the input parameters. Input data have been compiled using the California Irrigation Management Information System (CIMIS) data at Riverside and soil information measured in the laboratory.

A literature review showed that the degradation rate varies widely in different studies. Our next step is use the maximum, minimum, and average values reported in the literature to conduct simulations. The simulated results will be compared to field measured data to identify the parameters most suitable for the Riverside conditions.

One of the major tasks of this study is to analyze and publish the data in a peer-reviewed technical journal. We have finished literature review, materials and methods, and most of the tables and figures for two manuscripts. We expect to submit the manuscripts to *Journal of Environmental Quality* next spring.

Summary Points

- No significant differences were found in bulk density and saturated hydraulic conductivity between the surface and bottom layer.
- In the lab, the half-lives of dylox and chlorothalonil were determined to be much shorter than chlorpyrifos and metalaxyl.
- Dylox degrades fastest in the subsoil layer while chlorothalonil degrades fastest in the thatch layer.