TURFGRASS MATTERS

Mid-Atlantic Association of Golf Course Superintendents

July/August 1996 Volume 1, Number 3

What Happens to Pesticides Applied to Golf Courses?

Dr. Michael P. Kenna

Director, USGA Green Section Research

Protecting ground and surface water from chemical pollutants is a national initiative. The Environmental Protection Agency (EPA) estimates that 1.2 billion pounds of pesticides are sold annually in the United States. About 70 percent of the pesticides applied are used for agricultural production of food and fiber. Only a small fraction of this amount is used on golf courses. Yet, increased public concern about chemicals has drawn attention to golf because of the perception that the intense maintenance on golf courses creates the potential for environmental contamination.

In the late 1980's, golf was faced with a dilemma. On one hand, regulatory agencies responding to public concern routinely initiated environmental monitoring programs of ground and surface water. On the other hand, very little public information was available on the behavior and fate of pesticides and fertilizers applied to turfgrass. Probing, sometimes over-zealous federal and state regulators looking for non-point source polluters raised concerns about a recreational game that had relied on the integrity of chemical companies and the EPA to provide products and guidelines that protect the environment. There were lots of questions but few answers.

The game of golf needed answers to environmental questions, and the USGA wanted these answers based on scientific facts, not emotions. In 1991 the USGA initiated a three-year study of the fate of pesticides and fertilizers applied under golf course conditions. This article first briefly describes what is known about the fate of chemicals used on golf courses and provides some supporting documentation to help choose a pesticide. Highlights of the research projects then are summarized, but the articles should be read to learn more about the particulars of each research project.

THE FATE OF CHEMICALS APPLIED TO GOLF COURSES

Do golf courses pollute the environment? No, they do not. At least not to the extent that critics state in undocumented media hype. Golf course superintendents apply pesticides and fertilizers to the course, and depending on an array of processes, these chemicals break down into by-products that are biologically inactive.

In general, there are six processes that influence the fate of chemical products applied to golf courses.

- Solubilization by water.
- Sorption by soil mineral and organic matter.
- Degradation by soil micro-organisms.
- Chemical degradation and photo-decomposition.
- Volatilization and evaporation.
- Plant uptake.

The relative importance of each process is controlled by the chemistry of the pesticide or fertilizer and environmental variables such as temperature, water content, and soil type (See figure 1).

Solubility

The extent to which a chemical will dissolve in a liquid is referred to as solubility. Although water solubility is usually a good indicator of the mobil-

continued on page 5

Glenn Smickley, CGCS and Cary Sciorra take the 1996 Superintendent-Pro Tournament honors back with them to the Robert Trent Jones Golf Club.

Published by the Mid-Atlantic Association of Golf Course Superintendents