



## The Pesticide Debate

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**Editor's Note:** This feature should be under the heading of "From Across The Border." *The Pesticide Debate* is reprinted with permission from Dr. Ken Diesburg, editor of Illinois Turfgrass Update.

Over the last few years, there have been increasing concerns about the use of synthetic pesticides in agriculture and horticulture. Environmental activists have waged a broad attack against the chemical control of pests on golf courses, home lawns and other turfgrass areas because people and their pets may be exposed to potentially toxic materials. Many environmentalists believe that the benefits of controlling turfgrass and ornamental pests are outweighed by the risks to human health and the environment.

Pesticide critics have brought the subject into public view by gaining access to broadcast and print media. The result often has been sensational and emotional stories of the problems and misuses of pesticides, as well as supposed poisoning cases. In several reports, golf course superintendents, lawn care operators, and other turfgrass managers have been accused of applying pesticides and fertilizers that have been excessive, unnecessary, or both, to maintain high quality turf. Some authors go so far as to suggest that golf courses seriously threaten the environment because of the pesticides used on them and should be considered toxic waste sites.

Recently, turf- and ornamental-related industry representatives have sought to counter environmentalists' claims and answer questions about pesticides and their possible effects on the environment. Also, representatives from the agrochemical industry, such as pesticide manufacturers and dealers, have disputed anti-pesticide views and have said that their products are safe and effective when used as labeled.

Should we be concerned about pesticide use on turfgrass? Before we can answer this question, we need to know what pesticides do; why pesticides are needed for turf management; how much and how often pesticides are actually applied; and their potential for adverse effects on man, wildlife and the environment.

### Defining Pesticides and Toxicity

The term 'pesticide' actually encompasses a broad range of both naturally occurring and man-made chemicals used to control all sorts of pests. Pesticides can be categorized by the types of pests controlled; for example, insecticides control insects, herbicides control weeds, and fungicides control plant diseases caused by fungi. There are even avicides for controlling bird pests (birds can be pests, too—just look at the geese!). All of these and more are pesticides.

By their very nature, pesticides are poisonous to the "target" pest. Thus, there is always concern about how toxic a pesticide is to "non-target" species such as animals, birds, fish and humans. There are two types, or classes, of toxicity: (1) acute toxicity, which results from a single, high dose of a toxicant, and (2) chronic toxicity, which results from repeated or long-term exposure to a lower level of a toxicant. Most pesticides are relatively safe to apply because the ratings of their acute toxicity are very low.

One reason for these low toxicity ratings is that most pesticides are highly selective about what they poison. Deciding which pesticides to apply is based primarily on how the product works. Pesticides can be discriminating because most of our pests have physiological and biochemical systems that differ from us and from one another. For example, at labeled rates, fungicides do not control insects or weeds (or birds) and herbicides do not control insects or diseases. For this reason, fungicides and herbicides have a very low acute toxicity to man.

An important exception is insecticides, most of which work by poisoning the nervous system. Insect nervous systems are very similar to those of animals and man; therefore, many insecticides can be acutely toxic and require careful handling. However, most insecticide products are highly diluted during application,

so the actual amount of pesticide applied to control insects is usually very low and not toxic to higher organisms. Many insecticides used on commercial turf are also available to home owners and are quite safe when used as directed. In fact, many of the new insecticides are not nerve poisons and are accordingly more safe to apply.

### Why We Need Pesticides

Highly maintained turfgrass is not just a green carpet that happens to need mowing and watering. Each specialized turf area (putting green, sports field, home lawn, etc.) actually consists of a large population of individual living plants. For example, a typical putting green can have 10 million to 15 million plants growing on it. In such a large population, it's highly likely that parasites or other pests will develop. There is always a natural progression of new growth, aging of tissues, and eventually death. Turfgrasses used on highly maintained areas have been selected over time for their ability to withstand frequent low mowing and the wear and tear of daily intended uses. These improved grasses, however, remain subject to various pest problems. In fact, highly groomed turfgrasses are actually maintained in an artificial or unnatural condition which increases their susceptibility to pest attack. Therefore, pest control becomes critical.

An example of an artificial growing condition is a bentgrass putting green mowed daily at one-eighth of an inch. If left to grow in a natural, unstressed state, this bentgrass would be 10 inches to 12 inches tall and much more resistant to pests. Another factor in the pesticide debate that needs serious consideration is the demand for picture-perfect turf conditions, such as those found at Augusta National or Comiskey Park. A single blemish from a disease or insect pest or a single patch of weeds has some-

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how become unacceptable. Because of these demands, more pesticides and fertilizers are required.

Fanciers of "perfect turf" will have to reduce their demands if there is to be a drastic decrease in pesticide use, at least until viable alternatives to chemical pest control can be found. Remember that grounds managers try to match maintenance standards to public expectations. If the public will accept lower quality conditions, turf managers will use less fertilizers and pesticides.

The number of applications and amount of pesticides used varies widely among turf-use situations and depends on a number of factors, including budgetary constraints, weather, and turf-management expertise. In the Chicago area, for instance, most of 1992 was dryer and cooler than average, which reduced the amount of fungicide applications needed; most serious turfgrass diseases are caused by fungi that require warm and wet conditions. The frequent rains toward the end of this season could increase or decrease needs for other pesticides or fertilizers.

Many grounds superintendents are responding to concerns about pesticides and are trying to limit the number of pesticide sprays per season. Some ways they reduce applications are by using new pest identification, population monitoring, and predictive tools. On the horizon are some possible alternatives to pesticides such as biological controls, improved genetics leading to host-plant resistance, and alternative plants that naturally have fewer pest problems. When grounds superintendents employ more than one method to control pests, they are said to be using an "integrated pest management" approach.

### **Pesticide Safety**

The terms most often used when discussing pesticide safety are risk and exposure. Risk is a statistical probability of some negative outcome, derived by multiplying the inherent toxicity of a chemical by the exposure. Exposure is a factor of the concentration of a substance and the amount of time you are in contact with it. To decrease the risk from a toxicant, either the toxicity of the product or exposure to the product should be reduced. For example, smoking cigarettes for a number of years greatly increases your risk of heart disease

and lung cancer, but the risk could be reduced by smoking low tar or nicotine cigarettes (lowered toxicity) or by smoking fewer cigarettes (less exposure).

Many people inaccurately believe that pesticides all present the same danger and risk. However, pesticides vary greatly in chemical structures and toxicities, and therefore have widely varying risk factors. The public strongly disapproves of pesticide use; surveys have shown that people generally view pesticides as having a fairly high risk factor for injury or death. In reality, scientific data rank pesticides very low in risk.

There also have been many attempts to link chronic pesticide exposure with various forms of cancer. Several common pesticides have been classed as possible carcinogens based on animal studies and are most often targeted by environmental groups. However, these products have been in use in all aspects of agriculture for as many as 40 years without observable correlated increase in cancer occurrences. Researchers now believe that lifestyle choices (diet, smoking, alcohol) account for 75 percent of cancers, whereas environmental pollution (all aspects of the environment, of which pesticides would play a very small part) account for about 2 percent.

The Environmental Protectional Agency oversees the safety testing of pesticides. Agrochemical companies must provide the EPA with data concerning the toxicology and environmental fate of candidate pesticides prior to registration and release for sale. This is in addition to all of the tests to confirm the effectiveness of a manufacturer's proposed pest con-

trol. It is estimated that up to 20,000 substances must be screened before a new product can pass the rigors of the registration process. Development and EPA registration of each new product often takes up to 10 years and may cost \$20 million to \$40 million.

Even so, some environmental groups are concerned about pesticide safety. They contend that the EPA has not properly evaluated all the pesticides currently available. Also, many products introduced before the 1980s have not gone through the rigorous testing that is required of today's pesticides. The EPA is in the process of "reregistration" of older pesticide products, which will probably "weed" out some compounds that have adverse toxicological or environmental effects.

Environmentalists also fear that not enough is known about the chronic effects of pesticides on birds and other wildlife at golf courses, sod farms, and other areas where turf is highly maintained. In fact, there have been very few scientific studies of long-term effects on the environment, partly because such studies are hard to conduct. But there is indirect evidence that no serious harm occurs on treated turf areas when pesticides are used properly. For example, golf courses are often found to be excellent habitats for various forms of wildlife, especially birds. The United States Golf Association and the Audubon Society of New York State recently established a Cooperative Sanctuary Program for golf courses. The Audubon Cooperative Sanctuary Program promotes ecologically sound management practices and enhances and protects natural habitats on golf courses.



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## What Can You Do?

If you or your clientele are concerned about pesticide use in your turf management program, here are a few suggestions. When a choice among effective pesticides exists, select the pesticide that is lowest in toxicity, of least persistence, and most pest selective. For the safest, most effective use, read, follow, and understand all pesticide labels before purchasing, selecting, and using a chemical control. Learn as much as you can about pesticides, turfgrass and pest growth and development, and alternative pest controls. In this way, you can determine when a pest problem actually exists and select among an arsenal of pest controls, not rely solely on pesticides to do the dirty work.

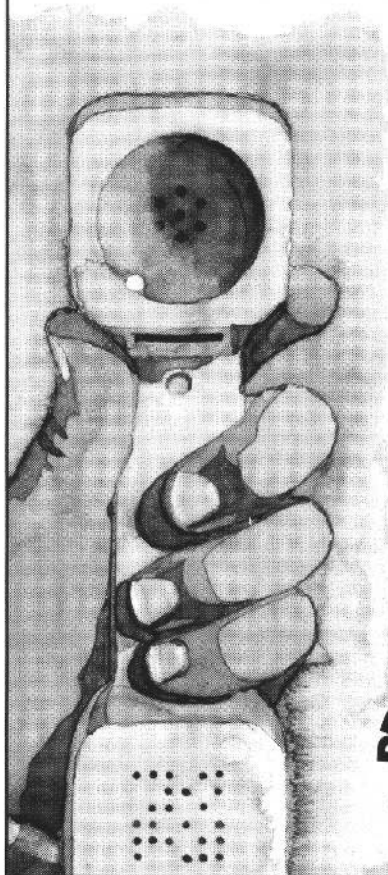
In addition, and perhaps more importantly, you can support turfgrass research. We currently cannot answer all of the pesticide questions posed by either pesticide users or anti-pesticide environmentalists. Only through research can we find the answers necessary to satisfy both groups. Future research activities will bring about new, effective, and safe pesticides, as well as new turfgrasses that are more tolerant to environmental and pest stresses. By supporting university research programs you can assist this process. When properly supported, university researchers can evaluate turfgrass pesticides and turfgrass cultivars. In addition, university researchers can add to our pest-control alternatives by determining the most appropriate turf management and environmental conditions. Cultivars that are growing relatively stress-free will be less bothered by insects, weeds, and diseases and will require less pesticide inputs.

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