

Responsible Turf Pesticide Use May Actually Protect Surface Water Quality

By Robert J. Mugaas, Michael L. Agnew and Nick E. Christians

Properly maintained and healthy turfgrass will tolerate the presence of low levels of pest populations without suffering permanent damage. Healthy turfgrass usually recovers more quickly from any insect or disease infestations. However, there may be times, even in healthy lawns, where some pest control may be needed to prevent significant turf damage. Correct and judicious use of pesticides, chemical or biological, can be used to reduce pest populations and allow turfgrass recovery.

Pesticides are subject to a number of different fates once applied to a turfgrass area. Some of them may be degraded by sunlight, microbial action, chemical action or a combination of these processes. Others may volatilize back to the atmosphere, be absorbed by the plants or adsorbed by soil particles limiting further soil movement. Pesticides may be subject to several of these different processes although some may be more important than others. Degradation processes and plant absorption are particularly important as they account for removal of the pesticide from the environment. Two environmental pesticide fates of concern to surface water quality are those associated with leaching and runoff.

Leaching

Leaching is the downward movement of pesticides (and nutrients) with water flow through the soil. It is the process responsible for carrying pesticide and nutrient contaminants to ground and possibly surface water resources.

Unlike pesticide application to bare soil, the turfgrass system with its high plant density, dense fibrous rootzone and thatch development can have a significant effect on pesticide leaching potential. Recent university studies have demonstrated that the grass and thatch present a barrier to movement of several of the commonly available turfgrass insecticides and herbicides. Other research has suggested that the turf rootzone area is biologically active and can

facilitate the microbial breakdown of some pesticides. Thus, long term build-up of these materials in the turf rootzone is unlikely. While the scientific data regarding the potential leaching of pesticides is limited, it is encouraging in that the turfgrass system does appear to restrict downward movement of pesticides applied to turf.

Runoff

Runoff occurs when the precipitation rate exceeds the rate of water infiltration into the soil. This can be a significant potential loss of pesticides and nutrients from row crop agriculture, where the pesticides are often applied to bare soil and may not be held in place by plants. When runoff occurs from these areas, pesticides can be dissolved and carried in runoff water. Pesticides also can be carried along as sediment in runoff water if they are bound tightly to soil particles.

Recent university studies have demonstrated that runoff from dense turf areas can be reduced to insignificant levels. Turfgrass areas have tremendous potential to absorb large amounts of precipitation. For example, it has been reported that a 150-acre golf course has the capacity to absorb 12 million gallons of water during a heavy (3-inch) rainstorm. Water movement over a dense turfgrass stand is usually slow enough that most of the water will infiltrate into the turf area before it can run off. Research also has indicated that, when runoff from turf areas was sampled for some herbicides, they were either non-existent or at very low levels.

While runoff research from turfed areas is limited, the initial findings are encouraging. It would appear that turfgrass can significantly limit runoff, thereby reducing the chances for off-site movement of nutrients and pesticides.

Responsible Pesticide Application Practices

The first step in responsibly using any pesticide product is to follow the label directions exactly as stated on the

Editor's Note

Last winter Bob Mugaas, Hennepin County extension horticulturist, had the opportunity to spend a study leave at Iowa State University researching scientific literature to find out what is known about present lawn practices and their impact on water quality.

In the October 1991 issue of Hole Notes, Bob collaborated with Michael L. Agnew, extension horticulturist/turf, and Nick E. Christians, professor of horticulture, at Iowa State University, to write about "Turf Nitrogen and Phosphorus Management Practices." In this issue they conclude their two-part series with a presentation on "Responsible Turf Use."

Says Mugaas: "A larger, more comprehensive publication will be forthcoming this fall. It is hoped that this information about turf fertilizer and pesticide practices and their impact on water quality will help you communicate with greater knowledge about these issues."

product container. The label provides necessary information regarding proper product application and container disposal procedures. Labels are legal documents and are enforceable by law should the product be used in a manner inconsistent with directions.

Before applying insecticides and fungicides to a turf area, be sure that the apparent damage symptoms are being caused by an insect or disease. If an insect or disease pest is found to be causing serious turf damage, then a proper control method can be selected. This may or may not involve the use of a pesticide.

Weeds should also be identified to determine whether there is a need for a

(Continued on Page 9)

Responsible Turf Pesticide Use

(Continued from Page 8)

pesticide. They may only be indicative of other cultural conditions that also need to be corrected.

As with fertilizers, it should be obvious that extreme care must be taken to prevent the direct application of pesticides into surface water areas.

Properly timing pesticide applications is crucial to their overall effectiveness against the pest and to minimize adverse environmental impacts. Often minimal amounts of pesticide can be used when the pest is in a young and/or highly vulnerable stage. For example, when weeds or insects are quite large and mature, greater amounts of pesticides are usually needed and may not be that effective. Likewise, treating disease problems at very early stages of infection is more prudent and may require less fungicide than attempting treatment of large, heavily infected areas.

Proper timing also can relate to the time of year when a pesticide may be most effective. For example, fall is the best time to control cool season perennial broadleaf weeds. At this time of year (mid-September to early October), these plants are actively growing and will more readily take up the herbicide. Often, lower rates and only one application of an appropriate herbicide are needed to be effective. Since much of the other landscape plant material is either going dormant for the winter or has been removed from garden and flower beds, there is usually less chance for off-target plant injury. However, that does not give license to be careless when applying a pesticide product.

Sometimes it is necessary to water-in a pesticide treatment for it to be most effective. Pre-emergent types of herbicides typically used for controlling crabgrass and other annual weedy plants must be moved into the soil surface to be effective. Their mode of action is such that it affects the seed as it begins to germinate but before it emerges from the ground. Depending on the soil type, .25 to .50 inches of moisture should be applied following application of these products. (This is about one to two hours of irrigation with most common lawn sprinklers. Automatic irrigation systems may need to be adjusted accordingly.)

This not only puts the product where it will be the most effective but may move the material far enough into the soil that it will not be carried away in runoff.

A similar situation exists when using insecticides and fungicides. Those materials used for controlling thatch and soil-inhabiting insects and diseases usually require some type of irrigation following application to move the product into the thatch and thatch/soil area. This puts the product where it will be the most effective, reduces the chances of it being carried away in runoff and potentially reduces exposure to the material. While thatch can facilitate the breakdown of these materials and potentially reduce their effectiveness, it also can shorten their persistence in the environment. Pesticide label directions will indicate whether post-application irrigation is needed.

In the case of herbicides, it is often unnecessary to thoroughly drench an area to achieve satisfactory weed control. This may be wasteful of both water and herbicide as well as moving the herbicide beyond the plants and into the soil where it may be more prone to leaching. Where plant cover is sparse, the herbicide could potentially be carried in runoff either directly or bound to sediment. Spraying to wet the foliage and not spraying to runoff is usually sufficient to get enough herbicide into the plant to be effective. Again, follow label directions for proper mixing and water volume to use with the product.

Protecting our surface water resources as well as groundwater resources is not something to be taken lightly. However, neglecting our turf areas for fear of introducing nutrients and pesticides into our water supplies is not a way to protect these resources. Evidence is beginning to build that properly maintaining turfed areas with appropriate but modest uses of fertilizers and pesticides may do more to protect our water resources than to hurt them.

Authors

Robert J. Mugaas,
Henn. County Extension Horticulturist,
University of Minnesota
Michael L. Agnew,
Extension Horticulturist-Turf,
Iowa State University
Nick E. Christians,
Professor of Horticulture,
Iowa State University

GREEN CLIPPINGS

Here is the slate of candidates for the GCSAA's 1992 annual membership meeting in New Orleans, La.

President: William R. Roberts, CGCS
Vice-

President: Joseph G. Baidy, CGCS
Randy S. Nichols, CGCS

Director: Joseph M. Hahn, CGCS
Paul S. McGinnis, CGCS
C. Wayne Perkins, CGCS
Bruce R. Williams, CGCS
Randall P. Zidik, CGCS

* * * *

Nebraska GCSA and Iowa GCSA will be co-hosts of a seminar on Golf Course Construction Techniques and Management December 3-4 at the Holiday Inn Central in Omaha, Nebr. For more information call 1-800-472-7878.

The annual Michigan Turfgrass Conference will be held January 20-22 at the Holiday Inn in East Lansing, Mich. Contact Michael Saffel, Crop and Soil Science Department, Michigan State University, East Lansing, Mich. 48824-1325. His telephone number is 517/353-9022.

* * * *

The MGCSA wishes to thank Par Aide for its donation to the Harold Stodola Research Fund in the name of Braemar Golf Course.

NK Medalist Turf Adds 3 Salesmen

NK Medalist Turf Division of NK Lawn & Garden Co., Minneapolis, has added three new turf sales specialists to its staff.

Michael W. Tentis will handle sales and service in NK Medalist's Western Region. His territory includes California, Nevada, Arizona, New Mexico and Utah. He formerly was a technical representative at O.M. Scott & Sons.

Luis B. Mendoza will cover the Midwest Region for NK Medalist. This includes southern Wisconsin, Illinois, Indiana, northern Kentucky and eastern Missouri. Mendoza joined NK from Cory Orchard & Turf, Indianapolis, an NK Medalist distributor.

Lee Record will handle turf sales and service in NK's Southeast Region. Record has several years of turf experience, most notably with the U.S. Golf Association Greens Section and Chemlawn Corporation.