Fate of Fungicides

Movement of agricultural pesticides through soil has been studied extensively, but environmental fates of turf-applied fungicides are not well understood. Researchers in the Department of Agronomy at Purdue University conducted experiments to evaluate the role of thatch as a sorptive surface for fungicides, hypothesizing that thatch decreases mobility of fungicides and therefore decreases their potential to be transported off-site.

Fungicide sorption to thatch and soil was measured and compared. Data showed sorption of triadimefon, chloroneb, and vinclozolin to be up to nine times greater in thatch than soil, and the amount of fungicide sorbed was proportional to the organic carbon content of thatch or soil.

Results of this study indicate that the presence of thatch increases the capacity of the soil profile to sorb fungicides, which greatly reduces the probability that these compounds will be transported to ground or surface water. The researchers note that these findings apply only to turfs where accumulations of thatch are present. However, turf residues, even in the absence of a distinct thatch layer, can increase the organic content of the underlying soil which will increase the capacity of those soils to sorb pesticide. Further research concerning the movement of turf-applied pesticides in soils underlying thatch-free turfs is needed.

(From: C.J. Dell, C.S. Throssell, M. Bischoff, and R.F. Turco. 1994. Estimation of Sorption Coefficients for Fungicides in Soil and Turfgrass Thatch. J. Environ. Qual. 23:92-96.)

Identifying Salt-Tolerant Turfgrasses

Irrigation of turf or forage grasses with saline water is increasing in situations where better quality water is not available or must be conserved for human use or salt-sensitive crops. Since salts from irrigation can accumulate in production and recreation soils, researchers at the University of Illinois, Urbana, are looking at more efficient methods for developing and identifying new salt-tolerant (ST) turfgrasses. Creeping bentgrass (*Agrostis palustris* Huds.) is one of the more saline-tolerant of the cool season turfgrasses, but superior, salt-tolerant creeping bentgrass cultivars are needed for use in high salinity locations.

Selected cell cultures of creeping bentgrass grown in media containing 0-3% sodium sulfate (Na_2SO_4) were regenerated, rescreened, and compared to non-selected plants at the whole plant level. Researchers report that this technique proved successful for screening potentially salt-tolerant plants. Neither the selected nor the non-selected microcultured plants produced roots in the medium containing 3% sodium sulfate. However, the selected plants exhibited better root and shoot growth than non-selected plants at lower salinity (1.5-2.0% Na_2SO_4). This system of laboratory screening may provide a convenient method of detecting many whole plant performance traits, prior to expensive, time-consuming field trials.

(From: Yu-Jen Juo, M.A.L. Smith, and L. Art Spomer. 1994. Merging Callus Level and Whole Plant Microculture to Select Salt-Tolerant 'Seaside' Creeping Bentgrass. J. of Plant Nutrition. 17(4):549-560.)

Benefits of Turfgrass

Turfgrasses have been utilized for centuries by people to enhance their environment. Turfgrasses have always played an important role in protecting our environment, long before it became a major issue to modern societies. James B. Beard of the International Sports Institute in College Station, Texas, and Robert L. Green of the University of California, Riverside, recently analyzed the beneficial aspects of turfgrasses that improve our quality of life, which are just now being quantitatively documented through research.

Functional benefits of turfgrass include soil erosion control and dust stabilization and improved protection of groundwater due to the ability of turfgrasses to trap and hold runoff, which results in more water filtering through the soil-turfgrass ecosystem. Another extremely important function of turfgrasses is soil improvement through organic matter additions derived from the turnover of roots and other plant tissues.

Turfgrasses also provide a low-cost, safe recreational surface for many outdoor sports. Turfs provide a unique cushioning effect that reduces injuries to athletes when compared with poor or nonturfed soils, particularly in the more active contact sports like football, rugby, and soccer.

The researchers also address allegations that turfgrass culture has a major role adversely affecting the environment. A review of the scien-

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Scanning the Journals

A review of current journal articles

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Crabgrass and other annual grass weeds are often controlled by fenoxaprop. Researchers at the University of Maryland, College Park, conducted trials to determine if a prepackaged mix of 2,4-D + mecoprop + dicamba would influence the efficacy of fenoxaprop.

Improved cultivars of hard and blue fescues have been reported to be low growing and to maintain a dense, aesthetic cover under low maintenance. The new turf-type tall fescues are generally greener and exhibit both improved quality and improved persistence under low mowing.

tific literature provides no valid scientific basis for water conservation strategies or legislation requiring extensive use of trees and shrubs in lieu of turfgrasses. The main cause of excessive landscape water use in most situations is the human factor. The waste of water results from improper irrigation practices and poor landscape designs rather than any one major group of landscape plant materials. Groundwater contamination from the use of fertilizers is also addressed. Research has shown that fertilization of turfgrasses, according to established cultural strategies, presents a negligible potential for nutrient elements to pass through the root zone into groundwater or be transported by runoff water into surface waters.

(From: James B. Beard and Robert L. Green. 1994. The Role of Turfgrasses in Environmental Protection and Their Benefits to Humans. J. Environ. Qual. 23:452-460.)

Controlling Crabgrass

Crabgrass and other annual grass weeds are often controlled by fenoxaprop, a postemergence herbicide. Since crabgrass and broadleaf weeds are often found together in turfgrasses, tank-mixing a broadleaf herbicide and fenoxaprop to control several weed species simultaneously seems a logical option. However, previous experiments have shown that when fenoxaprop was tank-mixed with several different broadleaf herbicides, broadleaf control was usually good, but crabgrass control was only poor to fair.

Researchers in the Department of Agronomy at the University of Maryland, College Park, conducted trials to determine if a prepackaged mix of 2,4-D + mecoprop + dicamba would influence the efficacy of fenoxaprop if applied several days or weeks before or following the fenoxaprop application. Results from experiments run in 1992 and 1993 showed that smooth crabgrass (*Digitaria ischaemum*) control by fenoxaprop was reduced significantly when the broadleaf herbicide was applied less than 14 days before the fenoxaprop was applied. Reduced control was also observed when fenoxaprop was tank-mixed with the broadleaf herbicide. There was no reduction in crabgrass control when the broadleaf herbicide was applied 21 days before fenoxaprop or at least 3 days after fenoxaprop.

(From: P.H. Dernoeden and M.A. Fidanza. 1994. Fenoxaprop Activity Influenced by Auxin-like Herbicide Application Timing. HortScience 29(12):1518-1519.)

Low Maintenance Fescue and Mowing

Fescues (*Festuca* spp.) are commonly used in low-maintenance turfgrass sites such as roadsides, highway medians, cemeteries and grassy areas in parks and military installations. Low-maintenance grasses that retain density and acceptable aesthetic quality would also be suitable for golf course roughs and some lawn situations. Improved cultivars of hard and blue fescues have been reported to be low growing and to maintain a dense, aesthetic cover under low maintenance. The new turf-type tall fescues are generally greener and exhibit both improved quality and improved persistence under low mowing compared with Kentucky 31. Many of the improved tall fescue cultivars were bred to be better adapted to higher management levels than Kentucky 31. Although the attributes of these and other fescues have been reported, their performance has not been compared under diverse low-maintenance or limited-mowing situations.

Researchers at the University of Maryland, College Park, addressed this question in a study which compared the persistence and quality of Aurora hard fescue, Bighorn blue fescue, and Rebel II and Silverado tall fescues under low input conditions and three separate mowing regimes. The three mowing regimes were (1) mowing as needed to a height of 5.5 cm; (2) monthly mowing to a height of 8.0 cm; and (3) monthly mowing initiated following seedhead senescence to a height of 8.0 cm.

Initially, the tall fescue cultivars were of good quality. Within one year of seeding, however, Bighorn and Aurora quality surpassed that of both tall fescues. The tall fescues were more rapidly and extensively invaded by smooth crabgrass and white clover than either Bighorn or Aurora. Turf maintained under mowing regime 1 was generally of better quality. Lowest turf quality was most often associated with regime 3, particularly during spring and summer. In a three-year absence of irrigation or fertilizer inputs, Bighorn and Aurora maintained better quality and better resisted weed invasion compared with the tall fescue cultivars evaluated.

(From: P.H. Dernoeden, M.J. Carroll, and J.M. Krouse. 1994. Mowing of Three Fescue Species for Low-Maintenance Turf Site. Crop Sci. 34:1645-1649.)

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PRO-TECH For Industry Professionals

As an outgrowth of the 1993 Governor's Conference on Technology, Cornell Cooperative Extension has received State funding for a new initiative called PRO-TECH. The goal of the PRO-TECH program is to enhance the competitiveness and profitability of the turf, ornamental, fruit, and vegetable industries through educational programs which encourage adoption of new and existing technologies based on sound management and marketing principles.

The program will integrate technology with relevant cost, financial, operational, human resource and marketing information. Curricula will be developed to guide decision-making regarding technology adoption. Courses will be structured to introduce technologies, to enable managers to make informed decisions about the appropriateness of a technology in their enterprises and to develop action plans for adoption.

PRO-TECH is an industry-driven program. A partnership with the turf and ornamentals, fruit and vegetable industries is critical to the success of this program. Industry will provide guidance in determining priorities, and in program development and delivery. Enterprise managers, industry organizations, suppliers, distributors and others serving horticultural enterprises will be involved in the PRO-TECH initiative.

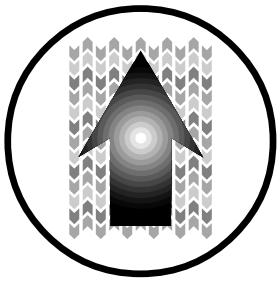
Working with groups of field staff, PRO-TECH staff and faculty will be actively involved in identifying technologies for which curricula will be developed, in organizing content, training staff and implementing courses. Industry representatives will be engaged in identifying and reviewing course content and assisting in program delivery.

Keep in touch with your local county Cornell Cooperative Extension office to learn more about local course offerings which will be delivered at the regional level in 1995.

For more information contact Joann Gruttadaurio at (607) 255-1792, who will work half time as a member of the PRO-TECH Leadership Team.

JOANN GRUTTADAURIO
DEPT. OF FLORICULTURE AND ORNAMENTAL HORTICULTURE

Editor's note: We recently learned that the PRO-TECH program was not funded in Governor Pataki's budget. The program's leaders hope to continue a scaled-down program without funding this coming year.



PRO-TECH Notes

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Effects of Irrigation on Pendimethalin Efficacy

Researchers at Ohio State University in Columbus conducted a two-year field study to determine effects of posttreatment irrigation timing on pendimethalin efficacy for controlling smooth crabgrass in turfgrass. Factors investigated included herbicide rate, formulation, and the interval between pendimethalin application and the initial posttreatment irrigation.

Granular-formulated pendimethalin provided better weed control than wettable powder pendimethalin when averaged over all rates, irrigation events, and years. All herbicide-treated plots contained fewer smooth crabgrass plants than untreated check plots. Granular pendimethalin was not affected by a delay in posttreatment irrigation. In contrast, wettable powder pendimethalin efficacy was reduced if irrigation was applied later than the day of treatment.

The study indicated that the granular pendimethalin formulation was more effective than the wettable powder formulation when no irrigation or rainfall occurred within seven days after treatment. No efficacy differences were observed between formulations when the initial posttreatment irrigation was applied on the day of treatment. Therefore, both formulations should perform equally well in irrigated turf areas, so long as the wettable powder formulation is immediately incorporated with water.

(From: J.J. Gasper, J.R. Street, S.Kent Harrison and W.E. Pound. 1994. Pendimethalin Efficacy and Dissipation in Turfgrass as Influenced by Rainfall Incorporation. Weed Science 42:586-592.)