Managing Dollar Spot In Tall Fescue

Tall fescue is one of the numerous turfgrass species attacked by dollar spot. In an experiment examining the effect of management practices on the susceptibility of two cultivars of tall fescue ('Mustang' and 'Kentucky-31') to dollar spot, an investigator at Oklahoma State University, in Stillwater, varied seeding rate, cutting height, and N-fertilization rate in a two-year field study. Other workers had demonstrated suppression of dollar spot at higher N-fertilization rates in creeping bentgrass, and lower seeding rates in Kentucky bluegrass, but the effect of these variables on tall fescue was unknown.

Two cuttings heights (19 & 57mm), three seeding densities (5, 29, & 78g seed/m^2) and 2 fertilization rates (4.9 & 24.4g N/m^2 per year) were replicated nine times for each fescue cultivar. A natural infestation of dollar spot provided the disease challenge. Only the fertilization trials produced a non-significant result, but this cannot be assumed to hold for other soil conditions. Dollar spot was more severe at the higher cutting height and higher seeding rate. The researcher surmised that the unexpected mowing effect may be due to the more effective removal of infected leaf tips, and the seeding rate effect may be due to the stress of overcrowding. Finally, 'Mustang' was more susceptible than 'Kentucky 31', perhaps because of the former's higher shoot density.

(From: A.D. Brede, 1991. Interaction of Management Factors on Dollar Spot Disease Severity in Tall Fescue Turf. HortScience 26(11):1391-1392).

Foliar Absorption of Nitrogen Sources

In a study comparing the uptake of three nitrogen sources applied as foliar sprays, researchers at the University of Nevada, Reno, applied urea, ammonium sulfate, and potassium nitrate to the leaves of perennial ryegrass in a controlled environment chamber. Foliar applications of urea nitrogen are commonly used on turfgrass and fruit trees due to urea's high solubility, low expense, and low risk of injury, but little is known about the suitability of the alternative nitrogen sources tested in this study.

Through measurements of radioactively labeled nitrogen, washing procedures, and Kjeldahl tissue analysis, no difference was found between the three sources in the amount of nitrogen absorbed. In all cases after 48 hours about 1/3 of the nitrogen absorbed was found in the upper half of the leaves, 1/2 in the lower half of leaves and crowns, and the remainder in the roots.

The researchers conclude that perennial ryegrass absorbs foliar applied N from the three sources studied with equal facility, even though there are subsequent differences in the metabolism of the nitrate and ammonia ions. Uptake is most rapid during the first twelve hours, and after 48 hours about 40% of the applied total is absorbed. Ammonium sulfate and potassium nitrate, however, burn foliage more readily than urea and cannot be used at the same concentration. After 48 hours, more than 1/3 of the total applied N remained on or in the upper leaves, all of which is lost if clippings are discarded. If clippings must be removed, the researchers recommend watering treated turf before mowing, thus washing residual nitrogen from the leaves into the soil.

(From: D.C. Bowman and J.L. Paul. 1992. Foliar Absorption of Urea, Ammonium, and Nitrate by Perennial Ryegrass Turf. J. Amer. Soc. Hort. Sci. 117(1):75-79.)

Biological Control of Dollar Spot

It has been estimated that more money is spent in the U.S. to manage dollar spot than any other disease on the golf course. Although effective fungicidal remedies are available, and management practices such as high nitrogen applications and adequate watering can suppress the disease, they are all expensive. In an effort to reduce costs and the potential for pollution, two Canadian researchers investigated biological control measures against dollar spot using a sand-cornmeal or chopped grain topdressing containing bacteria and fungi antagonistic to the dollar spot pathogen.

Potential antagonists were obtained from turfgrass and culture collections, isolated in the laboratory and screened in the greenhouse for effectiveness. Promising isolates were then grown on cornmeal or chopped wheat and field tested on an established experimental green of Penncross creeping bentgrass. The most effective isolate, *Fusarium heterosporum*, reduced dollar spot intensity in the field by 93% in 1987 when applied weekly as a sand-cornmeal top-dressing, and by 86% in 1988 when applied at half the 1987 rate. Biweekly applications and applications of killed media were only slightly less effective. The killed media experiments suggest that the effect of the antagonist is achieved by the production of a toxin, rather than through competition or parasitism.

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Scanning the Journals

A review of current journal articles

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Scanning the Journals

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tion. It had been expected that the losses of pesticide in the leachate from the Hudson soil would have been small and slow to occur. One feature unique to the Hudson soil which may partially account for the rapid leaching was the presence of earthworms. Their burrows could provide channels for water carrying pesticides to leach rapidly from the soil. So, the potential for water to rapidly move to the drain lines combined with the short two day interval between the pesticide application and the first leaching event seemed to increase the risk for pesticide leaching. It is important to note that very little pesticide was found in the first leachate collected from the 1X plots. In this case the leaching event was seven days after the application of the pesticide. Apparently most of the pesticide became unavailable for leaching within seven days of being applied.

Summary

The results of this initial study seem to indicate that turfgrass areas are at a relatively low risk for pesticide leaching. Factors unique to the turfgrass system which may contribute to this lower risk are the high plant density and the presence of a thatch layer. Despite the general low risk though there are situations where leaching may be a potential problem, for example when soluble pesticides are applied to very sandy soils. By managing the selection of pesticide and the scheduling of irrigation the risk of leaching from turfgrass areas can be made even lower.

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The workers conclude that with an improved organic carrier allowing lower application rates, and further research into the biology of the disease and the antagonist, a sound theoretical basis for the biological control of dollar spot can be developed.

(From: D.M. Goodman and L.L. Burpee, 1991. Biological Control of Dollar Spot Disease of Creeping Bentgrass. Phytopathology 81:1438-1446.)

Identity of Pythium Root Rot Pathogen

Pythium root and crown rot has become an increasingly severe problem in the northeastern U.S. Attacking nearly all species of cool-season turfgrass, the disease is favored by prolonged wet conditions at both high and low temperatures. Symptoms include root and crown decay, reduced stand density and vigor, leaf chlorosis, and in severe infestations, total loss of stand. Because the foliar symptoms of the disease are fairly nondescript, and because many *Pythium* species can be isolated from diseased (as well as healthy) turf, the identity of the causative agent of Pythium root and crown rot has remained something of a mystery.

Cornell researchers Eric Nelson and Cheryl Craft conducted laboratory, growth chamber and field studies of 121 *Pythium* isolates recovered from golf courses mostly within the upstate N.Y. area. The isolates were tested on creeping bentgrass and perennial ryegrass at high and low temperatures. Five species of *Pythium* were found to be pathogens of creeping bentgrass at cool temperatures, and three were also pathogenic at high temperatures. Three of the five species also attacked perennial ryegrass. *Pythium graminicola* was the pathogen most commonly isolated from diseased turf, and more isolates of this species expressed virulence toward both grass species at high and low temperatures than any other *Pythium* tested. The researchers conclude that *P. graminicola* is the most common cause of Pythium root and crown rot in N.Y. turfgrass.

(From: E.B. Nelson and C.M. Craft, 1991. Identification and Comparative Pathogenicity of Pythium sp. from Roots and Crowns of Turfgrasses Exhibiting Symptoms of Root Rot. Phytopathology 81:1529-1536.)

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