Nitrogen and Chloride Applications to Control Summer Patch in Kentucky Bluegrass

It has been reported that at least two-thirds of the golf courses in the northeast have been damaged by patch diseases. Once established, patch diseases can reduce the overall appearance and quality of sport and recreational turf. Nitrogen (N) affects diseases in many crops. It has been established that N form (nitrate vs. ammonium) is more important than N rate in determining the severity of many plant diseases. Chloride (Cl) has been reported to reduce the severity of at least 16 different foliar and root diseases on 11 nonturf crops.

Researchers at Rutgers University assessed the influence of N form and rate of N and Cl application on turf quality and summer patch severity in Kentucky bluegrass cv. Fylking. In this two-year experiment, plots of Kentucky bluegrass cv. Fylking were artificially inoculated with *Magnaporthe poae* (the causal agent of summer patch). Two types of N were applied (ammonium sulfate and calcium nitrate) at three rates to provide 0, 2 or 4 lbs N/1,000 ft^2/yr. Combinations of potassium sulfate and potassium chloride also were applied to provide 0, 2.5 or 5 lbs Cl/1,000 ft^2/yr.

Plots were rated for disease intensity and turf quality. Summer patch symptoms were more severe when the turf was fertilized with nitrate N than with ammonium N. The greatest amount of disease occurred where the high rate of nitrate N was applied, followed by the low rate of nitrate N. The least amount of disease developed where the high rate of ammonium N was applied. The rate of Cl application did not significantly influence summer patch severity. Researchers found a significant reduction in the development of summer patch through the cumulative effect of lowering soil and rhizosphere pH over a period of two years by application of N as ammonium sulfate. Lower pH in the soil and rhizosphere may reduce the severity of summer patch by either direct or indirect means. The pH level at which disease is suppressed, the impact of different soil types on disease development, and the mode of action of pH in reducing disease need to be determined.

(From: D.C. Thompson, B.B. Clarke, and J.R. Heckman. 1995. Nitrogen Form and Rates of Nitrogen and Chloride Application for the Control of Summer Patch in Kentucky Bluegrass. Plant Disease 79:51-56.)

Efficacy and Fate of Herbicides Applied to Perennial Ryegrass Turf

Researchers at the University of Nebraska and Montana State University conducted a two-year study to evaluate the efficacy of dithiopyr, compared to pendimethalin, in reducing large crabgrass *(Digitaria sanguinalis)* infestation, and to monitor the fate of the herbicides after application to a closely-mowed perennial ryegrass *(Lolium perenne)* turf.

Main plot (perennial ryegrass blend of 'Blazer', 'Fiesta' and 'Jazz') treatments consisted of 2.5 or 5 cm per week irrigation. Subplot treatments included pre applications of dithiopyr or pendimethalin at rates of 0.6 and 1.7 kg ai ha^{-1}, respectively. Immediately prior to herbicide application, large crabgrass was seeded into the turf.

Herbicide efficacy was not different between the 2.5 and 5 cm weekly irrigation treatments. Dithiopyr reduced large crabgrass infestation more than pendimethalin at 86 days after treatment (DAT) and beyond the first year, and at 74 DAT and beyond in the second year. For pendimethalin, large crabgrass infestation was greater than 25% at 86 DAT in either year. For dithiopyr, infestation was less than 5% at the same time periods. The data supports the standard recommendation of a second pendimethalin application for season-long control.

In both years, more pendimethalin but less dithiopyr was found in thatch 7 DAT than 1 DAT. Neither herbicide was detected 10 to 20 cm deep, nor in samples collected 30 cm outside of the experimental plots in either year. At 126 DAT (the final sampling date), little herbicide was detected in verdure, but residues were found in most thatch and all mat samples. No difference in herbicide dissipation was observed between the 2.5 and 5 cm weekly irrigation treatments. The estimated DT_{50} (average time for 50% reduction in detectable residues) in the turf-soil profile was 35 days for dithiopyr and 23 days for pendimethalin.

(From: L.C. Schleicher, P.J. Shea, R.N. Stougaard, and D.R. Tupy. 1995. Efficacy and Dissipation of Dithiopyr and Pendimethalin in Perennial Ryegrass (Lolium perenne) Turf. Weed Science 43:140-148.)

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Scanning the Journals

A review of current journal articles

Researchers found a significant reduction in summer patch through the cumulative effect of lowering soil and rhizosphere pH over a two year period by application of N as ammonium sulfate.

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typical turfgrass uses (other than sod production) a delay in establishment would be undesirable. Therefore, it would be important to understand what factor(s) may be important in affecting establishment including MSW compost properties and moisture. In the field study it was observed that the turfgrass density (% cover) was less on the MSW compost treated plots, especially at higher application rates. The period after seeding was somewhat dry. The possible explanations of the field results are: MSW compost somehow suppressed germination or shoot growth that was reflected in lower turfgrass density; the composting process for the Florida MSW material was not complete, therefore, when added to the soil the composting process was again initiated possibly injuring the seed (lower germination) or suppressing shoot growth; and the suppression was enhanced by dry soil and may have been a function of ammonia release (direct injury to the seed or young seedlings, or a rapid pH increase), higher temperatures (more stress on the plants) or acetic acid (direst injury to the seed or young seedlings or a rapid pH drop) release during further composting in the soil.

A greenhouse study determined the affect of compost age/maturity and environmental conditions (moisture) on germination rate, shoot biomass production and soil pH change. Germination was not affected by compost. It was observed, however, that the maturity of compost affected shoot growth. The compost that was used initially reduced shoot growth, where the compost that was allowed to age did not. The amount of irrigation affected growth but did not affect the results on compost affects. Thus, it is important that any compost be fully complete before being used as a soil amendment unless it will be allow to lay fallow for some time before seeding.

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Scanning the Journals

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Resistance of Kentucky Bluegrass Cultivars to Rust

One hundred and twenty-eight Kentucky bluegrass cultivars or selections were established in 1990 at the Turfgrass Research Area of Iowa State University's Horticulture Research Farm for evaluation of resistance to rust under a high-maintenance program. In 1993, the turf received 1 lb N per 1,000 ft^2 in mid-April. Plots were mowed at 2.5 inches until June 5 and at 3.5 inches during the remainder of the growing season. No fungicides, insecticides or herbicides were used in 1993. The plots were rated visually for disease severity on September 30, 1993.

Significant differences in disease resistance were found among the cultivars and selections in this test. The cultivars 'Conni', 'Alpine' and 'Cheri' showed the least amount of disease. The cultivar 'Opal' exhibited the most severe disease symptoms and signs.

In a similar field trial, 62 Kentucky bluegrass cultivars or selections were established in 1991 for evaluation of resistance to rust under a low-maintenance program. During 1993, the turf received no N fertilization prior to the rating date. It was mowed at 2.5 inches until June 5 and at 3.5 inches during the remainder of the growing season. No fungicides, insecticides or herbicides were used in 1993. The plots were rated visually for disease severity on September 30, 1993.

Again, Significant differences in disease resistance were found among the cultivars and selections in this test. The selections 'ISI 21' and 'MN 2405' showed the least amount of disease. The cultivar 'Cynthia' exhibited the most severe disease symptoms and signs.

(From: M.L. Gleason, N.C. Christians, and J.R. Dickson. 1994. Resistance of Kentucky Bluegrass Cultivars and Selections to Rust Under a High-Maintenance Program, 1993; and Resistance of Kentucky Bluegrass Cultivars and selections to Rust Under a Low-Maintenance Program, 1993. Biological and Cultural Tests 9:149-150.)

Significant differences in disease resistance were found among the cultivars and selections in this test. The cultivars 'Conni', 'Alpine' and 'Cheri' showed the least amount of disease. The cultivar 'Opal' exhibited the most severe disease symptoms and signs.