TURFGRASS SOILS REPORT - 1982

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Effect of Soil pH on Turfgrasses

A study on the effect of soil pH on three turfgrasses was established in August, 1981 at the Hancock Turfgrass Research Center. Ground limestone (1.5, 3.0 and 6.0 tons per acre) and sulfur (0.5 and 1.0 ton per acre) applications were made and rototilled to a depth of 3 inches. Three turfgrasses were seeded after treatment - Baron Kentucky bluegrass, Pennlawn red fescue and Manhattan perennial ryegrass. Soil pH tests for samples taken 1 year after application are given in Table 1. The higher limestone rates raised pH to about 7.5 in the surface 2 inch layer while the sulfur treatments caused significant lowering of pH. Some injury occurred on the Kentucky bluegrass and red fescue in the corner of one replication of the highest sulfur treatment. No other injury to the grasses was apparent throughout the other plots.

The effects of pH on other soil tests for the check, and the highest limestone and sulfur treatments are shown in Table 2. Although acidifying the soil increased the phosphorus tests, the differences were not statistically significant. Changing soil pH had no effect on the potassium test but did significantly reduce the available calcium and magnesium tests.

A greenhouse study was established with an undergraduate student, Robert Maibusch, in which 4 different particle size ranges of sulfur were mixed with a loam soil. These materials were applied at 4 different rates. Two months after application the soil was sampled for pH determination. Soil pH values are given in Table 3. Clearly, the finer particle size sulfur material was oxidized faster than the coarser material resulting in a faster pH reduction. This is consistent with previous field observations that sulfur products composed of powdered (or very finely ground) sulfur react faster than more coarsely ground materials. Because of the high surface area of the sulfur, the sulfur-oxidizing organisms convert the sulfur to sulfate much faster resulting in greater potential for turf injury.

Nitrogen Rate Effect on Penncross, Penneagle and Emerald Creeping Bentgrass Greens

Nitrogen rates ranging from 1 to 8 pounds nitrogen per 1000 square feet annually were applied to Emerald, Penneagle and Penncross creeping bentgrass greens at the Hancock Turfgrass Research Center. Generally, the Emerald plots had lower ratings (Table 4) than the other grasses during the growing season. There was little difference in the quality ratings between Penncross and Penneagle.

Table 4. Effect of nitrogen rate on quality of Penncross, Penneagle and Emerald creeping bentgrass putting greens at the Hancock Turfgrass Research Center. Treatments initiated in 1982. Plot size is 3 feet by 6 feet. Three replications. All plots receive 2 pounds K_2O per 1000 square feet annually.

Annual N rate	N carrier	Grass	Turfgrass quality rating (9=best) Nov 2	Dec 15
lbs/1000 sq ft				
1	Urea	Emerald	3.7h[y]	1.7i
2	Urea	Emerald	4.5gh	3.7gh
3	Urea	Emerald	4.5gh	4.0fh
4	Urea	Emerald	5.2fg	4.7ef
6	Urea	Emerald	5.5dg	4.7ef
8	Urea	Emerald	5.7dg	4.7ef
4L[x]	Urea	Emerald	5.3eg	8.8a
4L	Milorganite	Emerald	3.7h	5.7cd
4	Ammonium nitrate	Emerald	4.8fh	3.7gh
1	Urea	Penneagle	6.0cf	3.3h
2	Urea	Penneagle	7.2ac	4.0fh
3	Urea	Penneagle	7.2ac	4.2fh
4	Urea	Penneagle	7.8ab	5.3ce
6	Urea	Penneagle	7.8ab	5.7cd
8	Urea	Penneagle	8.0a	5.8c
4L[x]	Urea	Penneagle	7.0ac	7.3b
4L	Milorganite	Penneagle	6.0cf	5.8c
4	Ammonium nitrate	Penneagle	7.2ac	4.8df
1	Urea	Penncross	5.3eg	4.5eg
2	Urea	Penncross	6.7bd	4.8df
3	Urea	Penncross	6.7bd	4.2fh
4	Urea	Penncross	7.2ac	5.7cd
6	Urea	Penncross	8.0a	6.0c
8	Urea	Penncross	8.2a	5.8c
4L[x]	Urea	Penncross	7.2ac	8.3a
4L	Milorganite	Penncross	4.5gh	5.7cd
4	Ammonium nitrate	Penncross	6.5ce	4.8df

[x] - L refers to late season nitrogen application at 1.5.

[y] - means in columns followed by the same letter are not significantly different from each other at the 5% level using the Duncan's Multiple Range Test.