

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 Pennncross, 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 Pennncross 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 Pennncross and Penneagle.

Table 1. Soil pH control study on sandy loam at the Hancock Turfgrass Research Center. Treatments applied August, 1981. Averages for 3 replications. Samples taken August, 1982.

Treatment		Depth of sampling, inches	
Chemical	Rate, tons/A	0-2	2-4
Limestone	6.0	7.5a ^x	7.0ab
Limestone	3.0	7.6a	6.6bcc
Limestone	1.5	7.0ab	6.1cd
Check	---	6.0cd	5.5d
Sulfur	0.5	4.1ef	4.6e
Sulfur	1.0	3.4g	3.8fg

^x - means followed by the same letter are not significantly different from each other at the 5% level using Duncan's Multiple Range Test.

Table 2. Soil pH control study on sandy loam at the Hancock Turfgrass Research Center. Treatments applied August, 1981. Samples taken August, 1982. Averages for 3 replications.

Treatment		Depth of sample	pH	Available nutrient test, pounds/A			
Chemical	Rate, tons/A			P	K	Ca	Mg
Limestone	6.0	0-2	7.5a ^x	65	183ab	2867a	638a
		2-4	7.0a	76	98c	1433b	590a
Check	---	0-2	6.0b	86	188ab	1433b	268b
		2-4	5.5b	104	123bc	1233b	220b
Sulfur	1.0	0-2	3.4c	125	206a	433c	90c
		2-4	3.8c	132	169ac	700c	77c

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

Table 3. Effect of sulfur particle size and rate of pH on a loam soil seeded to Manhattan perennial ryegrass in the greenhouse. Averages for 8 replications. Samples taken 2 months after application.

Treatment		Depth of sample, inches					
S rate lbs/1000	Particle size mm	0-.5	.5-1	1-2	2-3	3-4	4-5
0	--	8.1	8.1	8.0	8.0	8.0	8.0
10	<.05	7.7	7.9	7.8	7.7	7.8	7.8
10	0.1-0.25	7.9	7.9	7.9	7.9	7.9	7.9
10	0.5-1.0	8.0	8.0	8.0	7.9	7.9	7.9
10	2.0-4.0	8.0	8.0	8.0	7.9	7.9	7.9
20	<.05	7.6	7.7	7.7	7.8	7.8	7.8
20	0.1-0.25	7.7	7.8	7.8	7.9	7.9	7.9
20	0.5-1.0	7.9	7.9	8.0	7.9	7.9	7.9
20	2.0-4.0	8.0	8.0	8.0	7.9	7.9	7.9
40	<.05	7.3	7.5	7.6	7.6	7.6	7.6
40	0.1-0.25	7.5	7.7	7.8	7.8	7.8	7.8
40	0.5-1.0	7.9	7.9	7.9	7.9	7.9	7.9
40	2.0-4.0	8.0	7.9	7.9	7.9	7.9	7.9
80	<.05	7.3	7.4	7.6	7.6	7.7	7.7
80	0.1-0.25	7.5	7.7	7.7	7.8	7.8	7.8
80	0.5-1.0	7.8	7.9	7.8	7.8	7.8	7.9
80	2.0-4.0	7.9	7.9	7.9	7.9	7.9	7.9