TURFGRASS SOIL MANAGEMENT RESEARCH REPORT - 1985

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This report summarizes the turf soil management research conducted primarily at the Hancock Turfgrass Center in 1985 and which was supported financially in large part by the Michigan Turfgrass Foundation. We are most grateful for this support and encouragement.

LONG TERM NITROGEN FERTILITY PROGRAM EFFECTS ON THREE CREEPING BENTGRASSES MAINTAINED UNDER GREENS CONDITIONS

The treatments outlined in Table 1 have been applied for 4 years to the blocks of Emerald, Penneagle and Penncross creeping bentgrasses. These grasses have been maintained under greens conditions and are growing on a modified loamy sand soil. Plot size was 4 feet by 6 feet with 3 replications. In previous years the Emerald plots tended to provide a very open turf, especially at the lower nitrogen rates. And the Emerald was highly susceptible to dollarspot as well. Quality ratings in 1985 (Table 1) indicated smaller differences between Emerald and Penneagle in particular, although some variability in data occurred. Frequently, Penncross had higher quality ratings for given month than the other grasses except for the August 23 rating date. There was no apparent cause for the low ratings on all grasses on that date. Some of the plots, particularly the Penncross plots and the Penneagle at higher nitrogen rates, are developing a significant thatch layer which will likely influence the turf quality in the future. Some evidence of scalping appeared in 1985 on these plots. Further, there was more wilting on the higher nitrogen plots on a few days earlier in the summer when there was more moisture stress.

LONG RANGE NITROGEN CARRIER EFFECTS ON A PENNCROSS CREEPING BENTGRASS GREEN AND AN ANNUAL BLUEGRASS FAIRWAY TURF

This cooperative study with J. M. Vargas, Jr. was established in 1982 with revisions in some treatments in 1985. Treatments outlined in Table 2 were applied to a 5-year old Penncross creeping bentgrass green growing on a modified loamy sand soil and to an annual bluegrass turf growing on a loam soil and maintained under fairway conditions at the Hancock Turfgrass Research Center. Plot size was 6 feet by 6 feet with 3 replications. Treatments for April and May were initiated in early June because of a change of technical personnel. Further, the 1985 November applications outlined were not applied as scheduled so data for treatments 1, 3, 5, 7, 9 and 11 should not be compared for others for 1985. The sulfur-coated urea is a greens grade from CIL while the 18-4-10 is a greens fertilizer from the Lebanon Co. Although the treatments receive 1 pound of nitrogen during the summer months from several carriers (treatments 3, 4, 6, 8, 10 and 12) rated highly on many dates, we suggest summer applications (July and August) of nitrogen on greens or fairways should not normally exceed 1/2 pound per 1000 square feet at one time, with an upper rate of 3/4 pound in rare cases.

Data in Table 4 are quality ratings for the annual bluegrass plots. Interestingly, the Penncross green and the annual bluegrass fairway plots

Table 2. Treatments applied in Penncross bentgrass green and Annual bluegrass fairway nitrogen carrier fertility study at the Hancock Turfgrass Research Center. Treatments initiated in 1982 and revised in 1985. Plot size is 6 feet by 6 feet. Four replications.

Treatment		Month of application							
No.	N Carrier	Nov	Apr	May	June	July	Aug	Sept	Total
		----------Pounds N per 1000 sq. ft. ----------							
1	IBDU	1.0	---	---	0.5	0.5	0.5	1.0	3.5
2	IBDU	---	1.0	1.0	1.0	---	---	1.0	4.0
3	S. Urea	1.0	---	---	0.5	0.5	0.5	1.0	3.5
4	S. Urea	---	1.0	1.0	1.0	---	---	1.0	4.0
5	Urea	1.0	---	---	0.5	0.5	0.5	1.0	3.5
6	Urea	---	1.0	1.0	1.0	---	---	1.0	4.0
7	Am. Nitrate	1.0	---	---	0.5	0.5	0.5	1.0	3.5
8	Am. Nitrate	---	1.0	1.0	1.0	---	---	1.0	4.0
9	Milorganite	1.0	---	---	0.5	0.5	0.5	1.0	3.5
10	Milorganite	---	1.0	1.0	1.0	---	---	1.0	4.0
11	18-4-10	1.0	---	---	0.5	0.5	0.5	1.0	3.5
12	18-4-10	---	1.0	1.0	1.0	---	---	1.0	4.0
13	18-4-10	---	---	1.0	---	---	---	1.0	2.0
14	18-4-10	---	0.5	1.0	0.5	0.5	0.5	1.0	4.0
15	18-4-10	---	1.0	1.0	1.0	1.0	1.0	1.0	6.0
16	Urea	---	---	0.5	---	---	---	0.5	1.0
17	Urea	---	---	1.0	---	---	---	1.0	2.0
18	Urea	---	0.5	1.0	0.5	0.5	0.5	1.0	4.0
19	Urea	---	1.0	1.0	1.0	1.0	1.0	1.0	6.0
20	Urea	---	1.5	1.5	1.0	1.0	1.0	1.5	7.5

Table 3. Effect of nitrogen carriers on quality of a Penncross creeping bentgrass green at the Hancock Turfgrass Research Center. Averages for four replications.

Treatment*		Turfgrass Quality Rating (9=best)					
No.	Carrier	June 30	July 23	Aug 6	Aug 15	Sept 25	Nov 14
1	IBDU	1.0 d**	6.4 cg	5.8 df	4.8 ik	6.8 ae	8.0 ad
2	IBDU	6.0 ab	7.6 ad	8.1 ac	7.5 ac	6.6 af	7.4 bf
3	S.C. Urea	1.0 d	4.5 h	6.1 de	3.5 l	5.8 ef	6.4 gh
4	S.C. Urea	4.9 bc	6.3 dg	4.9 f	6.5 df	7.0 ad	6.3 h
5	Urea	1.0 d	5.1 gh	5.4 ef	5.3 gj	6.7 af	7.4 bf
6	Urea	6.5 a	7.9 ac	7.5 c	6.8 ce	6.7 af	7.0 eh
7	Am. Nitrate	1.0 d	5.0 gh	5.4 ef	5.0 hk	6.5 af	7.6 bc
8	Am. Nitrate	6.6 a	8.0 ab	7.6 c	7.5 ac	5.6 f	7.0 eh
9	Milorganite	1.3 d	5.5 eh	6.0 de	5.4 gi	6.3 bf	6.9 eh
10	Milorganite	4.5 bc	7.9 ac	7.5 c	7.0 ce	6.7 af	6.8 eh
11	18-4-10	1.3 d	5.4 fh	5.6 df	4.4 jl	7.4 ab	7.1 dh
12	18-4-10	6.0 ab	8.4 a	7.9 bc	7.1 bd	6.9 ae	7.3 cg
13	18-4-10	4.5 bc	6.0 eh	5.5 ef	5.4 gi	6.3 bf	6.6 fh
14	18-4-10	4.1 c	6.8 bf	6.5 d	5.8 fh	7.1 ac	7.4 bf
15	18-4-10	5.5 ac	8.1 ab	8.6 ab	8.0 ab	7.4 ab	8.0 ad
16	Urea	4.3 bc	5.4 fh	5.5 ef	4.3 kl	6.1 cf	7.0 eh
17	Urea	4.9 bc	5.8 eh	5.4 ef	4.4 jl	5.9 df	7.3 cg
18	Urea	4.6 bc	6.9 af	6.4 de	6.1 eg	7.2 ac	8.1 ac
19	Urea	6.9 a	7.7 ad	8.9 a	8.4 a	7.5 a	8.3 ab
20	Urea	4.7 bc	7.0 ae	8.7 ab	8.0 ab	7.3 ab	8.8 a

*For treatment details see Table 2.

**Means within columns with like letters do not differ significantly according to Duncan's Multiple Range Test (5%).

Table 4. Effect of nitrogen carriers on turf color of annual bluegrass fairway turf at the Hancock Turfgrass Research Center. Averages for four replications.

Treatment*		Turfgrass Color Rating (9=Darkest Green)					
No.	Carrier	June 30	July 22	Aug 6	Aug 28	Sept 25	Nov 27
1	IBDU	4.3 fg**	6.0 ef	6.2 de	6.1 ac	6.1 c	7.0 be
2	IBDU	5.3 df	7.8 ab	7.1 ab	5.4 cf	6.3 c	7.5 ab
3	S.C. Urea	4.5 fg	6.8 ce	6.7 ac	6.3 ab	6.5 ac	7.4 ac
4	S.C. Urea	7.1 bc	7.5 ac	6.7 ae	5.7 bf	6.3 c	7.2 ad
5	Urea	4.6 fg	6.5 df	6.9 ad	6.1 ac	6.9 ab	7.0 be
6	Urea	8.0 ab	7.3 bd	6.2 de	5.2 df	6.3 c	6.8 be
7	Am. Nitrate	5.0 eg	6.5 df	6.4 ce	6.0 ad	6.5 ac	6.9 be
8	Am. Nitrate	7.8 ab	7.5 ac	6.2 de	5.0 f	6.4 bc	6.5 de
9	Milorganite	4.9 eg	6.6 df	7.1 ab	6.6 a	7.0 a	7.2 ad
10	Milorganite	6.4 cd	8.3 a	7.3 a	5.9 ae	6.4 bc	7.0 be
11	18-4-10	3.8 g	6.3 ef	6.5 be	6.0 ad	6.5 ac	6.5 de
12	18-4-10	7.3 ac	7.1 bd	6.0 e	5.7 bf	7.0 a	6.4 e
13	18-4-10	6.1 ce	5.9 f	6.7 ae	5.6 bf	6.9 ab	6.5 de
14	18-4-10	6.6 bc	6.6 df	6.7 ae	5.6 bf	6.7 ac	6.5 de
15	18-4-10	6.4 cd	7.3 bd	7.1 ab	5.6 bf	6.7 ac	6.6 ce
16	Urea	6.0 ce	6.1 ef	6.2 de	5.5 bf	6.1 c	6.4 e
17	Urea	7.0 bc	6.6 df	6.2 de	5.1 ef	6.5 ac	6.9 be
18	Urea	7.9 ab	7.3 bd	6.9 ad	6.0 ad	6.5 ac	6.9 be
19	Urea	8.0 ab	7.5 ac	7.3 a	5.6 bf	6.3 c	7.4 ac
20	Urea	8.5 a	7.1 bd	7.0 ac	6.0 ad	6.3 c	7.9 a

*For treatment details, see table 2.

**Means within columns with like letters do not differ significantly according to Duncan's Multiple Range Test (5%).

receive the same treatments, but the nitrogen responses on the annual bluegrass are not as clearly defined and do not appear to last as long as on the Penncross. Some of this difference may be due to the higher clay content soil (loam) where the annual bluegrass is grown while greater leaching would occur on the loamy sand. But even with slow release materials which would not be as susceptible to leaching (such as IBDU or Milorganite) the responses are not as marked on the annual bluegrass site.

EFFECT OF NITROGEN, COPPER AND SULFUR ON ALGAE ON A PENNCROSS CREEPING BENTGRASS GREEN

A rather serious algae condition developed in 1985 on a Penncross creeping bentgrass green growing on a sand/peat soil at the Hancock Turfgrass Research Center. The turf had received less than 2 pounds of nitrogen per 1000 square feet in 1984 while none had been applied in 1985 until the study was initiated in July. Treatments applied are outlined in Table 5. The annual nitrogen treatments were divided into 2 applications, while the copper and sulfur treatments were applied at the beginning of the study in July. Plot size was 3 feet by 6 feet with 3 replications. Because the turf was so weak there was no untreated check included in the study. It is obvious that the algae intrusion into the turf is occurring on turf which was fertilized at very low nitrogen rates in the past. In an attempt to increase ball roll and to reduce other turf management problems we may be using such low nitrogen rates that algae competition is encouraged because of the limited density of the turf. And sand topdressing and the use of high sand content soils in the construction of greens which have little organic matter and water holding capacity may enhance susceptibility to the algae problem. Susceptibility will vary with the kind of grass you have, nitrogen rate, nitrogen carrier, other auxiliary practices such as verticutting, topdressing, cultivation, specific site conditions, traffic and other management practices. Of course an algicide can be used to reduce the magnitude of the problem.

EFFECT OF TOPDRESSING PROGRAM AND NITROGEN FERTILITY PROGRAM ON A PENNEAGLE CREEPING BENTGRASS GREEN

The study outlined in Table 6 was initiated in 1982 on Penneagle creeping bentgrass growing on a modified loamy sand. The soil mix used in the study was prepared to match the texture of the soil utilized in the original construction. Turf quality ratings were taken twice in 1985 as shown in Table 6. Plots receiving the higher nitrogen rates ranked higher but in some cases were too succulent. Those plots receiving the 6 pounds annual rate of nitrogen per 1000 square feet were more susceptible to wilt, consistent with observations on other plots. There was also a tendency for plots receiving sand topdressing treatment at the high nitrogen rate to wilt before those receiving soil mix topdressing although no data were taken.

Stimpmeter readings taken in August (Table 7) indicate that shorter roll occurred on all plots receiving higher nitrogen consistent with observations reported by others. There was no difference observed due to topdressing treatment on that date.