

1980 Turfgrass Soils Research Report: Timing of Nitrogen Applications, Comparing Nitrogen Carriers and pH Control

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The field research efforts in turfgrass soil management during 1981 centered on several studies on timing of nitrogen carriers on turfgrass responses while expending considerable effort on soil modification at the new Hancock Research Center. The extensive rainfall during the summer of 1980 interfered often with the soil modification efforts.

Late Fall N on Poa annua

The effect of late fall timing of nitrogen carrier applications on Poa annua fairways was continued in the fall of 1979. Appreciation is expressed to Kurt Thuemmel, superintendent at Walnut Hills Country Club and Richard Bell and Mark Magee, superintendents at the Country Club of Lansing for their cooperation in this research. Treatments, given in Tables 1 and 2, were initiated October 1 at each site. The nitrogen rate was 1.5 pounds per 1000 square feet. Responses substantiate that the slower releasing nitrogen sources, such as IBDU and Milorganite must be applied much earlier than soluble N sources to attain the same response in November and the following spring.

The sulfur-coated urea from CIL generally responded faster than that from lakeshore (LESCO), but the latter material gave a longer response the next spring. The use of Dwell (a nitrification inhibitor from Olin-Mathison) on urea extended the N response from urea, particularly into the next spring. Fertilizers containing both soluble and slow release N (24-4-12, containing IBDU from Estech and 18-5-9, containing ureaformaldehyde N from Lebanon) gave favorable responses and were intermediate between urea and the slow release sources as would be expected.

One interesting observation was the injury caused by a PMA application to the Poa annua at the Country Club of Lansing. The rating was observed in December of 1979 and rated in April, 1980. Those treatments giving the fastest responses and resulting in the most succulent turf showed the greatest injury. The injury occurred shortly after the PMA application and was not significant on the plots receiving N later in the fall. This points out one significant reason for not using a strictly slow release N source early enough to get a significant response yet that fall. In this regard a fertilizer containing both slower and faster acting N may be preferred. This could be applied at such a time that the late fall response would be adequate yet not seriously increase the potential for low temperature or chemical injury. For these combination products we would suggest the date of application be November 5-10, depending on the season. If the weather stays warm this could be delayed a week, for example. For northern Michigan, November 1 may be an appropriate date for late fall N response while in southeast Michigan November 15 may be better.

Timing of N Carriers on Kentucky Bluegrass

Tables 3 through 8 show data from n timing and rate studies on several Kentucky bluegrass cultivars at Traverse City. These plots are located on the Traverse City Country Club grounds. Appreciation is expressed to Tom Mead for his cooperation in maintaining these plots.

Generally, the plots receiving higher nitrogen result in higher quality ratings for these grasses growing on sand soil with good irrigation. There were

Table 1. 1979-80 fall N study on Poa annua. Country Club of Lansing.
1.5 lbs N/1000 sq. ft. applied.

Treatment		Visual Turfgrass Quality Ratings (9 = best)				
Date of application	Carrier	10/15/79	10/29/79	11/12/79	12/11/79	4/30/80
10/1	IBDU Coarse	7.5 *	8.7	8.7	8.7	6.8 BE
10/15	IBDU Coarse	6.5	6.7	6.7	7.8	7.0 BE
10/29	IBDU Coarse	6.7	5.8	4.8	6.8	6.8 BE
11/12	IBDU Coarse	6.7	5.5	4.5	5.5	6.5 DF
12/11	IBDU Coarse	6.7	5.8	4.2	4.8	5.2 I
10/1	S.C. Urea-CIL	8.2	8.5	8.7	8.2	6.7 CF
10/15	S.C. Urea-CIL	6.8	8.3	8.7	8.5	7.2 AD
10/29	S.C. Urea-CIL	6.8	6.0	6.7	8.0	7.3 AC
11/12	S.C. Urea-CIL	6.5	5.7	4.2	6.7	7.3 AC
12/11	S.C. Urea-CIL	6.8	5.7	4.3	5.3	6.8 BE
10/1	S.C. Urea-LESCO	7.7	7.7	6.7	7.8	6.7 CF
10/15	S.C. Urea-LESCO	6.7	6.7	6.5	7.2	6.7 CF
10/29	S.C. Urea-LESCO	6.5	5.5	4.8	6.7	6.7 CF
11/12	S.C. Urea-LESCO	6.8	5.7	3.8	5.7	6.7 CF
12/11	S.C. Urea-LESCO	6.8	5.8	4.7	5.2	5.5 HI
10/1	Milorganite	8.0	8.3	7.7	8.2	6.8 BE
10/15	Milorganite	6.8	7.3	7.0	7.7	7.2 AD
10/29	Milorganite	6.7	5.7	5.5	7.3	7.0 BE
11/12	Milorganite	7.0	5.7	4.2	6.0	6.3 EG
12/11	Milorganite	6.3	5.0	3.7	5.2	5.5 HI
10/1	Urea	9.0	9.0	8.2	7.8	5.5 HI
10/15	Urea	6.7	9.0	8.8	8.3	6.3 EG
10/29	Urea	6.8	6.0	7.2	8.7	7.2 AD
11/12	Urea	6.0	5.7	4.3	7.3	7.5 AB
12/11	Urea	6.0	5.8	4.3	5.2	7.0 BE
10/1	Urea-1% Dwell	8.8	8.8	8.5	7.8	6.0 FH
10/15	Urea-1% Dwell	6.8	8.7	8.8	8.2	6.7 CF
10/29	Urea-1% Dwell	6.8	6.0	6.8	8.3	7.2 AD
11/12	Urea-1% Dwell	6.2	5.0	4.0	7.2	7.3 AC
12/11	Urea-1% Dwell	7.3	6.0	4.7	5.3	7.3 BE
10/1	24-4-12 IBDU	8.3	8.5	8.7	8.3	6.3 EG
10/15	24-4-12 IBDU	6.8	8.0	8.0	8.0	6.5 DF
10/29	24-4-12 IBDU	6.5	5.7	7.0	7.7	7.0 BE
11/12	24-4-12 IBDU	6.5	5.3	3.0	6.7	6.8 BE
12/11	24-4-12 IBDU	6.8	6.2	4.8	5.5	7.0 BE
10/1	18-5-9 Lebanon	8.0	8.7	8.3	7.8	5.7 GI
10/15	18-5-9 Lebanon	6.0	8.2	8.5	8.0	6.3 EG
10/29	18-5-9 Lebanon	6.8	6.0	7.8	8.7	7.8 A
11/12	18-5-9 Lebanon	6.7	6.0	4.5	7.3	7.5 AB
12/11	18-5-9 Lebanon	6.3	5.2	4.0	5.2	6.7 CF
Check		6.5	5.2	4.0	4.8	4.5 J
10/29	Ammon. nitrate	6.2	4.7	7.2	8.5	7.0 BE
11/12	Ammon. nitrate	6.2	4.8	3.3	8.2	7.3 AC
12/11	Ammon. nitrate	6.2	5.0	3.3	5.5	7.2 AD

*Means followed by the same letter in columns are not significantly different from each other using Duncan's New Multiple Range Test at the 5% level.

Treatment		Visual Turfgrass Quality Ratings (9 = best)			Injury rating (9 = greatest injury)
Date of application	Carrier	5/12/80	6/4/80	7/2/80	4/30/80
10/1	IBDU Coarse	7.0 FJ	7.5 EI	6.3 GK	35 CG
10/15	IBDU Coarse	7.2 EI	7.7 DH	6.5 FJ	32 BF
10/29	IBDU Coarse	7.3 DH	7.8 CG	7.2 BF	13 AC
11/12	IBDU Coarse	7.3 DH	8.0 BF	7.5 BD	13 AC
12/11	IBDU Coarse	6.3 JL	7.5 EI	7.8 B	13 AC
10/1	S.C. Urea-CIL	6.0 GK	7.7 DH	6.5 FJ	52 FI
10/15	S.C. Urea-CIL	7.8 BE	8.2 BE	6.7 EI	33 BF
10/29	S.C. Urea-CIL	8.5 AB	8.5 AC	7.3 BE	17 AD
11/12	S.C. Urea-CIL	8.7 A	9.9 A	7.7 BC	7 A
12/11	S.C. Urea-CIL	8.2 AC	8.7 AB	7.8 B	17 AD
10/1	S.C. Urea-LESCO	7.3 DH	7.5 EI	7.3 BE	52 FI
10/15	S.C. Urea-LESCO	8.0 BD	8.2 BE	7.5 BD	32 BF
10/29	S.C. Urea-LESCO	7.8 BE	8.5 AC	7.8 B	10 AB
11/12	S.C. Urea-LESCO	8.0 BD	8.5 AC	8.5 A	18 AD
12/11	S.C. Urea-LESCO	7.5 CG	8.3 AD	8.7 A	13 AC
10/1	Milorganite	7.2 EI	7.5 EI	6.8 DH	55 FI
10/15	Milorganite	7.3 DH	7.8 CG	6.3 GK	18 AD
10/29	Milorganite	7.7 CF	8.7 AB	6.5 FJ	13 AC
11/12	Milorganite	7.2 EI	8.7 AB	7.0 CG	15 AC
12/11	Milorganite	6.7 HL	8.7 AB	7.7 BC	12 AC
10/1	Urea	5.2 M	5.7 M	5.0 M	75 I
10/15	Urea	6.2 KL	6.2 KM	5.2 LM	60 HI
10/29	Urea	6.8 GK	6.8 IK	5.8 JL	13 AC
11/12	Urea	7.3 DH	7.5 EI	6.3 GK	13 AC
12/11	Urea	7.3 DH	8.0 BF	6.5 FJ	22 AE
10/1	Urea-1% Dwell	6.2 KL	6.0 LM	5.7 KL	57 GI
10/15	Urea-1% Dwell	7.0 FJ	7.3 FI	6.0 IK	43 EH
10/29	Urea-1% Dwell	7.3 DH	8.0 BF	6.7 EI	15 AC
11/12	Urea-1% Dwell	7.8 BE	8.2 BE	7.2 BF	7 A
12/11	Urea-1% Dwell	7.8 BE	8.2 BE	7.2 BF	18 AD
10/1	24-4-12 IBDU	6.2 KL	7.2 GI	5.8 JL	73 I
10/15	24-4-12 IBDU	6.7 HL	7.7 DH	6.2 HK	40 DH
10/29	24-4-12 IBDU	7.0 FJ	7.7 DH	6.5 FJ	13 AC
11/12	24-4-12 IBDU	7.2 EI	8.2 BE	7.0 CG	22 AE
12/11	24-4-12 IBDU	7.3 DH	8.2 BE	7.3 BE	18 AD
10/1	18-5-9 Lebanon	6.0 L	6.5 JL	6.0 IK	70 I
10/15	18-5-9 Lebanon	6.5 IL	7.0 HJ	6.2 HK	43 EH
10/29	18-5-9 Lebanon	7.3 DH	7.7 DH	6.8 DH	10 AB
11/12	18-5-9 Lebanon	7.8 BE	8.2 BE	7.0 CG	10 AB
12/11	18-5-9 Lebanon	6.8 GK	8.0 BF	7.2 BF	13 AC
Check		4.3 N	4.8 N	4.3 N	18 AD
10/29	Ammon. nitrate	6.5 IL	7.5 EI	5.7 KL	13 AC
11/12	Ammon. nitrate	7.2 EI	8.0 BF	5.8 JL	12 AC
12/11	Ammon. nitrate	7.5 CG	8.0 BF	6.5 FJ	13 AC

Table 2. 1979-80 fall N study on Poa annua. Walnut Hills Country Club.
1.5 lb. N/1000 sq. ft. applied.

Treatment		Visual Turfgrass Quality Ratings (9 = best)							
Date of applic.	Carrier	10/15/79	10/29/79	11/12/79	12/11/79	5/5/80	6/9/80	6/27/80	
10/1	IBDU Coarse	7.5 *	8.3	8.5	8.5	7.3 EI	7.5 DE	7.7 DE	
10/15	IBDU Coarse	7.5	7.0	7.2	7.7	7.7 CG	7.7 CD	8.0 CD	
10/29	IBDU Coarse	7.5	7.0	6.0	6.8	8.0 BE	8.0 BC	8.5 AB	
11/12	IBDU Coarse	7.5	7.0	5.5	5.7	7.7 CG	8.3 B	8.7 BC	
12/11	IBDU Coarse	7.5	7.0	5.2	5.3	7.0 GK	8.7 A	8.3 BC	
10/1	S.C. Urea-CIL	8.0	8.5	8.7	8.5	6.7 IK	7.3 EF	7.0 GH	
10/15	S.C. Urea-CIL	7.5	8.5	8.2	8.7	7.3 EI	7.3 EF	7.5 EF	
10/29	S.C. Urea-CIL	7.3	7.0	7.2	8.3	8.3 AC	7.7 CD	7.5 EF	
11/12	S.C. Urea-CIL	7.5	6.5	5.5	7.3	8.8 A	8.0 BC	8.0 CD	
12/11	S.C. Urea-CIL	7.5	7.0	5.2	5.0	8.7 AB	8.7 A	8.2 BC	
10/1	S.C. Urea-LESCO	7.7	7.8	7.7	7.3	6.8 HK	7.8 CD	7.5 EF	
10/15	S.C. Urea-LESCO	7.5	7.3	7.0	7.2	6.3 EI	8.3 B	8.3 BC	
10/29	S.C. Urea-LESCO	7.5	6.8	5.8	6.5	7.7 CG	9.0 A	8.7 A	
11/12	S.C. Urea-LESCO	7.5	6.8	5.5	5.8	7.2 FJ	9.0 A	8.5 AB	
12/11	S.C. Urea-LESCO	7.5	7.0	5.3	5.3	7.2 FJ	9.0 A	8.5 AB	
10/1	Milorganite	7.0	8.5	8.2	8.2	6.3 KL	6.7 G	6.7 HI	
10/15	Milorganite	7.5	7.5	7.0	7.5	7.0 GK	7.0 FG	6.7 HI	
10/29	Milorganite	7.5	6.8	6.2	6.7	7.3 EI	7.7 CD	7.0 GH	
11/12	Milorganite	7.5	6.7	5.3	5.8	6.7 IK	6.8 CD	7.0 GH	
12/11	Milorganite	7.5	6.7	5.3	5.5	6.7 IK	8.3 B	7.5 EF	
10/1	Urea	8.8	8.5	8.5	7.0	5.8 LM	6.0 H	4.8 O	
10/15	Urea	7.3	8.8	8.8	8.2	6.5 JK	6.2 H	5.0 O	
10/29	Urea	7.5	6.8	7.8	9.0	7.0 GK	6.7 G	5.3 N	
11/12	Urea	7.5	6.8	5.5	7.8	8.0 BE	7.3 EF	5.5 MN	
12/11	Urea	7.5	6.7	5.3	5.2	7.0 CF	7.5 DE	5.8 LM	
10/1	Urea-1% Dwell	8.5	8.7	8.5	7.7	6.7 IK	6.7 G	5.7 LM	
10/15	Urea-1% Dwell	7.5	8.7	9.0	8.5	7.2 FJ	6.8 G	6.0 KL	
10/29	Urea-1% Dwell	7.5	6.8	7.7	9.0	7.2 FJ	7.3 EF	6.7 HI	
11/12	Urea-1% Dwell	7.5	6.7	5.5	7.8	8.0 BE	7.8 CD	6.7 HI	
12/11	Urea-1% Dwell	7.5	6.7	5.0	5.0	8.3 AC	8.2 B	7.2 FG	
10/1	24-4-12 IBDU	8.3	8.5	8.2	7.3	6.7 IK	6.8 G	6.2 JK	
10/15	24-4-12 IBDU	7.5	8.3	8.5	8.2	7.0 GK	7.3 EF	6.2 JK	
10/29	24-4-12 IBDU	7.5	6.8	7.3	7.8	7.5 DH	7.5 DE	6.5 IJ	
11/12	24-4-12 IBDU	7.5	6.7	5.3	6.8	8.0 BE	7.7 CD	7.3 FG	
12/11	24-4-12 IBDU	7.5	6.8	5.2	5.3	7.2 FJ	8.0 BC	7.3 FG	
10/1	18-5-9 Lebanon	8.3	8.5	8.3	7.5	6.5 JK	6.7 G	6.0 KL	
10/15	18-5-9 Lebanon	7.5	9.0	8.8	8.3	7.2 FJ	6.8 G	6.5 IJ	
10/29	18-5-9 Lebanon	7.5	6.7	7.8	8.5	7.5 DH	7.7 CD	6.8 HI	
11/12	18-5-9 Lebanon	7.5	6.7	5.3	7.8	8.2 AD	8.3 B	7.0 GH	
12/11	18-5-9 Lebanon	7.7	6.8	5.0	5.0	8.0 BE	8.8 A	7.0 GH	
Check		7.5	6.5	5.3	5.0	5.2 M	4.8 I	4.2 P	
10/29	Ammon. nitrate	7.5	7.0	6.8	8.5	7.5 DH	7.0 FG	5.7 LM	
11/12	Ammon. nitrate	7.3	6.5	5.3	7.8	8.2 AD	7.3 EF	6.0 KL	
12/11	Ammon. nitrate	7.5	6.7	5.0	5.0	8.8 A	7.7 CD	6.3 JK	

*Means followed by the same letter in columns are not significantly different from each other using Duncan's New Multiple Range Test at the 5% level.