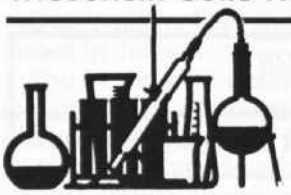

Implications From Fertilizer Demonstrations

By Dr. Wayne R. Kussow
Department of Soil Science
University of Wisconsin-Madison

Observations from demonstrations cannot be interpreted as concisely as the results from replicated experiments. However, demonstrations are efficient means for screening large numbers of products and identifying materials that merit further testing or have potential for meeting specific needs. It is with this in mind that the observations from three turf fertilizer demonstrations carried out last season at the Yahara Hills Golf Course are being shared with you.

Two of the demonstrations are located in rough areas on fescue-dominated turf. One involves 16 fertilizers (15 in 1988) applied at a single annual N rate split among two, three or four applications per season. The other was installed in 1989 for the purpose of looking at turfgrass responses to Nitrazine and Nitrazine in combination with other SRN's.

Before reviewing the results from these two demonstrations, it is important to note that severe moisture stress was unintentionally allowed to develop during July on both sites and mowing frequency was less than ideal. Turfgrass color was not rated once the moisture deficit began to induce dormancy in the turfgrass.

TABLE 1.
EFFECTS OF FERTILIZER AND NUMBER OF APPLICATIONS PER SEASON ON TURFGRASS COLOR RATINGS*

Fertilizer	2 Applications Ave.	2 Applications 7.0	3 Applications Ave.	3 Applications 7.0	4 Applications Ave.	4 Applications 7.0
		% Time		% Time		% Time
Urea	7.4	66	7.3	74	7.2	60
Ammonium Sulfate	7.4	66	7.3	64	7.2	46
Lebanon SCU	7.9	96	7.9	100	7.8	96
Lebanon 18-5-9	7.2	60	7.2	74	7.1	56
Brayton 18-5-9	7.2	72	7.4	74	7.4	76
Brayton 30-4-8	7.6	81	7.4	80	7.6	86
Scotts 32-3-10	7.4	91	7.6	85	7.4	91
Scotts 34-3-7	7.4	86	7.7	90	7.6	91
Nitroform 38-0-0	6.6	42	6.7	44	7.0	58
Par Ex 31-0-0	7.0	36	7.2	58	7.2	68
Par Ex 21-2-20	7.0	60	7.2	85	7.3	86
Par Ex 24-4-12	7.0	62	7.0	64	7.1	71
Milorganite 6-2-0	7.2	66	7.5	80	7.5	77
Sustane 5-2-4	6.9	44	6.8	30	7.0	67
Spring Valley 25-2-5	6.9	50	7.0	58	7.0	56
Andersons 9-6-18	7.4	76	7.4	74	7.4	70
AVERAGES	7.2	66	7.3	71	7.3	72

* Scale of 1 to 9; 1 = brown, 9 = very dark green, and 7 = minimally acceptable color. Color ratings are averages for 21 readings taken in 1988 and 1989.

The information presented in Tables 1 and 2 support the following generalizations:

1. Proper choice of SRN allows maintenance of acceptable turfgrass color 80% or more of the time with just two fertilizer applications per season. The fertilizers suitable for a twice per year fertilization program were: (1) Lebanon SCU 32-0-0; (2) Scotts 32-3-10; (3) Scotts 34-3-7; and (4) Brayton 30-4-8.
2. Increasing the number of fertilizer applications from two to three per season substantially increased turfgrass color achieved with Par Ex 21-2-20 and Milorganite. These, plus those cited above, were the most effective fertilizers in the three times per year fertilization program.
3. In the presence of summer moisture stresses, there was no advantage in increasing the number of fertilizer applications from three to four per season.
4. Spring residual response to nitrogen applied the previous fall depends on the source of N and whether applied in September or October. The five fertilizers that provided the best spring residual responses for the two fall application times were:

September Application	**October Application**
Lebanon SCU	Milorganite
Scotts 34-3-7	Par Ex 24-4-12
Milorganite	Brayton 30-4-8
Par Ex 31-0-0	Lebanon SCU
Scotts 32-3-10	Andersons 9-6-18

5. Summer rankings of the fertilizers are indicative of which fertilizers perform best during periods of moisture stress. For this period, the five highest ranked fertilizers were: (1) Lebanon SCU; (2) Brayton 18-5-9; (3) Scotts 34-3-7; (4) Brayton 30-4-8; and (5) Lebanon 18-5-9 = Andersons 9-6-18.
6. The five fertilizers producing the best turfgrass responses in early fall after recovery from summer drought were: (1) Lebanon SCU; (2) Scotts 34-3-7; (3) Brayton 30-4-8; (4) Lebanon 18-5-9; and (5) Scotts 32-3-10.
7. There was no evidence that full-season turfgrass responses to the fertilizers could be improved by applying different materials at different points in the season rather than using the same fertilizer throughout the season.

TABLE 2.
FERTILIZER RANKINGS BASED ON CLIPPINGS ITROGEN CONTENT OF RED FESCUE-DOMINATED TURF
1988-89

Fertilizer	SPRING RESIDUAL Sept. Appl.	SPRING RESIDUAL Oct. Appl.	Summer	Fall
Urea	7.0	6.5	10.0	6.4
Ammonium Sulfate	9.5	10.0	13.6	6.6
Lebanon SCU	1.0	3.0	3.8	2.5
Lebanon 18-5-9	9.5	6.0	5.6	6.2
Brayton 18-5-9	9.0	4.0	4.2	5.6
Brayton 30-4-8	8.5	3.0	4.8	3.6
Scotts 32-3-10	5.5	10.5	7.4	6.2
Scotts 34-3-7	2.5	8.0	4.6	3.5
Nitroform 38-0-0	10.5	12.0	6.8	12.6
Par Ex 31-0-0	3.5	4.0	6.0	13.4
Par Ex 21-2-20	6.0	5.0	10.0	9.5
Par Ex 24-4-12	8.0	2.5	7.2	12.5
Milorganite	2.5	2.0	9.2	7.8
Spring Valley 25-2-5	12.5	9.5	10.8	9.6
Andersons 9-6-18	6.0	3.5	5.6	9.2

(Continued on page 19)

(Continued from page 17)

Observations from the Nitrazine demonstration are tabulated in Table 3.

The purpose of applying SRN's with Nitrazine was to identify which combination or combinations produce the best turfgrass response. Nitrazine itself is a product pelleted from urea and powdered melamine. Melamine is a very slow release organic N compound. Virtually no N is released the first month after application. Some N release occurs the second month, but maximum N release does not happen until three months after application. The urea in Nitrazine is intended to provide quick turfgrass greenup and to satisfy N needs for the first month after application. The reason for applying Nitrazine with another SRN is to have adequate amounts of N available the second month after fertilizer application. Thereafter, microbial degradation of melamine is expected to supply turfgrass with adequate amounts of N for a period of two to three months. It is in this manner that appropriate Nitrazine-SRN combinations potentially become full-season fertilizers.

The objective of the Nitrazine demonstration in 1989 was to identify effective Nitrazine-SRN combinations. These combinations and the individual SRN's were applied in May, July and August at an anual rate of 4 lbN/1000 ft². Urea was also applied with Nitrazine to see what effect this would have on turfgrass color. As shown in Table 3, the urea induced rapid color development and, because of the three applications during the season, provided excellent color in September and October as well. However, combining Nitrazine with urea is not an advisable practice. Applications of this N source combination in July and August resulted in turfgrass burn.

TABLE 3.
1989 TURFGRASS COLOR RATINGS*
NITRAZINE DEMONSTRATION

FERTILIZER	MONTHLY COLOR RATINGS				SEASON
TREATMENT	June	Aug.	Sept.	Oct.	Mean
Nitrazine	7.7	6.4	7.4	7.6	7.3
Nitrazine + Urea	8.4	6.8	8.0	8.4	7.9
Nitrazine + SCU	7.2	6.8	7.2	6.8	7.0
Nitrazine + UF	7.1	6.8	7.5	7.0	7.1
Nitrazine + IBDU	7.1	8.1	8.8	7.9	8.0
Nitrazine + Organic N	7.0	6.6	7.6	7.1	7.1
SCU (Lebanon 32-0-0)	7.2	6.6	7.0	6.1	6.7
UF (Nitroform 38-0-0)	6.9	6.8	7.8	7.1	7.2
IBDU (Par Ex 31-0-0 Fine)	6.9	7.7	8.4	7.7	7.7
Org. N (Sustane 5-2-4)	7.3	6.8	8.1	7.6	7.4

* Scale 1 to 9; 1 = brown, 9 = very dark green, 7 = minimally acceptable color.

Turfgrass color responses to the Nitrazine-SRN combinations (Table 3) suggest that SCU is not an appropriate material for combination with Nitrazine. In fact, the SCU alone performed very poorly on this site. The best Nitrazine-SRN combination was that of Nitrazine + IBDU. This combination was particularly effective in bringing about recovery of the turfgrass from the drought-induced dormancy that occurred in July.

Next season, Nitrazine alone and Nitrazine in combination with IBDU will be applied on a one time only basis at various N rates. Turfgrass color and tissue N contents will be determined bi-weekly to evaluate the full season performance of these various treatments.

TABLE 4.
1989 TURFGRASS COLOR RATINGS
GOLF TEE FERTILIZER DEMONSTRATION

FERTILIZER	AVERAGE COLOR RATINGS					SEASON
	June	July	Aug.	Sept.	Oct.	MEAN
Nitrazine	8.7	8.1	7.8	7.1	7.5	7.7
Agriform	8.5	8.3	8.0	7.6	7.1	7.8
Nitroform UF	7.5	7.9	8.2	7.4	7.1	7.6
Johnson's SCU	7.5	7.7	7.2	7.8	7.3	7.5
Lebanon SCU	7.5	7.7	7.4	7.8	7.5	7.6
Par Ex 31-0-0	7.7	8.5	7.2	7.7	7.8	7.9
Scott's 22-0-16	8.0	7.9	7.6	8.0	7.3	7.7
Sta-Green 15-0-30	8.2	7.9	7.2	7.6	7.2	7.6
Sta-Green 21-0-21	8.2	7.9	7.4	7.2	7.3	7.6
Fine Milorganite	8.0	8.1	8.2	7.8	7.5	7.8
Sustane	8.2	8.1	8.0	8.1	7.5	7.9
Sta-Green 17-2-10	8.5	7.7	7.6	8.0	7.6	7.8
Johnson's 18-3-12	8.7	7.7	8.0	8.2	7.5	7.9
Scott's 32-3-10	8.5	7.8	7.6	8.2	7.5	7.9

The third fertilizer demonstration involved application of 14 different fertilizers on a poorly drained, *Poa annua* infested golf tee. Two of the fertilizers, Nitrazine and Agriform 34-0-7 were single season applications at the rates of 4 and 5 lbN/100 ft², respectively. All other fertilizers were applied three times during the season at a 4 lb. N rate.

Turfgrass color was rated ten times during the season. The ratings are summarized in Table 4. These ratings show that:

1. All of the fertilizers tested provided satisfactory turfgrass color throughout the season. Hence, performance of the single applications of Nitrazine and Agriform 34-0-7 was comparable to that observed with three applications of the 14 other fertilizers tested.
2. Not shown in the data is the fact that Nitrazine and Agriform caused some turfgrass discoloration (burn?) during the first two-to-three weeks after application.
3. Early season (June) responses resulted in excessively dark turfgrass colors when Nitrazine and Johnsons 18-3-12 were applied.
4. Late summer (August) responses to Johnson's SCU, Par Ex 31-0-0 and Sta-Green 15-0-30 were considerably less than those obtained with several of the other fertilizers tested.
5. Par Ex 31-0-0 excelled in the maintenance of late season (October) turfgrass color.
6. Some of the most stable color ratings throughout the season were achieved with the two organic sources, Milorganite and Sustane.

The Agriform 34-0-7 is a resin-coated fertilizer. It is the resin coating that controls release of nitrogen from the fertilizer granules. There is some talk in the fertilizer industry that resin-coated fertilizers are the slow release fertilizers of the future for turfgrass. Some go so far as to say that the days of sulfur-coated urea are numbered and that sulfur is destined to be replaced by resins. Thus, this material will certainly be included in next year's demonstration.