

### Nitrogen Carrier Evaluations

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Responses of several nitrogen carriers applied to Kentucky bluegrass turfs were evaluated at East Lansing and Traverse City in 1978. The results are given in Tables A and B, respectively. Based on these and other studies there are several conclusions which can be reached.

The use of Dwell (formerly Terrazole), from the Olin-Mathison Company, as a potential nitrification on urea has shown small but sufficient continuing promise that it warrants further study. There is still much to be learned about the most effective utilization of this material to provide a slow release response.

Pana Sea, a seaweed extract, did not result in improved turf quality ratings when applied alone or in conjunction with urea or Milorganite, except for one date with urea at Traverse City.

Generally, the sulfur-coated urea from Canadian Industries Limited (CIL:32-0-0) responded somewhat faster but the response did not last quite as long as that from Ag Industries Manufacturing (AIM:36-0-0). When applied to closely mown turfs (fairway height or shorter) a spotty response has been observed on some occasions. This is usually characterized by a few green spots in an otherwise nitrogen deficient turf and occurs only after many weeks following fertilization. Apparently, a few of the coatings which have just been broken are releasing nitrogen in the otherwise yellow turf. If adequate nitrogen is applied to keep the turf green this spotty response has not been a problem.

There has been some increase in the amount of annual bluegrass which has encroached bentgrass greens at both East Lansing and Traverse City where sulfur-coated urea has been applied over a 3 or 4 year period.

The powder form of ureaformaldehyde has given better responses than the standard larger particle UF when applied at 1 or 2 pounds per 1000 square feet. The powder form still does not provide responses comparable to other carriers. Over a period of years the UF may build up to provide more efficient responses but in one or two years this has not occurred. Since there is a range in types of ureaformaldehyde type products the user should evaluate the response from the material he is using especially when mixed with more soluble nitrogen sources.

Note the responses to the carriers applied June 29 this year at 1.5 pounds N per 1000 square feet.

Carrier	Response
CIL:32-0-0	3.2
AIM:36-0-0	3.1
UF (standard)	2.8
UF (powder)	3.5
UF (mixed)	3.4
UF (mixed)	3.3
UF (mixed)	3.2
UF (mixed)	3.1
UF (mixed)	3.0
UF (mixed)	2.9
UF (mixed)	2.8
UF (mixed)	2.7
UF (mixed)	2.6
UF (mixed)	2.5
UF (mixed)	2.4
UF (mixed)	2.3
UF (mixed)	2.2
UF (mixed)	2.1
UF (mixed)	2.0
UF (mixed)	1.9
UF (mixed)	1.8
UF (mixed)	1.7
UF (mixed)	1.6
UF (mixed)	1.5
UF (mixed)	1.4
UF (mixed)	1.3
UF (mixed)	1.2
UF (mixed)	1.1
UF (mixed)	1.0
UF (mixed)	0.9
UF (mixed)	0.8
UF (mixed)	0.7
UF (mixed)	0.6
UF (mixed)	0.5
UF (mixed)	0.4
UF (mixed)	0.3
UF (mixed)	0.2
UF (mixed)	0.1

Table A. 1978 Nitrogen carrier evaluations at East Lansing. Fertilizers applied at 1 pound nitrogen per 1000 sq. ft. July 10 and September 15, 1979. Averages of 3 replications.

Carrier	Turfgrass Quality Ratings (1 = best; 9 = brown)						
	July 19	July 30	Aug. 18	Aug. 31	Sept. 15	Oct. 9	Oct. 27
Urea	2.5 b	2.7 b	3.3 b	3.0 b	4.0 c-g	3.8 cd	3.3 b-d
Urea(1/2% Dwell)	2.8 bc	3.2 bc	3.8 b-d	3.2 bc	3.8 c-f	3.7 bc	3.0 bc
Urea(1% Dwell)	2.8 bc	3.2 bc	3.8 b-d	3.3 b-d	3.3 bc	3.2 b	2.8 b
Sulfur coated urea(AIM)	3.7 d-f	4.8 ef	4.2 cd	3.0 b	3.2 b	4.5 ef	4.7 f
Sulfur coated urea (CIL)	3.7 d-f	5.3 fg	4.0 b-d	3.3 b-d	3.7 b-e	5.2 g-j	4.7 f
30-5-10(LESCO)	3.8 d-g	4.0 c-e	4.0 b-d	3.7 c-e	4.2 d-g	4.7 e-g	4.2 ef
18-4-10(LESCO)	4.5 g-i	4.7 ef	5.7 f	4.7 g	5.0 h	5.0 f-c	4.7 f
IBDU-coarse	5.3 j	5.8 g	5.0 ef	4.3 fg	3.8 c-f	5.2 g-j	5.2 g
IBDU-fine	5.0 ij	6.0 g	5.0 ef	4.3 fg	4.2 d-g	5.5 ij	5.7 hi
24-4-12(Swift's)	3.2 b-d	4.0 c-e	3.7 bc	3.7 c-e	3.8 c-f	4.3 de	3.8 de
Ureaformaldehyde	5.3 j	6.2 g	5.5 f	5.3 h	6.0 i	6.7 l	6.8 j
UF(Powder blue)	5.0 ij	6.2 g	6.2 f	5.3 h	4.7 gh	6.2 kl	6.3 ij
Milorganite	4.7 h-j	6.0 g	5.0 ef	4.2 e-g	4.3 e-h	5.7 jk	5.3 gh
18-5-9(Lebanon)	4.3 f-i	4.0 c-e	4.5 d-f	4.3 fg	4.5 f-h	4.7 eg	3.8 de
34-3-7(Scott's)	3.2 b-d	3.5 b-d	3.5 bc	3.5 b-d	3.5 b-d	3.8 cd	3.2 bc
31-3-10(Scott's)	4.0 e-h	4.0 c-e	4.0 b-d	3.8 d-f	3.8 c-f	4.5 ef	3.8 de
16-4-8 (US Steel)	3.8 d-g	4.0 c-e	4.3 de	4.7 g	4.7 gh	4.3 de	4.5 f
25-5-10(US Steel)	3.7 d-f	3.7 b-d	4.5 d-f	3.7 c-e	4.3 e-h	4.8 e-h	3.8 de
23-5-5(LESCO)	3.5 c-e	4.7 ef	3.7 bc	3.7 c-e	4.2 d-g	5.3 h-j	4.3 ef
Check	6.8 k	6.2 g	7.7 g	7.5 i	7.2 j	9.0 m	8.8 k

\* Numbers in columns are not significantly different at the 5% level from each other if followed by the same letter.

Table B. Nitrogen carrier effects on turfgrass quality ratings of Kentucky bluegrass at Traverse City. Treatments applied June 7 and August 4, 1978. Averages of 3 replications.

Treatment		Turfgrass quality rating (1 = ideal)			
Carrier	N rate lbs/1000 sq ft.	July 13	August 3	Sept. 19	Oct. 19
Urea	1	2.50 bc*	3.67 b-f	1.33 ab	4.67i-j
Urea (½% Dwell)	1	3.17c-e	4.17 d-g	1.17 ab	4.33g-j
Urea (1% Dwell)	1	3.00 cd	4.00 c-g	1.17 ab	4.33g-j
36-0-0 (LESCO)	1	3.33c-f	4.83 gh	1.50 ab	4.00e-i
30-5-10 (LESCO)	1	3.33c-f	4.00 c-g	1.67 bc	4.00e-i
18-4-10 (LESCO)	1	4.33 gh	5.50 hi	2.17 cd	5.17j
32-0-0 (CIL)	1	3.00 cd	3.67 b-f	1.50 ab	4.17f-i
Urea (1 gal Pana Sea/A)	1	2.00 ab	4.00 c-g	1.17 ab	3.50d-g
Urea (10 gal Pana Sea/A)	1	2.00 ab	3.50 a-e	1.50 ab	3.67d-h
24-4-10(Free Flow)	1	3.50d-g	4.17 d-g	1.67 bc	4.00e-i
23-5-5(LESCO)	1	3.00 cd	3.67 b-f	1.17 ab	4.00e-i
31-3-10(Scott's)	1	3.50d-g	4.33 e-g	1.00 a	3.67d-h
34-3-7(Scott's)	1	3.00 cd	4.00 c-g	1.00 a	3.67d-h
16-4-8 (US Steel)	1	3.50d-g	4.17 d-g	1.67 bc	4.33g-j
18-5-9 (Agrico)	1	3.83d-h	4.50 fg	1.67 bc	4.50h-j
Milorganite	1	4.17f-h	4.50 fg	1.67 bc	4.50h-j
Ureaform (powder blue)	1	5.83 i	6.33 i	2.50 d	7.00 k
24-4-12 (Swift's)	1	3.83d-h	4.33 e-g	1.33 ab	4.00e-i
IBDU (coarse)	1	6.00 i	4.33 e-g	1.33 ab	2.83b-d
IBDU (fine)	1	4.67 h	3.50 a-e	1.17 ab	2.83b-d
IBDU (.5-1 mm)	1	4.17f-h	3.33 a-d	1.17 ab	2.83b-d
IBDU (.1-.2 mm)	1	3.50d-g	3.33 a-d	1.33 ab	3.33 df
Urea	2	1.50 a	3.17 a-c	1.17 ab	3.33d-f
Urea (½% Dwell)	2	1.50 a	2.83 ab	1.00 a	2.83b-d
Urea (1% Dwell)	2	1.33 a	3.00 ab	1.33 ab	2.83b-d
36-0-0 (LESCO)	2	1.67 ab	3.00 ab	1.00 a	2.00 ab
30-5-10 (LESCO)	2	2.00 ab	3.17 a-c	1.17 ab	2.33a-c
18-4-10 (LESCO)	2	3.50d-g	4.33 e-g	1.50 ab	3.17c-e
32-0-0 (CIL)	2	1.33 a	2.83 ab	1.00 a	1.83 a
24-4-10(Free Flow)	2	1.83 ab	2.67 a	1.00 a	2.00 ab
23-5-5(LESCO)	2	2.00 ab	2.83 ab	1.00 a	1.67 a
Ureaform (powder blue)	2	4.00e-h	4.67 gh	1.50 ab	4.00e-i
Check	0	7.50 j	8.00 j	5.00 e	8.50 l

\*Numbers in a column are not significantly different at the 5% level from each other if followed by the same letter.