Timing Nitrogen Fertilization

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In evaluating the need for nitrogen fertilization of a turf at any given time one has a number of factors to consider which affect the turf. These include N effects on 1) growth and vigor, 2) color, 3) density, 4) recovery from injury (thinning) caused by any of a number of stresses, 5) rooting, 6) susceptibility to disease, 7) competition with other plant species, 8) susceptibility to other stresses. In one circumstance the highest priority among the above responses might be to apply nitrogen to encourage the grass to "fill in" open areas. At another time it might be best to fertilize lightly (or not at all) to reduce susceptibility to disease or other stresses.

When considering N fertilization needs one must evaluate the release rate of the N carrier applied to know when to expect turf response. One should be familiar with not only the weather conditions that affect response rate but also the soil, irrigation, turf quality and past fertilization practices to plan a fertilization program.

There are 3 aspects of timing of N fertilization which are often misunderstood or not well practiced. Of course, adequate P_2O_5, K_2O and other essential nutrients must be present.

1. Fertilizing new seedings.

   The top priority in fertilizing new seedings is normally to encourage the grass to grow and spread rapidly in order to achieve the desired density and to compete with weeds. Higher N rates and/or more frequent applications are usually necessary, especially on sands or subsoils. Pay careful attention to proper mowing and irrigation. Note the responses in the Loretta perennial ryegrass plots seeded last August and fertilized in June.

2. Spring versus fall N.

   Whereas spring N gives the color and growth response desired by most people, fall applied N is very important in maintaining a healthy turf over a period of years. Some turf managers have switched from 2/3 spring N : 1/3 fall N to 1/2 spring N : 1/2 fall N or even more in the fall. The fall fertilization could really be called late summer - early fall. Depending on temperature and rainfall conditions this is normally late August - early September for maximum effectiveness.

3. Dormant N fertilization.

   This practice, gaining in interest, involves applying N so the release occurs after the turf has "hardened off" in the fall, usually after several freezes. Although this time varies from year to year it normally occurs by the end of October, but on occasion has been a week or 2 later.

   Concern for foliar burn from soluble components of fertilizers, increased susceptibility to winter injury and potential for leaching of soluble N have been expressed but to date there has been no difficulty on Kentucky bluegrass. One of the clear advantages of dormant N responses is the turf is green in the spring yet does not have the rapid growth rate expected from spring applications. Effects on susceptibility to diseases needs further study but appears promising to date.

To use dormant N fertilization effectively the annual fertilization program begins with the dormant application. Spring N applications can then be delayed. Slow release N sources like UF, Milorganite and IBDU will definitely need to be applied earlier, maybe 4 to 6 weeks before the desired response time for effective "dormant response". Soluble N sources can be applied within a few days (3 or 4) of response time desired.

Tables A and B give results from 2 dormant fertilization studies conducted on golf courses in 1977-78. Results from 1978-79 appear to be similar. In addition, note the responses of the Nugget Kentucky bluegrass to dormant applications of soluble N applied last November.

Table A. Dormant nitrogen treatment effects on bentgrass putting greesn turfgrass quality. Kalamazoo Elks Club. Treatments applied December 16, 1977 and April 10, 1978. Averages of 3 replications.

Treatment			Turfgrass Quality Rating (1 = ideal)		
Carrier	N rate lbs/1000 sq ft.	Time of application	April 25	June 1	June 15
None	0	-	5.67 h*	5.67 f	2.67 c
IBDU (fine)	1/2	Dec	4.50 g	4.33 e	2.33 bc
IBDU (fine)	1	Dec	3.67 f	3.33 d	2.33 bc
IBDU (fine)	2	Dec	3.00	2.33bc	2.17 bc
24-4-12 (Swift's)	1	Dec	2.00 cd	2.67cd	2.17 bc
Urea	1	Dec	1.17 a	2.50bc	2.00 b
Milorganite	1	Dec	3.67 f	2.83cd	2.00 b
32-0-0 (CIL)	1	Dec	1.83 bc	1.83ab	1.83 b
Urea (1% Terrazole)	1	Dec	1.33 ab	2.50bc	2.00 b
18-4-10 (Agrico)	1	Dec	2.50 de	2.83cd	2.83 bc
IBDU (fine)	1/2	Apr	5.00 g	4.17 e	2.17 bc
IBDU (fine)	1	Apr	4.83 g	3.00cd	1.83 b
IBDU (fine)	2	Apr	4.50 g	2.50bc	1.00 a
24-4-12	1	Apr	1.50a-c	1.67 a	1.87 b

*Numbers in columns followed by the same letter are not significantly different from each other.

Table B. Dormant nitrogen carrier effects on Poa annua fairway turf quality ratings. Edgewood Country Club. Treatments applied December 1, 1977 and April 1, 1978. Averages of 3 replications.

Treatment			Turfgrass Quality Rating (1 = ideal)			
Carrier	N Rate lbs/1000sq ft.	Date of application	Apr. 26	May 5	June 12	July 5
None	0	-	6.00o*	4.50n	4.50j	4.17h
IBDU (coarse)	1/2	Dec	5.67no	4.00lm	3.83hi	2.83de
IBDU (coarse)	1	Dec	4.50i-l	2.67g-i	2.50b-d	2.17bc
IBDU (coarse)	2	Dec	3.00e-g	1.83cd	2.17bc	1.17a
IBDU (fine)	1	Dec	5.171-n	3.33k	3.83hi	2.83d-e
24-4-12 (Swift's)	1	Dec	3.00e-g	2.17d-f	3.50g-h	2.67c-e
Urea	1	Dec	2.00c	2.50f-h	2.50b-d	3.00ef
Urea (1% Terrazole)	1	Dec	2.17cd	2.00c-e	2.83d-f	2.50b-e
32-0-0 (CIL)	1	Dec	2.67de	2.00c-e	2.50b-d	2.50b-e
36-0-0 (LESCO)	1	Dec	2.83d-f	2.17d-f	3.17e-g	2.67c-e
Milorganite	1	Dec	3.83hi	3.00i-k	3.00d-g	2.67c-e
18-4-10 (Agrico)	1	Dec	2.17cd	2.50f-h	2.83d-f	2.67c-e
18-5-9 (Agrico)	1	Dec	2.17cd	2.33e-g	3.00d-g	2.50b-e
IBDU (coarse)	1/2	Apr	5.33m-o	4.00l-m	3.00d-g	3.67gh
IBDU (coarse)	1	Apr	4.83k-m	3.17jk	2.00b	2.33b-d
IBDU (coarse)	2	Apr	4.00h-j	2.00c-e	1.00a	1.33a
IBDU (fine)	1/2	Apr	4.50i-l	3.83l	3.33f-h	3.00ef
IBDU (fine)	1	Apr	4.50i-l	2.83h-j	2.50b-d	2.50b-e
IBDU (fine)	2	Apr	3.50f-h	1.67c	1.33a	1.33a
IBDU (.5-1 mm)	1/2	Apr	4.50i-l	3.33k	3.17e-g	3.00ef
IBDU (.5-1 mm)	1	Apr	4.17h-k	2.33e-g	2.17bc	2.33b-d
IBDU (.5-1 mm)	2	Apr	2.83d-f	1.50bc	1.17a	1.33a
IBDU (.1-.2)	1/2	Apr	4.17h-k	3.00i-k	3.33f-h	2.67c-e
IBDU (.1-.2)	1	Apr	3.67gh	2.17d-f	2.00b	2.17bc
IBDU (.1-.2)	2	Apr	1.83bc	1.00a	1.17a	1.17a
24-4-12 (Swift's)	1	Apr	2.33c-e	2.00c-e	2.67c-e	2.50b-e
Urea	1	Apr	1.00a	1.00a	3.00d-g	2.67c-e
Urea (1% Terrazole)	1	Apr	1.17ab	1.17ab	2.00b	2.17bc
32-0-0 (CIL)	1	Apr	1.83bc	1.83cd	2.50b-d	2.00b
36-0-0 (LESCO)	1	Apr	3.00e-g	2.00c-e	3.50g-h	2.50b-e
Milorganite	1	Apr	3.50f-h	2.83h-j	3.00d-g	2.33b-d
18-4-10 (Agrico)	1	Apr	2.17cd	2.50fh	3.00d-g	2.50b-e
18-5-9 (Agrico)	1	Apr	1.67a-c	1.67c	2.67c-e	2.33b-d

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