

FOUR-YEAR NITROGEN-PROTOCOL STUDY
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An early-spring application of nitrogen (N) is a common practice among homeowners, ground managers, and professional lawn care companies. This practice has been shown to cause carbohydrate depletion in cool-season turfgrasses (4). It is thought, therefore that the turf becomes predisposed to summer stresses such as heat, drought, diseases, and insects (5). Research substantiating these effects following early-spring N has not been found in the literature.

Virtually all lawn care companies market an early-spring application of N, which they view as a critically essential income source. Lawn care companies sell a variety of programs that result in 1 to 6 pounds of N per 1,000 ft² (N/M) being applied annually. Turfgrass extension specialists recommend that the first spring application of N be delayed to help limit the heavy top growth usually associated with late April and early May (1). The purpose of this study is to assess most of these regimes as well as some that may be acceptable to all parties.

A significant dimension of this study is that the plots were mowed weekly in order to accurately mimic the mowing practices of both commercial cutters as well as most homeowners. This was different from typical turf studies where mowing follows the one-third rule, which is to not remove more than one-third of the total leaf surface at any one mowing (2). Clippings were returned by a mulching rotary mower as recommended by MSU specialists (3). The actual mowing height was 2.5 inches. Irrigation was applied as needed to avoid late morning wilt. Broad-leaved weeds were managed with Trimec Classic. Fungicides, insecticides, or pre-emergence herbicides were not used.

The plot area was established in 1992 with Spartan Grade A Mix, which was 40% Kentucky bluegrasses, 40% fine fescues, and 20% perennial ryegrasses. There were 20 treatments arranged in a randomized complete block with 4 blocks. Within each block, plots were separated with two-foot wide buffer strips that were not fertilized. Treatments occurred in 1995, 1996, 1997, and 1998. Ten programs were each split for quick-release N (100% urea) and slow-release N (50% urea and 50% sulfur coated urea). Therefore this experiment had twenty treatments (protocols) as detailed in the table below:

Treatments (Protocols) Odd numbers are all quick-release N and even numbers are 50% slow-release N.

Date	1 & 2	3 & 4	5 & 6	7 & 8	9 & 10	11 & 12	13 & 14	15 & 16	17 & 18	19 & 20
April 7						1	1/2	1	1/2	1
May 21	1		1	1	1	1	1	1	1	1
July 7					1	1	3/4	1	3/4	1
Aug 21								1	3/4	1
Sept 7				1	1	1	1			
Oct 7								1	1	1
Nov 15		1	1	1	1		3/4		1	1
Total lb.N/M/yr.	1	1	2	3	4	4	4	5	5	6
Apps/yr.	1	1	2	2	4	4	5	5	6	6

Treatments 1 and 2 represented those who only want to fertilize once and think that late spring is best. Please note that the odd numbered treatments were 100% quick-release N as urea, and the even numbers were 50% N as urea and 50% N as sulfur coated urea. Treatments 3 and 4 followed the advice that says, "If you're only going to fertilize once, then do it in the fall after you quit mowing."

The two practices above were combined with treatments 5 and 6. Treatments 7 and 8 included an early fall application with 9 and 10 adding a mid-summer application. These treatments followed the "Holiday Schedule" that is often recommended.

The rest of the treatments included the early-spring application of N commonly practiced by nearly all lawn care companies. Treatments 11 and 12, 15 and 16, and 19 and 20 represent 4, 5, and 6 round programs, respectively. The rest of the treatments used a 1/2 lb. N/M in the early spring. Some of these hybrid programs may be the middle ground between industry needs and university standards.

Visual quality and color have been assessed since the beginning of the experiment. The irrigated, lawn-height plots that looked the best overall throughout all years were the ones that received the most number of nitrogen applications. There were no visual shortcomings observed with protocols that had an early spring application of nitrogen.

In 1997 and 1998, we also measured clipping yields at 1, 2, and 4 weeks following the April and May applications. The plots receiving 100% quick-release N had the highest clipping yields one-week after each of those applications. At 2 and 4 weeks following those applications the opposite was true.

References

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5. Turgeon, A. J. (1996) Turfgrass Management. 4th ed. Prentice Hall, Upper Saddle River, NJ.