THOUGHTS ON FERTILIZING KENTUCKY BLUEGRASS TURFS

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Nitrogen has a dramatic influence on turfgrasses. Although the most noticeable effects are on color and growth (and therefore mowing requirements) there are a number of other effects which are not so apparent, but are just as important. These include effects on root growth, density of turf plants, competition with other plant species, recovery from injury, thatch accumulation and susceptibility to the stresses of high temperature, low temperature, wear, disease, and moisture. Thus, it is not surprising that the management of nitrogen fertility is a real key in maintaining turf successfully. Of course, all aspects of turf maintenance must be practiced wisely.

When I first got involved in turf fertilization in the mid-1960s, I thought primarily in terms of maintaining the greenest grass for the least amount of nitrogen. Using soluble nitrogen carriers, it was clear that two-thirds of the nitrogen being applied in the spring and one-third in the fall resulted in the greenest grass throughout the year. That conclusion was based on studies on Merion Kentucky bluegrass which was resistant to leafspot and had not yet developed the serious susceptibility to Fusarium blight nor was stripe smut much of a problem at that time.

Today, however, Fusarium blight is a significant problem on several cultivars of Kentucky bluegrass. Based on reports of Dr. Al Turgeon of Illinois and observations here in Michigan, Dr. Joe Vargas has been stressing the importance of no nitrogen applications in the spring of the year on turfs where Fusarium blight has been a problem. (This has been published in earlier proceedings.) This approach changes the emphasis on spring nitrogen which has been taken in the past. Greater emphasis is placed on Fall (late August-early September) and dormant (November) fertilizations.

We know that in a fertilization program which emphasizes more nitrogen during the fall growing season the turf is more stress tolerant the next summer than when the greatest emphasis is placed on spring nitrogen fertilization.

Now it is recognized that the commercial lawn applicator who sells his services must provide green color and growth in the spring of the year. He has a problem with the reduced emphasis on spring nitrogen applications. The owner usually wants green grass in the spring. This seems to be important as a sign that spring has finally arrived in Michigan! There may be need for crabgrass and broadleaf weed control applications. And if the turf is thin after the winter some fertilization will be necessary to improve the density of the turf.

Here at Michigan State University it is our responsibility to point out the pros and cons of certain management practices (such as timing of N fertilization) and the factors which should be evaluated. Then the turf manager should weigh these factors in light of his specific turfgrass conditions. If certain principles of turf management are ignored for the sake of convenience, income, etc., then there is greater opportunity for turf failure. So the low (or no) spring nitrogen program for Fusarium infested Kentucky bluegrass lawns should be considered seriously as a means of "holding" the turf in a somewhat acceptable condition or even to reduce the probability of Fusarium blight on healthy lawns. We are initiating plot work this year to substantiate (or disprove) the benefits of this program for Michigan.

Dormant Nitrogen Fertilization

With the above thoughts in mind, I would like to make a few comments on dormant nitrogen fertilization. There is a great deal of interest in dormant nitrogen fertilization on turf. This is an alternative for the turf manager to consider but should not be used on all turfs. A dormant nitrogen application can be made once the turf has reached a relatively dormant physiological stage during the late fall. In southern Michigan the date when the turf reaches this condition varies from year to year. In most years sufficient hardening would occur by Nov. 15. Occasionally the turf will become dormant as early as Nov. 1 or it may be as late as into December. As one moves farther north in the state hardening will occur sooner, up to 2 weeks earlier in the coldest inland areas.

Nitrogen applied after mid to late September or before the turf becomes dormant will increase the possibility of injury due to low temperature stress, winter moisture stress (desiccation), and snowmold disease. Based on limited studies on Kentucky bluegrass in the mid-sixties and on Poa annua in Michigan as well as from studies in several other states (Minnesota, Rhode Island, New Jersey, among others), dormant nitrogen fertilization has not resulted in increased turf loss due to low temperature injury. During a given winter there is always the possibility that the unique type of weather conditions could occur under which a dormant nitrogen application could result in turf loss, but this has not occurred in the studies of which we are aware. One of the advantages of a dormant application of nitrogen is that the turf is green in the spring but does not result in the rapid flush of growth that occurs with an early spring (April) application.

Normally a maximum of one pound of nitrogen per 1000 square feet is suggested for dormant nitrogen application. A carrier with some slow release nitrogen is suggested in order to reduce the potential for leaching. Slow release nitrogen carriers should especially be used on sandier soils. The use of water soluble sources (ammonium nitrate, urea, ammonium sulfate) has been successful in many cases but the potential for leaching and for foliar burn are of concern, especially the latter on finer quality turfs.

Dormant application of nitrogen can be made on snow covered turf or on frozen ground which is flat and is not subject to flooding. On frozen, sloping ground or on sites subject to flooding the fertilizer has the potential to be moved by water. This can lead to uneven nitrogen response the next spring and to pollution problems. In areas adjacent to lakes and streams or on extreme sloping areas dormant nitrogen treatments should not be used.

If one decides to follow a fertilization program which uses a dormant nitrogen application this will mean less (or later) spring nitrogen applications. The annual nitrogen rate should remain the same. Additionally, it is suggested that the annual nitrogen program should begin with the dormant application and follow through into the next growing season. That is, if you decide to start with a dormant fertilization program next year, follow through your normal schedule in 1978. Then in November (or when appropriate) in 1978 apply the first dormant nitrogen application. This amount of nitrogen will apply to the 1979 fertilization total, and should be taken off the spring fertilization levels. The early fall (early to mid-September) nitrogen fertilization should still be included.

Dormant nitrogen applications are subject to the same general guidelines as any nitrogen application: that is, care should be taken to be sure the fertilizer is applied to turf only and not allowed to fall on streets, sidewalks, and driveways or into adjacent water bodies.

Remember that dormant nitrogen fertilization is not adapted to all turf conditions. The turf manager must evaluate his turf and soil conditions and the use of

the turf very carefully before designing his turf fertilization program.

The following tables may serve as a guide to timing of nitrogen applications for several levels of intensity of management. For the higher nitrogen levels it is assumed that the turf would be irrigated during moisture stress periods. When the turf is dormant due to lack of moisture in the summer time there is no appreciable nitrogen uptake and lower total annual N rates are needed. For a given turf when clippings are removed higher annual rates will be needed (20-35% higher) than when clippings are returned. The actual dates you will use may vary a week or more depending on conditions.

ANNUAL RATE OF 3 POUNDS OF NITROGEN (N) PER 1000 SQUARE FEET

	May		June		July		Aug.		Sept.		Nov.	
	1	15	1	15	1	15	1	15	1	15	1	15
Traditional	1			1				1				
Alternative Traditional	3/4			3/4			3/4		3/4			
Fusarium blight reduction				1/2	1/2			1				1

ANNUAL RATE OF 4 POUNDS OF NITROGEN (N) PER 1000 SQUARE FEET

	May		June		July		Aug.		Sept.		Nov.	
	1	15	1	15	1	15	1	15	1	15	1	15
Traditional	1			1			1		1			
Fusarium blight reduction		1/2		1/2		1/2		1/2		1		1
Alternative dormant			3/4		3/4			1.5				1

ANNUAL RATE OF 2 POUNDS OF NITROGEN (N) PER 1000 SQUARE FEET

	May		June		July		Aug.		Sept.		Nov.	
	1	15	1	15	1	15	1	15	1	15	1	15
Traditional		1						1				
Dormant			1/2					3/4			3/4	