

NITROGEN FERTILIZATION AND DISEASE RELATIONSHIPS

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When we talk about turfgrass disease-nitrogen relationship, we are talking about two types of relationships: those diseases that nitrogen makes more severe and those that nitrogen makes less severe. The major turfgrass diseases are broken down into these two categories below.

<u>Severity Increased by Nitrogen</u>	<u>Severity Decreased by Nitrogen</u>
<u>Pythium</u> blight	Rust
Brown patch	Red thread
<u>Fusarium</u> blight	Dollar spot
Stripe smut	Anthracnose
<u>Fusarium</u> patch	
<u>Typhula</u> blight	
<u>Helminthosporium</u> diseases	

Once the relationship of nitrogen to disease development is known, timing becomes the important aspect. Applying excess nitrogen in the spring is not going to solve a stem rust problem in the fall; likewise, 2 to 3 pounds of nitrogen in the late summer and fall will not affect Fusarium blight. But the same 2 to 3 pounds of nitrogen applied in the spring would increase the Fusarium blight severity.

Reducing the severity of a single disease by timing of nitrogen application is not a simple matter; many other diseases occur on the same turfgrass species throughout a growing season, and all the diseases must be taken into consideration. It would be nice if each turfgrass species only had one disease, for then a nitrogen fertility program could be developed for it specifically, but unfortunately that's not the case. Many diseases occur on the same turfgrass species throughout the growing season and sometimes at the same time. So a nitrogen fertility practice that may reduce one disease may increase another. With this in mind, the following figure was developed to show the wrong times of year to fertilize with nitrogen or the times of year when fertilizing with nitrogen will increase the severity of each disease. The figure shows that nitrogen applications in the spring encourage Fusarium blight development; nitrogen applications in the summer encourage stripe smut, Pythium blight and brown patch; and nitrogen applications in the fall encourage Typhula blight and Fusarium patch.

Figure 1. Time of year that nitrogen applications will increase severity of individual diseases.

April	May	June	July	August	September	October	November	December
- <u>Fusarium</u> blight--								
-- <u>Helminth.</u> --								
-----Stripe smut-----								
----- <u>Pythium</u> blight--								
-----Brown patch-----								
----- <u>Helminthosporium</u> --								
----- <u>Typhula</u> blight-----								
----- <u>Fusarium</u> patch-----								

Obviously, what is needed is a nitrogen application schedule to obtain maximum disease reduction with a functional program. The grass plant needs nitrogen, and you can't simply eliminate all nitrogen to obtain disease control. So you must try to apply nitrogen at the times it will benefit your disease-control program. With this objective in mind, the bentgrass and annual bluegrass turfs have to be considered separately from the Kentucky bluegrass turfs.

Figure 2 shows a nitrogen fertilizer schedule that could be used in most of Michigan. The program would start with a dormant application in the late fall after the final mowing. This gives the turf an early gradual start in the spring and eliminates the problem of how to get on a wet golf course in the spring; this also prevents a surge of lush growth that often accompanies spring nitrogen applications. This gradual growth instead of a surge will help reduce the severity of Helminthosporium on the bentgrass. It should supply enough nitrogen to reduce the severity of any early dollar spot. A light 1/2-pound application in June, July, and August will help reduce the severity of Anthracnose and should give the turf enough nitrogen to grow but not increase the severity of Pythium blight and brown patch. A pound of nitrogen in late August or early September, depending on your area, should help reduce the severity of fall dollar spot and Corticium red thread. Not fertilizing in the fall (after early September) should allow the turf to harden off and be less susceptible to attacks by Typhula blight (gray snow mold) and Fusarium patch (pink snow mold) and to Helminthosporium, which often develops in cool, wet falls. The only possible problem in not fertilizing with nitrogen after early September is that Corticium red thread can be a problem. However, it is better to have a little Corticium red thread than to encourage a more serious problem like the snow molds by overfertilizing. Since Fusarium blight and stripe smut are not usually problems on annual bluegrass or bentgrass, they were not considered in this schedule.

The schedule for Kentucky bluegrass turfs on fairways, park areas, industrial sites, or home lawns assumes use of a cultivar of Kentucky bluegrass that is resistant to Helminthosporium. Thus, the two main concerns are going to be Fusarium blight and stripe smut. By limiting nitrogen fertility in the spring, the severity of Fusarium blight should be reduced; by limiting nitrogen fertility in the summer, the amount of turf lost to stripe smut should also be reduced. Not fertilizing late in the fall will reduce the severity of Typhula blight and Fusarium patch. As with annual bluegrass and bentgrass, the dormant application of nitrogen should give a slow, steady greenup in spring and avoid the surge of lush growth that can lead to Fusarium blight problems later on or to a severe problem later in the spring if you have a Helminthosporium-susceptible Kentucky bluegrass turf.

Figure 2. Schedule of Nitrogen Fertilizer Application Rate (per 1,000 square feet) to Help Retard Disease Development.

	June 15	July 15	August 15	September 1	...	December (Dormant)
Annual blue- grass, creeping bentgrass	1/2 lb.	1/2 lb.	1/2 lb.	1 lb.		1 lb.
Kentucky bluegrass	1/2 lb.	1/2 lb.	1/2 lb.	1 lb.		1 lb.