Springtime Fertilization: Getting An Edge

by: Tony Koski, Ph.D.

In recent years, the concept of late-season fertilization has become a mainstay of most cool-season turfgrass fertilization programs. It has even become a common practice on the warm-season species in the transition zone and South. This is an agronomically sound, research-proven fertilization technique. However, we all know that good quality turf can not be sustained without some kind of early-season fertilization.

It seems some turf managers are now reluctant to fertilize in the spring because they have been preached to about the terrible havoc that springtime nitrogen applications wreak on turfgrass roots, stress tolerance, and disease resistance. Certainly, excessive springtime N use results in a disease-prone, less stress-tolerant turf that requires frequent mowing. Also, concerns about the potential for water contamination via runoff and leaching require us to more closely consider N sources, application rates, and in which situations we should (or should not) be using that fertilizer. But judicious, well-timed spring fertilization can enhance turf quality, aid in recovery from winter problems, reduce the incidence or severity of some diseases, and help to prevent weed problems via the production of a vigorous, dense turf.

Stimulate color, not growth

This is a good rule-of-thumb for the average turf that is not subjected to intensive wear. However, on a heavy use soccer field, N must be applied more frequently to stimulate the growth that promotes better wear tolerance and speeds recovery from intense foot traffic.

Common sense must be used in determining frequency and amount of fertilizer to apply. The proper amount will vary with species, desired quality level, and designated application for which the turf is used. Annual N requirements for cool- and warm-season lawns are shown in Table 1.

Most turf managers do not generally make monthly N applications. Instead, they rely on residual activity of fertilizer sources to carry them from one fertilizer application to the next. The residual activities of a number of commonly used fertilizers appear in Table 2, along with a number of other characteristics important in fertilizer source selection.

Note that those fertilizers which promote rapid greening possess short residual activity, and that the potential for fertilizer burn is higher with these quickly-available sources. On the other hand, the quickly-available N sources are less affected by temperature (more of an advantage later in the season), and are less expensive on a per-pound-of-N basis.

The slowly-available N fertilizers provide more even feeding and longer residual activity than do fertilizers like urea or ammonium sulfate. However, some of the slowly-available fertilizers may provide a slow (yes, even disappointing) initial greening effect, especially under cool, dry spring conditions. This tendency for slow initial response can be offset by applying high rates (1.5 to 2 lbs. of actual N per 1000 sq.ft.) of the slowly-available source, as is often done with straight ureaform and the natural organics.

This is one of those rare instances when more than 1 lb. of N per 1000 sq.ft. can be safely applied. Unless you wish to adhere to a strictly natural organic program, it is wisest and easiest (and usually least expensive) to apply a blend of quickly- and slowly-available N sources in the early season.

Use N to fight diseases

We have long known that over- or underfertilization, especially in the spring, can result in turfgrass disease problems (Table 3). For example, red thread can be a problem during moist, cool springs on fine fescues and perennial ryes if they are underfertilized and not growing at a satisfactory rate. On the other hand, diseases like striped smut can become severe if susceptible Kentucky bluegrass cultivars are fertilized excessively during the spring.

Research at Cornell University and other universities is now showing that nitrogen sources may play an important role in the suppression of certain diseases. Although much work must still be done, it appears that natural

organic fertilizers and composts, when used as turf fertilizers, can sometimes reduce the incidence or severity of diseases like brown patch, necrotic ring spot, red thread, dollar spot, and pythium root rot. Still, the use of these materials should not be considered a cure-all. The relative success of their use can vary with fertilizer and location.

It appears that base material, production/composting process, disease pressure, and the environment into which these fertilizers and composts are introduced all influence the degree of disease suppression. It is also well-known that the acidifying effect of ammonium-based fertilizers can help reduce the severity of take-all patch on bentgrass and spring dead spot on bermudagrass over time. It should be emphasized that the simple use of a fertilizer will not in-itself counteract the negative effects of poor soil preparation and improper cultural practices which may predispose turf to disease problems.

Table 1: Seasonal N requirements (lbs. N/1000 sq.ft.) — Desired Quality Management

	Lower	Higher
Cool-Season Species		
Bentgrass	1 to 3*	3 to 8
Fine Fescues	0.5 to 2	2 to 4
Common Kentucky bluegrass	1 to 2	2 to 4
Improved Kentucky bluegrass	1.5 to 3	3 to 6
Perennial ryegrass	2 to 4	4 to 6
Tall fescue	1 to 2	3 to 5
Wheatgrass	0 to 2	2 to 4
Warm-Season Species		
Bahiagrass	0 to 1	2 to 4
Bermudagrass	1 to 4	3 to 8
Buffalograss/Blue grama	0 to 1	2 to 3
Carpetgrass	1.5 to 3	4 to 6
Centipedegrass	0 to 1	2 to 4
St. Augustinegrass	2 to 4	5 to 7
Zoysiagrass	2 to 4	5 to 7

*Lower rates are for shorter growing seasons and/or on heavy soils. Higher rates are used when growing season is longer, soils are sandy, precipitation rates are high, and clippings are routinely removed.

Fertilize with grass clippings

Grass clippings continue to be shown as legitimate and important nutrient sources when returned to turf areas. Research here at Colorado State University and elsewhere has shown that the quality, color, and density of cool-season turf species are noticeably greater when clippings are regularly returned to the lawn. In addition, the severity of rust and red thread may be dramatically reduced on ryegrass and bluegrass lawns where clippings are returned.

Local and state laws increasingly encourage recycling of clippings. It is generally conceded that the return of grass clippings does not contribute significantly to thatch accumulation, but that the organic matter returned is rapidly converted to a form which is beneficial to turfgrass systems.

Be a responsible fertilizer user

While most available research indicates that careful fertilizer use presents negligible risk to most ground and surface water sources, any fertilizer application has the potential to cause contamination via the processes of surface runoff or leaching. Use of water-soluble fertilizers on sandy soils where precipitation (or irrigation rates) are

Table 2: Characteristics of N fertilizers

Fertilizer Name	Analysis	Source of Nitrogen	Moisure Dependence	Low Temp. Response	Residual N Activity	Salt Index (per N)	Leaching Potential
Quickly-Available N Ferilizers							
Ammonium nitrate	33-00-0	ammonium nitrate	minimal	rapid	04-06 weeks	3.2	high
Ammonium sulfate	21-00-0	ammonium sulfate	minimal	rapid	04-06 weeks	3.3	high
Ammonium phospate	18-46-0	diammonium phosphate	minimal	rapid	04-06 weeks	1.6	high
Urea	46-00-0	urea	minimal	rapid	04-06 weeks	1.6	moderate
Slowly-Available Fertilizers							
Slow-Release Sources							
Sulfur-coated urea	22-38%	urea	moderate	mod.	10-15 weeks	NA	low
ONCE	24-35%	urea, nitrate, ammon.N	moderate	mod.	15-36 weeks	NA	low
Scots Poly-S	16-40%	urea, methylene urea	high	mod.	12-24 weeks	NA	low
Slowly-Soluble Sources							
IBDU	31-0-0	isobutylidine diurea	high	mod.	10-16 weeks	0.2	mod.low
Ureaform Reaciton Fertilizers							
Nitroform	38-0-0	ureaformaldehyde	high	slow	10-30 weeks+	0.3	very low
FLUF	18-0-0	urea, ureaformaldehyde	moderate	mod.	06-10 weeks	NA	low
Nutralene	40-0-0	methylene ureas	moderate	mod.	07-16 weeks	NA	low
Methylene urea	39-0-0	methylene ureas	moderate	mod.	07-09 weeks	0.7	low
Coron	28-0-0	urea, methylene ureas	minimal	mod.	07-09 weeks	NA	moderate
N-Sure	28-0-0	triazone, urea sol.	minimal	mod.	06-09 weeks	NA	moderate
Natural Organic Fertilizers							
Ringers	5-9% N	blood, bone, seed, meals	high	mod.	10-12 weeks	0.7	low
Sustane	5-2-4	composted turkey waste	high	mod.	10-12 weeks	0.7	low
Milorganite	5-6% N	activated sludge	high	slow	10-12 weeks	0.7	low

*Inclusion of products does not imply endorsement, nor does exclusion imply criticism.

Table 3: Influence of N fertilization on disease incidence.

	Severity Increases With Underfertilization	Severity Increases With Overfertilization	
Cool-Season Diseases	Anthracnose	Brown patch	
	Dollar spot	Leaf spot	
	Red thread	Melting out	
	Rust	Pythium blight	
		Striped smut	
Warm-Season Diseases	Anthracnose	Brown patch	Pythium blight
	Cercospora leaf spot	Gray leaf spot	Spring dead spot
	Dollar spot	Leaf spot	
	Rust	Melting out	

high greatly increases the potential for groundwater contamination. The leaching potential for some fertilizers is shown in the last column of Table 2.

Runoff from turf sites probably presents little hazard to water quality. However, sloppy application of fertilizer onto impervious surfaces like driveways and streets will obviously present a problem when that fertilizer (which often is also a pesticide carrier) runs into storm drains with precipitation. The responsible applicator will guard against this altogether, and will clean up any mistakes by sweeping up misapplied material.

Other nutrients

Remember to test for and maintain adequate potassium levels for your soil type. Research is showing that potassium can be an important enhancer of wear, heat, and drought stress on both cool- and warm-season species. Avoid the temptation to use excessive amounts of potassium in the attempt to produce a "super" turf.

Potassium fertilizers can increase the salinity levels of soils, just as any of the other fertilizers. This can be especially true on heavy, poorly drained soils. A good rule-of-thumb is to apply potassium in no more than a 1:1 ratio with nitrogen. In other words, 4 lbs. of N per 1000 sq.ft. of turf would call for no more than 4 lbs. per 1000 sq.ft. of potassium per season.

You might also try reducing the amount of N you use by making iron a more important part of your standard fertility program. Some turf managers have found that they can substantially reduce annual N rates without sacrificing turf quality by using iron. ❑

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