

Summer turf fertilization relies on balanced nutrients

Match nutrient applications to the plant's growth: more fertilizer in the fall and spring. But it's important to maintain some growth during the summer.

by David Wehner, Ph.D.
University of Illinois

■ Summer fertilization can help provide a strong, healthy turf when demands on the grass are the greatest. The key is understanding how the plant grows when temperature and moisture may not be optimum, and adjusting fertilization accordingly.

Too much fertilizer in the summer can decrease turf stress tolerance and increase occurrences of some diseases. Too little fertilizer will result in turf with poor recuperative potential, and, in some cases, turf unable to compete with summer germinating weeds.

Turf managers must strike a balance between the two extremes.

Understand plant growth—Cool-season turfgrasses generally show best shoot growth in air temperatures of 60 to 75° F. and best root growth at soil temperatures of 50 to 65° F.

As temperatures increase from these ranges, growth slows and eventually, at a high enough temperature, stops.

This is probably because, at the higher temperatures, the plant uses more of its food supply (referred to as carbohydrate reserves) than it produces. There isn't enough available for sustained root growth. Also, nitrogen applications cause the shoot system to grow preferentially over the root system.

Nitrogen applications, then, can make a bad situation worse by further reducing

energy available for root growth.

Most turf managers also realize that, as water becomes limited, growth declines and then stops. It's important to limit nitrogen applications during times of drought stress. Conversely, a moderate nitrogen application can help a plant recover from drought-induced dormancy.

Warm-season grasses, which exhibit optimum shoot growth at air temperatures of 80 to 95° F. and best root growth at soil temperatures of 70 to 85° F., are easier to deal with, since they are growing at their

several small applications of a quick-release N source or by applying a slow-release N source.

In situations where the turf manager is located at the site, apply 0.25 to 0.50 lbs. of actual N per 1000 sq.ft. from a quick-release fertilizer during the summer when it is necessary to increase the turf's growth.

The alternative strategy is to apply a slow-release fertilizer (1 to 2 lbs. of actual N per 1000 sq.ft.) early in the summer. This may be more feasible where it is diffi-

INFLUENCE OF NITROGEN FERTILIZATION ON DISEASE RESISTANCE

Severity increases with under-fertilization

Severity increases with over-fertilization

Cool-season turfgrass diseases

anthracnose
dollar spot
red thread
rust

brown patch
leaf spot
melting out
pythium blight

Warm-season turfgrass diseases

anthracnose
Cercospora leaf spot
dollar spot
rust

brown patch
gray leaf spot
leaf spot / pythium blight
melting out
spring dead spot

Source: Dr. Koski

peak over the summer months. They have more efficient photosynthetic mechanisms, and are more drought tolerant than cool-season grasses. However, they still need water. Too much fertilizer should be avoided during very dry periods.

Designing N programs—In designing an N fertilization program, match nutrient applications to the plant's growth. That is why you should apply more fertilizer in the fall and spring when the plants are actively growing than in the summer. It is important, however, to maintain some growth during the summer.

The turfgrass manager can approach summer N fertilization by either making

cult to get back to the site for applications over the summer.

A third strategy would be to moderately apply a slow-release at the beginning of summer and then supplement with small amounts of a quick-release source.

These same strategies, with modifications in the amount of N applied, can be used with warm-season grasses.

A substitute?—Another approach to summer fertilization is to use foliar applications of iron to improve color without stimulating excessive growth.

In our research, we were able to reduce the amount of N and get equivalent color by including iron in a foliar spray with N.

CHARACTERISTICS OF NITROGEN FERTILIZERS

Fertilizer name	Analysis (N-P-K)	Source of N	Moisture dependence	Low temp. response	Residual N activity	Salt Index (per N unit)	Leaching potential
QUICKLY-AVAILABLE N FERTILIZERS							
ammonium nitrate	33-0-0	ammonium nitrate	minimum	rapid	4-6 wks.	3.2	high
ammonium sulfate	21-0-0	ammonium sulfate	minimum	rapid	4-6 wks.	3.3	high
ammonium phosphate	18-46-0	diammonium phosphate	minimum	rapid	4-6 wks.	1.6	high
urea	46-0-0	urea	minimum	rapid	4-6 wks.	1.6	moderate
SLOWLY-AVAILABLE N FERTILIZERS							
Slow-release sources							
Sulfur-coated urea	22-38% N	urea	moderate	mod. rapid	10-15 wks.	NA	low
Once	24-35% N	urea, nitrate, ammon. N	moderate	mod. rapid	15-36 wks.	NA	low
Slow-soluble sources							
IBDU	31-0-0	isobutylidene diurea	high	mod. rapid	10-16 wks.	0.2	mod.-low
Ureaform reaction fertilizers							
Nitroform	38-0-0	ureaformaldehyde	high	slow	10-30+ wks.	0.3	very low
FLUF	18-0-0	urea/ureaformaldehyde	moderate	medium	6-10 wks.	NA	low
Nutralene	40-0-0	methylene ureas	moderate	medium	10-16 wks.	NA	low
Methylene urea	39-0-0	methylene ureas	moderate	medium	7-9 wks.	0.7	low
Coron	28-0-0	urea/methylene ureas	minimum	mod. rapid	7-9 wks.	NA	moderate
N-Sure	28-0-0	triazone/urea sol.	minimum	mod. rapid	6-9 wks.	NA	moderate
Natural organic fertilizers							
Ringer	6-1-3	blood, bone, seed meals	high	medium	10-12 wks.	0.7	low
Sustane	5-2-4	composted turkey waste	high	medium	10-12 wks.	0.7	low
Milorganite	6-2-0	activated sludge	high	slow	10-12 wks.	0.7	low

Source: Dr. Koski

Applications of 1 to 2 lbs. of actual iron per acre to Kentucky bluegrass resulted in a darker-green color that lasted for several weeks depending on the grass's growth rate (the faster the growth, the shorter the response period). Because of this, it may not be feasible to use iron where the turf manager is not able to frequently monitor results. Also, iron is more expensive to use than nitrogen.

Several considerations relative to using iron are listed in Table 3. Note that iron is not a replacement for a sound N fertilization program but rather a supplement.

Experiment with application rates to determine what provides the best results for the species of grass and conditions that you are working with.

Healthy plants—Insect or disease problems can further reduce the plant's ability to withstand stress periods. This is

Researchers have observed stress problems where soil phosphorus has declined to low levels, such as on creeping bentgrass putting greens where phosphorus was withheld to combat annual bluegrass encroachment.

particularly important when diseases affect the roots, as is the case with summer patch and necrotic ring spot on Kentucky bluegrass, or where nematodes may be present. Compact or water-logged soil will reduce rooting, thus weakening the plant.

Also, the plant must have enough phosphorus and potassium. Researchers have observed stress problems where soil phosphorus has declined to very low levels, such as on creeping bentgrass putting greens where phosphorus was withheld to help combat annual bluegrass encroachment.

Soil tests should be taken every two to three years to monitor pH and nutrient levels.

Strategy for success—By starting with a healthy plant and carefully matching fertilizer applications to existing growing conditions, the turf manager can ensure that the turf stand will survive the summer stress period with minimal problems.

—Dr. Wehner is an associate professor of horticulture at the University of Illinois at Urbana-Champaign.

Addendums to fertilization, insect control

■ The insecticide Crusade was inadvertently omitted from the cool-season insect control article in the April issue of *LANDSCAPE MANAGEMENT*.

Crusade is registered for control of insects in professional turf areas such as

golf courses and commercial sod growing areas. Applied in the spring, summer or fall, at 4 lb. ai/acre, it is effective against white grub larvae such as Japanese beetle, black turfgrass ateniens, chafers, *Phyllophaga* spp., green June beetle and Asiatic garden beetle. At 3 to 4 lb. ai/acre, Crusade is also labelled for controlling chinchbugs, cutworms and sod webworms.

All applicable directions, restrictions, and precautions on the EPA-registered label are to be followed.

—Harry D. Niemczyk, Ph.D.
Professor Emeritus
OARDC/Ohio State Univ.

■ In the February issue of *LANDSCAPE MANAGEMENT* on page 24, you show residual N activity of Nutralene at only 7 to 9 weeks. This statement is in gross error: actual residual is 10 to 16 weeks.

—James H. Taurasi
Jayson Associates (agent for Nor-Am)
Winchester, Mass.