# TECH CENTER

# Spring fertilization

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■ Early spring is a time to review your turfgrass fertilization program. Did your turfgrass flourish last season, or was growth poor with noticeable thinning? Was growth non-responsive to fertilization?

Poor turfgrass growth is often related to too much shade, cutting too low, or soil chemical properties. Knowledgeably selecting a turfgrass species for shade tolerance and proper mowing height can eliminate some common problems. Soil nutritional deficiencies, however—the topic of this month's cover story—can only be assessed through soil tests.

Turfgrass fertilization should be based on a recent soil analysis, but if an analysis does not exist, the nutritional requirements of the turfgrass can generally be met by applying 1, ¼ and ½ lb. of N, P and K, respectively, per 1000 sq. ft. as an initial application.

These nutrients can be supplied by applying 6 lbs. of a 16-4-8 analysis fertilizer. It is recommended that this mixture be composed of approximately 70% slow-release and 30% soluble N sources. If the soil is prone to leaching losses, a K source with reduced K loss potential should be used.

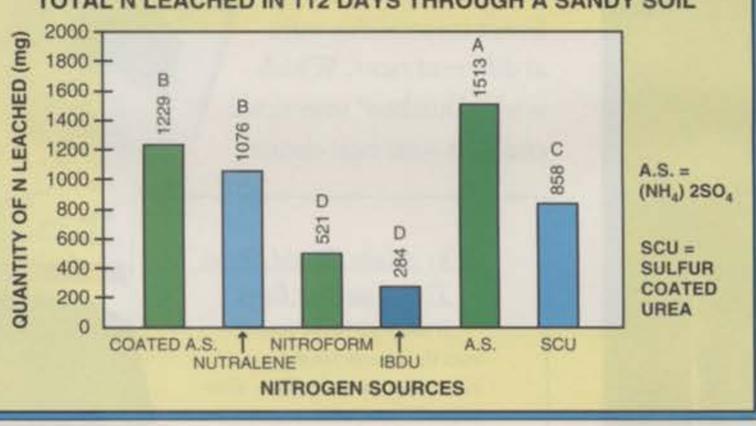
**Nitrogen**—Turfgrasses need more nitrogen (N) than either of the other primary nutrients, potassium or phosphorus. Most soil testing laboratories do not test for N because this nutrient is highly mobile and is typically deficient in the turfgrass rooting zone.

Some turfgrass species, such as bermudagrass grown on sandy soils, require relatively high rates of N application on an annual basis; other species such as bluegrass grown on clayey soils, require much less annual N. However, the early spring fertilization of turfgrasses on all soil types is generally similar, with initial application of approximately 1 lb. N/1000 sq. ft. being typical.

Using slow-release N sources permits increased rates of N application without the threat of turfgrass "burn," and can reduce application frequency from 30 days to as much as 90 days. A combination of slow-release and soluble N sources (70% slow-release, 30% soluble N ) promotes optimum warm-season turfgrass growth.

Slow-release N sources are also less susceptible to N losses through leaching (Fig. 1). Soluble N sources tend to leach more in sandy soils than slow-release N sources. They should be used with care when large applications of N are made on an annual basis, particularly if groundwater pollution potential exists.

FIG. 1.
TOTAL N LEACHED IN 112 DAYS THROUGH A SANDY SOIL




**Phosphorus**—Few soils used for turfgrass cultivation over an extended time exhibit phosphorus (P) deficiencies. A Mehlich 1-extractable P level of less than 15 ppm is considered low, and indicates a probable response to applied P.

Shallow rooting, low turfgrass root mass in early spring, and cool soil conditions often influence P fertilization response more than actual soil-test P level.

In long-term research, ryegrass positively responded to P fertilization, even though bermudagrass grown on the same phosphatic soil was negatively influenced by P fertilization. This suggests that cool-season turfgrasses can respond to P fertilization, even on soils testing high in P.

If overseeding is used in the turf management program, best response to P may be obtained during the cool-season turfgrass growth period. Early spring turfgrass growth may respond to P fertilization if the root mass of the warm-season turfgrass is restricted and the soil is cool.

Adequate fertilization can be achieved by applying ¼ to ½ lb. P/1000 sq. ft., using any of the commercially-available P fertilizer sources. No differences in growth response to P fertilizer sources have been observed.

**Potassium**—Considerable confusion exists regarding potassium (K) fertilization. Turfgrasses accumulate approximately one-half as much K as N. In some turfgrass cultures, this represents a considerable quantity of K over an entire season, especially if the clippings are removed.

In sandy soils, K leaches readily and is rarely found at high levels. Turfgrasses

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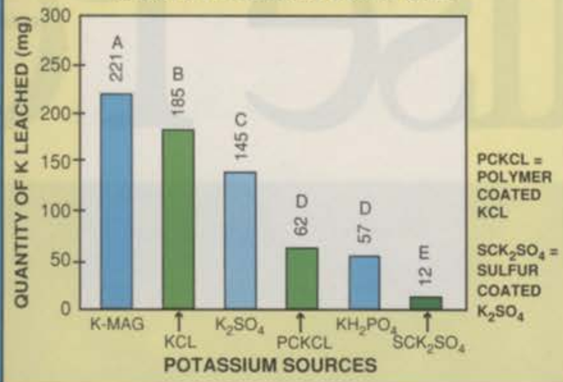
FIG. 2. TOTAL K LEACHED IN 49 DAYS THROUGH A SANDY SOIL




Soil deficiencies occur most frequently in sandy soils, acidic soils (pH less than 5.0) or sodium-saturated soils (rare). True Ca deficiencies are very uncommon in turfgrasses.

**Magnesium**—Turfgrasses growing on soils testing below 20 ppm Mehlich I extractable magnesium (Mg) usually respond to Mg applications. A Mg deficiency prior to spring growth can be corrected by applying dolomitic lime (if required for soil pH adjustment), magnesium sulfate, or potassium-magnesium sulfate.

Application of 4 lbs. Mg/1000 sq. ft. should correct the deficiency for an entire growing season. Annual monitoring is recommended if a deficiency has been noted.

If the soil Mg status is marginal, high rates of K fertilization can induce Mg deficiencies. There is no "magic" Ca:Mg ratio required in soils for optimum turfgrass growth; rather, the absolute soil test Mg level is of paramount importance.

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growing on soils testing less than 35 ppm K by the Mehlich I test generally respond to K fertilizer application.

In the recent past, some turfgrass managers have decreased their N:K fertilization ratios from 2:1 to 1:1 and even 1:2 on the premise that K increases top growth, root growth and overall turfgrass quality. Recent research findings, however, do not support the concept of a "magic" N:K fertilization ratio, though they have supported the need for K fertilization of K-deficient soils.

Whether due to turfgrass species or soil and environmental conditions, turfgrasses requiring high rates of N generally require higher rates of K application. There is no real "magic" ratio, but the "historical" 2:1 N-to-K ratio appears to satisfy the needs of bermudagrasses and ryegrasses in the Southeast.

If the soil test indicates that K is needed, application of ½ lb. K/1000 sq. ft. during early spring fertilization, followed by re-application of the same rate every 90 days during the growing season, should adequately supply the K requirements of turfgrass.

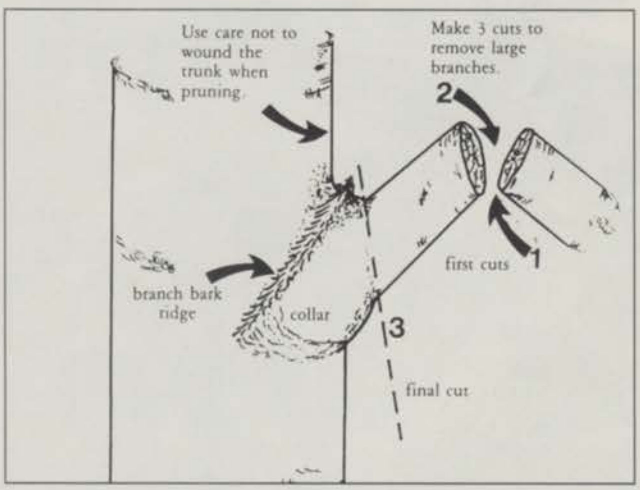
Potassium sources differ in their leaching potential in sandy soils and iron-coated clay soils (Fig. 2). Potassium-magnesium sulfate contributes larger amounts of K to the leachate than the other K fertilizer sources. This is attributed to the stronger attraction of Mg than K by soil exchange sites. In general, potassium sulfate leaches less than K potassium chloride whereas, mono-potassium phosphate, a relatively new turfgrass K source, leaches almost no K. Coated K sources also leach K relatively slowly.

**Calcium**—Turfgrasses can obtain calcium (Ca) from a number of different sources, including exchangeable soil Ca, liming materials and fertilizer sources.

# Pruning tips for aesthetics, tree health, from Dr. Wade

■ "The key to pruning is knowing the difference between heading and thinning," says Dr. Gary Wade of the University of Georgia. "Thick, dense canopies increase disease and insects, and the plant uses more water."

Wade, in a presentation at the Georgia Turfgrass Conference, told the audience to try and maintain nature's natural plant shape when pruning. You should try to cut right outside the branch collar, and not leave stubs. "When pruning is done properly, there is no need to paint or dress wounds," he noted.




Pruning should be done with a purpose, he said, and should be done "with low maintenance in mind."

Why prune at all? For various good reasons, including:

- To restore the shape of a tree that is out of proportion.
- To eliminate safety hazards from dead, split, broken and low branches.
- To stop possible interference with electrical lines.
- To reduce potential breeding sites for insects.
- When transplanting, to establish a strong scaffold structure.

In addition, here are Wade's reasons to prune:

- To maintain the correct size of the plants. This is a common problem with residential landscapes.
- To improve flowering or fruiting performance.
- To repair what Mother Nature has inflicted upon us.
- To rejuvenate plants in the dormant season.
- To increase ornate value in high-priced landscapes.

Some Wade tips:

- Prune six weeks before the start of the new growing season.
- Do not severely prune boxwood or conifers (pine, spruce, junipers).
- Prune in stages over two to three years, if possible.
- Be careful pruning crepe myrtle, the most abused plant in our landscapes.

# Turfgrass management in shady areas of lawns

by Joseph M. DiPaola, Ph.D.
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■ Like all plants, turfgrasses need light to grow, at least four hours of full sunlight per day.

Trees with dense crowns cast a deeper shade than trees with more open canopies. Deciduous trees selectively filter the sunlight, casting a "green shade" that is low in the parts of the light spectrum that are most important for lawn growth (blue and red light). Coniferous trees have a shadow that is largely unfiltered and block less light because of their needle-like leaf shape, more open canopies and narrow shapes.

Sunflecks are pockets of sunlight that penetrate the tree canopy and move across a turf. They greatly increase the ease of managing turf under shaded conditions. Sunflecking can be increased by opening the tree canopy through selective pruning. Dead and diseased limbs are good candidates for initial removal.

Shaded areas:

- are more humid,
- have restricted air flow,
- have fewer dews that "burn off" later in the day, and
- are cooler during the summer and winter months.

In response to this altered environment, turf in shade has:

- a more upright growth,
- lower food reserves,
- a more shallow root system,
- a decreased stand density, and
- a more succulent shoot tissue.

Overall, shaded turf is less able to compete with weeds and pests. On the other hand, some weeds, like crabgrass and goosegrass, also grow poorly in shaded conditions and are less of a problem.

Turf, particularly warm-season grass, often suffers more winter injury in shaded settings. Under shade, a lawn's vigor and wear tolerance is reduced. Increased humidity, restricted wind movement and the longer duration of dew all enhance the potential for lawn disease in the shade.

**Shade tolerance**—Diseases—like powdery mildew, brown patch, leaf spot, melting out and Fusarium blight—are a dominant factor limiting turf survival in the shade. Within a species, shade tolerance can range from poor to excellent, depending on the cultivar. Excellent shade tolerance does not ensure survival or acceptible performance.

Deeply shaded sites will not support a quality turf. In these settings, managers should consider using groundcovers and landscape mulches. If turf is necessary, pruning and/or removing trees may be needed to allow greater light penetration.

Many years ago, turf scientists demonstrated that shade disease problems were reduced when mixtures of turfgrasses (e.g. Kentucky bluegrass and fine fescues, tall fescue and Kentucky bluegrass) were used. Tall fescue has a much finer leaf blade under shade than in open sunny areas and has performed well in mixtures with Kentucky bluegrasses (80:20 or 90:10 by weight) or with Kentucky bluegrass and fine fescues (80:10:10 by weight).

Among warm-season turfgrasses, St. Augustinegrass is clearly the most shade tolerant, with the exception of Floratam.

*—The author is a member of the turf faculty at North Carolina State University. This article originally appeared in the winter/'92-93 issue of the North Carolina Turfgrass Council newsletter.*

### Shade tolerance of selected turfgrasses

**Kentucky bluegrasses:** *Good*—A-34, Georgetown, Glade; *Moderate*—Adelphi, America, Bristol, Enmundi, Fylking, Midnight, Nugget, Ram I; *Poor*—Birka, Columbia, Eclipse, Mystic, Sydsport, Touchdown.

**Fine fescues:** *Excellent*—Aurora, Biljart, Reliant, Scaldis, Sparta, SR3000, Waldina; *Good*—Center, Enjoy, Highlight, Jamestown, Shadow, Victory, Waldorf; *Moderate to poor*—Commodore, Flyer, Fortress, Pennlawn, Pernille, Robot, Ruby

**Perennial ryegrass:** *Good*—Allstar, Birdie II, Cowboy, Elka; *Moderate*—Gator, Palmer, Pennant, Repell; *Poor*—Yorktown II

**Roughstalk bluegrass:** *Moderate*—Laser; *Poor*—Sabre

**Tall fescue:** *Excellent*—Trident; *Good*—Adventure, Apache, Arid; *Moderate*—Finelawn I, Houndog, Jaguar, Bonanza, Falcon; *Poor*—Pacer, Rebel, Rebel II, Mustang, Olympic

**St. Augustinegrass:** *Excellent*—common, Roselawn, Bitterblue, Floralawn, Floratine, Raleigh

**Zoysiagrass:** *Moderate*—Belair; *Poor*—Cashmere, Emerald, Meyer

**Bermudagrass:** *Poor*—common, Vamont, Tifway

**Bahiagrass:** *Moderate*—Argentine, Pensacola

**Centipedegrass:** *Good*—common, Oaklawn, Tennessee Hardy, Centennial

## Shade management tips

**1)** Select shade-tolerant cultivars. A groundcover may be necessary for deeply-shaded locations.

**2)** Use mixtures or blends of cool-season turfgrasses when renovating or establishing the site.

**3)** Improve the air flow across the landscape by removing trees and ornamentals which obstruct wind movement.

**4)** Prune lower tree branches to improve light penetration.

**5)** Selectively prune upper tree limbs to improve light penetration.

**6)** Increase your lawn mower's cutting height by ½ to 1 inch.

**7)** Prune tree and ornamental roots using spades or edge the lawn with a trencher periodically. Do not remove more than half of the viable roots beneath the drip line. Some trees are sensitive to root pruning; check before beginning this work.

**8)** Reduce traffic on the lawn.

**9)** Promptly remove fallen tree leaves and clumps of mowing clippings.

**10)** Water deeply and infrequently. Avoid late afternoon and evening irrigation, which promotes disease.

**11)** Minimize nitrogen fertilization and maximize potassium fertilization.

**12)** Apply fungicides, when necessary, to check disease outbreaks.

**13)** Leave a two- to four-foot turf-free zone around small trees to improve their growth.

**14)** Provide broadleaf weed control and watch for encroachment by difficult-to-control weeds.

**15)** Keep soil pH adjusted.

**16)** Fertilize trees separately and at rootball depth.

*—J.M.D.*