Fertilization & nutrition: a varied arsenal

Most turfgrasses need additional fertilization to achieve maximum growth potential.

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One of the author's key concerns is field errors that can result in misapplication, such as this fertilizer spill.

Spring is the time to initiate new growth for turfgrass, and the time to get some needed nutrition back to lazy turf.

After winter dormancy, both warm- and cool-season turf begins growing. For northern turf, spring and fall represent the peak seasons for shoot and root development, when temperatures range between 50° and 75°F.

Root initiation occurs first in early spring, when soils begin to thaw. Active shoot development follows, as temperatures climb between 60° and 75°F.

For warm-season turf, late spring through summer represents the optimum time for development, as temperatures reach between 75° and 90°F. Nutritional programs often coincide with these peaks.

Nature alone helps stimulate spring green-up, but most turfgrasses need additional fertilization to achieve maximum growth potential. Spring fertilization is especially critical on recreational turf areas, such as soccer fields which receive intense traffic from increasing play each season. Without additional fertilization they often become severely worn and weed-infested.

To get turf started

For cool-season turf, "starter type" formulations are popular choices. These products supply nitrogen, phosphorous and potassium in ratios which are desirable for spring shoot and root growth. Unlike high nitrogen formulations which promote mostly top growth, starter types contain higher proportions of phosphorous (i.e., a 1:2:1 ratio).

The added phosphorous helps initiate root development and early turf establishment of new seedlings.

Go easy on nitrogen

Nitrogen is the most important element in a turfgrass fertilization program. However, there are limits to its use.

When turfgrasses are overfertilized with spring N, excessive top growth —which requires extra mowing — and shallow rooting result.

There is also a greater threat of nitrate leaching, a higher incidence of disease and reduced environmental stress tolerance, including summer drought.

In most situations, avoid applications of more than one pound of N/1000 sq. ft. when using "fast release" or highly water-soluble nitrogen.

When using only fast-release nitrogen sources, light applications, ⅛ to ½ pounds of N/1000 sq. ft., are more desirable, and should be applied more frequently.

This spoon-feeding approach has become increasingly popular on golf course putting greens.

Fast-release/slow-release

A widely used strategy in the spring is to fertilize with products that have a combination of fast- and slow-release nitrogen sources. Fast-release nitrogen stimulates earlier green-up and growth which is often sought in recreational and landscaped settings. Slow-release nitrogen sources,

whether synthetic or natural organic, last eight to 15 weeks, are less likely to burn the turf and will release nitrogen more uniformly than inorganic N sources.

Turf managers often must strike a balance between which combinations to use in each situation.

Sometimes this requires supplementing small amounts of fast-release nitrogen into the spring application.

Late/dormant application an alternative

A late fall or dormant fertilization can provide a successful alternative to an early spring application. This strategy is primarily used by athletic field managers to:

- accelerate spring green-up and growth;
- help distribute the workload more evenly over the year;
- avoid traffic damage to soft, wet turf.

One major concern with late fall fertilization is the increased potential of nitrate leaching during the winter. Using lighter rates of slow-release nitrogen will help reduce this threat. However, this strategy will generally be slower to stimulate growth in cold spring soils.

Soil pH affects nutrient availability

The soil pH has a considerable influence on the availability of most nutrients. Phosphorous is an example of a nutrient that is most available when the soil pH is between 6.0 and 7.0. However, in highly acidic soils with pH of less than 5.0, phosphorous gets "tied up" with iron and aluminum to form complexes which are unavailable to turfgrasses.

Maintaining near neutral soil pH values also favors the activity of beneficial soil microorganisms and the release of nitrate from nitrogen fertilizers.

In highly acidic soils, toxic concentrations of aluminum, iron and manganese may develop and cause impaired rooting (roots will appear short, brown and spindly) a decrease in overall turf vigor, shoot growth, drought tolerance and recuperative potential.

Choose the right fertilizer products for the job

Quickly available or water-soluble sources provide a rapid growth response under good growing conditions and include:

1. Urea, which is a water-soluble organic compound that contains 45% N.

2. Inorganic salts such as ammonium nitrate, ammonium sulfate, potassium nitrate, calcium nitrate and ammonium phosphates.

3. Methylol ureas, formed by reacting urea with formaldehyde have produced growth responses similar to other water-soluble sources but vary based on formulation. Examples of such products include:

- **Form-U-Sol,** which has 28% N, of which 67% is urea and 33% is methylol urea;
- **CoRon** is 28% N, has 50% urea and 50%methylol urea. It is an aqueous solution and its release is dependent upon microbial activity, but due to the relatively high urea content, it has shown to be effective in cool-seasons on turfgrasses.
- **Nitro-26,** which is 26% N with 30% urea and 70% methylol urea.

Slowly-available, slow-release or water- insoluble sources are released based on manufacturing processes. These include:

1. Urea formaldehyde (UF): Also called Nitroform, Ureaform, Blue-Chip, etc. Contains 38% N. Nitrogen release is based on activity index of various forms of water-insoluble nitrogen (WIN)

2. FLUF is a flowable form of UF that contains about 18%t N, of which 20-25% is water insoluble and thus has less burn potential than soluble sources.

3. Nutralene is a methylene urea product with about 40% N.

4. Isbutlyidene diurea, also called IBDU, contains 31% N. Its rate of N release is dependent upon the hydrolysis of the product.

Coated N sources are made by coating urea or complete fertilizer prills with an impermeable or semipermeable coating.

1. Sulfur-coated urea (SCU) is produced taking prilled urea and spraying it with molten sulfur.

2. Polymer-coated urea (PCU) products are coated with some type of plastic polymer coatings to reduce the rate of N release.

Natural organic fertilizers include sewage sludges, composted manures and tankages, hydrolyzed poultry feathers. Green-Releaf is composed of a biostimulant growth complex with minor fertilizer elements and plant extract concentrate added.

Dr. Gil Landry, University of Georgia

Keep potassium levels high

Potassium plays a vital role in plant nutrition, and deserves more attention in many fertility programs.

Keep potassium levels high during the growing season. It enhances turf tolerance to various environmental and biological stresses, including cold, traffic, disease and drought tolerance.

A nitrogen to potassium ratio of 3:2 has generally been considered desirable. However, higher potassium ratios to nitrogen, such as 1:1 or 1:2 have improved stress tolerance in some cases, even when soil tests indicate potassium levels are adequate. **LM**