

Table 1. Annual nitrogen requirements for turfgrasses

Species	Nitrogen/1000 sq.ft./year
Common Kentucky bluegrass	2-3 lbs.
Improved Kentucky bluegrass	3-4 lbs.
Perennial ryegrass	3- 4 lbs.
Fine fescue	1-3 lbs.
Tall fescue	2-3 lbs.
Creeping bentgrass	3-5 lbs.
Zoysiagrass	1-3 lbs.
Buffalograss	0-1 lbs.
Bermudagrass	3-6 lbs.

spring (Fig. 3). Divide the amount suggested for the spring into two applications, one in mid-spring and the other in early summer. Due to a different growth pattern, warm-season turfs (bermudagrass, zoysiagrass and buffalograss) are fertilized in early and mid-summer (Fig. 3).

Nitrogen types

Nitrogen products are generally grouped into three categories: water soluble; slowly-soluble; and slow-release. Water soluble forms—urea, ammonium nitrate, ammonium sulfate) produce a rapid plant growth response soon after application, and produce turf stands that are more susceptible to foliar diseases and have a high foliar burn potential. These last only three to five weeks.

Because the entire nitrogen amount is readily available in the soil profile, there is often more nitrogen available than the turf plant can use. As a result, the remaining non-absorbed portion has great potential to leach downward in the soil profile and contaminate groundwater.

The best use of water-soluble fertilizers is for supplemental fertilization. A light application (less than a half-pound/1000 sq. ft.) will produce a quick response and greening effect for a special purpose, such as opening day in baseball season and special golf tournaments.

Slowly-soluble forms of nitrogen include synthetic and natural organics such as IBDU, urea formaldehyde, animal by-products and activated sewage sludge. These products provide nutrient release

limited in the spring and fall. While this is beneficial for root growth, limited turf injury and reduced pollution potential, the turf manager may need to supplement with light rates of water soluble products to provide necessary nutrients in the spring.

Many products are formulated with both water-soluble and slowly-soluble carriers. IBDU fertilizers depend mostly on low solubility and a slow rate of dissolution to control their release.

Slow-release products are basically water-soluble forms, coated with a membrane to restrict contact with soil moisture. As the coating thickness decreases, the release rate increases, providing nutrients for the turf. Both slow-release and slowly soluble products have characteristics of gradual

more gradually than water-soluble forms. The release from natural organics and urea formaldehyde depends on the breakdown of the product structure by soil microorganisms. Due to lesser microorganism activity in cooler periods, nitrogen release is

availability and low foliar burn potential, which make them very desirable for use.

Product combinations

Certain turf pests also divert a turf manager's attention in the spring. Annual grasses, broadleaf weeds, overwintering sod webworms and bluegrass billbugs are some of the most important pests and should be monitored. If a damaging level is detected or predicted based on pest history, consider choosing a fertilizer/pest control product, especially if the application windows for each are near the same time frame.

Combination products

In areas needing both nitrogen and pest control, the number of applications and passes over the turf stand are cut in half or thirds, depending on the number of pest control agents in the combination product. However, the turfgrass manager can save money by applying only fertilizer in areas where there is no pest present, or in which no pest history has been documented. Another benefit of applying only fertilizer is reduced environmental contamination, as is always a possible outcome when pesticides are applied. As with any pesticide or fertilizer product, read and follow all label instructions carefully. **LM**

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Tips for successful sod establishment

Attention to detail following installation increases sodding success, according to John Huber, president of Huber Ranch Sod Nursery, Schneider, Ind.

"Check rooting after a few days to adjust water application levels," he says. "Sod should be wet enough to avoid drying out, but not so wet that puddling takes place. The root system should extend at least one inch down into the soil before watering is tapered off, two inches if hot summer weather is approaching."

Paul Zwaska, head groundskeeper for

the Baltimore Orioles, says, "Overseeding newly-installed sod with perennial ryegrass can help connect the pieces laterally as the roots from the germinating ryegrass develop sideways into the sod.

"As soon as sod has rooted sufficiently, core aerify in two directions and drag the cores back into the soil profile to mix the soils. Overseeding at that time also will help stabilize the sod and encourage rooting as the sod roots follow the seed roots into the soil." □