Sports Turf Mowing And Fertilization:

Plan For Success

By Steve T. Cockerham

Well-managed natural turf athletic fields are safe, durable, and aesthetically pleasing. Good nutrition is a key factor in that process.

Although turfgrasses may be mowed short, mowing with greater frequency allows the root system to better recover from the injury caused by the shock of the initial clipping.

When you stop and think about it, we really expect a lot from our turfgrasses. There are not many plants that can stand to have one-third of their foliage removed continually and still remain healthy, vigorous and tough.

Wherever it is, turf has an important aesthetic function — it's supposed to look good. Athletic field appearance, although primarily a concern for spectators and television audiences, does reflect pride of the maintenance personnel. A bad-looking field, especially one where playability is poor, can be a highly visible embarrassment.

Many maintenance factors, such as mowing and fertilization, aimed at creating healthy, uniform turf also have a positive impact on aesthetics. Mowing patterns, colorants, lines and logos can further enhance aesthetics.

Sharp Mowing

Cutting grass removes some of its photosynthetically active tissue. A direct, unseen result of that removal is a reduction in root growth. As turf is clipped lower and lower, the stress on the roots becomes more severe.

If the mowing frequency is increased, then the consequences of lower clippings are decreased. Although turfgrasses may be mowed short, mowing often allows the root system to recover from much of the injury caused by the shock of the initial clipping.

The frequency of mowing should be determined by the relationship between how tall the grass is permitted to grow and the cutting height. Removal of more than 40 percent of the top in a single clipping completely stops root growth. The larger percentage of foliage removed, the longer the period of time the root growth remains stopped. That is why the rule-of-thumb is to mow frequently enough to remove less than one-third of the leaf blade at one time. Hopefully, the root growth will not be completely stopped.

Rhizome weight and number are also restricted by mowing. Since the rhizomes of many species are important to rejuvenation, spreading, and recovery from injury, anything detrimental can eventually reduce turf density.

Tillers behave as if they were individual plants. Severe clipping reduces the

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number of tillers being initiated which, as with rhizomes, eventually decreases the turf density.

Bentgrass and bermudagrass will tolerate more severe defoliation than species such as Kentucky bluegrass. Since many of the bentgrasses and bermudagrasses have prostrate growing habits, the low, closely overlapping leaves permit a larger percentage of green foliage to remain after mowing. A relatively high level of photosynthesis continues and root growth is maintained.

Over a period of time, root growth may exceed food production from the reduced leaf area and carbohydrate reserves can become depleted, thus affecting the plant adversely. Bermudagrass simply takes longer to "go downhill" than other species.

As you might expect, temperature decidedly influences the impact of mowing on the entire plant. Unclipped Kentucky bluegrass grows better at relatively cool soil temperatures in the mid-60s F than at 80 degrees F soil temperature. Clipping the grass will reduce plant growth at the cool soil temperature to below that of unclipped plants at warm soil temperature. The same relationships hold even on a hybrid bermudagrass unmowed in the rough and mowed at 3/32-inch on greens in the desert.

Plants maintained at temperatures higher than the optimum for growth for a period of time, such as occurs when nights do not cool off, experience even more significantly reduced growth. The difference in plant growth between soil temperatures is less with clipped turf than unclipped. Clipping has more influence on plant growth than soil temperature.

Even though root growth is slowed just by clipping, when the temperature increases, root growth dramatically decreases as the mowing height is lowered. This reduction in the root system is an important factor in making warm weather turf management the tricky art it is. This is why it has long been a rule of thumb for turf managers to raise the mowers as summer approaches and lower them in the fall and spring.

Since mowing and mowing height intensify the effects of temperature, good irrigation practices become extremely important. With the shortened root system, the turf is actually more susceptible to drought injury than direct heat injury.

Low mowing produces denser turf and a faster playing surface, but results in a shorter root system. Cool season species maintained at a high mowing height, then cut to a lower mowing height, are more resistant to wear than grasses maintained at a low height and allowed to grow taller. Mixtures of perennial ryegrass and Kentucky bluegrass perform better under these conditions than Kentucky bluegrass alone. Recovery of bermudagrass subjected to severe wear is essentially the same whether maintained at 1/2 inch or 3/4 inch.

Scalping the sports field has a negative effect on the appearance and surface playability. The removal of verdure (the topgrowth left after normal mowing), by mowing or traffic, significantly lowers traction.

The aesthetics of a sports field can be greatly enhanced by creating ribbon or striping mowing patterns.

Fertilization Tips

When sports fields are expected to perform under the pressures of high traffic, the turfgrasses should be maintained at optimum vigor. Well-managed natural turf athletic fields are safe, durable, and aesthetically pleasing. Good nutrition is a key factor in that process.

Nitrogen is the element required in greater amounts than any other fertilizer-supplied nutrient. It is used in chlorophyll, determining the color of grass and affecting photosynthesis.

Phosphorus is especially beneficial to seedling turf and sports turf injury recovery by increasing root, rhizome, and tiller development. Fertilization following aeration helps deliver phosphate directly to the root zone.

Potassium is very mobile within the plant and tends to accumulate in young, actively growing tissues. Turf rarely visibly responds to added potassium, but it improves drought, heat, and cold tolerance, enhances disease resistance, and provides greater wear and traffic tolerance.

Iron is essential for chlorophyll synthesis, which is particularly important in production of dark green grass. Turf suffering from iron deficiency is pale green, or even yellow, and does not respond to nitrogen fertilization.

Sports turf is pretty well limited to one warm season grass — bermudagrass — and three cool season grasses — bluegrass, tall fescue, and perennial ryegrass. For sports fields with any of these four grasses, nitrogen is applied at the rate of one pound per 1,000 square feet per month of the growing season. If slow-release nitrogen fertilizers are used, the rate is one pound of nitrogen per 1,000 square feet, per month of release period.

Phosphorous is applied to warm and cool season turfgrasses at the rate of one to two pounds per 1,000 square feet, per year. Potassium is applied at one-half to one pound per 1,000 square feet, per month of the growing season. On sand-based sports fields, potassium should be applied at about the same rate and frequency that nitrogen is applied.

Turf can visibly respond to rates of iron as low as one-tenth of a pound to one pound per 1,000 square feet within a few hours after application, particularly if nitrogen is applied at the same time. A light application of iron in soluble form, such as ferrous sulfate, can be useful to deepen the turf color for a particular event. Great care must be taken in application of iron, as the potential for burning the grass is quite high.

Cool season grasses do not grow very well if the temperature is above 90 degrees F, and warm season grasses do not do well when the temperature is below 55 degrees F. There may be little benefit in applying fertilizer when temperatures are moving out of the range of the turf species. There are, however, exceptions. In the spring, although the temperature may be a little low, its sometimes possible to "jump start" bermudagrass with a one-time application of two to three pounds of nitrogen per 1,000 square feet in soluble form.

Turfgrasses can sometimes be induced to grow a little faster than normal.This procedure of actually forcing growth can be useful in sports turf management for short-term results. Soil heating, vented tarps, and soluble fertilizer at high rates are used in "forcing." If the turf is forced indiscriminantly, there can be severe long-term negative effects. Although there has been little research into turf forcing, it is a common practice among sports turf professionals. ❑

Editor's Note: Steve Cockerham is a turfgrass researcher at the University of California, Riverside. He is both a past president and active member of the national Sports Turf Managers Association.