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Give bermudagrass sports turf proper fall management

Jeff Higgins

Bermudagrass (*Cynodon dactylon*), both common and hybrid types, is the predominant turfgrass for sports fields in warm-season climates. This is due to its superior wear tolerance, fast growth and excellent recuperative potential. Bermudagrass spreads rapidly by stolons (aboveground stems) and rhizomes (belowground stems), which accounts for its superior recuperative potential. However, bermudagrass stops growing when temperatures fall below 60 degrees F and will initiate dormancy when temperatures drop below 50 degrees F for an extended period. Dormancy can last from a few weeks to several months depending on conditions. How you manage bermudagrass in the fall will determine its ability to tolerate cold-temperature stress and survive through the winter months.

In early fall, as the bermudagrass' growth slows prior to the onset of dormancy, the plants convert soluble sugars to starch. They then store these starches in stolons, rhizomes and roots to serve as food reserves to ensure winter survival. Fall management of bermudagrass sports turf should incorporate practices that increase food reserves and thereby increase stress tolerance.

One of the most overlooked difficulties of bermudagrass fields relates to the wear and tear from excessive traffic and play. The problem with fall management of bermudagrass sports turf is that, in warm climates, outdoor sports take place 12 months of the year. Play does not stop in the fall just because the bermudagrass goes into dormancy. If excessive play continues throughout the winter and spring, the wear will eventually take its toll, resulting in a worn-out turf that lacks the recuperative potential to fully recover in spring as the turfgrass emerges from dormancy. Wear from too much play is the most significant problem associated with sports turf.

This article focuses only on fall management practices that improve the performance and survival of bermudagrass sports turf.

Fall fertilization Historically, a common remedy for excessive wear on bermudagrass sports turf has been simply to apply more fertilizer to stimulate growth and recovery. This logic is agronomically sound, to a degree. However, the type of growth response you obtain from fall fertilization depends on many factors, such as previous management practices as well as the choice of fertilizer.

Research has shown that there is a point at which excessive fertilizer, especially nitrogen (N), may actually decrease bermudagrass's tolerance of stress and wear. The reason is that high rates of N in the fall can stimulate late-season shoot growth, resulting in plant cells with high moisture content and reduced wear- and cold-temperature-stress tolerance.

Potassium (K) is the nutrient that most affects water relationships in turfgrass plants. You should conduct soil tests in late summer or early fall, especially high-traffic bermudagrass fields, to determine the level of K present in the root zone. Bermudagrass sports turf with a sand-based root zone requires even closer monitoring using both soil and tissue testing to determine the balance between the nutrients in the soil vs. the uptake by plant tissues.

Fall applications of K at rates up to 1.5 pounds per 1,000 square feet have been a standard practice for bermudagrass sports turf to improve winter hardiness. Adequate levels of K in the root zone support stronger plants with more rigid cells that are more resistant to wear and stress. K fertilization in the fall continues to be an appropriate and practical means of preparing bermudagrass for its dormancy period. However, research has shown that if the soil-K level already is sufficient, additional K may not provide any measurable benefits. Knowing your soil nutrient levels will save you the time and expense of what could be an unnecessary application.

In addition to K, you may need to apply other nutrients such as phosphorus, iron, calcium and magnesium, depending on the results of your soil tests. It is not unusual to apply some N at this time as well, the primary benefit being enhanced fall and early spring color. The target date for the last N application in the fall is 30 days before the average date of the first killing frost. Timing the last N application according to this guideline minimizes the chances of increasing the turfgrass plants' susceptibility to cold weather or traffic damage.

The source and release rate of N for fall fertilization is important for fall and spring color and growth response. You'll see limited response with slow-release N sources such as urea formaldehyde and methylene urea, which require microbial activity for N release. Fast-release N sources such as ammonium nitrate, ammonium sulfate and urea provide the most rapid greening effect in the fall and the following spring. However, the high water solubility of these materials suggests that these N sources could be susceptible to leaching, especially when the bermudagrass is dormant. Therefore, use light to moderate rates with these materials in fall.

Research indicates that late-season N fertilization does not directly increase the winterkill susceptibility of bermudagrass, but acts in combination with other factors (soil moisture and previous cultural practices) to increase susceptibility to cold-weather injury. Other management factors, such as late-summer or early fall vertical mowing or aerification, may promote greater susceptibility to cold-weather injury than late-season N applications.

Consider withholding fall applications of N in areas where traffic or pest problems have reduced turf density. The N will only serve as a nutrient source for winter weeds and make the turfgrass more susceptible to cool-season diseases such as spring dead spot.

Another option for fall fertilization is iron sulfate. Foliar-applied iron provides an immediate greening effect that will continue until the first killing frost. Iron applications offer an advantage over N applications because iron does not cause a growth surge. However, the greening effect from the iron will not carry over into the following spring as with N applications.

Overseeding Often, field managers overseed bermudagrass fields in the fall with cool-season turfgrasses to provide green color during the dormant period and to protect the bermudagrass from wear when it is not actively growing. Overseeding is an expensive and time-consuming operation. Therefore, you should not attempt it unless you can devote adequate effort, money and time to do the job right. However, if performed properly, all sports fields that receive play in the fall, winter or early spring can benefit from overseeding.

The decision to overseed usually depends on economics and play scheduling. If play continues during the fall, winter and early spring, I suggest overseeding. However, overseeding is not necessary if play ends in November or December or if heavy frosts are not typical for your area. Some suggest that overseeding reduces winter weed problems by increasing competition. However, this is rarely the case. In fact, overseeding may actually cause a gradual increase in weed problems, especially annual bluegrass (*Poa annua*). Weed-seed contaminants may be present in the seed source and weed-control options are greatly reduced when overseed turf is present.

If you do overseed, do so in early to mid-fall before heavy play begins on the field. Seeding too early can result in excessive competition from the bermudagrass and the increased likelihood of seedling diseases such as Pythium blight. In contrast, overseeding too late in the fall may result in delayed or reduced seed germination due to low temperatures. The optimum time for overseeding is when nighttime temperatures are consistently below 55oF, or when soil temperatures at a 4-inch depth are in the mid-70-degree range, or the average midday air temperatures remain in the low 70s. Air temperatures between 50 and 70oF favor germination of the overseeded turfgrass. In practice, this usually means you should complete overseeding at least 30 days before the first expected killing frost.

Perennial ryegrass is the preferred cool-season turfgrass for overseeding bermudagrass sports turf. Improved turf-type perennial ryegrass cultivars germinate faster (typically in 5 to 7 days), have a finer leaf texture, darker green color, better seedling vigor and better disease and traffic resistance than annual ryegrass. In addition, perennial ryegrasses provide a desirable striped appearance when mowed in alternating directions. For these reasons, annual ryegrass has lost most of its historical importance in recent years, in addition to the fact that annual ryegrass stains athletes' clothing and provides a slippery playing surface.

Use only certified seed for overseeding. Specify high purity and good germination at the time of purchase. Seed also should be free of hard-to-control weeds such as annual bluegrass. Ask to see a complete analysis from the distributor. Also, request fungicide-treated seed to reduce potential seedling loss due to diseases such as Pythium and Rhizoctonia. It's a good idea to purchase extra seed (10 percent or so) for repairing divots and areas thinned from pest or other problems.

Thatch, compacted soil and weeds can result in poor stands of overseeded turfgrass. Therefore, proper seedbed preparation is necessary for successful overseeding. In fact, it is just as important as for new turfgrass establishment-the single greatest cause of poor germination and establishment of overseeded turfgrasses is poor seedbed preparation. Seedbed preparation does not begin 2 weeks before the targeted date of overseeding; it begins several months before seeding. If thatch exceeds 0.5 inch, perform light vertical mowings during the summer to help reduce the accumulation. One of the biggest mistakes a turfgrass manager can make is to vertical mow bermudagrass too deeply in the fall trying to prepare a seedbed. Vertical mowing too deeply at this time can create problems

such as promoting new growth of the severed bermudagrass stolons and rhizomes, resulting in tissue that is more susceptible to cold-weather injury.

Core aeration and topdressing also aid in controlling thatch and help provide a smooth, resilient surface up to the time of overseeding. In addition, topdressing provides a smooth seedbed and better soil-to-seed contact. Again, you should perform these management practices during the summer when the bermudagrass is actively growing. Avoid aerating overseeded sports turf within a month of overseeding. Otherwise, the overseeded turfgrass will emerge in the aeration holes in clumps rather than in an even, uniform stand.

About 1 month before the targeted overseeding date, stop N fertilization completely to minimize bermudagrass competition with the soon-to-be-overseeded turfgrass. Otherwise, excessive bermudagrass growth could result in poor establishment of overseeded turfgrass.

At about 1 week before overseeding, reduce the mowing height of the bermudagrass by 25 percent to scalp the turfgrass. Then lightly vertical-mow the bermudagrass (just barely touch the soil surface) in two or three directions to open up the turf canopy and expose the soil to the overseeded turfgrass seed. Blow, rake, sweep, vacuum or mow-whichever method works best for you-to remove debris generated from the vertical mowing.

Though it isn't critical, some turf managers use plant growth regulators about 5 days before overseeding to further reduce the competition from the bermudagrass turf during overseeding. Refer to product labels and use recommendations to determine rates and product limitations.

The seedbed should now be ready to overseed. Use whichever method is most convenient for you. Apply perennial ryegrass seed at a total rate of 10 to 20 pounds of seed per 1,000 square feet (435 to 870 pounds of seed per acre). Apply in at least two directions at right angles to each other to obtain uniform distribution, and split your seeding rate accordingly. Baseball infields and soccer-goal mouths may need higher overseeding rates (25 pounds per 1,000 square feet) while peripheral areas such as baseball outfields or football and soccer sidelines can get by with lower rates (5 to 10 pounds per 1,000 square feet). Work the seed into the turf canopy using either a drag mat or piece of chain-link fence. After that, topdress with 1 to 2 cubic yards per 1,000 square feet with a desirable topdressing mix to cover the overseeded turfgrass seed and smooth any rough surfaces left over from the overseeding operation.

Initially, you must irrigate the field frequently to ensure good germination (two times a day with 0.25 inch of water). As the seedlings emerge, reduce irrigation to once a day and eventually to an as-needed basis (which is usually once or twice a week). This will encourage deeper rooting and discourage disease development.

Mow the overseeded turfgrass at 1 inch when it reaches a height of 2 inches. Make sure you use a sharp blade to avoid leaf tearing. Once a week is a typical mowing frequency, but greater frequency may be necessary depending on the growth. Remove clippings if they could disrupt play or if clumping occurs during mowing. Remember-after the initial mowing, never remove more than one-third of the leaf area during any single mowing.

If warm, humid weather conditions occur, watch for Pythium blight on the overseeded turfgrass. If Pythium blight occurs, apply a labeled fungicide at recommended use rates for control. Preventive

treatments for Pythium blight also are available, but you must treat every 10 to 14 days to prevent an outbreak.

If bare areas occur as a result of excessive wear, re-seed with either dry or pre-germinated seed. You can pre-germinate seed by soaking it in water for 24 to 48 hours and then blending it with a topdressing mix. Apply the mix at a rate equivalent to 5 to 10 pounds of seed per 1,000 square feet (roughly 0.25 to 0.5 cubic yards of material per 1,000 square feet).

N fertilization influences the appearance of the overseeded turfgrass. But excessive N can cause unhealthy competition, succulent growth and possible leaching of N. Applications every 2 to 3 weeks with 0.25 to 0.5 pound of N per 1,000 square feet with a soluble N source (ammonium nitrate, ammonium sulfate or urea) or 1 pound of N per 1,000 square feet from a slow-release N source every 4 to 6 weeks is usually sufficient for perennial ryegrass without overstimulating growth and encouraging disease.

Weed control Weeds usually result from poor management. Weeds do not kill healthy turfgrass but rather appear when turfgrass density decreases. Thus, with extensive damage from wear on bermudagrass sports fields, weeds easily move in.

In non-overseeded bermudagrass, weeds are easier to control than in overseeded turf. Without overseeding, fall applications of pre-emergence herbicides pose few concerns. For pre-emergence control of annual bluegrass and other winter-annual grassy weeds, many herbicides are available (see the Turfgrass Chemical Update in the January 1999 issue of Grounds Maintenance).

You also can use post-emergence herbicides in dormant non-overseeded bermudagrass. Glyphosate (Monsanto's Roundup Pro), glufosinate (AgrEvo's Finale) and diquat (Zeneca's Reward) herbicides provide non-selective control of winter weeds. However, be cautious with these herbicides. Because they are non-selective, they can injure the bermudagrass if it is not completely dormant. Examine the bermudagrass closely (including stolons and rhizomes) to confirm dormancy before applying these non-selective herbicides. If you see exposed green tissue, the turf is not completely dormant. A variety of selective post-emergence herbicides control winter-annual broadleaf weeds such as chickweed, dandelion, henbit and wild garlic and onion. Repeat applications of these herbicides may be necessary for complete control. Check with your distributor for suitable broadleaf herbicides.

In bermudagrass you intend to overseed, weed-control options are more limited. From a pre-emergence perspective, you can apply pronamide (Rohm and Haas' Kerb) or benefin (Balan) 45 days or more before overseeding for annual-bluegrass control without undue risk to the overseeded grass. (Editor's note: The Kerb label instructs the use of deactivator, such as charcoal, if you have applied Kerb within 90 days of overseeding a susceptible cool-season species.) Fenarimol (Dow's Rubigan) primarily is a fungicide, but also provides pre-emergence control of annual bluegrass (be sure the appropriate supplemental labeling for this use exists in your state). A total application rate of 8 fluid ounces of Rubigan per 1,000 square feet is necessary for control. Make two to three applications, with the last application occurring 2 weeks before the target overseeding date.

As with non-overseeded bermudagrass, a variety of selective herbicides are suitable for use on overseeded bermudagrass turf for control of established winter-annual broadleaf weeds.

Today's sports turf manager must cope with higher expectations than ever. A quality playing surface that allows good traction and provides a degree of cushioning is an essential component for minimizing sports-turf injuries. Of course, it also provides an appearance of which you can be proud!

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