Field management in the transition zone

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Managing athletic fields in the Transition Zone of the southeastern United States can often be the best and worst of both worlds. Hot, humid summers with plenty of sun can provide an ample growing season for warm-season species like bermudagrass. At the same time, these summers eliminate any chance of being able to grow most cool-season grasses such as Kentucky bluegrass and perennial ryegrass year round.

Inversely, the bermudagrass-growing season is very short in parts of the transition zone, lasting only 4 to 5 months (May-September). For this reason, many athletic field managers overseed with species like perennial or annual ryegrass to extend color during fall and spring sports like football and baseball. This dilemma is part of what makes managing bermudagrass athletic fields in the transition zone so tricky for turf managers all over the Southeast.

The Transition Zone is an area that sits at the northern adaptation of warm-season grasses and the southern limitation of cool-season grasses. It runs from North Carolina west through Tennessee, Arkansas, Nebraska, and Oklahoma. For most athletic fields in these regions, bermudagrass is the species of choice for several reasons. First, its aggressive rhizomatous and stoloniferous growth habits allow it to tolerate the wear and tear commonly associated with athletic fields. Popular sports like football and soccer place a lot of pressure on highly used athletic fields from cleat damage, traffic, and compaction. It takes an aggressive species like bermudagrass to be able to recuperate from such damage. Second, bermudagrass is easily overseeded for fall and spring sports like football and baseball. Although, these sports can be played on non-overseeded, dormant bermudagrass, there are many instances where this may be unacceptable. For example, can you imagine turning on your television to watch a nationally televised, primetime Thursday night college football game and seeing dormant bermudagrass? Not likely.

Also, many baseball programs, whether at the college, high school, or municipal level, prefer to play on overseeded turf.

The third reason bermudagrass if the preferred species is that it's easy to manage. With the right inputs from fertilization, irrigation, and mowing, bermudagrass can take almost anything you throw at it from football games, concerts, graduation events, etc. I am sure athletic field managers all over the Southeast have plenty of stories of events that someone in administration has asked them to host on their field. So, in order to keep your fields in tip-top shape, here are some general guidelines on bermudagrass management in the southeast transition zone.

One of the first questions to address is what variety of bermudagrass is best for athletic fields in the transition zone. Keep in mind that when managing an existing bermudagrass field, it is very difficult to incorporate a new variety, in which case this is a trivial point.

However, when establishing a field from seed, sprigs, or sod, variety selection is an important first step. There are many available varieties on the market today. To illustrate this point, there are currently 42 different varieties of bermudagrass in the existing National Turfgrass Evaluation Program (NTEP) bermudagrass trial. The Crop Science Department at North Carolina State University is one of many host-sites for this trial, and of the 42 varieties being tested, about half are commercially available.

The interesting point of this is that 29 of these 42 varieties are available as seed. In the past, the only bermudagrass varieties that possess the low growth habit, dark color, fine leaf texture, and overall high quality that is needed for high-profile, high quality athletic fields were hybrid varieties.

The most popular of these hybrid varieties of course is Tifway (often referred to as 419). Tifway is an inter-species cross between Common bermudagrass (Cynodon dactylon) and African bermudagrass (Cynodon transvaalensis). Although Tifway has proven over the years to be a high-quality, reliable variety, the drawback is that it must be sprigged or sodded. Many athletic field managers at the high school and municipality level do not have the budget to do this and therefore are forced to seed.

Seeded varieties, until recently, typically possessed characteristics very similar to common bermudagrass which included coarse leaf texture, light green color, and an open canopy that cannot tolerate low mowing heights. However, this is no longer the case. Many of the newer seeded varieties perform as good or better than some of the hybrid varieties regarding density, color, leaf texture, and overall quality.

Another important factor that should be taken into consideration is cold tolerance, especially in the transition zone. Older varieties like Midiron, Quickstand, and Vamont used to be the selections of choice when cold tolerance was an issue. However, their appearance made them unsuitable for use on high profile fields. Newer varieties like Tifsport, Patriot, Yukon, and Riviera have been shown to possess not only desirable growth characteristics, but improved cold tolerance as well.

Incidentally, of these four varieties Riviera and Yukon are available as seed. More specific information on bermudagrass varieties currently being tested at North Carolina State can be found at www.turffiles.ncsu.edu.

With regards to seeding bermudagrass, recent research conducted at the University of Arkansas has shown that dormant seeding of bermudagrass can achieve significantly better results than traditional late spring-early summer seeding. In their study, bermudagrass was seeded on February 15, March 15, April 15, and May 15 at rates of 1 and 2 lbs pure live seed per 1000/sq.ft. Rate of establishment was evaluated until all plots reached 100% cover. The results of this study indicated that dormant seeding dates of February 15 and March 15 exhibited greater turfgrass coverage on every rating date from June 3rd until full establishment. Similar work will be performed this year at the NCSU Sandhills Research Station near Pinehurst, NC to see

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how well dormant seeding performs in North Carolina. This research could directly impact management strategies of athletic field superintendents across the state that may be trying to establish or fill in thin areas with seeded bermudagrass.

In addition to variety selection, implementation of a proper management program is vital to the success of growing bermudagrass in the transition zone. Healthy bermudagrass is not only necessary to withstand the wear and tear from games and practices, but it is also a key in successfully transitioning your field into and out of winter. Successful bermudagrass management programs need to place importance on all of the primary cultural practices like fertilization, irrigation, and mowing as well as secondary cultural practices such as aerification, topdressing, pest management, etc.

Simply mowing a field three times a week produces better quality turf that is more resilient under traffic than a field that is mowed once a week.

Although fertilization is necessary in any turfgrass setting, it is particularly important on athletic fields due to the high amount of traffic they receive. Actively growing bermudagrass typically requires 1 lb. of nitrogen per 1000/sq.ft. per month during the growing season. This rate is simply a guideline and can be adjusted depending on factors like budget, desired quality, and amount of use. For example, low budget fields that receive small to medium amounts of play can typically get by with 1 lb. of nitrogen per 1000/sq.ft. every 4 to 6 weeks.

High profile fields like college athletics or fields that receive a lot of play may need 1 lb. of nitrogen every 2 to 3 weeks. At the end of the growing season, it is not uncommon for athletic fields in the southeast transition zone to receive anywhere from minimal amounts of nitrogen applied up through 10-12 lbs. nitrogen per 1000/sq.ft. Higher rates within a given range are for regions where the growing season may be longer or where pressure from traffic is high. Also, newly established areas may require slightly higher (50%) rates during the establishment period.

In addition to rate, another factor that needs to be considered is nitrogen source. The amount of nitrogen a field receives should come from a combination of quick release and slow release sources. Quick release sources are great to apply prior to field events for an instant growth and green-up response. Slow release sources are more often used for general maintenance. Combining both of these sources helps to ensure the bermudagrass is not going through any part of the growing season with inadequate nitrogen. Also, light, frequent applications of fertilizer are suggested when attempting to rejuvenate an area thinned by pest or environmental stress.

In addition to nitrogen, it is also important to make sure you have sufficient phosphorous (P) and Potassium (K) available for plant growth. Turfgrasses, including bermudagrass, often use N, P and K in a 4:1:2 ratio. This means that for every 4 parts N a turfgrass plant uses, it needs 1 part P and 2 parts K. Also, whereas N is important for shoot growth, P if often associated with adequate root growth. Unlike N however, P does not readily leach out of the turfgrass root zone, especially on native soil fields. This affects management in the fact that it typically isn't necessary to apply P every time you apply N in your fertilization program. Many turf managers may use a complete fertilizer for their first summer fertilization (2-3 weeks after spring greenup) and then use a straight nitrogen source such as ammonium nitrate (34-0-0) or ammonium sulfate (21-0-0) for their following treatments. Any additional phosphorous should be applied based on soil test recommendations.

Potassium (K) is the last primary nutrient of importance in fertilization programs. It is second only to nitrogen in the amounts required to sustain turfgrass growth. Also, potassium fertilization is often associated with increased stress tolerance. Two major stresses found on athletic fields in the transition zone are traffic and cold stress. Adequate levels of potassium assist the plant in both of these areas. In fact, many athletic field superintendents in the transition zone will apply 1 lb. K per 1000/sq.ft. around late August to early September. This insures there are adequate levels of K for the plant to utilize just prior to entering dormancy. As with phosphorous, soil test results can be useful in determining the actual amount necessary for good growth.

Other nutrients such as calcium (Ca), magnesium (Mg) may be needed if the soil test indicates that to be the case. Micronutrients like iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B),

molybdenum (Mo), and chlorine (Cl) are rarely deficient in managed turf. These nutrients are typically are already present in the soil or applied as a by-product in lime and complete fertilizers in high enough quantities to prevent deficiency. However, if you are at all concerned about deficiencies of these nutrients a simple soil or plant tissue test is a good way to determine if they are an issue.

Irrigation

Irrigation is another primary cultural practice important in managing bermudagrass athletic fields. Water should be applied approximately one inch below the existing root system to encourage deeper rooting. This will require you to take a soil probe and pull a sample to determine the depth of the root system. It is best to run the system and check the depth to determine how long it takes to reach that depth. Actively growing bermudagrass typically requires about 1 inch of water per week. A good way to test your irrigation system is by placing pie pans across your field at random intervals. This will assist you in determining how much water you are applying during a certain time period. It is also a good way to check for uniform coverage.

Keep in mind that application timing with Oxadiazon is crucial as it is only absorbed by emerging shoots; therefore, if an application is made after weed seed germination, it will not be effective.

Of all of the primary cultural practices, the importance of proper mowing is probably the most often overlooked. Recent research at Texas A & M has demonstrated that regular, frequent mowing of bermudagrass at the proper height results in finer, denser turf that is much more resistant of wear and tear from traffic. Simply mowing a field three times a week produces better quality and is much more resilient under traffic than a field that is mowed once a week.

In addition to mowing frequency, mowing height is also important. The proper mowing height for bermudagrass ranges from 0.5 inches to 1.5 inches with 1 inch being a good standard for most athletic fields. It may also be a good idea to raise the mowing height as fall approaches to provide insulation to the growing points. This is especially true in the upper portion of the transition zone. Also, raising the mowing height obviously results in more leaf tissue. This extra leaf tissue will allow the plant to photosynthesis more and therefore produce more food to store for the winter. As a result, the plant will be healthier and hardier going into winter giving it a better chance to survive any harsh weather.

In addition to the primary cultural practices, secondary cultural practices like aerification, topdressing, and pest management (weeds, diseases, insects) are important in managing high quality bermudagrass. Aerification is particularly important on fields that receive high amounts of play in order to alleviate compaction in the root zone. Aerification is also often coupled with topdressing on native soil fields to modify the turfgrass root zone in an effort to prevent further compaction. The importance of adequate aerification in high-use areas cannot be overstated and in an ideal setting should be done as often as field use and budget allow. Information on all of these practices can be found on the NCSU turffiles website. Although all of these management practices are important, the spring application of pre-emergence herbicides is particularly worth noting for athletic fields that may be thinned or weakened by heavy traffic.

Pre-emergence herbicides are typically applied in late winter or early spring for control of many summer annual weeds, particularly annual grasses including smooth crabgrass and goosegrass. Popular pre-emergent products include benefin, dithiopyr, oxadiazon, pendimethalin, and prodiamine. (These are common names and are often sold under various trade names.) Although

each of these products offers acceptable control when properly applied, one should consider the herbicidal mode of action. Most of these products, including benefin, prodiamine, and pend-imethalin are members of the dinitroaniline (DNA) herbicide family.

Members of this family of herbicides are mitotic inhibitors, which inhibit plant cell division. Unlike the name "pre-emergent" suggests, they do not actually prevent weed seed germination. Instead, as weed seeds germinate and grow through the herbicide treated barrier, emerging shoots and roots absorb the herbicide. Consequently, the plant absorbs and translocates the herbicide resulting in death of susceptible weed species.

The reason this is important to bermudagrass athletic field managers is herbicides in this family can cause an effect known as "club-rooting" of bermudagrass due to the herbicide mode of action. When bermudagrass absorbs and translocates these herbicides, turfgrass cell division is also inhibited similarly to susceptible weed species resulting in clubbed roots that are not able to peg down as they would in a non-treated area. This decreased rooting or lateral spread inhibition may result in less recovery after heavy traffic events, and less lateral growth in areas you may be trying to grow-in or establish. If you think club-rooting may be a problem on your field, simply pull up a few bermudagrass stolons and see if they are rooted. If they are not, they will easily pull up and you will see the herbicide effect (clubbed roots) on the bermudagrass roots.

Oxadiazon

If this is a concern for your field, oxadiazon may be a suitable alternative. Oxadiazon belongs to a different family of herbicides and is only absorbed by emerging shoots, not roots. Although it is not labeled for use in home lawns, it is labeled for use on athletic fields when applied by professional pesticide applicators. Oxadiazon is more expensive but offers great control of summer annual grassy weeds without inhibiting the lateral spread or recoverability of bermudagrass. However, keep in mind that application timing with Oxadiazon is crucial as it is only absorbed by emerging shoots; therefore, if an application is made after weed seed germination, it will not be effective.

Managing athletic fields in the transition zone can be tricky in and of itself. Throw in the fact that many fields are severely limited by budget restraints coupled with demands for high use and it really gets tricky. Therefore, it is always important to keep up to date with what is going on within the turfgrass industry in your particular region.

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