Problems facing sports field managers:

Refining cultural practices to better manage high traffic sports fields

Brad Park, Rutgers University

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One of the most significant problems facing turf managers responsible for sports fields and grounds at schools and municipalities is maintaining adequate turf cover on high traffic sports fields. Maintaining dense cool-season turfgrass cover on sport fields has numerous benefits beyond aesthetic appeal including improving player safety, stabilizing soil, and reducing summer annual weed encroachment, particularly summer annual weeds like crabgrass, goosegrass and prostrate knotweed that ultimately revert to bare soil in fall.

There are numerous reasons why even highly competent sports field managers may have difficultly maintaining turf cover on highly used – or "abused" –fields. These reasons may extend beyond the sports field manager's control including installation of field lights (i.e. day AND nighttime field use), not having the option to hold events on a synthetic field where natural turf field space is minimal, limited budget and labor resources, and user groups and management unwilling to take fields out-of-play when turf cover and/or weed encroachment justify renovation and time is required to allow new turf to fully establish.

Conversely, many schools and towns struggle with implementing primary turfgrass management cultural practices; the result is a more rapid decline in turf cover during periods of intense traffic. Primary cultural practices are mowing, fertilization, and irrigation (Turgeon, 1999). Cultivation (i.e. aerification) has traditionally been defined as supplementary cultural practice but can play a primary role in the management of high traffic sport fields. Regular overseeding of field centers and goal creases can often "make or break" the presence of turf cover in these locations; thus, the practice of overseeding is arguably an additional primary cultural practice for high traffic sports fields.

Mowing

Unfortunately, there are institutions mowing large, multi-acre sports fields and adjacent grounds locations with rotary mowers equipped with single 5-ft-wide mowing decks. During spring and early summer months when turf growth is most rapid, it can be extremely challenging to mow frequently enough with small mowers at a desired cutting height without scalping. Removing too much turfgrass leaf tissue in one mowing weakens the turf and results in excess clippings left on the surface, which if not physically removed (a labor-intensive process), can lead to severe turf thinning and weed encroachment. Turfgrass that lacks density and is infested with summer annual weeds tends to be less traffic tolerant.

Wide-area, multi-deck rotary mowers with cutting swaths ranging from 11 to 16-ft are available and can greatly improve the efficiency of mowing large expanses of turf. It is unfortunate to observe some institutions ready to invest in new equipment pass on acquiring larger mowing equipment for the reason that "the maintenance department already has a mower", albeit a 5-ft-wide machine. Investment in wide-area mowers can reduce the labor time spent on mowing and allow these resources to be allocated to increasing the frequency of overseeding, fertilization, or other cultural practices.

Fertilization

School and municipal sports fields are commonly under-fertilized and subsequently exhibit limited growth and poor recuperative capacity, attributes that do not favor good turf cover under high traffic.

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Public agencies often rely on contractors to apply fertilizers to sports fields. Following a public bidding process, landscape and sports field firms are awarded contracts to perform various tasks, including the application of a defined quantity of nitrogen (N) per unit area, typically over multiple applications. In some cases, fields scheduled to receive an ample supply of N display insufficient growth and have an off-color appearance, classic indicators of turfgrass in-need of N. While not all contractors will "short" the school or town on N quantities, many contractors apply N as liquid applications and it is difficult for school and town representatives to fully audit what is in the contractor's spray tank.

Granular-formulated fertilizers can allow for better auditing of contractor-applied fertilizer applications as well as allow for more N to be applied per individual application with lower potential for turfgrass leaf tip burn compared to liquid fertilizers. For example, to apply 0.75 lbs N/1000 ft^2 to an 80000 ft^2 football field and surrounds using a fertilizer that is 25% N (e.g. 25-0-0), it will require 240 lbs of fertilizer (e.g. five 50-lb bags of 25-0-0). Bags can be counted following the application to ensure that the appropriate quantity of fertilizer has been applied and thus, high traffic sports fields are better able to recuperative from damage.

Irrigation

Automatic irrigation systems are an important tool in the management of sports fields and are highly preferable to water reels and certainly non-irrigated sports field and grounds sites.

Too often, however, automatic systems are simply set on a program and then ignored resulting in some fields becoming saturated with water and a subsequent loss in turfgrass traffic tolerance. Water-saturated sports field soils may be a result of irrigation programs being allowed to run immediately following rain events or systems set to deliver a quantity of water that the sports field soil does not have the capacity to accept. In either case, the sports field manager must regularly assess soil moisture (i.e. buy a soil probe!), view weather data, and know the ability of his/her sports field to accept varying quantities of rainfall and irrigation in order to program the automatic irrigation system accordingly.

Cultivation

Poor design and construction methods can accelerate turf loss on sports fields. If designed with inadequate surface pitch and/or manipulated when wet, even those soils that may have supported agronomic crops will be prone to poor drainage and compaction, conditions that are not conducive to growing healthy, traffic tolerant turfgrass.

Deep slicing and deep tine cultivation are methods to alleviate compaction at deeper soil depths, often a result of poor construction procedures. Severely compacted soils may not readily allow a tine to penetrate to a soil depth greater than several inches. In these cases, it can be advantageous to first perform deep slicing. These tools are equipped with heavy-duty rotating knives that cut through and fracture the soil.

Cultivation in turfgrass is more routinely performed with machines equipped with tines (hollow or solid) capable of penetrating to a depth of 3 to 4 inches. Use of hollow tines allows for the removal of a core and can be useful to alleviate shallow soil compaction, manage thatch accumulation, and following core re-incorporation, create seedbed at the surface in preparation for overseeding.

Too often tow-behind, drum-type cultivation units are used across dry compacted sports fields with little or no impact on the surface. Albeit more expensive to purchase and maintain, reciprocating tine coring machines powered by a tractor (i.e. attached to the PTO) equipped with 0.75 to 1.0 inch tines positioned on a tight centering pattern are most effective in alleviating compaction and bringing soil to the surface.

Overseeding

During the course of a traffic-intensive sports season, turfgrass cover in goal creases, field centers, and penalty kick areas will inevitably thin. As turf cover begins to decline, it is important to initiate an overseeding program to introduce new plants. All too often sports field managers wait for nearly 100% bare soil to appear prior to introducing seed. While overseeding at this point is better than taking no action, the process should be started prior to severe damage becoming apparent.

Choosing the appropriate seed for an overseeding program is critical. Many seed mixtures are marketed as "sports turf mixtures" leading field managers and purchasing agents to buy these products for use in overseeding. These mixtures typically contain Kentucky bluegrass and tall fescue and are better suited for establishment projects where there is ample time to wait for the turf to fully establish before use.

Perennial ryegrass seed blends (i.e. two or more varieties of the same turf species) are the best choice for routine overseeding of high traffic field locations as this species will germinate more readily in cooler soil temperatures compared to Kentucky bluegrass and tall fescue, making it an ideal choice for overseeding during the fall and early spring sports seasons.

Fields badly damaged resulting from summer sports can be core cultivated to a 4-inch depth in late summer. Following core re-incorporation using a tow-behind drag, a blend of two-to-five perennial ryegrass varieties can be sown using a slit-seeder operated in two directions at a minimum of 5 lbs seed/1000 ft^2

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per direction (i.e. total of 10 lbs seed/1000 ft^2). Application of a starter fertilizer and maintaining moisture at the soil (i.e. seedbed) surface will increase the probability of successful establishment.

During the sports season, prior to games and practices, perennial ryegrass overseeding can be performed using a rotary spreader and allowing athletes to 'cleat-in' the seed to achieve necessary seed-to-soil contact. In the midst of the sports season, the same rotary spreader can be used to apply seed prior to games and is preferential to repeated use of a slit-seeder as the vertical blades on these machines can potentially injure new seedlings resulting from previous overseeding efforts.

Applying a sufficient quantity of seed is important to achieve overseeding success. A reasonable starting strategy would be to apply 6 lbs seed/1000 ft^2 between the hash marks of the football field prior to every home game. This area on a standard Canadian football field is 16830 ft^2 (330 x 51-ft). To apply 6 lbs seed/1000 ft^2 to this area, it will require two 50-lb bags of seed. If after several games, and potentially other events, turf cover is still diminishing and new seedlings are not establishing, the seeding 'rate' can be increased to one or more additional 50-lb bags.

Conclusions

At minimum, turfgrass requires mowing, fertilization, and water. Regular mowing with efficient equipment, supplying adequate fertility, and avoiding the temptation to rely simply on the program 'clock' to apply irrigation are basic refinements to primary cultural practices. To maintain turf cover on highly trafficked sports fields, the integration of cultivation and overseeding into existing primary cultural practices will better ensure success.

Reference

Turgeon, A.J. 1999. Turfgrass management. Prentice Hall, Upper Saddle River, NJ.

Brad Park is Sports Turf Education & Research Coordinator, Rutgers University; member of the SFMANJ Board of Directors since 2003; and Editor, SFMANJ Update newsletter