

Advice for converting from cool-season grass to bermudagrass



>> EMERGING bermudagrass seedling.

THERE IS NO MAGIC, "PERFECT" GRASS. Each species has its own limitations and there will be times that even a vigorous grass will not be ideal. For example, even the most cold-tolerant bermudagrass may experience winter-kill. This could be due to being too much traffic when not actively growing. Additionally bermudagrass planted in low-lying, poorly drained areas, mowing too close and other factors may cause poor performance. Furthermore, competition from species like perennial ryegrass that may have been overseeded for winter color will limit future bermudagrass persistence.

The advantage to bermudagrass, however, is that under ideal conditions it will establish and spread much more quickly than cool-season grasses when seeded. Additionally, a mature bermudagrass plant forms a dense network of rhizomes and stolons that is conducive to a stable, high quality playing surface. Turfgrass scientists will continue to work for developing improved cultivars with better leaf texture, growth habit, etc. How they are implemented is up to you, the end user. We scientists are not only interested in the genetic potential of these grasses but also the potential management questions/challenges. Communicate regularly with your local turfgrass specialists as we learn as much from you as hopefully you do from us. —Cale Bigelow, PhD.

THROUGHOUT MUCH OF THE COOL-HUMID REGION the primary turfgrass species used for athletic fields are Kentucky bluegrass, perennial ryegrass, turf-type tall fescue or a mixture containing combinations of all three. While these cool-season grasses are originally planted, regular re-seeding due to traffic occurs; sports turf managers normally use perennial ryegrass or 50:50 ryegrass:bluegrass mixture.

Inevitably the composition of these fields shifts to ryegrass. While ryegrass is very popular turfgrass species its biggest drawback is summer performance, and susceptibility to potentially devastating fungal diseases. Where severe stand damage occurs this will require re-planting before or during late-summer/fall use period. Poor stand density can lead to potentially unsafe field conditions. Many of these summer diseases can be effectively controlled with fungicide applications; however, access to appropriate spraying equipment, cost, and the potential for unwanted pesticide exposure to users often prohibits these products from being applied.

Today all turf and facility managers are carefully reviewing their programs and systems to potentially reduce maintenance inputs and save money. For sports that demand a smooth, closely mowed turf canopy it is not uncommon to consider bermudagrass. In fact, bermudagrass may be less costly to maintain than many of the cool-season grasses. It is a durable, fast growing warm-season turfgrass. In terms of recovery from traffic it is difficult to find a species that is more aggressive during its active growth period (e.g. summer).

Additionally, it is less disease susceptible and less sensitive to post-emergent herbicide applications for annual grassy weeds like crabgrass, etc. Furthermore, since bermudagrass is a warm-season species it has much higher water use efficiency compared to cool-season grasses. In practical terms, this means that bermuda may require or be more tolerant of less than ideal (e.g. non-uniform) irrigation coverage.

Brown in winter

Probably the biggest negative to using bermudagrass on fields would be the straw-brown color associated with the winter dormancy period. This can be overcome by a proper overseeding program but that is a whole other topic in itself. Additionally, it is important to remember that bermudagrass areas that are used excessively during their winter dormancy period will likely be subject to death and require replanting. Therefore, bermudagrass is not generally recommended for fields that receive substantial early spring use.



>> **Above: REMOVING** competition before seeding.
>> **Right: CONTRAST** between perennial ryegrass, left, and bermudagrass, right.



Choosing a bermudagrass cultivar:

This is not an easy decision. Before planting bermudagrass you should visit with some managers who regularly cultivate bermudagrass and see their fields. Then I suggest you contact your local land-grant University. They will have the most current information regarding suitable bermudagrass cultivars for your region.

The other item you need to consider is what planting method you will use. Will you sod, sprig or seed? Traditionally bermudagrass was planted using vegetative methods. This is more expensive than seed; however, a lot of work has gone into improving seeded warm-season cultivars. Over the past 10 years a great deal of progress has been made in improving the appearance, growth habit, greenness, and cold temperature hardiness. For most situations seeding is the most economical decision and thus, the improved seeded cultivars are planted.

In the upper cool-humid region (transition zone and further north), winter hardiness is a primary consideration and for seeded bermudagrasses the gold-standard has been Riviera. While there are other cultivars that are equally cold hardy like Yukon, Riviera is most widely planted. Other factors may include seed availability (this has periodically been an issue), and cost.

Establishment process

The first step in renovating any existing turf area is to remove or dramatically reduce competition from any existing undesirable plants. Traditionally, this involves applying a non-selective herbicide containing the chemical glyphosate. In many situations more than a single application will be required to completely eliminate well established vegetation.

Are there other, less aggressive strategies? Attempts have been made to “passively” introduce plant material by applying plant growth regulators (PGRs) like trinexapac-ethyl instead of a non-selective herbicide to slow the growth of existing plants rather than

killing them. Generally, these practices have not been very successful in the long-term. Plain and simple, the existing plant rebounds quickly once the PGR wears off, and the newly planted seedlings are crowded out by the more mature existing plants. Remember that all plants are competing for sunlight, water, fertilizer/nutrients and the space to grow and thrive. The bigger plants normally will win!

Passive systems that involve banding herbicides in narrow (1-3 inch wide) localized areas and directly seeding or sprigging into these areas have had some success. The concept is that the bands are less visually disturbing compared to a completely brown, dead field. The next point in this process is to get the new plants established, then adjusting maintenance practices to favor the bermudagrass as opposed to the cool-season grass. This may involve adjusting irrigation schedules, mowing heights (e.g. lower than 1 inch will favor the bermudagrass), summer nitrogen (N) fertility (e.g. more summer N will stimulate the bermudagrass), and possibly not treating for fungal diseases during the summer months. Anything that favors the bermudagrass will promote its growth and spread.

The key here is that these practices can only be conducted on “established” bermudagrass. It is unrealistic to adjust these practices immediately, especially for seeded cultivars. Once established, however, taking advantage of the aggressive spreading growth habit during June through August may pay dividends in terms of field coverage. In all practicality, this may not be realized until Year 2 of the establishment process.

Researchers in Kansas found that this practice resulted in approximately 55% cover in Year 1 and nearly 90% coverage in Year 2.

Timing: In general when planting seeded bermudagrasses it is best to start as early as possible. For the transition zone and more Northern locations the ideal window is May 1 through mid-July. For later dates, the plants may not mature as quickly since temperatures begin to drop and day length continues to decrease. Thus, you can still seed but you may need to realize there may be some winter mortality.

Some managers may consider covering the fields to decrease the risk for winter damage on underdeveloped plants. The upside to these late seedings is that there may be hope with the practice of dormant seeding. In other words, seed while the turf is dormant in late-winter/early spring. Research conducted at the University of Arkansas reported that seeding even in the late-winter months was successful the following year. The benefit to this method is that ground tends to be moist and will promote germination. Subsequent plant development would occur as soon as the environmental temperatures were favorable. The downside is that there may be some issues with plant mortality if the field is inappropriately used at this

time or moisture cannot be supplied due to a dry period when irrigation is simply not available.

Seeding rates: Historically, seeded bermudagrasses were suggested to be planted at approximately 2.0 pounds of pure live seed (PLS) per 1000 sq.ft. Recent research, however, has suggested that much lower rates can and should be used. These range from 0.25-1.0 pound PLS per 1000 sq.ft. Certainly higher seeding rates usually result in more rapid leaf coverage, and higher shoot density, at least initially. The reality, however, is the plants are simply not very mature, which may translate to more shallow root systems and fewer rhizomes and stolons being produced. Therefore, the current recommendation for normal situations is that seeded bermudagrass be planted at 0.5-1.0 pound PLS per 1000 sq.ft.

The concept of “PLS” may seem trivial, however, there has been a great deal of confusion in the industry. Several cultivars are sold as “coated seed” which are often a combination of colorants, fungicides or other materials designed to improve the planting and establishment process. These coatings decrease PLS on a bulk seed basis and decrease the number of pure live seeds per pound and that decreases the seed purity value (note: because they have a lower “purity” value this does not mean they are all of low quality).

Take home point: pay attention to the seed label for each cultivar and make a quick calculation. Pure live seed by definition is the product of multiplying the percentage purity times the germination percentage. For example 50% purity x 80% germination = 40% PLS. Generally, the weight of seed required to supply 1.0 pound of PLS is about 10% more in uncoated bermudagrass seed and about 100-125 % more in coated seeded bermudagrasses, meaning you may need to apply approximately 2 pounds of actual seed from the container to achieve a 1.0 PLS seeding rate. Check this before you plant to ensure you are not underplanting the seed and reducing your potential for success.

Germination times: Several of the newer seeded bermudagrass cultivars are rather slow to germinate. Riviera may take 14 days even under ideal conditions. We all have difficulty being patient but this germination process is extremely difficult to speed up. Certain cultivars of seed simply possess more waxy coatings. These coatings presumably slow water uptake and the enzymatic processes associated with germination. A variety of techniques have been attempted to “pre-soak” or “pre-germinate” seed before planting to speed the establishment process. In many situations this involves the use of a barrel or bucket and the seed is placed in a mesh bag or other container allowing for water absorption. While there have been some successes with these methods, they are often not practically feasible in terms of handling (e.g. the process is messy and determining exactly when to remove the seed can be difficult) large seed quantities. Try to be patient.

Irrigation: Whatever method you choose to establish a new grass, access to adequate irrigation and moisture availability is paramount. Seeds need water to germinate and mature. On sand-based systems that drain readily covering the seed with a germination blanket may be necessary to ensure adequate moisture remains in

close proximity to the seed and seedlings. Keep the seed moist throughout the entire germination period. The surface should be regularly irrigated for at least 2 weeks to keep the surface moist but not wet.

Post-establishment fertility: Seedlings need nutrients to grow and develop. No mineral nutrient has a stronger influence on plant development than nitrogen. The general recommendation for seeded bermudagrass or any new seeding is to proceed with caution. The current recommendations would be to apply 1 pound of actual N from a mixed slow+quick release source (e.g. sulfur-coated urea + urea) at planting then 1 pound of actual N every 28 days until the desired coverage and growth is achieved. There are many ways to achieve this and reduce the rate/interval would also work (e.g. ½ pound every 14 days). Regardless the final application should occur approximately 3-4 weeks before the first hard frost in your area. For nutrients like phosphorus, potassium and micronutrients a soil test before planting will provide site specific information.

Mowing: Ideally bermudagrass should be maintained at 1 inch or less for an athletic field. This will be best achieved by using a reel-type mower. Although they may be more expensive to purchase and maintain the only real way to get a uniform cut is with these mowers. The turf should be mowed once a large portion of the canopy is near the intended maintenance height. Realize there may be some bare areas.

It is important to make sure the area is firm before putting any equipment on the site; thus, reduce irrigation cycles immediately before mowing. Another important consideration would be to remove clippings if possible during the first few mowings. Wet, succulent clippings tend to clump and these clippings may shade the turf resulting in bare areas. Alternatively, try to mow the area when it is dry or break the clumps up with a blower or drag mat if necessary. For all future mowings follow the “one-third rule” and do not let the turf become too tall between mowings to avoid scalping.

Weed control/management: Inevitably some weeds may become problematic during summer establishment. Again, that is another whole article. Grass weeds like crabgrass, goosegrass and sedge-type weeds are most common. There are many herbicides available for the control of these weeds and you can research to discover what is appropriate and labeled for use in your state.

Traffic management: Regardless of the species planted or planting method, traffic management is essential. Excessively using a newly planted field will certainly result in stand failure. Each field location and situation is different, even from one year to the next. Use your best judgment and restrict use as long as possible to promote turfgrass plant development. This may involve roping/fencing the area off, proper signage to communicate that the area is under renovation, etc. ■

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Competitive turf: overseeding for weed management

WEED MANAGEMENT ON ATHLETIC FIELDS and in municipal parks is becoming increasingly important as traditional weed control measures, such as herbicides, become unavailable due to municipal legislation and changing public perception. Currently, many municipalities and two provinces in Canada have banned or restricted the use of herbicides affecting more than 20 million Canadians. Turfgrass managers must turn to cultural practices and optimize their efficacy to develop an effective integrated pest management (IPM) program that decreases or eliminates the need for herbicides. IPM programs with a focus on weed management are important in delivering a good quality and safe playing surface for user groups.

Overseeding is typically used to fill in bare areas and stabilize soil to create a uniform playing surface for athletes. Current overseeding practices typically use perennial ryegrass and Kentucky bluegrass to create a vigorous, wear tolerant playing surface. However, due to time restrictions and increased use of facilities, the potential to manipulate overseeding for weed suppression is not being realized.

Research aimed at optimizing overseeding as a weed management tool is currently under investigation at the Guelph Turfgrass Institute (GTI), University of Guelph. The initial field trials examined the effectiveness of perennial ryegrass overseeding into pre-existing Kentucky bluegrass under low and high-use conditions and in non-irrigated and irrigated situations. Perennial ryegrass is quick to germinate and establish which is important when competing with weed species for light, water, nutrients and space. All plants compete for these four main elements and overseeding encourages a desirable turfgrass species to compete and establish as opposed to undesirable weed species.

Perennial ryegrass was overseeded in non-irrigated and irrigated trials at the GTI field station in Guelph, and on in-use soccer fields at the University of Guelph campus and in the Town of Oakville, Ontario, Canada over 2 years. Weed populations were not affected by overseeding in 2005, a dry growing season. However, when weed populations were high and normal growing conditions existed in 2006, overseeding applications in May/July/September at 8.2 lbs/1000ft² and 16.4 lbs/1000ft² decreased perennial weed cover, specifically white clover in the irrigated trial and dandelion in the non-irrigated trial at the GTI. An increase in perennial ryegrass was

observed in all plots that received an overseeding treatment. Treatments applied on the in-use soccer fields, which included May/September and May only overseedings, had no effect on weed populations or perennial ryegrass populations compared to the weedy control.

Too much of a good thing?

One potential concern with high rates of overseeding of perennial ryegrass into Kentucky bluegrass fields is that eventually the fields may be converted to perennial ryegrass. While perennial ryegrass has a quick germination time and appears to have increased seedling wear tolerance making it an ideal grass for overseeding and competing with weeds, it lacks the rhizomes that are prevalent in Kentucky bluegrass cultivars. The rhizomes are often related to quick recovery and fill in after excessive wear. In addition, rhizomes also provide increased stability because they are much thicker than the roots of turfgrass and offer more resistance to the tearing caused by cleats.

One of the largest concerns with increased populations of perennial ryegrass on athletic fields is the lower winter hardiness of perennial ryegrass in Canada and northern United States when compared to Kentucky bluegrass. While perennial ryegrass survives most winters, depending on climatic conditions and location we have observed 70-80% mortality in some winters. Kentucky bluegrass can also suffer winter injury although it is much less common most likely because of a prolonged spring dormancy and regeneration from rhizomes which are protected below the soil surface.

We are uncertain that overseeding with Kentucky bluegrass is effective. Kentucky bluegrass is much slower to germinate, and has reduced wear tolerance until rhizome formation is initiated. Work at Iowa State University by Dr. David Minner has shown that under simulated traffic Kentucky bluegrass overseeding did not appear to be effective and did not increase turfgrass cover. Generally it is believed that for Kentucky bluegrass overseeding to be effective field closure is necessary, rarely an option in a municipal athletic field situation.

Despite this information and the increased cost of overseeding with Kentucky bluegrass compared to perennial ryegrass, many athletic field managers in areas highly susceptible to winterkill include some amount of Kentucky bluegrass in their overseeding program.

Our current research, being implemented on research plots and in-use municipal athletic fields, is examining both the weed suppression capability and the amount of perennial ryegrass and Kentucky bluegrass in overseeding programs that range from 100% Kentucky bluegrass to 100% perennial ryegrass. We are also comparing whether overseeding 5 times a year is better than overseeding 3 times a year. By the end of the current research we hope to be able to make better recommendations regarding the use of Kentucky bluegrass in an overseeding program.

Many turfgrass managers try to target their overseeding program to the time of year that they believe to be best for seed germination and survival. Often this means trying to overseed once a year in the late summer/early fall. Our research suggests that it is more important to overseed as frequently as possible throughout the growing season for the inhibition of weed invasion. Weeds invade when a bare spot appears and frequent overseeding allows the desirable turfgrass species to have a chance to fill that void before a less desirable weed species. In addition, weather patterns are very unpredictable and a mid-July overseeding can be the most important if followed by a cool spell with good rainfall while the fall can be ineffective if the weather is unusually warm and dry. Our research suggests that frequent overseeding is effective for two reasons, it provides seed ready to fill voids as they appear and it increases the chances of experiencing favourable weather conditions during germination and establishment.

Money is an issue

One drawback of an overseeding program is that it is very expensive, and while it may help limit the presence of weeds on athletic fields it is nowhere near as effective as traditional weed control practices. Multiple researchers have shown overseeding with perennial ryegrass usually increases quality and playability of fields under high use and this alone justifies its practice. Often it is hard to justify the budget for overseeding and adding weed control as an additional benefit of overseeding may justify including an overseeding program as part of your usual management practices. Our research has shown that over the short-term, high rate and frequent overseeding with perennial ryegrass appears to provide competition against perennial weeds when weed pressure is high. Overseeding is an essential part of reducing herbicide application as part of an IPM program or maintaining athletic fields under a pesticide free management plan.

Thanks to funding by industry groups such as the Sports Turf Association and the Ontario Turfgrass Research Foundation, government agencies, partnerships with municipalities, and Pickseed Canada Inc., a total of seven field trials have been completed and more are underway. ■

Dr. Eric M. Lyons, assistant professor of turfgrass science and management, University of Guelph, and Evan Elford is a graduate student in Guelph's turf program..

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» **Right: AT THE HOME DEPOT CENTER** in Carson, CA Shaun Ilten aerates 7 days a week to surmount the side effects of reclaimed water and resist black layer on more than a million sq. ft. of turf.

» **Below: THE SAN DIEGO PADRES'** Luke Yoder uses this walk-behind (rather than a pull behind) on the infield, foul territory and edges to lessen the impact on an already heavily trafficked area.



The hole truth about aeration

Editor's note: This article was written by Brad Aldridge at John Deere.

DO YOU AERATE ENOUGH, too little or too much? Could you be aerating faster or cheaper? Using less crew? Or would a little more time today yield long-term turf health tomorrow?

Even in the best soils, aeration is vital for turf health. Compaction from foot traffic prevents root penetration and is a major factor in poor drainage, leading to poor turf quality. Aeration relieves compaction by pulling cores or using solid tines to simply place holes in the turf to open up area for the water and nutrients to penetrate, forcing the roots to go deeper to attain them.

While many sports field managers see aeration as

a necessary evil (perhaps a dreaded chore that thankfully comes only in the spring and fall), aeration is actually one of the key basics of turf management that can optimize the health of your turf in the long run. Knowing when to aerate, what equipment to use and how to do it can help keep your turf in top-playing condition throughout the year.

Determining your need

While dreaded by some, it is definitely worth the investment to devote a little time to aeration, despite the fact that it can be a long and labor-intensive process, requiring users to stay off the field for



Common mistakes to avoid

As you create an aeration schedule and customize your techniques, there are a few key mistakes to avoid:

- Aerating when it's too wet. This can actually worsen conditions.
- Not aerating enough. While it might tie up equipment and manpower, Minnick advises never going more than 3 weeks without aerating a field under heavy traffic, like soccer and

football fields or those with extra events like concerts.

- Aerating when it's too hot. This is particularly important for cool-season turf as it loses roots in the summer.
- Aerating too early on new sod. Aeration can disrupt the turf's establishment process.
- Aerating too deeply. Always start shallow, and adjust the aerator to deeper depths as

conditions permit. Many users automatically set the aerators up to their deepest depths, only to run into hole quality issues due to the soil profile being too firm underneath the turf surface.

- Not adjusting your schedule and approach from field to field or facility to facility. Take a water and soil sample whenever you start at a new facility.

Finally, if you can't aerate on the schedule you want, don't be afraid to get creative. Even with constant aeration, Minnick has instituted such measures as limiting play during the week (since weekends see 20+ hours of play) and changing the field dimensions (allowed in soccer) to give certain turf areas a rest.

"With proper aeration, the turf will take far more than you give it credit for," said Minnick.

Warning sign illustration courtesy of istockphoto.com

FieldScience

an additional period. The needs of the turf should dictate your aeration schedule.

"My goal is to have an aerator going all the time," says Jerad Minnick, sports turf manager for the Maryland Soccer Foundation at the Maryland Soccerplex. Such a goal may seem daunting, but is just a part of the routine for Minnick's 22-field facility that hosts 350 games a weekend and sees around 1.5 million people a year. He notes that it takes about 2 weeks to aerate all the fields once.

When designing an aeration plan, several factors should be considered:

- The goal of the field (type of sport and level of traffic)
- Weather and climate conditions
- Soil and turf type
- Frequency of watering and mowing

A soil sample can reveal compaction; so can divots, indicating the need for aeration.

Shaun Ilten, turf and grounds manager at The Home Depot Center in Carson, Ca has such a heavily used facility that he has one dedicated employee whose sole job is aeration. "He aerates eight to 10 hours a day year-round," said Ilten. "We aerate each field more than 30 times a year." From football and soccer teams to concerts and ESPN's X Games, The Home Depot Center encompasses 125 acres of grounds including 1.2 million sq. ft. of turf and 10 practice fields, in use 12 months of the year.

But for Ilten, the reclaimed water he uses for irrigation is also a primary driver of his aeration schedule. "Due to the water's inconsistency, you never know what you're going to

get," he said, noting fluctuating nitrates and sodium levels. "As a result, we're constantly working to avoid black layer and disease and flushing the turf to reduce salts." He relies on aeration to help open up the turf and flush those salts.

Minnick also advocates a proactive approach to aeration. Knowing the dedication of teams at the Soccerplex, he wasn't surprised when they continued play despite the driving rain one late spring day. "I knew there was heavy rain in the forecast, so we aerated a few days before," Minnick said. "It rained $\frac{3}{4}$ inches during the game, but we had no puddles and no divots. In fact, it rained 12 inches in May, 21 days of rain, yet we only had four rain-outs on native soil."

Luke Yoder, director of field maintenance for the San Diego Padres, schedules his aeration around his professional team's practice and game schedule. That's usually five or six times per season, and with a small crew, he often jumps in to assist in the time-consuming task.

He also noted that aeration is a task he can greatly reduce in the off-season, since the turf isn't undergoing the stresses of baseball. "However, the venue might be used for rugby, concerts or soccer," Yoder explained. "If the turf gets really beat up after one of these, we sometimes re-sod the whole field before baseball season begins, so our off-season aeration schedule changes from year to year."

How to use it

What sort of aeration you need will vary depending upon the individual field. Creative

The equipment

Running at slow ground-speeds is one of the toughest challenges when aerating. John Deere has created Flexi-Link technology as standard equipment on its entire line of tractor-mounted and walk behind aerators, which allows faster speeds without sacrificing hole quality, the company says. The system uses a series of rubber dampeners to absorb the forward motion of the machine, resulting in tines that spend more time perpendicular to the turf, aiding in healing times.

Choosing the equipment you need should be determined by the same factors that influence your aeration schedule: soil profile, traffic and the field's purpose, weather, and staff and other equipment on hand.

Yoder uses a tractor-mounted aerator for his outfield, but "coddles" his infield, foul lines and edges with a walk-behind aerator because it leaves less of a footprint.

Before you buy, examine your other equipment. If you are planning to attach an aerator to a tractor, ensure that the tractor has the proper hitch, ballast and sufficient PTO horsepower and lift capacity to do the job. Tractors with gear transmissions or electronically-controlled hydrostatic pumps with cruise control will make the job easier.

John Deere offers tractor-mounted aerators in 37.5, 57.5, and 77.5 inch coring widths, and the 31 $\frac{1}{2}$ inch walk-behind Aercore 800 is for smaller areas.

The patented verticut attachment offered by John Deere for its Aercore 800 walk behind can be used as a stand alone verticut at a depth up to 1.75 inches, or can be used in combination with aeration to aerate and verticut in the same pass.

timing around game and event schedules is key, since the field needs time to rest after aeration. Ilten explained that he generally needs 2 days for his fields to recover.

Minnick admits that some trial and error may be necessary when working a new field, but recommends aerating a few days in advance of a big game or event. "Then if the soil is too loose and coming apart, you can firm it up by putting water on the turf and running a roller over it," he said.

When aerating, the speed, angle and direction generally vary by personal preference. Your speed should be based on how many holes you want—the faster you go, the fewer holes you make. If you're working in seed, you should go slower for tighter hole spacing, particularly for worn areas such as field centers or edges.

Climate and turf type can also influence aeration techniques. For instance, Yoder, who has managed sports turf on both coasts, treats his current field differently than when he was the manager of field maintenance for the Pittsburgh Pirates.

"Here in San Diego, before we aerate we scalp the Bermuda from 5/8 to 3/8 inches because it makes cleanup easier, encourages the Bermuda grass to take over and also allows us to keep the mower off the field for several days," he said.

"But cool season turf wouldn't withstand that scalping," he added, explaining that in a city like Pittsburgh, timing is much more important. "If we tried to aerify on a 95-degree August

scorchers the Bluegrass might have a hard time recovering. But we couldn't aerate too late in the season because we didn't want to leave the field open and exposed to the cold as winter arrived.

"Here, you can beat up Bermuda in the heat of summer, and it just loves it," Yoder added.

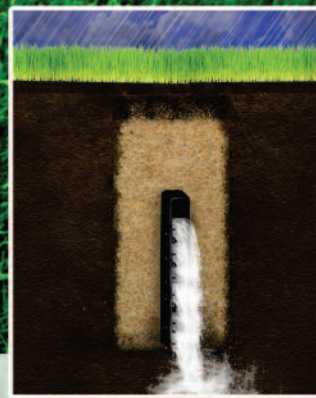
Yoder also advises turf managers to pay special attention to the areas around irrigation heads. "We aerify those by hand," he said. "It's one of the most important locations to aerate since the water tends to sit around the heads and black layer can develop." The aeration process allows the water to move through the turf, preventing anaerobic conditions around the irrigation heads.

Yoder primarily core aerates and tines only occasionally, while Ilten and Minnick place their emphasis on tine aeration. Regardless of your turf type or climate, core aeration should be done at least twice a year to relieve compaction, though even that schedule may pose a challenge for heavily used fields. Some professionals prefer to leave cores on the turf for a day or two and pulverize them if possible, working them back in with a drag then topdressing with sand. However, if you have a black layer or desire to change your soil profile, you may want to collect or sweep the cores off of the turf surface and topdress with a more desirable soil to fill in the aeration holes. ■

Brad Aldridge is a product manager with John Deere Golf.

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Aerating: an invaluable cultural practice

Editor's note: This article was written by Dr. Van Cline and Chris Hannon of The Toro Company

AERIFICATION IS OUR MOST VALUABLE CULTIVATION PRACTICE in turf management. There are several types: coring using hollow tines, solid tine aerification, slicing or spiking, and deep tine aerification. Similarly, there are a variety of problems that can be solved by this set of aerification methods including soil compaction, layering in the soil profile, poor drainage, restricted gas exchange, thatch, modifying heavy soils in the rootzone, and improving the establishment of sod or overseeding.

The best method of aerification depends on the particular problem that needs to be solved. A second important consideration in devising an aerification plan is timing. Specific problems develop at different times of the growing season. Periods of heavy field use result in high levels of wear and compaction. High summer temperatures amplify the need for gas exchange in the root zone to replenish soil oxygen and remove carbon dioxide. And, aerification imposes a temporary stress on turf. Speed of recovery from aerification is linked closely to weather conditions and to stage of the annual growth cycle for different species of turf. All of these factors make timing important for each type of aerification.

Core aerification

Core aerification is the most versatile cultivation method since it addresses several turf and soil issues at once. Core aerification creates open channels that improve soil gas exchange and both surface and internal soil drainage. Removing soil from the profile as cores can also reduce bulk density or compaction particularly in fine textured soils. Aerification followed by core removal and sand topdressing is the best method of controlling the buildup of un-decomposed organic matter that can plug the rootzone in sand-based soils. When cores are not collected and



removed they can be pulverized and incorporated back into the thatch layer as topdressing. And, core removal followed by sand topdressing allows the soil profile in the rootzone to be permanently modified over time.

Solid tine aerification

Solid tine aerification is a more specialized practice that enhances gas exchange between the rootzone and the atmosphere by creating aeration channels without removing cores. It is a particularly useful practice in cool season turfs during the middle of summer when root respiration is high increasing demand for O₂ and causing an accumulation of CO₂ in the rootzone. Because solid tining stresses turf less than coring, it can be done throughout the growing season. Coring is typical-

The equipment

Toro has created two new large area aerators, the ProCore 864 and 1298, and their names describe their configurations: the 864 has eight coring heads and is 64 inches wide, while the 1298 unit has 12 coring heads and is a full 98 inches wide. Both aerators are tractor mount, PTO driven and offer multiple tine head configurations.

The heavy duty 864 and 1298 units use the RotaLink tine guide system to ensure the tines remain vertical as they enter and exit the turf.

Toro also recently launched the ProCore SR series deep-tine aerators with a hydraulic depth adjustment that allows you to adjust the depth of the tines from the seat of the tractor. These deep-tine models feature aeration widths of 54–72 inches and depth capabilities of up to 16 inches.

The company's new ProCore Processor mounts directly behind a tractor-pulled aerator to sweep, process and disperse cores, all in one continuous operation. The 70-inch wide Processor collects the cores as soon as they are pulled and pulverizes them into fine particles, and then distributes it back as a layer of topdressing.

ly limited to times when the turf is vigorous and best able to recover (spring and fall).

Deep-tine aerification

Deep-tine aeration has become an increasingly popular practice to penetrate through the compaction layer that is created from traditional aeration methods. It increases drainage, improves gas exchange, and promotes deeper root growth resulting in healthier, more vigorous turf. In addition, turf that has been aerated at a deep level more efficiently uses fertilizers, water, and resists disease.

Deep tine aerification to depths up to 12 inches using both solid and hollow tines has become increasingly popular as a way of breaking through deep layers of compaction and improving drainage deeper into the profile. Repeated aerification using conventional 4-inch long hollow and solid tines results in what is known as a cultivation pan or layer of increased compaction just below the depth of aerification. Deep tining can penetrate this cultivation pan. Deep tining can also relieve deeper compaction created during sports field construction when significant earth moving occurs with heavy equipment.

Slicing or spiking

Slicing and spiking are similar to solid tine aerification since their primary benefit is to improve gas exchange by creating channels into the rootzone. Both are generally shallow treatments and cause minimal injury to the turf. As a result they are most useful during mid-summer stress periods when root respiration is high.

Often collecting aeration cores is impractical, so turf managers will destroy

the cores using a variety of methods, the most common being a drag mat behind a work vehicle. The traditional drag mat method of processing cores can be a challenge depending on the moisture level of the cores. Too wet, and they make a mess, too dry and the cores are extremely difficult to break up. Hours of drag matting can also be stressful to the turf.

Aeration is essential for promoting healthy and safe turf. While the benefits are known, aeration brings forth many chal-

lenges to turf managers. Aeration is an unenviable task for any maintenance crew. Not only is it labor intensive and time consuming, it also is a dirty, messy job that few look forward to. Even more critical is the amount of time the complete aeration process takes the turf out of play. ■

Chris Hannon is a marketing manager with The Toro Company. Dr. Van Cline is an agronomist for the company.

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TifGrand bermudagrass bred for shade available next year



THE UNIVERSITY OF GEORGIA has licensed a new variety of bermudagrass to grow well in both full sun and in shade. Called “TifGrand,” it is licensed by the University of Georgia Research Foundation to New Concept Turf and is expected to be available in 2010.

New Concept Turf, a Georgia-based company specializing in marketing new turfgrasses, has contracted Ft. Valley, GA-based The Turfgrass Group to exclusively handle licensing of TifGrand for sod production. TifGrand was licensed to a selected number of growers this summer.

TifGrand was developed by Wayne Hanna, professor of plant breeding and genetics in the Department of Crop and Soil Sciences at UGA’s College of Agricultural and Environmental Sciences.

“Although TifGrand produces a beautiful turf in full sun, its major contribution will be the production of nice turf in areas with reduced light, up to 60 percent less light than is normally required for healthy bermudagrass growth,” Dr. Hanna said in a news release.

TifGrand is the first sterile triploid hybrid with improved shade tolerance. Research testing over the past 10 years demonstrates its excellent growth at 60 percent to 70 percent shade levels. It can tolerate up to 90 percent shade levels, but it will have lower density. Dr. Hanna believes it will be the most shade-tolerant turf commercially available, according to an article in *Carolinas Green* magazine by Chris Hartwiger of USGA Southeast Region, Green Section. Here is more from that article, used here with permission by Sam Williams:

“Due to its semi-dwarf nature, TifGrand is not overly aggressive and it will tend to stay where planted and not encroach into nearby areas. [It] has both stolons and rhizomes and another unique feature is the lack of dew on the leaves in the morning, like *paspalum*. It has excellent mole cricket non-preference resistance and lower nitrogen fertility requirements compared to Tifway and TifSport.

“Like most bermudagrasses, seed heads are produced during June in full sun locations, but this is the only drawback observed. Few to no seed heads are present in shady locations. TifGrand will be popular for use at shaded rough areas, shaded tees, and shaded lawns. Fairway plantings are only advised for shaded sites initially, but this may change over time. Putting green tests at 5/32-inch are underway and it seems to produce a high quality surface. [It] should do well at shaded putting green sites with up to 60 percent to 70 percent shade. No other putting green bermudagrass ever has shown shade tolerance and this development will help many courses where shade around putting greens is a major issue.

“Sod will be recommended rather than sprigs at shaded sites to ensure the [grass] establishes well. Tests using sprigs at shaded sites didn’t work as well as the sod for establishment, especially where there is tree root competition.” ■

With new turfgrass, UGA sees green

Here’s an excerpt from a June 5 article by Lee Shearer of the Athens Banner-Herald on the financial implications of TifGrand:

“A new Bermuda variety developed by University of Georgia turfgrass researcher Wayne Hanna could let homeowners have their shade trees and carpet of lawn, too, when it becomes available to the public in 2010.

The grass grows in shade as well as sun and has sod-growers lining up for the right to grow the new grass, said Bill Carraway, vice president of marketing for a Fort Valley company called The Turfgrass Group.

“It is so, so big,” said Carraway, who is crisscrossing the country from California to South Carolina this summer, signing up sod-producers to begin growing the new grass, called TifGrand.

“This is a breakthrough,” Carraway said. Sod producers are “stacked up like cordwood wanting to get license to produce.”

Grasses developed in Tifton by UGA and U.S. Department of

Agriculture researchers working under Hanna and his predecessor, Glenn Burton, have grown on golf courses and athletic fields around the world for decades.

“Probably the center of the universe for warm-season turf grasses is in Tifton,” said Mike Garland, director of the Georgia Seed Development Commission.

Augusta National Golf Club and hundreds of other courses use UGA Tif varieties; most Southeastern Conference football teams (including Florida) play on turf grasses developed in Tifton, said Hanna, who began working in Tifton in 1971.

But the new TifGrand could penetrate a different market, and potentially add millions of dollars to the University of Georgia Research Foundation’s bottom line. The foundation owns patents for inventions and discoveries by UGA scientists, and uses some of the income from licensing and royalties to promote research at UGA. Researchers also get a cut.

“This is opening a door for us,” said Shelley Fincher of the UGA Research Foundation’s Technology Commercialization Office.

“We’re pretty excited about it. Everybody wants to have a shade tree in their back yard,” Hanna said.

The grass’s expected popularity could add millions of dollars to the research foundation’s bottom line.

In the five fiscal years from 2004 through 2008, producers paid \$3.2 million in fees for the right to grow UGA-developed turfgrasses, Fincher said, about 4 percent of the research foundation’s income from royalties and licensing fees.

Hanna and his research team took years to develop the new TifGrand Bermuda grass, using traditional plant breeding techniques. The researchers began by planting 27,500 hybrid varieties in 1992, he said. In 1993, the researchers picked the best 448 candidates from those and have been weeding out the pretenders ever since, he said.

“Every few years, we’d cut the number in half,” he said. ■