



Add all-stars to your roster.  
Without adding to your budget.

### John Deere Preowned Equipment.

It's true. John Deere preowned equipment trusted by sports turf professionals around the country is available for you at very reasonable prices. And since your John Deere distributor has access to a nationwide database, you can be sure to locate a 2653B PrecisionCut Trim Mower, 1200A Field Rake, or any other piece of our equipment that's an ideal match for your organization, and your budget. Interested? Contact your local John Deere Distributor or visit [www.JohnDeere.com](http://www.JohnDeere.com) or call 1-800-537-8233 for the one nearest you.

[www.JohnDeere.com](http://www.JohnDeere.com)



**JOHN DEERE**

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. Grassy 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. ■

*Cale A. Bigelow, PhD is an associate professor of agronomy for Purdue University's Agronomy/Turf Science program. He would like to thank Dr. Dennis Martin from the Oklahoma State turf program for his help during the preparation of this article.*

# Membership Application



Experts on the Field, Partners in the Game.

**This form is only valid for first time STMA National members through Sept. 30, 2009 (membership benefits continue through Dec. 31, 2009)**

Name \_\_\_\_\_ Title \_\_\_\_\_

Employer/Facility \_\_\_\_\_

Business  Home

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Work Ph: \_\_\_\_\_ Home Ph: \_\_\_\_\_ Cell Ph: \_\_\_\_\_

Fax \_\_\_\_\_ Email \_\_\_\_\_

*Submit via email,*

*Fax to: (785) 843-2977*

*Or mail with payment to:  
Sports Turf Managers  
Association  
PO Box 414029  
Kansas City, MO 64141*

**Membership Category:**

- Sports Turf Manager \$55
- Sports Turf Manager Associate\* (Additional Member(s) from the same facility) \$55\*

Please select the primary facility type where you are employed:

- Professional Sports  Higher Education  Schools K-12  Parks & Recreation
- Academic \$55
- Student (Verification of enrollment) \$25
- Commercial \$148
- Commercial Associate\* (Additional Member(s) from the same commercial company) \$75\*
- Affiliate (Person who is indirectly or on a part-time basis, involved in the maintenance/management of sports fields) \$50
- Chapter Dues (Contact Headquarters for amount) \$ \_\_\_\_\_  
Chapter Name \_\_\_\_\_
- Contribution to SAFE Foundation (research, education and scholarship) \$ \_\_\_\_\_

**Total Amount Enclosed:**

**Payment Method:** \$ \_\_\_\_\_

Check  Money Order  Purchase Order # \_\_\_\_\_

Credit Card:  Mastercard  Visa  American Express  Discover

**Credit Card:** Please do not email credit card info, please call 800-323-3875 to provide Exp Date: \_\_\_\_\_

Card # \_\_\_\_\_ Signature: \_\_\_\_\_

\*There must already be a National Sports Turf Manager from your facility or Commercial Member from your company before you may sign up in the Associate category.

Cut Here



# 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/1000ft<sup>2</sup> and 16.4 lbs/1000ft<sup>2</sup> 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.

# John Mascaro's Photo Quiz

John Mascaro is President of Turf-Tec International

## Can you identify this sports turf problem?

**Problem:** Round indentions in clay  
**Turfgrass Area:** Baseball infield area  
**Location:** Reading, Pennsylvania

**Answer to John Mascaro's Photo Quiz on Page 35**



## You're Always Ahead of the Game with a COVERMASTER® Raincover...

**"Excellent Quality... Competitive Prices..."**

wrote **Johnson Bowie**, Associate AD,  
**Drexel University**, Philadelphia, PA

Johnson's comments confirm what we hear from the many groundskeepers who use a COVERMASTER® raincover to keep their fields dry and ready for play.

Call us and we'll gladly tell you more.

### The COVERMASTER® Advantage...

- Superior in strength and UV resistance
- Outstanding heat reflective properties
- Light weight - easy to handle
- Widest materials for least number of seams
- Largest choice of weights and colors
- Backed by truly dependable warranties

### TARP MACHINE VIDEO!

Call, fax or e-mail for a free video, material samples and a brochure.

**COVERMASTER™**  
**COVERMASTER**  
**COVERMASTER**

MASTERS IN THE ART OF SPORTS SURFACE COVERS



Covers for football and soccer fields are also readily available.

TARP MACHINE™ lets you roll the cover on and off in minutes.

TARPMATE™ roller comes in 3 lengths with safety end caps.

CALL TOLL FREE  
**1-800-387-5808**

**covermaster.com**

E-MAIL: [info@covermaster.com](mailto:info@covermaster.com)



COVERMASTER INC., 100 WESTMORE DR. 11-D, REXDALE, ON, M9V 5C3 TEL 416-745-1811 FAX 416-742-6837

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..*

## Getting A Kromer Just Got Easier

GSA Contract Holder  
Contract GS-03F-0139V



**CLICK:**  
**kromerco.com**  
**CALL:**  
**800-373-0337**

Kromer manufactures a complete line of  
Athletic Field Maintenance Products



Our Field is Preparing your Field

KROMER CO. LLC • 15020 27th Ave North, Suite 200 • Plymouth, MN 55447-4892

ST8009

➤ **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.*

**D**O 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 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

scorcher 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.*

# 70% INFLOW RATE



# WATER MUST ENTER TO EVER EXIT!



◆ 7 to 25 times higher inflow rate than most other systems

◆ Capable of withstanding over 11,000lbs/ft<sup>2</sup>



## 800.223.7015

[hydraway.net](http://hydraway.net)



# Aerating: an invaluable cultural practice

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

**A**ERIFICATION 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 O<sup>2</sup> and causing an accumulation of CO<sup>2</sup> in the rootzone. Because solid tining stresses turf less than coring, it can be done throughout the growing season. Coring is typical-