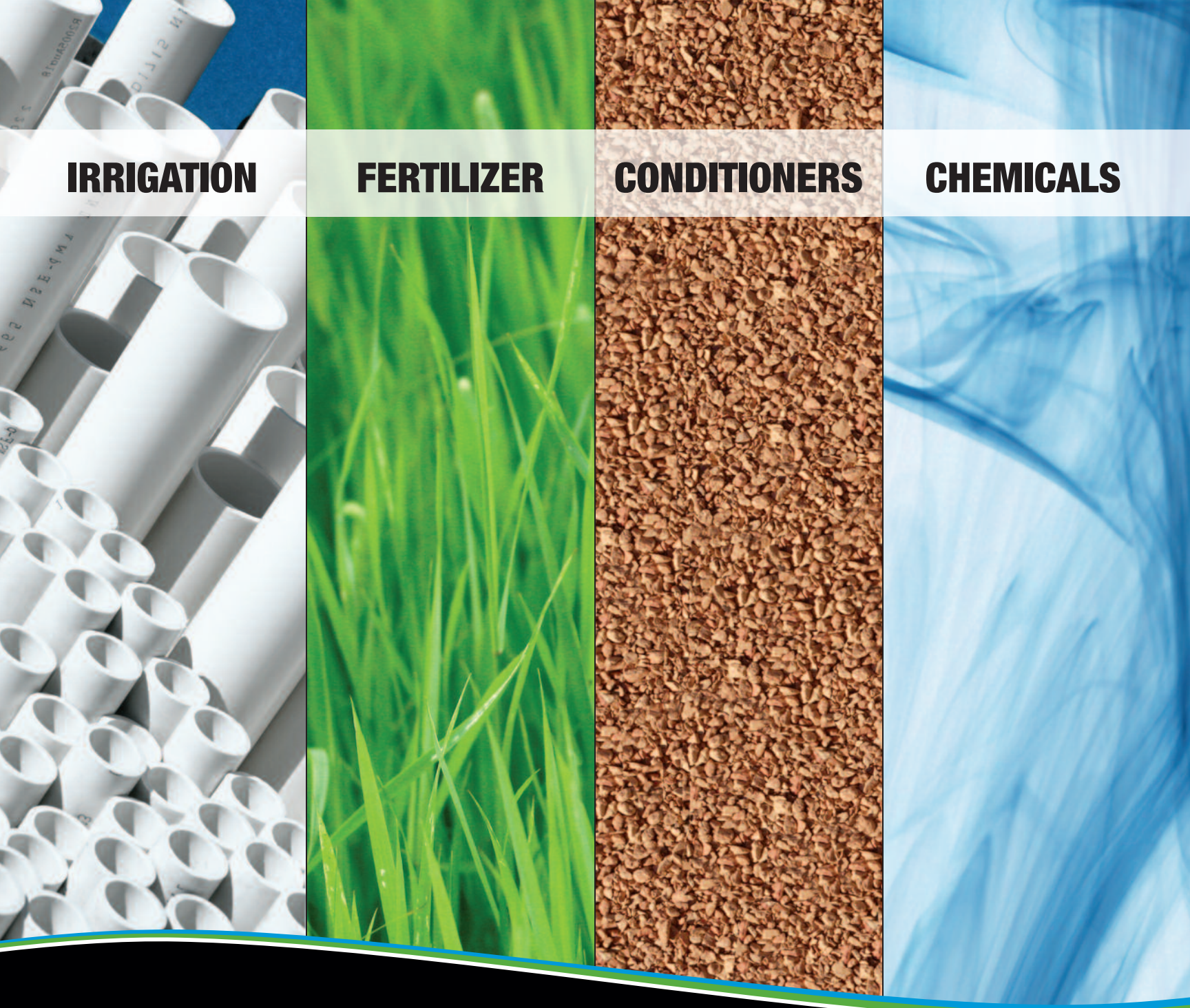

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By Greg Breeden and Dr. James Brosnan

Managing *Poa annua* for non-overseeded bermudagrass in the transition zone

ANNUAL BLUEGRASS is a winter annual grassy weed with a bunch-type growth habit (Figure 1) that often forms distinct patches or clumps in established turf. Annual bluegrass has many identifying characteristics including: (1) leaves that are folded in the bud, often partially wrinkled, and end in a boat-shaped tip (Figure 2); (2) a long, membranous, slightly pointed ligule; and (3) a panicle-type seedhead that is triangular in shape with spikelets bunched toward the end of the inflorescence (Figure 3).

Annual bluegrass seed will begin to germinate in autumn when soil temperatures fall below 70 degrees F. In the transition zone, this can be as early as August. At the same time that annual bluegrass seed is germinating, bermudagrass growth in the transition zone begins to decrease, resulting in less competition against weed encroachment. Dormant bermudagrass turf is often overseeded with cool-season species, like perennial ryegrass, to improve playability and aesthetics throughout the winter months, and to provide competition against various winter annual weed species. On golf courses, Velocity (bispyrabic-sodium) can be used to control annual bluegrass in overseeded bermudagrass turf; however, this is not a suitable option for sports turf managers as *this product is not labeled for use on athletic fields*. Thus, annual bluegrass control programs for bermudagrass athletic fields should be implemented when an overseeded turf species is not present.

Below: Figure 1

Options for control

Cultural Control. The best defense against any type of weed invasion is to maintain a dense, vigorous turfgrass stand. Cultural practices that maximize bermudagrass quality will allow the field to be competitive against potential weed invasions. These practices include things like mowing regularly at an appropriate height of cut, aerating regularly to provide soil conditions favoring root growth, and providing the field with adequate amounts of fertilizer and irrigation water.

Herbicidal Control (preemergence). Numerous preemergence herbicides are available for controlling annual bluegrass on non-overseeded bermudagrass athletic fields. Research conducted at Tennessee has shown that these materials perform similarly when applied under the same environmental conditions.

Major points

- Numerous preemergence and postemergence options exist for control of annual bluegrass on non-overseeded bermudagrass athletic fields.
- Make sure bermudagrass is totally dormant when using non-selective herbicides for annual bluegrass control.
- Rotate herbicide modes of action whenever possible to decrease the potential for developing annual bluegrass herbicide resistance.
- An application of glyphosate tank-mixed with a preemergence herbicide in early spring can provide preemergence crabgrass control as well as postemergence control of annual bluegrass.

Preemergence herbicides must be applied before seed germination in order to work effectively. These materials do not stop seeds from germinating; rather, they prevent seedlings from maturing into full grown plants. Thus, preemergence herbicides must be applied before seed germination in order to work effectively.

Annual bluegrass will germinate when

Figure 2

soil temperatures fall below 70 degrees F, which in Tennessee is usually sometime in early September. However, temperatures can occasionally decrease during the month of August causing annual bluegrass to germinate earlier than normal. This "early germination" is often the reason that preemergence herbicide applications fail to control annual bluegrass. In the transition zone, target preemergence herbicide applications for mid to late August.

Preemergence herbicides should NOT be applied if there is any consideration of overseeding the field with a cool-season turfgrass species like perennial ryegrass (unless otherwise stated on the product label).

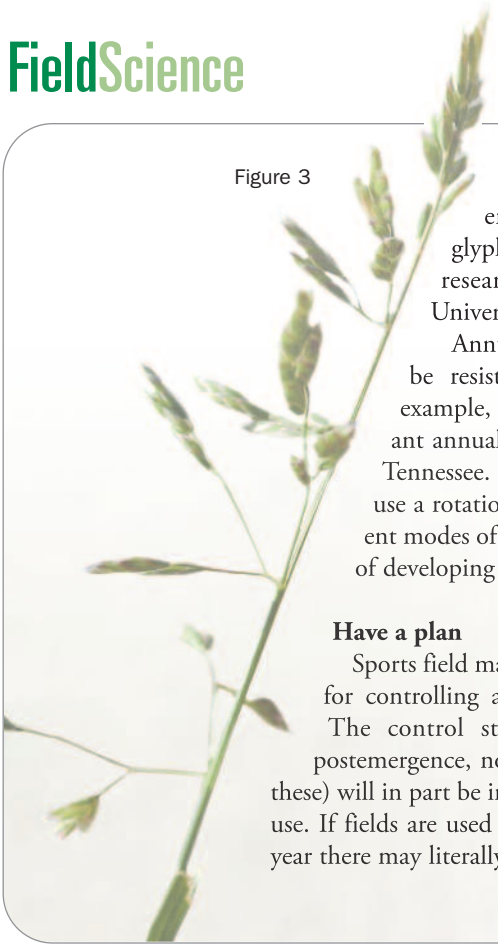
Herbicidal Control (postemergence). There are multiple postemergence herbicides that provide effective annual bluegrass control on non-overseeded bermudagrass athletic fields. Postemergence applications can be made any time after annual bluegrass seed has germinated. Caution should be used when applying postemergence herbicides close to the end of bermudagrass winter dormancy. Some herbicides can delay spring green-up when applied close to the break of dormancy.

Herbicidal Control (non-selective). Glyphosate can be applied to dormant bermudagrass to provide postemergence control of annual bluegrass. Keep in mind that injury can occur to the bermudagrass if it is not totally dormant. Anytime an application of a non-selective herbicide, like glyphosate, is used for weed control it is integral that the bermudagrass turf is totally dormant (Figure 3). If the bermudagrass is transitioning into or out of dormancy serious injury can occur.

Herbicidal Control (by tank-mixes). Combining pre- and postemergence materials will increase the weed control spectrum of a single herbicide application. For example, should temperatures drop in the fall to the point where annual bluegrass seed begins to germinate, tank-mixes of pre- and postemergence herbicides can be applied to control annual bluegrass plants that have recently emerged and those that have not yet germinated from seed.

If a glyphosate plus preemergence herbicide tank-mix is applied in late winter (February to early March in Tennessee), it can also provide preemergence control of crabgrass the following spring. Tank-mixes of pre-

Figure 3



emergence herbicides and glyphosate have performed well in research trials conducted at the University of Tennessee.

Annual bluegrass has been found to be resistant to certain herbicides. For example, incidences of prodiamine resistant annual bluegrass have been reported in Tennessee. Any herbicide program should use a rotation of herbicides, each with different modes of action, to decrease the likelihood of developing herbicide-resistant biotypes.

Have a plan

Sports field managers should always have a plan for controlling annual bluegrass on their fields. The control strategy selected (preemergence, postemergence, non-selective, or a combination of these) will in part be influenced by the schedule of field use. If fields are used heavily at one particular time of year there may literally not be enough time to apply an herbicide. Additionally, the heavy foot traffic from these athletic events could also reduce herbicide efficacy.

If the majority of play is during the spring for soccer, then preemergence herbicides applied in the fall may be the most effective option for annual bluegrass control. On the other hand, if the field is used heavily during the fall for football, then postemergence or non-selective control in the early spring may be a better option.

Multiple preemergence and postemergence herbicides are available for controlling annual bluegrass on non-overseeded bermudagrass athletic fields in the transition zone. Applying tank mixes of both preemergence and postemergence herbicides can help extend control throughout the winter and potentially into the spring. ■

Greg Breeden is weed science extension associate and James T. Brosnan, Ph.D., is assistant professor-turfgrass weed science at the University of Tennessee in Knoxville. For more information visit http://tennesseeturfgrass weeds.org.

Wetness and wealth key foes of native soil fields

Even the trustees who drive to board meetings in a Lexus know that financial times are tough. This is a good time for sports turf managers to talk dollars and "sense," whether the conversation happens at a school or a recreation department.

Nobody is out beating on office doors to sell native soil fields. Synthetic infill turfs have had a huge impact on the market. The reason is plain—a contractor might make $5,000 profit for crowning a natural field or even $20,000 for building one. But those Lexus-driving board members are going to write out a check for $100,000 profit to the contractor for a synthetic field. So, which do you expect the contractor to push?

"Don't mistrust your contractor, just know how to talk to him," says A.J. Powell, turf specialist at the University of Kentucky. While he concedes there are many good places for synthetic fields, he maintains that people need to take another look at natural soil fields—especially from an economic point of view.

Cost of construction outweighs the maintenance cost savings gained by establishing a synthetic field. Powell figures the average annual cost of maintaining a natural soil field at about $22,000 for a custom company, a sand-based field at about $40,000 and a synthetic infill at a minimum of $3,500. The high cost of construction and maintenance of a sand-based field is perhaps beyond reason, especially when one considers their frequency of failure.

Including laser grading to build a good crown in the center of the field, natural soil fields are inexpensive to build, costing maybe an average of $50,000, Powell told field managers at the Ohio Turf Conference (OTF). Even a worn natural field will provide good, soft footing. "And nobody has shown that a muddy field is unsafe to anyone, except the guy washing uniforms," Powell says.

Put all that on one side of the ledger and balance it with a $600,000 to $1,000,000 tag for a new sand field or new synthetic infill field.

"Sand-based fields are just as expensive as artificial fields and work no better than most natural soil fields," Powell points out. When factoring in the cost of construction and maintenance, the natural soil fields will always be some $42,000 to $56,000 per year less expensive than synthetic or sand-based fields.

"Most of the money spent on an artificial field is getting rid of excess rain water," Powell says. Water is a problem on natural soils, too. But there are a lot of agronomic things a sports turf manager can do to reduce the problem.

"Sometimes they spend more money on the paint scheme for the endzones than they do on the field itself." – Powell

Courtesy of Gerald Landby, Carroll College

"Yes, natural fields can get sloppy. No, they are not always uniformly aesthetic," Powell concedes. "But there is a big cost savings by going with natural turf and doing it right."

The starting blocks

The best place to start improving any natural soil field is to work to get the field into as good shape as possible to start the season. That may sound like Turf 101, but it is good advice.

"People like to play on a quality field. Yes, they may wipe it out. But that is just a fact of life," Powell says. Whenever a really great field is developed, there is enormous pressure for more and more teams to use the field.

However, limiting use on the premier natural fields can certainly help. This seems to be less a problem on baseball fields than anywhere else. Baseball coaches have been successful at lobbying to keep people off their fields. Perhaps they feel a closer affinity with the actual field. Perhaps they can sell the importance of "true" ball roll on the surface. Whatever the reason, baseball fields seem to have less wear and tear. As a result, they hold up better than football or soccer fields.

Perhaps big, rectangular fields simply lend themselves to more use: football, soccer, band practice, intramural games. But that's no reason why the fields cannot be prepared well and maintained well.

"Sometimes they spend more money on the paint scheme for the endzones than they do on the field itself," Powell scoffs. "If you have to cut costs, you should be talking about places other than the agronomics."

Powell sees no reason why a native soil field should not be able to carry one or two teams for two playing seasons per year—as long as the field is dry. He says he has seen successful programs handle 70 events a year, again citing the importance of keeping the field dry and not displacing the soil.

Water, athletics don't mix

No coach today would deprive an athlete of water. However, a good sports manager is better served by doing exactly that with the field.

"Especially on football fields, traffic on wet soil displaces the soil, destroys the soil structure and creates little birdbaths in the field," Powell says.

Can proper management reduce field wetness and soil saturation? "You betcha," Powell says in his best Sarah Palin imitation.

Many agronomists have noted the money that could be saved if football games were postponed in foul weather the way baseball games are called.

"There is a price to repairing the field, and you have to teach your administrators what that cost is," Powell advises.

Irrigation often is more the problem than the solution.

"Don't over-irrigate," Powell says. In fact, he would go so far as to remove the automatic clocks on irrigation systems in many parts of the country. Grounds managers would look at irrigation differently if they had to go out and turn some knobs every time

Comparing Sand vs. Infill

	Current-Sand field	New Sand field	New Infill (high end)
Initial Const.		$1,000,000	$1,000,000
Maint. 1st yr	$40,000	$40,000	$25,000
10 yr Maint.	$458,600	$458,600	$326,190
10 yr Total	$458,600	$1,458,600	$1,326,190
Avg Cost/yr	$45,860	$145,860	$132,619

Soil Based vs. Infill

	Soil Field Contract	Soil Field DIY	New Soil Field	New Infill
Initial Const.			$50,000	$600,000
Maint. 1st yr	$20,000	$7,000	$15,000	$3,500
10 yr Maint.	$229,358	$80,275	$172,018	$40,120
10 yr Total	$229,358	$80,275	$222,018	$640,120
Avg Cost/yr	$22,936	$8,028	$22,202	$64,012

Grass vs. Infill

	New Soil	Current Soil	New Sand	New Infill
Initial Const.	$50,000		$600,000	$800,000
Maint. 1st yr	$15,000	$15,000	$40,000	$25,000
10 yr Maint.	$172,018	$172,018	$458,600	$326,190
10 yr Total	$222,018	$172,018	$1,058,600	$1,126,190
Avg Cost/yr	$22,202	$17,202	$105,860	$112,619

Contractors Always Sell Grass First Really ??
•Even if a new grass field may only net $5,000 profit
•Knowing the risks of a grass Grow-In vs. an engineered system that can perform immediately•Surface performance unquestioned
•Surface performance identical to the elite competitors

Contractors Always Sell Grass First Really ??
•Few hidden costs with Engineered system
•Easy to minimize maintenance costs of syn. Infills –some spend zero dollars.
•Easy to exaggerate maintenance costs of grass –what the costs have been or should be.

Figures provided by Dr. A.J. Powell, University of Kentucky

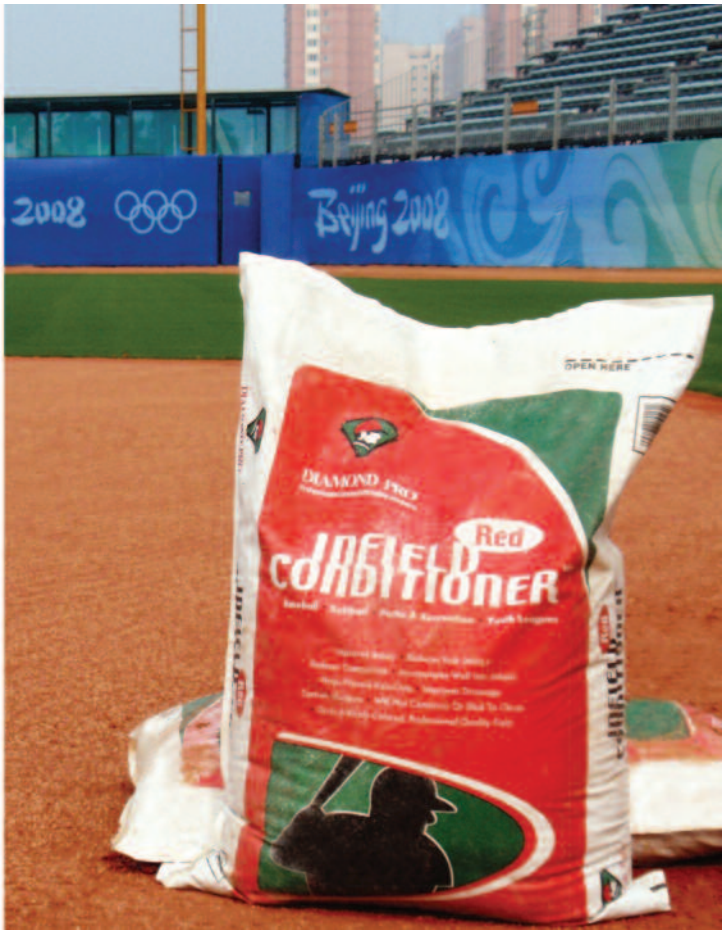
John Mascaro's Photo Quiz

John Mascaro is President of Turf-Tec International

Can you identify this sports turf problem?

Problem: Circular depression in field
Turfgrass Area: University of Phoenix Stadium
Location: Glendale, Arizona
Grass Variety: Tifway 419 bermudagrass overseeded with perennial rye

Answer to John Mascaro's Photo Quiz on Page 27



they wanted to water their fields.

Anticipate rainfall, Powell says. "Dryness is not deadly. Grass does not die from dryness, at least not quickly."

A turf manager who anticipates rainfall should turn off the system. "You cannot afford to have the field wet before a rain," he says. He says that, if managers treated water as a line item in their own budgets then they probably would not be so liberal with it.

Any manager who is starting to see depressions in the field already has a field that has gone too far. Depressions must be repaired each year, even the first year after the field is constructed.

A simple crown, yes, even on a soccer field, will take care of most water problems.

Good sideline drains are a must. Most field managers know it does not take too much effort to get the water off the field in the area between the hash marks. But, that water must have some easy place to go quickly. Good sideline drains are a must for all fields. Sleeve drains work but unless the water gets through the soil and down into the drains, they may be totally ineffective, or effective for only a year or two.

Destroying soil structure starts a landslide of problems. A sandy topdress helps, of course, but there is more to keeping a field dry than that.

"Build tough verdure," Powell says. A good, dense stand of grass will do much to remove water from a field. In sports turf, normal evaporation is too slow to keep a field dry enough for play. A plant with a deep root system will help remove a lot of water, and also maintain surface soil integrity, he adds.

Stick to the basics and keeping water off the field becomes straightforward.

Start with an annual renovation. Raise the height on the mower as far as the coaches will allow. Do a good job of crabgrass and broadleaf weed control. Give the turf the nitrogen it needs to thrive, but don't over-do it. Core regularly.

Powell says that, even if a field is being cored, it probably is not being cored enough. "This is especially true in practice fields and park and recreation fields."

He says coring is better than spiking or the other commonly used methods aimed at getting water into the ground. The problem with small-tine, solid coring is that, as soon as the soil gets wet, it quickly closes in around the hole and there is little opportunity for the water to flow down.

"If you must solid tine, it is only beneficial when the soil can be shattered, but it must be really, really dry," Powell told the OTF audience. While it is more difficult to core dry soil, the effect of the shattering will last longer. That said, he still likes to see regular 2- or 3-inch core aeration.

To get more robust grass plants, make them taller, he says. Before the coach screams his head off about slowing down his players, let him know that research shows there is no difference between a 1.5-inch, 2-inch or 3-inch cut height and runner speed on the field. This does not, however, apply to ball roll on a soccer field.

While mowing with a reel mower will make the field look nice, doing the job with a rotary machine is just fine for most uses.

Another curse of over-irrigation is that it increases the number of times you must mow. While one's first thought might be the labor or fuel required, Powell is more concerned about the effect of mower compaction.

Extra mowing leads to compaction, which causes weaker plants with shorter roots, which requires more irrigation, which leaves a wet soil, which causes more compaction. The downward spiral continues until the field is very fragile.

"You have no choice; your job is water management," Powell says.

Lastly, when it comes time to reseed the field, Powell advises using a "fast" grass. In areas where bermudagrass is appropriate, it is the variety of choice. He recommends perennial ryegrass anywhere else.

"A lot of TV venues that say they are bluegrass fields are bluegrass no longer," Powell says. "Maybe they were at one time but after a few years and several renovation seedings, they no longer have much bluegrass."

But those well-managed, well-drained fields look good. And that proves the point that, with proper management, a local native soil field can look just as good as anything from a big-budget program. For decades we have had many great native soil fields maintained on relatively low budgets, so why can we not do that now?" Powell asks. ■

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Sports turf industry officially loses MSMA

Dr. James Brosnan is the new Technical Editor for *SportsTurf* magazine.

MONOSODIUM METHANEARSONATE (MSMA) is a commonly used herbicide in warm-season climates. Since the 1960s, this product has been used to manage infestations of various crabgrass species (*Digitaria* spp.), as well as goosegrass (*Eleusine indica*) and dallisgrass (*Paspalum dilatatum*) in warm-season turf.

MSMA, an organic arsenical herbicide, contains an organic form of the element arsenic. In its organic form, arsenic is relatively non-toxic. For example, the herbicide MSMA is far less toxic than aspirin (see http://avogadro.chem.iastate.edu/MSDS/aspirin.htm or http://www.cdms.net/LDat/mp47P000.pdf). However, in an inorganic state, arsenic can be highly toxic. It is important to note that **MSMA only contains organic arsenic**. Furthermore, research has continually shown that MSMA is tightly bound to soil organic matter and is not readily leached.

However, water samples from two golf courses in Florida tested high in arsenic in 2006. This spurred a ruling by the U.S. Environmental Protection Agency (EPA) to cancel the registration of MSMA in all aspects of agriculture, including turfgrass management. There was a concern that organic arsenic from MSMA could convert into the more toxic, inorganic, form in the environment.

Multiple public comment periods followed the ruling and the response from various facets of agriculture was overwhelming. The MSMA task force, an alliance of chemical companies that manufacture the product and the cotton industry particularly, led the charge. Concerns were raised on a number of issues about the ruling, particularly that no information was provided regarding the type of arsenic detected in the water (i.e., organic or inorganic), the source of the arsenic found, and that there was no way to conclusively say that the arsenic was from applications of MSMA.

Latest ruling on MSMA use in turf

On January 16, 2009 the EPA and the MSMA task force announced the final decision regarding the use of MSMA in turf. Sports turf was not deleted in the January ruling; **however, considering it did not receive the same exemption that was provided to golf courses and sod farms, use on athletic fields will be deleted after December 31, 2010, per the EPA's original ruling in August of 2006**. It is important to note that the January 2009 ruling also indicated that it will be illegal to apply MSMA in the state of Florida, regardless of use site, after December 31, 2010.

Golf courses will continue use of MSMA through December 31, 2013. Newly constructed courses will be allowed one broadcast application, and existing courses will be able to use MSMA only as a spot treatment providing that spots are less than 100 square feet and no more than 25% of the course is treated within a given year.

Sod farms will be able to use MSMA through December 31, 2013 as well. Two broadcast applications of MSMA will be allowed per crop, and a 25-foot buffer strip will be required for farms bordering permanent water bodies.

The latest ruling deleted "residential turf" as a legal MSMA use site. Thus, lawn care operators will not legally be able to apply the product after December 31, 2010.

What's next?

Before 2013, the EPA will conduct an external review of the scientific information outlining the risks posed by inorganic arsenic in the environment. The use of MSMA will continue beyond 2013 should this review conclude that there are no health risks evident from applications of MSMA on golf courses and sod farms. EPA will also review the role that MSMA plays in weed resistance management before making a decision about use beyond 2013.

The loss of MSMA will certainly make managing weeds in warm-season turf more difficult, and inevitably, more expensive. Research is continually evaluating new compounds, as well as combinations of existing compounds, that will help soften the blow. To follow the latest research being conducted at the University of Tennessee, visit http://tennesseeturfgrassweeds.org. ■

James T. Brosnan, Ph.D., is assistant professor-turfgrass weed science at the University of Tennessee in Knoxville. Greg Breeden is the weed science extension associate at UT-K.