

BY HAL PHILLIPS

When Westmoor Country Club reopens late this month, the innovations implemented by Lohmann Golf Designs, contractor TDI International and Westmoor superintendent Jerry Kershasky may well change the way upper Midwest-golf courses are renovated and maintained.

At Westmoor, which is located in Brookfield, Wis., Lohmann Golf Designs directed significant green, tee and bunker upgrades. The bunkers are dramatic, sporting the deep, flat-bottomed, steep-faced style reminiscent of William Langford, who worked at Westmoor during the late 1950s.

Marengo, Ill.-based Lohmann Golf Designs also re-grassed all 18 putting surfaces with something relatively new to a climate this far north – A1 bentgrass, a premium turf that extreme density helps it resist *Poa annua* encroachment. The greens' drainage was enhanced before the fumigation and seeding process.

Only four greens were rebuilt from scratch. Soil profiles were prepared on the new putting surfaces to replicate the other 14 greens, allowing consistent maintenance practices coursewide. Lohmann's redesign also included removing about 500 trees, which increased the course's slope rating.

"This was an extraordinary project on so many levels," says Bob Lohmann, founder and principal of Lohmann Golf Designs. "There were so many interesting technical factors involved below the playing surface, in terms of agronomy and construction, it's easy to gloss over the work we did above ground, where we transformed an OK golf course into a spectacular golf course."

LGD was lucky to be reminded of what's important by the members, Lohmann says.

"We've had members who opposed the renovation acknowledge the project's success," he says. "It has been a long winter of anticipation for them – waiting to play the new Westmoor."

IN THE MAKING

A new and thoroughly improved course at Westmoor has been a long time coming. The members laid out the course in 1926, and several architects have left their marks on the course since. In 1957, William Langford

completely redesigned five holes along the new interstate at the time, and they're the best holes, says Kershasky, who added that shortly after Langford finished, the club softened the bold features.

Langford is one of golf's great practitioners from the golden age of course design, widely known in the Midwest for his work at places such as Lawsonia Links in Green Hill, Wis.; the Wakonda Club in Des Moines, Iowa; Skokie Golf Course in Chicago and neighboring Ridgemoor Country Club, where Lohmann Golf Designs authored a comprehensive, sympathetic renovation in 2003.

Lohmann and senior designer Todd Quitno have been working at Westmoor with Kershasky since the early 1990s, when the club resolved to restore Langford's work and carry it throughout the course. LGD managed to restore the bunkering on several of the original Langford holes, but its plans for the remaining holes stalled for various reasons.

At A Glance: Westmoor Country Club

Location: Brookfield, Wis.

Web site: westmoor.org

Type of project: Renovation (greens, tees and bunkers)

Golf course superintendent: Jerry Kershasky

Architect: Lohmann Golf Designs

Builder: TDI International

Course closed: Aug. 1, 2008

Course reopening: Late May 2009

Turfgrass on greens: A1 bentgrass

Course length: 6,800 yards

Greens: SR1119 bentgrass

Tees and fairways: SR1119 and Providence bentgrass

Immediate rough: a blend of bluegrass, ryegrass and fescue

Far rough: a straight mix of fescue



Fast forward to 2007 and the decision to regrass. *Poa annua* infestations made Westmoor's putting surfaces inconsistent, difficult to maintain in the summer and susceptible to winter kill. The decision to go with A1 – based on success stories from clubs in nearby Chicago and recommendations by the USGA Green Section – convinced the club to finish the remaining green, tee, bunker and tree work.

Because of the climate in the Midwest, the fumigation and regrassing process requires an August 1 course closing. With that sort of scheduling mandate, Lohmann and the club resolved to equip the greens with enhanced drainage capability before August 1 and renovate the remaining holes before the snow fell – in a fashion consistent with Langford's steep-'n-deep bunkering and strategic angles at greenside and along fairways.

"Renovating around existing greens is an exciting challenge," Quitno says. "Of course, it would've been easier to blow up every hole

and start from scratch, but that's not what the members were looking for. They like their golf course. So we worked hard to preserve Westmoor's character and still evoke the Langford spirit on those holes that were lacking."

As part of the project, Lohmann rebuilt a couple of putting surfaces that lost pin locations because of extreme slopes.

"Westmoor's greens have always run fast, and some were downright unfair," Quitno says. "The new greens will still be fast, but the A1 will make them consistent, and the Langford style we used will make them dramatic, but fair."

Quitno singled out the pond and putting-surface scheme planned for the 10th and 14th holes as examples of this balance. The project team recontoured the surface of the 10th green and raised the 14th putting surface about 3 feet and connected it with the 10th, creating a double green with a deep, Biarritz-like swale in between.

The team also expanded the ponds in front of each green and decorated the greenside banks with boulder walls, similar to those found elsewhere on the course.

"It's a dramatic change and an interesting look," Quitno says.

LGD's master plan lengthened the course from 6,846 to more than 7,050 yards from the tips. It also includes a combination of practical objectives and creative flourishes. It will restore, for example, much of the 1st hole yardage Westmoor lost when it built a new clubhouse in the 1990s. LGD also created a series of attractive chipping areas that surround the greens and occasionally sweep up to form tees on the following holes, adding a subtle flare to the routing's transition areas.

DOWN THE DRAIN

The drainage plan is creative, too. Last spring, Stuart, Fla.-based XGD Drainage – a subsidiary of contractor TDI International – removed 2-inch strips of sod on each green before digging 15-inch drainage trenches spaced every 6 feet in a modified herringbone design. XGD then laid down 2-inch drain tile and refilled the trenches with a 7:2:1 mix of sand, soil and peat – an attempt to match the greens' existing push-up soil profile. The sod then was relaid and members played the greens until Aug. 1.

When the course closed, the existing putting surfaces were killed via fumigation. Samples of the soil profiles underlying these greens were sent to a testing lab to determine their characteristics.

"This was an extremely important phase, because when this course reopens, we want all 18 greens – the four we rebuilt and the 14 that weren't rebuilt but were regrassed – to be cared for in a reasonably identical manner," Quitno says.

Westmoor's holes 6 (above) and 10 (below) after being redesigned by Lohmann Golf Designs. The upgraded bunkers are deep, flat-bottomed and steep – a style reminiscent of William Langford, who worked at Westmoor during the late 1950s.





The lab recommended a 7:2:1 construction mix of topsoil, sand and peat, the same mix used for the XGD drainage backfill. It's a dirty mix, not a USGA mix, but it matched the existing profile closely, and that's what LGD used on the four new greens.

"We had to go this extra mile because it made no sense to put the same grass on 18 greens

that didn't have the same soil profiles," Quitno says. "Of course, we could have rebuilt all 18 greens, but that was a considerable expense. Maybe the most important new information the Westmoor project will demonstrate is that clubs in this climate, and of this age, have viable alternatives to rebuilding their greens."

AMONG THE TREES

The tree situation at Westmoor typified the complicated anxieties attached to removal. Most acknowledge courses this old were built on land that was treeless originally or sparsely forested. And most agree tree encroachment hinders play and steals sunlight/soil nutrients from turf. But removing those trees after 80 years remains touchy, politically. At Westmoor, all those anxieties were joined by another: Members thought removing so many trees would make their slope rating decline – the secret fear of club members everywhere.

However, John Warren of the Wisconsin State Golf Association walked the course this past fall, and his findings surprised and

delighted the Westmoor faithful. Warren explained WSGA raters look at 10 different obstacles when rating a golf course – trees are just one of them. In his opinion, and based on a few measurements, he says the rating and slope at Westmoor will stay the same at minimum and likely increase.

"Part of this is because we've added considerable distance to the course, especially from the back tees," Lohmann says. "But also because we have added considerable challenge in the landing areas and around greens with the new bunkering, and we have removed trees that, by majority, didn't affect the immediate strategy of the golf course previously."

Still, the course is surrounded by more than 2,000 mature trees, and the ones LGD removed weren't key trees.

"The WSGA feels the course has actually been toughened for most players," Lohmann says. "I guess time will tell." **GCI**

Hal Phillips is a freelance writer based in New Gloucester, Maine.



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BY DAVID M. KOPEC, PH.D.

GAINING CONTROL

In the second of a two-part series on *Poa annua*, David M. Kopec, Ph.D., presents several control strategies.

In last month's article, we saw that *Poa annua*, also known as annual bluegrass, can be a cosmopolitan weed in almost all turfgrass situations. In warmer climates, the vast majority of the annual bluegrass is the true winter annual (*Poa annua* var. *annua*) that germinates in the fall, grows throughout the winter season, flowers profusely in the spring during March and April and then dies as the summer temperatures rise. The seed will remain in the soil all summer long and will germinate again early during the next fall. The annual form of *Poa annua* produces stemmy seed heads that often grow in a circular pattern

around the leaves, especially when the turf is mowed regularly. We also saw that *Poa annua* produces plants that are perennial in nature. These tend to "end up" on cool season bentgrass greens in warm climate regions, as well as on turfs of all different types (tees, fairways and roughs) in colder climates.

In southern climates where bermudagrass is the mainstay, the bermudagrass greens will squeeze out most of the *Poa*, both annual and perennial forms. The hot weather stress is not conducive for *Poa* growth.

Weed control programs in turfgrasses

generally are targeted against the annual form of *Poa*, (prevention and/or seed head control or growth suppression). For the perennial forms, the mainstay programs center on growth regulation and seed head suppression.

Situations for considering different *Poa* control strategies are:

- Type of *Poa* present;
- Background host turf competitive effects; and
- Herbicide tolerance of the host turf.

POA ANNUA IN BERMUDAGRASS TURF

This situation includes the often mandated

Research to control *Poa* includes evaluating products for control at germination, ability to seed into treated areas, elimination of emerged plants, plant growth regulation to favor the host species and seed head control.



TABLE 1: PREEMERGENCE CONTROL OF POA ANNUA FROM SEED WHEN BERMUDAGRASS WILL NOT BE OVERSEED:

Benfen (Balan*)
Bensulide (Betasan*)
Dithiopyr (Dimension*)
Oryzalin (Surflan*)
Pendimethalin (Pendulum*, Pre-M*)
Prodiamine (Barricade*)
Trifluralin (Treflan*)



Poa is capable of growing at all mowing heights and soil conditions. Note the light-colored *Poa* in the surrounds, the collar and on the clean-up pass around the green.

requirement to overseed the bermudagrass with a cool-season grass in the late summer/early fall. In this case, the germination of the cool-season overseed (ryegrass or perennial ryegrass) is a critical issue. If the bermudagrass is *not* going to be overseeded, it's much easier to control your *Poa* in a bermudagrass turf program.

Control *Poa* at the time of germination and prevent emergence by using a preemergence herbicide, or wait until after most of the *Poa* infestation is emerged and visible then use a postemergence herbicide.

Control *Poa* in overseeded winter turfgrasses, perennial ryegrass or roughstalk bluegrass (*Poa trivialis*) or in non-overseeded dormant bermudagrass by safely using preemergence or postemergence herbicides.

Prevent *Poa* from maturing and inhibit seed head growth without affecting ryegrass emergence.

PREEMERGENCE CONTROL OF *POA ANNUA*

There are many options available if a winter turfgrass is not overseeded into the bermudagrass. Several preemergence grass herbicides will easily control *Poa* by preventing seedling emergence (Table 1). As you can see, these are standard preemergence herbicides that control grassy weeds

TABLE 2: PRODUCTS FOR PREEMERGENCE CONTROL OF *POA ANNUA* IN OVERSEEDED BERMUDAGRASS

Fenarimol (Rubigan*)

Rubigan is a fungicide that has activity against *Poa*, but not on ryegrass, and has only slight activity against *Poa trivialis*. Rubigan should be applied in a two- or three-application program for a total of 12 ounces of product per 1,000 square feet in the fall season. If only ryegrass is used for the overseed turf, use two applications of 6 ounces of product per 1,000 square feet. Rubigan can be applied up to two weeks before overseeding. If *Poa trivialis* is used for the overseed turf, use three applications, with the last application being made 30 days before overseeding. For both two- or three-application programs, the treatment intervals are 14 days apart. Because Rubigan is an expensive molecule to make, it's usually used on high-profile turfs, such as greens and tees. It has a very good margin of safety, when applied at label rates and label timings.

Prodiamine (Barricade*)

Barricade, when applied six to eight weeks before overseeding, will stop 95 percent of the *Poa* from germinating and let the ryegrass come through. The ryegrass roots will be stunted for a while. Irrigation is critical and the ryegrass should not be allowed to dry and become stressed. Barricade is labeled for use on golf course turf (not greens), lawns and sod farms. The label states that rates for this special use of Barricade are 12 to 21 ounces of product per acre. Make sure your product application overlaps are right on target or you will double the applied rate and risk slow emergence and stunted turf afterwards.

Rimsulfuron (Tranxit*)

Tranxit can be applied five days before seeding (or overseeding) at 2.0 ounces of product per acre. It's labeled for many turf sites including sod farms, seed farms, golf courses, professionally managed college and professional stadium turf and industrial and commercial sites. Remember that Tranxit is also used to kill ryegrass in the spring to help the bermudagrass come back. Now we have a special use of this product for overseeding. When using Tranxit, the *Poa annua* must be visible at the surface (already germinated). The application of Tranxit will kill the *Poa*. Five days after Tranxit is applied, you can overseed with ryegrass. Therefore, Tranxit can be used in a "late" overseed situation - after the *Poa* has germinated, but before overseeding.

at label rates. In this case, it's usually easy. The products in Table 1 are applied in late September. If these herbicides were applied in the previous spring for summer annual grass weed control (crabgrass, etc.), these chemicals will not last long enough in the soil to be effective against *Poa* in the fall season.

When bermudagrass will be overseeded with a winter turf (ryegrass), the selection of an herbicide is limited and timing of application of a preemergence herbicide is very critical (Table 2, page 85). In this case, ryegrass must be able to emerge safely after overseeding and at the same time try to prevent *Poa* establishment. Most

preemergence herbicides also will prevent the ryegrass from emerging. However, a properly timed and a very early application of a preemergence herbicide is one option. Another option is to use selective chemicals that control the *Poa* while being safe on the emerging winter turf.

POSTEMERGENCE CONTROL OF *POA ANNUA* – WARM SEASON TURF

Here, the *Poa* has emerged and exists as either a seedling or as an established plant. The size and age of the weed and the background turfgrass are important considerations when applying postemergence herbicides for a *Poa*-control program.

When ryegrass is overseeded and established as a winter turfgrass, the safety to ryegrass and the underlying dormant bermudagrass is critical.

For postemergence control of *Poa annua* in bermudagrass overseeded with ryegrass, ethofumesate (Prograss*) is an option. Prograss is applied to the overseeded turf after the ryegrass has emerged and the bermudagrass is dormant. It's safe on ryegrass, but the bermudagrass must be totally dormant or injury will appear during spring green-up. It works best when the *Poa* is young and is in the two to four tiller stage. Prograss has both preemergence and postemergence activity on *Poa*. It's safe on ryegrass, Kentucky

IMPACT ON THE BUSINESS

Troubled greens

WIDGI CREEK IS REPLACING SEVEN OF ITS 18 BENTGRASS PUTTING SURFACES THAT WERE OVERTAKEN BY *POA ANNUA*. **BY ZACK HALL**

Widgi Creek Golf Club has had enough of its annual fight against *Poa annua* on its greens.

The Bend, Ore., course, which opened 18 years ago with plush bentgrass greens, is like nearly every golf course in the Pacific Northwest that was originally seeded with bentgrass.

Slowly, the greens have been overtaken by *Poa annua*, which is annual bluegrass that runs wild in the region and gives superintendents in Central Oregon headaches year after year.

Poa annua is a particular problem in Central Oregon because it's susceptible to the region's harsh winters, leaving many of Widgi's greens with brown, dead patches every spring.

Instead of patching up the greens, as Widgi has done for years, this year the golf course has decided to replace seven of its greens at the cost of about \$10,000 apiece.

Dan Ostrin, director of golf at Widgi Creek, says the replacement project has been discussed for the last few years.

"At some point in time we were going to have to do something," Ostrin says. "Pretty much year after year as the *Poa annua* had slowly taken over more of the greens, the health of the grass was slowly deteriorating."

Widgi Creek's maintenance staff, along with Beaverton-based Bernhardt Golf, which Widgi hired for the green replacement, have torn out the old greens on the fourth, seventh, ninth, 11th, 13th, 14th and 16th holes.

On April 7, the golf course staff and Bernhardt began laying down A4 bentgrass sod, grown specifically for Widgi Creek by Canadian grower BOS sod. The sod, which took several days to install, is grown under United States Golf Association standards and delivered at the exact grass height (0.2 inches) as Widgi's other greens.

At a cost of about \$10,000 per green, the transfusion is a major

investment even in roaring economic times.

But even in a down economy, Widgi Creek thought now would make a good time to replace the greens.

A relatively mild late winter and spring has helped spur the process.

Because Widgi was free of snow by the middle of March, the work started earlier than initially expected. And Ostrin expects the renovated greens to be ready for play by mid-May.

"We'd better take advantage of the opportunity even though, financially, it might not be the greatest time right now," Ostrin says. "But it is something that improves the course, and it is putting the money back into the business."

Larry Gilhuly, who oversees turf quality for the Western Region of the USGA, says that while *Poa annua* can work well for golf courses west of the Cascade Range, it has trouble in harsher high-desert climates.

Bentgrass uses less water and withstands temperature extremes better than *Poa annua*, he says.

Gilhuly, who lives in Gig Harbor, Wash., should know. His job is to help golf courses in Oregon, Washington, Hawaii and British Columbia, find the best grasses for their respective climates.

He has consulted with Central Oregon golf courses such as Bend Golf and Country Club and those at Sunriver Resort.

And he says it's inevitable that a bentgrass golf course in the Northwest will be overtaken by *Poa annua*, because the annual bluegrass has the ability to dominate whatever grass was originally planted by being a prolific seed producer and by withstanding shade and foot traffic.

"I haven't seen a course yet really over 10 years old that is pure bentgrass," Gilhuly says. "Because the way you get rid of *Poa annua* in bentgrass is to hand weed it. You better have a lot of staff to pull

bluegrass, tall fescue, St. Augustine, and dormant bermudagrass. It's not to be used on golf greens. Prograss is applied at 0.65 to 0.75 gallons of product per acre. Two applications near the dates of December 20 and by mid-January are effective and safest when the bermudagrass should be dormant. The label states February 1 or "four weeks before bermudagrass breaks dormancy" serve as the last date for application or spring green-up will be delayed.

In situations when the bermudagrass is not overseeded with a winter turf, there are many options available (Table 3, page 90). Many of the herbicides are non-selective and so it's critical to be sure that the un-

derlying bermudagrass is dormant before making applications. The *Poa* will begin to flower from late January to mid-April with profuse flowering in March. It's better to eliminate the *Poa* before flowering.

POSTEMERGENCE CONTROL OF *POA ANNUA* – COOL-SEASON TURF

Prograss is still used on fairways of Kentucky bluegrass and higher cut turfs. A relatively new product called Tenacity* (active ingredient is mesotrione) has shown good postemergence activity and preemerge activity when applied twice in the fall. There will be more information on this product as more tests are done around

the country. Mesotrione is not safe on bermudagrass turf.

On greens and fairways, there are labeled products of Cutless*(flurprimidol) and TGR* (paclobutrazole). These products are turfgrass growth regulators that, when applied at label rates, will have a greater effect on *Poa* than the surrounding creeping bentgrass. Read the labels carefully to make sure you choose an application program that deals with the amount of *Poa annua* that's present in the green and the risks of application in low (cold) and high summer stress conditions (heat/humidity).

Velocity* (bis-pyrobac sodium) has been in play as an experimental compound that

that off."

Oregon's High Desert presents some particular obstacles in the fight against *Poa annua*, he says.

"Two problems – it's the winter and the summer," Gilhuly says. "(*Poa annua*) has poor heat tolerance and it has poor cold tolerance. That is why it has difficulties on (the east) side of the state."

Widgi Creek, in particular, struggles with *Poa annua* because of its location. At a slightly higher elevation than the rest of Bend, the course tends to endure slightly longer, colder winters than lower-lying golf courses.

In addition, the ponderosa pine-lined golf course is shady, particularly on the seven greens that are being replaced.

According to Widgi, A4 bentgrass is rated to withstand freezing temperatures for as long as 90 days, while *Poa annua* will withstand those temperatures for only about 45 days.

That's a big difference for a golf course that is often under snow for much of the winter, and has forced Widgi to replace dead, brown patches of *Poa annua* every spring.

"(*Poa annua*) can be a very good putting surface," says Ostrin. "But you need to be out of an area that is not covered in three feet of snow two months a year."

Widgi Creek could have continued its patchwork fixes, but the course was concerned about the consistency of its greens.

"That was an option: You can always go in and cut out a third of the green that is maybe your trouble spots," Ostrin says. "But how does the turf blend? How does it work together? So that is kind of the stuff we looked at. We know that the greens are one of the good selling points to our golf course. So we want the best surfaces we can get."

Widgi could have also chosen to reseed the greens completely with bentgrass instead of replacing them with sod, which would

have been less costly at about \$500 to \$1,000 per green, Ostrin estimates.

But greens reseeded in the spring would take most of the summer to become playable, Ostrin says. With an already short golf season in Central Oregon, reseeding would have been unacceptable to Widgi Creek.

"It wasn't a good option for us," Ostrin says.

In addition to the greens surface overhaul, the golf course has removed its collar dams, an area around greens that, over time, builds up and prevents water from flowing off.

Those collar dams have allowed water to pool on the greens, aiding the formation of destructive ice during the fall and winter.

Gilhuly, who knows Widgi well but has not consulted on the project, says he believes the course is taking the right steps, including the removal of those collar dams.

In addition, future tree removal will be important to allow sunlight to hit those greens. That was a crucial part of helping Bend Golf and Country Club, with which Gilhuly consulted last winter, to overcome its *Poa annua* problems, he says.

"I call it 'deep pruning,'" Gilhuly says. "Six inches below the soil level and prune. It's a fact on any golf course with bentgrass."

Widgi Creek plans to eventually replace the other 11 greens on the course, though no timetable has been set, Ostrin says.

The good news, he adds, is that there is not as much urgency with those greens.

"When that is, I don't know," Ostrin says. "Money is a big issue because it is an expensive project. So you kind of want to spread it out. And the other greens are still pretty healthy." GCI

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Research

has received registrations in many states. It works well in certain places (northern climates that have long, consistent cold winters and short springs). In other places that have milder winters, with a lot of up-and-down temperatures, it has mixed results to date. It makes the *Poa*, as well as some cultivars of Kentucky bluegrass, bright yellow. It makes ryegrass a bit yellow for a while, as well.

Another product called Legacy* is a commercial mixture of two turfgrass plant growth regulators: Primo (trinexpac ethyl) and Cutless (flurprimidol). This combination packs a one-two punch of slowing down a hormone that makes cells elongate. You would use this product where *Poa* has invaded another turf, where the *Poa* becomes stunted more so than the host background turf. The label includes application programs for northern and southern turf applications, and it's also labeled for bentgrass greens (not for bermudagrass greens).

POA ANNUA CONTROL ON GREENS

Bermudagrass greens overseeded with ryegrass or *Poa trivialis* and bentgrass greens require special attention. Many plant growth regulators can be used safely to suppress *Poa* (Tables 4A/4B, page 90). Read the labels in their entirety, as particular protocols exist when using these products on greens.



Note the amount of *Poa* that will invade golf turf if there is no chemical control. Here, the absence of using a pre-emergence herbicide shows large amounts of *Poa*.



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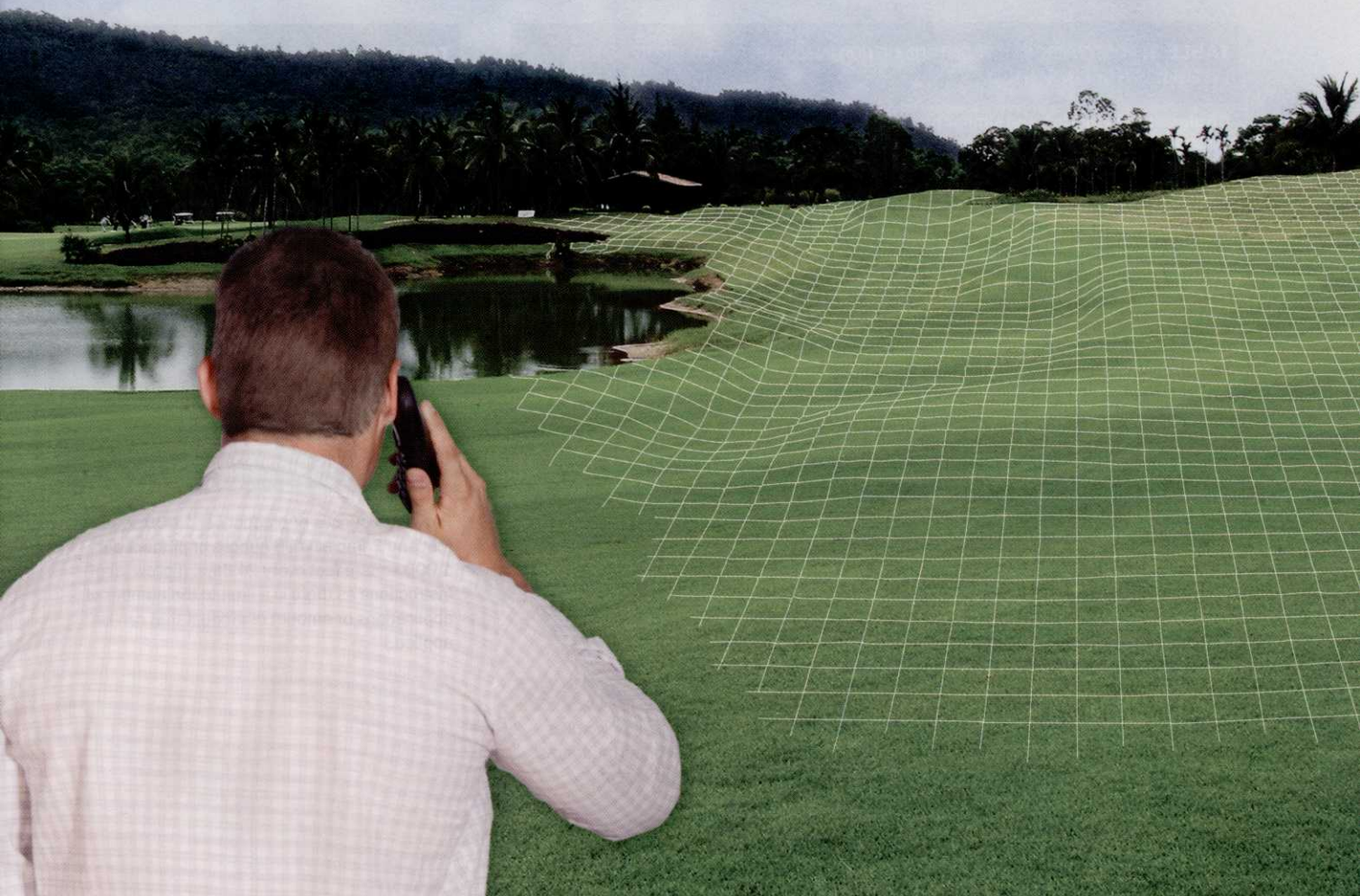


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Rarely will you find the perennial form of *Poa* on these greens. If you missed the opportunity to use a preemergence herbicide during fall overseeding, then you probably will have some of the true winter annual *Poa*.

Since you have winter ryegrass on the green, it's safest to stop the seed heads from emerging in the spring and then let

the annual *Poa* die from heat in late June. In this case, starting in the beginning of January, apply a tank mix of Proxy at 5 ounces of product per 1,000 square feet and Primo at 0.25 ounces of product per 1,000 square feet every 24 days (Table 4B). Apply this combination regularly through May or until the *Poa* is eliminated by the high temperatures. **GCI**

David M. Kopec, Ph.D., is a specialist in the department of plant science at the University of Arizona.

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TABLE 3: POSTEMERGENCE CONTROL OF POA IN NON-OVERSEEDED BERMUDA (RYEGRASS NOT PRESENT)

Glyphosate (RoundUp* and similar products)

A broad-spectrum and non-selective herbicide, glyphosate will control most actively growing green plants. Therefore, the bermudagrass must be dormant or injury will occur. Weed control is slow in winter and may take longer than seven to 14 days, but application at that time helps with *Poa* seed head management. Rates range from 8 to 64 ounces of product per acre, or as a directed; spray or spot spray and use a ¾ percent solution (1 ounce of product per gallon of water).

Diquat (Reward*)

A broad-spectrum and non-selective herbicide, Reward will rapidly control most weeds and *Poa* on contact. Therefore, the bermudagrass must be dormant or injury will occur. Use a rate in the range of 1 to 2 pints of product per acre.

Pelargonic acid (Scythe*)

This is fatty acid soap that is a broad-spectrum and non-selective herbicide. Apply it to dormant bermudagrass. Use rates are from 1-1/3 to 10 ounces of product per gallon of water. Spray until the foliage is wet.

Pronamide (Kerb*)

Kerb is an herbicide that controls all cool-season grasses. It will move with water after it's applied on the turf. Be cautious since it will move laterally. Kerb has both postemergence as well as preemergence activity on *Poa*. Application rates range from 1 to 2 pounds of product per acre.

Ethofumesate (Prograss*)

Again, Prograss will control young *Poa* plants only if it's smaller than the one to two tiller stage. Do not apply it within four weeks of the expected dormancy break of bermudagrass. The label states "do not apply past February 1." This direction is in the interest of protecting the bermudagrass.

Simazine (Princep*)

Simazine has both preemergence activity and postemergence activity on young seedling *Poa*. It won't be effective on mature *Poa* in March. The recommended rate is 1 quart of product per acre. Simazine must be watered in and applied October 1. Simazine will "yellow" bermudagrass temporarily. It is not to be used on golf course greens.

Glufosinate ammonium (Finale*)

Finale, similar to RoundUp, is a non-selective postemergence herbicide that must be applied when the bermudagrass is dormant. Application rates range from 2 to 6 quarts of product per acre and the high rate should be used in cold weather or if the *Poa* exists in dense populations. If using a directed or spot spray, use 3 to 4 ounces of product per gallon of water.

TABLE 4A: BENTGRASS GREENS

Vegetative suppression of *Poa*

Flurprimidol (Cutless*)

Paclobutrazol (TGR*) – quite popular

Mefluidide (Embark*) – for seed head control

Fenarimol (Rubigan*) – not the best choice here

Seed head control of *Poa*

Trinexapac-ethyl (Primo*) mixed with ethephon (Proxy*)

Table 4B: OVERSEEDED BERMUDAGRASS (RYEGRASS AND/OR POA TRIVIALIS PRESENT)

Proxy at 5 ounces of product per 1,000 square feet and Primo at 0.25 ounces of product per 1,000 square feet every 24 days. (Follow label instructions as there is a limit to the number of applications or amount of product that can be applied.)