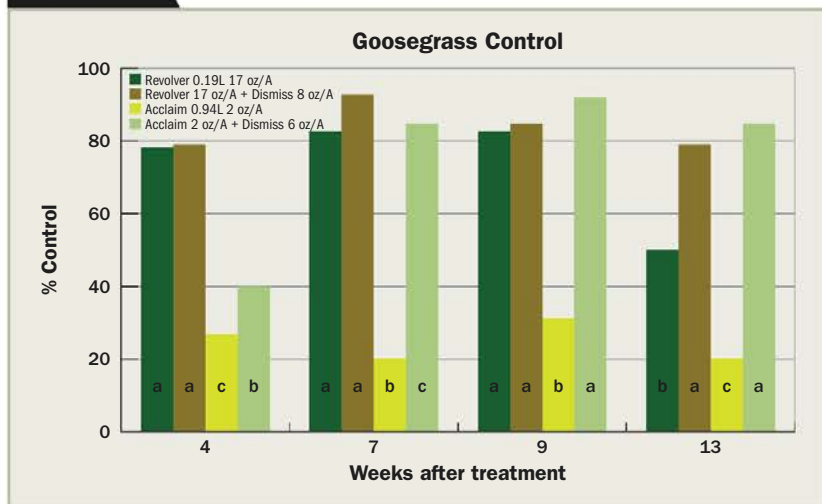


plants, basically starving treated weeds to death. This slow-to-work characteristic is manifested when temperatures are cool (<50 F). Dismiss, being more of a contact herbicide, is influenced more by available sunlight vs. warmer temperatures, offers activity within hours of application. Treated plants start to turn off-color, leaf margins are damaged, and plants start to wilt and eventually lead to shoot burndown. Figure 1 demonstrates hastened control of creeping Charlie (also known as ground ivy) when Dismiss is added to metsulfuron (several trade names). For example, one week after treatment, weed control was less than 5% without Dismiss, while it was almost 60% when Dismiss was added to metsulfuron. This trend was also evident two weeks after treatment where metsulfuron alone provided almost 60% control but when tank-mixed with Dismiss, 90% control was achieved.

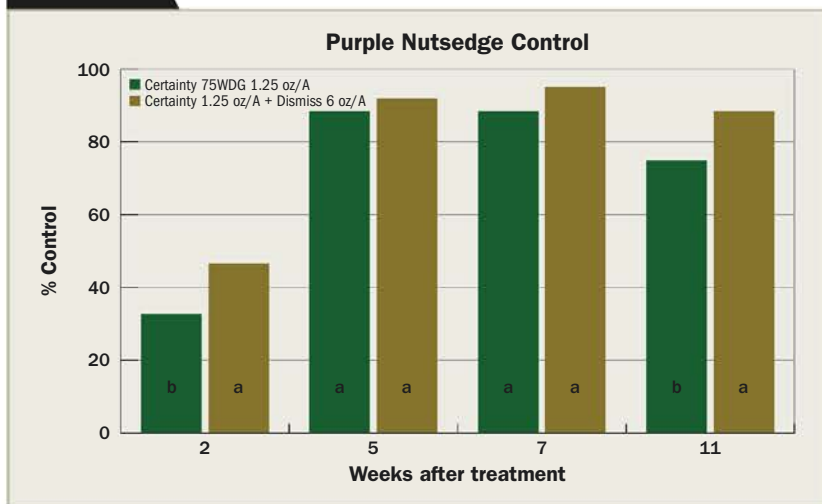
Dismiss 4L also offers additive control to many problematic weeds in turf, including many broadleaves, grasses and sedges/kyllingas. Adding 2 to 6 oz/acre as a spray tank additive provides quicker herbicide activity as previously discussed, but also “heats up” the tank-mixtures in terms of wider and more complete weed control. This is especially true for tough-to-control weeds such as perennial broadleaf weeds, grasses such as goosegrass and many sedges and kyllingas. For example, when controlling goosegrass (Figure 2), adding Dismiss to either Acclaim Extra (fenoxaprop-p-ethyl) or Revolver (foramsulfuron) again hastened control and also helped provide better long-term results. When tank-mixed with Dismiss, Revolver provided better goosegrass control after 13 weeks than without it (Figure 2). With Acclaim, adding Dismiss provided quicker and better short- and long-term goosegrass control. Figure 3 demonstrates quicker and longer term purple nutsedge control when Dismiss was tank-mixed with Certainty (sulfosulfuron).

FIGURE 2



Adding Dismiss to postemergence grass control products helps accelerate control and better extended control compared to not adding it. Shown are Acclaim Extra 0.94L at 2 oz/acre and Revolver 0.19L at 17 oz/acre with and without Dismiss 4L at 8 oz/acre for quicker and better long-term goosegrass control. Dissimilar letters at a particular rating date indicate statistical difference at the 0.05 level of probability as determined by Fisher’s protected LSD.

FIGURE 3



Purple nutsedge control is hastened and longer-lasting when Dismiss 4L is added at 6 oz/acre to Certainty 75WDG at 1.25 oz/acre. Dissimilar letters at a particular rating date indicate statistical difference at the 0.05 level of probability as determined by Fisher’s protected LSD.

So, if you are looking for a spray addition to “heat things up,” Dismiss often not only provides a wider spectrum of weed control, but is also less temperature dependent than other products. Mixtures with Dismiss often work much quicker, providing

an increased sense of security that the applicator is indeed treating the problem and dismissing the idea that only water has been applied.

Bert McCarty, Ph.D., is a professor of turfgrass science at Clemson University and can be contacted at bmccarty@clemson.edu.



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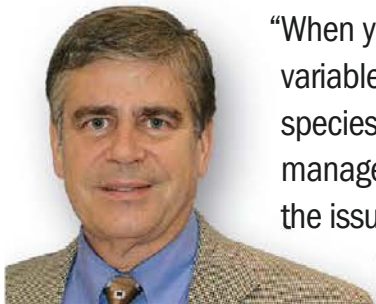
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KARL DANNEBERGER, PH.D., *Science Editor*

“When you look at yellow turf and the variables associated like type of soil, grass species, organic matter accumulation and management practices, the complexity of the issue becomes evident.”

Color by numbers? Not in turf

Summer's closure always brings a time for agronomic reflection. Like past summers, predicting what the weather will do is difficult. Across the United States some areas were too hot, dry, or wet. Weather's impact on turf is difficult to predict, as is the turf's response to the stress.

This year several golf courses experienced periods of high temperatures, along with excessive rainfall resulting in highly stressed turf. Explaining the impact of the environmental conditions and the plant's response to a member or club official often is complicated. As a club member recently said to me, “It's not like 2 + 2 equals 4.” I found that response to be enlightening.

Whether you are in the United States, China or on the moon, if you are on Mount Everest or in the Brazilian rainforest, 2 + 2 always equals 4. However, when dealing with living things like plants, the stresses that occur do not always add up to the same response.

For example, to visually compare an inanimate object with a living object, I often use a dead and a living sparrow. If I were to take a dead sparrow and throw it up in the air I could probably calculate its flight path (as well as my path to di-

rectly go wash my hands). However, in the case of the living sparrow, if I threw it up in the air I would not have a clue to where it was going or its flight pattern. Life is complex.

When golf course turf turns yellow or declines we often look for the single cause. And if that cause is identified it must be the same problem on all the courses in the region that have similar symptoms, right?

From my experience this is often not the case. When you look at yellow turf and the variables associated like type of soil, grass species, organic matter accumulation and management practices (just to name a few) the complexity of the issue becomes evident. Now you add the variability that occurs from golf course to golf course and the solution to the “yellowing” becomes even more complex.

Given that golf courses are unique biological entities we need to pay atten-

tion to the specific course conditions present. A good comparison would be how cancer research and treatment has evolved over the last 10 to 15 years. Physicians using molecular techniques can identify individually genetic changes in a cancer tumor, and how the surrounding tissue, or as it is sometimes referred to, the “microclimate,” influences tumor behavior. I find it fascinating that tumor cells are continually communicating with the surrounding “microclimate.”


By knowing the genetic alterations in the cancer tumor, and the responses due to the “microenvironment,” targeted therapies and bio markers will become available to treat cancer in an individual. It is truly personal treatment.

We do not quite have that level of “personalized plant treatment” in turf, but I think being aware of the unique biological characteristics of one's golf course allows for targeting treatment.

Returning to my yellow turf there are many reasons for the yellowing, including environmental extremes like a lack of light, anaerobic soil conditions, a phytotoxic response to a chemical(s), or from a disease. Diagnosing the exact cause of the yellowing, as most of us know, is not that easy. Given that, if I were to visit two golf courses that had identical yellowing, sent samples from both that confirmed the presence of the bacterial disease *Acidovorax*, would that be a good enough diagnosis? What if I told you on one of the golf courses turf decline was occurring while the second golf course the turf quality was fine? What would your recommendation be?

It just goes to show, when dealing with living things, there is no such thing as simple math.

Karl Danneberger, Ph.D., *Golfdom's* science editor and a professor at The Ohio State University, can be reached at danneberger.1@osu.edu.



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10 keys to enhancing turf survival this winter

Brian Horgan, Ph.D., is a professor of turfgrass science at the University of Minnesota. Winter survival of turf is one of Brian's research interests and he can be contacted at bphorgan@umn.edu.

Q What is the most common cause of winter injury on putting greens in Minnesota?

There is no single consistent cause of winter injury from year to year, or golf course to golf course or even within a single golf course. Turfgrass dies because of ice cover (anoxia), crown hydration, desiccation and direct low temperature kill or more often two or more of these factors in combination. It can be very difficult to identify the specific cause of winter injury.

Q What can be done in the fall to minimize winter injury?

1 Interseed with creeping bentgrass in early September If you have thin turf due to summer stress or a large population of annual bluegrass, interseed in late August or early September in conjunction with aeration. Creeping bentgrass is more winter hardy than annual bluegrass.

2 Aerify in early September Aerify and topdress in early September to create good growing conditions the remainder of fall and to reduce thatch accumulation.

3 Monitor soil moisture in the greens Provide sufficient water all fall to encourage healthy, actively growing turf. Be sure the soil is at field capacity before you blow out the irrigation system. If fall is warm and dry, delay blowing out of the irrigation system in order to keep irrigating.

Correct any drainage problems on greens. Make sure the collar does not block the flow of water off the front of the green.

4 Fall nitrogen fertilization Our thoughts on fall nitrogen (N) fertilizer for northern climates like Minnesota have changed greatly in the last few years. Maximum fertilizer uptake efficiency occurs in September compared to October or November. Therefore, fertilize once or twice in September with 0.5 to 0.75 lbs. nitrogen per 1,000 sq. ft. at each application with a predominantly soluble N source to maximize carbohydrate storage.

Continue spoon-feeding throughout the fall and late fall with 0.1 to 0.2 lbs. nitrogen per 1,000 sq. ft. every 7 to 14 days.

5 Covers Before buying covers, ask what winter injury problem(s) you are trying to minimize? Do all the greens need the same type of cover? No single type of cover protects from all winter injury problems. It is possible that more than one type of cover will be needed to protect all 19 greens at the golf course.

Topdressing heavily late in fall is a good strategy to help minimize winter injury.

6 Fungicides Snow mold protection is a necessity on greens on most northern golf courses. Consult your local turfgrass pathologist for fungicide recommendations. You can also check the University of Wisconsin Turfgrass Diagnostic Laboratory (www.tdl.wisc.edu) for results of their snow mold fungicide trials.

7 Measuring tools Use your soil moisture meter to precisely measure moisture in soil this fall to make sure the greens have received sufficient irrigation to prepare for winter. Keep a record of the moisture level and compare it with winter injury in the spring to start to build a site history.

"IN THEORY, BOTH WETTING AGENTS AND PGRs APPLIED IN FALL MAY BE BENEFICIAL IN MINIMIZING WINTER INJURY."

8 Wetting agents and plant growth regulators (PGRs) In theory, both wetting agents and PGRs applied in fall may be beneficial in minimizing winter injury, but there are no data yet to support their use in this fashion. The Minnesota GCSA has increased their dues to fund research at the University of Minnesota to minimize winter injury including the benefit of fall applications of wetting agents and PGRs.

9 Winter traffic Prevent winter traffic to the greatest extent possible.

10 Communication Let the golfers know about the steps being taken this fall to minimize winter injury. Emphasize the steps being taken now are to provide good playing conditions next spring.



Clark Throssell, Ph.D., loves to talk turf. Contact him at clarkthrossell@bresnan.net.



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BY CURT HARLER AND SETH JONES

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2. Aercore 2000

The Aercore 2000 has a full 80-inch coring swath. Designed to produce good quality coring holes up to four inches deep, this **JOHN DEERE** unit can cover 100,066 square feet per hour. Its heavy-duty frame, tine rams and adjustable hole spacing makes this aerator durable and versatile. Operators have a choice of two coring patterns — a 2.4-inch pattern or a 3.2-inch pattern, depending on the speed of movement. Flexi-link supporting arm keeps tines perpendicular to the ground longer for producing holes up to 1,200,800 high-quality holes per hour. There are six tine options to choose from. Johndeere.com

3. Greensaire 24

JACOBSEN says its Greensaire 24 walk-behind aerator gives superintendents “unparalleled core hole quality”

RELIEVING COMPACTION, removing thatch and getting the root zone some much-needed oxygen are just a few reasons crews are out there running aerators across the country. It takes long hours and hard work, but admit it: the sound of an aerator pounding the ground is the sound of progress.

which promotes faster turf healing — allowing play to resume earlier. The unit's maneuverability allows for tight turns on undulated turf without causing undue damage. Its narrow platform creates clean and consistent aeration hole depths even on undulations and varying terrains. The core head follows contours of the surface, ensuring tines are in position to create clean, quality holes every time. Jacobsen.com

4. PL72

The **WOODS** core aerator line comes in 48-, 60- and 72-inch models. The PL 60 has 12 plugger wheels and 96 spoons. It penetrates to 4.5-inch depth. The PL72 professional grade aerator is 78.15 inches wide and has a 4.5-inch penetration. Each comes with 96 one-eighth inch thick, three-quarter-inch case hardened steel spoons. It requires a Cat 1 hitch and has an operating weight of 561 pounds. Woodsequipment.com/landscapeEquipment.aspx

5. Coring Shaft

FIRST PRODUCT'S Coring Shaft is a non-PTO powered, 3-point hitch pull-behind. It features a three-quarter inch core diameter and pulls five holes per square foot.

Widths of 40, 60 and 80 inches are available. It fits into all First Products UA models. With five optional shafts and seed box option, the Universal Shaft System Frame can be used in a wide range of applications. Changing shafts takes an hour, so the machine can be used for renovation projects in the morning and seeding in the afternoon. 1stproducts.com

6. GS-48 T.I.P. Spiker/Seeder

Plant, seed and aerate on one pass with the **T.I.P.** Spiker/Seeder. This unit assures good seed-to-soil contact while opening the soil up for better drainage, solving dry spots and loosening the soil. The GS-48 is available both in a pull-type and 3-point hitch models, with a manually operated or electric actuated seed box, and with standard hydraulics or an optional 12-volt electric pump available on the pull-behind model. Either unit comes with 1200 replaceable spikes. Optional rear brush also is available. Tipinc.net

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- Use the carbide-tipped tines, they last longer!
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