

Managing Greens Under Stress

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AMONG THE responsibilities of today's golf course superintendent, the need to maintain a good stand of grass on putting greens is perhaps the most basic of all. Greens are the bread and butter of a golf course, and the reputation of a course and the superintendent who maintains it is often determined by the consistency of those greens. As long as the greens look good and putt well, golfers are inclined to overlook other weaknesses on the course. If this consistency fails for even a short time, though, the superintendent will be criticized — and golfers can be merciless in their criticism of even the least significant flaw.

Maintaining good putting green turf for most of the season is not as difficult as it once was. Science has given us a better understanding of how to maintain closely cut, heavily trafficked turf, and well-timed practices such as aeration, topdressing, fertilization, overseeding, and other renovation work can prepare the turf and the soil for the next period of stress. With the coming of the summer stress season, however, putting green management often takes on a meaning all its own: doing what is necessary to keep the grass alive under stress conditions.

Turfgrass stress can be defined in a number of different ways. By the book, stress is the "strain or pressure causing

a departure from the normal equilibrium." For the turf manager in the field, stress is what causes the grass to wilt and die right before his eyes, just like it did during the summer of 1987, the East's summer of despair. The turf on greens is exposed to many elements that can cause stress. The turf manager has little or no control over some of these factors, such as the amount of play a course receives, under what weather conditions this play occurs, and whether the players wear spiked or spikeless shoes. Other stress factors are imposed by the superintendent himself. These include extremely close mowing, the abrasion caused by turning heavy triplex mowers on the green perimeters and collars, deep vertical mowing, too much or too little irrigation, and misapplying certain chemicals. These stresses can be broadly grouped under mechanical stress.

The other category of stress the turf manager must deal with is given the name environmental stress. Temperature or humidity that is either too high or too low, rainfall that is too much or too little, and the presence of frost, are examples of environmental stress.

Generally speaking, any of these environmental or mechanical stress factors will not cause the loss of grass by themselves, but when a combination of stresses occurs at the same time (e.g.,

close mowing when it is too hot), the turf can be severely weakened, and may wilt and die. When this occurs on greens, it means an immediate public relations problem between the golf course superintendent and those who play the course.

Following is a listing of some of the management factors the golf course superintendent can control to some degree as he manages his turf under conditions of stress. Some may seem obvious, while others are less obvious, but all of them are worth considering in preparing for another period of heavy summer play and the accompanying stresses. After all, loss of turf on greens is something that every golf course superintendent and golfer wants to avoid.

Managing Mechanical Stress

- Raise the mowing height. Mowing the grass too close when temperatures and humidity are too great is a common cause of summer turfgrass failure. In many cases, the golf course superintendent feels pressured into sustaining low cutting heights for the sake of fast greens, resulting in thin, weak, or dead turf, and a mob of angry golfers.

What *should* be done? When the grass is under severe stress and is being cut less than 3/16ths of an inch, and where thinning and scalping damage is seen, raise the mowing height as quickly as



The result of putting green turf cut too low while under stress. The longer grass in the depressed area of the wheel mark survived well.

possible. Even a slight 1/64th- to 1/32nd-inch increase in cutting height can have a very beneficial effect. In contrast, lowering the cutting height by this small increment to increase green speed can have a disastrous effect. The old saying slow grass is better than no grass is so very true.

- Skip mowing. The physical act of cutting grass with a heavy machine is itself a significant stress. Common sense would suggest when the grass is under extreme heat stress (its rate of growth slows anyway) to skip a few days of mowing each week. The greens may lose a little speed, but again, slow grass is better than no grass.

- Avoid double-cutting greens. While double-cutting is one of the most useful techniques at the disposal of the golf course superintendent to achieve and maintain fast greens, it is, nevertheless, another form of mechanical stress. Therefore, when the grass is suffering from heat stress, defer double-cutting until conditions moderate.

- Use walk-behind mowers. Walk-behind units place less mechanical stress on the turf than triplex mowers. While it is true that triplex mowers are marvelously efficient machines, they do cause extra stress on the turf, especially on the clean-up cut around the greens. This mechanical wear is one of the most compelling reasons why more and more golf courses are going back to walk-

behind mowers during the summer stress season. The pleasing, traditional striping effect it causes is an added advantage of hand mowing. Finally, many superintendents feel that walk-behind units do a consistently better job of cutting, while minimizing wear stress at the same time.

- Watch out for grooved rollers. The Wiehle roller is an excellent grooming device for creating better putting green texture and quality, compared to mowers with other types of rollers. When the grass is tender and under stress, however, the extra abrasion these rollers cause, especially on the perimeter cut, can be a major source of stress. Thus, use grooved rollers religiously when mowing the grass during non-stress times, but consider replacing them with solid section or swedge rollers when the turf is under stress.

- Defer routine maintenance operations like topdressing and vertical mowing of greens. While bermudagrass tolerates and may even thrive with an occasional summer topdressing and vertical mowing, cool-season grasses can be injured by such programs if poorly timed. This illustrates a significant difference which exists between the management of cool-season and warm-season grasses during the summer. Warm-season grasses flourish when temperatures are hot, while cool-season grasses can suffer heat stress when temperatures reach the high 80s.

In summary, do whatever is necessary to minimize mechanical stress to cool-season grasses when they are under prolonged heat stress. Putting green speed and quality may be sacrificed slightly during this time, but it is a small price to pay for avoiding the loss of turf and the turmoil which would accompany such a loss.

Managing Environmental Stress

Heat, moisture, disease, and nutrient stresses are key problems in maintaining healthy turf during the summer. Good management techniques can minimize these stresses, though sometimes the chemicals and materials used to prevent injury cause stresses of their own. Following is a checklist of management factors to consider for handling various environmental stresses.

- Syringe the turf occasionally to reduce heat and moisture stress. Applying the correct amount of water is the key to this program. Syringing is often overdone, causing wet wilt and disease. Syringing is best done by hand, using trained workers with some good judgment, and applying water only to those sections of the greens that require it. Hand syringing is time consuming during the summer, but it is necessary, given the demands of golfers today.

- Open up pocketed greens. Summer heat stress problems are always more severe on pocketed greens, those partly

A green cut with a triplex mower one season (left) and the same green cut with a walk-behind unit the next season (right).



enclosed by a dense stand of trees and underbrush. It is always hotter and more humid in these pocketed areas, and the grass is always weaker because of it. Air circulation can be improved by thinning out the extraneous trees and underbrush near the green and pruning up the lower branches of the remaining specimens. Without a doubt, good air circulation is critical in allowing the turf to transpire and cool itself by releasing moisture through its stomata. Providing good air circulation is also helpful in drying the green to minimize disease and algae problems. Therefore, anything that can be done to improve air drainage in the vicinity of golf greens should receive high priority by the green committee.

- Control diseases. Many turf diseases become active when the weather is hot and humid and the turf is under stress. A good example is Summer Patch (*Magnaporthe poae*), a disease of *Poa annua* and one where disease severity is directly related to the degree of stress experienced by the *Poa annua*. Controlling this and other diseases during the summer is particularly important, as turf lost from disease activity at this time of year will be slow to recover. To prevent this from occurring, compress your preventive fungicide spray schedule if necessary, be sure to make an accurate diagnosis of the disease if symptoms are observed, and use curative rates of the most effective yet least phytotoxic fungi-

cide labeled to control that disease. Also, be sure to alternate materials or tankmix contact and systemic fungicides when appropriate for broad spectrum disease control and to reduce the potential for fungal resistance problems.

- Do not apply pesticides, fertilizers, or combinations of products that have the potential to burn the turf. Cool-season grasses under heavy stress often react negatively to what are usually considered mild herbicides or moderate rates of certain types of fertilizers. If in doubt, spray during the cooler evening hours or defer treatments until temperatures moderate, when the turf can tolerate the applications better. If crabgrass or other weeds must be treated during the summer, consider hand picking rather than using herbicides. Though time consuming, it may be better than dealing with burned grass.

Misapplications can be especially devastating during stressful weather. Applying the wrong rates or allowing overlapping (which essentially doubles the intended rate) is a common cause of turf injury during hot weather. If you're not confident about important applications, consider using foam markers or application dyes for spray applications, or switch to granular formulations and drop spreaders if necessary.

- If fertilization is deemed necessary, keep rates in the light to ultra-light spoon-feeding range. Soluble fertilizer sources containing N-P-K plus micro-

nutrients seem to work well at rates as low as 1/16th or as high as one-quarter pound of actual nitrogen per 1,000 square feet per application. Non-burning, low-nitrogen-content natural organic fertilizers can also be used to good advantage, but keep the rates low, in the range of one-quarter pound of nitrogen per 1,000 square feet. Keep in mind that more fertilizer can always be added if it is needed. If excess fertilizer has been applied, though, nothing can be done but live with the consequences.

- If the greens begin to thin and you feel they are in trouble, consider aerating the turf. That's right, aerate. Though it may seem inconsistent to aerify while at the same time trying to avoid turf stress, there is usually more to gain than to lose. Aeration helps a soft, wet soil dry out, and allows oxygen back into the root zone where it is so badly needed. It also improves water infiltration into tight, compacted soils, and relieves the effects of isolated dry spots. Very often, the turf begins to improve within a few days after aerification. As a precaution, use small tines, and do not let the green dry out too much. Solid-tine aerification or deep spiking may also be of help in this situation.

- Consider applying hydrated lime when conditions warrant. For example, when algae becomes established on the surface of the greens and cannot be controlled with fungicides containing maneb, a light application of hydrated lime sometimes does the trick. Consider hydrated lime also when a green takes on an acidic, musty odor (ominously referred to as the smell of death), usually during periods of hot, humid weather. As with aerating greens under severe stress, something may be gained by sweetening the surface of the soil with a light application of not more than one pound of hydrated lime per 1,000 square feet. This is an old remedy that can still be used to good advantage. Be careful. While light rates of hydrated lime have little effect on the grass, heavier rates can burn.

- Finally, communicate with the people at your course. Discuss the situation with the green committee chairman, president, golf professional, course administrator, general manager, or anyone else who has a need to know. Begin the conversation by saying something like, "Gentlemen, we will have a problem if things continue as they are . . ." That should get their attention. No one likes a surprise, especially finding dead greens that only a few days before were fully turfed and in beautiful condition.

Doing a proper job of hand watering is one of the best means of limiting summer stress.





Turf loss during the summer caused by the overlap of a preemerge crabgrass herbicide applied during the spring.

Tell them the story in clear, concise terms. People tend to be understanding if they know the facts. After all, no matter how good a job a golf course superintendent does, he cannot control the weather. Without a doubt, weather extremes remain the number one stress factor on golf courses today.

When the Weather Breaks . . .

When the period of stress is over, assess the condition of your golf course. Count your losses and analyze what you think caused the problems your course experienced. After all, there is nothing like a prolonged period of stress to bring out whatever strengths and weaknesses exist on the course. You may determine the greens need more and deeper aeration, that a better irrigation system needs to be installed, or that trees need to be removed from around pocketed greens.

Also, use the experience in a positive way to determine which practices need to be altered and which programs should be implemented to better manage turf when it is under stress. Rest assured, summer heat, with its associated stress-related problems, will occur again.

How to Make the Right Connections

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AND YOU THOUGHT THAT the acronym "TGIF" stood for "Thank Goodness It's Friday."

In the world of turf, TGIF also stands for the USGA Turfgrass Information File, which is maintained and compiled by the Turfgrass Information Center, at the Michigan State University Library. Like doctors, lawyers, and other professionals, we now have access to a vast database devoted to turfgrass without ever having to leave our offices.

The TGIF is the largest and most comprehensive database in the world dedicated solely to turfgrass. It may well be the most valuable new tool ever made available to turf professionals since the introduction of the aerifier. It is effective, inexpensive, and available now. But as you might have guessed, there is one little catch. You are finally

going to have to learn how to use a personal computer.

For those who still have nightmares about the day your child came home with something called the new math — relax. Using a computer to access (computer jargon for "gain access to and use") the TGIF is really quite simple. All you need is a computer, a modem, and the proper software.

There are so many different computers with such a wide range of features that acquiring one will probably be your most difficult job. They range in price from \$700 to \$7,000 and beyond, depending on the power, speed, and capability of the machine.

For TGIF purposes, all that is required is that your machine be able to run software programs that run on the IBM

PC. It must have a minimum of 256K of RAM (random access memory). A color or monochrome monitor can be used. However, if you have the option, purchase a system with a color monitor and graphics ability, since you will find the system better suited for other golf course record keeping applications as well.

Your computer can be equipped with two floppy disk drives or one floppy and one hard disk. Again, if you have the option, buy a machine with a hard disk. You will soon appreciate the additional speed and ease of use that this accessory provides.

For those of you who need a starting point in your search for a computer, take a look at the following sample system. As of this writing you can purchase a clone, or IBM-compatible