
**U.S. Kids Golf offers customized tee plates (close up, right) for young golfers. The plates are placed in front of forward tees and easily installed in fairways.**

pays a lower green fee than his or her parent, even on weekends.

Industry experts say more courses need to implement similar price structures.

### More than teaching

National organizations, such as The First Tee and Sticks for Kids, are lauded for teaching thousands of children to play golf. Many of these children never would have begun to play the game if it weren't for these organizations.

The First Tee, the industry's most visible youth golf-instruction program, has 202 chapters in 45 states and teaches golf at about 260 facilities.

Sticks for Kids, created for children ages 7 through 15, was a regional and annual event under the Golf Course Builders Association of America (GCBAA) charitable arm. But GCBAA Executive Director Paul Foley is taking Sticks for Kids nationwide. Foley recently teamed with the National Recreation and Park Association, which has 6,000 municipal and county park and recreation agencies nationally and more than 10,000 golf courses, to expand the program.

However, industry experts, including Sticks for Kids' Foley and The First Tee's Louis Barrow, agree that instructional programs alone will not get more kids playing the game. Courses must provide young new players the opportunity to try the game they've learned in a real-life setting. And that setting must be a comfortable one, experts agree.

"Let them nurture their interests in a safe and controlled environment," Louis Barrow adds.

Nass knows it's not easy for golf courses to create playing opportunities for kids, especially when their bread-and-butter players — the ones who supply most of the revenue — eat up a lot of playing time. But courses must find a way to serve their bread-and-butter clientele of tomorrow.

"If you're an owner who's truly committed to growing the game for the future, you're worried about where your dollars are coming from in 15 years, not just today," Nass contends.

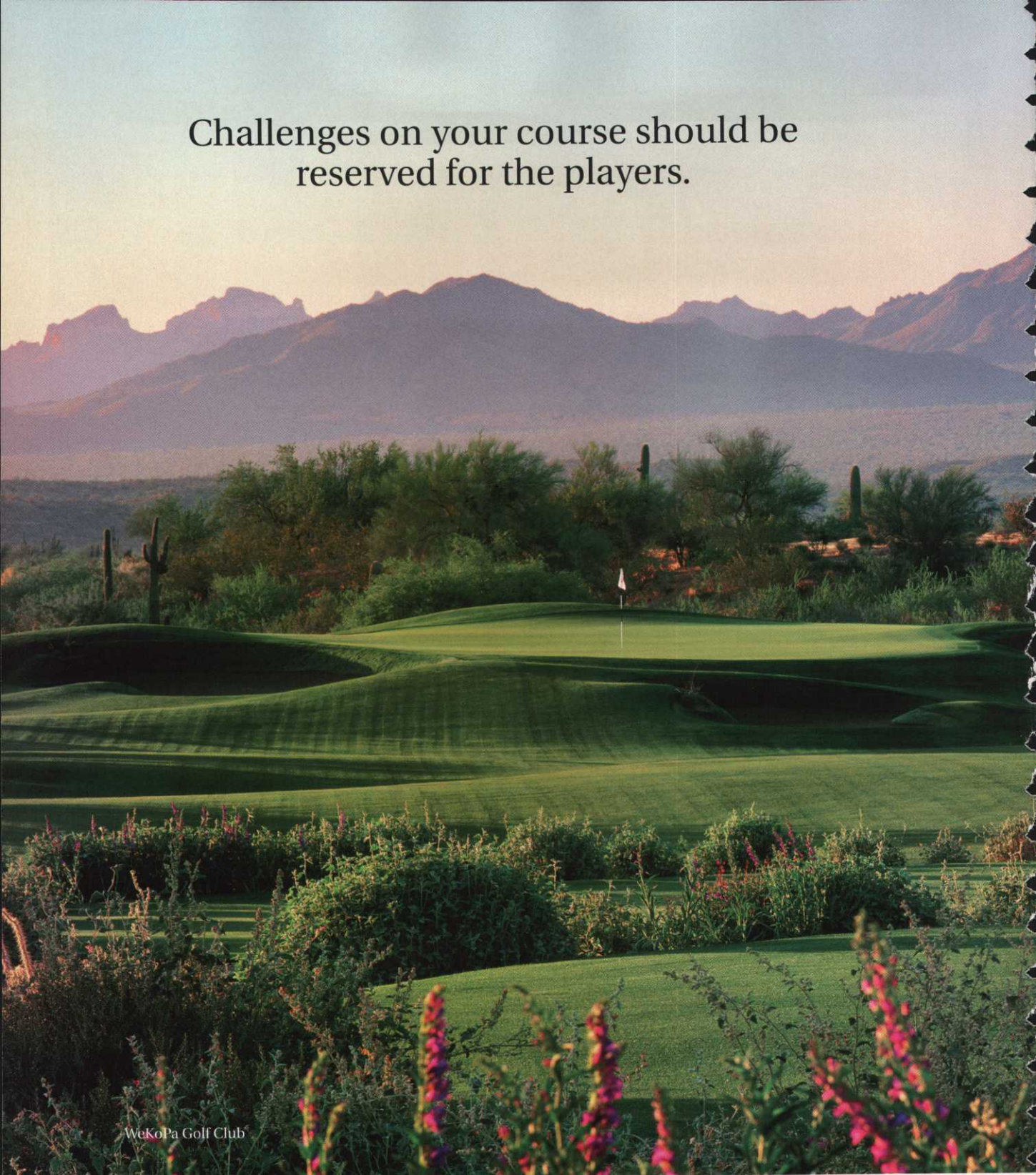
Golf facilities need to examine their slow periods during the week and then implement programs or leagues during those periods to provide kids set times to play, experts say.

Ultimately, it's up to owners and operators if they want to grow the game with younger players, Louis Barrow says.

"Golf is like politics; it's very local," he adds. "At the end of the day, it's the owners and operators who must accept the responsibility for reaching out to our communities." ■

PHOTOS COURTESY: U.S. KIDS GOLF

# Challenges on your course should be reserved for the players.




** Golf Digest 2005-2006 "100 Greatest Golf Courses" list.*

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   *Pebble Beach, California*

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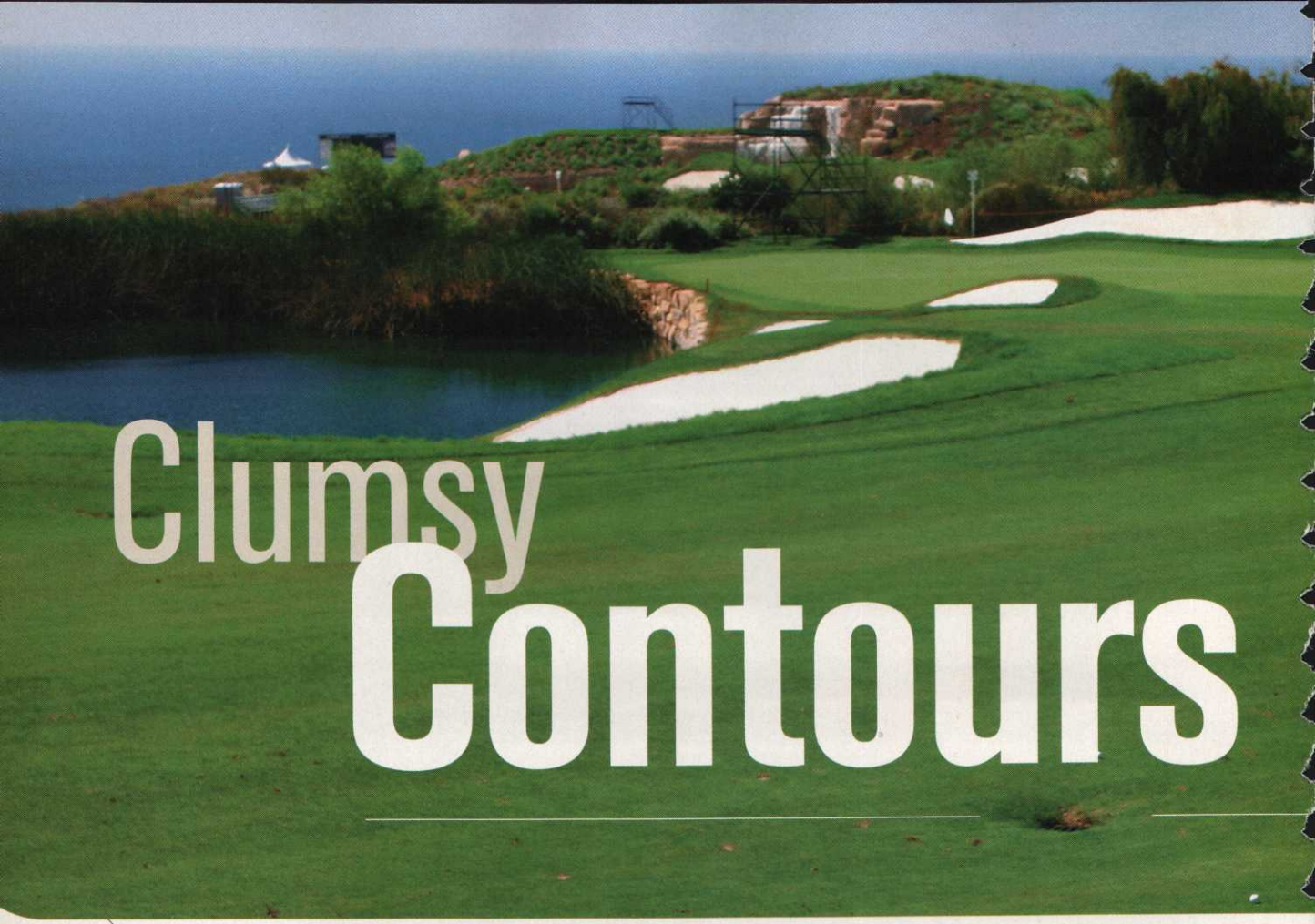


# Clumsy Contours

**Story and Photographs By Geoff Shackelford**
Contributing Editor

**ANALYSIS**

"The golf architect should be made responsible for contours; for every detail in the construction of the course."
– George C. Thomas, *Golf Architecture In America*

Some of today's practicing architects scoff at the notion that design had a Golden Age in the 1920s, instead favoring the superior beauty and functionality of their own work.

Yet most golfers disagree, especially above-average golfers who cringe when hearing the letters TPC, a symbol of overbuilt, soulless architecture.

Many are unequivocal in their belief that the golf courses created by the Rosses, Thomases, MacKenzies and Tillinghasts of the world were strategic masterpieces, proving enjoyable to play on a repeated basis.

But these masters also constructed their courses beautifully and economically. What was their secret? Besides not having many of the modern means to move earth at will, they were adamant in their devotion to surface drainage.

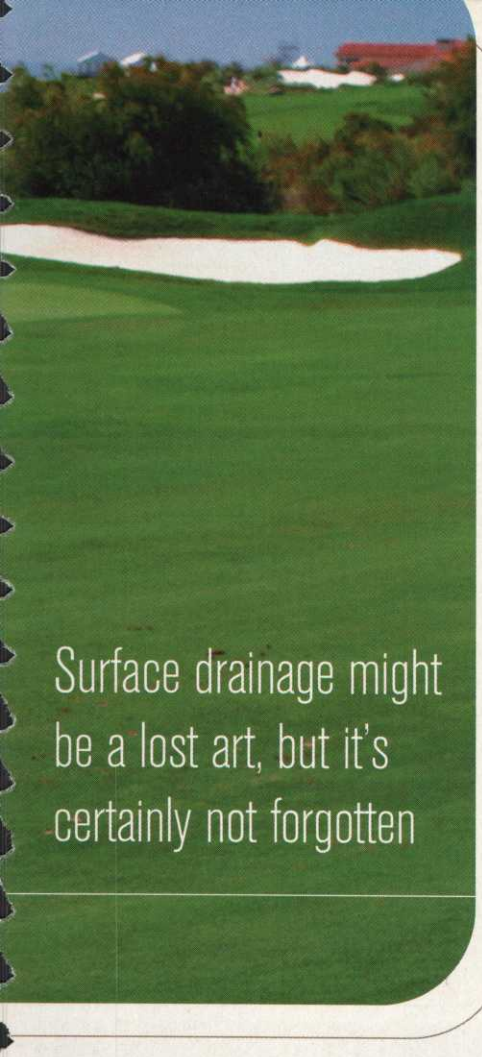
## The Design Perspective

"Surface drainage is the most critical and effective type of drainage for greenswards and can be achieved in a number of ways."
– Cornish and Graves, *Golf Course Design*

When you walk an artfully designed course, it feels solid to the foot. Everything flows wonderfully, including the sometimes wild and obvious unnatural undulations. Even the uneven stances feel authentic. Nothing feels forced or manmade. Tees sit low to the ground. Holes are not protected by containment mounds. Fairways feature an almost imperceptible tilt. Signs of man's hand are masked tastefully.

This walk-in-the-park feel is due in part to the architect's adherence to existing contours and a willingness to allow the natural drainage to act just as it had before golf was introduced to the site.

But contrary to popular belief, not even a Golden Age site was ideal. Those wonderful tilts and swales and other function-driven touches were manmade.



Surface drainage might be a lost art, but it's certainly not forgotten

The true artists in golf architecture masked much-needed drainage via a system of tactfully graded slopes, swales, bumps and other ground movement so water fed into a clever series of waterways and ditches during extreme weather.

Modern architects continue to tackle drainage requirements, but the two eras approach the solution in different ways.

The desire for containment mounding surrounding fairways and greens, designed to send wayward balls back to the center of play, often handcuffs modern architects. This also has the unfortunate effect of sending all water back to the main play areas.

Add the challenge of trapping run-off so it won't contaminate natural bodies of water or wetlands, and subsurface drainage becomes a necessity.

There is no denying the importance of innovations in subsurface drainage, but catch basins, French drains and even the "USGA green" have become an all-too-frequent crux for the modern architect dealing with this strange confluence of issues. For some, it's the result of trying to design from an office without understanding how containment mounds and other unnecessary ground movements affect the turf.

When you step onto a classically designed course, you rarely find the ground shaped out into symmetrical bowls, complete with little green grates and sloppy bottoms.

Nothing could be more unnatural than walking down a modern fairway littered with catch basins, or worse, just missing a green and requiring a free drop from a catch basin that is stopping water from moving to a location away from the green.

Imagine the great British Isles links, with little bumps and rises strewn about their fairways. Sometimes there are dunes on both sides of the holes, but not often. And even in those cases, water always has a place to go, and it's not always straight down.

The modern American design mentality has flipped those bumpy links fairways and created a series of valleys that never seem to drain.

The catch basin has become an alternative to surface drainage, perhaps because it is easier to pencil them in at the office. It's much easier than directing (or allowing) shapers to gently mold the land by feel in hopes of moving water toward out-of-play locations.

And while many golfers might not notice fairways littered with unsightly and unnatural basins and grates, the eventual impression of the course seems manufactured and fake.

Man has spoiled what should have been a good walk.

**Man has spoiled what should have been a good walk.**

### Evolution of Drainage

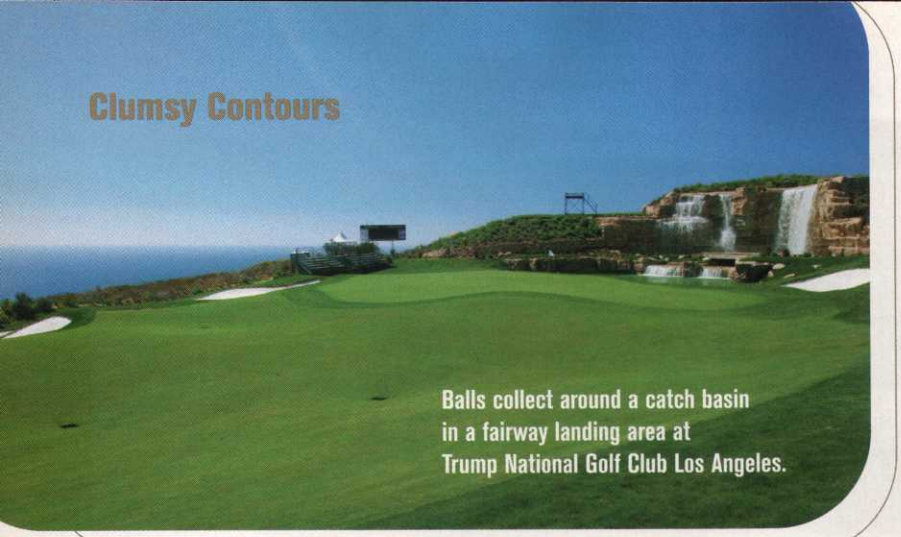
"Whatever you do, don't slight drainage."
– Donald Ross

The days when architects slighted drainage ended long ago. Actually, they never really existed, contrary to popular belief.

Yes, some would point out all of the drainage they've had to add to older courses, but as we've often learned through aerial photos, their original designs have been tampered with beyond belief.

Alterations have included the inevitable introduction of drainage problems caused by

*Continued on page 36*




Balls collect around a catch basin in a fairway landing area at Trump National Golf Club Los Angeles.

*Continued from page 35*

subsurface drainage proponents who ignored the surface-drainage ingenuity of their predecessors. It is often difficult to understand the modern disregard for surface drainage in favor of the immediate removal of water underground, especially considering the extreme cost and maintenance issues that accompany subsurface systems.

Again, this is not meant to minimize the great importance of catch basins and French drains, which have improved turf conditions and prevented contaminated run-off from reaching wetlands or other waterways.

No, the mystery is why costly subsurface drainage is preferred in situations when surface drainage could have been preserved on sites or manufactured during construction to prepare the course for the long term.

"Surface run-off is the easiest and most rapid method of removing excess water during intensive or prolonged rains," writes James Beard in *Turf Management for Golf Courses*. "Surface drainage can be provided via slightly crowned fairways on flat areas and via a minimum slope of 2 to 3 percent on rolling terrain. These modest slopes should direct water into diversion swales and eventually into grass waterways. The waterway cross section must be designed to handle the anticipated water volume at a moderate velocity to minimize erosion potential. Contours on the fairways and primary roughs should be graded uniformly to avoid depressions where water can accumulate. Where depressions can't be avoided, catch basins and drain lines can

be installed to remove the excess water, while dry wells or French drains are useful in small depressions."

### The player's perspective

Confronted with a natural swale or ditch, the golfer attacks the feature with joy because nature has offered a challenge (even if it's actually one artfully created by man).

A lob wedge over a manmade turf bowl with a grate centered at the bottom just doesn't provide the same thrill.

The illusion of battling nature is the key to separating the timeless golf experience from the less satisfying and perceptibly manufactured design. There also isn't much charm in the uneven lie created by the catch basin wall or the free relief taken from the grate in the center line of a fairway.

The situation becomes more intolerable when greens are drained toward the fronting approach, where a catch basin awaits to slow down the run-up shot. The golfer should be offended whether they considered a ground-game alternative or not because limiting his options in favor of function almost always will make the golfer yearn for an old-style design.

If you've ever wondered why a modern design just doesn't feel right, then take a second look at the way the designer chose to drain the course. Did he cleverly mimic what nature might have done during thousands of years to solve the problem, or did he mound up all around the hole and then stamp out a series of bowls to collect the water and send it underground to fester in a bed of gravel?

The difference might seem slight to some. But for those charged with growing the grass, those who funded construction and most of all, those who play it, subtle surface drainage makes all the difference.

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*Geoff Shackelford is the author of 10 books, consults on classic courses and co-designed Rustic Canyon Golf Course in Moorpark, Calif. He can be reached at GeoffShac@aol.com.* ■

**Did he cleverly mimic what nature might have done during thousands of years to solve the problem?**

# Another Brick in the Winter Fortress

BY KARL DANNEBERGER

Similar to fortifying a military base or regiment prior to battle, turfgrasses fortify themselves for the coming winter. Lack of fortification or cold acclimation and hardiness can cause death. For example, a plant growing at a warm temperature that's suddenly exposed to a subfreezing temperature dies. Yet, the same plant that's exposed to a period of low nonfreezing temperatures prior to subfreezing temperatures survives. Why?

In general, we know the mechanism of freeze tolerance in turfgrasses. Freeze tolerance, and conversely freeze injury, is due to how the turfgrass plant reacts to cell dehydration. Water freezes intercellulary in freezing temperatures, resulting in a decrease in water potential outside the cell. In response, the differential water potential within the cell moves toward the external ice crystals.

Simply stated, the cell dehydrates in response to freezing temperatures. The colder the temperature, the more water flows out of the cell toward the frozen water in the intercellular spaces. At 14 degrees Fahrenheit (-10 degrees Celsius), 90 percent of the osmotically active water will move out of the cell (Thomashow, 1998).

From the above description, we can see that if cells are flush with water either from succulent or rapid growth, then rapid drops in temperature can cause injury. During fall there has to be changes in the turfgrass plant so that a redistribution of water or hardiness occurs (Beard, 1973). Exposure to low but nonfreezing temperatures (less than 50 degrees F (10 C) is critical for inducing plant hardiness. Currently, the induction of cold hardiness in response to low temperatures is a hot area of research.

Scientists have identified and studied the roll of specific plant genes in freeze tolerance. A group of genes called cold-response (COR) genes apparently plays an important role. The activation of these genes requires a period of low but nonfreezing temperatures (32 to 50 degrees F (0 to 10 degrees C). The activation of these genes is then associated with the hardening or freeze tolerance of the plants. A possible reason why plants in effect die when exposed to freezing temperatures without a hardening period is due to the lack of COR gene activation. Interestingly, light in addition to low but nonfreezing temperatures is needed for gene activation (Wanner & Junttila, 1999).

GENETIC RESEARCH MIGHT UNVEIL NEW WAYS TO FORTIFY AND ACCLIMATE TURF FOR WINTER

Although none of this work has been done on turfgrass plants, the reduced or inactivation of COR genes might explain why we see freeze injury to *Poa annua* and bermudagrass turf under low light conditions. For example, increased shading on Northern golf course greens favors establishment and spread of *Poa annua*, which is susceptible to freeze injury. Reduced light in fall can negatively impact the hardening process by impacting COR gene activity. The lack or reduced state of cold hardiness increases the likelihood of freeze injury in late winter.

Continued research into the mechanisms involved in turf hardening is needed. By understanding the mechanisms involved in hardening, we can better understand why low light conditions are detrimental to turf, which will lead to better management practices to increase the turf's cold hardiness. For example, exposing a newly seeded putting green to low but nonfreezing temperatures prior to covering might help those juvenile plants reach a greater degree of cold hardiness.

Superintendents build a winter "turf fortress" through management practices. One more brick in this fortress is the role of COR genes and how light affects them.

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

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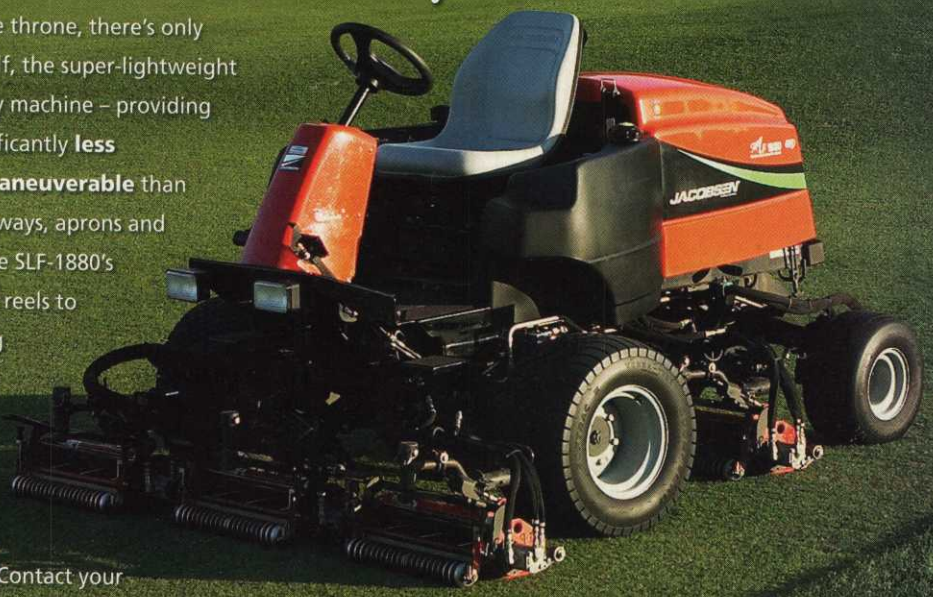


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