# rules

## AGAINST THE ODDS, AN AMATEUR DESIGNS, BUILDS AND OPENS AN AWARD-WINNING PUBLIC LAYOUT

by A. D. "Butch" Horn

"I could build a better course than this one."

How many people have thought and maybe even said that? Probably hundreds. But how many have actually done it? That's how Joe Salemi separated himself from the golfing crowd. Not only did he think it, he's actually made it happen in Streetsboro, Ohio. His Boulder Creek Golf Club opened in 2002 and was ranked eighth on *Golf Digest* magazine's list of top new courses in 2003 – the highest ranking a course designed and built by an amateur has ever achieved.

"I didn't start playing golf until I graduated from The Ohio State University in 1977, but it didn't take long for me to see flaws in public courses," Salemi says. "I decided I could do it better.

"I wouldn't recommend creating a golf course the way we did," he adds. "We defied all common sense, broke the rules and bucked the odds all the way. But I wouldn't change a thing, and the response has been beyond belief."

### By the book

When Salemi says he built a course by the book, he means it literally. He did his homework and brought the experience and wisdom of design greats into the mix.

"I read everything I could by the past greats and the current greats," he says. "Dr. Alistair MacKenzie, who designed and built Augusta National, and A.W. Tillinghast had the greatest influence on Salemi when designing Boulder Creek.

"Tillinghast designed legendary courses such as Winged Foot, Baltusrol and Bethpage Black, and his book was really important to me," he adds. "But I took bits and pieces from all the best, Nicklaus, Fazio, Ross, Dye …"

While Tillinghast's "Course Beautiful," one of three volumes that comprise a collection of his notes and observations, was a guide, Salemi also felt a kinship with George Crump, who designed and built the Pine Valley Golf Club, since he, too, was an amateur and only built one course.

### It starts with the land

It's a monumental challenge to build a golf course from scratch by oneself, Salemi says.

"Finding the right piece of land can't be emphasized enough," he says. "Early on, I recognized that an average golf course on a great piece of land would be more marketable than a great course on average property."

By the time he was ready to put his dream into motion, Salemi was a successful real-estate developer, and through his connections in real estate, received a lead on the land that would become Boulder Creek.

"A friend told me about an old farm, but at first glance I wasn't impressed," he says. "Then I walked

"We defied common sense, broke the rules and bucked the odds all the way. But, I wouldn't change a thing." - JOE SALEMI

Photo: Boulder Creek Golf Club

Joe Salemi, owner of Boulder Creek, says he realized an average golf course on a great piece of land would be more marketable than a great course on average property.

to the back of the property, and the sight of mature trees, lakes and extreme elevation changes (as much as 100 feet in some places) sold me. I bought 100 acres right then and added a second 100 in 1997."

The farm was for sale because deposits of sand and gravel that were to become a profit center didn't measure up to the previous owner's standards. This was a lucky break for Salemi because it put the land on the market and because the sand, while not up to road-building standards, was up to the standards required to build top-quality greens.

"We were able to put in our own screening plant, and all the greens were built with sand right from the property," he says.

By 1998, Salemi was ready to get to work. It was then that MacKenzie's book, "Routing a Golf Course," came into play.

"Routing a course is like cutting a diamond – you only have one chance to do it perfectly," Salemi says. "You can't replace mature trees. Without that book, I would have made many more mistakes."

The new owner walked the land hundreds of times planning, routing and rerouting each hole in his mind. Salemi is a private pilot, so he was able to fly over the property several times to get a different perspective.

"One of the best investments I made was to hire an aerial mapping service to provide exceptionally accurate aerial photos and maps of the whole property," he says. "Working with the photos and maps, it became a chess game to work out all the moves we needed to make."

## Luxury of time

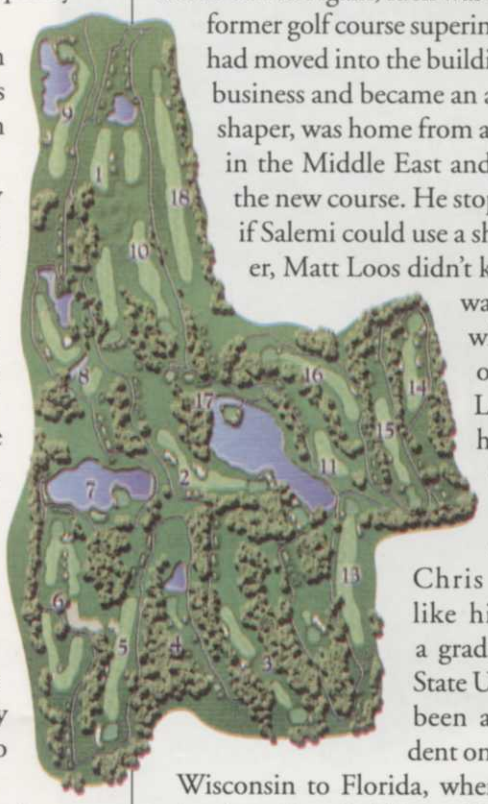
It took Salemi and his hand-picked staff about four years to complete the project once they started work in earnest.

"A professional probably would have finished much sooner, but we had the luxury of taking our time," he says. "We made changes gradually because we wanted to preserve as much of the natural beauty of the property as we could."

To do that, Salemi brought in a handful of people to begin clearing the land. Each hole was first cleared down its center line, then the route was evaluated before taking more action. Each hole was cleared in a three-step process. For about nine months, Salemi and three helpers were the only ones pulling stumps and clearing trees.

"One of the reasons we went so slow was to protect the trees we wanted left," Salemi says. "You destroy more trees by running over their roots with heavy equipment than any other way. We wanted to avoid that."

Salemi grew up in the Cleveland area working for his family's excavating business, so he was comfortable moving dirt. When it came time to begin that process, he bought his own equipment and brought in specialists to run it. Again, luck was on his side. A former golf course superintendent, who had moved into the building side of the business and became an accomplished shaper, was home from an assignment in the Middle East and heard about the new course. He stopped in to see if Salemi could use a shaper, however, Matt Loos didn't know what he was getting into when he signed on in 1999. Loos brought his brother, Chris, into the project a year later. Chris Loos, who like his brother is a graduate of Penn State University, had been a superintendent on courses from Wisconsin to Florida, where he learned what it took to build a golf course. Chris Loos is now the superintendent at Boulder Creek.



## AT A GLANCE

**Boulder Creek Golf Club**

| | |
|---|---|
| Location: | Streetsboro, Ohio |
| Type: | Public, daily fee |
| Project Start: | 1998 |
| Project Finish: | 2002 |
| Course Open: | August 2002 |
| Holes: | 18 |
| Par: | 72 |
| Yardage: | 5,586 (gold tees) to 7,173 (black tees) |
| Slope: | 119 (gold) to 140 (black) |
| Greens: | G2 bentgrass |
| Fairways: | PennTrio bentgrass mix |
| Owner, designer, builder: | Joe Salemi |
| Superintendent: | Chris Loos |
| Head Pro: | John Elser |
| Teaching Pro: | Greg Wood |


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Photo: Boulder Creek Golf Club

The lakes at Boulder Creek were drained and scraped to remove the silt and sediment to make the water cleaner.

## Nothing typical

When Chris Loos started working on Boulder Creek there was a skid steer loader, a wheelbarrow, a shovel and not much else.

"There wasn't anything typical about this job," he says. "We did all the work ourselves, and it took us more than two years working almost 365 days a year.

"I have a better appreciation for what it takes to build a course now, and more than ever, I appreciate the benefit of having the superintendent involved as early in the process as possible," he adds.

Loos was involved in all the critical phases, but none more important than building the greens.

"The greens are the make-or-break area of the course," he says. "We intentionally made them bigger than usual, averaging 7,000 square feet. We knew, as a public course, they'd get a lot of traffic so we wanted to give ourselves ample room for pin placements."

The greens are G2 bentgrass developed at Penn State from samples taken at Augusta National in the 1980s – the same turf on The Masters' course today.

"We're really pleased with the greens," Loos says. "We've had more play than we expected, and they have held up very well to the traffic. They've been resistant to disease problems, and the G2 is doing well at keeping the *Poa* out, too."

The fairways, a PennTrio bentgrass mix – Penncross, Penneagle and Pennlinks – also have held up well to the whims of golfers and the Ohio weather.

## A stroke of luck

While the Loos brothers and Salemi did their work like craftsmen, they had their lucky streaks.

"The property has natural streams and lakes, so we wanted to make the most of them," Salemi recalls. "We drained the lakes and scraped the bottoms down to the hard clay base. Removing the silt and sediment made the water cleaner and better all around. And we also found that we had water beneath the property that allowed us to sink two wells that can provide up to 1,000 gallons a minute to our irrigation system."

However, not everything went that smoothly. During one of the lake projects, the crew hit quicksand, and in a matter of minutes, almost lost two sizeable machines before a third was able to tow them to safety.

"There were times, especially when working on the permits, dealing with regulatory agencies and the weather, that we were sure Murphy's Law was working at peak efficiency," Salemi says.

"Professionals would probably say we did a lot of things the wrong way, but now that it's over, I wouldn't change a thing," Salemi adds. "I wanted to really build a golf course. I financed the whole project with signature loans – although it helped that I owned the property – and we were careful in how we spent the money. We never cut any corners on anything that would impact the golf. This is a player's course, and anything that makes the game better is the highest priority." GCN

*A.D. "Butch" Horn is a free lance writer from McFarland, Wis. He can be reached at adhorn@charter.net.*

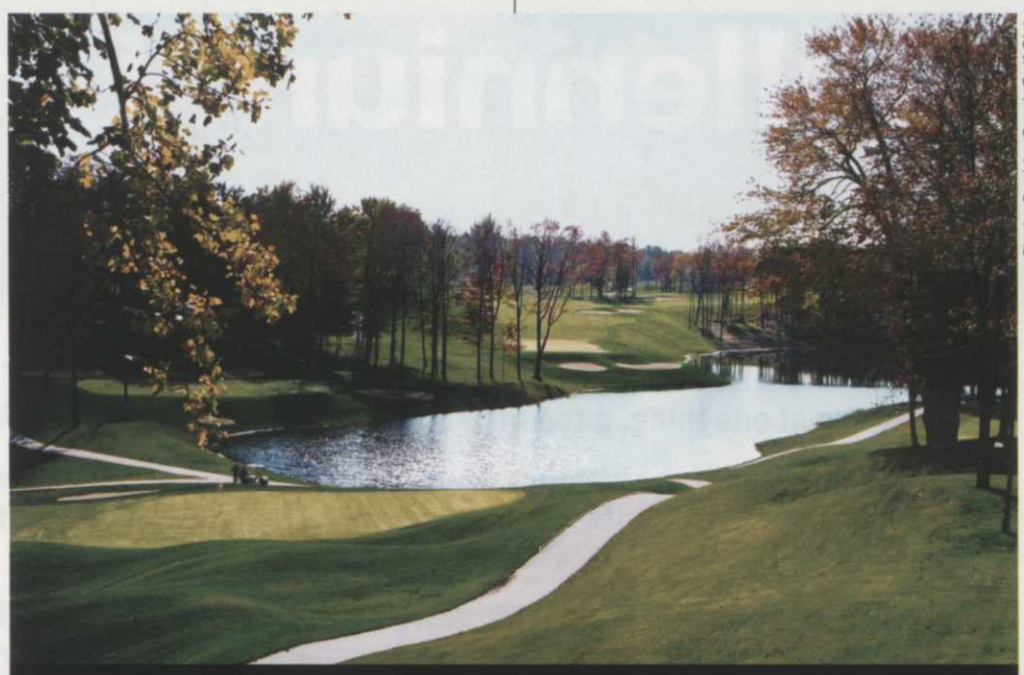

Photo: Boulder Creek Golf Club

Boulder Creek's owner walked the land where the course was built hundreds of times planning, routing and rerouting each hole in his mind.


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USE READER SERVICE #23

# The debate rages on

## SOME SUPERINTENDENTS ADVOCATE ROTATING FUNGICIDES TO COMBAT RESISTANCE – ONE TURFGRASS PROFESSOR DOESN'T

by DAVID WOLFF

The debate about how to combat fungicide resistance continues. While a number of plant pathologists advocate rotating chemicals, some take the opposite position. As an example, three golf course superintendents in Orlando have never used the same material in consecutive applications. While admitting they haven't scientifically documented the rationale for their programs, each says chemical rotation is what they were taught. And during their many years in the business, this principle has proven effective for them.

Fungicide use is an important strategy in an overall integrated program for turf disease control. To ensure current products remain available in the future, golf course superintendents should be aware of the need to use fungicides in ways that minimize the risk of resistance.

Fungicide resistance is defined as the emergence of a target pathogen population that isn't sufficiently sensitive to be controlled adequately by a fungicide that was effec-

At Grand Cypress Golf Club in Orlando, Fla., superintendent Tom Alex rotates systemic and contact fungicides to help combat turfgrass diseases.

Photo: David Wolff

tive previously. Once a pathogenic fungus develops resistance, a disease can get out of control quickly despite fungicide use, even with frequent applications at high rates.

There are two types of resistance:

- Single-step resistance is a sudden, marked decrease of effectiveness. Increasing the application rate doesn't matter because this resistance is stable and can last for many years. This occurs in benzimidazoles, strobilurins, dicarboximides and phenylamides.
- Multi-step resistance is less sudden, and there's a gradual decrease of sensitivity to the fungicide. This is less stable and occurs in products such as sterol inhibitors (DMIs).

And there's another event: cross-resistance, which occurs in chemically related fungicides that have the same biochemical mode of action such as strobilurins, sterol inhibitors and dicarboximides.

The development of resistance is a possibility for a number of turf fungicides, particularly for many of the newest systemic products that are popular because they can be used at low rates and have minimal environmental impact. However, they often have specific modes of action, attacking fungi at only one specific biochemical reaction among the tens of thousands of biochemical reactions that occur in a living fungus. Research and field experience conducted at the University of Kentucky College of Agriculture has shown fungicides with specific modes of action often are at risk to develop resistance.

Fungicide resistance is caused by a naturally occurring random mutation in the fungus that allows it to grow and reproduce in the presence of a fungicide. The mutation might result in the alteration of the biochemical target site in the plant, development of an alternative metabolic pathway, metabolic breakdown of the fungicide and exclusion or expulsion of the fungicide.

Other fungicide resistance elements are:

- The fungicide didn't cause the mutation – it selects for pathogens with mutation;
- Many mutations don't have any effect – some are lethal to the organism;
- It's estimated that one in every one billion spores or propagules is resistant to a fungicide;
- Resistance usually isn't noticed until about one in 50 pathogen individuals is resistant; and
- Resistance is a shift in the pathogen population.

It's critical to note most fungicides don't kill fungi. Continual use of a single fungicide family selects fungi that are resistant to it. In fact, the proportion of resistant individuals in the population increases.

Most failures of fungicides to control disease aren't due to resistance. Improper timing, inadequate rate, poor coverage and poor efficacy against some diseases and incompatibility are more likely explanations for control failures than development of fungicide resistance. Resistance occasionally occurs, and when it does, there's a sudden loss of disease control, and fungicide options for controlling diseases in the future might become limited.

## Management strategies

The Fungicide Resistance Action Committee is a specialist technical group of CropLife International. Its purpose is to provide fungicide resistance management guidelines to prolong the effectiveness of at-risk fungicides and to limit crop or turf losses should resistance occur. The goal of FRAC is to identify existing and potential resistance problems. It collates information and distributes it to groups involved with fungicide research, distribution, registration and use. FRAC provides guidelines and advice on the use of fungicides to reduce the risk of developing resistance and to manage resistance should it occur. The organization recommends procedures for use in fungicide resistance studies and stimulates an open liaison and collaboration with universities, government agencies, advisors, extension workers, distributors and farmers.

FRAC suggests the following strategies for resistance management.

**1. Don't use the product in isolation.** Rotate chemical families. Apply products as a mixture with one or more fungicides of a different type, or as one component in a rotation or alternation of different fungicide treatments.

**2. Restrict the number of treatments applied per season and apply only when strictly necessary.** Use other fungicides subsequently. This approach, like rotation, reduces the total number of applications of the at-risk fungicide, and therefore, must slow down selection to some extent. It can also favor decline of resistant strains that have a fitness deficit. However the treatments, which are still applied consecutively, generally coincide with the most active stages of epidemics when selection pressures are highest. Thus, any delay in resistance might not be proportional to the reduction in spray number. On the other hand, a substantial break in use at a time when the pathogen is still multiplying can allow a beneficial resurgence of more sensitive forms.

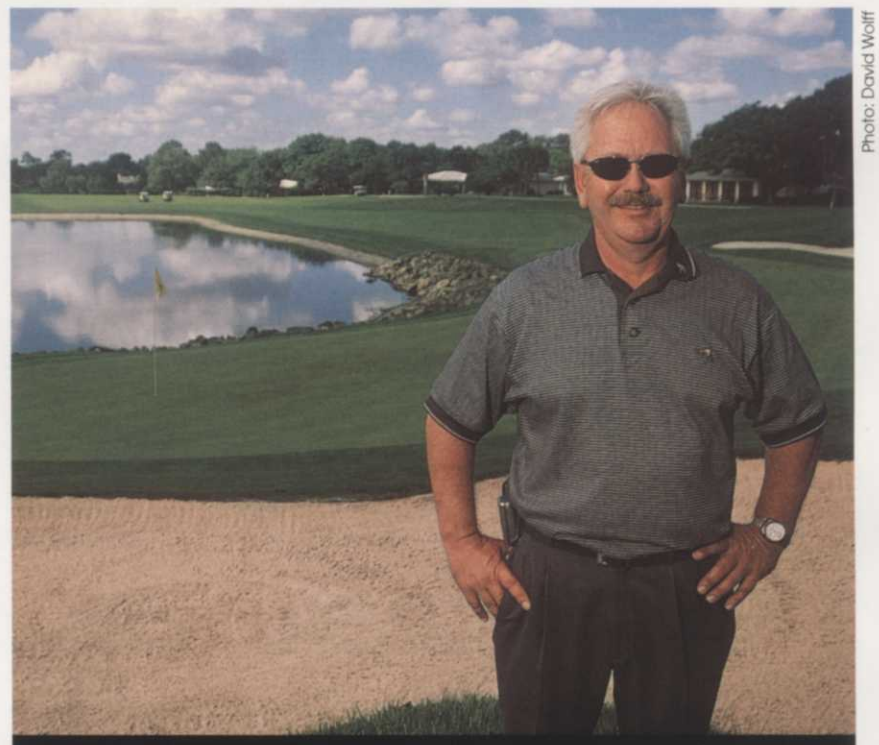

Photo: David Wolff

John Anderson uses at least seven different fungicides on the greens at Bay Hill.

**3. Maintain the manufacturer's recommended dose.** In some cases, reduced rates are used where disease pressures are low. FRAC recommends doses must be maintained because they'll retain the built-in safety factor and secure the claimed levels of performance under a wide range of conditions and reducing the dose can enhance the development of resistance.

**4. Avoid eradicant use.** One of the advantages of systemic fungicides is they can eradicate or cure infections. This property greatly assists their use on a threshold basis where application is made only when an economically acceptable amount of disease already has appeared to prevent further spread. However, avoidance of systemic fungicide use in this way is recommended as an anti-resistance strategy.

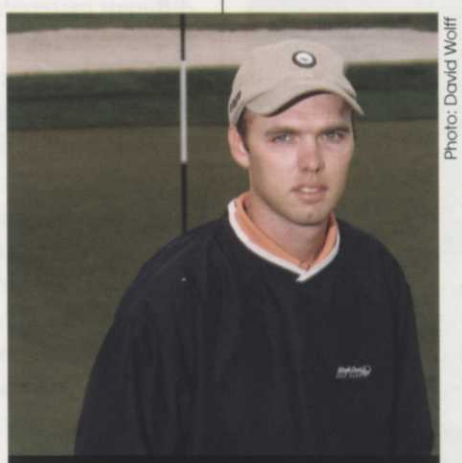

Photo: David Wolff

Rickey Craig considers himself a minimalist when it comes to fungicides.

**5. Integrated disease management or integrated pest management.** The integrated use of all types of coun-

termeasures against disease is desirable on economic and environmental grounds and is a major strategy for avoiding or delaying fungicide resistance.

**6. Chemical diversity.** The availability of a number of different fungicides for the control of each major disease is highly beneficial environmentally and to overcome resistance problems. The continued use of one or few types of compounds throughout many years presents a much greater risk of side effects and favors resistance in the target organisms. Tank mix or alternate at-risk fungicides with appropriate fungicides.

Plant pathologists generally agree these factors also can reduce the risk of fungicide resistance:

- Keep spray equipment calibrated;
- Spray preventatively when possible; and
- Use synergistic combinations. Synergism is the cooperative action of two agrochemicals such that the observed response of a test organism to their joint application appears to be greater than the response predicted to occur by an appropriate reference model. The late Dr. Houston Couch of Virginia Tech University concludes various disease management strategies could significantly modify the inherent risk of fungicide resistance in the target pathogen. He also says risk could be lowered by rotation among fungicides with different biochemical modes of action or by using synergistic fungicide combinations.

## Dissenting opinion

Not everyone agrees rotating chemicals combats fungicide resistance. Perhaps the most outspoken about this position is J.M. Vargas Jr., Ph.D., a professor in the plant pathology department at Michigan State University. Vargas conducted research on fungicide resistance management for dollar spot fungus (Sclerotinia homoeocarpa). The key points of the study were:

- Rotating different fungicide chemistries doesn't prevent the dollar spot fungus from developing strains that are resistant to fungicides;
- A strain of S. homoeocarpa can become resistant to more than one of the classes of fungicide chemistries;
- Contact fungicides such as chlorothalonil don't prevent resistant strains from developing; and
- Incorporating contact fungicides into a dollar spot management program can reduce the number of site-specific fungicide applications throughout time and extend the life of the chosen site-specific fungicide.

"Golf course superintendents have been left with the notion that the different chemistries in the rotation are eliminating only the resistant strains and are not affecting the sensitive or wild-type strains," Vargas says in his report. "If fungicides are capable of 'getting rid of' resistant strains, what are they doing to the sensitive strains? The answer is they are both eliminating the sensitive strains of S. homoeocarpa from the population. This allows room for the multiresistant strains to develop and become dominant."

Vargas concludes his research stating: "Entomologists long ago discovered that rotating chemistries would not prevent resistance. Pathologists did not learn from them, and based on their latest recommendations of alternating different chemistries to prevent herbicide resistance, it appears that weed scientists have not learned from either group." GCN

Photo: David Wolff

At the Bay Hill Club in Orlando, Fla., superintendent John Anderson rotates between systemic and contact fungicides because they work differently.

## Practicing rotation

Three superintendents in the Orlando, Fla., area always have rotated fungicides.

At Grand Cypress Golf Club, the fungicide program for the 48-hole facility includes 21- to 28-day intervals from October to January. Superintendent Tom Alex rotates systemic and contact products, broad spectrums and pythium – whatever is necessary.

"I have never, ever given fungicides a chance for resistance because I'm always switching," he says. "I might use five to seven different products and never go with them in back-to-back applications. There are enough different materials out there that give decent disease control."

Alex never sprays one product until it doesn't work anymore.

"Call it old school thinking, but in my opinion, why not keep four or five different fungicides in your arsenal that work versus using only one and everything eventually becomes resistant to it," he says. "Now I'm down to four choices. Use another one up, and I'm down to three choices. The heck with that. I want as many choices as I can get. I haven't seen any evidence that not rotating is a better option. I don't have any reason to believe what we're doing is not working."

John Anderson, superintendent at Arnold Palmer's Bay Hill Club, also rotates between systemic (usually single site) and contact (usually multisite) products because they work in different ways.

"Systemics go into the plant and work very well to prevent disease," he says. "Contacts stick to the outside of the plant, and while they don't last very long, their base of activity is much broader. With a product with a narrow base of activity, it's more likely that resistance will develop. With a broad-based product that attacks disease from all directions, it's almost impossible to develop resistance. It's important to have both types of products in our rotation."

Anderson uses at least seven different fungicides on the TifEagle Bermudagrass greens.

"If there is a disease present, and we use the same material all the time, the pathogen builds a resistance against the fungicide," he says. "I haven't done my own scientific research, but this is what I've been taught, and it works."

Superintendent Rickey Craig of Shingle Creek Golf Club believes in preventative maintenance when it comes to fungicides. He closely monitors weather conditions because each soil-borne disease organism prefers a specific growing environment.

"I'm a minimalist as much as possible when it comes to fungicides," he says. "Of course I make adjustments when I see a problem, and I always alternate products. As one product is used, I bring another in for the next application. The goal is not to go back-to-back. The bottom line with fungicides – rotating material works, so that's why we do it." GCN

*David Wolff is a freelance writer based in Watertown, Wis. He can be reached at dwolff@charter.net.*

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Photo: Kevin J. Ross

Aerification practices have changed throughout the years to closer spacings and smaller tines.

# Today's greens management

## IMPROVEMENTS CONTINUE, BUT WHERE DO THEY END?

by KEVIN J. ROSS, CGCS

There's no debating about the fact that the green surfaces golfers are playing on today are the finest ever produced. Present greens management programs have evolved from years of experience and technological advances that produce an excellent product worldwide.

Not too long ago, during the 1970s, greens were being cut at three-sixteenths of an inch and producing speeds of 7 feet on the Stimpmeter.

Presently, some golf courses are cutting greens as low as one-tenth of an inch and producing daily Stimpmeter readings of 11 to 12 feet. Times have changed from cultivar selection to fertilization practices and almost everything in between.

### Greens cultivar selection

Since the late 1950s, Penncross creeping bentgrass has dominated the bentgrass market. Even with the newer bentgrasses on the market, Penncross is still the world's No. 1 selling bentgrass – about 750,000 pounds are sold annually.

While Penncross still dominates the market, the newer superbents (such as the A and G series, L-93, SR1119, etc.) are the new popular choices for greens. These superbents offer finer texture, greater density, upright growth patterns and the ability to be cut at preferred heights of one-eighth of an inch and lower. These bents also offer tremendous rooting potential, which translates to a water-efficient plant. Unlike the past, when Penncross was the sole option, superintendents now are faced with a difficult decision about what bentgrass to use.

Determining the best bentgrass cultivar for a particular area takes extensive research. But where should one start? The National Turfgrass Evaluation Program (www.ntep.org) might be the best starting point. This program evaluates all the major golf course turfgrass species. There are various sites throughout the United States (primarily universities) that conduct the testing.

However, one should be careful when evaluating NTEP testing results. For example, assume bentgrass A is the overall, top-ranked performer for a particular year. While a testing site such as Orono, Maine, might have it ranked fairly low, other sites might have it ranked much higher. So what's the concern? While the overall rankings are good, the real meat of the rankings should be looked at from a regional standpoint. The optimal way to decipher the rankings is to compare testing areas that match, or are similar to a course's climatic conditions. If a superintendent plans to grow bentgrass A in Springfield, N.J., then the performance of that particular cultivar in Orono, Maine, might be of less concern.

Possibly the best method for evaluating bentgrass cultivars is individual testing by a superintendent at his course. No data and observations can be better than testing under the exact growing conditions. For example, if one is faced with the decision to select a bentgrass for green surfaces before a reconstruction project, that person should consider developing a test green for evaluation. Many superintendents have done this successfully.

To do this, construct a test green including the top eight cultivars being considered. Then, throughout a 12-to-16-month period, watch these bents under your management practices and climatic conditions. As a result of this testing, select the bentgrass that would ultimately perform the best in your area and under your management programs. This is the ultimate way to evaluate what will perform best. This testing hinges on timing that requires forward thinking 12 to 18 months out. This can even be done in a new construction situation. There's easily enough time during the construction phase for a test green to be constructed and evaluated.

### Construction

The greens that superintendents produce today are, in large part, a result of greens construction specifications that have been refined throughout the years and offer the ultimate in soils physics. The U.S. Golf Asso-