

## BMPs For Minimizing Nitrate-Nitrogen Leaching in Golf Course Turf

**OVERVIEW.** The principle factors that can be implemented to minimize nitrate-nitrogen leaching on golf courses are 1) nitrogen rates, 2) nitrogen sources, 3) methods of application, 4) irrigation practices, and 5) enhancement of root growth and activity. Some of these factors are interrelated.

### SPECIFIC PROPOSALS

#### NITROGEN RATES

(All fertilization rates are presented as pounds of nitrogen per 1000 square feet. Multiply by 43.56 to convert to pounds per acre)

- A. Nitrogen fertilization of greens and tees should not exceed 2, and that for fairways and roughs should not exceed 1 of nitrogen that will become available in any given month.
- B. Water-soluble nitrogen should not exceed 0.5 per application.
- C. Nitrogen in irrigation water, such as that in effluent, should be credited towards the maximum monthly allowance.

#### NITROGEN SOURCES

- A. Controlled-release nitrogen sources should be used when more than 0.5 needs to be applied in a single application. These sources may be indicated on the Florida fertilizer label as 'water-insoluble nitrogen,' or as 'controlled-release' nitrogen.

#### METHODS OF APPLICATION

- A. Fertigation may be used to apply small amounts (less than 0.5) of nitrogen on a frequent basis.
- B. Nitrogen may be applied in sprays either for foliar applications or for ground applications, but the rate of nitrogen application should not exceed 0.5.

#### IRRIGATION PRACTICES

- A. Irrigation amounts should not exceed the amount needed to restore soil moisture to field capacity, plus the percent irrigation efficiency of the irrigation system in use.

#### ENHANCEMENT OF ROOT GROWTH AND ACTIVITY

- A. Cultural practices should be employed to enhance turfgrass root systems, within the confines of desired turfgrass playability and legal use of agrochemical. Root-damaging conditions to be avoided include soil compaction, soil layering (including excessive thatch), poor aeration, root-feeding insects and nematodes, root diseases, inadequate soil depth and localized dry spots.

#### DIRECT COMMENTS, SUGGESTIONS AND QUESTIONS:

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first-draft proposals, some of which may be changed in the final presentation to FDACS.



Controlled and slow release N sources help reduce N leaching. Photo by G.Snyder.

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## Fairy Ring Experiment Pays Off at Sun 'n Lake

If the members at Sun 'n Lake Golf Club in Sebring hadn't already experienced problems with fairy ring, they may not have agreed to participate in a fairy ring experiment the winter of 1996. The club rebuilt the front-nine greens of the original 18-hole course in late summer of 1995 and began having problems with fairy ring in February 1996.

"We stripped the greens, reshaped them and cored them down to 12 inches," says Mark Hopkins, golf course superintendent for the past 8-1/2 years. "Then we brought in an 85/15 sand and Canadian peat mixture. Since we sit right on top of a sand hill, we didn't feel we needed any more drainage. But fairy ring most often attacks sand-based greens."

When fairy ring began popping up,

some of the Sun 'n Lake members first thought improper mowing procedures were causing the problem. But Hopkins launched an educational effort, posting information from the USGA about the disease on the club bulletin board and working to dispel the rumors about the brown, unsightly rings. Hopkins tried everything he could think of to control the problem: wetting agents, extra water and fungicides. He finally used the curative rate of ProStar® 50WP Fungicide and the problem cleared up within two weeks.



Golfers putt on practice green with fairy ring at Sun 'N Lake Golf Club in Sebring. Photo by Bob Hickman.

### Splitting Greens Down the Middle

Before rebuilding the back-nine greens, Hopkins talked to the greens committee and other club members to discuss what he wanted to do. He suggested

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applying ProStar® on half of each green at a preventive rate, as a test plot to see how well the fungicide controlled the fairy ring he knew would appear. "It's hard to get a golf course to split greens in half as an experiment," notes Hopkins. "But they knew we had to do something. Luckily, they got to see firsthand how well the product worked."

The greens were rebuilt and sprigged by May 1996. Hopkins waited four months before starting the applications so the greens would have full cover. He put PVC sleeves in the ground at the sides of each green and marked the halves with flags.

Starting in September, he first sprayed the green halves at a preventive rate of 3 ounces of ProStar® per 1000 square feet, returning every six weeks with the same rates of ProStar® and Primer, a wetting agent. The AgrEvo EH sales representative, Bob Hickman, supervised the experiment with the help of Dr. Monica Elliott from the University of Florida.

"Fairy rings started popping up on the sides we didn't spray by the end of February or early March 1997," explains Hopkins. "You could see a perfect line, where half the greens had rings all over them and the other halves were perfectly clean. The only thing we didn't see was half rings right at the center line!"

After Elliott and John Foy of the USGA Green Section visited the Sun 'n Lake course to observe the experiment, Hopkins sprayed ProStar® at the curative rate on the affected halves of each green. All the greens remained clean for two months after the ProStar® applications. Hopkins plans to continue using ProStar® on a regular basis during winter months until the fairy ring fungus completely goes away.

Since the newest nine-hole course on the 27-hole Sun 'n Lake facility was built only four years ago, Hopkins does not intend to rebuild those greens anytime soon. "But when we do rebuild them, we'll use ProStar® as a preventive treatment from the beginning," he said.

BOB HICKMAN  
AgrEvo EH

Business Support Representative

The Central Florida GCSA and GCSAA

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# Letters..

...to the Editor

## Bug Tutorial Info Change

Just received the letter back and the diskette (thank you) on the item I submitted concerning the Turfgrass No. 1 Bug Tutorial for CEUs.

We are still coming out with it, but it will probably not be until June. The place to buy it is now through UF/IFAS Publications at telephone 800-226-1764 to order or 352-392-1764 for information.

Other than that, everything else is the same. We are now starting the production cycle so that we have one out every three weeks. We'll have them in L&O, GHP, Termites, Fumigation and Core.

Details of all my programs are available on the UF Buggy Software WWW site at [www.ifas.ufl.edu/~ent1/software/fasulo.htm](http://www.ifas.ufl.edu/~ent1/software/fasulo.htm). As a program becomes available it is listed there.

Tom Fasulo  
Extension Entomologist  
UF

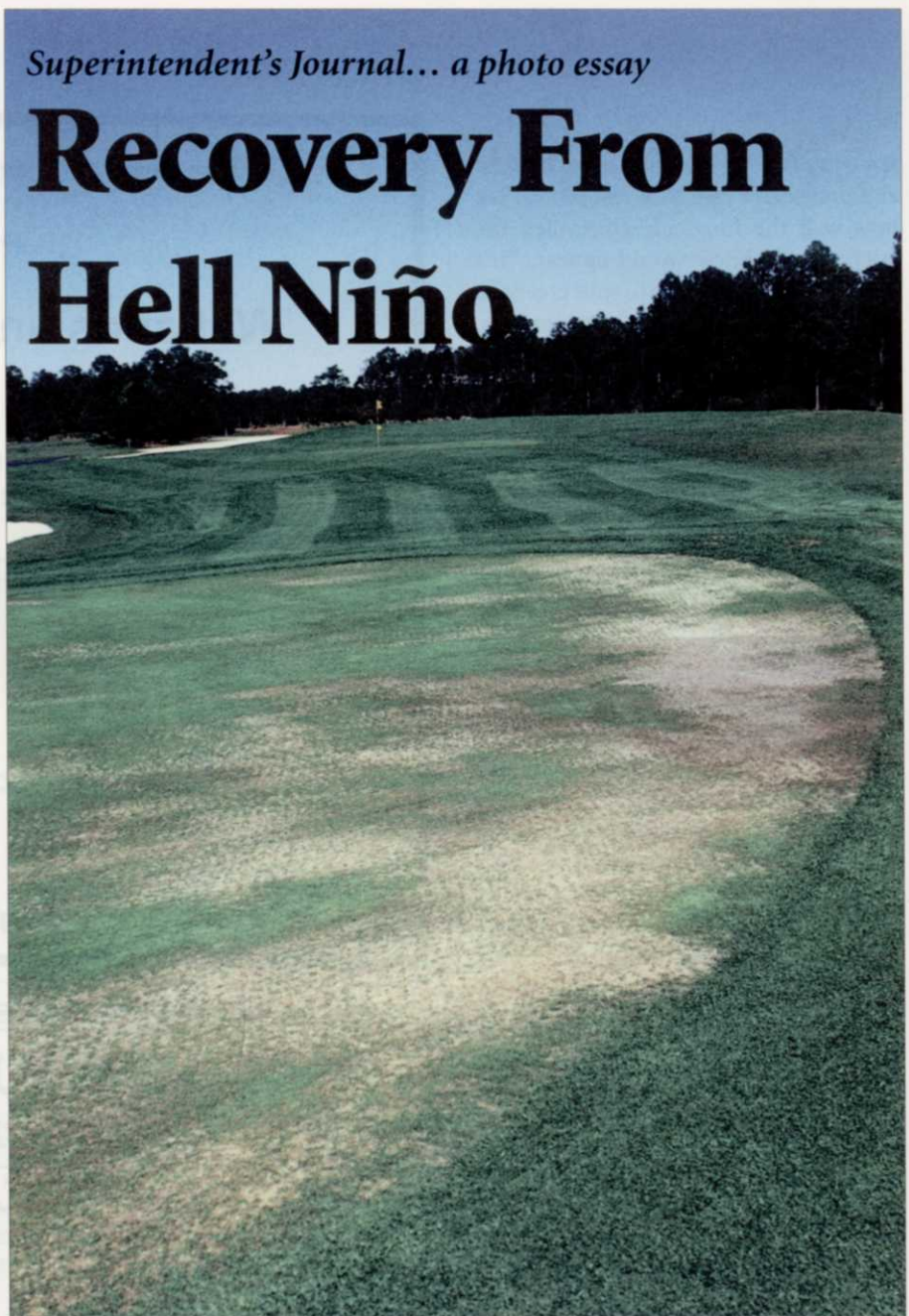
Many greens like this one suffered extensive turf loss this winter. Greens that had faulty construction, poor drainage, heavy traffic, too much shade or poor air circulation couldn't survive the heavy rains and lack of sunlight from the El Niño effect. Photo by Joel Jackson.

## Rebuilding Bigger Can Be Better

Unacceptable turf thinning and loss during El Niño prompted many clubs to rebuild or regrass the damaged greens. This green is being enlarged because it was so small that heavy traffic literally wore off the turf during the impossible growing conditions this winter. Photo by Joel Jackson.

Superintendent's Journal... a photo essay

# Recovery From Hell Niño





1



2



3

## Rapid Turf to the Rescue!

**1** Several clubs in Central Florida chose to re-grass their greens using Rapid Turf to get them back in play as soon as possible. Rapid Turf is grown hydroponically on plastic sheets for easy harvesting and transporting in large 4-foot wide rolls. Photo by Joel Jackson.

**2** The first strip of Rapid Turf goes down. The white flags mark the perimeter of the putting surface for the operator. This green was totally rebuilt after investigation showed the sub-drain system had been crushed during original construction, which contributed to its chronic weak condition and final failure during El Niño. Photo by Joel Jackson

**3** One hour later, nearly half the green has been re-grassed. The small turf roller in the center of the picture is used to help smooth the surface. Photo by Joel Jackson.

**4** One week after Rapid Turf installation the green is almost ready for return to service. This process is more expensive than sprigging, but it does give clubs another alternative when repairs are warranted. Photo by Joel Jackson.



4

**T**This is my final article as the assistant editor of *The Florida Green*. I like to kid Joel about “firing” me but the truth is that I requested he find a replacement who could actually put the magazine

together in the event that Joel was unable to perform those duties.

I’ve enjoyed the prestige of holding this title for our highly regarded publication, but I have neither the time nor the inclination to learn what’s

necessary to do Joel’s job if the need should arise. Our association deserves a more qualified and dedicated person in the assistant editor’s position and Joel has found this person in Past President Scott Bell.

Anyone who knows Scott knows the talent and effort he will bring to this position, so I confidently and contentedly turn this position over to his capable hands. I thank Joel and the officers of the Florida GCSA for the privilege of holding this position for the past few years and for their offer to continue allowing me space in the magazine for my musings and ramblings.

By now it is old news that Dr. John Cisar is the new turf coordinator for the University of Florida. John has addressed and/or attended meetings of the FGCSA and FTGA boards, the USGA, some local chapters and other meetings with industry reps since his appointment in March.

He demonstrates his enthusiasm and commitment to building the best turfgrass program in the country. With our long-term commitment of support this will become a reality. As an industry, we need to develop new sources of revenue for turfgrass research.

At the risk of sounding like a broken record, we cannot expect the same sources who have always supported us to increase their level of support. We need new sources and new strategies.

The golf and turf industry in Florida is huge and the vast majority of those who derive their livelihood or enjoy the benefits of turfgrass currently do nothing to support our efforts to improve quality of our product, reduce its costs and protect our fragile environment. This isn’t right and we need to find methods to rectify this inequitable situation. Godzilla needs to get off the Prozac and start taking steroids.

## *Giving Up the Title, But Not the Fight!*

### **Mark My Words**



Mark Jarrell, CGCS  
Assistant Editor



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**W**e live in a world of deceivers, receivers and true believers. Maybe they could be called the good, the bad and the ugly, but not necessarily in the same order.

There are just plain bad folk out there who have no conscience about going around spreading misinformation and disinformation about golf courses and their impact on the environment. Some do it out of ignorance, but the worst do it because that's how they make money. They get paid government and charitable grant money for ranting and raving and preying on people's fears. No real proof.

Just lots of rhetoric.

Then there are those who deceive themselves into thinking that if they ignore all the fuss, things will just keep going on like they all ways have and they won't have to make any changes in how they conduct business or enjoy their hobbies, like golf for instance.

There will always be deceivers as long as people look to take the easy way out.

The next bunch are the receivers. Doesn't mean they're good or bad, but they can be the ugly. They receive the benefits of a well maintained golf course. Maybe they are just daily fee players enjoying being outdoors, or the challenge of competition in a friendly match, or entertaining business clients. Maybe they are private-club members living in an exclusive golf community enjoying all the amenities. Maybe they make a living from a golf course by owning one or by being

employed by one as a superintendent or golf pro or general manager. Maybe they are professional tour players making a living plying their skills on courses around the world. Maybe they manufacture equipment and clothing for playing the game.

The one thing they don't do is give. They only receive.

And that can be ugly!

Then there are the true believers. Call them the good guys. They not only participate in the game of golf, they respect the traditions of the game. They volunteer their time and resources to make golf available or enjoyable to others. They too are employed by golf courses or make their living from some form of golf interest. They are educators and scientists who look for ways for golf to grow and change with the times and the evolution of the environment. They are the superintendents who practice the fine art of stewardship. True believers give something back to the hand that feeds them.

If the receivers would stop for just a moment and realize that they have within their power the ability to guarantee or destroy the game of golf as they know and enjoy it, maybe — just maybe — they would join the true believers. If they could only see that a very modest investment of time, effort and money could secure the future of the game from which they profit.

As we look for new strategies and ways to raise money to fund turf research or golf programs in general, the receivers must step up and give. Isn't it written somewhere that it's better to do that anyhow?

# Deceivers, Receivers and True Believers

## Green Side Up



Joel Jackson, CGCS  
Editor

*If more receivers of the benefits of golf became true believers like the Barbaron company, the future of golf would be secured. Photo by Joel Jackson.*





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