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**Fertigation methods**

Fertigation is best used to apply fertilizer to turf in frequent, but low per-application rates. Total fertilizer application over time may remain the same as is used for conventional fertilization with dry sources, although many users have reported that lower fertilization rates can be used when fertigation is employed.

The key advantage of fertigation is that the total application of fertilizer can be split up into light, frequent doses of nutrients that can be readily absorbed by the turf without requiring much more labor than is needed for the irrigation itself.

Since the turf is fertilized frequently, growth is consistent over time, and since the per-application rates are low, uptake is rapid, efficient, and there is little unadsorbed nutrient left in the soil solution to leach into the groundwater.

The cost of fertilizers for fertigation

should be very competitive with their dry counterparts, and, in fact, should be much lower than controlled-release sources.

The fertilizer can be delivered in liquid form directly to a storage tank, or in some cases via an inlet pipe connection conveniently located near an access road some distance from the storage tank. Liquid fertilizers can be pumped over distances and elevations without the manual effort required for moving dry fertilizers.

Generally fertigation should be used for nutrients that are difficult to manage in the soil, i.e., that are not retained well in the soil. Examples include nitrogen in virtually all soils, potassium in sand soils, and micronutrients such as iron and manganese in calcareous soils.

Nutrients such as calcium, magnesium, and phosphorus are retained well by many soils and can be applied infrequently at relatively high rates. Fertigation is less advantageous in these cases, par-



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ticularly if these nutrients lead to a less soluble and stable liquid mix.

Fertigation does not have to be the sole fertilization method.

It often is better to use fertigation to provide a uniform rate of fertilization over a golf course, and then supplement greens, tees, and other high-use areas with foliar, drench, or dry fertilizers, as opposed to attempting to apply varying rates of fertilizer by fertigation differentially over the course.

Additional instructions and suggestions for using fertigation on golf courses have been published elsewhere (*Snyder and Burt, 1974; Snyder and Burt, 1977; Snyder and Burt, 1978; Snyder 1979; Snyder 1987; Snyder, 1994*).

New and innovative uses of fertigation for turf

What about the current research trends and uses for fertigation systems?

Actually, the method of fertigation hasn't changed too much, although the newer injection systems are more sophisticated and often use flow-sensing devices to maintain a constant, though adjustable, concentration of fertilizer in the irrigation water.

But the original concept remains. What has changed is the array of chemicals injected with fertigation systems. Initially designed to inject inexpensive, soluble, inorganic nutrient sources, fertigation now is being considered for application of various soluble organic-based nutrients, organic matter extracts, and biostimulants.

Such studies are under consideration for study at the FLREC.

Fertigation has been adopted for solving other turfgrass agronomic problems as well.

In certain parts of Florida, high calcium carbonate levels in irrigation water from dissolved limestone along with appreciable lime in the soil can result in high-soil-pH-induced micronutrient deficiencies, and in reduced percolation due to precipitated carbonates.

Fertigation systems have been designed to monitor irrigation water pH and automatically inject pH-reducing chemicals into the water to obtain a desired pH. Gypsum (calcium sulfate) in-

jection into irrigation water is used to displace sodium from clay minerals, thereby promoting flocculation of the clays with a concomitant improvement in soil structure and water penetration.

Originally, these systems were designed to combat the adverse agronomic impacts on crops, and now turf grown in high sodium-affected clay soils throughout the arid west.

They now are being marketed to combat sodium-affected turfgrass areas in

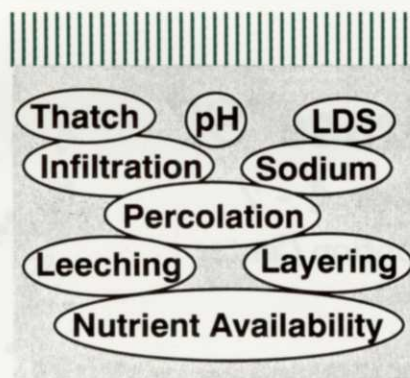
Florida, and may have some utility in coastal areas with high levels of saltwater intrusion.

Testing of one such gypsum injection system at the FLREC was considered earlier this year by a California-based vendor. However, the FLREC soil and water conditions were judged by the vendor to be of sufficient quality to negate the potential usefulness of the system.

The test system was, however, in-

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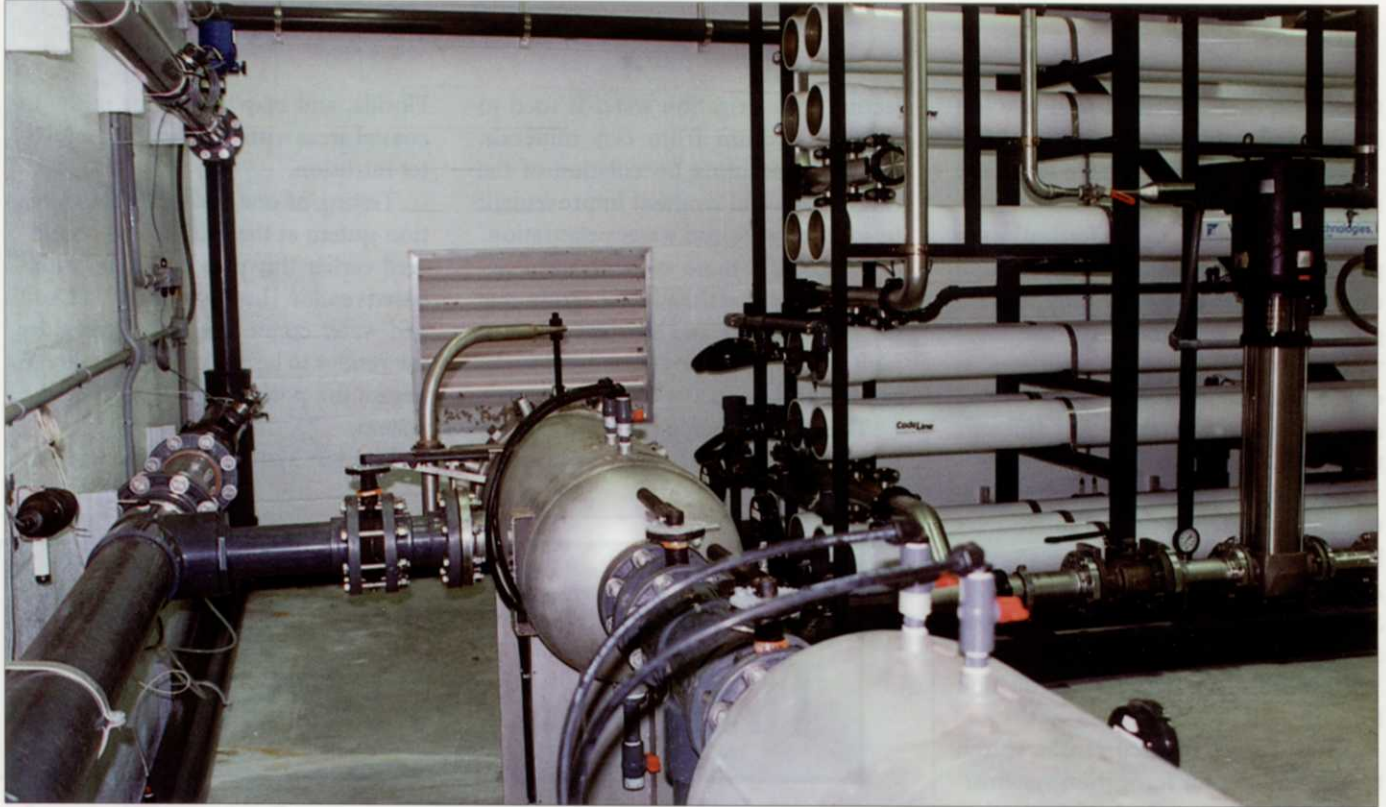
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Since 1996, Peter Brooks at the Everglades Club has been making his own irrigation water from salt water by using a reverse osmosis process. There are two units each capable of producing 300,000 gallons per day. Pete's pump station can deliver 15,000 gpm, but the RO plant can only make 4,100 gpm. So, Pete stores some of his water in a four acre irrigation holding lake. He tries to match flow projections from his Network 8000 to the water needs on the course.

stalled in early 1997 at a golf course in Jupiter, and we await the results of that test.

**Conclusion**

Fertigation has evolved from a questionable golf course fertilization technique to a commonly-used method of maintaining high-quality turf. Fertigation has been shown to stabilize turfgrass nitrogen nutrition and minimize nitrogen leaching.

Today, fertigation systems are being used to apply chemicals for various purposes other than fertilization. The future may see the use of fertigation systems for applying various organic and biological compounds that assist golf superintendents in providing quality turfgrass.

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# Florida Club Course Designer Dick Gray Uses Georgia Grass On His Greens.

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# The New Networking

BY JOEL D. JACKSON, CGCS

**L**ove it or hate it, the computer age is here.

I'm not much of an Internet surfer, but I have done some exploring for hotel and airline prices. However, I do like the ease and speed of e-mail and have taken advantage of that aspect to conduct file transfers with our publisher, Larry Kieffer at Janlark Communications.

That means no more reams of fax paper piled up on the bedroom floor. Instead, just the friendly America On Line voice telling me "You've Got Mail!" when I sign on.

A click on the Download Button and a few minutes later the word-processed stories I sent Larry a few days ago are back in my computer in PageMaker publishing layout for me to proof, edit and send back for printing.

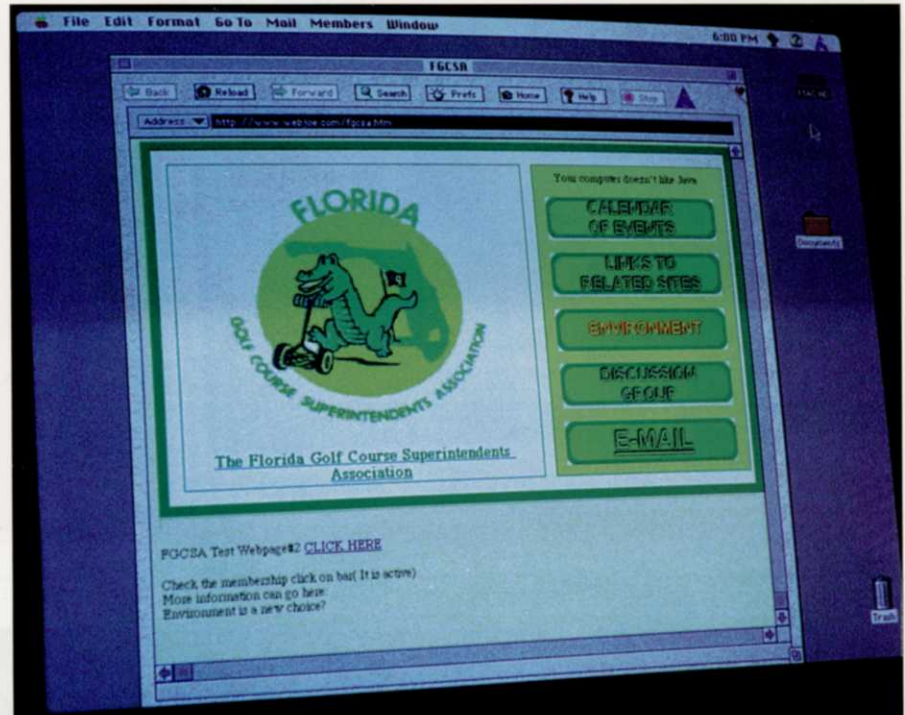
I have also been e-mailing IFAS professors for research stories; Shelly Foy for Stewardship articles; and Darren Davis with information on FGCSA Committee work and *Florida Green* articles.

I keep in touch with a dozen or so superintendents nationwide through a loose network affectionately called the SBBB or (Surly Beer for Breakfast Bunch). A few of the SBBB have met twice (face to face) at the national conference and shows in Orlando and Las Vegas.

One day when I was messing around I clicked on the Members icon on the AOL menu bar and dragged down to Membership Directory.

Up popped a window directing me to type in key words to help me locate people with the same likes, dislikes, hobbies, interests and occupations. I typed in "golf course superintendent" and found 213 screen names of people who had indicated that occupation in their AOL profiles.

By scrolling the list I located 23 Florida superintendents who identified themselves as golf course superintendents. I



Sample web page for proposed FGCS site.

made up an e-mail list of those screen names called Florida Supts. I can now e-mail all 23 of them simultaneously with one click of the Send Button... and I have!

There is no telling how many superintendents are really out there on line because many people choose to remain anonymous and do not fill out profiles and many more use local independent service providers for Internet access rather than America On Line or CompuServe.

Several times a week I log into the GCSAA Members Only Discussion Forum at the GCSAA Web Site and check the posted topics to see if there is anything of interest to me or if I can answer a question that is posted.

I also check out the "What's New" link to get the latest press releases and announcements. GCSAA is working on set-

ting up a link so you can register for the Conference and Show on line.

The ability to communicate instantaneously and send and receive large amounts of information electronically is changing our lives and the way we do business. We must embrace these advancements and mold them as useful tools for our own progress as individuals and associations.

Even now the FGCSA is looking at establishing a web site to provide information to its members and to the World Wide Web with a links to other appropriate web sites.

**Editor's Note:** The FGCSA Education Committee is finalizing plans to offer a computer training seminar at the 1998 Crowfoot Open. If you're interested, contact me or Darren Davis and stay tuned for details.



Gas cans and plastic bed liners make for a potentially dangerous combination. Photo by Joel Jackson.

# Safety Alert!!

## Don't fill gas cans in pickup trucks with bed liners.

**Y**ou or your employees are at risk of serious injury or even death if you fill gas cans that are sitting in the bed of a pickup truck with a bed liner.

Chevron USA has reported several instances of metal cans exploding while being filled in the backs of pickup trucks at service stations. At least 23 injuries or deaths have resulted.

In a warning published in Chevron's Marketing Bulletin 36-1904, Chevron said that the insulating effect of the plastic liners found in the back of many pickup trucks prevents the static charge generated by gasoline flowing into a metal can from grounding.

As the charge builds, it can create a static spark between the can and the gas nozzle resulting in explosion or fire.

Although it has been suggested that placing a rubber mat under the can while it remains in the pickup bed may eliminate the danger, that may be ineffective. It is not recommended as a safety precaution.

Chevron USA advises workers to place cans on the ground, away from vehicles and people, when filling them to minimize the danger of fire and explosion.

(This article was reprinted with permission by Thomas P. Kerr, Inc.)

-Don McCommon, GCS  
Fairways G.C.

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## Floratex: First Year Impressions

BY SCOTT BELL, GCS

*Bent Pine G.C.*

**T**he Indian River Soccer Association in Vero Beach decided that the players deserved their own soccer fields. For many years the fledgling association played on whatever substandard fields they could find. The turf almost always was bahiagrass and, depending on the time of the year, it was a blessing if the grass had been mowed.

Fire ant mounds were common obstructions and holes and sand spots posed constant threats. The association and Indian River County finally reached an agreement for the association to build fields on county land.

In 1995 land was cleared and fill was brought in. The local chapter of the Florida Irrigation Society installed the irrigation system consisting of a 4-inch artesian well with a 10 hp pump and Toro 2000 heads. By September 1995 the

irrigation system was complete, the electric power was installed and the final grade was established.

Quality Grassing installed the FloraTex sprigs, and Roger Welker grew in the fields.

Unfortunately we got a late start due to some circumstances beyond our control, and we entered November with month-old sprigs. Luckily we had a warm enough fall to get a fairly decent cover before winter.

Roger employed a grow-in program similar to that used to grow-in a golf course, with a heavy reliance on ammonium sulfate and other fast-release fertilizers. By late December the decision was made to overseed the fields to give them color and to fill any voids that existed. The fields were seeded at about 250 pounds per acre, and that gave a good cover for our first season. By April the ryegrass was fading and the FloraTex was starting to grow.

I considered last summer to be the true grow-in period. I did a couple of fertilizer applications in June and Sep-

*It can take the abuse of the kids playing the games and it still looks great.*

tember and we got the turf fully covered. The soil that had been used as fill was full of rocks and debris which kept surfacing all summer, causing damage to the mower. By fall most of the rocks and debris were gone and the fields were in great shape for the fall season.

The Indian River Soccer Association Fields consist of one large adult field, two under 12-year-old fields, two under 10-year-old fields, three under 8-year-old fields and three under 6-year-old fields. These take up 14 acres. Games are played on Saturdays and Sundays. There have been weeks where there have been over 50 games a weekend.

FloraTex has impressed me particu-



- Minimal damage to course.
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larly for sports fields though I also think that it could have some golf course applications. The grass has very good drought tolerance as most Bermudas do. What I really noticed is how tight this grass is.

The stolons do not get leggy like 419 can. The grass looks as good at the beginning of the season as it does at the end. It can take the abuse of the kids playing the games and it still looks great.

I think that because it is so tight it doesn't damage easily.

Perhaps FloraTex's greatest asset is its ability to resist the cold and stay green. The field is unprotected and susceptible to the wind. I've noticed that the fields turn off-color later and they green up faster than my golf course.

It has been very interesting managing this new grass. I would recommend it for any sports turf use. FloraTex should be given a chance on sports fields and common areas.

# EDUCATION

## Earn While You Learn

Some of the most consistent advice that successful superintendents offer over and over again is to "never stop learning," "learn something new every day," "the more you know the more you grow."

Here is the latest schedule of university-level regional seminars to be held in Florida for the remainder of the year. If you can't travel far, these seminars will provide great information for your personal and professional growth and development and also meet CEU recertification requirements for certified superintendents.

### 1997 GCSAA Regional Seminar Schedule in Florida

August 6, 1997. "Enhancing Your Value as a Professional Golf Course Superintendent" at the Palm Beach Holiday Inn. Co-hosted by the Palm Beach GCSA.

September 4, 1997 "Lake and Aquatic Plant Management" Tampa Convention Center or Hyatt Regency. Co-hosted by the FGCSA on the day before the opening of the Florida Turfgrass Association Conference.

November 20 & 21, 1997 "Managing People for Peak Performance and Job Satisfaction" at the Royal Caribbean Resort. Co-hosted by the Central Florida GCSA (first two-day seminar!).

December 4, 1997 "Improving your Negotiating Skills" at The Meadows. Co-hosted by the North Florida GCSA.

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If you can't get away at all, then you might consider these GCSAA correspondence courses that will allow you to learn at home.

**Learn at your own pace**

GCSAA's correspondence courses allow you to study at your own pace, as your schedule allows. The courses are designed to be completed in seven to 14 hours and include reference materials that can be added to your professional library.

The (+) icon identifies those correspondence courses that fulfill requirements for the six specializations in the GCSAA Environmental Management Program.

**Emergency Planning and Community Right-To-Know (+)**

This correspondence course will help you understand and comply with the federal Emergency Planning and Community Right-to-Know Act, which may affect your golf course maintenance op-

*The courses are designed to be completed in seven to 14 hours and include reference materials that can be added to your professional library.*

eration. You will also receive instructions on developing a chemical emergency preparedness plan specific to your workplace. Tips on crisis communication round out this course. Continuing education units 1.4 Code # 30150 \$100 member/\$150 nonmember

**Hazard Communication Program (+)**

By completing a series of exercises and activities designed especially for golf course operations, you will develop the materials required for compliance with the Hazard Communication Standard.

The exercises involve a drawing of your golf course facility, an inventory of hazardous chemicals, a compilation of MSDS's, and the development of procedures for employee training and maintaining documentation. This correspondence course or the seminar, Developing Your Hazard Communication Program, satisfies a study requirement for the Employee Safety and Right-To-Know specialization in the Environmental Management Program. education units 1.4 Code # 30225 \$100 member/\$150 nonmember

**Media Relations (+)**

This course will provide you with the skills needed for responding to or initiating contact with the media. You will learn how the news media operates and how to talk to reporters. Story writing, establishing media contacts and public relations are discussed in detail. Continuing education units 1.4 Code # 30175 \$100 member/\$150 nonmember

**Personal Protective Equipment for Pesticide Applicators (+)**

This course provides EPA-approved information regarding the use, care and cleaning of personal protective equipment (PPE). Examples provide pesticide label interpretation, as well as worksheets, to help organize label requirements. This information will also help employers who fall under the EPA's Worker Protection Standard. Continuing education unit .7 # 30275 \$100 member/\$150 nonmember

**Personal Stress Management**

This course discusses ways to deal effectively with stress. The material provided explains the benefits of good stress and the warning signs of too much bad stress. Exercises include an assessment of your personal stress level and structured activities for managing this condition. Continuing education unit .7 Code # 30125 \$100 member/\$150 nonmember

**Time Management**

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