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About the use of trade names: The use of trade names in this magazine is solely for the
purpose of providing specific information and does not imply endorsement of the products
named nor discrimination against similar unnamed products. It is the responsibility of the
user to determine that product use is consistent with the directions on the label.
I have taken a keen interest in the tactics and spin that the radical so-called environmentalists have used to communicate with the citizens of our nation. It is hard to determine if it is centrally controlled or if it is the work of many different factions coming from different directions.

At the Poa Annua we had a very informative program that David Court put together. The first three hours of the program were a lesson in media relations, put on by Dow Elanco's Issues Manager, Terry Henderson. The program was interesting and timely. The last hour and a half, the class engaged in a lively panel discussion on the media. The panel consisted of three reporters from the southwest Florida area. One of the reporters was from a local television station, another reporter covered local news for a local paper and the other person was a local sportswriter. All three of the reporters felt that they were fair and that they tried to explore both sides of an issue before they wrote or aired a story.

Many superintendents in the class had horror stories of misquotations and misrepresentations. Others did have positive stories of how they were properly portrayed. This brings me to my point, which is that everyone has a particular view and many people are not going to change.

Have you ever had an employee who you felt was not carrying his share of the work? I have. Every time that I would confront one of these people, they would respond by telling me that they are one of the hardest workers on the staff, and I should look at others who they felt did not carry a fair share. I have found the same to be true with environmentalists and media. I recently wrote a letter to the editor of an well-known environmentalist magazine to dispute the slant they gave golf courses in one of their articles. I do not know if it was published (I doubt it), but I did get a reply. The reply was the same untruths and environmentalist packaging that they give many anti-golf stories. I have seen enough of it that I can recognize it by now. My letter had no effect on the individual, and his basic reply was, "the fact that golf is doing environmentally favorable things proves that it was hurting the environment in the first place."

In the May 1 edition of Sports Illustrated, in the Scorecard section, an article was written regarding the 25th anniversary of Earth Day. The first question that I had was why that magazine was doing this story in the first place.

The story lambasted the new Republican Congress and, oddly enough, the Clinton Administration, for its lack of movement in the environmental fields. What frustrates me with stories like that is that no credit is given to what has been done.

The mindset seems to be that the sky is falling, and everything that is done...
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In this issue I would like to share some excerpts from comments made by Robert Trent Jones, Jr. at the 1993 Green Section Education Conference:

"...No one is quite sure when the term was contrived. Perhaps it was back in the teens or even before that, but many of our early golf courses were called “country club.” These early clubs and courses were located well out of the inner cities — out in the country. One reason they were there was because golf not only requires space, but they were also there because of the environment they provided for members and players of all ages.

In those early days, you went to your club in a horse and buggy or, later, in a Model-T with your clubs in the rumble seat. The streets of the city were littered with horse manure and, later, with smoke-belching autos. The environments of the major metro areas were not at all that delightful and even today, some say that our cities are no better.

But at that country club, all was bright and beautiful. One hundred acres or more could be found of green grass, white sandy bunkers, and often a glittering blue sky. There were no horse droppings, no smoke, no noise, no clutter, no urgency, no problems...unless you considered a tough golf shot a problem.

With this in mind, we can say that “greens keepers” can be thought of as early environmentalists. They provided players with a place to go to enjoy nature and the great outdoors. These superintendents kindled the beliefs that courses provide habitat for wildlife and green spaces for all of us.

Isn’t it strange that the game that found its earliest roots in environmentalism is often attacked today by those who call themselves environmentalists? Many of those people don’t truly understand or appreciate the game of golf. They see it as a giant club with privileges not to be enjoyed by the populace; they see it as a wasteful use of land and water; and they see it as a residue of chemicals gone astray.

There are obviously some misconceptions and misunderstanding here, and it is our mission to heal this void and to bring more true understanding to these detractors and to make them realize that we — all of us superintendents — are true environmentalists.

This is not something new with us or with the game of golf. Golf course superintendents, with our absolute professionalism and sharp attention to maintenance methods, provide the best, cleanest and most wholesome environment we possibly can.

We must carry the message to these critics that golf may once have been a game for the well-to-do, but now it is played by everyone. Take them out to our municipal courses. Let them see the seniors, the women, the juniors, the peeves and the handicapped who play this game.

Let them see our strict adherence to tight regulations on chemical use, whether it is pesticides or fertilizer. Show them that we follow the rules — we often do better than what is regarded as standard practice.

We are what we have always been, with a long history and thousands of golf courses to prove it. We are dedicated environmentalists, and we are getting better at what we do each and every passing day!

So the message today is loud and clear. The environmental movement is here to stay and we are a major part of it. As devout and dedicated as we have been in the past — we can be even more so in the future.

The golf industry demands that we be good at what we do because there is no place for us if we aren’t. We prove how good we are every day, just as the golf pros do on the tour. Just as those talented players have the best equipment with which to play the game, we also have remarkable tools and pieces of machinery to help us with our work.

It is time for each superintendent, and all others associated with the game of golf, to stand tall and proclaim that golf is not an environmental problem. Golf is an answer, one of the best answers we have, to make this world a better place in which to live, to play, and to enjoy a clean and healthy outdoor environment.
The doomsdayers are never going to go away

just makes our world worse. The environmentalists seem to take no credit, nor do they give any credit, for things improving. The environmental movement has been responsible for many major victories and some have been positive.

In the past 25 years, we have seen the creation of the EPA at national and state levels, the Clean Water Act, and the Clean Air Act, as well as the recycling of water, plastic, paper, metal and other materials. The movement has been, in my opinion, partly responsible for the movement of American factories and jobs out of our country, thus resulting in a lowering of living standards.

You may view some of the things listed above as positive or negative, but either way the environmentalist movement has affected all of our lives. I feel that they do not want to admit that any of that is true, and they would rather keep playing David vs. Goliath and making America think that they are a small group, a faint voice in the wilderness, trying to save America and mankind from itself.

We cannot rest on our current position that seems kinder to us than in the past. Many environmental laws are restrictive and cumbersome, but we have learned to work with them and accept the costs. Some laws were necessary, and 25 years ago we had some very polluted waters and air. Much of that has been cleaned up to safer levels, and we need to question where the happy medium is.

The doomsdayers are never going to go away, and we will never change their minds. The best that we can hope for is to get the people in the middle to our side. Many people are more skeptical of the environmentalists as they see costs associated with the environment going up and they see business handcuffed with regulations.

Keep informing people and doing positive things for our industry. Be judicious in your chemical and fertilizer usage. We can improve our situation, but it takes all of us.

This is the last of my President’s Messages. I hope that you enjoyed them or that the messages at least made you think of our industry. After this past season, I think that it is evident that we all need to stick together and help each other out.

Thank you for letting me serve, as I have truly enjoyed it. Support Greg as you have me. Thanks to Marie, Paul, Greg, Dale, Kevin, Donnie, Debbie, Joe, Joel and my staff.
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Poa Annua Classic: productive, educational, fun

The annual Spring gathering of Florida superintendents began on the morning of Friday, May 19, with the FGCSA Board Meeting. At this meeting the CIBA corporation presented a check for over $25,000 in rebate incentives to be used for turf research. Also at this meeting, funding was approved to partner with the FTGA to sponsor DNA testing of hybrid bermudagrasses.

At noon, Dow Elanco’s Issues Manager, Terry Henderson, presented a program called Emergency Response. The second half of the seminar included a lively panel discussion with three media representatives of the Fort Myers-Naples area.

On Saturday, May 20, the Everglades Chapter buried the competition and took team honors in the annual fund raising Poa Annua Classic. Jim Osburn of Cape Coral CC took individual honors with a sterling score of 68. Kevin Downing of the Treasure Coast was second with a 72.

Michael Swinson of Seven Rivers GCSA was low net superintendent winner with a 62 and Dickie Harrell was the low supplier with a gross 73. Later that evening, contestants and guests enjoyed a “Southwest Fiesta” banquet complete with entertainment.

Sunday morning saw David Barnes and company kick off the Annual G.C. Horn Memorial Tournament which raises endowment funds for the FTGA Research Foundation. Once again, a productive, educational and fun weekend. Our hats off to the Everglades Chapter for another first-class event. All golf events were held on the Naples Beach Club Golf Course, which is managed by Dick Naccarato.

The Envirotron Golf Classic raises $35,000 for research

The third annual Envirotron Golf Classic, held April 24 at World Woods Golf Resort in Homosassa Springs, raised $35,000 for the Envirotron Research Laboratory at the University of Florida. The tournament’s net proceeds will go toward purchasing research equipment and supporting an in-house researcher. The inaugural event, held June 28, 1993, yielded a $22,500 donation. Last year’s tournament brought $30,000.

Funded in part by the Florida Turfgrass Association, the 3,100-square-foot, state-of-the-art research field laboratory opened in November, 1993 and includes a greenhouse, four climate-controlled glass houses, two walk-in growth chambers, two laboratories, study areas, classrooms and offices.

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Presented by the Seven Rivers Chapter of the Florida Golf Course Superintendents Association, the tournament comprised of a pair of 18-hole, 4-man scrambles, played on two of the nation’s top courses — Pine Barrens (rated No. 1 by Golf Digest) and Rolling Oaks (rated No. 8 by Golf Digest).

Major sponsors included World Woods Golf Club, Seven Rivers Golf Course Superintendents Association, Barbaron, Tresca/Jacobsen, United Horticultural Supply/Bayer, Ag Resources/Helena and Southern Golf Products.

For information on sponsoring the Envirotron or FTGA membership, contact Jane Rea at (800) 882-6721.

Misty Creek G & CC hosted the Twelfth Annual Suncoast Scramble. Thirty area club teams participated in the tournament this year. Each team was made up of manager, pro, superintendent, and supplier. Each player had the opportunity to purchase two mulligans and an unlimited number of raffle tickets.

Host superintendent Tom Crawford had the golf course in top condition with “Sunday” pin placements and quick rolling greens that everyone enjoyed.

Over fifty gold, silver and bronze sponsors donated from $50 to $500 as tee signs that helped raise $8,700. The proceeds will be distributed to FTGA, educational seminars, scholarships and junior golf.

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"For the past five years, we have overseeded our greens with straight Laser. Year after year, Laser has out-performed the other Poa trivialis varieties we've compared it against. It has consistently proven to have better color, quicker establishment, better disease resistance and better durability under high traffic. Laser produces an excellent putting surface. Our observations have convinced us that Laser is the superior choice of Poa trivialis."
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Have you ever seen 1,000 golf balls dropped from a helicopter onto a green? Well, it happened at Loblolly Pines just before the Blue Pearl Tournament.

Shelly Foy organized this fundraiser for the Hobe Sound Women's Club, and they raised $6,000 in six weeks! With the help of Greg Norman's helicopter and pilot, 1000 numbered golf balls were dropped onto a temporary green.

Shelly says it was the "coolest" thing she had ever seen and was most definitely a lot of fun! Each numbered ball was sold for $10, and the ball that landed closest to the pin won $1,000.

Proceeds will be shared between the Cooperative Sanctuary Program for Schools and the Hobe Sound Women's Club Education and Scholarship Fund.

If you missed out on your chance to win this year, don't worry. Plans are already underway for the Second Annual Helicopter Hole In One!
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Blue Pearl Tourney benefits program

The Treasure Coast Golf Course Superintendents Association hosted their 2nd Annual Blue Pearl Charity Tournament at Loblolly Pines Golf Club Saturday, May 13th.

Proceeds from this year's event will benefit the Cooperative Sanctuary Program for Schools. The TCGCSA will adopt 10 schools, provide reference materials on native plants, wildlife and habitat, as well as establish a $5,000 grant fund so the adopted schools will have a funding source for projects they wish to work on.

The TCGCSA has received recognition from the Audubon Society of New York for providing the first fundraiser for the Cooperative Sanctuary Program for Schools. They have also been recognized by the GCSAA for leading the way with the School Program, as it was announced at the FGCSA Poa Annua meeting that the GCSAA will become the sponsor of the Cooperative Sanctuary Program for Schools.

Congratulations Treasure Coast!

Cooperative Sanctuary Program for Schools

The Three Amigos
Tim Cann, President, TCGCSA; Ron Dodson, President, Audubon Society of New York State; Craig Weyandt, Treasurer, TCGCSA. Check out the hats with the blue dots!

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Lonnie Stubbs: A Man of Enduring Quality

BY SCOTT BELL

It is rare in this business for a person to stay at one club for an entire career. Lonnie Stubbs is an exception to the rule. This year marks Lonnie’s 35th year at Club Med at Sandpiper.

In 1974 Lonnie became the head superintendent, under the well-known architect Chuck Ankrom. Lonnie has been at Sandpiper since the construction of the Sinners Course in 1960. The Saints Course was built in 1961.

The original director of golf was Chick Howard, who is in the Golf Hall of Fame. After Chuck Ankrom left, LeRoy Phillips, a 1992 President’s Award recipient, filled in as golf maintenance director for GDC. In 1974 Lonnie became the head superintendent.

Lonnie takes great pride in the fact that he was there in 1960 when the property was being surveyed and that he is still there today. He helped to oversee every facet of the construction, and he knows the property like the back of his hand. As I drive down US 1 in Port St. Lucie past the shopping centers, malls and fast food, I can’t help but to think of what it was like in the 1960s when the area was sparsely settled. Consider also the changes in equipment and irrigation that one would see over 35 years.

Lonnie has worked for three different owners of the Sandpiper property. The first was obviously GDC. The second was a company called Tulman and Huntley, who currently own the property and now lease the golf courses to Club Med. Club Med, a French vacation company with holdings all over the world, has been at Sandpiper for over eight years. Lonnie oversees the two golf courses and a nine-hole pitch and putt, as well as the hotel grounds. When Lonnie worked for Tulman and Huntley, they had a day to celebrate his 25th year at the club. Many superintendents were invited for lunch and golf.

Lonnie’s son David is following in his father’s footsteps. David is one of Lonnie’s assistant golf course superintendents. Two of his other sons, Lonnie Jr. and Thomas, also work on the courses at Sandpiper.

Like Joe Snook and 1990 President’s Award recipient Adam Yurigan, Lonnie was a founding board member of the Treasure Coast Chapter. Lonnie was president of the chapter in 1982, second after the legendary Yurigan. Most of the Treasure Coast board meetings were held at Sandpiper between 1980 and 1985. Lonnie, Joe, Adam and Jim Callaghan got the Treasure Coast Chapter started in 1980, and most of them helped out for the first five or six years to help grow the chapter. They are owed many thanks for that hard work.

Former Treasure Coast Chapter President Jim Callaghan commented that “it is a heck of a milestone for a superintendent to be in the business for 35 years, especially at the same club.”

Lonnie and his long time friend, Joe Snook, were both given their President’s Awards in 1994. They both exemplify the credentials searched out for the award. They were both instrumental in the formation of the Treasure Coast Chapter, and they easily had the twenty years in the business with ten years as superintendents. To me, they took it a step further. They are an example of what has always been right about our business. Two friends at different courses, helping each other out. When the Treasure Coast Chapter nominated them, someone made the comment that “you can not nominate one without nominating the other.”

Joe Snook: Treasure Coast’s Mr. Versatility

BY SCOTT BELL

A good pilot tries to change direction when he sees rough weather ahead, and that’s what Joe Snook had to do in 1973. Joe was a pilot for a well-known national company when he realized that the quality of the aircraft that he was flying was beginning to decline and the company was not upgrading or replacing the planes as quickly as they had in the past. He feared that the company that he worked for would soon be discontinuing or scaling back its corporate flight division, so Joe searched out his old friend, Tom Burrows, who was working in Stuart at the time. Joe had worked part-time for Tom when he was not flying and they both worked in Chicago.

In 1974, Tom Burrows was the Golf and Landscape Director at Mariner Sands in Stuart. He hired Joe to work in the landscape division of the development company. Shortly after Joe began working, his immediate boss moved on and Joe was put in charge of the landscape division. Unfortunately, the development company was struggling and rumors of bankruptcy were floating around. Tom left his position, and Joe was asked to run the golf course as well. Joe ran the first
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eighteen until one day when the comptroller for the project approached Joe while he was mowing the first green. Joe was told to gather the staff and lock up all of the equipment in the maintenance building — the company was closing the doors. Joe asked if he could finish mowing the green and was told that there was no need to because they were going to let the course go. He then reminded the comptroller that they had not been paid. Joe was told “no problem, just go down to the pro shop and take what you think your last pay was worth.” Joe got a set of clubs and some sport jackets as his final pay. The course was let go for a period of time, and the grass and weeds did grow up.

Joe was unemployed for only two days when the pro that he worked with at Mariner Sands called and told him of a job at Riverbend in Tequesta. Joe has been at Riverbend Country Club since 1975. His course is always in fine shape, thanks to his years of dedicated service. In the 1970s, the South Florida Chapter included Palm Beach and the Treasure Coast, as well as Dade and Broward. For meetings, the guys would often have to drive to Miami or Ft. Lauderdale. Joe and Tom would join up with Lonnie Stubbs to attend the SFGCSA meetings. Tom and Lonnie got Joe signed up to join the GCSAA. In 1980, Joe helped to form the Treasure Coast Chapter. The area was growing and more courses were being built. Joe served as president of the Treasure Coast Chapter in 1983 and 1984.

Jim Callaghan, superintendent at Rio Mar Country Club in Vero Beach, has known Joe since the late 1970s and says, “Joe was instrumental in getting the chapter started.” Jim said that Joe could always be counted on to come through.

Tom Burrows and Joe have been friends for nearly 30 years. When I asked Tom if he had any good stories to tell about Joe Snook, he replied, “There are not enough hours in the day to tell all of the stories about Joe Snook.”

Joe Snook has been involved in golf course management for over twenty years and he helped start the Treasure Coast Chapter. Joe was an integral part of the first board here. Joe has been a friend to many. In fact, Joe was part of a dual nomination for the President’s Award in 1994. His long time friend and colleague, Lonnie Stubbs, is also honored in this issue.
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<td>Mean Quality Scores Color</td>
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**Monthly and seasonal mean values for turf quality on cool-season grasses overseeded on a "Tifdwarf" bermudagrass putting green from Dec. 1993 to Mar. 1994 at Gainesville, Fl.**

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<td>PT-GH-89 C11</td>
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<td>Danish Common</td>
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Quality mean based on eight visual ratings on a scale of 1-9 where 9 = best

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<th>Establishment rate of Poa trivialis varieties overseeded on dormant bermudagrass in Florida (data from Dr. A.E. Dudeck, Univ. of Florida)</th>
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Lou Oxnevad: In the Old Tom Morris Mold

BY DAN JONES, CGCS

Today's designs...tomorrow's white elephants?

All the new golf courses have shown a trend toward severe, highly penal designs that frustrate the average golfer and, in the long run, alienate a growing number of new golfers or old members. These are the ones who pay the bills.

The average golfer wants a course that makes him strive to play a better game without penalizing him for every slight mistake. It is much easier to build a fancy course, impossible to score on, where money is no object, than to improve on a very fine proven course.

The above is a typical remark by Lou Oxnevad. Straight forward and to the point. No politics, no side steps, just the straight honest facts.

Lou was born in San Bernardino, California, 67 years ago. He is married to Selema, and they have four grown daughters. Lou's parents divorced when he was six years old, and Lou went to 13 different schools while growing up. He attended a one-room school house which provided 12 grades with one teacher for 38 students.

So, how did Lou get into the superintending business? We have to go back to World War II to get the answer.

Lou served with the 82nd Airborne and upon discharge in 1947 moved to Northern California, where he worked for the Division of Parks and Highways. He and Selema raised flowers for arrangements at resorts. They lost their home to a forest fire and moved back to Louisburg, North Carolina, where Lou attended North Carolina State University, majoring in horticulture.

Lou and Selema started a small nursery, and Lou worked part-time for the state measuring and plotting land for contour plowing and crop rotation. Louisburg has a nine-hole golf course with sand greens. They asked Lou to take it over and convert the greens to grass. A group from Saudi Arabia came over to Green Hill CC to learn how to maintain sand greens. Lou converted the greens and used a one-man paperinorator bag to spray the greens.

Lou then moved on to Carolina CC, where he rebuilt the greens and changed them from common Bermuda to Tifton 328 bermudagrass. The total maintenance budget was $42,372 and a walking greens mower cost less than $200.

Lou then went to McGregor Downs CC, where he built the golf course in a virgin forest. He spent the first year cutting timber and building a lake. He hydro seeded the greens with Penncross bentgrass.

In 1968, Lou moved to Florida to take the superintendent position at Lost Tree CC in North Palm Beach. Fred and Glen Klauck worked for Lou during summer vacations and helped install a new irrigation system. While at Lost Tree, Lou built two golf courses at John's Island.

In 1972, Lou went to Riviera CC in Miami and rebuilt the greens. There he row planted 419 bermudagrass into common bermudagrass.

In 1980, Lou built Highridge CC in West Palm Beach under the watchful eye of golf course architect Joseph Lee.

In 1984, Lou worked for Ransome Mowers getting the Florida market established.

Then in 1985, Lou found a home at the Breakers Hotel and Club in Palm Beach. For ten years, Lou took pride in caring for the golf course and hotel grounds. Lou remained at the Breakers until his retirement on April 1, 1995. (No fooling.)

Lou has done so much for the golf course superintendents in Florida. In 1975, he asked Dan Jones to get involved with the Florida Green Magazine. Lou trained and encouraged many of our golf course superintendents. For 11 years Lou represented us on the USGA Green Section Committee. Lou was the first certified golf course superintendent in the state of Florida. Now there are more than 125 in our state.

The list could go on and on. Lou has represented his profession well. He can look back with pride on his contributions to our industry, and I wish him well as he enters into another challenge — retirement.
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Disney’s Bonnet Creek Golf Club

Fly-over country for Osprey and Eagles

Eagle Pines, Hole 12, Par 3. Target golf, pine straw and sandy waste areas.
A Tale of Two Courses

BY JOEL D. JACKSON, CGCS

It was the best of times, it was the worst of times, it was the age of automation, it was the age of manual labor, it was the epoch of environmentalism, it was the epoch of development, it was the season of Fazio, it was the season of Dye, it was the winter of opening and overseeding, it was the spring of transition, we had everything before us, we had nothing before us, we were going direct to Golf Digest’s Top 100, we were going direct the other way...

Paraphrasing the opening of Charles Dickens’ classic, A Tale of Two Cities, might be overstating it slightly, but Disney’s Bonnet Creek Golf Club, home to the Osprey Ridge and Eagle Pines golf courses, has become a classic in its own right.

The sweeping boldness of Tom Fazio’s Osprey Ridge and the creative innovations of Pete Dye’s Eagle Pines side by side offers dramatic contrasts just as the cities of London and Paris did in Dickens’ tale.

I often wondered if Pete and Tom overtly planned the contrasts between the two courses with Pete saying, “You take the high road and I’ll take the low road and I’ll get to opening before ye.” The operative word in Osprey Ridge from day one was “Ridge”. As Pete cleverly sculpted a low-rolling course on Eagle Pines, he sent all his excess fill north for Tom to construct a network of ridges that separates holes and provides some pretty impressive elevated tees on Osprey Ridge.

But I’m getting ahead of myself. Why build Bonnet Creek at all? The fortunes of Disney golf had ridden quite nicely for twenty years on three Joe Lee-designed courses: Lake Buena Vista, Palm and Magnolia. With the addition of Oak Trail, a Ron Garl 9-hole walking course next to the Magnolia, all the bases seemed cov-
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erated. In fact, the 25th anniversary of the annual PGA event, The Disney-Oldsmobile Classic, will be celebrated on the original courses this October.

Each of those courses have had their greens rebuilt to USGA specifications over the past three years. Two important factors became the driving forces in adding to Disney’s golf course inventory. First, like many Central Florida courses, Disney was turning away play in the winter. Second, Disney was building more hotels which would mean more guests to accommodate year round. And so it was that the Disney Development Company (DDC) was commissioned to build Bonnet Creek.

With environmental protection and enhancement foremost in mind, the project began. A wildlife study revealed a colony of gopher tortoises in an upland habitat on the Osprey Ridge site. The tortoises were moved to a temporary holding area during construction. Wetland areas were

About Osprey Ridge: The tremendous popularity of the course makes conditioning a challenge. We have a large volume of play and no 1 & 10 tee set up to give us time to work on the first hole unless we're closed. We use a Toro Hydroject aerifier in the winter to help relieve compaction.
roped off just like tournament fairways. Miles of silt fencing was also installed along all wetlands that bordered the construction sites. All storm runoff is contained and filtered by spreader swales, internal drainage, man-made marshes, ponds, and lakes.

All perimeter irrigation is part circle, watering only the golf course. On Eagle Pines, Dye went even further by irrigating only tee tops with small heads and leaving large areas between tee and fairway unirrigated in the ever famous “waste area” concept. We will visit the waste area topic later.

Each course has its own man-made irrigation lake which is recharged with effluent water which makes each course a filter and recharge location for water resource conservation and recycling. All of the other Disney courses have been retrofitted to use effluent water.

The Bonnet Creek irrigation is controlled by a Rainbird Maxi computer system complete with a weather station to provide on site data to customize the daily watering needs. Each controller in the field has its own preset rain switch to turn off that zone if it should receive rainfall that exceeds the selected amount. The system is not fool proof. If the weather station records sufficient rainfall it shuts down the whole system. After studying the rainfall patterns across the two courses six rain gauges were installed to double check the computer’s shutdown commands and to provide data to adjust watering times.

Both architects did an excellent job designing drainage systems that move surface runoff to drain basins quickly. Much of the design credit goes to the on-site Design Associates, Steve Masiak for the Fazio group and Michael O’Connor for Pete Dye. The only thing they couldn’t control was the soil content on some of the holes.

Invariably it seems in the construction phase of every project that heavy hard-pan and clay soils find their way to the surface of fairways instead of being buried under mounds. Naturally, during periods of heavy rainfall those areas don’t percolate as readily as sandier profiles, thus prolonging the challenge and aggravation to superintendents and golfers everywhere.

Another lesson learned during this project is that USGA spec greens really should have an inner and outer head system. Inner for the the putting surface and outer for the slopes, bunkers, etc. Normally the surrounds of the green will not be as porous as the green’s well itself with its special sandy mix and intricate drainage system.

Trying to follow the recommended deep watering techniques can be a problem when watering two radically different areas with one head. This concern is not unique to Bonnet Creek, but one that can be avoided in future projects everywhere.

Landscaping the courses was easy. Look around. What’s
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already here? Pines. Oaks. Cypress. Bays. Hickories. Maples. Wax myrtles. OK! Plant some more where you need them. Extensive use was also made of low maintenance native grasses like cordgrass and gulf muhly, which has a dynamite pink bloom in the fall.

Bahiagrass was planted in unirrigated roughs and areas that required stabilizing like some of the remote lake banks.

The only other non-native plantings on the grounds are a splash or two of annual beds along the entrance road; a ground-cover bed of jasmine on a steep slope behind the clubhouse; and a small Shillings holly bed for Mickey's nose on the putting green. That's what I said, "Mickey's nose!" The boss in profile. You have to see it to believe it!

Growing in the courses, especially Osprey Ridge, was a challenge just from
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an access point of view. The course is a
links layout with the ninth and tenth
holes the farthest point from the mainte-
nance facility.

The four closest holes 1, 2, 17 and 18
were the last to be completed. Holes 3
though 16 were on the other side of a
wetland area. Construction of a permit-
ted wooden bridge to span the wetland
was also completed late in the project.

Therefore, equipment and personnel
had to be driven or transported several
miles around the property on a perimeter
canal bank road that put extra wear and
tear on new equipment not normally
curred during grow in.

There were haul roads that cut through
the Eagle Pines course but they were of-
ten impassable due to heavy rains and
rutting by construction equipment. A
Cushman is no match for a scraper or a
dump truck.

And when the project got down to the
last four holes it was September and not
much time left to sprig before fall weather
could set in. The final holes were sodded
wall to wall except the greens surfaces. In
doing so, a caravan of sod trucks made
their way to Bonnet Creek from every
available sod farm. Having said that, no
one should be surprised if we came up
with some color and texture differences
in some of our Tifway 419 areas.

That was in 1991 and since then Tifway
419 has been the point of much discus-
sion about contaminated or mutated turf
fields. And now, unfortunately, even
Tifdwarf purity has come into question.
In fact, the FGCSA and FTGA are now
funding DNA research that will hope-
fully hasten the return of certified turf to
Florida. It will not be a quick fix. It is not
a good guy v.s. bad guy problem. It has
more to do with returning to a turf cer-
tification program, and the DNA testing
is just one tool to help us get there.

One of the best outcomes of building
a golf course is creating new habitat. In
the late stages of grow-in aquatic plants
like spike rush and bull rush were estab-
lished along the lake and pond banks to
provide cover and habitat for the fish
populations that would follow.

It was satisfying to watch small 2 to 3
inch long fry of large mouth bass, bream,
and catfish grow into catch and release
size so quickly. After the fish came the
fishers. Herons, cormorants, ospreys and
even eagles. During the first year of op-
eration nine osprey nesting poles were
installed to provide homes for the name-
sake of Osprey Ridge. This spring, pa-
tience (sometimes a rare commodity in
golf) paid off as a nesting pair of Ospreys
took up residence and started a family on
the pole between Osprey Ridge's #7 and
Eagle Pine's #15.

The Bonnet Creek Golf Club is a mem-
ber of the Audubon Cooperative Sanctu-
ary Program. Many of the initiatives al-
ready taken during original construction
will help qualify for full certification.

The Bonnet Creek Golf Club opened
its doors in late December 1991. I secretly
think, that during the conceptual plan-
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Eagle Pines' L-shaped 3. A par 3 over water.

**Eagle Pines**

Eagle Pines #7 with pine straw accents and a marsh lake.
Greg Norman's debut turfgrass, GN-1, is a hybrid bermudagrass with a deep green color, superior tolerance to low temperature and parasitic nematodes and less thatching than other hybrid bermudagrasses. The patented GN-1 features quick divot recovery, higher ball elevation and DNA fingerprinting for authenticity. Durable and convenient, GN-1 can be maintained at fairway and tee cutting heights.

OTHER GRASSES AVAILABLE:
• 419 Tifway Bermuda (Golf Course Quality)
• Tifdwarf

NEW PRODUCTS COMING SOON:
• Dwarf Perennial Peanut
• Floradwarf Bermuda (New Hawaiian Dwarf)
• FLoraTeX™ Bermuda
There is probably no one who has experimented more with textures and contrasts as part of the design of a course...

A short par 4, Eagle Pines 8, invites big hitters to go for it.

ning for Bonnet Creek, Golf Director, Mike Beaver, heard a voice whispering in the pines. It said, "Build it and they will come."

And come they have in record numbers. Just ask the maintenance staff as they try to beat the first golfers down the #1 fairways to the green. But when the players come, they play courses rated in the Top 10 resort courses in the USA. Both courses have participated in the finals of the Oldsmobile Scramble.

They have hosted the Bryant Gumbel, Charles Barkley, and Frank Viola Celebrity Pro-Am tournaments. By virtue of its 1 & 10 tee start capability, Eagle Pines has also hosted the 1994 Disney-Oldsmobile Classic PGA event and the LPGA's HealthSouth Inaugural this year.

You don't get those kind of credits by having the sorcerer's apprentice conjure up thousands of broomsticks mowing and grooming the course. Like Walt always said, "It takes people!"

It was my pleasure and good fortune to return to Disney in June of 1991 and partner with superintendents, Scott Welder and Pat Hennessey, under the very capable direction of Manager of Golf Course Maintenance, Larry Kamphaus, CGCS to help make the Bonnet Creek project a reality.

Suffice it to say that in my travels I have never met any superintendents that have exceeded their capacity for hard work, commitment, hands on versatility, ability and perseverance. They are a great
Full season fertilizer—with no more weeds. You know about Polyon®, the controlled-release fertilizer that gives a season's worth of nutrients with one application. Now Harrell's custom blends Polyon® with Ronstar®, the just-as-long lasting pre-emergent herbicide that doesn't root prune.

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bunch of gentlemen to work with. I will not dwell in this area too long lest I am accused of gilding the lily. But sometimes, we don’t say thank you enough to the people we work with every day.

Scott left his post as superintendent of the Lake Buena Vista Club in January 1991 to serve as the on site superintendent to work with DDC and to represent the Golf Division during construction. He and Larry provided DDC with input on equipment lists and necessary infrastructure for the project. They also were responsible for helping DDC enforce construction specifications and suggest some obvious changes overlooked in the contract.

Sometimes the wish list fell victim to “value engineering,” but eventually the list will be completed by the “real engineers” who run the place. Scott serves as the Head Superintendent of the Bonnet Creek Club, and also has day to day responsibility for the Osprey Ridge Course.

Pat was promoted to Superintendent of Eagle Pines from his Assistant’s position on the Palm course.

I promised to revisit the topic of “waste areas” and the time has come. Pete Dye is unquestionably one of the premier innovators and risk takers in golf course design. There is probably no one who has experimented more with textures and contrasts as part of the design of a course. His concern and passion for the environment are legendary. He incorporated nearly 65 acres (over one-third of the total Eagle Pines acreage) in pine straw “waste areas” around teeing areas and outer roughs. The initial visual effect was spectacular and would require, in theory, very low maintenance.

Please see Page 55
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6500-D
Something new under the sun.

If your golf course is located in a warm weather region, it's likely you're using two different fairway mowers. A heavyweight for thick, warm season grasses. And a lightweight for cooler months. Now you need just one. Toro's all new Reelmaster® 6500-D. The first truly mid-size fairway mower for year 'round operation.

Power Packed
The 2 or 4-wheel drive 6500-D equips a powerful 38 hp Peugeot diesel engine to tackle heavy bermuda, zoysia, overseeded rye, bent or blue grasses. It's also ideal for high altitude areas where most other mowers don't have reserve power. Yet it operates quietly, measuring only 85 decibels.

Heavy Duty Reels
Toro's cutting technology is totally new. For example, Reelmaster® 6500-D features five heavy duty, variable speed reels. All interchangeable. These heavy duty 7 inch diameter reels are designed to easily handle fast growing, tough seasonal grasses. And each 22 inch wide reel can be quickly changed from steerable to non-steerable. The overall cutting width is a productive 96 inches.

Contoured Cutting
The 6500-D gives your fairways a consistently superb quality of cut. Its secret is the new L-I-N-K-S™ system. Its four-bar floating linkage and individual lift arm dampers give the Reelmaster® 6500-D the ability to hug the turf and reduce "bobbing" better than anything else on the market.

Leak Alert
The 6500-D's hydraulic system is state of the art. All hoses are frame mounted and shorter, reducing flexing and chafing. Fewer bends mean fewer leaks. What's more, Toro's exclusive TurfDefender™ electronic leak detection system senses and alerts operators to turf damaging leaks, but minimizes the false alarms that plague conventional systems.
Operator Friendly


Automated Controls

ACE™ (Automated Control Electronics) is another Toro® exclusive. Among its many capabilities it automatically adjusts reel speed to mowing speed and can also be programmed to set and control mowing speed. Maximum mowing and transport speeds are 7.5 mph and 10 mph respectively.

Easy Maintenance

The 6500-D offers easy access to components. Improved single point adjustment. Rerouted hydraulic hose lines. Fully interchangeable reels.

The ACE™ system can help you quickly separate electrical from hydraulic problems. If electrical, it can pinpoint the fault with your hand held tool. And the Data Log™ system can be installed on units experiencing intermittent electrical problems. It captures and records information for accurate diagnosis.

Fast Track Delivery

Parts for your Reelmaster® 6500-D are backed by Toro's 24 Hour Fast Track guaranteed parts delivery program* or your parts are free. And Direct Today 48 Hour means reliable arrival in two days*. For full program details contact your local Toro distributor.

*24 Hour Fast Track and Direct Today 48 Hour delivery are available in the 48 contiguous states and cover only parts supported by The Toro Company, Bloomington, and do not include irrigation or certain engine parts. Program subject to carrier delivery restrictions.
Reelmaster® 6500-D Specifications*

**MODEL 03800, 2-WHEEL DRIVE OR MODEL 03801, 4-WHEEL DRIVE**

| ENGINE | Peugeot, 4 cylinder, 4 cycle, overhead cam, 116 cu. in. (1.9 liter) displacement, liquid cooled diesel engine. 36 hp (28 kW); governed to 2500 rpm. High idle 23.5:1 compression ratio, 3.27" (83 mm) bore x 3.46" (88 mm) stroke. Automatic glow plug system. Heavy duty, 2 stage, remote air cleaner. |
| RADIATOR | Rear-mounted, cross-flow agricultural type radiator; 7 fins per inch. Approx. 7.5 quart (7.1 liter) capacity. Air to oil cooler mounted to rear of radiator tips outward for cleaning. Removable oil cooler/radiator screen. |
| ELECTRICAL FEATURES | 12 volt, 530 cold cranking amperes at 0°F (-18°C), 85 minute reserve capacity at 80°F (27°C), maintenance free battery. 55 amp alternator with I.C. regulator/rectifier. Automotive type electrical system. Seat switch, reel and traction interlock switches. |
| FUEL SYSTEM | Rotary fuel injection pump with energized-to-run (ETR) fuel flow solenoid. Replaceable spin-on fuel filter/water separator with water sensor. Fuel capacity: 15 gallon (64 liter). |
| CONTROLS | Foot operated operation and brake pedals. Hand operated throttle, speed control lever, parking brake lock, ignition switch with automatic preheat cycle, single joystick control for cutting unit on/off and lift/lower. Cutting unit backlap switch located under operator's seat. Reel speed input located under control panel. |
| GAUGES | Hour meter, speedometer, fuel gauge, temperature gauge, 4 bank warning lamp: oil pressure, water temperature, amps, and glow plug. 2 bank warning lamp: water in fuel, water level. |
| DIAGNOSTICS | The Automatic Control Electronics, ACE™ system allows precision timing and control of machine functions for maximum reliability. Standard diagnostic display connects to an electronic control unit to pinpoint any electrical problems quickly and easily. Available DATA LOG™ system automotive mechanic to find intermittent problems. |
| TRACTION DRIVE | Servo-controlled hydrostatic system driving double planetary gear reduction front wheel drives. Foot pedal control of forward/reverse ground speed. Toro 4-Matic® 4-Wheel Drive System only: couples rear drive axle to hydrostatic transmission via overrunning clutch for full time on-demand 4 wheel drive. A Roll Over Protective Structure (ROPS) and seat belt are standard. |
| GROUND SPEED | 0-10 mph (0-16.1 km/hr) forward; 0-4 mph (0-6.4 km/hr) reverse. |
| TIRES/WHEELS/ PRESSURE | Two rear steering tires: 20 x 10.00-10, tubeless, 6-ply rating. Two front traction drive tires: 29 x 12.00-12, tubeless, 6-ply rating. |
| MAIN FRAME | All welded formed steel frame. Includes tie-down loops. |
| BRAKES | Individual totally enclosed, multi-disc, wet brakes and parking brakes on front traction wheels. Hydrostatic braking through traction drive. |
| STEERING | Power steering with dedicated power source. |
| CUTTING UNIT SUSPENSION | Equal length lift arms with the L-I-N-K-S™ suspension system. |
| SEAT | Deluxe high back suspension seat. Optional Armrest Kit, Model 30707. |
| OVERALL DIMENSIONS | Height Length Overall Transport Width Overall Operational Width 60" (152 cm) 120" (305 cm) 84" (213 cm) 110" (279 cm) |
| WEIGHT | Model 03800: 3,200 lbs. (1,451 kg) with 5 blade cutting units and full fluid levels. Model 03801: 3,300 lbs. (1,497 kg) with 5 blade cutting units and full fluid levels. |
| WARRANTY | One year limited warranty. Refer to the appropriate Operator’s Manual for further details. |
| SOUND LEVEL | 85 dB(A) under normal operating conditions. |
| CERTIFICATION | The Reelmaster 6500-D complies with American National Standards Institute (ANSI B71.4-1990) and European Community (CE) specifications with required kits and ballast installed. |

**5 AND 11 BLADE CUTTING UNITS, MODELS 03854 AND 03856**

| TYPE | Five 22" (56 cm) width cutting units are fully interchangeable to any mounting location on the machine. |
| WIDTH OF CUT | 96" (244 cm) total; 22" (56 cm) each cutting unit. |
| HOC RANGE | 3/4" - 1 1/4" (9.5 mm - 32 mm) height of cut range. Recommended use: 5 Blade — 3/4" - 1 1/4" (19 mm - 32 mm); 11 Blade — 3/8" - 3/4" (9.5 mm - 19 mm). |
| HOC & ROLLER ADJUSTMENT | Height of cut adjustment is made at rear roller with quick locating pin and/or threaded micro-adjustment. Front roller position is adjustable to 3 locations to set cutting unit attitude. |
| REEL CONSTRUCTION | Fairway reels. All welded construction. 7" (17.8 cm) diameter reels. |
| REEL DRIVE | Reel motors feature quick disconnect for removal or installation onto cutting unit. Cutting units can be driven from either end. |
| BEDKNIFE/BEDBAR | Single point adjustment mechanism. |
| CLIP FREQUENCY | .375" - 1.25" (9.5 mm - 31.7 mm). Reel speed automatically adjusts to maintain proper clip. Reel speed is continuously calculated based on the current forward speed and the pre-set reel type and height of cut. |
| ROLLERS | Front rollers: 3" (7.6 cm) diameter Wielke rol. Rear rollers: 2.5" (6.4 cm) diameter full rollers. All rollers use the same heavy duty ball bearings with two conventional single lip seals and a Toro labyrinth seal to provide four sealing surfaces to protect the bearings. Replacement 3" (7.6 cm) diameter full rollers, P/N 93-3040, are available for the front position. |
| ROLLER SCRAPER KITS | Front Roller Scraper Kit, P/N 93-2967. Rear Roller Scraper Kit, P/N 93-2962. |

*Specifications and design subject to change without notice. "Toro", "Reelmaster" and "Toro 4-Matic" are registered trademarks and "Automated Control Electronics", "ACE", "Data Log", "L-I-N-K-S" and "TurfDefender" are unregistered trademarks of The Toro Company, 8111 Lyndale Avenue South, Bloomington, Minnesota, 55420-1196. Products depicted in this brochure are for demonstration purposes only. Actual products offered for sale may vary in design, required attachments, and safety features. 

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**Eagle Pines Golf Course**

**Designed by:** Pete Dye. Assisted by Michael O'Connor.

**Constructed by:** Fore Golf — Devcon.

**Opened:** December 1991.

**Major Renovations:** Reduced 65 acres of pine straw down to 25 due to drainage problems and unmanageable washout areas.

**Acreage:**
- **Total turf = 142 acres. Lakes = 25 acres.**
- **Greens:** 3.5 acres, Tifdwarf. HOC = .141 - .156. Average size = 7,500 square feet. Overseeded w/Poa trivialis @ 18 - 22 lbs. per 1,000 square feet. Green speed 8.5 - 9.5.
- **Tees:** 3 acres, 419 Bermuda. HOC = .438 - .5. Overseeded w/Perennial Rye @ 15 lbs. per 1,000 square feet.
- **Fairways:** 35 acres of 419 Bermuda, HOC = .5. Overseeding wall to wall, fall 1995.
- **Roughs:** 50 acres of 419 Bermuda, St. Augustine (Delmar), Bahia. HOC = 1.25 - 1.75. Overseeded w/Perennial Rye @ 250 lbs. per acre.

**Irrigation:**
- **Source:** Re-use. **Equipment:** Flo-Tronex Variable Speed Pump Station, Rain Bird Maxi 5, Hydraulic System.

**Total Staff:** 20, including superintendent.

**Wildlife Inventory:** Club Membership Audubon Cooperative Sanctuary. Birds - Thrush, blue jay, cardinal, mockingbird, towhee, red bird, crow, LBB's, herons, egrets, ibis, eagles and hawks. Mammals - deer, bobcat, panther, otter, raccoon, oppossum, squirrel, rabbit. Fish - stocked population.

**Playing Characteristics:** Large undulating greens make good putting a premium to achieve par. Wide rolling fairways keep ball in play. Hole layouts reward good shotmaking for approaches to the greens. Large native areas frame manicured turf and offer spectacular visual contrasts. Not overly long. Good players on their game have a chance to shoot a good score. Course record 61 by Jay Overton.
Top, preparation;
left, transportation.

Photos By Joel Jackson

Osprey
Pole
Installation

Opposite page:
left, installation;
right, Patience is rewarded.
First nesting pair arrives
three years later.
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Fish Stocking at Bonnet Creek

Top, Transporting the young fry; Middle, Acclimating for water temperature differences. Bottom, Release!
Photos by Joel Jackson

Largemouth bass, sunfish (bream) and catfish were released.
Unless you can control your weather, you'd better control your N and K release.

There are too many things about running a course that you can't control, like weather, traffic and greens committees.

But you can control the delivery of Nitrogen and Potassium to your turf, With K-Power®.

K-Power potassium nitrate provides a beneficial balance between potassium and nitrate nitrogen not found in other potassium sources. And K-Power's breakthrough polymer coating, MultiCote®, releases both nutrients to your turf evenly over time.

That's good to know, because a proper N:K balance is key to healthy turf, and a healthy paycheck.

K-Power gives you control of nutrient delivery across your entire fertility program; greens grade, fairways and solubles. So get a little more control over your destiny with K-Power.

For more information, contact your distributor or call us at 1-800-227-2798.
COVER STORY

Wildflowers at Bonnet Creek Golf Club
Landscaping by Mother Nature
Two things happened to shatter that theory.

(1) Pine straw harvested and baled elsewhere, and then scattered on the ground in an artificial application did not hold up to traffic and required frequent replacement.

(2) Sudden heavy thunderstorms moved the pine straw off of slopes and caused large mats of the pine straw chaff to clog drain basins.

To correct the tremendous labor impact of restoring these areas after a heavy rains and traffic, Pete concurred with the plan Scott, Pat, and Larry devised to reduce the pine straw area down to 25 acres.

Elevated sloping areas were sodded either with bermuda or bahia depending on the location and irrigation capability. Other areas were converted to sandy "waste areas."

Pete came back several times to view the handiwork and to report that he was still using pine straw areas, but this time he put them only where existing pine trees could naturally replenish the straw and the slopes were not a factor.

There is another design element that has proven to have its shortcomings. Pete used a lot of Delmar variety St. Augustine to surround the bunkers. It has proven to be very susceptible to uncontrollable patch diseases during the warm season. I understand that it may not be for sale any longer. If it is, stay away from it. It is a poor performer at least for us. Long range plans call for a phase out to Tifway 419 to eliminate management problems.
Osprey Ridge Golf Course

**Designed by:** Tom Fazio. Assisted by Dennis Wise and Steve Masiak

**Constructed by:** Fore Golf/Devcon.

**Opened:** December 1991.

**Acreage:** Total turf = 130. Lakes = 32 acres.

**Greens:** 4 acres, Tifdwarf. HOC = .141 - .172. Average size = 8,200 square feet. Overseeded w/Poa trivialis @ 16-20 lbs. per 1,000 square feet. Green speed 8'6" - 10'.

**Tees:** 3.6 acres, 419 Bermuda. HOC = .438 - .5. Overseeded w/Perennial Rye @ 15-20 lbs. per 1,000 square feet.

**Fairways:** 40 acres of 419 Bermuda, HOC = .5.

**Roughs:** 60 acres of 419 Bermuda, HOC = 1.5 - 2.0. Overseeded w/Perennial Rye.

**Irrigation:** Source: Re-use. Equipment: Flo-Tronex Variable Speed Pump Station, Controls: Rain Bird Maxi 5.

**Total Staff:** 20, including superintendent.

**Wildlife Inventory:** Addition of osprey “nesting platforms". This year will have “first born” on the platforms. Platform between Osprey #7 and Eagle #15 has 2 eggs. Whole range of wading birds and song birds from A to Z. Bird of prey include Eagles, hawks, ospreys and owls. Everything else from alligators and armadillos to panthers and turtles.

**Playing characteristics:** Can be stretched to 7000 yards. Elevated tees and ridges influence shot making. Wide fairways keep the ball in play. Large greens place premium on approach shots and putting skills. Gentle undulations on greens. What you see is what you get, but there's lots to see! Reachable, gambling par 5's.
When you think you need Roundup, try REWARD®.

With REWARD herbicide, there's no waiting for it to go to work. Because REWARD is absorbed by broadleaf and grass weeds just minutes after application. On golf courses, around residential and commercial turf, greenhouses and nurseries, in right-of-ways — wherever you have a weed problem. REWARD is especially good for spot treatments, edging, tree wells and other areas where you need quick, effective weed control.

Unlike other herbicides, REWARD can be used in both aquatic and grounds maintenance situations. Plus it’s rainfast in only 30 minutes.

Also with REWARD, there's no worry about the surroundings. It stays where you spray it, controlling weeds without affecting non-target vegetation, fish and other wildlife.

REWARD herbicide. For broad-spectrum weed control without the wait — and without the worry.

For more information, contact your distributor or call Zeneca at 1-800-759-2500.
BioControls, BioStimulants, and Wetting Agents

With lofty goals and good intent, I dedicated this edition of Hands On to the discussion of programs involving products in the title above. A funny thing happened on the way to production of this issue, no one sent in any articles discussing their programs.

Some suppliers volunteered additional product information, but this space is dedicated to those comments and tips from superintendents about the topic at hand. Armed with my trusty tape recorder I ambushed a slew of superintendents attending the Poa Annuia in Naples and asked them point blank about these products and how they are using them.

The results of my interviews can be summed up rather quickly. First, practically everyone is trying or testing all of these products in some form or the other. I suppose the relatively new emergence of so many products has a lot of us taking a wait and see approach.

Practically everyone is using some type of wetting agent on “hot spot” and a few are on a regular program. More courses are cautiously trying the nematodes for mole cricket control. Some folks report success using products like Roots, Iron Roots, Panasea, and Sand Aid. There is mole cricket control. Some folks report are cautiously trying the nematodes for these products in some form or the other. I suppose the relatively new emergence of so many products has a lot of us taking a wait and see approach.

At Disney, we have applied Proactant and Vector II for mole cricket suppression. We increased the coverage this year after seeing success on the Oak Trail fairways last year. Overall feeling is that although there still are hot spots emerging, the number and severity is less than last year at the same time.

We are also trying a consistent wetting agent program, by applying Aquatrol’s Primer monthly to the greens. On the Palm course we are trying the Bio-Ject system for thatch reduction, and we are trying Toro’s Bio-Pro on the Lake Buena Vista course.

While it is our fervent desire to embrace natural organic products to avoid using more potentially toxic products, there is some concern about the overall efficacy and benefit of some of the products. An article by Dr. Wayne Kussow follows and offers a dose of healthy skepticism. More importantly it points out the need for more independent research in this area.

Joel D. Jackson, CGCS
Disney’s Magnolia G. C.

A Letter From IFAS

Enclosed are excerpts from a recently-published book chapter by Howard Frank which describes, in detail, our biocontrol efforts against mole crickets in Florida. I have highlighted important facts and concepts, but I urge you to read the entire thing to get the whole story. Although published in 1994, some important events have occurred since then:

The parasitic wasp Larra bicolor (pp. 469, 470, 473) collected from Bolivia was released near Gainesville in 1988-89. This population was discovered (in fall 1993) to be established near Gainesville and is apparently spreading quite well. 10% of tawny mole crickets collected from a local golf course were found parasitized.

The parasitic fly Ormia depleta is now known to be established in all counties of the Florida peninsula at the latitude of Alachua County (Gainesville) and south (except Monroe County where we have not looked at it). I have found as many as 25% of female tawny mole crickets, collected from a golf course, to be parasitized, although the fly does not perform equally well in all locations.

We are still having difficulty in rearing the predatory beetle Pheropsophus aequinoctialis; however, this has improved somewhat recently.

The nematode Steinernema scapterisci is now sold commercially as a biopesticide. It can provide control similar to chemical insecticides but is much more expensive and requires greater care in storage, handling and application. However, it can act as a classical inoculative bicontrol agent (p. 469) similar to O. depleta; once established in a mole cricket population, it will kill a certain percentage of adult mole crickets indefinitely and it can spread, via infected hosts, to untreated areas.

Future research needs include determining nectar sources (landscape and wild flowers) of adult flies so that their performance might be enhanced; determining host range of the beetle so that we may obtain permission from regulatory agencies to make field releases; and determining effects of the wasp on mole cricket populations. Currently no funding is available for such research which, of course, seriously hampers progress.

Best regards,
Patrick Parkman
Research Associate
Humate and Humic Acid

BY DR. WAYNE R. KUSSOW
DEPARTMENT OF SOIL SCIENCE
UNIVERSITY OF WISCONSIN-MADISON

Numerous products being sold for turf use as growth enhancers or growth stimulants contain humate or humic acid. Given the number of inquiries I’ve had about these products, the time seems right to assess their value in turfgrass culture. To begin, we need to understand something about humate and humic acid.

Humic acid can be extracted from any material containing well-decomposed organic matter — soil, coal, composts, etc. Extraction is by way of treatment of these materials with a solution of sodium hydroxide. This dissolves much of the organic matter present. If we then take this solution and add enough acid to drop its pH to about 2, organic material will begin to flocculate and can be separated from the liquid portion. The flocculated material is humic acid. What remains in solution is fulvic acid.

If we take the flocculated humic acid and dry it down to form a black mass that can be crushed and sized by dry sieving, we have humate. In other words, humate is humic acid in its solid state. Therefore, the chemical properties of humate and humic acid are basically the same.

Humic acid defies precise description except in very general terms. Black or very dark brown high molecular weight organic polymer is as good a description as any. The color of the material is effectively used as a sales or advertising attribute. Black organic matter conjures up the image of dark fertile soils covered with lush plant growth.

Chemically, humic acid contains more carbon and less hydrogen and oxygen than does the plant and animal residues from which it has formed through extensive biological decomposition. It also contains about 4% nitrogen. But don’t expect this N to be or any consequence as far as turfgrass growth is concerned. Because humic acid is one of the end products of the biological decay of organic matter, it has great resistance to further decomposition. Estimates of its microbial decay rate are often in the range of 0.3% per year under ideal laboratory conditions.

Two properties of humic acid that may have some benefit in turfgrass culture are its cation exchange capacity and its capacity to form chelates with the metallic micronutrients iron, copper, zinc and manganese. The cation exchange capacity (CEC) of commercially produced humic acid is in the range of 500 to 600 milliequivalents (me) per 100 grams. This is about 5 times greater than the CEC of good quality peat moss and twice as high as the CEC of soil humus.

To gain some perspective on the possibility of effectively making use of the high CEC of humic acid, we can examine the recommendations of one manufacturer that call for addition of 2 lb. humate per cubic yard of 80:20 sand-peat rootzone mix, or substitution of 3 lb. humate for the peat moss. By my calculations, assuming the pH of the rootzone mix and sand are near 7.0, 2 lb. of humate would contribute about 0.37 me CEC/100 g of the 80:20 mix. This would be in addition to the approximately 2.9 me of CEC provided by the peat moss. That turns out to be a rather expensive 13% increase in the CEC of the rootzone mix. When substituted for the peat moss, you wind up with a rootzone mix with a CEC of about 0.55 me/100 g. Considering the fact that the potassium leaches readily from sand-peat mixes with 5 times more CEC than in the sand-humate combination, this doesn’t seem like a wise substitution.

The chelating action of humic acid is sometimes used to produce chelated iron products. Without the addition of a nutrient such as iron, the claim is often made that humic acid has the ability to solubilize micronutrients already in the soil. This is a valid claim, but one has to realize that turfgrass roots themselves excrete organic compounds that solubilize micronutrients. Regardless, here in Wisconsin, where we’ve yet to confirm a deficiency of Fe, Cu, Mn or Zn on turfgrass, the chelating action of humic acid has to be deemed to be of little or not importance.

Now let’s go to the research reports on the effects of humic acid additions on turfgrass. I have but one in my files. A search of the 17,000+ entries in the Turfgrass Information Center revealed no reports where “humate” was a key word, four reports with “humic acid” as a key word, and three reports with “growth stimulant” as a key word. Only two of the seven literature citations were of relevance to this article. Both were studies that demonstrate how strongly humic acid can absorb fungicides and herbicides. Indications are that surface applications of humic acid or humate can significantly reduce the effectiveness...
of systemic pesticides by reducing their absorption by plant roots and soil-borne pathogens and insects.

The single research report in my files is for a study in which 14 "non-nutritional growth enhancers" were applied to a creeping bentgrass putting green. Several humic acid and humate products were among those tested. The focus of the study was the effects of the products on rooting and root development. Data averaged over all rooting depths for the entire growing season revealed that none of the products significantly affected bentgrass root length or root to numbers.

Because so little research seems to have been done with humic acid products on turfgrass, there exists the possibility that there are situations where significant positive responses can occur. My assessment is that we should not expect positive effects over a wide range or conditions. Other than possible reductions in the effectiveness of pesticide applications when the humate or humic acid resides on the soil surface, the products are rather harmless when applied at rates recommended by the manufacturers.

There is, however, no justification at this time for using them on more than a small scale, trial basis. Humic acid will not compensate for poor turfgrass cultural practices.

Editor's Note: Reprinted from The Grass Roots.

## Linking Up with the World of Golf

BY DARREN DAVIS
OLDE FLORIDA GOLF CLUB

Have you ever had a vendor come into your facility and try to sell you a product that you felt would be of absolutely no benefit to you? Later, after much thought or persuasion, you find your way clear to purchase or try the product. The months pass by, and each month you experiment with the product a little more or put more faith into it. Finally, a year goes by and you reflect back and ponder how you could have ever survived without this great product.

Sound familiar? Well, this is a true story and it happened to me recently. The product is Golf Link, a complete weather and information satellite service.

Like most of you, I am very picky how I spend my club's money, and I treat it as if it were my own. When a vendor came by with a demo of this product I wondered to myself how I could ever justify leasing a product like this. Then he told me about a trial offer that guaranteed me that if I did not like the system, I could return it. That sounded fair, and I trusted the vendor, so I checked a couple of references and agreed to the trial.

What is Golf Link? Among other things, Golf Link is an electronic weather system. Golf Link is a division of Broadcast Partners. Broadcast Partners supplies Golf Link with the electronic weather information. This information is also supplied to other similar companies, one of which is FarmDayta. This is the system I originally leased and which many other superintendents still have. The FarmDayta system provides excellent weather information. However, some of the other information, such as the price of beef in Iowa or the stock market figures, had no bearing in my grass-growing world. I consider myself a well-rounded person, but I didn't find this information relevant to the golf course that is paying for this service.

One day I was thumbing through a copy of a trade magazine and came across an article on Golf Link. The article stated: "Golf Link is designed for the golf industry, providing subscribers with news that superintendents would enjoy. This includes turf tips, national and local association updates, research, new product information and commentaries. And, probably most importantly instant Doppler weather radar, weather forecasting capabilities and soon lightning strike maps." After reading the article on Golf Link, I thought it sounded just like my system with one major difference. The
difference is that instead of providing rarely used farm information, Golf Link provides information that relates directly to the golf course business.

Golf Link provides access to the systems of the GCSAA, USGA, PGA, NGF, EPA, architects, builders and others. Also, recently the FGCSA Board of Directors gave permission to Golf Link to put published articles out of the Florida Green into the system.

As you can see, the benefits of the Golf Link system are numerous. However, I have found two main uses that my staff and I employ the system for, both of which have substantial financial rewards to my club. These benefits are both related to the weather functions the machine provides, including instant Doppler weather radar and various projected forecast maps that are updated continuously, 24 hours a day, seven days a week.

The hardware and monitor are located in the office of the office manager, who can be in radio contact with my staff and me at any time during the day. If adverse weather is approaching, the information is communicated by handheld radio to the management staff, who can then make a judgment call on when to order the crew members off the golf course. Once the crew is in the maintenance facility, the Doppler weather radar is analyzed by the staff to help make a decision on whether to keep the crew at work or allow them to leave for the day. This helps us to save on labor cost that might have otherwise been wasted.

The other financial reward that we obtain by using the weather functions of the system is in planning applications of fertilizer or other compounds. We all know that one application of a product that is washed away by rainfall can be a costly mistake. By using the system in correlation to the application of compounds that could be potentially harmful it also signifies a commitment to being a conscious environmental steward.

The weather maps and radar are also used daily when determining whether or not to irrigate the golf course. We are fortunate enough to have a weather station that will cumulate all the factors that go into evapotranspiration and down-

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Professionalism, Part II —
Is Your Image a True Reflection?

Do you consider your professional work responsibilities comparable to that of an airline pilot or a judge? If you answered “yes” then I like your attitude. If you said “no” then we’ve got something to discuss. Do think they are superior to you?

Just why do we look up to the profession of an airline pilot? When we see the pilot and flight crew walking to our gate, don’t you expect to see a certain “image” in the pilot? A crisp neat uniform, confident attitude, walking tall, in command. How would you feel if instead you saw an unshaven, staggering, bleary eyed individual with alcohol on his breath. Would you be inclined to board the plane? Probably not! No matter what you do for a living shouldn’t you have the expectation of positive traits and behavior that define a professional’s career?

An airline pilot’s or judge’s image can be easily identified with life and death responsibility in their work. Have you thought about the golf course superintendent’s responsibility for proper administration of pesticides. We have to guard against improper exposure to our employees, golfers and the environment in general. How can our image presumed to be any less important? How can we afford to be any less professional?

On my return flight from the GCSAA Conference, we hit a patch of turbulence over the Rocky Mountains that sent the plane dropping, dipping and veering off course. The plane was stone quiet as we sat frightened to death as the “professional” in the cockpit fought to control the plane. In a few minutes the plane was stabilized and the pilot came on the intercom and apologized for the inconvenience. He explained that the unstable air we hit is caused by the mix of warm and cool air blowing over the mountains. It doesn’t show up on radar. You can’t see it coming. You just have to deal with it when it happens.

I didn’t see a single passenger go up to the cockpit and chew him out or disagree with his answer. Why? Because we’re not qualified to dispute his answer. It seems that we, as golf course superintendents, are always second guessed. Our explanations and answers are often disputed and challenged. Golfers seem to think because they mow grass they are qualified to pass judgment. They don’t have much empathy for that “unseen turbulence” we experience like low oxygen levels in lakes that might cause a fish kill. They immediately point a finger at the “pilot” superintendent and think something incompetent has happened.

If we can form a visual image of that commanding pilot or a wise judge, what is the image of a golf course superintendent? More and more everyday we are being called upon to be leaders and stewards of a very valuable resource, the green space and wildlife sanctuary in the ever sprawling urban environment. The mantle of environmental responsibility is being placed on our shoulders.

Our professional image will be formed by our ability to provide thorough and accurate information that educates the public and dispels the negativity to golf that has been so widely publicized. Our image will also be reflected in the behavior and appearance of our staff from the rookie greensman to the Superintendent. It will be manifested in the cleanliness of our shops and equipment.

Professionalism has to come from the top. If you lead by example, that professionalism will trickle down to the most inexperienced person on your staff. Professionalism to the utmost is what every golfer expects of you whether you like it or not. What do they see? Is your image a true reflection of a professional?

Mike Bailey, GCS
Boca Rio C.C.

Professionalism, Part II —
The Assistant’s Role in Golf Course Operations

In recent times, the image and responsibilities of the golf course superintendent have greatly changed. In the early years, they were thought of as greenskeepers with little or no formal education. Today, many golf course superintendents hold a specialized degree in turfgrass management and are recognized as golf course managers. As challenges and opportunities for the modern golf course superintendent have changed, so has the role of the assistant.

Today, many golf course superintendents are busy with committee meetings, budget tracking and preparation, as well as dealing with numerous government regulations. For these reasons, a superintendent places greater responsibility on the assistant superintendent.

It is the assistant who carries on the day-to-day tasks of the golf course. He or she works directly with the golf course crew in scheduling, training and ensuring assignments are completed properly, efficiently and safely. Self-confidence in his or her abilities to supervise the golf course staff and deal independently with a variety of issues, without daily guidance from the superintendent, is necessary.

An assistant superintendent must display strong work ethics through hard work, honesty and dependability because he or she is a positive role model for the crew. The assistant must also project a professional image to other club employees as well as to the club’s membership.
A good assistant will employ the ideas and philosophy of the superintendent. The assistant may not understand why some things are done the way they are, but he or she must trust and support the superintendent’s judgment. You learn to use tact when inquiring about certain decisions the superintendent makes, not to question, but to learn.

A variety of skills are essential to be an effective assistant superintendent. One is good communication skills, not only with the crew, but also with the superintendent, vendors, other professionals and club members. It allows the assistant to effectively inform the superintendent on the status of the golf course, its employees and events that may directly or indirectly affect the golf course operations.

Problem solving is another necessary skill. Making the right decisions in the superintendent’s absence, based on experience with the superintendent, the assistant will solve many small and less difficult problems. These problems can range from turf and pest practices to personnel issues. He or she will also be aware of the guidelines and limitations regarding certain types of decision that require the superintendent’s input and final decision.

Computer literacy is yet another needed skill. The assistant is usually the one that operates, or assists, in the operation of a sophisticated computerized irrigation system. A data base management system may also be used to track pesticide and fertilizer applications.

Having a degree in turfgrass management, or equivalent knowledge, is a definite advantage for an assistant superintendent; education plus experience is an even greater advantage. This combination provides knowledge not only for field diagnosis of problems and turf and pest management, but also in how to build resources and network with various agencies and peers. Resources, and an active network of peers having various degrees of practical experience, supply a vast pool of knowledge to draw from or simply exchange ideas.

In order for the assistant to be successful, it will take more than hard work, honesty and dependability. He or she must work for someone who has the same values and wants to see the assistant succeed. The superintendent must give the assistant guidelines to work within. In most cases the guidelines are in the form of a job description. The superintendent and assistant should talk often to ensure they both share the same priorities (i.e., if the assistant has the responsibility of doing crew schedules). As more responsibility is delegated to the assistant, a good superintendent will support decisions the assistant makes because the superintendent will realize there is more than one way to get things accomplished. If the assistant makes a mistake, a good superintendent will inform the assistant, not in a condescending manner, but as a teaching experience. By so doing, the assistant will not be reluctant to make more decisions.

The assistant’s role today is nearly as demanding and diverse as the superintendent’s role. It can also be just as rewarding. Attitude, dedication, hard work and a superintendent who motivates and teaches his or her assistant superintendent is what will make tomorrow’s knowledgeable and confident superintendent.

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On our planet, water makes up over two-thirds of the entire surface area. It is also a basic requirement for survival of all life forms. Water bodies and wetlands are found on virtually every golf course in Florida.

Protecting surface and groundwater quality should be a goal and an integral part of course management. To ensure that your golf course is maintaining good water quality, it is important to have a strategy in place to monitor water quality, improve conditions if warranted and deal with any problems that may arise.

Water quality management will be the focus of this sixth and final article in this ACSP series. To achieve certification in this category, you need to consider the following things:

1. **Baseline Data and Water Quality Monitoring**: What baseline information has been established for water quality, including clarity, dissolved oxygen, and pH? What water sources are tested? Who conducts the tests and how often are they carried out?

2. **Streams**: If a stream or creek is on the property, what stream protection measures are in place to reduce erosion, maintain adequate shading, and reduce pollution inputs? Has anyone sampled for "macroinvertebrates" (insect larva and other organisms that lack a backbone)? Since many of these organisms are sensitive to pollution, they are a highly reliable indicator of pollution.

3. **Wetlands**: If wetlands are present, what condition are they in (degraded? viable & productive? invaded by phragmites or purple loosestrife? protected?) What measures are taken to protect or improve wetland habitat?

4. **Buffers and “No Spray” Zones**: Vegetative buffers around water features help to filter runoff and reduce erosion. Have you established buffers and "no spray" zones near water sources to minimize potential drift and runoff?

5. **Drainage**: What areas drain to lakes, ponds or wetlands? What filtering mechanisms are present? If fertilizers are getting into lakes, that can be a major cause of algae problems.

6. **Chemical Additives**: What (if any) chemicals have been added to water features? Have you made any changes in chemical management of water features? Have you tried alternatives such as biological remediation or aquatic planting? Is wildlife abundant or scarce?

7. **Maintenance Buildings**: The maintenance area can be a potential source of contaminated runoff. Are all buildings safe and up to code? Are there repairs that need to be made? If someone came to inspect your facility, would they come away confident or wary about your management practices?

As an additional note on water quality management, research conducted by the USGA on the environmental impacts of golf courses revealed that when fertilizers and pesticides are used properly, the potential for leaching of these materials into ground water is minimal. However, this research revealed that minimizing runoff into surface water is an area that needs greater attention.

The creation of buffer strips and no spray zones should be pursued at all facilities. Although a vegetation buffer surround-
Water quality affects virtually every golf course

ing all sides of a water body would provide the best nutrient filter, this is usually not an acceptable situation when an area comes into play. Maintaining a higher height of cut turf buffer strip or grassed swale for those areas in play is a reasonable compromise that can also help minimize maintenance requirements. For the out-of-play areas of lakes or ponds, border shrubs and emergent plants should be established and maintained.

Ideally, “no-spray” zones approximately 50-feet wide should be enforced around all surface water bodies. However, adhering to this ideal is not always feasible on a golf course. When fertilizer applications must be made immediately adjacent to a water body, the use of drop spreaders is recommended.

Also, only slow release nitrogen sources and no more than 0.5 lbs. of actual nitrogen per 1,000 square feet should be applied at a time in sensitive areas. If an unacceptable level of pest activity develops in a “no spray” zone, naturally the first route to pursue would be the use of biological control agents. If a pesticide must be used in these areas, it should only be applied as a spot treatment.

Also, the chemical characteristics of the pesticide options should be carefully considered in selection of the material to use in these locations.

The Jan/Feb, 1995 issue of the Green Section Record contains a listing of commonly used pesticides and their characteristics.

Water management by design

BY STEVE EHRBAR, CGCS
OLD MARSH GOLF CLUB

Old Marsh Golf Club was built on a unique 460 acres of land. Architect Pete Dye routed many of the holes around protected wetlands and his design for the irrigation and drainage systems were very well thought out.

The irrigation system was installed with many different sized heads and half circles to ensure no irrigation water would be thrown into the wetlands or created marshes.

The drainage system on the course has approximately 30 catch basins per hole. All the excessive runoff water from rain or irrigation is collected by these basins and run through a series of pipes to containment lakes. From these containment lakes, the water is pumped to the main irrigation lake for reuse.

One design feature that each hole has is that all the perimeters of the fairways and roughs are built higher than the middle of the fairways to ensure no fertilizer or pesticides contaminate the wetlands. We are very selective on our use of products, and try to be environmentally conscious.

Pete Dye manages water at Old Marsh with unique design features. Photo courtesy USGA Green Section.
Grassing for Water Quality

BY FRED YARRINGTON

Note: Fred Yarrington is an ACSP Resource Committee Member for the Hole In The Wall Golf Club, Naples

At Hole in the Wall Golf Club, we have approximately 10 acres of land in 4 or 5 areas which are out of play. Most of these areas are adjacent to native vegetation areas or bodies of water. Our long-range goal is to environmentally restore all of these areas, which are currently mowed on a regular basis, and eventually have a low maintenance area of natural vegetation.

The project started in 1987, when we decided something had to be done about the algae in the canals (see photo above). We were told we needed to deepen the canal in order to control the

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The plantings are six months old and are slowly growing in. We would have preferred a more dense planting, but selected the 3-foot centers for cost reasons. The trade off is that more weeding is required in the interim until the grass grows dense enough to inhibit weed growth.

Golf Maintenance Budget Blues?

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May, 1995:
After the cordgrass and aquatic plantings.

We no longer have a problem keeping the canal clean in this planted area. During construction to deepen the canals, we inserted a weir near the 17th green which enables us to control water levels and flow through the canal. Therefore, we are able to keep the water level in the canal much higher than we were before this project.

Our membership has been very supportive of this project. We got the idea and source of the cord grass from Collier’s Reserve Country Club. I believe a key to success in the Audubon Cooperative Sanctuary Program is the sharing of ideas and information.

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Water quality management for the equipment wash area

BY DARREN DAVIS
GOLF COURSE SUPERINTENDENT
OLDE FLORIDA GOLF CLUB

The equipment wash area has become a hot topic in recent years. Most superintendents' management styles are slightly different, but I believe we all want the same outcome, an environmentally conscious equipment wash area that functions up to our standards.

A couple of years ago, it seemed everyone was jumping on the band wagon and buying water recycling units. The recycling units were supposed to filter all contaminants from the water and recycle the water for reuse. The feeling was that the units were going to be the wave of the future, and someday they might be.

However, it seems that people are currently shying away from these units because of the horror stories that are being told by some of the original purchasers, not to mention the cost. I was told by one equipment technician that he spends one-third of this time working on their recycling unit. I also know of a golf course that bought a unit three years ago, and it has still never worked to this day.

I contemplated the purchase of one when I was designing our maintenance facility. I did not buy one, and with a few minor exceptions, I am very happy with the system we are using at Olde Florida. I am sure that this system would not work for everyone, but it is an option.

**Goals**

My goals of the equipment wash area are simple:

*To be located in a convenient* area that coincides with the desired flow of traffic.

*The area to be large enough* so at least three pieces of equipment can be cleaned at once.

*The quality of water used* to clean equipment be free of any damaging compounds that might cause premature corrosion or deterioration of the equipment.

*The availability of compressed air* for use on electrical components or other needed parts of the equipment.

*Complete capture of any clippings/solids.*

*Complete capture of any petroleum products* (by using an oil/water separator or a similar baffle system).

*A pleasant area to clean the equipment,* with little or no unpleasant odor.

**The Pad**

The concrete pad at Olde Florida measures 20-feet by 40-feet. The sides and back also have a 5-inch poured concrete curb to prevent water and/or debris from leaving the area. Along with the wash pad, a concrete ramp should be poured leading on to the wash area so that water and debris are not channeled on to the pad from the surrounding area.

The concrete pad is sealed with a silicone, acrylic concrete stain. It is very important to use this or a similar concrete stain, and follow the directions completely. If you do not, you will most likely be dissatisfied with the longevity of the coating.

Before applying the stain, the concrete should be at least 45 days old, clean, dry and free of paint and grease.

For best results, the concrete should be etched with one part muriatic acid and two parts water. The solution can be mixed in a plastic sprinkler can. The area
should be thoroughly and evenly wet with the solution. Then rinse the area with clean water after 20 minutes. The concrete should then be allowed to dry for at least 24 hours before applying the stain.

For the first two coats, one gallon of concrete stain should be mixed with one to two quarts of solvent. The third coat (and fourth if needed) should be straight concrete stain. The final step is simple, stay off the area for at least 72 hours.

Why seal the concrete? I can think of several reasons. One, the area is aesthetically more pleasing (it looks cleaner). Don’t laugh until you think about this. If an inspector (DER, EPA, etc.) came to your facility, I think you would agree that the cleanliness of this area will most likely have an impact on his decision whether to investigate the area further.

I also strongly believe that a clean maintenance facility results in better work habits among the staff. In addition, a clean, organized maintenance facility will provide a more positive feeling by the membership towards the money they are spending for the maintenance of the golf course.

Another reason to seal the concrete is since concrete is semi-permeable, the concrete stain/sealer will not allow petroleum products to penetrate. The grease spots can then be wiped off with a reusable shop rag and a cleaner.

The pad is formed so that the entire area slopes to one of three concrete sumps. The sumps are 1-foot by 1-foot by 2-foot deep. The sumps have a recessed lip so the aluminum grate that covers the sump rests flush with the concrete pad. Inside the sumps are removable stainless steel baskets that catch the solids that enter the sump.

One side of the basket has a stainless steel grate so clippings are contained, and the water flows unobstructed through the baskets. These baskets are removed daily, excess water is allowed to drain out of them, and the clippings are emptied into a utility vehicle to be disposed of on property.

Separation Tank

Once the water leaves the three sumps, it travels through a 4-inch pipe into a 1,200-gallon concrete tank. The tank is a septic tank that was modified for Olde Florida. It is divided into three chambers by using two concrete divider walls.

The first wall extends from the very bottom of the tank upward to a height slightly below the intake pipe. The object of the first chamber is to contain all solids that might escape the catch baskets in the sumps.

The first chamber periodically must be cleaned. To dispose of this material, our loader/backhoe is used to carefully scoop out this material. This material is then transported by a utility vehicle to a site on property and either spread out, or used to fill in a hole. Experience has shown the need to clean this chamber approximately every 9 months.
The second chamber that is formed between the two walls functions as an oil/water separator. The second wall extends from the top of the tank and does not extend the full distance to the bottom. Therefore, it creates a chamber that would contain oil, since oil will always float on water. The water then flows under the second wall into the third chamber.

The third chamber should have clean water in it always. However, to be extra cautious, we extended the exit pipe down from the top so that the water is forced up from the bottom of the tank. Therefore, in theory, it would be impossible for any soil to escape the tank.

Since the tank is installed level, it remains full of water. Because the exit pipe is lower than the entrance pipe, hydraulics force the water through the system (not gravitational flow). This is important since the second chamber is used as an oil/water separator. If the water level would fluctuate, the oil that might be in this area, could in theory escape under the second wall.

The lid of the tank must be removable so that at least solids contained in the first chamber can be removed. At the same time, the lid must be secure enough so it makes a seal to the second wall. This will ensure the second chamber retains all potential oil that might enter the system.

The water that leaves this tank then filters through a long retention swale that contains a healthy stand of wetland plants (duck potato). The water is then retained on-site in the irrigation pond.

Other features

When designing the maintenance facility, we provided numerous blank conduits under the surrounding pavement for future use. In particular, two were provided to the equipment wash area so that compressed air hoses could be run through the conduits for use at the equipment wash area.

Using air to assist in the cleaning of the equipment has been extremely beneficial. The air allows us to clean sensitive areas of the equipment, such as electrical components, without the fear of causing damage.

Using compressed air to clean the engine also will help extend the life of the machine. Severe damage could occur if cold water was constantly used to wash a hot engine. Also, if large deposits of clipplings have accumulated on a machine, air can speed up the cleaning process by dispersing the clipplings before using water. (If compressed air is supplied for operator use at the equipment wash area, be sure that signs are posted requiring that eye protection be worn.)

The wash pit is equipped with three
High-pressure water can invade seals and bearings causing damage and extra work for the mechanic staff.

separate water outlets. The three outlets are equipped with a 1-inch hose. Using a 1-inch hose provides us with a high-volume, low-pressure water supply.

There are several advantages of using a high-volume, low-pressure water supply. First, the time it takes to clean the equipment is reduced. Second, the potential damage to an operation, or the painted surface of the equipment, is less than if a high pressure system was used. Finally, high-pressure water can invade seals and bearings causing damage and extra work for the mechanic staff.

One feature that I would definitely like to have, and would advise anyone considering a system like this to include, is a roof over the pad where the equipment is washed.

The roof would serve two purposes. First, it would create a more pleasant area for the operators to clean the equipment. The operators would most likely play closer attention to the quality of job that they are performing, rather than rushing to get out of the sun.

Second, the roof would keep the operators dry so that they can clean the equipment in the rain. (The roof should have lightning protection on it for employee safety.) The roof would also keep heavy rains from forcing unnecessary water through the separation tank.

The final point I would like to make is that this system is not for use as a mix/load site or sprayer cleaning area. That should be a separate area, also with a method of containment. The water that is emitted in mix/load operations should not be discharged, rather it is preferred that this water be recycled as a tank rinse or some other means of disposal on a turf area.

**Conclusion**

I am not inferring that the system we designed at Olde Florida is the only way to design an equipment wash area. What works well for us might not work for you. Many people are trying to predict what the future local, state, and federal regulations are going to be. However, I feel that as professional turf managers, we should not simply ignore the problem. Rather, it is our duty to make the most environmentally, financial, and functional decision for our individual situation.

---

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Improperly or poorly managed water resources can cause great problems for the golf course; for example, poor quality irrigation water may injure or even kill greens, while pond algal blooms can cause aesthetic and odor problems. Understanding the ecology of aquatic plants, algae and macrophytes, as an important component of the golf course water resources is paramount to making certain they only positively impact the golf course environment.

Incorporation of aquatic management strategies should be part of the courses overall environmental management program (Peacock and Smart 1995).

1.0 Algae and Aquatic Macrophytes. Aquatic algae are plants generally classified as either attached (periphyton) or free-floating (phytoplankton). Attached aquatic macrophytes are generally classified by their growth form - floating, emergent, and submergent. Each water body has algae and aquatic macrophytes that occur naturally.

Aquatic plants are an important component of the ecosystem. Like other plants they produce food through photosynthesis and are thus the base of the aquatic food chain, and they provide cover for animals. The algal community is comprised of many different types of algae that may change throughout the growing season. Some of the common groups include blue-green algae, green algae, dia-

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Pristine Water (Oligotrophic)</th>
<th>Moderately Enriched (Mesotrophic)</th>
<th>Enriched (Eutrophic)</th>
<th>Highly Enriched (Hyper-eutrophic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L or ppb)</td>
<td>8.0 3.0-17.7</td>
<td>26.7 10.9-95.6</td>
<td>84.4 16-386</td>
<td>750-1200</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L or ppb)</td>
<td>361 301-1630</td>
<td>753 361-1387</td>
<td>1875 393-6100</td>
<td>_ a</td>
</tr>
<tr>
<td>Chlorophyll a (µg/L or ppb)</td>
<td>1.7 0.3-4.5</td>
<td>4.7 3-11</td>
<td>14.3 3-78</td>
<td>100-150</td>
</tr>
</tbody>
</table>

a No Data
toms, dinoflagellates, and euglena. The body shapes of algae are highly varied and include unicellular, multicellular, colonial, and filamentous.

The distribution and abundance of algae and macrophytes in a water body is subject to considerable spatial and temporal variation. Among the many factors that determine their presence, distribution and density are light, temperature, water turbidity, water currents, hydraulic residence time, nutrient concentrations, nutrient loading from watersheds, water chemistry, water depth, sediment quality, herbivore grazing, and human activities. Aquatic sites are thus dynamic and responsive and as the availability and nature of the resources change, so will the species diversity and/or amounts of aquatic vegetation. However, at some point a healthy algal or macrophyte population may actually become an "algal bloom" or "weed infestation" that may impair the usefulness of a water body for its intended uses.

2.0 Aquatic Algae and Algal Blooms.
Although many factors influence the abundance of algae, algal blooms are most often associated with an increase in nutrients (primarily phosphorus and nitrogen) in the water. Through much research, phosphorus was identified as the critical element in causing algal blooms in water bodies (Vollenweider, 1971; Jones and Bachmann, 1976; Wetzel, 1983). Phosphorus is therefore generally considered the limiting nutrient in freshwater ecosystems; that is, phosphorus is a required nutrient for plant growth that is most often in short supply.

Algae are particularly well adapted to
Table 2.
Effectiveness of herbicides for aquatic plant control in irrigation watersupplies (Langeland, 1994).
Effectiveness of control is as follows: * = Not recommended; F = Fair; G = Good; E=Excellent.

<table>
<thead>
<tr>
<th>Aquatic Plant</th>
<th>Diquat</th>
<th>2,4-D</th>
<th>Copper</th>
<th>Fluridone</th>
<th>Glyphosate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Floating Plants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duckweed</td>
<td>G</td>
<td>F</td>
<td>*</td>
<td>E</td>
<td>*</td>
</tr>
<tr>
<td>Watermeal</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>G</td>
<td>*</td>
</tr>
<tr>
<td>Alligatorweed</td>
<td>*</td>
<td>F</td>
<td>*</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td><strong>Submersed Plants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bladderwort</td>
<td>G</td>
<td>F</td>
<td>*</td>
<td>G</td>
<td>*</td>
</tr>
<tr>
<td>Brazilian elodea</td>
<td>E</td>
<td>*</td>
<td>F</td>
<td>G</td>
<td>*</td>
</tr>
<tr>
<td>Coontail</td>
<td>E</td>
<td>F</td>
<td>*</td>
<td>E</td>
<td>*</td>
</tr>
<tr>
<td>Hydrilla</td>
<td>E</td>
<td>*</td>
<td>F</td>
<td>E</td>
<td>*</td>
</tr>
<tr>
<td>Parrotsfeather</td>
<td>G</td>
<td>*</td>
<td>*</td>
<td>F</td>
<td>*</td>
</tr>
<tr>
<td>Pondweed</td>
<td>G</td>
<td>*</td>
<td>*</td>
<td>F</td>
<td>*</td>
</tr>
<tr>
<td>Slender naiad</td>
<td>E</td>
<td>*</td>
<td>*</td>
<td>E</td>
<td>*</td>
</tr>
<tr>
<td>Southern naiad</td>
<td>E</td>
<td>*</td>
<td>*</td>
<td>G</td>
<td>*</td>
</tr>
<tr>
<td>Spikerush</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>G</td>
<td>*</td>
</tr>
<tr>
<td>Variable leaf milfoil</td>
<td>G</td>
<td>E</td>
<td>*</td>
<td>G</td>
<td>*</td>
</tr>
<tr>
<td><strong>Emerged Plants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American lotus</td>
<td>*</td>
<td>G</td>
<td>*</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>Cattail</td>
<td>G</td>
<td>F</td>
<td>*</td>
<td>F</td>
<td>E</td>
</tr>
<tr>
<td>Fragrant waterlily</td>
<td>*</td>
<td>G</td>
<td>*</td>
<td>G</td>
<td>E</td>
</tr>
<tr>
<td>Rush</td>
<td>*</td>
<td>F</td>
<td>*</td>
<td>*</td>
<td>G</td>
</tr>
<tr>
<td>Spadderdock</td>
<td>*</td>
<td>F</td>
<td>*</td>
<td>G</td>
<td>E</td>
</tr>
<tr>
<td>Waterpennywort</td>
<td>F</td>
<td>G</td>
<td>*</td>
<td>*</td>
<td>E</td>
</tr>
<tr>
<td><strong>Filamentous Algae</strong></td>
<td>G</td>
<td>*</td>
<td>G</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

take advantage of high nutrient concentrations (particularly phosphorus), warm water, and sunshine as they reproduce in exponential fashion. The result is an algal bloom, often distinguished by the “pea-soup” appearance of water that results from large quantities of algae. Concentrations of nutrients and chlorophyll a associated with different levels of water quality are given in Table 1 (Page 74). Chlorophyll a is used as a measure of the algal biomass in water.

Algal blooms cause many different problems. Two of the primary concerns on golf courses are aesthetics (looks bad and smells when they die) and die-off (die-off is when most of the algae die at nearly the same time). Die-off occurs for many different environmental reasons (overcast skies reducing light intensities and a cold snap are among the two most common) and may also occur when chemicals are applied for algal control. A die-off is easily observed - one day the water is green, and the next day the water is brown. The intense green of the algal bloom is from the chlorophyll in the
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Table 3.
Waiting period in days before using water after application of herbicides for aquatic plant control.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Irrigation</th>
<th>Fish Consumption</th>
<th>Swimming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper Compounds</td>
<td>NR*</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>2,4-D</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Diquat</td>
<td>14</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Fluridone **</td>
<td>7-30</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>

* NR = No Restrictions
** See label for specific information.
+ Water use restrictions vary by formulation and manufacturer. In general, if water is used for irrigating sensitive plants, 2, 4-D should not be used.

algae. The mass die-off of algae places a large oxygen demand on the water; that is, large amounts of dissolved oxygen are required to decompose the dead algae.

If oxygen demand is large enough, dissolved oxygen concentrations can fall to levels that cause changes in the biological and chemical characteristics of the water body.

Four mg/l of dissolved oxygen is generally the minimal amount of oxygen that is desirable for maintenance of aquatic life. Thus, if dissolved oxygen levels fall below this level aquatic biota may die (e.g., a fish kill may occur). In many states, 4.0 mg/l is the water quality criteria for warm water fisheries and 5.0 mg/l is the criteria for cold water fisheries. It is important to maintain these levels of oxygen in the water column. The lack of dissolved oxygen also sets in motion a series of chemical reactions that reduces water quality.

2.1 Prevention of Algal Blooms. The factors that control the abundance of algae, form the basis for managing them. Frequently, prevention of algal blooms requires controlling nutrient loadings to the water body. This means that sources of nutrients in the watershed or basin that have the potential of reaching the water must be controlled, or at least, reduced to the lowest quantities possible. The alternative to controlling nutrients before they enter the water, is to undertake restoration of the water body after nutrients have reached levels great enough to cause blooms and water quality has deteriorated. Restoration is expensive and time consuming and includes not only controlling external nutrient loadings, but also internal nutrient cycling. The larger the water body, the greater the costs. Restoration generally requires years to successfully complete.

Prevention of algal blooms is the best approach to maintaining water quality, and prevention of algal blooms require reductions in nutrient supplies to the water.

Implementing Best Management Practices (BMPs) to control nutrient movement from the golf course and into surface waters is the most cost effective solution.

2.2 Controlling Algal Blooms. The best approach to maintaining water quality against algal blooms is prevention. Prevention is best because causes of algal blooms are addressed. However, in water bodies at golf courses algae must often be controlled. Controlling algae at a golf course is an ongoing effort. The presence of algae should be ‘scouted’ as part of the Integrated Pest Management (IPM) program at the golf course. Scouting should begin in early spring, as water is warming, and thorough records kept of the time, location, and amount of algae observed. Obtaining and graphing water temperatures in each water body and noting when algae first appear is a simple but effective management tool. These records are a management tool and review of the records can indicate locations of problem areas on the golf course and suspected time of outbreak. Once known, BMPs can be implemented at the problem areas.

Chemical applications of copper sulfate materials are effective algicides (Table 2). Chemical treatment should begin as soon as algae are seen in the ponds. Applications are best for overall aquatic protection when they treat only approximately one-third (⅓) of a water body at a time. This is because chemical treatment resulting in algal die-off can cause oxygen to fall to very low levels and cause fish kills if treatment causes a die-off of an entire bloom. For small pond treatment, applications near the edge of the pond (approximately shore to 3 ft) are very effective control mechanisms.

3.0 Aquatic Macrophytes. Overabundant rooted or free-floating macrophytes can be a major nuisance to golf course water bodies. Macrophytes can interfere with irrigation intakes and detract from aesthetic values. They can also introduce significant quantities of nutrients and organic matter to the water, perhaps stimu-
lating algal blooms and increasing consumption of dissolved oxygen. Light and nutrients tend to be the dominant factors controlling distribution and abundance of macrophytes.

3.1 Aquatic Macrophyte Control. Growth habit, proper identification of the plants species, the relative abundance, location within the lake, and age of infestation are important considerations when dealing with macrophyte control. These are important considerations because they may provide insight into the extent of the problem and how and when to proceed with control measures. Use of the site and fate of the water will determine if many of the chemical control alternatives can be considered. Time of the year will determine how effective different treatment approaches will be.

There are a number of distinct strategies for aquatic weed control. These include the following:

(1) prevention - this could be a very important consideration in the design and construction of new water bodies;
(2) mechanical - harvesting and removing, especially at critical developmental or reproductive stages could be considered;
(3) water management - such as seasonal drawdown, although this may have limited potential;
(4) chemical control - a variety of aquatic herbicides and algicides are available. However, various characteristics of these usually limit their use to specialized sites. Additionally, effects on nontarget species must be considered. Most of the limitations on chemical control are associated with the use or potential use of herbicide-exposed water;
(5) biological control - two biocontrols that directly attack or infest plants have found some success. The use of the South American alligator weed flea beetle and moths for control of alligator weed and the white amur ("grass carp"), a herbivorous fish, which is very effective for submersed weeds such as hydrilla.

4.0 Chemical Control. Chemical control of aquatic algae and macrophytes can be considered for certain plant species under specific conditions. Information on the effectiveness of herbicides for aquatic weed control is included in Table 2 (Page 76). While each of the materials listed is legally labeled as an aquatic herbicide, specific restrictions may be imposed on each chemical or even by manufacturers on specific brand names. At all times, the label must be rigidly followed when using these materials. Additionally, even under specifically allowed and controlled conditions for application, restrictions on use of the water subsequent to application may apply. Examples of these restrictions are given in Table 3 (Page 78). However, additional or more specific information may be given on the product label.

Use of aquatic herbicides presents spe-

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Use of aquatic herbicides presents specific questions about their impact on water quality. These materials have been shown not to accumulate in living organism nor concentrate in the food chain (SJRWMD, 1989). Dissipation of these materials from photochemical reaction, microbial breakdown, and dilution is rapid.

The application rate of each of the herbicides used for aquatic weed control will vary depending on the amount of active ingredient required to effectively control the targeted weeds and the formulation. Lake volume is another consideration. Applications are best when they treat only approximately one-third (⅓) of a water body at a time. For small pond treatment, applications near the edge of the pond (approximately shore to 3 ft.) are very effective control mechanisms.

With each herbicide information is available about use precautions and toxicological properties. Of primary concern is the effect of these materials on nontarget plants which may have been intentionally planted as wildlife habitat and the effect on nontarget wildlife. Effects on nontarget plants must be evaluated by a specialist in lake management who can accurately identify the vegetation and mechanism of action of the specific herbicide in question.

Each material listed in Table 2 will be discussed individually for effects on wildlife which inhabits or contact the aquatic environment. Data has been taken from the Herbicide Handbook of the Weed Science Society of America (1989), Weed Control Manual (1992), Farm Chemicals Handbook (1995), and “Acute and Chronic Toxicity of 75 Pesticides to Various Animal Species” (Kenaga, 1979). Values are either for LD50 - the dose (quantity) of a substance that will be lethal to 50% of the organisms in a specific test situation expressed in weight of the chemical (mg) per unit of body weight (kg); or for LC50 - the concentration of a substance in water that will kill 50% of the organisms in a specific test situation.

Fluridone. At recommended application rates concentrations in the water would range from 0.08 to 0.5 ppm. This material has been shown to be nonhazardous to birds (bobwhite oral LD50>2000 mg/kg; bobwhite and mallard duck acute LC50 values are both >5000 mg/kg of diet). Fish have excellent tolerance at these concentrations with an LC50 of 11.7 ppm for rainbow trout, 14.3 ppm for bluegill, and 10 ppm for channel catfish. Aquatic invertebrates also exhibit tolerances above these levels with values for daphnids at 6.3 ppm and midges at 1.3 ppm. No observed effect concentrations are 0.5 ppm for catfish and 0.48 ppm for fathead minnows. Communities of phytoplankton, zooplankton, benthic invertebrate organisms, and fish are unaffected at sites treated with these formulations.

Glyphosate. At recommended application rates concentrations in the lake water would range from 0.36 to 1.8 ppm. This material has been shown to be extremely safe to wildlife. The LD50 for bobwhite quail is >3850 mg/kg. The tolerance levels as LC50s for aquatic species are as follows: trout, 86 ppm; bluegill, 120 ppm; Daphnia magna, 780 ppm; harlequin fish, 168 ppm. None of these organisms would be especially sensitive to this material at proper application rates.

2,4-D. At recommended application rates the concentrations in the lake water would range from 0.36 to 1.5 ppm. General toxicity to wildlife and fish indicates that at 100 ppm there would be some slight mortality for fingerling bream and largemouth bass. Toxicity to rabbits is in the range of 300 to 1000 mg/kg. Some formulations are more toxic to aquatic animals and should not be introduced into aquatic environments unless specifically recommended on the label. The concentrations which would be found in lakes treated with the proper formulation of this material would not present a toxicity concern.

Copper sulfate. Calculated concentrations of copper in the water range from 0.155 to 0.4 ppm depending on the formulation. Environmental guidelines list the hazard to fish at >1 ppm for rainbow trout and 0.884 ppm for bluegills and >1000 ppm for pheasant. At the recommended rates this material should not pose a problem to wildlife.

Diquat. At recommended application rates concentrations in the water would range from 0.36 to 1.5 ppm. It is known to be generally safe to wildlife and fish with the LD50 for mallards at 564 mg/kg and the LC50 for bobwhite quail at 2932 ppm, rainbow trout at >10 ppm and Daphnia at 7.1 ppm. Lake water concentrations at recommended rates would pose no environmental threat based on these tolerances.

Although algae and aquatic macrophytes can be controlled in an effective manner, the goal of the golf course should be prevention of unwanted algal blooms and infestations. Prevention is the most cost effective and environmentally compatible management practice. This requires the implementation of well-designed environmental management program that includes Best Management Practices and Integrated Pest Management strategies for protection of natural resources at the course.
References

March Madness brings best out of Florida Superintendents, Golf Courses

Say “March Madness” to 90 percent of the population and they’ll tell you it’s all about the NCAA Basketball Tournament. Say it to golf course superintendents in Florida and they’ll tell you it’s the spring fling of the PGA Tour as it travels from Miami to Jacksonville. Here’s part 2 of our coverage of the 1995 professional golf tournament sites in Florida.

Doral-Ryder Open

Doral is a name that is synonymous with great golf and a great golf course, but this year’s Doral-Ryder Open showcased a golf course that was well beyond anyone’s expectations. Thanks to Superintendent Pat McHugh, CGCS, and his staff, the Blue Monster was in the best shape that anyone has seen for many years, including myself, and I have been around Doral since 1979.

Pat, a 1977 graduate from Michigan State’s turf program, made a bold decision this past winter to overseed the entire course for the first time. Pat’s gamble paid off in a big way. With the cold, wet winter south Florida endured, the rye grass overseed was the perfect vaccine for a predominantly Ormond bermudagrass course that may have suffered severely.

Pat is no stranger to the PGA Tour, having worked for the Tour for one year at the Tournament Players Club at Southwind, home of the Federal Express St. Jude Classic. Pat was working at Hunter’s Run when he decided to accept the position as Director of Golf Maintenance at Doral.

Due to the Blue Monster’s unique makeup of mostly Ormond turf, Pat’s decision to overseed the entire course was based on the idea of trying to put its best foot forward. “We wanted to put a different touch on the place,” McHugh said.

The 328 greens were seeded with a fescue and poa mix at about 24 pounds per 1,000 square feet, adding 2 to 3 pounds monthly. The tees were done with a 70-30 mix of rye and poa at 20 pounds per 1,000 square feet. Fairways and roughs were done with straight rye with rates of 400 pounds and 250 pounds per acre, respectively.

With a first time project came different work patterns that required the crew to establish new work habits and techniques. The tees were now being walked mowed, the roughs cut with rotaries and the fairways mowed, amazingly, with triplex greens mowers. Because of the overseeding, the fairways were being mowed everyday to create that checkerboard pattern that everyone likes to see. It took eight machines 4 or 5 hours to mow them all. The greens are being cut at .141 mm to get them up to 11 on the stimp meter. Pat uses all liquid fertilizer on the greens so they can be maintained right up to tournament time. With the quality of the overseed, the greens should be spectacular, probably the best on tour.

The large amounts of rain experienced this winter may have been a blessing in disguise for the Blue Monster. Due to the timing of the rain and the overseeding, there have been no carts on the course’s fairways since November, making them absolutely perfect. “We could be stronger looking, if not for the rain,” McHugh said. This is hard to imagine, though.

With the Doral facility incorporating 81 holes, it is not hard to find men to supplement the 16 full-time crew members that work on the Blue Monster. This time of year is not easy on Pat and assistant Eric Von Hofen. The Doral staff is responsible for putting up the fencing and ropes around the course, leader boards and concession areas. The TV towers are left up year round so all they have to do is put the floors in. For weeks before the tournament, the crew will work 10- and 12-hour days preparing.
the tournament, they will work split-shifts to get everything mowed and cleaned up after each round.

The Doral maintenance crew has traditionally enjoyed this time of year, but with about 70% of the crew being new, no one knows quite what to expect. Much time has been spent by Pat and Eric finding out who can operate what and where. On Saturday of tournament week, the crew will hold a large party and celebrate what will definitely be a successful event.

Pat has had some help, though. This past summer the PGA tour came down and helped to reshape some of the fairways. Tour Agronomist Jeff Haley comes in early to assist, and Hector Turf has donated some equipment to make life easier. Some of the equipment includes a lightweight mower, two 3100 greensmowers and four Toro 1000 walk mowers.

Kenneth Lee Dixon
Hollybrook CC

The Honda Classic

At Weston Hills, perfection is expected from the golf course, and the man entrusted with that job is Dan DuPree. Dan has represented himself well once again with an outstanding golf course that lives up to the grueling expectations of the PGA Tour and the membership.

I am a little ashamed to admit that this was my first visit to Arvida’s beautiful facility at Weston. Being a fairly new course, Weston has some advantages that a lot of us do not. Dan gets to work with all new equipment, and plenty of it. Dan has a 21-person crew, expanded to 30 for the tournament, for an 18-hole facility that will soon be 36, as nine new holes have just opened.

Dan, who graduated from Lake City in 1973, has been at Weston Hills for three years now. Before that, he served as superintendent at Broken Sound for eight years and, before that, eight years at The Diplomat. The Honda Classic is the first PGA event that Dan has been associated with, but the experience has been a great one. “I really enjoy it. If you don’t enjoy this time of year, you definitely don’t need to be in this business,” DuPree said.

The course at Weston Hills is all bermuda with 419 on fairways, tees and roughs. The greens are Tifdwarf that have been overseeded with straight bent. The tees and fairways are cut at .375 mm, the roughs at 2.75 inches, and the greens at .141 mm. The greens should be more than adequate for the pros, with a stimpmeter reading of about 10-10.5.

The tour has some stringent demands, and the crew at Weston has been able to adapt to those demands. The fairways are being double cut everyday, and the greens walk mowed. Carts will be on “paths only” for a month before the tournament begins. An 1.25 inch step cut is cut around the fairways. The crew, which will pick up many overtime hours in the weeks prior to the tournament, will be working a split-shift during the tournament. The
Nestle Invitational
Nick Faldo practices for the Nestle with help from his caddy, Fanny, and coach, David Leadbetter.

The Honda Classic
Superintendent Dan Dupree, left, and his assistant, Tim Sticco.

Nestle Invitational
Now that the Nestle is over, Bay Hill Superintendent Dwight Kummer has his hands full with new construction on the Charger Nine.
Tournament Players Championship
Superintendent Fred Klauk coped with 48 mph winds at TPC at Sawgrass, which challenged his crew to have a firm and fast course.

LPGA Sprint Championship
Superintendent Mark Heater, left, and First Assistant Allison Reaves are all smiles after a successful tournament debut on the LPGA International Golf Course.

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crew will come in at 4:30 a.m. and work until about 9:00 a.m. They will come back at 4:00 p.m. and will work until they are finished. Jeff Haley, tour agronomist, and Vaughn Moise, tour advance man, have provided invaluable assistance for the preparation of the course.

Dan may get the credit, but he chooses not to accept it. He would rather give it to his assistant, Tim Sticco, and his crew. "I could not have done it without him," DuPree said of Tim.

Tim was at Weston for a year before Dan arrived, so he was able to have many of the things the PGA Tour expects done before they ever arrived. Dan thinks this tournament brings the members of his crew closer together. They like the tournament and seem to be geared up for it. "The crew is always the most important thing. Without them, I am nothing," DuPree said.

Dan has had help from other places as well. Hector turf has donated a Toro 5100 fairway mower. The Honda people have been a big help also. They put up all the ropes, bleachers and concession area, freeing Dan and his crew to do other things. With only 32,000 rounds a year, the course recovers well from the tournament. Weston is a beautiful facility, and everyone should take a trip there some time, whether it is to play or just to watch the tournament.

*Kenneth Lee Dixon*
Hollybrook CC

**The Nestle Invitational**

Bay Hill superintendent, Dwight Kummer, celebrated his fifth Nestle Invitational this year and he says, "It seems to be getting easier!" He also felt he had his best putting surfaces ever for this year's event. And the reason for those near perfect greens was also the source of his biggest headache during tournament preparations.

Four weeks out from the tournament Central Florida was hit with "a week of winter" which included 3-4 frosts back to back and a freeze thrown in for insult. For plant material enjoying an otherwise mild winter, it was devastating. Dwight described the results, "We lost all of our blooming ornamentals and annuals which add so much color that time of year. We don't overseed the fairways and they went completely dormant. I have to give the crew a lot of credit. We've moved the most overtime we ever had in order to clean up all the dead plant material and replace all the beds. And with a little luck and some ammonium sulfate we got the color back on the fairways. Even though that cold snap brought a lot of problems, I think it helped stop all bermuda competition on the greens and allowed us to manage straight poa greens for the tournament."

Dwight attributes one other practice to the continued improvement of the putting surfaces over the years since the course was rebuilt. Dwight said, "We have begun to deep drill our greens in August for our fall renovation. I firmly believe we are driving those roots down making for healthier turf, which has reduced spike marks during the tournament." The condition of this year's greens drew high praise from Dwight's boss, Arnold Palmer, who was calling them better than Augusta. And TV's guru of grain, Johnny Miller, was quoted as calling them "flawless" this year.

Dwight outlined his overseeding program as follows: Greens - Laser Poa trivialis is overseeded at the rate of 10 lbs. per 1,000 sq. ft. in early November. In mid-December additional Laser is added at the rate of 2-3 lbs. per 1,000 sq. ft. This practice continues every 10-14 days until the desired density is achieved. This year a total of 20 lbs. per 1,000 sq. ft. was applied.

Roughs, tee slopes and greens slopes are overseeded with 100% Palmer II perennial ryegrass at the rate of 30 lbs per acre in mid-November. Since the fairways are not overseeded, Dwight needed a way to overcome the very slow healing divot scars incurred during the heavy winter play in the dormant bermudagrass. The solution that works for him is to topdress the divots with a sand-seed mix including Jamestown II chewings fescue. The fescue is non-aggressive, grows just fast enough to fill-in and blends well with the bermudagrass.

Bunker faces are another area that can be tough to manage. Dwight has found that Rebel Jr. tall fescue is more drought tolerant than ryegrass. By overseeding his bunkers at the rate of 10-15 lbs. per 1,000 sq. ft. with Rebel Jr., he has eliminated the need for hand watering these areas.

As for tournament week itself, it was pretty routine. There was a rain suspension on Saturday which required the staff to stay late to prepare the course for a 6 hole shotgun start on each nine at 7:00 am Sunday morning. And now Dwight and the Bay Hill staff can turn their attention to rebuilding the Charger Nine and remodeling the 16th hole on the Champion's course. Arnold wants to add a little more excitement to that gambling par five finishing hole. Congratulations to everyone at Bay Hill for another successful tournament. See you next year!

*Contributions to this article by Dr. Richard H. Hurley, Loft Seed, Inc. and Joel D. Jackson, CGCS, Disney's Magnolia G.C.*

**The Tournament Players Championship:**

**TPC at Sawgrass**

As the PGA tour makes its final stop in its four-week sprint through Florida golf's "March Madness," the critical eyes of the golfing public and the players themselves are focused on the Tour's home course.

Since 1986, Fred Klauk has been meeting the challenge of preparing the Tournament Players Club at Sawgrass to satisfy the highest expectations on the tour.

From the record cold of 1990 to the record rains of 1994, the staff of the TPC is tested time and again. This year March did not go out like a lamb.

Following are Fred's capsule comments on the event:

"The 1995 Tournament Players Championship was both challenging and exciting. Very windy conditions (48 mph) prevailed the entire week causing the course to dry out rapidly and present some extremely difficult playing conditions."
...of the professional golf tour

Last year the course conditions were criticized as being too soft from the record rainfall in 1994. We were determined to keep the playing conditions firm in 1995. The result was close to U. S. Open playing conditions, very firm and very fast. The winning score went from -24 in 1994 to -5 in 1995, which got very favorable responses from the media and spectators alike."

The LPGA Sprint Championship

Going into the LPGA members' first championship to be held at their brand new LPGA International Golf Club, Superintendent Mark Heater had two fears, rain and/or hot weather. The late spring dates in April could be disastrous on either count. On April 16th, one week before tournament week, the temperatures began climbing to summer-like numbers 90, 92, 93... Mark could imagine TV shots of dead ryegrass all over the place. At 1 pm that Sunday, the watering began.

Mark said they pumped record gallons of effluent water each night for six nights plus the daytime syringing to cool the grass in the heat of the day. The down side to so much watering to save the overseeding was that the course is built on heavy soils. Heavy storms run off quickly, but the top quarter-inch can stay soft and hamper mowing. It was a no-win situation.

Finally, the heat wave subsided just in time for tournament week with high temperatures returning to low to mid 80s. Mark had also hedged his bets by spraying the fairways with Primo growth regulator in case he couldn't mow due to wet conditions.

By the end of the tournament, some ryegrass areas were getting "toasty," but the course only lost a few per cent of overseeding. After the tournament another heat wave hit and this time the rye said sayonara! Through it all the bent/poa greens showed no signs of stress. Mark attributes that to the application of K-Power's 12-0-42 fertilizer at 1 lb. of Potassium per 1,000 square feet, three weeks before the event.

The tournament routine itself was a juggling act of men and equipment squeezed into a near impossible time frame. It took eight men walk mowing with spotlights on the putting and chipping greens and first holes front and back to stay ahead of the early morning 1 & 10 tee times. The 5:45 a.m. morning routine consisted of setting cups, walk mowing 24 greens (double cut), walk mowing the tournament tees because of signs immediately behind each tee, raking the bunkers and dragging the fairways.

At 4:00 p.m. the crew returned, working until dark to triplex mow the rest of the tees, mow the fairways, collars and approaches, mow the first cut of rough, double cut the greens again, and "brush drag" the bunkers. By the way, the greens average 7,000 square feet so it wasn't a
Palm Beach Chapter spotters all geared up for the Senior PGA event at PGA National.

Central Florida Chapter volunteers gather before getting group assignments "inside the ropes" at the Nestle Invitational.
Inside the Ropes

Acting as the eyes and ears for NBC Sports, the FGCSA has been providing spotters and scorers for the television broadcasts of LPGA, Sr. PGA and PGA Tour events in Florida for several years now. It is a win-win situation for all involved. NBC gets golf knowledgeable people to report who’s away, club selections, unusual shots, penalty situations and scores to the production trailer for relay to the announcers, and the FGCSA members get the best seat in the house inside the ropes following a group of players during competition. Additionally, the monies paid by NBC for these services is turned over to chapter scholarship and research funds.

LPGA, from Page 87

walk in the park to stay ahead of golfers in the morning and trying to beat sundown each night.

Mark and assistants, Allison Reaves and Steve Kugler figure they beggin putting in 90 hour weeks a month out to make sure the new course would be ready. Including them, it is a 25 man operation with 18 crew members grooming the turf. There are 90 bunkers. Some of them rival the Mojave and Sahara in size. It took 4 mechnical sand rakes to rake them ahead of play each day. Mark said he had zero spare people, and on Saturday he found himself walk mowing greens to cover for a “no show” by a now former employee. There were three other saving graces that

Continued on Page 91
Announcing

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Category 3 ...... Scenic Hole Layout Shots: includes sunrises, sunsets, frosts, storms and any other golf hole view.

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1st Place is $100 and 2nd Place is $50 in each category
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Easy Rules

1. Color prints only. No slides.
2. Photo must be taken on an FGCSA member's course. Photo must be taken by an FGCSA member or a member of his staff.
3. Each photo shall be attached to a sheet of 8.5 x 11 legal paper. Line up the photo with the vertical and horizontal lines to square the photo on the page.
4. Attach the photo to the paper using a loop of masking tape on the back of the photo. A caption identifying the category, course and photographer should be typed or printed on the sheet of legal paper below the photo.
5. Attach a label to the back of the photo which identifies the category, course and photographer. Do not write directly on back of photograph.
6. Judging will be done by members of the FGCSA Board of Directors not participating in the contest.
Florida fuel tanks must be insured

BY SCOTT BELL

On January 1, 1995, all above ground fuel storage tanks were required to be insured. If you have above ground fuel storage tanks that hold over 550 gallons of fuel, then you are required to carry restoration insurance and third party liability coverage.

Restoration insurance will cover the costs (after a deductible) for clean up from a fuel spill. Those costs can include soil and water remediation, reporting and testing. The third-party liability covers you in the event that the contamination leaves your property and affects your neighbor’s property.

The limits needed for tanks of 250,000 gallons or less are $1 million per incident and $2 million annual aggregate for facility clean up and third party liability coverage. With all of the remediation, testing and reporting, restoration costs can easily exceed $100,000.

The law allows for a facility to self insure itself if it can meet certain criteria explained in 17-769.5000 FAC. A facility can purchase insurance from a private insurance company, or they can participate in the Florida Petroleum Liability and Restoration Insurance Program (FPLRIP). Information can be obtained by calling:

FPLRIP 1-800-475-4055
PLUS 1-800-866-4758
another insurance program

For more information, call the FL DEP at 904-488-0876. It should be noted that if you have below ground storage tanks, they should have already been insured, and if they are not, they should be insured as soon as possible.

LPGA Sprint Championship
from Page 89

made the operation possible: (1) Loaner equipment in the form of three walk mowers, a fairway mower, a Jake 3810 and a bunker rake, (2) They didn’t have to mow the roughs after the first day of the week, and (3) Super volunteer, former superintendent, Gary Morgan who showed up every day to help drag fairways and rake bunkers.

Mark would like to acknowledge the training and experience he got by understudying Tom Alex at Grand Cypress. Mark said, “I set my benchmarks for excellence based on what I learned from Tom. I saw and learned what a golf course could be. Why would anyone strive for anything less? It is the model I use to compare results here at LPGA International.”

With a clubhouse, resort, and homes to be built, Mark and company have a lot of work ahead. But for now, congratulations on an outstanding debut!

Joel D. Jackson, CGCS
Disney’s Magnolia G.C.
Will Research Dollars Become (Ex)Spendable?

BY SCOTT BELL

The state university system has been decimated by budget cutting and allocation realignment. While funding for prisons has risen from 2% of the state funding budget to 8%, the education funding has dropped from 12.5% in 1985 to 7.5% in 1995. Unfortunately, enrollment in both state universities and prisons has increased. In 1985, 60% of the education system funding came from state sales tax. Presently, 49% of the funding is coming from sales tax.

At the University of Florida in Gainesville, 29% of the funding comes from taxes and the lottery, while 71% comes from tuition, various funds, endowments, etc. University of Florida research funding only takes 22.5% of its funding from taxes and the lottery. IFAS relies on state funding for 56% of its $1.63 million budget, and the research section relies on the state for 64% of its funding.

What does this have to do with golf course superintendents?

The state legislature has asked for a 25% savings in operating costs to give the money back for allocation to other areas. This request comes after a 1992 reduction in operating costs of 15%. Obviously the quality of the education would be the last thing that the legislature will want to cut since Florida students already rank below national averages in many standardized tests.

The main part of the budget cutting would happen in the university areas and particularly in research. While the universities can raise tuitions to make up shortfalls, and since they are less dependent on tax dollars than IFAS, the universities could survive this, although I’m sure that the quality of education would drop, and nobody wants that.

IFAS, on the other hand, could be severely hurt by a 25% budget cut. Anyone who has worked on the research committee or with the research green can tell you that IFAS is not rolling in money.

Write to your state senators and representatives... Let them know that you benefit from Florida research.

Anyone who has worked on the research committee or with the research green can tell you that IFAS is not rolling in money.

Write to your state senators and representatives... Let them know that you benefit from Florida research.

has greatly benefited and will continue to benefit from the work done at the IFAS facilities.

What can you do? Write to your state senators and representatives, who are listed in the beginning of the white pages in all phone books. Let them know that agriculture needs research to be done in our state. Let them know that you benefit from Florida research.
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At the Poa Annua board meeting, the FGCSA finally voted to approve funding for the DNA research proposal initially presented by IFAS last fall. This is a two-year, cutting-edge research project whose $66,000 price tag will be jointly split between the FGCSA and the Florida Turfgrass Association.

My use of the word “finally” in no way implied that we've been dragging our feet on the matter, as some might conclude, but rather, suggests that a lot of deep thought and analysis by many busy people went into the decision to fund this project. Members of both FGCSA and FTGA should find comfort in the deep sense of fiscal responsibility and concern for our industry demonstrated by all those involved in this project from conception to initiation.

For those of you unfamiliar with this proposal and its attendant concerns and controversy, I'll do my best to summarize:

I think we all would agree that one of the Florida golf and turf industry's greatest problems is the lack of standards and quality controls in the sod and grassing business. All of us are painfully aware that specifying "Tifdwarf" or "Tifton 419" in a grassing contract is wasted ink, and visiting a field is wasted time. The best quality control measures currently available are word of mouth and the individual integrity of the grassing contractors and sod producers.

Golf courses often spend millions of dollars during construction or renovation only to be disappointed with the quality and/or consistency of the turfgrass installed on their property. Even if initially satisfied, decline in quality and consistency due to the appearance of off-types is inevitable as time passes.

At this point in time, speculations about the origin of off-types are offered but conclusions are impossible, and answering this question is one of the main objectives of this project. Superintendents have been fired, grassing contractors have been sued, and fingers have been pointed in every direction seeking to assign blame and accountability for a problem that is truly a failing of our entire industry.

Though the problem has been with us for many years, a totally satisfactory solution could not be achieved using the standard morphological methods of identification and chromosome counts.

As Dr. Phil Busey puts it, “A deficiency or morphology is that the number of useful traits is few, while the number of possible variants is potentially large. It is difficult for morphology to represent the adaptive genetic diversity of bermudagrass, and to distinguish closely related genotypes. Small genetic differences can produce large morphological effects.”

In this project, morphology will be used as a preselection process to increase the chance of off-type detection and reduce the cost. Likewise with chromosome counts — costly DNA testing is unnecessary if you can screen out a selection based on chromosome numbers.

The intelligent and appropriate use of all these identification techniques will help build our necessary database, keep costs reasonable, allow for practical certification inspections, and give us the best chance of developing a reliable and repeatable positive identification procedure.

Notice that I said “give us the best chance” in the previous paragraph. Everyone needs to understand that there is a possibility, as there would be with any endeavor using new technology, that the project will not yield the results we are expecting.

Obviously, we think the risk worth taking, or we wouldn't be putting up $66,000. There is also the chance that everything works fine, but the conclusion reached is that off-types are caused by spontaneous mutations, in which case no practical solution for our problem is feasible, but at least we'll know that and the finger pointing can stop.

Earlier in this article I used the word “controversy,” and the real controversy surrounding this project is the DNA technology. Some of the brightest minds within the field disagree on the best methods and techniques, so how can golf course superintendents make an intelligent decision?

Making our decision a little easier is
the fact that our recently instituted certification program needs Florida data and validation, since it will be administered and conducted within the state of Florida. We will still utilize out-of-state expertise, such as Dr. David Huff of Penn State, author of most of the papers published on RAPD markers in turfgrasses, to help us achieve the desired results.

The two DNA technologies at the heart of the controversy are DNA Amplification Fingerprinting (DAF), currently utilized at the University of Tennessee, and Random Amplified Polymorphic DNA (RAPD), which is the method proposed by the University of Florida for this project.

Drs. Phil Busey, Al Dudeck, Charlie Guy, Terril Nell, and Nigel Harrison at the University of Florida, and Dr. David Huff at Penn State, feel the RAPDs technology offers the best chance of developing an efficient method of genetic fingerprinting bermudagrass cultivars.

RAPDs is cheaper and faster than other methods, doesn’t use radioactive labeling, and works with easily extractable, small amounts of crude DNA. Up to 100 primers will be tested, giving a high degree of confidence in the results. The main concern with the RAPDs method, readily transferable results from one lab to another, will be addressed by replicating selected results between the two labs in Fort Lauderdale and Gainesville.

We are taking a giant step into the future for our industry. Fear of failure should be our last concern. Turfgrass certification needs the backbone this project can provide.

Kevin Downing, David Barnes, Mike Bailey, Paul Crawford, Jeff Hayden, the professors at the University of Florida, and many others, have worked long and hard to bring this project this far along, and it assumed that this two-year proposal is but the first step in a long, multi-year process. Results won’t come quickly, and practical application even slower.

Of course, we could just hire a genetic engineer to develop a “bentudagrass,” and forget all about these bermudagrasses and their problems, couldn’t we?

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All that information won’t necessarily help me groom a golf course better than someone who hasn’t evolved into the computer age, but maybe I have a better feeling for what is driving the rapid cultural revolution in the global business world.

Streamlining, flattening, downsizing, out-sourcing, empowerment, accountability, performance development plans and leadership pathways are the buzzwords and passwords in the competitive marketplace of today. This is especially true for all corporate golf operations, and remember all you private clubs it is the world of many of your members.

We recognize that the role of the superintendent has changed over the past decade, and I’m here to tell you the pace of change is accelerating. It is not enough to be technically proficient in managing turf. In fact the word “manage” may be on an evolutionary dead end branch of the business tree.

We are increasingly called upon to be facilitators, coaches, leaders and communicators. Issues of loss prevention, environmental integrity, social awareness in areas of ADA, OSHA, and diversity propel us helter-skelter through a litigious society.

Amid all the clamor of rapid change and competition remains the demand and expectation for the best possible playing conditions on the golf course.

And guess what? Mother nature doesn’t care about nanoseconds, microchips and organizational initiatives! Spring will come when its good and ready, and maybe when you not! Turfgrass will recover and flourish when the conditions are ripe for growth. Not because we will it, but because the sunshine, water, soil temperatures and nutrients are present in the correct amounts at the appointed time.

What can be changed is how we deal with people internal and external to our operations. Breaking down old barriers and finding new ways to partner and cooperate for the success of the whole entity not just maintenance.

It will take hard work and soul searching to identify, measure, and solve old problems. Traditional mindsets will be assaulted and people will be moved out of comfort zones into the tumult of the competition for survival, personal and organizational.

Forces at work in this high-tech, fast paced world don’t always realize that their meteoric flights are adjusted to the natural rhythms of the planet. It is the nature of man to explore the possibilities and we cannot remain immune to trying new things.

We are being asked to change old attitudes. However, those pursuing the cultural revolution must remember that nature can “cop an attitude” of its own and will have the final say and dictate a certain success rate based on its own terms.

Mankind is often reminded that nature must be respected and dealt with in all human endeavors.

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