available on the toxicity levels relative to the different amphibian species, including influence on the predators and prey.

The review did not point the finger at the turfgrass industry, but rather pointed to the need to understand the influence of wastewater treatment, livestock, precipitation, and fertilizers on nitrate pollution. Clearly, as major users of fertilizers for turfgrass areas such as golf courses, we must be aware of best management practices to minimize off-site movement. In addition, turf is an important vegetative buffer and biofiltration system to protect sensitive aquatic habitats. Now is the time to think about this bigger picture before another crisis occurs.

What’s Next?

Kenna and Snow end the chapter in the ACS Symposium Book saying, “The USGA, and the game of golf, need to keep asking questions and looking for new ways to maintain golf course grasses. More important, efforts should be increased to educate the golfer about environmental issues.” The importance of these points cannot be overstated, yet I am regularly amazed at how many in our industry feel that the environmental crisis is over. I sense a complacency among organizations and industry leadership that image, labor issues, and expected turf quality are greater challenges, since they know the results of the USGA studies.

There is nothing more important to the wellbeing of the game of golf and our industry than environmental quality. Yes, the data is encouraging that as far as we can measure, there appears to be little negative influence, yet as we continue to ask questions we find new answers. At the same time, we need to look at course management. Should we plant ryegrasses where gray leaf spot is going to be a problem? Can we justify intense pesticide use for new pest problems? Are we creating these problems from the conditions we create? Why do the golfers appear no more involved than they were a decade ago? Why isn’t every course in the Audubon Program?

As the human population grows, the concern for environmental quality will be even greater. As an industry, we cannot rest on our laurels. We must be vigilant in our efforts to inform golfers about the price of what they are demanding. In some cases, we may not know exactly, but shouldn’t we err on the side of caution? The amphibian study is only one aspect of what we are a part of, as Carson states in *Silent Spring*, “the fabric of life, on one hand delicate and destructible, on the other miraculously tough and resilient, and capable of striking back in unexpected ways.”

Frank S. Rossi, Ph.D. is assistant professor of horticulture at Cornell University. He can be reached at 607-255-1629, fax 607-255-9998, email fsr3@cornell.edu. Submitted by Shelly Foy, USGA Green Section Florida Region and reprinted from Dr. Rossi’s 2001 USGA Regional Seminar presentation with permission.
Summer is Really Here!

One of my favorite things about this time of year in South Florida, however, is that you can’t go outside without hearing birds everywhere. For the first time in four years, I have great crested flycatchers nesting in a box in my backyard. I have to laugh because I am constantly telling superintendents to be patient with their nest boxes, that sometimes it just takes a while for the birds to find them. I should take my own advice, because I am probably the most impatient person on this planet. Happily, I can now sit out on my patio and watch the mom and dad flying in and out of the box feeding their young. It just makes me feel incredibly satisfied with life.

I have found the secret to getting information for this column: pick up the phone and call people. Since you won’t send the information to me, here is your heads up that I will be calling, so start making some notes on your environmental projects and programs.

Nest Boxes

I have truly enjoyed some recent phone conversations with George McBath, ornithologist from Naples. George works with a lot of golf courses in Florida installing birdhouses and setting up monitoring programs for them. George now has over 1300 birdhouses on over 46 golf courses in Florida. He is currently monitoring birdhouses on 26 golf courses in Southwest Florida.

For any golf course interested in establishing a nest box program, George McBath is the person you need to call. George has designed his own nest boxes made out of all recycled material. You can call George at 941-774-2820.

According to George, “It is nice to have birdhouse projects, but it is important to adopt the physician’s credo: First, do no harm. You need to check the birdhouses at least twice a month during the starling nesting season, and if you find starlings, they absolutely need to be eliminated.”

George went on to say that, “Particularly on more urban courses that are surrounded by homes and shopping centers, you really need to be concerned about starling reproduction. They are going to be more prevalent in these areas because they tend to hang around areas where there are a lot of people.” Shelly’s advice: Go out and buy a good book on Florida birds that has pictures of the birds and the eggs before you start your monitoring program.

George also talked about birdhouses fulfilling another function: wintertime roosting. He has seen quite a few red belled woodpeckers roosting in boxes during the winter.

George tells me that these are the birds in Florida you can expect to find nesting on your golf courses: screech owls, bluebirds, great crested flycatchers, carolina wrens, red belled woodpeckers, downy woodpeckers, nuthatches, kestrels and purple martins.

Now, obviously that does not mean that every golf course will attract all of those birds. It basically depends on the surrounding habitat, and what area of the state you are in. For instance, even though technically bluebirds could be found in Southeast Florida, I can’t tell you where any are. However, they are all over the place in Southwest Florida. Same with Kestrels: you are more likely to find them the further north you go in the state.

In talking about purple martin houses, George says that the success rate for the first year is over 90 percent. Basically, if you put up purple martin houses, you are going to have nesting success. He was particularly pleased with the purple martin boxes at Stonebridge in Naples. They had very good first year results with the boxes on the golf course, and more than that, a lot of the homeowners were so impressed they...
North American Birdwatching Open
Florida golf course participants in Birdwatching Open:

ACSP Courses
(Golf Course, City, Total Species)
IGM @ Aquarina CC, Melbourne Beach, 33
Foxfire Golf and CC, Naples, 54
Heritage Pines GC, Hudson, 66
Indian River Club, Vero Beach, 50
Interlachen CC, Winter Park, 30
Royal Poinciana GC, Naples, 51
Seminole GC, Tallahassee, 17
IGM @ Spessard Holland CC, Melbourne Beach, 23
The Majors Golf Course, Palm Bay, 42
Panama CC, Lynn Haven, 28
Shadow Wood CC, Bonita Springs, 50
IGM @ The Habitat GC, Malabar, 43

Signature Courses
Bonita Bay East Courses, Naples, 42
Collier’s Reserve, Naples, 61
IGM @ West Bay, Naples, 50
Twin Eagles, Naples, 25

got involved and put the purple martin boxes on their properties as well. And that folk’s is what it is all about... educating people and setting good examples.

George was also particularly impressed with the Waterlefe Golf Course in Bradenton. He said they had quite a diversity of birds, and that on the first day he was on the course he counted 62 species. They must be doing something right!

I also enjoyed hearing about the golf course tours they give every year to schools. This year, they gave 28 tours in three months to 580 students ranging from first graders to seventh graders. These students toured Collier’s Reserve from six different schools and a Boy Scout troop. Collier’s would like to thank Bill Gamble and Bill Gordon from Club Car of Florida, who donated four transporters to help get the students around the golf course this year. Bill Davidson and/or Pepper would be happy to give you the scoop on how they organize these school tours, so just give them a call.

Replacing bermuda roughs
Matt Taylor and I talked about Audubon

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related projects at Royal Poinciana. Just in the past year, they have taken out over 15 acres of non-play bermuda and have planted over 27,000 native grasses, including cordgrass, fakahatchee grass and muhly grass. They are working on a longrange drainage plan, and have donated a pair of bluebirds for the Everglades project talked about in the Winter 2001 issue of the Florida Green. McBath also did a bird count for Matt, and on May 14, there were a total of 348 birds and 41 different species counted.

Audubon Steward Network
Audubon International has developed an Audubon Steward Network made up of people that have taken a property through certification and have volunteered to help others through the certification process. These Stewards have volunteered to share their knowledge and experience and be an information source for other Audubon Cooperative Sanctuary members in their regions.

Any one of the above Audubon Stewards would be happy to help you with any questions you might have about the ACSP. If you have taken a property through certification and are interested in being an Audubon Steward, call Joellen Zeh, staff ecologist for Audubon International at 518-767-9051 ext. 14, or e-mail her at jzeh@audubonintl.org.

Birdwatching Open Results
For the fourth year in a row, Audubon International has invited members of the Audubon Cooperative Sanctuary Program to participate in the North American Birdwatching Open. It was held on International Migratory Bird Day, May 12. Interested members were given forms and asked to identify by sight or sound, all bird species on their property within a 24-hour period. The purpose of the event is to gather data on specific bird species that use managed lands and to demonstrate publicly that many land managers are committed to responsible environmental stewardship.

There are more Florida golf courses than are on this list that have birds on property, right? Joellen will be making changes to the Birdwatching Open for 2002, and I sincerely hope that more of you will participate. We currently have 231 ACSP registered properties in Florida. I know we can do better than 16 participants. (I'm hoping that a little guilt will work wonders)

Meadowbrook Birdwatching Cooperative
Lyne Page, Meadowbrook/IGM Environmental Compliance Coordinator reported that they had five courses in close proximity work together to participate in the Birdwatching Open. Three of those courses are managed by IGM. The Majors, Indian River Club, IGM at Habitat, IGM at Spessard Holland and IGM at Aquarina had 12 volunteers spread out across the area counting, and everyone was pleased with the results (see results above).

Lyne was also particularly pleased with some recent naturalization projects at Spessard Holland. The golf course only has 65 acres, and they have still been able to...
Audubon Stewards in Florida

Buddy Keene, Gainesville Golf & Country Club, Gainesville
Bob Karnes, Disney's Osprey Ridge, Lake Buena Vista
Matt Taylor, Royal Poinciana, Naples
Jeff Klontz, Country Club of Florida, Village of Golf
Ron Hill, Amelia Island Plantation, Amelia Island
Lyne Page, Meadowbrook/IGM, Lakeland
Don Merritt, Hobe Sound Elementary School, Hobe Sound
Shelly Foy, USGA, Hobe Sound
Todd Lowe, USGA, Englewood

naturalize over 10 acres. They primarily used saw palmetto, muhly grass and sea oats. The golf course also has a 3-acre butterfly garden planted with coontie, beach sunflower, and galardia. The butterfly garden was planted last summer and Lyne reports that it is just beautiful!

A personal comment on the Meadowbrook/IGM golf courses. There are currently over 40 of them in Florida, and each one is a member of the Audubon Cooperative Sanctuary Program. Currently, six are fully certified, and most of them are enroute towards full certification. I'd personally like to give a pat on the back to Scott Zakany and Greg Plotner for seeing the importance in having all of these golf courses participate in the ACSP. Kudos to you both.

Everglades Bluebird Project

Here's the quick update on the golf course bluebird translocations and their current status from Gary Slater (see article in Winter 2001 issue). We moved a pair of bluebirds before they began breeding from each of three golf courses: Royal Poinciana, Foxfire, and Grey Oaks. All except one of these birds, the female from Foxfire, have been found nesting in Everglades National Park.

The Grey Oaks pair nested, but an American crow depredated their nest. We expect them to renest. Birds from Royal Poinciana and Foxfire nested together in the unlikely location of a hole in a Ted Shed, but just fledged three juveniles. Finally, the second bird from Royal Poinciana is nesting with a Big Cypress bluebird that was also translocated this year. Their nest is still active, but should fledge soon.

At two golf courses, The Glades and Eagle Creek, we moved a pair and their nestlings. All the nestlings fledged in their aviary fine. Unfortunately, a snake made a meal of the two fledglings from the Glades. The Glades birds were radiotagged and released and one has been located on a couple occasions. The pair from Eagle Creek split up after release, but we found the female with one surviving juvenile. The male has been flying all over Everglades National Park and we locate it regularly.

Gary will give us a full update on the Bluebird project in the next issue of the Florida Green.

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Can Drive 75DF
Eradicate Torpedograss?

Often unnoticed in fairways and roughs, torpedograss really gets noticed when it reaches greens and tees

BY PHILIP BUSEY, PH.D.

Torpedograss, Panicum repens, is a persistent weed on many golf courses. Now that we have a chemical product, Drive 75DF®, that selectively controls it, can we use the chemical to eradicate torpedograss from areas of the golf course?

My opinion is that it will be possible to permanently remove torpedograss from bermudagrass turf, if multiple small applications of Drive 75DF® are used in multiple successive years on the same infested areas. The label restricts the number of applications to two or three per year using no more than 2 pounds of product per acre in one year.

On golf courses, torpedograss starts from rhizomes and tubers that are carried and unintentionally planted, for the most part during construction. Seeds have not been reported in Florida. The rhizomes and tubers withstand burial and remain hidden, to later sprout new shoots through one or more feet of soil.

Torpedograss was introduced to Florida, probably in the late 1800s, with the intention that it might be a good forage plant. It did not make a good forage, but it did become widely established.

I have seen torpedograss establish from the root balls of trees in a new landscape, and I have seen it puncture up through asphalt paths. Golfers pay little attention to torpedograss. When they ask me what I am doing at one of my herbicide trials on the golf course, I show them the torpedograss in the rough and I say, "I am trying to find the best way to kill torpedograss."

Their usual response to me is, "Oh, okay. I thought that was part of the rough."

Once torpedograss is on the golf course, it spreads underneath fairways and roughs, eventually reaching greens and tees. When it reaches mitigated wetland areas, it generally overwhelms the native plants and looks unsightly around lake margins.

Trying to pull it out of the ground is useless, as the shoot will break off from the buried rhizome. In fact, almost any mechanical treatment such as disking only serves to spread torpedograss.

Modern, well-designed golf courses often have the worst problems from torpedograss, either because they were built from dredged lake bottoms, or because they were built in former pastures. Older golf courses, which have had limited movement of soil, are often relatively clean.

In 1991, University of Florida researcher Dr. Bert McCarty began to discover control or suppression of torpedograss with quinclorac. (Dr. McCarty has since moved to Clemson University, and has authored several books, such as the Color Atlas of Turfgrass Weeds.)

In research published in 1993, McCarty found little or no injury from quinclorac to bermudagrass turf. Considering how tough torpedograss is, and the failure of past herbicides to give selective control, Dr. McCarty's work was a major breakthrough.

Following the 1998 EPA registration, BASF Corporation published its first label for Drive 75DF® (75% quinclorac), for control or suppression of torpedograss in bermudagrass turf. Other weeds are listed, but none as notable for Florida superintendents as torpedograss.

There are a number of restrictions and application requirements on the Drive 75DF label. For example, it may not be applied to golf course greens or collars. The Florida registration was issued July 1, 1999. For the next year and a half, Drive 75DF was marketed by

Key Points

- Torpedograss is a persistent perennial weed that spreads by rhizomes and tubers.
- It can be transported mechanically in sod, tree root balls and during construction.
- Drive 75DF® marketed by BASF is an effective herbicide for the control of torpedograss in bermudagrass.
- There is an application limit of 2.0 pounds of active ingredient per acre of Drive 75DF® per year, split over a maximum of three applications.
- It appears that three years of diligent applications will be needed to eradicate torpedograss from areas on the golf course.
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TopPro Specialties, but following corporate reorganization, it is currently handled by BASF.

The biggest issues with Drive 75DF® are the low application rates on the label, and regrowth of torpedograss. While Dr. McCarty showed that the active ingredient quinclorac was effective in controlling torpedograss — up to 89% control through the tenth week after initial treatment — he observed only 53% control through the 19th week after initial treatment. That degree of control was at a rate of application twice the subsequently labeled rate.

According to the Drive 75DF® label, no more than two pounds of product may be applied per acre per year, and the 1998 label recommended two applications of 1 pound per acre per application. Using this 1 + 1 protocol, McCarty observed only 16% control of torpedograss, 19 weeks after initial treatment.

In my initial research on Drive 75DF®, in 1998 and 1999, tank mixtures of Drive 75DF® with Illoxaan seemed to show some initial improvement of torpedograss control in replicated plots, but in the second successive year of treatments to the same plots, I observed no improvement in torpedograss control.

The Drive 75DF® label recommends that “to achieve consistent weed control, a crop oil concentrate or methylated seed oil is recommended.” However, in my evaluation of six different adjuvants including MSO (methylated seed oil), I observed no improvement in torpedograss control by the use of any adjuvant, compared with no adjuvant, or even compared with watering in the Drive 75DF® after application.

Kyle Miller, BASF technical representative, has confirmed that the MSO adjuvant may be more appropriate for annual species including crabgrasses, which are also controlled with Drive 75DF®, and MSO may not be necessary for torpedograss. Miller also said that in the case of torpedograss, “root uptake is the major factor.”

Considering the lack of improvement from tank mixtures or adjuvants, my next recourse was to split the annual 2 pounds of Drive 75DF® into more than two applications, with applications three weeks apart.

Theoretically, the longer that torpedograss stays suppressed, the less opportunity it will have to photosynthesize and restore its reserves. I had seen plots by BASF’s Joe Mitchell, tended by golf course superintendent Arthur Kurtz, of Broken Sound West in Boca Raton. In those plots, the three-way splits looked almost clean of torpedograss.

Based on work that I started in 1999 at Palm Aire Golf Course courtesy of Fred Granger, CGCS, four applications of 0.5 pounds Drive 75DF®, at three-week intervals provided better control than three applications of 0.67 pounds, which were better than two applications of 1 pound.

In plots evaluated before treatment, and in water controls, torpedograss density was 75 to 85%. There was progressively less torpedograss in successive years of Drive 75DF® treatment, but the most dramatic improvement was in the four-way split of 0.5 pounds Drive 75DF® per acre per application, where I observed 10% torpedograss canopy.

To think of these observations in terms of relative control (reduction compared with the water treatments), the standard two applications of 1 pound per acre gave 47% reduction of torpedograss, three applications of 0.67 pounds gave 71% reduction, and four applications of 0.50 pounds gave 89% reduction. Other experimental plots at TPC at Eagle Trace, managed by Jim Moore, also showed an advantage for the three-way split, 0.67 pounds Drive 75DF® per acre per application, compared with two applications of 1 pound of Drive 75DF®.

To find out what was going on below ground, a cup cutter was used to remove two plugs from each plot, and the plugs were carefully washed and the contents separated and weighed. In the case of the water controls, 64% of the torpedograss plant dry weight was contained in the tubers, only 24% in the rhizomes and roots, and 12% in the leaf. Relative control or reduction of torpedograss leaf, rhizome, and tuber biomass was consistent with visual observations, except visual estimates slightly overestimated biomass reduction.

When evaluating torpedograss, there is eight times as much material below the surface as above the surface. Long-term torpedograss control is a long-term proposition.

The bottom line is that torpedograss consistently regrows under all conditions, but that the control from multiple small-rate applications is sufficient that there is an accumulated benefit from a year-to-year program. It appears that at least three years of diligent applications will be necessary to eradicate torpedograss from areas of the golf course. How to accomplish that will require careful record keeping and possibly some kind of GPS mapping.

Philip Busey, Ph.D., is associate professor of turfgrass science at the University of Florida/IFAS Research and Education Center in Fort Lauderdale. He may be reached at 954-577-6337; fax 954-577-6337; e-mail turf@ufl.edu
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Category 2 - Course Landscape: Formal Plantings: includes annuals, shrubs, trees, entrance and tee signs.

Category 3 - Course Landscape: Native Plantings: includes aquatic vegetation, grasses, shrubs, trees and wildflowers.

Category 4 - Scenic Hole Layout Shots: includes sunrises, sunsets, frosts, storms and any other golf hole view.

Prizes
• 1st Place ($100) and 2nd Place ($50) in each category.
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• All winning entries published in the Fall 2001 issue.

Easy Rules
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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. Attach a label to the back of the print or slide which identifies the category, course and photographer. DO NOT WRITE DIRECTLY ON THE BACK OF THE PRINT. Each photo shall be attached to an 8.5” x 11” sheet of paper. Attach the print to the paper using a loop of masking tape on the back of the photo. Slides must be easily removable for viewing.
4. A caption identifying the category, course and photographer should be typed or printed on the sheet of paper below the print or slide.
5. Judging will be done by a panel of FGCSA members not participating in the contest.

Letters to the Editor

Winter Issue Draws Kudos from Ohio Transplant

Dear Joel,

I just finished reading the Winter issue of the Florida Green. What an interesting and informative issue!

The slick cover photo and others in the issue has given the magazine a real professional look. More importantly, the articles are well written and full of information on Florida golf.

I especially enjoyed the article on Olde Hickory: Sharing Space With Old Florida. The personal touch by the superintendent, etc. to preserve the natural areas and highlight the environmental beauty was well illustrated. I plan to visit this course soon.

Being retired from Ohio to Deltona, I especially enjoy visiting with Florida superintendents. Recently, I have agreed to work with Chris Cartin, superintendent at Deltona Hills CC as greens and grounds chairman.

Mike Koval
Retired owner/Class A superintendent
Sugar Bush Golf, Inc
Garrettsville, Ohio

Mr. Koval,

This issue was very well received in general and earned some very positive feedback from superintendents and other golf club members like yourself. Stories like Olde Hickory's are fun and easy to tell when you have a superintendent like John Stach passionate about what he does. Thank you for taking the time to write a personal note.

Joel Jackson

This issue was very well received in general and earned some very positive feedback from superintendents and other golf club members like yourself.