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STEWARDSHIP NOTES BY SHELLY FOY

# What is Stewardship?

Stewardship comes in many forms. I have been fortunate enough to see quite a bit of stewardship from golf course superintendents over the years. Knowing what you do in your everyday job is amazing enough, let alone all the “extras” that you get involved in from day to day.



One such stewardship effort is under way at South Fork High School in Stuart. South Fork is the only high school in the country that we know has a golf course on property fully maintained by students. The Bull Dog Horticulture and Sports Turf Complex is a 25-acre facility that includes a three-hole, par-three golf course with 11 tees ranging from 100 to 215 yards, a practice range, practice green, plant nursery, equipment compound, computer lab, classrooms, shade house and propagation house.

The nearly 100 students enrolled in the program are offered a three-year, six-course program on golf course operations, ornamental plant nursery operations, or landscape operations. They meet five days a week for 100 minutes a day to gain hands-on skills vital to the above three areas. They learn plant identification, propagation, plant care, soil science, landscape design and installation, the agronomics of growing turfgrass, and cultural practices including mowing, irrigation, fertilization, cultivation and IPM.

The project was started in 1989 with architect Charles Ankrom donating his time to design the course. Many local golf courses and members of the turf industry offered resources to complete the project and keep it functioning. The PGA of America has officially sanctioned the complex as a teaching facility and has recorded a video there. *Golf Digest* presented the facility with its prestigious 1997 Junior Development Award.

Instructor Keith Krueger teaches not only the turf program, but all the horticulture programs as well. Keith is a classroom teacher with over 22 years of experience, and he does this with practically no budget.

Rob Kloska, superintendent at the Jupiter Island Club, has formed a business advisory group to help Keith and his turf program. Members of this advisory group are Roy McDonald, superintendent, Hobe Sound Golf Club; Craig Weyandt, superintendent, Yacht & Country Club of Stuart; Kevin Downing, superintendent, Willoughby Golf Club; Bill Lanthier, Golf Ventures; David Oliver, Boynton Pump and Irrigation, Inc.; John Foy, director, USGA Green Section, Florida Region; and Shelly Foy, office coordinator, USGA Green Section

In November, SFHS applied for a grant from the USGA Foundation for equipment, consumables, summer interns and uniforms for their turf program. They were awarded a \$5,772 outright grant for interns, and a \$45,000 challenge grant. This is the second year that the USGA Foundation has made a challenge grant to the SFHS Turf Program. Under the terms of this grant, the USGA will match funds raised by SFHS, \$2 for every \$1 raised up to \$45,000.

Last year SFHS received \$41,860 from the USGA.

The following is a list of items needed for the SFHS Turf Program: trim mower; greens aerifier; multi-cutter power head; multi-cutter edger; multi-cutter string

trimmer; rebuilt sand pro; rebuilt fairway verticutter; money for parts/repairs and maintenance of equipment; sludge; 10-20-30 fertilizer; 15-5-15 fertilizer; 21-0-0 fertilizer; 11-3-22 greens mix fertilizer; Chipco Choice; Dursban; Round Up; MSMA; Spreader Sticker; Barricade; Momentum (240); Kerb; Drive; sand; overseeding; and uniforms.

The business advisory group is seeking donations for items on this list. The USGA has generously agreed to match donations received for this list, again at \$2 for every \$1. Please look over the list and consider making a donation to this program.

Benefits are already being realized to the turf industry, as several students are interning on local golf courses during the summer and some of them are already working full time on local golf courses after graduating from the program.

You can make a donation to the SFHS Turf Program by contacting any of the business advisory committee members.

Again, stewardship comes in many forms. We applaud the USGA for recognizing the value of this program, the business advisory group for getting involved, and all of you who will choose to help us reach our goal of fulfilling the USGA Challenge Grant.

Note: The USGA’s 2000 Turfgrass and Environmental Research Summary

## Audubon Additions

Florida’s Newest Audubon Cooperative Sanctuary Golf Courses as of 11/17/00:

- Carefree Country Club**, Winter Haven
- Pablo Creek Club**, Jacksonville
- Weston Hills Country Club**, Weston
- St. Andrews Country Club**, Boca Raton

New Fully Certified Audubon Cooperative Sanctuaries since 11/17/00:

- Wildcat Run Golf & Country Club**, Estero
- Polo Park East**, Davenport

is now available. If you are interested in receiving a copy, please call my office at 561-546-2620, or send me an e-mail at [sfoy@usga.org](mailto:sfoy@usga.org). The USGA also has an updated version of the pamphlet, "Golf Courses Benefit People and Wildlife", which I would also be happy to send you.

## **BMPs vs ACSP: Different Aims and Both are Worthwhile**

BY GRADY L. MILLER, PH.D.

I was recently asked to explain how the University of Florida Institute of Food and Agricultural Sciences (UF-IFAS) publication *Best Management Practices of Florida Golf Courses* (2nd edition, 1999) compares to the Audubon Cooperative Sanctuary Program.

As a preface to an explanation let me first state that as a Land Grant University, the University is federally mandated to serve the citizens of this state. The Cooperative Extension Service is a partnership of county, state, and federal government that serves the citizens of Florida by providing information and training on a wide variety of subjects. Turfgrass science is one area of specialization where UF-IFAS has specialists that serve golf courses and other turfgrass production and maintenance industries.

The *Best Management Practices of Florida Golf Courses* book is intended as a reference guide for Florida golf course superintendents and regulatory agencies in their efforts to grow and maintain some of the most prestigious golf courses in the world.

The information contained in the book was compiled and written by more than 11 researchers, teachers and/or extension specialists. The recommendations in the book are as up-to-date as possible, and in most cases, are based on many years of research.

Much of the research that was used to generate this data was paid for by agencies such as the United States Golf Association, US EPA, Golf Course Su-

perintendents Association of America, Florida Department of Agriculture and Consumer Services, various Florida water management districts, Florida Turfgrass Association, and the Florida Golf Course Superintendents Association. Many other groups and individuals have likewise contributed toward research necessary for completing the publication.

The *Best Management Practices of Florida Golf Courses* was produced so as to provide a template and explanation of good turf management principles and also to provide information for green construction and reference values for irrigation water quality. The term "Best Management Practices" or BMPs has meaning on a number of different levels.

This IFAS publication *suggests* BMPs for golf course management, but they are not in the form of rule, law, or ordinance. The university is not a regulatory agency. In reality, many of the state's regulatory agencies defer to UF-IFAS in matters related to standards, due to our years of research experience on specific matters (e.g. nitrate leaching, water use, pesticide need, etc). We would like to think that policy decisions are substantiated with science, although we know that decisions are sometimes made based on political reasons.

In contrast to the IFAS publication related to turfgrass management, the Audubon Cooperative Sanctuary Program presented by Audubon International (1991 inception) is a voluntary program designed to provide conservation management strategies for a golf course.

The primary goal of the program is to enhance wildlife habitat and protect natural resources. It is based around monitoring programs and implementing various stewardship projects. The primary financial supporters of this program are the USGA and the individual golf course members.

The Audubon Cooperative Sanctuary Program recognizes six categories:

1. Environmental Planning – each club generates a written plan out-

lining their goals and proposed projects.

2. Wildlife & Habitat Management – emphasizes the management of non-play areas to provide habitat for wildlife.
3. Integrated Pest Management – developing a responsible program for controlling pests, ensuring a healthy environment for both people and wildlife.
4. Water Conservation – attention is directed toward irrigation systems, recapturing and reuse of water resources, maintenance practices, and turfgrass selection.
5. Water Quality Management – directs emphasis on impact of golf course chemical use on quality of lakes, streams, and groundwater sources.
6. Outreach & Education – focus is placed upon generating public awareness through education.

These six areas require extensive documentation and in many cases, implementation of projects to support or strengthen the golf course's efforts in environmental awareness and/or protection. As you can probably gather from this list, the Audubon program is taking a more holistic approach to evaluating the golf course environment, addressing the turf, water issues, wildlife, pest control, and community education.

The university's goal with developing BMPs for golf courses is primarily focused on growing quality turf in the most ecologically friendly way, but we do not specifically address the extensive monitoring or the community outreach and education components as outlined in the Audubon program.

It is my experience that most of the university-directed golf course turf programs are geared toward the people who manage the turf rather than the end user (e.g. the golfer). The Audubon outreach and education programs are designed primarily for the golfers and potential future golfers.

Which program is the best? They both serve an important function for the sustainable future of this industry. 🦋





# Gaining Ground on Turf's Top Enemy



**Figure 1.** Mole cricket damage is often quite severe and effective control can often times be a frustrating and expensive endeavor.

## Practical Use of New Research for Effective Mole Cricket Control

BY RICK L. BRANDENBURG, PH.D.  
North Carolina State University

**T**he southeastern United States, and Florida in particular, seem to be blessed (or cursed) with an abundance of turfgrass insect pests. The list ranges from cutworms to mole crickets, fire ants to sod webworms, chinch bugs to white grubs. Many of these pests are troublesome every year and often persist for long periods of time during the warmer months. In addition, several of the pests such as fire ants and mole crickets offer special challenges as we attempt to control them in an environmentally and economically sound manner.

While fire ants present their own special challenges, just not in terms of effective control, but also from the health risk they produce, in this article we will restrict our comments to mole crickets. The underground nature of this insect, its presence near water, and several behavioral characteristics of this pest make it a particular challenge (*Fig. 1*).

The majority of this article will focus on recent research that helps us better understand what the mole cricket does under the soil and how this information may be useful in helping us manage this pest.

The first advantage that mole crickets have working in their favor is the very fact that they are a soil insect. This works to their advantage in two ways.

First, we can't see what the insect is doing when it's below the soil surface. This obviously works to the insect's ad-

vantage. We don't know where the pest is concentrated, its developmental stage, or even its general abundance prior to serious damage to the turfgrass.

Secondly, the soil and associated organic matter (such as thatch) work against our efforts to deliver the insecticide or other control agent directly to the insect pest. Many insecticides are bound tightly to organic matter in the soil and this results in less availability of the product to the insect. The soil itself somewhat buffers the insects from any application of an insecticide. As a result, control of soil insects such as mole crickets is a great challenge that often requires a significant investment in time and money.

These challenges in mole cricket management have resulted in a number of research projects through the years to help us better understand the biology





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Figure 2. The southern (left) and tawny mole crickets are similar in appearance, but differ in their biology and ecology.

and ecology of this pest. Our program at North Carolina State University has been studying this pest for about 15 years and a very significant effort has been under way for the past 10 years. A portion of this work in collaboration with Dr. Mike Villani at Cornell University has been funded for seven years by the United States Golf Association.

The major focus of our research has been studying the biology and behavior of mole crickets and how this affects our efforts to manage this pest. We have studied both the southern and tawny mole crickets (Fig. 2). While there are many similarities between the two species, there are also some distinct differences.

The southern mole cricket is more of a predator feeding on soil organisms and the tawny mole cricket feeds more on the root systems of the turf. Each will modify its feeding behavior somewhat under unusual or less than optimal conditions. However, the very predatory nature of the southern mole crickets actually allows them to attack and feed upon tawny mole crickets that are the same size or smaller.

Fortunately for the tawny mole crick-

ets, their biology gives them a leg up on the southern mole cricket. Tawny mole cricket adults typically lay eggs earlier than the southern mole cricket and as a result the tawny mole crickets are often a little larger, offering them a level of protection from the southern mole crickets. It is quite possible that some of the ear-

liest hatching southern mole crickets do consume a few of the later hatching tawny mole cricket.

When we consider the management implications of this difference, the length of egg hatch is going to be considerably longer in areas where the two species coexist. This makes good control more difficult since the timing and residual activity of the insecticide must cover a longer period of time than the situation where only one species is present. The combination of the two species in one location usually gives us a bit more of a problem in our efforts to obtain maximum control.

In addition to the fact that we can have two different species present in one location, we are finding that there are some rather significant regional differences in mole crickets.

For example, in a particular year, a mole cricket population in north Florida may enter into the winter months with about 80% of the nymphs having completed their development to the adult stage. In North Carolina we may see as high as 90% of the population overwinter as adults.

We don't know why we see advanced development in an area with cooler spring and fall temperatures and where the eggs may hatch a month later. There also

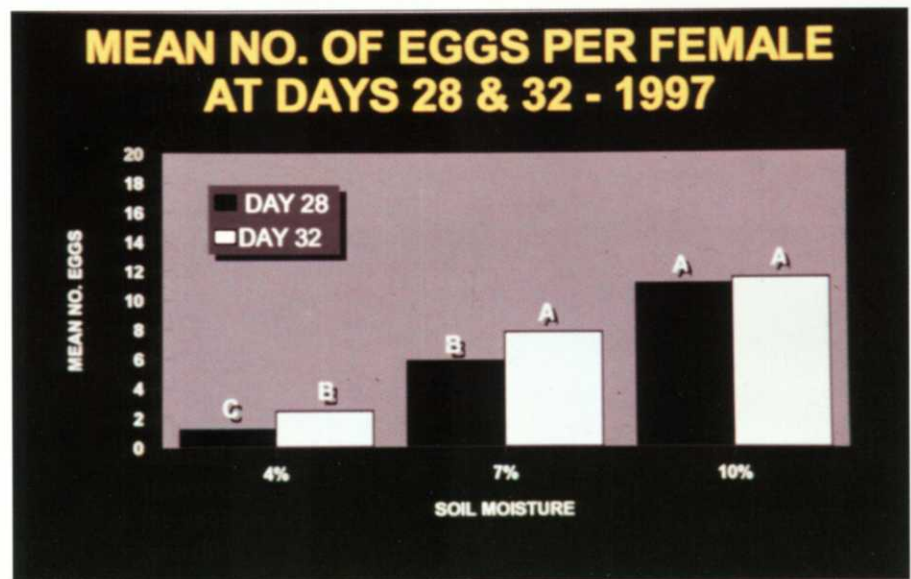


Figure 3. Effect of soil moisture on the egg laying of mole crickets in a greenhouse study (North Carolina).



appear to be some differences in the susceptibility of mole crickets to particular insecticides from various parts of the Southeast.

Are all of these differences a reflection of different environments (i.e. soil types, rainfall, temperature), the result of years of exposure to different insecticides, or is it that the various populations of mole crickets that found their way to the U. S. came from different points of origin in South America?

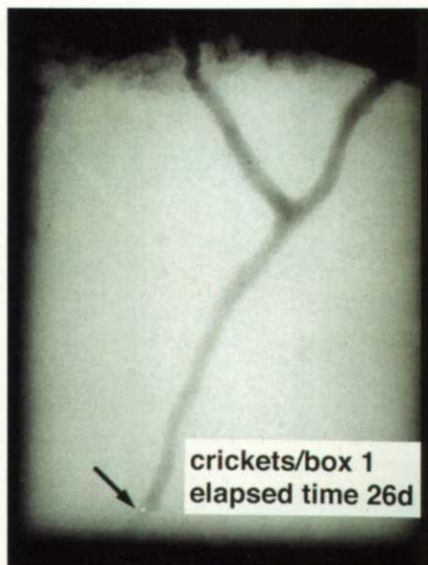
I don't think we have a clear answer for this yet, but it does caution us in accepting data from far removed locations as the gospel. The way a product stacks up in North or South Carolina may or may not be the same as it performs in south Florida. Local testing and on-site trials are critical with this pest.

One aspect of mole cricket ecology that does appear to be consistent across its range is that it is a creature of habit. By this, I mean that the mole cricket population generally finds an area that it is suitable and populations tend to occur there year after year.

Much of this is the result of the fact that the adult male mole cricket seeks sites that are suitable for making attractive calling chambers to attract the females for mating in the spring. These same sites are often good for egg laying, which the females frequently utilize soon after mating. In effect, the signs of adult activity in the spring are actually a very good indicator of where significant egg laying will occur and represents a site where monitoring of egg hatch should be focused.

This is not to say mole crickets don't spread to new areas because they certainly can and do. By mapping and monitoring these sites of springtime adult activity, superintendents can use their time most effectively and feel confident that they can accurately monitor egg hatch. Defining those areas and closely observing egg hatch is the first step to an effective control program.

Soil moisture greatly affects mole cricket behavior. Female mole crickets like good soil moisture in which to deposit their eggs (Fig. 3). Our research has shown that females may lay their



**Figure 4.** Typical "Y" shaped tunnel of a tawny mole cricket in the soil as observed through an X-ray image.

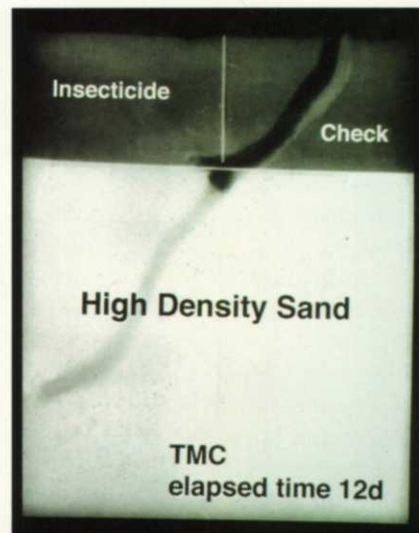
eggs a little bit earlier if a good rainfall occurs and a little bit later if the soil is dry.

I believe the effect of soil moisture is one reason why we have not been able to accurately predict egg hatch based upon soil degree days. This desire for higher moisture area to initially deposit the eggs may well explain the reason for the consistency in the sites in which they show up each year. Once hatched, the nymphs may migrate to drier areas as we often see them around bunkers and on mounds.

Under drier soil conditions, the mole crickets also have a tendency to be a little deeper in the soil. This is why it is more difficult to use the soap flush to get them to the surface when it is dry.

Dry conditions also make it more difficult to control mole crickets. The dry soil and organic matter make it more likely that much of the pesticide will be bound to it rather than moving to the target site. In addition, the cricket is simply residing down deeper in the soil and is less likely to contact the insecticide.

I have observed on several occasions a situation where superintendents are ready to throw in the towel on a particular treatment. A treatment is



**Figure 5.** Indications of avoid behavior by tawny mole crickets to the presence of an insecticide in the soil as observed through an X-ray image.

applied in a timely manner, but under dry soil conditions. Time passes and it remains dry. During this dry period the mole crickets are still feeding and growing larger, but there is little evidence of surface damage.

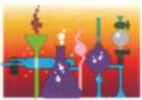
Then we enter a period where we receive some good soaking rains and suddenly mole cricket damage appears everywhere, including the treat areas (regardless of the insecticide used). Immediately we feel that the treatment has failed.

What has most likely happened is that with the rains, the crickets moved to the surface and it's the first time the crickets have actually been exposed to the insecticide. If the insecticide has sufficient residual activity it will then begin to control the crickets. One must remember, however, that the crickets are larger and it may take up to several weeks before the damage begins to subside and the mole crickets die.

Mole crickets have two other unique behavioral characteristics that affect our ability to control them in an effective manner. Studies conducted in collaboration with Dr. Mike Villani at Cornell University has helped us to better understand behavior in the soil.

The tawny mole cricket typically makes a "Y" shaped tunnel in the soil





that may go as deep a 3 or 4 feet in the soil during cold weather (Fig. 4). This "Y" shaped tunnel structure is found in some other soil insects and is consistent with other species of mole crickets such as the African mole cricket which is found in heavy clay soils in South Africa.

It is obvious this "Y" shaped structure plays an important role in mole cricket biology. It appears the tawny mole crickets feeds extensively on the turfgrass root system between and near the branches of the "Y". The southern mole cricket tunnel structure has the appearance of more random movements, such as might be expected from an insect that is seeking prey. This different tunnel structure most likely affects the effectiveness of certain treatments against each species.

The other behavioral response of the mole crickets is that they appear to be able to detect and avoid conditions that are detrimental to the cricket. Our

research indicates that mole crickets are able to detect and even avoid insecticides applied to soil (Fig. 5).

The mole cricket may go deeper in the soil and stay away from the treated area for a considerable time. The larger the mole cricket, the longer it can stay deeper in the soil and thus avoid contact with the insecticide. This is one more reason why treatments directed against smaller crickets are usually more effective.

In many cases our initial observations of mole cricket control may be simply a reflection of repellence, rather than actual control. We have even observed a similar avoidance response with biological control agents. Unfortunately our understanding of this behavior is still too limited to develop means to overcome it. However, we do know that the rate of application, as well, as environmental conditions can influence this avoidance behavior.

Hopefully this information will

prove useful in your understanding of mole crickets and how to most effectively manage them. There is a lot we know about this pest that space doesn't permit us to discuss in this article, but the points highlighted here are of great importance.

At the same time there is still a lot of room to improve our knowledge of this pest and our program will continue to seek additional answers. I will keep you posted of new information as it is developed.

Should you have questions or feel I can be of assistance, please feel free to contact me. I also hope that in the future we'll have an opportunity to address some of these issues face to face in workshops or seminars.

*Rick L. Brandenburg, Ph.D., is professor and extension entomologist at NCSU in Raleigh. He may be reached at 919-515-8876, fax 919-515-7746; e-mail rick\_brandenburg@ncsu.edu.*

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## Golf Course Superintendent or Greenskeeper?

What are we really? With all the things that we get involved in by choice or by just trying to stay one step ahead, sometimes I think we forget our focus.



*Image-building, job titles, marketing strategies and public perception may be the modern consequences of golf's popularity to our profession, but the bottom line is we are first and foremost, keepers of the green.*

**R**egardless of the outcome of GCSAA's Professional Development Initiative, maintaining good golf course conditions is what it is all about.

Compared to the golf professional, our jobs have drastically changed with all the things we need to keep up with: FQPA; PDI, Sara Title III; OSHA; county, state and national laws just to mention a few.

Then there are the groups we join to keep up our education on turf management and regulations. GCSAA, USGA, FSGA, TCGCSA, FGCSA and FTGA. Don't get me wrong: these are all great organizations and I am a member of all of them, but regardless of all the administration and regulation, our real job boils down to golf course conditions.

My family came to this country from England in the 1940s, and has been in the golf business for many years. My grandfather and his brothers were golf professionals in England. Their father and uncles were also in the golf business.

The MacDonalds have been playing this great game for over 200 years in this country, England and Scotland. The love for playing the game of golf came from my father, brother and my great uncle who all taught me the great game of golf. Over

there, superintendents are still called greenskeepers and their professional association is called the British and International Greenskeepers Association.

No matter what you call us or how our job descriptions have changed, we are about the game of golf just like Jack, Arnold, Sam, Ben and the rest of the great golfers over the past 200 years. So how do I keep my focus and carry out my primary responsibility of maintaining good playing conditions? I play golf!

The last greenskeeper I worked for taught me many things, but the one thing that sticks out is he always found time to go out and play a few holes. Most of the time it was long after the crew had gone home or early on a weekend morning. We were both very lucky in that way, we both really love to play the game.

If I don't play my golf course at least once a week, I feel as if I let my members down. Because to me that is one of the best ways a person can really evaluate his or her golf course's conditions. We also have a few Tour players who play out of my golf club. I take the time to talk to them and compare our course to the ones they play on the tours.

Playing other courses is also a great way of knowing what is going on. The next time you are in the clubhouse and

one of your members says, "Joe's course is always in good shape. Why can't we be that good?" You will have an answer for him: budget, overseeding, new grass, new irrigation system, new greens, etc.

If you don't have time to play other courses, just go look at them. When was the last time you went and looked at three or four golf courses in one day? You can compare first hand what "Joe" is doing up the street just by going and looking at a few his greens and talking to him about his current programs.

Playing golf with my members is something else I try to do. This does not happen on a regular routine but I do try to do this six or seven times a year. This seems to work for me and might not be for everyone. But I really think that if you don't play a few times a month, you don't know your course as well as you think.

Image building, job titles, marketing strategies and public perception may be the modern consequences of golf's popularity to our profession, but the bottom line is we are first and foremost, keepers of the green.

ROY MACDONALD  
Greenskeeper  
Hobe Sound Golf Club