about not feeding squirrels or other animals. Even one member who habitually feeds the animals can train them to be problem animals. If you already have problem cart trespassers try squirt guns to discourage them. Squirrels just need to get the idea that a cart will offer an unpleasant experience.

Feeding fox squirrels is not necessarily a bad thing to do, but it needs to be done so it helps the squirrels and does not aggravate the members. If you want to feed fox squirrels, it is best done by scattering food on the ground in an isolated location away from heavy cart traffic.

Placing it about on the ground instead of in feeders in trees may reduce transmission of diseases such as skin fungus. In the wild, fox squirrels eat nuts, seeds and some fruit. You will need to follow that pattern. Commercial seed mixes can be appropriate squirrel food and you may also place the fruits of trimmed palms in the mix. Squirrels should not be fed bread or processed foods and peanuts are not nuts.

Nest boxes

If your course is one of the many with few ideal nesting sites, you may want to provide additional nesting sites in the form of nest boxes. Wood duck nest boxes work well for fox squirrels. Ideally they should be placed fairly high in pine or cypress trees, at least 25 feet from the ground, and be in a mixed cluster of trees.

You will need holes in the bottom for drainage and some circulation under the roof section. These boxes are often well used, both by females with litters and by individuals during extremely heavy rains and wind.

Education

One of the best ways to benefit fox squirrels is by providing information to members and guests. This might include signs asking players to watch out for darting squirrels along cart paths or club roadways or writing columns about habitat enhancement, feeding restrictions, or natural history of wildlife species that are common on your course.

Many club members are not familiar with our native wildlife and plants and a little information may go a long way in helping them to understand and appreciate the unique and beautiful natural heritage of Florida.

A moderately trimmed cabbage palm provides a mid-day resting site for a Big Cypress fox squirrel whose fondness for pecans allowed him to be part of a radio-tracking study. Photo by Rebecca Ditgen

Squirrels should never be fed from golf carts or otherwise hand-fed by people.

In review

Whether you are the manager of an existing course with fox squirrels or you are involved in the planning of a new course, knowing what fox squirrels need can allow you to manage for their survival. Just remember the main areas of attention:

- Plant and maintain pines, cypress, oaks, maples, figs and other native trees and shrubs
- Maintain an open understory and create areas with a pine litter layer
- Trim palms moderately or not at all
- Consider human interactions- feeding, nest boxes, education

With careful planning, well-directed efforts, and good fortune you can help increase the feeding and nesting opportunities of the unique Big Cypress fox squirrel of southwest Florida.

An acknowledgment: In the course of my study I met a host of helpful and hardworking superintendents and assistant superintendents, many of whom shared my affection for these delightful fox squirrels. Their generosity and patience gave me access to the fox squirrels and their urban homes and I am deeply grateful for their assistance.

About the Author

Rebecca Ditgen is a wildlife ecologist in the Department of Wildlife Ecology and Conservation at the University of Florida. She conducted research on urban populations of Big Cypress fox squirrels as a Ph.D. student in that department and plans to continue her study of the species with a project in Big Cypress National Preserve. RSDitgen@ufl.edu.

'Naturalizing' Means Restoring Ecosystems, Not Going Native

By Tom Stone

President, Nature Golf, Inc.

The Audubon Cooperative Sanctuary Program, GCSAA, and the USGA have ignited an interest in naturalizing non-play areas on golf courses. The reasons vary greatly from environmental stewardship to cost reductions and everything in between.

But what might be right for the front nine may be entirely wrong for the back. Ensuring success in this process may be as simple as letting nature tell you what to do.

In naturalizing areas of the golf course, the long-term goal should be to develop a self-sustaining habitat which will survive with minimal outside assistance after it is established. Planting the wrong plant in the wrong area will probably lead to less than favorable results, requiring additional water, fertilizer, chemicals and labor. A little research before you plant will pay off greatly.

Most golf courses cannot be totally restored to their original native environment, but they can be naturalized to what they have become! The construction process moves soils around, changes elevations affecting water flow and drainage, and generally alters the original ecosystem. For instance, a wetland forest which has been drained, probably will not survive as it had naturally, and should be naturalized according to its new environmental features.

There are 17 different and distinct natural ecosystems throughout Florida. Some of the more familiar ones are coastal uplands, fresh water marshes, pine flatwoods, wetland forests and mesic-hardwood forests. Each ecosystem has natural plant communities affected by site conditions like soil type, water availability and climate. These plant communities are made up of trees, understory trees, shrubs, vines and groundcovers, wildflowers, and aquatics.

Naturalizing out-of-play areas like this tee slope can save you labor hours. It is important to choose the right plant material that will adapt and thrive in the new conditions. Photo by Tom Stone.

Naturalizing the golf course is more than just planting some native plants. The following steps will allow this to be more successful:

1. Identify wildlife species whose habitat you are trying to enhance. What specific features are required for them: nesting areas, food sources, shelter, cavities, etc. Encompass their needs into your overall plan.

2. Identify the areas to be naturalized. Use a map of the individual hole or the whole golf course to mark out the areas to be considered. Consider corridors for wildlife to move within the course.

3. Determine how naturalizing an area will affect playability of the golf course. Will it slow down play or make the hole too difficult? Trees may be unacceptable because they close off a dogleg across water but native grasses may have a place in these areas.

4. Classify the areas being considered. Determine what type of ecosystem would occur in these areas naturally. Do water levels fluctuate, does this area stay flooded for months at a time, is this area well drained after a 4-inch rain?

5. Determine what types of invasive plants or trees are already located in these areas. Implement a plan to eradicate or remove these species prior to naturalization.

6. Develop a plant palette of species which will survive naturally in these specific areas. You wouldn't expect a bald cypress to live on top of a sand hill or a pine tree to survive submerged for three to five months, so put the right plant in the right place.

7. Plant, fertilize, irrigate and use pre-emergent herbicides for the first year or two to allow for a successful establishment, then turn off the water, eliminate the fertilizer, and let nature do the rest.

The end result will be the successful restoration of ecosystems and habitat within the golf course.

The golfing experience will be greatly enhanced, allowing golfers to experience a more natural environment and see wildlife which they may not see anywhere else

Besides improving habitat for wildlife, naturalizing non-play areas of the golf course will reduce expenses for irrigation, fertilizer, herbicides/pesticides, and labor to maintain these areas.

Ever notice how more fans always follow one foursome?

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IPM Principles Apply Indoors as Well as Outdoors

By Jean Cibrorowski
Minnesota Department of Environmental Protection

Integrated pest management is typically associated with treating pest problems which occur in landscape settings or agricultural fields.

How many of you have ever thought of employing IPM when treating indoor pest problems?

In most cases, when an indoor pest problem arises, people want the quickest solution; however, in the long run, a "quick fix" may not be the most appropriate. Just as in outdoor settings, indoor settings can also benefit from well-planned IPM programs which are proactive in nature.

The same principles which apply to outdoor IPM are also applicable to indoor IPM. Remember the six IPM "How To" steps: gather information and assess your situation; establish monitoring procedures; establish injury levels and develop economic thresholds; determine corrective actions; establish a good record-keeping system, and finally, evaluate your program's effectiveness.

It makes good sense to use IPM in indoor settings where humans and pets live, work and play. The goals of a good IPM program stress:

1) the importance of minimizing the risks to human health and the environment;

2) providing effective control of a pest complex by including alternative pest management strategies which are least toxic to non-target organisms;

3) ease in carrying out a pest management program safely and effectively;

4) maintaining cost effectiveness both in the short and long term; and

5) appropriateness to the site.

When implementing a pest management program in buildings it is important to consider not only the pest but the environment in which the pest is found.

What factors are contributing to the pest's ability to survive and propagate? Where is the pest located, i.e., throughout the building or just locally in a specific area?

In order to manage the pest, you must be aware of its habits and location. The more information you collect, the better able you will be to make informed pest management decisions. Often by simply monitoring the pest, you will be able to determine its location and then, using one or more of several treatment options, control the pest so that it is below your accepted aesthetic, economic and/or safety threshold.

Remember, when treating any pest you must be aware of its life cycle so that you treat the pest during its susceptible life stage. Treatment of dormant stages will prove unsuccessful and a waste of time and money.

Broadly speaking, what are the treatment options for in door pests? I will touch briefly on four general categories: education, habitat modification, physical controls and chemical controls.

• Education: Often indoor pest problems can be drastically reduced or eliminated by education. If people understand what causes a pest problem, they may be better able to avoid behaviors which can lead to pest problems. For example, people may not realize that by leaving food and drinks out and not cleaning up spilled foods, they are creating the perfect environment for pests.

• Habitat modification: It is important to keep things clean. Sanitation goes a long way in eliminating pest populations. Eliminating sources of water and food for potential pests is very important. Storage of items in the proper containers, off the floors, and in dry spaces can aid in preventing problems.

• Physical controls, including vacuuming, caulking cracks, placing traps and removing pests by hand play an important role too. Choosing least-toxic chemical controls such as dessicating dusts and insect growth regulators can also contribute to your IPM program.

• When chemical control is necessary, consider the safety of the pesticide for humans, pets and the overall environment. Try to use a chemical which is species specific and always follow label directions.

Keep in mind that the aim of an IPM program is to manage pests over long time periods. You want to implement a program which will be viable now with continued efficacy into the future.

Sanitation goes a long way in eliminating pest populations. Eliminating sources of water and food for potential pests is very important. Storage of items in the proper containers, off the floors, and in dry spaces can aid in preventing problems. Physical controls, including vacuuming, caulking cracks, placing traps and removing pests by hand play an important role too.

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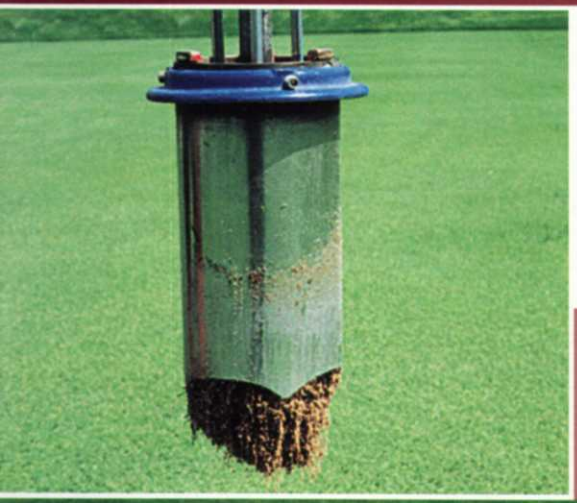
Get to the root of the problem...



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University of Florida Field Days

Look Where Our Research Dollars Go!

In the last issue of the *Florida Green* we mentioned the association's annual budgeting process and how research funds are derived. In this follow-up article, take a look at the nearly three dozen research projects that were on display at the 1998 University of Florida Field Days in July.

Sometimes, the total scope of all the ongoing research gets lost in the focus on a few "hot button" issues. Our local and state fund-raising efforts help support continuing basic research and evaluation of products and programs which are essential as regulatory parameters change and new chemistry and grasses are developed.

Dr. Al Dudeck discusses the successes and failures of 40 bermudagrass selections being evaluated for use on fairways. Photo by Joel Jackson.

G.C. Horn Memorial Turfgrass Laboratory:

Fertility, Nutrition, Growth Regulators and Environmental Impact Studies:

1. Comparison of Viking Ship and standard fertilization programs for golf greens and fairways – J.B. Sartain

Dr. Grady Miller explains the rhizotron operation and discusses the deficit irrigation vs. quality parameters study being done there. The rails in the foreground and background running left to right support a rolling roof to keep rainfall off the test cells. Photo by Joel Jackson.

A precise nutrient plan has been developed by Hydro-Agri (Viking Ship Fertilization Program) involving specific application times and materials. This project will compare the Hydro-Agri nutrient management plan with a standard plan. Turfgrass growth and quality will be compared using the two plans.

2. Effects of types and rates of N on growth and quality of turfgrasses – J.B. Sartain

Evaluate the effectiveness of different slow-release N sources in promoting growth and influencing quality of Tifway bermudagrass and ryegrass. Determine the application rate and environmental conditions on the response of the slow-release materials.

3. Comparative responses of Pursell's new coated products to other N sources under two N fertilization schemes on Tifway bermudagrass – J.B. Sartain

Evaluate the effectiveness of two new standard-sized coated urea products relative to five commercially available slow-release N sources applied at two rates to Tifway bermudagrass and maintained under fairway conditions. The N sources will be compared along with ammonium sulfate with 75% of the applied N originating from the slow-release sources.

4. Effects of Fe sources on growth, quality, and nutrient uptake of bermudagrass – J.B. Sartain

Initiated to determine growth, quality, and iron uptake response of bermudagrass to the application of experimental iron sources. Study the staining potential of the various iron sources when left on a concrete surface under moist conditions.

5. Comparative responses of cool and warm-season turfgrasses to liquid and solid sources of N and K – J.B. Sartain

Various N and K nutritional products applied in different frequencies and rates to determine their influence on growth rate, visual quality, and nutrient uptake of cool- and warm-season turfgrasses and on maintenance of quality during transition from cool- to warm-season turfgrasses.

6. Influence of two growth regulator products on TifSport bermudagrass grow-in – J.B. Sartain

This research will evaluate the influence of different formulations of gibberellic acid (a known growth regulator) on top and root growth of TifSport bermudagrass during establishment over a 12-week period.

Turfgrass Breeding, Evaluation and Field Trials

7. Bermudagrass Fairway Trials – A.E. Dudeck

Forty bermudagrass selections were plug-planted June 27, 1995 in field plots at the IFAS Turfgrass Field Laboratory,

Gainesville. Plots are being fertilized with a total of either six or three pounds of nitrogen per 1000 square feet per growing season. Plots are being mowed five times per week at a height of 0.5 inches. Seven of the best-performing grasses were planted in fairway trials at the Palm Beach National Golf Course, at the Grand Cypress Golf and Country Club, and at the Gainesville Country Club.

8. Ultradwarf Bermudagrass Trial – A.E. Dudeck

Eight bermudagrass selections were plug-planted Aug. 5, 1997 in field plots to evaluate performance of ultradwarf bermudagrasses Champion, FloraDwarf, MS Supreme, and TifEagle. Plots are being fertilized weekly with 0.5 pounds of nitrogen per 1000 square feet. Plots are being mowed five times per week at a mowing height of 0.19 inches during the growing season. Clippings are being removed. After complete establishment of all grasses, alleys will be allowed to close and mowing height will be reduced to 0.12 inches.

9. St. Augustinegrass Performance In North Florida – A.E. Dudeck

Twelve St. Augustinegrasses were plug-planted on Aug. 8. 1995 in field plots at the IFAS Turfgrass Field Laboratory, Gainesville. Plots were fertilized with a total of four pounds of nitrogen per 1000 square feet per year. Plots were mowed three times per week during the growing season with a mulching mower set at a height of 2.0 inches. After two years, grasses having best turf quality, which averaged 5.6 on a scale of 1 to 9 where 9 = best turf quality, included FHSA-115, FHSA-117, FL 1997-6, Floralawn, Floratam, Floratine, MSA-11, MSA-31, and Palmetto. Grasses having best turf density scores, which averaged 7.2 on a scale of 1 to 9 where 9 = best density, included FL 1997-6, MSA-11 , and MSA-31.

10. 1997-1998 Overseed Trials on Fairway and Putting Green Bermudagrass – S . F. Anderson and A.E. Dudeck

Forty-three cool-season turfgrasses were overseeded on a Tifdwarf bermudagrass putting green and on a Tifway bermudagrass fairway at Gainesville. Studies were established from Nov. 7–14, 1997 and terminated April 30, 1998. On the putting green, grasses with best turf quality scores, which averaged 7.6 on a scale of 1 to 9 where 9 = best, included creeping bluegrasses, Poa reptans, DW 42 and DW 184, a mixture of 85% Power perennial ryegrass, Lolium perenne, with 15% 'Stardust' rough bluegrass; Poa trivialis; a mixture of 80% Catalina perennial ryegrass with 20% Winterplay rough bluegrass; and a mixture of 28% each of Atlantis, Imagine, and Lynx perennial ryegrass with 15% Fuzzy rough bluegrass. On the fairway, grasses with best seasonal turf quality scores, which averaged 7.2, included creeping bluegrasses DW 42, DW 184, and DW 208; and a mixture of 28% each of Atlantis, Imagine, and Lynx perennial ryegrass with 15% Fuzzy rough bluegrass.

11. Hawaii Bermudagrass Expansion – A.E. Dudeck

Twenty selections are being increased for field testing throughout the state. Seven of the best performing grasses were planted in fairway trials at the Palm Beach National Golf Course, at the Grand Cypress Golf and Country Club, and at the Gainesville Country Club.

12-13. Breeding Bermudagrass and Zoysiagrasses for Florida – B.T. Sculley

Thirty-seven genotypes of both bermudagrass and zoysiagrass along with known genetic standards are replicated twice in this study. This evaluation block in Gainesville is one of five statewide cooperative test sites for UF/IFAS turf germplasm.

14. National Bermudagrass Test – 1997 – A.E. Dudeck

This NTEP study is one of 17 being conducted throughout the southern United States. Sixteen bermudagrass selections were plug-planted Aug. 7, 1997 along 18 seeded types, which were planted Aug. 12, 1997 in field plots at the IFAS Turfgrass Field Laboratory, Gainesville. Plots are being fertilized at a rate of 4.0 pounds nitrogen per 1000 square feet per growing season. Plots are being mowed at least three times per week at a height of 0.5 inch.

15. St. Augustinegrass Cultivar Breeding and Evaluation Program – R T. Nagata

The goal of the St. Augustinegrass breeding and evaluation program is to identify superior lines that can fill the current and future needs of the citizens of Florida and the southeast United States. These lines will be acceptable to both commercial sod producers and end users (homeowners, etc.), while minimally impacting the environment and require fewer resources for growth.

This research plot represents a part of the statewide evaluation program that has the same 100 lines planted in Jay, Gainesville, and Belle Glade. The turfgrass here was established as plugs June 27, 1997. At this time, several lines appear to be promising and will be advanced for further studies. These lines are NUF-23, NUF-32, NUF-56, NUF-80, NUF-94, NUF-129, NUF-148, NUF-155, NUF-164, and NUF 175. All of these lines have uniform appearance, are quick to grow into the plot area, and have very little gray leaf spot disease. Selected lines will be evaluated in larger plots under commercial turf production practices to study end use potential and longevity.

16. National St. Augustinegrass Test - 1996 – A.E. Dudeck

This study is one of seven being conducted throughout the southern United States. Ten St. Augustinegrass selections were plug-planted Aug. 15, in field plots at the IFAS Turfgrass Field Laboratory Gainesville. Plots are being fertilized at a rate of 2.0 pounds nitrogen per 1000 square feet per growing season. Plots are being mowed weekly with a mulching mower set at 2.5 inches. During the 1997 growing season, best turf quality, which averaged 7.7 on a scale of 1 to 9 where 9 = best turf quality, was produced by FHSA-115'. Second best group of grasses that produced acceptable turf quality scores, which averaged 6.1, included Delmar, FHSA 117, Floratam, Raleigh,

and 6-89-70 St. Augustinegrass.

17. National Zoysiagrass Test – 1996 – A.E Dudeck

This study is one of 16 being conducted throughout the southern United States. Sixteen zoysiagrass selections were plug-planted Aug. 19, 1996 along with eight seeded-types, which were planted Aug. 21, 1996 in field plots at the IFAS Turfgrass Field Laboratory, Gainesville. Plots are being fertilized at a rate of 0.5 pound nitrogen per 1000 square feet per growing month. Plots are being mowed weekly with a mulching mower set at a 2.0 inches.

Seeded cultivars of Chinese common, J-36, J-37, Korean common, Z 18, Zen-400, Zen-500, and Zenith produced unacceptable turf quality during the 1997 growing season. This was predominately due to mole cricket activity. Mean turf quality averaged 4.2 on a scale of 1 to g where 9 = best turf quality.

Vegetative zoysiagrasses having best turf quality scores, which averaged 6.6 included El Toro, HT-210, Jamur, Miyako, and Zeon.

18. Tall Fescue Germplasm Evaluation – R. R. Duncan and G. M. Prine

Plots of 10 tall fescue experimental lines from Dr. R.R. Duncan, University of Georgia, and four experimental lines from Dr. G.M. Prine, University of Florida, were seeded Jan. 9, 1998 in field plots located at the IFAS Turfgrass Field Laboratory, Gainesville.

The purpose of this study is to screen for genotypes with heat and drought tolerance. A complete fertilizer totaling 2.0 pounds of nitrogen per 1000 square feet per growing season was applied during the winter growing season. Plots are being mowed weekly with a mulching mower at a height of 2.5 inches. No supplemental irrigation during the summer season was to have been applied, but due to the extended spring/summer drought, supplemental irrigation is being applied.

Herbicide and Nematicide Control Evaluations

19. Season-Long Grassy Weed Control With Various Preemergent Herbicides – G L Miller and J.S. Weinbrecht

Devrinol, a preemergent herbicide recently registered for use in ornamentals and turfgrass, was evaluated for summer annual grassy weed control in a stand of Tifway II standard comparison included Barricade, Dimension, Pendulum, Ronstar, and Surflan.

Plots were seeded with goosegrass and southern crabgrass at 30 seed/sq. ft. At 90 days after initial application, good (80%) goosegrass and southern crabgrass control was evident following all treatments. Despite irrigation efforts to maintain a healthy turf, there was concern regarding questionable germination response through the unusually dry spring. To address this concern, an additional seeding was made July 7 in anticipation of more typical summer rain events, and to further evaluate season long efficacy.

Additional efficacy ratings were available for spotted spurge and globe sedge seedlings which became evident throughout the trial area during May and June. In this trial, good spotted spurge control was evident only with Pendulum. Good globe sedge seedling control was evident with Devrinol, Dimension, Pendulum, and Ronstar. Evaluation will continue through the winter season to monitor annual bluegrass efficacy.

20. Dr. Dunn has nematicide studies at the Turf Laboratory and the Envirogreen. See the Fall 1998 Florida Green.

Envirotron Complex

Rhizotron

21. Relationship Between Deficit Irrigation of Lawn Grasses and Quality Parameters. G.L. Miller and F.S. Zazueta

The purpose of this project is to measure St. Augustine and bahaia turfgrass water consumption under stress in order to determine reduced-irrigation turfgrass water use coefficients. A computer control system was designed and installed to implement the following irrigation strategies: 1) timer based historical data, 2) daily water budgets, 3) sensor controlled, 4) neural network, and 5) visual stress.

Glasshouses

22. Phosphorus retention in USGA greens – E.A. Brown and J.B. Sartain

Determine the influence of sand coatings, soil amendments, and phosphorus source on the retention and leachability of P through a USGA green profile. Parameters include coated vs. uncoated sand; plain sand; Fe-humate, and peat amendments; and different sources of P fertilizer (MKP, 0-20-20, and CSP). Profiles were leached biweekly to evaluate leaching of P and tissue samples were harvested biweekly and evaluated for growth rate and nutrient

Dr. Jerry Sartain explains just one of eleven nutritional and environmental studies he has underway at the G.C Horn Turfgrass Field Lab and at the Envirotron Complex. Photo by Joel Jackson.

uptake. Iron and Al oxide coated sands with Fe-humate amendment retained more P. This study is currently in progress.

23. Lysimeter Study For Evaluation of Turfgrass Response to EDR Reject Water – O'Connor

24. Mini-lysimeters with bermudagrasses for K leaching evaluations – Kuen-Took Chung and J. B. Sartain

25. Cone-tainer production of turf samples for class demonstrations – G. L. Miller and T. Hoffner

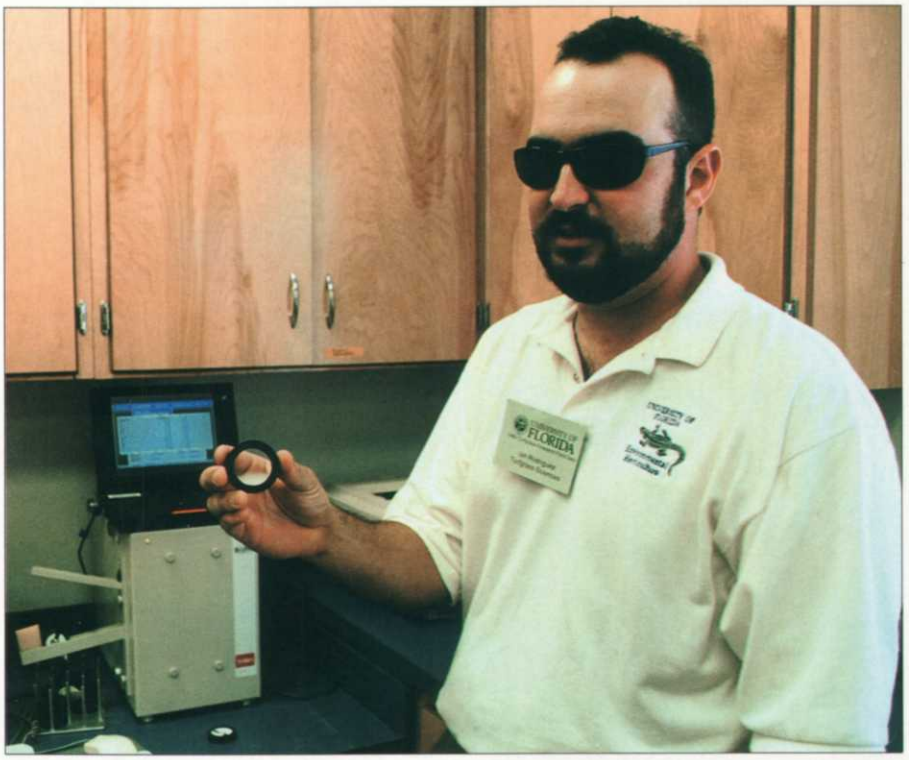
26. The environmental impacts of golf greens establishment and post-construction maintenance – H.D. Gooding and J.B. Sartain

The impact of a choker-layer, soil physical amendments, N-fertilizer source and regime on N leaching during establishment and post-construction maintenance of a sand putting green were evaluated in two glasshouse studies. Preliminary results suggest that a choker-layer did not influence N leaching loss. Fertilizer source and physical amendments significantly affect leaching. Minimum N leached during post-construction maintenance period with all treatments.

Envirogreen and Glasshouses

27. St. Augustinegrass tissue N evaluation using a electronic chlorophyll meter. – G.L. Miller and I.R. Rodriguez

Evaluate the utility of a hand-held chlorophyll meter (SPAD 502) to assess the nitrogen status of St. Augustinegrass. Utilize this new technology to compare leaf chlorophyll measurements, tissue nitrogen and tissue iron as to their usefulness for predicting turf quality of St. Augustinegrass. Due to the cost and inconvenience of testing, most N fertilizer application recommendations are still based on fertilizer application schedules without measuring for plant deficiencies. A quick reliable method to diagnose turfgrass N status would be a valuable tool for golf course superintendents, consultants, and researchers.



Graduate student Ian Rodriguez explains how fast tissue-sample analysis is with Near Infrared Reflectance Spectroscopy (NIRS). The turnaround time is measured in hours instead of days. Photo by Joel Jackson.

28. Soil and Turfgrass Analysis Correlation – J. R. Higby and J. B. Sartain

By applying N, P and K at incremental rates, a range of plant available nutrients was established in the plant tissue and the underlying soil of two bermudagrass cultivars. This matrix allows for a statistical correlation to be performed by quantifying these parameters along with the results from frequent visual quality ratings.

Additionally, a mirrored, mass-balance lysimeter study is being conducted concurrently to determine any adverse environmental effects resulting from these differing application rates. This study will also provide an opportunity to evaluate new, site-specific, rapid analysis techniques over a wide range of nutritional values.

29. Nitrogen scheduling on USGA golf greens using NIRS technology – G.L. Miller and I. R. Rodriguez

Inconvenience and slow turn-around time restrict the usefulness of traditional wet chemistry tissue analysis for diagnosing N status in turfgrasses. Evaluate the utility of near infrared reflectance spectroscopy (NIRS) in developing fertility programs for bermudagrasses grown on a USGA green. NIRS results correlated positively with Kjeldal N analysis (standard wet-chemistry analysis). This study shows that using NIRS for N fertility scheduling can result in high quality turfgrass with reduced N fertilizer used compared to other scheduling techniques.

Additional studies under way:

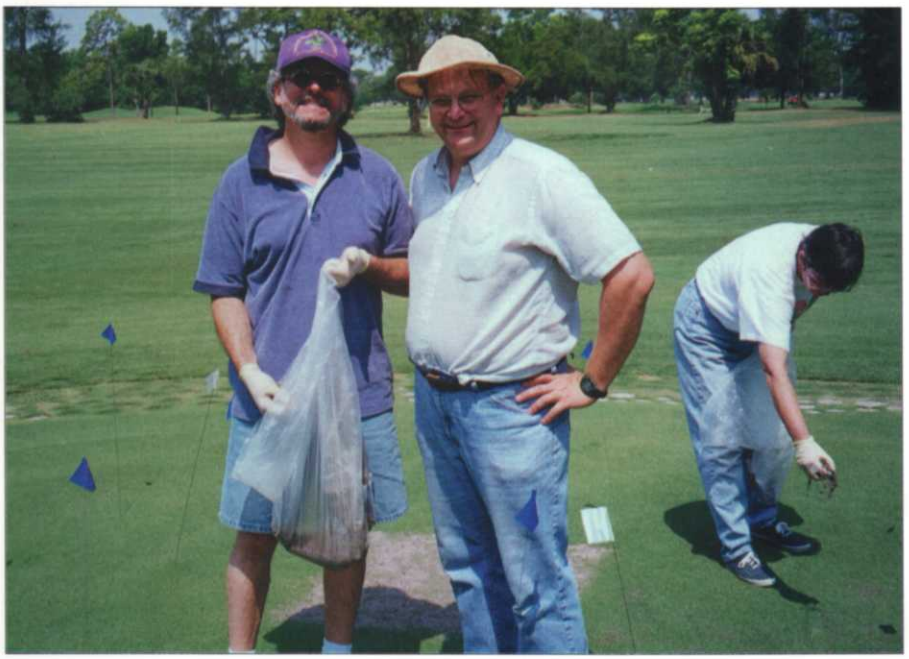
30. Soil Stabilization Using Subsurface Stabilization Mats For Sand-Based and Native Soil Athletic Fields – G.L. Miller And J.S. Weinbrecht

A soccer field containing four Enkamat products was built in one of Gainesville's city parks using the native soil. The field was sprigged to Tifway bermudagrass and is currently being grown in for further evaluations. Evaluation parameters include surface hardness and turf wear. To gain a better understanding of Enkamat's surface stabilization qualities on a sand-based system, a greenhouse evaluation is currently being conducted. These evaluations will be

compared to a control (no Enkamat) for a total of five treatments.

31. Evaluation Of Soccer Field Surface Hardness And Ball Roll Characteristics For Development Of Performance Standards – G.L. Miller

The two UF varsity soccer fields are being intensively evaluated for surface hardness using the Clegg Impact hammer and ball roll characteristics using the Soccer Field Gauge. In this study, the UF soccer fields are sectioned off in grid fashion (80 grid quadrants) so that we can return to the same area for continued monitoring of the field surface hardness. Based on these evaluations, a set of performance criteria is being developed.



From left, Dr. Lawrence Datnoff and Dr. John Cisar lay out compost topdressing experiment on the nursery green at Palm Beach National G.C. Unidentified UF research assistant in the background applies compost mix. Photo by Mark Jarrell, CGCS.

Dr. Al Dudeck brought a whole array of fairway bermudagrass selections down from the test plots in Gainesville to be grown out under south Florida conditions. Photo by Mark Jarrell, CGCS.

32. Dislodgeability Of Turfgrass-Applied Pesticides And Implications For Human Exposure – R.H. Snyder And J.B. Sartain.

Chlorpyriphos, fenamiphos, isafos, 2, 4-D and dicamba were applied to bermudagrass (Cynodon dactylon L. x C. transvaalensis) at their labeled rates. Dislodgeability of these pesticides onto cotton fabric, leather, golf balls, golf club grips, club face and cheesecloth were examined over time. These data were used to develop a comprehensive risk assessment.

33. Impact of amendments on the mobility of nutrients and water retention of USGA greens – J. A. Comer and J.B. Sartain

Comparison of nutrient and water retention capabilities of several different amendments in lysimeters simulating USGA constructed greens with a bermudagrass crop. The amendments studied were organic matter, potassium polyacryla-mides, polyacrylamides, iron humate and zeolites. Amended soils had a higher tendency to retain nutrients and lower water usage in a USGA green than unamended soils.

IFAS Researchers Conduct Studies at Palm B. National

There comes a time when research studies need to leave the artificial world of the university test plot and be subjected to real world conditions. Two such studies are under way at superintendent Mark Jarrell's Palm Beach National Golf Club in Lake Worth.

IFAS Turf Coordinator Dr. John Cisar is teaming with plant pathologist Dr. Lawrence Datnoff to evaluate the effects of topdressing golf greens with a compost material, and plant breeder Dr. Al Dudeck has planted 40 fairway bermudagrass selections for evaluation under normal maintenance conditions. Stay tuned for developments and hopefully more news on other on-site projects.