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THE INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES MAGAZINE | VOL. 23 NO. 1 | SPRING 2007

FIRE ANTS meet their MATCH

UF | UNIVERSITY of FLORIDA

perspective

BIOLOGICAL INVADERS

Many of the qualities that make Florida the world's No. 1 tourist destination also make the state ideal for some unwelcome visitors. Our warm climate, thriving tourist industry and global trade ports make Florida increasingly susceptible to invasive plants, animals, pests and diseases. In fact, Florida is probably more susceptible than any other state in the nation.

Hundreds of invasive species—ranging from Africanized bees, fire ants and Formosan termites to diseases such as citrus canker and greening—threaten Florida's economy, agriculture and environment. In many cases, these biological invaders also threaten the health and welfare of people.

The invasive species puzzle is big and complicated. For example, almost 2 million acres of Florida's natural areas have become infested with nonnative plants. Aggressive weeds cover pastures and tree canopies while hydrilla clogs waterways and destroys native biodiversity. Florida has more nonnative fish than any other state, and the intentional or accidental release of iguanas, pythons and other exotic creatures affects native species and alters the natural environment. Mosquito-borne diseases such as West Nile and Eastern Equine Encephalitis viruses threaten human and animal health. Lurking offshore in Africa and the Caribbean are diseases such as tick-borne heartwater that would devastate the state's cattle and livestock industries.

Two bacterial diseases—citrus canker and citrus greening—are major threats to Florida's $9.3 billion citrus industry, and the pathogens that cause these diseases also have worldwide implications. Scientists with UF's Institute of Food and Agricultural Sciences (IFAS) are working with the U.S. Department of Agriculture (USDA), the Florida Department of Agriculture and Consumer Services and other citrus-producing countries to develop technologies to manage these diseases, and we are making progress in developing disease-resistant citrus varieties.

IFAS is also performing a critical role in the battle against soybean rust, a destructive fungus that threatens the nation's soybean industry. Florida's warm winters provide an ideal environment for the rust to survive on various weeds before the fungus moves north into major soybean production areas. Therefore, Florida is an important sentinel state for predicting outbreaks elsewhere in the country, and IFAS scientists are partnering with scientists in major soybean-producing states to monitor movement of the disease.

In another example of how invasive species can disrupt the natural environment, the melaleuca tree has infested more than a million acres in South Florida, replacing native vegetation, destroying wildlife habitat, affecting water flow and creating fire hazards. IFAS research and extension scientists have partnered with state and federal agencies and private landowners to develop and demonstrate effective biological controls for the tree. The TAME Melaleuca project—short for The Areawide Management and Evaluation of melaleuca—is helping control this invasive tree that was introduced from Australia about 100 years ago.

When it comes to insect pests, more than a thousand have invaded the state, and one of the most troublesome is the red imported fire ant, which is the subject of the cover story in this issue of IMPACT.

These stinging ants came from South America to the United States in the 1930s and have spread rapidly because their natural enemies were left behind. Until recently, insecticides and baits were the only way to manage the ant, but the pest is now being controlled more effectively thanks to a successful biological control research and demonstration project developed by USDA in cooperation with the Florida agriculture department's Division of Plant Industry and IFAS. The project is a prime example of how IFAS is working with other state and federal agencies to manage an onslaught of invasive pests and emerging pathogens.

In addition to these efforts, IFAS faculty and staff are working on other interdisciplinary research and education programs to stop or manage invasive species. Many graduate and undergraduate courses offered by IFAS faculty address issues related to biological invaders; information on these issues is also available on the UF Extension Service Web site: SolutionsForYourLife.com

IFAS is one of three main components in UF's new Emerging Pathogens Institute, which received funding from the 2006 Florida Legislature. By fusing key disciplines, the Emerging Pathogens Institute will develop research and educational outreach capabilities to predict and control invasive diseases, and preserve the health and economy of the state.

As always, we hope you find interesting and useful information in this issue of IMPACT. We welcome your comments and suggestions for improving the magazine.

JIMMY G. CHEEK
Senior Vice President for Agriculture and Natural Resources at the University of Florida

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IFAS

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NEWS UPDATES

FEATURES

On the Cover

Accidentally introduced from South America in the 1930s, the red imported fire ant (*Solenopsis invicta*) has spread across the southern United States, infesting more than 320 million acres. New biological control measures are helping reduce populations of these small and aggressive, stinging ants. FOR MORE INFORMATION, PLEASE SEE PAGE 14. **PHOTO BY DAVID ALMQUIST**

Organic Farming Opportunities

As organic food goes mass market and revenues climb by almost 20 percent each year, the demand for trained professionals is also growing, prompting UF's College of Agricultural and Life Sciences to launch a new academic program that will help meet the needs of producers and consumers.

The fall 2006 semester marked the official launch of a science-based organic agriculture undergraduate program at UF, making it one of the first three U.S. institutions to offer this major. Colorado State University and Washington State University started similar programs last fall.

UF has offered a minor in organic agriculture for the past year. Both the major and minor programs are administered by the horticultural sciences department, part of UF's Institute of Food and Agricultural Sciences.

Florida has a growing organic food industry, but producers must look beyond the state to find highly trained personnel to manage their operations, said Dan Cantliffe, chairman of the horticultural sciences department.

"This (program) is something that's been long overdue, especially for UF and the United States," Cantliffe said. "There's a big industry, a big demand and a lack of people who are qualified to do the work employers need."

Organic agriculture is an approach to food production that involves little or no use of synthetic chemical fertilizer and pesticide. The U.S. Department of Agriculture has established strict guidelines for certifying organic farmers.

In 2005, organic foods accounted for $13.8 billion in U.S. consumer sales, about 2.5 percent of total U.S. food sales, according to a manufacturers' survey commissioned by the Organic Trade Association, a leading industry organization. Since 1998, revenues from U.S. consumer sales of organic foods have risen by an average of more than 18 percent per year.

And it's not just consumers who are interested in organic food, Cantliffe said. The UF major and minor programs were developed partly in response to ongoing student demand.

"Another big factor was that we have faculty and facilities that are suitable for teaching this material," he said. "As the demand and the curriculum develop, we may expand the program."

Five students have enrolled in the undergraduate program, and many others have expressed interest, said Melissa Webb, academic support services coordinator for the horticultural sciences department.

"We think a lot more (students) will come out of the woodwork," Webb said. "There's no set cap on enrollment, so the more, the merrier."

About one dozen students are enrolled in the minor program, she said.

The undergraduate program will focus on training students to manage an organic farming unit, said Mickie Swisher, director of UF's Center for Organic Agriculture.

"This gives you the skills and technical knowledge where if you needed to put 2,000 acres of organic crops into production, you could do it," said

Rachel Ben-Avraham, left, a student in UF's College of Agricultural and Life Sciences, examines an organically grown bell pepper with Dan Cantliffe. Ben-Avraham, a Tampa resident, is enrolled in UF's new organic agriculture undergraduate program. **PHOTO BY THOMAS WRIGHT**

Swisher, a UF associate professor of family, youth and community sciences.

The program requires 120 credit hours, most of them in science courses including chemistry, botany, genetics, entomology and soil science, capped off by several production agriculture classes.

One required class, Principles of Organic and Sustainable Production, was devised specifically for the program; another, Alternative Cropping Systems, was modified to put greater emphasis on organic agriculture.

The minor program requires the sustainable production and alternative cropping classes, plus at least three credits of electives on each of three subjects—crop production, pest management and resource management.

Swisher helped organize a committee that developed the minor program over a six-month period in 2004. Launched in fall 2005, the minor is considered interdisciplinary and is also headquartered in the horticultural sciences department. ■ – TOM NORDLIE

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BUILDING A BETTER PEANUT

Peanut allergies are the most common and often the most severe of all food allergies, but now researchers from UF's Institute of Food and Agricultural Sciences have taken an important first step toward creating a nonallergenic peanut.

They have found that one of the allergenic proteins in peanuts is sometimes produced with a portion missing—resulting in a form that apparently doesn't trigger a bad reaction by human immune systems.

"If we can breed or create a peanut where all the allergenic proteins are in forms that are as benign as this one, that would be a big step for making life much easier for the millions of people who are sensitive—sometimes deathly so—to a substance that the rest of us like to eat so much that it's virtually everywhere," said Maria Gallo, a plant molecular biologist who conducted the research with her graduate student, Il-Ho Kang. Their work has been published online by the journal *Plant Science* and will appear in an upcoming print issue of the publication.

Peanuts are known for being loaded with protein, but over the years scientists have reported about 20 types of protein molecules that seem to trigger an overblown immune response in those with peanut sensitivities. The three that cause the most problems are dubbed Ara h 1, Ara h 2 and Ara h 3.

The latter, however, sometimes shows up in a form that's slightly different than that found in most peanuts. This altered protein has been named Ara h 3-im. The UF

Maria Gallo, left, examines a test tube-grown peanut seedling held by postdoctoral research associate Victoria James. Gallo is investigating a naturally occurring variation in a peanut protein that may be a first step toward an allergy-free peanut. **PHOTO BY SALLY LANIGAN**

researchers extracted peanut proteins and exposed them to blood drawn from two people who are allergic to peanuts and one who isn't.

The normal form of the protein triggered a severe reaction in the samples from the allergenic patients, but Ara h 3-im produced no reaction—showing that the patients' immune defenses didn't recognize this altered protein.

As promising as this sounds, the future of an allergen-free peanut is far from certain.

"This seems great, but we need to go through and try this out with samples from a lot more than just three people to see that this lack of response is true for everyone," Gallo said. "Some might just have less of a response, and—who knows?—there is a possibility that sometimes this might just get the same response as the normal allergen."

The next step would be trying to find or create other stand-ins for the usual suspects of peanut allergens. If that were accomplished, then they would all have to be put together to produce a peanut plant that would replace those used by peanut farmers today.

"Don't look for this to be something that you'll see in the next 20 years or so," said Peggy Ozias-Akins, a peanut genome researcher at the University of Georgia. "There's a lot of genetics groundwork that we still have to lay before we even know if something like this can be done.

"However, it opens up an opportunity. And, more importantly, it tells us a lot about food allergies," she said. And that knowledge is not limited to peanuts. "Similar structures could be found in soybeans—which would be the most likely plant—but also in tree nuts and a lot of other foods."

In the end, building a better peanut might not need to be the ultimate goal. Understanding why the human immune system doesn't overreact to this particular form of protein could play a vital role in other efforts to protect those with peanut sensitivities, such as efforts to create a peanut allergy vaccine.

"There are many dedicated scientists out there working on this, and technology is making our jobs easier," Gallo said. "We'll figure out how to produce an even healthier peanut." ■

– STU HUTSON

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A+ Peanut Production

Three new peanut varieties have been released by UF's Institute of Food and Agricultural Sciences, and researchers hope they will give the market-dominant Georgia Green peanut some hearty competition.

The new peanuts, including two named for former university administrators, were introduced in August 2006 at UF's annual Peanut Field Day in Marianna. Created through traditional breeding, the new varieties have been in the works about a decade, said Dan Gorbet, a professor of agronomy at UF's North Florida Research and Education Center in Marianna.

The York variety, named for former State University System Chancellor E.T. York, has strong resistance to tomato spotted wilt virus—the No. 1 peanut disease facing growers in the Southeast during the past 10 years. The peanut is also high in healthy oils and has a long shelf life. The McCloud variety, named for the late UF agronomy department chairman Darrell McCloud, shares similar traits.

The third new variety, Florida-07, also has strong resistance to the disease, is high in healthy oils and has a long shelf life, said Gorbet, who has been breeding new peanut varieties since 1970.

"It's the first peanut ever produced by Florida that made 7,000 pounds an acre in tests in both Marianna and Gainesville," he said. "We've never had the same peanut make 7,000 pounds an acre—we've had it happen here and there, but never twice in (the) same season at two sites."

UF breeders released high oleic acid peanuts—the healthy kind that help lower cholesterol—in 1995 and 1997, Gorbet said. But those varieties couldn't stand up to tomato spotted wilt virus like the new ones.

"We're just now getting plant material out that has good resistance to that virus," he said. "Compared with the many peanut varieties UF has issued over the years, these stack up really well—they should give the market-dominant Georgia Green peanut a run for its money because the new ones are higher in heart-healthy oils with better pod/seed yields."

The Florunner, introduced in 1969 by Al Norden, a UF professor of agronomy, dominated the market for two decades before it became susceptible to tomato spotted wilt virus, Gorbet said.

The peanut breeders named the two varieties for the former UF administrators because of their work to advance agriculture, he said, and because they both had focused on improving peanut production.

York, chancellor emeritus of Florida's public university system, was UF's provost for agriculture, vice president for agricultural affairs, executive vice president and interim president.

In 1964, he organized UF's Institute of Food and Agricultural Sciences, bringing the College of Agricultural and Life Sciences, the Florida Agricultural Experiment Station and Florida Cooperative Extension Service under one umbrella.

He's been an adviser to six U.S. presidents and traveled the globe to lend agricultural assistance in Latin America, Asia and Africa.

But lesser known is that York began his career as a North Carolina State University agronomist, and his first assignment: figuring out how to boost what were then stagnant peanut-crop yields.

He did so, and eventually penned a chapter for the textbook *The Peanut: The Unpredictable Legume*. And while the title seemed apt at the time, after exhaustive research on peanut production, he realized that farmers who followed a complete package of recommended techniques enjoyed much higher crop yields than those who didn't.

York said having a peanut named for him is "quite an honor," though he said it's sure to earn him some ribbing.

"I'll be kidded a lot about it, but that's all right," he said, before grinning and making a joke of his own. "It makes sense, since I've been working for peanuts for all these years." ■

– MICKIE ANDERSON

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(Opposite) Dan Gorbet, who has been breeding new peanut varieties at UF's North Florida Research and Education Center in Marianna since 1970, holds the new Florida-07 peanut, which has strong resistance to tomato spotted wilt virus, is high in healthy oils and has a long shelf life. PHOTO BY JOSH WICKHAM

Exceptional AG EXPOS!

More than 800 people attended the first-ever Florida Ag Expo at UF's Gulf Coast Research and Education Center in December 2006, and UF now has a permanent exhibit building at the Sunbelt Ag Expo in Georgia—billed as the world's largest farm show.

"At the first-ever Florida Ag Expo, the turnout far exceeded our expectations, and we received many positive comments from growers and vendors who participated in the vegetable production seminar, field demonstration and trade show event," said Jack Rechcigl, director of UF's Gulf Coast Research and Education Center in Balm. "Based upon this response, we plan to host the event annually."

The Dec. 8-9 exposition was presented under the aegis of UF's Institute of Food and Agricultural Sciences in cooperation with the Florida Fruit and Vegetable Association (FFVA), the Florida Tomato Committee, the Florida Strawberry Growers Association and *Florida Grower* magazine.

Rechcigl, who coordinated the event, said educational programs at the expo focused on a wide range of issues facing the state's fruit and vegetable industry, including food safety, changing state and federal regulations, and exemptions from the Environmental Protection Agency for the continued use of the effective methyl bromide soil fumigant. Best management practices for vegetable production, irrigation, fertilizer, and pest and disease control were also discussed in seminars.

Craig Chandler, a professor of horticultural sciences at the Gulf Coast center, presented results from field trials of new strawberry varieties, and Jay Scott, a professor of horticultural sciences, showed results from field trials of new tomato varieties.

Rechcigl said one of the highlights of the expo was the demonstration of new, affordable housing for migrant farm workers. "The prototype housing, commissioned by the U.S. Department of Housing and Urban Development, is the result of two years of work by Florida producers and others to develop quality, cost-effective housing that can withstand Category 4 hurricanes," he said.

He said the idea for the expo came from FFVA Chairman Jay Taylor and former FFVA Chairman Tony DiMare, who both serve on the UF center's advisory committee. "After discussing the idea with Jimmy Cheek, UF's senior vice president for agriculture and natural resources, we decided it would be a useful event to have at the center—something that would be different from a traditional field day, incorporating a variety of educational programs as well as field demonstrations and vendor booths."

The 2007 Florida Ag Expo will be held December 6-7 at the Gulf Coast center.

One of the highlights of the Florida Ag Expo was the demonstration of affordable housing for migrant farm workers. Among those who inspected the housing were, from left, Jack Rechcigl; Charles Bronson, commissioner of the Florida Department of Agriculture and Consumer Services; Inez Banks-DuBose, director of the U.S. Department of Housing and Urban Development; Jimmy Cheek and Jay Taylor. **PHOTO BY IAN MAGUIRE**

Sunbelt Ag Expo

The annual Sunbelt Agricultural Exposition in Moultrie, Ga. now includes a new exhibit building for the UF's Institute of Food and Agricultural Sciences. Featuring more than 20 displays highlighting research and education programs, the building was dedicated during the October 2006 event.

Cheek said the Sunbelt Ag Expo is the premier farm show in the world, and UF will have a permanent presence at the annual event. The three-day show features more than 1,200 exhibits and attracts more than 200,000 visitors.

"The Sunbelt Ag Expo emphasizes information, education and implementation of the latest agricultural technology, research and equipment—providing an important venue for showcasing our teaching, research and extension programs," Cheek said.

Wayne Smith, Pete Vergot, Liz Felter, Charlotte Emerson and a team of other UF faculty and staff coordinated the installation of the IFAS displays at the facility in Moultrie. Smith is a professor and director emeritus of the School of Forest Resources and Conservation in Gainesville; Vergot is an extension district director at the North Florida Research and Education Center in Quincy; Felter is an extension agent with statewide marketing responsibilities at Mid-Florida Research and Education Center in Apopka; and Emerson is director of recruitment and alumni services for the College of Agricultural and Life Sciences (CALS) in Gainesville.

Smith, who leads the team, said the Sunbelt Ag Expo displays—which focus on managing and protecting water resources—include information on programs to improve water quality in the 505,000-acre Everglades Agricultural Area, implement best management practices (BMPs) in the Suwannee River Basin, maintain forests as healthy watersheds, use reclaimed water from urban areas on agricultural crops, control irrigation systems with soil moisture sensors, grow crops with computer-controlled hydroponic systems and control aquatic weeds.

Other displays provide information on UF's statewide Florida Automated Weather Network (FAWN) and AgClimate, a climate information system for the southeastern United States. Smith said both services are important for today's precision agriculture.

Felter said an important feature of the display is the UF Extension Service's new Web site—SolutionsForYourLife.com—that provides instant access to the vast array of useful information from statewide IFAS teaching, research and extension programs. The consumer-oriented Web site includes information on UF's Master Gardener Program, Florida Yards and Neighborhoods, BMPs for nurseries and turf, small farms and alternative enterprises, 4-H youth development, and the "Family Album Radio" and "Gardening in a Minute" radio programs.

Emerson said the CALS display showcases the college as a national educational leader in the areas of pre-professional training, food, agriculture, natural resources and the life sciences. "The display also shows how the many curricula available to CALS students are taught and advised by a distinguished faculty who are recognized nationally and internationally for their teaching, research and extension expertise," she said. "As a college known for its student-centered focus, CALS prides itself on educating society-ready graduates." ■

– CHUCK WOODS

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UF's new exhibit building at the Sunbelt Ag Expo was opened Oct. 17, 2006 in ceremonies led by Jimmy Cheek, far right. Others participating in the ceremonies were, from left, Dale Bennett, UF Wakulla County extension director; Pete Vergot; Chip Blalock, executive director of the Sunbelt Ag Expo; Charlotte Emerson and Wayne Smith. PHOTO BY JOSH WICKHAM

HELPING THE HUNGRY IN HAITI

In Haiti, where malnutrition is common, the diets of many young children are now healthier thanks to a low-cost source of protein developed by a University of Florida animal scientist.

Sally Williams, an associate professor with UF's Institute of Food and Agricultural Sciences, has created a turkey sausage that's being used in a charity feeding program for infants and toddlers in villages near Jeremie, a city of almost 100,000 in the southwest area of the Caribbean nation.

"Children in Jeremie get very little protein in their diets, and what they get comes mainly from rice and beans and polenta," Williams said. "They don't get a meat source."

Animal protein helps children avoid a malnutrition-linked illness called kwashiorkor and other health problems common in Haiti, she said.

Children under 5 years of age comprise about 15 percent of Jeremie's population; malnutrition affects 30 percent of them.

Every three months, Williams oversees production of about 200 to 300 pounds of the sausage at UF's animal sciences department; the sausage is canned in Jacksonville at the Duval County Extension Canning Center. UF personnel began sending the shipments in July 2005; funding comes from a three-year U.S. Department of Agriculture grant.

When the sausage arrives, it's sliced into 2-ounce portions and used to feed children ages 6 months to 3 years, as part of a feeding program operated by the Haitian Health Foundation, a volunteer organization based in Norwich, Conn.

Comprised of 83 percent mechanically separated turkey and 17 percent soy protein and seasonings, the sausage offers a nutritional profile that includes 15 percent protein and 18.5 percent fat, Williams said. The ingredients are put into casings about 3 inches in diameter and cooked. The finished product is cut into 1.5 pound portions before being packed in water and canned. Sliced, the sausage resembles bologna and has a mild turkey flavor.

Noufoh Djeri, left, a graduate student in UF's animal sciences department, checks the quality of a turkey sausage with Sally Williams. **PHOTO BY JOSH WICKHAM**

This spring, the program will take a giant step forward as production of the sausage moves from Florida to a meat processing facility in West Virginia. The plant, owned by UF Putnam County Extension Director Edsel Redden and his brother, will manufacture and can the sausage free of charge. The goal is to boost output to about 4 tons per month to feed 2,700 children. Redden has been involved in Haitian relief efforts since 1989 and visits the country about six times per year.

UF is pursuing related projects to improve nutrition, agriculture and education in Haiti, said St. Johns County Extension Director David Dinkins, who helps Redden oversee the program. North Carolina State University is also involved in the work.

"The turkey sausage is an immediate measure where we can go in and feed people," said Dinkins, based in St. Augustine. "It's very important, but it's an interim solution. Ideally, we'd like to get Haitian farmers producing more of their own protein foods."

In addition to developing turkey sausage, UF faculty are assisting with an aquaculture project that produces tilapia fish to feed children in Gressier, a community in southern Haiti. With local assistance, Dinkins and Redden have established 16 concrete ponds that yield a total of 1,100 to 1,200 fish per week. Each fish contains 4.5 to 5 ounces of edible product. ■

– TOM NORDLIE

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25 Years and Counting

The University of Florida and The Nature Conservancy recently celebrated 25 years of research and education at the Katharine Ordway Preserve and Carl Swisher Memorial Sanctuary in Putnam County.

The November 4, 2006 event also marked the upcoming gift of the 3,000-acre sanctuary from The Nature Conservancy to the University of Florida Foundation and naming the combined facilities as the Ordway-Swisher Biological Station.

Approximately 100 guests attended the event by invitation of UF President Bernie Machen and Victoria Tschinkel, state director of the conservation organization in Orlando.

Machen said UF research, education and conservation programs at the sanctuary have benefited from a long relationship with The Nature Conservancy, which he described as one of the world's leading conservation organizations working to protect ecologically important lands and water.

He said the Ordway-Swisher Biological Station, which is managed by the wildlife ecology and conservation department in UF's Institute of Food and Agricultural Sciences, is a biological field station established for the study and conservation of unique ecosystems.

"The celebration turns a new page in the relationship between UF and The Nature Conservancy," Machen said. "We are looking forward to a close partnership that pairs environmental conservation with education, research and outreach."

Tschinkel said, "We see this as an enhancement to our partnership that will bolster the Ordway-Swisher Biological Station as a research area and tool for the University of Florida science program. This will also allow us all to manage this beautiful and important place more efficiently and effectively."

John Hayes, chairman of UF's wildlife ecology and conservation department, said the property is a mosaic of wetlands and uplands that includes sandhills, hammocks, upland mixed forests, swamps, marshes and lakes. A variety of fauna inhabit the station, including a number of state and federally listed species.

"The station's research program focuses primarily on supporting research and education activities for UF students and faculty," Hayes said. "The station's education program includes workshops on environmental stewardship and training in conducting prescribed fires. Other universities and colleges, along with state and federal agencies, also utilize the station for research and education."

The Swisher family of Jacksonville bought the land in the 1930s and used the tract for 50 years as a private hunting and fishing preserve. In 1979, the Swisher Foundation approached The Nature Conservancy for assistance in establishing a wildlife sanctuary as a monument to the late tobacco industrialist, Carl Swisher. Two tracts of land, totaling 3,000 acres of wetlands and prairies, were donated to The Nature Conservancy, and the acreage was named the Carl Swisher Memorial Sanctuary.

In early 1980, the Goodhill Foundation awarded a grant to the UF Foundation to purchase 6,100 acres of upland high-pine sandhills from the Swisher Foundation. The acreage was preserved in the name of Katharine Ordway, the 3M Corporation heiress who founded Goodhill. At the same time, The Nature Conservancy agreed to lease the Carl Swisher Memorial Sanctuary to the UF Foundation, and both organizations signed a joint stewardship agreement for the combined properties.

The Goodhill Foundation also established an endowment administered by the UF Foundation for the management and protection of both the Katharine Ordway Preserve and Carl Swisher Memorial Sanctuary. UF was designated as the managing body for both properties. In order to more clearly identify the use and management of the properties, the UF Board of Trustees named them the Ordway-Swisher Biological Station earlier this year. ■

– CHUCK WOODS

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John Hayes takes notes on some of the unique environmental features at the Ordway-Swisher Biological Station near Melrose in Putnam County.
PHOTO BY SALLY LANIGAN

WINGS *for* FLORIDA 4-H

While some people may associate the 4-H Youth Development Program with agriculture and livestock, the program also includes other exciting projects such as communications, leadership, citizenship, and science and technology.

And when it comes to science and technology, one of the most interesting and popular programs is Project Butterfly WINGS—an interactive project that helps young people engage in the scientific method of data collection.

WINGS—short for Winning Investigative Network for Great Science—allows 4-H youth in fourth through eighth grades to design projects to collect information about butterflies in their areas and share it online, said Marilyn Martin, director of Project Butterfly WINGS at the Florida Museum of Natural History on the UF campus. The project integrates 4-H life skills, such as decision making and problem solving, through experiential and cooperative science learning.

"The youth don't need to have previous knowledge about butterflies to participate, they just need to have an interest in them," she said. "The fun and easy activities provide a quick way to transform them from a beginner to an engaged citizen scientist. Citizen science means that the youth participants contribute to the scientific knowledge base during the program."

After they observe the butterflies, the youth enter their data into an interactive WINGS Web site. Scientists and the public will be able to use this information to further scientific knowledge and view trends in butterfly populations.

"Young people come away from this project feeling like they are truly contributing to science," Martin said.

The program's main goals include: involving adolescents in the generation of knowledge about science, particularly scientific insights into butterfly distributions provided by data collected; helping youth participants gain knowledge and life skills in decision making, problem solving and critical thinking; and collecting butterfly data that will be used by research scientists to increase scientific knowledge.

"We have developed a great partnership with the Florida Museum of Natural History to offer the WINGS project to our 4-H'ers," said Marilyn Norman, state 4-H leader and associate dean of UF's statewide Extension Service. "It makes science a fun experience for youth and gives them skills that they will use into adulthood."

Martin said the WINGS project is delivered through leaders to youth in 4-H clubs and groups. "The WINGS program follows a train-the-trainer model," she said. "4-H agents and leaders participate in workshops designed to help guide youth through the experiential science learning, and then they are able to go out and train the youth themselves."

In Miami-Dade County, workshops were conducted recently with 19 participants for the second WINGS project. "All of the participants stated that they increased their scientific inquiry skills by working on this project," Martin said. "Youth even took their interest in WINGS outside of the workshops for 54 butterfly-related fair projects this year, including the creation of a butterfly quilt that was donated to the Florida museum."

WINGS began in the summer of 2004, and it is expanding its pilot testing to other 4-H groups in the state and the southeastern United States. Funded in part by the National Science Foundation, WINGS is being developed collaboratively by UF's Florida Museum of Natural History and the wildlife ecology and conservation department. The Florida 4-H Youth Development program is administered by the Extension Service, which is part of UF's Institute of Food and Agricultural Sciences. ■ – LAURA LOK

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Youth from Alachua County support programs such as the WINGS project and become "citizen scientists" as they monitor butterflies and enter their sighting data on the WINGS Web site: www.flmnh.ufl.edu/education/cise/wings.htm **PHOTO BY JOSH WICKHAM**

DVD DISPELS ORCHID MYTH

Growing orchids just got easier, thanks to a new University of Florida DVD that provides a complete guide to producing "the world's most beautiful flowers."

"Growing Orchids: Easier Than You Think," featuring two orchid experts at UF's Institute of Food and Agricultural Sciences, includes interviews and hands-on demonstrations. The disk also has information on selecting appropriate containers, plant media, fertilizers, watering requirements and other tips. Total running time of the DVD is 54 minutes, with a 21-minute segment on easy-to-grow orchid varieties and a 33-minute guide for growers.

The DVD, which dispels the myth that orchids are difficult to grow, was recorded on location at the American Orchid Society Visitors Center and Botanical Garden in Delray Beach, Fla.

"Once just a hobby for those with the time, money and patience to care for exotic plants, orchids are now the fastest growing segment of the nation's $13 billion floriculture industry, and Florida's warm, humid climate is ideal for these flowering plants," said Tom Sheehan, a professor emeritus in UF's environmental horticulture department and one of the nation's leading orchid experts.

When a few basic cultural requirements are met, growing orchids in the home environment can be a rewarding experience, he said. The species and hybrids of six orchid genera are the most popular because they're easy to grow and produce beautiful flowers: *Phalaenopsis, Dendrobium, Vanda, Cattleya, Oncidium* and *Epidendrum*.

When it comes to habitat, orchids can be terrestrial, epiphytic (those that grow on other plants) or lithophytic (those that grow on rocks). The habitat dictates the type of growing medium to be used, Sheehan said.

Over the past few decades, the popularity of orchids has increased dramatically, thanks to new and improved cultivation and propagation techniques that allow commercial growers to produce large numbers of plants at affordable prices for the consumer, he said.

No longer a luxury item, orchids can be purchased at prices comparable to other potted flowering plants, Sheehan said. With more than 25,000 identified species and 120,000 registered hybrids, they are the largest group of flowering plants.

While orchids are common in the tropics, they also grow wild under different climatic conditions on every continent except Antarctica. In the United States, orchid species are native to every state—including Alaska, where "arctic orchids" have been identified.

"Often described as the most beautiful flowers in the world, orchids have a distinct and undeniable mystique," Sheehan said. "Beauty alone cannot explain our fascination with these flowers. When it comes to variety, complexity and elegance, orchid plants are unlike any other."

Sheehan, who appears on the DVD with Bob Black, another professor emeritus in the UF environmental horticulture department, said orchids—next to poinsettias—are now the leading potted flowering plant produced in Florida, generating more than $23 million in annual farm sales.

UF orchid research dates back to 1957 when Sheehan began studying proper fertilization methods for using bark as an orchid growing medium. He also began using tissue culture to multiply clonal varieties and tested foliar application of fertilizer on orchids. He remains active in national and international organizations and orchid societies.

"Orchid mania" has spawned hundreds of orchid societies across the nation. In South Florida alone, more than 20 societies meet every month, Sheehan said. The American Orchid Society has nearly 20,000 members nationwide, and there are orchid shows throughout the year, including the world famous Miami International Orchid Show sponsored by the South Florida Orchid Society.

The DVD can be purchased for $25.00 (plus tax, shipping and handling) from the IFAS Extension Bookstore at ifasbooks.com. For more information, call (352) 392-1764 or (800) 226-1764.

Sheehan and Black are also the authors of a new book, *Orchids to Know and Grow*, that will be released later this year by the University of Florida Press. ■ – CHUCK WOODS

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Tom Sheehan, left, and Bob Black examine vandaceous orchids in Black's greenhouse near Gainesville. Sheehan and Black are active in the Gainesville Orchid Society and the American Orchid Society. PHOTO BY SALLY LANIGAN

FIRE ANTS MEET THEIR MATCH

by Chuck Woods

With damage and control costs exceeding $6 billion a year, the red imported fire ant is one of the most troublesome pests in the southern United States. The aggressive, stinging ants—accidentally introduced from South America to the U.S. in the 1930s—have spread rapidly because their natural enemies were left behind. Until recently, insecticides and baits were the only way to manage the ant, but the pest is now being controlled more effectively thanks to a successful biological control research and demonstration project developed by the U.S. Department of Agriculture's Agricultural Research Service in cooperation with the Florida Department of Agriculture and Consumer Services and UF's Institute of Food and Agricultural Sciences. The project, which received a top USDA national award in March 2007, is a prime example of how UF is working with other state and federal agencies to manage an onslaught of invasive pests and emerging pathogens.

It's not science fiction or a scene from a horror movie. In this real-life drama, millions of tiny flies that decapitate their enemy are being released by Florida researchers to help stop an invasion of fire ants across the southern United States.

The decapitating flies—along with pathogens that infect fire ants—are some of the biological control tools being used to help win the fight against a costly pest that now infests more than 320 million acres in 12 southeastern states and Puerto Rico.

The red imported fire ant (*Solenopsis invicta*), which has spread to New Mexico and California, is also invading Australia, China and New Zealand. Florida's balmy climate, like that of other southern states, is ideal for the South American invader that entered the port of Mobile, Ala., more than 70 years ago.

"In South America, the fire ant population is only about 20 percent of what it is in the U.S. because their natural enemies are not here," said Phil Koehler, a professor of entomology with UF's Institute of Food and Agricultural Sciences. "Over the past 30 years, fire ants have become very troublesome because of their large

(Opposite) Robert Vander Meer, left, and Phil Koehler examine activity in a fire ant colony in Gainesville. Vander Meer said the fire ant research and demonstration project is an excellent example of cooperation and technology transfer between the USDA and the State of Florida that benefits all 12 fire ant-infested states. **PHOTO BY SALLY LANIGAN**

(Right) When disturbed, fire ants viciously defend their nests, crawling on intruders and repeatedly stinging them. A white pustule forms on the site of the sting, which usually heals in about two weeks. The sting can be fatal for people allergic to fire ant venom. **USDA PHOTO**

(Left) A decapitating phorid fly—less than one-sixteenth of an inch in size (about 1 millimeter)—hovers above a fire ant before diving in and injecting an egg into the ant. (Middle) After several weeks, the fire ant is decapitated by the developing fly larva, which then consumes all tissue inside the fire ant head. (Right) The decapitating phorid fly uses the fire ant's head as a pupal case, and then a new fly emerges several weeks later. **PHOTOS BY SANFORD PORTER**

numbers and painful sting—about 40 percent of the people in heavily infested areas get stung every year."

When disturbed, fire ants viciously defend their nests, crawling on intruders and repeatedly stinging them, he said. A white pustule forms on the site of the sting, which usually heals in about two weeks. But the sting can be fatal for people allergic to fire ant venom.

Koehler, who leads the extension education program in Florida and other cooperating states for the multiagency fire ant suppression team, said the invasive pest harms the natural environment—reducing the number of native ants and other insects, killing ground-nesting wildlife such as the northern bobwhite quail and newly hatched sea turtles. The ants kill livestock and feed on crops such as citrus, peanuts and strawberries. Heavy infestations also damage electrical equipment.

Until recently, insecticides and baits have been the primary methods of controlling fire ants, but these materials must be applied several times a year, which can be expensive when large areas are being treated, he said. Insecticides are not effective unless the chemical reaches the queen, which may be deep inside the fire ant nest. Baits are more effective because worker ants feed the bait to the queen and brood, thereby controlling the colony.

"Treating all infested land with insecticides or baits in the 12-state area would cost about $10 per acre, or about $6 to $12 billion a year," Koehler said. "Because of the expense and perceived hazard of using insecticides or baits, most landowners do nothing, underscoring the need for sustainable, biological controls that have been developed in this integrated fire ant management demonstration program."

Robert Vander Meer, leader for the USDA Agricultural Research Service's (ARS) Imported Fire Ant and Household Insects Research Unit in Gainesville, said the project was initiated about six years ago by the ARS to develop and demonstrate the use of sustainable biological controls that complement existing insecticide and bait treatments.

"The overall goal of the demonstration project is to maintain greater than 80 percent reduction of fire ants over several years using an integrated management approach with biological control agents and toxic baits," Vander Meer said. "The effort is the result of a temporary ARS-funded program—Area-Wide Suppression of Fire Ant Populations in Pastures—that has been under way for about six years and will end in 2008."

He said the long-term goals of the ARS are to develop biologically based methods of fire ant control, including self-sustaining fire ant biological control agents to at least partially restore the ecological balance observed in the fire ant's homeland in South America. This could ultimately reduce damage and control costs by billions of dollars a year.

In tests in Florida and other participating states, 300-acre plots were treated with insecticides that reduced fire ant populations up to 90 percent. However, within a few months, fire ants reinvaded the sites from surrounding areas.

"In Florida, fire ant reduction has averaged 88 percent where the integrated pest management approach was used compared to only 71 percent where fire ants were controlled only by chemical pesticides," Vander Meer said.

The area-wide project, headquartered at the ARS Center for Medical, Agricultural and Veterinary Entomology (CMAVE) in Gainesville,

includes entomologists at UF and the Florida Department of Agriculture and Consumer Services in Gainesville. In addition to scientists in Gainesville, the $6 million project includes state and federal researchers in Mississippi, Oklahoma, South Carolina and Texas.

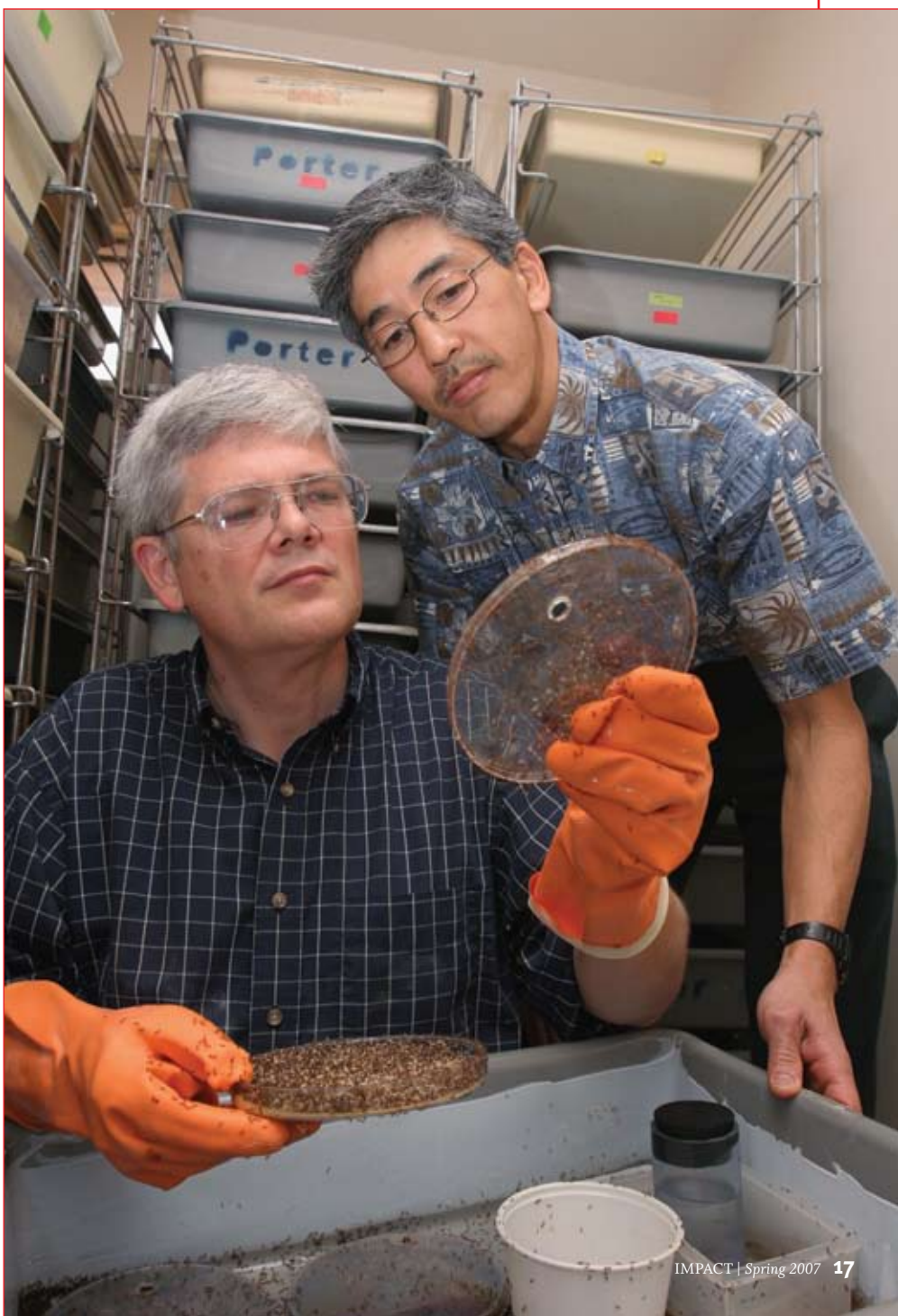
Vander Meer, who also is a courtesy assistant professor in UF's entomology and nematology department, said the natural predators and pathogens being released in Florida and other states were found in Brazil and Argentina where they help control fire ant populations. Before the biocontrols are released in the U.S., they are carefully tested in quarantined facilities operated by CMAVE in Gainesville to make sure they will not harm native plants and animals. In other words, he said, they must be specific for fire ants.

Sanford Porter, an ARS entomologist, began his efforts to find natural enemies of fire ants in 1991 when he visited Argentina and Brazil. Since then, he has returned with four different species of phorid flies that attack and decapitate fire ants, and each species attacks a specific size fire ant and is active only during certain times of the day. Three different phorid flies have been released in Florida and other sites throughout the southern U.S., and they are spreading at the rate of 10 to 30 miles per year. A fourth fly is expected to be released in 2007. He estimates there are about 20 different types of phorid flies that attack fire ants.

"When the female phorid flies are released near fire ant mounds, they quickly attack—or dive bomb—the ants and lay eggs inside them," Porter said. "The egg hatches into a tiny maggot that burrows into the ant's head and grows there for several weeks. Then the maggot causes the fire ant's head to fall off, killing the ant and using the ant's head for a protective case in which to complete development. Two weeks later, the adult fly squeezes out of the ant's mouth. Each newly emerged female fly can attack and kill several hundred more fire ants."

He said the decapitating flies also weaken the fire ant colonies because workers stop looking for food outside the nest and hide in the mound to avoid being attacked by the flies.

Porter, who also is a courtesy assistant professor in UF's entomology and nematology department, said species of the phorid flies have become established on more than 60 million acres in Florida and in the nine other southern states. In North Florida, the



Sanford Porter, left, and David Oi examine fire ants in a laboratory colony. **PHOTO BY SALLY LANIGAN**

two flies are established on more than 15 million acres.

One fly species (*Pseudacteon tricuspis*), released in 1997 and 1998, attacks medium-size and large-size fire ants from late morning to late afternoon. Another species (*P. curvatus*), released in 2003, attacks small fire ants during the middle of the day. A third species (*P. litoralis*), released over the past four years, attacks large fire ants, mainly during the early morning and early evening. A fourth fly species (*P. obtusus*), scheduled for release this year, attacks medium- to large-size fire ants during the day.

Once the decapitating flies are approved for release by the USDA, the job of rearing millions of flies for release in Florida and other states is being coordinated by George Schneider, a biological administrator at the Florida Department of Agriculture and Consumer Services Division of Plant Industry in Gainesville. He said the fly-rearing program is funded through a cooperative agreement with the USDA's Animal and Plant Health Inspection Service (APHIS) and his state agency. During 2006, more than 2 million *P. tricuspis* and *P. curvatus* phorid flies were reared at the facility.

In addition to the decapitating flies, researchers are relying upon another biological control that weakens the entire fire ant colony. A fire ant disease—caused by a single-celled protozoan parasite (*Thelohania solenopsae*)—infects ant colonies when workers transmit the disease to the queen, probably through food exchange. It reduces the queen's weight, and she produces 90 percent fewer eggs, causing the colony to die within 18 months.

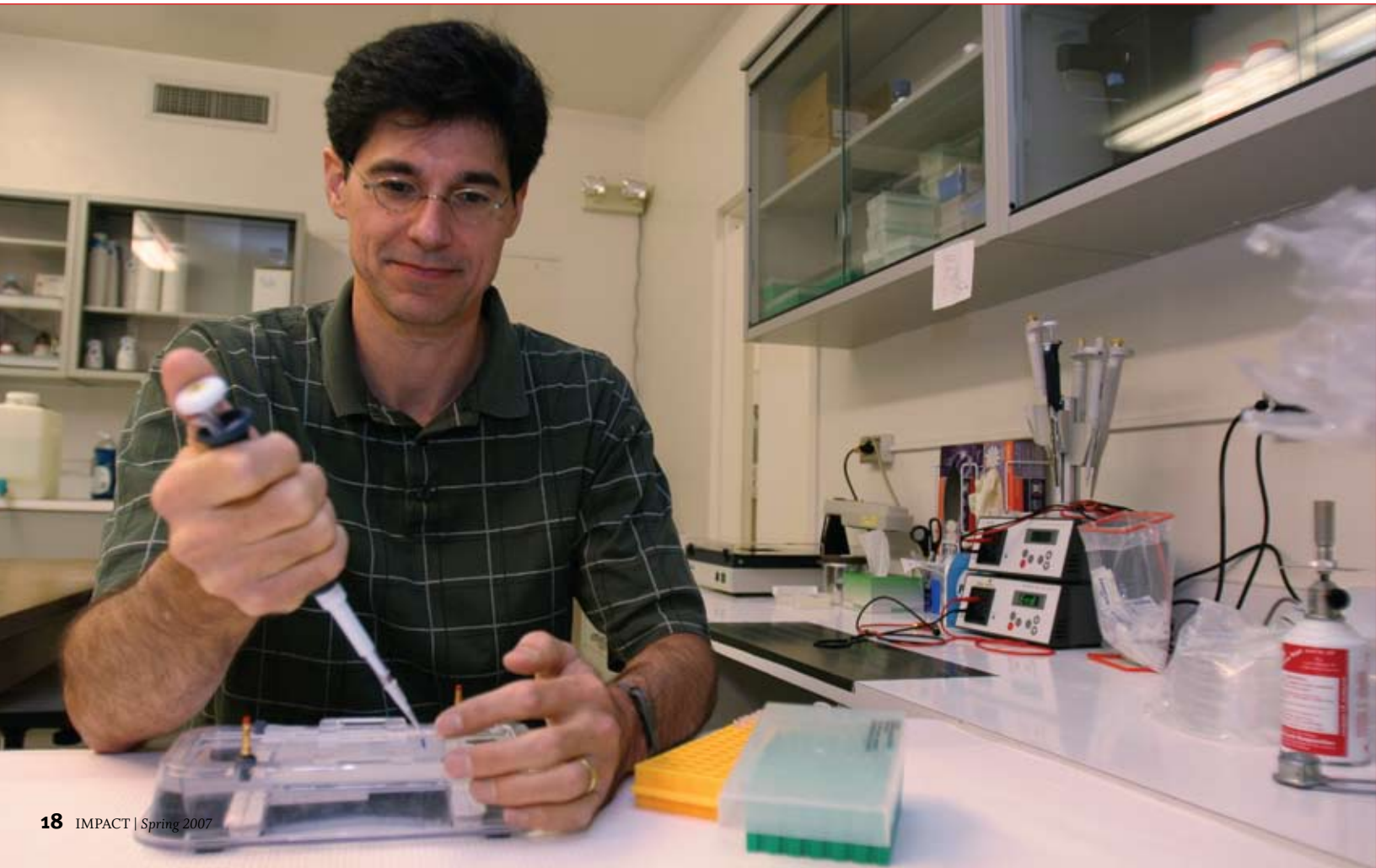
"While this disease is effective, it spreads more slowly than the phorid flies," said David Oi, an ARS entomologist in Gainesville who oversees this phase of the project.

He said some fire ant colonies have only one queen while others have many. A single-queen colony may have 250,000 workers, and a multiple-queen colony can have twice that number.

"It's easier to infect multiple-queen colonies with the disease because they will adopt and raise infected brood from other colonies," Oi said. "On the other hand, they are harder to control because large populations limit the disease's impact."

Oi, a courtesy assistant professor in UF's entomology and nematology department, said the single-queen colonies are more difficult to infect

Steven Valles loads a gel to separate and characterize viral genes. His laboratory has completed sequencing the entire genome of the first virus (*Solenopsis invicta virus-1*) that infects the red imported fire ant. He found the virus by screening more than 2,000 fire ant genes. **PHOTO BY SALLY LANIGAN**



Two worker fire ants tend larvae in a colony. **PHOTO BY SANFORD PORTER**

because they are suspicious of, or fight with neighboring fire ant colonies.

He said the research team is also studying another protozoan pathogen (*Vairimorpha invictae*) from Argentina that is more potent, but it's more difficult to rear in the laboratory.

Viruses can also be an effective biological control agent, said Steven Valles, an ARS entomologist in Gainesville who has discovered the first virus (*Solenopsis invicta virus-1*) that infects the red imported fire ant. He found the virus by screening more than 2,000 fire ant genes.

He said the virus infects all fire ant developmental stages, including eggs, indicating that the infection is passed from parents to offspring. The virus, which appears to be easily transmitted, is already present in fire ant populations in Florida and other areas.

"The average infection rate is about 20 percent, and its presence is seasonal," Valles said. "Infected individuals or colonies do not exhibit any immediate, discernable symptoms in the field. However, under stress caused by moving the colony from the field to laboratory, massive brood death is often observed among infected colonies, often leading to the death of the entire colony."

Valles, a courtesy assistant professor in UF's entomology and nematology department, said these characteristics are consistent with similar insect-infecting viruses. "They often persist as unapparent, asymptomatic infections that, under certain conditions, grow in the host, resulting in observable symptoms and often death," he said. "We are currently studying the factors necessary to induce the lethal phase of the virus in fire ants to better assess its effect on the population and use as a potential biological control method." ■

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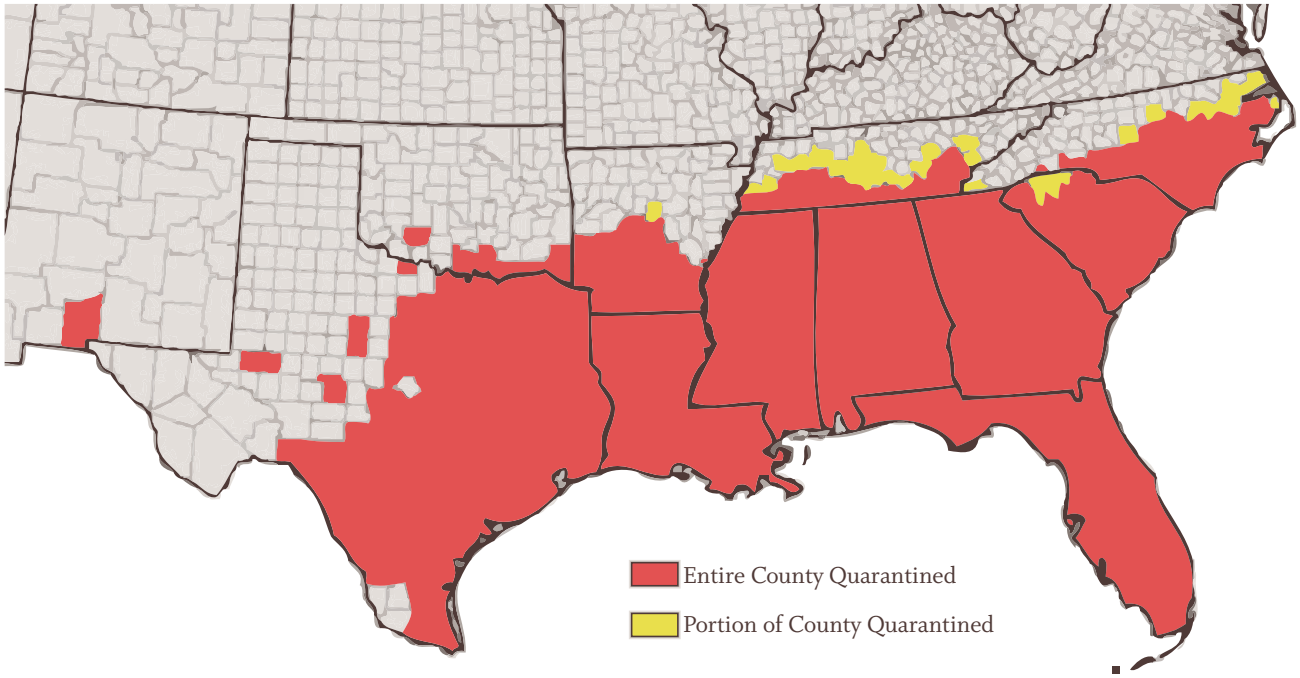
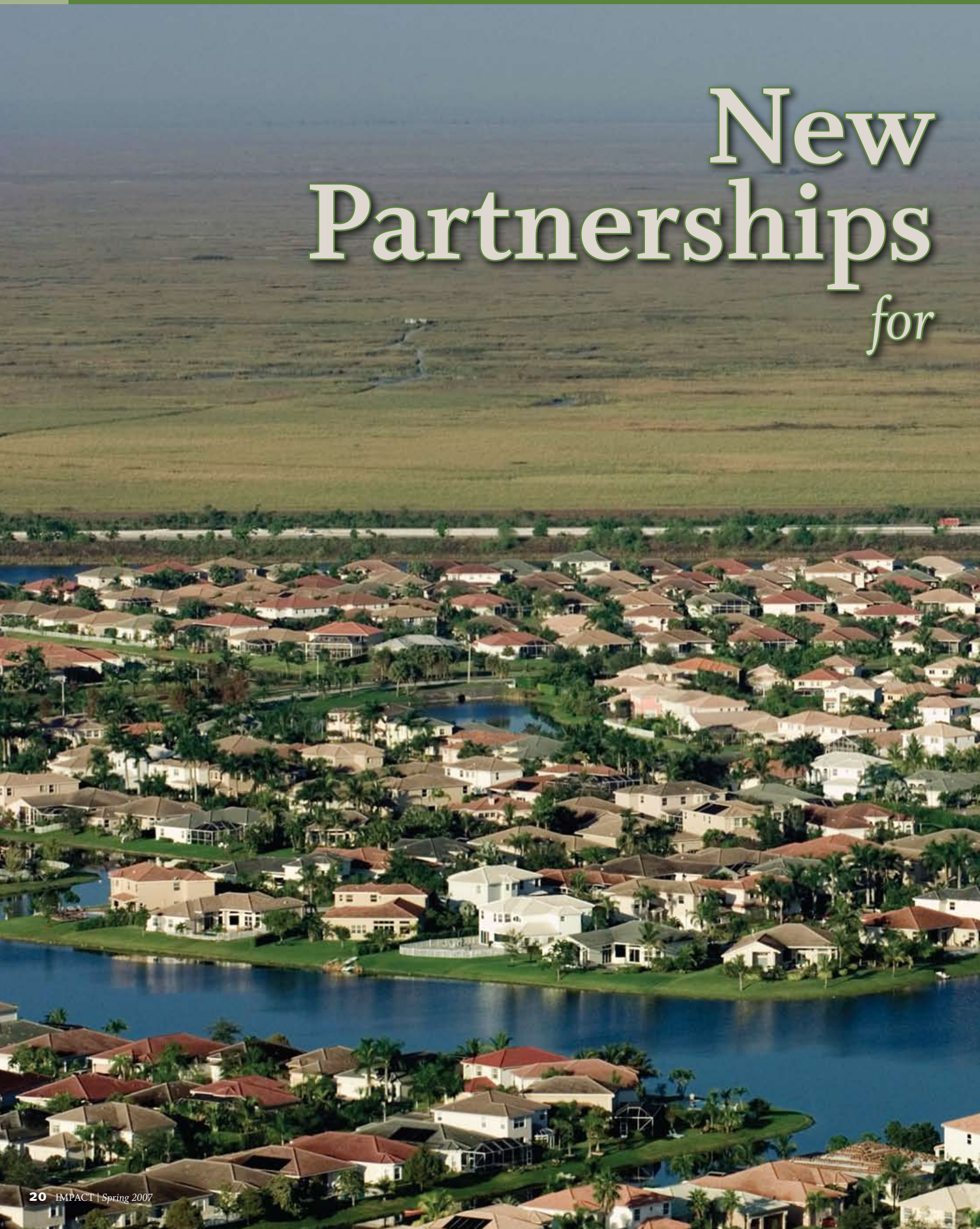
Map shows the distribution or range of fire ants across the southern United States. **USDA MAP**





New Partnerships *for*

Growth Management Issues

With Florida's population expected to double in 50 years, growth management will continue be one of the most urgent, difficult and potentially contentious issues facing the state. Finding realistic and equitable legal solutions to a wide range of important environmental and land use issues—especially those that affect agriculture, green space, water resources and energy—is easier thanks to a new partnership between the University of Florida's Levin College of Law and UF's Institute of Food and Agricultural Sciences (IFAS). The Conservation Clinic, housed in the law college's Center for Governmental Responsibility, is working closely with the statewide IFAS Extension Service to help educate the public about growth management and sustainability issues throughout the state.

(Opposite) Some new residential developments such as this one near Pompano Beach border the Florida Everglades. More than 200,000 new single-family detached homes were constructed in Florida during 2005, and the state has led the country in new home construction for 13 out of the past 15 years. In the next 50 years, more than 11 million new homes—along with millions of square feet of commercial space and thousands of miles of new roadways—will be needed to accommodate an influx of new residents. **PHOTO BY PATRICK LYNCH**

Tom Ankersen, left, and Pierce Jones are working with Marion County officials to protect water quality in Silver Springs. UF's Conservation Clinic and the Program for Resource Efficient Communities in IFAS have been assisting Marion County with policy and practice tools to integrate low impact development practices into new planned communities within springsheds. **PHOTO BY SALLY LANIGAN**

Amidst a population boom that adds almost l,000 new residents daily, Florida is poised to become the nation's third largest state in the next two years—behind California and Texas—underscoring the need for realistic growth management practices to protect the state's environment.

More than 200,000 new single-family detached homes were constructed in Florida during 2005, and the state has led the country in new home construction for 13 out of the past 15 years. In the next 50 years, more than 11 million new homes—along with millions of square feet of commercial space and thousands of miles of new roadways—will be needed to accommodate the influx of residents, according to Pierce Jones, director of the Program for Resource Efficient Communities at the University of Florida's statewide Extension Service, which is part of UF's Institute of Food and Agricultural Sciences.

"In order to achieve the kind of resource-efficient growth we need, our community planning efforts require cross disciplinary collaboration with building professionals, local governments, water management districts and other agencies," Jones said. "The Program for Resource Efficient Communities, which was established in 2005, works with these and other collaborators to promote the adoption of best design, construction and management practices in new residential community developments that measurably reduce energy and water consumption and environmental degradation."

Jones said the goal of building resource efficient communities has been strengthened by a new partnership with the Conservation Clinic at UF's Levin College of Law.

The Conservation Clinic provides environmental and land use law services to Florida communities and nongovernment organizations and university programs such as the UF Extension Service and Florida Sea Grant College Program, said Tom Ankersen, director of the clinic. Among other projects, the clinic has consulted with local governments on ordinances and comprehensive plan policies, drafted language for state statutes and worked with landowners on conservation easements.

"Demand for clinic legal services has been growing, and much of this has come through requests generated by our expanding relationship with UF's Extension Service, which has offices in every county," Ankersen said. "The Conservation Clinic already has an ongoing relationship with the Florida Sea Grant program to support its coastal and marine education programs."

According to Larry Arrington, dean for the Extension Service, "UF's Institute of Food and Agricultural Sciences has faced increased pressure" to play a greater role in Florida growth management issues.

"Agricultural producers in the state have emphasized the need for science-based solutions to issues surrounding growth, and county government officials are also requesting more support on growth issues," Arrington said. "The partnership with the College of Law positions IFAS to better respond to these needs."

Jones said the Conservation Clinic recently helped draft the language for Gainesville's Green Building Program, which is being used as a model by Sarasota and other Florida communities. Working with the Program for Resource Efficient Communities, Carter Construction and other local builders are participating in the Gainesville Green Building Program. The incentive-based program incorporates a variety of energy efficient construction and landscape criteria that builders must follow in order to build homes that are certified by the Florida Green Building Coalition.

Another extension educational effort benefiting from the clinic's legal services is the Florida Yards and Neighborhoods (FYN) program, which encourages builders and developers to protect natural resources by incorporating environmentally friendly landscaping into their new construction.

Ondine Wells, statewide builder and developer coordinator for FYN, said the Conservation Clinic provides model language for various covenants, conditions and restrictions to help homeowner's associations do their part to protect and conserve Florida's water resources using science based information generated by IFAS.

"The health of Florida's estuaries, rivers, lakes, springs and aquifers depends partly on how yards are landscaped and maintained," she said. "Thanks to the efforts of the Florida Yards and Neighborhoods program, many developers and builders are opting to protect Florida's natural resources by incorporating Florida-friendly landscaping into their new construction."

However, ensuring that these landscapes are maintained properly and not replaced with more energy- and water-intensive landscapes by the homeowner is a constant challenge, Wells said.

"One way to ensure that homeowners maintain the landscape is to incorporate the principles of a Florida-friendly landscape into the community covenants, conditions and restrictions (CCRs)," she said. "CCRs developed by the Conservation Clinic provide a binding set of community regulations that can be used by developers and homeowner associations."

Wells said Willowbend in Osprey, Fla., is the first development to incorporate Florida-friendly landscaping throughout the project, and the community association requires that the landscaping be maintained according to environmentally friendly principles.

Lee Wetherington, president and founder of the project, said landscaping was developed on a community-wide rather than house-by-house basis. Each homeowner was allowed to select individual plants from a list of Florida native plants. "To cut down on the amount of water required for irrigation, we installed a drip irrigation system and also regulated what plants could be placed under overhanging eaves," he said. "We also placed native plants around lakes to avoid fertilizer runoff."

Jim Cato, director of the Florida Sea Grant College Program, said the Conservation Clinic has been working with Sea Grant's boating and waterways management program for a number of years.

Bob Swett, a waterways specialist who directs the program for Florida Sea Grant, said the laws of Florida regarding boating, anchoring and mooring fields have been in a state of flux over the last few years. Many local communities and counties are confused as to the options available to them with regard to regulating their waterways and providing public access. The Conservation Clinic has been instrumental in providing guidance to county governments as well as cities such as Bradenton Beach, Ft. Myers Beach, Punta Gorda, Sarasota, St. Augustine and Venice.

"The Conservation Clinic is currently helping develop a harbor management plan for the City of St. Augustine," Swett said. "They have also developed policy toolkits and guidelines that have been valuable to communities struggling with the issue of public access to Florida's waterways."

Angela Polo Maraj, left, and Ondine Wells, right, talk with developer Lee Wetherington about his decision to incorporate Florida-friendly landscapes in the community of Willowbend in Osprey, Fla. Polo Maraj is the Florida Yards and Neighborhoods regional builder and developer coordinator for the Southwest Florida Water Management District. **PHOTO BY THOMAS WRIGHT**

Using geographical information systems, the University of Florida's GeoPlan Center has developed these maps showing current land use in Florida and projected land use by 2060. Graphics courtesy of Glatting Jackson Kercher Anglin, Orlando.

The toolkits and guidelines are available on the Conservation Clinic's Web site: http://www.law.ufl.edu/conservation/waterways/waterfronts/

Robert Jerry, dean of the Levin College of Law, said smart growth and sustainability are key issues in Florida, and have long been a focus of the college's environmental and land use law program as well as a number of units in UF's Institute of Food and Agricultural Sciences.

"An interdisciplinary approach is vital to successfully managing these areas, and this partnership with the Extension Service will greatly amplify available intellectual and physical resources," Jerry said. "Conservation Clinic projects also leverage taxpayer dollars by utilizing the time and talents of law students under faculty guidance. The students benefit, too, by gaining hands-on, real world experience." ■

– CHUCK WOODS

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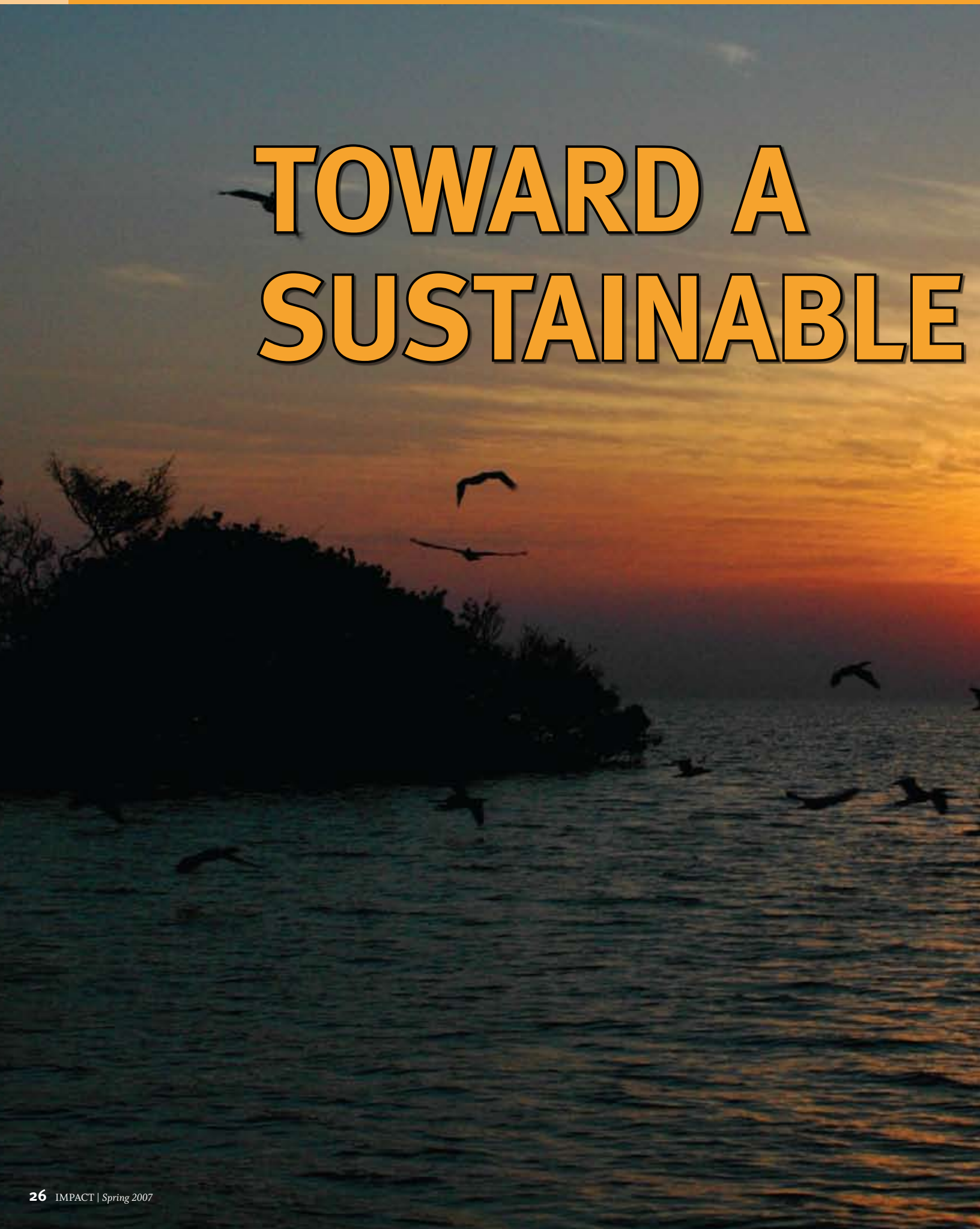
Robert Jerry, left, and Larry Arrington discuss the new partnership between UF's Levin College of Law and the UF Extension Service to address various growth management issues around the state. Arrington said Florida's population is expected to double in 50 years, and growth management will continue be one of the most urgent, difficult and potentially contentious issues facing the state. **PHOTO BY THOMAS WRIGHT**



TOWARD A SUSTAINABLE

FLORIDA

Restoration and protection of the Florida Everglades is enhancing sustainability in South Florida. Experts with UF's Institute of Food and Agricultural are helping educate the public about the benefits associated with green space, the need of conserving water and energy, and the importance of community participation in the development decision-making process. **PHOTO BY JOSH WICKHAM**

FEATURE

At a time when managing Florida's breakneck urban growth is one of the biggest challenges facing the state, Jeffrey Gellermann and Devesh Nirmul are leading the way as the first extension agents hired by UF's Institute of Food and Agricultural Sciences to help educate residents about growth management and urban environmental sustainability.

Gellermann, who joined the St. Lucie County Extension Service in June 2005, is developing educational programs for smart growth management practices on the Treasure Coast, while Nirmul, who began working for the Pinellas County Extension Service in September 2006, is developing outreach programs for urban environmental sustainability in the Tampa Bay area.

Nirmul, a regional agent based at the Extension

Devesh Nirmul, left, Thomas Roberts, Bert Henderson (foreground) and Carl Lucchi check the energy efficiency rating of a heat pump in Pinellas County. Nirmul said one of the first steps that organizations can take to improve their sustainability is to eliminate waste and improve efficiency. Roberts is a curator of education with the UF Pinellas County Extension Service; Henderson is an extension energy agent, and Lucchi is a special project assistant. **PHOTO BY JOSH WICKHAM**

Service's Bushnell Center for Urban Sustainability in Largo, is working with county residents, local government agencies, community organizations and corporate institutions to improve environmental, economic and social sustainability in the daily lives of individuals at home, work and play.

"Sustainability is a process that can lead to conservation of natural resources, increased economic prosperity and better lives today and in the future," Nirmul said. "It can be as simple as changing to fluorescent light bulbs or as bold as redesigning cities."

Before coming to the UF Extension Service, Nirmul was an environmental services coordinator and urban planner in Tampa. His previous work includes climate change and sustainable development consulting for the U.S. Agency for International Development as well as environmental finance work for the National Wildlife Federation in Washington, D.C., where he also founded a sustainable business network. His current position and the establishment of the Bushnell Center for Urban Sustainability in Pinellas County is supported by UF's William P. and Janet F. Bushnell Professorship in Urban Environmental Sustainability endowment.

Nirmul will lead the Bushnell center in its first operational year, focusing on a tripartite strategy—sustainability in county departments, community outreach to promote adoption of sustainable practices, and developing partnerships with UF and other institutions for applied research, learning and analysis on urban sustainability.

Gellermann, who has been working on growth management issues for the past two years, said forecasts indicate the state's population will reach nearly 34 million by 2050. Partly because of this growth, Florida is making impressive economic gains beyond traditional mainstay industries such as agriculture, natural resources and tourism, he said. The state is quickly becoming known for its growing biotechnology industry, evolving from a tourist destination to a diverse economic magnet.

"But we are paying a price for that growth and prosperity," Gellermann said. "There are many redevelopment projects across the state, but a large portion of the land cleared to make room for all of the new residents migrating to Florida is undeveloped. This has resulted in a large portion of Florida's native habitats being destroyed. Rapid development has begun to take a toll on the quality of life; key economic sectors such as agriculture and natural resources are also feeling the impact.

"The good news is that we are learning from our past mistakes, and we can take steps to prevent detrimental development patterns in the future," he said.

Growth management—balancing economic and ecological sustainability while maintaining individual property rights—is the primary instrument that will shape the future, he said. "A sustainable Florida can be achieved through educating the public to the benefits associated with green space, the need of conserving water and energy, and the importance of community participation in the development decision-making process."

Gellermann said rapid growth on the Treasure Coast is similar to that occurring elsewhere in the state. According to the regional planning council, there are approximately

Jeff Gellermann says rapid growth on the Treasure Coast is similar to that occurring elsewhere in the state. According to the regional planning council, there are approximately 118,585 homes pending or approved in the region. In St. Lucie County, there are 80,228 pending or approved homes alone.
PHOTO BY THOMAS WRIGHT

118,585 homes pending or approved in the region. In St. Lucie County, there are 80,228 pending or approved homes alone.

"By working with the development community in St. Lucie County, we can help promote the adoption of more sustainable development practices by the industry across the entire region," Gellermann said. "With the large number of new homes planned, even a small change in practices for the better can have immense benefits overall."

Gellermann is also looking at issues such as affordable housing, which is one of the hottest topics currently in growth management. He said St. Lucie County currently has a tremendous demand for affordable housing, and it is projected that 50 percent of the total number of homes needed in Florida in 2050 have not yet been built.

Another important growth management issue involves urban service boundaries, designed to limit urban services such as water and sewer. "In many counties and cities across Florida, development pressures to build past these boundaries are increasing," Gellermann said. "In some instances, the county may approve development on one side of the road but will not approve the same development on the other side without those services."

He said some developers have solved this problem by establishing wells for drinking water and package plants to handle their own sewer and wastewater discharge. So far, their last major hurdle seems to be schools that are not allowed to be constructed beyond the urban service boundary.

Florida's construction activity for 2005 was valued at approximately $69 billion—nearly $12 billion more than the tourism industry and $18 billion less than the agricultural and natural resource industries, he said.

"If we have learned anything, the speed of our development is as much of an issue as the amount," Gellermann said. "The techniques used to solve the challenges we are facing today may have dire consequences for tomorrow. In the 1970s and 80s, issues surrounding leapfrog developments and sprawling residential neighborhoods in South Florida were not taken as seriously as today. Growth management professionals are still trying to undo those mistakes. Unfortunately, with development, the consequences may be unknown for many years or decades, and by that time we may have very well replicated those mistakes across the state many thousands of times."

For more information, visit the following Web site: SolutionsForYourLife.com to access publications under community development (urban and rural growth), including *Towards a Sustainable Florida*. The 102-page publication, released in September 2005 for The Century Commission for a Sustainable Florida, provides a comprehensive review of environmental, social and economic concepts for sustainable development in the state. Many of the reports in the document were prepared by faculty and staff in UF's Institute of Food and Agricultural Sciences. ■

– CHUCK WOODS

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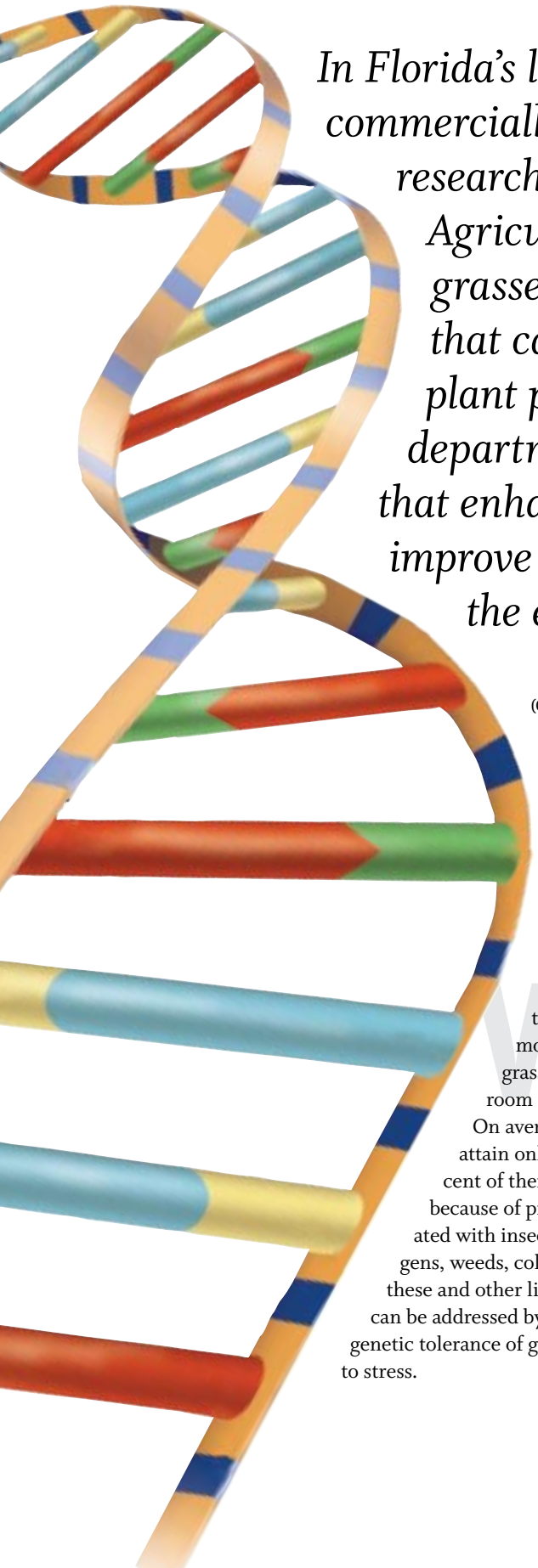
DESIGNER GENES *for* GRASS



In Florida's largest biotechnology program for commercially important species of grasses, researchers in UF's Institute of Food and Agricultural Sciences are improving forage grasses, turfgrasses, cereal crops and grasses that can be used for bioenergy. The molecular plant physiology laboratory in the agronomy department is developing advanced technologies that enhance the productivity of these grasses, improve the use of natural resources and protect the environment.

(Opposite) Fredy Altpeter displays transgenic bahiagrass prior to exposing it to freezing temperatures in a computer-controlled environmental growth chamber.
PHOTO BY THOMAS WRIGHT

When it comes to the world's most important grass crops, there's room for improvement. On average, these crops attain only about 25 percent of their potential yield because of problems associated with insect pests, pathogens, weeds, cold or drought, but these and other limiting factors can be addressed by enhancing the genetic tolerance of grass crops to stress.

That's the goal of Fredy Altpeter, an assistant professor of molecular biology in the agronomy department, who leads a team of researchers using genetic engineering to improve economically important pasture grasses, turfgrasses and cereals.

Residential and commercial turfgrass covers about 4.4 million cultivated acres of land in Florida, and consumers in the state spend about $6.5 billion a year on turfgrass maintenance and products. Bahiagrass, one of the most popular perennial pasture grasses in the southern United States, covers 5 million acres in Florida and supports the state's $1.1 billion cattle and dairy industries. Cereal crops include grasses such as wheat and rye cultivated for their edible grains. Worldwide, cereal grains are grown in greater

Fredy Altpeter measures stress tolerance of transgenic bahiagrass plants using a pulse amplitude modulation fluorometer.
PHOTO BY SALLY LANIGAN

quantities and provide more food energy for people than any other crop.

Altpeter said the targets for improving grasses include better insect resistance, cold and drought tolerance, disease and herbicide resistance, and conversion to biofuels. While many of these improvements have been the target of conventional plant breeding programs for decades, genetic engineering opens new doors for plant improvement.

"Our research team is identifying critical genes for crop stress tolerance and quality, redesigning these genes, introducing them into grasses and studying the performance of these genetically enhanced grasses under controlled environmental and field conditions," Altpeter said.

He said research has shown that plant response to stress is very complex at the molecular level, with approximately 2,000 genes responding to each stress episode. However, only a small fraction of these genes seem to be crucial—some of them act like a master switch and turn on multiple stress-protecting genes at the same time.

More importantly, Altpeter said, plants have most of the right stress-tolerance genes they need, but they don't switch them on appropriately to deal with adverse conditions. "The hardware is all there, but it's the wiring—or the regulatory master switch genes—that's mucked up," he said.

Altpeter says that understanding this "wiring" and identifying the most important regulatory genes is the key to designing better crops. "We are beginning to understand how plants sense stress and which genes are activated or turned on in response. But translating this knowledge into improved turfgrass, forage, cereal grain or bioenergy plant biomass requires knowledge of how these pathways can be cranked up without lowering yield or compromising the plant's quality."

Working in cooperation with Ken Boote, a professor in the agronomy department, and Hartwell Allen, an agronomist with the U.S. Department of Agriculture's Agricultural Research Service (USDA/ARS) in Gainesville, Altpeter is evaluating the extent to which individual genes help protect plants from stress.

"Identifying genes that help plants respond to stress, designing better versions of these genes and reintroducing them by genetic engineering may allow plants to survive and produce biomass with less water or with lower water quality," he said. "One of our studies shows that a regulatory master switch gene—isolated from a drought-tolerant desert grass—enhanced drought tolerance and biomass production of turf and forage grass," Altpeter said.

His work in collaboration with Ann Blount, a professor of agronomy at UF's North Florida Research and Education Center in Marianna, showed that transgenic grass shows an improvement in biomass production on an annual basis. "By introducing stress-tolerant genes from wild plants into domesticated crops, we can add desirable characteristics

Ann Blount checks a patch of healthy, green transgenic bahiagrass (inner circle) that is highly resistant to glufosinate herbicide. Non-transgenic grass (outer circle) was eliminated by the herbicide. **PHOTO BY MELANIE THORPE**

that allowed their ancestors to survive in a harsh environment," Altpeter said.

In another study with Blount, Altpeter confirmed the generation of bahiagrass that is highly resistant to glufosinate herbicide compared to regular grasses and weeds that are eliminated by the herbicide. The herbicide is marketed commercially as Liberty.

Altpeter's research with Blount is also addressing concerns about the potential environmental impact of genetically modified grasses. "With the availability of new molecular and existing reproductive containment systems, we can minimize the dispersal of transgenic plants into natural areas," he said.

Field research with Kevin Kenworthy and Tom Sinclair, professors in the agronomy department, demonstrated improved turf quality in transgenic bahiagrass. "Plants displayed a denser turf and delayed seed-head production following redesign of a master switch gene that affects plant development," Altpeter said.

In cooperation with Maria Gallo, Paul Mislevy (based at UF's Range Cattle Research and Education Center in Ona) and David Wofford, professors in the agronomy department, and Robert Meagher, an entomologist with USDA/ARS, Altpeter is introducing synthetic *Bacillus thuringensis (BT)* genes in grasses to control insect pests. He said research shows that transgenic bahiagrass with a synthetic BT gene is more resistant to fall armyworm pests than regular bahiagrass.

To enhance the process of converting grass biomass into low-cost ethanol, Altpeter is working with James Preston, a professor in UF's microbiology and cell science department. "Our research is currently focused on developing plant-based technologies for high-level expression of cell wall degrading enzymes—a promising technology for reducing the cost of producing ethanol from biomass," Altpeter said.

He said that energy derived from grass biomass is one of the ways that Florida and the nation can move towards energy security. "The state has plenty of unused or underutilized agricultural land, and perennial grasses are grown on large areas of these lands," he said.

Altpeter is also the senior author of two journal articles describing work that should help improve bread making quality and disease resistance in cereals. The articles were published in the April 2004 and January 2005 issues of *Plant Molecular Biology*.

His research is supported by grants from the USDA, the Southwest Florida Water Management District, the Consortium of Plant Biotechnology Research, and private industry leaders in turfgrass biotechnology such as The Scotts Company and forage grass genomics such as Vialactia Biosciences. ■

– CHUCK WOODS

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FEATURE

Stopping SCALE on SAGOS

In another example of how an exotic insect can wreak havoc on valuable landscape plants and cause millions of dollars in damage to the state's nursery industry, the Asian cycad scale has invaded South Florida and quickly spread throughout the state.

The tiny insect's only host is the cycad—also called a sago palm—and experts say the scale is probably the single most important threat to wild cycad populations and conservation collections around the world.

Its rapid spread throughout the state suggests that the insect has few effective natural enemies established in Florida, said Catharine Mannion, an assistant professor of ornamental entomology at UF's Tropical Research and Education Center in Homestead.

"The insect began attacking the plants in South Florida in the mid-1990s, when the pest was accidentally introduced to the Miami area from Southeast Asia," she said. "Within a few years, 80 percent of the king and queen sago palms in South Florida were killed, and the pest has killed almost half of the king and queen sago palms in Central Florida. The cycad nursery industry has been devastated, with economic losses in the millions."

She said two commonly grown cycads—king and queen sagos (*Cycas revoluta* and *Cycas rumphii*)—are very susceptible to attack by the Asian cycad scale (*Aulacaspis yasumatsui*). At its worst, an infestation can completely coat a medium-sized sago within months and kill it within a year.

Like other armored scales, the Asian cycad scale produces a waxy covering on the plant, under which the insect lives, Mannion said.

"The covering is most visible on an infested plant," she said. "In general, scale insects hatch into a crawler

King and queen sagos are very susceptible to attack by the Asian cycad scale. At its worst, an infestation can completely coat a medium-sized sago within months and kill it within a year. **PHOTO BY JOSH WICKHAM**

Catharine Mannion examines the severity of an Asian cycad scale infestation on a sago palm at UF's Tropical Research and Education Center in Homestead. **PHOTO BY JOSH WICKHAM**

or mobile stage—small enough to be spread to other plants by wind. When they find a suitable spot on the plant, they insert their mouthparts and start feeding."

The scale completes its life cycle in about one month, but dead scale stay on the plant for weeks, especially if the infestation is heavy, she said. The Asian cycad scale is unusual in that it can also infest plant roots.

She said management of the scale is difficult because early infestations are hard to see, populations can grow very quickly and they are very good at hiding in protected areas of the plant's trunk and crown. Until now, cycads have been considered relatively "low-maintenance" for pests, but this insect has changed that.

"In areas with high infestations, management of the pest will be a continuous and long-term effort," Mannion said. "If infested cycads go unmanaged, the scale will not only kill the cycad but can be spread to other cycads. Management of the pest can also be deceiving because it is not obvious when the scale insects are dead, and the scales remain on the plant for long periods of time."

Researchers with UF's Institute of Food and Agricultural Sciences have introduced two natural enemies to help combat this pest, but they are not completely effective. The insects were imported from Thailand and released in South Florida in 1997 and 1998 by Richard Baranowski, a professor of entomology at the Homestead center.

The natural enemies are a predaceous beetle (*Cybocephalus nipponicus*) and a parasitic wasp (*Coccobius fulvus*). The adult beetle feeds primarily on adult female scale. The beetle lays her eggs among the scale eggs underneath the scale armor covering. After hatching, the beetle larva feeds on all stages of the scale. The parasitic wasp attacks and kills female scale by laying its egg inside the female scale where the developing wasp larva feeds and grows.

"Both of these natural enemies have become established in many areas in southern Florida and contribute to the control of the scale," Mannion said. "However, because of the explosive nature of the scale insect, neither one of these natural enemies can provide complete control."

Ronald Cave, an assistant professor of entomology at UF's Indian River Research and Education Center in Fort Pierce, is conducting research on the scale's natural enemies to learn more about their population dynamics and interactions with the scale pest.

Cave recently traveled to China and Vietnam to identify parasitoids that could be imported and released in Florida. Two parasitic wasps (*Aprostocetus purpureus* and *Arrhenophagus* sp.) were collected and brought to quarantine facilities in Gainesville and Fort Pierce, where methods are being developed to rear the wasps for research purposes.

Mannion is also evaluating another potential predatory beetle (*Rhyzobius lophanthae*) that was introduced into Hawaii many years ago for control of other armored-scale insects and reportedly provides some control of the Asian cycad scale. This predatory beetle was released on the island of Guam and in south Texas, where it is spreading rapidly. Small, isolated populations have been found in Florida, but Mannion says this localized distribution is not understood, and early indications are that it may not be contributing much to the control of this pest.

At this time, horticultural oils and/or insecticides can be used to manage Asian cycad scale, she said. Thorough coverage of the plant is extremely important when applying a foliar spray. Depending on the product, repeat applications may be necessary.

"If plants are heavily infested with the scale, removal of the leaves may help reduce the pest population," Mannion said. "Monitoring the plant and application of an oil or insecticide are still necessary after the leaves have been removed. No product will kill all the insects on the plants forever, so maintenance of a clean, healthy plant will likely be a continuing effort." ■

– CHUCK WOODS

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Chinese Collaboration

He Kang, a former Chinese minister of agriculture and one of the founders of the South China University of Tropical Agriculture (SCUTA) in Hainan Province, visited with faculty, staff and students at the UF's Tropical Research and Education Center in Homestead and the Fort Lauderdale Research and Education Center in December 2006.

Kang was invited to visit the UF facilities by Mark McLellan, dean for research at UF's Institute of Food and Agricultural Sciences in Gainesville, who met the Chinese scientist at the World Food Prize Awards in Des Moines, Iowa last fall. Mary Duryea, associate dean for research, and Van Waddill, director of the Homestead and Fort Lauderdale centers, also accompanied Kang on his tour of UF facilities.

During his visit, Kang called for increasing collaboration between the Chinese university and UF because the two institutions have much in common. He said SCUTA is the largest Chinese university dedicated to tropical and subtropical agriculture.

"Minister Kang has opened up an extraordinary door for UF—all we need to do is to walk through it," McLellan said. "This collaboration with agriculturists in the world's most populated country is rich in benefits and opportunities for our faculty and our Chinese counterparts. Virtually every discipline in our program has potential for unique study, strong collaboration and excellent exchange. These opportunities do not come every day, and we are pleased that our faculty is in a position to take advantage of this new relationship."

Waddill said Kang was surprised by the number of Chinese scientists and students working at the two UF centers, and he enjoyed interacting with them. "He extended a warm invitation to our faculty to visit China and develop cooperative research projects," Waddill said.

The Chinese minister discussed research projects with faculty at the UF centers, including Yuncong Li, an associate professor of soil and water science at the Homestead center, and Nan-Yao Su, a professor of entomology at the Fort Lauderdale center and one of the world's leading termite experts.

He Kang, left, learns about a research project on nematodes from Robin Giblin-Davis, a professor of nematology at UF's Fort Lauderdale Research and Education Center. **PHOTO BY IAN MAGUIRE**

Prior to Kang's visit, Jonathan Crane, a professor and associate director of the Homestead center, traveled to China in December to consult with researchers and learn more about tropical agricultural research and education there. ■

– CHUCK WOODS

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Distance Education for Honduras

For more than 20 years, UF's College of Agricultural and Life Sciences has developed a close working relationship with the Escuela Agricola Panamericana in Honduras, and now that relationship is being further enhanced by a distance education course presented by faculty at UF's Indian River Research and Education Center in Fort Pierce.

P.J. van Blokland, a professor of food and resource economics at the Ft. Pierce center, and Ron Cave, an assistant professor of entomology at the center, recently initiated a distance education class in English for seniors at the Honduran college (now a four-year college called Zamorano University).

Van Blokland, who also directs the center's education programs, said the class lasted 10 weeks and ran from 90 minutes to two hours on Wednesday afternoons.

"The idea was to present a variety of subjects to the students to help them attain the required proficiency in English before their graduation," he said. "The class included insect identification, computer skills, ornamental cultivation, marketing, sales, investing, bonsai production and invasive species."

Despite some bandwidth problems between Florida and Honduras, which occasionally hindered reception, the class was surprisingly well received, he said. As a result, the course will be continued in the future.

In October 2006, van Blokland and Cave, along with Ferdinand Wirth, an associate professor of food and resource economics at the UF center, and Sandra Wilson, an associate professor of ornamental horticulture at the center, visited Zamorano University to meet many of their students as well as faculty and administrators at the university.

The trip strengthened the reciprocal program between UF and Zamorano University and will result in more student exchange programs, van Blokland said. Usually, he added, there are several exchange students from Zamorano University studying at the Fort Pierce center, which is part of UF's Institute of Food and Agricultural Sciences. ■

P.J. VAN BLOKLAND

– CHUCK WOODS

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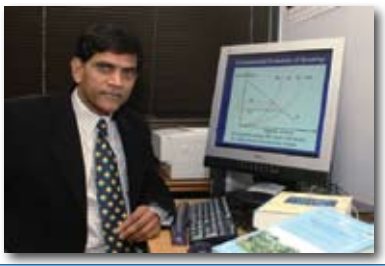
UF Research Foundation Professors


JANAKI ALAVALAPATI


LAWRENCE DATNOFF


JUDE GROSSER


CURT HANNAH


GEORGE O'CONNOR


K.T. SHANMUGAM

Six faculty members with UF's Institute of Food and Agricultural Sciences have been named UF Research Foundation Professors for 2006, in recognition of their past research accomplishments and strong current research agendas.

The honorees are Janaki Alavalapati, Lawrence Datnoff, Jude Grosser, Curt Hannah, George O'Connor and K.T. Shanmugam.

Campuswide, 33 UF faculty members were named Research Foundation Professors. The three-year award provides each honoree with a $5,000 annual salary supplement and a $3,000 grant.

Janaki Alavalapati, an associate professor in the School of Forest Resources and Conservation, studies economics and policy related to sustainable forestry, environmental services, wildland-urban interface, biomass and bioenergy, climate change and protected areas management.

Lawrence Datnoff, a professor in the plant pathology department, focuses on the biology, etiology, epidemiology and control of foliar and soilborne diseases of rice, turfgrass and, most recently, ornamentals. He is perhaps best known for studying how silicon, used as a fertilizer, can help rice and turfgrass resist disease, and has been investigating the mechanisms responsible for this effect.

Jude Grosser, a professor of horticultural sciences at the Citrus Research and Education Center in Lake Alfred, specializes in genetics and biotechnology research related to citrus variety improvement. His work has addressed all major citrus production problems in Florida and the development of new citrus varieties to provide growers with greater marketing opportunities.

Curt Hannah, a professor in the horticultural sciences department, researches the molecular genetics of starch production in corn. He is particularly interested in genetic mutations that change the size, shape and texture of corn seed. Recent studies have also investigated the effects of introns, DNA sequences in plant genes that are not copied by messenger RNA during protein synthesis.

George O'Connor, a professor in the soil and water science department, focuses on the application of basic soil chemistry to issues associated with the land application of nonhazardous wastes, primarily biosolids. His interests include determining how chemicals in the wastes move through the soil and developing methods to control the impact of these chemicals on the environment.

K.T. Shanmugam, a professor in the microbiology and cell science department, researches the physiological processes involved when bacterial cells synthesize enzymes containing the element molybdenum. His current research focuses on engineering bacteria as biocatalysts for cost-effective conversion of biomass-derived sugars to fuel ethanol, hydrogen and commodity chemicals, such as lactic acid, a bioplastics precursor.

All UF Research Foundation Professors are selected based on recommendations from the deans of their respective colleges. The research professorships are funded from UF's share of royalty and licensing income from technologies developed by faculty, staff and students.

Founded in 1986, the UF Research Foundation is a nonprofit organization that supports research by faculty members and facilitates transfer of UF-developed innovations to the public. ■

– TOM NORDLIE

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New Associate Deans

Elaine Turner, interim associate dean of UF's College of Agricultural and Life Sciences, and Mark Rieger, a professor of horticulture with the University of Georgia, have been named associate deans of the UF college, according to an announcement by Dean Kirby Barrick.

Turner's appointment became effective in June 2006, and Rieger's appointment became effective in September. Rieger also serves as a horticultural sciences professor.

Although their responsibilities overlap somewhat, each associate dean has specific assignments, Barrick said. Turner will provide leadership for undergraduate education and teaching enhancement programs. Rieger will provide leadership for graduate education, distance education programs and the upper-division undergraduate honors programs.

The addition of a second associate dean will greatly benefit the college, said Turner, who is also an associate professor of food science and human nutrition.

A member of the UF faculty since 1996, Turner taught at Clemson University from 1986 to 1996. She earned a bachelor's degree in dietetics from Kansas State University, and master's and doctoral degrees in nutrition from Purdue University.

Rieger has been with UGA's horticulture department since 1987, where his research focused on environmental stress physiology of fruit crops. He has three horticultural science degrees—a bachelor's degree from Pennsylvania State University, a master's degree from the University of Georgia and a doctoral degree from UF.

"I'm delighted to be coming back to Gainesville after 20 years," said Rieger. "I've been preparing for a career in college administration, and this is a great opportunity for me." ■ – TOM NORDLIE

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ELAINE TURNER

MARK RIEGER

Three New Department Chairs

New chairpersons were recently named for three departments in UF's Institute of Food and Agricultural Sciences.

Raghavan Charudattan is the new chair of the plant pathology department; Geoffrey Dahl is the new chair of the animal sciences department, and Dorota Haman is the new chair of the agricultural and biological engineering department. The appointments were announced by Jimmy Cheek, UF senior vice president for agriculture and natural resources, following nationwide searches for candidates.

Charudattan, who joined the UF plant pathology faculty in 1970, assumed leadership of the department Feb. 13. Cheek said Charudattan is recognized nationally and internationally as a leader in the biological control of weeds, using plant pathogens as a supplement to conventional weed management methods.

"Dr. Charudattan has built a unique, strong and productive program of research, graduate education and international cooperation in biological control," Cheek said. "He is known for his pioneering studies on weeds and aquatic plant diseases, and he has served as editor of *Biological Control*, a highly respected scientific journal."

The author of numerous publications, Charudattan earned his bachelor's, master's and doctoral degrees in plant pathology at the University of Madras in India. He also was a postdoctoral research plant pathologist at the University of California, Davis, from 1968 to 1970.

In announcing Dorota Haman's appointment, which becomes effective May 1, Cheek said, "We are fortunate to have a faculty member with the

expertise and range of experience that Dr. Haman brings to the department, which is consistently ranked among the nation's top programs by *U.S. News and World Report* magazine."

Haman began her career in the department as an assistant professor in 1985, rising to the rank of professor in 1998, and has most recently served as the department's graduate coordinator. Specializing in irrigation and water management, Haman has a strong interest in irrigation education in developing countries. Her recent research projects have focused on irrigation efficiency in ornamental plant production.

Haman received her bachelor's degree in mathematics from the University of Warsaw in 1973, and completed her master's and doctoral degrees in agricultural engineering at Michigan State University in 1980 and 1983, respectively. She has received numerous professional awards and is a member of many professional societies, including serving a second term on the board of directors of the U.S. Committee on Irrigation and Drainage.

She is the second woman to lead the department, replacing Wendy Graham who became director of UF's new Water Institute in 2006. Ken Campbell, a professor in the department, has served as interim chairman of the department since May 2006.

Geoffrey Dahl, a professor of animal sciences at the University of Illinois, succeeds Glen Hembry, a UF animal sciences professor who became chairman in 2000 when the department was created by merging the animal, poultry and dairy science programs. Hembry also led the animal sciences program from 1990 to 2000.

Cheek said Dahl will focus on enhancing the department's teaching, research and extension programs in beef cattle, dairy cattle and equine sciences. His appointment became effective in September 2006.

"We believe that through his leadership we will build on our strengths and achieve even greater successes in the future," Cheek said. "Dr. Dahl will help this become one of the best departments of its kind in the world."

Prior to his UF appointment, Dahl was a faculty member in the animal sciences department at UI at Urbana-Champaign from 2000 to mid-2006. From 1994 to 2000, he was a faculty member with the University of Maryland's animal and avian sciences department. He began his professional career as a research fellow with the University of Michigan's reproductive sciences program from 1991 to 1994.

Dahl received a bachelor's degree in animal science from the University of Massachusetts in 1985, a master's degree in dairy science from Virginia Polytechnic Institute in 1987 and a doctorate in animal science from Michigan State University in 1991. ■

– CHUCK WOODS

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RAGHAVAN CHARUDATTAN

DOROTA HAMAN

GEOFFREY DAHL

New Biotech Director

Following an international search for outstanding candidates, Robert Ferl has been named director of the UF's Interdisciplinary Center for Biotechnology (ICBR), which is expanding its mission in the new $85 million Cancer and Genetics Research Complex in Gainesville.

In announcing the appointment, Win Phillips, UF senior vice president for research, said Ferl's record of research accomplishments made him the ideal choice. "He is well known for his outstanding dedication to research, but he's also admired for his ability to work with others and coordinate efforts effectively," Phillips said.

Ferl, a professor of molecular biology in UF's Institute of Food and Agricultural Sciences, joined the UF faculty in 1980 as an assistant professor in the botany department. He became an associate professor in the horticultural sciences department in 1987 and a professor in 1990. In 1994, he was named assistant director of the ICBR.

Phillips said the primary mission of the ICBR is to provide UF's biotechnology community with centralized research facilities, state-of-the-art equipment and staff trained in the latest technologies, such as high-end genomics, informatics and proteomics.

These are technologies that are usually too expensive or unwieldy for individual researchers.

Ferl received a bachelor's degree in biology from Hiram College in 1976 and completed his master's and doctoral degrees in genetics at Indiana University in 1980. ■ – STU HUTSON

ROBERT FERL

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International Fellow

Dan Cantliffe, professor and chairman of UF's horticultural sciences department, has been named a fellow by the International Society for Horticultural Science. Cantliffe is one of only six individuals to receive the highest honor from the 6,300-member society.

The ceremonies took place at the 27th International Horticultural Congress and Exhibition in Seoul, South Korea, in August 2006.

During the conference, Cantliffe also received a second honor—the ISHS Medal—for his work as chairman of the organization's vegetable section over the past eight years.

The fellowship selection process requires letters of support from at least five colleagues in three nations and approval by the organization's council, which includes representatives from each of ISHS's more than 140 member nations.

Cantliffe's international work includes research and outreach on protected agriculture, a high-tech, high-yield approach to growing fruits and vegetables in greenhouses. Popular in Europe, the Middle East, Canada, Mexico, China, Korea and Japan, protected agriculture enables year-round production while conserving resources and reducing pesticide use.

Cantliffe has developed collaborative relationships with institutions in Brazil, Israel, Italy and Korea. While promoting protected agriculture in Florida, he has also introduced growers to two crops developed in Israel: Galia muskmelons and Beit Alpha cucumbers. He was named an International Fellow by UF's Institute of Food and Agricultural Sciences in 2005. ■ – TOM NORDLIE

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Soil and Water Engineering Award

Kenneth Campbell, a professor and interim chair of UF's agricultural and biological engineering department, has been recognized by the American Society of Agricultural and Biological Engineers (ASABE) for his creation of sophisticated computer models that provide a highly accurate view of waterway dynamics. His work reveals the ebb and flow of essential nutrients and pollutants through waterways.

The Hancor Soil and Water Engineering Award was presented to Campbell at the 2006 ASABE Annual International Meeting in Portland, Ore. The award, first given in 1966, is one of the group's most prestigious recognitions of engineering achievement. Campbell was among eleven nominees from national and international institutions.

According to the ASABE, Campbell was chosen in large part for his two-decade-long endeavor to model phosphorous levels in South Florida. In the early 1980s it was recognized that excess phosphorous in runoff was a major factor behind damaging algal blooms that were clogging the area's water systems. Campbell's work provides a clear illustration of this effect and helped to develop regulations to rein in the damaging effects.

In 2000, Campbell began a year's Fulbright sabbatical in South Africa at the University of Natal. He helped develop a new computer model using the object-oriented computer language called Java to help land managers in the near-desert region make the best use of their resources. The system proved to be so adaptable that he brought it back to UF, where he uses it to predict runoff from ranches and farms.

However, the model isn't the only connection Campbell still holds with South Africa. Since his time there, Campbell has helped four students from the region come to UF to pursue graduate academic degrees. ■

– STU HUTSON

KENNETH CAMPBELL

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Distinguished Alumni Award

Larry Arrington, UF dean for extension, received the 2007 Distinguished Alumni Award on March 3 from The Ohio State University's College of Food, Agricultural and Environmental Sciences Alumni Society.

Arrington, who completed his doctoral degree in agricultural and extension education at Ohio State, joined the faculty of the UF's Institute of Food and Agricultural Sciences in 1981. He was appointed interim dean for extension in 2003 and has served as dean for extension since 2004.

His professional affiliations include the Florida Farm Bureau, American Association for Agricultural Education and the Florida Association of Extension 4-H agents. In 2004, he served as a member of the Board of Directors with the National Extension Virtual Diversity Center. ■

– CHUCK WOODS

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LARRY ARRINGTON

IFAS DEVELOPMENT *News*

Jimmy Cheek, left, UF senior vice president for agriculture and natural resources, receives a $100,000 check from Florida Cattlemen's Association President Hal Phillips at the FCA Allied Trade Show. **PHOTO PROVIDED BY RON O'CONNOR**

Carl B. Loop, Jr. **PHOTO PROVIDED BY FLORIDA FARM BUREAU FEDERATION**

Muncy and Herb Chapman

FLORIDA CATTLEMEN'S ASSOCIATION FOUNDATION

The Florida Cattlemen's Association Foundation has given a $100,000 gift designated for the construction of a new multipurpose facility at UF's Range Cattle Research and Education Center in Ona. The foundation's contribution may be matched dollar for dollar through the Alec P. Courtelis Facilities Enhancement Challenge Grant Program.

"The range cattle center is an outstanding facility for training students interested in pursuing career opportunities in livestock and forage production, as well as the enhancement of natural resources that are linked to our range and grazing landscapes," said center director John Arthington. "This gift will be a tremendous asset for the enhancement of our facilities."

New multipurpose facility to be constructed at the Range Cattle Research and Education Center in Ona.

CARL LOOP LEGISLATIVE INTERNSHIP ENDOWMENT

In recognition of his 23 years of service to the Florida Farm Bureau Federation, the federation honored Carl B. Loop Jr., former president, with a gift to establish *The Carl Loop Legislative Internship Endowment.* The gift will support undergraduate and graduate students participating in either the state or federal legislative internship program through UF's College of Agricultural and Life Sciences. The $100,000 gift also qualifies for a 50 percent match from Florida's Major Gifts Trust Fund.

NATIONAL FOLIAGE FOUNDATION GRADUATE ASSISTANTSHIP

The National Foliage Foundation Inc. (NFF) recently funded a new $350,000 permanent endowment through the University of Florida Foundation to support graduate student assistantships in the environmental horticulture department. Administered by the Florida Nursery, Growers and Landscape Association, the NFF is dedicated to funding research projects that have the potential for enhancing the development of the foliage industry and increasing the enjoyment of indoor plants. The endowment qualifies for a 50 percent match from Florida's Major Gifts Trust Fund.

HERB AND MUNCY CHAPMAN ENDOWMENT FUND

Herb and Muncy Chapman of Vero Beach recently funded joint life charitable gift annuities with a gift of appreciated securities to the University of Florida Foundation.

"Fifteen of my 28 years with UF's Institute of Food and Agricultural Sciences were spent as director of the Range Cattle Research and Education Center, which served over half of the cattle industry in Florida," Chapman said. "Since retirement, Muncy and I have written *The Wiregrass Trilogy*, three historical fiction novels based on the cattle industry prior to the Florida Territory becoming a state. The Ona center continues to provide vital information for cattlemen in subtropical and tropical environments, and we wanted to help support their efforts."

The remaining principal value of the annuities will one day establish *The Herb and Muncy Chapman Endowment Fund* that will support research and academic programs at the Range Cattle Research and Education Center in Ona.

IFAS *Development*

"Private Gifts Providing the Margin of Excellence"

WHAT IS IFAS DEVELOPMENT?

The IFAS Development program serves as the central fundraising effort to secure private support for the University of Florida's Institute of Food and Agricultural Sciences in partnership with the SHARE Council direct support organization and the University of Florida Foundation. Charitable gifts provide the "margin of excellence" for statewide IFAS academic programs, research, extension and facilities.

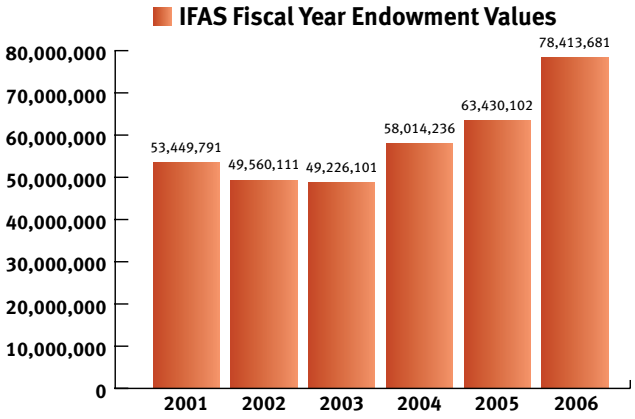
WAYS TO GIVE

There are several ways to support IFAS:

- Cash
- Charitable Bequests *(wills and trusts)*
- Real Estate *(residential or farmland)*
- Life Income Gifts *(charitable remainder trusts, annuities, retained life estates and retirement planning)*
- Stocks *(especially appreciated stocks)*
- Life Insurance *(new or existing policy)*

UF/IFAS ENDOWMENTS

Endowments are named permanent funds that provide annual renewable support for donor-designated IFAS programs. Endowments are managed and invested by the University of Florida Foundation. As of December 31, 2006, there are 234 UF/IFAS endowments valued at more than $78 million established by individual College of Agricultural and Life Sciences alumni, businesses, associations and friends of UF/IFAS. A new endowment requires an initial minimum gift of $30,000.



HOW GIFTS ARE USED

All gifts designated for IFAS are payable to the University of Florida Foundation and are generally tax-deductible. Your gift may support IFAS academic, research or extension programs, faculty initiatives, student scholarships, enhanced facilities or equipment. Permanent named endowed funds may also be established to ensure long-term stable funding for any project or program.

MATCHING GIFT PROGRAMS

The state of Florida currently provides generous matching funds for endowed gifts of $100,000 or more through its Major Gifts Trust Fund according to the following state matching gift levels:

$100,000 to $599,999	50%
$600,000 to $1,000,000	70%
$1,000,001 to $1,500,000	75%
$1,500,001 to $2,000,000	80%
$2,000,001 or more	100%

The Alec P. Courtelis Facilities Enhancement Challenge Grant Program provides 100 percent matches for gifts to construct or renovate UF/IFAS academic buildings.

Employers may also match employee contributions. Check with your employer's benefits office, and see if they will provide a matching gift form for you to complete and return with your gift.

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GARDENING IN A MINUTE!

Tom Wichman, an extension agent in UF's environmental horticulture department, provides thousands of listeners with timely information on the new "Gardening in a Minute" radio series.

Designed for Floridians with a passion for home horticulture and produced by UF's Institute of Food and Agricultural Sciences, the one-minute program airs on WUFT-FM in Gainesville and WJUF-FM in Inverness during the 2 p.m. hour and again at 6:18 p.m., Monday through Friday. These 2 public radio stations cover 19 counties in North Central and Mid-Florida.

Wichman, who also coordinates the popular Master Gardener Program, said broadcast coverage will be increased as other stations are added. The program can also be heard online at GardeningInAMinute.com. The interactive Web site provides gardeners with an opportunity to ask questions of a state horticulture expert, participate in horticulture contests and find more information on gardening topics.

Listeners can also subscribe to Podcasts of the program at GardeningInAMinute.ifas.ufl.edu/shows/podcasts/index.html.

"We're very excited about the impact this program can have in bringing practical gardening information to the public," Wichman said. "Although the series is for gardeners throughout the state, more localized information can be obtained from UF Cooperative Extension Service offices located in every county." Visit SolutionsForYourLife.com for more information.

He said "Gardening in a Minute" provides a chance for IFAS faculty to become involved in an interdisciplinary effort. While the show is a gardening program, script content is reviewed by state specialists in many fields.

The program is produced at WUFT-FM in UF's College of Journalism and Communications; UF's Center for Landscape Ecology and Conservation funds production costs and underwrites expenses for the series.

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PHOTO BY EMILY EUBANKS