



Myakka

A Soil and Water Science Department Publication



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Interdisciplinary Programs



Eric Brown, a PhD student, assessing the leaching characteristics of various nitrogen sources in a field maintained USGA putting green.



Soil sampling at a silvopastoral site at Ona, FL

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Visit the SWS website:
<http://soils.ifas.ufl.edu>



FROM THE CHAIR

The University of Florida and IFAS are celebrating UF's sesquicentennial year in 2003. This celebration highlights faculty

excellence with the theme, "honoring the past and shaping the future." In almost 100 years, Soil and Water Science Department (SWSD) faculty, staff and students have made significant contributions to improving the quality and productivity of Florida's agriculture and natural resources. Soil and water science - related research in Florida was first published in 1888 by the newly established Experiment Station of the State Agricultural College of Lake City, Florida. Early soil survey maps developed in 1904 included soils of Alachua, Levi, and Marion counties and showed Alachua Lake (Paynes Prairie) filled with water. In 1907, the Experiment Station was moved from Lake City to Gainesville. The present Newell Hall, then called the Experiment Station, was built in 1908. Early research included the use of lysimeters to study nutrient leaching in sandy soils. Water quality has been the focus of the SWSD during the past four decades and during this period our faculty have made major contributions at state, national, and international levels and brought recognition to the department and to the UF. The department has been blessed with excellent faculty. In the history of the department, 24 faculty members (13 retired) were elected as fellows of the Soil Science Society of America and the American Society of Agronomy, the highest recognition given to a scientist at the national level.

Today, the soil and water science programs are more complex and require expertise from various disciplines. To develop interdisciplinary connections, it is critical for us to maintain disciplinary strength,

which the SWSD has done effectively over the years. The interdisciplinary nature of SWSD programs provides students and faculty an opportunity to conduct basic and applied research at multiple scales, from molecular to landscape, to solve environmental problems and protect and manage land and water resources. We conduct research in a wide range of ecosystems, including agricultural lands, forested lands, range lands, urban lands, and wetlands and aquatic systems. In this newsletter, we showcase a few examples of interdisciplinary projects initiated by our faculty in collaboration with faculty from other disciplines.

Our faculty recognizes the importance of interdisciplinary approaches in addressing complex soil, water, environmental issues. At present all our grant projects involve one or more scientists from other disciplines, including several UF departments and scientists from other universities in the U.S and other countries, and state and federal agencies.

These are challenging times, with severe budget reductions, limited resources, and complex soil, water, and environmental issues, forcing us to think "outside the box" and explore new opportunities. We are making concerted effort to reach out by forming teams with other disciplines. To be successful in this effort, core disciplinary strength must be maintained. We strongly believe that programmatic team-building is important for success of our department, IFAS and UF, and we are doing our share to accomplish this goal. To our friends and alumni, we thank you for your support of our programs.

SWSD Alumni - We are in the process of updating alumni contact information. Please visit our website at <http://soils.ifas.ufl.edu/departments/alumni.html>. If you have questions, please contact Pam Marlin, pem@ufl.edu

TEACHING

Spring 2003

NEW GRADUATE STUDENTS

Kimberleigh Cayse, MS, *Advisor*, J. White
Gabriel Kasozi, PhD, *Advisor*, P. Nkedi-
Kizza
Manohardeep Josan, PhD, *Advisor*, V.
Nair
Michael Miyittah, MS, *Advisor*, G.A.
O'Connor
Sanjay Lamsal, PhD, *Advisor*, S.
Grunwald
Huazhi Liu, PhD, *Advisor*, S. Grunwald
Deoyani Sarkhot, PhD, *Advisor*, N.
Comerford

DISTANCE EDUCATION

Joaquin Jimenezs, MS, *Advisor*, S.
Daroub
David Mahnken, MS, *Advisor*, J. White
Rafe Padgett, MS, *Advisor*, S. Daroub
Christopher Penton, MS, *Advisor*, K.
Reddy
Charles Trotman, MS, *Advisors*, J.
Prenger and Shibu Jose

GRADUATES

Alex Aycrigg, MS, *Advisor*, J. White
Erin Bostic, MS, *Advisor*, J. White
Donald Hardison, MS, *Advisor*, L. Ma
Lakeshia Hill, MS, *Advisor*, D. Graetz

NEW UNDERGRADUATE STUDENTS

Valerie Antolak
LeAnna Totten

GRADUATE

Christopher Quensenberry

COMBINED BACHELOR'S/MASTER'S PROGRAM

The SWSD introduces a Combined Bachelor's/Master's Program that allows undergraduates to take graduate-level courses prior to completion of the bachelor's degree and to count 12 graduate credits toward both degrees. This degree track is intended for students who wish to pursue either a Master's thesis or non-thesis degree. To meet specific needs, students enrolled in this program may develop their graduate programs in Soil Science or Environmental Science tracks. Each graduate program is specifically tailored to meet the interests of the student in these tracks. For additional information, contact **Heather Barley** at: hdbarley@ifas.ufl.edu.

International Conference "Sustainable Land Application"

January 4-8, 2004, Wyndham Palace Resort and Spa, Lake Buena Vista, Florida

The University of Florida/IFAS is hosting an international conference entitled "Sustainable Land Application." The conference will address soil reactions of constituents in biosolids, effluents, manures, and other non-hazardous wastes. The conference will be science-based to avoid the appearance of bias. We expect the conference to have wide appeal, and to attract a minimum of 300 participants. The conference venue is Lake Buena Vista (Orlando), FL at a Disney property (Wyndham Hotel and Spa). Deadline for poster abstracts is Aug 1, 2003. For additional information contact the conference chair, **George O'Connor** at: gao@ufl.edu or visit the conference website at: <http://conference.ifas.ufl.edu/landapp>.

New Courses FALL 2003 - SEMESTER

SOS 5050C, 4 credits,
Soils for Environmental Professionals.
For details contact: George O'Connor
gao@ifas.ufl.edu

SOS 5720C, 3 credits,
GIS Land Resource Management
For details contact: Sabine Grunwald
sgrunwald@ifas.ufl.edu

SOS 6932, 3 credits,
Environmental, Soil, Water, and Land Use
For details contact: Randy Brown
rbb@ifas.ufl.edu

SOS 4233, 3 credits,
Soil and Water Conservation
For details contact: Randy Brown
rbb@ifas.ufl.edu

RESEARCH

Environmental Research in Agroforestry



Poultry manure application at the pecan-cotton alley-cropping field site at Jay, FL

SWSD has started a collaborative research project with the Center for Subtropical Agroforestry (<http://cstaf.ifas.ufl.edu>) of the School of Forest Resources and Conservation. The project on nutrient dynamics and environmental integrity is based on the hypothesis that agroforestry systems can minimize nutrient losses from the soil because of enhanced nutrient uptake by tree- and crop- roots from varying soil depths, compared to more localized and shallow rooting depths of sole crop stands. Nitrogen (N) and phosphorus (P) movement from organic- and inorganic-fertilized plots are currently monitored in collaboration with Dr. Shibu Jose at his alley-cropping site at the UF/IFAS West Florida Research and Education Center in Milton, FL. We are also studying nutrient movement through the soil profiles of Spodosols at the silvopastoral site of Dr. Rob Kalmbacher at the Range Cattle Research and Education Center, Ona, FL. These experiments, set up on different landscapes and soil types, should provide valuable information on the impact the two agroforestry practices have on nutrient runoff and leaching from soils and their effect on reducing ground-water pollution. For additional information, contact **Vimala Nair** at: vdna@ifas.ufl.edu

1st World Congress of Agroforestry June 27 to July 2, 2004 Orlando, Florida

Agroforestry researchers, high-ranking government officials, practitioners, extension agents, and students from throughout the world will gather in Orlando, Florida, for the 1st World Congress of Agroforestry, June 27 to July 2, 2004, for sharing knowledge, experiences, and ideas, and developing strategies for research, education and training in agroforestry. Sponsored by UF/IFAS and other public and private institutions in the United States and overseas, the Congress is planned and organized by a Global Organizing Committee, under the leadership of **P. K. Nair**, distinguished professor and director of the Center for Subtropical Agroforestry of the School of Forest Resources and Conservation, who is also an affiliate faculty member of the SWSD. The Congress, with the overall theme "Working Together for Sustainable Land-use Systems" will be organized around five major topics: Improvement of rural livelihoods; Enhancement of the environment and landscape; Policy, social, and institutional issues; Agroforestry science and education; and Agroforestry: the next 25 years. For additional details, please contact: **Ms. Mandy Padgett**, Congress Coordinator; Tel. (352) 392-5930; Fax (352) 392-0750; E-mail: mrpadgett@ifas.ufl.edu. Congress web-site: <http://conference.ifas.ufl.edu/wca>

RESEARCH

Phytoremediation Research on Arsenic Hyper-accumulation by Chinese Brake Fern



Close-up of the brake fern

The discovery of the first known arsenic hyperaccumulating plant in the world, *P. vittata*, commonly known as Chinese brake fern, marked the beginning of our efforts to understand why this peculiar plant has the extraordinary capability to accumulate huge amounts of arsenic and yet grow well. The discovery was published in *Nature* in 2001 and received unprecedented publicity worldwide. This all started with Kenneth Komar who joined the Bio-geochemistry of Trace Metals Program in 1998 as a M.S. student under the supervision of Lena Q. Ma.

One of the objectives of his research was to screen arsenic accumulating plants from an arsenic contaminated site. The arsenic hyperaccumulating plant was one of the more than a dozen plant species he collected from the site.

The long-term goal of our research program is to understand the mechanisms of arsenic hyper-accumulation by this plant, more specifically the mechanisms of arsenic uptake, translocation, distribution and detoxification by Chinese brake fern. Significance in science and application of this research has resulted in interest by scientists from many disciplines. The first joint effort was funded by the National Science Foundation to determine the feasibility of using Chinese brake to phytoremediate arsenic contaminated soils and wastes. Scientists involved in this research include Dr. Alex Green from Mechanical Engineering Department, Dr. Greg Erdos from Interdisciplinary Center for Biotechnology Research, and Dr. Yong Cai from Chemistry Department of the

Florida International University. To better understand the mechanisms of arsenic hyperaccumulation and enhance its potential for phytoremediation, a



Harvesting brake ferns

second joint effort was funded by National Science Foundation. Scientists involved in this research include Dr. Alex Green from Mechanical Engineering Department, Dr. Greg Erdos from Interdisciplinary Center for Biotechnology Research, and Dr. Yong Cai from Chemistry Department of the Florida International University. For additional information, contact **Lena Ma** at: lqma@ufl.edu

Turfgrass Nutrient Management



Travis Shaddox, a PhD student, conducting research on turfgrass water use efficiency

Through interdisciplinary efforts over the years, a strong research and education program has been developed within SWSD in the area of turfgrass fertility management and assessment as it relates to environmental impact and water quality. These efforts have been carried out by six faculty and five graduate students, within and outside of the department, and three support staff under the leadership of J.B. Sartain. Currently there are four Ph.D. and one M.S. graduate student working on various research projects related to turfgrass nutrition and the improvement of fertility management practices. This program is currently supported by grants from the Florida Turfgrass Association (FTGA), Florida Department of Agriculture and Consumer Services (FDACS), Florida Department of Environmental Protection (FDEP), United States Golf Course Association (USGA), The American Association of Plant Food Control Officials (AAPFCO) and eleven industry related organizations.

The objectives of this program are to determine: 1) the environmental impact of various turfgrass fertility management programs during grow-in and post-construction management, 2) correlate nutrient application rate, extractable soil nutrient test levels and turfgrass tissue nutrient levels with turfgrass growth and quality, 3) nutritional requirements of cool and warm season turfgrasses that will promote a high quality transition from cool to warm season turf, 4) the influence of N and P application and various growth media mixtures on contamination of ground water, and 5) various materials for use in turfgrass culture as soil amendments or as topdressings. Turfgrass is a major commodity in Florida with over 4 million acres of home lawns and 200,000 acres of turfgrass on over 1400 golf courses and an economic impact in excess of \$ 8 billion. Many feel that turfgrass is detrimental to the environment but through the research efforts of the Turfgrass Nutrient Management Program within the SWSD in collaboration with faculty in Environmental Horticulture Department and Ft. Lauderdale REC, we have discovered that turfgrass can be grown-in on a fairway with less than 4% of the N leached and maintained in a post-construction environment without any N loss. It has also been discovered that turfgrass in the landscape uses less than half the water and leaches far fewer nutrients than trees and shrubs. We will continue our efforts to improve the fertility management practices of turfgrass in Florida in an attempt to dispel some of the unjust claims being directed towards turfgrass and its management. For additional information, contact **Jerry Sartain** at: jbs@ifas.ufl.edu.

EXTENSION

The UF/IFAS Role in the USDA-CSREES National Water Quality Program

The USDA-CSREES nation water quality program, which is funded by the USDA's National Program Office for Water Quality, is a member of the larger CSREES (Cooperative State Research, Education, and Extension Service) Integrated Research, Education, and Extension Competitive Grants Program. It is often referred to as a "406" program because of its legislative roots in Section 406 of the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA). Cooperative Extension personnel from across the nation are involved, including: scientists learning new insights about agriculture the natural environment, instructors teaching within land-grant universities and community workshops, extension educators working with local community decision-makers, youth, the underserved, and the general public. All are effectively working to improve the quality of our nation's water resources. The goal of the program is to apply knowledge to protect or improve the quality of water resources throughout the United States and its territories, particularly in agriculturally managed watersheds at the national, regional, state and local levels. The CSREES National Water Quality Program consists of nine Regional Programs (based on the ten EPA regions), along with national facilitation, extension education, and integrated research, education, and extension projects. Florida is part of the Southern Regional Water Quality Program, which consists of 13 states from New Mexico to North Carolina. Our website address is <http://srwqis.tamu.edu/>.

The SWSD faculty involved in water quality extension programs include: Tom Obreza: Nutrient/water management and extension water quality coordinator; Rao Mylavarapu: Nutrient management, soil testing, and fertilizer recommendations; Mark Clark: Wetland resources and watershed management; Jerry Sartain: Nutrient management for turfgrass; Yuncong Li: Fertilizer and irrigation management for vegetables and tropical fruits; Craig Stanley: Water management for vegetables and ornamentals; Chris Wilson: Aquatic ecological risk identification and mitigation. The SWSD 406 funds will support travel and registration costs for eight county agents and seven extension specialists to attend the Southern Region Extension Water Quality Conference in Ruidoso, New Mexico in October 2003. Three agents and three specialists will present examples of their extension programs at the conference. For additional information contact: **Thomas Obreza**, Extension Water Quality Coordinator, at: taob@ifas.ufl.edu

FACULTY, STAFF and STUDENTS

Lena Ma was awarded UF-Research Foundation Professorship (2003-06). Thus far, 6 SWS faculty received this award. Lena was also awarded the 2003 Sigma Xi Junior Research Award.

Hugh Popenoe was honored by the Organization for Tropical Studies for his role in the Costa Rican-based research and education consortium.

Ann Wilkie was awarded a Travel Grant by the American Association for the Advancement of Science (AAAS) to visit Ukraine in Fall 2003. While in Ukraine, Ann will collaborate with Ukrainian scientists and provide technical expertise on waste treatment and bioenergy production from dairy manure.

The Department sponsored two undergraduate students to attend a summer course in Czech Republic. This interdisciplinary course, entitled "Integrated Analysis of Forested Watersheds" is taught by several UF/IFAS faculty, including **Mary Collins**.

Lena Ma was promoted to Full Professor and **Yuncong Li** was promoted to Associate Professor with tenure. Congratulations to both of them.

Two graduate students (**Daniel Perkins** and **Kimberly Epps**) were awarded UF Alumni Graduate Fellowships to pursue Ph.D in Soil and Water Science. These students will join the department in the Fall 2003.

Myrlene Chrysostome was awarded third place in the poster competition at the Southern Branch ASA meetings at Mobile, Alabama from Feb. 2-4, 2003.

Several of our faculty and staff retired during the current fiscal year. We wish them all the best and enjoyable retirement years.

David Calvert started his career at the Indian River REC, in 1962. During his tenure he also served as center director for seventeen years. His research program addressed the applied nutrient management issues facing Florida citrus grown on Flatwood soils, as related to environmentally sound management of this billion dollar commodity in the State of Florida. He is also actively sought by the citrus industry and state agencies to aid in developing best management practices for this commodity.

Bob Mansell joined UF faculty in 1968. His responsibilities included research and teaching. His research focused on coupled water-heat-chemical transport in plastic-covered soil beds during vegetable production; transport of reactive chemicals during variably-saturated water flow in subsurface porous media; density-coupled water flow and contaminant transport; and wetland hydrology and water quality.

Hugh Popenoe joined UF in 1951. In addition to his research in tropical agriculture, Dr. Popenoe was appointed for various administrative positions, including Director of the Center for Tropical Agriculture in 1965 and Director of International Programs in Agriculture in 1966. In addition he initiated and was Director of the Florida Sea Grant College from 1971 to 1978. He has traveled and worked in most of the tropical countries of Asia, Africa and Latin America.

George Snyder joined UF at the Everglades REC in 1967. He studied the management of soil, water, fertilizers and pesticides to optimize crop production and minimize losses of nutrients and pesticides. His research has focused on the organic and sand soils of south Florida and has involved vegetables, pasture, sugarcane, rice and turfgrass. Dr. Snyder has taught soil science courses for fifteen years as part of the undergraduate degree program at the Fort Lauderdale REC.

Mary McLeod joined UF as USPS staff in 1965. She spent her career in the Forest Soils Laboratory and was promoted numerous times as the program grew.

Shirley Robinson joined UF as USPS staff with ESTL/ARL in 1982. She was promoted to computer operator in 1989.