



Fall 2008

1 Plant Sciences Newsletter Fall 2008

Department of Plant Sciences

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Plant Sciences Newsletter

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Turf Undergraduate Program Update



by John Sorochan

The Turfgrass Science and Management (TSM) concentration in the Department of Plant Sciences at the University of Tennessee has grown tremendously over the past couple of years. Historically, students majoring in the former Turfgrass Management concentration were challenged to become turfgrass experts with only two turfgrass classes and one internship being offered during their undergraduate tenure. Since 2006, undergraduates majoring in the new TSM concentration are offered six turfgrass classes with the first beginning in the fall of their sophomore year. In addition to more turfgrass classes being taught, TSM majors are required to take an internship and can enroll for as many as two internships for credit.

Continued page 12



As an undergraduate student Stephen Sayrs worked for the UT Athletics Department. That experience helped him land his current job with the NFL as Assistant Athletic Field Manager for the Carolina Panthers.

Organic Outreach

by Annette Wszelaki



Interest in organically produced foods has been on the rise for more than a decade, with the demand across the country far exceeding the supply. Tennessee is no exception. In Tennessee, there are currently around 35 U.S. Department of Agriculture (USDA)-certified organic farms, with many more in the process of transitioning to organic approaches and even more opportunities for organic production.

What does “USDA-certified organic” really mean? To be labeled “USDA-certified organic,” fresh and processed foods sold in the U.S. must be produced according to the national organic standards and certified by an inspection agency accredited by the

USDA. The USDA created standards based on the definition of organic agriculture as an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. The standards, which went into effect in 2003, are based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony.

Potential growers have many questions.

- Where can I learn more about these standards?
- How long does it take to become ‘organic’?
- How do I get certified here in Tennessee?
- Why would I want to ‘go organic’?
- How can I connect with consumers who want to buy my organic crops?

Sometimes the process can seem a bit daunting. To help answer these questions, the University of Tennessee, in cooperation with the Tennessee Department of Agriculture, has launched a statewide organic agriculture initiative. The intent of this initiative is to involve more Tennessee farmers in organic production to increase farm income and provide an alternative to keep the family farm in the family.

Organic production has the potential to increase profits by reducing the use of off-farm inputs and providing consumers with locally grown, high-quality organic products in a rapidly growing market. In a collaborative effort among growers, university researchers, Extension specialists, industry and government, an organic production network is being created across the state to address critical issues in organic agriculture. Through a 10-part, yearlong lecture and hands-on demonstration series for commercial growers, we will fill in the gaps on how to “grow organic.” Workshops will cover organic opportunities in Tennessee, transitioning to organic, what you need to know about organic certification, how to market organic products, as well as the nuts and bolts of recordkeeping and production issues, such as seed supplies, fertilizer, crop rotation and pest management.

Moreover, on-farm research and organic production demonstrations will be conducted with cooperating farmers, as well as on the newly dedicated 21-acre



Graduate research assistant Constance Marie Hugo estimating biomass production in a separate field of rye and hairy vetch.



Dr. Annette Wszelaki, our Commercial Vegetable Extension Specialist, recently received a grant from the Tennessee Department of Agriculture to launch the UT Organic Agriculture Initiative in collaboration with her Plant Sciences colleague Dave Lockwood, as well as Rob Holland of the Center of Profitable Agriculture. Annette joined the Department of Plant Sciences in January of 2007. The main focuses of her Extension program include production and variety recommendations, diversifying production, developing alternative crops, sustainable production, crop sensory and nutrition evaluations, and postharvest handling.

Master Gardener Program



by Beth Babbit

Beth Babbit is our department's Extension Urban Horticulturist and State Master Gardener Coordinator. As an urban horticulturist, her focus is on assisting general audiences with home gardening issues. Beth co-hosts a two-hour, call-in radio program every Saturday with Dr. Sue Hamilton and Andy Pulte, called "The Garden Girls." She works closely with Extension agents and Master Gardener volunteers who provide sound university recommendations to gardeners.

One of the most popular questions I receive is, "What is the Master Gardener Program?" or "Who are the Master Gardeners?" Master Gardeners are trained individuals who volunteer to assist University of Tennessee Extension county offices in providing gardening information to the public. As the population grows and the need for information increases, Master Gardeners are becoming more invaluable to society, and more volunteers are being recruited.

The next question people ask is, "How do I become a Master Gardener?" This may be more complicated. Not all counties host a Master Gardener program or have an immediate need for the volunteers. However, the program is available in more than 45 counties in Tennessee. Most counties hold one training per year, and all volunteers must complete an application for consideration. Because of the popularity of the program, applicants are often placed on waiting lists.

When an applicant is accepted, he or she will start a rigorous 40-hour training program to begin a journey to becoming a certified University of Tennessee Master Gardener volunteer. The next part of the certification is volunteering. All certified MG volunteers have performed 40 hours of volunteer service in their community.

Following the year of certification, Master Gardeners must maintain their certification with 25 hours of volunteer service and eight hours of continued education. A Master Gardener volunteer is a truly dedicated individual.



Master Gardeners, community volunteer gardeners and new homeowners celebrate the completion of installing a landscape. This is a typical occurrence for a Saturday afternoon during the spring and the fall.



Graduate students, Constance Marie Hugo (BESS) and Sarah Broughton (Plant Sciences), transplanting melons and tomatoes with a no-till transplanter.

UT Organic Research Unit, a part of the East Tennessee Research and Education Center in Knoxville. Applied research will focus on conservation tillage techniques, high-tunnel production,

variety trials and evaluating the use of cover crops for optimizing fertility, enhancing beneficial insect populations, reducing soil-borne pathogens and managing weeds. Through this compre-

hensive organic outreach and research effort, Tennessee producers will have an opportunity to diversify their farm offerings and capture additional farm income. ✿



What It Means to Plant Sciences

Augé. What exactly is bioenergy?

Stewart. Bioenergy is energy from biological materials: from ancient firewood to provide heat, to futuristic cellulosic ethanol and tapping photosynthesis directly to extract energy. Today's bioenergy in the U.S. is mainly corn grain to ethanol. About a tenth of the volume of ethanol produced is biodiesel.

Augé. Bioenergy and biofuels have been in the Tennessee news quite a bit the past year or two. What is the Tennessee Biofuels Initiative?

Zale. The Tennessee Biofuels Initiative is a consortium including the state of Tennessee, the University of Tennessee and Oak Ridge National Laboratory. Producers will be paid to grow switchgrass and the switchgrass will be fermented into ethanol at a biorefinery. This initiative will take advantage of the extensive grasslands that cover much of the state.

Stewart. The initiative was driven by a partnership between UT AgResearch, the UT System and Oak Ridge National Laboratory to make cellulosic ethanol production a reality in Tennessee. Funded first by the state of Tennessee, and enabled by a business partnership with Dupont-Danisco, the initiative will build a 250,000 gallon per year plant—a biorefinery—that will mainly use a switchgrass feedstock.

Augé. What does bioenergy have to do with the Department of Plant Sciences?

Zale. The department intends to provide students with the educational skills and tools that will be important to this new industry.

Stewart. Research projects range from agronomy to the genomics and biotechnology of switchgrass and poplar trees. A new bioenergy undergraduate major became available in fall 2008, and Extension will be important as farmers begin growing new feedstock crops. Plant science is a fundamental foundation for bioenergy.

Augé. In his State of the Union address in January 2006, President Bush mentioned producing fuel ethanol from wood chips and switchgrass. What is switchgrass?

Stewart. The scientific name of switchgrass is *Panicum virgatum*. It is a North American perennial bunchgrass that can be used as forage or fuel feedstock. It is quite well-adapted to Tennessee. UT is a world leader in the biotechnology of switchgrass, with work pioneered by Dr. Bob V. Conger, now retired.

Zale. Switchgrass has traditionally been used in conservation plantings and as a forage crop. It has not been genetically improved to any great extent. Although it is native, it is anticipated that there may be disease problems in large-scale monocultures in the future. It will be important to continually genetically improve this grass so that it grows well in Tennessee microclimates.

Augé. And how are trees involved in ethanol production?

Zale. Poplar trees are fast-growing, and unlike switchgrass, require no special storage facilities, as the wood can be stored until use.

Stewart. Hybrid poplar has emerged as the most important tree from a genomics perspective. With a completely sequenced genome and work to

identify important cell wall and growth genes underway, it can help teach us how trees grow, which should lead the way to manipulation as bioenergy feedstocks for use in portions of the U.S.

Augé. We have a new undergraduate concentration in Bioenergy, which started this fall. What kind of jobs are our graduates likely to get three or four years from now?

Zale. Jobs will likely become available in fields such as agronomy, plant improvement and breeding, fermentation and bioengineering. There will be a range of other 'support jobs' available in this new green industry too, such as biorefinery jobs, engineering and in transportation.

Stewart. The biorefinery will need various skilled researchers and operations people even sooner than three or four years from now. As more switchgrass and other feedstock crops are planted, agriculturalists will be needed to grow it and also communicate with farmers.

There will be a high demand for researchers in universities, government and industry. The new biofuels are so new that it is hard to predict exactly which jobs will be available, but we will definitely need a workforce knowledgeable about bioenergy, which is a multifaceted field – from agronomy to enzymology and microbiology. Plants feature prominently in most aspects of bioenergy.

Augé. Do you think I'll be fueling my car with biofuel soon?

Zale. From my understanding, you can fuel up on E85 (85 percent ethanol/15 percent gasoline) now, but you will first have to ensure that your vehicle will



Above: A professor with the UT Department of Plant Sciences, Dr. Dennis West is a tall man, but you wouldn't know it from this picture. Standing in front of a towering teosinte plant, his newest research interest as another potential biofuel crop, he is dwarfed.

run on this higher concentration of ethanol.

Stewart. If it is a diesel car, you can use biodiesel now, and if it is a gas vehicle with a yellow gas cap, it can run on 85 percent ethanol E85, which is increasingly available in Tennessee. By 2020, our government's goal is that 20 percent of our transportation fuels will come from bioenergy. 🌱



Interim department head Bob Augé interviewed faculty members Janice Zale and Neal Stewart about the department's bioenergy programs.

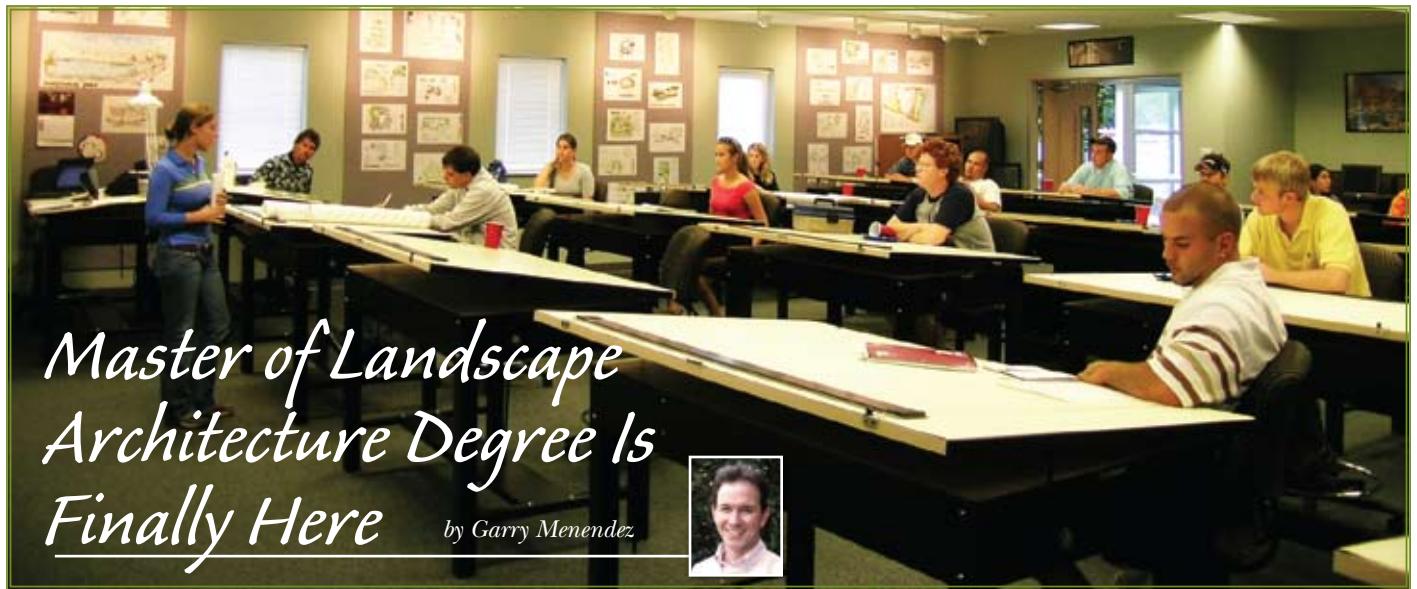
Dr. Janice Zale, monocot biotechnologist and geneticist, has a research and teaching appointment in the Plant Sciences Department. Her research focuses on genetic tool development and biotechnology of cereal and biofuel crops. Some of the genetic tools that she is currently developing require minimal technological inputs and would be useful in the developing world. Zale also has a prebreeding field program to develop superior germplasm lines of biofuel crops. Her plant biotechniques laboratory class is a mandatory class in the Plant Biotechnology concentration. She is also interested in new crop introductions and ornamentals.



Dr. Neal Stewart holds the Racheff Chair of Excellence in plant molecular genetics in the department. His research spans plant biotechnology, genomics and ecology. He has been performing agricultural biotechnology and biotechnology risk assessment research since 1994 and is also interested broadly in uses for biotechnology in the environment. He is a key person in the newly-funded \$135 million Oak Ridge National Laboratory Bioenergy Science Center who will be working to genetically improve switchgrass as a bioenergy crop. Stewart teaches graduate level courses in plant genomics and research ethics and a new undergraduate course in plant biotechnology and genetics.



Below: Native to Tennessee, switchgrass grows well on marginal land as well as in dedicated fields. UT researchers are working to boost its yield significantly.



Master of Landscape Architecture Degree Is Finally Here

by Garry Menendez



After a long and arduous wait, the University of Tennessee is finally offering its first degree in Landscape Architecture. Through a joint effort by faculty in the College of Architecture and Design (COAD) and the Department of Plant Sciences in the College of Agriculture and Natural Resources (CASNR), UT will see its first batch of graduate students in the Master of Landscape Architecture program this fall.

Two different tracks will allow students to choose the academic and career path that best suits them. Track 1 is a first professional degree that qualifies the student to sit for the Landscape Architecture Registration Exam (LARE). Track 2 will allow a student to pursue a Master of Arts (M.A.) or a Master of Science (M.S.) in Landscape Architecture and will be more research-oriented than Track 1.

Garry Menendez is a registered Landscape Architect and associate professor in the Department of Plant Sciences. He teaches courses in landscape design, graphics and professional practice and also maintains a small private practice in landscape architecture. He has authored several articles featured in such publications as The Tennessee Gardener, Landscape and Irrigation, and Garden Guide.

Landscape architecture integrates the experience of natural and constructed places into the design of memorable landscapes. The core values of the graduate program are based on a design-centered curriculum that promotes ethical imperatives, critical thinking and sustainable practices. These values will be expressed in an education that challenges students to become leaders and to engage the cultural, political and regional realities of real-world problems in designed and naturally occurring landscapes.

While the program will be administered through COAD, the Department of Plant Sciences will be actively involved in every step of this exciting new offering. Currently there are three registered landscape architects on the faculty of Plant Sciences: Garry Menendez, Sam Rogers and Curtis Stewart. The current undergraduate program in Landscape Design and Construction is likely to continue to grow and evolve as the graduate program in Landscape Architecture develops.

As more pressure is placed on the finite amount of land in Tennessee to suit the various needs of its citizens, the University of Tennessee and Plant Sciences will do their best to see that tomorrow's leaders will be up to the task of sound environmental stewardship. We are committed to the highest-quality collegiate opportunities. More information regarding the MLA program may be found at http://www.arch.utk.edu/acad_prog/mla_main.html. 🌿

Landscape Architecture is a unique blending of the arts and sciences. Abstract land forms and sensuous shapes are combined in this photo of the garden at the Museum of Modern Art in Edinburgh, Scotland.



Making Beneficial Selenium a Part of Your Regular Diet



by Dean Kopsell

I have been working with selenization of vegetable crops since my graduate school days. It has been both interesting and challenging to read through the medical literature describing the health benefits of consuming selenium (Se). With what I've read, every guy in the department should do his best to consume at least 200 μg Se per day. At this rate, one cohort study demonstrated a 60 percent decrease in the incidence of prostate cancer in the subject group. The study was actually stopped short due to the risk of those participants in the control group receiving no supplemental Se.

Many students and faculty have heard my colleague Carl Sams or I describe the “Jekyll and Hyde” quality of Se. At intakes up to 200 μg Se per day, Se can suppress the incidence of certain cancers; however, at intakes higher than 700 μg Se per day, Se is extremely phytotoxic. Because of the dramatic impacts Se has on disease suppression, medical doctors and plant scientists have been fortifying food stuffs with adequate levels of Se for human diets. Brassica and Allium species were the first obvious choices for selenization. These crops metabolize sulfur, which adds to their flavor attributes. This unique characteristic also allows them to accumulate and tolerate high concentrations of Se in their tissues. Both Carl and I have successfully selenized many Brassica and Allium species. But, there is a recent fear that these crops are too efficient at accumulating Se, and consumption of selenized Brassicas could lead to potential toxicities.

Another important factor to consider is that Se is continually excreted, and it

must be consumed daily for full benefits. In the U.S., the foods we eat (like fish, nuts and meats) provide enough Se to meet RDA levels of 50-70 μg Se per day. I've now turned my focus to crops that could provide lower levels of Se to supplement human diets up to the 200 μg Se per day level.

A study Carl and I presented this summer at the 2008 American Society of Horticultural Science conference involves the foliar application of Se to herbal crops. Herbal crop species are consumed regularly in the diet for their culinary flavor attributes. We conducted a study to determine the potential of fortifying basil and cilantro through foliar Se applications to consistently supplement diets with nutritionally beneficial levels of Se. Plants of each species were grown in both growth chamber and field environments and treated with foliar applications of selenate-Se and selenite-Se at concentrations of 0, 2, 4, 8, 16 and 32 mg Se/L. Actively growing plants received three separate foliar applications at five-day intervals. Selenium accumulation in both basil and cilantro leaf tissues increased linearly with increasing foliar Se treatments in both environments. Maximum Se leaf tissue concentrations for basil and cilantro ranged from 13 mg to 55 mg Se gram dry weight.

Dr. Dean Kopsell is a vegetable crop physiologist in the Plant Sciences Department. He received his graduate degrees in vegetable crops from the Horticulture Department at the University of Georgia. Before coming to UT in the fall of 2004, he spent more than four years as a faculty member in the Department of Plant Biology at the University of New Hampshire. Kopsell specializes in the areas of plant nutrition and plant improvement of vegetable and specialty crops. His current research focuses on environmental and genetic factors that increase the nutritional quality of vegetable crops, especially carotenoid phytochemicals. Some of his past projects have included measuring the impact of enhanced vegetable crops using human feeding intervention trials in collaboration with nutritional scientists.



At the tissue Se concentrations in our study, you would only have to consume about 1 tablespoon (4.5 g per 15 cm^3) of dried selenized basil per day to fortify your dietary intake up to 200 μg Se. So, start thinking of all the ways you can incorporate selenized basil into the foods you prepare to help protect against prostate cancer. 🌿

Plant Breeding Programs



Left: Graduate student Catherine Nyinyi designs a field layout to identify superior single plant selections. Her extraordinary work has already confirmed quantitative trait loci (QTL) for soybean fatty acid composition, oil content, and other valued traits, paving the way for geneticists to employ molecular marker assisted selection for plant improvement.

Below: Graduate student Andy Scaboo works diligently with undergraduate student assistant Elaina Behounek to test phosphorous concentration in soybean. Their research led to the first confirmed QTL for soybean seed phytate.



by Vince Pantalone

The plant breeding programs in the Department of Plant Sciences utilize genetic introgression and recombination to achieve genetic gains for the primary purpose of developing superior crop varieties. The Kentucky-Tennessee Tobacco Improvement Initiative, led by Dr. Bob Miller, is a striking success: More than 70 percent of the U.S. burley tobacco crop is planted each year in disease-resistant tobacco varieties developed by Miller. An important new thrust of Miller's current research is to reduce levels of nicotine to nornicotine conversion from foundation seed lots, leading to new low converter (LC) varieties with lower content of carcinogenic nitrosamines.

The Soybean Breeding & Genetics Program, led by Dr. Vince Pantalone, combines classical and molecular genetics approaches to solve research problems and rapidly develop new soybean varieties for farmers in Tennessee and the Mid-South region. The new Roundup Ready® variety 'USG Allen,' named in honor of Dr. Fred Allen, was co-developed by Department of Plant Sciences researchers Pantalone, Dr. Fred Allen and Debbie Ellis. In the 2007 standardized testing program, averaged over all counties in West Tennessee and western Kentucky, USG Allen soybean ranked NO. 1 for seed yield, outperforming the commercial variety average in its maturity class by 7.8 bushels per acre, during the most severe drought year in decades. The productive soybean varieties USG 5601T and USG 5002T, co-developed by Pantalone and Allen, currently serve as high-yield check varieties for the USDA Southern Uniform Testing Program, as the gauges of success that other breeders strive to beat.

The Corn Breeding Program, led by Dr. Dennis West, continues a high level of activity with a number of new releases of white corn inbred lines in recent years. West is currently researching teosinte, an ancestor of modern corn, in hybrid combination with corn, for its potential as a biofuel crop. Dr. Janice Zale has initiated a switchgrass evaluation/breeding project in collaboration with West and Allen. Allen and Zale have developed a new five-parent, experimental synthetic of switchgrass that is in the early stages of performance evaluations. Zale has recently made a notable discovery in identifying a rust species infecting lowland switchgrass accessions/varieties, and a bunt species that was contaminating seed lots from Texas. She plans to work closely with the anticipated hire of a new biofuel crops breeder to accomplish genetic gains in switchgrass for disease resistance and cellulosic ethanol production. *



Dr. Vince Pantalone is a professor in the Department of Plant Sciences, where he serves as project leader for a nationally recognized program in soybean breeding and genetics. Pantalone's research targets improved seed yield and seed quality. A current thrust of his research program is the development of low phytate soybeans for improved livestock nutrition and improved water quality from reduced phosphorous pollution. Another major thrust of the program is the development of low trans fat soybeans, which are currently in high demand by the food-processing industry and health-conscious consumers. Pantalone's program uses traditional and molecular methods of plant breeding – bringing improved soybean varieties to producers rapidly.

Notes from an Alumna by Jennifer Smith



Plant Science Advisory Board

As a graduate of the Ornamental Horticulture and Landscape Design program in 1982, I have found it interesting to see the transformation of this department. The many additions include an Advocacy Board that is evolving to serve our growing program. Having served on the Agriculture and Natural Resources Alumni Association Board, I was its president in 2005 when the strategic move was made to disband the Association and move to the Advocacy Board format. This Board not only includes alumni but those in the industry who attended other universities.

As the Plant Sciences Advocacy Board finds its niche, it strives to provide feed-

back for applied research, trends within the green industry and career opportunities for students. As a program graduate, I feel it is important to represent our students in their efforts to graduate with an employable skill.

Interestingly, I have wanted to talk with other agriculture advisory groups to learn how they operate, and recently found a fellow UT graduate at a conference in Florida! What a coincidence – the president of the Forestry Advisory Board was at my lunch table.

Lastly, Plant Sciences students, teachers, researchers and Extension specialists are in a unique position to positively affect our environmental ecosystem. I believe this will be the program's legacy. ❁

Jennifer Mathews Smith is a 1982 graduate of the Ornamental Horticulture and Landscape Design program. During that time she was involved with the Horticulture Club and served as its president. Since then she has had a career in the area of public horticulture and currently serves as the executive director of the Tennessee Urban Forestry Council. Jennifer served as president of the UT School of Agriculture and Natural Resources Alumni Association and is currently president of the Department of Plant Sciences Advocacy Board. In her role with the Advocacy Board, Jennifer is interested in developing this organization to serve the department with respect to teaching, outreach and research.

UT Gardens Celebrates 25 years

by Chuck Denney



East Tennessee gardeners like to point out that you can't spell beautiful without a "U" and a "T." Those letters come together at the UT Gardens in Knoxville. This blooming treasure along the banks of the Tennessee River remains one of the nation's prettiest science labs.

The Gardens are part of the East Tennessee AgResearch Center, where some 4,000 flowers, plants, trees, vegetables and grasses are evaluated each year. The Gardens' primary mission is research, yet it also is a beautiful place for the people of Knoxville to enjoy.

This year marks the silver anniversary of the Gardens, and curators say a new

Friendship Plaza dedicated on September 28, will only add to the experience for all who visit. Friends of the Gardens collected and donated more than \$150,000 to make the plaza project possible.

"This is the defining moment of the Gardens' 25th Anniversary," says Dr. Sue Hamilton, interim director of the Gardens and a UT professor in Plant Sciences. "It's with great appreciation that I thank the Friends of the Gardens for their commitment and support."

"This beautiful plaza is like a horticultural footprint for the gardens, and launches us into the future," says Mrs.



Students help sustain the UT Gardens. The Gardens, in turn, have helped launch many graduates' careers in exciting areas of public horticulture and landscape design.

Posey Congleton of Friends. "We have a long history of supporting public gardening and this inviting entrance is a gift to the region." ❁



the West Tennessee Research and Education Center



Dr. Robert M. Hayes, Research & Education Center Director and Professor

Dr. Hayes became the center's director in 2002. In addition to the director position, he maintains his weed science professor position in Plant Sciences. He received a Ph.D. in agronomy from the University of Illinois in 1974, and worked as an associate professor at the University of Kentucky until joining UT as an assistant professor in 1978. He has authored numerous refereed publications, served as major professor or on the graduate committees of 14 Ph.D. and 20 M.S. students and was named Fellow by the Weed Science Society of America in 2003.

Dr. C. Owen Gwathmey, Associate Professor

Dr. Gwathmey received his Ph.D. at the University of California, Riverside in 1991 in botany (plant physiology). Gwathmey specializes in the adaptation, ecology and management of field crops. He leads the cotton agronomy and physiology project in West Tennessee. This project conducts research on the environmental physiology and agronomy of cotton to help improve the efficiency, profitability and sustainability of crop production in Tennessee. Current projects focus on macro and micronutrient effects on cotton yield and fiber quality, and environmental stress effects dealing with water relations and ethylene concentrations.



Dr. Christopher L. Main, Assistant Professor

Dr. Main received his M.S. in agronomy from the University of Florida in 2001 and obtained his Ph.D. at the University of Tennessee, Knoxville in 2005. Main was previously the Extension weed control specialist with Clemson University prior to taking over responsibilities for cotton and small grains with the University of Tennessee. Main is responsible for coordinating statewide Extension educational programs in cotton and small grains production and cotton variety testing. He also collaborates with Extension personnel to conduct on-farm demonstration and research in the areas of crop production systems, fertility and variety testing.

Dr. Xinhua (Frank) Yin, Assistant Professor

Dr. Yin received his M.S. in crop nutrition and fertilization from the Nanjing Agricultural University, Nanjing, China in 1988, and his Ph.D. in agronomy from Purdue University in 2001. Yin joined UT's faculty in January 2008 as an assistant professor, in a 100 percent research appointment, working in the area of systems agronomy. Yin brings much-needed expertise in precision agriculture and nutrient management to our already strong team of research and Extension scientists in Jackson.



Dr. Lawrence E. Steckel, Associate Professor

Dr. Steckel received his Ph.D. in 2003 from the University of Illinois, his M.S. in 1989 from the University of Missouri and his B.S. in 1987 from Western Illinois University. He was employed as a seed corn company agronomist in the private sector for 10 years. Through his experiences as an agronomist, he enjoyed working with farmers and helping them solve management challenges. His study emphasis while at Illinois was researching the biology, ecology and management of a very troublesome pigweed species, common waterhemp. Steckel has a 75 percent Extension/25 percent research appointment at the University of Tennessee. He has statewide Extension responsibility as a weed specialist for all row crops. His research program is focused upon the study of the biology and management of weeds that are troublesome to Tennessee row crop producers.



Dr. M. Angela Thompson, Associate Professor

Dr. Thompson received her M.S. in agronomy from the University of Kentucky in 1989, and obtained her Ph.D. at the University of Tennessee, Knoxville in 1993. Previous career experiences include crop protection products research and teaching undergraduate agriculture classes. She is responsible for coordinating statewide Extension educational programs in corn, soybean and grain sorghum production. Thompson collaborates with Extension personnel to conduct county hybrid and variety testing, and coordinates demonstration research in areas of weed management, crop production systems, fertility and integrated pest management.

Known for its research on ornamentals, turf grasses, agronomic and horticultural crops, the West Tennessee Research and Education Center, established in 1907, is the oldest of UT's 10 Research and Education Centers. This has been a showcase year for UT in West Tennessee, with the annual Summer Celebration (July 10) at WTREC and the biennial Milan No-Till Field Day (July 24) at the Milan REC. Above and left are our Plant Sciences faculty at the WTREC.



[Continued from cover]

The greatest change to the TSM concentration has been the junior year spring semester block, which consists of several 1-2 credit-hour classes that focus on turfgrass science and management. This junior year spring semester block lasts 10 weeks, which enables students to finish their intensive studies in mid-March. Finishing the semester early allows students to begin their internship one and a half months earlier, and gives them an advantage over other university turf programs for internship opportunities. Having students available sooner for internships has been very rewarding for TSM undergraduates obtaining practical experience, as well as providing recognition to the University of Tennessee turfgrass program. Since the inception of the junior year turf spring block, TSM undergraduates have obtained highly competitive internships at major turfgrass venues. Students have done internships with lawn care companies, the last two PGA championships (Southern Hills Country Club and Medinah Country Club), several of the top 100 major golf courses, and professional ball teams such as Tennessee Titans, Philadelphia Eagles, Detroit Tigers, Baltimore Orioles and the Boston Red Sox (during their World Series championship year). The TSM program at UT has grown to include an international reputation: e.g., Winston Golf in Germany provides travel, housing, and meal expenses in addition to salary for UT students to intern.

TSM students are also excelling on a national level. Recently, Turf Club students competed against 28 other teams in the Sports Turf Managers Association Student Challenge. The team of undergraduate students (Stuart Morris, Lucas Freshour, Tyler Mittlesteadt and Will Jel-

licorse) won first place at the Student Challenge competition held January 17-20, 2007 at the National Sports Turf Managers Association's Annual Conference and Exhibition in San Antonio, Texas. The Student Challenge was a two-hour exam that consisted of turfgrass, insect, weed and disease identification; sports turf and budgeting-related case studies; pesticides application and calibration; and irrigation and sports turf playability questions. There were a total of 29 teams entered in the Student Challenge from various universities around the country. The UT students won first place medals, a trophy to bring back to the university and \$4,000 for the UT Turfgrass Club. More than 1,000 people were in attendance at the awards banquet. In addition, UT TSM students excelled in the national scholarship competition, where Will Jellicorse won first place for the Jim Watson Outstanding Undergraduate Student Scholarship held at the same conference. Another team member, Tyler Mittlesteadt, was one of three winners for the SAFE Undergraduate Student Scholarship. ❁

A native of Calgary, Alberta, Canada, Dr. John C. Sorochan began working on the grounds crew at Earl Grey Golf and Country Club in 1987. He received his Ph.D. in turfgrass science from Michigan State University in 2002, and is presently associate professor of turfgrass science and management in the Plant Sciences Department. Sorochan is responsible for the department's academic turf programs at both the undergraduate and graduate level and, in addition to teaching turfgrass management, advanced turfgrass management, and turfgrass root-zone management and construction, he has advised more than 40 undergraduate students and five graduate students. Sorochan's research interests include golf, athletic fields, residential, commercial and municipal turf applications, sustainable turf management, and turfgrass stress physiology.

Winston Golf, in Germany, where Neil Joiner (not pictured) completed a very rewarding internship. This golf course takes UT students as interns and not only gives them a salary, meals and accommodations, but also pays for the airfare to go over there, provides a car during their stay and offers free German lessons.



Right: Tony Cortes during the 2007 PGA Championship at the Southern Hills Country Club in Tulsa, Oklahoma, deemed 32nd in Golf Digest's Top 100 courses. In the background Tiger Woods receives his trophy.

Below: Dustin Lewis, in front of the Medinah Country Club in Illinois, had the opportunity to be a part of the 2006 PGA Championship. As part of his internship he set up and maintained the grounds at this golf course ranked in the top 20 of over 17,000 in the U.S.



Undergraduate Concentrations

Major in
Landscape Design & Construction
Department of Plant Sciences

Discover Plants

THE UNIVERSITY OF TENNESSEE
INSTITUTE OF AGRICULTURE
COLLEGE OF AGRICULTURAL SCIENCES & NATURAL RESOURCES

In the Landscape Design & Construction concentration, our focus is on all of the elements that create the landscape – balancing the concerns of people and environment in designing landscapes, installing plantings and stewarding these creations. Ours are “green” endeavors, melding art, science and business into creative acts of beautifying our surroundings.

Major in
Public Horticulture
Department of Plant Sciences

Discover Plants

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INSTITUTE OF AGRICULTURE
COLLEGE OF AGRICULTURAL SCIENCES & NATURAL RESOURCES

Public horticulturists write gardening books and articles, host gardening shows, and coordinate educational programs at botanical gardens or Master Gardener programs. Public horticulturists also manage public gardens, parks and greenways, and ensure that our nation is conserving plants through managed plant collections and plant exploration research all over the world.

Major in
Turfgrass Science & Management
Department of Plant Sciences

Discover Turf

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Turfgrass managers are involved with the production and maintenance of grasses for recreational, aesthetic and environmental uses. Students interested in careers in golf courses, athletic field and commercial turf management have the opportunity to develop a personalized program by selecting classes offered in a wide variety of areas.

Bioenergy is a dynamic and emerging field that seeks to convert energy from the sun into fuels via plants and bioprocessing and conversion. Bioenergy is booming in Tennessee and the U.S. as we seek to displace foreign petroleum products with homegrown energy sources that also have a more favorable carbon and environmental footprint.

Major in
Bioenergy
Department of Plant Sciences

Discover Plant Energy

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Plant biotechnology consists of genetic engineering and the molecular and cellular manipulation of plants and tissues. Biotechnology improves lives by enabling more efficient agriculture, better nutrition, a cleaner environment, and improved health.

Major in
Biotechnology
Department of Plant Sciences

Discover Biotechnology

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Would you like to learn how food is grown? Would like to run your own plant nursery or greenhouse? Perhaps a winery and vineyard are in your future? Areas of focus include production of ornamental plants, fruits and vegetables; nursery and greenhouse management; and plant breeding. Horticulture scientists help improve crop yield, quality, nutrition, and resistance to pests and environmental stresses.

Major in
Horticulture Science and Production
Department of Plant Sciences

Discover Plants

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The Latest...

Some New People

Dr. Jim Brosnan
Assistant Professor, weed control turf
Joined us August 18, 2008

Ms. Sujata Agarwa
Manager, Genomic Hub Lab
Joined us August 18, 2008

Ms. Dana Saywell
Extension specialist,
organic production
Joined us July 1, 2008

Mr. Andrew Pulte
Lecturer, public horticulture
Joined us July 1, 2008

Ms. Lynn Zorn
Business Manager
Joined us June 16, 2008

Dr. Frank Yin
Assistant Professor, systems agronomy
Joined us January 1, 2008

Dr. Greg Armel
Assistant Professor, weed control
hort crops
Joined us October 1, 2007

Dr. Annette Wszelaki
Assistant Professor,
vegetable production
Joined us January 1, 2007

Dr. Chris Main
Assistant Professor, cotton
& small grains
Joined us October 1, 2006

Graduate Program: As of fall 2008, we have 43 masters and Ph.D. students, whose studies range from molecular genetics to landscape architecture, representing many horticultural and agronomic specialties.

In the past year or so, our graduate students have competed and won awards in several competitions:

Turf students Jay McCurdy, Steve Borst and Dustin Lewis: Student Paper and Poster Presentation Awards, Southern Weed Science Society 2008 Annual Meeting, Jacksonville, Florida

Agronomy student Lucas Owen: first Place, Weed Science Poster Section, 2008 Beltwide Cotton Conference, Nashville, Tennessee

Turf students Jay McCurdy and Dustin Lewis: Oral and Poster Presentation Awards, Crop Science Society of America Annual Research Conference, Section 5: Turfgrass

Turf and weed students Matt Cutulle, Jay McCurdy, Dustin Lewis, Drew Ellis and Dennis Jones: Annual Summer

Weeds Contest Awards, Southern Weed Science Society 2007 Annual Meeting, Vero Beach, Florida

Soybean breeding student Catherine Nyinyi: 2007 Biotechnology Student Excellence Award, American Oil Chemists Society, Quebec, Canada

For a listing of current and recent graduate students, see <http://plant-sciences.utk.edu/gradstudents.htm>. (Don't see your name there? Please send it to us... and, apologies! We tried to list all graduates of each legacy department, but we know the list is incomplete, especially going back into the last millenium.)

Undergraduate program: We are pleased to announce that beginning this fall, we have six undergraduate academic concentrations: Landscape Design & Construction, Public Horticulture, Turfgrass Science & Management, Bioenergy, Biotechnology, and Horticulture Science & Production. Currently we have about 145 undergraduate majors in the department.

Recent undergraduate student awards:

Landscape student Valerie Friedmann: 2007 Exhibition of Undergraduate Research and Creative Achievement Award, University of Tennessee, Knoxville

Turf students Stuart Morris, Lucas Freshour, Tyler Mittlesteadt and Will Jellicorse: Student Challenge Trophy 2007 Undergraduate Competition, Sports Turf Managers Association's Annual Conference and Exhibition, San Antonio, Texas



For more { departmental news visit plantsciences.utk.edu/news.htm
undergraduate program news visit plantsciences.utk.edu/ug_news.htm

**2008 Faculty and
Emeritus Faculty Awards:**

Dr. Tom Mueller
University of Tennessee Chancellor's
Honors Award for Research and Creative Achievement.

Dr. Tom Mueller
Southern Weed Science Society's
Distinguished Service Award

Dr. Henry Fribourg
Distinguished Grasslander Award,
American Forage and Grassland
Council

Dr. John Foss
University of Minnesota Outstanding
Achievement Award

Dr. Garry Menendez
The Dutch & Marilee Cavender Best
Publication Award

Dr. Garry Menendez
The E.R. "Prof." Lidvall Outstanding
Teaching Award

Dr. Neil Rhodes
North Carolina State University
Outstanding Alumni Award

Plant Sciences in the Campaign for Tennessee: Growing in Support

By Mark Clark, Associate Development Director, UTIA Development Office

In the spring of 2008, the University of Tennessee announced its most ambitious fundraising goal ever. The effort involves raising \$1 billion to further support the growth and excellence of every department across each of the UT campuses. We are both fortunate and thankful for the contributions our department has received.

Outstanding support leads to new opportunities for our entire department and ultimately, it is our entire state that benefits. Within the last year, our department has been the beneficiary of several noteworthy gifts. While we can't possibly thank everyone appropriately, we wanted to share just a few of the ways our department has benefited from this campaign.

The Steve and Ann Bailey Endowment for Public Horticulture will provide real-world, hands-on experience by supporting undergraduate internships and educational programs to the public, garden clubs and students. The Jerry Baird Organic Horticulture Research and Education Endowment supports organic horticulture research and extension education programs in what is a rapidly growing area of interest. The Friends of the Gardens just helped the UT Gardens celebrate its 25th anniversary by dedicating a new "Friendship Plaza."

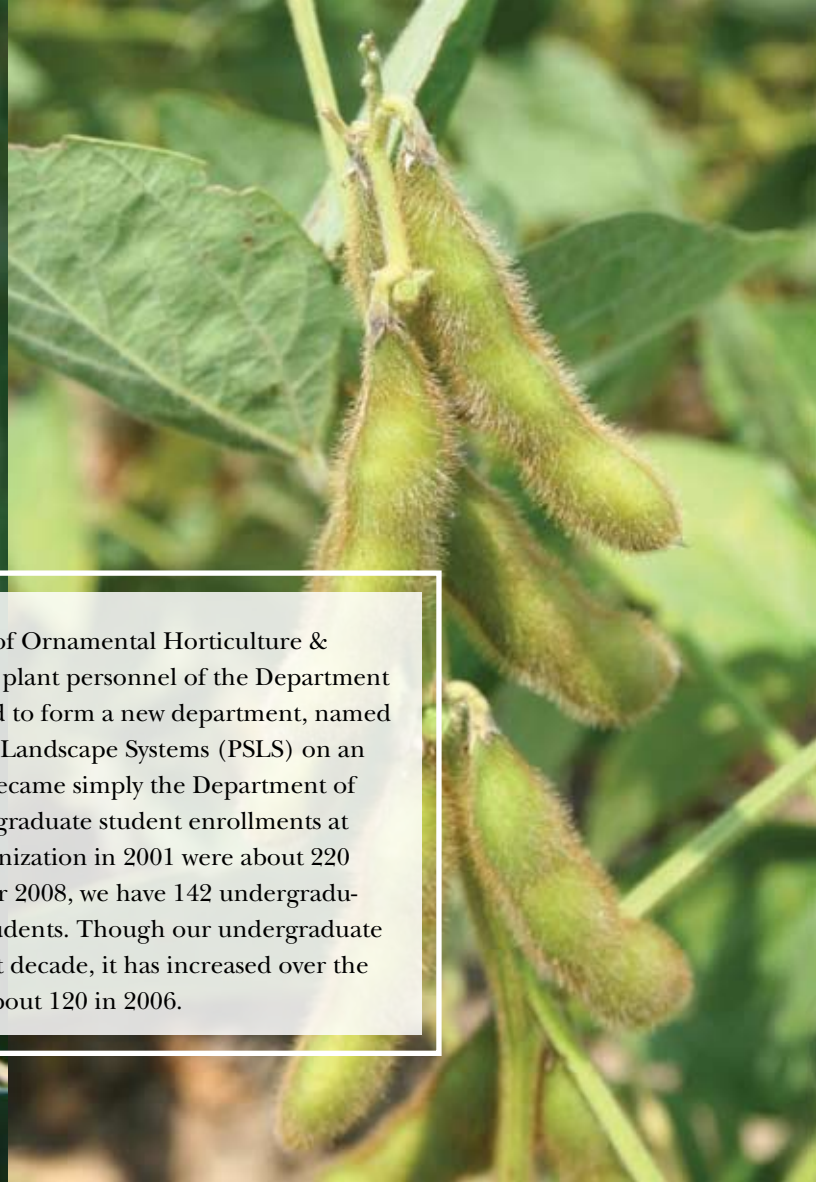
Interest in all things related to plant sciences – biofuels, organic farming, public horticulture, gardening, sustainability, etc. – have recently enjoyed resurgence in popular discourse. We are proud to note that we, as a department of faculty, staff, alumni, donors and friends, have always provided leadership on these critical issues. And with our growing support through the Campaign for Tennessee, we will continue to do so.

If you would like more information about the department's specific needs and/or naming opportunities, contact Mark Clark at mclark4@utk.edu or 865-974-5315.

Department head: On March 31, 2008, Dr. G. Neil Rhodes stepped down from his position as department head after more than six years in that job. He returns to faculty ranks as an Extension specialist in weed control. In addition to his work with agronomic crops, Neil has initiated a weed control program in switchgrass, critical to Tennessee's biofuel efforts.

Dr. Robert Augé has been appointed interim head to carry on administrative functions while a search is conducted for department head. Augé has worked in research and teaching for the Institute of Agriculture for more than 20 years, hired by the legacy Department of Ornamental Horticulture & Landscape Design in 1987, then moving to Plant Sciences when it was formed in 2001.

We would love to assure we have your current address. Please email us at plantsciences@utk.edu with your current contact information. Thanks!



In summer 2001, UT's Department of Ornamental Horticulture & Landscape Design (OHLD) and the plant personnel of the Department of Plant & Soil Sciences (PSS) joined to form a new department, named the Department of Plant Sciences & Landscape Systems (PSLS) on an interim basis. A year or so later we became simply the Department of Plant Sciences. Undergraduate and graduate student enrollments at the time of the departmental reorganization in 2001 were about 220 and 24, respectively. For fall semester 2008, we have 142 undergraduate students and 43 graduate students. Though our undergraduate enrollment is down compared to last decade, it has increased over the last couple of years from its low of about 120 in 2006.

The University of Tennessee
Department of Plant Sciences
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