

The Tiller

Plants & Soil: Tools for a Cleaner Environment

Department of
**PLANT & SOIL
SCIENCE**



Plant Sciences Building Approved

It's really going to happen! The UVM Board of Trustees approved \$55.7 million for construction of a new Plant Science Building to house both PSS and Plant Biology (formerly Botany). Groundbreaking for the 96,000 square-foot building is scheduled for spring 2008, with occupancy in summer 2010. The building will include seven teaching laboratories, three fifty seat general-purpose classrooms, and sixty-one research bays. These state-of-the-art facilities will serve over 1200 students annually. The building will be located near the water tower, and linked to the current Stafford greenhouses by an enclosed corridor. In keeping with the University's mission, it is designed to meet Silver LEED status. Exciting plans are underway for the exterior, as faculty and students will determine the design of the surrounding landscape features.



Architect Ellenzweig Associates from Cambridge, MA is collaborating with Burlington firm Freeman French Freeman

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Keep in touch:

- Write to pss@uvm.edu if you would like to be added to our new Alum Listserve and to receive upcoming newsletters.
- Let us know what you are up to. Include a picture if you can.
- Check out what other Grads are doing under the PSS Alumni section on our website at: www.uvm.edu/~pss

PSS Goes International

Last June, PSS assistant professor Ernesto Méndez led seven students to the coffee producing region of El Salvador, accompanied by teaching assistant Jessica Ridgeway and adjunct professor Jeanne Fossani.



Group gathers at the Rosales family farm

This team launched *Cafe (en) Tacuba: Ecologies and Livelihoods in a Shade Coffee Landscape of El Salvador*, which will be offered each summer. Students studied amid the beautiful coffee landscapes and two small-scale farmer cooperatives that manage about 100 Ha of shade coffee.

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From the Chair



Deborah Neher

Hello and welcome to the second edition of *The Tiller*.

Thank you for returning your yellow cards and providing feedback on

our first edition. Last spring, we watched 18 students graduate from PSS. New student enrollment is keeping our numbers of majors steady at 52 and our graduate student population increased from 18 to 23 this fall. Much of this growth is due to the attraction of Assistant Professor's Ernesto Mendez and Sarah Taylor Lovell's research labs. We are excited to announce the formation of four new minors, 3 in our department (Ecological Agriculture, Sustainable Landscape Horticulture, and Soil Science), and Food Systems which is cross-college and covers topics ranging from production to consumption. We are always interested to hear your thoughts. I hope you'll visit us on the web from time to time, or drop us a line. E-mail to: pss@uvm.edu

Best regards,
Deb



The Tiller is an annual newsletter from the Department of Plant and Soil Science, Vermont College of Agriculture and Life Sciences at UVM.

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Four New Minors



In response to student feedback and faculty input, Plant & Soil has reworked our minors to reflect our mission more accurately. Students have asked not only for more choice, but to engage in issues pertinent to us all today. We are addressing soil quality and health, food safety and security, organic production, agricultural and storm water run-off. We are also introducing research-based environmental approaches to traditional horticulture/landscape practices as an alternative to current methods. We believe environmentalism starts in your own backyard, and even your refrigerator. We hope to bring green processes into all levels of food production, landscape and soils management one corner of the world at time.

Ecological Agriculture

The Ecological Agriculture minor is designed to give students a knowledge-based concentration in diversified crop production based on ecological principles and is economically viable, socially acceptable, and minimizes impacts to the environment.



Food Systems

The interdisciplinary minor in Food Systems gives students the knowledge and skills necessary to understand the complex system of food production, processing, distribution and consumption.

Soil Science

The Soil Science minor provides students with a knowledge-based concentration in soil science that is sought after by those looking to hire agricultural and natural resource professionals.

Sustainable Landscape Horticulture

This minor is designed to provide students with a concentration in horticulture based on the application of ecological principles in landscape design and plant sciences.



A well-chosen minor can complement and fill out a student's career path in many ways. Combine a business major with horticulture and open the door to jobs in greenhouses, landscaping, or running your own company. Food Systems along with a nutrition major might help foster stronger ties for local farm to table initiatives. Study eco-agriculture with a language major so you can travel and also bring valuable skills to other parts of the globe. These are just a few examples, the possibilities are endless.

Gardens Galore.... The Gardens Flourish....



Summer 2007 was a much better growing season than 2006, with less rain and a greater amount of sunshine. Professor Mark Starrett coordinated two full time interns in our teaching gardens, both PSS majors, Joshua Bedol (Connecticut) and Andrew Doolittle (Maine). They, along with Master Gardener volunteers, worked tirelessly all summer, and it shows!

Continuing the work begun in 2006, these students erected a twenty-foot long piece of fencing, to coax foot traffic where we want it to flow. They put in a morning glory teepee, planted an Alpine display, herb and



edible display and masked the large drain covers behind Siberian Iris. They continued adding rows of ornamental grasses to the perennial bed by the Greenhouse retaining wall to make mowing the steep slope less of a travail. A stepping garden, by the foot of the wall, offers fragrant alternatives to the usual lawn grasses.



Part of the educational reasoning behind the gardens is that people will take a hint, and copy some of the plantings. In addition to these examples, an invasive species garden was built behind the Johnson House, on Main Street. This special project was initiated by students, done in tandem with Professor Jane Molofsky. They planted a selection of “most wanted” invasive species along with recommended replacements. To view: www.uvm.edu/~invasive.



The pocket garden outside Carrigan Wing has taken on a definitive Zen aura. The huge Volkswagen sized boulder unearthed during construction is

now comfortably companioned by Japanese maple, bamboo and a small rock path. Occasionally you will see a student or UVM'er relaxing in the sun, leaning against the warm rock surface.

The gardens popularity continues to grow. Science students, art students and just plain tired students continue to discover them for learning and relaxation. Faculty and staff take breathers there, and the picnic table has become prime lunchtime real estate.



Without Dr. Mark Starrett's planning and hard work, none of this would exist; we are so appreciative!

Master Gardener



Plant and Soil is home to one of Extensions most successful and visible outreach programs, The Master Gardener Program. For 15 years they have

provided timely, research-based information to home gardeners throughout the state via a toll-free Helpline (800-639-2230) and e-mail service that answers over 3,000 home horticulture questions each year. To become certified, you participate in a 13-week course, then complete a 40-hour internship. The instructors are UVM faculty and Vermont Horticulture Professionals. What might an internship consist of?

An impressive sampling of what volunteers have tack-

led this year alone include: MG installed rain gardens and organic lawn plots to reduce phosphorous loads in our waterways. They supported community gardens by lending teaching expertise, labor and obtaining funds. They worked with local schools to grow and donate produce to local food shelves. To educate the public about invasive species, they recently completed a 3 year renovation on the North grounds of the State house in Montpelier by eradicating goutweed.

This program is managed by two staff in PSS, Nancy Hulett, Program Director and Lisa Avery, Program Assistant. Email to: master.gardener@uvm.edu.

To learn more about the Vermont chapter of Master Gardener, visit their web-site: www.uvm.edu/mastergardener.

Not in Vermont? Go to the AHS web-site: www.ahs.org/master_gardeners.

UVM Constructed Wetland 4th Year Anniversary

The UVM Constructed Wetland Research Center (CWRC), located at the Paul Miller Dairy Farm, is approaching its four-year anniversary this fall. The constructed wetland system receives and treats barnyard run-off and milk parlor wash water from the farm's dairy operations. Since its inception in 2003, researchers have monitored the constructed wetland's treatment efficiency of nitrogen, phosphorus, organic matter, suspended solids, and pathogen removal. The CWRC site focuses on the use of steel slag filter systems to remove phosphorous and suspended solids from dairy farm effluents and storm water run-off. In addition, the constructed wetland is monitored for potential greenhouse gas emissions (methane, carbon dioxide, and nitrous dioxide).

Research is conducted by both graduate and undergraduate students under the supervision of Research Assistant Professor Aleksandra Drizo and Research Technician Eamon Twohig. Dr. Drizo is a leading in-

ternational researcher on constructed wetlands and steel slag filter systems for water pollution control. In particular, she is interested in their potential for nutrient removal from agricultural, rural and urban effluents; natural and industrial by-products as phosphorus removing filters; the impact of aquatic plants (*Scirpus sp.*, *Phragmites sp.*, *Typha sp.*) on pollutants removal and system hydraulic design; flow distribution patterns; optimal design parameters, and systems longevity in northern climates.

Please visit www.uvm.edu/~cwrc.



Eamon Twohig sampling in the wetlands field.

Organic Apple Open House

An Open House for the OrganicA Project was held on a sunny Friday afternoon, August 17, 2007, at the University of Vermont Horticultural Research Center (HRC) in South Burlington, Vermont. The event was open to the public and well attended by nearly 50 participants.

Opening remarks by project coordinator Dr. Lorraine Berkett of the University of Vermont and a definition of 'organic' by Nicole Dehne of the Northeast Organic Farming Association were followed by a tour of the organic research orchards. Further presentations by Dr. Berkett and project personnel Dr. M. Elena Garcia from the University of Arkansas, Dr. Renae Moran from the University of Maine, and Dr. Heather Darby and Terence Bradshaw from the University of Vermont covered many of the details of organic apple production. A wealth of information was offered and audience participation was active.

The OrganicA Project is a multi-disciplinary, multi-state research project with the long-term goal to enhance adoption of organic apple production in New England. Research is being conducted in organic orchards at the HRC examining the two major production systems growers would use in changing to new cultivars and to organic production. Horticultural data, soil health, pests, and economic inputs are being examined to determine challenges and opportunities, profitability, and sustainability of these systems. More information and resources for organic apple production can be found at: www.uvm.edu/~organica.



Terry Bradshaw discussing organic apple production.

International



(Continued from page 1)

Here they lent their hands to activities such as making Bocachi compost, planting coffee shrubs and starting

a coffee nursery. They also hiked in the tropical dry forest of El Imposible National Park and took the country's first shade coffee canopy tour.

A key skill students brought home was the ability to conduct a "participatory rapid rural appraisal" -- a method that rural development experts use to collect information quickly while emphasizing farmers' and community members' perceptions. It includes reviewing documents, mapping farms and communities and interviewing farmers.

In January, Méndez and assistant professor Sarah Lovell will submit a proposal to the National Science

Foundation for a related El Salvador project. In cooperation with coffee cooperatives, the Ministry of Environment and University of El Salvador, they hope to analyze ecosystem services, conservation and farmer livelihoods in a shade coffee buffer zone surrounding the National Park.

Jeanne Fossani passed away Oct. 24 after battling cancer. She taught multiple UVM courses and was an eco-tour coordinator and avid birder. As her vibrant work in this summer course shows, she was active to the end, making her sudden absence more poignant.



Alpha Zeta



2007 Induction

Alpha Zeta is a professional, service, and honorary agricultural fraternity for men and women; it seeks to develop leadership skills in individuals to benefit agriculture, life sciences, and related fields. There are over 100,000 members around the world!

The Green Mountain Chapter of Alpha Zeta was started in 1905 and is part of the College of Agriculture and Life Sciences at the University of Vermont. During the school year, the organization participates in service projects around the local community. The on campus advisor for the Green Mountain Chapter is Professor Mark Starrett. For more information go to: www.uvm.edu/~uvmaz.

Common Ground Farm

Common Ground is a non-profit organic student run educational farm that strives to maintain and expand the knowledge of agricultural practices through hands-on learning. PSS has been sponsoring the 2-acre farm since 1994, selling CSA shares and creating a positive link between UVM and the greater Burlington Community. The club donates 50% of the produce grown to local emergency food providers, such as the Chittenden County Emergency Food Shelf and the Burlington Salvation Army. Highlights of this past season included Common Grounders tilling their plots in the spring using draft horses. Over 35 CSA shares were sold to the UVM community with a variety of fresh healthy vegetables available each week. An extra share was given to the shareholders at the end of the season that was used for a harvest potluck and celebration. Visit us on the web! www.uvm.edu/~cgsref.



Faculty advisor Ann Hazelrigg, Plant Pathologist, discusses recent developments in Integrated Pest Management with students at the farm.

Horticulture Club



Montreal trip to the Botanical Gardens

Affectionately known as “the Hort Club”, this organization was founded in 1997 by Dr. Mark Starrett to bring together students interested in horticulture, that they may increase knowledge for themselves and others in the community. Activities are open to all students, from those who have no knowledge of plants to those who are majors in Plant and Soil Science. Members participate in a variety of activities including; forcing bulbs into bloom as gifts to local nursing

homes, attending presentations on bonsai tree care and flower arranging, field trips to the Montreal Botanical Gardens, and fundraising by selling house plants to other students during move-in weekend. The club is informal and fun. Many times, it is a student’s first foray into the world of serious plant people. Sometimes, it grows on them. Check us out at: www.uvm.edu/~hortclub.

Wendy Sue Harper Leaves PSS



Dr. Wendy Sue Harper, after 18 years with UVM in the PSS department, has moved on to new pursuits at the Northeast Organic Farming Association of Vermont in Richmond, (NOFA). She is their new Farmer Education Coordinator. Beloved by students and co-workers, she introduced hundreds of undergraduates to the hidden delights of soil science. We miss her, and wish her well for the future.

Fred Magdoff Retires



After 34 years with UVM, Fred Magdoff has retired. We were lucky to have had him for that long, both as professor and Department Chair. Fred also headed up the Sustainable Agriculture Research & Education program. Although officially retired, Fred is still very active in social justice, environmental and agriculturally related issues. We wish him well, and hope his suspenders hold their snap!

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Current Faculty

- * John Aleong - Applied Statistics
- * Lorraine Berkett - Plant Pathology
- * Sidney Bosworth - Field & Forage Crops
- * Scott Costa - Entomology
- * Aleksandra Drizo - Constructed Wetlands
- * Vladimir Gouli - Insect Pathology
- * John Hayden - Ecological Agriculture
- * Ann Hazelrigg - Plant Pathology
- * Sarah Taylor Lovell - Landscape Design
- * Ernesto Méndez - Agricultural Systems
- * Deborah Neher - Soil Ecology
- * Bruce Parker - Entomology
- * Leonard Perry - Ornamental Horticulture
- * Donald Ross - Soil Chemistry
- * Nate Sands - Soil Fertility & Management
- * Margaret Skinner - Entomology
- * Mark Starrett - Horticulture/Landscape
- * Jon Turmel - Entomology
- * Stacey Waterman - Soil Science, Agroecology

In the Spotlight - Scott Costa



Scott Costa

Scott Costa joined the Department of Plant and Soil Sciences in February of 1999. He moved his wife Allison and 4 children up from Raleigh, North Carolina where he had finished his doctoral studies at NCSU and worked for the U.S. Department of Agriculture. When they first arrived to their new home it was dark outside and they camped out in the living room. The next morning, they awoke to a view out the picture window of snow covered fields filled with horses. Now Scott and Allison have 2 more children, their own field with a horse and pony, and they love Vermont.

Over the past 8 years, Scott has progressed from a post-doctoral researcher to a research assistant professor in our department. He has worked on the manage-

ment and ecology of various insect pests including tarnished plant bug, western flower thrips, whiteflies and the hemlock woolly adelgid, which recently invaded Vermont. His primary emphasis has been the development of biological controls based on the use of insect-killing fungi. Along the way, he developed a standardized method for detecting the adelgid in forests that has been widely adopted by the US Forest Service and others. Recently, he was the lead-inventor on a patent application for a 'whey-based fungal micro-factory' technology, which is a natural approach to improving the economics and effectiveness of using fungi for pest management. The potential of this approach to expand adoption of beneficial fungi and reduce reliance on chemical pesticides led him to form a private company to encourage its development. More information at: www.uvm.edu/~scosta.



Hemlock twigs heavily infested with hemlock woolly adelgid, a destructive insect recently found in Vermont

Hills Building
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RETURN SERVICE REQUESTED



PSS Degrees Awarded at the 2007 Commencement

BACHELOR OF SCIENCE

Ecological Agriculture

Robert W. Ard
Laura M. DiCicco
Kristen L. Gallagher
Angela L. Hobson
Ian M. Irwin
Rebecca E. Snow

Plant and Soil Science

Debora L. Bedin
Benjamin J. Garber
Sarah N. White
Sustainable Landscape Horticulture
Errol D. Anderson
James M. Battin

Lindsay A. Blair
Ashley M. Carter
Adam T. Cushman
Ashley E. Gesner
Jennifer L. Johnston
Daniel J. Kirk
Sarah B. Lade

MASTER OF SCIENCE

Karen M. Hills – M.S. – Disease Suppression and Soil Quality Indicators after Organic Amendment to Two Soils with Differing Management Histories

Amanda L. Priestley – M.S. – Effect of Transgenic Bt Silage Corn Expressing the Cry1Ab Toxin on Non-Target Soil Arthropods