The Department of Plant and Soil Science is launching a new two-year summer institute to provide students science-based tools for understanding and applying techniques at the heart of sustainable food production. The sequence of courses was launched in 2009 to serve minors and majors in Ecological Agriculture, Sustainable Landscape Horticulture, and Food Systems. Course offerings were designed to serve UVM students as either requirements or electives toward the majors of Sustainable Landscape Horticulture (SLH) and Ecological Agriculture (ECAG) and minors of ECAG, SLH, and Food Systems. Odd and even-numbered summers will feature

(Continued on page 4)

10th International Agroecology Course

Plant and Soil Science Assistant Professor Ernesto Mendéz partnered with Stephen Gliessman of UC-Santa Cruz to co-instruct the 10th annual International Agroecology course. The course had a special focus on conceptualizing and applying participatory action research (PAR) approaches in agroecology to develop more sustainable food systems. In addition to providing a solid introduction to the field of agroecology, the course presented a critical overview of participatory approaches and methods, illustrated with long-term, ongoing PAR processes in the U.S., Latin America and Spain. This year’s setting in beautiful Vermont allowed participants to

(Continued on page 5)
This is an exciting time to be in Plant and Soil Science. The construction of Jeffords Hall is progressing quickly and our move is planned for early summer 2010. The landscape will become an outdoor laboratory for our students. Ecological Agriculture now attracts 30 majors and 5 minors and our degree in Sustainable Landscape Horticulture serves 28 majors and 12 minors. This past summer, we launched a new summer institute to showcase classes at the university farm. The selection and timing of courses is designed to serve minors and majors in Ecological Agriculture, Sustainable Landscape Horticulture, and Food Systems. Common Ground launched its 15th summer with a bountiful harvest. Vermont is a great place to spend summer! Our graduate program continues to grow with increased extramural funding. We currently have 28 full-time graduate students enrolled in our programs, of which 11 are pursuing doctoral degrees. This is a historical record high!

We thank you for your continued loyalty and support of our programs!

Deb

Urban Agriculture

Urban Agriculture (UA) is a hot topic these days and in response to student demand, a course is being taught as an elective this fall in the PSS Department. Students are learning perspectives on UA from the historical ancient Aztec chinampas, to Michelle Obama’s White House Garden, to the future potential for skyscraper farms in our densely populated areas. Instructor John Hayden believes Urban Agriculture is a movement whose time has finally arrived. Whether as a response to economic or ecological pressures, or a deep seated need for urban people to feel more connected to their food sources, we are seeing a huge surge of interest in this area.

Among the topics being covered are the technical aspects of container gardening and green roofs, vermicomposting and small scale livestock raising in the urban environment, the benefits and challenges of community gardening, and how urban agriculture can be an effective response to waste management crises and food insecurity.

The class has a hands-on experiential learning portion that involves students doing a “dormsteading” or at home project. These projects range from growing sprouts, mushrooms, redworms, windowsill herb boxes, season extension structures, and even rabbits in Burlington. The class took three field trips earlier in the semester, to The Farm Between, Montreal, and an exploration of the Burlington Urban Agriculture scene.
The cool wet weather in Vermont this past summer was much like the weather in Ireland in the 1840s. From 1780 to 1840 Ireland experienced a population explosion in part due to suitability of the potato as the main food staple for thousands of poor tenant farmers.

Instead of arriving in ship holds, our Phytophthora arrived from infected plants shipped into local big box stores and from wind blown spores from southern areas where the disease overwinters. The first samples of the disease showed up in the Plant Diagnostic Clinic in late June 2009, with samples increasing rapidly as the weeks progressed. It is an easy pathogen to identify under the microscope because it produces unique, lemon-shaped sporangia. Several early samples came in from gardeners and farmers worried about spots on their tomato foliage that turned out to be the normal fungal leafspot diseases we see every summer in Vermont. As the disease spread throughout the state, most of the samples by the end of the summer were infected with late blight. Several of the larger commercial conventional growers were ready with an arsenal of effective fungicides to control the disease. The organic farms were harder hit by the disease because the sprays available for management are not as effective and need to be applied on a very tight schedule due to the repeated rains. We suspect hundreds of thousands of dollars were lost in total farm profits this past summer as a result of this devastating disease.

The introduced potato grew well in the Irish climate, produced a good yield for the small acreage and was able to be stored through the winter. By 1840, one third of the Irish population was dependant on the potato for its sustenance. As a result of this Irish monoculture, the crop and the people were vulnerable to the new disease that was brought in to the country from ships’ cargo holds in the fall of 1845. The disease, caused by a fungus-like pathogen called *Phytophthora infestans*, rapidly spread to fields causing one third of the crop to be lost. The blight spread throughout the fields as spores settled on the leaves of healthy potato plants, reproduced by the millions, and were carried by the wind to surrounding potatoes. Under ideal moist conditions, a single infected potato plant could infect thousands more in just a few days. The next several years were perfect for the disease, ultimately causing approximately a million Irish to die and many more people to emigrate.

The symptoms of the disease, seen by the Irish in the 1840s, were the same as we saw in Vermont this summer. The blight causes a dark green greasy looking spot on the foliage. Under moist conditions, you can see white sporulation on the leaf undersides. In Vermont, we saw the disease attacking both tomato and potato foliage, although the potato seemed a bit more resistant.

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The good news about the disease is that it does not overwinter here in Vermont, so we may not see it again for several years. Of course, this depends on the weather, the storm patterns that could blow spores in from the South, and whether the disease is introduced into the state from infected southern transplants. Next spring, Vermonters should consider growing their own tomato transplants for their garden or purchasing them locally so I can take a vacation next summer!
Vermont Food Summit
Kate Turcotte, Ecological Agriculture Senior

For one week in April 2009, PSS student Kate Turcotte spearheaded a challenge to the campus community, making us see and think about our food differently.

The Vermont Food Summit was a week-long, student-driven event that celebrated and brought everyone to the table to discuss food. All of the events were sponsored by different organizations on and off campus, including Common Ground Farm, University Program Board (UPB), Vermont Campaign to End Childhood Hunger, City Market and Eco-Reps. There was a total of 36 presenters and sponsors throughout the week. A highlight was the Battle of the Campus Chefs, where ten chefs from the UVM dining halls paired up with a student organization to compete for the title and trophy in front of a panel of judges and the audience. The Local Foods Potluck and contra-dance, sponsored by UPB, Eco-Reps, and The Vermont Student Environmental Program, was a huge hit and great way to end the week. There was a day-long intensive series of workshops for young aspiring farmers with speakers from the Center for Sustainable Agriculture, the Intervale, the Women's Agricultural Network, and NOFA-VT. The keynote speaker for the event was Robert Egger, founder of the DC Central Kitchen and Campus Kitchens Project, and a fierce advocate for young people creating positive change. Throughout the week there were speakers, informal discussions, movies, and demonstrations to bring attention to something that we do everyday. Please visit the website at www.uvm.edu/~vfs

Summer Institute at the University Farms

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Nutrient Management and Pest and Pathogen Management themes, respectively. The courses are taught field station style at the Miller dairy farm and Horticulture Research Center. In summer 2009, Tom Gilbert of Highfields Institute, taught PSS 154 Composting Ecology and Management and Assistant Professor Josef Görres taught PSS 162 Soil Fertility and Conservation. One class project was to produce a management plan for a compost facility at UVM that includes farm and food waste.

Summer 2010 will feature Pest and Pathogen Management courses. Entomology, plant pathology, and weed ecology will be offered one day per week for 8 weeks (June 14 - August 6). Tree Fruit Crops (June 14-July 9) and Introductory Ecological Agriculture (July 12-

August 6) will each be offered two days per week. Students can gain experiential learning in farm planning and practice in a six-credit Organic Practicum sequence beginning spring 2010, running through fall 2010. Our aim is to attract outside audiences that include K12 teachers, non-traditional students interested in learning production systems, and traditional students moving through their BS in less than 4 years. Summer courses have the advantages of coinciding with the growing season in Vermont, a savings of 15% on tuition, and a student graduating 1 or 2 semesters early.
Soils around the world contain a vast store of carbon—more than currently in the atmosphere or tied up in living plants and animals. While not a cure for global climate change, enhancing and protecting soil carbon can partially offset atmospheric increases while also increasing soil quality. Vermont’s forests cover about 80% of the state and a better understanding of forest soil carbon dynamics is needed. How much carbon is contained in a typical forest soil profile? How is it distributed with depth? What are the effects of timber harvesting on soil carbon stores? These questions are being addressed in a study conducted by Don Ross, PSS faculty, and Juliette Juillerat, PSS graduate student, along with Sandy Wilmot of the Vermont Department of Forests, Parks and Recreation. The focus has been on the dominant soil types found in Vermont under the dominant natural communities or forest types. Over the past two summers, a field crew has been sampling sites around Vermont that fit these criteria and that have a sustainable forest management plan. Plots have been put on state lands, federal lands, town forests, UVM’s Jericho forest and parcels owned jointly by the Vermont Land Trust and the Nature Conservancy. Early results are interesting in that it appears that ‘poor’ sites that are wet may have more carbon than nutrient-rich sites that may be more productive for timber. A website (http://www.uvm.edu/~soilcrbn/) details the study and is being updated with results as they are tabulated. The plan is to revisit and resample the sites after timber harvest and examine any changes in soil carbon. A number of other soil quality indicators are being measured, including mercury, which is the focus of Juliette’s thesis research. Mercury is an air-borne toxin that, while low in concentration, appears to accumulate in forest surface soils (associated with soil carbon). Several undergraduate students have participated in this research, including Corey Snyder, Mark Rasmussen, Pace Goodman, Jerome Barner, Chauncey Smith and Emily West. The research will be disseminated widely through our many cooperators, listed on the website under “contacts”.

The Carbon Beneath Your Footprints

Soils around the world contain a vast store of carbon—more than currently in the atmosphere or tied up in living plants and animals. While not a cure for global climate change, enhancing and protecting soil carbon can partially offset atmospheric increases while also increasing soil quality. Vermont’s forests cover about 80% of the state and a better understanding of forest soil carbon dynamics is needed. How much carbon is contained in a typical forest soil profile? How is it distributed with depth? What are the effects of timber harvesting on soil carbon stores? These questions are being addressed in a study conducted by Don Ross, PSS faculty, and Juliette Juillerat, PSS graduate student, along with Sandy Wilmot of the Vermont Department of Forests, Parks and Recreation. The focus has been on the dominant soil types found in Vermont under the dominant natural communities or forest types. Over the past two summers, a field crew has been sampling sites around Vermont that fit these criteria and that have a sustainable forest management plan. Plots have been put on state lands, federal lands, town forests, UVM’s Jericho forest and parcels owned jointly by the Vermont Land Trust and the Nature Conservancy. Early results are interesting in that it appears that ‘poor’ sites that are wet may have more carbon than nutrient-rich sites that may be more productive for timber. A website (http://www.uvm.edu/~soilcrbn/) details the study and is being updated with results as they are tabulated. The plan is to revisit and resample the sites after timber harvest and examine any changes in soil carbon. A number of other soil quality indicators are being measured, including mercury, which is the focus of Juliette’s thesis research. Mercury is an air-borne toxin that, while low in concentration, appears to accumulate in forest surface soils (associated with soil carbon). Several undergraduate students have participated in this research, including Corey Snyder, Mark Rasmussen, Pace Goodman, Jerome Barner, Chauncey Smith and Emily West. The research will be disseminated widely through our many cooperators, listed on the website under “contacts”.

10th International Agroecology Course

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learn about one of the strongest locally-driven food systems in the United States, one of the factors that drew 37 students, of which 11 were from UVM and the remainder from other regions of the US, Canada, Mexico, South Korea, Saudi Arabia, Columbia, and Venezuela.

The course consisted of lectures, demonstrations, and field applications of agroecology illustrated by visits to local farms, Digger’s Mirth, Pitchfork, Jericho Settler’s, Full Moon Farm, and The Farm Between. Discussions of course concepts were complemented with these on-farm and in-garden experiences in research and production alternatives.

ANNUAL INTERNATIONAL AGROECOLOGY SHORT COURSE
5-18 July, 2009
Deb Neher Receives Vogelmann Award

Congratulations to Professor and PSS Chair Deb Neher, winner of the 2009 CALS faculty research award!

The Hubert W. Vogelmann Award in CALS recognizes outstanding effort and achievement in research and scholarship. The recipient of this annual award has his/her name engraved on commemorative plaque and receives an award of $2,500.00 which can be used to support research efforts. In addition, the recipient presents a seminar to the CALS faculty in the fall semester.

Quoting Deb on her research: "This is the last frontier — we know more about outer space and the deep sea than we know about the organisms in our own back yard," Neher insists. "Soil animals make up 23 percent of the total diversity of life, yet we know only about 10 percent of the taxa and little about their life history. Not only are there many gaps in the taxonomy, only a handful of scientists study what is known."


Jeffords Building Update

△ We are on time, and on budget!
△ Project Manager: Michael Stevens
△ Project Architect: Freeman French Freeman, Inc. with Ellenzweig Associated, Inc.
△ The departments will move in May 2010
△ Landscaping is installed, the mild fall weather was a big help
△ The goal for the building is Leed Certification
△ Bricks, granite from Vermont

△ Seven new teaching laboratories designed for 24 students each
△ Three lecture rooms for 48 people each
△ Multiple sizes of conference rooms
△ Computational lab for Field Naturalist and landscape design students
△ Connected to greenhouse for transporting of plants 12 months per year
△ State of the art climate control
△ Watch the building of Jeffords Hall (3 min. movie)
Goodbye to Sarah Taylor-Lovell

Sarah was recruited away from UVM and back to the University of Illinois Champagne-Urbana this summer. Though we were very sad to lose her, we are looking forward to our continued collaborations on current and future grants.

Welcome Jane Sorensen

Teaching PSS 137 Landscape Design Fundamentals and PSS 238 Ecological Landscape Design, Jane brings fourteen years experience to our students. A practicing landscape architect for 10 years, she holds an MLA from Harvard, and co-owns an organic small-fruit, vegetable and flower farm, River Berry Farm in Fairfax, Vermont.

Welcome Stacey Waterman

Currently teaching PSS 021, Introduction to Ecological Agriculture, Stacey came to UVM after her 2005-2007 Peace Corps Volunteer work in Malawi, where she worked with farmers on soil conservation and food security projects.

In the Spotlight - Master Gardener Program

Housed within the Department of Plant and Soil Science at UVM, the Extension Master Gardener program provides Vermonters with science-based horticulture information through a trained group of dedicated volunteers. Research shows that hobby gardeners are quick to resort to over-the-counter pesticides when dealing with unknown pests in their landscapes and gardens. Through lectures and demonstration sites, Extension Master Gardener (EMG) volunteers teach the gardening public about pest identification and management using integrated pest management (IPM) strategies. IPM strategy is the principal that guides the program’s four focus areas: water quality issues, local foods, sustainable landscapes and invasive species awareness. EMG volunteer outreach impacts communities across Vermont. Volunteers help maintain plant collections at the UVM Horticultural Research Facility and the PSS student learning gardens on campus. They also support gardening in communities by working at schools, farmers markets, community gardens, libraries, hospitals, agricultural fairs and more. Additionally, volunteers staff the Master Gardener Helpline, a statewide source of information for home gardening questions that consumers access via toll free phone or email.

Since the program’s initial inception in 1991, over 2,500 home gardeners across the state have completed the annual course, which includes a 40 hour internship. In 2009, 533 volunteers contributed 12,371 hours of education outreach across Vermont!
PSS Degrees Awarded at the 2009 Commencement

BACHELOR OF SCIENCE

Ecological Agriculture  Sustainable Landscape Horticulture  Sarah Maleno Greenleaf
Claire Elise Garner  David M. Brault  Kaitlin May Harris
Andrew Lee Herrick  Alex Paul Corn  Mark H. Jenkins, Jr.
Dana Lipinski Jokela  Benjamin M. Crockett  Jonah Fortune Tidyman

MASTER OF SCIENCE

Simon Christopher Edward Bird - MS - Investigations of Electric Arc Furnace Slag filters: Phosphorus Treatment Performance, Removal Mechanisms and Material Reuse
Morgan Lyn Cromwell - MS - Evaluation of Alternative Fungicides for Organic Apple Production in Vermont
Yiwen Zhao - MS - Non-Target Effects of Bacillus Thuringiensis Transgenic Corn on Soil Microarthropod Communities

DOCTOR OF PHILOSOPHY

Brian James Darby - PhD - Influence of Altered Temperature and Precipitation on Desert Microfauna and Their Role in Mediating Soil Nutrient Availability
Sally A. Flis - PhD - The Effects of High Copper Dairy Manure on Manure Storage, Soil, and Plant Growth and Composition
Amminder Jit Kaur - PhD - Soil Moisture and Season Effects on Nitrogen Transformation Rates in Seep Soils of Two Northern Hardwood Forests in Vermont