Plants & Soil: Tools for a Cleaner Environment
Dear Alumni,

We reach a historic record as we greet 83 undergraduate students majoring in Ecological Agriculture and Sustainable Landscape Horticulture! In addition, we advise 48 Environmental Science students.

Our programs are attracting outstanding students and we take pride in the placement of our alumni. Our graduate student numbers remain steady at 25 even after 8 graduated this past year. This academic year marks a first at UVM when students are required to take courses in ‘sustainability’ and our department is among those with this brand.

Three faculty members were recognized for achievements this past year. Yolanda Chen earned tenure and was promoted to Associate Professor. Mark Starrett earned the UVM Administrative and Facilities Services Outstanding Colleague Award for his contributions to educational gardens on campus. Ernesto Mendez earned the Lynne Bond Outstanding Service-Learning Faculty award for his Advanced Agroecology course and Community Participatory Action Research.

New grant dollars support three new full-time Research Assistant Professors in our department this fall: Jason Parker, Scott Merrill and Ahmed Hamed. Other new grants were earned by Terry Bradshaw, Yolanda Chen, Deb Neher, and Margaret Skinner.

Changes abound with new budget models on campus. Extension faculty on campus will now answer directly to the Dean of Extension rather than in CALS. Academic year courses are now managed within CALS that were offered previously through Continuing and Distance Education. We finished a second successful year of the Catamount Farm summer program which expanded to manage six acres of organic vegetable production, and produced a series of outstanding CSA shares this season!

We are grateful to generous donors that contributed to the purchase of our new departmental van this semester.

Thanks for your continued loyalty and support of our programs!

Deb
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The Tiller, annual newsletter for:
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All artwork courtesy of Jane Neroni
Cover art work oil painting, “After the Storm”.

Departmental Faculty

- Sidney Bosworth - Field & Forage Crops
- Terence Bradshaw - Pomology
- Yolanda Chen - Insect Agroecology
- Josef Görres - Ecological Soil Management
- Ahmed Hamed - Computer Science
- Ann Hazelrigg - Plant Pathology
- Stephanie Hurley - Landscape Design
- Scott Lewins - Entomology
- Ernesto Mendéz - Agricultural Systems
- Scott C. Merrill - Quantitative Ecologist
- Keith Morris - Permaculture
- Deborah Neher - Soil Ecology
- Jane Neroni - Botanical Illustration
- Bruce Parker - Entomology
- Jason Parker - Agricultural Anthropology
- Leonard Perry - Ornamental Horticulture
- Donald Ross - Soil Chemistry
- Margaret Skinner - Entomology
- Jane Sorensen - Pollinators/Landscape
- Mark Starrett - Horticulture/Landscape
Dr. Yolanda Chen and the Insect Agroecology and Evolution Lab study how humans have shaped insect-plant interactions in agriculture. She is particularly interested in how the origins of insect pests may be coupled with crop domestication and how human-assisted crop translocation affect the evolution of widely successful insect pests. Ultimately, the IAEL lab is focused on developing guidelines for designing agroecosystems that draw upon an understanding how a better understanding of ecological, evolutionary, and agricultural processes can lead to novel ways to control insect pests.

Dr. Chen will be on sabbatical for the 2015-2016 year, which she will spend at the Laboratorio Nacional de Genomica para la Biodiversidad in Mexico. Dr. Chen is interested in furthering her research interests in studying how crop domestication influences species interactions. She recently published two review papers on crop domestication and insect-plant interactions in Annual Review of Entomology and Entomologia Experimentalis et Applicata.

Pest evolution of the Colorado potato beetle

Colorado Potato Beetle (CPB), *Leptinotarsa decemlineata* (Coleoptera: Chrysomelidae) is a major pest of potato and found throughout the Northern Hemisphere. Despite being a ubiquitous backyard pest, relatively little is known about how this beetle evolved as a pest and why it is so incredibly successful. By studying Mexican and US populations, it was discovered that one Mexican beetle population appears to be genetically similar to the US pest population, but does not appear to be entirely the ancestral population. With Dr. Sean Schoville (University of Wisconsin) and the Human Genome Sequencing Center at Baylor University, Dr. Chen has been leading an international effort to describe the genome of CPB.

Designing agroecosystems to disrupt activity of the invasive swede midge

*Contarinia nasturtii* (Diptera: Cecidomyiidae) is a recently introduced invasive pest of *Brassica* crops (broccoli, cauliflower, brussel sprouts, bok choy, canola, etc.). It was first discovered in upstate New York in 2004, and in Vermont in 2006. Larvae feed on the growing tips of host plants, concealed by meristicmatic tissue. For conventional growers, the cryptic feeding behavior limits pest control options to systemic pesticides, and there are currently no suitable control options for organic growers. Losses due to swede midge can be devastating for organic growers, as some growers in upstate New York and Ontario have recently reported 100% losses. Graduate students Chase Stratton and Elisabeth Hodgdon are looking into developing ecologically-based strategies to disrupt midge oviposition. Chase is studying whether plant essential oils can repel the swede midge. Elisabeth is working with Dr. Rebecca Hallett (Univ. of Guelph) and Christy Hoepting (Cornell University) to study whether more inexpensive blends of the midge’s sex pheromone can be developed to effectively block the midges from mating and producing eggs.

To learn more about her recent research visit Dr. Chen’s blog, IAEL.
Kirsten Workman, PSS graduate student in Sid Bosworth’s lab, is working towards an M.S. in Agronomy. In addition to pursuing her degree, she also is a full-time Agronomy Outreach Professional for UVM Extension, based out of Middlebury. She is thrilled that her professional and academic careers have intersected so well, as her work is aimed at identifying agronomic best management practices for Vermont farmers that both protect water quality and improve crop production. She is conducting on-farm research investigating cover cropping strategies for dairy producers to reduce soil erosion and improve manure nutrient cycling. Currently her research is funded through a USDA-NIFA grant and a Northeast SARE Graduate Student Grant. She enjoys empowering farmers to try new solutions to cropping and environmental challenges.

She is especially proud to serve as Secretary for the Champlain Valley Farmer Coalition, a farmer-led nonprofit dedicated to a clean Lake Champlain and thriving agriculture in Vermont. This field season, she helped coordinate over 40 field trials and demonstrations on farms throughout the Champlain Valley implementing and assessing alternative forage crops, cover cropping systems, reduce tillage and soil health. Kirsten and her husband raise their two young children in Richmond, Vermont at the Farm at Vermont Youth Conservation Corps where her husband trains young people to be the next generation of agricultural leaders.

Caleb Goossen is pursuing his Ph.D. in Sid Bosworth’s lab, with a research focus on the fatty acid content and profile of forage crops. Growing consumer demand for grain-free dairy products and their associated bioactive fatty acid components is outpacing supply, particularly in the Northeast. Caleb has used small plot research to examine the roles that both nitrogen fertility and harvest timing have on the fatty acid content and profile of summer annual forage species, and is currently investigating the effect that different forage harvesting strategies have on forage fatty acids and energy content.

Caleb hopes his work will help fellow Vermonters remain competitive in the dairy industry for years to come. His work has been funded through a USDA-OREI grant, and is currently being funded through the UVM Dairy Center of Excellence.
Professor Hamed's research focuses on the creation of computational tools and resources to solve problems in public health and biomedical informatics sciences. Current projects are focused on three areas: 1.) Advancing biomedical literature for drug search. The design of a modern expert system shell, which can be used as a knowledgebase for public health rule-based system. 2.) Social search engines -- the design and implementation of emerging social search engines can be bridge the gap for evidence-based systems. 3.) Computer science and Informatics methodologies include: Data Mining, Natural Language Processing, Expert System Shells, Knowledge Engineering, and Knowledge Representation. [C.V.]

Dr. Merrill examines dynamics of change within pest-crop agroecosystems including aspects of climate change. Additionally, Dr. Merrill uses experimental gaming as a novel technique for collecting data to examine human dimensions of social ecological systems. He uses a variety of techniques in population modeling, spatiotemporal simulation modeling and landscape ecology. An important goal of his work is the creation of applicable and predictive models to inform suggested best management practices. Dr. Merrill teaches Quantitative Thinking in the Life Sciences. [C.V.]

Dr. Parker is an agricultural anthropologist whose work investigates diversity, scale, and land tenure in households and communities using participatory research and development approaches to understanding food systems, agricultural and other natural resource issues. He uses multiple forms of qualitative and quantitative (narrative, observation, numeric), geographic, and documentary forms of data for qualitative, quantitative, and spatial analyses. [C.V.]
We purchased a new van in September. Many thanks to our generous donors who helped make this possible.

Field trips can now be conducted with larger groups, with the best safety options available, and comfort.

Congratulations to Professor Mark Starrett, this year’s recipient of the UVM Administrative and Facilities Services Outstanding Colleague Award. Well deserved recognition! Mark is a champion for the campus landscape, working to install gardens, create an arboretum, and utilize all of it as a learning laboratory for many classes.

Video of the gardens.

Congratulations to Professor Ernesto Mendez, winner of the 2015 Lynne Bond Outstanding Service-Learning Faculty Award. Ernesto designs his course with a community service component because he knows that students learn best when they have opportunities to engage with real issues in real communities.

Agroecology and Rural Livelihoods Group
Congratulations to our graduates, class of 2015


Burlington Garden Club Award winners, Alissa Boochever and Jacob Suissa.

Rosie Gluck, recipient of the PSS Teaching Assistant Award.
Student Honors and Awards

Donald Keith holding his Ludlow Endowed Scholarship in Landscape Architecture and PSS Teaching Assistant Award.

Katherine Brewer with her American Society for Horticultural Science Collegiate Scholars Award.

Julija Cubins with her Agronomy, Soils and Sustainable Agriculture Senior Recognition award.

Jacob Suissa holding his ASHS Outstanding Horticulture Student award, Darrow Horticulture Award, Ralph Lewis Jones Award, & the Seymour Horticulture prize.

Melissa Sullivan, with her Vermont Vegetable and Berry Growers Award.

Congratulations to all our outstanding students.
• **Peter Dalton Austin**, M.S. Advisor Josef Gorres. “An evaluation of vermicompost as a fast-acting nitrogen amendment to mitigate nitrogen deficiencies in organic vegetable production”

• **Gemelle Brion**, M.S. Advisor Yolanda Chen. “Swede midge, *Contrarinia nasturtii* (Diptera: Cecidomyiidae), response to *Brassica oleracea* in simulated intercropping systems”


• **Lily Calderwood**, Ph.D. Advisors Heather Darby & Josef Gorres. “Top-down and bottom up tools for integrated pest management in northeastern hop production”

• **Lynn Fang**, M.S. Advisor Deborah Neher. “Biological indicators of compost-mediated disease suppression against the soilborne plant pathogen *Rhizoctonia solani*”

• **Margarita Fernandez**, Ph.D. Advisor Ernesto Mendez. “Subsistence under the canopy: agroecology, livelihoods and food sovereignty among coffee communities in Chiapas, Mexico”

• **Ann Hazelrigg**, Ph.D. Advisor Josef Gorres. “The efficacy and non-target impacts of an organic disease management system containing biostimulants compared with two sulfur-based systems on four apple cultivars in Vermont”

• **Meghan Knowles**, M.S. Advisor Donald S. Ross. “Earthworm presence in northern forests: impact on distribution of soil carbon within aggregate fractions.”

Why teach drawing to science students? From Renaissance artists to Darwin, and the present, drawing has a long storied history as a means of science investigation and communication. This practice is still relevant to naturalists and scientists today. Since Spring 2008, The Botanical Illustration course has been offered by Lecturer Jane Neroni as a three credit course which satisfies the drawing or design prerequisite for our Sustainable Landscape Design major. The syllabus has been developed to accommodate the talents and needs of all types of students. The course’ goal is to create visual thinkers who observe and draw accurately, and who can produce aesthetically pleasing drawings and paintings of a variety of plant forms. It is structured so all students learn basic botany. Science students are superb observers, and although they need to practice their drawing skills, they invariably learn to draw within the allotted time.

Jane Neroni came to Vermont to “retire” from her work as a faculty member at the Rhode Island School of Design. She has generously shared her paintings with us for this issue of our annual newsletter.

BIO

Examples of class work, L to R: Ginger by Jessica Waterman, Mushrooms by Emily Brown, Orchid by Sam Hoadley
Jeffords Hall
63 Carrigan Drive
RETURN SERVICE REQUESTED

Visit our Alumni Web Page, If you would like to be included contact us via social media, or email to pss@uvm.edu