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A Knowledgeable 'Neophyte'

Beth Mintz, professor of sociology, is merging her teaching and research interests with a new project looking at employment segregation. (*Photo: Bill DiLillo*)

After stepping away from her duties as chair of sociology and into a year-long sabbatical, Professor Beth Mintz found herself, she says, "with an enormous amount of pent-up energy." That burst of verve has driven Mintz headlong into a new area of research, and she's currently juggling a passel of papers in varying stages of completion.

FULL STORY ▶

Nibbling a New Landscape In 1838, when 1.6 million sheep outnumbered the 292,000 Vermonters five-to-one, the Green Mountain State wore a lighter and more expansive shade of green than it bears today; at peak, 80 percent of the state was grassy pasture land.

Small Insects, Big Insights Sara Helms Cahan, assistant professor of biology, has discovered among harvester ants what has been called "a remarkable blurring of the lines" of what makes a species.

THE WEEK IN VIEW

Feb. 11, **8 a.m. Trustees Meeting: "Committee of the Whole. " Memorial Lounge, Waterman Building. Information: Trustees.**

Feb. 11, **7:30 p.m. Lane Series Concert: Pianist Vassily Primakov. UVM Recital Hall. Tickets $25. Information: Lane Series.**

Feb. 13, **1 and 4 p.m. Televised sports: Women's and men's basketball play at Boston University on New England Sports Network starting with the women at 1 p.m. Information: Athletics.**

Feb. 13, **3 p.m. Concert: The music faculty joins forces to present a concert of chamber music. UVM Recital Hall. Information: 656-3040**

Feb. 15, **3:30 p.m. Lecture: Stephen Kuusisto, a poet and memoirist, will read prose and poetry, followed by a talk at 4 p.m. on Feb. 16 entitled, "Body and Soul: Modern-day Stories of Disability." Marsh Lounge, Billings. Information: 656-3166**

PREVIOUS ISSUE

New Web Valuation Project Applies Ecological Economics

Science Without Borders

'Divas of Diction' to Perform Slam Poetry at Ira Allen

F-f-f-free Coffee For a Frigid Friday

Dom Grasso Q+A

Lecturer Looks to Nature for Sustainable Solutions

Young Russian Pianist to Play Schubert, Ravel and Glass

Flynn Dance Event Discounted for UVM Affiliates

NEWS BRIEFS

Gund Ecoinformatics Team Will Contribute to Major European Project

The Ecoinformatics Collaboratory, part of the Gund Institute for Ecological Economics, is the only United States partner of an approximately $19.1 million (15 million Euro) project financed by the European Union that will create an integrated computer toolkit to analyze sustainable agricultural practices. Thirty research institutes from 13 European countries are also involved in the enormous effort, which organizers dub SEAMLESS-IF.

The project will integrate approaches from economic, environmental and social sciences to assess the impact of policy and behavioral changes and innovations in agriculture and agroforestry. The system will operate at different spatial scales from farm to global, allowing consideration of both top-down and bottom-up approaches to land management change, including predicting the effects of proposed policy changes. The research consortium will deliver a prototype version of the computer toolkit in 18 months, and a fully operational version in four years.

The UVM group, led by Ferdinando Villa, a research associate professor with both a theoretical ecology and software engineering background, will be involved in designing the project's database and modeling infrastructure. Villa says his team's expertise with ecological modeling, open-source software development and artificial intelligence, will help mesh heterogeneous data sources and disparate models into a seamless, user-friendly whole.

"The involvement of UVM in an EU project is very significant at a time of strained relationships between the EU and the USA. It's a good sign and a recognition of the quality and uniqueness of our research," Villa says. "The methodologies we will be developing are rooted in research we've been pursuing for several years, and although agricultural policy-making in the EU is the main target of this project, the results we'll be producing will be by no means locked to the European context. We're committed to open source and to reusability of everything we do."

Agricultural policy is a pressing issue in the EU: roughly 40 percent of the union's budget is used for common agricultural policy, and 40 percent of the European land surface is used for agriculture. But the continent's rural areas are facing fast-paced change caused by the continuous enlargement of the EU, changes in farm support payments and liberalization of world trade. Such changes interact with alterations in the physical and natural environment (for example climate change and loss of biodiversity). SEAMLESS aims

Business Journalist and Alumnus Returns to Discuss China

Assembling a list of China's 100 wealthiest business people would have seemed an odd exercise not so long ago. But as the country's economic might and entrepreneurial freedom have grown dramatically, *Forbes Magazine* has applied its expertise to China and will soon expand their list to highlight the 400 wealthiest in the country, just like the U.S. edition.

UVM alumnus Russell Flannery, Class of 1981, is the magazine's Shanghai bureau chief and heads the team that puts together the annual list. He returned to the university on Feb. 8 for a talk on "China's Economic Boom: What Will Private Sector Reforms Mean?"

Flannery described the current state of rapid economic and social change in China, "the world's fastest growing economy, a place with one-quarter of the world's population and booming from one end to the other." It's an era, Flannery said, that produces some strange bedfellows – newsstands where glossy magazines dense with ads for luxury items are displayed next to copies of *The People's Daily*, the mouthpiece of the Communist Party.

Dramatic urbanization, growing disparity in income levels, intellectual property rights, press freedom, and the possible political ramifications of an economic downturn are among the many issues looming for China. One thing that appears certain, Flannery said, is that there is little sign that the country's economic growth will slow down any time soon. The combined wealth of this year's top 100 individuals, $29 billion, is up 30 percent from last year's figure.

Serendipity led to the alumnus's return visit to UVM. Two weeks ago, Economics Professor Art Woolf heard a BBC report by Flannery and recognized the name as a student he'd taught early in his UVM career. A quick follow-up confirmed that it was, indeed, the same Russell Flannery. A conference, editorial research, and a visit to his family in Rutland brought Flannery back to the States this month, and at Woolf's urging he included UVM on the itinerary. Before his talk in Billings, Flannery fondly remembered pulling all-nighters downstairs in the *Cynic* office during his days as editor.

Osher Lifelong Learning Institute Receives Third-Year Grant

The university's Osher Lifelong Learning Institute has received a $100,000 grant from the Osher Foundation to support continued growth of its programming and courses for Vermonters age 50 and over. This is the third consecutive $100,000

to link science to society through highly capable computer models and approaches to assess alternative agricultural and environmental policy options.

SEAMLESS will include quantitative models that simulate effects of the biophysical environment and economic developments next to procedures that can assess qualitative factors such as quality of life and visual landscape quality. An important part of the system is interactive identification of the key indicators (like pollution, economic performance or social acceptability) relevant to specific policy questions.

While the project is pan-European in scope, the results will be published and the software will be open source. SEAMLESS organizers expect that the project's tools will apply to other geographic contexts.

That mission resonates with the UVM Ecoinformatics Collaboratory, which director Villa describes as an "attempt to unify the language of nature with that of the computer." The group, which attracts a wide range of research funding, sees the Web moving from a loosely indexed, relatively passive "encyclopedia" to a more active space for collaborating in creating and sharing knowledge. To that end, one of the project's key goals is to produce and make accessible peer-reviewed, first-class data, models, and collaborative planning tools for a multidisciplinary area encompassing ecology, economics, sociology and policy-making.

grant the institute has received since its inception in Janurary 2003, and another year of growth makes it eligible for an Osher Foundation endowment of $1 million beginning in 2006, the institute's fourth year.

UVM's Osher Institute now comprises 400 members and five centers, located in Brattleboro, Montpelier, Rutland, Springfield and St. Johnsbury. New centers in the Stowe/Morrisville area and Newport/Derby may also be created as early as this year.

"As the word about the Osher Lifelong Learning Institute spreads around Vermont, increasing numbers of individuals have joined their friends and neighbors to participate in unique learning programs," says Deborah Worthley, director of the institute. "The topics are as interesting and diverse as the audiences, and people are attracted by the opportunity to stay mentally engaged, a healthy and appealing thing to do."

The popularity of Osher courses can be attributed to the volunteer retirees and community members who run the steering committees for each center. Committee members plan the programs, determine logistics, and are able to tailor the courses to meet the interests of their communities.

Course topics range from "Islamic History" and "Traditional Chinese Medicine" to "Teaching Challenges in the 21st Century." This summer Osher members will also have the opportunity to participate in Killington Resort's Summerfest program, which features presentations on "Global Issues," given by four UVM faculty and "Joy of Opera," presented by a UVM alum.

UVM's Osher Institute is part of the Bernard Osher Foundation's Lifelong Learning Network initially begun in California Universities and now a part of over 40 higher education institutions nationwide.

Information: learn.uvm.edu/osher

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EVENTS

'Powerful' Writer to Read Work, Lecture on Disability Stories

Stephen Kuuisto, a poet and memoirist whom the *New York Times* calls “a powerful writer with a musical ear for language and a gift for emotional candor,” will read prose and poetry on Feb. 15 at 3:30 p.m. at Marsh Lounge in Billings.

Kuuisito will give a talk entitled, "Body and Soul: Modern-day Stories of Disability," the following day at 4 p.m., also in Marsh. Both events are free and open to the public.

Kuusisto is the author of a collection of poems, *Only Bread Only Light*, and a highly praised memoir, *Planet of the Blind*, that charts his lifelong struggle to come to terms with his blindness. Born prematurely, his retinas were scarred when he was incubated and over-oxygenated during postnatal care, leaving him fractionally sighted. Taught to hide his blindness by his parents, and able to make out only kaleidoscopic colors and shadowy shapes, Kuusisto attempted to pass as a sighted person for decades. "My eyes are engines of apparition," he has written, never seeking pity, but rather trying to share his world.

Kuusisto is a graduate of the Iowa Writers’ Workshop, a former Fulbright Scholar, former director of student services at Guiding Eyes for the Blind, and currently assistant professor of English at Ohio State University,

His visit is sponsored by the English Department’s Writers’ Workshop; Cooperative Christian Ministry; College of Education and Social Services; ALANA; Center on Disability and Community Inclusion; Affirmative Action; and the National Institute on Leadership, Disability, and Students Placed at Risk. Individuals requiring accommodation should contact Sally Knight at 656-3166 or sally.knight@uvm.edu.

Fleming to Hold Noontime Café Series

Experts will give talks complementing the Fleming Museum’s spring exhibits in frequent noontime cafes. All events begin at 12:15 p.m. in the museum’s East Gallery. Lunch is available for purchase in the Marble Court from 11:30 a.m. to 1:30 p.m. The schedule is as follows:

- Feb. 16, “Alfred Stieglitz, Lewis Hine, and the Canon of American Photography,” with Evelyn Hankins, curator of collections and exhibitions
- March 2, “From Barbie Doll to Voodoo Doll: Anthropology and Collecting the Body,” with David Houston, lecturer of anthropology; Margaret Tamulonis, manager of collections and exhibitions; and students from Museum Anthropology 250
- March 16, “Present Gods: Divinities in Indian Art,” Jonathan Gold, visiting lecturer of religion
- March 30, “The Other Vermont: Lewis Hine and the Child Labor Movement,” with Paul Searls, visiting assistant professor of history
- April 13, “Aesthetic Experience and Devotion in Indian Painting,” with John Seyller, adjunct curator of Asian art and professor of art and art history

Prof's Talk Probes the Environmental and Social Impact of Valentine's Day

Saleem Ali, an assistant professor in the Rubenstein School of Environment and Natural Resources, will give a talk, "Judging Jewels: The Environmental and Social Impact of Valentine Traditions," on Feb. 11 at 3 p.m. in Lafayette Hall, Room 108.

"Behind every diamond and golden ring given at Valentine's Day is a complex series of environmental and social processes which should

Lane Series Brings Acclaimed Singer-Songwriter to UVM

John Gorka, a highly acclaimed singer-songwriter, will perform on Feb. 18 at 7 p.m. at the UVM Recital Hall as part of the UVM Lane Series.

Gorka's expressive baritone, first-rate guitar playing, and affecting songwriting has made him one of the most successful folk musicians in America. The *New York Times* says when listening to Gorka sing, "one can get goosebumps all over. There are many reasons: fresh lyrics, a stunning emotional baritone voice, and his twisted humor…"

Gorka has been described as the living link between classic folk troubadours like Woody Guthrie, Pete Seeger, and Utah Phillips and cutting-edge new songwriters like Ani DiFranco and Dar Williams. His fans have watched him grow up in the music business starting with early ballads of love lost and found to his current explorations of marriage, parenthood, and mid-life. He has toured with Nanci Griffith and Mary Chapin Carpenter and has appeared on Austin City Limits and in venues worldwide.

Gorka has built his career and is at his best performing in small intimate spaces like the UVM Recital Hall. For tickets, call the Flynn Regional Box Office at 86-FLYNN, or order securely on-line at Lane Series.

be considered in any purchase," says Ali. The talk will include a screening of the award-winning movie *Choropampa, The Price of Gold*.

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NOTABLES

February 9, 2005

Awards and Honors

A paper by **Bruce Beynnon**, associate professor of orthopaedics and rehabilitation, has earned the 2005 American Orthopaedic Society for Sports Medicine O'Donoghue Sports Injury Research Award. The award is given to the best overall paper that deals with clinical research or human in-vivo research. Beynnon and colleagues will receive the award and present the paper on rehabilitation of the knee following anterior cruciate ligament reconstruction at the AOSSM Annual Meeting Scientific Session in Keystone, Co., in July. The paper is co-authored by numerous Department of Orthopaedics and Rehabilitation faculty, including: **Dr. Joseph Abate**, **Dr. Bjarne Brattbakk**, **Dr. Robert Johnson** and **Dr. Claude Nichols**.

Jane Kolodinsky, professor and chair of the Department of Community Development and Applied Economics; **Jean Harvey-Berino**, chair of the Department of Nutrition and Food Science; and **Linda Berlin**, lecturer in nutrition and food science, have been awarded a National Research Initiative Grant from the USDA for their project, "Providing nutrition information at the point of sale in a dining service environment." The project will investigate students' use of nutritional labels on restaurant food items.

Publications and Presentations

Wolfgang Mieder, professor and chair of German and Russian, co-authored an article on "The Proverb `Good Fences Make Good Neighbors' in Ireland," which appeared in the British journal *Folklore*. Mieder also published the paper "*Zur Dialektik der Sprichwörter in den Aphorismen von Hans Kudszus*" in an essay volume on *Lexikalische Semantik, Phraseologie und Lexikographie* published in Hungary. The article discusses how the modern German author Hans Kudszus bases many of his intellectual aphorisms on traditional proverbs.

David Scrase, professor of German and Russian, published the article "Building a Holocaust Studies Program for Both Town and Gown" in an essay volume on *Teaching the Representation of the Holocaust*. The article describes the creation and activities of the Center for Holocaust Studies at the University of Vermont of which Scrase is founder and long-time director, and notes that students can now earn a minor in Holocaust Studies.

Appointments

Donald Honeman, associate vice president for enrollment, planning and admissions, has been named to the Board of Trustees of the College Board's New England Regional Assembly. Honeman, who will serve a four-year term, will be provide communication to the New England Region and present the concerns of the region's educators to the College Board.

Dr. **Burton Sobel**, professor and chair of medicine, was elected as a fellow of the International Academy of Cardiovascular Sciences in recognition of his outstanding achievements in cardiovascular research and education. Established in 1996 by renowned cardiovascular scientists, surgeons and cardiologists, the IACS provides the organizational structure for the world-wide sharing of research and education information in the field of heart health.

February 2, 2005

Awards and Honors

A Knowledgeable 'Neophyte'

University Scholar to present work that departs somewhat from past efforts in a Feb. 16 seminar

By Kevin Foley
Article published Feb 09, 2005

Beth Mintz, professor of sociology, is merging her teaching and research interests with a new project looking at employment segregation. (*Photo: Bill DiLillo*)

After stepping away from her duties as chair of sociology and into a year-long sabbatical, Professor Beth Mintz found herself, she says, "with an enormous amount of pent-up energy." That burst of verve has driven Mintz headlong into a new area of research, and she's currently juggling a passel of papers in varying stages of completion.

Mintz will share her latest work during her University Scholar lecture on Wednesday, Feb. 16, at 4 p.m. in Waterman's Memorial Lounge. The focus of her talk will be a project empirically examining occupational race and sex segregation from 1980 to 2000, work she's collaborating on with Daniel Krymkowski, associate professor of sociology.

Mintz's work on corporate networks and interlocking directorships, which was published in the book *The Power Structure in American Business* among other places, remains a widely read classic in the field. (In fact, an early paper from her research group was cited in Google's original patent application; it turns out that the methods Mintz and colleagues used help inform the world's leading search algorithm.) But until recently, occupational segregation — men, women and minorities doing different work for different pay — was something she taught, not studied.

"What's lovely is that I'm a neophyte in this area. So at the sociology meetings last year, I often talked with people I didn't know other than by reputation, and I was new and I was asking for advice. That's not a situation I've been in for a very long time," she says. "It's a wonderful place to be," Mintz adds of the freedom to explore a new field without questions of ego and "what I should know."

Tracking segregation

The paper Mintz will discuss at her University Scholar seminar seeks to empirically establish that men and women do different work for different pay, and assess how those patterns have changed (or not changed) in particular types of jobs during the period in question. But the paper goes beyond this, also looking at how race interacts with gender over time to increase or relieve segregation. Mintz and Krymkowski aren't just interested in measuring the phenomenon, however. They want to begin explaining it, so they use multinomial regression to flexibly relate ethnic and gender data in 479 different types of jobs with a variety of variables and indexes they adapted from sociological theory.

The goal is to attack questions such as: Do people of different genders and backgrounds do different jobs because of education? Racism? The authority of

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the jobs? Pay? Because they involve physical “male” tasks or collaborative “female” tasks? How do these factors play out for different genders and different races? Which types of jobs are more segregated, which are less, and how are they changing over time?

Because of the many variables, demographics and time periods involved, the answers are complex. But some patterns do emerge. Mintz says that the primary axis along which occupational segregation turns is still male versus female, although there are some important differences in occupational segregation within a given gender based on race.

Her study shows that discrimination, too, plays a significant role in affecting job prospects, but it’s a subtler, more abstract form of discrimination than the image the word usually conjures.

“Discrimination remains an issue, inequality remains an issue, but it’s a particular kind of discrimination, the technical term is statistical discrimination,” Mintz explains. “Most employers aren’t looking at race and gender and eliminating potential employees whose race and gender they didn’t like. There’s also no evidence that the discrimination takes the form of a dominant group trying to preserve its position. It turns out the most important part of this is segregation stereotypes that people carry about the competence of different groups for different tasks.”

Identifying and measuring these processes is one of Mintz’s missions as an academic.

“It’s my passion, it speaks to gender inequality and race inequality. I’ve organized a good part of my academic life addressing those issues,” she says. “One of the reasons it’s particularly important now is that we’re in the situation… the visceral reaction (to issues of race and gender) is things have really improved, things are fine, things are moving forward. And the data simply don’t support that. But we need to look at these issues with empirical tests. If we can understand what’s going on, that’s key to changing it.”

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Nibbling a New Landscape

By Cheryl Dorschner
Article published Feb 09, 2005

Meet the ruminants: The number of sheep and goats in Vermont is increasing as the popularity of organic farmstead dairy products leads to different farming practices such as grass pasturing of livestock. *(Photo: Cheryl Dorschner)*

In 1838, when 1.6 million sheep outnumbered the 292,000 Vermonters five-to-one, the Green Mountain State wore a lighter and more expansive shade of green than it bears today; at peak, 80 percent of the state was grassy pastureland.

In 2005, the number of sheep will fluctuate between 16,000 and 20,000, and the pasture/forest mix has flip-flopped. Eighty percent of Vermont is now thickly covered with the dark fringe of conifers laced with a seasonal kaleidoscope of soft- and hard-wood tree foliage, a shift mirrored throughout the Northeast.

Now Vermont's landscape is changing once again — imperceptibly to most travelers of the predominantly north-south ribbons of roads threading through the state. But Vern Grubinger sees it. Chet Parsons sees it. Carol Delaney notices, as does Gwyneth Harris. All are University of Vermont Extension specialists who work directly with Vermont farmers. All but Parsons head projects out of UVM's Center for Sustainable Agriculture, which was honored Feb. 3 in Montpelier for receiving a 2005 New England Board of Higher Education Excellence award.

Grass pastures — and the sheep and goats that thrive on them — are making a comeback here. Even some dairy cattle farmers are rethinking grazing as they respond to market opportunities and adopt different techniques. And university experts are there at every step, with site visits, farmer-to-farmer pasture walks, workshops, research results and publications. The result is sometimes high value-added products, lower-cost farming and an economy of scale. The side benefit is that open land that benefits not only farming, but key economic sectors like tourism.

"To the general population Vermont may not look different, but it is different," says Grubinger, the center's director.

While cattle dairy farms are decreasing in number and increasing in size as they consolidate operations, the overall number of farms is actually steady as farmers switch to other animals and products. And although many large-scale dairy farms' cows rarely stroll farther than that amble between the stall and the milking parlor, grazing and pastures are still as much a Vermont duo as are Ben and Jerry.

"Rocky, hilly land, short on growing season are three characteristics that originally led farmers to let pasture land revert to forest," says Grubinger, "but now we see Vermont as suitable for pasture because of its good climate, distribution of rainfall and temperatures and a lot of land unsuitable for tilling."

Jobs, Race and Gender
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The renewed importance of grassland to the region is attributable to many factors: growing popularity of farmstead cheeses, which has led to the increasing popularity of seasonally pasture-fed sheep and goats; more demand and higher prices for organic and grass-finished meat products; and lifestyle and value changes among consumers.

A gathering of grazers

The state's farmers, naturally, are paying close attention to the trend and techniques. On Jan. 22, a bitterly cold day, nearly 350 farmers traveled to Randolph for the ninth annual Vermont Grazing Conference. The attraction was Rhodesian biologist and grazing guru Allan Savory. Savory has shown success in restoring ecosystems worldwide with intensive pasture management techniques, which are also called rotational grazing.

"The whole thing of the grass pasturing is to graze intensively," explains Grubinger. "That means moving animals from one section of pasture to another, in some cases up to several times a day. More technology has made that possible — portable fences and field irrigation, for example."

Teddy Yandow of St. Albans testified to the benefits of the approach at the conference. Twenty years ago his 184-acre farm was $780,000 in debt, he says. He credits UVM Plant and Soil Science Professor Emeritus Bill Murphy with turning his farm, his thinking and his quality of life around by telling him about rotational grazing. "I thought, I'm going to go bankrupt anyway, so I'm going to change completely. I have nothing to lose," Yandow told the crowd gathered at the Technical College. Yandow's farm is now a model for others, running a 100 percent grass-based dairy year round.

"Bill Murphy was a pioneer," says Grubinger. "He became a national leader in grassland management, and UVM picked it up with SARE (Sustainable Agriculture Research and Education) and the Center for Sustainable Agriculture. Today the center, the Plant and Soil Science Department, UVM Extension, United States Department of Agriculture Natural Resources Conservation Service and the Vermont Grass Farmers Association all work in partnership to research and promote grass farming."

Rise of the ruminants

Ironically, while it was the woolen mills lining Vermont rivers that completed the loop from pasture to product more than a century ago, most recently, wool prices have dropped so low that "people are starting to show interest in sheep that you don't have to shear, such as Kathadin and Dorper," says Chet Parsons, who is a UVM Extension livestock specialist in sheep. "Meat and dairy are strong, though, and Vermont's marketing co-ops are thriving. As they become more successful, we're going to need more good sheep."

Carol Delaney echoes the sentiment. "There's more demand than supply for market lamb," says the small ruminant dairy specialist who is seeing an increase in sheep farming across the state. "Vermont farmstead cheese in demand, the start-up cost to farmers is lower for sheep than cows and sheep are more family friendly. I've even got dairy (cow) people who want to switch."

Gwyneth Harris has helped many farmers make the changeover. Moving from cattle to small ruminants is much different from a start-up, says Harris, who has been UVM's Center for Sustainable Agriculture's pasture network coordinator for four years.

"It's an audience that needs a lot of advanced technical knowledge. These people are experienced dairy farmers converting to organic," she says. "Organic has become a huge market and grazing is a big part of it."

Grubinger agrees, and he sees the results written on the landscape as he travels through the state.

"Grass farming has become an ecological choice that returns Vermont to its roots, so to speak," he says.

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Small Insects, Big Insights

Biologist's analysis of ant DNA finds species lines blurrier than once thought

By Lynda Majarian
Article published Feb 08, 2005

Biologist Sara Helms Cahan, with tubes of ants. Cahan's study of harvester ants has revealed a suprising interspecies evolutionary strategy. *(Photo: Bill DiLillo)*

Extinction: 11 percent of mammals and birds and 33 percent of some plants are currently threatened, according to the World Conservation Union. Insects, on the other hand, are among the world's hardiest and successful creatures, in large part because they have developed just about every method of evolutionary adaptation to ensure their survival.

This is especially true of ants, and Sara Helms Cahan, assistant professor of biology, has discovered among the insects what has been called "a remarkable blurring of the lines" of what makes a species. In an article published in the Dec. 31 issue of the journal *Current Biology*, Helms Cahan and colleagues described how two different varieties of harvester ants ("the best known ants in North America," she says) interbreed to create sterile, hybrid workers for both species. Both species have given up the ability to produce pure-species workers in favor of the hybrids. Consequently, the two species are completely dependent on each other for survival.

"Here we have two separate gene pools that interbreed to produce workers," says Helms Cahan. "In every generation the genes meet each other, but never get a chance to recombine."

Markers of class

Female ants are generally found in two forms: reproductive queens and sterile workers. The role, or caste, of an individual is determined for life. The environment in which a female is raised, rather than a genetic predisposition, determines which caste she will adopt. However, in two harvester ant populations in southern New Mexico that Helms Cahan studied, queens and workers from the same colonies are genetically very different. In both species only the queens are genetically derived from a pure species-specific lineage; all the workers are hybrids that possess a combination of genes from the two species in a single individual. Through controlled crosses, Helms Cahan has demonstrated that pure-lineage eggs fail to develop into workers even when inter-lineage brood are not present. It seems, therefore, that environmental caste determination has been lost in favor of a hardwired genetic mechanism.

"This has probably been happening for about a million years," says Helms Cahan, "but we only discovered it when technology allowed us to identify the genetic markers." Biologists now amplify and analyze the ants' DNA, especially "micro-satellites," which are little bits of DNA that reveal variation in and between species, according to Helms Cahan.

Interbreeding between species is usually a costly evolutionary mistake. "Most hybrids are sterile, and therefore can't pass along their parents' genes," she

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explains. But interbreeding is often adaptive — that is, evolutionarily beneficial — with ants, who live in colonies, take slaves, fight wars, build highways, practice agriculture and police their societies.

“The social structure allows ants to take advantage of any useful hybrid traits, even if hybrids cannot reproduce on their own,” says Helms Cahan, who was also interviewed recently on the topic for “Blue Planet,” a weekly series produced by United Press International.

There may be other cases of successful hybrid societies, but the only such case known is a species of fire ants in Texas, Helms Cahan says. What biologists do know, based on new findings, is that hybridizing between species is more important than previously thought.

Helms Cahan, who was once a curator’s assistant at the University of Michigan Museum of Natural History, has always been interested in insects. She began with wasps, then switched to ants for her doctoral thesis. She studies harvester ants throughout the Southwest every summer with funding from the Earthwatch Institute, also involving high school students in her field studies. During the academic year, Helms Cahan keeps ants in the basement of the Marsh Life Sciences building, where they thrive on a diet of seeds and crickets in a warm, controlled climate.

Helms Cahan teaches courses in sociobiology, behavioral ecology and introductory biology. To read the UPI article, visit Helms Cahan in "Blue Planet". To read her paper on “Loss of Phenotypic Plasticity Generates Genotype-Caste Association in Harvester Ants,” access Current Biology online.

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