A PUBLICATION OF THE VERMONT AGRICULTURAL EXPERIMENT STATION AND UVM EXTENSION

Annual Report 2012

Solutions for the Future

Vermont Agricultural Experiment Station

The University of Vermont Extension

2012 Annual Report

It has become a Vermont tradition each February to hold a reception in the Vermont State House cafeteria to release this Annual Report published by the Vermont Agricultural Experiment Station at the University of Vermont College of Agriculture and Life Sciences and UVM Extension.

We like to think that invited government leaders attend to talk to the scientists and program specialists whose work we highlight that afternoon during a poster session.

Truth be told, we've heard the call echo through the open stairwell of this venerable building, "Allenholm Farm's apple pie, Island Homemade ice cream, cheese and sugar-on-snow in the cafeteria!" Science *can* be delicious.

Credits

CONTRIBUTORS & PHOTOGRAPHERS

Rico Balzano, Lynn Zanardi Blevins, Susan Brouillette, Joshua Brown, Cindy Corkins, Cheryl Dorschner, Gary Deziel, Tom Fontaine, Richard Fanus, Lisa Halvorsen, Lindsay Jones, Jeanne Keefe, Caleb Kenna/The Golden Cage Project/The Vermont Folklife Center, Douglas Lantagne, Jane Nevins, Katie Robinson, Robin Smith, Diane Trono, Tom Vogelmann, Christopher Willey, Naomi Wolcott-MacCausland, Phoebe Wolcott-MacCausland, Cathy Yandow.

DESIGNER

Kathy E Design

PHOTOS: FRONT COVER & THIS PAGE

Cover: The birch grove could become Vermont's new sugarbush if Abby van den Berg's research pans out. Don't expect UVM's Proctor Maple Research Center to change its name any time soon though. See story page 4. Photo by Cheryl Dorschner.

This page: Just as the nation's demographic has shifted to a significant Latino population, on a small scale Vermont's Latino population grew 24 times faster than its overall population in the past decade. The reason: employment of noncitizen dairy farm hands. See stories pages 7-8. Photos by Caleb Kenna/The Golden Cage Project/The Vermont Folklife Center.

Vermont AGRICULTURAL EXPERIMENT STATION

The University of Vermont EXTENSION

INSIDE

Deans' Message

Our Pledge to Vermonters

"Central to our mission are public service, civic engagement and outreach throughout Vermont to further economic development, health, civic life and environmental sustainability."

These are the words of Thomas Sullivan during his installation as 26th President of the University of Vermont on October 4, 2012. Our new UVM President calls this one of the four pathways to success for UVM students, faculty and staff.

Not surprisingly these words echo the mission of the Vermont Agricultural Experiment Station and UVM Extension – and the pledge of land-grant universities in every state in the nation since Vermont statesman Justin Morrill conceived of this public education concept over 150 years ago.

And this is also our simple promise to Vermonters.

This annual report highlights in eight stories – eight ways that we carry out this pledge in the areas of agriculture, environment, nutrition, food safety, health, community and economic development. Among our successes last year:

- UVM Extension and other organizations support a coalition of Vermont farmers leading the way to keep Lake Champlain clean.
- Proctor Maple Research Center tests the viability of birch syrup as an added crop to help maple producers during increasingly unreliable seasons.
- Noteworthy, two stories and several photos in this report shed light on how UVM research and Extension outreach address issues surrounding the needs of Vermont dairy farmers, the workers they employ who are not citizens and the communities in which they live. Dan Baker, Erin Shea and Naomi Wolcott-MacCausland and many other UVM faculty and staff are on the forefront studying this demographic shift in Vermont. They quantify valuable data useful to leaders and service providers. They address needs stemming from language and culture differences. They help ensure all Vermonters have access to health care. And they work to make Vermont's agricultural work force just and sustainable.

Cheryl Dorschner

Thomas Vogelmann, left, Douglas Lantagne.

Of course, it takes money to carry out this research and outreach to Vermonters.

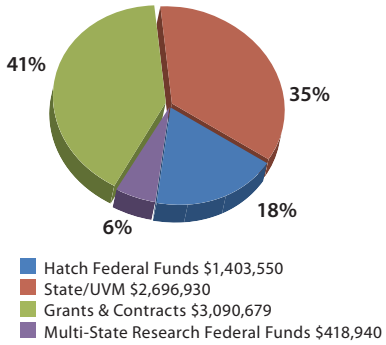
As a government-funded, land-grant institution, we supplement state and federal allocations with additional grants and funding. In fiscal year 2012 (which runs from Oct. 1, 2011 through Sept. 30, 2012) those outside grants and contracts accounted for more than $11.5 million of the nearly $23.4 million of the combined budgets of the Vermont Agricultural Experiment Station (VT-AES) and University of Vermont Extension. It is becoming increasingly challenging to achieve increased or even level funding during these more stringent economic times.

The charts at right demonstrate our research obligation by categories mandated by the USDA's National Institute of Food and Agriculture. Visit our websites listed throughout this publication for further details of our financial reporting for fiscal year 2012.

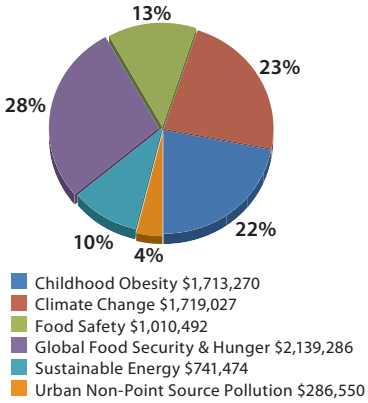
~Thomas Vogelmann, Dean
Vermont Agricultural Experiment Station

~Douglas Lantagne, Dean
UVM Extension

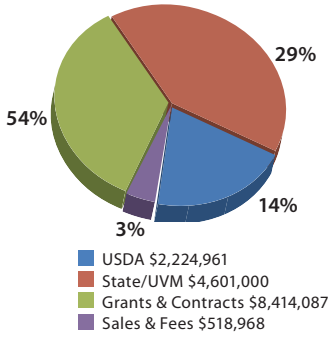
VT Agricultural Experiment Station Budgeted Dollars FY 2012



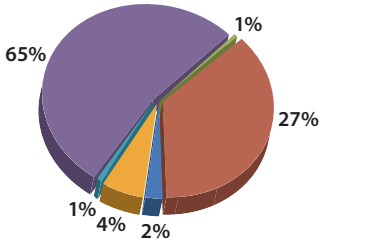
VT Agricultural Experiment Station Budgeted Dollars by National Program Area FY 2012



UVM Extension Budgeted Dollars FY 2012



UVM Extension Budgeted Dollars by National Goal Area FY 2012



AGRICULTURE

~ Vermont Agricultural Experiment Station

What if Cows and Milk Could Be Healthier?

Grocery shoppers are familiar with eggs fortified with omega-3 fatty acids, but a new study could lead to other products in the dairy case

containing these nutrients. Jana Kraft studies whether cattle feed that is high in healthful fatty acids improves cow's health and the health attributes of milk fat. Her ultimate goal: to create milk, cheese and yogurt that are high in omega-3 fatty acids and selenium.

Because omega-3 fatty acids and selenium have been recognized as nutrients of high biological value that impart health benefits, they represent promising functional food components enriched in milk and dairy products. Consumption of these nutrients has been shown to be significant in lowering cholesterol and the risk of heart attacks.

"There is growing interest in the development of functional milk and dairy products to maximize their contribution to health promotion and disease prevention," says Kraft.

Her two-year project began in October 2011, funded by $150,000 from UVM's Dairy Center of Excellence. "For the current project, the plants for the oil to feed the cows were grown in Canada," Kraft explains. "However, I'd like to see the plants grown in Vermont to encourage sustainable agriculture here." To incorporate the bonus of locally grown cattle feed part of the project, Kraft will ask grant funders to extend the project an additional year.

She's supplemented her initial project with a $60,000 three-year Hatch Project ending in 2015 to test her hypothesis on an animal model and additionally "look at the cow level, that is, the objective is to improve the overall health of the cow through feeding omega-3 fatty acids," she says.

NOT SO SIMPLE, BUT WORTH IT

Why not just add omega-3 fatty acids to milk and yogurt and skip running it through the cow altogether?

"The omega-3 fatty acids could be simply incorporated into the products," Kraft concedes, "but one of our major goals is also to improve the cow's health, so with one strategy we will accomplish two goals: improving the healthfulness of milk and enhancing the health of the dairy cow." Then there's the suspended fat. "If you add fats to dairy products, you will need to emulsify it into the product," she says. "A 'naturally enriched' product may be more appealing to or accepted by the consumer." Last but not least, there are a number of reasons having to do with milk chemistry. "Milk fats' composition is unique, for example, the milk fat globule membrane contains bioactive substances by itself. Milk fat is easy to digest and has a unique and desirable texture and flavor," Kraft explains. "By simply adding the omega-3 fatty acids and/or removing milk fat, you may alter the typical and desirable flavor and texture of milk and the way it performs in recipes."

Christopher Willey

As an animal nutritionist, Jana Kraft's research aims to improve animal health by developing and testing health feeds. Yet a larger goal is to improve human health through offering fortified dairy products.

Unfortunately, one can't just feed cattle, say, fish oil, which is rich in omega-3 fatty acids, because the oil is toxic to the bacteria in the rumen that digest the feed in the cattle's stomach, Kraft explains. Also, the rumen bacteria convert unsaturated fatty acids to saturated fatty acids – the opposite of our goal of adding healthful fatty acids to the diets of both cows and humans. One "work-around" to this obstacle is to add encapsulated rumen-protected oil to the feed. But ultimately, Kraft believes she will come up with a novel rumen-protected, feed source that is high in specific omega-3 fatty acids, will be good for cows that eat it and the beneficial acids will be present in their milk. To that end, she analyzes the milk for lipids and fatty acid analysis using gas chromatography to test variables such as what feed offers the highest levels of omega 3's and what is the lowest dose cattle must receive for the benefits to show.

In related research, Kraft recently submitted a proposal to the New England Dairy Promotion Board/Vermont Dairy Promotion Council to collaborate with UVM College of Medicine to improve understanding of the role of milk fat from whole milk as an integral part of a balanced diet and its efficacy in modulating risk factors associated with metabolic syndrome. This study will be a human intervention trial.

Kraft feels that "milk fat is getting a bad rap. Milk fat contains a unique variety of bioactive fatty acids that may account for beneficial effects of milk fat. Whole-milk dairy products are an important part of a healthful diet. Balance is what is important," she says.

"Many researchers focus on developing new products for the market, but overlook human nutrition as a component of those products," says Kraft, who is an assistant professor of animal science. "My work is the interface between animal science and human nutrition."

~Cheryl Dorschner

AGRICULTURE ~ UVM Extension

Keeping Food Safe from Farm to Table in Vermont

Consumer concerns over increased risk of food-borne illness from fresh fruits and vegetables have prompted many Vermont growers, including Karen Manix, to develop a practical food safety plan for their operation.

Karen and her husband Jack own Walker Farm, a farm stand and garden center on Route 5 in East Dummerston that draws customers from hundreds of miles away. Although they started out nearly 40 years ago as a vegetable operation, today flowers, including many unusual and heritage varieties, are a big part of their business.

"Because we are NOFA-certified organic for our vegetables, and take pride in the condition and quality of our produce, we already were doing a lot of the recommended things," she says, referring to a workshop she attended at the UVM Extension office in Brattleboro in March 2011.

The hands-on workshop was conducted by the UVM Extension Center for Sustainable Agriculture, which has taken the lead in helping small farms develop viable on-farm safety plans designed to keep fresh fruits and vegetables safe from field to fork by following proper procedures for growing, harvesting, packing and storing.

A template and guidelines for these plans were developed as part of the Practical Produce Safety program by Ginger Nickerson, Good Agricultural Practices (GAP) coordinator, and Hans Estrin, local food network coordinator. While most farms that sell to large buyers, including major grocery store chains, usually are required by the buyer to have GAP audit certification, no such standards exist for smaller operations that supply farm stands, farmers' markets, restaurants, schools and other local markets directly.

As a result of the workshop, the couple made several changes in their operation.

"I hadn't really thought about scheduling how often we do sanitation," Manix says. "And as a result of the workshop, we now give our picking crew a five-gallon thermos of water and paper towels to wash their hands in the field."

While admitting that they still have a ways to go in terms of following their plan, the grower says that the most significant change is that they now triple wash all their produce.

"We had been washing thoroughly, but just in one sink. It was obvious from discussions in the class that wasn't enough. We went to a restaurant equipment store in Springfield, Massachusetts, to buy a triple sink."

Andy Jones, farm manager for the Intervale Community Farm in Burlington, liked the idea of a written food safety plan as it gets everyone on exactly the same page when it comes to procedures, a plus for an operation that depends on seasonal workers.

Katie Robinson

Teaching farm workers to follow proper procedures when growing, harvesting and handling fruits and vegetables helps keep food safe from field to fork. Hand washing with soap and water is one of many steps in preventing transmission of pathogens from people to produce.

"We are a consumer co-op CSA (community supported agriculture) farm," he says, "and grow 25 acres of diverse organic vegetables entirely within a 100-year-old flood plain in Burlington's Intervale."

He attended a workshop last April and while he does not yet have a plan in place, once it is, like Manix, he plans to upgrade his watering system and triple wash his produce. In addition, he will put mobile hand washers in the truck for the pickers to use.

As president of the Vermont Vegetable and Berry Growers Association, Jones also is looking at the bigger picture.

"If something goes wrong, there's potential spillover to other farms," he points out. "While not required, everyone can appreciate the importance of having a safety plan. A few simple practices can reduce potential risks to all consumers. It keeps everyone in the industry in better shape."

"It's good business sense for growers to think about putting protocols in place to do all that they can that will offer consumers a safe product," concurs Steve Parise, agricultural production specialist with the Vermont Agency of Agriculture, Food and Markets Consumer Protection Services. "It is not a question of if but when an outbreak will occur.

"UVM Extension provides an invaluable service. USDA does not want us to make recommendations to growers, only interpret and conduct audits. Having folks at UVM is a godsend and benefit to growers."

~Lisa Halvorsen

ENVIRONMENT

~ Vermont Agricultural Experiment Station

Birch Syrup: Tastes Like Money?

On a snowy slope near UVM's Proctor Maple Research Center, blue plastic tubing connects to black spouts sticking out of the side of trees and then runs downhill, pulling sap, under vacuum pressure, to collecting tanks. Everything here looks like a modern maple sugarbush.

'Except the trees. They're not maples. They're birches.

Up a long dirt driveway in Leicester, Kevin New and his cousin converted an old goat barn into a sugarhouse. "We don't win awards for the looks of our shack," he says, laughing, "but we have won awards for our maple syrup." Along one wall he's tacked a pair of blue ribbons from the Addison County Fair. Against the back window, stand two neat rows of mason jars filled with rich reddish syrup.

Except the syrup isn't maple syrup. It's birch syrup.

These may be the only two places in Vermont where birch trees are tapped.

If research assistant professor Abby van den Berg's uncanny science project at the Proctor Center yields promising results, she expects more Vermont maple producers will add birch products to their business.

Her proposal earned an $80,307 two-year grant from the Northeastern States Research Cooperative due to its potential to offer solutions to the social, economic and ecological challenges in the Northern Forest. In April 2012, van den Berg, colleagues Tim Perkins and Mark Isselhardt and Teague Henkle '14, collected sap and data from 40 birch trees in five research plots. They want to learn "whether there is enough sugar produced by birches here in Vermont, using modern tools and techniques — like vacuum and reverse osmosis — to make a profitable addition to an established maple operation," she says. "We don't know a lot about birch here in the Northeast. How long is the season? How much sap do different size trees make? How much sugar will they yield? How many trees and taps would you need to be profitable?"

WHAT'S IT WORTH?

Kevin New has talked with van den Berg by phone about what they're both learning. Birch sap is more watery than maple sap. While 40 to 60 gallons of maple sap yield one gallon of syrup, for birch sap, it's more than 100 to 1. This adds a tremendous amount of fuel and time to the equation — which is one reason birch syrup is rare. There are only a handful of commercial producers in Alaska, New Hampshire, British Columbia and other parts of Canada.

But the other side of the scale: Alaskan birch syrup sells for $78 per quart and $328 per gallon. New tested his prices at $50 per quart and $25 for 8 ounces.

"Is it worth it? Will people buy it? That's what I need to find out." He's given samples to restaurant chefs, he's telling his friends and he's letting anyone who stops by take a taste.

Cheryl Dorschner

Abby van den Berg isn't playing a practical joke when she taps birch trees in April at the UVM Proctor Maple Research Center. She's measuring sap production to calculate whether the labor intensive, high-priced birch syrup is a viable product for Vermont sugarmakers.

"I wouldn't ruin a pancake with it," New says, with a broad grin. "I think it's fruity, myself. Some people call it tangy. Some call it spicy." He lists birch syrup recipes: "you'll find it in sauces and glazes, on salmon, seared scallops, chicken. You can make a pecan pie out of it. I have a friend making birch bars instead of maple bars."

Maple sap runs when it's freezing at night and warmer by day. Birch sap, driven by root pressure rather than stem pressure, only starts to run when it stays above freezing in the spring. For a typical year in Vermont, this means late March into April, so a sugarmaker could follow a six-eight-week maple run with a two-three-week birch run using the same equipment.

But 2012 was atypical, mid March registered a record-breaking 86 degrees at the Proctor Center followed by weeks of cold and a short sap run. "This year may be a dud, but I don't expect this project to be a dud," van den Berg says. She interpreted the data during the rest of the year and will collect more this spring.

Birch trees are already present in a lot of sugarbushes, and if birch become a species of value," she says, "producers are more likely to want to keep them and thus keep more diversity in our forests."

Maple syrup production is under threat by the rising costs of fuel, production and even land ownership. Climate change poses a threat as the sugaring season is unreliable and the future health of maples is uncertain.

"We've had calls and interest about birch from producers all over the place," van den Berg says. "They're very keen to find things that will extend the season, make a little extra money, and just experiment with something new. That's the culture of maple producers."

~ Joshua Brown & Cheryl Dorschner

ENVIRONMENT ~ UVM Extension

Farmers, Extension Work Together for Cleaner Lake

Like all good stewards of the land, Peter James, a third-generation dairyman, is concerned about keeping nutrients on his fields and out of rivers and lakes. As one of the owners of Monument Farms in Weybridge, he's adopted a number of sustainable management practices that minimize agricultural runoff and soil erosion to protect the environment.

The 2,200-acre farm lies in the Lake Champlain Watershed, about 10 miles from the lake, and borders Otter Creek and the Lemon Fair River. Milk from 500 cows is processed and bottled on the farm for sale at retail outlets in Vermont.

"Our nutrient management plan is geared to try to keep highly erodible fields in sod longer," James says, noting that they use strip cropping, fall contour plowing, cover cropping and grass buffer strips on fields along waterways, among other conservation practices. "This year we tried dragline manure application as manure injected into the soil through an aerated system means a lot less chance of runoff."

UVM Extension agronomy professionals are helping James and other farmers in the watershed stay abreast of new ideas, equipment and technology to protect water quality, such as use of no-till grain drills and aerial seeding of cover crops. The Champlain Valley Crop, Soil and Pasture Team, based in Middlebury and led by Jeff Carter, works with farmers in Lake Champlain's main and south lake watershed areas of Addison, Chittenden and Rutland counties. Heather Darby and the UVM Extension Northwest Crops and Soils Team assist farmers in the northern part of the watershed.

This proactive team approach enables UVM Extension to reach farmers throughout the Lake Champlain Basin to help them implement good management practices. Team members also provide hands-on technical assistance, workshops and field days and even mobile technology including goCrop. The Web and mobile application, developed by Darby and her team, allows farmers to access and update real-time records for on-the-spot decision-making about fertilizer application and other actions.

More than 2,500 acres on several farms, including Monument Farms, were seeded with winter rye through a cover crop helicopter seeding project in late summer. The Natural Resource Conservation Service (NRCS) and Vermont Agency of Agriculture, Food and Markets offered cost-share funding with UVM Extension providing boots on the ground support.

Laura DiPietro, deputy director of Agricultural Resource Management for the Vermont Agency of Agriculture, notes, "Water quality is an important issue in Vermont and we're glad to partner with UVM Extension on projects like cover crops and aerial seeding. The work they are doing benefits not only farmers but anyone who uses the lake."

Susan Brouillette

Aerial cover crop seeding of ripening corn fields can help farmers in the Lake Champlain Basin add nutrients to the soil while reducing erosion. After the corn harvest, the cover crop remains on the field to stabilize the soil.

Lorenzo Whitcomb of the North Williston Cattle Company in Williston also signed up for the aerial seeding project and other practices including manure injection.

As part of his conservation program, Whitcomb, who farms with brother Onan Whitcomb and their families, has put in drainage ditches with vegetative buffer zones to prevent runoff of fertilizers and herbicides from fields. "We also have a silo leachate system that collects juices from the bunk silo," he says.

UVM Extension's commitment to clean water involves multiple partners including the Vermont Agency of Natural Resources, the Lake Champlain Basin Program, NRCS, Vermont Natural Resources Conservation Districts and the Vermont Agency of Agriculture as well as the farmers themselves. It also has support from U.S. Senator Patrick Leahy and Congressman Peter Welch's offices, which have helped secure funding for various programs.

In Franklin and Grand Isle Counties the Farmer's Watershed Alliance, founded in 2009, has farmers working together to tackle the clean water issue by lobbying legislators, educating the public and learning about state and federal programs and UVM Extension projects.

"Our number one priority is keeping the lake clean," says Whitcomb, a founding member of the newly formed Champlain Valley Farmer Coalition. "The coalition is a great resource to meet other farmers and see what works for them and share what we've done.

"If the lake is dirty, good farmers and bad get lumped together as farmers, and we all get the blame or the credit. It's to our advantage to help other farms take steps to keep the lake clean."

~Lisa Halvorsen

NUTRITION, HEALTH & FOOD SAFETY

~ Vermont Agricultural Experiment Station

The Art & Science of Cheese

Professor Paul Kindstedt just wanted to write a textbook for his nutrition and food science students at the University of Vermont. Who knew – it would completely transform his scientific research 180 degrees.

In 2003, while writing *American Farmstead Cheese: The Complete Guide to Making and Selling Artisan Cheeses*, he knew he needed a little historical context to help new farmstead cheesemakers understand the big picture. But Kindstedt easily realized that the 9,000-year history of cheese was an important way to connect today's cheesemakers with their ancient roots.

Nine years and more than 250 pages later, in 2012, his new *Cheese and Culture: A History of Cheese and Its Place in Western Civilization* was published. "It highlights the stories of traditional cheeses, which adds to their specialness – crucial for cheeses to command high prices," Kindstedt says. "Several high profile cheesemongers have told me that *Cheese and Culture* helps them to sell artisan cheeses, and that's good for Vermont artisan cheesemakers."

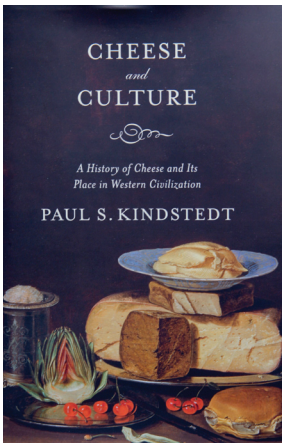
Great timing: in December, a team of scholars published in the prestigious journal, "Nature," a major discovery dating the earliest definitive evidence of cheesemaking at 5,500 B.C. in what is now Poland. As a result, Kindstedt receives requests from journalists worldwide for his comments and expertise.

Kindstedt built that expertise, over 26 years at UVM specializing in the chemistry, biochemistry, structure and function of cheese. Most notably, by figuring out the science behind eradicating naturally occurring calcium crystals that form on cheese, he helped major industrial cheese manufacturers produce smooth, uniform products for mass markets.

But by 2005, as author of *American Farmstead Cheese* and co-director of UVM's Vermont Institute of Artisan Cheese, Kindstedt was at the forefront of a burgeoning movement. In 2011 with a Hatch Research Incentive grant he shifted his research toward artisan cheese, while building on what he had already accomplished.

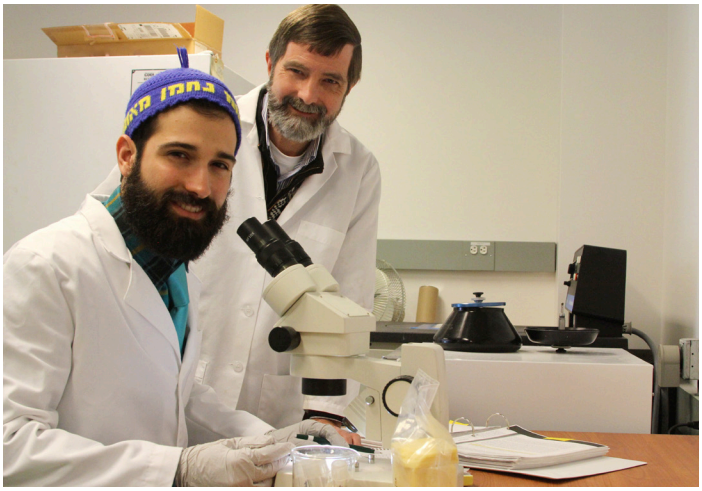
THE 'SNOWFLAKE BENTLEY OF CHEESE'

And now, he's looking at cheese crystals in quite the opposite way.



"My previous work was all about eradicating crystals – the new work is to take that base of knowledge and look at crystals as the signature of traditional cheesemaking practices and their nature," Kindstedt says. "The hypothesis is that traditional cheeses are much more prone to forming various types crystals because of the way they're made and aged."

"In European cheeses, crystals are seen as a characteristic of proper aging, a cheese without crystals will tell you the cheese wasn't aged for as long as it should have – it's too young a cheese for the price," chimes in Gil Tansman, Kindstedt's graduate student.



Cheryl Dorschner

Paul Kindstedt, right, and student Gil Tansman, use the tools of microbiology and geology and disciplines of anthropology and archeology to understand artisan cheese. New findings help cheesemakers and cheese buyers think new ways about farmstead cheese.

That's what these researchers need to demonstrate and, they've found the resources for this scientific inquiry in what may seem two unlikely places: UVM's geology lab and College of Medicine.

It is Tansman, says Kindstedt, who came up with some completely unexpected tools for studying cheese crystals – tools he found in a geology laboratory. "The tools and techniques that Professor John Hughes uses to study moon rocks, are useful to study cheese," says Tansman. The pride of the Hughes lab is an x-ray diffractometer, which irradiates crystals, causing beams to diffract in specific ways distinctive to the crystals' atomic and molecular structure.

"The amount of probing power Professor Hughes uses hasn't been used for food science before," says Tansman. Tansman's results suggest that each kind of cheese displays unique crystals.

Meanwhile, the Medical College's Microscopy Imaging Center will train Tansman to use its electron microscopy instruments. "Some of the same equipment used to study cancer cells are fantastic for cheese," says Kindstedt.

Kindstedt is excited to see "food science drawing bits and pieces from both geology and medicine," just as his books draw from the fields of archaeology and anthropology to bring new understanding to the very core characteristics that define artisan cheese.

What's more, cheese crystal patterns are beautiful in the way the famous snowflake images first photographed by Vermonter Wilson "Snowflake" Bentley in the early 1900s.

"Gil Tansman is the Snowflake Bentley of Cheese," says Kindstedt. "Gil is making it possible to see those crystals at the microscopic level – they're really a thing of beauty – that's what Snowflake Bentley was doing. Crystals show off some of the attributes that make these cheeses so desirable – their hand-craftedness – it's a signature to be celebrated. And if you look at that at the microscopic level we show people that these are works of art."

~ Cheryl Dorschner

NUTRITION, HEALTH & FOOD SAFETY ~ UVM Extension

Program Helps Migrant Farm Workers Get Health Care

Something as simple as making a doctor's appointment can be nearly impossible when

faced with language barriers, lack of transportation and concerns over costs for services. But for many of Vermont's migrant farm workers, it's a familiar scenario.

Through Farm Health Connection – a three-year, grant-funded program that ended in April 2012 – and the current Bridges to Health (Puentes a la Salud), UVM Extension has addressed many of the issues surrounding health care access for Latino workers on northern Vermont farms. The need for this support has grown as the number of Spanish-speaking workers on dairy farms – now estimated to be close to 50 percent of all farm employees in the state – has increased significantly over the past five to seven years.

"Our overall goal," says Naomi Wolcott-MacCausland, the Migrant Health Coordinator for Bridges to Health, "is to work with health clinics to make them aware of cultural differences and help them identify and reduce barriers to improve access and coordination of care." The staff assists migrant farm workers by coordinating health appointments, ensuring the use of interpreter services, providing educational materials in Spanish and referring them to other services, as needed, including the Vermont Migrant Education Program and Women, Infants and Children.

For Manuela (not her real name), Bridges to Health has been an invaluable lifeline, not only for help arranging appointments with local health care providers, but also as a source of health and nutrition information. The mother of four arrived in Vermont from Chiapas, Mexico, just over a year ago when her husband found work milking cows on a Franklin County farm.

She is learning about proper nutrition, wellness and illness prevention from Natalie Guarin, a bilingual nurse practitioner student from New York. Guarin is one of several students in the UVM School of Nursing and Health Sciences' graduate nursing program who provide health education classes through on-farm visits in collaboration with the UVM Extension program.

Guarin drew upon her previous experience as a volunteer translator for the Open Door Clinic in Middlebury and a community health care project in Oaxaca, Mexico that was part of the UVM Healthcare and Culture course. Her visits with Manuela and other mothers have focused primarily on healthy eating, especially for kids, and incorporating locally available foods into meals.

"The nutrition classes were helpful because we learned what foods benefit our health," Manuela explains through a translator. "It's helped a lot in particular when they gave classes in first aid. I learned how to make suero (a rehydration drink) and a lot about diarrhea, fever and vomiting. I didn't know what to do in those situations before I took the class."

Naomi Wolcott-MacCausland

UVM nursing students Lindsey Mucia, left, and Alexa Santucci, right, take a break from a cross-cultural health and nutrition lesson with Eva, center, a Bridges to Health/Puentes a la Salud participant, and her baby, Carina.

"I don't want to teach what they already know, so the key is finding the right balance," Guarin notes. "Some families, for example, want to learn about American foods and try new recipes. Others want to make healthy meals with traditional foods."

Through Huertas, a gardening project, volunteers helped prepare a garden site last summer for Manuela to grow tomatoes, beans, corn and other culturally familiar vegetables and herbs, including cilantro.

"Until I grew it, I hadn't had fresh cilantro since I got here," she says.

UVM Extension also has partnered with the UVM College of Medicine for farm outreach by Fletcher Allen Health Care (FAHC) residents in family medicine during their community health rotations to provide general wellness visits to farms. In 2012, 60 farm workers on 24 farms received wellness checks from FAHC residents, Northern Tier Centers for Health employees and the Vermont Department of Health with a total of 123 reached in the past two years.

"Our mission is to provide access to health care for all," says Melissa Miles, Vermont Special Projects Coordinator for the Bi-State Primary Care Association, the funding organization for Bridges to Health. "UVM Extension has the structure to reach farmers. I know I can work with them for help in identifying workers who need access to health care.

"Us, the clinics and UVM Extension. It's a nice trifecta."

~Lisa Halvorsen

ECONOMIC DEVELOPMENT & QUALITY OF LIFE ~ *Vermont Agricultural Experiment Station*

The New Face of Vermont Dairy Farming

Shortages of farm labor are common across much of the United States. Some 41 percent

of U.S dairy farms depend on outside labor, primarily from Mexico. Vermont, however – the 12th largest milk producer in U.S. – has always hired most of its labor locally. Until recently.

Between 2000 and 2010, Vermont's Latino population grew 24 times faster than its overall population, and the two largest dairy producing counties, Addison and Franklin, tallied 73 and 111 percent increases respectively. That said, the actual numbers are small – an estimated 1,200-1,500 workers in a state of 626,000 people. Still, this represents a significant demographic shift for a state where Spanish is rarely spoken.

"Public concern about how migrant workers were being treated was raised in 2009 when a young Mexican worker was killed in an accident on a Vermont dairy. This accident highlighted the lack of objective data about how workers are faring in Vermont," Dan Baker wrote in the "Journal of Agromedicine" in an article published in July 2012.

"Little is known about who these workers are, how they view dairy farm employment, or how they differ from dairy farm workers from Vermont and what their health needs are," says Baker a UVM assistant professor of community development and applied economics. That's why he, research specialist David Chappelle and UVM Extension outreach professionals Erin Shea, Naomi Wolcott-MacCausland (see page 7) are among the UVM faculty and staff who are conducting several studies and programs.

RESULTS INFORM POLICY, CHANGE

Baker's three-year, $60,000, USDA Hatch-funded project, which ended in 2010, tries to understand the broader issues faced by dairy farm labor in Vermont. Through surveys, analysis of secondary data and collaboration with partner organizations, he's gathered statistics such as those below that build a picture of the state of Vermont's work force. Most importantly, it includes the perspectives of both farm managers and farm workers and how they affect Vermont's economy and communities. He and his colleagues found some surprising conclusions and many opportunities for change and further studies. For example:

Dan Baker

- 78 percent of farmers surveyed believe there is a shortage of domestic labor.
- Although few farmers speak Spanish and few workers speak English, farmers report being pleased with their Hispanic workers and 90 percent of workers report they're satisfied with their jobs and felt they were treated well.

Caleb Kenna / The Golden Cage Project / The Vermont Folklife Center

Because UVM research on Vermont's migrant dairy workers and their employers has been continuously funded by state and federal grants since 2008, data is becoming increasingly valuable to policy makers, farmers and government agencies seeking to improve Vermont's labor issues.

- 90 percent of Hispanic workers put in more hours than their domestic counterparts each week, 70 compared to 50 hours, and want to put in more hours.
- The main concern farmers expressed about hiring Hispanic workers was potential legal repercussions.
- The greatest challenge most workers report is isolation. And other studies point to workers suffering from a number of work-related injuries and diseases and high levels of depression and anxiety.

"The results of this study will contribute to a more detailed understanding of the situation faced by the state's farming sector and the policy alternatives available to address agricultural labor issues," says Baker. "It is also of use to other states and regions facing similar changes in their farm labor work force."

Baker has delivered survey findings at an annual roundtable discussion on the state of Vermont's agricultural work force, testified before Vermont Senate and House committees, written articles and delivered remarks at conferences and meetings such as the Northeast Organic Farming Winter Conference, Vermont Farm Bureau annual meeting and to the Vermont Agency of Agriculture.

The need for further research and discussion can only continue as does the increase in the Latino population and the need for solutions to make Vermont's agricultural work force just and sustainable. In 2011, he led a one-year project investigating migrant health issues in Vermont. In 2012, Baker received a two-year, $30,000 USDA Hatch fund grant to study anxiety and depression among migrant farm workers.

~Cheryl Dorschner

ECONOMIC DEVELOPMENT & QUALITY OF LIFE ~ UVM Extension

Hands-On Programs Engage Youths in Technology

For a week last July, 14-year-old Austin Jenks hiked through Lyndon State Forest, GPS unit in hand, in search of the Jack Pine, as part of a

Vermont 4-H Tech Wizards Summer Science Day Camp. Although he admits he had lots of fun, Austin and the other participants were all business when it came to mapping locations of the trees for the Vermont Agency of Natural Resources.

"I've always been interested in technology," the East Burke home-schooled teen says, "so when I heard about this camp, I thought it might be a good experience to try something I couldn't learn anywhere else."

The campers trekked several miles a day through the woods in Lyndonville, using GIS (Geographic Information Systems) mapping technology to collect data, which they later entered on Google Earth to produce aerial maps.

"The best part was being able to see what we did, where we walked and what we mapped," Austin says. The activity also appealed to him because it was a "real project that helped someone out." The youths' monitoring efforts will be used by the agency to determine if this non-native species is sustainable in Vermont.

Geoff Whitchurch, an AmeriCorps state member who works with UVM Extension's 4-H Tech Wizards program in the Northeast Kingdom, developed the summer camp to foster an interest in science, math and technology in middle-school students as well as teach them life and career skills including goal setting, decision making and problem solving.

"We are teaching them to be curious," Whitchurch says, "to have an open mind to ask questions and develop the confidence to try new things and not be intimidated by new equipment or vocabulary."

A second camp held last summer in Caledonia County had kids – including Austin and his 11-year-old sister Melena – mapping out a new connector trail on the shoulder of Burke Mountain for the Kingdom Trails Association. The not-for-profit organization develops year-round recreational trails for non-motorized vehicles to stimulate the economy.

The partnership was a natural fit, according to Tim Tierney, Kingdom Trails' executive director and a former 4-H'er.

"Kids often ask, 'When will I ever use this?' when learning something in school," Tierney points out. "With this mapping program they are learning geography, geology, history and natural sciences and seeing how it applies to real life."

Lindsay Jones

This 4-H Tech Wizards group completed a community service project in Lyndonville using GPS and creating maps for Kingdom Trails Association. Participants were led by VISTA AmeriCorps member Fred Gonzales, Jr., left, and NEKI AmeriCorps member and 4-H Tech Wizards Program Instructor Geoff Whitchurch, right.

Thanks to their work, the association was able to construct the majority of the new trail last fall and will add the finishing touches this spring. A similar camp was offered through Operation: Military Kids at Camp Johnson in Colchester, where campers used GPS mapping technology and digital photography to identify invasive plant species to aid the Vermont National Guard in forest restoration.

The 4-H Tech Wizards program was developed in Oregon several years ago for culturally at-risk youths and quickly was adopted by other states. Funding is through the Office of Juvenile Justice and Delinquency Prevention and administered through the National 4-H Council.

In Vermont, the program also offers units in robotics, model rocketry, videography and other emerging technologies through after-school classes and vacation camps. It targets kids in Grades 4-8 in communities in four counties that have higher populations of military kids, at-risk youths and free and reduced school lunch recipients.

The three-year grant, which recently received its year two funding, required that UVM Extension reach 120 youths. A total of 176 kids at sites in Caledonia, Chittenden, Franklin and Windsor Counties were reached with 43 percent participating in 26 hours or more of programming and 27 percent a minimum of 10 hours or less.

"The program builds confidence with technology and leadership to help others," Whitchurch says, noting that a key piece to the program's success are the volunteer mentors who provide positive adult role models for kids, especially those considering a career in science and technology.

Tierney agrees. "Every time you put kids in a new situation with new peers, they learn how to work with others, communicate and get out of their comfort zone. We are creating leaders by exposing kids to programs like Tech Wizards."

~Lisa Halvorsen

CONTACT US

Vermont Agricultural Experiment Station
College of Agriculture and Life Sciences
Thomas Vogelmann, Dean
Thomas.Vogelmann@uvm.edu

Morrill Hall, UVM
146 University Place
Burlington, VT 05405-0106
(802) 656-0137

Advisory Board
Roger Allbee, Townshend
Ray Allen, South Hero
Tom Berry, Colchester
Megan Camp, Shelburne
Patricia Coates, Jericho
Cynthia Danaher, Winchester, Massachusetts
Robert Foster, Weybridge
Kayla Gatos, Jericho
Patricia Heffernan, Shelburne
Victor Izzo, Burlington
Peter Karnezos, Colchester
Fred "Chico" Lager, Williston
Richard LeVitre, Colchester
David Marvin, Hyde Park
Jenny Nelson, Ryegate
Miriam Nelson, Concord, Massachusetts
Robert Paquin, Shelburne
Chuck Ross, Hinesburg
Robert Ullrich, Charlotte

UVM Extension
Douglas Lantagne, Dean
Doug.Lantagne@uvm.edu

19 Roosevelt Highway, Suite 305
Colchester, VT 05446-5933
(802) 656-2990, 1-866-622-2990

Advisory Board
Ray Allen, South Hero
Tom Berry, Colchester
Joe Buley, Montpelier
Jen Carp, Colchester
Patricia Coates, Jericho
Tara Collins, Fairlee
R. Monty Fischer, Hardwick
Kay Henry, Waitsfield
Jocelyn Hewett, South Royalton
Beth Kennett, Rochester
Jenny Nelson, Ryegate
Bill Rowell, Sheldon
Katherine Sims, Westfield
Art Whitman, North Bennington

Vermont Agricultural Experiment Station

The University of Vermont Extension