

OMAFRA – University of Guelph Partnership

Volume XXIX · Number 1 · July 2014

Research

2014 Agri-Food Yearbook Edition

magazine

Leading the way

New approach helps promote communication between farmers and researchers
P. 35

Veterinary researcher
Steven Roche

INSIDE
Creative research partnerships foster innovation



Ontario

UNIVERSITY
of GUELPH

CHANGING LIVES
IMPROVING LIFE



Farmers, consumers and industry benefit from an innovative agri-food system



Our partnership in support of research and innovation continues to make a difference

It is a pleasure to welcome you to *Research* magazine's Agri-Food Yearbook, highlighting some of the great work being done as part of the Ontario Ministry of Agriculture, Food and Rural Affairs – University of Guelph Partnership.

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) invests more than \$75 million each year to support agri-food and rural research in Ontario.

Investing in research and innovation has always been a core function of our ministries over the years. It's one of the reasons the agri-food sector has become such an important economic driver in the province, contributing more than \$34 billion each year to the province's economy and supporting more than 740,000 jobs.

To help solidify its position in our economy, we have challenged the agri-food sector to double its annual growth rate, create 120,000 new jobs, and to do so by 2020. We believe one of the key ways we can assist the sector in delivering on this vision is through a continued focus on research and innovation.

Under the partnership agreement with the U of G, new programs are underway in zoonotic disease surveillance, Highly Qualified Personnel (HQP), Knowledge Translation and Transfer (KTT), rural development, and improving the commercialization of research.

Collaborations with industry and other government and university partners continue to be critical in moving research-based innovations to industry. This issue of the Agri-Food Yearbook presents several excellent examples of the value of these types of collaborations, including the project investigating a new source of rubber from Russian dandelion which is sponsored in part by Bridgestone Tires, and a project examining liquid feeding for pigs, in which more than 15 companies invested. A new centre in Ingersoll is demonstrating its value to rural youth of the area, initiated through the Rural Development and Agricultural Policy research theme of the partnership.

Our partnership with the University of Guelph is central to our support of research and innovation and it continues to deliver results for the sector and for all the people of Ontario.

Jeff Leal
Minister of Agriculture, Food and Rural Affairs

During my tenure as president of the University of Guelph, I've been thrilled to watch Ontarians' increasing appreciation of our safe and delicious food supply. At the same time, I've also sensed how much we've come to value the efforts of Ontario farmers, the people responsible for producing the food we so enjoy.

The University of Guelph is proud to support farmers' needs, and to contribute to Ontario's superb food system through the research partnership with the Ontario Ministry of Agriculture, Food and Rural Affairs.

By definition, a university touches all aspects of society — as does the partnership. Farmers, consumers and manufacturers all benefit from the partnership, which has been yielded tremendous economic, environmental and health benefits. You'll read about some of the partnership's activities and achievements in this issue of the agri-food research yearbook.

These research achievements make Ontario a better place to live. Independent studies have shown the ministry's annual investment in the partnership results in a \$1-billion-plus return to Ontario, thanks to such developments as new crop varieties and better health management for livestock. And that's not to mention advances in environmental sustainability and informed policy development, matters that go beyond financial returns.

Industry is contributing more and more to the partnership. Consider the new livestock innovation research centre being built in Elora (see story on page 19). Research and innovation initiatives there supported by the partnership and livestock sector will be dedicated to human health, food safety, animal welfare and renewable energy, among other things. Everyone benefits.

The University of Guelph has been named one of the world's top research universities. We could only have achieved this lofty standing with support from the partnership. Like the flourishing Ontario food and agriculture industry itself, I look forward to watching this partnership grow for many years to come.

Alastair J.S. Summerlee
President and Vice-Chancellor
University of Guelph

uoguelph.ca/research

Volume XXIX · Number 1 · July 2014
Focus: OMAFRA – U of G Partnership

**Associate Vice-President, Research
(Strategic Partnerships)**
Richard D. Moccia

**Editor and Director, Research
Communications**
Owen Roberts

Editorial Advisers
Robyn Meerveld, Liz Snyder and
Bronwynne Wilton

Associate Editor
Samantha Beattie

Project Co-ordinators
Samantha Beattie
Katherine Tuerke
Maritza Vatta

Design
LINDdesign

Cover Photo
Martin Schwalbe

Address correspondence to:
Liz Snyder, Manager, Research Communications
and Marketing
Room 451, University Centre
University of Guelph, Guelph, ON N1G 2W1
519-824-4120, Ext. 53781
inforc@uoguelph.ca

**University of Guelph student research-writing
activities are supported by:**

Pioneer Hi-Bred Limited
(founding sponsor)

Grain Farmers of Ontario

Dairy Farmers of Ontario

Ontario Farmer Publications

Ontario Ministry of Agriculture, Food and Rural Affairs

Knowledge Translation and Transfer Unit,
OMAFRA – U of G Partnership

Guelph Mercury

SHARCNET

Publication Mail Agreement Number
40064673

**Please return undeliverable Canadian
addresses to:**

Room 451, University Centre
University of Guelph
Guelph, ON N1G 2W1

ISSN 0841-9494



Highlighting the partnership for
research, laboratory and veterinary
programs between the Ontario
Ministry of Agriculture, Food and
Rural Affairs (OMAFRA) and the
University of Guelph



UNIVERSITY
of GUELPH

CHANGING LIVES
IMPROVING LIFE



Contents

Volume XXIX · Number 1 · July 2014

OMAFRA – U of G Partnership

Bioeconomy

Rubber from an unlikely source: The Russian dandelion	5
These tall grasses are good for green fuel	6

Product Development

Natural process produces organic fertilizer	7
Ontario icewine is the real deal	8

Environmental Sustainability

New approaches to reducing greenhouse gas	10
Keeping drinking water safe	11

Emergency Management

Managing a menace: The Spotted Winged Drosophila	12
Identifying high-priority diseases in Ontario	13

Highly Qualified Personnel Program

Doctoral student aims to reduce viral diseases	14
---	----

Veterinary Clinical Education Program

Diabetic tools for curing ketosis in dairy cows	15
--	----

Laboratory Services

Serving a key role in human health and animal health	16
These are the heroes behind every bite	17

Partners for Progress

18

Agricultural and Rural Policy

Showcasing rural space for tourism	20
A place to learn, grow and have fun	22

Production Systems

Mink producers give mom a break	23
Low-cost health food for pigs	24
Red lights mean higher profits	25
An unprecedented buzz in the bee sector	26
Growing Ontario tomatoes in winter	28

Food for Health

The brighter side of pinto beans	29
Towards smoother food for seniors	30
This tea is in mint condition	31
Deep purple: Making a carrot comeback	32

Knowledge Translation and Transfer

A bridge between knowledge and users	33
A new online tool for producers	34
Cover story: Talking with farmers about disease control	35

R CONTRIBUTORS



The University of Guelph Research magazine is written and co-ordinated by students involved in the University's Students Promoting Awareness of Research Knowledge (SPARK) program: uoguelph.ca/research/spark



Karen

In the summer, fifth-year psychology student Karen Ball enjoys fresh vegetables collected from her garden in her hometown, Oakville. Now she has a new vegetable to plant—purple carrots. Karen writes about the promise of these particularly healthy vegetables on page 32.



Samantha

Yearbook co-ordinator Samantha Beattie, an International Development student, was extremely excited when she was assigned a story about two of her favourite things—faraway places and wine. After speaking with professor Lefa Teng, she learned all about Ontario icewine and its rising popularity in China. Find out more on page 8.



Megan

Megan Cowie is a second-year Nanoscience student who loves to keep busy, whether it's trying new recipes, playing soccer, or strumming a ukulele. That's why she was glad to find out about new steps being taken to keep dairy cows healthy and uphold one of her favourite fuels, milk. See her story on page 35.



Sarah

Nanoscience student Sarah Hollywood combined her passion for science and social media in a story about Prof. Jan Sargeant's user-friendly database for zoonotic diseases. Find out more on page 13.



Laura

Growing up in small-town Blenheim, ON, Human Health and Nutritional Sciences Master's student Laura Montgomery knows first-hand the importance of having a strong sense of community. That's why she was happy to learn about the positive impact Ingersoll's Fusion Youth Centre is having on the town. She writes about the Centre's success on page 22.



Andrea

International Development student and Guelphite Andrea Seccafien loves travelling to major metropolises around the world, often while pursuing her passion for running. Her story on innovative rural tourism opened her eyes to the emerging travel possibilities outside big cities. Read the full story on page 20.



Katharine

As a child, neuroscience doctoral candidate Katharine Tuerke loved dressing up for tea parties. Now an avid tea-drinker, she was excited to learn about a new super spearmint tea that reduces pain for osteoarthritis sufferers and creates opportunities for crop farmers. See her story on page 31.



Maritza

Maritza Vatta, a Biochemistry Co-op student, is helping co-ordinate production for this issue of the yearbook. She says one of her biggest challenges is venturing outside of her traditional "science world" to find creative, publicly accessible photos and graphics that help tell the researchers' stories.



Isaac

After meeting with plant agriculture professor David Wolyn, fifth-year marketing student Isaac Sacco learned dandelions aren't all bad... in fact, Russian dandelions may be a possible solution to the natural rubber shortage. Find out more on page 5.

Rubber match

Will Russian dandelion meet the rubber industry's needs for a new supply source?

BY ISAAC SACCO

Experts are forecasting that the natural rubber industry will likely — and soon — be experiencing a supply shortage. Nearly all natural rubber is now grown in South East Asia, but labour shortages and competition for land has left this region unable to keep up with demand.

Finding a replacement will not be easy. Unlike synthetic materials, natural rubber has the unique ability to handle the extreme demands made on tires, such as those posed by airplanes or heavy equipment.

At the University of Guelph, Prof. David Wolyn, from the Department of Plant Agriculture, is looking into how the Russian dandelion might help address the problem. This rare plant is native to Kazakhstan, but with its bright yellow flower, it looks a lot like the North American dandelion. When its roots are broken, Russian dandelions release a rubbery sap that can be collected and used in the production of a variety of natural rubber products.

The idea of using the Russian dandelion goes back to the early 1940s, as North America tried to find sources of rubber when overseas supplies were cut off. But once the Second World War ended and supplies were restored, the idea was shelved. Supply issues, though, have researchers back on the case.

Research is underway on the Russian dandelion at various locations in North America. Wolyn, a plant breeding expert,

is developing a program for industrial-scale production of the plant in Ontario.

“With almost certain supply shortages in the future, Russian dandelions are a very strategic crop, and luckily we are engaging in research in a timely manner,” says Wolyn.

Having obtained seeds from the United States Department of Agriculture, Wolyn is looking at the best way to breed these crops for maximum yield and efficiency.

By testing different types of soil, as well as growing conditions and seasons, Wolyn hopes to begin growing a practical crop that produces a high yield of rubber in several years.

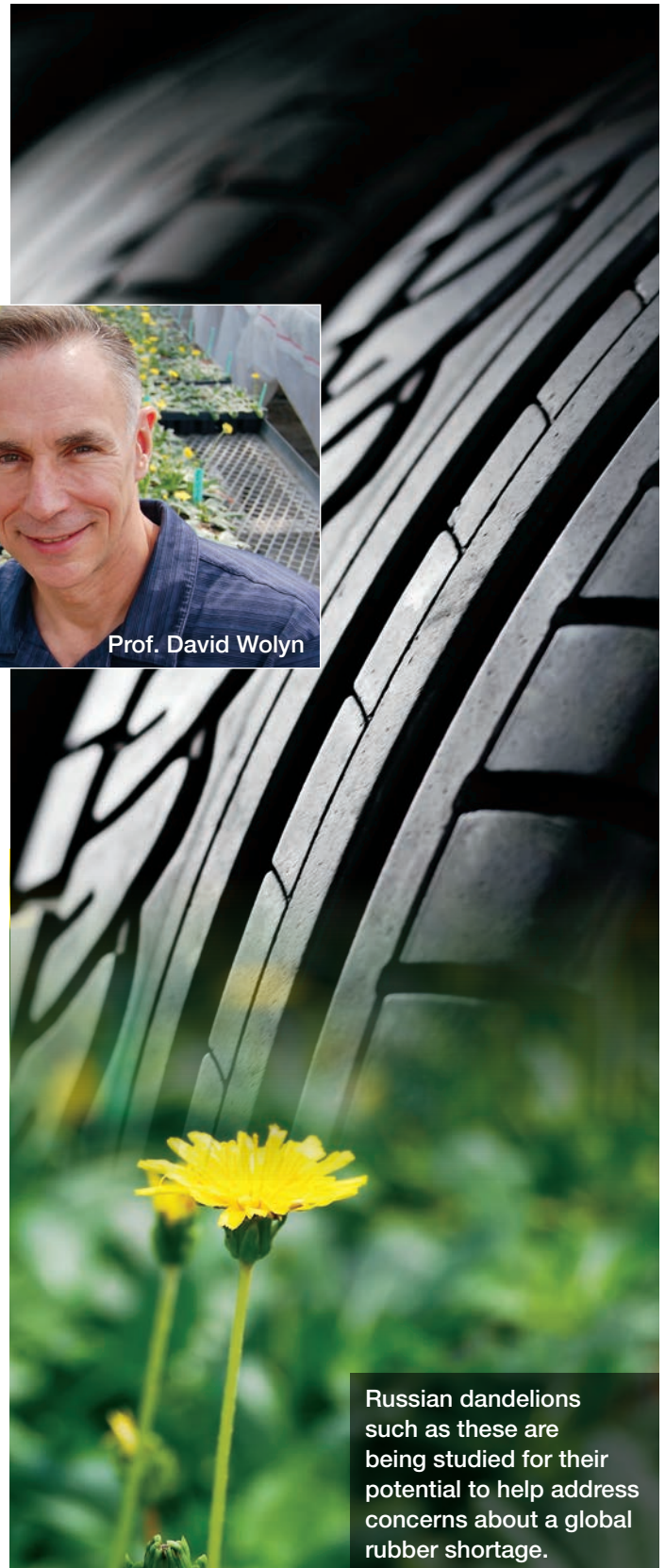
“I believe the Russian dandelion has great potential to be a replacement crop in the natural rubber industry and become an essential and valuable crop in the future,” says Wolyn.

The Canadian Food Inspection Agency has conducted a risk assessment and determined that introducing the Russian dandelion as a new crop would not pose an economic or environmental risk. **R**

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the OMAFRA New Directions Research Program, the Canadian Agricultural Adaptation Program, Bridgestone America's Centre for Research and Technology and LANXESS Canada.



Prof. David Wolyn



Russian dandelions such as these are being studied for their potential to help address concerns about a global rubber shortage.

Tall grasses for green fuel

BY SAMANTHA BEATTIE

A green energy source that's as good for the environment as it is for the economy has yet to be found. But researchers believe perennial grass is a promising biofuel source that requires few agricultural inputs yet yields high amounts of energy.

Plant Agriculture Prof. Bill Deen and graduate student Kate Withers are part of a team working to adapt two types of perennial grasses — miscanthus and switchgrass — to Ontario conditions.

They're also evaluating the grasses' bioenergy potential.

"Perennial cropping systems may offer ecological and environmental benefits to the Ontario landscape," says Deen. "They may also offer socioeconomic benefits because they provide an opportunity for producers to diversify their crops and invest in low-risk markets."

Some annual biofuel sources, such as corn and canola, have been criticized for being too nutrient intensive, reducing the long-term productivity of soil. But perennial grasses have two advantages over annual crops: they don't need to be replanted every year, and they have a longer growing season. That results in an extensive root system, enabling the plants to prosper in shallow and fragile soils and requiring less fertilizer and other nutrient inputs, says Deen.

Once these grasses are harvested, they can be burned to produce heat for industrial or residential applications and can be a cost-effective and environmentally friendly fuel. Deen and Withers suggest other uses for perennial grasses in the production of bioproducts, such as succinic acid and cellulosic ethanol, or as agricultural substitutes for livestock bedding and mushroom compost substrate.

But to get to that stage, the plants first have to flourish in Ontario's climate. For her part, Withers is figuring out why some varieties of cold-tolerant miscanthus are particularly able to survive the winter months. From there, she'll develop a way to screen for improved germplasm to narrow the selection down to the varieties best suited for Ontario production.

These efforts are part of a broader initiative to lower the costs associated with establishing perennial grasses.

"It takes three years for perennial grasses to reach their full height, making them



Prof. Bill Deen

quite expensive to establish," says Withers. "That's why it is important to get high yields as quickly as possible."

Along with adapting miscanthus to Ontario's climate, the researchers are also investigating the use of nurse crops (plants of a different species) that can grow in between rows while the grasses are maturing. Nurse crops will help farmers generate income as they switch to perennial crop production. **R**

- Collaborators include University of Toronto Prof. Rowan Sage and Ian McDonald of OMAFRA.
- Funding is provided by the OMAFRA – U of G Partnership.

Don't waste your waste

Natural process converts chicken manure into value-added products

BY ISAAC SACCO

Flies and manure have long had a strong symbiotic relationship, but now University of Guelph researchers are capitalizing on this partnership to create a solution to manure problems that are literally piling up for chicken farmers.

Environmental Horticulture Chair Prof. Youbin Zheng and graduate student Nichelle Lomas, from the School of Environmental Sciences, have been investigating using fly larvae to convert chicken manure into value-added fertilizer and high-protein animal feed and to reduce the manure's smell and transportation costs.

Once processed, the manure becomes a purely organic fertilizer and the larvae (or puparia) have the potential to be used as animal feed.

"Basically we are just taking what Mother Nature already does and trying to do it on a much larger and more efficient scale," says Zheng. "Purely organic fertilizer is hard to come by in the market. Our process is unique in the fact that it is organic, high quality and bountiful."

Zheng and Lomas have shown that by adding fly eggs to piles of fresh manure, the mass of the manure could be reduced by about 75 per cent and its moisture content by 90 per cent. When the fly larvae hatch, they process organic matter and add oxygen

into the mass, significantly reducing its weight and odour.

The researchers say the once foul-smelling manure turns into a light, odourless and high-nutrient fertilizer within a week.

The chicken industry is currently shifting to operating fewer barns with larger populations of chickens. With more chickens comes more manure that needs to be disposed of. Roughly 10 tonnes of manure can be generated each day by an average-sized barn.


Traditionally, manure has been composted by piling it outdoors, where it takes many months for it to become ready as a fertilizer and for the odours to subside. The weight and volume of composted manure can also make distribution an issue.

"What we are proposing is a win-win solution for everyone involved," says Lomas. "The manure is converted into a profitable fertilizer, which is organic and full of nitrogen and other nutrients."

A prototype manure converter has been built by the team, which includes industry

partner Ecospace Engineering. The team's next steps include trying to develop a more commercial-scale machine that is self-contained and can process the substantial amounts of manure that would be coming out of a barn.

The researchers are also developing a way to deal with the flies that will be by-products of the process.

Zheng has confidence that this technology will be sought after by farmers because it manages to solve a manure problem while also generating potential revenue through a fertilizer or animal-feed retail opportunity. 

■ Other researchers involved include Profs. Stephen Marshall and Mike Dixon, School of Environmental Sciences.

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by Ecospace Engineering and Root Rescue.



Graduate student Nichelle Lomas (left) and Prof. Youbin Zheng have a different twist on fertilizer production.

Cheers to the real deal

Ontario icewines are highly valued ... so much so that counterfeit products are emerging on store shelves abroad

BY SAMANTHA BEATTIE

Icewine — refreshingly chilled and smoothly sweet — is a luxury drink and a status symbol, particularly in China with its emerging middle and upper classes. And the best icewine in the world, according to Chinese consumers, is meticulously produced by wineries nestled throughout Niagara's verdant and rolling escarpment.

China is the world's largest and fastest growing importer of Canadian icewine. The country bought more than \$7-million worth of icewine in 2011 — twice as much as was purchased in 2008.

But icewine's increasing popularity has led to the emergence of fake products.

Prof. Lefa Teng, College of Management and Economics, wants to help put an end to these imitations. He's teaching Chinese buyers, retailers and consumers how to identify counterfeit companies and products. He's also collaborating with the wine sector to raise awareness about icewine fraud and how it can be avoided.

"Counterfeit wines are harmful to the industry because they undercut market prices and lower consumers' standards," says Teng. "I'm trying to clarify consumer confusion, as well as create a stronger icewine industry that Ontario producers can benefit from."

Counterfeit wines are made from grapes picked in the regular season, around September and October. These wines are then mixed with sugars and some flavours. They still taste sweet, but they don't meet the stringent production standards of real icewine (see sidebar).

Teng urges Ontario wineries to be cautious in using buyers and importers, some of whom will buy real icewine for product tasting but later replace it with counterfeit icewine, still claiming it's Ontario icewine.

A winery's best defense against fraud is to conduct background checks on importing companies and go with buyers who completely control their distribution system.

"For wineries, it's worth the extra effort in the long run to make sure their reputation is protected as a reliable icewine brand," says Teng. "There is a taste and quality difference between icewine and counterfeit icewine that many consumers notice."

Teng found this to be true when he conducted a blind taste test of icewine and late-harvest wine (made with grapes picked earlier in the season, around November, before they fully freeze) with more than 300 Chinese and Ontario consumers. Although those who were less familiar with icewine couldn't initially detect a difference, experienced icewine drinkers — having consumed more than five bottles in their lifetime — could tell the two types apart.

Besides taste, there are other definite indications that a bottle of icewine is counterfeit.

For example, if a bottle (375 ml) is priced at less than \$60 in China, it is definitely not icewine, but late-harvest wine, Teng says.

The label is also revealing. The product is counterfeit if icewine is spelled as two separate words (ice wine); if the VQA (Vintners Quality Alliance) regulatory

Ontario's climate is ideal for producing icewine, as the grapes can only be handpicked after they reach a "hard freeze" or an internal temperature of -8 C. This hard freeze occurs only if temperatures drop quickly and at the right time of year, usually in January. If the weather is too warm, the grapes will spoil on the vine. But if it's too cold, no grape juice can be extracted.

Icewine production is a risky venture, but good-quality icewine is appreciated across the world, particularly in Asia.

symbol guaranteeing the wine originates in Canada is not on the label; or if there are back label errors, such as incorrect postal codes.

In the summer, Teng led a conference in Beijing that educated retailers, buyers and consumers about icewine and how to tell it apart from late-harvest imitations.

Teng is also working with Pillitteri Estates Winery and other Ontario wineries to develop champagne-style icewine to match Chinese taste preferences, which he describes as fizzy yet sweet.

"China-Canada relations are very good right now, and Ontario icewine already has a strong reputation in China," says Teng. "I'm helping local wineries benefit from these opportunities by developing the right products and building credible distribution channels." **R**

- Collaborators include Prof. Jie Chen of the Shanghai Jiao Tong University and Prof. Yingyuan Wang of the University of Science and Technology Beijing.

- This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by Canbest Group and Pillitteri Estates Winery.



Canada's success at producing icewine is prompting a raft of counterfeit products abroad, says Prof. Lefa Teng.

Best management for emissions

BY SAMANTHA BEATTIE

Thanks to modern technology and research, dairy farmers have more options than ever to improve manure production, storage and application and to reduce greenhouse gas emissions. For farms big and small, best management practices will improve producer profitability and benefit the environment.

These practices include applying manure to fields at the right rate and time, scraping manure from dairy barns continuously, emptying manure tanks completely and installing an anaerobic digester.

Prof. Claudia Wagner-Riddle, from the School of Environmental Sciences, is leading a research team evaluating the effectiveness of these practices.

The team has created three videos that highlight its findings.

“We want to treat manure as a resource and optimize its efficiency, while reducing the harmful side effects,” says Wagner-Riddle. “This research is very applicable to all different types of dairy farms, and we want to convey this to producers through the videos.”

Here’s why it matters. When it comes to global warming, methane is the second-most significant greenhouse gas after carbon dioxide. In Canada, nearly 30 per cent of methane is believed to come from agriculture. That’s why dairy farmers are working toward a greener industry.

The first video shows farmers how they can maximize the benefits of manure application while reducing methane emissions. For example, applying manure to fields as soon as possible after crops are planted maximizes crop production and odour reduction and reduces methane losses into the environment.

The second video focuses on manure storage research. Here, the team talks about the benefits of anaerobic digestion, which can reduce emissions by up to 90 per cent.



Best management practices reduce emissions and increase farmers' profitability, says Prof. Claudia Wagner-Riddle.

If dairy farms are large, enough manure is produced to be stored in an anaerobic digester rather than in a liquid storage tank. The digester converts manure and organic waste into energy, which may be used to heat barns. On one farm, the digester saved a producer about \$25,000 in annual fuel expenses.

Some farms, however, are too small to produce enough manure to benefit from anaerobic digestion. So the team is also looking at how emptying manure tanks completely would limit the growth of microbes that produce greenhouse gases.

The final video examines how to stop emissions at the source, that is, in dairy barns. Strategies include flushing and scraping manure out of the barn continuously and placing straw on gutter systems.

Cow nutrition also has a role to play. Reducing the soluble protein that cows consume reduces the ammonia they end up excreting and lowers the amount ultimately released into the atmosphere.

The team is continuing to analyze management practices to find out which are most effective. Along with informing dairy farmers across Canada about these results, the team will use the new research to influence future environmental and agricultural policy. **R**

- Collaborators include University of Guelph Profs. Rob Gordon, Bill Van Heyst and John Lauzon, as well as OMAFRA staff Tom Wright and Chris Duke, and Karen Clark from Dairy Farmers of Canada.

- These videos are funded by the OMAFRA – U of G Partnership through the Knowledge Translation and Transfer program. Additional funding is provided by the Agricultural and Greenhouse Gases program.

- Check out the videos on YouTube:
[y2u.be/Yq9QJ4MCWeE](https://www.youtube.com/watch?v=y2u.be/Yq9QJ4MCWeE)
[y2u.be/I4ZmTQG85Xg](https://www.youtube.com/watch?v=y2u.be/I4ZmTQG85Xg)
[y2u.be/6Wmyhnb6K90](https://www.youtube.com/watch?v=y2u.be/6Wmyhnb6K90)



Prof. Emmanuelle Arnaud (left) and graduate student Anna Best are analyzing subsurface environments.

Keeping water safe for drinking

Researchers go underground to see why pollutants persist

BY MEGAN COWIE

Guelph's drinking water is among the safest and most vigilantly tested water supplies in Canada. Land management practices in the surrounding county — and through Ontario — have improved over the years through legislation and best management practices designed to protect the province's soil and water resources. But recent research has shown that pollution of the city's aquifer (a natural underground water source) by two common contaminants persists.

The question is why?

Prof. Emmanuelle Arnaud, from the School of Environmental Sciences, and graduate student Anna Best believe the answer lies deep underground. These researchers are investigating how pollutants move from the soil surface to a layer of water-saturated porous rock, deep

underground, called the bedrock aquifer. It is the City of Guelph's primary source of drinking water.

The team is focusing on two pollutants in particular. Nitrate and a fecal indicator bacterium, *E. coli*, have been discovered in the subsurface sediments and underlying bedrock aquifer.

"These pollutants are really important to think about," says Arnaud. "The *E. coli* concentrations are high, and the fact that they're down there just isn't good."

While Guelph's drinking water remains safe, the study will help the city manage these risks. And it will be relevant to people outside Guelph as well, Arnaud says. All of southwestern Ontario and much of southern Canada have subsurface environments similar to Guelph's.

The team is studying three sites: one exposed to fertilizer; another exposed to manure; and finally a control forested woodlot area with minimal human intervention. The researchers want to determine how land management practices and the subsurface environment affect water contamination.

Long core samples are taken from each site, and the geochemistry of the subsurface materials is analyzed for pollutants. Wells installed at varying depths are used to measure underground water pollutant levels.

So far, the team has discovered low-to-moderate nitrate concentrations at the fertilizer site and high-nitrate concentrations at the manure site. The amount of *E. coli* in the underlying bedrock of the manure site spiked after manure application.

Next, the data will be analyzed to evaluate the relationship between pollutants and the characteristics of the subsurface environment at each site. In collaboration with City of Guelph researchers, the best available solutions will be developed to keep Guelph's drinking water safe and mitigate future risks. **R**

■ Other faculty involved include Profs. Kari Dunfield and Gary Parkin, School of Environmental Sciences; Beth Parker, School of Engineering; and Ramon Aravena of the Department of Earth and Environmental Sciences, University of Waterloo.

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Ontario Research Fund and the Natural Sciences and Engineering Research Council.

Managing a menace

Researchers take aim at Spotted Winged Drosophila, a new invasive species



Prof. Jonathan Newman: “We don’t realize that an invasion is happening until it is already a problem.”

BY ANDREA SECCAFIEN

Fruit flies can be a pesky annoyance, but their ability to do significant economic damage has mostly been limited — until now.

A new invader, a small vinegar fly called the Spotted Winged Drosophila (SWD), prefers softer-fleshed fruit and has the ability to cause major damage to berry crops, peaches, grapes, tomatoes and other tree fruits.

And it’s nasty. Most other members of the vinegar fly family are attracted to fermenting (rotting) fruit. But female SWDs cut a slit in healthy and ripening fruit and lay their eggs inside.

SWD hitched a ride across the ocean on fruit imported from Asia and began invading crops on the U.S. west coast, in Oregon, Washington and California. Then it made its way north and east and is now fully entrenched in southern Ontario.

University of Guelph professor Jonathan


Newman, the director of the School of Environmental Sciences, is working to control the pest.

“We don’t realize that an invasion is happening until it is already a problem. It’s too late to contain it or stop it now, but instead we need to learn how to manage it,” Newman says.

Little is known about the SWD, and Newman hopes to fill in some of the gaps. He and his team are now looking at the life history of the insect, including its longevity, rates of reproduction and mortality, and ability to overwinter.

Later, they’ll study the fly’s development time in a variety of temperatures to determine the range of temperature in which the insect can survive. They will also investigate host specificity, that is, the way different fruits affect the insect’s egg laying and development time.

All of this information will ultimately be fed into a mathematical model that will show the pattern of pest load on landscapes through different seasons and temperatures. From there, the best and worst conditions for dealing with the pest can be determined.

“This work will help advise others who are focusing on risk assessment and practical field issues and those who are dealing with this pest and the potential economic loss,” says Newman. 

■ Other collaborators on this project include post-doctoral fellow Geraldine Ryan, doctoral student Aaron Langille and master’s student Lisa Emiljanowicz. Environmental Sciences Prof. Rebecca Hallet leads a team that is working on other aspects of SWD and collaborates closely with Newman.

■ This research is funded by the OMAFRA – U of G Partnership.

Target: high-priority diseases



Researchers enlist professionals and the public to help policy makers put dangerous zoonotic diseases first

BY SARAH HOLLYWOOD

Outbreaks of zoonotic diseases — those diseases, such as rabies and West Nile virus, transferred from animals to humans — concern the general public and policy makers alike. But not all zoonotic diseases pose the same level of threat, so criteria must be determined to prioritize their control and to help ensure resources are made available to combat the most dangerous diseases first.

Population Medicine Prof. Jan Sargeant and post-doctoral fellow Victoria Ng are exploring what criteria the public, as well as professionals, believe should be the priorities when considering zoonotic diseases.

Once the researchers determine the criteria, they will create a user-friendly database to help government public health and policy staff prioritize zoonotic diseases efficiently based on the level of threat they pose.

“We wanted to consider what people from all walks of life are concerned about when they think of zoonotic diseases,” says Sargeant. “We are going to combine this information with the actual characteristics of the diseases in order to provide the

most well-rounded view possible for policy makers.”

There are many criteria that can be used to prioritize diseases. Examples include the severity and duration of the illness, the economic burden and the case-fatality. However, determining which of these criteria is most important is much more difficult — which is where members of the public come in.

While an expert may see the value in including more subtle characteristics — such as how much is scientifically known about the disease — the public is more likely to give higher priority to diseases with striking characteristics. Public participation allows policy makers to see what the residents in certain geographical areas are concerned about, which also aids in faster and more successful prioritization.

In the study, nearly 1,500 participants prioritized a list of 21 key characteristics of zoonotic diseases. The participants ranged from experts in the field to the general public. The characteristics were then assigned a certain number of points, depending on how they were prioritized, and were applied to 62 zoonotic diseases

of public health importance in Canada and the United States.

Now that they have a list of prioritized characteristics, the researchers are going to create a user-friendly interface that will allow policy makers to prioritize resources more effectively. For example, a human-health organization may be interested in the database, but it doesn't make the animal side of diseases a high priority. Using the interface, then, the organization can pick and choose which characteristics it's interested in and prioritize from there.

“This interface will be a superb tool for disease prioritization,” says Sargeant. “It will allow for fast and easy access to disease characteristics and will help policy makers prioritize dangerous zoonotic diseases more efficiently.” **R**

■ Participants in this project include scientists at the University of Guelph, OMAFRA, the Canadian Food Inspection Agency, the Public Health Agency of Canada, and Public Health Ontario.

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Canadian Institutes of Health Research / Public Health Agency of Canada Applied Public Health Chair, formerly held by Prof. Jan Sargeant.

Aiming to reduce viral diseases on chicken farms

BY MEGAN COWIE

Viral diseases can lead to major financial losses for chicken farmers. It's not known which farm practices affect virus prevalence, making it difficult for farmers to consistently raise healthy flocks.

To help deal with the problem, Dr. Michael Eregae, a recipient of a Partnership-funded "Highly Qualified Personnel" (HQP) scholarship is studying risk factors associated with three particularly problematic viruses on chicken farms.

His goal is to identify practices that affect pathogen prevalence. He ultimately plans to make recommendations that can be used by farmers to decrease chicken disease.

Eregae completed his veterinary and master's degrees at the University of Nairobi, Kenya. He then pursued his PhD in Epidemiology, coming to the University of Guelph, where he was awarded an HQP scholarship.

The HQP program provides graduate students conducting research related to food production with agri-business knowledge and experience. Students in the program take a specifically designed business course — UNIV 6050: Integration of Science and Business — that teaches them about business and innovation, intellectual property, entrepreneurship and commercialization related to the agri-food system in Ontario.

Eregae completed an HQP program work semester at the Chicken Farmers of Ontario (CFO) under the supervision of Dr. Gwen Zellen, vice-president of Food Quality, Operations and Risk Management, and Cathy Aker, manager of Food Quality and Risk Management.

Eregae shadowed field service representatives there as they conducted farm and processing plant audits, and he was able to see first-hand how science can direct policy decisions.

"The HQP Program has benefited me because now I can appreciate where my own research will end up," he says.

Eregae's research may help the CFO




Michael Eregae is helping identify on-farm practices that impede healthy flocks.

develop tighter on-farm biosecurity controls that will reduce chicken disease.

His work is part of the larger, ongoing Enhanced Surveillance Project (ESP), which is evaluating the prevalence of 13 viral pathogens on chicken farms. Led by Eregae's academic advisor, Prof. Michele Guerin, Department of Population Medicine, the project is the first large-scale study to be done in Ontario on this many pathogens.

The ESP team collected biological samples from chickens at processing plants to identify the presence of the pathogens in Ontario. Then they travelled to the corresponding chicken farms to assess farm management and biosecurity practices specific to each sampled flock. Now they're working on analyzing the data.

In the future, Eregae wants to continue to be part of research initiatives aimed at livestock disease control.

"I hope to contribute to disease control anywhere in the world. But because of my experiences in the developing world, I would really get a lot of satisfaction if my influence helped reduce the disease problems in those countries," he says. 

- This research was sponsored by the OMAFRA – U of G Partnership through the HQP program, the Emergency Management theme, and the Animal Health Strategic Investment program, managed by the Animal Health Laboratory of the University of Guelph. Additional funding was provided by the Poultry Industry Council and Chicken Farmers of Ontario.
- Collaborators include the Animal Health Laboratory, OMAFRA, Chicken Farmers of Ontario and broiler hatcheries and processing plants in Ontario.

More milk and a better cure

Researchers find new diagnostic tools and treatments for ketosis in dairy cows

BY LAURA MONTGOMERY

For dairy producers, the battle of treating ketosis has just become easier. University of Guelph researchers have found that a glucometer — a simple diabetes management tool — can be useful for diagnosing ketosis, which affects 40 per cent of fresh cows.

Ketosis is similar to Type 2 diabetes in that the animals are insulin resistant. Ketosis develops when there is not enough glucose (or sugar) available to the body. Decreased milk production can result. If the ketosis is not treated, it can lead to life-threatening conditions that only surgery can resolve. Doctor of Veterinary Sciences student Jessica Gordon is part of a team of researchers at the Ontario Veterinary College that have found diabetic management techniques can be instrumental in providing more effective, economical and less invasive treatments for ketosis.

“Ketosis is very prevalent in dairy herds,” says Gordon. “So finding solutions to improve animal welfare and also improve economics is very important in agricultural research.”

And that’s what the team has done.

Using a glucometer is one solution. It’s a diagnostic tool that measures both blood glucose and ketones and allows researchers to determine the severity of ketosis. Then, researchers can identify the type of ketosis and decide how effective a treatment might be before administering it. Often there are no apparent signs of ketosis development,



Jessica Gordon is finding more effective and economical treatments for ketosis.

so measuring blood ketones to assess ketosis sub-clinically helps to prevent the condition from worsening. Researchers also found the glucometer inexpensive to operate and durable enough for on-farm conditions.

Gordon and her team also looked at new treatment solutions for ketosis. Unlike humans, cows can’t orally absorb pure glucose, so giving cows sugar wouldn’t increase their blood glucose.

This reality led the team to conduct randomized clinical trials on more than 1,400 cows to see which solution might

work best to treat ketosis. Insulin injections, an injected vitamin B12-phosphorous product called Catosal, and an oral propylene glycol drench were investigated, along with a combination of all three products.

The team found that insulin didn’t cure ketosis in cows. Catosal, however, helped ketotic cows produce more milk and cured them sooner. In addition, the team found the propylene glycol drench helped more severely ketotic cows.

Though Catosal is not yet licensed in Canada, Gordon and her team suspect that giving vitamin B12 alone may have similar effects — and it’s inexpensive.

Looking forward, Gordon and her team plan to investigate further the blood glucose-ketosis relationship to find out its exact mechanism. This research will allow veterinarians to make recommendations for the most effective type of treatment, straight from the field.

“This research contributes greatly to our knowledge of ketosis and is something that can be applied right away,” says Gordon. **R**

- Collaborators include Ontario Veterinary College Profs. Todd Duffield, Stephen LeBlanc and David Kelton, and Michigan State Prof. Tom Herdt.

- This research was funded by the OMAFRA – U of G Partnership through the Veterinary Clinical Education Program. Additional funding was provided by Bayer Animal Health and Vetoquinol.

Animal health benefits human health

More than half of all infectious diseases in humans have a zoonotic component

BY ROBYN MEERVELD
RESEARCH ANALYST
OMAFRA

The health and well-being of Ontario's livestock are essential for the production of safe, quality food products and for industry access to international markets. They're also important to human health. More than half of all infectious diseases have a zoonotic component, including salmonellosis, Q fever, listeriosis and Lyme disease.

The Animal Health Laboratory (AHL) at the University of Guelph plays a key role in animal and human health, thanks to the facility's experts in veterinary pathology, toxicology, virology, bacteriology and other highly specialized fields. They provide rapid and accurate diagnostic services for a wide range of public- and private-sector clients, including veterinarians, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), the Canadian Food Inspection Agency, researchers, livestock processors and retailers, law enforcement agencies (in forensic investigations) and public health agencies.

OMAFRA relies on the lab's work to develop evidence-based policy and programs that will provide the greatest benefit to the province's livestock industry and the public.

Getting a handle on animal health

Through the OMAFRA – U of G Partnership's Animal Health Strategic Investment Program, the AHL has increased its capacity in some important areas:

- **Improved diagnostic capability.** More



than 100 new or improved test methods have been developed. Improved equipment has increased the lab's capacity to test not only for a wider range of pathogens, but with more sensitivity, specificity and faster turnaround times.

- **Enhanced disease surveillance.** Baseline levels of various animal diseases in Ontario have been determined, providing a benchmark for early detection of emerging hazards. The projects have also served to train students in field and laboratory techniques, enhancing Ontario's pool of personnel highly qualified in disease surveillance.
- **Responsive emergency management.** In the event of a foreign-animal disease outbreak, the AHL, industry and government each have unique roles to play in mitigating the impact. The AHL's response is tested in regular, full-scale simulation exercises for several livestock species. New high-throughput equipment and postmortem facilities are proving to be valuable assets for both

efficient daily operation and emergency situation management.

Still more innovation ahead

The AHL and OMAFRA are working with Ontario's livestock industry to support their animal health priorities. In the works are:

- Integration of the AHL lab results with those from other Canadian animal health laboratories and public health networks to provide a coordinated picture of disease epidemiology, in real time.
- Industry-focused surveillance activities, as well as the expansion of cluster analysis and other surveillance tools, to give greater feedback to industry and to get a jump on outbreaks sooner.
- Continual updating and testing of the AHL's emergency response, through regular simulation exercises with industry and government partners, to remain ready and able to respond to needs. **R**

Putting food through its toughest test: safety

BY ISAAC SACCO

Staff at the Agriculture and Food Laboratory (AFL) would never refer to themselves as heroes, yet every day their work helps protect the food and drink consumed by some 13.5 million Ontarians.

Located on Stone Road in Guelph, the University of Guelph laboratory is staffed by more than 150 professionals who are specialized in services as diverse as DNA analysis, microbiology, agrochemical testing, microscopy, nutrient analysis, and testing for drug residues, pesticides and allergens.

The AFL's daily mission is to work together toward a healthier future by providing high-value analytical and diagnostic services and by making sure Ontario residents consume the safest food possible. This mission translates into the annual testing of more than 800,000 raw milk samples, more than 200,000 Ontario food samples, and many more thousands of samples of water, soil and plants.

In addition, lab personnel provide compliance, regulatory and food safety testing for fruit and vegetables, meat, milk, processed food, and soil, water and plant materials. Industry leaders, such as the Dairy Farmers of Ontario, Egg Farmers of Ontario, and Royal Canin, also work closely with the AFL.

Being a not-for-profit organization frees the lab to fund research for the public good, such as the development of more accurate test methods and libraries for pathogen strains, which enable contaminated products to be identified faster. Sharing its expertise with other food safety professionals is an important part of the AFL's operation. Presentations and publications, industry networking, and mentoring of post-graduate students are all done in an effort to increase global knowledge about food safety.

"Every day at the lab we look to identify contamination, including residues or misrepresentation of products by analyzing food, its raw components, water and soils,"



Andrew Moore, supervisor of the Analytical Microscopy Lab

says Lynne Fruhner, a manager at the lab. "With so much diversity located under one roof, the lab goes beyond results and creates a synergy of collective solutions."

The testing facility is dedicated to best practices and is accredited by the Standards Council of Canada, the Canadian Association for Laboratory Accreditation, and others. It is the only non-government food-safety lab in Canada to hold accreditation for test method development, evaluation and non-routine testing in specific laboratory disciplines.

While the AFL has a long-standing service relationship with the Ontario Ministry of Agriculture, Food and Rural

Affairs, it also serves many other federal and provincial government clients, such as the Canadian Food Inspection Agency, Health Canada, and Agriculture and Agri-Food Canada.

The AFL is also the laboratory of choice for many domestic and international brand corporations looking for assistance in monitoring the quality and safety of their products.

With so many different parties relying on its services, the AFL finds it essential to be aligned with current regulations and new technology. With its proven 40-year history, the AFL will strive to continue to support excellence in food safety. 



Partners for F



Lana Culley, Director of Business Development for Vineland Research and Innovation Centre.



New research

BY SAMANTHA BEATTIE AND ANDREA SECCAFIEN

The U of G's new \$25-million Livestock Research Innovation Centre will be a world class dairy facility, funded by both OMAFRA through Agricultural Research Institute of Ontario (\$20 million) and the Dairy Farmers of Ontario (\$5 million). Set to open this fall, the Centre and its associated

Working together to establish better crops and profits

BY KAREN BALL

In the rapidly growing horticulture industry, there is a high demand for new products and services that improve profitability and lower growers' costs of production. With the help of industry and government partners, the Vineland Research and Innovation Centre is looking for innovative practices and technologies to meet the demands of the horticulture sector.

The researchers are getting a great response. The number of Vineland's research and innovation projects doubled in 2012–2013 with industry contributions growing to more than \$1 million.

Vineland, which became a not-for-profit organization in 2007, is located on the site of a research station that has been operating since 1906. Through the years, it has become a world leader in horticultural science and

innovation, addressing growers' and consumers' interests in lowering costs and creating high-quality foods, ornamentals and other horticulture products.

For example, Vineland is breeding new varieties of apples that thrive in Ontario's climate by working with the Ontario Apple Growers and using sensory science and consumer panels' taste preferences to select the best types. And in collaboration with Flowers Canada, researchers are developing environmentally friendly alternatives to pesticides, such as using predator insects to control pests.

Vineland also collaborates with the University of Guelph. Two researchers in particular are involved in extensive research on the Vineland grounds: Prof. Jay Subramanian is immersed in new fruit breeding programs with peaches, plums, nectarines, and

sweet cherries; and Prof. Youbin Zheng is examining water- and nutrient-use management in flowers and nursery products. Zheng's most recent work involves best practices for fertilizer application rates.

Working with researchers, producer groups and private companies allows Vineland to deliver superior technologies and products to growers and consumers alike. These partnerships are important in driving research innovations that help Vineland develop sustainable solutions for industry problems.

- Vineland is funded by the OMAFRA – U of G Partnership; Growing Forward 2, a federal-provincial-territorial initiative; the Agricultural Research Institute of Ontario, industry and other sources.



Prof. Amar Mohanty (far left) explains and Development Centre is supporting in Ontario to Uganda High Commission Former Vice-President Kevin Hall and on in the background.

Progress



centre will be world class

research program will establish an integrated campus for dairy research, technology development and innovation.

Prof. Vern Osborne of the University's Animal and Poultry Science is the design lead for the centre, which is also supported by the Livestock Research and Innovation Corporation (including the Dairy Farmers of Ontario) and OMAFRA.

"The new (centre) creates a unique multi-discipline research cluster designed to incorporate multi-purpose, scalable and flexible research infrastructure to accommodate research needs in the dairy industry," says Osborne.

Dairy research within the facility will bring together educators, industry partners and scientists from many disciplines, and it will include cow health, reproduction,

nutrition, life cycle, emissions and welfare. To facilitate these studies, the building will house laboratories designed specifically for metabolic, lactating, growth and life-cycle research.

In the future, the centre will also incorporate research into other species of livestock, all with the goal of meeting the needs of the various industries in the most effective ways possible.



how the Bioproducts Discovery and Development Centre is advancing sustainable product development. Prof. John Nsambu (far right) and Prof. Rumina Dhalla look

Sustainable solutions for a plastic-dependent world

BY MEGAN COWIE

Plastic is an integral part of our lives; in fact, it's difficult to imagine a world without it. But this dependence on plastic may not be sustainable, considering plastic is traditionally made from petroleum, a fossil fuel which ultimately turns into a greenhouse gas.

That's where Guelph's Bioproducts Discovery and Development Centre comes in. It was created to address the world's increasing need for sustainable plastics and other bio-based materials. Now, it serves as a

facility where researchers and industry come together to develop environmentally friendly plastic products that maintain quality and cost-effectiveness.

And it's making progress. Some products developed at the centre, such as biocomposite multi-purpose storage bins (called "bio-bins") are already being sold at leading hardware stores.

Prof. Amar Mohanty, director of the centre, says that biocomposites and green composites — which are made using a combination of plant-based fibres and either traditional plastics or bio-based plastics, respectively — can

substitute a company's petroleum-based plastic use by as much as 80 per cent.

He says the centre is now working with more than 25 industries and institutions worldwide. It received a boost towards this goal in the fall with a \$450,000 grant from OMAFRA, that leveraged a \$1.25-million donation from BMO to develop its next phase.

"Our goal is to expand these partnerships to help usher the world into a more sustainable future," says Mohanty.

Innovative ideas coming forward

Research efforts target rural space potential

BY ANDREA SECCAFIEN

Rural areas everywhere are facing tough odds, as urbanization spreads and gobbles up their space. Likewise, rural tourism needs help keeping attractions in the countryside popular and profitable. With that in mind, University of Guelph Travel and Tourism Prof. Marion Joppe and several colleagues are identifying and compiling innovative best practices in rural tourism that build on the strengths of the resources in Ontario's rural communities.

"Rural areas are slowly depopulating as their residents are growing older and younger generations are moving to urban areas to be educated and don't return," says Joppe. "This project aims to help the rural tourism industry be adaptive and creative."

"We are trying to provide an opportunity to make a good living without moving to an urban space." —Prof. Marion Joppe

Through case studies of rural tourism in destinations ranging from St. Jacobs, Ont., to Scotland, Joppe and her colleagues are fostering new ideas for Canada's rural spaces. Collaborators on this project include University of Guelph School of Hospitality and Tourism Management Profs. Michael Von Massow, Iain Murray, Kerry Godfrey, Stasia Elliot and Tanya Maclaurin.

Elliot's study of 'The Townships' Trail, a culturally themed tourist trail in the Eastern Townships of Quebec, provides an example of a rural tourism destination. The case study explores how the initiative has increased visits to the area by enhancing its heritage, cultural and natural attractions. The trail travels through 31 municipalities and highlights the built and natural heritage of the Eastern Townships.

Joppe says planning such developments requires the collaboration and reconciliation of stakeholders with a wide range of opinions and interests.



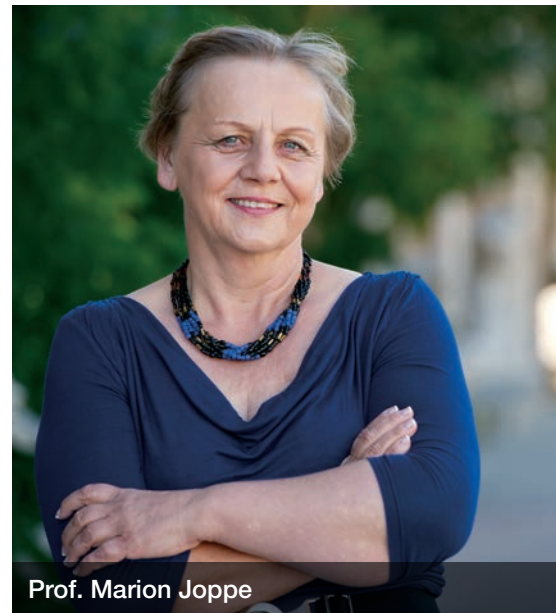
Innovation has to be understood as fostering tourism development and can be seen in three distinct forms. First, since tourism operators tend to be risk averse, most innovations consist of incremental improvements or adjustments to an existing situation. These changes are designed to improve performance, increase efficiency, and where possible, boost short-term profits.

Second, at the opposite extreme, radical innovation introduces a new idea that disrupts current conventions. The visionary

innovator — usually an outsider — is unconcerned with the traditional thinking of an industry or sector. Radical innovations target new customers with unique value propositions that were not operating before. Finally, in between lies liminal innovation, in which existing ideas are lifted from other contexts and adapted to fit local situations. The novelties build on what is already in place.

Whatever type of innovation is introduced, it needs to build on the natural resource base of the community.

to revive rural tourism



Prof. Marion Joppe

Rural Ontario holds many opportunities for tourists to experience a variety of attractions, such as horse-drawn buggy rides in St. Jacobs.

Typically, food is a key link in rural tourism and requires connecting farmers with consumers through a maple syrup festival, for example, or a wine trail. New ideas, such

as chocolate trails or garlic festivals, are emerging in rural areas and allow producers to package their product along with a unique experience.

These events bring people into the rural area where they are bound to spend money, not only on the celebrated commodities, but also at a local restaurant or hotel. Ultimately, Joppe says, tourism is about the overall economic activity that helps to sustain the rural environment.

Joppe says government involvement is vital for successful rural tourism and

innovation. Governments can provide support in strategic planning, investment in research, product development, and education and training.

“Our rural areas are under a lot of stress. If there isn’t economic activity, these areas will become deserted. We are trying to provide an opportunity to make a good living without moving to an urban space,” says Joppe. **R**

■ This research is funded by the OMAFRA – U of G Partnership.



Developing new skills at Ingersoll's Fusion centre.

A place to learn, grow and have fun

Research shows innovative youth centre has a positive effect on a rural community

BY LAURA MONTGOMERY

With a state-of-the-art recording studio, imaginative art lessons, cutting-edge graphic design programs and heart-racing fitness classes, Ingersoll's Fusion Active Youth and Technology Centre is not your average community centre.

By most measures, Fusion is one of the most unique youth centres in the province. And it has University of Guelph researchers examining how investing in youth has changed this rural community for the better and how the centre might be a model for communities and youth elsewhere.

Environmental Design and Rural Development Prof. Al Lauzon and his team of researchers have studied the youth at Fusion for their feelings of acceptance, behavior changes and future career goals.

So far, the results have been positive. The team found that Fusion youth feel included and safer, display better emotional regulation and are more confident in what they want to do in the future.

"The cliques that exist with adolescence are transcended at Fusion. They talk about how everyone gets along, there are no hassles and they hang out with people they wouldn't normally talk to," says Lauzon.

With four per cent of the municipal budget going towards the centre, youth pay just a one-time membership fee of \$5 to participate in unlimited programs from age 12 to 18 years old.

In addition to municipal funding, the

centre is run with an entrepreneurial spirit. The 18,000-square-foot facility can be rented out during the day and leased during non-centre hours, helping to cover the costs of running the centre and paying for the skilled professionals that lead Fusion's programs.

The skills developed at Fusion, such as graphic design or music production, can then be transferred into the community. Many local businesses have been very supportive in hiring Fusion youth.

Miss Ingersoll Family Restaurant's owner Brenda Hendry has hired Fusion youth many times to design logos and paint seasonal windows for her restaurant. She praises the centre for what it's done for youth in the community.

"Fusion youth are good, responsible and respectful when they've worked for me," says Hendry, "I think they are changing the opinion about teens in this town."

Along with assessing Fusion's role in providing employment experience and building respect in the community, Lauzon has partnered with business Prof. Fred Pries to study changes in the youth crime rate.

When the centre opened in 2006, the number of crime incidences was 48.9 cases per one thousand Ingersoll youth. In 2011, the crime rate dropped to 15.2 and is now on par with the provincial average.

Now, Pries is aiming to determine the cost savings associated with Fusion's introduction into the community.

"In addition to the social benefits, when crime rates drop, there is also a positive financial impact on policing costs," says Pries. "The challenge is putting a dollar value on those impacts."

Lauzon, who has lived in Ingersoll for the past 20 years, says you can see the changes in the community just by walking down the street. And, he adds, it is a prime example of what a community can do when it invests in its own youth.

"All too often rural communities invest most of their resources in the youth that are going to leave, not the ones that will settle in the community," he says. "Fusion is an investment in the youth that will stay." **R**

■ Other collaborators include Prof. Andrea Breen, Department of Family Relations and Applied Nutrition, and research associate Carolyn Pletsch.

■ This research was funded by the OMAFRA – U of G Partnership.

Giving mom a break

New getaway bunks improve mink welfare, productivity and policy

BY KATHARINE TUERKE

Parenting is challenging, and all mothers need a rest at times — including mink. Stressed, overworked mink mothers engage in more stereotypic behaviours and often get nursing sickness.

But simply adding a shelf to their housing units gives mothers the break they need.

Prof. Georgia Mason, from the Department of Animal and Poultry Science, holds the Canada Research Chair in Animal Welfare. With the help of Ontario mink farmers, she has come to understand how a respite shelf benefits both the mothers and their babies. So she developed a housing unit that includes such a feature.

It's been a hit with the industry. Based on Mason's research, the National Farm Animal Care Council revised its codes of practice this year, and Canada's new guidelines require a shelf be provided for mink mothers. Denmark has also used Mason's research to upgrade its animal-care code.

"This project has been very rewarding — to see that we could make such a difference with this small, simple change," says Mason. "Working with the biology of the animal and mimicking nature will increase animal welfare and productivity for farmers."

Here's what happens. Out in nature, mink mothers have to forage for food, giving them short breaks from infant care.

But on farms, their feed is provided and they don't need to forage, so the breaks they'd normally receive don't exist. By four weeks, the babies combined outweigh their mother, who is then under a lot of pressure.

That's where a getaway bunk comes in. It allows the mother to take a break — just as she would in nature — from the relentless demands of her litter.



Adding a shelf to minks' housing units gives mothers the rest from infant care they would get out in nature.

About mink farming

Mink farming is a significant industry in Ontario. According to Statistics Canada, mink raised in Ontario generate almost \$40 million annually.

Approximately 123,000 mink, most of them breeding females, live on 60 farms. When they give birth, the population rises to almost 600,000 — about double the number of dairy cows in the province.

To test this approach, Mason and her team compared the behaviour and health of mink mothers with getaway bunks to those in a control group. Over two annual successful breeding seasons, she measured suckling time, kit weight, infant mortality, time resting, teat infection and inflammation.

She found that the mothers used their getaway bunk more frequently as the kits got older, usually for an hour or less each day in total. Mink mothers with larger litters spent more time on the shelf, but their kits continued to grow well. The shelves improved mink health and welfare.

Maternal stereotypic behaviour and infant mortality rates decreased, and in one of the two years, mastitis was less common.

"They don't turn into neglectful, lackadaisical mothers," says Mason. "They still provide care."

She says adding shelves and other enrichments will improve maternal health and kit survival and increase farmer profits.

The current shelf has walls to prevent the kits from climbing up, which turned out not to be a problem. Mason will continue her work to determine the most cost-effective design for farmers and to assess how other strains and breeds of mink respond to the new shelf addition. **R**

- Collaborators include Prof. Derek Haley, Department of Population Medicine, and graduate students Lauren Dawson and Misha Buob.
- This research was funded by the OMAFRA – U of G Partnership.
- Two peer-reviewed articles resulting from this research have been published in the *Journal of Applied Animal Behaviour Science*.

Low-cost health food for pigs

Alternative liquid feeding method beats conventional feed, says researcher

Feed is the No. 1 cost in domestic livestock production. High feed costs over the past several years have driven down profitability in Canadian pork production. Research at the University of Guelph is underway to find ways to keep costs down while maintaining or improving feed quality.

For the past 10 years, a team of researchers led by Kees de Lange, a professor in the Department of Animal and Poultry Science and a member of the Swine Liquid Feeding Association, has been working to optimize a liquid feeding process. The goal is to lower feed costs while providing proven health and nutritional benefits to pigs.

A unique feature of liquid feeding is that it allows steeping. Steeping is the partial fermentation of feed with either enzymes or beneficial microbes to improve the feeding value of co-products before they are fed to pigs. De Lange compares aspects of liquid feed to those of yogurt. Through partial fermentation, some of the fibre and other carbohydrates are converted to products such as lactic acid. Lactic acid and some bacteria present in partially fermented liquid feed can provide gut health benefits to pigs and improve feed utilization.

In collaboration with pork producers, various industries and his colleagues, de Lange receives liquid and dry co-products from the bio-fuel and food industries. He then explores ways to improve their nutritional value.

Initially the focus was on improving the availability of phytate-bound phosphorus through the use of phytase enzymes. “We have shown that the effectiveness of added phytase is higher in liquid feeding than in conventional dry feeding systems for pigs,” says de Lange. As a result, the amount of added phytase required to improve phosphorus utilization is less than half of that required in conventional dry-feed systems.

More recently, the team’s focus has



The potential benefits of improving the feeding value of co-products through liquid feeding are substantial.

shifted to improving the feeding value of wheat shorts and corn-dried distillers’ grains, which are high-fibre co-products from the wheat flour and ethanol industries, respectively. Essentially, starch is removed during processing of wheat or corn, reducing the nutritional value of these co-products compared to that of the original grains.

The research team quickly found that simply feeding wheat shorts through liquid feeding systems improved the feed efficiency of growing pigs by about 10 per cent. The researchers also showed that using fibre-degrading enzymes and beneficial bacteria improved the fermentation characteristics of corn distillers’ grains. And that makes it easier for growing pigs to digest it. **R**

- This research program was developed in close collaboration with Ontario pork producers and feed companies.
- This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by Swine Innovation Pork, Ontario Pork, Natural Sciences and Engineering Research Council, AB Vista, Big Dutchman Pig Equipment, Casco Inc./Corn Products International, Nutreco Canada Inc./Shurgain, Chr. Hansen Animal Health and Nutrition, Lallemand Institute Rosell, Great Lakes Nutrition, Agribrands Purina Canada Inc., Furst McNess, Grand Valley Fortifiers, Daco Animal Nutrition, B.S.C. Nutrition, and Dwyer Manufacturing Ltd.

More red means more green

New LED light bulb boosts hen reproduction and profitability — and cuts energy costs

BY SAMANTHA BEATTIE

A six-watt LED light bulb designed for poultry barns significantly boosts egg laying while reducing on-farm energy consumption. This unique bulb emits red-spectrum light — casting a reddish-purple glow — that stimulates the release of reproductive hormones in hens.

Animal and Poultry Science Prof. Gregory Bedecarrats developed the bulb after four years of extensive research into how vision and light affect reproduction. To ensure the bulbs could withstand the dusty and wet poultry-barn environment, Bedecarrats and industry partner Thies Electric Distributing Co. put their product through three upgrades. Now, the one-piece aluminum-sealed bulb housing unit is dustproof and waterproof, as well as easy to clean.

The project began with a special line of naturally blind birds that laid more eggs than their sighted counterparts, indicating that the type of light the eye sees is not important for reproduction, says Bedecarrats. Instead, he says, it's more beneficial if the photoreceptors located in the brain are absorbing light.

The type of light that reaches hens' brains most effectively is not the full-spectrum light emitted by regular bulbs, but rather the

Graduate student Mikayla Baxter (left) and Prof. Gregory Bedecarrats are developing new technology that promotes egg production.

red-spectrum light. When red-spectrum light hits the photoreceptors in the hens' brains, the response is similar to turning on a master switch. Hormones are released that signal the gonads to produce more eggs.

Bedecarrats found pilot farms that installed the red-spectrum bulb experienced a two per cent increase in egg laying. That may not sound like much, but it translates into 900 more eggs per day in a modern barn with 45,000 hens.

What's more, the six- or 10-watt bulbs used for red-spectrum light are more energy efficient than traditional 60-watt incandescent bulbs (which are being phased out in Ontario, anyway), reducing energy

consumption by more than 90 per cent.

The red-spectrum bulb is a financial management tool because it lasts, theoretically, at least five years longer than a conventional bulb, reduces barn energy consumption and boosts egg production. The bulb was released in July and is now available for purchase. Currently, it costs about \$45, but its price is expected to drop as its popularity grows. For his part, Bedecarrats is promoting the data that supports its use. **R**

- Collaborators include Animal and Poultry Science Prof. Tina Widowski, Agriculture and Agri-Food Canada's Dr. Stephanie Torrey, Agviro Inc. engineer Ron MacDonald, and Thies Electrical Distributing Co.

- This research is funded by the OMAFRA — U of G Partnership. Additional funding is provided by the Natural Sciences and Engineering Research Council, Thies Electrical Distributing Co. and the Poultry Industry Council.

Red hues emanate from this specially designed light bulb.





Thomas Woodcock and Sarah Bates work with a frame of bees at the University of Guelph Honey Bee Research Centre.

A buzz

Researchers hit new heights promoting pollinator use and conservation

BY SAMANTHA BEATTIE

Bees are often celebrated for carrying pollen from flower to flower, enabling plants to produce bountiful fruits and vegetables. But cross-pollination, as such, is only one part of bees' job description. Although it is lesser known, bees also help self-pollinating flowers reach full pollination.

Self-pollinating crops include some clovers, American ginseng, apricots, canola, most beans, and sunflowers. These and other self-pollinating crops can experience still greater and higher-quality yields through insect-mediated pollination (see sidebar).

Prof. Emeritus Peter Kevan, from the School of Environmental Sciences, research associate Dr. Thomas Woodcock, and Canadian Pollination Initiative Network Manager Dr. Sarah Bates are helping Ontario farmers get the most out of pollination.

They've created a website called Best Management Practices for Pollination in Ontario Crops that provides recommendations and information on plant breeding systems. The site profiles more than 40 different fruit, vegetables, oilseeds, forages and cover crops.

"Even though researchers around the world have been studying pollination and its impact on crop production for decades, many farmers have limited information about its

in the bee sector

importance and how it works,” says Kevan. “We developed this website to organize research results into an accessible format that fills this knowledge gap.”

In creating the website, the team tailored existing scientific literature to Ontario conditions. Along with covering pollination basics, the site features profiles of individual crops. Here, farmers can find out which pollinators suit their crop needs best and why.

For example, both scarlet and runner beans experience up to 10-times greater yield and seed quality when pollinators are present. On the other hand, apricot and peach producers need to be wary of over-pollination, which happens when too many flowers are pollinated. The trees end up producing too much fruit for the resources available, often resulting in undersized fruit and even tree damage sometimes.

The website also provides the researchers with a portal to encourage farmers to use wild pollinators.

Kevan says managed pollinators, such as honeybees and bumblebees, are important to agriculture, but wild pollinators can also be encouraged through low-cost measures, such as ensuring that off-bloom resources (like wild flowers) and nesting sites are available. In Ontario, wild pollinators

How pollination works

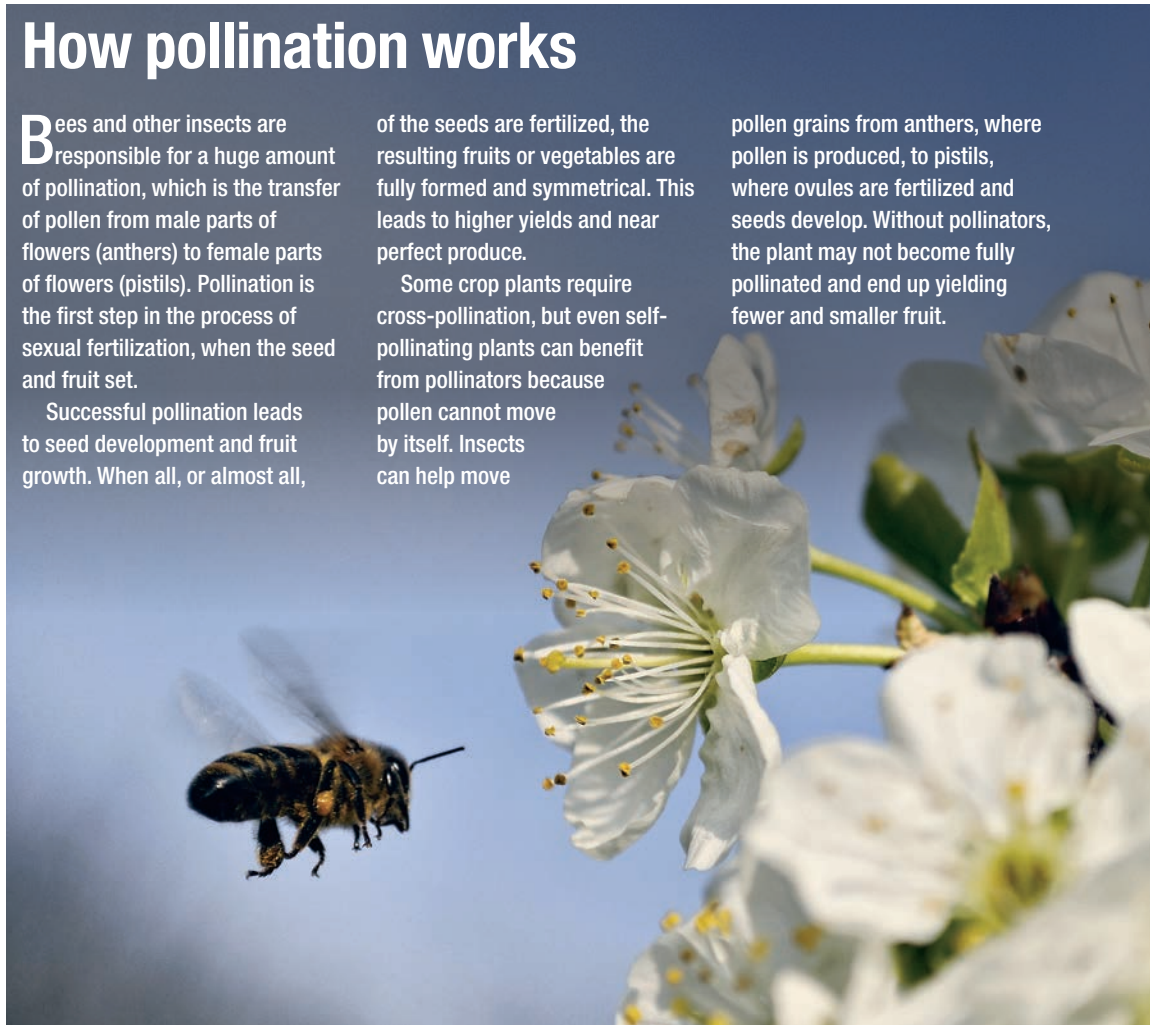
Bees and other insects are responsible for a huge amount of pollination, which is the transfer of pollen from male parts of flowers (anthers) to female parts of flowers (pistils). Pollination is the first step in the process of sexual fertilization, when the seed and fruit set.

Successful pollination leads to seed development and fruit growth. When all, or almost all,

of the seeds are fertilized, the resulting fruits or vegetables are fully formed and symmetrical. This leads to higher yields and near perfect produce.

Some crop plants require cross-pollination, but even self-pollinating plants can benefit from pollinators because pollen cannot move by itself. Insects can help move

pollen grains from anthers, where pollen is produced, to pistils, where ovules are fertilized and seeds develop. Without pollinators, the plant may not become fully pollinated and end up yielding fewer and smaller fruit.



include many native bees, wasps and flies, as well as butterflies and moths. These insects are valuable to producers because they help keep the wider ecosystem healthy and their services are free.

Finally, the website helps

convey to farmers the impact of pesticides on pollinators and how pollinator poisoning can be prevented, detected and mitigated.

From here, the team plans to update the website continually with the most current

information on crop pollination and pollinators.

“Promoting full pollination not only boosts crop yields and quality, it also helps our environment,” says Kevan. “That’s why protecting our pollinators is absolutely vital for keeping Ontario’s agriculture strong.” **R**

Reducing the impact of pesticides

As a leader in pollinator conservation, Prof. Emeritus Peter Kevan participated in the Ontario Bee Health Working Group. The group—composed of beekeepers, farmers,

agri-business representatives, scientists and government staff—has provided options to mitigate the risk to honey bees from exposure to neonicotinoid seed treatments on corn and

soybeans. These chemicals are commonly used to protect soybeans and corn, but they are also under re-evaluation by the Pest Management Regulatory Agency of Health Canada.

■ For more information visit www.pollinator.ca/canpolin.

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Natural Sciences and Engineering Research Council.

Ontario tomatoes in winter

New greenhouse growing technique increases winter tomato production

BY KAREN BALL

Growing Ontario tomatoes in winter may be easier and more profitable thanks to a new technique that addresses the low natural-light levels that hamper crop production in the winter.

University of Guelph Prof. Barry Micallef is teaming up with Profs. Bernard Grodzinski, Department of Plant Agriculture, and Mike Dixon, School of Environmental Sciences, to develop new growing techniques that help greenhouse producers extend the tomato-growing season into the winter.

If too lengthy, exposure to artificial light (called “photo-period”) causes the leaves of a tomato plant to turn yellow and die as they develop a disorder called photoperiodic injury. No leaves available for photosynthesis mean no tomatoes.

“Long periods of light are needed for adequate productivity in the winter when using supplemental lighting, but greenhouse vegetables such as tomatoes respond poorly to it,” says Micallef. “The question is how can we improve the tomatoes’ response to long photoperiods.”

To help, Micallef and his team are developing a new technique for greenhouse growers called time-of-day fertigation.

Here’s how it works. Nitrate is the primary form of nitrogen used in hydroponic tomato production. The tomato plants’ uptake of nitrate and their capacity to use it fluctuate throughout the day. This is a classic biological rhythm. Long photoperiods disrupt these natural uptake rhythms, causing an imbalance between nitrate uptake and use by the plant.



Prof. Barry Micallef

If too much nitrate is provided during the plants’ natural low-nitrogen phase, photoperiodic injury occurs.

To solve the problem, researchers are reducing the amount of nitrate provided throughout the day, as well as changing the temperature in the greenhouse to better mimic natural day-and-night rhythms of nitrate uptake and use by the plant.

“This isn’t something people have done before in greenhouse production,” says Micallef. “We can really make a big improvement if we go to time-of-day fertigation.”

Using this technique will help tomatoes grow under longer periods of light, which will allow growers to extend the growing season by four months and boost their revenue during the winter.

Current greenhouse trials, using the new tomato-growing technique at Great Northern Hydroponics and Erieview Acres

Inc., are promising. They have shown that altering the plant’s nitrogen levels during the long periods of light produce healthy, green plants and, in turn, nice red tomatoes.

The new time-of-day fertigation growing technique will provide great economic benefits for greenhouse growers across Ontario.

“One of our greenhouse growers is getting three times more revenue per box in the winter than he would get for his tomatoes in the summer,” says Micallef.

Micallef plans to perfect the growing technique with his team and continue to develop other methods of extending the greenhouse vegetable-growing season. **R**

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Natural Sciences and Engineering Research Council.



The brighter side of pinto beans

Post-harvest darkening cuts into producer profits

BY ANDREA SECCAFIEN

Pinto beans begin darkening just a day after harvest. Their background colour turns from light beige to a muddy brown. It's a perfectly normal development, but it's often misinterpreted by consumers who think there's something wrong with the beans and discount them unnecessarily.

University of Guelph plant agriculture Prof. Peter Pauls and Ali Navabi of Agriculture and Agri-Food Canada are determined to keep pinto beans bright. They're developing pinto bean varieties that don't darken and are adapted to Southern Ontario growing conditions.

"The darkening trait in beans is something consumers react to when they make purchasing decisions," says Pauls. "We hope our efforts will allow us to have something that distinguishes the pinto bean grown in Ontario from ones grown elsewhere," mainly in the United States, where most pinto beans originate.

The crop value of dry beans, both white and coloured, is approximately \$100 million per year. Pinto beans represent only a small portion of that, but Pauls believes growers can increase the value of pinto beans in the market by cultivating the non-darkening varieties.

Pauls and his team, including doctoral student Mohammad Erfatpour, have now



Prof. Peter Pauls

produced pinto beans that are non-darkening using conventional plant breeding. They're evaluating the yield potential of the new lines through field tests at the University of Guelph research stations in Elora and Woodstock.

Erfatpour's thesis research also includes studies of the genetic controls of the darkening trait. He is examining different populations of pinto beans with the non-darkening trait to identify the gene responsible and to develop tools to make the breeding process more precise and faster.

Pauls believes some of the compounds involved in darkening could be beneficial for human nutrition and could be

contributing to the antioxidants present in pinto beans. So he also wants to ensure that introducing the non-darkening trait doesn't reduce nutritional value.

Future research is planned in collaboration with Krista Power, a research scientist at Agriculture and Agri-Food Canada's Guelph Food Research Centre, to compare the anti-inflammatory effects of darkening to non-darkening pinto beans.

Pauls says work still needs to be done to develop the variety and make it available for the market — but he's hopeful.

"We want to help Ontario producers sell their product with an edge, or premium, over other beans and protect

the value of the commodity in this large market," says Pauls.

Pauls says master's student Dana McRobert and technician Lori Wright are extending these findings to include cranberry beans, which are white or cream coloured with red stripes. The research may also have applications to light-red and dark-red kidney beans, but this possibility has not yet been explored. **R**

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Canadian Institutes of Health Research and the Canadian Agricultural Adaptation Program.



Prof. Lisa Duizer

Towards smoother food

Researchers are developing nutritious puree diets for older adults

BY KATHARINE TUERKE

Older adults with degenerative diseases, such as Parkinson's or Alzheimer's, often have difficulty swallowing and are restricted to eating pureed foods. It's a serious medical concern affecting up to a third of patients in long-term care in Ontario. Food that's too runny will cause them to choke; too thick, and they're unable to eat it.

There are also issues with the consistency of commercially prepared pureed food. For many reasons, many older adults refuse to eat these foods, leading to malnutrition and nutritional deficiencies.


"Our population is getting older, and there is an urgent need to develop nutritional foods with high-sensory quality," says Prof. Lisa Duizer, Department of Food Science.

Duizer has teamed up with long-term care facilities and three Ontario companies that prepare pureed food to determine which sensory properties patients value most. Ultimately, the researchers would like to develop products featuring these properties.

A trained sensory panel was used to evaluate turkey, carrot and bread purees.

The panel compared the texture, flavour, taste, odour and appearance of in-house and commercially made purees. Then, a nutritional analysis assessed the fat, protein, fibre, carbohydrate and sodium content in each puree. Once the recipes were formulated and assessed by the panel, they were tested by patients.

The appearance of the food was key. Duizer says it drove food choices because patients used it as a cue to decide whether to eat it. Identifying the type of food could sometimes be difficult, especially if the purees were all the same colour. Duizer says adding a bit of gravy or cheese sauce helped patients identify the food and made the meal more appetizing.

Determining the right consistency is difficult. Chefs at long-term care facilities need a test to help them get the thickness of purees right, says Duizer. 

- Collaborators on this project include Heather Keller, Schlegel Research Chair in Nutrition and Aging at the University of Waterloo, Agri-food for Healthy Aging, Research Institute for Aging, Bruyère Continuing Care, and Schlegel Villages.
- Food for this study was provided by Campbell's, apetito, Healthcare Food Services, Turkey Farmers of Ontario, and Ontario Fruit and Vegetable Growers' Association.
- This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Canadian Institutes of Health Research and the Canadian Agricultural Adaptation Program.



It's super spearmint tea time for (from left) Profs. Alison Duncan, Laima Kott and Amanda Wright.



Mint condition

New low-cost treatment for osteoarthritis may be just a sip away

BY KATHARINE TUERKE

Pain relief for osteoarthritis sufferers may be as close as the tea pot.

In animal tests, spearmint leaves from plants with highly elevated levels of rosmarinic acid, an anti-inflammatory compound, developed by University of Guelph plant agriculture Prof. Laima Kott, significantly reduced joint swelling in arthritic horses.

Now, Profs. Amanda Wright and Alison Duncan from the Department of Human Health and Nutritional Sciences are testing whether this “super tea” will likewise reduce pain in human patients with osteoarthritis.

“With no satisfactory treatment options available, the potential impact of this clinical trial is huge,” says Wright.

Osteoarthritis is a common and painful disease that occurs when cartilage in the

joints begins to break down. It affects about 4.5 million Canadians and costs \$27 billion in health care each year.

But this new minty brew could be a low-cost treatment for osteoarthritis patients.

In the University’s Human Nutraceutical Research Unit, Wright and her team compared knee pain levels of people with osteoarthritis who drank either the rosmarinic tea or conventional commercial tea for four months.

The results were consistent with the horse study — people drinking the high rosmarinic acid tea reported less pain.

And unlike many pharmaceutical products, the tea has no negative side effects.

With promising economic impacts, this low-cost alternative therapy has led the University of Guelph to work with a private company to conduct field trials designed to bring this high-rosmarinic spearmint to market.

Spearmint is also generating excitement for Ontario’s agricultural sector. The plant grows well in the province and can be harvested twice a season. This plant drives away aphids, and its dense canopy

suppresses weed growth, minimizing the cost and use of herbicides and pesticides.

Osteoarthritis isn’t the only ailment this super spearmint might relieve. Kott, who developed the super spearmint plants through selective breeding, has found other research pointing to rosmarinic acid’s effectiveness against allergies, asthma, heart disease, chronic lung disease, arterial blockage, skin grafts and organ transplants. Many of these benefits are due to rosmarinic acid’s anti-inflammatory, anti-viral and anti-oxidant properties.

Another special quality is rosmarinic acid’s ability to cross the blood-brain barrier, a protective gateway between brain tissues and circulating blood that protects the central nervous system. This ability may be the key to flushing stored metals out of the body, which have been linked to disorders such as Alzheimer’s and MS.

So next, Kott will assess rosmarinic acid’s ability to remove heavy metals, such as iron, copper and aluminum from the body. **R**

■ This research is funded by the OMAFRA – U of G Partnership.



Prof. Mary Ruth McDonald

Deep purple: Making a carrot comeback

These vegetables have unique health-promoting benefits

BY KAREN BALL

Orange carrots have been household staples for hundreds of years, but that hasn't always been the case. Before farmers started genetically selecting orange ones in the early 1600s, purple carrots were more common — and for good reason. It turns out purple carrots have a unique antioxidant called anthocyanin that is believed to provide a buffer against inflammation and diabetes.

University of Guelph Profs. Mary Ruth McDonald, Kelly Meckling and Alan Sullivan, graduate student Chanli Hu and research scientist Rong Cao, from Agriculture and Agri-Food Canada, have found

that purple carrots contain five times more antioxidant activity than yellow and white varieties.

And while a serving of purple carrots has a lower amount of anthocyanin than one of blueberries or plums (which are renowned for their antioxidant properties), the carrots are less expensive.

“Antioxidants such as those found in purple carrots are important for good health,” says McDonald. “Having a lot of fruits and vegetables in your diet reduces the risk of chronic diseases, such as heart disease, stroke, Type 2 diabetes and several cancers. They do all kinds of good things.”

That doesn't mean people should stop eating orange carrots. Carrots of each colour have health benefits: orange carrots contain beta-carotene; red carrots lycopene; white carrots phytochemicals; and yellow carrots xanthophylls. And while most fruit

typically lasts about a week unspoiled, root vegetables such as carrots can be stored for up to eight months.

McDonald is the only researcher in Ontario specifically studying carrot production. People turn to her to solve problems. Most recently, her research team has been conducting trials with animals and humans to determine if eating purple vegetables actually provides health benefits. This is ground-breaking research, and McDonald wants people to know about the advantages of purple carrots so they can eat more and reap the health benefits. **R**

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Campbell Company of Canada, the Ontario Potato Board, the Bradford Co-op and the Holland Marsh Growers' Association.

A bridge between knowledge and users

New handbook supports translation and exchange of research knowledge

BY LAURA MONTGOMERY

Researchers from the University of Guelph and the Public Health Agency of Canada have created a new handbook designed to ensure policy-makers are informed by the best available scientific evidence. The researchers hope the handbook will improve communication and links between researchers and policy-makers.

The handbook, entitled *Knowledge Synthesis, Transfer and Exchange in Agri-Food Public Health: A Handbook for Science-to-Policy Professionals*, was created by Population Medicine post-doctoral fellow Dr. Ian Young and Dr. Andrijana Rajić. To make the handbook, Young and Rajić studied similar tools used in healthcare and other sectors, looking for examples of knowledge transfer and exchange (KTE) methods and how these methods could be applied to the agri-food public-health sector.

“It was a challenge trying to figure out what tools and methods would be most useful to this audience because of the diverse backgrounds of the stakeholders,” says Young.

But it was a challenge they met. The handbook consists of five chapters, beginning with definitions of key KTE terms and principles. Next it discusses how to synthesize knowledge, where to find scientific research, and how to better communicate and exchange research between researchers, policy-makers and other stakeholders. And finally, it offers insight into evaluating the implementation of KTE techniques.

To coincide with the release of the



Ian Young with new handbook

handbook, Young and Rajić hosted a two-day workshop to raise awareness about KTE methods in the agri-food and public-health sector and to train individuals on the various methods and techniques presented in the handbook.

In the future, Young and Rajić plan to have more face-to-face workshops, where they can train other users and evaluate the success of the handbook.

- Andrijana Rajić is now with the United Nations Food and Agriculture Organization, which is applying these approaches globally and at the country-level through increasing awareness and capacity building. Ian Young is now with the Public Health Agency of Canada.
- Collaborators of this project were Prof. Scott McEwen and the Public Health Agency of Canada.
- Funding was provided through the OMAFRA – U of G Partnership’s Knowledge, Translation and Transfer Program.

How to personalize knowledge transfer and exchange

For KTE to be successful, personalized KTE plans must be created for each stakeholder. Here’s how:

- Define your target audience, then determine its members’ interests and needs
- Investigate their background knowledge of terms and concepts
- Determine the key message you want to communicate
- Determine the form of communication most appropriate to each stakeholder group

- Access the publication at this website: bit.ly/OBGpEF

Field Crop News

Home

About

Archives

Authors

Contact

Disclaimer

Search This Site...



The screenshot shows the Field Crop News website interface. On the left is a large image of a green cornfield. The main content area features two articles:

- Variable Rate Nitrogen Trial (Oxford County) Preliminary Results**: Dated March 11, 2014, written by Nicole Rabe. It includes a small map of Ontario and a "Continue reading" link.
- Wheat Nitrogen Strategies**: Dated March 9, 2014, written by Peter Johnson. It includes a "+4 rating, 4 votes" and a "Continue reading" link.

On the right is a sidebar with an "Advanced Search" box and a "Categories" list including: 30% Residue: Dead or Alive, Alerts, Baute Bug Blog, Canola, Cereals, Corn, Cover Crops, Dry Edible Beans, Events, Forage Production, In-Season Crop Reports, Pest Management, Precision Agriculture, Presentations and Video, Soil Fertility, and Soil Management.

A new online tool for producers

BY SAMANTHA BEATTIE

Social media and websites are emerging as effective tools to connect producers and researchers. These tools are an outlet for producers to share their field crop expertise, and for researchers to respond with timely posts and tweets about how to improve this year's harvest.

Plant Agriculture Prof. Francois Tardif and OMAFRA Weed Management Field Crops Program Lead Mike Cowbrough are part of this online trend. Together they've created the website *Field Crop News*, which links Ontario producers with research conducted at the University of Guelph.

The purpose of *Field Crop News* is to break down research into plain language, capturing key field crop knowledge generated from the partnership between the University of Guelph and OMAFRA, says Cowbrough.

"Social media is an effective feedback mechanism that gives producers a new role in research," says Cowbrough. "We're entering a time when producers can connect with researchers across the world to help inform



future projects or quickly find out crucial management information.

Field Crop News was launched in 2012 and now averages about 5,000 views a month—a 200 per cent increase from 2012. Cowbrough says its unusually long viewing time—about five to six minutes per page, which is about three times more than the average—lies in the content. They're constantly engaging with Twitter and Facebook users to find out what types of information will be meaningful to the agricultural community.

Tardif and Cowbrough are also finding ways to tell their stories better, whether it's by adding videos, information graphics or even a mobile app to the page, or by refining the messages.

Cowbrough says the website has been an important resource for producers dealing with crop issues such as pests, weeds and other management problems. For example, in June 2012, when an armyworm outbreak occurred, Cowbrough and Tardif made sure *Field Crop News* provided management information necessary to help producers cope with the challenge. The outbreak only lasted for one week, but it was extremely popular with farmers—the site's armyworm content remains one of the most viewed pages, reflecting the need for responsive and practical information.

"We can't predict what issue will happen next, when people will be seeking information or what tools will be required, so we are continuing to develop the content on *Field Crop News* so it remains a useful tool for producers now and in the future," says Cowbrough.

■ Access the website at:
www.fieldcropnews.com

■ This research is funded by the OMAFRA – U of G Partnership. Additional funding is provided by the Grain Farmers of Ontario.

Talking about disease control

Focus Farms strikes up conversations to help combat Johne's disease

BY MEGAN COWIE

Johne's disease is a digestive-system infection that affects about a quarter of dairy herds in Ontario. This fatal disease — caused by bacteria called *Mycobacterium avium* subspecies paratuberculosis — prevents cattle from being able to absorb nutrients.

Dairy farmers are taking preventative measures to benefit their herds, and a number of management strategies to combat Johne's disease have been suggested. But dairy farms differ significantly from each other, so it's hard to find strategies that might work across the industry.

That's why PhD candidate Steven Roche and his advisor Prof. David Kelton, Department of Population Medicine, are taking a new approach in bridging the communication gap between researchers and producers.

The initiative, called Focus Farms, brings dairy farmers and veterinarians together to discuss ways to reduce the prevalence of Johne's disease.

"We want to get away from the idea of telling producers what they should do and move towards a conversational style," says Roche. "We want producers to sit down and talk about what they know and don't know about Johne's disease and learn from each other."

So far, about 250 dairy producers from across Ontario have participated. They meet four times a year in small groups of 10–12 participants.

A typical meeting takes place on a farm. Producers spend half a day touring the farm to see what is being done to manage



Steven Roche is helping lead a new approach called Focus Farms to develop conversations with dairy farmers.

disease. After the tour, they discuss what they saw.

The initiative helps producers create disease-management strategies that are appropriate for their own farms. That means the strategies are more likely to be implemented. About 80 per cent of producers who participated have made changes to improve disease control.

"This approach has really had a positive impact," says Roche. "It has increased the number of people making changes to control Johne's disease, which is what we're hoping for at the end of the day."

The majority of changes have been inexpensive, practical and relevant for producers. One of the most common changes has involved building a pen to separate calves from their mothers as soon as they're born, reducing the calves'

likelihood of contracting the disease. It's a simple fix that often doesn't require any extra money.

In the future Roche hopes that the Focus Farms will be adapted to address other issues, in addition to Johne's. Ultimately, his goal is to communicate the University of Guelph research effectively, so that it will be taken up by people who will benefit the most from it.

"I'm really excited that we've helped producers make these changes," says Roche. "It's rewarding to see people benefit from the work we do as an institution."

■ This research is funded by the OMAFRA – U of G Partnership's Knowledge Translation and Transfer Program. Additional funding is provided by the Agriculture Biosecurity Program.



Looking to grow?

University of Guelph can help.

The Catalyst Centre is your portal to working with the U of G.

Contact us to find out how we can help you grow faster.

CATALYST
CENTRE Growing the value of great ideas

uoguelph.ca/catalystcentre
catalystcentre@uoguelph.ca
519.824.4120, Ext. 58878



UNIVERSITY
of GUELPH

CHANGING LIVES
IMPROVING LIFE

twitter

Linked in

You Tube