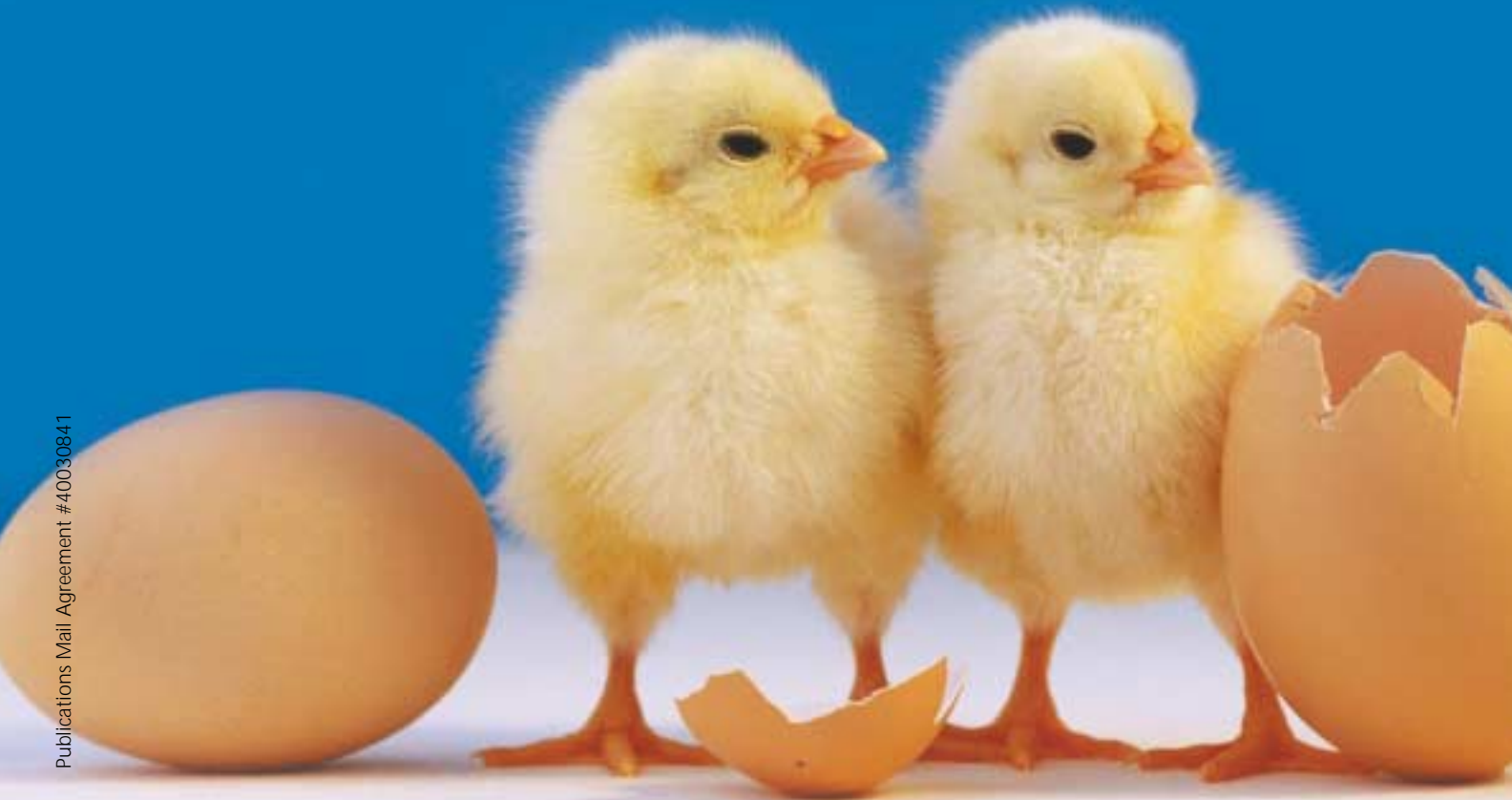


# reach & discover

→ Agricultural Research and Innovation in Alberta ←

Issue 2 • Spring 2004

## hatching new ideas



# reach&discover

Issue 2 • Spring 2004

# Spring

→Agricultural Research and Innovation in Alberta←

Alberta is all about innovation. Albertans have always been forward thinkers and *Reach & Discover* captures a new wave of leaders in agricultural research and development.

Science is making the most of food, fibre, and bioresources, in ways that change daily lives. So, as Alberta REACHes to add value to agriculture and DISCOVERs wonderful new uses for agricultural resources, we invite you to join us for an exploration of the exciting world of research and development.

*Reach & Discover* is brought to you by the members of Alberta Agriculture Funding Consortium. The Consortium provides an innovative approach to coordinating agricultural research and development funding and aligning projects with industry-wide goals. Each member organization retains its own identity and funds a range of projects in its target area – but also gains efficiencies from sharing a single approach to application and joint-funding opportunities.

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**On the cover**  
Cover photo by Cornelia Doerr

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# Alberta Attraction

Alberta's efforts to attract world-class scientists have created a research community with global appeal.

There is no question that Alberta has been successful in drawing researchers from across the globe to lend their talents to its laboratories. As it turns out, the reasons for this success vary depending on the scientist you speak to. But to the province's credit, there are several constants that seem to emerge from nearly every conversation with these adopted Albertans that help to paint a picture of why the province continues to be a destination for researchers with a sense of adventure, curiosity, and skill.

For one, Alberta is aggressive. Just ask Dr. Suresh Narine, who, three years later, still clearly loves telling the story of how Dr. John Kennelly, Chair of the University of Alberta's Department of Agricultural, Food and Nutritional Science, was able to spirit him away from corporate America and up to Edmonton to lead that institution's efforts in value-added agricultural research, simply by refusing to take "no" for an answer. In fact, Kennelly actually called Narine's wife, sold her on both the province and the job, and when Narine got home from work, the decision was already made.

But it's not just perseverance. Alberta, according to these researchers, also offers an innovative research environment, with unique inter-agency partnerships, accessible funding, and a beautiful setting in which to build a new future. The promise of "opportunity" is no myth, they say.

And what do Albertans receive for fostering this type of environment? Just a small sampling of the agricultural research being conducted at the university, provincial, and federal levels shows that the easy answer is... a lot. From work in bovine genomics to help selecting more feed-efficient cattle, to developing cultivars with higher levels of resistance to fusarium head blight, the mosaic of scientists assembled in Alberta are helping to both protect and advance the agriculture industry for the benefit of all.

## Opportunity Knocks

It's not just agriculture. Alberta, with its economy continuing to churn, holds appeal for numerous potential transfers – domestic or from abroad. But these particular scientists cite "opportunity" so often as a reason for coming that it does bear emphasizing.

Dr. Stephen Moore, for example, spent over 10 years as a researcher with the federal laboratories in Australia, known in short as CSIRO. Seeking a change, he looked to Canada, and replied to an advertisement for an industry-funded chair with the University of Alberta. He got the job. "I saw it as an opportunity to build something here, and be master of my own destiny, I guess," recalls Moore. "That's really what drove it."

Moore's story is similar for Dr. Surya Acharya, from India, whose first taste of Canadian living actually took place in Saskatoon. After nine years of studying and working there, Acharya was hired by the Alberta Environmental Centre, now part of the Alberta Research Council, as its native grass breeder. "That was a brand new position, and they found me suitable although I didn't have much experience. But they realized I had done a few things in the past

and probably would be able to learn," says Acharya, who is now the Forage Breeder at the Agriculture and Agri-Food Canada Lethbridge Research Centre.

Consider also the story of Dr. Francois Eudes, a Frenchman, who after obtaining his Ph.D. in Quebec City, planned to return to his native France to try to land a job in his field of genetic engineering. Oddly, a supervisor of his with Agriculture and Agri-Food Canada urged him to look into the excellent post doctoral fellowship programs in Lethbridge before he left Canada. With no knowledge of where Lethbridge was, Eudes hunkered down with a map, eventually deciding because Lethbridge was not Calgary or Edmonton, it was too far away and that it just wasn't for him. Lo and behold, a short time later he got a call from someone in Lethbridge who offered him a post doctoral fellowship. Agonizing over it for two more months, Eudes finally took the plunge. What did he find out? That Lethbridge's size and proximity to the Rockies is a nearly identical set-up to the small town near the Pyrenees he grew up in. "I misjudged (referring to his original plan to return to Europe and the opportunities in Lethbridge)," admits Eudes, a federal biotechnologist. "Anyway, I'm very happy to be in Lethbridge now."

In perhaps the most unique example of Alberta seemingly having "something" for every scientist, there's the case of Dr. Igor Kovalchuk, who took a research position with the University of Lethbridge in 2001. Coming from Ukraine, Kovalchuk freely admits that when it came time to make a move, he didn't just point to Alberta on a map and declare, "Yes, that is the place." But then again, the decision wasn't entirely up to him. Kovalchuk's wife, Olga, is also a research scientist with a specialty in biological sciences. As chance would have it, Kovalchuk said there were not one, but two, positions, open in Lethbridge. That, and Canada's social and political climate as compared to the United States sealed the deal.

The bottom line, as always, is that opportunity knocks in a variety of ways. Alberta just seems to have more, and louder, knocking.

## Support Crucial

The success of these scientists once they get to Alberta can be attributed to their own genius and the infrastructure that supports them. And suffice to say, many of these international scientists say they have no

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## Introducing...

Whether nearly two decades ago, or just over two years ago, Alberta attracts international researchers to its scientific community. Here's a snapshot of who some of these agricultural researchers are, where they hail from, and the road they took to Canada's energy province.



**NAME:** Dr. Abimbola Abiola

**COUNTRY:** Nigeria

**CAME TO CANADA:** 1985

**TITLE/ORGANIZATION:** Director of Research Integration and Scientific Leader at the Olds College Centre of Innovation

**SPECIALTY:** Environmental scientist in the area of microbiology/ecology

**BACKGROUND:** Dr. Abiola completed his Bachelor and Masters degrees in Nigeria at the University of Ise, before teaching at the University. He came to Canada to complete his Ph.D. at the University of Regina and worked there as a research scientist before relocating to Alberta in 1992. In Alberta, he worked at Lakeland College in Vermilion for four years before moving to Olds College in 1996 to start a new program – compost and environmental waste management.

**HIS OWN WORDS ON "MICROBIOLOGY":** "Many times it's what we don't see that has more impact on us than what we do see. These microbes, they're so small, (but) the impacts of their activities affect our daily lives. That is the most intriguing thing."



**NAME:** Dr. Stephen Moore

**COUNTRY:** Australia

**CAME TO CANADA:** 1999

**TITLE/ORGANIZATION:** Professor and Industry Chair in Beef Genomics, with the University of Alberta

**BACKGROUND:** Originally from Sydney, Dr. Moore spent his last eight years in Australia as a resident of Brisbane. He worked for 11 years in the federal laboratories of the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Seeking a professional change, Moore applied for the position of an industry-funded chair with the University of Alberta, got it, and moved to Edmonton.

**HIS OWN WORDS ON "WHETHER RESEARCH IS**

**PATRIOTIC":** "The industry will adopt any gene test, be it developed in Canada or elsewhere, if it results in an economic advantage. It is vitally important, however, to strive to develop tests in Canada for a couple of reasons. First, we need gene tests that are appropriate to the Canadian industry and environment. Second, training is an essential component of any research program. The individuals trained in the program are the future of the technology development and application for the industry. Without such programs the industry becomes dependent on technology that may not be entirely appropriate and will not have the capacity to apply new technology even if it is developed elsewhere."

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intention of moving on – due, in large part, to their satisfaction with the support they have received to this time.

As someone who was promised “funding for world-class research,” Narine has great respect for the efforts to support R&D in the province. “Certainly the intention of Alberta to go in a direction of research-led, value-added agricultural utilization, has been strengthened,” says Narine. “I’ve found that provincially there has been a tremendous motivation for this vision of having \$20 billion by the year 2010 in value-added agricultural business for the province. That vision is being firmly pursued on the research end.”

Narine points out that his personal research has been supported by such diverse organizations as Alberta Agriculture, Food and Rural Development, the Alberta Agricultural Research Institute, the Alberta Crop Industry Development Fund, AVAC Ltd., and the Alberta Canola Producers Commission. “So there’s a unique thing happening here where you have farmers working together with government, and bureaucrats working with funding agencies and industry, in a really tremendous effort to fuel research and research commercialization that I have yet to see emulated anywhere else in Canada by any other province,” Narine says.

For his part, Acharya is grateful for the competitive grants, primarily from the Alberta government, that have helped to fuel his forage-breeding program. “After getting to this particular position that I am in now, I realized I am getting good support for my research work,” says Acharya. “So I stayed. I haven’t thought of moving anywhere else.”

Research infrastructure aside, natural bounty also plays a role and Alberta’s scenic vistas undoubtedly come into play. Eudes, for example, has literally jumped into Alberta’s backcountry with both feet, swishing down the slopes on the weekends as a member of the Canadian ski patrol.

## Research Benefits

As mentioned previously, Albertans are certainly reaping the rewards of having this international contingent of scientists on hand. The scope of the research is diverse. At Olds College, Dr. Abimbola Abiola, the Director of Research Integration, who is



**NAME:** Dr. Surya Acharya

**COUNTRY:** India

**CAME TO CANADA:** 1975

**TITLE/ORGANIZATION:** Forage Breeder with the Agriculture and Agri-Food Canada Lethbridge Research Centre

**BACKGROUND:** Dr. Acharya completed his Bachelor and Masters degrees in Agriculture at Orissa University of Agriculture and Technology in Bhubaneswar, India. He then moved to Saskatoon with a full scholarship to the University of Saskatchewan in order to complete his Ph.D. Relocating to Vegreville in 1984 he became the new native grass breeder at what was then known as the Alberta Environmental Centre (now a part of the Alberta Research Council). He has been working in Lethbridge since 1989.

**HIS OWN WORDS ON “RESEARCH EFFORTS”:** “It’s a very labour intensive program. We need lots of pairs of hands. For that we need to go out and get support. And it’s very fortunate that I have been able to do that.”



**NAME:** Dr. Kan-Fa Chang

**COUNTRY:** China

**CAME TO CANADA:** 1988

**TITLE/ORGANIZATION:** Plant Pathologist with Alberta Agriculture, Food and Rural Development

**BACKGROUND:** Dr. Chang is currently the pathologist working on the new provincial pea-breeding program. Born in China, Chang obtained his Bachelor degree at Chungshing University in Taiwan before moving to the U.S. to complete his Masters at Washington State University. He finished his Ph.D. at the University of Alberta. But before he graduated, he had already started working with Alberta Agriculture.

**HIS OWN WORDS ON “CANADA”:** “Canada has colder weather, but warmer relationships, than the U.S.”



**NAME:** Dr. Francois Eudes

**COUNTRY:** France

**CAME TO CANADA:** 1998

**TITLE/ORGANIZATION:** Research Scientist at the Agriculture and Agri-Food Canada Lethbridge Research Centre

**SPECIALTY:** Cereal biotechnology with a focus on fusarium head blight (FHB)

**BACKGROUND:** Dr. Eudes was born in the countryside of southwest France. After completing his Bachelor and Masters degrees in Biology and Agronomy respectively, he wanted to undertake a research experience outside of Europe. He spent six months in Quebec City before returning. After a couple of years in the military, he accepted an invitation to come back and complete a Ph.D. at the University of Laval. Three years later, and after one more return trip to France, he accepted a post doctoral fellowship opportunity in Lethbridge.

**HIS OWN WORDS ON “FIGHTING FHB”:** “We cannot afford to fail. I feel the farmers are really watching us. We have no choice but to succeed and release some resistant cultivars.”

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originally from Nigeria, is heavily involved in studies based on microbiology and ecology.

One of his significant projects is determining whether certain microbes found in the air can be attributed back to any nearby feedlots. The findings will have benefits for a number of stakeholders, including feedlot operators, potential neighbouring homeowners, and government decision makers.

Dr. Kan-Fa Chang of China, a long-time pulse crop pathologist with the province, is now the full-time pathologist on the joint Alberta-Canada project to launch a new pea-breeding program – which is extremely good news for Alberta's pulse crop industry. Meanwhile, Dr. Nicholas Savidov has ambitious goals as leader of greenhouse crop research at the Crop Development Centre South. "An important goal is to increase production of greenhouse crops per one square metre (but keep) the same expenses or less," says Savidov, who hails from Russia. "The second important thing we're trying to develop is a new strategy to move us from bulk production to high quality produce that can be marketed as healthy produce."

Moore wants to eventually develop a gene test for cattle that will be quick and inexpensive, meaning that it might some day be available to test animals heading into a feedlot for nutritional efficiency. Eudes is working on developing wheat cultivars that are more resistant to fusarium head blight, while the Kovalchuks have discovered that plants under stress are apparently able to rearrange their genetic makeup to defend themselves against bacteria and other stress-inducing agents.

Acharya has recently developed a brand new rye crop, which he insists gives Albertans at least a three year advantage in the industry. And Narine is leading the way in developing new plastic products from biodegradable sources like canola and flax oils.

The evidence of such an eclectic array of agricultural research makes it quite clear that a self-perpetuating cycle has been created in Alberta. Draw the world's best and brightest international scientists to the province, and the result is the formation of a diverse, innovative, and most important, evolving research hub that, in turn, helps draw even more researchers. With that type of momentum, it's a near certainty that Alberta will be an attraction to overseas adventurers for years to come.



**NAME:** Dr. Igor Kovalchuk

**COUNTRY:** Ukraine

**CAME TO CANADA:** 2001

**TITLE/ORGANIZATION:** Research Scientist at the University of Alberta

**SPECIALTY:** Biological sciences

**BACKGROUND:** Dr. Kovalchuk obtained his physician diploma, his M.D. and his Ph.D. in Ukraine, and also has an M.B.A. He worked in Switzerland before tracking down two research positions open at the same time at the University of Lethbridge. Why did he need two? The other was for his wife, Olga, also a researcher specializing in biological sciences.

**HIS OWN WORDS ON "RESEARCH FREEDOM":** "Of course science has to serve humanity and save lives, and grants are made possible by the taxes paid by people. But I feel that in Alberta, a researcher can still find funds even if his work is just to increase the broad pool of knowledge."



**NAME:** Dr. Suresh Narine

**COUNTRY:** Guyana

**CAME TO CANADA:** 2000

**TITLE/ORGANIZATION:** Associate Professor, Department of Agricultural, Food and Nutritional Science, University of Alberta

**BACKGROUND:** Born in South America, Dr. Narine's entire post-secondary education has taken place in North America – specifically Ontario. He completed his Bachelor and Masters degrees in physics at Trent University in Peterborough, before completing what he refers to as essentially a physics Ph.D., but done in food science, at the University of Guelph. He then worked for M & M Mars as a researcher before taking his position with the U of A.

**HIS OWN WORDS ON "BEING PART OF A CANADIAN BIOPRODUCTS MISSION TO GERMANY":** "First of all, the Alberta delegation was larger than any of the other provinces and secondly, we were so far ahead in just our approach and our grasp of what we need to do and how we have to mobilize all the way from a primary production perspective to commercialization, that it became obvious to me that Canada really is the place to be."



**NAME:** Dr. Nicholas Savidov

**COUNTRY:** Russia

**CAME TO CANADA:** 1997

**TITLE/ORGANIZATION:** Greenhouse Crops Research Scientist at Alberta Agriculture, Food and Rural Development's Crop Diversification Centre South (CDCS), in Brooks

**SPECIALTY:** Horticulture

**BACKGROUND:** Dr. Savidov was born, raised and educated in Moscow. After obtaining his Ph.D., he moved to Israel to work first as a postdoc, then a research officiate. He seized the opportunity to move to Alberta, interviewing with the Alberta Research Council before beginning a five-year term with the University of Alberta to study the nitrogen use efficiency of canola plants. He joined the CDCS in 2001.

**HIS OWN WORDS ON "REAL-WORLD APPLICATION":** "The major benefit of having a domestic greenhouse industry is a supply of fresh produce directly to the domestic consumer. And, literally, the health of our people in our hands."



# Focused on Fowl

**In a health-conscious world, chicken and turkey are popular sources of protein. Work at the Poultry Research Centre is evaluating ways to produce the meat efficiently for generations to come.**

Poultry is a healthy choice in many diets and a centerpiece for most holiday feasts. The poultry we consume has been carefully selected and bred over the years to develop healthy, tasty meat quickly and efficiently. As in most breeding programs, the endeavour to improve one trait, in this case poultry muscle mass, can sometimes mean other traits are compromised, such as reproductive performance. Work at the Poultry Research Centre in Edmonton is looking at ways to evaluate not only productive parent and grandparent lines of birds, but also to make sure those efficient hens have good egg laying attributes as well.

The Poultry Research Centre (PRC), formed in 1986, is the joining of government, the University of Alberta, and poultry industry players to share resources and brain power for researching all aspects

of poultry production. The facility typically works on five year contracts on everything from hatching, to nutrition, processing, animal care, and food safety. (For more on the Centre see "Award Worthy Learning" on the facing page.)

## **Striking a Balance**

Dr. Frank Robinson is heading up one of the largest projects ever undertaken by the Centre. He and his team are working closely with a large poultry genetics company to evaluate eight potential parent or grandparent lines of chickens destined for the dinner table (broilers). As in many production systems, an increase in meat production efficiency usually means a decrease in reproductive performance. Robinson says that a balance between the two traits

*These projects are funded by: Alberta Livestock Industry Development Fund, Alberta Agricultural Research Institute, Alberta Chicken Producers, Alberta Turkey Producers, Alberta Hatching Egg Producers, Alberta Egg Producers, Lilydale, and Maple Leaf Foods.*

## Award Worthy Learning

The Poultry Research Centre recently won the Growing Alberta Leadership Award for its passion and commitment to building youth leadership in the agriculture and food industry. The Centre prides itself on having students “learn by getting their hands dirty” and teaches through hands-on projects, student internships, and summer student programs.

The Centre offers poultry processing, packaging, hatching, feeding, and egg grading facilities all in one location. A dedicated staff of researchers and technicians introduce countless students to exciting new careers in the poultry industry, encouraging many to continue their studies in the field. And the Centre isn't just for university students – Dr. Frank Robinson has written the “Poultry Farming for Girl Guides” handbook, allowing Girl Guides nation-wide to earn a badge in poultry farming. The Centre also hosts school excursions and participates in the Classroom Agriculture Program.

Though teaching is one aspect of the PRC, research and passing on that knowledge is just as important. Many of the projects undertaken by university students are published and the findings made available to producers.



Dr. Frank Robinson (above), Dr. Rob Renema, and Dr. Gaylene Fassenko have recently released two new full-colour textbooks on poultry production (inset). The books are receiving excellent reviews from producers, students, and industry professionals.

can be found with a little hard work. “What we’re looking into is not only how a line of, in this case, chickens performs, but also how well their reproductive performance stands up in various conditions.”

Since the birds’ genetics are constantly changing, growers receive unique and improved broiler lines each year. This means that each flock will have varying feed requirements and growth rates. With no accurate way to extrapolate what the flock’s needs may be, producers usually err on the side of caution and provide more feed than the birds might need.

“Of the eight breeding lines we’re evaluating, some hens are chosen for production traits and others for their reproductive performance. We then evaluate the group for growth potential, while sisters of these birds go on to lay eggs to establish reproductive performance at different feeding rates,” Robinson explains. The information gleaned from this study will hopefully pave the way for more efficient feeding, as well as maintaining healthy reproductive traits to ensure a sustainable supply of eggs to hatch the next generation of broilers.

“This trial will provide data that will make it easier for primary breeders to give producers a better idea of how their new flock responds to feed allocation variations, for instance, if they’re highly sensitive to feeding fluctuations or not. It will allow producers to know what they are getting into when they change breeds, or receive new varieties,” Robinson says.

## Improving on Tradition

Building on Robinson’s work and adding a turkey component, Dr. Gaylene Fassenko’s research is looking to put a new spin on poultry development before production, right in the egg. Most commonly, eggs are incubated in a multi-stage incubator containing every stage from freshly-fertilized eggs all the way to eggs ready to hatch. The incubator is kept at a constant temperature, using heat generated from nearly-hatched eggs at one end to help warm newer eggs to the incubator. Traditionally, all eggs are incubated for the relatively standard 21 days for chickens and 28 days for turkeys, at constant temperatures, regardless of parental lines or individuality of the eggs. The system works, but Fassenko sees room for improvement.

“A younger flock’s eggs will actually metabolize and develop more quickly than eggs from older hens,” Fassenko explains. What’s more, higher meat-producing lines of turkeys and chickens also seem to metabolize more quickly. Fassenko plans to select some of the same breeding lines from Robinson’s work, using sisters of the birds he’s evaluating for meat production traits. These hens will then lay eggs that Fassenko will place in a newly-developed incubator that can track metabolism from day three all the way to hatching. “In a multi-stage incubator you can’t tailor the temperatures and times to a specific batch of eggs. In this new equipment, we want to evaluate the differences in chick development as it relates to parental lines and also optimize

temperatures for healthier, more productive chicks,” she says.

The goal, according to Fassenko, behind modifying temperatures is to tailor the incubation for specific chicks’ needs even before hatching. “We’re looking to match incubation to egg size, parent-line age, and the hen’s own production in hopes of maximizing hatchability and chick quality,” giving the chicks their best start.

Robinson points out that much of the work done at the PRC has immediate implications for producers and eventually consumers. “Many times, we wrap up a project and take the findings straight to a producer and they see the value in it right away.” He notes that he makes about 20 presentations a year, and Fassenko five to seven annually. “We’ll talk to the provincial marketing boards and members of the feed industry, among others, to get the findings out to the producers to make their operation run more efficiently.” Robinson is also proud of two new textbooks being published specifically for broiler producers and breeders. “These books are for producers first and students second, with great readability. They outline problems in production and what work was done to remedy the situation. They’re quite unique books.”

Transferring the knowledge gleaned from its research is just one more way that the Poultry Research Centre is focused on fowl, and though much of the work affects producers first, consumers will see the benefit in an affordable, sustainable source of tasty poultry for years to come.

# Refurbishing Roosts

Alberta's egg producers care about their hens' welfare, so they're renovating their roosts to include more comfort for the hens.



Dr. John Church's research is demonstrating that small changes to hens' cages can provide big benefits in terms of hens' happiness.

Alberta's egg producers want their hens to be as happy as possible. Producers in the province have taken steps to ensure that the eggs delivered to consumers' tables are safe and produced in a healthy hen environment. Producers have taken the initiative and sought out research to find the perfect new furniture for their hens' roosts.

Housing laying hens in cages, as most hens in Alberta are, offers both benefits and challenges in regards to production and also to hen welfare. Air quality for both hens and humans who work within the barns is improved in cage systems, as feces are allowed to drop out of the cage and into a manure handling system. This also improves the safety of the eggs for human consumption as the danger of *Salmonella* is decreased in this cleaner system. And housing hens in smaller groups, similar to natural groupings, decreases communicable disease and injuries due to pecking between hens.

At the same time, current cage design, which lacks certain structures, may result

in frustrated hens because they cannot exhibit the natural behaviours of nesting and perching. Two alternative systems have been evaluated: housing the birds loose and providing a furnished cage that has nesting areas and perches to keep the hens happy. Alberta's producers wanted to know what would work best for their birds, and so, in 2002 the Alberta Egg Producers decided to anticipate changes in the industry by determining the preferable system and how to best implement the changes.

Dr. John Church, Leader, Livestock Welfare Unit with the Alberta provincial government, and University of Alberta graduate student Michelle Jendral have been working steadily on finding those answers. Their work is discovering some surprising findings that benefit both the hens and producers.

Church and Jendral are comparing a European furnished, colony cage with a modified conventional cage and have discovered that Alberta's producers can achieve the same increase in hen welfare (as brand new furnished cages)

without replacing their existing systems. "A modified conventional cage, with an added nest box and perch offers all the benefit of the European model with none of the detriments (such as cannibalism and contaminated eggs), and at the cost of perhaps five cents per dozen eggs to the consumer," says Church. "This means that the hens can be made happy at a minimal cost to all involved. It's a win-win situation."

Church's findings, along with the work of others, is evaluating the feasibility of the free-run alternative and exploring the optimal way to improve bird welfare. In a world where some feel free is better, the free-run system fails. "In the wild, birds would congregate in small groups. A free-run system, such as what is being pushed for in Europe, actually perpetuates more cannibalistic behaviour, pecking, and disease transmission because the stocking densities are at unnatural levels," Church explains. "The future of laying hen production is definitely in a cage system, but in a modified, furnished cage."

Church's research has found another unexpected benefit: although the added structures mean removing a bird per cage, thus decreasing overall flock numbers, production remains constant. The remaining birds will produce just as many eggs as the original flock simply by the addition of the comforts of perch and nest box. "These birds are so happy, they're actually compensating for their missing roommates by laying just as many eggs overall," explains Church.

Church's research can attest that a modified cage system, complete with nesting box and perch, keeps the hens happy with minimal changes to their roosts. But the benefits are anything but minimal – increased food safety, flock health, and hen welfare means chickens and eggs both come first.

r&d

This project is funded by: Alberta Livestock Industry Development Fund, Alberta Egg Producers, Alberta Farm Animal Care, and the Canadian Egg Marketing Agency.

# A Commitment to Caring

Animal welfare is important to all livestock producers. Alberta Farm Animal Care is continually seeking the best way to handle and care for livestock.

Producers are the first to speak up and seek out answers when they see a problem with their production practices. A great example was in 1993, when nine major livestock groups got together to form Alberta Farm Animal Care (AFAC). Now with 14 founding members and 75 active and associate members, AFAC seeks to promote responsible, humane animal care while encouraging and funding research relevant to the ever-changing needs of the industry.

"The agricultural sector increasingly recognizes that the welfare of livestock is crucial to successful economics. Animal welfare is an integral part of a food quality continuum. A healthy animal is one that has been handled, cared for, and transported in a humane and dignified way," explains Susan Church, Manager of Alberta Farm Animal Care. "Alberta's entire food chain, from producer to consumer, benefits by ensuring all livestock animals are produced in a humane and healthy environment."

Producers are the ones driving change. For example, the egg layer industry came to AFAC with an issue regarding spent hen disposal, Church says. Producers knew it would be more humane to avoid transporting live hens by disposing of them on farm, but weren't sure how. "That sparked collaboration between engineers, animal behaviourists, and producers to find the best solution. From there, we now have prototypes ready to be evaluated to resolve this concern for hens and producers alike."

AFAC knows that the livestock industry faces an onslaught of public scrutiny, and welcomes it. The organization focuses on funding research with over-arching implications, like transport stress, pain mitigation, and confinement systems. In this way, AFAC can have answers ready for producer and consumer concerns as they come down the pipeline. Aart Okkema is Chair of AFAC and a dairy producer. He's impressed by the brainstorming that members of AFAC take part in to deal with potential issues before they become a

problem. "We get together every six weeks for a roundtable. There is a strong synergy between the groups, and when one group champions a project it makes for a real incentive for other groups to do the same," he explains. "We always have animal welfare on the front burner."

AFAC has done great work in transferring the knowledge gained from its research to producers and consumers alike. "We've developed handbooks and guidelines, and even educational packages for school kids. As an organization, we often bring in Dr. Temple Grandin (a world-class animal welfare expert) to work with the bulk of the livestock industry. She has a unique gift of really driving home the message of the benefits of responsible animal care. Alberta Farm Animal Care is about actively improving animal welfare for the sake of animals, producers, and consumers," Okkema says. The organization seizes every opportunity to communicate what producers are already doing to ensure humane practices, including interactive displays, publications, and educational resources.

Church highlights that AFAC's work contributes to food safety, animal welfare, and human safety as well, by outlining and encouraging best management practices. Applicable research findings into areas such as animal husbandry, the animals' environment, and housing are being passed on to producers through great education programs. Consumers can gain peace of mind knowing that producers and Alberta Farm Animal Care are diligently keeping watch over those who can't speak for themselves.

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## Where on the Web

For a full listing of Alberta Farm Animal Care's research projects, resources, and information, visit its web site at: [www.afac.ab.ca](http://www.afac.ab.ca).

# Diabetes Dilemma

**An oat-based diagnostic kit is helping people avoid diabetes, but getting the technology adopted was no easy task for this Alberta inventor.**

When two separate multinational pharmaceutical companies failed to commit to a partnership to market his AccuScreen diabetes diagnosis test, Ceapro Inc.'s President Mark Redmond didn't anticipate that it would probably be one of the best things that could have happened for the Edmonton-based company. "Our plan was similar to any small biotech company trying to bring a product to market," says Redmond. "Our intent was to set up an alliance with a pharmaceutical company. When it didn't work out it was disappointing, but it made us realize that we were trying to target the wrong customer."

Redmond realized that the big pharmaceutical companies are really only interested in drugs and treatments for diabetes, and this test was about early detection and prevention. So, it prompted the Ceapro team to take a step back and ask themselves, "Who is going to benefit from this product?"

The answer to that question has resulted in Ceapro Inc. actively pursuing not just one, but three market opportunities for its AccuScreen product – a glycemic indexed testmeal in the form of cookies containing fingerprinted oat extracts as the main ingredient. AccuScreen more accurately and more economically detects diabetes than any other standard test, but more importantly, it spots people who have impaired glucose tolerance that leads to type-2 diabetes.

*This project is funded by AVAC Ltd.*

"Studies show that huge cost savings can be achieved both directly and indirectly by early detection of diabetes, and those who are paying for the cost of treatment – public health groups in Canada and Europe – could see major benefits," says Redmond. "Our goal is to demonstrate the value this test has and gain acceptance in the health care community. Because there are already a lot of alternatives, we need to work very closely with opinion leaders to prove that this test can identify patients that other tests cannot."

To prove the viability of introducing such a test into the public system through Family Physicians, Ceapro Inc. has approached Capital Health, one of Canada's largest integrated academic health regions, providing health services to 1.6 million residents of Edmonton and its surrounding communities, as well as central and northern Alberta. "Capital Health is always looking for ways to help people in our communities manage their own health, and one area we can do that effectively is through better chronic disease management," says Susan Paul, Senior Vice President for Capital Health.

Chronic diseases such as diabetes are on the rise not only in the Capital Health region but also across Canada, and many of the risk factors associated with diabetes such as obesity, high blood

Since diabetes is a Pan-American problem in aboriginal communities, Redmond hopes to see the marketing activities with the Blood tribe open the door to markets in the United States. "Our marketing strategy is very much a pull strategy, in that our belief is that if we can prove that it works in a small test market, larger markets will undoubtedly be interested."

This marketing strategy also applies to Ceapro's third, and perhaps most lucrative, market opportunity. "We discovered through the Canadian Diabetes Association that within progressive industrial firms there is a real interest and commitment to healthy workplace programs," explains Redmond. "If the workforce isn't healthy, the workforce isn't efficient. So we're partnering with Syncrude in Fort McMurray, Alberta, to add AccuScreen as a tool for early detection for diabetes to its program."

By offering the test to Syncrude's 3,000 employees and family members over the next year, Ceapro will be able to prove to other large employers the benefits of administering AccuScreen packages to their employees, which could lead to further inroads into the U.S. market with HMOs and insurance companies. From

***"Studies show that huge cost savings can be achieved both directly and indirectly by early detection of diabetes, and those who are paying for the cost of treatment – public health groups in Canada and Europe – could see major benefits."***

***- Mark Redmond, Ceapro Inc.***



AccuScreen is a screening test that can accurately identify pre-diabetics and diabetics. AccuScreen consists of oat-based cookies containing precisely calibrated amounts of protein, fat, and carbohydrate. After an overnight fast, a patient eats 10 of these cookies, then has their blood glucose level tested 45 minutes later.

pressure, and abnormal cholesterol levels are preventable by making healthier lifestyle choices. To help combat this disease Capital Health has implemented a new regional diabetes program that provides prevention, assessment, treatment, and follow up services to people with type-2 diabetes.

Once the market testing in Edmonton proves successful, Redmond says that the model can be applied to the rest of Canada, the United Kingdom, Germany, and France. "However, working with public health care groups is a lengthy challenge, which prompted us to expand our thinking to other market opportunities."

One such opportunity is currently being tested with the aboriginal community through a partnership with the Blood tribe of the Kanai First Nation in southern Alberta. Diabetes occurs at a much higher rate in the aboriginal community, and most aboriginal people live in remote areas with reduced access to health care. Redmond explains interest is high. "At our first breakfast information session we anticipated a turnout of 10 people for testing and 28 showed."

there, the possibilities truly are endless.

"As we look back, this marketing strategy wasn't the obvious road," admits Redmond. "But all of these ideas demonstrate how a small workforce with a good plan can market a product on a broad basis. We're multiplying our marketing efficiencies by using our customers' resources to spread the word."

"Sure, it would have been nice to sign on with a large company at the early stages, but over the long-term, staying small has been a real benefit because it's allowing us to interact with the markets, really discover what's needed, and react faster. And that's really exciting."

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# → A Hive of Activity ←

Healthy bees are making healthy honey in Alberta. Three bee-focused projects have a similar vision in mind when it comes to making the province's honey industry sing with sweetness.

What's all the buzz about bees in Alberta these days? Well for starters, there are 230,000 colonies in Alberta which represent one third of the bee colonies in Canada and nearly \$320 million in value to Alberta's pollinated crops. Plus, bees provide honey products that have been anecdotally adored by cultures all over the world for thousands of years.

Three bee-focused projects in Alberta continue to place these creatures upon a pedestal. Whether it is developing new integrated pest and disease management techniques or encouraging changes to current federal border regulations on honeybee importation, the projects all have one goal in mind – enhanced production methods, improved bee health, increased honey quality, and more secure marketing for Alberta's honey products.

## Bees Know How to Get Around

The honey industry in Western Canada was built upon a management practice where bees were only used for one season with new ones purchased from California in the spring. In 1987, that practice was eliminated when the federal government closed the border to the importation of bees because of pest issues, such as the varroa mite, in the United States. Varroa mites are devastating insects that prey on adult bees, weakening the bees' defense against viral diseases. "Bees being a flying insect, the problems that occur in the U.S. now also occur in Canada," says Grant Hicks, Alberta Beekeepers Association delegate to the Canadian Honey Council.

As a result, a project to address the national ban of honeybee importation has been underway since 2001. A bee-industry team has received funding from the Alberta Crop Industry Development Fund to encourage the Canadian Food Inspection Agency to open the border. "Having the border open to bulk bees and queens is another tool in the IPM (Integrated Pest Management) toolbox," emphasizes Hicks. "Any bees purchased from the U.S. will have very few varroa mites on them because infested colonies are not strong enough to produce the extra bulk bees required for the shippers to sell." Hicks represents one of the member provinces recommending a loosening or total lift of the ban. He says importing packages from the U.S. would be a real economic benefit. Not only would producers see a decrease in their miticide costs, they would see an increase in production associated with healthy bee colonies. This is also good news for consumers – more healthy bees make more healthy honey.



*These projects are funded by: Alberta Crop Industry Development Fund and Alberta Agricultural Research Institute.*

***“Over time we will have domestic bee stock which is less susceptible to disease which means less costs for producers, greater colony sustainability, and more quality honey.”***

***- Steve Pernal, AAFC***

## **Integrating Options**

Dr. Medhat Nasr, the province's new apiculturist, has begun the work to outline an IPM program that aims to develop alternative controls for parasitic mites in bee populations, namely the trachea and varroa mites which together, if left untreated, can kill up to 80% of a bee colony annually. Some of the mites have developed resistance to the pesticides traditionally used, and there has also been evidence of pesticide residues in honey and wax. In order to avoid miticide resistance, reduce miticide residues, lower production costs, and improve bee health and honey quality as a result, Nasr hopes to implement an IPM approach which would include the use of disease and mite resistant bees, organic acids, and essential oils as alternatives. According to Nasr, despite the need for new management techniques to address an increasingly food-safety conscious environment, Alberta's beekeeping industry is very progressive. Producer education, however, is a fluid and evolving process, especially when it comes to quality. "There is a need for improving the management practices and educating producers on how to keep their bees healthy in order to produce quality products," says Nasr. "That is first and foremost what I hope to address."

## **Combing for Strategies**

For the last three years, Steve Pernal, research scientist with Agriculture and Agri-Food Canada's Beaverlodge research station, has been working to combat American Foulbrood (AFB) disease in bees. AFB is a bacterial disease that affects immature bees and produces spores that are moved throughout the colony, eventually propagating the disease throughout an entire operation. Without intervention the disease will kill the colony. In Alberta, there has been evidence of increased oxytetracycline-resistant strains of the disease. Pernal wants to reverse that trend so that Alberta's bees can thrive. Similar to Nasr's, his project aims to

develop an integrated solution for better detection and controls for the disease, while lessening the use of antibiotics, in particular oxytetracycline, in the process. "We need to conduct experiments to find out whether other antibiotics are effective, and that the way in which they are applied doesn't leave residues in the honey," explains Pernal.

In order to meet his goals, Pernal is developing a trifold strategy that would offer producers a more integrated approach when it comes to disease management in their hives:

- Generate data which will support the registration of alternative antibiotics to which the bees have no known resistance.
- Create more efficient disease detection methods.
- Identify ways in which individual beekeepers can use genetic techniques to select for hygienic behaviour.

Both Nasr and Pernal have high hopes for hygienic bees. Bees with this genetic trait are naturally more resistant to AFB and can detect and destroy the disease in its early stages, before the bacteria has a chance to divide and produce spores. "If more bee breeders are able to select for traits such as hygienic behaviour," says Pernal, "over time we will have domestic bee stock which is less susceptible to disease which means less costs for producers, greater colony sustainability, and more quality honey."

## **Sweet Success**

All those involved in the various projects agree that in the end it is the consumer who ultimately benefits. "In the case of the disease and mite control research, we are looking at fewer chemicals used in the system, healthier bees, and a greater supply of higher quality honey," explains Doug Walkey, Executive Director with ACIDF. "In the case of the regulatory issues, we are looking at lower costs for producers, which mean a stronger industry,

## **Did you know?**

- Alberta exports 90% of its honey – 70% to the U.S. and 20% to Japan and Europe.
- The average bee makes only one twelfth of a teaspoon of honey in its lifetime.
- During the winters in Canada, bees thermo-regulate their hives to maintain a temperature of 32°C.
- The term "honeymoon" comes from the Middle Ages, when a newly married couple was provided with enough honey wine to last them for the first month of their new life together.

**Dr. Medhat Nasr would like Alberta beekeepers to adopt new pest management techniques including the use of organic acids and essential oils to control mite infestations in their hives.**



a more consistent supply, and again, a safer end product."

Nasr plans on taking that attention to quality on the producer side through to application on the consumer end. He would like to see more creative marketing for the honeybee industry. Most of Alberta's honey is exported as a raw product without any processing. Nasr would like to see the introduction of other value-added products such as honey beer and mead (honey wine) that will ensure consumers' continued interest in and adoration of honey while taking Alberta's hives to new heights.

# → Favourable

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**Alpaca fibre has been warming its wearers for over 5,000 years. It is fitting that Canadians are now catching on to not only the warmth, but also the appeal of this insulating product.**

There is an exciting new industry growing in Alberta, as complex and intricate as the fabric it creates. Having graduated from “cottage industry” status, alpacas, and the valuable fleece they provide, are weaving quite a spell on Albertans.

Jane Atkins, owner of Triabar Alpacas near Sundre, Alberta, was first introduced to alpacas in 1995. She and her husband were looking for an exciting new agriculture industry that they could work in, even through retirement. Alpacas seemed the perfect fit – they are docile and personable and can be raised on a small land base. Atkins adds that they’re kid friendly, too. “My five-year old granddaughter showed her very first alpaca last year,” she boasts.

Efficient little critters, these South American members of the camelid family are raised on very little roughage to create fine, high-quality fibre that provides above average insulation and feels like cashmere. The fleece comes in over 20 natural colours and is suitable for knitting, weaving, and commercial applications of certain felts and fabrics.

Atkins says that there is immense opportunity in the alpaca fleece industry – for expansion in herd size, uses, and global markets. For her own part, Atkins has been building her herd

*This project is funded by the Diversified Livestock Fund of Alberta and involves collaboration and contributions from: Canadian Alpaca Breeders' Association, Canadian Camelid Fibre Co-operative, and the Natural Fibre Centre at Olds College Centre for Innovation.*

steadily on her 10-acre farm for nine years and has added custom shearing and farm-based sales to her portfolio. "Alpaca fibre is made into the softest fabric. Many people who replace their socks with alpaca fibre socks never go back!"

Artisans and weavers have also been enticed by the regal feel of this natural fibre. The fibre is light and easy to work with, with very few coarse hairs. Delicate shawls and cozy throws are woven out of this ancient, prized fleece.

Canada's alpaca industry is certainly heating up, but Atkins explains that breeding herds will have to triple in size before we can produce enough fibre to compete on a commercial, global scale. "As a breeder looking for ways to process and market my fleece, I realize all industry players need to work together to promote this valuable fleece," Atkins says.

The Alpaca End-Product Fibre Promotion and Development Project, funded by Diversified Livestock Fund of Alberta (DLFOA), a producer-directed funding agency funded by the province of Alberta, has been set in motion to help address some of the obstacles holding this industry back from its global goals. Ruth Elvestad, Manager of the Natural Fibre Centre at the Olds College Centre for Innovation says, "It was decided that, as an industry, we needed to get each level of production, from breeders, to processors, to designers and retailers, on the same page. We needed to foster awareness of what would make this industry successful and then get all the partners excited to collaborate, and push for global quality classification standards as a starting point."

## Fibre First

The goals of world-class quality and standards begin with the breeders and growers of the alpacas and follow through all the way to customers, retailers, and processors. Elvestad explains that for the alpaca fleece industry to be competitive, the product must be separated and graded to strict quality standards, and in the beginning, consistently applied grading and classification did not exist in North America.

"We needed to develop standards for shearing, sorting, grading, and classifying the fibre," explains Elvestad. As a shearer, Atkins explains that an alpaca's fleece is the highest quality over its body and haunch area, with leg hair being coarser and less valuable.

Obviously, shearers needed to be trained to understand their significant role in sorting at the beginning of the value chain.

Once sheared, grading to international standards allows the fibre to be separated into a quality product specific to end-users' needs. "At the beginning of this project, we had no certified graders or database to work from," says Elvestad. So a training and classifying component of the project was added. Canada now has a means of identifying its highest quality fleece for niche markets at home and abroad. The fashion industry is beginning to catch on with elite retail stores offering luxurious one-of-a-kind sweaters and other items of clothing.

But before grading standards can be applied, there is also an opportunity to breed the alpacas for finer, more uniform fleece. As a result, the Canadian Alpaca Breeders' Association (CABA) became the next thread tied into this project. CABA's members, like Atkins, are now working on selecting animals with less guard hair (the coarse, hollow, prickly fibres) to increase the overall quality of the fleece. Each alpaca's fleece is tested by the Natural Fibre Centre's Testing Laboratory, giving producers an accurate view of the animal's fleece quality.

## Leading by Example

Bill Buchta, General Manager of DLFOA, says that the alpaca project is establishing a model for other industries as it includes an educational component and use of technology with the planned and deliberate process targeted towards expanded market access. The project has not only focused on the individual elements required for success, but also on the over-arching tools of industry segment co-operation and attention to long-term sustainability that can be lacking in some agricultural projects. It's all part of creating, and then sustaining, a value chain, he adds.

"Competing in today's global market environment requires that products meet the highest standards, and processes must be in place to provide assurances of such standards," explains Buchta. Buchta believes that industries must also learn how to build working relationships among all players required to get a product to market. In these relationships, players share knowledge, know-how, and other resources, or what he calls core competencies, to ensure market success

## Did you know?

- There are 480 alpaca owners in Canada, most of which are located in Alberta and B.C.
- There are close to 15,500 alpacas registered with the Canadian Llama and Alpaca Association.
- Alpaca fleece is one of the strongest natural fibres, even in its finest form. It is lightweight, warm, soft, and non-allergenic, and grows naturally in over 20 colours.
- Alpacas are small, generally between 100-155 lbs, and have gentle dispositions.

and thereby viability for every player involved. The Canadian Camelid Fibre Co-operative has added to the project its core competency of building awareness for the product while providing a valuable network of processors and mills to its producer members.

So far, the project is moving along at an encouraging pace. Standards and classes for quality are established, videos on shearing and a fibre sorting manual are underway, and a tradeshow is in the works. With three newly certified fibre Classers on board, Elvestad is excited about this next year. "Now that we're consistently grading and classifying, we can begin to diversify our market – including creating new products by blending alpaca fleece with sheep, mohair, and even bison fibre!"

Buchta is optimistic about this project, as well as for the continued development of other segments of Alberta's agriculture industry. "This project typifies how a small industry can reach world-class standards and compete internationally by using a collaborative planning approach all along the value chain where the needs and interests of all players are met," he concludes.

All those involved in this alpaca project share a common appreciation for the alpaca, and have gathered around the producers to help expand this industry the best way they know how. Like Atkins, they truly believe that given effective industry development thinking and a little hard work, this fleece is poised to become one of the most favoured fibres in the world.



# Driving the Deal

Getting everything from auto parts to surgical tubing made out of flax and canola is not just the dream but the plan of Dr. Suresh Narine.

Dr. Suresh Narine, associate professor at the University of Alberta and director of the Alberta Bioplastics Network (ABN), would like someday to take the wheel of his car knowing that it was derived from Alberta fields. His research to create bioplastics shows tremendous promise but he knows the technology needs to move out of the lab and into Albertans' lives in order to truly shine. He has a lot of determination and plans, but he also has a philosophy that the key to being a successful researcher is being an optimist. "Being a good researcher isn't about strokes of brilliance," explains Narine. "It's about maintaining a high level of optimism every day in the face of adversity and disappointment."

That said, Narine has a lot to be optimistic about these days. Efforts are currently underway to commercialize the technology that produces plastics from canola and flaxseed oil. Market analysis has been conducted, and a pilot scale production plant will be built by mid-year thanks to the investment of Alberta Agriculture, Food and Rural Development's Centre for Agri-Industrial Technology. The plant will pave the way for aggressive testing so that, if all goes well, testing can begin by 2005 on prototype projects for a number of marketing opportunities.

The potential for Alberta farms is significant. Information from the American Plastics Council indicates that the current overall production and sale of plastics within North America is in the order of 100 billion pounds. The ability to tap into that market would be

a boon for oilseed producers, and Alberta's R&D community.

"Currently, we're concentrating on creating bioplastics that would be used in the automotive industry – car bumpers, moulded plastic parts like dashboards, and paneling," says Narine. "Although we're not at the business stage yet, the North American automotive market is one that our market analysis shows we can integrate into with relative ease."

The ABN is also investigating packaging for both the food and retail industry and moulded plastic parts for medical devices. A report by the Alberta Plastics Network showed the medical plastics market was an estimated 2 billion pounds in 2000, and was projected to increase at an annual rate of 6% to an estimated 2.6 billion pounds by the year 2006.

"Interesting work being done at the University of Alberta has also shown that elastomeric polyurethanes from vegetable oils may be suitable for medical and laboratory tubing, sealants, and other uses," says Narine. "Although there doesn't seem to be as high a volume, the estimated market is believed to be greatly understated."

"In the case of the medical industry, biodegradability is required, but only when triggered. You can't have medical tubing deteriorate while in use," explains Narine. "In instances like these, we've found that polyurethanes from vegetable oils are well suited as an ingredient, because they should be biodegradable once they are triggered."

Biodegradability leads to another market opportunity: agricultural films such as vapour barriers and plastic wrap. "The total world demand for agricultural film is approximately 1.3 billion pounds per annum," says Narine. "And unlike our other areas of concentration, this is an area where biodegradability is very important, as it's estimated that the disposal of agricultural film can be as much as \$125 per acre."

With these kinds of opportunities, Narine will be focusing the pilot project on strong potential markets and, once successful, will be seeking a manufacturer to bring the product to market.

"The structure of the ABN is multi-institutional, which does not allow us to have to partner with one large firm while we are in the discovery phase," says Narine. "We're really lucky to have funding partnerships with AVAC, ACIDF, ACPC, AAFRD, AARI, Ag Canada, Environment Canada, and AED who provide funding and support, so we can freely explore these many market opportunities for our research."

"Of course more science, scale-up, and testing is needed before there's any product rolling out that is made from bioplastics," says Narine. Even so, given the optimism of this researcher, it is likely that in the near future not only will he be driving to bring bioplastics to market, he will also be driving with them. **r&d**

*This project is funded by: AVAC Ltd., Alberta Crop Industry Development Fund, Alberta Agricultural Research Institute, Environment Canada, Alberta Economic Development, and Alberta Canola Producers Commission.*

# → Caring for Body and Soul ←

One farmer's passion for creating novel and natural products from Alberta oilseed crops is meeting people's needs for both inner and outer nourishment.



*"Natural lines are one of the fastest growing segments of the cosmetics business."*

*- Lance VandenBorn,  
The Farmer's Company*

It takes a lot of passion to grow food. It also takes a lot of passion to grow crops that promote the well being of people in other ways. Lance VandenBorn of The Farmer's Company has passion galore – for the environment, for health, and for the well-being of Canadian farms. He is applying this passion to create new products for agriculture.

As always, research is the foundation for new products and new ideas. That is the first creative step, but it takes many more creative leaps to get a product into consumers' hands. VandenBorn's dream is to create a true value chain that extends from seed to the consumer by developing consumer products from oilseeds. "I want to bring local farmers to local tables," he explains.

His first foray into this effort has been his Thompson Valley Farms oils. These cold pressed oils are made from flax, canola, safflower, and hemp seed, although certainly his hemp products have garnered the most

attention. Focused on the natural products sections established in many health food and grocery stores, VandenBorn has found places are struggling to find enough products to stock these sections properly.

Ironically, just as he was getting his product into these stores in 2000, the drought hit and his supplies of seed for crushing were cut back. Realizing quickly that this could mean trouble for his fledgling business, he redeveloped products. "We had to develop the highest value product to survive the drought," he says quite simply. In assessing the returns gained per pound of seed, VandenBorn saw opportunity in the body care market. It turns out, to produce \$250,000 of gross revenue from oil it takes about 120,000 pounds of crop, but just 6,000 pounds of crop produces the same value in body care products.

With funds from Alberta Crop Industry Development Fund, The Farmer's Company developed an emulsifier that allowed him

to prepare 1,500-litre vats of body products such as soaps, lotions, sunscreens, face wash, lip balm, and hair conditioner. "Natural lines are one of the fastest growing segments of the cosmetics business," VandenBorn reports.

Funding also supported new packaging and a marketing plan. Selling out of the Strathcona market in Edmonton starting last fall, he did a booming business in body care products during the holiday season. His next plan is to refocus on the grocery store and drug store market. Specialty retailers are great he says, but the vast majority of the dollars get spent in main line stores.

The practical skills he exhibits as a marketer do not diminish his passion for what he does, however. "I can't explain how wonderful it is to hear about how much a product means to people," says VandenBorn. He talks about repeat clients who are already enthusiastic about his natural products that come right from Alberta farms to nourish their stomachs, bodies, and souls.

*This project is funded by Alberta Crop Industry Development Fund.*

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# Beyond the Bench

Looking past the bench in the science lab, Alberta researchers are discovering a world of practical applications for food science. Not just for academia, Agri-Food Discovery Place will be an environment where science meets innovation in order to foster the value-added industry and get great products into the hands of consumers worldwide.

Once it is completed in June of 2005, close to \$22 million dollars will have been invested into the construction of Agri-Food Discovery Place, a new facility that will allow scientists to transform research from their labs into new or improved products with tangible benefits for the marketplace. As a result of Agri-Food Discovery Place, consumers will enjoy a bevy of made-in-Alberta goods with properties beyond the usual. From beta-glucan enriched foods to plastics made from canola, a panacea of good products awaits discovery.

## Extracting and Converting

A major part of Agri-Food Discovery Place is the Crop Utilization Research Centre, which will house research into specialty products for both health and home. Led by Dr. Feral Temelli, this Centre will focus on extracting high-value crop components, such as beta-glucan in barley, and finding new ways to incorporate them into products for the consumer. "We will be taking any of those crop fractions in their original or converted form and looking at how we can develop food and non-food applications," explains Temelli. Functional foods, nutraceuticals, value-added processing, and bioproducts have all been identified as strategic priority areas for the Centre. Temelli's work is the first step before any of these products can be developed. "The key thing is that regardless of whatever

end product we're targeting, we need this initial capability of being able to fractionate and convert the different crop components," she says.

## Savour that Steak

Food safety is a priority in Alberta and has always been. When consumers cut into their steaks in the future, Agri-Food Discovery Place will be just one of the many places contributing to a safe and tasty meal in the province and beyond. As well as undertaking research and development into crop components, the new facility will study how to suppress harmful organisms associated with raw meat and cooked products, capitalizing on the latest technologies and approaches.

University of Alberta researcher Dr. Lynn McMullen is responsible for leading the Meat Safety and Processing Research Centre at Agri-Food Discovery Place. Thanks to state-of-the-art facilities, researchers will be able to ensure the freshness of meat. What makes the Centre unique, says McMullen, is the Level 2 bio-containment facility which will allow pathogens such as *E. coli* or *Salmonella* to be brought into the building and put into meat products. McMullen and her team will then assess the ability of novel processes to either kill or stop the growth of these pathogens. "What we do in a test tube does not translate well to what happens

## Discovering Agri-Food Discovery Place

### Facilities

- \$22 million facility
- Located on the University of Alberta campus
- Level 2 bio-containment facilities
- Pre-pilot solvent processing facilities

### Areas of Focus

- Processing parameters for meat products
- Crop component extraction and fractionation
- Bioproduct research and development



Agri-Food Discovery Place is slated to be completed by June, 2005.

This project is funded by: Canada Foundation for Innovation, Alberta Science and Research Investments Program, Alberta Agriculture, Food and Rural Development, Western Economic Diversification Canada, University of Alberta, Alberta Barley Commission, Alberta Canola Producers Commission, and Alberta Crop Industry Development Fund.

## Good-for-you Beta-Glucan

Among the cereal grains, both barley and oats are rich in soluble fibre, especially beta-glucan. Beta-glucan has been shown to help lower cholesterol and regulate blood-glucose levels. Barley also contains insoluble fibre which is believed to protect against colon cancer, and B vitamins which are essential for all around health and metabolic activity. Tocotrienols and tocopherols – natural antioxidants which make up vitamin E – are also found in barley. Antioxidants are thought to play a role in preventing cancer, heart disease, and stroke.

Dr. Feral Temelli's work at the new Agri-Food Discovery Place will help find ways to extract components of crops, like beta-glucan, to create new products with special health benefits. To date, Temelli has developed trial products that include a beta-glucan enriched orange-flavoured beverage, and low-fat breakfast sausage. Other products in development include cookies enriched with barley protein and dairy products boasting beneficial beta-glucan. This means that food with extra ingredients for improved health benefits could be coming soon to a grocery store near you.



Dr. Feral Temelli

***“This type of facility will allow researchers the opportunity to transfer the results of their work to the consumer much more quickly.”***

***- Alan Hall, AARI***

to meat in a processing environment,” she explains. “Agri-Food Discovery Place will allow us to fill that gap and ensure the continued safety of our meat supply as a result.”

Terry Rachuk of the National Research Council of Canada's Industrial Research Assistance Program, who supports both McMullen and Temelli's work and the creation of a unique centre of excellence in food and product development, explains that the processing industry is working to ensure continual improvement when it comes to food safety. “From that perspective alone, Agri-Food Discovery Place will play a critical role,” he says.

## Beyond the Bench

Agri-Food Discovery Place truly bridges the gap between the intricate processes that go on in the lab and the practical applications of every day living, says Alan Hall, Managing Director of the Alberta Agricultural Research Institute. “This type of facility will allow researchers the opportunity to transfer the results of their work to the consumer much more quickly.”

Agri-Food Discovery Place will be part of the overall research and development system in Alberta and will have close ties to other facilities such as the Leduc Food Processing Centre, the Centre for Agri-Industrial Technology, Agriculture and Agri-Food Canada, Alberta Research Council, and the Olds College Centre for Innovation. Temelli feels the partnership between Agri-Food Discovery Place and these other facilities will, as a result, fill a major gap in Alberta's research infrastructure and nurture

the province's status as an epicentre of excellence. “What we are lacking is small-scale processing capability where we can research a large number of processing parameters,” she says. “By taking this approach, we are really creating lots of opportunity.”

Ian Morrison, Dean of the Faculty of Agriculture, Forestry, and Home Economics at the University, agrees with both Hall and Temelli. Morrison feels Agri-Food Discovery Place is poised for enormous success in food and bioproduct development, adding, “The facility will give us the opportunity to find novel ways of adding value to products that are normally disposed of in a waste stream with little cost recovery.”

A highly collaborative effort, the wide range of funders and partners expect Agri-Food Discovery Place will attract world-class researchers, foster international collaborations and exchanges, and serve as a centre of activity for students to come to Alberta and utilize resources and expertise. Of course, there is also the expectation that consumers will excite in the discovery that a variety of research results, which once graced a scientist's test tube, have been transformed into new and exciting products for their homes and for their good health.

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# Smart About Food Safety

Food is a necessity of life, and those who produce it are more than aware of the enormous importance of their work. On-farm food safety programs address the growing need for consumer recognition of farmers as well as the growing hunger for knowledge about the origins and handling of the foods we put into our bodies.



In today's modern world, there is tremendous pressure to explore new frontiers, and develop technologies that prove to be more efficient than their predecessors. This same pressure is being applied to agriculture: the development and incorporation of new technologies in order to produce an abundance of wholesome, healthy, and safe food, with low costs to the consumer, is a high priority. However, unlike machines, living organisms such as plants and animals cannot be fully controlled. As the gap grows wider between urban and rural communities, and as industries become more specialized and technical, it becomes increasingly difficult for consumers to understand the intricate processes that are involved in food production.

## Addressing the Concern

Since 1994, Dr. Joyce Van Donkersgoed, a dedicated veterinarian with a long family history of both cattle and grain farming, has worked with the Canadian beef cattle industry helping to develop the *Quality Starts Here* program to promote beef quality, including on-farm food safety. Currently, she is the provincial co-ordinator of the Alberta Beef *Quality Starts Here* program and is responsible for training producers to meet the program requirements and delivering certification services that recognize the implementation

*The Alberta Beef Quality Starts Here program is funded by: Alberta Livestock Industry Development Fund, Alberta Beef Producers, Agriculture and Food Council - CARD Program, and Agriculture & Agri-Food Canada.*

## The Food Safety Information Telephone Service

The Food Safety Information Society (FSIS), an independent, non-profit society headquartered in Calgary, has been working since 1995 to provide consumers with unbiased science-based information to enhance the understanding of food safety, encourage adoption of safe food practices, and promote confidence in the Canadian food supply. FSIS provides Canadians with a toll-free consumer telephone service to answer questions on all aspects of food safety. The program is staffed by professional home economists with expertise in food safety and food microbiology, as well as consumer education.

To have your questions or concerns on food safety addressed, please call the FSIS toll-free consumer information service at 1-800-892-8333.



of good production practices, while reassuring the consumer that farmers are doing their part to ensure safe food.

The program combines both sound science and practical on-farm applications in an effort to provide food safety reassurances to the consumer. Training is the first step of the program, followed by a three-month implementation for feedlots and six months for cow-calf operations. This period is followed by a full assessment and if the beef cattle farm is found to be successfully conforming to the national industry standard, the operation is certified for one year. After that, the farm undergoes periodic audits to ensure compliance over time.

## The Changing Times

Similarly, in Alberta, the national turkey, chicken, and hatching egg on-farm food safety programs are delivered by an organization called the Joint Venture Group (JVG). The JVG is a non-profit organization representing a partnership between Alberta Turkey Producers, Alberta Hatching Egg Producers, and Alberta Chicken Producers. The mandate of the JVG is to assist producers with the implementation of the National On-Farm Food Safety Program.

Angela Bork, Manager of Food Safety Programs for the JVG, illustrates the dramatic change in consumer concern regarding food. "Fifty years ago, in the industrialized world, people were just grateful to have food on their plates. Today, our food supply is taken for granted, and the consumer is more concerned about where their food comes from, how it was produced, and whether it is safe." Bork is quick to point out that food related illnesses are not new. In fact, she says, the food that is produced today is as safe if not safer, than it has ever been.

Turkey, chicken, and hatching egg producers initially attend a workshop organized and delivered by the JVG which provides background information on the national programs, describes the audit protocol and report, and finally details the specific good production practices and critical control points specific to the particular program, while emphasizing the various risks associated with different practices. Following the workshop, the farmer is provided with personal on-farm assistance by the JVG. Once the producer has implemented the program, an accredited auditor goes on-farm and determines whether the producer meets the national program's food safety requirements. Farm audits take

place once a year, with a full audit occurring at least once every three years.

"Ensuring the credibility of the system requires an elaborate infrastructure to ensure everyone is following a recognized standard," explains Bork. "This infrastructure involves a database to track each on-farm audit and internal audits within each province, as well as third party audits to ensure national consistency."

## Paying for Safety

Creating a manageable, efficient system of food safety regulations however, costs money. Canadians are used to an abundance of low-cost, high-quality food, so the question becomes, "Who is going to pay for these programs?" Bork notes, "If it is the industry, margins are very tight already. This highlights the importance of cost-sharing among all groups in the value-added chain, including consumers."

In 2003, the Canadian cattle industry was hard hit by two detected cases of bovine spongiform encephalopathy (BSE), often called mad-cow disease. The disruption to the industry means some producers are so economically stressed that focusing on getting certified can feel overwhelming. "They are simply in survivor mode," says Van Donkersgoed. "On the other hand, producers feel that food safety programs are more important than ever in order to reassure consumers and re-open markets." One of her program's major challenges is keeping certification costs low while, at the same time, showing producers the benefits of becoming certified.

Jacci Holowath is the Corporate Quality Assurance (QA) Manager for XL Foods, a Western Canadian beef processing and packing company with six plants in Calgary, Edmonton, and Moose Jaw. XL has invested heavily in a QA program that follows the internationally recognized HACCP (Hazard Analysis and Critical Control Points) standards. HACCP is a preventative program and involves implementing measures and controls to prevent risks from entering the food chain. Though the implementation of these controls has had a significant impact on XL's operating costs, Holowath feels they are necessary to ensure consumer trust – recalls and consumer distrust are the costs her industry cannot afford.

## Laying Down the Law

Ruth Malda and her husband Jim operate J & R Malda Farms, a

hatching egg operation with a capacity for 13,500 laying hens, which is located one hour northwest of Edmonton. The fertilized eggs produced on the Malda farm are trucked to the hatcheries that raise the chicks for broiler producers – broilers are the chickens that ultimately grace our dinner plates. Malda was certified under the national program just over a year ago, making her operation the first in Alberta.

Malda firmly believes her industry is a leader in the global arena. The JVG came to the Malda farm over a period of two years in order to assist them with their transition in incorporating the changes that were necessary for certification. In turn, the Maldas provided feedback that was then

“The BSE issue certainly brings everything into focus,” says Ray Grimson, Operations Manager at Lakeside Farm Industries in Brooks. “But, Alberta and Canadian producers have been working on improved food safety, improved animal welfare, and improved environmental practices for many years.” Lakeside Farms was the first beef cattle operation in Canada to be certified this year under the new Alberta Beef *Quality Starts Here* program. Lakeside participated in the pilot programs as well, under the direction of company veterinarian Dr. Janice Berg and feedlot manager Duke Joy.

Grimson feels that the *Quality Starts Here* program is a method of proving due diligence in the safe production of food. “We found that



***“At a time when schools are eliminating many home economics courses, when parents are spending less and less time preparing food for their families, and when the food industry is offering a myriad of food choices, there appears to be a disconnect between the food we eat and one’s responsibility in keeping that food safe.”***

***- Simone Demers Collins, Food Safety Information Society***

used in the preliminary creation of the current regulations. “We have a very good record here in Alberta,” says Malda. “We regularly monitor the birds and deal with things such as disease and illness in a proactive manner.”

Malda agrees with Bork when it comes to the importance of affordable groceries. “We have always been proactive in doing safe things on our farm. We have also kept our costs of production as low as possible so consumers can keep their food costs low,” she says. “Now we must make changes that involve further costs and labour in order to protect our industry and provide insurance and traceability against our good practices should something go wrong.” Malda points out that there are no government grants available to make the changes and in some instances those changes must be made gradually. “If consumers are demanding a rigorous system of accountability, they must also be willing to pay more for their food,” she says.

### **Say What You Do, Do What You Say**

Canadian on-farm food safety programs were established long before the first case of BSE. In an age of intense media scrutiny and heightened public awareness, the BSE incident has raised the demand for traceability to even greater heights. Both Bork and Van Donkersgoed have found, however, that most producers were already following the good practices outlined within their programs. “With tight margins, producers must implement good practices – otherwise they wouldn’t be in business,” says Bork.

what the food safety program did for our operation was reorganize a lot of the things that we were already doing into a coherent framework that allowed us to manage with a heightened level of awareness.” Grimson is impressed with the level of knowledge and awareness of the consuming public. “People do realize the minimal risk involved with the BSE issue,” he says. “But we can take their confidence away if we don’t walk the talk. We need to be able to prove that we did what we said we were going to do.”

### **Chain of Responsibility**

All national on-farm food safety programs follow HACCP and are developed by the national commodity organizations; upon completion, the programs are reviewed by the Canadian Food Inspection Agency for technical soundness. “The HACCP concept of controlling hazards is being applied at the farm level, in the feed mills, the processing plants, and throughout the distribution chain,” says Keith McMillan, a Veterinary Consultant and independent auditor for the poultry industry. “These programs all contribute to the safety of food for the consuming public.”

It is not only the industry which must adopt new systems of best practices however. “Our grandmothers, who knew you had to handle and cook meat well, had it right all along,” says McMillan. He feels that industry spends an enormous amount of money trying to ensure proper processing and handling procedures are carried out to minimize any risk to the consumer. “It is time that some of the same effort invested by the livestock industry to ensure the safest food products possible is put into public education on proper food handling,” he says.

## Where on the Web

For more information on the *Quality Starts Here* program, visit: [www.beefsafety.ab.ca](http://www.beefsafety.ab.ca)

Many producers, including Malda, agree that education is imperative in the food safety effort. "Farming is getting such a bad rap and, as a result, there is a lot of fear among consumers and plenty of negativity in the media," she says. "If the public was informed as to how well we are monitored in our industry, their perception of farming would be much more positive." Malda feels it is imperative to have more positive media exposure as well as compulsory farm education in the school curriculum. "We need to let people know how well our industries shine in Alberta and globally."

Bork agrees that the onus does not simply rest on the shoulders of those who grow and process food. "Food safety is the responsibility of all involved in the food supply chain, including the consumer," she says. "Once food leaves the grocery store shelf, it is important for people to understand that safe handling practices need to be continued to ensure food remains safe."

That is exactly the message Simone Demers Collins, President of the Food Safety Information Society (FSIS), wants to get out. FSIS provides a consumer information service, educational resources, and support and expertise to educate the public on all aspects of food safety. Demers Collins feels on-farm food safety programs have done a commendable job of providing transparency and

bring food preservation and canning research to a variety of professionals, the message is certainly spreading.

## Tracking Progress, Inspiring Confidence

Alberta began implementing the national beef On-Farm Food Safety Program in November of 2002. So far about 813 producers and 114 veterinarians and nutritionists have taken the training. Following on the heels of Lakeside Farms, Hwy. 52 Beef Producers, and Designer Gene Cattle Co., other beef operations are close to becoming eligible for their first year's certification. "Beef producers are doing their part to ensure safe, high-quality food products," says Van Donkersgoed. "Participation in the formal program shows their commitment to food safety. It also gives them the opportunity to be recognized for their good production practices."

To date, all of Alberta's licensed chicken producers have participated in the JVG program and in 2003 voted in favour of making their on-farm food safety program a mandatory component of licensing. As a result, any chicken producers who are not on-farm food safety certified by March 31, 2004 will not receive a licence to produce chicken. Turkey producers and hatching egg producers are also implementing the program so that they too will be certified within the year.

"A validated on-farm food safety



***"A validated on-farm safety program provides farmers with an insurance policy by providing proof of a well-run operation."***

***- Angela Bork, Joint Venture Group***

engaging public scrutiny on production practices; the FSIS wants to ensure that same commitment to safe food practices is carried through to the consumer level. "At a time when schools are eliminating many home economics courses, when parents are spending less and less time preparing food for their families, and when the food industry is offering a myriad of food choices, there appears to be a disconnect between the food we eat and one's responsibility in keeping that food safe," she says.

To address that gap, FSIS has taken the basic principles of clean, cook, separate, and chill and reinterpreted them in practical ways so that consumers understand their role in the chain of food safety. The Society has partnered with commodity groups across Canada to support their food safety messages and provide independent, third party, science-based information. Through the *Mrs. Cookwell* program, designed to teach university students the basics of food preparation, and through the Society's work with canning supply company Bernardin Ltd. to

program provides farmers with an insurance policy by providing proof of a well-run operation," says Bork. "This not only maintains product consistency, it also protects the long-term integrity of the industry, and ensures the well-being of consumers."

Food does affect us all and fortunately for most Canadians abundance of good eating is something we enjoy on a regular basis. On-farm food safety programs, such as those in Alberta, are the cornerstone of confidence that farmers need to inspire consumers' continued trust.

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# The Genome arm

**Three Alberta researchers are wrangling cattle genes in order to help producers reduce their costs, build a better end product, and improve beef economics all the way to the grocery store shelf.**

At any given time in Alberta, there are a number of different agricultural research projects on the go and when it comes to resources and expertise, integration of knowledge is critical to expediting results. The Bovine Genome Project, one such collaboration of three forward thinking researchers, is part of the international effort to understand the structure and function of the bovine genome in the hopes of securing the future of the Canadian cattle industry.

## Mapping the Future

In December 2003, it was announced by the National Institute of Health that the bovine genome will be sequenced just as the human genome has been. When one considers that there are over six million cattle in Alberta providing a valuable source of protein for Albertans and beyond, it is easy to understand why the DNA of cattle is being treated with similar respect to that of humans. For the last three years, Dr. Stephen Moore, the Industry Chair in Beef Genomics at the University of Alberta, has been participating in the build-up work required to proceed with the sequencing. As part of a larger international team, he has made significant contributions to what is now a fine-scale map of the bovine genome. Now that the sequencing has been approved, Moore, along with researchers Drs. John Basarab and Denny Crews, wants to transfer that knowledge to the practical. "Now we're trying to assign functions to genes, and trying to find out how variation in those genes might affect production or quality in the beef cattle system," Moore explains. "We want to know what genes affect fatness, growth, and other important traits."

The three researchers are working co-operatively in terms of herd resources, staff resources, and expertise in order to determine why some animals are more efficient with their food than others. "We're trying to understand how animals partition their energy differently. Some of them might be producing more heat for example and some of them might not be absorbing as much feed," says Moore. "This is what we don't know and what we want to learn."

## Cruising Quantitatively

Dr. Denny Crews, scientist with Agriculture and Agri-Food Canada's research station in Lethbridge, is responsible for leading the quantitative genetics component of the project. He collects his quantitative data by assessing physical characteristics such as size and weight – things that are determined simply by looking at the animal. Crews and his team assess this external, or phenotypic, data in order to understand how actual genes in the cattle affect traits that are economically relevant to producers and how those genes can be used to improve sustainable beef production. "We conduct experiments to identify key traits such as growth rates, efficiency, and meat quality," he explains. "We then design

*The Bovine Genome Project is a collaboration of many projects. Individual projects are funded by: Alberta Agricultural Research Institute, Genome Canada, Canada/Alberta Beef Industry Development Fund (CABIDF), Agriculture & Agri-Food Canada Matching Investment Initiative (MII), Alberta Beef Producers, and Beef Cattle Research Council.*

*"It's really about having the ability to predict how an animal will perform before it goes into the feeding system."*

*- Dr. Stephen Moore, University of Alberta*



and recommend programs to genetically improve those traits."

## The Gene Library

For his part, Dr. John Basarab, a research scientist with Alberta Agriculture, Food and Rural Development in Lacombe and a member of the Western Forage Beef Group, is focused on residual or net feed intake, a novel way of identifying animals that have a genetic advantage for eating more efficiently. Net feed efficiency can be used to select cattle that eat less without compromising body size and growth rate, or adversely affecting meat characteristics like marbling and grade. Basarab sends various phenotypic data, blood, and tissue samples from the Lacombe research herd to Moore's lab where DNA is extracted, assessed for a variety of genetic markers or traits, and entered into a large genetic library, all in the effort to find the actual genetic mechanisms that make two animals different.

Measuring feed efficiency traits, however, is an expensive and lengthy process. "Feed efficiency is not under the control of just one gene – it is likely 20 or 30 major genes!" says Basarab. "If we could get the feed efficiency trait into the hands of industry in a significant way, either through breeding bulls or genetic testing, it would improve competitiveness of the Canadian beef industry. With a genetic marker test, it could be identified almost at birth whether animals will be efficient eaters or not."

## Feeding Results

The way in which bovine genome research will be put into practice is twofold. In the cattle breeding sector people have traditionally selected on phenotypic factors such as the ratio between the amount of feed an animal eats and the amount of weight that is gained with that feed. "For breeders," says Moore, "that kind of

selection only takes into account how big an animal is – which has in fact defeated the purpose of our work because bigger animals eat more." With the advent of genetic mapping of useful traits in cattle, science will give producers breeding selection abilities that can significantly improve their bottom lines. "With this trait we are taking the size of the animal out of the equation and seeing what we are left with," says Moore. "That's why it is called residual feed intake."

The second application is found in the feedlot where producers will ultimately have the ability to sort animals into groups based on their traits. Some animals may be pre-dispositioned for long feeding regimes, others for shorter regimes. In this case, science aims to offer producers the opportunity to mechanically separate animals and, as a result, streamline production and lower their costs. "It's really about having the ability to predict how an animal will perform before it goes into the feeding system," says Moore.

## Further than the Feedlot

Dave Plett, President and CEO of Western Feedlots, an integrated agribusiness with three feedlots, 100,000 standing feeder cattle capacity, and an annual production of 200,000 head of cattle, knows a lot about collaboration. In addition to participating directly with researchers in testing new technologies, Plett sits as Chair of the National Beef Industry Development Fund (NABIDF). NABIDF funds a variety of cattle research programs and is responsible for bringing technology, education, and new systems to the industry. "As new technology and information emerges, there's no question it needs to be transferred to producers just as much as the signals or demands of the industry need to be brought back to the researchers," he says.

As a producer, Plett also knows firsthand

how genetic mapping can benefit a cattle operation – enhanced production systems, improved cattle health, superior product quality, and of course, improved feed efficiency. "Feed efficiency will always be a high priority for producers since feed can be anywhere from 30-50% of the cost of a finished animal," he comments.

Crews illustrates how mapping the bovine genome addresses a producer like Plett's concerns. "About 30% of the variation we measure in feed efficiency is due to genetics," he says, "and it has been estimated that selection for improved feed efficiency could save the industry more than \$75 million in annual feed costs in Southern Alberta alone." That kind of cost-cutting is a production boon, but genetic mapping has even further potential.

Moore, Basarab, and Crews share in the excitement for the promising spin-offs at the consumer level. It is possible that through genetic marking, researchers could enhance nutraceutical effects in meat like those currently seen in Omega-3 eggs. There is also the potential that biological traits could be used as part of the trace-back effort in the chain of food safety. "The paper trail that now exists with ear tags and bar code labels on box beef is a huge step forward but it doesn't necessarily trace the biological material," says Moore. "If we can develop a very inexpensive way of measuring DNA based ID, we'd have an even better method of knowing where a meat product was sourced."

The Bovine Genome Project is evidence that many hands make light work – collaboration has certainly brought genetic marking and functionality that much closer to those on the front lines. "In the modern research world," says Crews, "collaboration and a multi-disciplinary approach are not a novelty; they are simply the way things get done."

# A Southern Gene

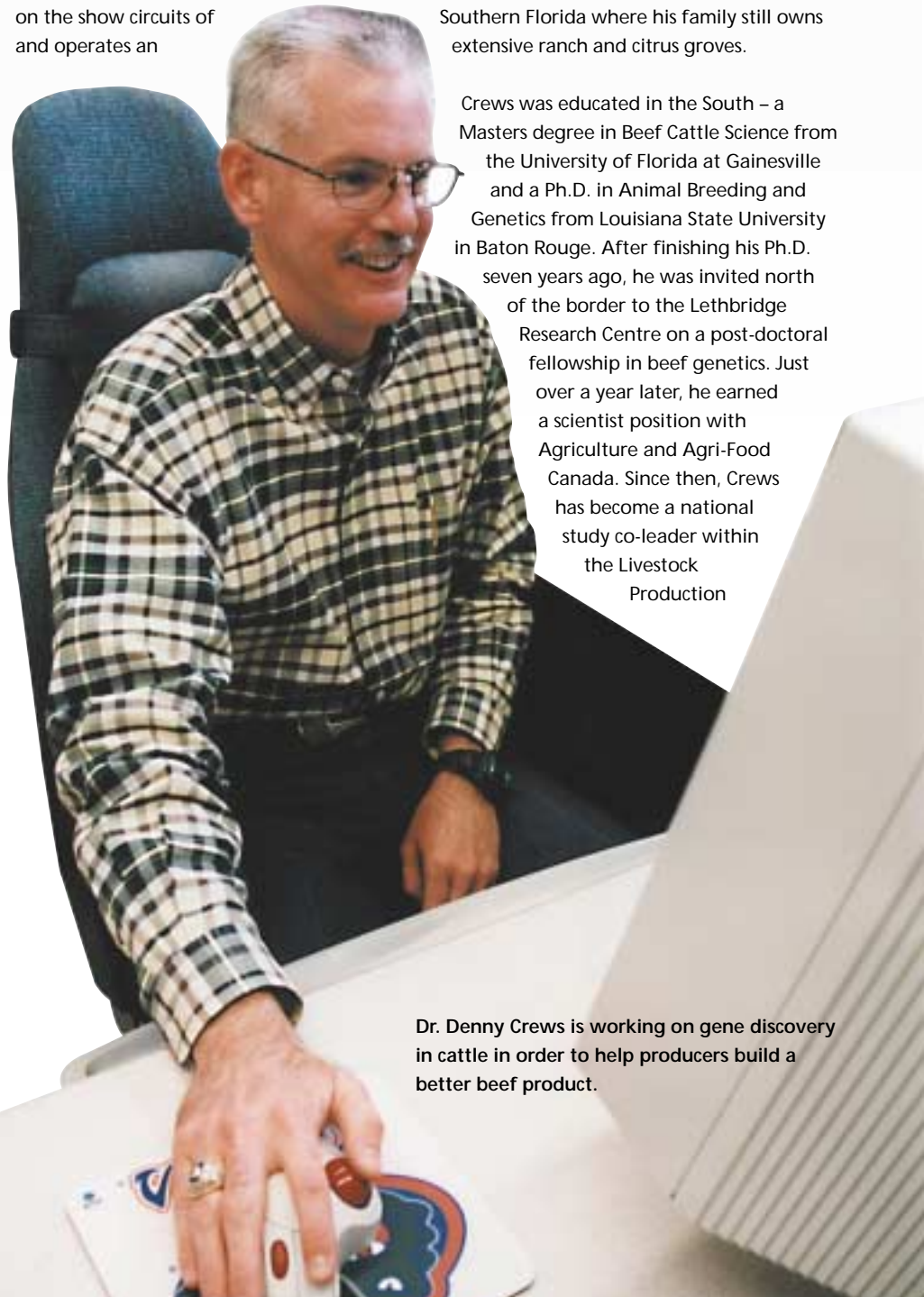
**Dr. Denny Crews, an American Civil War buff from Southern Florida, spends the majority of his time soldiering through a more cerebral kind of field - the field of breeding better beef.**

When you hear the charming southern drawl of Dr. Denny Crews, it is easy to believe this Florida native when he tells you he has a penchant for ranching, and spends most of his free time hunting, shooting skeet and target rifles, and reliving the American Civil War through history books. It is more than just hunting opportunities, however, that brought this researcher north of the border.

## **From Gene to Protein**

Crews, a research scientist in Beef Quantitative Genetics with Agriculture and Agri-Food Canada's research station in Lethbridge, comes by his veneration for the Civil War naturally. His family first arrived in Florida around the 1860s, about the time of the Civil War, and he has several ancestors who were soldiers. He comes by his affinity for cattle honestly too: ranching has been part of the Crews family for over 100 years. Growing up, he participated in cow camps, and showed and judged purebred cattle and market steers on the show circuits of Southern Florida where his family still owns and operates an extensive ranch and citrus groves.

Crews was educated in the South – a Masters degree in Beef Cattle Science from the University of Florida at Gainesville and a Ph.D. in Animal Breeding and Genetics from Louisiana State University in Baton Rouge. After finishing his Ph.D. seven years ago, he was invited north of the border to the Lethbridge Research Centre on a post-doctoral fellowship in beef genetics. Just over a year later, he earned a scientist position with Agriculture and Agri-Food Canada. Since then, Crews has become a national study co-leader within the Livestock Production



**Dr. Denny Crews is working on gene discovery in cattle in order to help producers build a better beef product.**



*“With good technology transfer, we put our work in the hands of the producers who utilize our results to produce cuts of meat with attributes demanded by the consumer.”*

*- Dr. Denny Crews, AAFC*

Systems Science Theme on a project dealing primarily with beef production.

Crews' current work focuses on useful genetic evaluation and improvement programs for traits in beef cattle. Crews uses quantitative data from the cattle to identify key traits which directly affect beef production – things like growth rate and feed efficiency. He and his team look at cattle and measure a variety of traits to see which ones consistently perform well. He then designs and recommends programs to genetically improve these traits.

## Southern Exposure

Perhaps it is Crews' firsthand experience as a cattle rancher that allows him to understand the need for effective technology transfer so well. He also has an innate ability to structure his research according to what consumers are demanding. “Consumers want a safe, healthy, and consistently savoury beef product at a reasonable price,” he says, “and they want the production sector to do that humanely and with minimal environmental impact.” As a leader in bovine genetics research, Crews has a solid understanding of what resources are required to get the job done.

In practice, Crews uses research herds, combined with planned matings, best management practices, and controlled marketing to clearly identify how genetics contribute to the economically sustainable production of beef products that are safe and tasty. That knowledge is then applied to industry herds by, for example, computing carcass expected progeny differences (EPDs) for purebred beef associations. EPDs are tools that

rank animals with respect to their genetic merit for a particular trait. “This research model gets our work to the implementation phase by being based on good science,” he explains. “Then with good technology transfer, we put our work in the hands of the producers who utilize our results to produce meat cuts with attributes demanded by the consumer.” Crews and his team also conduct national and international cattle evaluations, where they estimate genetic values for animals for the various economic traits, using field data from beef breed associations. The associations then publish the results in the form of breeding values in their sire summaries.

## A Team Effort

According to Crews, genetic markers are one tool among several that are part of a larger effort in genetic improvement in cattle. And speaking of collaboration, he is part of a team of researchers in Alberta working to accurately evaluate individual animals so that producers can make sound, profitable breeding decisions. Known as the Bovine Genome Project (see “The Gene Team” on page 24), Crews shares herd resources, staff resources, and expertise with Drs. John Basarab and Stephen Moore.

“Specifically, I lead the quantitative genetics component of several joint projects that also involve Steve and John, as well as other colleagues all over the world,” he explains. “In the Bovine Genome Project, we are looking to use both quantitative and molecular approaches to understand how actual genes in cattle affect economic traits like growth, efficiency, and meat quality, and how we might utilize those genes to improve sustainable beef production.”

Crews calls himself the number-cruncher of the group. His experience in statistical genetics, large-scale genetic analysis, and national cattle evaluation provides an important link in the chain from discovery to implementation.

## The Details

While gene discovery in cattle is geared towards advances in understanding the details from gene to protein, Crews' research always has the consumer in mind; meat quality in terms of the product offered at the grocery store, and feed efficiency in terms of lowering costs of production so that the costs of beef for consumers stay relatively low. “We have answered some very basic questions related to how animals convert their feed into meat products and what the optimal models are for identifying what genes are responsible for producing that high quality meat,” he explains. “It is our job to continue to look beyond those primary applications.” Since a basic tenant of the science behind Crews' work is that genetic makeup is generally similar from one species to the next, he feels that eventually gene discovery in cattle may have crossover applications in human health and medicine.

Perhaps he is a man obsessed with details about genes, but Crews' brilliance as a researcher is balanced by a real southern down-to-earth temperament and love of things besides just his work. Having married “a real Canadian from Southern Saskatchewan”, as he calls his wife Ronda, and nurturing a growing family, it is clear that Crews has set down some serious roots in Alberta. Given the significant applications and economic impact of his work, many hope Denny Crews, the Southern soldier of science, stays.

# Fuelling Excellence

To get where you're going you have to know where you've been. The value to Alberta that I see in research and development has come full circle. Building off Alberta's legacy of being an energy provider, research and development is making the next phase in sustainable energy possible, as well as maintaining an identity of excellence for the province.

When my grandfather came to Alberta at the turn of the century, he sought out land with trees, as that would be his heat source. Shortly thereafter, the move towards non-renewable sources of energy began. The '20s and '30s saw a move to using coal, in the '40s, oil reigned as king and generated a wealthy economy from which we still benefit. More recently, natural gas became the "it" fuel. But what the 1920s to the present have taught us is that there is risk in finite resources. Sustainability and renewable resources are the future – for energy and beyond.

At our feedlot, Highland Feeders Limited, we run 36,000 head of cattle at any time. Alberta is blessed with clean, safe water, productive land, and a climate conducive to growing a variety of crops successfully. The energy of the future is in those crops we grow.

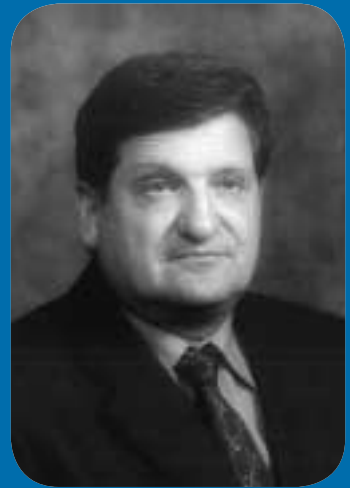
From our 36,000 cattle, thanks to research and development of bright ideas, we're capitalizing on waste and turning it into energy. We're in our third year of a collaborative biogas project the Alberta Research Council, Alberta Agricultural Research Institute, and Agriculture Canada's Greenhouse Gas Mitigation Program, and in that time we've been integral in turning an idea and information into real knowledge on

a field scale. Our biogas facility, already generating enough energy for our use, will, in approximately three years time, be capable of providing all of Vegreville's 5,000 citizens with a renewable source of energy. That's the awesome power of research and development.

## Our Identity of Excellence

Alberta has the opportunity to not only continue to lead in the energy field, but R&D is also fuelling Alberta's position in other world markets thanks to a commitment to quality and collaboration. As a province, we benefit from the vision of key industry players, like our provincial Agriculture Minister and the members of the Funding Consortium, who want to organize, collaborate, and set definite strategic goals to guarantee the future of a sustainable industry. As agriculture moves forward, there is a tremendous interest in the importance of food safety and consumer confidence. Alberta has an international reputation for excellence that will continue with research and development already at work in the sector, giving us remarkable potential to expand and gain value.

Our global advantage is our focus on research, technology transfer, and food safety. Consumers are the agriculture industry's customers, and as such, change and innovation are directed to derive the most benefit for them. We know we can't always sell products at the cheapest price, but we have the opportunity to avoid playing the pricing game by outshining our competitors on quality and safety. And research and development are necessary to maintain and further strengthen that edge.



Bern Kotelko

*Alberta has an international reputation for excellence that will continue with research and development already at work in the sector, giving us remarkable potential to expand and gain value.*

As a province, our government and industry have come together and stated, quite clearly, that we don't want to produce more of the same or maintain the status quo. We want to move forward. We've made the commitment to R&D because we want to add value to our products and create a truly sustainable industry. Alberta's agriculture industry is picking up steam and is poised to become a leader in quality products, innovative solutions to problems, and cutting edge technology. R&D is the vehicle to get us there. **r&d**

*Bern Kotelko is the owner of Highland Feeders Limited in Vegreville.*

*This is part of a series of rotating editorials that captures Words of Wisdom from people in the sector.*

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