



The new Mazer group dealership in Moosomin will be similar to this location in Neepawa.

## New 25,000 square foot building:

# Mazergroup building in Moosomin this year

BY KEVIN WEEDMARK

Mazergroup has big plans for its Moosomin dealership.

Bob Mazer says the company will build a new 25,000 square foot building on a site on the North Service Road facing the Trans-Canada Highway.

"We just met this morning to finalize the size of the building," Mazer said in an interview Tuesday afternoon. "Our current property is sold to Ron Kaban from Yorkton Hyundai and Whitewood Chrysler.

"We will turn it over to him as soon as the new facility is ready. The sale of the other property was a big impetus to move ahead."

Construction was originally scheduled to start in 2016, but as we reported at that time, Mazergroup delayed the project.

"The ag industry hasn't been real great the last couple of years," Bob Mazer explains. "The biggest cause is the drop in our dollar, which made the cost of the equipment go up so much that it did cause

some grief in our industry. 2015 was not kind to our industry. Our combines went up \$100,000 apiece, for instance. It sent shockwaves through our industry. We just wanted to be prudent with our approach to this development. Selling the property prior to starting the build helps us move forward.

"We were going to start in the spring of '16. Now we're going to start in the spring of '17, so it's back a year. It actually worked out very nicely because, as you know, we actually put in a massive amount of fill to build the property up. We've built up six acres of the 15 acres.

"That extra year gave it time to settle and it's in really good shape to be able to

start building now."

Plans for the building are now being finalized.

"We'll be finalizing the size of the building within the next seven days and it's going to be in that vicinity of about 25,000 square feet, so it's two and a half times the size of what we're living in today.

"We will be moving the canvas shed over to the new property. It's very easily moved."

Construction will start within the next few months.

"We'll be letting the contract for the building probably within the next 60 days," said Mazer. "It may go a little quicker, but worst case scenario, we'll have the

building up and enclosed for freeze up, and we'll complete the interior over the winter, and moving sometime over the winter before the season starts. We'd like to be in the building and prepared for the spring of 2018."

Mazer says the company will likely increase staffing to meet an anticipated growth in business once the new building has been completed.

"Because we've got limited space, we really are limited to what we can do out of that facility. We will be increasing our staff as we increase our business, and we believe we will increase our business when we have facilities to do so."

*Continued on page C2* <sup>23/2017</sup>

—Bob Mazer

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# Sights set on lamb production expansion

BY NEIL BILLINGER

Canada produces less than half of the lamb and mut-



There is room for additional sheep production on the Prairies. These lambs are at Westwood Ranch near Elkhorn.

ton required by the domestic market, and the sheep sector wants to change that. It's focused on attracting new producers to reduce imports from New Zealand and Australia. Statistics Canada reports the sheep population fell 1.4 per cent last year. Two of the three higher producing provinces, Quebec and Alberta, saw declines. However, there were gains in Manitoba and Saskatchewan.

## Expansion effort

The two Prairie provinces are making concerted efforts to grow the sheep population.

A new venture, Canada Sheep and Lamb Farms, was recently formed in southeast Manitoba. The two participants are locally based Sarto Sheep Farms and Integrated Foods Ltd. of New Zealand. The plan is to grow the existing flock from 5,000 breeding ewes to 30,000 within five years.

Saskatchewan is setting its sights on encouraging smaller operations. About 900 provincial farms have sheep and lambs. Less than 10 per cent are sole-income operations, but 50 to 60 per cent provide significant income to the farm.

The Saskatchewan Sheep Development Board hosted seminars for beginning producers or those looking to expand.

## Growing confidence

"Producers are starting to have more confidence that prices are not fluctuating very much," says Gordon Schroeder, SSDB executive director. "We are seeing lots of interest and hope that translates into increased numbers."

Trent and Sandy Larson own L5 Farms Ltd. near Southey, about 50 kilometres north of Regina.

"I think sheep farming is a little easier to get into than other forms of livestock," Trent says. "Breeding stock is a little cheaper to buy and you don't need the same amount of infrastructure."

Schroeder says prices are good at \$200-plus per market lamb. Lambs raised in Saskatchewan are shipped to federally inspected plants in Innisfail, Alta. or Ontario for processing. A number of provincial abattoirs slaughter lambs for farmgate sales and direct marketing.

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# Farm-to-fork connection is changing the face of dairy

BY BRITTANY STEVENS

The first in her immediate family to obtain an agriculture degree at the University of Saskatchewan, Moats' interest in animal nutrition was sparked by her experience working on a variety of dairy farms. Seeing the direct connection between what animals eat and the human benefit, she knew she wanted to learn more.

After completing her undergraduate degree (BSA) in animal science in 2012, Moats accepted a research position with the feed manufacturing company O&T Farms in Regina.

In this role, Moats provided technical support to customers and helped co-ordinate research initiatives. Inspired to use her skills to build on her own passions and interests, she returned to the U of S in 2013 to pursue graduate studies in ruminant nutrition.

Moats' research is a collaboration between the College of Agriculture and Bioresources and O&T Farms, with additional funding from SaskMilk and the National Research Council. Under the supervision of David Christensen and Timothy Mutsvangwa, professor emeritus and professor, respectively, in the Department of Animal and Poultry Science, Moats examines how the nutritional value of milk is affected when dairy cows are fed a supplemented flaxseed diet.

Canada is the world's largest producer of flaxseed, producing nearly 40 per cent of the global yield. Flaxseed contains high levels of omega-3 fatty acids, which are known to benefit both animal and human health.

Using Holsteins from the U of S herd, Moats compares



benefits of feeding cows a control diet and those fed diets supplemented with unprocessed or extruded flaxseed products.

Having seen an increase in omega-3 fatty acid content in milk when cows were fed the extruded diet, Moats is encouraged by the initial results and is hopeful the final outcome will lead to development of value-added dairy products in Saskatchewan.

"I truly believe our province has the potential to become a leader in the omega-3 dairy product production,"

said Moats. "Implementing extruded flaxseed into the diets of dairy cattle could benefit all levels of the supply chain by creating new markets and increasing the availability of essential nutrients for consumers."

Last July, Moats presented her research at the American Dairy Science Association's joint annual meeting in Orlando, Fla. Her presentation earned her first place in the three-minute thesis competition and second place in the graduate student research poster competition. The opportunity granted her invaluable exposure and helped showcase Saskatchewan's agricultural presence on an international scale.

"Having our research receive that kind of international recognition was such an exciting and humbling experience," she said.

Moats is the recipient of many awards and scholarships. Notably, she received the Saskatchewan Innovation and Opportunities Scholarship, awarded to graduate students whose research topics are thought to enhance the province's agriculture industry.

Building on the relevance of the farm-to-fork mentality, Moats hopes to apply her knowledge to developing innovative animal feed programs to improve animal performance as well as the nutritional value of food products for consumers.

"The impact animal nutrition can have on the quality of the food we produce has always been an area of interest for me," she said. "Combine this with the importance of consumer nutrition, and it's easy to see that this research opportunity was a natural fit."

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**Above:** On January 6 the 4-H Club sold calendars to help support STARS.

**Top Left:** The 4-H Club Public Speaking Competition took place on February 10.

**Bottom Left:** January 14 the 4-H Club participated in District 4-H Curling in Whitewood. The Senior team was Ashton Reid, Ty Woods, Cheyenne Jamieson, and Cutter Reid (Spare: Levi Jamieson).

## Fairmede 4-H Beef Club

BY LEVI JAMIESON

Fairmede 4-H Beef Club held it's organizational meeting on November 4/2016 with our election of officers. Our Club Executive this year is:

- General Leader: Darren Fisk
- Assistant Leader: Diane Jamieson
- President: Ty Woods
- Vice President: Katelyn Garvey
- Treasurer: Cheyenne Jamieson
- Secretary: Chloe Woods
- Phoners: Marti & Joel Fisk
- Reporter: Levi Jamieson
- District Delegates: Cheyenne Jamieson

& Katelyn Garvey

December 3/2016 we had a Weigh Day and meeting at Woods.

On January 6/2017 we sold calendars to help support STARS.

January 14/2017 we participated in District 4-H Curling in Whitewood. Our Senior team was Ashton Reid, Ty Woods, Cheyenne Jamieson, Cutter Reid(Spare: Levi Jamieson) and our fun curlers were Callie Reid, Marti Fisk, Joel Fisk and Levi

Jamieson.

Our 4-H Club Public Speaking Competition took place on February 10/2017. A huge thank you goes out to our judges for the evening: Lana McCormac, Karly Fregin and Tamala Jones. They gave us lots of helpful comments, advice and encouragement.

Results of the evening:  
 CloverBud: 1st-Callie Reid, 2nd-Joel Fisk, 3rd-Marti Fisk  
 Junior: 1st-Chloe Woods, 2nd-Levi Jamieson

Intermediate: 1st-Cheyenne Jamieson, 2nd-Katelyn Garvey, 3rd-Cutter Reid  
 Senior: 1st-Ty Woods, 2nd-Trae Reid, 3rd-Rhett Woods, 4th-Ashton Reid

Thanks to the Turpie and Jamieson Families for donating plaques for the Angus Turpie Memorial Public Speaking Awards and to the Woods Family for donating the Judges gifts.

District 4-H Public Speaking will be held on March 19/2017 at Wawota, hosted by Wawota Multi Club. The top 2 placings in each category will attend. Good Luck to all the speakers!

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## Pulses in Western Canadian crop rotations

Farmers in Western Canada know the benefits of well thought-out crop rotations. These can reduce the impact of harmful insects, reduce the amount of fertilizer needed, improve soil health and lengthen the period that specially bred crops remain resistant to disease. With the increased interest in growing pulse crops in recent years, researchers at Agriculture and Agri-Food Canada (AAFC) have quantified some of the benefits of adding these crops to rotations.

To help commemorate the International Year of the Pulse, we are revisiting some important research findings on how pulses contribute to sustainable crop production.

### Enhanced system productivity

AAFC researcher Dr. Yantai Gan, located in the semi-arid growing region of Swift Current, Saskatchewan, has recently published a paper that shows that, when compared to summer fallowing (leaving the land idle during the growing year), diversifying cropping systems with pulses:

- Improves soil water use;
- Improves soil nitrogen availability;
- Increases crop production.

The 2005–2011 trial was done in three-year cropping sequences involving pulses (dry pea, lentil and chickpea), cereals (wheat, barley and durum) and summer fallow. The cereal-pulse system increased total grain production by more than 35%, improved protein yield by nearly 60% and enhanced fertilizer-nitrogen-use efficiency by 33% over the cereal-summer fallow system.

### Enhanced soil biodiversity and improved soil health

In another study, Dr. Gan and his team found that crop rotations have a large effect on microbial communities in the soil. These microbes, including fungi and bacteria, can have a beneficial relationship with the plants. Farmers benefit from microbial-crop rotation relationships through increased crop profitability and input efficiency. For example, the team found that durum does better following a crop of peas than it does following chickpeas, due to the pea roots having beneficial interaction with microbial communities in the soil.

Research into the effects of crop rotations on microbial communities and soil health is ongoing.

### Improving cropping systems may help mitigate greenhouse gas emissions

Dr. Gan's research shows adoption of diversified crop rotations with pulses can substantially lower a crop's carbon footprint.

One paper, published in 2011, showed that diversifying cropping systems with oilseeds and biological nitrogen fixers such as pulses lowered the carbon footprint of durum wheat by an average of 22% over cereal-based monoculture systems.

Another paper, published in 2014, showed that in a 25-year field study, wheat in a lentil-wheat rotation system produced a similar amount of grain as in the continuous wheat system, but the former did so with 29% less nitrogen fertilizer. Consequently, fertilizer-nitrogen-use efficiency for wheat in the lentil-wheat system averaged 80% greater than for continuous wheat system in dry years, 97% greater in normal years, and 36% greater in wet years.

How does this happen? Rhizobia, a particular kind of soil bacteria associated with legume root systems, fix nitrogen from the atmosphere in a solar driven process that transforms the nitrogen into ammonia. This provides a large portion of the nitrogen required for plant growth.

A portion of the fixed nitrogen remains in the crop roots, nodules and soil, which contributes to nitrogen pools that benefit subsequent crops.

These two studies clearly show that the use of pulses to diversify rotation systems is key to increasing total grain production while reducing carbon footprint in agriculture.

### Too much of a good thing?

Lentils have increasingly become a crop of choice for farmers, especially in southwest Saskatchewan, as pulses have a lot of benefit for crop rotations. However, is shortening the rotation to include more lentil plantings a good idea? Considering potential risks of pathogen building up in the soil with intensified pulse rotation over time, it is advised that in wetter areas or on clay soils, or on those farms where root rot diseases have been a growing concern, a longer rotation of pulses or more diversified cropping system should be adopted.



Checking on field peas in a Saskatchewan field.

Farm and Food Care Saskatchewan photo

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## Water quality and dugout treatment trial results

BY HALSEY SHAHEEN, BSc, AAG,  
REGIONAL LIVESTOCK SPECIALIST

SASKATCHEWAN MINISTRY OF AGRICULTURE

While most surface water sources are frozen solid this time of year, it is a good time to start planning ahead and thinking about water supplies for the 2017 grazing season. Water is the single most important nutrient for livestock, and is the most abundant component in the body. Poor water quality may affect animal performance. Sometimes the effects will go unnoticed until larger scale herd symptoms or even animal deaths in extreme cases. Other less obvious symptoms include decreased milk production, weight gains and immunity that will lead to reduced feed efficiency and increased treatment costs. All of these effects will have a negative impact on the producer's bottom line.

One common mineral issue in Saskatchewan water sources is sulphates. Elevated sulphates typically do not present a visual change or produce an odor. High sulphates cause a variety of effects that are often difficult to identify. Typically surface water evaporates as the summer progresses, which results in concentration of the sulphates. Another common issue in Saskatchewan dugouts is cyanobacteria, also known as blue-green algae. Some strains of cyanobacteria are potentially dangerous and in the right conditions will produce deadly toxins that act on the nervous system and/or liver. There are multiple water treatment products available to Saskatchewan producers to try and mitigate the deleterious effects of poor quality water however, there is limited research surrounding the efficacy of these products.

During the 2016 grazing season, Regional Livestock Specialists in Moose Jaw, Outlook and Watrous conducted a project through the Agriculture Demonstration of Practices and Technologies (ADOPT) program to study water quality and the efficacy of four treatment products that are available to producers. Four dugouts in each area were treated with one of the four treatment products and monitored for quality throughout the grazing season.



Water samples from four different dugouts within a few kilometers of each other, comparing the dissolved sulphate levels (mg/L). Appearance is not always indicative of quality.

The four products used in the study were Nature's Pond Conditioner, Pond Boss, Ponder and a product new to Saskatchewan, AquaSpherePRO by Bioverse. During this study, it did not appear that any of the products were effective at improving water quality or removing contaminants from the water. In addition, none were seen to be effective at killing cyanobacteria and preventing its regrowth. These products were also more expensive than copper sulfate products that are known to be effective at treating dugouts for cyanobacteria.

In many cases, changing management can help to reduce the impact of poor quality water. You can't manage what you don't measure, so testing is the first step in determining water quality. Both surface and ground water can and often will change quality over time, therefore routine testing is recommended.

Feed testing is also recommended so that the complete diet can be examined and to ensure the correct mineral package is being supplemented.

For more information you can contact your local Regional Livestock Specialist, or call the Agriculture Knowledge Centre at 1-866-457-2377.

## Time to revisit crop rotations

BY CORY JACOB

REGIONAL CROPS SPECIALIST, WATROUS, SK  
MINISTRY OF AGRICULTURE

The concept of crop rotations has fallen out of favor lately, whether it's due to economics, lovely Mother Nature, or logistics in the busy season. I think that it is time to revisit this concept and to understand why it has been promoted in the past.

Crop rotations are designed for improving crop and soil health over the long term and some would argue economics too, all to ensure sustainability. I really want to emphasize sustainability, as many producers seem to not be considering this. If you have a son that will be taking over the farm or are a young producer, think about the issues and consequences of less crop diversification and tight crop rotations 10, 20, 30, and 40 years down the road. Crop rotations are a great way to lessen these risks and consequences as they keep pests off balance, while maintaining soil nutrient levels and using water and nutrients efficiently.

Herbicide resistant weeds and weed management are issues associated with tight crop rotations, where the same crop is grown and a similar herbicide is used year after year. Plants are smarter than we give them credit and adapt to our farming practice and eventually the weed population shifts to weed species that are resistant to that herbicide or mode of action. Herbicide resistance develops from a genetic mutation or natural tolerance in a weed population and if the same herbicide or mode of action is continually used, that weed does not die and goes to seed and spreads, then you have more and more herbicide resistant weeds to deal with. Once they are present, they are a long-term tenant on farmland.

Minimizing disease levels is also an important aspect of crop rotations; which reduce the growth, reproduction and survival of soil stubble borne pathogens,

which cannot survive without a susceptible host or plant tissue. Crop rotations will not eliminate these pathogens, but will reduce their population size so that there is less crop damage and control options will become more effective. Rotation of fungicide groups and modes of action will ensure fungicide efficacy. Using one, single mode of action fungicide year after year will select for organisms that have resistance to the fungicide or mode of action and soon the fungicide will not be effective against the disease. Selecting a variety with disease resistance will also help, but do not only depend on that as resistance will break down and new strains, with no known resistance are discovered.

Crops have different rooting depths to capture nutrients and water. Peas, lentils, and flax have shallow root systems, while cereals crops have a deep rooted fibrous root system, followed by canola and mustard with a deep rooted taproot, and alfalfa with a very deep rooted taproot. The deep rooted taproot allows the plants to obtain nutrients such as nitrogen and sulfur that leach down in the soil profile, especially in these wet years. Shallow roots and the fibrous roots system of cereal crops allows to capture phosphorus and potassium, which from seeding are higher up in the soil profile and move only a few mm in the soil every year.

As well, including pulse crops in crop rotations is a way to get free nitrogen from the crop when it is inoculated. Pulse crops fix 50-90 percent of their nitrogen. Faba bean fixes 90 percent, 80 percent for pea and lentil, 70 percent for chick pea and 50 percent for soybean and dry bean and these crops leave residual nitrogen for the following crop as pulse stubble is broken down relatively quickly.

At the end of the day, I understand that economics and Mother Nature play a big role in choosing crop rotations. I wanted to provide some food for thought.

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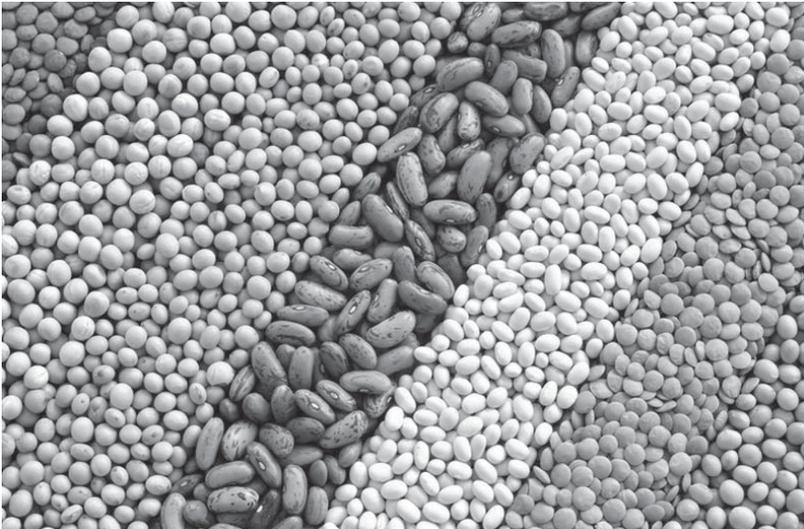
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## Research makes healthier pulses, leading to healthier foods for Canadians

The nutritional value of pulses—a category of crops that are commonly grown in Canada and which include lentils, beans, peas, and chickpeas—can be enhanced through processing methods, according to an Agriculture and Agri-Food Canada (AAFC) research study of pulse-based ingredients and foods. In turn, these nutrient-rich pulses can be used to improve the health benefits of the foods Canadians already eat.

Research scientist Dr. Qiang Liu, of the Guelph Research and Development Centre (GRDC), is looking at ways to improve the nutritional properties of food ingredients made from pulses; specifically by manipulating the types of starch found in pulses.

Dr. Liu's team has been coming up with new bread recipes that use pulse ingredients such as pea, chickpea, and red split lentil flour. They tried different techniques to alter the starch structure of the pulse flours, as well as the interactions between the starch and other ingredients in the bread.

After many experiments, Dr. Liu and his team were able to successfully increase the amount of slowly digestible starch and resistant starch in pulse-based breads.

Slowly digestible starch is important for human health as it can only be digested slowly by the small intestine,

resulting in a modest and steady glucose release (compared to the high blood glucose spikes that occur when more common starches are consumed). Resistant starch cannot be digested in the small intestine at all and therefore enters the large intestine functioning as dietary fibre—which, as everyone knows, is recommended by Health Canada as part of a healthy diet. Slowly digestible starch and resistant starch can improve gut health, slow the absorption of glucose into the bloodstream, and help stabilize blood sugar levels.

By modifying ingredients made from pulses to slow starch digestion, pulses can be used to improve OR increase the nutritional value of common foods, such as bread. What's more, breads made using pulse ingredients can also be consumed by individuals with food intolerances and gluten sensitivities who previously had to avoid the quick digesting starches commonly found in wheat products, thereby broadening the potential market for pulse-based foods.

Dr. Liu and his team recognize that breads are not the only food that may benefit from the addition of pulses, which is why they are also experimenting with pulse ingredients in muffins, cookies, and pasta.

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MARCH <i>Daylight Savings Time Begins March 12</i>		
Wednesday, March 22	Regular Feeder Sale	9 AM
Friday, March 24	Cow-Boys Angus Bull & Female Sale	
Monday, March 27	Butcher Sale	9 AM
Wednesday, March 29	Presort Feeder Sale	10 AM
Thursday, March 30	Sheep/Goat Sale	12 Noon
APRIL		
Saturday, April 1	Tri-N Charolais & Guest Sale	
Monday, April 3	Butcher Sale	9 AM
Wednesday, April 5	Regular Feeder Sale	9 AM
Friday, April 7	Bred Cow & Cow / Calf	
Monday, April 10	Butcher Sale	9 AM
Wednesday, April 12	Presort Feeder Sale	10 AM
Friday, April 14 - 17	Good Friday - Easter Monday - CLOSED	
Wednesday, April 19	Regular Feeder Sale	9 AM
	Replacement Pen of 5 Heifer Sale	1 PM
Monday, April 24	Butcher Sale	9 AM
Wednesday, April 26	Presort Feeder Sale	10 AM
Friday, April 28	Bred Cow & Cow / Calf	
MAY		
Monday, May 1	Butcher Sale	9 AM
Wednesday, May 3	Regular Feeder Sale	9 AM
Thursday, May 25	Sheep/Goat Sale	12 Noon
	Spring Horse Sale	

- All cattle must be CCIA tagged
- Sale dates and times subject to change
- Sunday delivery between Noon and 8 PM for Monday butcher sales
- PRESORT SALES - Delivery accepted until 5 PM the day before the sale
- BRED COW SALES - Delivery accepted until 2 PM the day before the sale
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**Left:** checking barley for fungal disease.

**Right:** Barley at harvest  
Barley's primary use is animal feed, more than 80% of the world production goes into the feed market. Secondly, Barley has been used for thousands of years in the production of alcoholic beverages, such as beer and whiskey. Only a small portion of Saskatchewan's production goes into the food market. There may be expanded opportunities for barley in food because of its benefits for heart health



## Barley is 'in' when it comes to heart health

As cereal grains go, barley is a winner when it comes to good nutrition. This centuries-old grain is packed with fibre, is naturally low in fat, and contains important vitamins, minerals, and antioxidants.

Canadians looking to lower their blood cholesterol may soon be choosing food products that contain barley.

Health Canada officials accepted an application submitted by the Alberta Barley Commission for a health claim linking the consumption of barley beta-glucan to lowering blood cholesterol.

Dr. Nancy Ames and her team at Agriculture and Agri-Food Canada (AAFC) in Winnipeg, Manitoba, contributed to the scientific work backing up this claim and summarized all evidence for the petition to Health Canada.

The barley health claim is based on scientific data showing that the consumption of at least three grams of beta-glucan per day helps reduce cholesterol, which is a risk factor for heart disease. Beta-glucan is a type of soluble fibre found in barley.

Suitable barley food products can now include labels with statements regarding the recognized health benefit. To use this claim, the food must contain at least one gram of beta-glucan from barley grain products per serving and consumers would need to choose three of such serv-

ings to obtain the minimum daily intake for lowering cholesterol.

Barley grain products include dehusked or hullless barley, pearl barley, barley flakes, grits, meal, flour, and bran, as well as beta-glucan enriched milling fractions.

Dr. Ames believes that the barley health claim gives credibility to barley as a healthy food option. There is real potential to increase consumer demand for barley food products, giving farmers incentive to grow more food-grade barley and opening up new market opportunities for both producers and processors.

This success shows how government and industry work together for the benefit of the agricultural sector and all Canadians.

"One of the benefits of the new health claim is to educate consumers about the link between diet and health," says Dr. Ames, "and help them include barley in their daily food choices."

Dr. Ames' research team analyzed many barley samples from Canadian processors to validate beta-glucan levels and check potential levels in various recipes and serving sizes. AAFC barley breeders and others have developed several barley varieties with a focus on maximizing beta-glucan content for food use.

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# Farm asset values, debt expected to increase

BY JP GERVAIS

In 2016, both commodity prices and farm input prices declined because supply climbed faster than demand in global markets. Those price declines and their impacts to revenues, expenses and profitability are reflected in Agriculture and Agri-Food Canada (AAFC)'s 2017 Canadian agricultural outlook.

AAFC estimates Canadian farm cash receipts to have totaled CA\$59.1 billion in 2016, a 1% decline from 2015 revenues. Total farm operating expenses in 2016 are estimated to have been CA\$44.2 billion. The sector's total net realized income (revenues - operating expenses and depreciation) was CA\$7.7 billion in 2016, or 7% below the record-high profitability of CA\$8.3 billion reached in 2015.

AAFC projects Canadian agriculture will see stable revenues overall in 2017, with a decrease of less than 0.5% over the estimated 2016 level. Driving those revenues will be continued strength in global demand for Canadian exports and continued weakness in the Canadian dollar, expected to remain throughout 2017 at about US\$0.75. AAFC projects total operating expenses at CA\$45.0 billion in 2017. They're not likely to increase too quickly, as oil prices are expected to remain at roughly US\$50/barrel in 2017 and despite supply limitations for key fertilizers.

Stable farm revenues and small increases to expenses yield a bottom line that is roughly equal to the 5-year average. Projections of the Canadian agriculture sector's year-over-year profitability



Saskatchewan Farm and Food Care photo

Farm asset values and debt are expected to continue to increase in 2017.

of CA\$6.7 billion in 2017 as measured by total realized net income.

### WHAT THIS MEANS FOR YOU

Overall, Canadian agriculture's total net income is projected to hold up in the face of some pressure throughout 2017, as and oilseeds PDF (944 KB).

Knowing this can help anticipate changes you could see in your income statement in 2017. It can also identify efficiency gains needed to face revenues levelling out in 2017.

### OVERALL ASSET VALUES, DEBT EXPECTED TO INCREASE IN 2017

Land typically accounts for a majority of all farm assets. That was true in 2015 (see our 2015 Farmland Values Report), when land values totaled two-thirds of Canadian farm asset values.

Our analysis suggests that the value of land and buildings climbed around 4% in 2016.

This continued land values' upward trend, albeit at a slower pace than in previous years.

We project it to increase between 1% and 3% in 2017.

Farm cash receipts, once again higher than the five-year average, are expected to drive these land value increases.

That anticipated growth in farm asset values in 2016 and 2017 helped push FCC's debt projections of September 2016 slightly upward for both years. We expect soon-to-be-released data will show farm debt outstanding grew around 7% in 2016 and that it will grow further in 2017, between 3% and 5%.

Debt likely grew faster than asset values in 2016 - and it should continue to do so in 2017. However, net worth (owners' equity, or assets - liabilities) across Canadian agriculture as a whole is still expected to climb. AAFC estimates a 4% increase in both 2016 and 2017. That's generally good news and speaks to the sector's resiliency and optimism. Canadian farm equity has continued to grow despite softer commodity prices, thanks in part to the buffering effect of the dollar on overall revenues.

I say this with one caution: The lower total net income expected across Canadian agriculture in 2017, combined with the overall sector's growing equity, suggests we'll see a lower rate of return on equity in 2017. This isn't necessarily reason for concern as the current environment of low interest rates helps, but it's certainly one element to keep monitoring.

Why? Financial risk is incurred by borrowing money. Businesses should be earning a higher rate of return on equity than the rate they pay on debt.

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## Foodgrains Bank Responding to Somali Hunger Crisis With \$1 million of assistance

Canadian Foodgrains Bank is responding to the hunger crisis in Somalia, where immediate emergency assistance is needed to help prevent a hunger catastrophe.

The Foodgrains Bank is a Canadian charity with strong support in southeast Saskatchewan and southwest Manitoba. Successful growing projects are held each year at Moosomin and Kola, where local farmers, implement dealers and farm input dealers work together to grow crops destined to help the neediest in the world.

"At the back of our minds is the 2011 Somalia famine, where a quarter of a million people died of hunger," says Barbara Macdonald, Foodgrains Bank International Programs Director. "There is no way that should be allowed to happen again."

The current hunger emergency is the result of two consecutive seasons of drought.

Many Somalis are pastoralists, who depend on being able to buy and sell livestock for their livelihoods. The drought has resulted in a lack of water and food for the animals. Many have died, and those left are in such poor condition they are beyond selling.

In some areas, including communities where the Foodgrains Bank is responding, water is at a premium, and being trucked in and sold at great expense.

"While a famine in Somalia has yet to be declared, there are still over six million people in Somalia in need of humanitarian assistance," says Macdonald, noting that many of those who are most affected by the hunger crisis are children.

"The declaration of a famine means that we're too late—people are already dying. And the situation right now in Somalia—on the verge of a famine—is still a terrible place for people to be," she adds.

Through its member Emergency Relief & Development

Overseas (ERDO), the Foodgrains Bank is providing 850 of the most vulnerable households (about 6,000 people) across six villages in northern Somalia with five monthly cash transfers they can use to purchase locally available food. The project is being implemented through ERDO's partner World Concern, and totals \$500,000.

In the South West state of Somalia, Foodgrains Bank member ADRA Canada is providing 1,000 households (about 6,000 people) with four monthly emergency vouchers redeemable at approved local shops for a set amount of rice, beans, sorghum, and other household staples. Part of the voucher is also redeemable for food items chosen at the recipient's discretion to allow families to better choose products that suit their needs.

In particular, the project, which totals \$500,000, is providing assistance to people who have come to this region in search of food after losing all their livestock, as well as widowed and child-headed households, and others who are extremely vulnerable.



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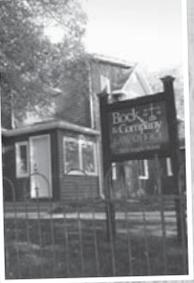
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## Lower Qu'Appelle hosting watersheds conference

The Lower Qu'Appelle Watershed Stewards Inc. (LQWS) is pleased to be hosting the Saskatchewan Watersheds Association Annual Conference from April 5-7 at the S.N. Boreen Centre in Esterhazy. The Saskatchewan Association of Watersheds (SAW) provides a unified voice of the 11 watersheds in Saskatchewan. Together we work towards their vision for the natural resource of water to be protected and conserved, their mission to provide a unified voice to influence decision making and policy development and to balance the economic, environmental and social aspects of the watershed members. The goal of SAW is to ensure there will be a healthy source water supply of ground and surface water for future generations, right here in our province.

The Lower Qu'Appelle watershed is located in southeastern Saskatchewan and covers an approximate area of 17,800 kilometres. Forming the lower downstream half of the Qu'Appelle River Basin, the Lower Qu'Appelle Watershed begins near the town of Craven and ends at the Manitoba border. Even though our watershed ends at the Manitoba border, it does not mean it stops there, we continue to participate in the Assiniboine River Basin Initiative (ARBI). ARBI works towards encompassing the Assiniboine River basin which includes the Assiniboine River, the Souris and Qu'Appelle River and their tributaries and includes members from Saskatchewan, North Dakota and Manitoba.

The LQWS vision is for a long term, stable, high-quality water supply for people and for the environment. Water quality in the Lower Qu'Appelle Lakes will be able to support recreation, fishing



A portion of the Qu'Appelle Valley in snowy Saskatchewan, as seen from the International Space Station.

Cmdr Chris Hadfield photo

and economic development within the ecological limits of the system.

We have undertaken many projects working towards our vision. Our recent projects have included a door to door survey on private sewage storage, delivering the Love your Lakes program to the District of Katepwa. The Love your Lakes program is a shoreline assessment and educational stewardship program. The assessment will generate a picture of the current state and health of their lakeshore. We have monitored for Aquatic Invasive Species at the six recreational lakes within our watershed as well held demonstrations on how to clean, drain and dry your boat. We have offered cash incentives for wetland restorations, we

provide several workshops every year in the east and west of the watershed on topics that vary from carcass disposal planning, forage, winter feeding strategies, decommissioning water wells, solar powered water systems and educating producers on programs that are available to them. Last year, producers applied for over \$700,000 in projects with \$361,000 back to producers! This winter we have been working with producers to implement a multi drainage permit similar to our neighboring watersheds.

Our Research and Monitoring Committee has partnered with Water Security Agency, Moose Jaw River Watershed and the Wascana Upper Qu'Appelle. The priority of the committee is to

determine what nutrient sources must be managed effectively in order to better protect our lake quality. Projects being undertaken include: 1) Municipal Effluent Discharge. This project will give us an estimate of the loading of municipal sewage effluent sources and potential abatement. We will use existing data to understand the relative importance of municipal sewage effluent to other nutrient sources. 2) Evaluating nutrient contributions from agriculture and estimating the potential for Beneficial Management Practices (BMP), we have partnered with the Global Institute of Water to estimate the footprint of agricultural practices in each of the tributary sub basins of the Qu'Appelle System which could

affect nutrient loading and/or concentration. Lastly, LQWS sampled macroinvertebrate at six monitoring sites within our watershed. The science behind aquatic bugs tells a story about the quality of water.

This year's conference focuses on water quality and provides an opportunity for members and stakeholders to share information and learn from each other's success and challenges! The conference is open to anyone with interest in water management.

Topics include:

Wednesday, April 5 - 5:00 p.m. - 7:00 p.m. Registration  
6:00 p.m. - 9:00 p.m. Water on the Rocks Mixer & Trade Show Viewing

Thursday, April 6 - 8:00 a.m. - 10:30 a.m. Registration and Trade Show Viewing.

Conference kicks off at 10:30 with updates from Water Security Agency, topics for Thursday include Mosaic Potash, Regina Wastewater Treatment Plant Upgrades and Operations, Lower Qu'Appelle Watersheds, Ducks Unlimited and tours of the Esterhazy Four Mill and the Mosaic Potash Museum. To top off the evening there is a dinner theatre featuring the Kapsovar Valley Kapors.

Friday, April 7 - 7:30 - 8:30 breakfast, topics include Implementing Urban BMPs, Ground Water on the Prairies, Drainage Effects on Water Quality, Climate Change on the Prairies and wrapping up the conference with a presentation from our neighbour, the Upper Souris Watershed Association. Conference wraps up at 3:30. For more information on how you can register or become a sponsor or participate in the trade show, go to [www.saskwatersheds.ca](http://www.saskwatersheds.ca) or call the LQWS office at 306-745-9774.

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# Probiotics' anti-inflammatory effects could improve livestock intestinal health

Probiotics are good for human health, especially your digestive system, but did you know that probiotics can benefit the health of livestock animals? According to Agriculture and Agri-Food Canada (AAFC) research, probiotics, live microorganisms, or "good bacteria," could be used to improve intestinal health and prevent gut-associated diseases in poultry and swine.

"When combined with dietary fibre from barley, oats, rye and soy, probiotics could provide options for developing

natural alternatives to conventional antibiotics for livestock," says AAFC research scientist, Dr. Magdalena Kostrzynska of the Guelph Research and Development Centre (GRDC).

She is studying the role probiotics play in both reducing inflammation and improving gut microflora in livestock and humans.

This discovery could have beneficial applications in the livestock industry as producers look for alternatives to antibiotics in the management of intestinal diseases

caused by food-borne pathogens.

Dr. Kostrzynska, along with her former AAFC colleague Dr. Susan Tosh, studied the anti-inflammatory effects of probiotics in combination with dietary fibre using a cell culture method.

Results showed that probiotics consumed with fibre can re-populate the gut with beneficial microbiota, as well as reduce inflammation and restore the gut mucus lining.

Dietary fibre combined with probiotics that can reach the lower digestive tract,

helps promote the growth of these beneficial bacteria.

For livestock like poultry and swine this means healthier growth and reduction in the use of antibiotics. Traditionally, antibiotics have been used to kill pathogenic bacteria, reduce inflammation and promote growth.

Dr. Kostrzynska's research on probiotics spans over a decade and in the future she plans to further investigate the health benefits of probiotics for both livestock and humans.

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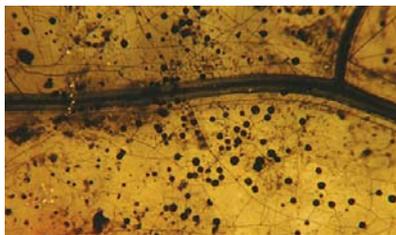
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## Land of the living soil



AM fungi associated with an alfalfa root in soil—extending the root system's ability to capture nutrients.

Soil microbiologists at Agriculture and Agri-Food Canada are trying to understand complex interactions between plant roots and soil microorganisms. How complex? Plant scientists have found that a single soil sample can contain more than 30,000 varieties of microorganisms (also known as microbes). There's not just some life down there—there's a lot!

### Beneficial Microbes

As scientists delve deeper into this unknown world, they are finding that some communities of organisms are beneficial to plants and others are not. Beneficial microbes can fight pathogens or even trigger a plant's own defense mechanisms against disease. Scientists are also finding that different microbial communities form depending on the plant type present. Relatively

little is known about how these mechanisms work, but it appears that plants are attuned to soil organisms and visa-versa.

Dr. Chantal Hamel, a soil microbiologist from AAFC in Swift Current, SK finds this concept exciting. Knowing more about these microbial communities and how specific plants interact with them raises possibilities for improving plant production and soil health.

"Ancient Greeks knew that the key to successful agriculture was in the soil," says Dr. Hamel. "2,500 years later, we have the tools, like advanced DNA and molecular technologies, powerful computers and lots of patience, needed to crack soil's black box."

### Current Arbuscular Mycorrhizal (AM) Fungi Research

Dr. Hamel is most in-

terested in interactions between plants and arbuscular mycorrhizal (AM) fungi. This family of fungus is known to colonize on root systems and increase the plant's ability to take up nutrients.

Of late, Dr. Hamel's team has done extensive soil sampling to assess the influence of land use on the soils. Collections were made in pastures, on cropland and in roadsides, which interestingly enough, are the main repository of microbe diversity in much of the Prairie area. Dr. Hamel found that despite the soil disturbance created by agriculture, the AM communities have been maintained. That's good news for farmers because AM fungus is generally good for soil health.

Hamel has also explored the ability of AM fungus to suppress soil born disease. In a recent study published in the Canadian Journal of Microbiology, she found that overall, roots that were colonized by AM fungus were better able to suppress pathogens and were healthier as a result.

The ultimate dream of soil microbiologists is to understand how to encourage these nutrient-transforming, disease-fighting communities. Hamel's work is a piece in this very complex, unfinished voyage of discovery.

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# Agricultural research looks at dugouts as absorbing carbon dioxide

BY DALE JOHNSON

Three researchers at the University of Regina have been awarded a provincial research grant to study the role of agricultural dugouts in greenhouse gas capture.

Dr. Kerri Finlay, Dr. Peter Leavitt, Dr. Gavin Simpson of the biology department, along with Dr. Helen Baulch of the University of Saskatchewan, were recently awarded \$255,030 from the Saskatchewan Ministry of Agriculture's Agriculture Development Fund.

"We are hoping to provide guidelines for dugout management to maximize CO2 uptake. If successful, this would offer a very low-cost option for carbon offsets to farmers, as they already have the dugout infrastructure in place," Finlay says.

The funds will be used primarily to hire students, travel, collect, and analyze samples from dugouts across southern Saskatchewan.

Dugouts provide invaluable ecosystem services on agricultural lands including water for livestock, habitat for natural flora and fauna, and flood abatement. They may also provide a critical offset of greenhouse gas (GHG) emissions from agricultural practices.

This new research is an application of previous work done at the U of R.

In their earlier work, they found that lakes in southern Saskatchewan are absorbing more carbon dioxide as a result of global warming. This is contrary to previous research that suggested global warming is increasing CO2 emissions from lakes.

Now they will focus their research on dugouts.

"In this research we want to pursue this further by ex-

amining whether, and if so how much, CO2 is coming into farm dugouts. We further want to investigate whether this CO2 is being buried in the sediments and might thus be used as carbon offsets for agricultural emissions. Additionally, we will be measuring the other, more potent greenhouse gases, like methane and NO2, as they might completely negate the CO2 uptake," explains Finlay.



Photo by U of R Photography

Dr. Kerri Finlay is part of a team of researchers in the biology department trying to find out if dugouts take in carbon dioxide.



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Kevin Weedmark photo

While winter seems to have hung around a bit too long this year, the growing season is just around the corner. This aerial photo of farmland near Moosomin was taken last July.

## Forages as a tool to rescue saline and erodible soils

BY: NADIA MORI, PAG,  
REGIONAL FORAGE SPECIALIST  
SASKATCHEWAN MINISTRY  
OF AGRICULTURE

can be established, alfalfa is a great legume to include in forage mixtures for saline areas.

Perennial forages are overall great soil builders. The extensive root systems of forage grasses can access nutrients deep in the soil layers beyond the reach of annual crops.

As roots die and are replaced, they leave behind fine soil channels which increase soil aeration and water infiltration, essentially giving the soil a sponge-like absorptive quality. The year-round vegetative cover provided by forages holds the soil in place, captures snow and slows spring runoff. Any soil at risk of erosion can benefit from perennial forage cover.

The Farm Stewardship program, funded under the federal-provincial territorial Growing Forward 2 initiative, helps producers protect high-risk erodible and saline soils through the establishment of perennial forages. This Best Manage-

ment Practice (BMP) is offered as a rebate, meaning that, after the forage establishment work has been completed, cost-share funding is provided to qualifying applicants. Because certain restrictions apply, it is best to discuss the project with a Regional Forage Specialist prior to purchasing any forage seed.

Forage seed should be ordered early, as certain forage varieties can sell out. If you plan on taking advantage of this BMP funding, 2017 is the year to do so.

Rebate applications have to be submitted by January 31, 2018, which only leaves the 2017 growing season to get those seeds in the ground.

For more information, please contact:

- Your Regional Forage Specialist,
- Agriculture Knowledge Centre at 1-866-457-2377 or
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# A trip into the unknown

BY GLENN CHEATER  
 Ever since the invention of the microscope, we've known they're out there—congregating in the millions and billions on (or in) just about anything on the planet, including us.  
 But despite intense scrutiny, microbes—bacteria, fungi, viruses, and their fellow microscopic critters—remain one of science's great mysteries.  
 Take, for example, the simple task of eating. We know microbes in our digestive tracts break down food into nutrients that our bodies can use. But even the most basic questions—How many participate in that everyday act? Which does what?—are, as yet, largely unanswerable.  
 "Life is way more complicated than we give it credit for," says Matthew Links, who became an assistant professor of animal science at the University of Saskatchewan in November. "There are a lot of bugs. Some estimate there are 10 times more micro-

bial cells in or on you than constitute you. People joke about whether you are the entity or whether microbes are the entity and you're their slave."  
 Regardless, we need each other. While there are certainly a lot of bad bacteria, fungi, and viruses, there are many good ones, too. Some play a role in making us healthy by, for example, boosting our immune system or combating pathogens. But before we can figure out which ones do what and how, we need to get a handle on how many.  
 "Most of the microbes we know are the ones we can grow on petri dishes," says Links. "But when you think about the number of possible conditions that exist on our body or in a stomach or in a rumen, there is huge diversity. And we're blind in even being able to know who is there."  
 It's a challenge that requires a new breed of scientist—and that's exactly what Links is.

The 39-year-old developed his twin-track passion for computer programming and life sciences (specifically genomics) in his teens and is now an expert in bioinformatics (a mash-up that also includes statistics, mathematics, and engineering). Those skills have been increasingly in demand since the sequencing of the human genome in 2002 ("Our equivalent of the moon landing"), but his hybrid science is still something quite new and different.  
 "The department is really being visionary in saying, 'We need to go in this direction, even though we don't entirely know yet where it's going to lead us,'" he says.  
 And it truly will be a trip into the unknown. Scientists like Links are exploring collections of hundreds or thousands of different microbes called microbiomes. Their populations and interactions are in constant flux, and even the number of species is a big question mark because of the petri dish problem—if you can't culture a species in the lab, how do you study it?  
 Well, you can track it by using DNA biomarkers, which act as a sort of genetic radio collar.  
 "So even if we don't know what to call it yet, we can track its abundance and we can see if the population goes up or down when we do something to the system," says Links. "Is it susceptible to this antibiotic? Does it get knocked back or does that knock down its enemy and increase its abundance?"  
 But once you've tagged all these different types



Matthew Links, associate professor of animal science at the University of Saskatchewan

of microbes, how do you make sense of what they're doing?  
 "My work is different because instead of studying one organism at a time, it's focused on what organisms matter most. We're really letting the data speak first."  
 In some ways, that's the opposite of a traditional investigation.  
 "We don't want to come to an experiment with a pre-conceived notion of what bugs are bad and which ones are good, but rather let the data tell us which ones are behaving badly," says Links. "Instead of saying, 'I'm going to go and only test if this is a probiotic,' we've realized there's a much more fluid nature to these microbes. They do lots of

things—some of which are good for us and some of which could be bad for us if they're in the wrong place."  
 It's a sensible enough view, until you think how much data there is. Although most genomes of bacteria consist of a single chromosome, each one has several million base pairs governing many, many different biological functions. And again, there are huge numbers in every microbiome.  
 It's an unimaginably complex task but one with great promise.  
 The ability to identify microbes that help animals grow faster or shake off bugs that sicken their herd mates would be a game-changer. 'Metagenomics' may be our best bet in that search, but probing big data requires big teams of

researchers. Links is also at the forefront of that effort. He's led the development of a software program that "brings the concept of FaceTime to the analysis of data" and allows anyone with an interest in the field to participate in group collaboration.  
 "It's always seemed normal to me to have a computer geek, a math nerd, a plant breeder, a statistician, and even an English major all in the same room just talking and collaborating," he says. "This program recreates that using technology, so you can have all types of people in the same virtual room."  
 It's a new type of science and a new way of working together. But it may finally allow researchers to answer some very old questions about the fundamentals of life.

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## Not the lesser of two weevils

BY WENDY SCHATZ LEEDS, P.A.G., CCA  
LEAD AGRONOMIST, SHARPS SOIL SERVICES  
This coming summer you might want to dust off the insect sweep net buried in the back of your shop. According to Saskatchewan Agriculture and Food forecast map, Cabbage Seed Pod Weevils are creeping closer to our geography.

Like many of the pests that bug us, the Cabbage Seed Pod weevil was introduced from Europe 70 years ago. It lived happily on the west coast until 1995 when it was discovered in Southern Alberta. I was fortunate/unfortunate enough to be a crop specialist there at the heat of its infestation. Since this time the weevil has been spreading in its geography both in Alberta and Southern Saskatchewan.

Adult weevils are an ash grey color about 3-4 mm long. They have a prominent curved snout indicative to the weevil family. They also have the weevil characteristic of "playing dead" when disturbed. The Cabbage Seed Pod weevil host plants are Brassica species - plants that belong to the mustard family.

Adults overwinter under soil surface and emerge when soil temps reach 15°C. When they emerge, they will seek out flowering Brassica weeds and volunteer canola. Movement to the canola crop oc-

curring in June at bud to early flowering stage. Adults mate and females lay eggs in developing pods. Larvae develop over 6 weeks and during this time consume five to six canola seeds. Mature larvae exit out and pupate in the ground, emerging as new generation adults 14 days later. Majority of the damage occurs from larvae in the seed pod but adults also can blast flowers. Larvae exiting seed pods leave a hole in the pod. These holes can provide an entry point for fungal infections and make the pod prone to shattering at harvest time.

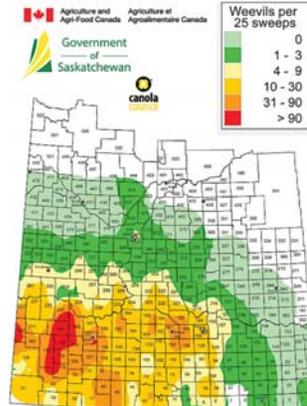
Your dusty sweep net is the key to determining threshold of the weevil. Chemical control is recommended when three-four adults are collected per one sweep at 10-20 percent flowering. This number is an average of 10 sites across the field where 10 - 180 degree sweeps have been counted.

Options for control can be chemical and cultural - for instance trap cropping around field edges. There is also a small effect from predation from five families of Hymenoptera (wasp) species. Environment can also play a factor in Cabbage Seed Pod weevil survival. Cold winter soil temperatures do not support survival. Survival will decrease from 5°C to -5°C with insect death at -7°C soil temps.

If you have a concern you may have collected a Cabbage Seed Pod Weevil, stop in and we will help you with a solution. Happy sweeping!



## Cabbage Seedpod Weevil 2016 Survey



## Prevent the buildup of herbicide resistant weeds

BY LYNDON HICKS,  
REGIONAL CROP SPECIALIST, YORKTON  
The 2017 planting season will soon be upon us. Producers are making final decisions about the types of crops to be grown this year. Although spraying season is a little further away, this is also a good time to think about the weed control measures that can be used to prevent the buildup of herbicide resistant weeds.

For some time now producers have been aware of the potential for weeds to develop resistance to specific herbicide groups/modes of action. The first documented cases in western Canada were wild oat and green foxtail that exhibited resistance to Group 1 herbicides. More recently we have seen the development of many resistant weeds to other herbicide groups such as wild oat, kochia and wild mustard with Group 2 Resistance develops as a result of repeated use of the same herbicide groups over extended periods. There may only be one plant in the initial population that has resistance. This plant will increase with repeated use of herbicides of the same group and after several years show up as a small patch of plants that were not controlled by herbicide application. By the time it is visible as a patch in the field, it could be a little as three years before the whole field is infested.

It is important to recognize that, of all the herbicides available, there are only 30 groups or modes of action and only 18 of these are available in Saskatchewan (many are used on crops we don't grow here). As well, roughly 8 of these modes of action dominate the majority of applications made by Saskatchewan crop producers. Breakthroughs with new modes of action have been few and far between in recent decades due to the lack of additional metabolic pathways that can be interrupted in a plant to result in its death. Because of this, producers have few options other than to deal with herbicide resistance through preventative practices. There are a number of practices that can be used to prevent the development of resistant populations. For example: increasing crop diversity by rotating 3 or more types of crops (such as cereals, oilseeds and pulses) will reduce the risk of developing herbicide resistance over less diversified rotations. As well, tank mixes of different groups for control of the same weeds can reduce herbicide resistance risks. While rotation through various modes of action or groups of herbicides has been promoted as a way to slow resistance from developing, recent research has found that resistance evolution will continue under rotation strategies, just at a much slower pace. If you suspect that you have some weeds that are resistant you should ensure that you prevent those plants from setting seed by either herbicide or mechanical means. Mark these patches since weed seed dormancy will mean that they will be back in the future. You may also wish to collect some seeds from those areas and have them tested to confirm your suspicions.



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# Discovering manure's massive potential

BY HENRYTYE GLAZEBROOK

Schoenau looks beyond manure as a mere byproduct of raising livestock. Instead, he sees it having massive potential in everything from nutrient recovery through its use as a fertilizer to a prospective new path toward a more sustainable industry as a whole.

"Rather than a waste, in fact it's a resource—another valuable output from the livestock operation. From the standpoint of growers, they have another source of nutrients and organic matter that they can use in land application," he says.

Schoenau is a professor of soil fertility with the University of Saskatchewan College of Agriculture and Bioresources as well as the Saskatchewan Ministry of Agriculture's Strategic Research Chair in Soil Nutrient Management. He explores a wide variety of subjects in his work, including soil fertility and fertilizer management, soil conservation, cropping systems, nutrient cycling, soil-herbicide interactions—and, yes, how manure affects these areas and more.

These days, he's anticipating the creation of the Livestock and Forage Centre of Excellence (LFCE)—a research complex that will bring together all aspects of livestock research—and the changes it will make possible in his own work.

Despite being among the leaders in Canadian cattle production, Saskatchewan imports and applies much of the nutrient used in its crop production as commercial inorganic fertilizers. One challenge is the lack of sufficient quantities of manure produced and its low content of nutrient, which limits the ability to economically move it long distances and apply it.

Since much of the work being done with livestock extends throughout the province Schoenau says an in-



creased focus on livestock research, such as what a large operation like the LFCE will make a reality, could create better opportunities for the creation and development of effective manure utilization strategies in our own backyard.

"I guess you might say here [in Saskatchewan] we're probably in a little bit of a manure deficit in the sense that we certainly have livestock here but a lot of those livestock are spread out over a large area in cow-calf operations," he says.

"If you talk about establishing confined feeding systems like feedlots, certainly then you've got that nutrient that's contained in the feed basically staying at home here in Saskatchewan because it's being fed to the cattle. Ultimately, a lot of it ends up coming out the other end in

the manure that can be recycled and put to work as a soil amendment, but there are still some challenges to be overcome in its handling, application and use."

The LFCE will provide a concentrated hub of research that might help to fill the void of manure in the province.

"It's a location that provides manure, you might say. It's also got infrastructure there in terms of manure application equipment, monitoring instrumentation, and the land area. It really provides the basis as a site, a location and an area to do manure management research close to Saskatoon."

It's also a chance for Schoenau and his team to conduct some unique research. For example, the site chosen for the LFCE's feedlot research facility is land to which little or no manure has ever been applied.

"It's an opportunity to take a look at the impact of different manure management application strategies and that includes different approaches to processing and application of manure," he says.

Bringing several operations together under one umbrella has the added benefit of creating a more condensed network of researchers and facilities, geographically speaking. For Schoenau, this means greater opportunity for future agricultural leaders in his own field and beyond to gain more hands-on experience during their education.

"Having that facility that close to the university really offers the opportunities to take students ... out into the field very easily and give them a first-hand look at best manure management practices—how you would sample manure, how you sample manured soils, how to apply it, the impact on soils and crops," he says.

"I think it really will add a dimension to the experiential learning that we emphasize very much in the College of Agriculture and Bioresources."

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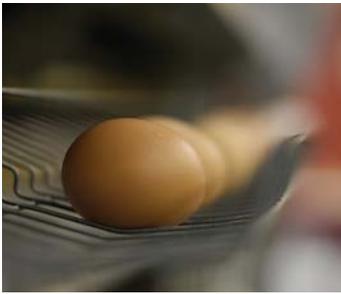
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## U of S research boosts omega-3 in eggs with new ingredient for laying hen diets in Canada

Funded by the Saskatchewan Ministry of Agriculture's Agriculture Development Fund (ADF), this multi-year project was co-ordinated by the U of S Canadian Feed Research Centre to perform the required feeding trials to gain approval of camelina meal for broilers and laying hens.



by CFIA," said Sean Thompson, feed industry liaison with the Canadian Feed Research Centre. "This approval requires data from several feeding experiments in order to prove that the ingredient provides a benefit to the intended species whilst maintaining both animal and human safety."

"Previous studies have shown a high omega-3 content in eggs from laying hens fed camelina meal," said Rex Newkirk, associate professor in the Department of Animal and Poultry Science at the U of S. "This benefit may provide additional incentive for laying hen producers to feed camelina meal now that it is an available feed ingredient."

Camelina is a drought tolerant oilseed belonging to the Brassica family and is closely related to mustard, canola and rapeseed. The oil extracted from camelina has shown value as a human food product, biofuel and other bio-based industrial products. However, until recently there had been no market for the byproduct produced during oil processing. The Canadian Food Inspection Agency (CFIA) approval of camelina meal in broiler and now laying hen diets helps to address this issue.

"Before new feed ingredients can enter the market they must be approved for use

The laying hen aspect of the project was conducted by researchers at the University of Alberta's Poultry Research and Technology Centre between 2012 and 2014. After a lengthy assessment of safety and performance data, the CFIA recently granted approval for use up to 10 per cent in layer diets.

This concludes the overall project where CFIA approval was previously granted in December of 2014 for broilers up to 12 per cent through experiments completed at the University of Saskatchewan's Poultry Research Centre.

"The recent approval of camelina meal for laying hens adds another market for camelina co-products in the feed industry," said Thompson.

Ongoing feeding studies with camelina meal are also being conducted at the Rayner Dairy Research and Teaching Facility at the U of S to gather data for dairy cow approval, and is a collaborative project with Smart Earth Seeds and Soy 20/20.

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# Canadian Grain Commission seeks input on proposed user fee updates and use of surplus funds

The Canadian Grain Commission has launched a consultation on proposed changes to its user fees and began a discussion about potential uses of surplus funds.

Grain producers, farm groups, licensed grain companies and industry associations are invited to provide their input on proposed changes to Canadian Grain Commission user fees and service standards.

The Canadian Grain Commission is proposing to reduce user fees for most of its services. The consultation closes on May 1, 2017.

The updated fees would take effect on April 1, 2018 after the current five-year user fee review cycle ends on March 31, 2018. Following the consultation period, the Canadian Grain Commission will consider stakeholder input and make a formal proposal through the Canada

Gazette process.

The Canadian Grain Commission is also asking for input on potential uses for surplus funds. As a result of higher than expected grain volumes and lower than expected spending, the Canadian Grain Commission reported an accumulated surplus of \$95.9 million in the 2015 to 2016 fiscal year. As of September 30, 2016, the Canadian Grain Commission has accumulated a surplus of \$107.2 million.

The discussion period also ends on May 1, 2017. Comments received will be reviewed before options for use of the available surplus are presented to the Minister of Agriculture and Agri-Food.

**Quick facts**

Updating user fees is a regulatory process that requires the approval of the Governor in Council

A proposed new formula-based fee structure will better align revenues with the costs of providing Canadian Grain Commission services

The Canadian Grain Commission must retain a surplus of approximately \$36 million (representing approximately six months of operating costs) to address variabilities in revenues and employee severance obligations

The surplus may only be spent on programs and activities that are related to services that the Canadian Grain Commission is authorized to provide under the Canada Grain Act

The Canadian Grain Commission needs approval from the Treasury Board of Canada to spend the surplus

**Canadian Grain Commission**  
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# Sask looks at changes to extension services

Saskatchewan Agriculture Minister Lyle Stewart is inviting farmers, ranchers and agribusinesses to provide input on how the province currently delivers agriculture extension services.

Agriculture extension services include the business information, advice and support provided by specialists in regional offices around the province and at extension events, the toll-free Agriculture Knowledge Centre phone line, and a variety of print and electronic publications.

"Agriculture is the foundation of our province and we want to make sure we are providing the right services, in the right locations, using the best delivery options available," Stewart said.

"We are asking producers and industry how we can better serve them and how we can ensure our



Saskatchewan Ag Minister Lyle Stewart

extension activities remain relevant and valuable."

An online survey will help identify the current and future needs of farm-

ers and ranchers and the most effective way to deliver services.

Focus group discussions will also be hosted around

the province to help identify what is working and possible gaps producers may be finding.

"The agriculture industry is forever evolving and our extension activities need to be driving sustainable growth and ensuring our producers stay competitive in a global market," Stewart said.

"Through our consultations, we need the voice of

those who access our services currently, as well as those who don't, to ensure we move our extension activities in the right direction."

Information collected during the consultation process will help determine how extension services should be delivered by the Ministry of Agriculture.

The new delivery model

is expected to be in place when the next federal-provincial-territorial agriculture policy framework starts in April 2018.

The online survey can be found at [www.saskatchewan.ca/public-consultations](http://www.saskatchewan.ca/public-consultations) and will be open until March 31, 2017. A report will be shared publicly following the conclusion of the survey and focus group discussions.

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## Deadlines coming up for Manitoba ag programs

Manitoba Agriculture reminds producers of the March 31 deadline for forage insurance, other Agrilnsurance programs and the Farmland School Tax Rebate.

Forage insurance is part of a comprehensive suite of business risk management products provided through Agrilnsurance and administered by the Manitoba Agricultural Services Corporation (MASC).

Producers can choose between basic hay and select hay insurance depending on what works best for their farm. Basic hay insurance provides lower-cost, whole-farm coverage that protects producers from a production shortfall. Select hay insurance provides more comprehensive and individualized protection, with no offsetting between hay types, and production and quality losses are covered for alfalfa, alfalfa grass mixtures, tame grasses, sweet clover and coarse hay.

Producers participating in either program are also automatically eligible for a forage restoration benefit (\$80 per acre), which provides compensation when insured hay or forage seed crops are damaged by excess moisture or flooding

and need to be re-established. Insured hay acres are also eligible for the hay disaster benefit, which helps offset increased hay prices and transportation costs if there is a severe provinciewide forage shortage. Several other forage-related insurance options are available to meet the needs of producers.

Agrilnsurance is the first line of defence when it comes to managing risk due to unpredictable perils such as excess moisture or flooding, protecting more than 70 crops grown by Manitoba producers. March 31 is also the last day to apply for Agrilnsurance, or to change coverage levels and crop selections.

Producers must also submit their applications for the Farmland School Tax Rebate to MASC by March 31. Eligible landowners can receive an 80 per cent rebate, up to a maximum of \$5,000, on education taxes paid on farmland in 2016.

Producers should contact their local MASC office or visit [www.masc.mb.ca](http://www.masc.mb.ca) for more information about Agrilnsurance including forage insurance and the Farmland School Tax Rebate. Applications must be received by MASC by the March 31 deadline.

Agrilnsurance programs are supported through Growing Forward 2, a five-year federal-provincial-territorial policy framework.

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# Temple Grandin to speak at 4-H Centennial Gala

Temple Grandin to speak at 4-H Saskatchewan Centennial Gala

Saskatoon, Sask.- 4-H Saskatchewan is excited to be celebrating 100 years with a Centennial Gala on March 25, 2017 in Saskatoon.

"We've themed our Gala 'Back to Our Roots' to recognize 4-H's historic connection to rural communities and agriculture, since its creation in 1917," said Cera

Youngson, executive director of 4-H Saskatchewan.

During this exciting milestone celebration, there will be plenty of entertainment, including special guest speaker Temple Grandin, a renowned autism spokesperson, consultant to the livestock industry on animal behaviour and a distinguished 4-H alumni.

She will present "An Evening With Temple Grandin," which will detail her own involvement with the



4-H program, as well as share her thoughts on how the agriculture industry can improve how it is perceived, and on the importance of young people connecting to the world of agriculture.

"We are so excited to have Temple Grandin present," Youngson said. "She is among the most distinguished 4-H alumni in the world and can share how the program impacted her own youth."

In addition to the supper program and special guest speaker, there will be a walkthrough history display, two special draws and a live auction.

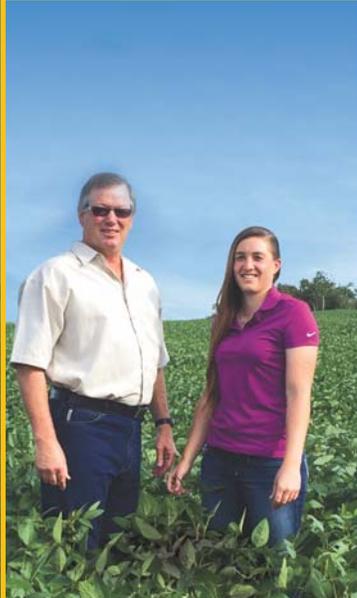
"We will be showcasing information and historical items in our special 'Walk-through History' display area," Youngson said. "We're pleased to have more than 300 past and present 4-H members and leaders join us for the celebration."

This year is a milestone for 4-H Saskatchewan, marking a century of providing youth opportunities.

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"In the past century, thousands of young Saskatchewan members have taken the 4-H pledge to put their head, heart, hands, and health to work for the betterment of their club, community, and country," Youngson said.

"Mr. John Rayner's simple vision that started 4-H has endured the test of time, making 4-H one of our Saskatchewan's most recognized and valued youth programs where nearly 3,000 members continue to Learn To Do By Doing, today."



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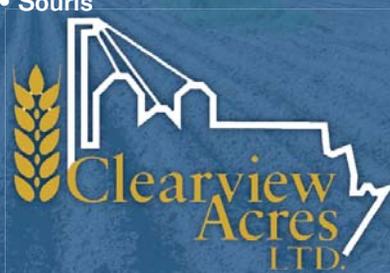
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# Family business has produced drive thru gates for 30 years

A family business in Broadview has been serving the farming community for more than three decades.

Ecklund Drive Thru Gates produces electrified gates that allow vehicles to pass through and then close on a spring, while keeping livestock in through an electric charge.

In November, the Ecklund family was presented with the 30-year Agribition Exhibitor Award at the Saskatchewan Legislative

Building.

Gary Ecklund says the idea came to him when he returned to the ranch in the 1980s.

"You have got to go through gates to feed the cattle, and that requires someone standing there opening and closing the gates for you, or you would be the guy opening and closing gates for somebody else," he says. "I didn't find much appealing in that so I thought I might as well try something. It came togeth-

er in a matter of days. The idea is a gate that swings open when a vehicle hits it, and swings closed again. Where the vehicle hits is rubber, so it won't hurt the paint job, but it carries a current, so it keeps the livestock in.

"The main patent is the pressure release that pumps the gate open.

"I used it at the ranch for a couple of years and then took it to the Farm Progress Show.

"At that time if you had a new product they allowed you to come in without a fancy booth or anything, they gave you free booth space in the new inventions area. Then the old boys would come around at that time and they took their job as critiquing you if you were willing to listen to them. I listened to the guys and that gave me good experience talking to people. If I had a dime from every person who said that was a good idea I would have made some money."

Then he hit the road. "I putted around in my 4x4 selling gates farm to farm. I ended up going on a tour that went across the Prairies right from south of Winnipeg, the edge of the bush line all the way to Waterton Park in southern Alberta up into the Peace River country, and back

until I ended up in the Interlake area in Manitoba.

"I was selling farm to farm. Guys were looking for good quality fences and the gates came around at the right time to match with electric fencing.

"I would be going farm to farm until the news would start at night. Lots of times the guys would say 'you can't drive all the way back to town, stay here eat supper. I stayed with lots of great people and stayed at some crazy \$12 hotels."

He said making the effort to meet with farmers one-on-one paid off for him, but wasn't always easy.

"It takes a lot of guts driving into someone's yard rather than driving past," he said.

"It was a lot of fun and it was always interesting. I don't think you could do it today. I don't think people are around enough. Even back in those days it was hit and miss, but that was before cell phones of course.

"I did that for two years and then after that I started

selling at Agribition which why this last year was 30 years at Agribition.

"I made some improvements in the gate to make it more than just a feedlot gate. I developed the electric rubber which made it soft so you could bump it using different types of vehicles and I figured out how to make electric fibre glass that can carry a current.

"What I have got is a single bar that is adjustable in length because people have different sizes of gates. It will go from 10-17 feet—a bit bigger than a corral panel. You can ease up to the gate, just touch it with the front of your truck, with your tractor tires, or with your wind screen on a small vehicle and push forward and the gate will pop back out of the way. You continue through and the gate will pop open to about 100-130 degrees. You drive through and it doesn't need to touch the side of the vehicle. There's very little spring pressure—about 20 per cent—and it's

too long to fall between the tractor and the box, which is where short gates would get into trouble.

"It's a simple design. When people see it they understand it."

Over the years, about 30,000 of the gates have been sold across Canada, and to Japan, Sweden, Australia, Argentina, Chile, Uruguay, U.K., New Zealand, Ireland, Scotland, Holland, Saudia Arabia, and the U.S.

Ecklund believes his drive thru gates were the right idea at the right time.

"The way I put it is, it's not that the good Lord won't talk to you, but you've got to be paying attention when he does," says Ecklund.

"Inventing is the easy part. The marketing part is the tricky part. That's what makes the difference."

Ecklund says he has enjoyed meeting lots of farmers over the years through his gate business and has enjoyed giving many young people their first job assembling the gates.



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# The grass can be greener

BY GLENN CHEATER

Breeding better forages is Bruce Coulman's passion and the veteran U of S scientist knows the vital role they play in healthy ecosystems and feeding the world. Following is an interview with Coulman

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Our natural grasslands here were once grazed by vast herds of bison and evolved under grazing. You can overgraze, but well-managed grazing is actually beneficial to the ecosystem.

**New forage cultivars play a role in that and you have developed more than 20 new cultivars. Please talk about one.**

One is hybrid brome grass, created from two brome species. Smooth brome is a good hay species, producing most of its growth in spring and early summer. Meadow brome doesn't have the high productivity of smooth brome early in the season but regrows well. They're fairly closely related, so can be crossed, but it took many years of selection to produce productive hybrids. The first crosses were actually made in the late 1970s. In 2000 we released the first dual-purpose variety of hybrid brome and then a second one in 2003, and these have been very popular with producers. They can take a first cut of hay and then later graze those fields.

The gains from new forage varieties are often quite small, but a perennial forage crop lasts many years. If a new variety gives a 5 per cent productivity increase, you get that 5 percent increase every year. So over time, the gains become quite significant.

**Grasslands cover about 25 per cent of the land on the planet and 70 per cent of agricultural land. You've come to know one grassland on the other side of the globe very well, haven't you?**

I started teaching forage crop production at the Inner Mongolia Agriculture University in 2002. Since then I've been there every year but one. Inner Mongolia is about the size of Saskatchewan and Alberta put together, and about 70 per cent is grasslands.

The number of livestock—cattle, sheep, cashmere goats—has increased greatly over the past 25 years. This has led to some serious overgrazing and degradation and erosion, even to the point of desertification. This is a big issue because in



Beijing, which isn't that far away, dust storms in the spring are fairly common.

All this has led to restricted spring grazing on some land, and other areas have been closed off and the herders resettled. This is no small deal. Not only do you ruin the livelihoods of many small herders, but you have serious ecological consequences from not managing grazing lands properly. Part of the response has been to plant billions and billions of trees, but in the drier areas there never were trees, so there's concern the water table may be drawn down and this effort may fail.

However, there's also been an effort to manage the resource better through things like fencing off land and implementing rotational grazing. Producers are being encouraged to produce hay, partly by using high-yielding species. Hay is important as a feed source in the winter, but especially in the spring when native grasses are just starting to grow and can be really damaged if you graze them then.

**Does this play into a larger issue, namely feeding a global population heading towards nine billion people?**

Yes. China has a growing economy and greater affluence, and that means there's more demand for meat and milk. This demand is going to increase in China and elsewhere, but there is not going to be any great increase in land for agriculture of any sort. So to meet the demand for animal products, we have to get more productivity from agricultural land, and that includes improving the quantity and quality of feed.

**Food security is the goal of another project in Ethiopia you are involved with.**

The collaboration with Hawassa University started in 1997, funded by a series of International Development Research Centre (and other federal government) grants. Initially, it was about capacity building by creating graduate programs, but about 10 years ago the focus shifted, specifically to pulse production.

Southern Ethiopia has a rainy season in spring, summer, and fall, and then a dry season in late fall and winter. The main crops are wheat, corn and a cereal called teff, and after harvest the land is left idle until the next spring. But chickpeas can grow on the residual moisture after the main crop is harvested—and because it is a legume, it adds nitrogen to the soil.

As well, including pulses in people's diets helps prevent the malnutrition and stunting in children we see in that region. So there have been programs to educate Ethiopians on how to cook and use chickpeas and other pulses, and promote their use.

Now we're trying to scale this up, with the goal of getting 70,000 farmers to grow pulses. I've previously been involved on the scientific advisory board of this project, but my new role is more focused on project management.

**So you are involved in food security efforts both on the crops and forage side. Do you think people appreciate the importance of the latter, particularly when it comes to forage breeding?**

The simple answer is no, and this is precisely why we've seen budgets for forage breeding slashed over the years, not just in Canada but elsewhere. We have about 15 forage researchers in Canada now—about 30 per cent of what we had in the 1980s. I quite expected that when I retired, I wouldn't be replaced with another forage breeder.

But in recent years, we've seen more funding. The Beef Cattle Research Council has increased its funding for forage research and so has Saskatchewan's Agriculture Development Fund. And in May 2014, the university hired Bill Billiget as a forage breeder. So I'll be turning the program over to him.

**Can forage breeding make a difference in the lives of people?**

In an indirect way, yes. Improving the productivity and quality of forage through breeding will lead to more livestock production. This will increase the availability of nutritious meat and milk for the world's population.

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## Canadian scientists contribute to effort to sequence the canola genome

Agriculture and Agri-Food Canada (AAFC) researcher from Saskatoon, Dr. Isobel Parkin, is part of an international team that has deciphered the complex genome of *Brassica napus*, extensively cultivated as 'canola' in Canada. Dr. Boulos Chalhouh, from the National Institute for Agricultural Research (INRA) in France, led a team of scientists from 30 research institutes from all regions where the crop is produced, including National Research Council Canada (NRC).

According to Dr. Chalhouh, "Canada's contribution was an essential component of the research, assisting with the complicated task of assembling the canola genome and providing access to the genome for one of the ancestral parental species."

In the process, the team gained ground-breaking knowledge about the origins of crop species that will help accelerate on-going breeding efforts in the crop - "contributing to sustainable increases in oilseed crop production to meet growing demands for both edible and biofuel oils." Footnote 1 The results are published in the prestigious journal Science (August 22 issue, 2014).

Canola, one of the most recent plant species, has a unique origin. The first *Brassica napus* plants originated just a few thousand years ago from unintentional crosses between European cabbages and Asian turnips. Because all flowering plants originated from such events (but in

most cases millions of years ago) the canola genome provides unique insight into the early formation of new species in plants.

Unlike many other plants, canola has retained almost all of the genes of its two parental species, probably due to breeding efforts. These multiple gene copies provide novel material for further adaptation of the crop.

With around 101,000 genes, it contains one of the highest gene densities of any sequenced organism—in comparison, humans have less than 30,000 genes.

Canola, with its bright yellow flowers, is a familiar sight on the Canadian Prairies; grown on over 20 million acres in 2014, it represents a significant contribution to the agricultural economy. According to the Canola Council of Canada, the "Canadian-grown canola contributes \$19.3 billion to the Canadian economy each year, including more than 249,000 Canadian jobs and \$12.5 billion in wages."

This is not by accident: researchers in Saskatoon have a long history of working with the crop. In fact, the species most commonly grown today, and whose healthy oil is found on the shelves of every supermarket, was developed through collaboration between scientists at AAFC, NRC and the University of Manitoba in the 1970s. Today, canola is the most important oilseed crop in not only Canada, but also in Europe, Asia and Australia.

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# Agricultural biotechnology crucial for feeding world population



Murray McLaughlin

It took until 1800 for the world population to reach one billion people. The second billion was reached in only 130 years (1930), the third billion in less than 30 years (1959), the fourth billion in 15 years (1974) and the fifth billion in only 13 years (1987).

During the 20th century alone, the global population grew from 1.6 billion to over six billion people.

In 1970, there were roughly half as many people in the world as there are today.

In The Population Bomb (1968), Paul Ehrlich writes: "The world, especially the developing world, is rapidly running out of food ... in fact the battle to feed humanity is already lost in the sense that we will not be able to prevent large-scale famine in the next decade or so."

How was this global starvation catastrophe averted?

One element high on the list is innovation. Crop production science and innovation led to new technologies that produce more per acre and more per crop inputs.

Dr. Norman Borlaug was an American agronomist known as "the father of the Green Revolution." Borlaug developed new varieties of wheat that were planted around the world and had tremendous yield responses. His approach was adopted by other scientists to improve other crops. He was awarded the Nobel Peace Prize in 1970 for his contributions to world peace through increasing food supply. Borlaug is often credited with saving over a billion people from starvation.

With new technologies based on Borlaug's research, the successes continue. Biotechnology is a new set of tools that enhance crop breeding for new plant traits. Products from biotechnology have shown tremendous improvement since first pro-

vided to farmers in 1995. Biotech-bred crops allow farmers to reduce pesticide use, and improve quality and yields with reduced input costs. Biotech-enhanced crops are now grown by 18 million farmers, most of them in developing countries.

In Canada, corn, soybeans and canola are grown using biotechnology (often referred to as genetically-modified organisms or GMOs). All are designed to reduce pesticide use while improving yields. In 1940, corn varieties yielded 25 to 40 bushels per acre. Now, with hybrids and biotechnology, yields are typically 150 to 200 bushels per acre.

GMOs have helped Canadian farmers manage production costs, increase yields and provide safe, nutritious food to the world's consumers. There is tremendous experience and knowledge about the safety and benefits of GMO crops, based on years of development, testing and production.

The predictions of major hazards, by critics of GMO, have not materialized. GMO crops have played a vital role in improving world agricultural food production per capita. And this will be an ongoing need as the world's population heads to 10 billion people later this century.

Biotechnology in agriculture production should be embraced the same way we have embraced innovation in medicine, transportation, communication and any number of other sectors. Biotechnology will continue to help reduce global poverty.

We need more people like Borlaug. Through research, science and innovation, he helped ensure we have the necessary tools for a healthy future. Biotechnology will be an important part of that future.

*Dr. Murray McLaughlin is an adviser to and former executive director of Bioindustrial Innovation Canada, based in Sarnia, Ont., and a former Saskatchewan deputy minister of agriculture.*

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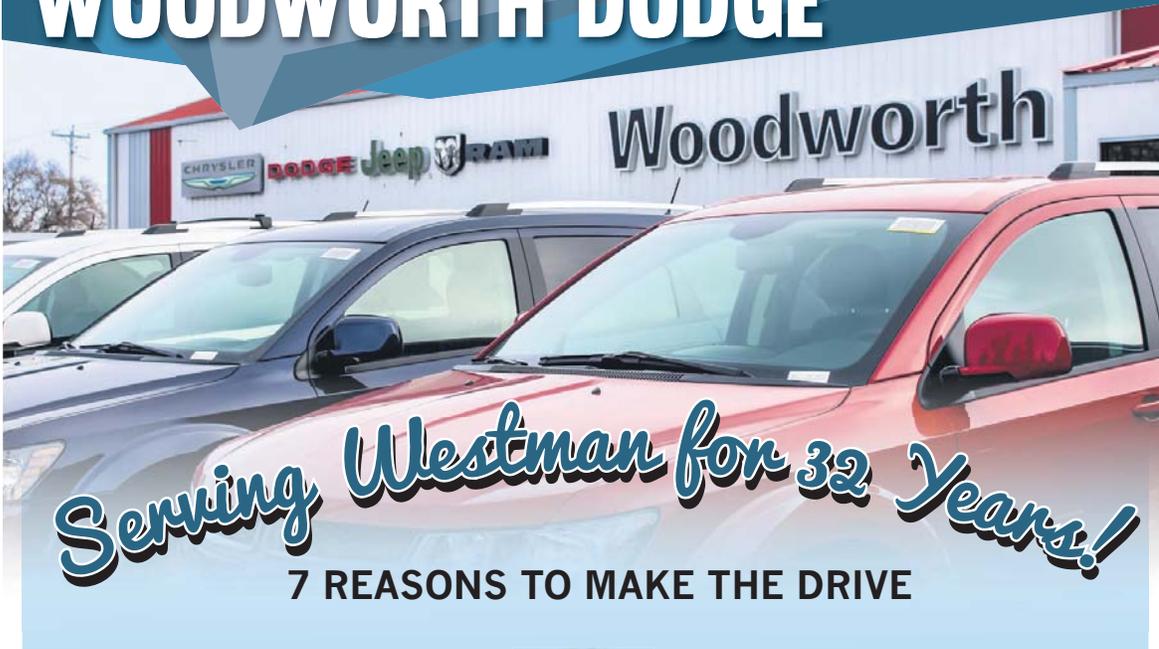
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Nathan Muchowski of Odessa got third in the agBot Challenge with this robotic seeder.



# Prototype seeder is a robot

BY CHRISTALEE FROESE  
Engineer Nathan Muchowski expects robots to be seeding for farmers within the next five years.

In order to test his theory, he built a prototype that won third place in the 2016 agBOT Challenge in Rockville, Indiana.

The idea for an unmanned seeder had been on the 26-year-old's mind for several years, so when he saw a Twitter message for the agBOT Challenge, he jumped into action.

"This was a way to test my idea and to make a seeder exactly the way I wanted to do it," said Muchowski.

The U of R graduate grew up on a grain farm in Odessa, Sask. where he was always drawn to the mechanical side of the operation. Upon graduating with a degree in electronics systems engineering in 2012, Muchowski took a high-tech job in Regina, however, it wasn't in the agricultural sector.

The automated seeder was a way for him to work on one of the ag-related projects he'd always been passionate about. The design stage took about 10 months with the physical construction phase consuming over 300 hours.

"I was very proud of what we had built and constructed because when you basically scrounge up parts and money the way we did, and you actually have something to show for it, it's very rewarding," said Muchowski who had his grain farming dad, Pat Muchowski, help him with the fabrication of the seeder's frame.

The agBOT seeder cost roughly \$20,000 to construct, most of which came out of Muchowski's pocket. Some ag-sector sponsors did donate parts and cash.

When the young engineer traveled to the Indiana competition in May under the banner of Muchowski Farms, the outcome was bitter-sweet as his seeder was not operational enough to be in the field-test.

"The judges told us that if we would have gotten it out there, we would have had first place because we were the only team that had answers to all of their objectives," said Muchowski.

Unlike many seeders in the competition, Muchowski's was built from scratch as he wrote the program, engineered the design and fabricated the entire seeder. The free-standing automated seeder was also fully electric, making it a zero-emissions implement.

"I just didn't write the software or do the drive

systems, but I integrated all the components together to make a working unit."

Muchowski sees unmanned seeders similar to the one he designed being in the field within the next decade. He envisions farmers using 10 to 20 of them with only one person needed in a central command centre. In the next several decades, Muchowski believes robotic seeders like his will totally revolutionize farming.

"With machine learning and the advances in arti-

ficial intelligence, there may not even need to be a farmer controlling equipment for seeding, swathing and harvest."

Despite a disappointing third-place finish in the AgBOT Challenge, Muchowski's participation in the competition delivered a reward he wasn't expecting. He had several ag-sector job offers following the competition, one of which was in Regina.

"It got me my dream job," said Muchowski, adding that the \$10,000-

USD funds for the third-place finish did help defray some of his costs.

The first-place finishing team in the AgBOT Challenge was also from Saskatchewan. University of Regina students Samuel Dietrich, Joshua Friedrick and Caleb Friedrick took home the \$50,000 cash prize for their U of R project—a seeder pulled by a remote-controlled tractor.

The fourth-year students were supervised by associate professor Dr. Mehran Mehrandehz, and worked

with the help of technologist Dean Kertai. They started with a regular tractor and made it capable of seeding while driving itself. The students designed the software which enabled the tractor to be operated remotely by a farmer. The project was done as part of the students' final year Capstone engineering project.

The second-place prize of \$30,000 was awarded to Purdue/South Newton Polytech of Indiana. Nathan Muchowski, repre-

senting Muchowski Farms, split the third-place prize of \$20,000 with PeeDee Precision Ag of South Carolina.

Muchowski said he is considering entering the 2017 AgBOT Challenge, which is again focused on seeders. However, he realizes that going solo on such a complex project is difficult.

"I learned that if you're going to take on something of this scale, you really need a large industry behind you to provide the resources."

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Students attend a farm safety demonstration. The federal and Manitoba governments announced an investment last week to help promote agriculture education for Manitoba students.

# Manitoba investing in ag education

The federal and provincial governments are investing \$25,000 to expand and create new opportunities for young people to learn about agriculture and food, Federal Agriculture Minister Lawrence MacAulay and Manitoba Agriculture Minister Ralph Eichler announced Thursday. "Agriculture is attracting the best and the brightest young people," said MacAulay. "But the sector needs many more young entrepreneurs pursuing careers in agriculture to ensure a sustainable and competitive industry for the future. Opportunities like this will help highlight the importance of farming to students, creating awareness and sparking interest to become the future leaders of the sector. Our government will continue to ensure we help our youth get the skills and support they need to drive Canadian agriculture forward for future generations."

The funding, provided through the Growing Forward 2 - Growing Actions program, will support two Agriculture in the Classroom - Manitoba (AITC-M) projects. The Made in Manitoba Breakfast program will receive \$20,000 to expand to 10 new schools in Winnipeg this year. At school events, a farmer shares his or her story with

students while serving a breakfast made from Manitoba foods. Students learn how their food is produced, the importance of farming and the agriculture industry, as well as the variety of careers available. "Agriculture has many interesting and important stories to tell," said Eichler. "It's important for Manitoba students to have the opportunity to experience and learn about this first-hand, from people who are passionate about food and farming. Manitoba is a proud supporter of AITC-M and their incredible work on behalf of the entire agriculture industry."

AITC-M will also receive \$5,000 to develop a new and interactive Edible Classroom curriculum for middle-years students. It will give them the opportunity to learn about nutrition and sustainability by growing indoor gardens and composting, with assistance provided by farmers and other agricultural leaders. "We are thrilled to start developing the Edible Classroom program where students will get to celebrate the connection between their classroom and agriculture," said Sue Clayton, AITC-M executive director. "Through

hands-on learning, students will gain knowledge about where food comes from, the agriculture industry, agriculture careers and nutrition. With knowledge come understanding, respect and inspiration, motivating youth to care about and support Canadian agriculture."

March is Canadian Agriculture Literacy Month, a national initiative encouraging students to learn about and appreciate agriculture. AITC-M reaches approximately 30,000 students and teachers every year at all grade levels with curriculum-based programs, activities and tools focused on its importance to Manitoba. To learn more about this non-profit organization and its initiatives, visit [www.aitc.mb.ca](http://www.aitc.mb.ca).

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The federal and provincial governments are investing \$176 million in Manitoba under Growing Forward 2, a five-year, federal-provincial-territorial policy framework to advance the agriculture industry.

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# U of S research shows how forest-loving moose have learned to thrive on farmland

BY JENNIFER THOMA

"Thirty years ago, seeing moose in the farmland of Saskatchewan would have been very rare but over time they have expanded to these new areas," said Ryan Brook, a wildlife biologist with the Department of Animal and Poultry Science at the U of S.

"It's unique to see populations well-established in areas with less than one per cent forest cover and dominated by crop production."

Brook, who leads the Saskatchewan Farmland Moose Project, is working with colleagues to discover how the moose are succeeding in what used to be considered highly unsuitable habitat.

The research team used a net gun fired from a helicopter to capture 40 adult cow moose and fit them with GPS satellite collars in 2013 and 2014 to track the animals' movements for four years.

The team found that the animals are taking advantage of the area's "knob and kettle" land forms, that is, rolling hills with plentiful tree-ringed sloughs and wetlands. During the heat of the summer days—"hot" for a moose being above 14 C—the animals retreat to shade and water, coming out to feed once it cools off.

The team's findings are published in the Journal of Wildlife Management. Brook explained this is the first paper ever published on farmland moose, detailing specific ways that moose select habitat. It also maps overall habitat quality in both summer and winter, which will help support management efforts.

Unfortunately for farmers, what the moose are feed-



U of S researchers tracking moose in southern Saskatchewan

ing on is often crops, particularly cereals but also oilseeds such as canola. Crop damage is becoming a concern, par-

ticularly in the south central part of Saskatchewan.

Moose are also hazardous for drivers, particularly in Saskatchewan, which has the largest municipal grid road network in Canada. The animals' long legs and high centre of gravity create a high risk of driving the main body of the animal through the windshield. Since cows can weigh up to 360 kg and bulls up to 700 kg, collisions can be catastrophic.

Brook explained that since moose have only recently started moving south, there has been little information available to guide management efforts, which makes the study vitally important.

"There has not been any previous research on farmland moose, so a first step is to understand the ecology of these animals to understand habitat selection," he said.

Brook and his colleagues hypothesize that the moose are also doing well because farmland areas have few or no large predators like wolves or bears that keep populations in check in the boreal forest.

For now, the province has instituted moose hunting seasons in the affected areas. When feasible, farmers can also protect their crops by fencing off sloughs and associated treed areas to deprive moose of their daytime refuges.

Data collection for this study has neared conclusion and more results are expected in 2016. Funding for the work was provided through the Saskatchewan Fish and Wildlife Development Fund, the Saskatchewan Ministry of Environment, the Saskatchewan Wildlife Federation, the Cyril Capling Trust at the U of S, and the Natural Sciences and Engineering Research Council of Canada.

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# Finding root solutions



Leon Kochian, one of the world's most highly cited scientific researchers, has been named the Canada Excellence Research Chair (CERC) in Food Systems and Security at the University of Saskatchewan (U of S) - a \$20-million initiative that will use cutting-edge plant and soil science to help feed a growing world.

"We are excited to recruit an individual of Leon's research pre-eminence to lead this multidisciplinary program that will drive change in agricultural technologies, practices and policies, while training young scientists in an innovative systems approach to global food security," said Karen Chad, U of S vice-president research.

"Combined with our \$37.2-million Canada First Research Excellence Fund program in food security launched in August and our world-class facilities and agri-food expertise, we are poised to provide transformative and sustainable research solutions to the world."

Kochian joins the U of S and its Global Institute for Food Security (GIFS) from Cornell University in Ithaca, New York and the U.S. Department of Agriculture. He will serve as associate director of GIFS—founded in 2012 by PotashCorp, the Government of Saskatchewan, and the U of S—and will lead the institute's research on root, soil and microbial interactions. He will also hold faculty appointments in plant sciences and soil science at the U of S College of Agriculture and Biosciences.

In announcing the \$10-million federal contribution, Canada's Minister of Public Safety and Emergency Preparedness Ralph Goodale said, "The arrival of Leon Kochian as CERC in Food Systems and Security is a coup for the U of S and for Canadian research. As we examine the social and societal implications of climate change, his work will help strengthen

Canadian agriculture - and make our economy more resilient, which will improve our collective well-being and strengthen the middle class."

The seven-year funding for the \$20-million research program comes from the federal government (\$10 million), the U of S Global Institute for Food Security (GIFS) (\$7 million), and the U of S (\$3 million).

A further \$800,000 will be contributed by the Canada Foundation for Innovation towards the cost of a \$2-million "Roots of Food Security" research facility to support the work of the CERC team in designing and breeding better crops with more efficient root systems. The remaining funding for the facility will be sought from public and private sources.

"The new crop varieties and environmentally sustainable agricultural practices and technologies that Leon and his CERC team will develop at GIFS will have a significant impact in both the developed and developing world," said Maurice Moloney, GIFS executive director and CEO.

"With Leon as a critical part of our growing GIFS team, we will work with producers and other partners around the world to promote adoption of these new crops and technologies in order to address daunting global food security challenges."

Kochian and his team aim to improve crops by unlocking the secrets of the plant's "hidden half"—the root system, an unexplored aspect of plant research and crop development.

"We will develop new root-based approaches to crop improvement that will lead to targeted breeding of superior root traits and ultimately new crop varieties with higher yields and greater capacity to thrive in the world's less fertile soils," Kochian said.

The CERC team will use the Canadian Light Source synchrotron and other revolu-

tionary root imaging tools, along with the latest computer technology, to digitize desired crop traits (phenotypes) and link them to specific genes in a searchable database. This will enable tailored design and breeding of root systems to specific agro-environments for the major crops, including wheat, barley, lentils, and canola.

"The successful recruitment of such a highly cited and influential individual to the U of S and the Global Institute for Food Security

demonstrates the strength of our province's research community," said Saskatchewan Minister of Agriculture Lyle Stewart. "Leon Kochian is a skilled, respected researcher whose work, in addition to further establishing Saskatchewan as an international leader in the biosciences, will help feed a growing global population. On behalf of the entire Government of Saskatchewan, I want to congratulate him on this prestigious appointment. We wish him all the best."



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# Canadian agriculture attracting interest and opportunities

There appears to be a growing interest in agriculture education in Canada, along with an increasing number of job opportunities in the industry, according to Statistics Canada data and a couple of independent surveys.

Statistics Canada data reveals there were a total of 12,168 students studying in agriculture or an ag-related program in 2014, which is a 2.7-percent increase from the previous year and a 16.6-percent overall increase from 2009-10.

The number of enrollments in agricultural programs grew at a rate double of all post-secondary enrollments (2.7 percent and 1.2 percent, respectively), while slowing down at about the same level as all other post-secondary programs over the past five years.

Agriculture programs are also more likely to see full-time enrollment than other programs (87 percent compared to 75 percent, respectively) and this rate has

been steady over the past five years.

A recent informal Farm Credit Canada (FCC) survey of 33 post-secondary institutions offering agriculture and ag-related programs confirms agriculture has become a popular career option, especially over the past five years as the industry has grown.

"This is a testament to the strength and appeal of Canada's agriculture industry, which is generating more interest among students than ever before," said Todd Klink, FCC's chief marketing officer, who has undertaken projects to get high schools students interested in careers in agriculture. "As the industry grows, so does the need for additional talented, energetic and well-educated young people."

The need to attract skilled and educated young people to Canada's agriculture industry is highlighted in a recent study by Canadian Agricultural Human Resource Council (CAHRC).



Agriculture 2025: How the Sector's Labour Challenges Will Shape its Future shows the gap between labour demand and the domestic workforce in agriculture has doubled from 30,000 to 59,000 in the past 10 years and projections indicate that by 2025, the Canadian agri-workforce could be short workers for 114,000 jobs. The study also reveals that primary agriculture has the highest industry job vacancy rate at seven per cent.

"The sustainability and future growth of Canada's agriculture and agri-food industry is at risk," explains Portia MacDonald-Dewhirst, CAHRC Executive Director, said in releasing this study. "It is critically

important that this risk is acknowledged and mitigated in an intentional and strategic way."

FCC is committed to helping young people enter the industry by offering various loan products for young farmers and through its long-standing support for 4-H Canada clubs and programs and Agriculture in the Classroom.

"Given that one in eight jobs in Canada are tied to the agri-food industry, there are a lot of opportunities for young people," Klink said.

"The growing interest in agriculture education shows we can be optimistic for the future of agriculture."

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