

Canada's top producer-focused swine industry publication since 1972. Covering news, commentary, events and research in five editions annually.

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Phone: 780-491-3528  
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## Publisher

Darcy Fitzgerald, Alberta Pork

## Editor

Andrew Heck  
Phone: 780-491-3527  
Email: andrew.heck@albertapork.com

## Cover Photo

'Pysanka' (Ukrainian Easter egg) monument in Vegreville, Alberta.



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# Message from the editor

The Spring 2022 edition of the Canadian Hog Journal is here!

The cover of this edition features the world's largest 'pysanka' (Ukrainian Easter egg), which is found in Vegreville, Alberta – about 100 kilometres east of Edmonton. Starting in the late 19th century, waves of immigrants from Ukraine – including many of my maternal ancestors – were lured to the Canadian prairies with the promise of abundant farmland. This monument, composed of aluminum tiles, is perhaps the best-known symbol of Ukrainians in Canada.

The situation in Ukraine remains a terrible, unsolved, worsening humanitarian crisis. Easter for most Ukrainians would have been much less festive this year. For Canadians – including me, my wife and our daughters (with another child on the way) – peaceful family gatherings are often taken for granted. I always look forward to my mom's perogies and cabbage rolls at holiday feasts, and it was no different this time around, but the tragedy unfolding overseas should help us all appreciate how fortunate we are to be free of violent conflict.

In addition to the human toll resulting from the war, livestock feed pricing and global food security are front-and-centre since fighting ramped up earlier this year. Direct market responses are not certain, but it should come as no surprise that the carnage has created a ripple effect that will harm farmers and even people in the developing world who rely on food donation programs. University of Saskatchewan research chair Stuart Smyth shares his thoughts, and Alberta Pork's Bijon Brown inspects the broader context as well, with consideration given to weather-related impacts on crops.

The 50th anniversary of the 'Alberta,' 'Western' and 'Canadian' Hog Journal has now passed. (Time flies when you are having fun or are bad at math, like some magazine editors.) While there are way too many memories to cover off with just one article, I took a look back at some of the Journal's history, which you will find here. Regrettably, two past editors, Bill Owen and Bernie Peet, were unable to provide comment. Owen is currently residing in an assisted living facility, while Peet sadly passed away last month. Their input would have been valuable and worth recognizing. My best wishes go out to Owen, and my sympathies go out to Peet's loved ones.

In Ontario, two producers are embracing the shift to virtual platforms by offering a space for producers to connect with each other, and by creating a novel communication channel to showcase a hog operation for curious members of the public. Ontario Pork provides the details.

Porcine epidemic diarrhea (PED) has been raging in parts of the country this year. Following Alberta's first-ever PED



outbreaks, in 2019, research has taken place to determine whether piglets are infective after having been exposed to contaminated manure. Learn more about the results.

Back in 2018, *E. coli* contamination led to the death of a restaurant diner in Alberta who was served under-cooked pork. New research is investigating the development of a plant-based antibody to be fed directly to pigs, to help address the problem. A newly minted Ontario-based vet, Lexie Reed, provides her summary of the work.

And a research team at the University of Manitoba, led by Argenis Rodas-Gonzalez, is exploring genetic selection for feed efficiency, as a way to improve growth performance and yield a leaner carcass. Find out how his team is accomplishing this.

What's going on in your corner of the country? Let me know by emailing [andrew.heck@albertapork.com](mailto:andrew.heck@albertapork.com) or connect with the Canadian Hog Journal on Facebook and Twitter (@Hog-Journal) to like, share and comment on our digital content. Dialogue is difficult across the print medium, but social media gives everyone a voice! ■



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# Hog Journal hits 50: a look back

Andrew Heck

The past half-century has brought massive changes to the Canadian pork industry. Changes in politics, society and technology have re-shaped the world in significant ways since 1971, but one thing remains the same in 2022: farmers' dedication to producing food for consumers, providing jobs for workers and bringing benefits to the economy.

This year, the Canadian Hog Journal celebrates 50 years of publishing coverage of the news, events, commentary, research and other topics that are relevant to farmers, packers, vets, genetics companies, nutrition suppliers, equipment manufacturers and so many people who make this industry what it is.

"When the Alberta Hog Journal first came out, it was my fifth year in the industry, making me one of 22,000 Alberta producers, according to the third edition that year. Three decades later, when I quit hog production, the number of producers had fallen to below 1,000," said Roy Barrett, a retired farmer near Ponoka, Alberta – approximately 100 kilometres south of Edmonton. "Sten Berg, who was the chair of Alberta Pork

at the time, stated in the first edition of the magazine, 'We believe that primary production belongs in the hands of farmers.' Unfortunately, hog farmers have disappeared like the bees!"

Now in our 51st year, we are constantly looking forward, but a quick trip down memory lane reveals just how closely connected – and just how far away – we are today, compared to our roots.

## Editorial excellence always in focus

The Hog Journal was first conceived as the 'Alberta' Hog Journal when Ed Schultz, Alberta Pork's former communications manager, then general manager, was hired to take the reins of an upstart publication aimed at the provincial hog industry.

Schultz was attending a meeting hosted by Bruce Jeffery, Alberta Pork's general manager at that time, who had set his sights on expanding Canadian pork access in Japan. Schultz recalls the incident fondly.

"Bruce asked, 'Can you write?' And I lied and told him, 'Yes,'" said Schultz, jokingly.

Thanks to ongoing market development efforts, the valued relationships established back then are still going strong, with Japanese buyers enthusiastic about Canadian pork to this day. The Alberta Hog Journal helped demonstrate to our foreign partners that Canadian pork was a cut above the rest, from swine research to market analysis, leading to the rapid growth of the commercial industry.

After Stirling McLeod edited the very first edition of the Alberta Hog Journal – his only edition – Schultz would take the editorial lead for the next eight years, before turning over the keys to Bill Owen, in 1979, with the re-named 'Western' Hog Journal. In that time, Schultz had assumed the general manager position with Alberta Pork, and the magazine duties had become too much. Now operating with the cooperation of producer organizations in B.C., Saskatchewan and Manitoba, the magazine's popularity and reach had blossomed, further amplifying messages.

Owen would prove to be a stalwart for the next decade, carrying the Western



Covers of the first editions of the 'Alberta,' 'Western' and 'Canadian' Hog Journals, circa 1971, 1979 and 2017, respectively.

# PIG-LIT

By STEN BERG  
Chairman of the Board

One of the biggest existing problems facing producers' organizations such as ours, is one of communication.

Since your Board began operations in November, 1969, it has been involved in numerous studies to design a system which would keep each producer member informed in the many activities in which your organization is involved.

The decision to publish our own magazine was finally considered to be the most direct and factual method for surfacing your ideas in this important area of your business — MARKETING.

the e hold. In even our expansion tion. To provi their pay ing 3 Aug), Aug; or be Th.

## EDITORIAL



by Ed Schultz

## An Introduction to the Western Hog Journal

Welcome to the Western Hog Journal, the prairie pork producers' magazine.

It is my pleasure to write the first editorial for Canada's newest hog production and marketing magazine. This magazine is the outgrowth of the Alberta Hog Journal, a publication of the Alberta Pork Producers Marketing Board for the past seven and one half years.



Canadian Hog JOURNAL

## Message from the editor

Welcome to the very first edition of the Canadian Hog Journal as we extend a hearty hello and bonjour to our new readers from across the country! It has been a bit of a learning process, as I expect it will continue to be as we continue to expand our scope of coverage.



This framed poster, from 1996, proudly adorns a wall at the Alberta Pork office in Edmonton, celebrating the Journal's quarter-century milestone.

Transitioning from a provincial to regional to national focus is a testament to the magazine's popularity in the Canadian pork sector.

Hog Journal all the way until 1992, when Ward Toma took over.

"The greatest strength of the Journal has always been that it offers very good technical facts," said Toma. "It is trusted by producers and is well regarded by advertisers, at the same time."

Toma's wife, Julie, actually worked with Owen on the magazine at the time the pair met. Toma served as the magazine's editor until 1996, before joining the Western Hog Exchange (WHE), which split from Alberta Pork that same year, when single-desk selling ended in the province. Today, Toma is the general manager of Alberta Canola.

Following Toma, Jody Wacowich joined.

"For the Journal to last 50 years with all the changes that have happened in com-

munications practice speaks volumes of the value it has for the pork industry," said Wacowich. "This magazine is a special tool to help keep the industry connected and growing even in the most challenging times."

Wacowich left the magazine in 2007 and is AgSafe Alberta's executive director today. After Wacowich, the magazine was taken on by the first of two non-staff editors, Bernie Peet. Sheri Monk took over from Peet in 2013, and in 2017, a national focus was adopted for the magazine. Since being renamed the 'Canadian' Hog Journal, the scope of content and readers has continued to expand.

In 2019, the editorial duties were brought back in-house when I (Andrew Heck) was offered the opportunity to take on the role. Two-and-a-half years later, the magazine continues to serve the needs

of the many industry stakeholders who read it, and we strive to deliver on our value proposition with every edition.

### Content contributors play a crucial role

Each edition of the magazine includes a message from the editor, but what about some of the other players who operate behind the scenes for the publication to become a reality? In many cases, content contributors, designers and administrative staff have outlasted the editors to whom they have answered over the years.

When Marvin Salomons joined Alberta's agriculture ministry as a pork specialist, in 1980, he was approached by Bill Owen and encouraged by the legendary Frank Aherne – Salomons' graduate school advisor – to solicit research pieces for the

*CONTINUED ON PAGE 8*

# Research R·E·V·I·E·W·S

by Marvin Salomons  
Regional Swine Specialist  
Alberta Agriculture  
Reil Deer, Alberta



## Behavior Research Always Provides Insight

Marvin Salomons was a long-time writer of research reviews, such as this one, published in the Summer 1993 edition.

magazine. By 1984, Salomons was writing research reviews himself. His most-recent piece, related to farm labour, was published in 2020.

"I believe the Hog Journal can be proud of where it is today. It has been a long haul with many dedicated editors, transitions and approaches to industry topics," said Salomons. "Unlike

some other magazines, and despite the rise of the internet, the Journal has survived."

Other writers, such as Geoff Geddes, have also become prolific and regular contributors. Their bylines can be found at the top of many articles published in the past decade.

"The Hog Journal is known as a great place to find important information about the industry," said Geddes. "With so many interesting topics to pursue, there is no shortage of things to cover."

Not only editors and writers, but graphic designers, advertising salespeople and Alberta Pork support staff have always



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been unsung heroes of publishing the Journal.

Prior to the magazine's 'Western' evolution, advertising sales were handled in-house by various Alberta Pork staff members. Starting in 1979, James Shaw, based in Ontario, was responsible for the advertising, until 2014. With Shaw's departure, sales became the responsibility of Sheri Monk. Following Monk, Robert Samletzki of Calgary-based WTR Media took on the file.

"We're grateful for advertisers' support," said Samletzki. "Their contributions are fundamental to keeping the magazine running, and we appreciate that."

On the layout side, the Journal was produced by Quality Color Press in Edmonton for many years. Starting in 2010, Capital Colour in Edmonton – just around the corner from the Alberta Pork office – took over design and printing.

"For the last 12 years, we have enjoyed working with the fine people at Alberta Pork," said Brian Todd, President, Capital Colour. "We're looking forward to continuing our relationship for many years to come!"

Last but not far from least, Marilyn Griesheimer, Office & Finance Manager, Alberta Pork, has been responsible for handling most of the financial demands that come with the magazine, since 1977. At this point, Griesheimer holds the title of the longest-serving member of the team, surpassing Ed Schultz, who retired from the magazine and his lengthy career, in 2007.

### **The Journal lives on, thanks to you**

Fifty years from the inception of the Alberta Hog Journal, few producers today were in business at the time the magazine was first published, but many of their parents and grandparents were. Now, as many of those producers are parents and grandparents themselves, the longevity and sustainability of the family farm and the farming community at large remains at the heart of the Canadian Hog



*Social media is helping broadcast content to new, wider-reaching audiences and starting conversations online.*

Journal. The printed magazine is still delivered to more than 2,500 mailboxes five times every year, and it is being read digitally by thousands more as time goes on and preferences change.

Through thick and thin, the Journal has withstood a test of time many magazines are never able to achieve. This legacy is the result of much hard work by everyone who has contributed to the magazine, including financially, which is all made possible thanks to the support of producers and the broader industry.

On behalf of the Canadian Hog Journal and Alberta Pork, I would like to offer my sincere thanks to all the readers, advertisers and partners within industry, government and academia who have willingly and faithfully propped up this publication throughout the years – some of which were not particularly easy. Since the beginning, this magazine has existed to encourage the collective success of the entire Canadian pork value chain. This objective has remained firmly front-and-centre for editors past and present, and it will remain in sight for the foreseeable future. ■



# Virtual options benefit industry outreach

Ontario Pork



When COVID-19 interrupted the ability to meet in-person, Dave DeVries collaborated to create a new digital space for hog farmers.

With COVID-19 restrictions easing, producers and industry partners have been eager to see each other face-to-face, attending meetings the same way we did prior to the pandemic.

While in-person events are mostly preferred to virtual ones, the new virtual reality that has emerged since COVID-19 is also showing some benefits when it comes to creating connections between producers and between producers and consumers.

In Ontario, two prominent producers have shown great initiative in leveraging the advantages that digital spaces can provide – from sharing information with each other, to sharing information with classrooms and the general public.

## Producers can now meet, no matter where

In February 2021, Dave DeVries, who farms near Mapleton, just south of London, started planning a virtual meeting place for pork producers – dubbed ‘Swine Online’ – motivated by a TED

Talk at the Ontario Agricultural Conference. Collaboration was key to its success, starting with the witty name.

“My wife, Lauren, gets full credit for that,” said DeVries.

Fellow producers Brett Israel and Daniel Roelands, who farm nearby, worked with DeVries on the details. Tim Blackwell, Ontario’s Chief Provincial Veterinarian, enthusiastically embraced the plan.

“We got a positive response right from the start,” said DeVries. “People definitely wanted it to continue.”

Laura Eastwood, a swine specialist with Ontario Agriculture, Food and Rural Affairs, gave them access to a secure Zoom platform with a chat option.

“Laura is our technical guru,” said DeVries. “She runs the sessions and helps with any connectivity issues.”

Blackwell acts as moderator, and Jaydee Smith maintains the online blog. Recordings are put on a password-protect-

ed website for subscribers to view at any time.

“The communication staff at Ontario Pork have also been very helpful in promoting the meetings,” said DeVries. “We have a great group of producers joining us now, some from as far away as Iowa and Saskatchewan.”

Polling questions are sent in advance to find producers who can speak to specific topics, ranging from loading area logistics, to feed costs, to the industry’s carbon footprint and environmental sustainability. Producers can showcase their operations through slides or videos, and products may be discussed, but DeVries cautioned that this is a neutral platform with no place for advertising or sales pitches. He also pointed out the advantages of online meetings.

“For one thing, you don’t have to buy doughnuts,” said DeVries. “Many producers say that they really appreciate being able to see operations all over the province, and there are no biosecurity issues in virtual visits.”

## Community connections create interest

Most pork producers are proud to show off their barns and operations, and John Van Engelen of Hog-Tied Farms Ltd., east of Sarnia, is no exception.

Van Engelen’s modern, fully wi-fi-enabled pig barn is ideal for virtual tours. He has been doing online tours for a few years, both for school groups and for other farmers.

“Last year, I was asked to do a farm tour for the Western Fair, and I guess it went well,” said Van Engelen. “Because then the Royal Winter Fair asked me to do theirs, too.”

Van Engelen’s virtual tours have become a popular way for anyone who has never seen a modern pig farm up close to understand how pork produc-

CONTINUED ON PAGE 12





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*Virtual tours of John Van Engelen's hog farm allow him to showcase the industry without compromising biosecurity.*

tion really works. Technology is integral to the operation. His sows are fitted with radio-frequency identification (RFID) tags, which his electronic sow feeders read to ensure each pig receives its specific ration and precise amount, according to size and gestation state.

His hogs are sorted and fed different rations depending on their individual weights. He also uses RFID tags on his hogs in Pig Performance Testers to track growth and gains, to get an average meat per tonne of feed throughout the year.

Van Engelen's farm was one of the first in Ontario to install an electricity-generating wind turbine, and he even designed a shower for the pigs to enjoy. Presenting urban students his clean, modern barn helps them feel engaged with local farmers.

"When people get to see for themselves how calm, healthy and well-treated the pigs are, it makes a much better connection," said Van Engelen.

When he gives tours to younger school-children, they mostly want to see cute piglets, but older students are much

more informed and aware of the contemporary social issues with farming. They come armed with tough questions about environmental sustainability and animal welfare. Van Engelen welcomes this as an opportunity.

"Most people don't know much about their food sources, and there are a lot of misconceptions," said Van Engelen. "The tours are a great way to educate and inform them."

Van Engelen estimates that, in his time on the farm, his environmental footprint has dropped by half or more. He uses his barn's own manure as fertilizer and minimizes energy costs with heat exchangers.

"I can raise a larger pig in 50 days less than it used to take to bring one to market 40 years ago," said Van Engelen.

The most important part of the tours, for him, is that they help make real connections between the community and the food producers they depend on.

"It's important to correct misunderstandings about farming. This isn't Old McDonald's farm anymore," said Van Engelen.

## **Embracing, rather than fighting, change**

Swine Online and Hog-Tied Farms' tours are great examples of how producers have demonstrated resilience through the COVID-19 pandemic. Embracing innovation and technology to share experiences will help build long-term connections across the industry.

Even as in-person meetings and events return, it is likely that virtual options, when they make sense, will become permanent in our industry and many others. ■

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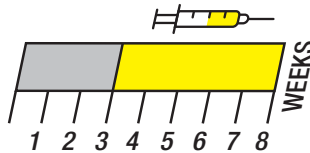
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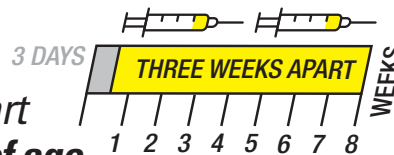
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# Tight grain supplies increase feed costs

*Bijon Brown*

*Editor's note: Bijon Brown is the Production Economist for Alberta Pork. He can be contacted at [bijon.brown@albertapork.com](mailto:bijon.brown@albertapork.com).*

High feed prices seen today have resulted from a combination of local and global events. By understanding some of the major factors that are currently affecting feed supplies and pricing, risk mitigation may be possible.

From the war in Ukraine, to moisture conditions across the Americas, to international trade relationships, feed prices have remained the number-one concern for livestock producers for more than a year, and this looks to be the case in the coming months.

## Ukrainian infrastructure damage causes concern

Along with the tragic and significant loss of life since the war in Ukraine began earlier this year, the movement of grains and other commodities has been challenged by damage to critical infrastructure and the closure of seaports.

Ukrainian grain exports in March were a quarter of the volumes reported in February, with only 1.1 million tonnes of corn, just over 300,000 tonnes of wheat and almost 120,000 tonnes of sunflower oil moved to export destinations via rail.

The closure of ports has caused significant backlogs and bottlenecks on rail corridors and has dramatically increased the cost of moving grain out of Ukraine. According to the United Nations' Food and Agriculture Organization (FAO), this conflict has fueled a marked increase in the price of sunflower oil globally.

## South American drought ravages soybean crop

Dry conditions have devastated crop yields in South America recently. Brazil's soybean crop is expected to fall below 120,000 metric tonnes for the

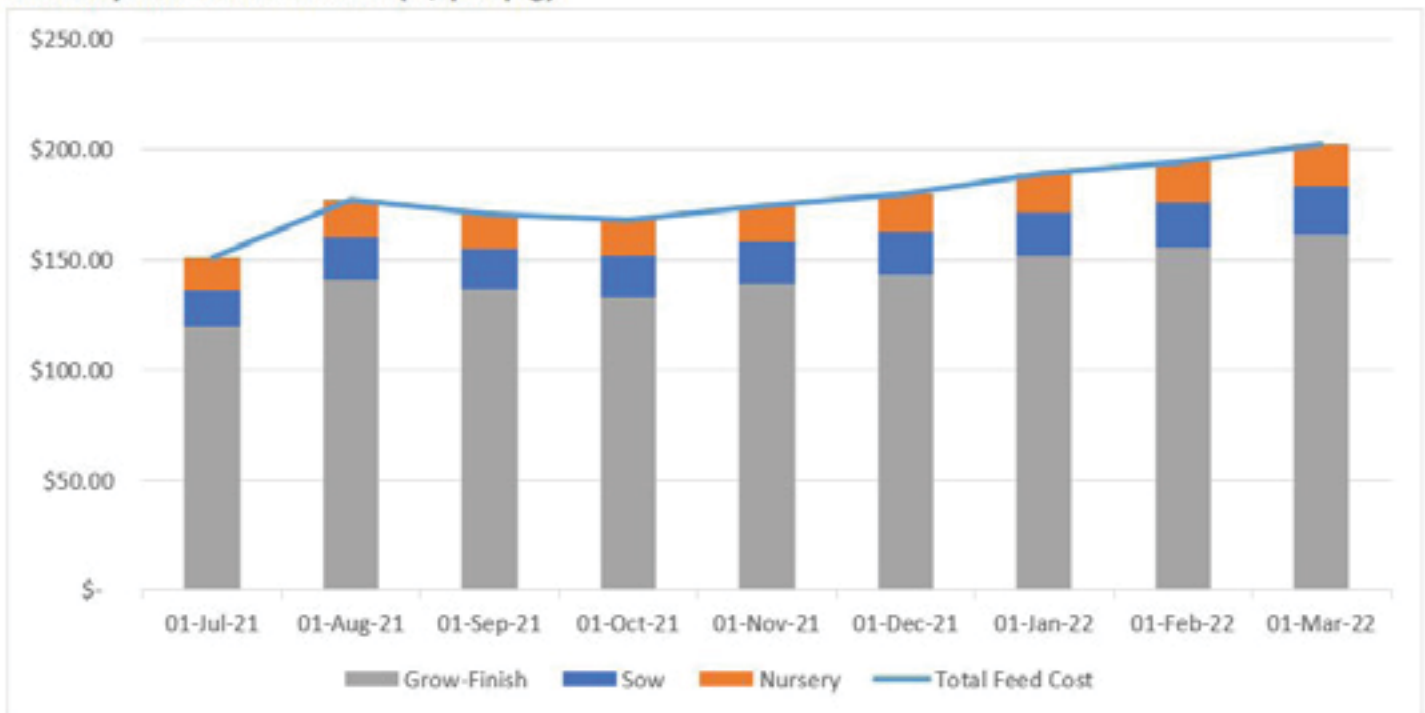
first time three years. The drought has been felt not only in Brazil, with soybean production projected to be down nine per cent in Argentina and 37 per cent in Paraguay.

Soybean prices, which had pulled back from a high point in January 2021, have risen sharply again to a seven-year high since then, in response to the lack of moisture. With tighter supplies in South America, the higher global prices may stick around until the North American harvest.

## North America could be drier than usual this summer

In the U.S., growing conditions look less-than-favourable this year. The La Niña effect has caused a warmer- and drier-than-usual winter. According to the U.S. National Oceanic and Atmospheric Administration (NOAA), most of

## Monthly feed cost estimate (C\$ per pig)



Source: Gowans Feed Consulting

Gowans Feed Consulting has estimated a \$50 jump in feed cost per pig over the course of the past year alone.

## U.S. soybean meal nearby futures prices



Source: Nasdaq.com

Soy prices spiked in early 2021 and again in early 2022.

the country will be unseasonably warm between April and June, with some of the drier areas representing grain-producing regions. Drought conditions are expected to persist or develop for most of the western half of the U.S. over the next few months.

Production of hard red winter wheat this year, which makes up nearly 40 per cent of total U.S. wheat production, plunged 44 per cent because of drought in the northern plains. Areas in the Dakotas are still experiencing moderate drought conditions, and a repeat of last year could significantly disrupt U.S. spring wheat supplies.

Data out of Canada also points to some drier-than-normal precipitation levels

over a significant portion of the arable prairies this spring. This is troubling, given that the region is coming off a year when feed grain supplies faced a 42 per cent shortfall in some areas and only a six per cent surplus in others. Another dry year could lead to significant feed disruptions.

### Feed barley exports continue to grow

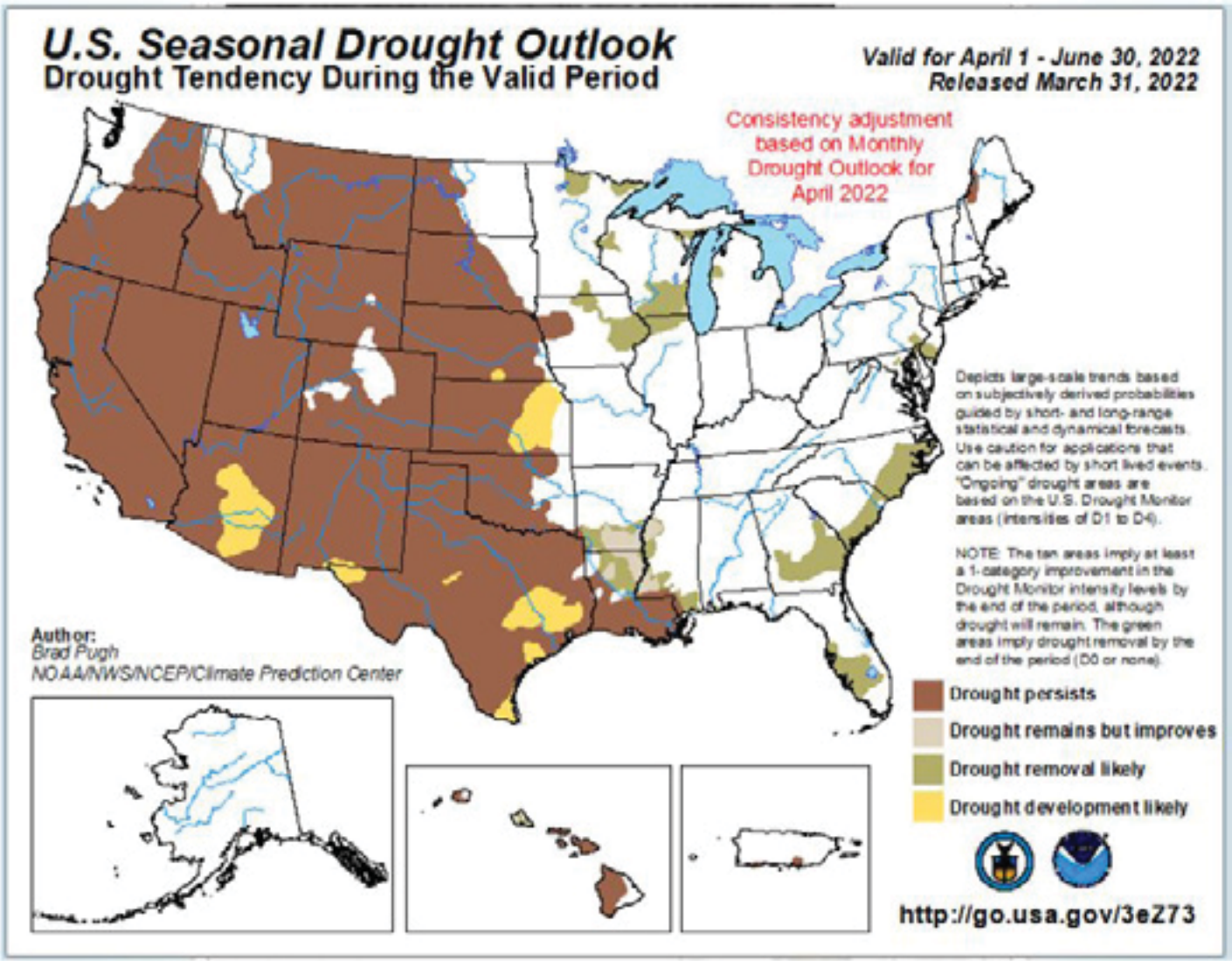
Coming off a drought-impacted 2021 harvest, feed grain exports from Canada continued a second year of decline. Crop year-to-date, 1.1 million tonnes of feed grains were exported as of early April. At this rate, Canada would be on target to export 1.7 million tonnes of feed grains by the end

of July, down 9.3 per cent from last year.

Nevertheless, feed barley exports continue to increase. Last year, 1.5 million tonnes of barley were exported, and this year, Canada is on track to export 1.6 million tonnes, with almost all the crop pushed through the west coast terminals likely destined for Asia.

In a year when prices are supposed to be high because of feed shortages, the free market continues to dictate where grain is sold – to the highest-paying buyer. In this case, that means foreign markets. This has exacerbated shortages and pushed domestic feed grain prices higher, making hog production less profitable

CONTINUED ON PAGE 16



Source: U.S. National Weather Service

Moisture levels across western Canada and the U.S. are expected to be below normal, with drought expected across much of the region.

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than it might be if the trend favoured selling into the domestic market.

**Geopolitical strife always has a role in markets**

Some countries have, in light of the global events earlier described, made efforts to ensure grain supplies. Egypt, Algeria and Serbia are a part of a list of countries that have banned the export of grain or food to combat their perceived food security problems.

China is the largest grain buyer in the international market. However, it would appear China is taking a protectionist stance by banning exports of



*China's protectionist politics hold considerable sway in the market. The country recently banned exports of fertilizer, to boost domestic crop production. Image © Bruno Corpet*

its own fertilizer, in a bid to support its own domestic production. Observing this strategy, it calls into question whether the Canadian grain and livestock industries could work more closely together to benefit producers of all commodities.

The lack of fertilizer supply globally has driven up prices and increased the marginal cost of producing grain. This means that both food and feed grains will become more costly this crop season, even as Canada continues to ship feed grains out of the country, result-

ing in financial strain for domestic livestock producers.

While hog futures are looking favourable heading into summer, costs continue to push higher, offsetting much of the potential gains. ■

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# Grain and fertilizer shortages destabilize food systems

Stuart Smyth

*Editor's note: Stuart Smyth is an associate professor with the University of Saskatchewan's College of Agriculture and Bioresources, where he holds the Agri-Food Innovation and Sustainability Enhancement Chair. He can be contacted at [stuart.smyth@usask.ca](mailto:stuart.smyth@usask.ca).*

The farther we tread into 2022, it would appear this year is positioning itself to be one of the worst on record for producers and consumers, who are facing higher input costs, driven by supply shortages, that are threatening farmers' livelihoods, food security and food pricing globally.

In addition to reduced availability of food, feed grains and fertilizer, political volatility and transportation disruptions have made the past year particularly bumpy. These factors are reflected in producers' expenses and consumers' ability to access affordable food.

## War in Ukraine pauses production and export

Ukraine and Russia are leaders when it comes to crop production and export, and Russia's invasion of Ukraine has added another dimension to supply chain woes.

Ukraine is the world's leading exporter of sunflower oil, fourth-leading exporter of wheat and corn, and ranks seventh in rapeseed exports. Russia, on the other hand, is second in wheat, rapeseed and sunflower oil; fourth in barley; and sixth in corn. And both countries are facing trade dilemmas, for different reasons.

This spring, much of Ukraine's arable land may go unseeded, due to the inability to safely deliver seed, fertilizer and fuel to farms, in addition to difficulties related to transporting existing stocks to export points, such as maritime ports on the Black Sea, from where container ships set sail across the world. Conversely, Russia faces trade restrictions and sanctions, which could be extended to commodity exports, as well as transportation access to port facilities.

Further compounding the problem in crop markets was the March 2022 announcement that Argentina has

halted its export of soybean oil and meal. As the world's leading exporter of both – accounting for 41 per cent of total global soybean meal exports and 46 per cent of soybean oil – these restrictions will negatively impact meal- and oil-importing countries that rely on Argentina, as they will now have to pay higher prices to import from other exporting countries.

Fertilizer prices are also considerably higher than last year. In the spring of 2021, urea prices were just over USD \$500 per tonne, and by February 2022, the price rose to USD \$900 per tonne, an increase of 45 per cent, according to data analyst firm DTN. Production delays at chemical plants have reduced the availability of some plant protection products heading into the 2022 crop year.

Crop farmers who still have commodities on-farm are fortunate, as they can

still take advantage of receiving higher prices for last year's yield. While farmers may benefit from the currently high commodity prices – whether in crops or livestock – input costs have also increased. Farmers will need to ensure their pencils are sharp and that they are able to improve their profitability in the face of rising input and commodity prices.

## Canadian transportation faces disruptions

Inflation in February 2022 rose to 5.7 per cent year-over-year, the highest since the early 1990s. The rising price of crude oil throughout 2021 and into 2022 has contributed to increasing the cost of transporting food into and across Canada. Furthering this problem are challenges to transportation corridors – be it the flooding of highways and railways in B.C. and disruptions to key trade routes with the U.S., such as



*Mariupol, a port city on the Black Sea, has been a target for Russia. The city has experienced heavy damage since the war began, with thousands of lives lost. The city's Independence Day celebration, in 2021, marked 30 years of Ukrainian sovereignty from the former Soviet Union. Image © mariupolrada.gov.ua*





Rail access has faced several significant threats recently. A lack of political will to move Canadian oil and gas products by pipeline has also created obstacles for agriculture.

highways and bridges at international border crossings.

A large part of the challenge facing agricultural commodity and food product supply chains is the increased competition for rail line access, most notably with the energy industry. Canada has a proven, safe network of oil and gas pipelines that, with some line expansion, could facilitate the transportation of tens of thousands of additional barrels of petroleum products per day. Because pipeline construction has been delayed or, in some instances, outright

cancelled, agricultural commodities and food products must compete with the more profitable oil and gas exports for rail access, raising transportation costs even more.

As governments have been slow to recognize the significance of transportation as a key part of food security, officials are becoming more aware just how vital transportation is within agri-food. As consumers continue to express their concerns over food pricing, we may see greater emphasis placed on the movement of food products within

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Canada, by finding ways to overcome constraints.

Very quickly, governments in Canada need to decide whether to move oil by rail or food by rail, as the current approach of moving significant volumes

*CONTINUED ON PAGE 20*

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of oil by rail needlessly contributes to higher food prices.

### Sticker shock for shoppers

If 2020 and 2021 had been 'normal' years, the rise in food prices would not have been as dramatic as we are currently witnessing. The COVID-19 pandemic has impacted food processing and distribution, resulting in shortages of some products and higher prices for most products. After being subject to shortages, price increases and shrinking product sizes for the past two years, consumers are becoming wary of pushing their carts down grocery store aisles, as they are unsure of just what price increase is going to jump out at them next.

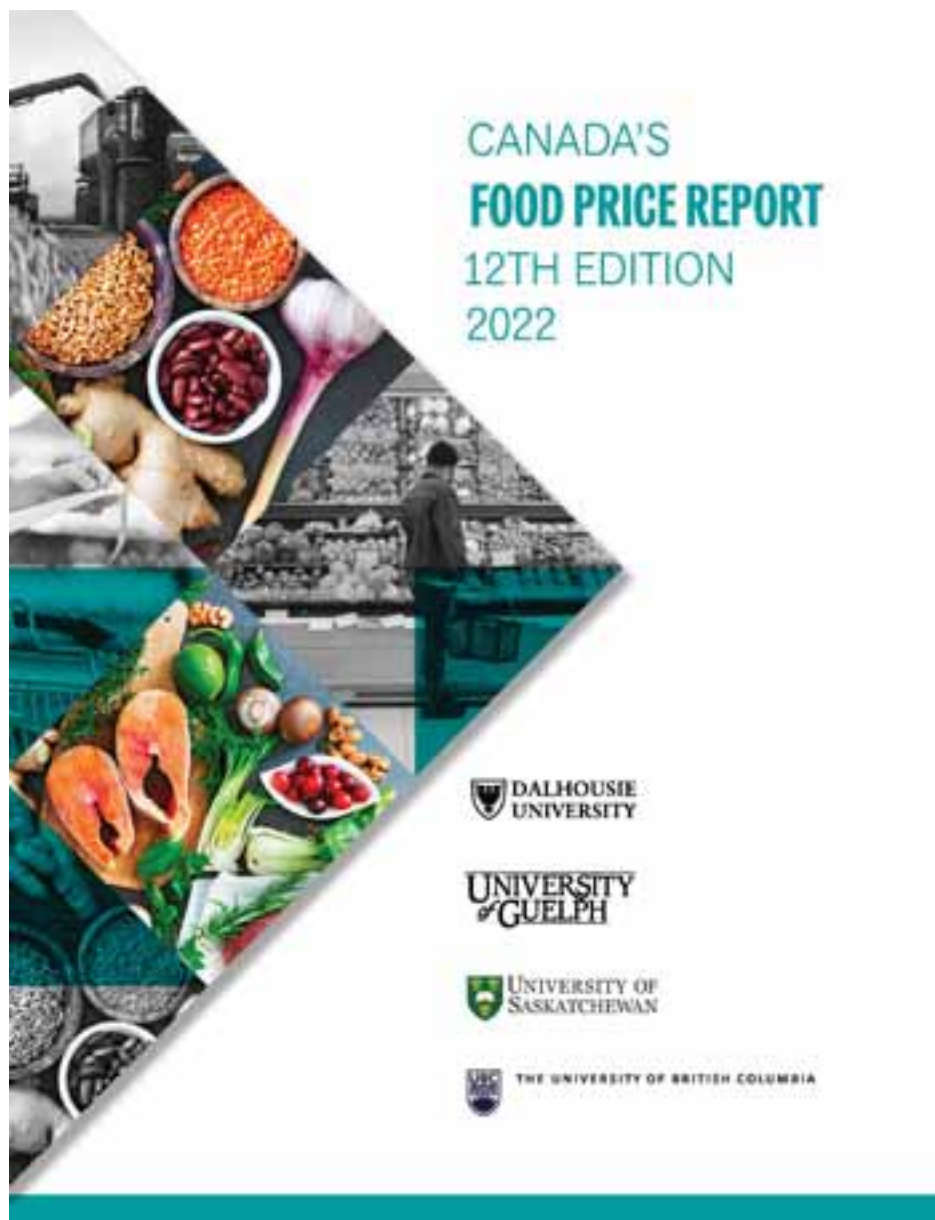
Consumers faced a constant barrage of food price increases throughout 2021 that show no sign of easing up this year, according to Canada's Food Price Report for 2022. Last year, meat prices rose by nearly 10 per cent, dairy products were up by five per cent and bakery, fruits and vegetables were up by three per cent. Restaurant prices also rose by three per cent. On average, in 2021, food prices rose by four per cent and are projected to rise by as much as seven per cent in 2022.

In the fall of 2021, media reports indicated that consumers were foregoing some purchases, as the price of some products was beyond what consumers felt was reasonable. This may have been more noticeable at specific times of the year when families tend to gather to celebrate holidays or special occasions.

While some consumers have been able to absorb the increased costs without much trouble, a growing number of Canadians are being priced out of the equation altogether, relying on food banks to meet their needs. This trend suggests not only frustration with the higher cost of living but also a crisis for public health, which is tied to nutrition.

### Food insecurity grows in step with conflict

When we think of the food supply chain, Canadians should also consider parts of the world that are much less fortunate



*Canada's Food Price Report tracks changes to food pricing for Canadian consumers. Record-high jumps were reported in 2021 and 2022.*

than ours. The United Nations' World Food Programme (WFP) uses food assistance to build a pathway to peace and prosperity for people recovering from conflict and disasters.

Anticipated lower production and export of Ukrainian wheat will put significant pressure on the WFP, which buys 50 per cent of its wheat requirements from Ukraine. Much of this wheat is distributed to many food-insecure northern African countries. The lost access to this wheat would mean the WFP would need to buy the same amount of

wheat at a higher price – or more worryingly – the amount of wheat purchased would decline due to a price increase, potentially resulting in more people becoming food-insecure.

In late 2007 and early 2008, economic and political conditions resulted in a food pricing crisis for many countries globally. At the time, several Asian countries had enacted bans on rice exports, resulting in even higher rice prices, exacerbating the problem. Export restrictions compound issues related to supply and pricing, and they are not viable solutions



The United Nations' World Food Programme relies heavily on Ukrainian wheat, especially for flour, which will be in short supply this year. Image © WFP/Photolibary

to complex situations, such as the sanctioning of Russia. Should Russia be hit with export bans, the net effect could be largely negative for everyone.

**Are brighter days ahead?**

While the future appears rather dark and ominous, rays of sunshine have poked through, providing some optimism. For

example, if sufficient moisture is received during the coming growing and pasture season, grain supply could improve.

COVID-19's impact on the agri-food sector is rapidly diminishing, indicating that processing and manufacturing will begin returning to full capacity. These capacity increases will help ensure that

livestock producers can market their animals and that grocery store shelves will once again be fully stocked.

With farmers' bottom lines and consumers' pocketbooks feeling the pinch, we can only hope the worst of 2022 is now behind us and the remainder of the year is considerably brighter. ■

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### Wild boar legislation moves forward

As wild boar awareness increases, provincial pork producer organizations and some governments are taking a closer look at management strategies.

In mid-March, the Government of Saskatchewan enhanced wild boar control in the province. New regulations are being developed for licensing existing wild boar farms and imposing a moratorium on any new farms. Regulations will also be developed under the *Pest Control Act*, which would specify the various monitoring efforts, as well as public obligations to report sightings.

“Increasing surveillance and eradication, along with declaring them a pest, are proactive measures to help ensure the health of both the agriculture industry and the natural environment,” said David Marit,

Minister, Saskatchewan Agriculture. “These are substantial steps that improve risk management and protect the resilience and security of our agriculture industry.”

Additionally, annual funding for the Saskatchewan Crop Insurance Corporation (SCIC) Feral Wild Boar Control Program for surveillance and eradication efforts in the province is being doubled to \$200,000.

Also in mid-March, a new wild boar research project in Alberta received more than \$400,000 of funding through the Canadian Agricultural Partnership to increase wild boar surveillance. The project will be led by a researcher from the University of Calgary, with strategic input from Alberta Pork.

Alberta Pork works closely with Alberta Agriculture, Forestry and Rural Economic Development to conduct that province’s existing wild boar monitoring and eradication program; however, the Government of Alberta re-introduced a bounty on wild boar, in early April – a decade-long strategy which previously failed and was initially ended in 2017.

Currently, only three of Alberta’s 64 rural municipalities have signed on to the bounty program, offering a small payment, for a one-year period, to hunters who present sets of wild boar ears to those municipalities. The payment is also available, for a two-year period, to approved trappers who work with landowners to eliminate entire wild boar sounders (groups).

### Manitoba government funds swine disease mitigation

A nearly-\$700,000 investment was made in mid-February under the Canadian Agricultural Partnership to support two major projects aimed at protecting health and managing disease in Manitoba’s hog sector.

“Our government is pleased to support these projects that protect animals, ensure the quality of the industry and our ongoing competitiveness in international trade,” said Derek Johnson, Minister, Manitoba Agriculture and Resource Development. “The targeted, risk-based surveillance of these projects allows for rapid



National Invasive Species Awareness Week (NISAW), in early March, helped organizations like Alberta Pork spread the word about the threat of wild boar to livestock, crops and the environment.

disease detection, resulting in a more effective response.”

The ‘Invasive Swine Eradication Initiative Project’ will help mitigate the threat of disease spread by wild boar. In support of the project, Manitoba Pork has hired a new team member, former Manitoba Chief Provincial Veterinarian, Wayne Lees.

The ‘High Traffic Facility Swine Disease Surveillance Project’ continues to address the risk of porcine epidemic diarrhea (PED). It will allow more time to fully evaluate the efforts that have decreased the occurrence of PED.

“Animal diseases not only have a significant economic impact, but a lasting impact on the mental health of farmers,” said Rick Préjet, Chair, Manitoba Pork. “Reducing the risk and spread of animal disease is paramount to the long-term success of Manitoba’s hog sector.”

In early April, the Government of Manitoba also committed more than \$2 million to modernize its Animal Health Laboratory Information Management System (LIMS). LIMS is computer program that contains all animal disease diagnostic information for Manitoba’s provincial animal health laboratory.

## Foreign worker rules relaxed to address shortage

The Government of Canada announced changes to the Temporary Foreign Worker Program (TFWP) in early April, aimed at easing the labour shortage demonstrated in specific sectors, like Accommodation and Food Services, which includes meatpacking and restaurants.

“Currently, thousands of jobs are vacant in food processing plants,” said Marie-Claude Bibeau, Minister, Agriculture and Agri-Food Canada. “By facilitating the entry of foreign workers and extending their stay, our government aims to enable businesses to operate at full capacity and access new markets, increasing demand for our agricultural producers.”

Labour Market Impact Assessments (LMIAs) are now valid for 18 months, an increase from nine months. Prior to COVID-19, LMIAs were valid for only six



*The Canadian pork value chain, including meatpacking, relies on temporary foreign workers to occupy the vacancies unable to be filled by Canadian citizens or permanent residents.*

months. Employers are also now allowed to hire up to 30 per cent of their workforce through the TFWP for low-wage positions, for one year. Prior to the announcement, LMIA applications for low-wage jobs were automatically refused in regions with an unemployment rate of six per cent or higher. This policy has been ended.

## Research supports meat quality, animal health

The Canadian Agri-Food Automation and Intelligence Network (CAAIN) unveiled in mid-March the successful projects to be funded through its inaugural open competition.

“Through these projects, CAAIN is building on the innovation ecosystem where agri-food, technology development and advanced manufacturing intersect,” said Laura Kilcrease, Chair, CAAIN. “This convergence creates a unique opportunity for the network to drive new growth.”

CAAIN helps advance the agri-food sector by supporting projects that apply technological solutions to address identified

needs, with particular focus on automation and robotics, data collection and validation, and smart farms.

One of selected projects, worth more than \$300,000, will lead to the development of an automated device to assess pork marbling. The device is intended to evaluate marbling on the entire loin from the outer surface, without any cutting. MatrixSpec – based in Baie D’Urfe, Quebec, southwest of Montreal – will test and validate the system in a pork processing plant.

Another project, worth more than \$50,000, will seek to identify a solution for real-time data tracking in a livestock disease outbreak. Using analytics to predict disease spread could reduce the time and cost associated with outbreak response. The tool will be developed by Farm Health Guardian, based in Guelph, Ontario.

Edmonton-based CAAIN was created in 2019 by eight founding partners from B.C., Alberta, Saskatchewan, Ontario and Quebec. Later this year, CAAIN will announce the recipients of a second Canada-wide open competition.

*CONTINUED ON PAGE 26*

## Quebec food entrepreneurs get a boost

Sobeys announced the launch of the 'IGA Local Accelerator' in late March to help Quebec companies develop new food products. The accelerator will offer companies personalized support throughout the various stages of their project and exclusive access to resources, with the cooperation of the University of Laval.

"We have many brilliant, creative and ambitious entrepreneurs in Quebec. We want to reach out to them and get involved in their projects by making our expertise and resources available," said Mireille Thibodeau, Vice President, Sobeys. "We are aware of the challenges of young companies developing new products, and the IGA Local Accelerator is a concrete way to help overcome them."

The accelerator is a \$1-million annual investment aimed at companies that have developed products with the potential to revitalize the Quebec food industry. Selected businesses will receive a dedicated team of relevant experts, tailored to each company. Approximately 10 companies will be recruited each year.

## Saskatchewan government funds swine research

The University of Saskatchewan received more than \$4 million in mid-January to develop livestock-related innovations.

Funding was awarded through the Canadian Agricultural Partnership to 19 researchers to support 23 projects, of which, four researchers will focus on swine as part of five projects.

Researchers Dan Columbus, Jennifer Brown and Bernardo Predicala are among the researchers who received funding. All three perform work on behalf of Prairie Swine Centre – a facility at the University of Saskatchewan that also receives funding and direction from provincial pork producer boards in Alberta, Saskatchewan, Manitoba and Ontario.

Columbus will examine how dietary protein quality affects gut health in young pigs. Brown will aim to determine whether providing environmental enrichment to pigs early in life will have a lasting impact on their later behaviour. Predicala will investigate novel methods to reduce the emergence and spread of antimicrobial resistance in swine production, along with conducting optimization and field validation of a rapid diagnostic test kit for porcine epidemic diarrhea (PED) under Canadian conditions.

## Ontario government funds producers and packers

A \$900,000 investment was made in early March through the Canadian Agricultural Partnership to launch a new project to connect Ontario meat and poultry farmers with abattoirs that have available processing capacity and to support labour initiatives in the industry.

"Ontario's meat and poultry producers work tirelessly to ensure that Ontarians have access to fresh, local and high-quality meat products for their families," said Lisa Thompson, Minister, Ontario Agriculture, Food and Rural Affairs. "We have heard concerns about processing capacity shortages, and that is why our government is stepping up with this important investment."

The new 'Farmer-Processor Connections Initiative,' led by Meat and Poultry Ontario and AgSights, is designed to relieve processing capacity challenges and supply chain disruptions, helping farmers get their products to market faster.

Meat and Poultry Ontario includes membership from producer groups, packers and other stakeholders working to support Ontario's meat sector. AgSights is an Ontario-based software development company that creates tools for managing data for grazing animals and meat processing.

## Alberta producers help Canadians and Ukrainians

Alberta Pork's board of directors undertook two charitable initiatives in mid-March: a pork donation to Food Banks Alberta, and a financial contribution to the Canada-Ukraine Foundation.

Food Banks Alberta received five pallets of vacuum-packed fresh pork tenderloin, representing more than 5,000 tenderloins or enough for 15,000 meal portions.



Food product developers in Quebec are receiving a helping hand, thanks to a new initiative by Sobeys: the IGA Local Accelerator.





*Pallets of pork tenderloin await distribution at Food Banks Alberta's central warehouse, south of Edmonton. The network includes more than 100 local food banks across the province.*

“We are beyond grateful for our new partnership with Alberta Pork,” says Arianna Scott, CEO, Food Banks Alberta. “We know that thousands of families across our province are experiencing food insecurity, and as a result, are accessing their community food banks.”

In solidarity with those affected by the war in Ukraine, the board also committed \$10,000 toward humanitarian relief.

“Our hearts go out to everyone affected by the tragedy in Ukraine,” said Brent Moen, Chair, Alberta Pork. “Peace must prevail to encourage stability and the spirit of cooperation between neighbours.”

### **Saskatchewan producers support sick kids**

Guests staying at Ronald McDonald House in Saskatoon and Prince Albert, Saskatchewan – about 140 kilometres northeast of Saskatoon – were served pulled pork sandwiches in mid-March, thanks to a donation by Sask Pork and local processor Prairie Meats.

“The Home for Dinner program is a wonderful gift for our families, providing kindness and support during a very stressful time in their lives,” said Karen Linsley, Director of Development and Communications, Ronald McDonald House Charities Saskatchewan.



*Prairie Meats pulled pork, buns and salads ready to be served at Ronald McDonald House in Saskatoon. Sask Pork sponsored the meal and another in Prince Albert.*

*CONTINUED ON PAGE 28*



*This year's Great Canadian Farm Tour featured a virtual stop at a hog farm in PEI, owned by Joel & Amy Van Gorp.*

Ronald McDonald House Charities provides accommodation and support for families of sick children while they are receiving medical treatment away from home.

"We're proud to be able to work with Prairie Meats on behalf of provincial pork producers to bring a homegrown meal to Saskatchewan families," said Mark Ferguson, General Manager, Sask Pork. "We hope that it brings them some measure of comfort to know that our provincial industry, many of which are their neighbors, stand behind them during such difficult times."

### **Ag-based funding granted for youth initiatives**

Marie-Claude Bibeau, Minister, Agriculture and Agri-Food Canada (AAFC) kicked off Canadian Agriculture Literacy Month (CALM) in March with an announcement of up to \$415,000 in support for Agriculture in the Classroom Canada (AITC-C).

"To build the next generation of agricultural producers, we must inform and inspire Canadian youth," said Bibeau. "Supporting these efforts is an investment in a stronger, more sustainable agriculture sector."

AITC-C is a not-for-profit organization advocating for agriculture education in Canada, with membership chapters in all provinces. The organization delivers curriculum-linked agri-food resources, programs and initiatives.

"We are thrilled to continue our collaboration with AAFC through this most-recent announcement of funding," said Johanne Ross, Executive Director, AITC-C. "The support will be leveraged alongside other AITC-C donors to ensure initiatives such as CALM continue to grow and thrive."

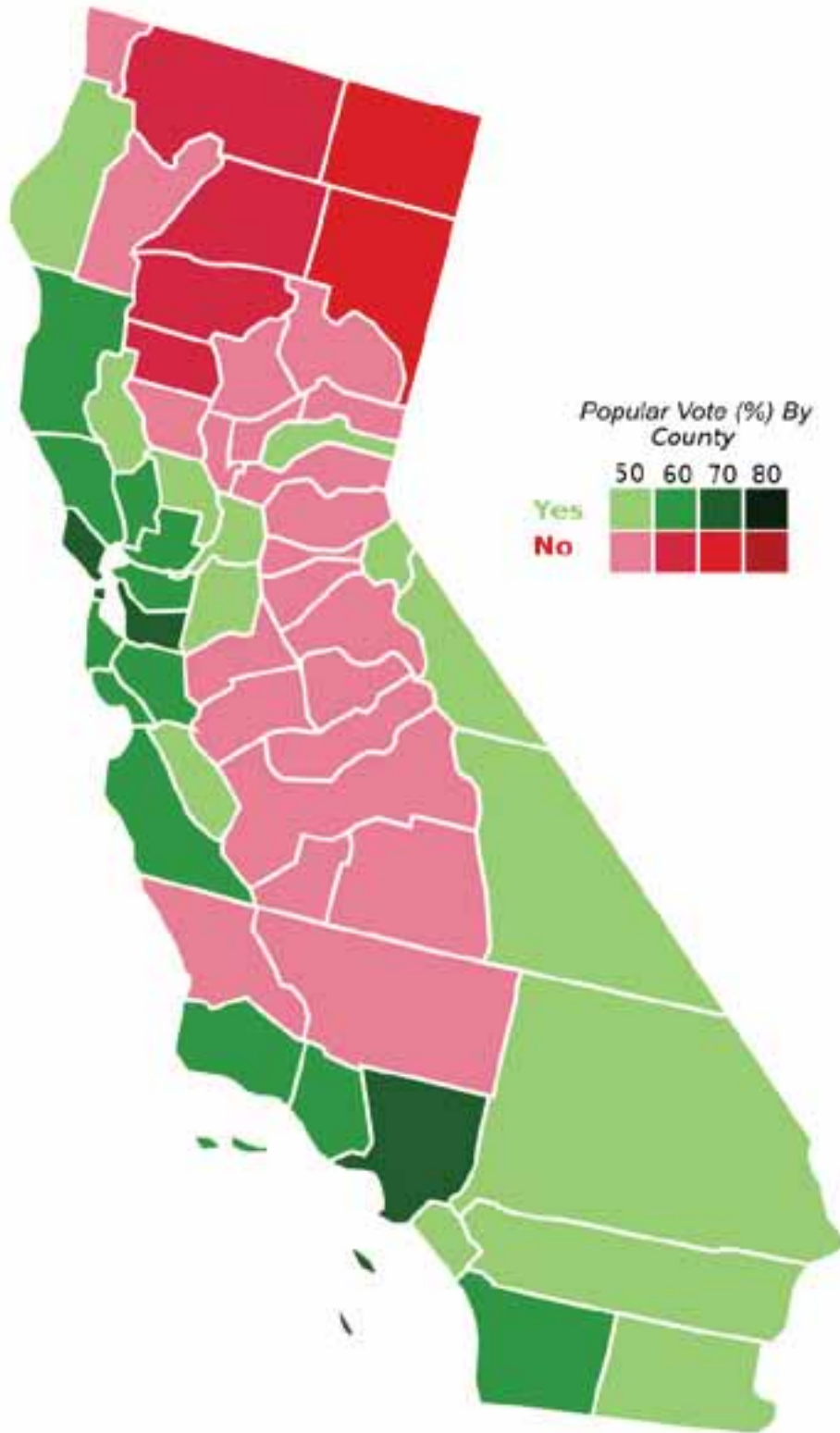
In celebration of CALM, AITC-C hosted the Great Canadian Farm Tour, an 11-stop engaging learning experience, including a visit to Pure Pork Farms near Mount Albion, Prince Edward Island (PEI). Other

stops were made in all other provinces, featuring different commodities.

### **California Prop 12 delayed**

California's Proposition 12 effectively bans most pork currently sold in California, from farms across the U.S. that are unable to meet incoming sow housing and production standards. Prop 12 was passed in November 2018 by more than 60 per cent of California voters and was set to go into effect in January 2022. However, implementation has been delayed for six months due to a court ruling to allow the state to provide further regulatory guidance.

In August 2021, researchers from the University of California released a study on Prop 12's potential impacts. The study places the cost increase for farmers at \$15 per compliant hog. Practically speaking, "Prop 12 will result in only slightly fewer sows in stalls and a bit more space for sows already in group housing. Thus, impacts on sow housing will be much more modest than claimed."



Results of California's vote on Proposition 12, by county. Municipalities near San Francisco Bay and the Los Angeles metro area – urban centres – appear to support the new law more than rural voters.

In March 2022, the U.S. Supreme Court agreed to hear a case brought by the U.S. National Pork Producers Council (NPPC) and the American Farm Bureau Federation (AFBF) against Prop 12. NPPC and AFBF

have filed their initial brief, which could hear oral arguments in the fall and could render a decision by the end of the year.

“Prop 12 sets arbitrary animal housing standards that lack any scientific, tech-

nical or agricultural basis, and that will only inflict economic harm on U.S. hog farmers and consumers,” said Terry Walters, President, NPPC. “We have poured a lot of blood, sweat and tears into preserving the rights of America’s pork producers to raise hogs in a way that’s best for their animals’ well-being.”

## Global leaders want to reduce antimicrobial pollution

In early March, the Global Leaders Group on Antimicrobial Resistance published a formal call to reduce environmental waste from antimicrobials. This includes researching and implementing measures to safely dispose of antimicrobial waste from food and animal health systems.

Antimicrobials given to humans, animals and plants are entering the environment and water sources via run-off and sewage, spreading drug-resistant organisms and creating antimicrobial resistance. This could fuel a rise in the emergence of ‘superbugs’ that are resistant to several types of antimicrobial drugs.

Suggested actions to address the problem include enforcing laws and policies to reduce or eliminate antimicrobial use that is not under the guidance of a trained health-care provider and implementing standards to treat and manage discharge from farms.

The Global Leaders Group on Antimicrobial Resistance was formed in November 2020 and includes politicians, researchers and private sector representation. The group meets quarterly to advise on prioritized actions to address antimicrobial resistance. ■

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# Pigs fed *E. coli* antibodies could lead to safer pork

Lexie Reed

Editor's note: Lexie Reed holds a Doctor of Veterinary Medicine from Ontario Veterinary College. She can be contacted at [lexiereedvm@gmail.com](mailto:lexiereedvm@gmail.com).

Pork-associated human illnesses have drawn unfavourable media attention to the swine industry over the years. In 2018, a pork recall was issued by the Canadian Food Inspection Agency (CFIA) in response to an outbreak linked to an Alberta restaurant. The pathogen responsible for the death of one individual and more than 40 cases of illness was *Escherichia coli* (*E. coli*) O157:H7.

As few serious *E. coli* illnesses have been associated with pork products, there was skepticism that contamina-

tion from cattle in the abattoir was truly to blame for the outbreak. However, a 2020 study found that O157:H7 bacteria reside within the intestinal tract of pigs, and though risk of *E. coli* illness from pork products is low, it can have serious consequences.

Fecal contamination of hog carcasses is a serious risk factor for foodborne illness from pork. For these reasons, cooking pork thoroughly is recommended to kill any bacteria that may be present on the meat. Hygienic removal of the intestines post-slaughter,

to prevent the spillage of intestinal contents onto the saleable carcass, is another important step.

But what if there was another layer to the pork safety net?

## The need for *E. coli* antibodies

A 2017 study of provincially licensed abattoirs in Alberta found that 1.8 per cent of carcasses sampled were contaminated with O157:H7, several of which were subtypes of O157:H7 that are of importance to human health. Samples were taken from abattoirs that slaughtered both pigs and cattle



Proper cooking of all meat, including pork, helps prevent foodborne illness. Now, scientists are finding ways to address the problem well before the consumer ever takes a bite.



*E. coli* O157:H7 is known to exist in cattle, often transmitted at feedlots. But for a long time, no-one suspected pigs, too, could be affected.

and from abattoirs that slaughtered pigs only. No difference in the prevalence of O157:H7 carcass contamination was observed between abattoirs that slaughtered just pigs or pigs and cattle, indicating that O157:H7 contamination of hog carcasses is a result of the pathogen occurring within the pigs themselves.

O157:H7 antibody technology was originally proposed for development in cattle, as O157:H7 contamination is predominantly associated with ruminants. However, the efficacy and safety studies in mice are more applicable to monogastric species, and thus the development in pigs was pursued. Success in monogastric studies may still lead to the development of direct-fed O157:H7 antibodies to cattle.

### **Developing an *E. coli* antibody to feed pigs**

Agriculture and Agri-Food Canada (AAFC) research scientists have recently isolated an *E. coli* antibody that could neutralize O157:H7. The antibody is synthesized within the plant *Nicotiana benthamiana* and could be delivered as an edible feed material. Once ingested, the antibodies would bind and neutralize O157:H7 present in the gastrointestinal tract.

Rima Menassa is a genomics and biotechnology research scientist at AAFC's London Research and Development Centre. She conducted the study that found the antibodies to be effective at neutralizing O157:H7 in cell cultures. Presently, Patti Kiser

of Western University is conducting a study to determine if the direct-fed antibody can neutralize O157:H7 in mice, which would bring the technology one step closer to proof of concept in livestock.

"If feeding the antibody to mice who already have O157:H7 established in their intestines prevents shedding of the pathogen, then antibody feeding short-term prior to slaughter could be an option in pigs," said Menassa. "If, however, the antibodies only prevent O157:H7 from colonizing the intestinal tract when it is introduced to naïve mice, then it is more likely that the antibodies would need to be fed from an early age, before significant O157:H7 exposure."

*CONTINUED ON PAGE 32*



*Nicotiana benthamiana*, the plants in which the O157:H7 antibodies are produced, are shown here in a research greenhouse.


If successful, the outcome of the study could lead to commercialization of the technology. Preventing *E. coli* from colonizing the gastrointestinal tract or reducing shedding of the pathogen would reduce the risk of O157:H7 contaminating the carcass at time of processing. Further, this technology could reduce the risk of contaminated manure, which may be spread on crop fields as fertilizer.

The plant used to produce the antibody, *Nicotiana benthamiana*, is a plant related to tobacco, native to Australia. It is commonly used for molecular biology studies and has been used to produce vaccines and other pharmaceutical products, thanks to its natural ability to express foreign gene sequences.


Although the dose regime has not yet been established, it is unlikely that the amount fed of the plant material would contribute any appreciable nutritional or fibre content. The current study in mice will explore both efficacy and safety of the plant-encapsulated antibodies. The results of this study will also help to establish a timeline for feeding pigs pre-slaughter. This study is a collaboration between AAFC and PlantForm Corp., a start-up plant biotechnology company based in Guelph, Ontario.

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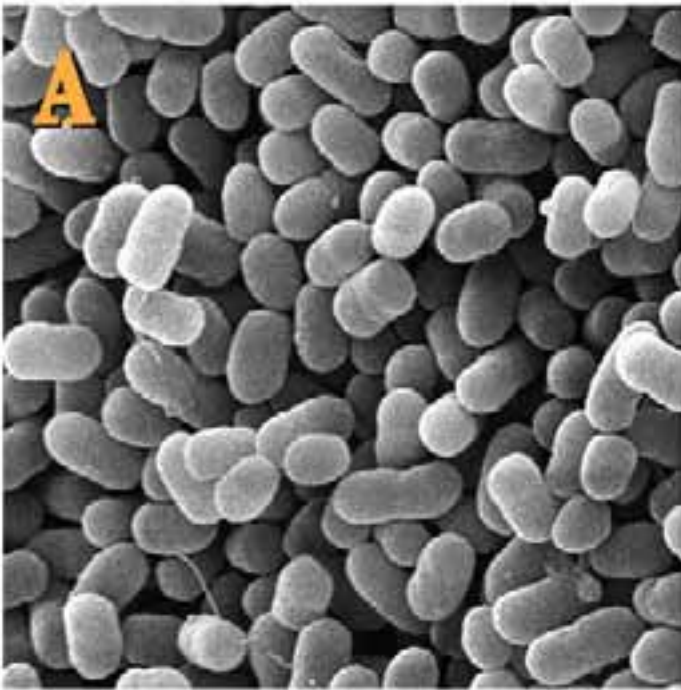
### Direct-fed antibodies have a future

Though still in its infancy, direct-fed antibody technology is on the horizon. The commercialization of this technology for O157:H7 could expand to other significant zoonotic pathogenic bacteria in pigs, providing abattoirs with another mechanism to reduce foodborne illness from pork that starts before the pigs even reach the packing plant.

Even beyond a food safety application, this pharmaceutical delivery system could create a new avenue for vaccine

and antibody delivery through feed, particularly at a time when barn labour is a significant challenge for many producers.

Whether or not an *E. coli* O157:H7 antibody for pigs is embraced as a method for preventing foodborne illness from pork, the development of a novel delivery method for antibodies could be a breakthrough product for the swine industry. ■



The development of oral antibody technology for *E. coli* may have implications for the prevention of other pork-associated infections as time goes on.

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# Study reveals more about PED in manure

**Andrew Heck**

When porcine epidemic diarrhea (PED) broke for the first time ever in Alberta, in 2019, the province's fears of its inevitable spread were confirmed. What was not clear – as in many disease outbreak investigations – is the source of how it arrived on-farm.

“Our disease surveillance program regularly tests for PED, among other viruses of concern,” said Javier Bahamon, Quality Assurance and Production Manager, Alberta Pork. “Before the outbreaks, and since, thousands upon thousands of tests have come back negative, which is a positive sign for our industry.”

Despite surveillance, and despite a lengthy investigation, Alberta's four PED cases from 2019 remain a minor mystery. Could it have been a contaminated feed ingredient? Poor truck washing? An unintentional lapse in biosecurity? We may never know for sure, but we do know the virus can be pres-

ent in manure. Is that manure capable of causing the virus to shed in piglets?

With PED flaring up in other parts of Canada, and as farmers turn to spreading manure on their crop fields as a way to offset high fertilizer prices, this question has become important to answer. Thanks to support from Swine Innovation Porc (SIP), Results Driven Agriculture Research (RDAR) and provincial funding partners, researchers at the University of Saskatchewan's Vaccine and Infectious Disease Organization (VIDO) – led by Qiang Liu and supported by Colette Wheler, Trina Racine and Mingmin Liao – began looking for clues last year, and their findings are now helping to better inform Canada's PED response.

## **Simulating barn conditions, for testing**

The concern over manure stems from the idea that piglets are highly exposed to manure in the barn, and some of that is ingested. Additionally, when it comes

to applying manure to fields, equipment used in the process can be considered fomites – transmission pathways – for the virus.

To find out if it is possible for piglets to shed PED virus after ingesting contaminated manure, three groups of newborn piglets were fed highly concentrated lagoon materials containing RNA of PED virus – a simplified genetic component – which was collected from infected lagoons by representatives from Alberta Pork and Alberta Agriculture, Forestry and Rural Economic Development. For this specific case study, the lagoon materials were necessarily gathered six-and-a-half months following the initial PED outbreaks in Alberta, which may have impacted results.

Using three commercially available pregnant sows from Prairie Swine Centre in Saskatoon, piglets were farrowed and immediately brought into the study. After being fed the lagoon materials, the piglets were observed for diarrhea and mortality

*CONTINUED ON PAGE 36*



*Newborn piglets are especially vulnerable to PED. The virus can be detected in manure using polymerase chain reaction (PCR) testing, but other transmission risks still exist even when manure is not the culprit for the disease.*



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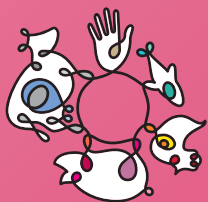
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Criteria for fecal scores	
Fecal scores	Description
0	Normal, formed feces
1	Soft, pasty like toothpaste, sticks to swabs
2	Mild diarrhea (wet), consistency of porridge
3	Severe diarrhea, watery and thin, drips off swab, Swab may come out "clean"

Criteria for clinical scores	
Clinical scores	Description
0	Normal appearance, healthy
1	Sluggish but ambulates well, appears to be nursing
2	Losing body condition, gets up if stimulated, ambulates fairly well and appears to be nursing
3	Difficulty standing even when stimulated, body condition deteriorating, tacky skin, empty looking

Fecal and clinical scores for the piglets involved in the trial

over the course of a week, which could potentially indicate PED infection. For a deeper dive, fecal swabs were collected for daily analysis.

Following the trial, none of the piglets showed any abnormal clinical signs, though there was mild diarrhea observed

in a few piglets. Diarrhea consistency trended toward the lower end of fecal scoring – toward “soft, pasty like toothpaste, sticks to swabs” – which would not be the case in the event of PED infection, where diarrhea should be seen at the higher, more severe end.

The mild diarrhea was gone after a couple of days, and the piglets completely recovered. Body weight gains were similar among piglets having diarrhea and piglets without diarrhea, further indicating that the diarrhea was not the result of PED but some other factor. Fecal swabs failed to yield any of the virus RNA at a detectable level as well.

In this specific case study, under the conditions in which the lagoon materials were gathered, the researchers concluded that the exposure of these animals to the infected material failed to produce infectivity or clinical signs of PED in the animals themselves. Other factors, it seems, are likely responsible for Alberta’s cases of PED in 2019.

**Study results are positive, with caution**

While the study’s supporters are pleased to have gained further insight into PED’s lack of infectivity in manure, with con-



sideration given to the time period in which the study took place after the initial outbreaks, the important take-home message for producers is not to rest on their laurels when it comes to proper practices.

“We are happy with what the study’s findings, as this study provides a reference when dealing with contaminated manure,” said Bahamon. “However, producers are always advised to be vigilant when it comes to using manure from their operations, since there are still so many more unknowns out there, and we do not want to give anyone a false sense of security, especially in places where PED is an active problem.”

Given the limitations of the study, it cannot be absolutely confirmed that PED virus shedding in piglets is impossible when exposed to contaminated manure. Key factors include the length of time following an outbreak and the number of outbreaks in any given geographic area. These must be taken into account when it comes to evaluating the risk of spreading the disease, and a different level of risk may be observed when dealing with certain cases when other concerns come into play.

As the industry’s understanding of PED continues to improve, mitigating risks, the threat posed by PED remains ever-present. With time and further investigation, the hope is that the industry can further adapt to the realities of this virus, for the benefit of healthy hog production. ■

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# Exploring genetic selection for feed efficiency

Argenis Rodas-Gonzalez

Editor's note: Argenis Rodas-Gonzalez is an associate professor in the Department of Animal Science at the University of Manitoba. He can be contacted at [argenis.rodasgonzalez@umanitoba.ca](mailto:argenis.rodasgonzalez@umanitoba.ca).



Topigs Norsvin Canada boars at a Manitoba facility being prepared for manure sampling to measure feed efficiency.

Profitable, cost-effective swine production requires healthy animals, higher performance, increased feed efficiency and making the best use of available nutrients.

Feed efficiency can be described as the biological basis of how pigs consume and metabolize feed to grow and produce an edible product. This is a complex trait based on a pig's ability to store and use nutrients from feed, such as fats, carbohydrates, and proteins. Skeletal muscle plays a significant role in using and storing those nutrients. Most of the efforts to improve feed efficiency have been focused on formulating bal-

anced diets through investigating nutrient composition and genetic selection for carcass leanness.

Feed efficiency can be expressed as a feed conversion ratio (FCR), which is defined as feed intake over body weight gain. A low-FCR value means animals consume less feed per unit of gained body weight, making them highly efficient; in contrast, a high-FCR value means animals consume more feed per unit of gained body weight, making them less efficient. There are other expressions of feed efficiency, such as residual feed intake and lean feed conversion, but these will depend on addi-

tional knowledge required for informed decision-making.

## Feed efficiency factors vary

A common approach to improve feed efficiency is to supply appropriate nutrient requirements for animals; however, the improvement could be limited and depends on the ingredient composition of the feed, which can vary in nutrient digestibility.

On the other hand, purebred pigs are selected for feed efficiency at the nucleus level, and genetic selection to improve feed uptake continues to be a challenge. At Topigs Norsvin, selecting genetics



Manure samples were analyzed to determine nutrient digestibility.

based on the estimated breeding values for a given feed conversion ratio (EBV-FCR) has proven to be an effective strategy to maximize feed efficiency and improve growth performance and carcass composition. However, it is not clear if nutrient digestibility in pigs could be altered by genetic selection for feed efficiency.

Studies have shown that diverse feed efficiency groups resulted in lines of pigs showing both differences in growth performance and digestibility of nutrients, which happens in the gut.

For example, in Yorkshire breeding lines fed with high-energy diets, the digestibility of dry matter, total energy, absorption of nitrogen and other nutrients like fibre are similar in both high- and low-efficiency groups, based on residual feed intake (RFI) values. But when these groups are fed with low-energy diets, the high-efficiency group has greater digestibility of dry matter, total energy, nitrogen and fibre compared to the low-efficiency group; however, low-energy diets reduce growth performance of both efficiency groups.

In contrast, other studies have reported no differences in digestibility among divergent feed efficiency pigs, despite high-efficiency pigs presenting a fast-

er growth and leaner carcasses. Thus, based on some contradictory results, uncertainty exists with selection for feed efficiency and its effect on growth performance, nutrient digestibility and carcass characteristics, especially with Large White lines.

## Overcoming the feed efficiency dilemma

My team at the University of Manitoba includes researchers Ethendhar Rajendiran, Gustavo Mejicanos, Laura Beens and Ankita Saikia from the Department

CONTINUED ON PAGE 40



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of Animal Science. We are working in collaboration with Topigs Norsvin Canada to respond to certain feed efficiency questions that have stumped breeders.

Our project is funded by Topigs Norsvin Canada, the Canadian Agricultural Partnership and the Ag Action Manitoba Research and Innovation program. The investigation is planning to evaluate 2,000 genotyped boars from two Large White dam and sire lines separated into low- and high-feed-efficiency groups based on EBV-FCR values within the breeding line.

This study investigates the variation in growth performance, apparent total tract nutrient digestibility (ATTD) and *in-vivo* carcass traits in finisher boars selected for low or high feed efficiency. Digestibility is determined by testing manure nutrient levels using an indigestible marker, while *in-vivo* carcass traits refer to the lean yield of the whole pig, determined using Computer Tomography (CT) scanning. Boars are selected at 23 weeks of age based on their feed efficiency value and fed a mixed corn-soybean meal-based diet using feeding stations that record individual feed intake and body weights.

Preliminary findings indicate that the sire line was heavier, with a final weight of more than 9.69 kilograms, growing more rapidly and more efficiently than the dam line, gaining more than 130.69

grams per day with a feed conversion ratio of less than 190 grams of feed consumed to gain one kilogram of body weight.

In addition, sire line presented greater loin depth, at more than 6.92 millimetres, and thinner fat depth, at less than 2.60 millimetres. However, there was no significant difference in nutrient digestibility between lines. On the other hand, regardless of the genetic line, and compared to the low-efficiency pigs, the high-efficiency pigs consumed less feed, at less than 284.97 grams per day, were more efficient, with a feed conversion ratio of less than 260 grams of feed consumed to gain one kilogram of carcass weight, had thinner fat depth at less than 3.05 millimetres, along with greater loin depth more than 6.92 millimetres compared to low-efficiency pigs.

The high-efficiency pigs were better able to digest crude protein and tended to show higher phosphorus and calcium digestibility compared to low-efficiency pigs. Based on the estimated protein deposition and the average feed intake one week before sampling, the amount of digestible lysine content met the requirements for the average pig. Nevertheless, high-efficiency pigs had a reduced feed intake, implying that they might have experienced a shortage of lysine in the diet. Thus, high-efficiency pigs offer favourable growth performance, heavier and leaner carcasses. However, it is still



unclear whether the improved digestibility of crude protein was due to a lysine shortage or differences in genetic merit for feed efficiency.

### Forward thinking for progressing efficiency

The University of Manitoba and Topigs Norsvin are also exploring the pig gut microbiome to identify the favorable microorganisms that contribute to feed digestibility, along with determining feed digestibility by using near infrared spectroscopy, and *in-vivo* leanness by CT scan. The findings may allow us to better understand the relationship between the gut microbiome, nutrient digestibility and genetics, leading to the improved and more effective selection of pigs for breeding programs. ■

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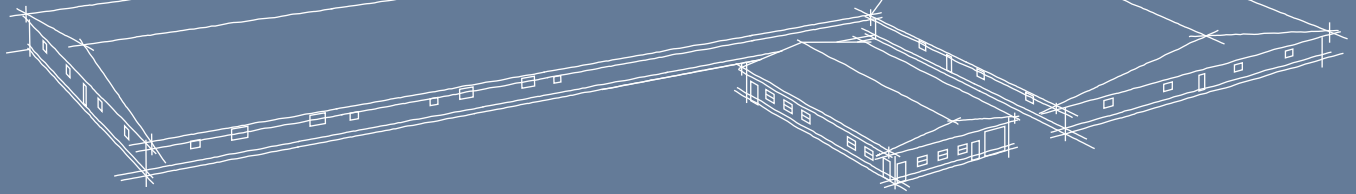
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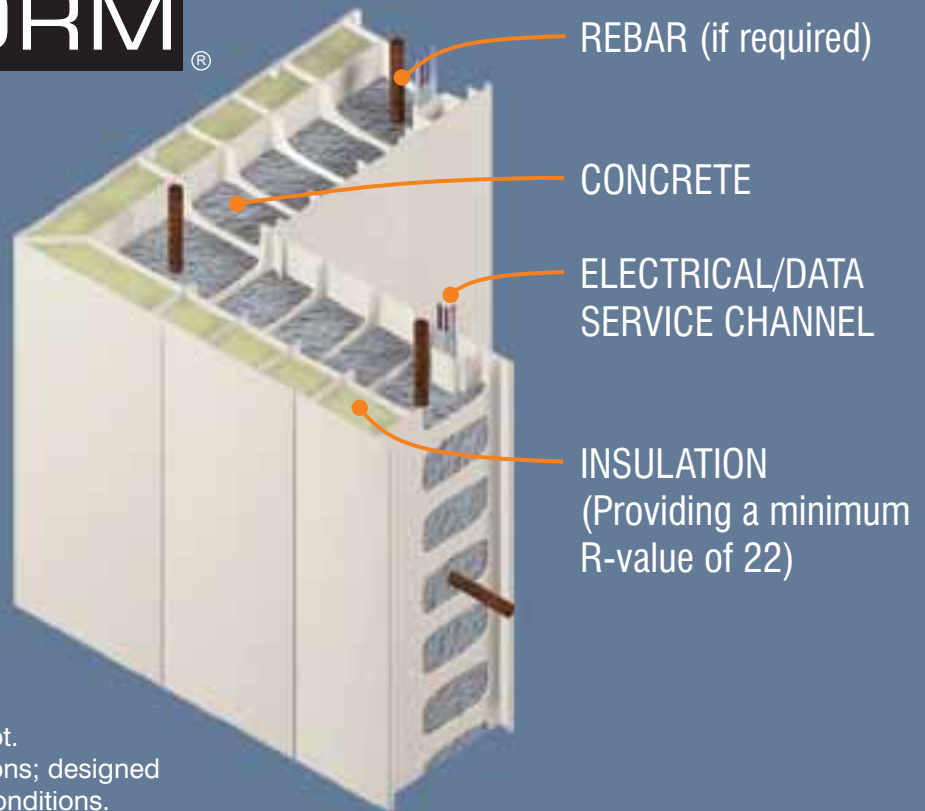
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