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### Cover Photo

Apple- and chaga-brined pork rib chop



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# Message from the editor

The Banff 2023 edition of the Canadian Hog Journal is here!

For the second year in a row, the Banff Pork Seminar returned in-person. This year's seminar took place with the theme: 'A Sustainable Pork Journey.' By now, many people in a lot of industries reflexively roll their eyes when they hear the word, 'sustainability.' But, true to its definition, it has every intention of sticking around as a principle touching everything from farming and processing, to retail and restaurants. Hence, the cover photo of this edition is a dish served at the Juniper Hotel's bistro in Banff – noted for its commitment to eco-consciousness and preserving the area's Indigenous heritage.

Choosing that image, on my part, wasn't without purpose. Other than being an incredible-looking and delectable-tasting dish, to me, it illustrates the line-of-sight our industry must have when it comes to everything we do. While many people in our industry may consider the connection from the farm to the table to be tenuous, Banff is one of the most pertinent examples of how wrong that notion is.

Consider where Canadian pork ends up: most of it goes to Asia. Walking through the streets of downtown Banff, guests at the seminar may have noticed Japanese script on storefront windows and signs indicating shops carrying everyday cultural staples, such as instant noodles. Those are not random observations but should suggest something about the origins of the tourists who visit our country to spend money. These same tourists buy our pork at home, in their own countries. Tourists, just like guests at the seminar, frequent Banff's businesses, including restaurants. The one I chose to highlight was singled out for its additional values that align with this year's theme for the seminar and encourage positive public percep-



tion – something that continues to be desperately needed in animal agriculture.

With that in mind, there is a skewed side of sustainability, and it is sustainability that compromises the product – the pig, which becomes pork. While society undoubtedly expects our industry to fall in line with sustainable practices, if these practices result in worse-performing pigs or pork that is lower-quality or less food-safe, the sector will have lost the plot, and society will have lost an affordable, delicious, nutritious source of sustenance. At that point, sustainability may be counter-intuitive. On top of that is also the issue of financial gain – the 'brass tacks' of why producers are able to raise pigs, why packers are able to slaughter them, and why end-users are able to sell pork to customers. If sustainability, in that sense, amounts to widespread consumer buy-in, then it all has a round-about way of being justified. But if that financial element is overlooked, everyone loses.

Writers are seldom the most knowledgeable people in the room, but yet, we're the most inclined to open our proverbial mouths by publishing our words. Case in point: the photo on this page shows me, at right, with Alberta Pork's Production Team, Javier Bahamon and Cris Neva, at left and centre – two very astute individuals with an invaluable dedication to this industry that many of you share.

With that considered, let me know what you think about this edition by emailing [andrew.heck@albertapork.com](mailto:andrew.heck@albertapork.com). I would also encourage you to participate on social media and 'follow' the Canadian Hog Journal on Facebook and Twitter (@HogJournal). ■

A handwritten signature in black ink that reads 'Andrew Heck'.

Andrew Heck



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# Inflation could cause markets to balloon this year

Andrew Heck

Unless you have been living under a rock or in some kind of banana republic with absurdly worthless currency, you have probably noticed that things have gotten pretty expensive in the past year especially, from farm supplies to food.

At the 2023 Banff Pork Seminar, two presenters, Brett Stuart of Global AgriTrends and Steve Weiss of NutriQuest, offered their analyses of the year to come, as it relates to market impacts on the pork industry.

## COVID-19 aftermath, cash and China

COVID-19 created a lot of unpredicted and unprecedented market hiccups, but for the most part, its effect on market conditions today has waned, but not without leaving a long-term mark.

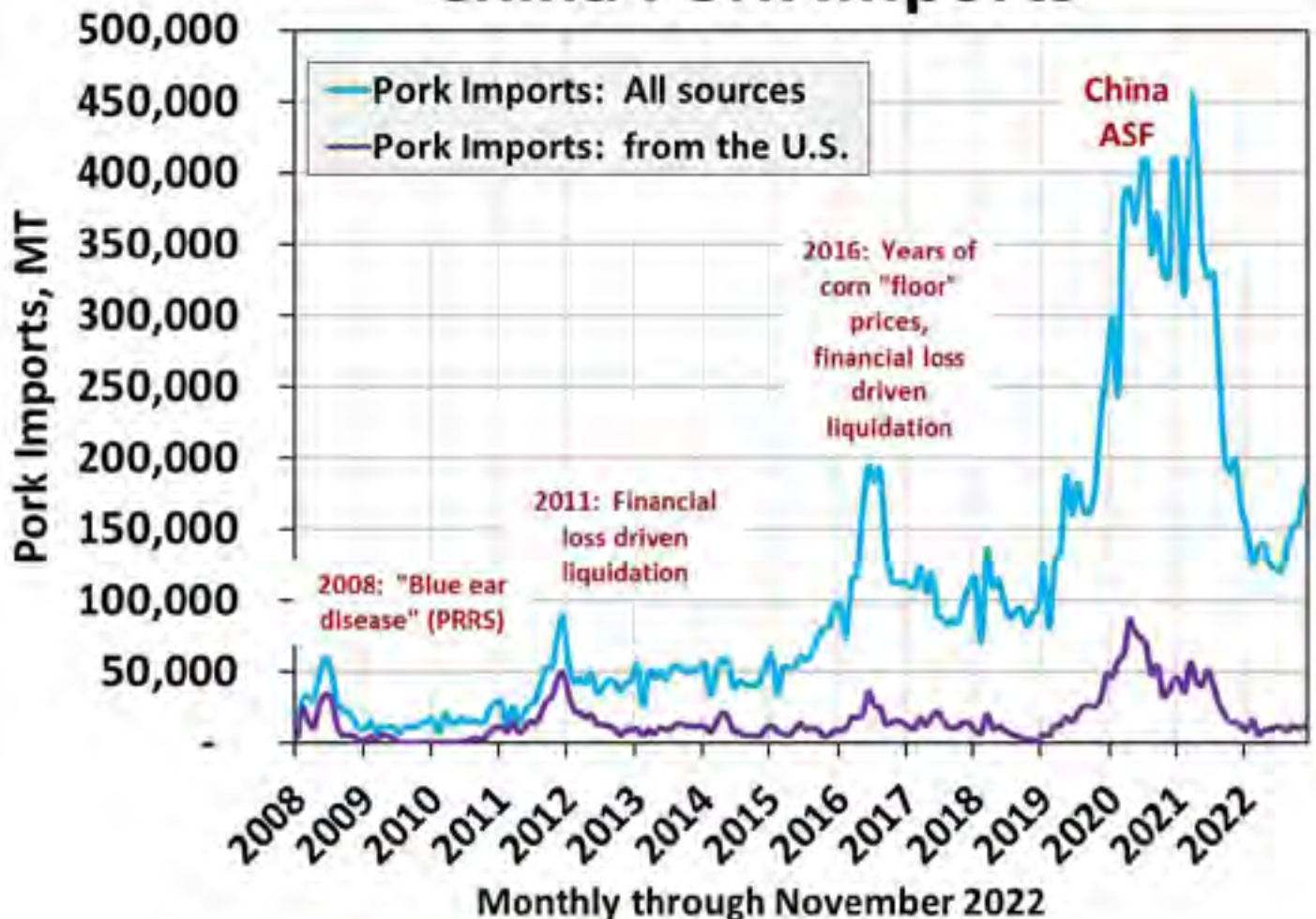
According to Brett Stuart, food price indices have stabilized since COVID-19 started, but that baseline has increased by 20



According to Brett Stuart of Global AgriTrends, the risk of a global recession, due to inflation, remains high but not certain, considering the market situation.

CONTINUED ON PAGE 8

## China Pork Imports



The Chinese market for pork imports has historically been incredibly volatile and driven by sudden demand. Over the course of 2022, imports declined significantly, and Stuart predicts this trend to hold.





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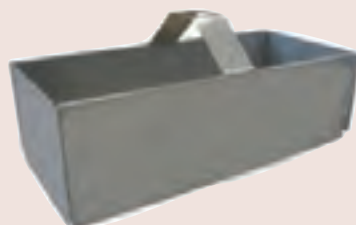
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*According to Steve Weiss of NutriQuest, producers and packers need to do more to work together, as risk management becomes a greater focus.*

basis points, due to inflation created by increased money supply. In 2020, global broad money supply was 143 per cent of global GDP, and that proportion of money to GDP continues to increase.

“We’re not going back. Don’t hold your breath,” said Stuart. “I’m not saying things are never going down, but it won’t be the same.”

While interest rates are on the rise and concerning, Stuart does not expect them to reach double digit rates of the

early-1980s. He expects two or three more rate hikes this year, and then they may actually start to come down.

“The Fed [U.S. Federal Reserve] talks tough to scare the market into compliance,” said Stuart. “That’s what they do. But how hawkish are they going to be this year?”

A large part of the reason why the money supply grew was economic stimulus activity related to COVID-19. In theory, the stimulus was meant

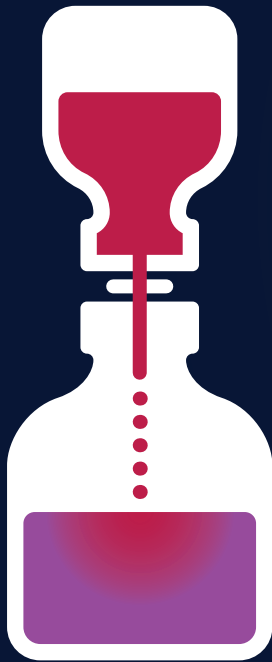
to support those who needed it most – such as those who were left out-of-work due to lockdowns – but Stuart posits that more of the money ended up in the pockets of corporations, rather than providing the intended effect of increased consumer spending. While inflationary periods can cause consumers to tighten their budgets, a lot of that activity may be related to the nature of the expense. Unfortunately for our friends in beef, that means them.

*CONTINUED ON PAGE 10*

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U.S. beef production is expected to be down by seven per cent in 2023, representing the single-largest drop in 44 years. This could result in a decline in consumption of around two pounds per person. However, beef's loss is sometimes pork's gain, and based on data following the 2008 global recession, pork fared OK during that time. If we head toward a similar situation in the months ahead, Stuart speculates the situation could be the same.

Looking internationally, Stuart is not confident much U.S. pork will go to China this year. Reports suggest Chinese domestic production is at its highest in the past eight years, after a sharp decline due to African Swine Fever (ASF) starting almost five years ago.

"They can live without us, but can we live without them? The simple answer is that, if Mexico keeps buying our pork, we can live without China," said Stuart. "[U.S. and Canadian pork exports] ebb and flow with China. The only growth market is Mexico."

Mexican domestic hog prices have been at a record high, which benefits U.S and Canadian exports. The corn

price in Mexico has contributed to elevated feed and hog prices domestically, growing the demand for foreign pork.

"It's the only country in the world where production's increasing, consumption's increasing, imports are increasing and exports are increasing," said Stuart. "What it is, is rising incomes."

### Input costs show no sign of slowing down

Steve Weiss examined the angle of profitability in the face of high input costs as the focus of his presentation. He expressed some strong concerns about what lies ahead this year, in that regard, suggesting costs will put extreme pressure on business leaders in the hog sector.

"It's pretty scary and eye-opening what people are looking at in 2023," said Weiss. "In a commodity business, cost is king."

In this timeline of rampant inflation, where is the value going for pigs and pork? Weiss suggested the consumer price of pork was shared more evenly between producers, packers and retailers decades ago, but over time, re-

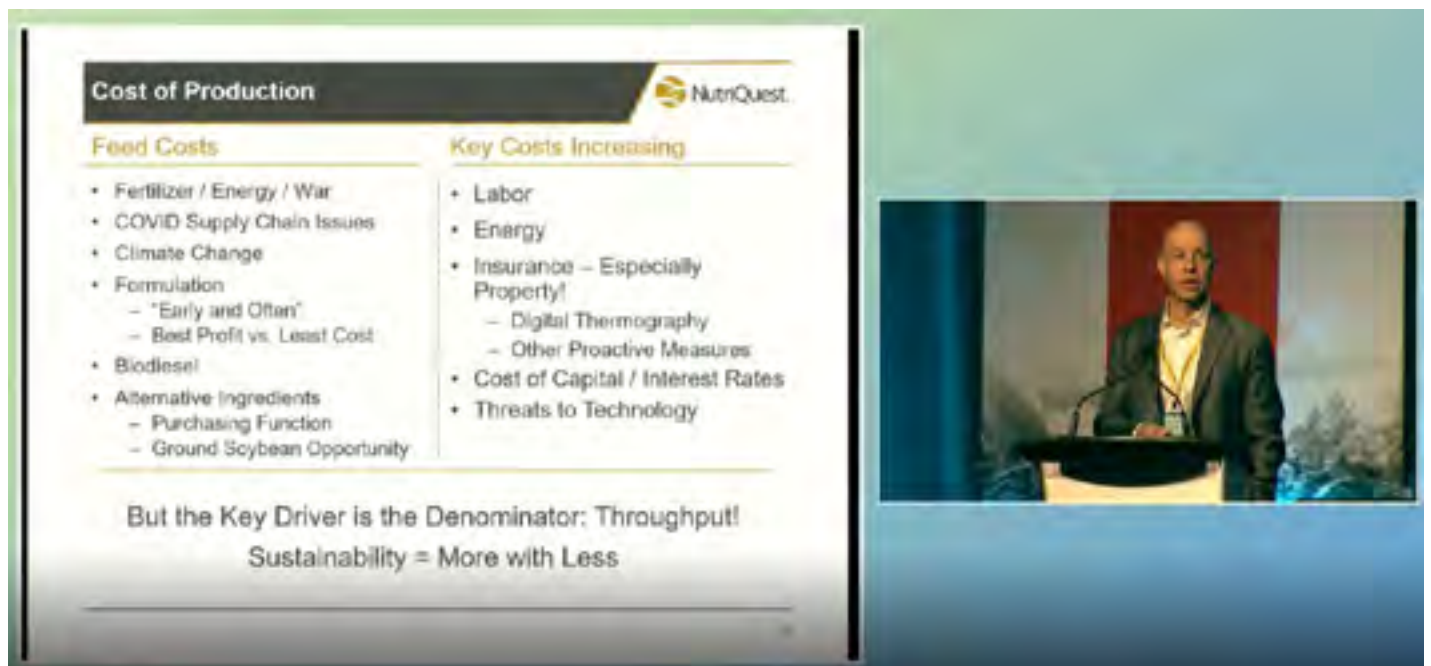
tailers have begun to absorb the lion's share of profits.

Looking back on his time starting out in the industry, in the early-1990s, Weiss recalled a time when hog industry growth was all but inevitable. The future was brighter then, as he believes the industry has stagnated in recent years, despite optimism it might have become more streamlined and equitable.

"There's always been a win-lose mentality between producers and packers," said Weiss. "And I'm not sure that's sustainable."

According to Weiss, the most successful producer-packer negotiations result from producers treating packers as their customers. In the absence of price discovery, this is the best approach for producers.

In the U.S., cost of production has increased by at least one-third in two years, but there is high variability among producers Weiss works with. Being creative with alternative feed ingredients is also picking up interest, such as upping soybean meal rations in diets.



Business efficiency, or 'throughput,' is the best insulation against losses this year, according to Weiss.



Disease issues and mortality also play an overlooked role in what contributes to costs. The spread of porcine reproductive and respiratory syndrome (PRRS) and porcine epidemic diarrhea (PED) in the U.S. could give Canada an advantage this year, he thinks, given our high standards compared to other jurisdictions.

“You look at China’s hog hotels, and Canada is kind of the opposite, with so much land and good biosecurity,” said Weiss.

With fertilizer prices through the roof, Weiss suggested the value of manure is greater than hog profits currently, for some, but that value is not being adequately recovered by producers. On top of cost savings, using manure responsibly is part of our industry’s sustainability story. Capturing the value of manure and assigning it a dollar value is neces-

sary. Failing to do so is a missed opportunity, which speaks to poor risk management strategies.

“If you don’t do [business risk management] methodically, it’s just not sustainable,” said Weiss.

Weiss has seen how businesses with disciplined risk management approaches are doing the best right now. Operating passively is dangerous in the marketplace today, and benchmarking your losses and gains is vital to improvement. To do so, information needs to be timely and accurate.

Living with the reality of an industry experiencing contraction, Weiss also highlighted the importance of succession planning for those looking to retire or otherwise make an exit from the sector. As the marketplace becomes harsher for independent producers, this may lead to further consolidation and vertical

integration but not necessarily expansion of the total hog herd.

### **Prices versus costs: a balancing act**

In recent years, the list of problems for the hog industry appears to have gotten longer than the list of solutions. Perhaps it has always been this way, but as we trend toward stricter budgeting, increasing consumer demands and a more competitive labour pool, pig production and pork processing alike may be forced to continue limping along in 2023 without much financial reprieve except the prospect of hog prices hovering above the five-year average. ■



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# Sustainability hangs on to pigs and pork

Andrew Heck

'Environmental, social and governance' (ESG) goals: you may have heard of them, and you may be skeptical that they are a hip but unsubstantial layer within the complexity of big business. On top of that, you may be wondering what they have to do with agriculture at all, or at least raising pigs or selling pork.

Like a cultural tsunami, these corporate priorities have swept up investors, executives and media pundits alike, and they are probably coming to a barn and processing plant near you, soon, if they have not already arrived.

In fact, two presenters at the 2023 Banff Pork Seminar, Mauricio Alanis, Direc-

tor, Sustainability Strategy & Partnerships, Maple Leaf Foods and Banks Baker, Director, New Product Marketing, Pig Improvement Company (PIC) are riding the crest of that tidal wave but bringing plenty of hope and encouragement along with them, rather than heavy-handed morality or guilt-inducing tactics of those who sometimes like to pick on the livestock sector.

Alanis and Baker were recruited to speak about their companies' sustainability commitments, what they mean and, most importantly, how they are measured. And they did so with a great deal of fluency and convincing, providing some helpful insight into where sector leadership is headed in the very near future.

## Maple Leaf considers all aspects of production

In 2019, Maple Leaf Foods declared itself the 'world's first carbon-neutral food company,' based on its systematic approach to avoiding, reducing and replacing emissions of carbon dioxide.

According to Mauricio Alanis, through-out Maple Leaf's operations – from farms

to packing plants and beyond – the company uses instruments to measure carbon dioxide releases, where possible, such as from manure lagoons. These readings are validated by an unbiased party, for accuracy. Whatever carbon is unable to be mitigated by making process optimizations is offset by the purchase of carbon credits.

"Offsets are not *the* solution; they are part of the solution," said Alanis. "They keep us honest on our sustainability journey."

The idea behind purchasing offsets is to contribute to investments in projects that work toward addressing carbon intensity in all kinds of areas inside and outside of agriculture. Offsets are verified by third-party registries that endorse projects based on their ability to make a difference in the bigger picture. Projects include renewable energy development, anaerobic digestion of manure for electrical generation, regenerative crop production and carbon sequestration.

Maple Leaf's 'carbon inventory' spans everything from greenhouse gases (GHGs) resulting from barn heating and other



The much-anticipated plenary session on sustainability, matching the seminar's overall theme, was a popular topic of conversation.



Mauricio Alanis faced a critical crowd but provided evidence for how Maple Leaf Foods is backing up its sustainability commitments.



production inputs, to emissions from feed crop production and end-use considerations like transportation and packaging materials for its food products.

But, for Maple Leaf, sustainability takes into consideration more than just emissions. Alanis believes the food industry today faces a burning platform in terms of emissions, antibiotic use and food waste. The intersection of *what the world needs* and *who you are* creates purpose, and that is the driving force behind the company's sustainability initiatives.

"It's not just the bacon you scraped off you breakfast plate. It's everything that preceded it," said Alanis. "We can do good by food, and we can promote our industry's positive effect on society."

Maple Leaf is currently the largest producer in North America when it comes to pork raised without antibiotics (RWA), representing a 99 per cent reduction in use across company-owned hog operations since 2014. Maple Leaf previously



Maple Leaf's 2021 Sustainability Report summarizes the key areas in which the company is constantly trying to improve.

committed to ending gestation crate use by 2024 and exceeded that target by meeting the goal in 2021. Additionally, the company's own farms also recycle 100 per cent of hog manure, by using it on crops.

The business case for sustainability is also not lost on Maple Leaf. Following

consumer trends and making marketing claims is an important part of the follow-through on their initiatives, which translates into company profits.

Product claims on packaging highlight the company's values in "delivering nutrition, affordable and sustainable food choices that don't compromise on

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<sup>2</sup> ES 124, ES 133, ES 147, ES 150, ES 144, ES 154

taste,” which appeal to some consumers’ appetites for a ‘better’ product than comparable goods that are, perhaps, unable to make the same claims regarding carbon neutrality, animal welfare and meat quality – even if those claims ultimately rely on perception and preference.

For an integrated producer-packer with retail-branded products, like Maple Leaf, it all adds up to consistently favourable meat margins, even though the company’s plant-based portfolio has yet to make much profit, if any. While many producers may not always consider the value added by processing to be returned to them, at the independent farm level, it stands to reason that Canadian companies like Maple Leaf need to stay on the cutting edge to compete with even larger players around the world, including next door in the U.S. Any loss of global pork market share by the likes of a Maple Leaf or another major packer in Canada ultimately spells worse outcomes for Canadian producers.

### PIC approaches carbon reduction differently

While Maple Leaf Foods is focused on addressing sustainability across its supply chain, PIC is looking through a wider lens and working to make pigs that naturally pollute less, through gene editing. PIC is working with industry partners to develop a genetics framework, which, once developed, will be available to all swine genetics companies.

It is a decidedly contemporary direction for the genetics sector. Not only does the framework have the potential to reduce the carbon intensity of pig production, but performance, too, could see gains and cost savings with fewer inputs.

“Agriculture is being asked to do a lot,” said Baker. “And we’re being asked to do this in the face of a food affordability challenge.”

While lower-carbon pigs will not bring grocery shoppers’ bills down,



PIC’s Banks Baker is not a climate alarmist, but he is a bit of a canary in a coal mine, when it comes to alerting others to where the industry is headed.

they do conform to a trend that is being seen across the business landscape. Companies spanning the industrial spectrum are aligning with the Paris Climate Accords: science-based targets set out by the United Nations (UN), covered under a treaty signed

by all 194 UN members, including Canada, and representing more than one-third of global market capitalization today.

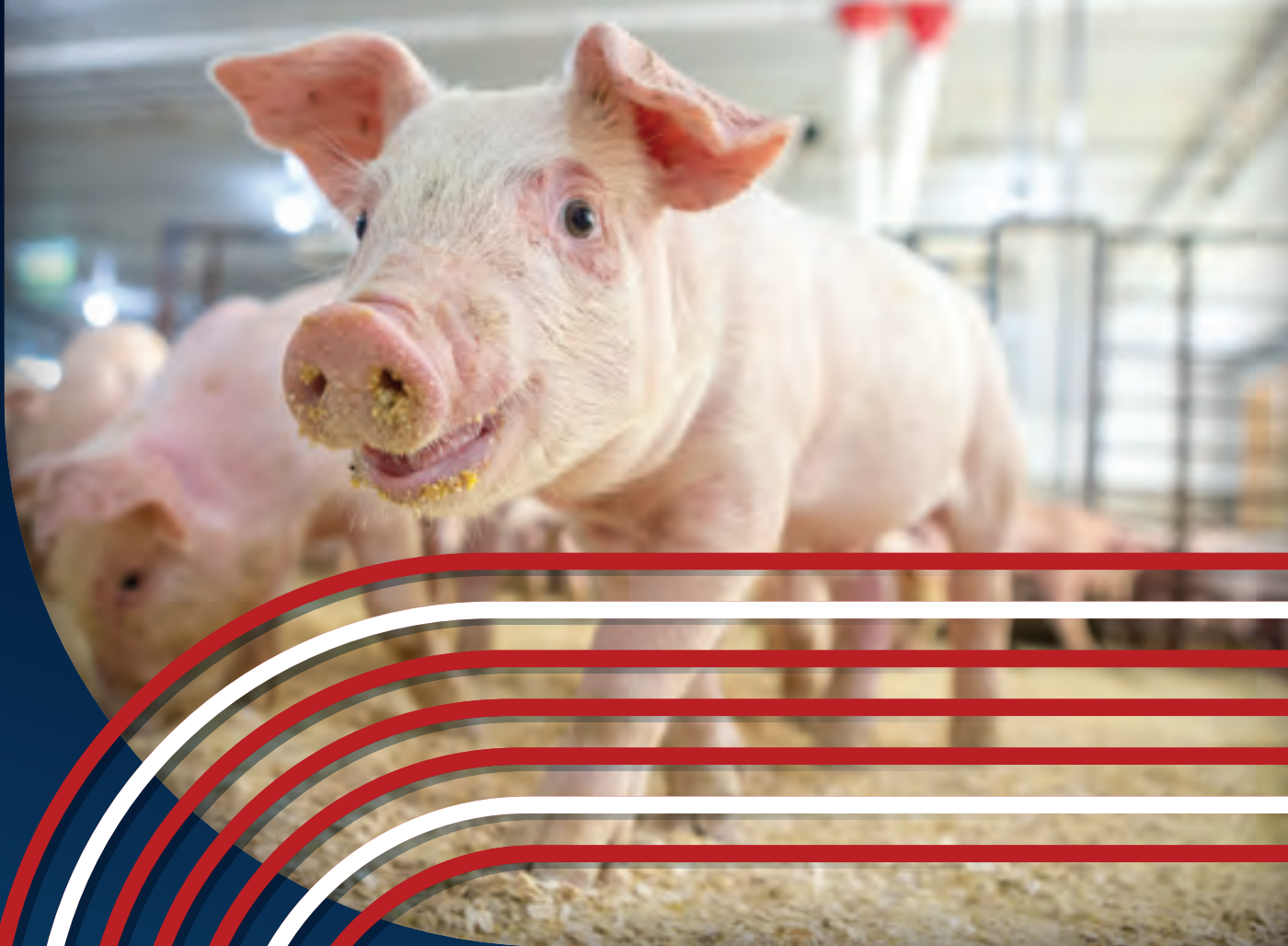
“I’ve heard from some people they don’t believe in climate change or that they don’t believe it’s caused by humans,”

CONTINUED ON PAGE 16



While the Paris Climate Accords have been universally agreed upon by UN members, how will transitioning to lower-carbon activities be funded? Countries in North America, western Europe and eastern Asia have the deepest pockets, thanks to industrial development, which is, paradoxically, the main climate change culprit. Image © World Bank





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said Baker. “I’m here to say, it doesn’t matter. Our customers are asking for these things, and our governments are compelling them.”

Baker points to the U.S. Government’s net-zero commitment by 2050.

“When you look at this from a logical deduction standpoint, what’s coming next? Is it something like a carbon tax?” said Baker. “This is on our doorstep. This is here.”

While planet-minded pigs could certainly boost the hog industry’s image, improved genetics also have obvious profitability benefits for the producers who raise them. As genetics companies and other suppliers make these kinds of climate commitments, Baker feels it is important to reward producers for assisting in the process, by providing financial incentives.

There are even opportunities to build bridges with critics. Animal activists may support animal welfare improvements through gene editing, which also contributes to company sustainability. When it comes to those who question the safety, healthiness or taste of eating pork from gene-edited pigs, and whether that could deter consumers, Baker is not worried.

“PIC has been in this business for 60 years, and we plan to be in it for another 60,” he said. “We’re not trying to interrupt choices or jeopardize trade.”

Whether sustainability comes in the form of enhancements to genetics, on-farm production, processing or end-use

efficiencies, the challenge will remain for the entire industry to equitably spread the benefits across the value chain.

### **Sustainability can improve image and bottom line**

All told, the discussions around sustainability in agriculture must continue to balance saving the planet and saving profits – but that is not necessarily a *bad* thing.

Whereas navel-gazing and self-consciousness are a real risk with these discussions, producers, packers and everyone with a stake in food production (which includes anyone who eats food) should consider that the weight

of world hunger – sad as it to acknowledge – must ethically outweigh sentimentality around environmental concerns, even if those purported concerns are said to exacerbate food insecurity, which is a shaky argument, at best.

Sustainability matters, but only if food is making it onto the world’s plates. This does not, however, mean that pie-in-the-sky idealistic thinking can be ignored, since, without it, progress is seldom realized.

Working to curtail the carbon intensity of the hog industry, while also being mindful of other consumer demands that tend to overlap this issue, is still a relatively unexplored frontier. ‘First mover advantage’ may not have disappeared yet for agri-businesses, when it comes to novel concepts regarding sustainability, but there will come a time when that ship has sailed, and the scrutiny will shift toward those who have failed to adapt as quickly. Today’s values-based consumer or foreign buyer will have the option of simply looking elsewhere for their purchases – perhaps a commodity other than pork or a country other than Canada, altogether. ■



*Sustaining the planet is important, but that will not happen without sustained profits around agri-food capacity to feed the world. And a sustained planet is only as valuable as its people, many of whom are suffering from food insecurity. Image © WFP/Michael Castofas*



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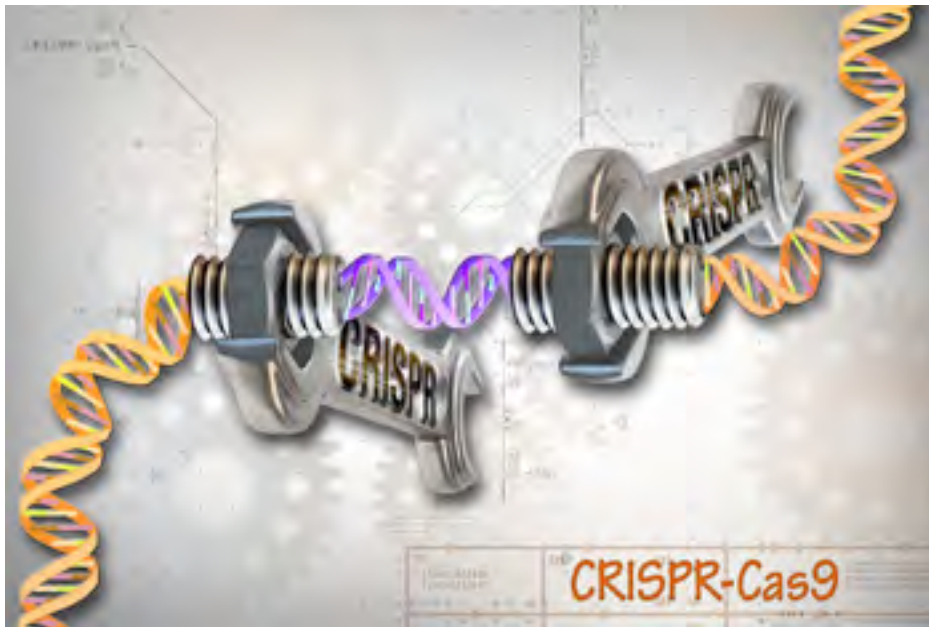


[DNASwineGenetics.com](http://DNASwineGenetics.com)



# Dissecting gene editing for pig production

Andrew Heck



*CRISPR/Cas gene editing technology was discovered in 2012. The scientists who discovered it won the Nobel Prize in Chemistry in 2020. In just over a decade, the technology has positively disrupted the field of genetics forever. Image © U.S. National Human Genome Research Institute*

When science fiction becomes science fact, heads quickly turn. Such is the case with gene editing – an emerging suite of technologies enabling precise changes to the DNA of a cell or animal.

While the discovery of DNA in the 1950s heralded a new age for biotechnology, the field really began to take off after the 1990s, thanks to successive breakthroughs in genetic engineering.

Fast-forward to the 2020s, and gene editing technologies are now taking centre stage, with more than 35,000 scientific papers published on the subject since 2013, including 7,000 alone in 2022. More than 100 of those published last year were related to pigs, specifically in the field of biomedical science.

Just prior to the start of the 2023 Banff Pork Seminar, Swine Innovation Porc (SIP) hosted three researchers to present their knowledge on the subject, including Ray Lu from the Department of Molecular and Cellular

Biology at the University of Guelph, Vilceu Bordignon from the Department of Animal Science at McGill University, and Stuart Smyth from the Department of Agricultural and Resource Economics at the University of Saskatchewan.

The researchers each spoke on different aspects of gene editing. For Lu, the possibility of using gene editing as a solution to the wild boar problem; for Bordignon, an exploration of where the technology has been successfully deployed in various aspects of our world; and, for Smyth, the state of the technology's public acceptance.

“Our goal in presenting this information is not about being ‘for’ or ‘against’ gene editing,” said Arno Schober, Chair, SIP. “It’s about bringing together farmers and researchers to have discussions about how we can prepare for the future and what role it could play in our industry.”

To begin to understand the basics of gene editing, it is important to establish what it is. ‘CRISPR/Cas’ gene

editing is a precision genetic toolbox that singles out individual nucleic acids – the building blocks of DNA. This allows for the creation of new gene sequences at the same level as nature, in principle. Genetic variations exist naturally between organisms but also between cells within an organism, and most of these differences play no role in ‘phenotypes,’ which are the visible expressions of genetic variation, such as what makes brown hair, brown, and blonde hair, blonde.

Comparing gene editing to genetic modification or ‘GMO,’ the major difference is that gene editing relies on existing genetic material to perform edits, rather than introducing new genetic material – typically from entirely different organisms – which is the case with GMO.

At the higher level, more traditionally, genetic variation within livestock has been brought about through selective breeding strategies. These have, for a long time, led to the favourable genetic advancements in pigs that we can all appreciate. But can isolating, slicing and replacing strands of DNA achieve results in a similar fashion, with greater speed, efficiency and effectiveness? Certainly, and science is only beginning to scratch the surface.

## **A radically different approach to wild boar**

On the Canadian prairies, in parts of Ontario and across the southeastern U.S., wild boar – sometimes referred to as ‘feral swine’ or by other terms – are a highly destructive invasive species. Controlling wild boar populations has proven incredibly difficult or impossible, in some regions. Hunting causes their groups to scatter and infest new areas, leaving the most credible solution, at present, to be tracking, trapping and culling whole groups, called ‘sounders.’





*By introducing gene-edited wild boar into existing populations, they could reproduce slower or become resistant to certain viruses.*

But what if there was a proactive way to manage the wild boar population? Ray Lu believes gene editing could help reduce the harm they cause in two ways: one, by making them resistant to the African Swine Fever (ASF) virus, or, two, by limiting their ability to replenish their numbers so quickly.

The first option is called ‘population replacement,’ which refers to editing an organism’s genome so the specific gene that transmits a certain pathogen

is altered in a way that does not allow for transmission. With successive generations of reproduction, the altered gene becomes more prevalent, eventually snuffing out any virus-carrying potential. The second option is called ‘population suppression,’ which acts as a method of generating female infertility to reduce wild boar numbers outright.

In 2015, Pig Improvement Company (PIC) began to develop a gene-edited

pig resistant to porcine reproductive and respiratory syndrome (PRRS). Currently, the company is working toward making the pig commercially available. There has been a great deal of enthusiasm around the PRRS-resistant pig, and some have wondered if the approach can be applied to other swine viruses.

“For ASF resistance, it is more complex,” said Lu. “This virus is very stable in the environment.”

ASF is presently less widespread than certain other swine viruses, including PRRS, but its existence anywhere is much more concerning for the pork value chain, collectively, along with Foot-and-Mouth Disease (FMD), which affects swine and several species of ruminants. PRRS continues to take a massive toll on swine herds around the world, and recovery from PRRS is costly for individually affected farms; however, the discovery of an ASF or FMD case in Canadian wild boar or a domestic pig herd would close our borders to the international markets into which around 70 per cent of all pigs produced and pork processed in our country are sold. Given the relationship between Canadian and U.S. markets when it comes to pricing pigs and pork, a case of ASF or FMD discovered in the U.S. could be equally devastating for

*CONTINUED ON PAGE 20*

# SO MANY GENES – ONE GOAL

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Canadian exports of live animals or pork and beef products.

While the agri-food industry certainly has a vested interest in controlling wild boar and diseases they carry, other disease issues have a broader, global impact on humans. Mosquito-borne viruses like dengue, malaria, Zika and West Nile kill upwards of one million people annually, with the vast majority of cases and deaths affecting people in Africa, especially young children. As such, the scientific community has been actively pursuing gene editing solutions to combat these viruses, demonstrating that the real potential for positive improvements in this area goes well beyond the hype. Suffice to say, the world is ready for any credible strategy that lowers the toll of insect- or animal-borne disease transmission, which is a promising inclination for everyone.

### **Where gene editing is already finding success**

Vilceu Bordignon believes advancements in gene editing can have mutual benefits for human medicine and livestock production, while also recognizing the pitfalls.

“Not all genes can be edited,” said Bordignon, referring to genes that are fundamental to an organism’s existence. “What we do in the lab isn’t ‘natural,’ but it’s pretty close to what nature does.”

Bordignon provided several examples of how the technology is already being deployed, including ‘xenotransplantation,’ which is the transfer of living cells, tissues or organs from animals to humans. Notable instances include a pig-to-human kidney transplant, in late 2021, and a pig-to-human heart transplant, in early 2022. Both examples were taken from pigs that had 10 gene edits applied.

In the case of the kidney transplant, the recipient continues to live a functional life, but in the case of the heart transplant, the recipient, unfortunately, passed away just two months following the procedure. The recipient was a 57-year-old male with terminal heart disease. Had nothing been done, his fate may have been the same. But thanks to his willingness to participate in the experimental procedure, his contribution and the work of the surgeons who performed the transplant will long be remembered as a necessary step toward meaningful progress. Such examples exist in many scientific fields throughout history, and their value cannot be overstated.

In livestock production, gene editing is more familiar to the bovine industry. It has already been used to produce hornless dairy cattle with genome-edited cells, and within the



*The world’s first pig-to-human kidney transplant took place in September 2021. The pig from which the kidney was harvested was gene-edited to remove a gene sequence that causes organ transplant rejection in humans. Image © Joe Carrotta/NYU Langone Health*



past year, the U.S. Food and Drug Administration (FDA) has approved beef from gene-edited cattle for human consumption.

“Gene editing is much more than cutting genes with scissors; it’s more like a Swiss Army Knife,” said Bordignon. “The CRISPR/Cas system allows for all kinds of modifications and combinations.”

Piglet castration is a contested practice within production, along with tail-docking. While it makes practical sense, the animal welfare component is constantly brought to light. The main goal of castration is to remove the testes to prevent male

pigs from reaching sexual maturity, to avoid ‘boar taint’ in meat. A novel approach could be to use gene editing to delay puberty beyond market age – so it is never fully reached – or generate sex reversals in utero by preventing the expression of the genes that present the male phenotype, resulting in an all-female piglet litter.

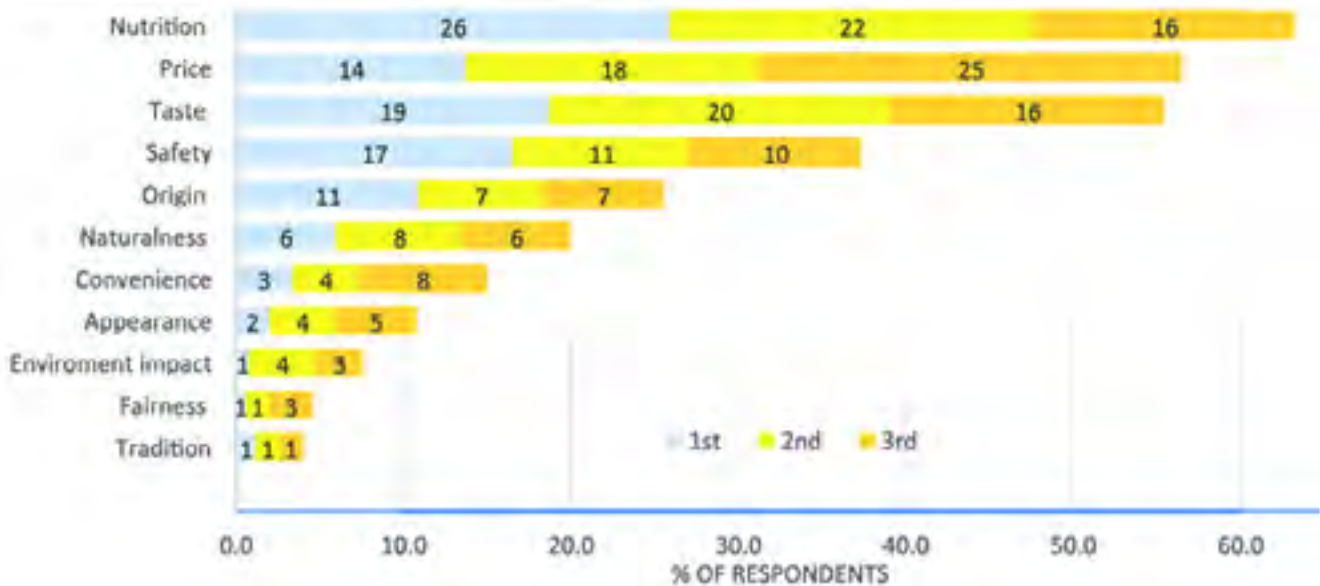
No matter where gene editing in livestock is headed, the possibilities cannot be denied, while the full scale of unknowns surrounding the technology warrants further research and dialogue across the agri-food industry and society.

## Getting public buy-in on gene editing

Looking at the history of innovation and science within the public consciousness, Stuart Smyth presented some alternative examples of how, over time, acceptance continues to grow.

‘Mutation breeding’ has existed since the 1920s, when researchers zapped crops like corn and barley with X-rays to find out if radiation could be used to create beneficial genetic variations. It worked, and it has been instrumental in advancing crop science ever since. But imagine the reaction of someone a century ago after being told that the same

*CONTINUED ON PAGE 22*



What do Canadians value, when it comes to food? ‘Naturalness’ ranks significantly below some other considerations, according to recent research by Stuart Smyth and colleagues.

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corn and barley their ancestors had grown for years could be drastically improved through advances in biotechnology – like magic, to the untrained eye. Are we, today, going through a similar shift with gene editing?

“Messaging around this issue is just as important as the science,” said Smyth. “Those people who are fighting against science and innovation in agriculture are appealing to emotion. If the messaging doesn’t appeal to emotion, the public will reject it.”

As of 2022, Health Canada no longer requires additional risk assessments on gene-edited crops; however, we still have no regulatory framework for gene-edited animals.

“The pace of innovation exceeds that of regulation, causing lengthy delays,” said Smyth.

Public perception in Canada on gene editing is currently split. In 2018, two-thirds of Canadians were opposed. In 2020, that decreased to just over half,

with many remaining uncertain. Yet, it is becoming abundantly clear that the Canadian pork sector has an opportunity to prevent zoonotic diseases and overcome potential trade barriers by using gene editing.

Trade protectionism is increasing in the world, and when it comes to meat and plant products crossing borders, buyers are becoming even bigger skeptics on the disease front. If gene editing can create a closer-to-guaranteed solution to disease issues, in addition to farm biosecurity and in-plant food handling practices, Canada’s important trade relationships may be easier to preserve with airtight confidence.

While keeping borders open is the goal of free trade, the biggest challenge, it seems, may be to open minds.

### **Benefits of gene editing coming into focus**

Wherever you find yourself on the spectrum of opinions about gene ed-

iting, there is little doubt, given the growing body of research interest, that the subject is poised to change many aspects of our world, including the pork sector.

“We are a science-based industry; that’s a big part of the success of Canadian agriculture,” said Daniel Ramage, Executive Director, SIP. “It’s how we do more with less, and it’s how we produce safe food efficiently. Research is a foundation to that.”

If gene editing can lead to better pork production, safer food or enhanced human medicine, it is increasingly likely you could soon come across gene-edited technologies in a barn, grocery store or hospital near you. As time goes on, however, wrinkles in the social fabric caused by gene editing might prove even more stubborn than the brilliant minds using gene editing to achieve the goals of scientific progress. ■



*Research enthusiasts were more than happy to do some pre-work prior to this year’s Banff Pork Seminar, on the afternoon of the first day, just before the networking session to kick off the event.*



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# On-farm tech must make sense (and cents)

David Speller

Editor's note: David Speller is a poultry farmer and CEO, OPTIfarm, based in the U.K. He presented as part of the 'Technology' breakout session during the 2023 Banff Pork Seminar. He can be contacted at david.speller@optifarm.co.uk.



According to David Speller, 'Technologies don't always start from problem-first principles.' When the solution comes before the problem itself, it may be time to take a step back and re-consider.

Digital farming, technology and data insights have all become popular subjects for many animal agriculture conferences. The terms offer so much yet often deliver so little when we try to apply them. Indeed, it appears crop farming is accelerating away from us with self-steering, precision applications, GPS mapping and, soon-to-come, self-driving or driverless tractors.

For more than a decade, livestock sectors have been focused on gathering data on environmental impacts, feed and water consumption, and performance. The aim is to capture, store and analyze this data, to help farmers. This will surely lead to an increased understanding of our businesses, better decision-making on-farm and increased livestock productivity, health and welfare. This trend has definitely set businesses on a journey, but not so many businesses have seen the actu-

al, tangible benefits and extra profits related solely to the new technologies they have implemented.

Most recently, we have seen a focus on using technology to conduct the same evaluations as a skilled stockperson, focusing on sight, sound and smell, with a lot of activity around visual data. Some technologies have been specifically developed for the agricultural implementation, such as camera weighing systems or microphones listening to animals, while others have been taken from other sectors and adapted for agriculture, such as an electronic 'nose' originally designed for human health or robotics from the nuclear industry.

We now appear at a point where the possibilities of technology know no bounds. We have reached a place where we appear full of data, with more different data sets arriving daily and an ever-growing desire to find ways to use this

data, from generating improvements, validating supply chains and, more recently, answering questions around sustainability. However, there are still few ways of turning any of this data into real-life business actions to deliver value to livestock farmers.

## Finding the right problems for the right solutions

Although the specific problems in different livestock sectors vary, there are some common themes. Primarily, we see technology being developed to bring new insights and understanding, reduce the demand on labour and compile data to enhance the prediction of animal health challenges. Examples of this include monitoring animal activities to understand behaviour, using robotics to support human tasks such as weighing pigs and analyzing sounds to predict swine respiratory diseases.

Most of the digital and technology solutions we see globally are originating from a 'start-up' culture, as a spin-off of an established business, academic institution or as a standalone company with a product idea. By their very definition, start-ups require significant investment or early adopters willing to fund the realization of a concept. This has really driven most developers to answer the call of their investors by offering new business models, innovative approaches and a drive to finding solutions that are believed to meet the mutual needs of a global livestock sector.

In the last few years, we have seen larger supply companies acquire technology from start-ups rather than incubating it internally, and they are also showing a desire for these innovative solutions to support their legacy products. It appears that we may be on the cusp of seeing innovations implemented within existing supply chains that have a need to improve



# Why Is Tech Slow To Scale

- The tech solution often comes before the problem
- The theoretical payback calculations are too optimistic
- Reliable connectivity still not with us everywhere
- Too many assumption on the needs of farming
- Minimal true support/ commitment from up chain companies
- We have all experienced previous failures
- The products are still in development
- Commercial needs vary across companies

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*Technology ideas are easy to come by, but to be effectively applied, they must be scalable.*

performance, but relatively few of these solutions have seen rapid global scaling to date. Innovators are still wondering who the customers are for their solutions: farmers, processors or allied supply industries?

Companies in livestock are now very committed to addressing the demands of their own sustainability pledges. While these initiatives complement good business practices with resource efficiency and output optimization, what will also be needed, moving

forward, is a way to validate sustainability claims. This is where digital insights can really support a business, and it is an area in which technology uptake will likely continue to grow.

*CONTINUED ON PAGE 26*

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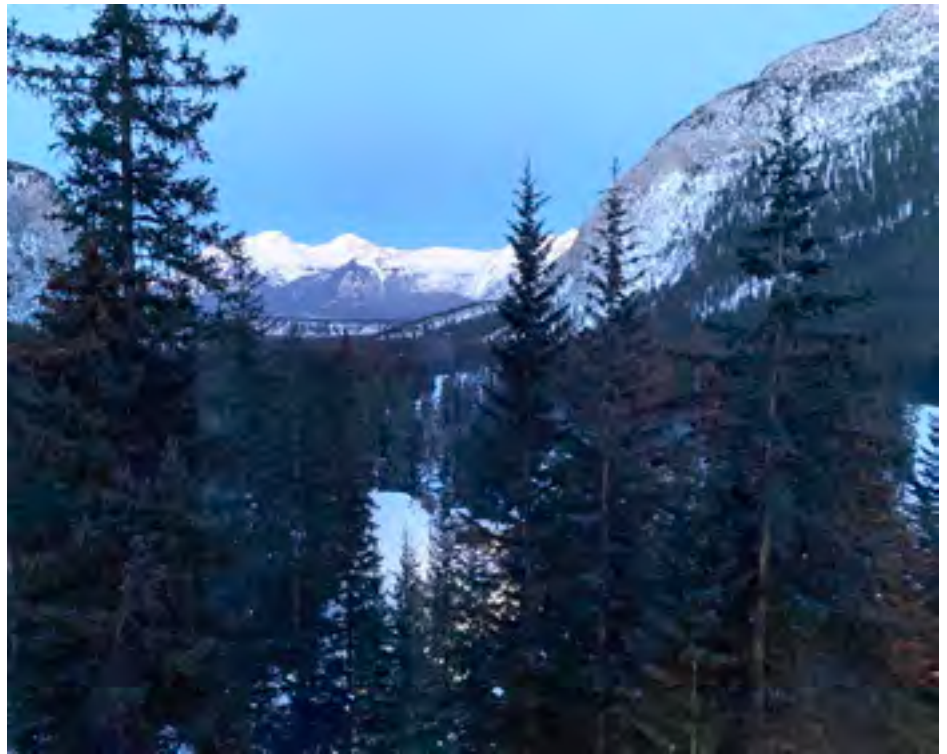
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### **Return-on-investment should rationalize uptake**

Digital technologies have the potential to support productivity gains on-farm, but how is that value realized? Consider the use of insights and technology to improve uniformity in a batch of pigs delivered to a processor. If the supply contract does not reward the producer for the improved uniformity, the processor gains a more desirable carcass without any costs incurred, while the producer pays the price without much direct benefit. On the other hand, if the processor is offering a premium for pigs raised without the use of antibiotics (RWA), the producer may have an incentive to implement technology that



*Even technology that 'works' can lead users astray. Speller urges caution, with an analogy: a compass can help guide you out of the woods, but if you head north in a straight line while relying only on the compass, you will probably run into a tree.*

allows for improved decision-making around disease issues.

Uptake of digital solutions and technology differs across livestock sectors and regions of the world. Ideas and offerings have been around in a 'proof of concept' format for many years, so there may be an argument that uptake is too slow. The availability of commercial-ready offerings is increasing, but many producers are still trying to determine the return-on-investment (ROI) for these solutions.

What we need to see now is the growing acceptance and use of these digital solutions, as not only does this endorse the solutions themselves to the industry, but it allows innovators to learn and adapt their technologies much faster, as they can see how their solutions being deployed in the real world, at scale.

### **Slow but steady progress – the way forward**

The successful and practical implementation of digital solutions and technology in livestock sectors can be seen more as an evolution, not a revolution. There

are still critical issues to address, such as rural internet connectivity and the declining cost of hardware to catch up with the aspirations of innovators.

In many farm enterprises, the margin between profit and loss is incredibly narrow, so solutions must be cost-effective, offer strong and reliable ROI and meet the current day's needs. All this from the coming together of academia, start-ups and large corporations makes this a hugely interesting and exciting time for all involved. ■





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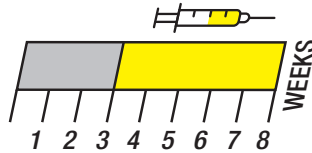
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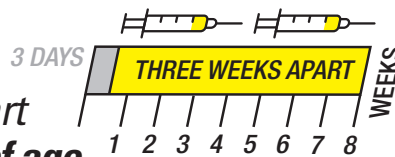
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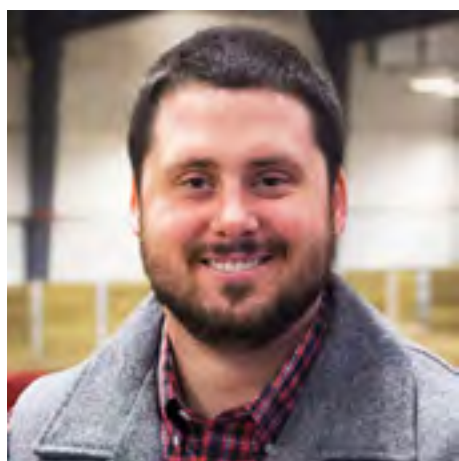
# Good pig management controls costs at all stages

Treana Hein

The latest on-farm best practices relating to all phases of production were shared as part of several presentations during three management-focused breakout sessions during the 2023 Banff Pork Seminar, including the impact of mortality and efficient feeding.

Lee Schultz of Iowa State University and Kurt Stoess of HyLife showcased their work and how it can save money for producers.

## Putting a price on mortality



Lee Schultz from Iowa State University has developed a decision tool to measure the monetary angle of mortality.

With colleagues from his university and others, Lee Schultz has been working on a spreadsheet-based decision tool to help producers examine the costs of reducing mortality on their operations by a certain level. It is important, he said, to determine whether the costs are worthwhile in terms of the profit benefits of the lowered mortality.

That is, there is an optimum total farm profitability level of mortality that can be determined for any given operation. Producers should note, however, that this level can also change over time. Schultz stressed that economists think differently about the optimal level of mortality compared to producers in general.

“It’s where marginal revenue, the last dollar I get, is equal to marginal cost, or

the last dollar that I spend,” said Schulz. “It sounds really simple, but it isn’t. It’s a very different task to calculate it.”

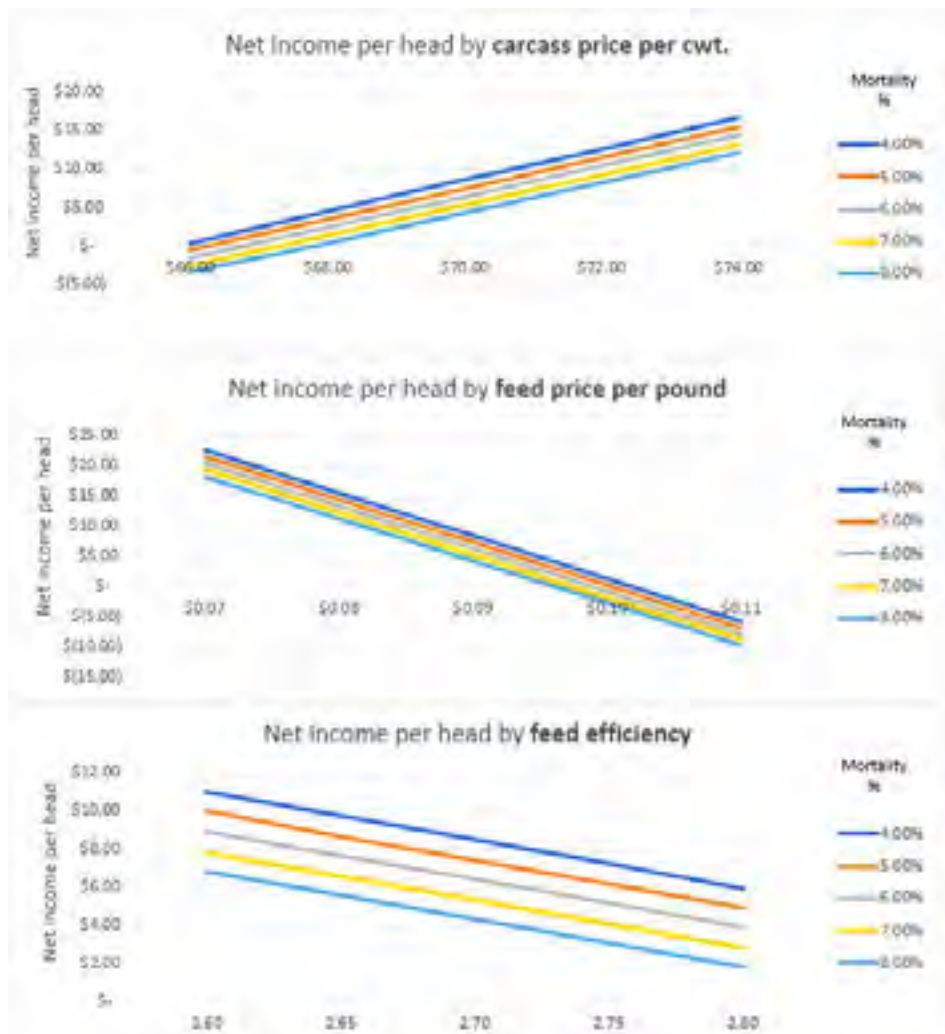
Schulz further explained that the value of a dead pig should not just be measured through the money that has been invested in that animal up until the time of its premature death, but must also include the lost revenue that would have been received had the pig provided its maximum profit, similar to what its fully grown peers brought in, at the point of marketing. The cut-out value and not just live weight at marketing should be the focus.

He also suggested defining the value of, for example, what a percentage point

drop in mortality would do related to the return realized for the costs involved.

“When you think about making a change on your operation, you usually know the cost because someone’s quoted you the cost of an animal health intervention, a nutritional intervention,” said Schulz. “But you need to know the value of it in order to decide whether you should incur that cost.”

He then illustrated with the decision tool an example of comparing the value of going from six to five per cent mortality. The spreadsheet is simple and easy-to-use while factoring all the information needed for good analysis.



Schulz’s decision tool asks users to input their own data, then spits out simple analyses based on defined formulas. The basic example is shown here.



Producers tailor the information to their farm and also input current market characteristics. Schulz explained that a large part of the calculation is the average weight of pigs at death.

“The later they die, the less cost savings producers have,” said Schulz.

He added that there might be some differences in the calculations of wean-to-finish feed efficiency that come with changes that producers employ, to try and reduce premature death, but everything else in the calculation needs to stay the same – feed costs, for example – in order “to tease out the true cost of that one per cent of mortality.” He also added that the overall cost of reducing mortality can vary depending on the cause.

While it may not be completely exact, Schulz insisted this tool is a valuable starting point for producers to weigh the projected benefits of mortality-reducing strategies against the anticipated costs.

### **Feed-related choices can be significant**

The critical importance of ongoing in-depth conversations with your nutritionist is what Kurt Stoess stressed.



*Saving money on feed is a tall order, but producers and nutritionists need to work together, according to Kurt Stoess of HyLife.*

He urged producers to discuss many aspects of their swine diets with their nutritionists on a regular basis if they want to see farm performance improve.

“Nutritionists are one of the biggest influences on your feed costs, which covers two-thirds of your costs,” said Stoess. “The other thing I want you to remember is that your farm is unique, and there is no one-size-fits-all solution to your problems.”

Stoess advised that nutritionists must, first of all, know the pig you are feed-

ing in terms of any change in genetics, or new information that may become available from your genetics firm, along with gender, health status, target end weight and any other updated packer specifications.

Referring to the feed itself, Stoess touched on energy, amino acid ratios, ingredient availability, feed additives, mash versus pellets and the reformulation schedule.

Energy is divided up into maintenance, growth or challenges, he explained, but that growth is a complex aspect that needs close attention from you and your nutritionist.

“At the beginning of your finisher batch versus late in your finisher batch, for example, you may want that growth to be doing different things, and a lot of this is dependent on genetics,” said Stoess. “In the beginning, you’re going to get more lean deposition versus fat deposition, so maybe you want your nutritionist to feed higher energy there if you get bonuses for loin eye size and things like that – maybe there is payoff there.

“Vice versa, maybe you just want to keep your energy level steady throughout

*CONTINUED ON PAGE 30*

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*Alternative feed ingredients are a popular option for cutting costs, but the western Canadian climate and other issues can put a damper on options, at times.*

your whole feeding stage and let things play out, or maybe you drop your energy level at the end. Maybe your back fat needs to rise [at the end] if your genetics are very lean, and you will get penalties for having it too low. There is no one right answer, but you need to have that conversation with your nutritionist.”

With amino acid ratios, the key, in Stoess’ view, is to continue learning and keep abreast of new findings. Similarly, Stoess encouraged regular discussion about all the latest feed additive developments. One newer finding he pointed out relates to feeding ionophores, where there are bigger benefits being seen with higher-fibre diets.

On the ingredients front, he noted that western Canada usually has good advantages for availability, but things like drought, labour and other factors can get in the way quickly. Comparing mash to pellets, he said that, while pellets cost more but have more benefits, particle size is important. Pelleting wheat and barley has more benefits than pelleting corn.

To maximize the value of reformulation, Stoess strongly recommended that producers and their nutritionists have a prescribed plan as to how often diets are

being assessed and what factors trigger reformulation.

“How does that work?” asked Stoess. “As your nutritionist is running different scenarios and trying to least-cost your diets, you both have to also remember ingredient availability, so you need to have constant communication.”

Producers and nutritionists also need to decide how to implement stage feeding plans and perhaps increase the number of stages. With only three, he believes producers are leaving money on the table and instructs that five to seven is best. To determine where one stage ends and the next begins, “I like to go with tonnage [rather than weight],” said Stoess, “as it’s nice and simple to control.”

Overall, he also thinks producers should work with nutritionists to focus on gut health through vaccinations, investing in veterinary advice, and using ionophores and feed additives such as essential oils.

“If you focus on improving your gut health from day one, when those little health challenges happen, they will not affect your bottom line nearly as much,” said Stoess. ■

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# Why sharing your story matters

Andrew Campbell

Editor's note: Andrew Campbell is a dairy farmer and award-winning storyteller based in southern Ontario. He presented the closing plenary session during the 2023 Banff Pork Seminar. He can be contacted at [andrew@thefreshair.ca](mailto:andrew@thefreshair.ca).



Campbell is not a fan of the mentality, 'mine is better than yours,' when it comes to evaluating farming practices. He believes diversity and choice are better for instilling consumer confidence in the entire industry.

Whether it is a pig farmer, veterinarian, feed truck driver or dozens of other jobs in Canada's pork sector, anyone I've ever talked to has been proud to be involved in the industry. Maybe it's the \$24-billion impact pork has in Canada or the 25 million animals that are produced to supply billions of servings of nutritional protein around the world. Or maybe it's the more than 100,000 jobs that are supported by 7,000 farmers. Whatever the reason, anyone in the pork sector is proud to be there.



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But then when you go outside the sector, and especially when you go beyond the agriculture industry, there are millions of Canadians who are unaware of these impacts, let alone how that pork chop or rib ended up on their plate.

For the generations before today, you could argue it didn't matter. People bought based on price, taste and quality, and any other factor wasn't relevant. Today is different. Today, those attributes may still trump other concerns, but consumers also want to feel good about

what they are eating. They want to feel good about the environmental impact, welfare of the animal, treatment of farm workers or many other issues. It's why today is the most important time to consider what our non-farming neighbours think of pork production and how pigs are raised in this country.

After all, if they don't know and hear something on television or read something online that isn't true and attacks the current system, is it fair to think that consumer will start a research journey?

**“ I can't do a Google search for answers about farming practices without being bombarded by organizations with an agenda.”**



Consumers are being inundated online with information about farming. Most of it doesn't matter to them as much their personal preferences, regardless of 'truth.'



Will they investigate all sides of a discussion? Will they ensure they only read peer-reviewed articles? Of course not. The reality today is everyone is in information overload, and quite simply, if the pork sector doesn't come to the table with its own story, then, to consumers, that side of the story simply doesn't exist.

And without the pork side of the story, it can lead to companies like processors or retailers demanding new production practices or governments stepping in with regulations making it more difficult to raise pigs in an environment that may actually be better for animal health or farm productivity.

It's why sharing your story matters, and you've got to be prepared to talk about it. Here are four things to keep in mind when doing that, whether it be in simple one-on-one conversations or to larger audiences, like over social media.

### **Facts aren't as important as feeling good**

Maybe this is an oversimplification of an issue, but the reality is consumers don't necessarily trust every fact as truth.

An easy example would be the Canadian Pork Council commissioning a study that finds eating pork is good for you. I'd be-

lieve that, because I know the importance of animal protein in my diet. But others will treat it as boughten research, stating that, of course the *pork council* says pork is good for you. It's why simply coming out with facts, statistics and research data isn't going to cut it. Think instead about perception and how people perceive facts.

### **Feeling good is better than feeling guilty**

At the end of the day, most people just want to feel good. They want to feel good about what they ate, the impact they had, and avoid anything that makes them feel guilty or fearful. Just look at what pork has to offer: a source of protein or Vitamin B12 are easy sells for those looking at the label. Bacon and ribs as a source of 'deliciousness'? Even better!

It's really not hard to get people to feel good. However, if anything else is nagging them about why they shouldn't eat pork, they simply won't. There are just too many other options on the grocery store shelf to worry about feeling guilty.

### **You don't need to win**

It's a habit we all share. The habit that we want to convince someone we are talking with that we are right, and their point of view is wrong. I always ques-

tion how often that has worked with your spouse or teenager. Usually zero per cent of the time.

Don't think of every opportunity to connect as an opportunity to change minds or to educate them on why you are right. Instead, focus on just having a conversation. Focus on learning where their point-of-view comes from and connect their concerns to your concerns. That way, you'll be able to simply share your perspective that will undoubtedly have a lasting impact on how they view a particular issue.

### **You do need to find common ground**

Part of how people perceive facts is by understanding what is important to them. By thinking about shared values, farmers and consumers can actually find a lot in common. Things like raising kids or the importance of family, concerns about sustainability, or community involvement are all things that farmers and non-farmers share. Why not start the conversation there, to find what those shared values are, and then tie-in why those values impact how you run your business.

So step up and share your story! No-one else is going to do it for you. ■

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# Swine health topics target disease mitigation

Lexie Reed

Editor's note: Lexie Reed is a food animal veterinarian based in Lethbridge, Alberta. She can be contacted at [lexiereedvm@gmail.com](mailto:lexiereedvm@gmail.com).



Nutritional strategies can help manage disease, but not by themselves, according to Brooke Smith of Cargill Animal Health and Nutrition.

Swine health is an important and popular topic every year at the Banff Pork Seminar, and 2023 was no different. This year, breakout sessions included information about *Streptococcus suis* (*Strep suis*) and *Escherichia coli* (*E. coli*) in the nursery, along with a veterinary practitioner's perspective on circovirus in the present and future.

Brooke Smith of Cargill Animal Health and Nutrition, and Ryan Tenbergen of

Demeter Veterinary Services, led these respective sessions, focusing on what should matter to producers.

## **Strep suis and E. coli in the nursery**

Smith led session attendees through novel health management tools for the purpose of improved nutrition – an area of innovation that combines her Doctor of Veterinary Medicine with her PhD in swine nutrition.

“Increased virulence of common pathogens and increased resistance to antimicrobials creates an opportunity for additional health management strategies. If we know the mechanism by which a pathogen causes disease, that can give us a clue as to what nutritional intervention is best able to target the pathogen,” said Smith. “When it comes to nutritional interventions, I have two approaches I can take: directly interfering with the pathogen’s ability to colonize the pig, or improving the immune system’s response to the presence of the pathogen.”

These approaches can be deployed on common nursery pathogens like *Strep suis* and *E. coli*. *Strep suis* infection in nursery pigs is often a function of combined factors: primarily, concurrent viral disease, ventilation and temperature; genetic predisposition; high stocking density; and dietary changes.

“All commercial pigs are a carrier of at least one serotype of *Strep suis*,” said Smith. “When we move pigs into a nursery, some pigs have never seen the serotype that the other litters have. We combine all of those external stressors to a naïve population that is faced with

Strategies and Ingredients for Direct Interference	
Strategy/Ingredient	Proposed Effect
Increased Dietary Fiber	<ul style="list-style-type: none"> <li>Stimulate mucus production and enterocyte turnover → disruption of cell surface pathogen receptors (structural fiber)</li> <li>Provide substrate to commensal microbes in the gut (competitive exclusion) (fermentable fiber)</li> </ul>
Essential Oils (EO)	<ul style="list-style-type: none"> <li>Alter bacterial cell membranes</li> <li>Quorum-sensing inhibition (bacteria-to-bacteria communication)</li> </ul>
Antimicrobial Peptides (AMP)	<ul style="list-style-type: none"> <li>Alter bacterial cell membranes</li> <li>Neutralize non-receptor bound bacteria</li> </ul>
Mucilages	<ul style="list-style-type: none"> <li>Form thin mucilage layer on surface of intestine → block cell surface receptors</li> </ul>
Zinc Oxide*	<ul style="list-style-type: none"> <li>Reinforce enterocyte cell junction integrity</li> </ul>



Smith believes increasing dietary fibre could help prevent *E. coli* infections.

a serotype they have never seen before, and it creates an opportunity for clinical disease to occur. Tonsillar epithelium is the predominant site of colonization in *Strep suis* serotypes found in North America.”

Nutritional strategies to limit colonization include using amino acids to manipulate pig growth rate and to increase nutritional support towards the immune system. Smith and her team at Cargill are exploring how reducing amino acid concentrations in the diet early in the nursery phase could help, by diverting these amino acids away from rapid growth, which puts metabolic stress on the pigs, towards the immune response. And then there are functional proteins, like plasma, that directly contribute to improved immunity.

“Because that infection is not localized to the gastrointestinal tract, and *Strep suis* spreads systemically after it colonizes the tonsils, I need to start thinking about nutritional strategies that are absorbed, metabolized or circulated, rather than just having an effect at the site of the intestine,” said Smith. “Not only is plasma a highly digestible and palatable source of protein, it also contains compounds like immunoglobulins that bind pathogens in the gastrointestinal tract, which is work that the immune system would have to do otherwise.”

Phenolic compounds – the natural defense molecules in plants – have direct antimicrobial properties and can be added to the nursery diet.

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<p><b>On-farm consultation from a Cargill expert</b></p>	<p><b>Access to Cargill's farm management tools tailored to your farm needs for one year</b></p>	<p><b>Dinner</b></p>	<p><b>Transportation</b></p> <p><small>*Distance limitation will be applied</small></p>

Another ubiquitous nursery pathogen that Smith and her team are working on addressing is *E. coli*. The site of colonization of *E. coli* in the pig is the small intestine, where it binds specific receptors on enterocytes – the cells lining the interior surface of the small intestine. The expression of these receptors can be up- or down-regulated by age, genetics and prior or concurrent gastrointestinal disease like Rotavirus and coccidia. The severity of *E. coli* infection is increased by cool and damp environments, poor sanitation, the transition to a plant-based diet, reduced feed intake and high stocking density.

“For us as nutritionists, this means that we have the potential to use ingredients that will have prolonged contact with *E. coli* in the gut. Or I can use the diet to create an unfavourable environment for *E. coli* to grow,” said Smith. “One strategy for a base diet is to increase dietary fibre. This increases the turnover of the cells lining the intestine and stimulates mucous production, which blocks *E. coli* from binding onto the receptor site of the cell.”

Mucilages are additives that act in the same way when they reach the small intestine. Another strategy is the use of essential oils, which can physically alter the cell membrane of bacteria and disrupt the communication between *E. coli*, making them less able to colonize the intestine.

While nutritional strategies can help, they alone cannot manage disease in nursery pigs.

**CONTINUED ON PAGE 36**





## Jefo Microencapsulated Organic Acids for sows and piglets.

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“A number of nutritional strategies and ingredients are available, but understanding what type of pathogen is driving clinical signs, and how, is key,” said Smith. “External factors impacting exposure to, and dynamics, of disease need to be addressed. This includes managing husbandry, environment, genetics, concurrent disease and population dynamics.”

### Circovirus: a practitioner’s perspective

Ryan Tenbergen led his session with an important takeaway message: “Do not forget about circovirus!”

Circovirus vaccines, which have been available commercially in North America since the early-2000s, are largely successful at controlling Porcine Circovirus Type 2 (PCV2). However, there have been reports of PCV2 clinical disease in vaccinated herds in recent years. PCV2 causes a wide range of clinical presentations. One of the hallmarks of the disease is this varied clinical presentation and severe immunosuppression.

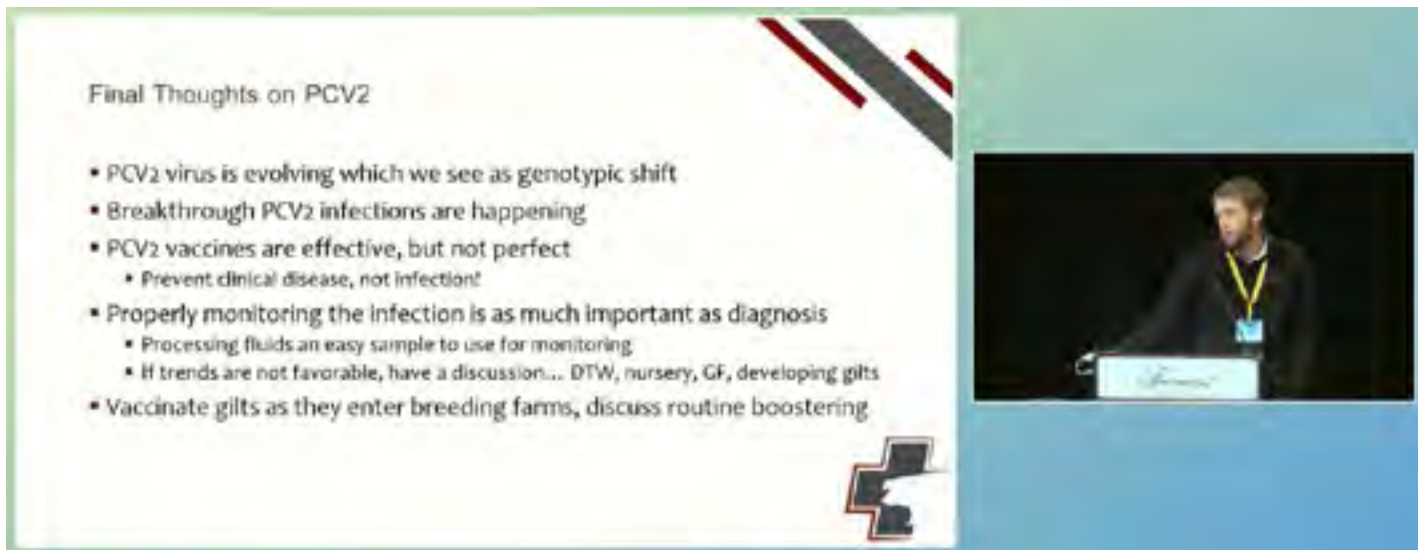
“In order to stay ahead of circovirus-associated diseases and avoid the potential of significant losses associated with clinical disease, we need to rethink circovirus monitoring and vaccination strategies against it,” said Tenbergen. “It’s multifactorial. You have infectious and non-infectious causes, and then circovirus is there to cause clinical disease. Generally, alone, it’s hard to produce disease.”

PCV2 monitoring can be done with PCR testing on processing fluids, tissue or blood. A positive PCR test would indicate replicating and circulating virus in the body. Some studies have found this to be associated with negative growth performance in growing pigs, suggesting that a subclinical PCV2 infection is occurring; however, it is important to note that PCV2 is widespread in swine populations. PCV2 is in barns and circulating in pigs, but just because we find it in pigs does not mean it is causing disease.

Tenbergen stressed that when interpreting PCV2 PCR results, it is important to look at the degree of positivity and the cycle threshold (CT) value. The degree of positivity is the proportion of positive samples in a total sample submission. The CT value is the number of times that the PCR process had to be run in order to detect the virus. The more virus present, the lower the CT value will be. When there is a high percentage of positive



Ryan Tenbergen of Demeter Veterinary Services wanted to draw increased attention to circovirus with his presentation.



Tenbergen has seen an uptick in Porcine Circovirus Type 2 (PCV2) in Ontario herds recently.

samples and CT values are low, the more likely PCV2 is circulating at high levels in the herd.

Referring to a summary of Demeter's PCV2 lab results, Tenbergen said, "What's interesting is that, in 2021, there was an increase in strong positive results. Generally, as pigs get older, we see more positive results. We are more likely to find it in the finisher than the nursery."

Tenbergen shared some case studies of farms in Ontario that presented with high mortality after weaning. On these farms, pigs would fall back after weaning. One week after weaning, pigs began to lose condition, and in two to three weeks post-weaning, mortality would spike anywhere from 10 to 30 per cent. In these herds, a co-infection with porcine respiratory and reproductive syndrome (PRRS) virus was also present, and in some of the herds, so were porcine dermatitis and nephropathy syndrome (PDNS), an inflammation and dying off of the underlying skin structures that appears as dark patches of skin on the hind limbs and underside of the pig.

"If you see PDNS, it is worth investigating if PCV2 is present in these pigs," Tenbergen advised.

In these herds, antimicrobial treatment had little effect on reducing mortality in the growing pigs. However, mass vaccination of the sow herds and an addition of a PCV2 vaccine in piglets at processing (two to four days after birth) in the short-term successfully reduced disease and mortality in the growing pig herds.

So why do PCV2 infections occur in herds that are vaccinated? Tenbergen explained that this happens when sow immunity is not uniform in the herd. When pigs are born infected or become infected early in life with PCV2, vaccination is ineffective, and the disease spreads among the growing herd. To achieve stability, gilts and sows must have immunity to PCV2 so that they do not shed it to their piglets. Vaccinating the female breeding herd achieves this goal of uniform immunity.

"I think monitoring the herd status and determining the stability of the herd should be a priority," said Tenbergen. "With a higher PCV2 natural challenge, a one-dose program isn't enough to carry them through their entire lifetime."

Tenbergen explained that herds with high replacement rates in gilts are at greater risk of PCV2 instability in the sows. Incoming gilts could be susceptible to the strain of PCV2 in the barn or could bring with them a strain not present in the herd. PCV2 has the ability to re-combine, and co-infection of more than one PCV2 has been reported in Canadian diagnostic lab data.

Tenbergen noted that it is common for replacement gilts to receive only one dose of circovirus vaccine at weaning. In addition to PVC2, Tenbergen implored producers to consider the emerging Porcine Circovirus Type 3 (PCV3). PCV3 was first recognized as causing clinical disease in 2016. Though both PCV2 and PCV3 fall under the same broad virus family, *Circoviridae*, they share less than half of their genetic similarities. Like PCV2, PCV3 is thought to be endemic in herds and likely has been circulating in the swine population for years. PCV3 has also been reported to cause post-weaning multisystemic wasting, reproductive failure and PDNS. Looking at Demeter lab data, Tenbergen reported an increasing trend of PCV3 positives from 2020 to 2022. He has found three clinical cases of PCV3 in Ontario to date.

"Looking at PCV3 results, there are more positive results than negative, and the strong positive results are increasing each year," said Tenbergen.

Tenbergen reminded session participants that PCV vaccines are effective, but not perfect, and that the disease continues to evolve. His final suggestion was to consider implementing a PCV2 monitoring program in the herd and consider routine PCV2 boosters in the breeding herd. He recommended that PCV3 positive test results be interpreted in light of the pathological and clinical findings in the herd. ■

# Weaning device wins prize and praise

**Stacey Ashley**

*Editor's note: Stacey Ashley is Public Relations and Communications Manager, HyLife. She can be contacted at [stacey.ashley@hylife.com](mailto:stacey.ashley@hylife.com).*

*The F.X. Aherne Prize for Innovative Pork Production recognizes individuals who have developed either original solutions to pork production challenges or creative uses of known technology. The prize is named for the late Frank Aherne, a professor at the University of Alberta, who was a major force for science-based progress in the Canadian pork industry.*



*HyLife's Robert Lafrenière (left) and Barak Doell (right) accepted the F.X. Aherne Prize, for their team's invention of a weaning ramp to improve animal care.*

A new HyLife weaning ramp has the potential to improve animal care across the industry. The device was awarded the F.X. Aherne Prize during the 2023 Banff Pork Seminar.

The ramp was created by HyLife's Continuous Improvement (CI) Team, a group of engineers dedicated to solving challenges while improving animal welfare. After listening to farm employees, it

was discovered that picking up piglets and bringing them to the employee performing vaccination placed a strain on both the staff and animals.

To use the invention, piglets enter the alleyway and towards the ramp, in groups. Once up the ramp, a gate using a pulley system is lowered. Employees can easily begin picking the piglets from waist height to be vaccinated. The ani-

mals are then gently placed on a slide, depending on their sex. Gradual sloping slides, off each side of the station, bring the piglet back down slowly and safely to ground level.

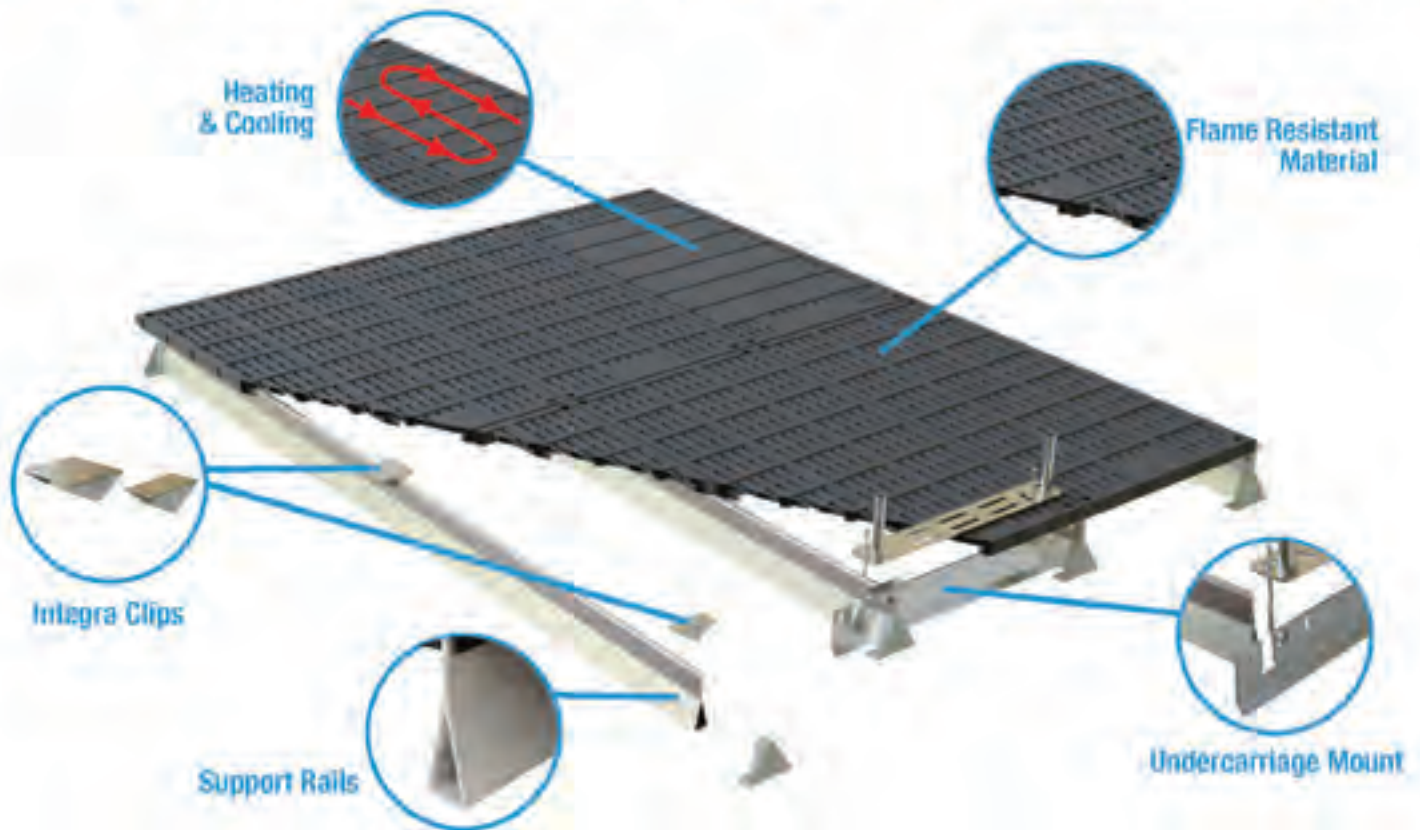
"We knew there was a better way. We prioritized animal care and leaned on our in-house experts and CI team to develop a creative solution," said Lyle Loewen, Senior Vice President, Farms

**CONTINUED ON PAGE 40**



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*Renowned animal behavioralist, Temple Grandin, toured HyLife's farms and processing plant in Neepawa, Manitoba, praising the team's efforts.*

Division, HyLife. "The result is a ramp that eliminates the need to pick up piglets. This means less stress and more safety for both our animals and employees."

Even before winning the Aherne Prize, the in-house invention captured the interest of renowned animal behavioralist, Temple Grandin.

"This innovative system should be in every sow farm for vaccinating weaned piglets... I can't say enough good things about it," said Grandin. "It should go industry-wide. I was amazed how well those little pigs used the ramp; that's the kind of stuff that makes handling easier."

Grandin is widely considered a leading expert in her field, and as part of HyLife's ongoing commitment to animal welfare, the company recently engaged the professor of animal



*The award-winning invention*



science and distinguished author. She traveled to Canada to extensively tour operations, including HyLife's farms and processing plant in Neepawa, Manitoba. During her evaluation, Grandin paid close attention to animal handling practices and was extremely impressed with the uniqueness of the award-winning ramp.


HyLife is now investing in the ramps across all sow barns and continues to look for creative ways to improve animal care and employee safety. ■

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# Young scientists recognized for their work

Editor's note: The R.O. Ball Young Scientist Award recognizes graduate students who provide a best overall combination of good and relevant science, a well written abstract and an excellent presentation. The award is named for Ron Ball, a long-time researcher and former Banff Pork Seminar director.



Student researchers Jessica Vehof (left) and Tausha Prisnee (right) with the University of Alberta's Ben Willing (centre), who presented the awards.

The first prize of the 2023 R.O. Ball Young Scientist Award was given to Jessica Vehof of the University of Saskatchewan for her paper, "Effects of sow grouping practices on mixing aggression and production."

Vehof's research shows that as producers transition to group sow housing, early mixing of dynamic groups could lead to greater aggression, with the effect on production unknown. Research results show that dynamic mixing of sow groups, as opposed to static mixing, could reduce damage caused by sow aggression.

Vehof received a \$500 cheque and a plaque, recognizing her work.

The second prize was given to Tausha Prisnee of the University of Alberta for her paper, "*Kazachstania slooffiae* alters immune system function and promotes an anerobic environment."

Prisnee's research developed a piglet model and subjected the model to *Kazachstania slooffiae* fungi, yeast commonly found in pigs' intestinal tracts. Results suggest that supplementing these fungi in early life could help prepare piglets for bacterial colonization in the gut later on, promoting better health.

Prisnee received a \$250 cheque and a plaque, recognizing her work. ■

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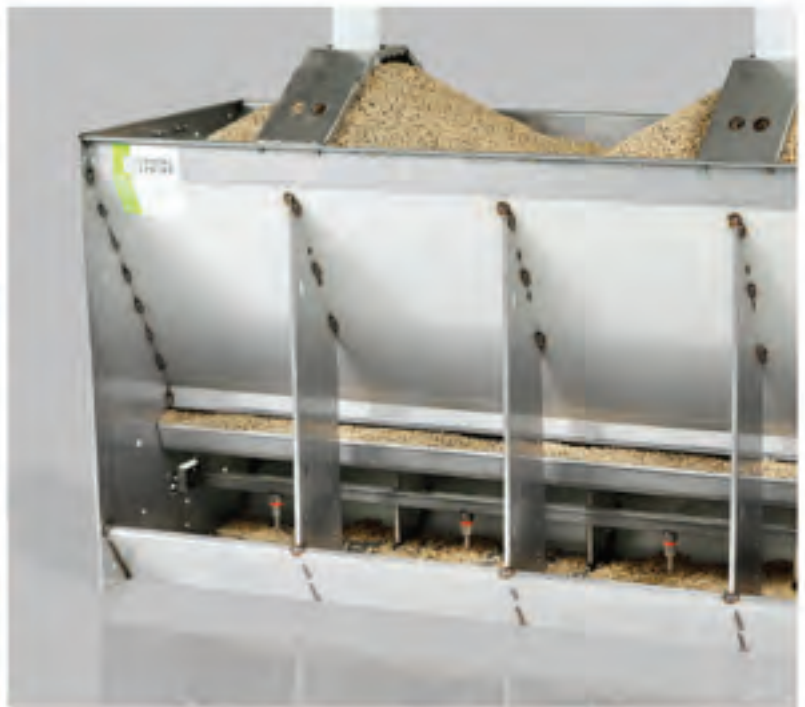
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# First piglet topical anesthetic in Canada launches

Nihan Ganjuk

Editor's note: Nihan Ganjuk is Product Manager, Dechra Canada. She can be contacted at [nihan.ganjuk@dechra.com](mailto:nihan.ganjuk@dechra.com).



Dechra Canada representatives were on-hand to promote Tri-Solfen™ for the Canadian market.

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Producers who are interested in Tri-Solfen can contact Alison Brodie, Inside Sales Representative, Dechra Canada by email at [alison.brodie@dechra.com](mailto:alison.brodie@dechra.com) or by phone at 519-731-1325. ■



Dechra Canada launched Tri-Solfen™ during the 2023 Banff Pork Seminar.



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