# Better pork

August 2019 $8.00

## TACKLING *S. SUIS*

6

## ACTIVIST CHALLENGES

Being Prepared

14

## FEED BIOSECURITY

Understanding Risks

42

## PED ELIMINATION

Barn Disinfection

26

## TRAILER CLEANING

Best Practices

30

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**COVER:**
HRM Photography, yongkiet/iStock/Getty Images Plus photo

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Back issues $12 (including $1.38 HST)

**Mailed to U.S.** $39.30 for six issues over one year

**International** $66 for six issues over one year

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GST Registration #868959347RT0001

POSTMASTER: Send address changes to AgMedia Inc.
52 Royal Rd., Unit A, Guelph, Ontario N1H 1G3
Publications Mail Registration No. 1156
Publications Mail Agreement No. 40037298
Email: subscriptions@betterfarming.com



*Better Pork* is published six times a year by AgMedia Inc.



**Printed in Canada. Printed with Soy Ink.**

*DEAR READER: LETTERS FROM A FAMILY FARM*

# SIGHTS SET ON TARGET

A key strength of the ag industry is the constant push for incremental improvements.

In the cash crop sector, for example, I think of the advances in seeding technology.

For generations, we depended on the skill of the tractor driver to ensure straight rows. Within families and perhaps even among neighbours, producers could expect a bit of kind-hearted teasing for wiggles.

In the late 1990s, autosteer removed some of this pressure and made planting a little less grueling. (Today, the tech also allows us more time to connect with other farmers on Twitter.)

Once we had perfectly straight rows, we looked to the next challenge: seeding overlap in those oddly shaped fields. Again, equipment manufacturers stepped up to the plate. In the mid-2000s, we welcomed the development of automatic row shutoffs.

As with autosteer, this technology brought economic benefits. Some estimates suggest that automatic row shutoffs offer a cost savings of about 9 to 15 per cent on seed.

Shortly thereafter, producers, agronomists and equipment manufacturers turned to the variability in our soils and began experimenting with variable rate seeding.

As the advances in planting equipment show, as an industry, we quickly pivot from incorporating one tech or agronomic advance to searching for the next opportunity.

And, of course, this dedicated and driven attitude extends to the pork sector. This thread runs through several of our articles this month.

Department writer **Richard Smelski**, for example, gives us a refresher on those statistics classes we may have tried to block out of our memories.

He reminds us of the practical applications of this math. Smelski suggests how we can track these numbers to identify opportunities for improving our production efficiencies.

And, in her feature article, staff writer **Kate Ayers** dives into a discussion of *S. Suis*. She outlines the clinical signs of the disease, treatment options and research initiatives.

Since we've addressed many other herd health concerns, Ayers's interviewees suggest, our industry can now focus on battling this disease.

Given our track record, I have faith we'll make advances soon. **BP**

Andrea

HRM Photography

**Jim Denys, a second-generation Middlesex County, Ont. hog farmer, was recognized as one of the Ontario Soil and Crop Improvement Association's soil champions for 2019. See the Up Close interview with Denys on page 20.**

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

# INDUSTRY TRUCKING TO BOOSTED BIOSECURITY

Cleaning transport trailers could become cheaper and quicker, thanks to Canadian swine researchers.

Project partners aim to develop:

- trailers that are better for the animals and easier to clean
- an automated cleaning system
- a disinfection process
- a verification system to ensure disinfection between loads

In one important step towards these goals, the **Prairie Agricultural Machinery Institute** "is (leading) the development of an automated washing system for the inside of swine transport trailers," **Dr. Terry Fonstad**, an associate dean at the **University of Saskatchewan** and principal investigator of the project, said in an emailed statement to *Better Pork*.

Fonstad's team at the university, along with **Transport Genie** in Guelph, Ont., are "developing a sensor system" that will track trailer identity, location and adherence to disinfection requirements, he said. The sensors will also monitor trailer temperature and humidity during transportation for animal welfare.

Fonstad hopes the team will begin commercialization of the technology at the end of the year.

The **Prairie Swine Centre** is also collaborating in this project to develop improved transport trailer design. **Swine Innovation Porc** and several industry partners are supporting the research and development. **BP**

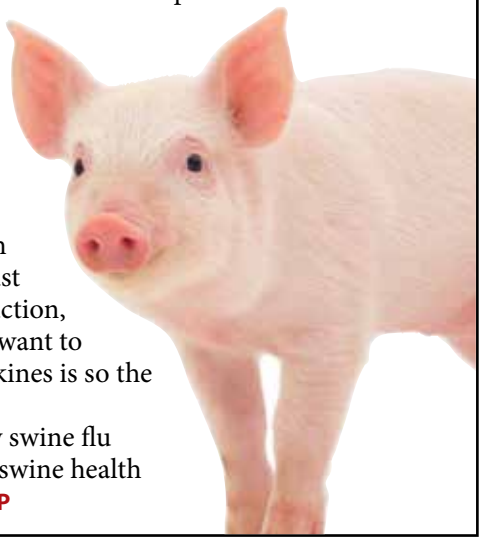
# RESEARCHER TAKES AIM AT SWINE FLU

A **University of Saskatchewan** scientist will use a federal grant to study how influenza A affects a pig's lungs.

**Dr. Yan Zhou**, a professor in the school's department of veterinary microbiology, received $290,000 from the **Natural Sciences and Engineering Research Council** to help fund the work.

She will study the mechanisms behind inflammation in pigs' lungs in response to an influenza A infection.

"The lungs are the primary infection route and infection site," she told *Better Pork*. "The respiratory tract has the main responsive cells that mount an immune response."



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Zhou wants to examine cells in the immune system that help produce cytokines, a large group of proteins.

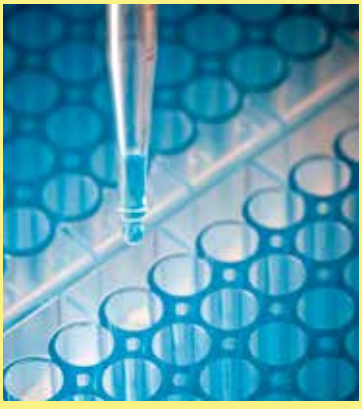
"If there's too much cytokine production, the pig can end up with lung damage," she said. "If there's just the right amount of cytokine production, that will be beneficial to the host. I want to study what the perfect level of cytokines is so the host can fight the virus infection."

More detailed knowledge of how swine flu affects a pig's body could help with swine health product development, Zhou said. **BP**

# WHERE'S THE VACCINE FOR ASF?

So far, no vaccine exists for African swine fever (ASF) but researchers around the world are working hard to develop one.

**Dr. Bob Rowland**, a professor of diagnostic medicine and pathobiology at **Kansas State University's College of Veterinary Medicine**, is one of these scientists. He's trying to build "Fortress North America," he told *Better Pork*.



dra_schwartz/E+ photo

In this work, he's rebranding a term used during the Cold War for a plan to defend Canada and the United States if the rest of the world fell during nuclear war.

As the name suggests, Rowland's goal is to develop a vaccine that would protect the North American swine herd from ASF. But the challenge is finding an alternative to a live vaccine.

"By introducing the live virus, as you would in an endemic situation, you'd be bringing in the virus we're trying to keep out of our countries," Rowland said.

"The biggest reason we don't have a good handle on how to initiate effective vaccination is that ASF doesn't follow the rules," he added. "We have to rethink everything and sometimes go outside the box."

Researchers from both inside and outside the "fortress" are sharing their work at international events like the African Swine Fever Forum, held in Ottawa in the spring. **BP**

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# THE PORK SECTOR RAMPS UP BATTLE AGAINST *S. SUIS*

by KATE AYERS

**This endemic disease affects swine operations around the globe. Scientists continue to search for effective solutions.**

Although African swine fever has dominated the spotlight for a year, this disease is not the only one about which the swine sector worries.

*Streptococcus suis (S. suis)* has a silent but steady presence in North American swine herds, costing the industry millions of dollars annually, says Dr. Matheus Costa, an adjunct professor with the University of Saskatchewan's Western College of Veterinary Medicine. He is also an assistant professor with the University of Minnesota.

As a result, stakeholders are researching ways to reduce the effects of this bacterium on the swine sector.

In Canada, *S. suis* is a constant cause of swine mortality, he says.

And the challenges stretch across borders.

"In fact, *S. suis* was recently considered the number one bacterial agent that poses the most risk for the U.S. swine industry," says Dr. Maria Clavijo, a research assistant professor at Iowa State University's Veterinary Diagnostic Laboratory (ISU-VDL). She also works as a part-time health assurance veterinarian at the Pig Improvement Co.

The disease "contributes to significant economic losses mainly associated with mortality, decreased feed efficiency and increased treatment costs."

Producers have limited options to prevent and mitigate *S. suis* in their herds.

Fortunately, researchers and veterinarians around the world are working to gain a better understanding of the bacterium and how it causes disease.

*Better Pork* speaks with veterinarians, a pathologist and other herd health specialists to discuss the bacterium's characteristics, treatment options and ongoing research that they hope will help producers battle this bug.

## What is *S. suis*?

Researchers identified *S. suis* as a pathogen in 1987, an Iowa State University article says. This bacterium is the predominant streptococcal infection of pigs. While it is most commonly seen in nursing or newly weaned piglets, *S. suis* can affect all age groups.

Researchers have identified over 35 serotypes of the disease, and these strains range in virulence. Serotypes 1 through 9, including serotype ½, represent over two-thirds of the *S. suis* isolates found mainly in diseased pigs in North America, a Merck Veterinary Manual article says.

However, "serotype 2 is probably the most commonly diagnosed" in Canada, says Dr. Egan Brockhoff,

the veterinary counsellor for the Canadian Pork Council and a partner at Prairie Swine Health Services in Red Deer, Alta.

*S. suis*, a gram-positive bacterium, is quite resilient. It "can survive in the environment for up to two weeks in water at 4 C (39.2 F), up to 104 days in feces and up to 54 days in dust at 0 C (32 F)," says Clavijo.

*S. suis* is a normal inhabitant of the "upper respiratory tract (tonsils and nasal cavities), genital tracts and possibly the gut," adds Costa.

"Virtually every pig has *Streptococcus suis* and thus virtually every herd may have *S. suis*-associated disease."

The pathogen is most often transferred through direct contact with carrier or infected pigs, says Lisa Becton, the director of swine health information and research for the National Pork Board in Iowa.

Piglets can contract *S. suis* when passing through the sow's birth canal or nursing.


Dr. Maria Clavijo

"*S. suis* is often described as an 'early colonizer,' as piglets are infected from their dams shortly after birth with endemic serotypes of *S. suis* present in the herd," says Dr. Bailey Arruda, a pathologist at ISU-VDL.

"Ongoing transmission occurs as pigs age or are commingled."

Pigs can also become infected through the transfer of respiratory secretions in nose-to-nose touching while in nurseries.

As a result, "when mixing two different populations of pigs, it is important to keep in mind that they might not share the same strain and might not have immunity to the other strain," says Clavijo.

This situation could lead to an outbreak.

*S. suis* "can also be directly transmitted by equipment, feeders, flooring and things that pigs come in contact with such as gates and objects that are not properly disinfected," Becton adds.

## Clinical signs of *S. suis*

While most herds have a carrier rate near 100 per cent, the incidence of disease is generally around 5 per cent, the Merck Veterinary Manual article says. But if left untreated, *S. suis* can cause up to 20 per cent mortality.

A troubling aspect of *S. suis* is that animal infections are unpredictable.

Some cases emerge in the presence of other diseases such as porcine reproductive and respiratory syndrome or influenza. These viruses disrupt a pig's immune system and leave it more vulnerable to infection from *S. suis*. Transport, stressful events or less-than-ideal environmental conditions may also play a role in disease predisposition.

However, some cases occur due to a single *S. suis* bacterial infection.

"It's a complex bacterium in terms of its ability to evade the immune sys-

tem. Its natural presence in pigs doesn't always stimulate strong immunity either," Brockhoff says.

*S. suis* "can fly under the radar, not really triggering the animal's immune system despite universal presence. And then some third factor or driver, like a viral disease or environmental stressor, may trigger a severe infection."

External factors such as "ventilation issues, piglet chilling or weaning stress all seem to be capable of driving this bacterium to go clinical," he says.

Becton agrees.

Pigs can become colonized with the bacterium but show no disease, she says.

In pigs that show clinical signs, the animals' central nervous systems will often be affected.

Some signs may include septicemia (blood poisoning), acute meningitis, polyarthritis (arthritis affecting several joints) or bronchopneumonia, the Iowa State University article says.

Signs may differ between cases, depending on what parts of the body the bacterium infects and the serotype that invades the animal.


Dr. Alejandro Ramirez

For example, if a virulent strain of *S. suis* infects the lungs, pigs may have bronchopneumonia. If *S. suis* infects the brain, pigs may exhibit neurological signs such as "tilting of the head and paddling," says Dr. Alejandro Ramirez, an associate professor of veterinary diagnostic and production animal medicine at Iowa State University. Incoordination and inability to stand are other neurological signs.

"The other symptom we see is swollen joints. As *S. suis* gets into the bloodstream, the pathogen can travel and hide in the joints. This infection may then result in lameness," he adds.

The range in clinical signs can make *S. suis* a challenging disease for veterinarians to definitively diagnose in pigs. To make matters worse, *S. suis* can present like other swine pathogens, including African swine fever, Brockhoff says.

"Sometimes you'll just see purple ears or cold feet. But *S. suis* commonly causes meningitis in piglets and nursery pigs, and the bacterium is one of the classic causes of heart failure in pigs due to destruction of the valves."

In severe cases, *S. suis* "causes sudden deaths because it attacks so quickly," Brockhoff adds.

But scientists do not yet know what factor(s) influences the virulence of different strains.

"What we don't fully understand is why certain strains of the bacteria are more pathogenic or more damaging to the pig and actually cause disease," Becton says.

Ramirez agrees.

"The question is: when does *S. suis* go from being a normal skin bacterium to actually invading and creating problems?" he asks.

"We don't know what triggers it."

## Controlling *S. suis*

Using antibiotics is still the most common and effective method of treating pigs that have clinical signs of *S. suis*.

"It's a disease you don't eradicate from a farm. You just manage it with immune stability, managing the environment, minimizing stress, or in certain circumstances with some use of antibiotics," says Brockhoff.

"One of the key things is finding the infection early on," Ramirez says.

"If diagnosis takes too long and the disease establishes itself in the animal's brain or in the joints, it's hard to (a) get drugs into those organs and (b) effectively treat the disease. The damage can still be left behind."

However, before farmers and their veterinarians administer medications, they should submit tissue samples to a diagnostic lab, Becton says.

Due to the vast range in serotypes, farmers must know what strain their animals carry to most effectively treat the disease.

The lab will create a plated culture

Kelli Jo/iStock/Getty Images Plus photo

***S. suis*** **"is a disease you don't eradicate from a farm. You just manage it with immune stability, managing the environment, minimizing stress, or in certain circumstances with some use of antibiotics," says Egan Brockhoff.**

and test its sensitivity to determine which antibiotics will work the best.

The situation "comes down to making sure you have the right diagnosis and supporting information to help guide treatment," Becton adds.

Once lab technicians identify the serotype, farmers and their herd management staff can more effectively administer medications at the right time and dosage, improving animal prognosis and treatment.

Veterinarians and laboratory staff can also conduct post-mortem examinations to help with diagnosis.

"There may be multiple serotypes on the farm but only one or two are often the pathogenic and true cause of the clinical signs," Brockhoff says.

"Because the bacterium is a normal pathogen in pigs, you really have to look for the bacteria in lesions. For example, you could find multiple serotypes in the lungs, but you'll only find one serotype in the brain. Getting necropsies or post-mortem examinations done" on tissues related to the symptoms that the pigs present will help to determine the serotype that causes the disease.

Farmers may also administer anti-inflammatories to sick pigs to help reduce internal inflammation associated with the infection and ensure animal welfare, Costa says.

Unfortunately, the efficacy of available treatment options varies.

"Some herds may use autogenous vaccines, which are often produced using one specific serotype. Serotypes can affect the efficiency of (such) vaccines, while the presence of resistance genes affects the efficiency of antibiotics. Thus, if there's more than one serotype circulating, the vaccine won't protect against it," says Costa.


Dr. Matheus Costa

"Antibiotics are usually delivered to many animals simultaneously, to help prevent and treat disease.

"The choice of which antibiotic to use is made by the herd veterinarian and takes into account multiple factors including the susceptibility of the specific strain circulating in each herd," Costa adds.

"Research is underway to develop new preventative and treatment methods."

## Finding solutions

While *S. suis* has challenged swine herds for over three decades, the bacterium's prevalence in the swine industry has risen recently.

From 2016 to 2018, "*S. suis* diagnoses either due to pneumonia or systemic disease are considered primary or secondary participants in roughly 10 to 12 per cent of all porcine pathology cases submitted to the ISU-VDL that have histologic evaluation," says Arruda.

"Over the past five years, it appears, based on data from the ISU-VDL, that the frequency and percentage of cases with a *S. suis* diagnosis have increased," she explains.

Indeed, the epidemiology and ecology of the bacterium and how it causes disease are complex.

"We need improved tools, techniques, protocols, models and vaccines, all of which first rely on a concerted effort in the identification of pathogenic strains," Arruda adds.

So far, no vaccine is commercially available for producers to prevent *S. suis* in pigs.

"There is interest globally for a vaccine to be produced," says Brockhoff. "So, a lot of research is focused on knowledge blocks that are needed to produce an effective vaccine."

The movement toward reduced antibiotic use in Canadian and American swine herds has put more market pressure on producers to go antibiotic-free, Brockhoff adds.

And "this disease often shows up when you take antimicrobials out of a farm as soon as there is a big stress event."

Clavijo agrees.

"The recent changes in the Veterinary Feed Directive in the United States and overall societal pressures from the public and government have led to a downward trend in antimicrobial use in North America," she says.

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**"*S. suis* is often described as an 'early colonizer,' as piglets are infected from their dams shortly after birth with endemic serotypes of *S. suis* present in the herd," says Dr. Bailey Arruda.**

"We could speculate that this situation has potentially caused an increase of cases which, in other times, would have been under control. Therefore, the pork industry will have to develop novel ways to minimize the impact of *S. suis*."

The industry needs more research to better understand the genetic variations of the bacterium, and develop effective preventative and treatment options.

"As the industry evolves and antibiotics are scrutinized more and used less, we are going to need the foundational knowledge we currently lack to prevent and mitigate disease through a better understanding of innate and acquired immune or resistance mechanisms," Arruda says.

Researchers are also examining the zoonotic potential of *S. suis*.

Dr. Bailey Arruda

"Although unheard of in Canada, this disease has the capacity to affect humans," says Brockhoff.

Indeed, *S. suis* "is the leading cause of human bacterial meningitis in southeast Asia, where several outbreaks have been reported," Costa says.

A person "can be infected if ingesting contaminated pork products such as food containing raw pork or if manipulating contaminated biological material with open skin lesions."

However, such infections are rare in the western world.

"People in North America who work in pig barns their whole lives are typically not impacted by this pathogen.

"But farmers need to know that it can cause disease in humans and take appropriate precautions, such as

wearing gloves when handling sick animals and remembering to wash their hands with soap and warm water," Brockhoff adds.

Advances in overall herd health management have also recently brought more attention to *S. suis*.

Over the past few years, "the industry evolved, which led to better management practices, diagnostics and vaccines. These advances resulted in better control over other diseases," Costa says.

"As we moved forward with healthier herds, we began to fine-tune things, such as *S. suis*-associated disease. It has always been out there, but we may have had other diseases eclipsing it.

"Unfortunately, we didn't spend enough time and resources to tackle it and are now trying to catch up."

So, scientists are searching for answers and trying to develop effective tools for swine industry stakeholders to enhance control of this pathogen.

Costa looks forward to the discovery of new treatment options.

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**"Over the past five years, it appears, based on data from the ISU-VDL, that the frequency and percentage of cases with a *S. suis* diagnosis have increased," says Dr. Bailey Arruda.**

"Many approaches are being investigated: microbiota manipulation, alternative vaccine strategies and non-antibiotic treatments," he says.

"We are trying to gain a better understanding of the disease's mechanisms: how does *S. suis* cause meningitis, for example. We hope that this new knowledge will soon lead to field tools." **BP**

# DEALING WI
# ANIMAL-RIGHTS A

by GEOFF GEDDES

Reps from Canada's swine sector discuss recent
what farmers and truckers can do to protect th

Rawpixel Ltd./iStock/Getty Images Plus photo


*Wanted: pig transport driver. Must be thick-skinned, unfazed by confrontation and able to navigate human blockades. Apply now!*

While this job posting is fictional, the challenges posed by animal-rights activists in the pork industry are real. Although producers, transport truck drivers and plant operators are no strangers to dealing with controversy, some individuals see a rise in "less-than-peaceful" protests as cause for concern.

"We understand that people are entitled to their beliefs and to protest peacefully at facilities or farms," says Geraldine Auston, president of Ag & Food Exchange Ltd. in British Columbia and an expert on crisis management. The business specializes in issues management for agriculture.

"As long as (activists) aren't breaking the law, interfering with legal businesses or endangering themselves or others, we respect their right to be there."

The problem in some instances is that the line between innocuous and intrusive seems to be blurring.

"In recent months, we have seen an escalation in activism that goes beyond the peaceful protest we support," says Stacey Ash, Ontario Pork's manager of communications and consumer marketing. "Industry members have experienced an increase in incidents of trespassing, harassment and physical interference with individuals and vehicles."

On farm, other concerns include barn break-ins, thefts of animals and vocal, large-scale protests.

"Farms are not just businesses; they are homes," says Ash.

"When, as has occurred in other jurisdictions like B.C., you have dozens of people confronting residents, carrying placards and refusing to leave, it's very disturbing. It's equally troubling to learn that some activists here in Ontario believe they have a right to secretly enter barns and businesses and remove property."

## Get the truck out of here

Given their high visibility, pig transport drivers are also a prime target of activists, who often block the way as truckers try to enter slaughter plant grounds.

"Protesters stand in front of the truck, swear at us, throw water bottles at the window and pound on the fender," says Tyler Jutzi, vice-president and driver for Brussels Transport Ltd. in Bluevale, Ont.

Apart from causing stress for the driver, Jutzi feels that those actions can put a strain on the pigs.

"The animals are usually resting peacefully by the time they get to the plant entrance, so they are disturbed by the ruckus," he says.

"There is also a major safety concern. I'm driving a 100,000-pound tractor trailer that doesn't stop on a dime when people suddenly block the road.

"I can't see all four sides of the truck to know if I'm about to run over someone when I start up again."

While no hard stats are available on the prevalence of activism in the pork industry, the reason for activism's rise may be easier to pin down.

## Global ties

"There have always been people who disagreed with using animals for food, but we live in an age when a movement can start in Australia and quickly make its way around the world," says Auston.

"Activist groups communicate amongst themselves, share their beliefs and find strength in each other to a degree that wasn't possible 20 or 30 years ago," she says. "It's called social media."

As empowering as social media can be, activists may also be emboldened by what often happens when they break the law: nothing.

"Escalation can partly be linked to a lack of meaningful legal consequences," says Ash.

A recent example is the case of animal-rights activist Jenny McQueen. In 2016 and 2017, she entered a hog barn near Lucan, Ont. several times without the property owner's knowledge. Though McQueen recorded herself inside the barn and admitted to stealing two animals, the Crown dropped charges of break and enter and mischief to property on May 1, 2019.

"We were shocked by the charges being dropped," says Eric Schwindt, chair of Ontario Pork. "As producers, we believe in free speech and the right to protest, but we also believe that our farms, food and families must be kept safe. We're disappointed that, thus far, the Crown has not been willing to share the rationale for the decision."

## Two-minute warning

At the Burlington plant where he makes deliveries, Jutzi is frustrated by what he sees.

"For some reason, police are allowing protesters to block our way for two minutes before we enter the plant," says Jutzi. "During that time, demonstrators can curse us and pretty much do what they want. If that sort of harassment occurred at any other workplace, I think it would be promptly addressed."

For its part, Ontario Pork is pushing officials to resolve these gaps in enforcement.


Tyler Jutzi

"The agricultural sector wants to work with government and law enforcement to give farmers and transporters more protection," says Ash. "Whether that (protection) involves new legislation or stronger enforcement of existing laws, something has to change."

The focus on change is shared by representatives of other organizations and commodity groups who say all illegal acts should be treated as such.

"In the absence of punishment, some activists are getting more brazen in their tactics," says Kelly Daynard, executive director of Farm & Food Care in Guelph, Ont. The non-profit organization connects farmers, ag businesses and government organizations to share credible information about food and farming with the public.


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**"Activist groups communicate amongst themselves, share their beliefs and find strength in each other to a degree that wasn't possible 20 or 30 years ago," Geraldine Auston says. "It's called social media."**

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"This (activism) is worrisome for the livestock industry in Ontario and has prompted many groups to write to the premier, minister of agriculture and solicitor general (to) tell them we need help. The bottom line is that we must take the issue seriously."

## Balancing act

In the meantime, industry leaders advise farmers to tread the fine line between caution and paranoia.

"I tell farmers not to lie awake at night worrying about (animal-rights activists) and to just be vigilant," says Daynard. "Do your checks and balances, and ensure your property is secure so you can rest easily."


Kelly Daynard

Security measures range from locking your barn doors and placing "no trespassing" signs at your gateway to installing a keypad entry system for your facilities. Motion detector lights and cheap – but effective – security cameras mounted on trees or fence posts can also be of value.

And clear communication with your family and staff is important too.

"Have the discussion with employees, children and spouses on what to do if someone you weren't expecting shows up on (your) farm," suggests Daynard.

"A few weeks ago, an activist posing as a feed company employee was trying to get on farms in Ontario. If in doubt, check ID. Talk to your local police station (staff) so they know who you are in case something occurs.

"I also urge all farmers working with livestock to have staff sign an animal care code of conduct like the one on our website, just to reinforce that commitment."

## The right stuff

When farmers encounter unwanted visitors, taking a stand – in a non-aggressive manner – is the best protection. It may also be the best hope for reducing such incidents in the future.

"Be respectful, stay calm, and know your rights," says Auston.

"If someone is trespassing, inform them of that and ask them to leave the property. Call law enforcement to ensure that … trespassers know where the boundaries are between public and private land. At present, it appears that those who oppose farming have more rights than those who raise livestock.

"When a problem arises, don't engage in a confrontational fashion, but don't just sit back and observe. Involving police when laws are broken is the only way that appropriate charges can be" laid.

Though farmers are do-it-yourself types by nature, engaging activists can be draining and unproductive.

"By and large, protesters are peace loving and not intent on hurting anyone. Even so, discussing a heated topic with someone who is diametrically opposed to your point of view is stressful," says Auston.

"Going down that road results in nothing but a disagreement; neither side is interested in changing his or her mind."

For evidence of the chasm between world views, look no further than the rationale for aggressive activism itself.


Stacey Ash

"Animal advocates are becoming increasingly concerned by the lack of transparency by the self-regulating farming industry and are working to expose to the public images and videos of the conditions in which animals are kept," says Camille Labchuk, executive director of Animal Justice in Toronto, Ont. The organization leads the legal fight for animals in Canada, working to pass strong animal protection legislation, pushing for the prosecution of animal abusers and fighting for animals in court.

"If the farming industry has noth-

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**"The agricultural sector wants to work with government and law enforcement to give farmers and transporters more protection," says Stacey Ash.**

ing to hide, it should welcome surveillance by animal advocates and ask the government to impose animal welfare regulations with public inspections," she adds.

Not surprisingly, industry members take a somewhat different view.

"This is not a question of transparency," says Schwindt. "It is an issue of extremists using an anti-animal agriculture agenda as justification for illegal actions including harassment, trespassing and theft."

## Animal attraction

If there's any common ground between farmers and activists, it may be what both sides value most dearly: the animals.

"A farm is like any community, neighbourhood or small town," says Auston.

"Every day, things can happen, and people or animals get sick. When that occurs, it's the responsibility of those (individuals) charged with care of the animals to … do the best they can.

"There will always be incidents that are beyond our control, but we need to prevent what we can. At the end of the day, we must do everything in our power to ensure the well-being of animals in our care."

Eric Schwindt

Just as we protect the animals, we could argue that protecting their owners is in everyone's best interests.

"Don't forget: only 1.7 per cent of Canada's population produces food," says Daynard. "We need farmers, and we don't want them being afraid of doing what they do best." **BP**

by
KATE
AYERS

# TAKING CARE OF BUSINESS AND THE SOIL

**This Ontario producer believes that preserving the land and running a successful business go hand in hand.**

Jim Denys is a second-generation Middlesex County, Ont. hog farmer who is passionate about producing quality pork – but not at the expense of his soil.

He received his associate diploma in agriculture from Ontario's Ridgetown College in 1998. When he returned to the farm that year, he purchased his brother Andre's 85-sow herd.

In 2004, Jim expanded the business to a 300-sow farrow-to-finish operation. At this time, he sold his swine herd back to Denys Farm Inc., the farm corporation under which his family operates.

His brothers Mike and Andre began working full time as business partners, alongside Jim and their father Dan.

Since the 1990s, the Denys family have worked to preserve the soil by building up organic matter and reducing erosion. Dan started growing no-till wheat over 25 years ago.

Today, Dan, Jim, Mike and Andre continue this conservation work. They no till both soybeans and wheat and use strip tillage in corn. The Denys family are also transitioning to controlled traffic to limit compaction to designated areas and apply variable-rate fertilizer to control nutrient runoff.

They follow a corn-soybean-wheat rotation and extensively use cover crops.

"We try different mixes throughout the year," Jim says. The cover crop mixes range from three to nine types of seeds, "depending on what we are trying to achieve."

In honour of his conservation efforts on the farm, the Ontario Soil and Crop Improvement Association recognized Jim as one of this year's soil champions.

"We're trying to do things in a way that will continue to improve our production practices and our land," Jim says.

"We do things through a sustainability lens."

For example, the family feed some of the corn they grow to their pigs. They sell the rest of the crops.

Jim and his wife Jen have four children, Griffen (15), Clay (12), Mack (10) and Maddie (5). They all love working on the farm and their rural lifestyle.

Jim looks forward to his children finding their paths in life and continuing to provide the best care for his family, animals and land.

HRM Photography

**Jim Denys (centre) farms with his brothers Andre (left) and Mike (right), as well as his father Dan.**

### How many people does your farm employ?

Four full-time workers and my oldest son Griffen (works) part time.

### What are your roles on your farm?

I am a partner in the farm with my two brothers and my dad.

### Hours you work per week?

That's a good question.

Probably 55 hours in the wintertime and whatever it takes to get the job done in the spring, summer and fall.

### Hours in the office per day?

Too many.

At least an hour and a half to two hours on average.

### What are two items that are on top of your desk?

A calculator and a computer are on my desk.

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### Email or text?
It depends on the situation.

Usually text messaging is quicker but if the message is long, email is better.

### Any favourite apps?
I use a few weather apps, the Farmers Edge app, Twitter and the Pest Manager app.

### What role does social media play in your daily life?
I usually check social media throughout the day.

It's good for sharing ideas and getting industry information.

Or if you're looking at trying something different or looking for farm equipment.

The ag Twitter community is pretty good at giving you input on any questions you have.

### What do you like best about farming?
The variety of work, the challenge of it and solving problems.

### What do you like least?
Paperwork for regulations.

### What does your family think of farming?
My wife Jen is very understanding and patient, for sure. She was a town girl, so farming was new to her but she is very supportive.

My kids love it. My oldest boy is very interested in farming and the other three enjoy it a lot, too. It is a little early to tell which direction they will go yet but we all love living in the country.

### What's your top tip about farm transition planning?
Keep the lines of communication open.

### What's the most important lesson you've learned?
Don't be afraid to try something new.

### What's your guiding management principle?
Pay attention to the details.

### What's your top goal?
To run a successful and profitable business.

### How do you define success?
Being happy and having everything you need.

### What are the biggest challenges you face in the industry and how have you addressed them?
Keeping on top of the technology that is available and sorting through what is of value and what is just noise in the industry.

And of course, keeping on top of all the regulations and making sure you have all that stuff in order.

I keep educating myself.

### Are you involved in any committees, associations or volunteer efforts?
I'm serving as a director and past president for the Middlesex Pork Producers' Association.

I'm a delegate for Ontario Pork. In the past, I served on the resolutions

committee as well.

I'm on the North Middlesex and District Minor Hockey Association Board and I'm on the Lambton-Middlesex Local League board.

I also coach some hockey.

**If you could send a message to non-farmers, what would you say?**

Like any other personal business, farming is your heart and soul.

And it's always something that is on your mind.

**If you weren't a farmer, what do you think you'd be doing for a living?**

When I finished college, I thought about going into plant science.

Something in that area, like plant breeding.

**How do you support your mental health during the busy times of the year?**

I go fishing to get some quiet time.

**What are your hobbies or recreational activities?**

I enjoy fishing and coaching kids' hockey.

**What was the last book you read?**

I read more magazines than books.

The last book I read was called *The Coming Famine* by Julian Cribb.

**How often do you travel?**

A few times a year.

We like to get away with the kids in the summer and the last couple of winters we have gone on trips.

**Where did you last travel to?**

The Dominican Republic.

**Is your farm vehicle messy or neat?**

It's a little cluttered.

**What was the last piece of equipment you bought for your shop?**

A plasma cutter.

**What's the best time of day?**

At night, when I get home and see the kids.

**What were your most memorable production years on the farm?**

Last year was certainly memorable. Not all for good reasons but there was just such a difference between the first half and second half of the year.

I've never seen such contrast between drought and then complete monsoon conditions for several months.

And in 2012, I think. We were working ground in March and were planting in mid-April. It was a very warm year. **BP**

Ontario Pork Congress

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by
DR. JESSICA LAW

# ELIMINATING ON-FARM PED OUTBREAKS: PART TWO

**Together with your vet, implement internal biosecurity protocols and complete a thorough disinfection.**

**Maternal protection from antibodies specific to PED is critical in protecting suckling piglets after a PED outbreak. The producer marked these piglets to show that they received colostrum within eight hours post-farrowing.**

Since writing and publishing my June *Better Pork* article on porcine epidemic diarrhea (PED) elimination, the number of PED cases in Manitoba has increased. By the first week of May, Manitoba had two cases of PED in 2019. As of July 9, the province had 53 cases of PED in the 2019 outbreak.

The producers and staff at the western Canadian sites that experienced outbreaks of PED early in the year were entering or completing the clean-up and elimination phase. The length of time this phase takes depends on the production phase and individual characteristics of the site.

In my June article, I discussed the initial steps producers and their veterinarians should take after a PED outbreak occurs. This process includes biocontainment, laboratory confirmation, herd exposure and piglet euthanasia.

In this article, I will discuss the steps that the producer typically takes in consultation with his or her vet after exposing the herd to PED to achieve elimination.

PED elimination is possible in almost every case; the length of time to achieve this goal will vary based on factors such as animal flow, risk factors and effective herd exposure.

When the entire herd is exposed to the PED virus, the producer must establish biocontainment measures on the farm and reinforce internal biosecurity. The farmer and his or her staff must also complete a thorough disinfection of the barn before the next group of sows are due to farrow.

In the first part to this two-part series, we left off after the barn staff had exposed the herd to the PED virus and removed as many piglets as possible from the farrowing rooms. The team had either aborted or euthanized at birth the litters from sows 93 to 114 days pregnant. While the production gap will depend on the specific procedure chosen, the gap should fall between 18 and 21 days.

The implementation of internal biosecurity is critical to minimize movement of the virus between production phases.

For example, if your barn is farrow to finish, you must have internal biosecurity between gestation and farrowing, within farrowing (into each room), between farrowing and nursery, within the nursery between batches, etc.

Internal biosecurity may include a complete boot and coverall change, temporary Danish entries or separate employees for these areas who do not crossover. The use of separate employees in grow-finish areas is ideal. Having a garbage disposal close to these entries, as well as in other easily accessible areas, helps to contain the pathogens.

Internal biosecurity is fundamental in disease elimination. One aspect of internal biosecurity is McREBEL, which stands for management changes to reduce exposure to bacteria to eliminate losses. Producers have used this process to successfully eliminate porcine reproductive and respiratory syndrome, PED and other diseases from commercial farms.

In PED eliminations, barn staff

slightly alter the use of McREBEL but the principles remain the same: minimize bacterial load through sanitation, eliminate movement between production phases and farrowing rooms, and adhere to all-in all-out practices.

While producers implement these internal biosecurity practices, barn staff should also complete a thorough cleaning and disinfection.

The washing, disinfection and drying stage of a PED elimination is extensive and involves the removal of anything that cannot be disinfected. The pits should be drained and every room washed until no organic material remains.

Disinfection is a key element in PED elimination and successful disinfection is heavily reliant on the removal of organic material.

The PED virus is enveloped, meaning it is susceptible to most disinfectants. Using products with a label for virucidal activity against PED is highly recommended.

Once staff have washed all surfaces or wiped down with a disinfectant those surfaces that cannot be washed, the barn manager, veterinarian or production manager should inspect the facility.

Inspection can include visual inspection for organic material as well as inspection of viral presence through environmental swabbing. After the assessor completes this inspection, the staff can complete the final disinfection.

The team may opt to apply dry lime as a final disinfectant application. A helpful strategy is the use of a leaf blower – but be sure staff wear personal protective equipment.

Application of heat is also extremely helpful in ensuring the environment is dry. Desiccation of the PED virus is another way to neutralize it.

In total, three tools are extremely useful for the deactivation and elimination of PED: disinfectant, heat and drying.

Once the team has successfully inspected, disinfected and dried the farrowing rooms, the first farrowing can occur. This farrowing is a key indicator of success but it does not guarantee that the team has eliminated PED.

The implementation of zones within the barn can improve staff adherence to strict internal biosecurity.

Keep day one piglet care and McREBEL principles at top of mind to help ensure healthy litters. These principles include ensuring piglets receive colostrum within eight to 12 hours of birth, splitting suckling large litters or litters with uneven birthweights, minimizing stress events, restricting fostering to even out litters and only adding or removing piglets, not both.

Producers should euthanize unthrifty and lightweight piglets.

When it comes to development of colostral antibodies, the higher the dose of viral exposure gilts received during the initial exposure phase, the lower the mortality of their piglets due to the higher-quality colostrum.

Since animals can shed PED intermittently post-infection, colostrum management and colostral antibodies are critical to piglets' survival once farrowing begins again.

The antibodies in the sow's milk are like a vaccine for the piglet. If the piglet does not receive colostrum or antibody-rich colostrum, the animal will not be considered protected or "vaccinated."

Once the piglets are weaned, they quickly lose the immunity the sow provided them. This decline in maternal antibodies leaves the piglets vulnerable to infection. Keeping the nursery PED negative and maintaining good external and internal biosecurity is essential to preventing PED infections there.

Recent research shows that vaccines for PED in the sow herd can provide improved maternal immunity and colostrum quality and may be of value in response to some PED outbreaks. The PED vaccine does not prevent infection and cannot be used to stop a PED outbreak.

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**Producers should take extra precautions for biosecurity around manure management and spreading.**

After PED exposure and clean-up, your veterinarian will lay out further testing and surveillance protocols for your herd based on the individual risk factors and barn scenario.

Marketing pigs and manure spreading are two controversial topics that require much more room for discussion. Opinions and decisions regarding these topics will vary based on geography, the number of outbreaks around the premises and several other factors.

Producers should exercise caution such as reinforcing external biosecurity and enforcing the control and restricted access zones when spreading PED-positive manure.

Testing spreading equipment prior to use on your premise and managing traffic flow when the equipment is on site is important. Lagoons will remain positive for at least 27 weeks, if not significantly longer.

Industry representatives are collecting further evidence on the risk manure poses to PED outbreaks.

As mentioned in the previous article, this article is based on research, and practitioner and producer experiences. However, farmers should consult their herd veterinarians and follow the procedures and protocols that they established for the specific cases.

Every operation is unique and each team has to address different needs and challenges to successfully eliminate PED.

Finally, I would like to thank my colleagues for sharing their valuable knowledge and experiences. Dr. Cordell Young, Dr. Craig DeGroot and Dr. Pete Pawluk helped to ensure this article encompasses Alberta's experience with PED. **BP**

*Dr. Jessica Law is a veterinarian with Prairie Swine Health Services in Red Deer, Alta.*

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# ASSESSING CLEANLINESS OF SWINE TRAILERS

**Visual inspections of trailers don't provide reliable results, so researchers explored other options.**

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**Prairie Swine Centre researchers set out to find an alternative reliable, rapid and easy-to-use means of monitoring the surface cleanliness of swine transport trailers.**

Pig transportation poses a significant risk for the transmission of swine diseases.

With the ongoing threats of porcine epidemic diarrhea and porcine reproductive and respiratory syndrome, the industry has put a great deal of effort into ensuring transport trailers are properly washed, disinfected and inspected for organic matter and microbial contamination prior to use.

Typically, workers carry out a visual inspection to assess the cleanliness of trailers after the washing, disinfection and drying procedure. In some situations, workers will supplement this visual inspection with the culture method, according to a 2011 study by the Canadian Swine Health Board.

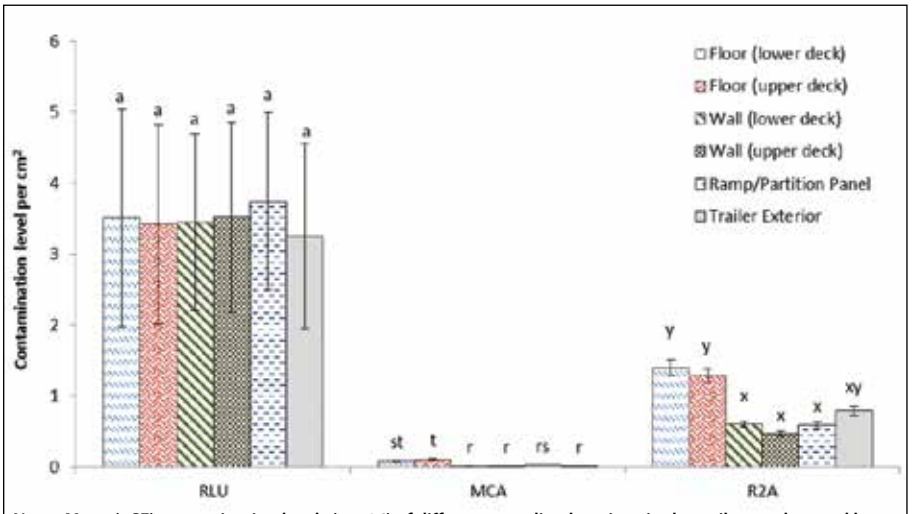
However, Prairie Swine Centre (PSC) scientists found visual inspection does not provide a consistent or very reliable assessment.

The traditional microbiological culture method involves the use of plated media which need to be incubated and analyzed to obtain an indication of the contamination of the sampled surfaces. The method also relies heavily on the quality control process of sampling and analysis. This process can cause significant downtime for trailer operation.

The need to wait for test results delays the implementation of corrective actions.

Dr. Bernardo Predicala, an engineering research scientist, and other researchers at PSC set out to find an alternative reliable, rapid and easy-to-use means of monitoring the surface cleanliness of swine transport trailers.

Over the last decade, other industries – such as the food, hospital and cattle industries – have used the ATP (adenosine triphosphate bioluminescence) method for monitoring surface cleanliness and microbial contamination. So, swine researchers




**Note: Mean (±SE) contamination levels (n = 16) of different sampling locations in the trailers as detected by the ATP bioluminescence meter (in RLU per cm2), and MCA and R2A agar plates (in CFU per cm2). Means with the same letters are not significantly different (p>0.05).**

**Trailer floors posed the highest risk of microbial contamination among the six critical areas tested.**

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**ATP bioluminescence is a good alternative for quick monitoring of transport trailers' surface cleanliness.**

explored the possibility of the practical application of the ATP method within the pork industry.

This method uses bioluminescence (the production and emission of light by a living organism) as an indicator of the level of residual ATP present on swabbed surfaces. Once a surface is swabbed, the technician exposes the sample to an ATP-releasing agent (lysis buffer) and an ATP-activated light-producing substrate and enzyme (luciferin and luciferase).

The scientist can then quantify the amount of ATP present on the tested surfaces by the amount of light emitted during the enzymatic reaction in terms of relative luminescence units (RLU). The intensity of light is proportional to the amount of ATP and the degree of contamination.

Technicians took samples from dry, cleaned trailers using an ATP swab by wiping 10-cm-by-10-cm (3.9-inch-by-3.9-inch) areas in multiple locations in the trailer and testing them for microbial contamination levels using an ATP bioluminescence meter.

Researchers compared the results obtained from ATP testing to the co-located samples taken using standard microbiological techniques with MacConkey and R2A agar contact plates (diameter = 60 mm or 2.4 inches). Scientists examined more than 500 samples for each method, which were collected from 18 commercial swine transport trailers across Saskatchewan.

Researchers found a moderate correlation between the ATP bioluminescence method and the standard microbiological technique using R2A agar plates. Scientists found a poor correlation, however, between the ATP bioluminescence method and MacConkey agar (MCA) plate counts. Unlike R2A that detects a wider group of bacteria, MCA supports only the growth of selected gram-negative bacteria. ATP bioluminescence detects ATP from both microbial and organic sources.

Researchers established threshold values in assessing the effectiveness of swine transport trailer cleaning protocol using the ATP bioluminescence method. They identified figures of 430 RLU per 100 $cm^2$ and below as passes. Researchers identified figures of 850 RLU per 100 $cm^2$ and above as fails or as having high risks of disease propagation. (See Table 1 on page 32.)

The benefit of the ATP bioluminescence method is the ability to provide results within minutes, as opposed to several days for traditional microbiological testing. As a result, ATP bioluminescence is a good alternative for quick monitoring of transport trailers' surface cleanliness.

## Key points

- The ATP bioluminescence method can be used as a tool for rapid assessment of surface cleanliness of swine transport trailers, complementing the washing and disinfection procedures.
- Dirty areas in trailers can be conveniently and rapidly identified using the ATP bioluminescence method,

**Table 1:** Threshold values in assessing effectiveness of swine transport trailer washing, disinfection and drying protocol using MCA, ATP bioluminescence and R2A.

| Assessment criteria from the Canadian Swine Health Board, 2011 | | Threshold values | | |
|---|---|---|---|---|
| Category | Remarks | MacConkey agar | ATP bioluminescence | R2A agar |
| Pass | Maintain wash, disinfection and drying protocols. | 0 – 10 | 0 – 430 | 0 – 140 |
| Critical | Risk of disease propagation. Room for improvement. | 11 – 50 | 431 – 850 | 141 – 625 |
| Fail | High risk of disease propagation. Identify problem and correct the wash, disinfect and drying protocol and its observance. | >50 | >850 | >625 |

**This table shows the threshold values for the MacConkey agar, ATP bioluminescence and R2A agar tests.**



and workers can take corrective actions on the current washing and disinfection protocol.

- Visual inspection of newly cleaned transport trailers is not sufficient in assessing surface cleanliness.
- Trailer floors posed the highest risk of microbial contamination among the six critical areas researchers tested. **BP**

*The Prairie Swine Centre conducts near-market research that can be applied by the pork industry within a one- to seven-year time frame.*

## ESTIMATE OF TESTING COSTS

These calculations are based on a two-deck swine trailer.
Number of locations: six
Number of samples per location: two
Number of samples per trailer: 12

### Microbial culture method (MCA/R2A)

Priced at $6.73 per contact plate
In-house incubation and counting: cost is ~$80/trailer (+ incubator ~$500)
Commercial lab (incubation and counting): ~$480/trailer (+ shipping)

### ATP bioluminescence

Priced at $3.72 per swab
Cost is ~$45/trailer (+ ATP luminometer ~$2,000)

Notes: In both cases, the user conducts the sample collection on the trailer. The labour cost is not included in the calculations. **BP**

Ontario
# Pork News & Views
Prepared and Edited by the OMAFRA Swine Advisory Team
ONTARIO PORK
August 2019

## Changes under the Nutrient Management Act are here!

As of July 1, 2019, two important changes to the Nutrient Management regulation are in effect under the *Nutrient Management Act*. They will help farmers reduce regulatory burden in the agriculture sector while continuing to protect the environment.

The most far-reaching change removes the automatic expiration of nutrient management strategies every five years. This requirement added burden without improving environmental protection. Nutrient management strategies can now remain in effect until there is a significant change to an operation, placing a greater emphasis on annual reviews.

To support this change, OMAFRA is developing tools for producers to help them more easily complete their annual review and keep their strategy up to date and focused on supporting long-term planning.

The Nutrient Management Act will now also include lower-risk manures from non-farm grazing animals, such as zebra, elephant or kangaroo, as Category 1 non-agricultural source materials. This will make it easier for businesses and agricultural operations to use these manures as a crop nutrient source and help promote improved recycling of these materials. Farm animal manure continues to be defined as agricultural source material no matter where it is generated, including horse manure generated at facilities other than farms.

Developed in consultation with Ontario farmers, these regulatory changes were made through a joint initiative between the Ministry of the Environment, Conservation and Parks and Ministry of Agriculture, Food and Rural Affairs as part of the Ontario Open for Business Action Plan

*Matt Wilson*
*OMAFRA Nutrient Management Lead*

## New Swine Research Facility Announced

In July OMAFRA announced that planning is underway to construct a new swine research facility to support research and training needs in the industry.

**Quick Facts**

- The new swine research facility will have capacity for a wide number of research disciplines, including animal health, nutrition and welfare; consumer-oriented research; environmental factors; genetics/genomics; nutrient man agement; and reproduction.
- The new research facility is a partnership between the province (through the Agricultural Research Institute of Ontario) and 1,200 industry producers through Ontario Pork and the University of Guelph.
- Swine research in the province will be relocated from the current Arkell Research Station to the recently expanded Elora Research Station.
- The new facility, estimated to cost $15 million ($12 million from the Ontario government through the Agricultural Research Institute of Ontario and $3 million from Ontario Pork), has recently entered the design phase and is expected to take up to three years to complete.

*From an OMAFRA News Release, July 2, 2019 (https://news.ontario.ca/omafra/en)*

## How Big is Your Pig? Determining the Size of Finisher Pigs, Replacement Gilts and Sows

Understanding of the size of your pig is key to optimizing management, performance and profitability! With finishing pigs and replacement gilts the focus should mainly be on the weight of the animal. With the breeding herd the focus should be on sow body condition, and not just on weight.

Body weight is used to ensure correct diets are being fed, to plan future market dates and to assess reproductive maturity in gilts. By knowing the weight of your pigs, you can more accurately determine the time point in which diet phases should change as they grow, and you should be able to ship the majority of your pigs within a desired weight category to market. Pigs can be weighed on a platform scale, but there are also other techniques that can estimate body weight with relative accuracy when no scale is available. These include body weigh tapes and smart phone applications which use 3D cameras to measure the pig and determine its body weight.

Body weight is only part of the equation when it comes to your reproductive animals. The body condition of a sow accounts for both weight and backfat thickness. As with any animal, variations in size mean that

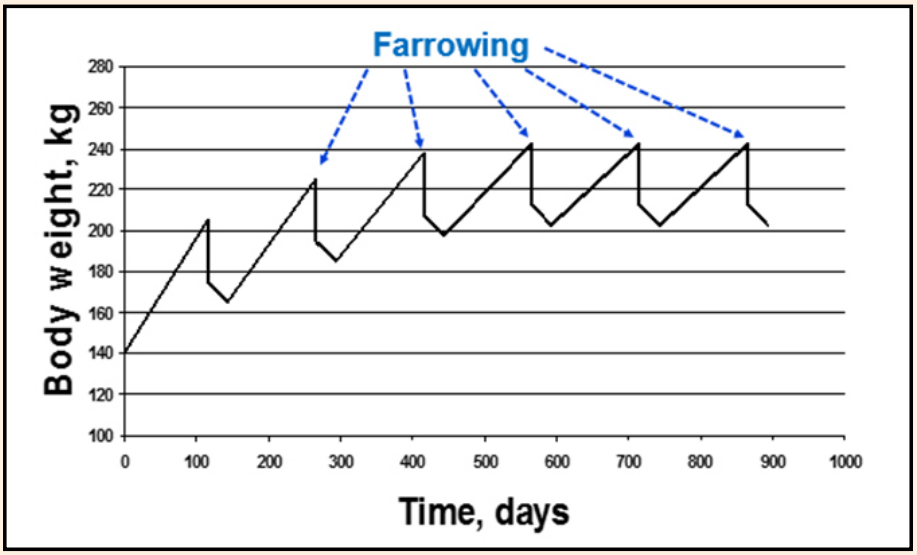



**Figure 1**: Desired body weight changes in sows across multiple parities (NRC, 2012).

two sows that weigh the same may not have the same body condition score (BCS). One sow may be much taller or longer than the other sow of the same weight, meaning that one is likely over- or under-conditioned. Although a sow's BCS will fluctuate throughout her reproductive cycle, preventing large swings in BCS is key to optimizing your breeding herd performance. For example, sows that enter farrowing over-conditioned will have lower feed intakes, rely more on their own fat reserves to produce milk, and will leave farrowing having lost more body condition, thus requiring more inputs to bring her back to normal. This also translates into decreased numbers of piglets born in her next litter (Young et al., 2004). There are several different ways to measure sow weight and body condition, including weigh scales, weigh tapes, ultrasound, visual scoring and BCS calipers. Producers should take advantage of these tools to help ensure each sow is achieving the desired body weight (Figure 1) and BCS changes over time.

## WEIGH SCALES

Weigh scales are the most accurate form of determining the weight of your pigs, as long as the scales are cared for and maintained properly. There are various types of scales available, from individual animal scales through to large group scales. Autosort systems have scales built in, as do some electronic sow feeding systems. Scales should be checked for calibration on a regular basis. Calibration weight should be roughly equal to the weight of the animals using the scale. For example, if you are weighing 50 kg hogs, two 25 kg feed bags work great as a scale calibration check.

Scales are not cheap, but over time their benefits provide significant return on investment. By allowing you to accurately determine when to phase change diets, or by ensuring all pigs going to market are within the target grid, you will improve your profitability.

## WEIGH TAPES – HEART GIRTH

The heart girth of a pig is highly correlated with body weight, and is an excellent, cost effective way of estimating pig body weight when no scale is available. When measured properly, this method predicts body weight within 10 lbs (4.55 kg) for market pigs and replacement gilts, and within 30 lbs (13.6 kg) for mature sows.

Measuring the hearth girth of pigs can be done using a tape measure, a string with incremental measurement markings or a polyethylene

**Table 1:** Pig weights in pounds and kilograms based on heart girth measurement (inches) +/- 10 lbs (from Groesbeck et al., 2002) *Weight (lbs) = 10.17 x heart girth (inches) – 205.75*

| Inches | Pounds | Kilograms |
|---|---|---|
| 25 | 49 | 22.2 |
| 26 | 59 | 26.8 |
| 27 | 69 | 31.3 |
| 28 | 79 | 35.8 |
| 29 | 89 | 40.4 |
| 30 | 99 | 44.9 |
| 31 | 110 | 49.9 |
| 32 | 120 | 54.4 |
| 33 | 130 | 58.9 |
| 34 | 140 | 63.5 |
| 35 | 150 | 68.0 |
| 36 | 160 | 72.5 |
| 37 | 171 | 77.5 |
| 38 | 181 | 82.1 |
| 39 | 191 | 86.6 |
| 40 | 201 | 91.1 |
| 41 | 211 | 95.7 |
| 42 | 221 | 100.2 |
| 43 | 232 | 105.2 |
| 44 | 242 | 109.7 |
| 45 | 252 | 114.3 |
| 46 | 262 | 118.8 |
| 47 | 272 | 123.3 |
| 48 | 282 | 127.9 |
| 49 | 293 | 132.9 |
| 50 | 303 | 137.4 |
| 51 | 313 | 141.9 |
| 52 | 323 | 146.5 |
| 53 | 333 | 151.0 |
| 54 | 343 | 155.5 |
| 55 | 354 | 160.5 |

tube with markings (see below). The heart girth is measured by wrapping the tape measure around the pig, just behind the forelegs and shoulders (Figure 2), and in front of the first mammary gland in sows. Table 1 shows the measurement in inches and body weight in both pounds (lb) and kilograms (kg) for market pigs and replacement gilts. Table 2 shows the measurement in inches and body weight in both pounds (lb) and kilograms (kg) for mature sows. It is important to use the correct table, as the mathematical relationships for younger and older pigs are different.

**Table 2:** Sow weight in pounds and kilograms based on heart girth measurement (from Iwasawa et al, 2004). *Weight (lbs) = 21.54 x heart girth (inches) – 684.76*

| Inches | Pounds | Kilograms |
|---|---|---|
| 45 | 284.5 | 129.1 |
| 46 | 306.1 | 138.8 |
| 47 | 327.6 | 148.6 |
| 48 | 349.2 | 158.4 |
| 49 | 370.7 | 168.1 |
| 50 | 392.2 | 177.9 |
| 51 | 413.8 | 187.7 |
| 52 | 435.3 | 197.5 |
| 53 | 456.9 | 207.2 |
| 54 | 478.4 | 217.0 |
| 55 | 499.9 | 226.8 |
| 56 | 521.5 | 236.5 |
| 57 | 543.0 | 246.3 |
| 58 | 564.6 | 256.1 |
| 59 | 586.1 | 265.9 |
| 60 | 607.6 | 275.6 |
| 61 | 629.2 | 285.4 |
| 62 | 650.7 | 295.2 |
| 63 | 672.3 | 304.9 |
| 64 | 693.8 | 314.7 |
| 65 | 715.3 | 324.5 |

**Figure 2**: Photo of a polyethylene tube being used to measure heart girth and estimate body weight.

To ensure accuracy, it is important to perform this measure when pigs have had full access to feed and water (not directly after transportation, for example), and when pigs are clean. Additionally, the pig's head should be down, as the heart girth measurement becomes less accurate if the pig's head is raised. Allow the pig to chew on your boot or provide some feed on the floor to help obtain an accurate measurement. Take the measurement 3 times and use an average of the 3 values to improve accuracy.

**Constructing a heart girth tube**

Measuring tapes and strings are flimsy and can be difficult to use on a moving target. Researchers at North Carolina State University developed a more rigid, polyethylene version of the heart girth measuring tape, which is easy to make and very inexpensive (less than $2.00 each; Figure 3). The following are the step by step instructions as outlined in a video made by the NC State Swine Extension Team (www.youtube.com/watch?v=iemmCZd9VVI):

**Figure 2**: Polyethylene tube designed to estimate body weight using heart girth measurements.

- Cut a 5 foot length (60 inches) of polyethylene tubing (3/8 inch o.d. works well)
- Secure a measuring tape flat to the floor or a table
- Straighten the poly tubing and secure with tape beside the tape measure you have laid out
- Using a permanent marker, draw a line on the tubing starting at 45 inches through to 55 inches (this will cover a weight range of 250 to 350 lbs (113 to 159 kg))
- Using 2 different colour 1 inch wide masking tapes, wrap alternating colours on each of the marks on the tube
- Write the corresponding weight on each of the coloured tape sections

**Table 3:** Sow weight in pounds and kilograms based on flank-to-flank measurement (from Iwasawa et al, 2004). *Weight (lbs) = 26.85 x flank-to-flank (inches) – 627.93*

| Inches | Pounds | Kilograms |
|---|---|---|
| 34 | 285.0 | 129.3 |
| 35 | 311.8 | 141.4 |
| 36 | 338.7 | 153.6 |
| 37 | 365.5 | 165.8 |
| 38 | 392.4 | 178.0 |
| 39 | 419.2 | 190.2 |
| 40 | 446.1 | 202.3 |
| 41 | 472.9 | 214.5 |
| 42 | 499.8 | 226.7 |
| 43 | 526.6 | 238.9 |
| 44 | 553.5 | 251.0 |
| 45 | 580.3 | 263.2 |
| 46 | 607.2 | 275.4 |
| 47 | 634.0 | 287.6 |
| 48 | 660.9 | 299.8 |
| 49 | 687.7 | 311.9 |
| 50 | 714.6 | 324.1 |

**Figure 3**: Flank-to-flank measurement of a sow (Iwasawa et al., 2004).

- Repeat from the opposite side of the tubing, so your heart girth tube can be used from either direction.

**WEIGH TAPES – FLANK TO FLANK**

When sows are housed in stalls it is difficult to obtain a heart girth measurement since the front end of the sow is hard to access. Because of this, researchers at Kansas State University determined the relationship between sow body weight and flank-to-flank measurement in addition to heart girth. They found that the flank-to-flank measurement was just as accurate as using the heart girth (within 30 lbs or 13.6 kg), although the equations are slightly different. The relationship between measured inches, pounds and kilograms is shown in Table 3. The flank-to-flank measure is taken from the bottom of the left flank to the bottom of the right flank, running over top of the sow (Figure 3).

**MEASURING BACKFAT THICKNESS**

Backfat thickness can be measured using an A-mode or B-mode ultrasound scanner. These measurements are usually taken at the P2 position (6-8 cm away from the body midline at the last rib level). Each ultrasound machine may have slightly different instructions for measuring backfat, so it is important to follow the manufacturer's instructions. A contact gel will be required to get an accurate reading. Different genetic lines of pigs have different optimal backfat measures for reproductive sows. Work with your genetics supplier to know what is best for your herd.

**BODY CONDITION SCORING**

Body condition can be evaluated using finger and hand pressure on various parts of the sow where fat is generally deposited. These areas include; ribs, spine, and hip bones. It is important to evaluate all three of these areas when body condition scoring as sows deposit fat differently. Consultation with a qualified advisor such as a swine nutritionist or veterinarian is needed to set the target scores of individual herds according to their unique feed, genetic lines and management strategies. Sows are typically scored on a 5-point scale with 1 being emaciated (very thin) and 5 being obese. Figure 4 is a visual representation along with a written explanation of each score.

**Condition score 1:** The sow is visually thin, with hips and backbone very prominent and no fat cover over hips and backbone

**Condition score 2:** The hip bones and backbone are easily felt without any pressure on the palms.

**Condition score 3:** It takes firm pressure with the palm to feel the hip bones and backbone

**Condition score 4:** It is impossible to feel the bones at all even with pressure on the palm of the hands.

**Condition score 5:** The sow is carrying so much fat that it is impossible to feel the hip bones and backbone even by pushing down with a single finger.

**Figure 4**: 5-point visual body condition scoring scale (NFACC Code of Practice for the Care and Handling of Pigs, 2014).

**Table 4:** Body condition score guidelines for critical points in the reproductive cycle (NFACC Code of Practice for the Care and Handling of Pigs, 2014).

| Critical Point | Target Body Condition Score |
|---|---|
| Sows at Farrowing | 3 to 3.5, with 80% scoring a 3 |
| Lactating & Weaned Sows | 2.5 to 3.5 |
| Remedial Action Needed | Below 2.5 |

A sow's body condition will fluctuate with her reproductive cycle. Because of this, it is important to obtain multiple body condition scores throughout each reproductive cycle. The National Farm Animal Care Council Code of Practice provides guidelines for target body condition scores at critical points in the reproductive cycle (Table 4).

**Body Condition Score Caliper**

In 2015, Dr. Mark Knauer at North Carolina State University developed a new tool to remove the subjective nature of using the visual 5-point scale for sow body condition scoring. The sow body condition caliper quantifies the angularity of a sows topline and uses the degree of the angle to determine the condition of the sow (narrow angle = too thin, wide angle = too fat). The caliper, shown in Figure 5, can be ordered by contacting Dr. Knauer directly at mtknauer@gmail.com.

**Figure 4**: Sow Body Condition Caliper designed by Dr. Mark Knaur at NC State University.

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For more information on determining the size of your pigs, or to receive a free polyethylene heart girth measuring tube (while supplies last), contact:

*Laura Eastwood*
*OMAFRA Swine Specialist*
*laura.eastwood@ontario.ca*
*226-921-5819*

## Causes and Prevention of Sow Lameness

*The following is a summary of Dr. Laurie Connor's presentation at the Group Sow Housing and Management Seminar held in Stratford last December.*

Sow lameness is the second most common reason for culling, about 8-15%. This begs the question: is this a welfare issue in group housing? Dr. Connor says the answer is yes. Sows need to be able to comfortably walk around to access food, water, resting space and to be able to maintain their place in the social hierarchy of the herd. Dr. Connor commented that we all wish lameness stemmed from one cause, but it is a multifactorial problem. Some causes include: the sows' genotype, nutrient intake, cleanliness, feeder design, facility design, herd management and injury. Predisposing factors include: poor conformation, inappropriate flooring, inter-sow aggression and poor space quality. Dr. Connor believes that the emphasis of lameness prevention needs to be on early detection and effective treatment. If this is possible, it will increase the likelihood of recovery without reoccurrence. Treatment heavily depends on cause and severity.

Quantity and quality of space is affected by many factors such as pen layout / configuration, type of flooring, feeding systems and group characteristics. There must be sufficient space per pig to allow proper access to essential resources, social interactions and normal behavior. Crowding can cause difficulty for some sows to reach food or water, which promotes aggression and limits space for effective avoidance behavior. Crowding will compromise the lower ranking animals the most. There are recommendations for space per pig in Canada, but the actual space required for pigs is going to be a function of several factors; the conditions of the animals will determine how much space they need. Dr. Connor stresses that these animals need clearly defined spaces for feeding, drinking and dunging to discourage competition and enhance social stability in the group.

Pen layout must allow for avoidance, escape, ease of movement and access to resources. Space dividers are recommended by Dr. Connor to create discrete resting areas for the pigs to easily lay down and get up. Walk ways need to be wide enough for the pigs to avoid being blocked and avoid bottle necks; 7-10ft is recommended.

Dr. Connor states that a number of things about the flooring is going to impact the sow. Abrasiveness can cause lesions, slipperiness can cause sprains or other injuries, drainage/cleanliness can infect existing wounds. Compressibility such as straw or rubber matts have been proven to provide less impact on joints, leading to less lameness. Inappropriate flooring is a major cause of sow lameness, injuries and pain, all of which can lead to early culling. The incidence of lameness is greater on concrete slatted floors than solid floors with bedding. When using slatted floors Dr. Connor recommends that the slat and gap width, slat orientation and functionality is kept in mind. In Canada the recommended slat and gap width is 5 inches for the slats with a 0.75 inch gap.

A very detailed study took place that followed gilts during two gestation periods on a test floor vs. a control floor (105mm slat/19mm gap; 125mm slat / 25mm gap). Body condition scores, lesions, reproductive performance, manure handling and air quality were all observed in the hopes of coming up with some guidelines. Sows on the narrower slats and gap widths had lower feet lesion scores and improved comfort indicators, but there were no differences in body condition, reproductive performance, manure

build up or air quality. The results suggest that the narrower slats and gap width proved to be beneficial to gilts and sows.

Dr. Connor then goes on to discuss the feeding strategies and choice of feeding systems in relation to sow lameness. Feeding systems are central to a group housing design, and feed availability is certainly a source of competition. The feeding system choice can either increase or decrease feeding related aggression, which plays a part in the welfare, body condition score, productivity and economic outcomes. A competitive feeding system requires a higher maintenance level for success and it provides less protection at feeding time which can lead to inter sow aggression and variation in body conditions. In a non-competitive feeding system, the sows should be receiving adequate FI daily. Inadequate amounts can raise agonistic behavior and inadequate amounts during the first month can risk pregnancy loss, lower farrowing rate and smaller litter sizes.

Mixing sows into groups requires a management goal of rapid establishment of a stable social order. It is known that groups must develop a dominance hierarchy, which means there will be agonistic behavior, aggression, and avoidance behavior. Some sows will fight but many do not need to fight to determine a hierarchy. Some will intentionally avoid aggression, hence the reason for a pen set up with partitions. Injuries can be minimalized by ample space for escape and avoidance behavior. When running a group housing system, the stock people at the facility should be knowledgeable, attentive, enjoy working with sows, trained with an animal directed approach and should be able to recognize lameness issues as well as other problems within the group and know how to deal with them.
Some important considerations to minimize distress and lameness would be to abide by the recommended space allowance, use appropriate flooring, allow separate areas for eating, sleeping and dunging, provide escape routes or dividers, and to strive for stable social groups being quickly established.

If you would like to watch Dr. Connor's presentation follow this link: https://youtu.be/rtBoeeEMzgw. Check out the growing number of other talks from the London Swine Conference on the LSC YouTube Channel.

*Summarized by:*
*Ava Lass*
*OMAFRA Summer*
*Livestock Assistant, Swine*

## Are You Raising Hogs Without Antibiotics!

If so, the Prairie Swine Centre would like to recruit you to participate in a research project! The overall goal of the study is to determine whether the pattern of antibiotic use on farms is correlated with the prevalence of specific pig pathogens and antimicrobial resistance. The project will use both RWA and non-RWA farms, and is currently recruiting RWA farms for the project.

The research trial will be conducted over a 2 year period, and the research team will need access to all pig treatment records, as well as fecal and manure sampling every 6 months (training will be provided). Reimbursement will be offered to each barn enrolled in the study for any incremental project-related costs. Farms located in Canada are eligible.

If you are interested and would like to learn more, please contact:

*Dr. Bernardo Predicala*
*Research Scientist – Engineering*
*Prairie Swine Centre*
*bernardo.predicala@usask.ca*
*306-667-7444*

## SOD TURNING FOR SWINE RESEARCH STATION AT ARKELL

On May 3rd, 1979, the Honourable Lorne Henderson, Minister of Government Services and the Honourable William Newman, Minister of Agriculture and Food, officiated at the sod turning ceremony for new swine research facilities at Arkell. The Government will contract with the University of Guelph to conduct swine research in the facility to open in the Spring of 1981. It is estimated the facility will cost 3 million dollar's and will have a carrying capacity of approximately 1500 hogs of various ages for swine research.

*Andy J. Bunn, Swine Specialist, London*

Group Sow Housing Research at the Arkell Swine Research Facility

Ministry of Agriculture, Food and Rural Affairs

Ontario

# 2019 Ontario Monthly Hog Market Facts

*Compiled by Jaydee Smith, OMAFRA* *jaydee.smith@ontario.ca*

| Month | Jan '19 | Feb'19 | Mar '19 | Apr '19 | May '19 | Jun '19 | 1st 6 mo. |
|---|---|---|---|---|---|---|---|
| 100% Formula Price ($/ckg, 100 index) | $135.65 | $133.45 | $139.01 | $193.73 | $202.91 | $190.33 | $165.85 |
| *** Same Month - Previous year** | **$156.28** | **$165.96** | **$151.39** | **$128.94** | **$152.13** | **$185.96** | **$156.78** |
| Average price ($/ckg, DW total value) | $171.01 | $165.88 | $173.80 | $229.80 | $240.74 | $224.59 | $200.97 |
| Low price ($/ckg, DW total value) | $146.50 | $146.74 | $145.55 | $207.09 | $220.15 | $207.80 | $178.97 |
| High price ($/ckg, DW total value) | $223.57 | $210.31 | $224.55 | $260.99 | $266.68 | $249.27 | $239.23 |
| Ontario Market Hog Sales | 424,466 | 410,839 | 521,399 | 392,174 | 510,557 | 402,446 | 2,661,881 |
| ***% Change Same Weeks - Previous Year** | **3.8%** | **3.4%** | **11.3%** | **1.0%** | **9.9%** | **4.2%** | **5.2%** |
| Average Carcass Weight (kg) | 105.19 | 104.06 | 103.87 | 103.38 | 103.57 | 102.74 | 103.80 |
| Weaned Pigs ( $/pig, 5 kg)**Formula | $35.27 | $34.70 | $36.14 | $50.37 | $52.76 | $49.49 | $43.12 |
| Feeder Pigs ( $/pig, 25 kg)**Formula | $55.96 | $55.05 | $57.35 | $79.92 | $83.70 | $78.51 | $68.42 |
| Value of Canadian Dollar (US$) | $0.7490 | $0.7566 | $0.7499 | $0.7478 | $0.7431 | $0.7526 | $0.7498 |
| *** Same Month - Previous year** | **$0.8032** | **$0.7987** | **$0.7747** | **$0.7857** | **$0.7780** | **$0.7632** | **$0.7839** |
| Prime Interest Rate at End of Month | 3.95% | 3.95% | 3.95% | 3.95% | 3.95% | 3.95% | 3.95% |
| Corn (farm price) - $/tonne | $198.68 | $198.93 | $194.31 | $192.73 | $207.23 | $236.38 | $204.71 |
| *** Same Month - Previous year** | **$170.06** | **$176.12** | **$187.77** | **$191.07** | **$199.32** | **$187.76** | **$185.35** |
| Soybean Meal (Hamilton + $20)-$/tonne | $513.56 | $494.96 | $488.39 | $487.55 | $486.30 | $534.99 | $500.96 |
| *** Same Month - Previous year** | **$476.49** | **$510.27** | **$559.57** | **$572.80** | **$593.04** | **$560.25** | **$545.40** |
| Corn - Western Ontario Feed - $/tonne | $215.54 | $212.83 | $208.82 | $204.94 | $219.12 | $248.51 | $218.29 |
| *** Same Month - Previous year** | **$183.80** | **$189.97** | **$201.92** | **$203.28** | **$214.17** | **$204.19** | **$199.56** |
| DDGS FOB Chatham/Sarnia/Alymer ($/tonne) | $177.13 | $174.00 | $187.80 | $205.38 | $259.50 | $258.30 | $242.28 |
| *** Same Month - Previous year** | **$219.21** | **$244.00** | **$227.90** | **$244.75** | **$259.50** | **$258.30** | **$242.28** |

**Summary of OMAFRA Swine Budget ($/pig, Farrow to Finish)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Value of Market Hog | $160.53 | $156.28 | $162.42 | $224.51 | $235.48 | $219.25 | $193.08 |
| Feed Cost | $120.66 | $119.85 | $119.70 | $118.72 | $118.72 | $120.07 | $119.57 |
| Other Variable Costs | $45.11 | $45.31 | $45.33 | $45.05 | $44.88 | $44.67 | $45.06 |
| Fixed Costs | $24.55 | $24.55 | $24.55 | $24.55 | $24.55 | $24.55 | $24.55 |
| Total Costs | $190.33 | $189.71 | $189.58 | $188.02 | $188.15 | $189.30 | $189.18 |
| Net Return | -$29.80 | -$33.43 | -$27.16 | $36.49 | $47.33 | $29.95 | $3.90 |

*++ Year figures are based on January to December.*

Ontario

# Swine Budget – June 2019

*Compiled by Jaydee Smith, Swine Specialist, OMAFRA* *jaydee.smith@ontario.ca*

| Income ($/pig) | Farrow to Wean | Nursery | Grow-Finish | Farrow to Finish |
|---|---|---|---|---|
| Market Pig @ 101% of Base Price $190.33/ckg, 110 index, 102.74 kg plus $2 premium | | | | $219.25 |
| **Variable Costs ($/pig)** | | | | |
| Breeding Herd Feed @ 1,100 kg/sow | $13.84 | | | $15.18 |
| Nursery Feed @ 33.5 kg/pig | | $16.51 | | $17.40 |
| Grower-Finisher Feed @ 283 kg/pig | | | $87.50 | $87.50 |
| Net Replacement Cost for Gilts | $2.41 | | | $2.65 |
| Health (Vet & Supplies) | $2.16 | $2.10 | $0.45 | $5.03 |
| Breeding (A.I. & Supplies) | $1.80 | | | $1.98 |
| Marketing, Grading, Trucking | $0.90 | $1.50 | $5.76 | $8.33 |
| Utilities (Hydro, Gas) | $2.35 | $1.38 | $2.13 | $6.17 |
| Miscellaneous | $1.00 | $0.10 | $0.20 | $1.40 |
| Repairs & Maintenance | $1.26 | $0.61 | $2.15 | $4.19 |
| Labour | $6.27 | $1.85 | $4.00 | $12.83 |
| Operating Loan Interest | $0.32 | $0.40 | $1.33 | $2.11 |
| **Total Variable Costs** | **$32.32** | **$24.45** | **$103.52** | **$164.74** |
| **Fixed Costs ($/pig)** | | | | |
| Depreciation | $4.22 | $2.04 | $7.18 | $13.95 |
| Interest | $2.36 | $1.14 | $4.02 | $7.81 |
| Taxes & Insurance | $0.84 | $0.41 | $1.44 | $2.79 |
| **Total Fixed Costs** | **$7.42** | **$3.59** | **$12.64** | **$24.55** |
| **Summary of Costs ($/pig)** | | | | |
| Feed | $13.84 | $16.51 | $87.50 | $120.07 |
| Other Variable | $18.49 | $7.94 | $16.02 | $44.67 |
| Fixed | $7.42 | $3.59 | $12.64 | $24.55 |
| **Total Variable & Fixed Costs** | **$39.74** | **$28.04** | **$116.16** | **$189.30** |

| Summary | Farrow to Wean | Feeder Pig | Wean to Finish | Farrow to Finish |
|---|---|---|---|---|
| Total Cost ($/pig) | **$39.74** | **$69.41** | **$145.71** | **$189.30** |
| Net Return Farrow to Finish ($/pig) | | | | **$29.95** |
| Farrow to Finish Breakeven Base Price ($/ckg, 100 index) includes 101% Base Price & $2 Premium | | | | **$164.09** |
| Farrow to Finish Breakeven Base Price ($/ckg, 100 index) excludes 101% Base Price & $2 Premium | | | | **$167.50** |

This is the estimated accumulated cost for a market hog sold during the month of June 2019. The farrow to wean phase estimates the weaned pig cost for January 2019 and the nursery phase estimates the feeder pig cost for March 2019. For further details, refer to the "2019 Budget Notes" posted at http://www.omafra.gov.on.ca/english/livestock/swine/finmark.html .

PigCHAMP ›

# Reproductive Grow-Finish

The PigCHAMP Grow-Finish program gives you the broadest range of options for managing and improving your grow-finish operation. When used in tandem with PigCHAMP Reproductive, you have all the tools you need to manage your farrow-to-finish operation.

**PigCHAMP Farrow to Finish offers powerful reporting that allows you to:**

- Make precise decisions for today with real-time information
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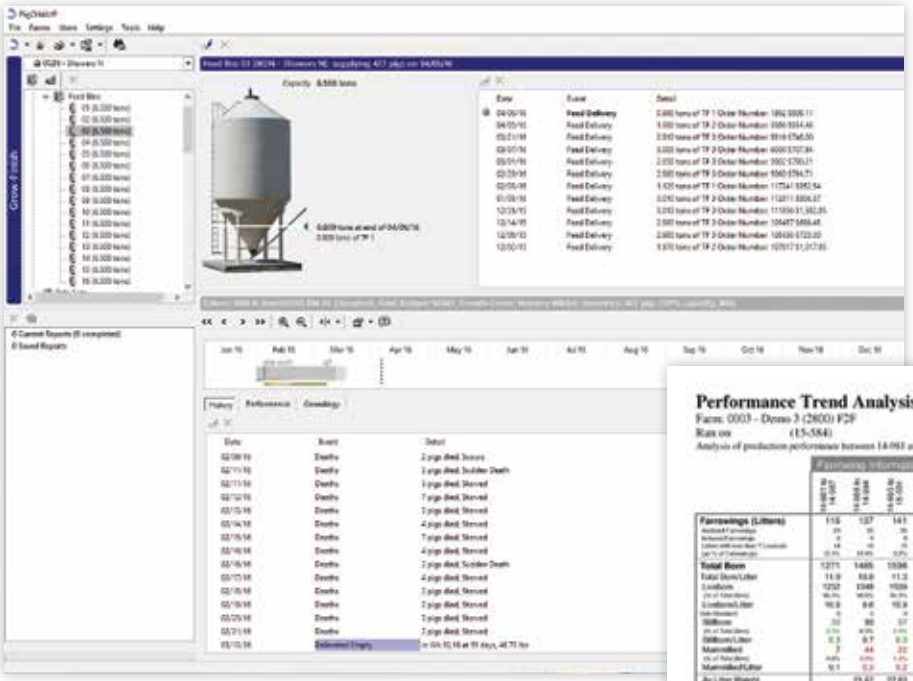

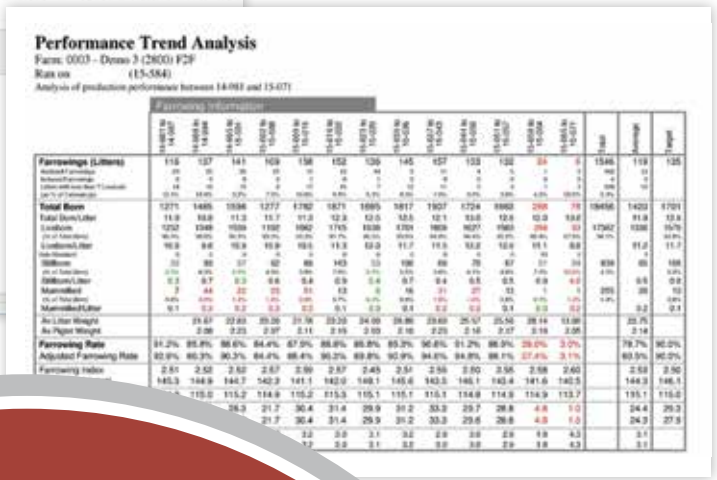


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by
PETER
FIDDER

# HOW TO SAFEGUARD FEED FROM DISEASE RISKS

**Best practices for feed safety should be top of mind as the global pork industry continues to battle ASF.**


National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**Knowledge is a critical first step when it comes to assessing feed safety.**

Asia's repeated outbreaks of African swine fever (ASF) are a worrying reminder of the harm a diseased animal or contaminated feed shipment could inflict on hog farmers if the disease made its way to North America.

The decision to cancel the 2019 World Pork Expo out of an "abundance of caution" underscores just how seriously the ag industry takes the threat of an ASF outbreak. But it's not only industry groups and event organizers who are concerned about ASF; the disease threat is also of concern on the farm.

As a result, Canadian hog producers are asking what practices can help support feed safety across the supply chain during this critical time.

Feed manufacturers and ingredient suppliers serving markets around the world have created many feed safety best practices based on findings born out of real-world incidents.

Insights gleaned during feed safety crises, such as melamine detected in Chinese milk in 2008, have helped the industry advance its approach to feed-to-food safety. Research and development, complemented by real-world experiences and practical application of safety measures, have helped define some best practices for ensuring feed safety.

Below, we look at three best practices for ensuring the integrity of feed ingredients and finished feed during a time of heightened alert.

These best practices address some of Canadian farmers' most frequently asked questions, including what the industry should know about the origins of feed ingredients sourced from China and how the supply chain is collaborating to address the risk of ASF.

## Know the feed ingredients

Knowledge is a critical first step when it comes to assessing feed safety. The Canadian Food Inspection Agency has developed an awareness toolkit that provides resources, including fact sheets, videos and infographics related to ASF. The resource is available at inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/african-swine-fever/producers/eng/1556041717935/1556041718185.

Producers can also talk with nutritionists to gather the facts about animal feed. You should ask two important questions.

First, find out what ingredients the supplier uses in your feed. Second, find out from which geographic region the supplier sources your animal feed ingredients.

The question about ingredients should help you identify any feedstuffs that may present risks. Examples of high-risk ingredients include grains, vegetable carriers and vitamins on vegetable carriers sourced from regions affected by recent ASF outbreaks.

Since 2018, these outbreaks have largely been limited to Asia, with China, Mongolia, Cambodia, Vietnam and North Korea reporting outbreaks.

Other ingredients, such as vitamins A and D, could present a risk for contamination due to animal origin carriers like gelatin.

Any ingredients left unprotected and exposed to nature can also present risk for the spread of ASF. Crops, hay and straw present a risk of exposure to wild boars or other suspect disease carriers.

Similarly, farm practices such as swill feeding and including human food or restaurant waste in the ration could facilitate contamination from infected animals and present a disease risk.

## Choose a supplier that follows stringent quality control

Animal feed safety measures must be in place across the supply chain, stretching from ingredient sourcing to storage and potential recall protocol for a product in the event of a feed safety incident.

An integrated feed-to-food safety program should be structured to support international quality standards spanning all phases of the supply chain.

Five interrelated pillars that support feed safety include:

1. Certified quality and food safety: Encompassing a commitment to quality in all parts of the supply chain, this pillar addresses hazard analysis and critical control point international quality standards, along with a certification program such as FeedAssure, developed to serve the Canadian market and supported by a third-party independent audit.
2. Ingredient and supplier assessment and measurement: Consistent, common standards for approved suppliers establish a baseline for quality control. Any new supplier should be required to undergo a stringent evaluation and approval process. Ingredient suppliers should complete statements attesting to the integrity of their ingredients and affirming compliance with management protocols built on common standards. Any ingredient suppliers based in a suspect disease region, such as China, should comply with additional biosecurity measures including assessment, traceability and production processes. Ingredients derived from fermentation processes or using organic carriers should also undergo additional checks.
3. Monitoring and control: A monitoring system includes procedures for harmonized sampling and analysis conducted by laboratories meeting specific requirements. An early warning and rapid alert system should specify processes for the control of non-conformities and outline detailed procedures for internal measures and external notifications.
4. Risk management: A risk management program outlines procedures for minimizing risk, specifying corrective actions and communications and, where necessary, recall procedures. An effective program requires the support of a comprehensive global network including regulators, non-governmental organizations and stakeholders.
5. Tracking and tracing: In an era of global trade, any ingredient in animal feed must be traceable through geographical lot tracking and tracing systems. Technology makes it possible for sophisticated systems to track feed batches back from finished formulation to specific raw ingredients. Such systems can facilitate the rapid movement of information upstream and downstream to support an efficient recall program. This technology keeps a record of every input and process from ingredient purchasing to delivery of the finished product.

## Biosafety measures should meet or exceed global and regional guidelines

Canadian producers have always had mitigating feed safety risk at the forefront of their minds. So, the nation's requirements for feed formulation are especially stringent when it comes to protecting the integrity and safety of ingredients used in animal feed.

The Canadian Pork Council recommends holding feed ingredients at a temperature of 20 C (68 F) for 20 days or 10 C (50 F) for 100 days. These thresholds can serve as a baseline.

To further amplify safety, I suggest suppliers abide by even more stringent guidelines – for example, requiring that vitamins A and D are stored at 20 C (68 F) for 30 days before they are used in the production of animal feed.

Resources of scale also come into play. Suppliers should have access to

National Pork Board and the Pork Checkoff, Des Moines, Iowa photo

**Canadian producers have always had mitigating feed safety risk at the forefront of their minds.**

monitoring programs to test for the presence of ASF as well as foot and mouth disease and porcine epidemic diarrhea in feedstuff ingredients.

Polymerase chain reaction testing measuring DNA in an approved laboratory provides further assurance.

Since scientists have yet to develop a vaccine to protect against ASF, prevention efforts such as biosecurity practices to guard against the disease arriving on Canadian hog farms must be the area of focus.

Information that supports animal feed decisions coupled with actionable, practical steps to defend against the threat of ASF can help Canadian producers ensure the safety and biosecurity of their operations and the food they produce. **BP**

*Peter Fidder is director of quality affairs at Trouw Nutrition, a Nutreco Company. Fidder has four decades of experience in quality assurance within the feed-to-food industry and oversees Trouw Nutrition's global feed-to-food safety operations.*

MOE'S MARKET MINUTE

by
**MOE AGOSTINO & ABHINESH GOPAL**

# GOOD NEWS FOR U.S. PORK EXPORTS

**The Mexican market is critical for U.S. pork exports, so U.S.-Mexico trade optimism benefits the sector.**

David Kadlec/iStock/Getty Images Plus photo

**American hog producers likely increased production between December and February because of the expected increases in Chinese demand.**

On May 20, the American government removed its tariffs on aluminum and steel imports from Canada and Mexico. The same day, Mexico removed the 20 per cent retaliatory duty on most U.S. pork imports. The American pork industry welcomed this news.

But on May 30, U.S. President Donald Trump proposed a 5 per cent tariff, beginning on June 10, on all goods imported from Mexico unless that country took more steps to curb illegal migration at the U.S.-Mexico border. Between July 1 and October 1, the duty would rise incrementally to 25 per cent if Mexico did not address the issue of illegal migration.

In return, Mexico could enact retaliatory tariffs on grains (excluding corn) and pork, officials said. This announcement came as the American, Mexican and Canadian governments all pushed for ratification of the USMCA (the United States-Mexico-Canada Agreement) trade pact.

On June 7, American and Mexican negotiators reached a deal on immigration enforcement and U.S. officials announced that tariffs on Mexican goods were "indefinitely suspended."

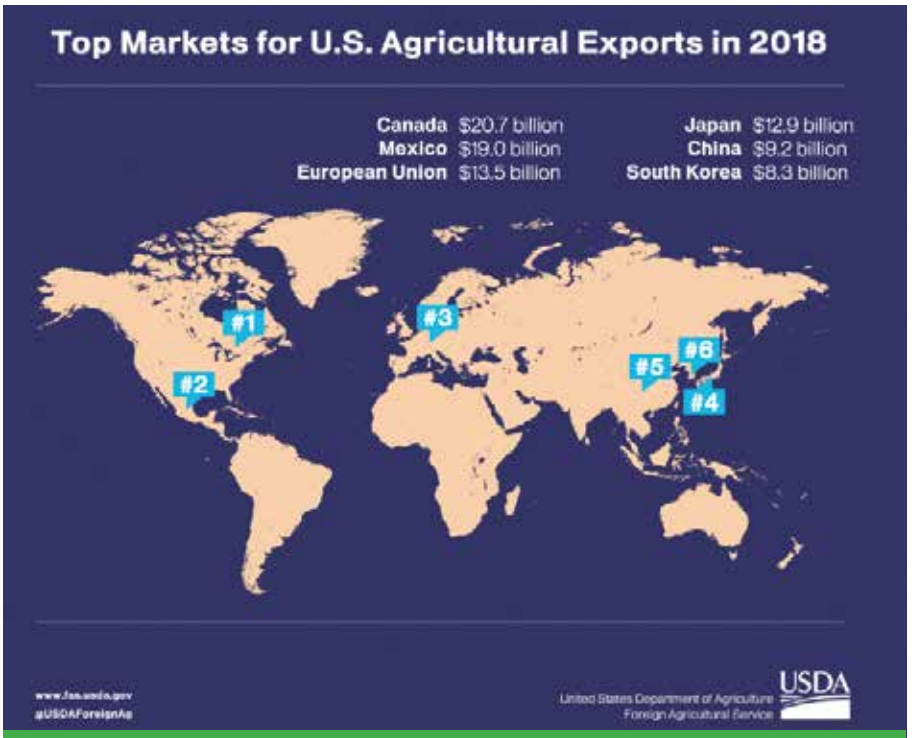
As part of the agreement, the Mexican government deployed National Guard personnel to the country's border with Guatemala in an effort to stem the flow of migrants headed for the U.S. border where legal loopholes and politics prevent officials from properly enforcing immigration law.

New U.S. trade tariffs with Mexico could jeopardize American pork exports to one of its largest markets. Mexico is the U.S. pork industry's largest export market in volume and second largest, after Japan, in value.

Mexico buys roughly one-third of all U.S. corn exports. Most products that the U.S. imports from Mexico are strictly agricultural products and Mexico is America's largest source for agricultural products.

In 2018, the United States' total ag imports, led by fresh fruits and vegetables, from Mexico were valued at nearly US$27 billion. About US$19 billion of U.S. farm produce went to Mexico that year.

If the U.S. tariffs on Mexican goods (which include a lot of ag products) reach 25 per cent, American import-




**Mexico is America's second-biggest export market for ag products.**

ers could be hit with a US$6.75-billion cost based on 2018 trade.

The trade tensions between Mexico and the United States serve as a good example of the deterioration in demand that could occur if the two countries entered a trade war. We can look to what happened when the recent trade accord between Mexico and the United States was not in place earlier in the year.

In April, the U.S. exported a total of 216,757 metric tons (MT) of pork, U.S. Department of Agriculture (USDA) and U.S. Meat Export Federation data shows. This period was before the U.S. government lifted the tariffs on steel and aluminum imports from Mexico and Canada. The total April pork exports were down by 6 per cent year over year (Y/Y) and were valued at US$535.2 million, meaning they were down by 8 per cent Y/Y.

Looking specifically at Mexico, U.S. April pork exports sank 30 per cent Y/Y in volume, down to 54,971 MT. The value of these exports fell 29 per cent Y/Y to US$94.5 million.

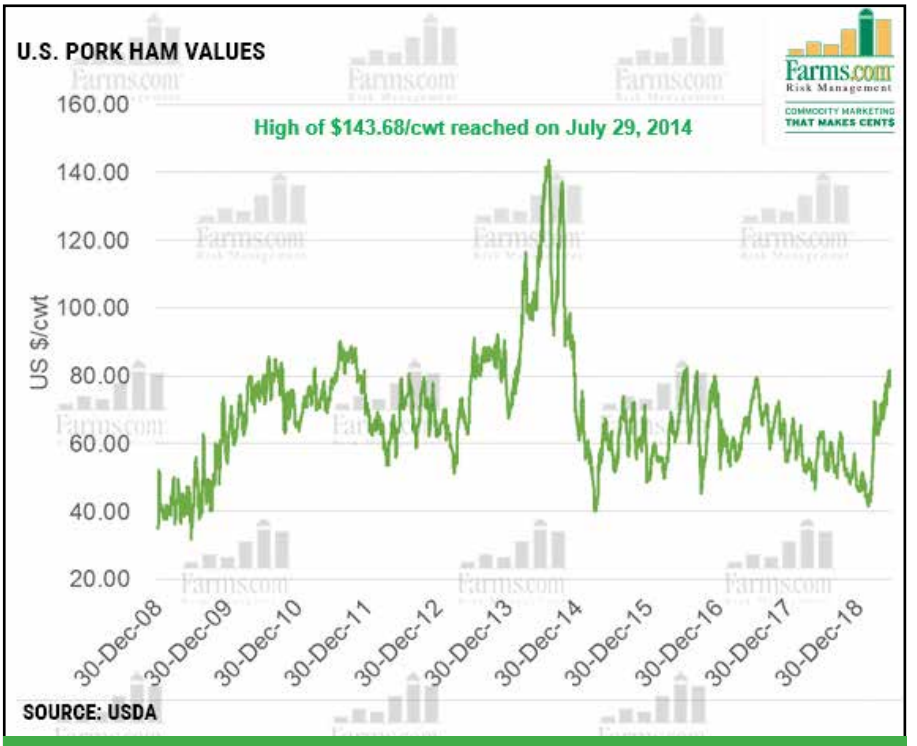
U.S. total pork exports between January and April were also 6 per cent lower in volume Y/Y, dropping to 817,025 MT. These exports had fallen 12 per cent Y/Y in value to just over US$2 billion. Over this period, exports to Mexico were down 18 per cent Y/Y in volume, falling to 232,391 MT, and 29 per cent Y/Y in value, dropping to US$356.5 million.

The U.S. trade picture started to change in May and early June. In the June 2019 WASDE (World Agricultural Supply and Demand Estimates), the USDA raised its projected 2019 U.S. pork exports by 10.2 per cent Y/Y with a further expansion of 7.4 per cent for 2020.

These increases largely reflected Mexico's late May removal of tariffs on American pork products.

Despite Mexico's removal of this duty, lean hog futures did not perform better. However, the situation would have been much worse if the Mexican tariffs remained in place.

In the spring, markets built a significant premium for summer lean hog futures, as analysts expected U.S. pork supplies to seasonally dampen




**Despite an American pork supply increase, the U.S. price of hams spiked as traders expected Mexico to remove its tariff.**

in the summer and the U.S. export scenario to get rosier.

Market analysts expect China's African swine fever (ASF) epidemic to cause a global shortage of pork this year. If that situation occurs, U.S. pork exporters could take advantage of it.

But reflection of that market shortage has not yet happened. American hog producers likely increased production between December and February because of the expected increase in Chinese demand. In turn, this situation caused the seasonally light U.S. hog slaughter summer period to witness very heavy slaughter levels.

U.S. ham cutout prices spiked higher in April and early May because traders expected Mexico to remove its tariff. In June, despite a pork supply increase, the average U.S. price of hams briefly crossed above US$80 per hundredweight (cwt), in contrast to US$61.3/cwt a year ago. This price increase has added more dollars to the bottom lines of both U.S. packers and hog producers.

On the other hand, fear of a decline in exports to Mexico pushed lean hog futures to test three-month lows in mid-June. Although eventual Chinese pork import demand could offset a Mexican demand shortfall, other factors are weighing more heavily on the market.

The United States and Mexico are next to one another, simplifying transportation and decreasing the cost. The two countries also have a "well-oiled" pork trade system. Finally, the volume and value of annual U.S. pork exports to Mexico make this export market critical.

American hog traders hope China's rise in domestic pork prices would increase Chinese demand for pork imports from the U.S. and, in the process, support American hog and pork prices. If U.S pork exports to Mexico pick up steam and China keeps buying, this situation could help clean up excess pork supply and lead hog prices higher. **BP**

*Maurizio "Moe" Agostino is chief commodity strategist with Farms.com Risk Management and Abhinesh Gopal is head of commodity research. Risk Management is a member of the Farms.com group of companies. Visit RiskManagement.Farms.com for more information.*

by
RICHARD
SMELSKI

# STATS HELP US ROOT FOR MEANINGS

**While you may have dreaded this subject in school, statistics have many practical applications on the farm.**

How do we comprehend the truth when seeking information to make decisions, especially since emotions and social media are major influencers? A little knowledge of statistics helps us make more accurate and fair judgements.

Let's review where statistical knowledge may help in our pork operations.

To start off, the mean is what most of us know as the average. We calculate this value by adding up all the numbers and then dividing the sum by the number of numbers.

The median is the middle value in a list of numbers arranged from smallest to largest.

The mode is the number that is repeated the most in a list. We will not have a mode if no number is duplicated in a dataset.

The best example where the average can be misleading is in parity profile. This number can be skewed because it is dependent upon the number and timing of gilt entries.

One hand in the fridge and one on the stove makes for a good average but an uncomfortable scene.

In my opinion, standard deviation is the most important calculation for any dataset.

Standard deviation shows how much measurements for a group are spread out from the mean or expected value. When numbers are closely grouped around the mean, the standard deviation will be low. When the numbers are more spread out, the standard deviation will be high.

This calculation is especially important in closeout data, as a lower standard deviation means that our performance is more consistent. Since a closeout is dependent on the poorest performing pig in the batch, we must analyze the level of deviation (or uniformity) in performance.

Correlation shows whether two or more variables fluctuate together. If the variables increase or decrease in parallel, we have a positive correlation. If one variable increases while another decreases, we have a negative correlation.

Martin Schwalbe photo

**In my opinion, standard deviation is the most important calculation for any dataset.**

We can ask ourselves, for example, what the correlation is between parity and number of pigs weaned, or coughs in the finisher barn and cleanout days.

When looking at correlation, however, we need to be careful to explore all options and not necessarily assume cause and effect.

Let's take the case of a significant increase in the local birth rate nine months after sailors came into a port. Contrary to our initial assumption, perhaps, we could learn that the increase in sailor spending helped local families become more confident in having larger families.

Statistical correlations are not always indicative of cause and effect.

Bias is a predisposition to have a certain belief or view, instead of keeping an open mind. Avoid inherent bias in your hypotheses. Do your research and explore all your options.

Elasticity is the measurement of how an economic variable responds to a change in another variable. Elasticity (or inelasticity) is most obvious in market prices. The last pig sets the price.

An algorithm is a step-by-step method of solving a problem. This process is used in such technology as artificial intelligence analysis, facial recognition, robotics and GPS mapping.

Although we may think of algorithms as new science, they are one of the older statistical methods. In May 1997, an algorithm in an IBM computer defeated chess world champion Garry Kasparov.

We can use statistics to analyze data and make informed decisions on our farms. **BP**

*Richard Smelski has over 35 years of agribusiness experience and farms in the Shakespeare, Ont. area.*

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