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*DEAR READER: LETTERS FROM A FAMILY FARM*

# A STRONG AGRICULTURAL SECTOR

On my family farm, each of us makes individual contributions to ensure the smooth operation of the business. Dad manages the fieldwork and the seed and fertilizer sales. My sister, Jessica, and I together handle the accounting. Mom oversees it all, while working off-farm and helping to care for her granddaughter (my niece). We've each settled into our niche roles, those areas of the operation where we can best use our strengths.

While we each have our roles, the time-sensitive nature of agriculture means that we sometimes have to step outside of these responsibilities to help address current needs. Jessica and I, for example, run the tractor and grain buggy at harvest. We all have to work together to ensure the continuity and success of the farm business.

This month, a number of our articles similarly demonstrate the importance of teamwork and cooperation. Quebec producer **René Roy**, for example, stresses the importance of his family's contributions in his ability to balance farm, school and committee obligations. **Richard Smelski** reminds us of the importance of "using a team-based approach to problem solving."

This cooperation extends beyond the farm to include the entire supply and production chain. **Jennifer Jackson's** feature on boar studs shows how these genetic suppliers adhere to strict biosecurity protocols on site and throughout product delivery, helping to ensure the health of the industry. **Swine Health Ontario's** article highlights how producers, feed manufacturers, transport truck drivers and processing plants can all contribute to the elimination of Porcine Epidemic Diarrhea.

By working together – as families on farms and as members of the broader industry – we can continue to grow and strengthen the Canadian agricultural sector. **BP**

**ANDREA M. GAL**


Stuart DeVries, Total Swine Genetics photo

***Before entering the barn or lab, all boar stud staff must change into company boots. See "Ensuring Biosecurity at Boar Studs" on page 6 to learn more about the protocols genetic suppliers follow to help ensure the success of the swine industry.***

kadmy/iStock/Getty Images Plus photo

# CREATING SWINE SURROGATES FOR LEADING BOARS

When it comes to breeding prize boars, farmers are limited to what sperm the boar can directly produce themselves. But scientists have developed male pigs that could potentially produce sperm genetically identical to a selected donor boar.

These male pigs have testes but lack the stem cells responsible for creating sperm with their own genetic material due to gene editing, according to a **University of Edinburgh** release. Eventually, the pigs could act as surrogates for donor boars.

"This (research) could dramatically improve the production efficiency and quality of farmed pigs," **Bruce Whitelaw**, professor at the university's **Roslin Institute**, said in the January release.

Closer to home, **Ina Dobrinski**, a veterinarian and professor at the **University of Calgary**, is working on similar research.

Just like the U.K. study, Dobrinski's team is developing surrogate recipients. The challenge now is to culture the stem cells efficiently, she says.

"Our long-term (goal) is to (potentially) take a little piece of the animal's testes, expand the stem cells and transplant them to ten of these recipient animals, for example. Instead of having one animal making the sperm of your desired genetic donor, you could have ten," she says. "What still needs to be developed, at the moment, is the one to 10." **BP**

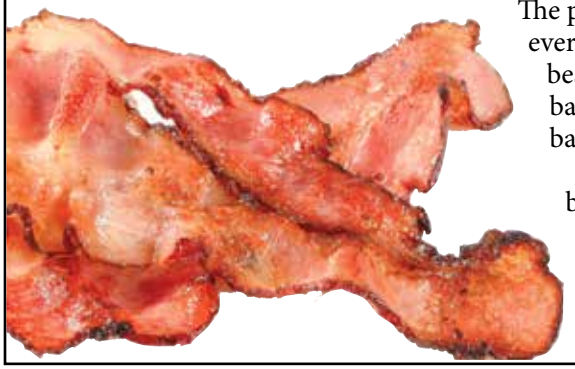
# NEW GADGET FOR COOKING BACON

Attention, bacon lovers! We've seen bacon-themed board games, bacon-scented underwear and even bacon-flavoured alcohol. Now, however, there is a more practical product that is sure to allow you to get your daily bacon fix.

Do you ever wake up in the morning with a hankering for bacon but lack the time to cook it in a frying pan? Just when you think you have seen it all comes the **Bacon Express** bacon toaster.

Like you would load a toaster with bread, you can insert six strips of bacon into the device and adjust the dial to reach the desired level of crispiness. The vertical design ensures the grease falls away from the bacon strips while cooking.

The whole process for cooking six strips of this delicious meat takes only a few minutes – the perfect timeline to allow for a quick bite before starting morning chores.



ajafoto/iStock/Getty Images Plus photo

The product description, however, notes that the device is best-suited to store-bought bacon rather than thick-cut bacon from a butcher shop.

The Bacon Express can be found on the **Nostalgia Electrics** website.

This article does not imply endorsement of this product. **BP**

# LESSONS LEARNED FROM H1N1 OUTBREAK

While some may disagree, mistakes can be a blessing if you learn from them.

In 2009, **H1N1** was detected on an Alberta pork farm.

"It appeared to be an urgent situation where people could get sick and die, so the Canadian Food Inspection Agency put the farm under quarantine," said **Dr. Gerald Hauer**, chief provincial veterinarian for Alberta at the time.

Unable to sell his market hogs, the producer ran out of room and had to perform a cull.

Shortly thereafter, it became apparent that the virus wasn't as much of a threat to public health as first thought. In hindsight, the practices of movement controls, quarantines and animal euthanasia were not necessary to protect public health.

"We applied that lesson right away by not quarantining other farms with the virus."

The second lesson was that readiness for these types of situations was within reach.

"We subsequently adopted an incident command system (ICS) to deal with emergencies. (The system) helped address PED, salmonella in the poultry industry and the bovine tuberculosis outbreak in Alberta and Saskatchewan," Hauer said. **BP**

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# ENSURING B
# AT BOAR

## Genetic suppliers follow strict biosecurity protocols

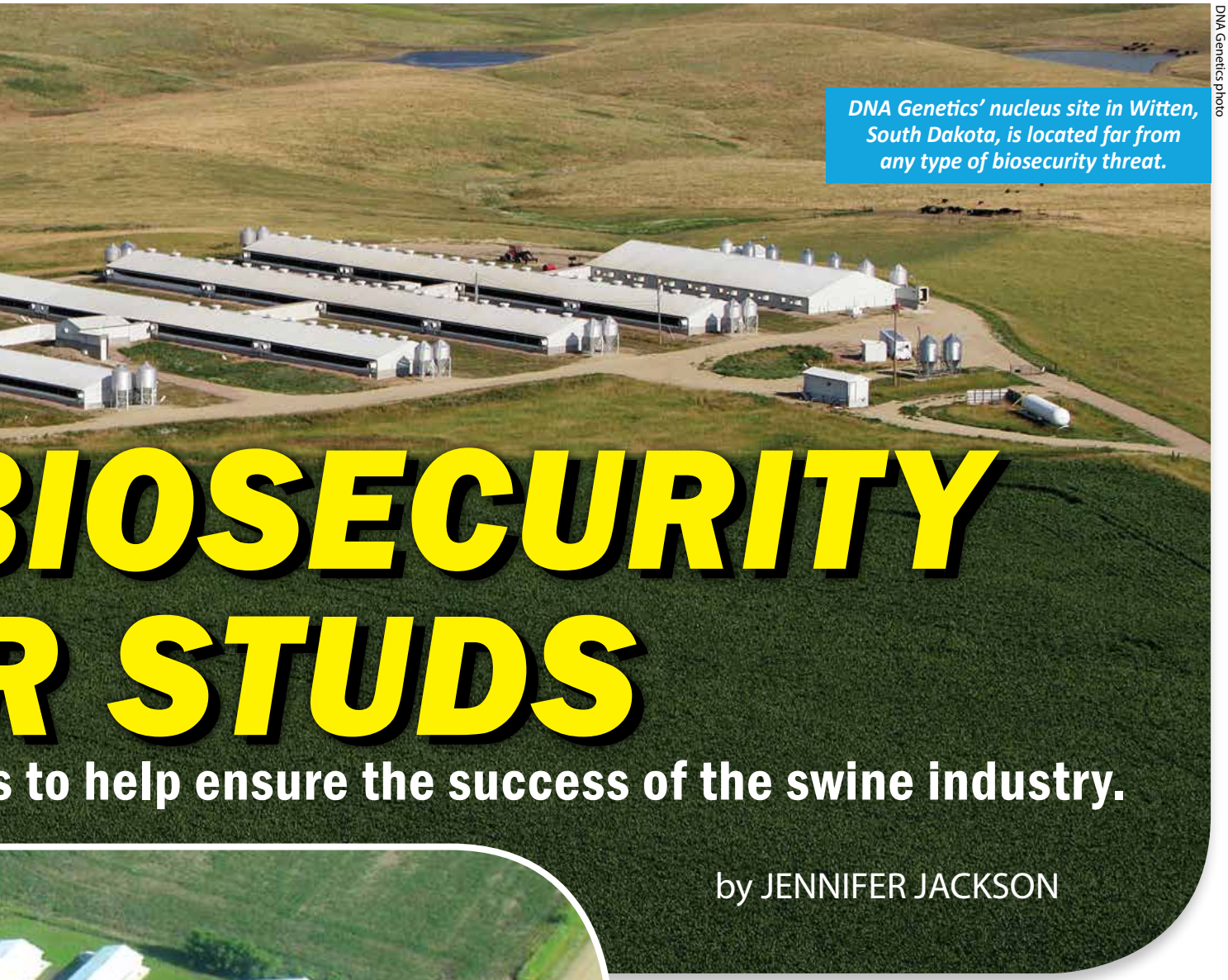
Shipping boars' genetic material internationally comes with great responsibility and requires great attention to biosecurity. In this business, strong biosecurity measures keep you in business.

This fact is well known to Pat Hoffmann, director of health assurance for DNA Genetics, a Nebraska-based producer of maternal and terminal lines. The company caters to farmers across North America.

"Without healthy (animals), genetic suppliers have nothing," he says. For example, "one of the most catastrophic diseases would be foot-and-mouth disease (FMD), not only because of (the disease's) impact on the animals themselves, but (also because of) what it would do to international pork exports. More than 25 per cent of pork production in the United States and Canada is exported and that would end overnight with FMD."

The risk of disease, and what it could mean for international business, is something Stuart DeVries, general manager of Total Swine Genetics, is also well aware of.

Total Swine Genetics – an Ontario-based genetic supplier – began operation in 1995 just west of Tillsonburg. When the time came to expand the



DNA Genetics photo

*DNA Genetics' nucleus site in Witten, South Dakota, is located far from any type of biosecurity threat.*

# BIOSECURITY R STUDS

## s to help ensure the success of the swine industry.

by JENNIFER JACKSON

DNA Genetics photo

*DNA Genetics' Nebraska Gene Center.*

operation a couple of years ago, Total Swine Genetics built a new facility. Biosecurity is the highest priority.

This new boar stud, which is south of Tillsonburg, is 10 kilometres away from any other swine operation and livestock transportation traffic. Even though the site is this far away from biosecurity risks, a system filters all of the barn's incoming air to meet the same level of purity as used in hospital surgery rooms.

"We wanted to make sure that anything possibly floating through the air is not coming into our barns," says DeVries. "Any viruses and bacteria from the outside cannot make it into our barns."

The new site consists of three barns, which are export certified and built according to European Union standards. This site allows the company to ship semen not only across the country but also to any country that will accept Canadian products.

"We built the facility with E.U. exports in mind, understanding that trade rules change over time," he says.

DeVries pays attention to the details, such as managing the activities of staff and ensuring that products are delivered only to off-farm sites, away from

Stuart DeVries, Total Swine Genetics photo

*The air quality in Total Swine Genetics' facility is of the same quality as in hospital surgical rooms.*

hog barns and biosecurity risks.

### *Disease transmission*

Although live hog interaction poses the biggest threat of disease transmission, possible contamination through semen is no less a concern.

At one time, much of the industry believed artificial insemination was practically without risk, says Robert Friendship, veterinarian and swine health professor at the University of Guelph's Ontario Veterinary College.

In the late 1980s, porcine reproductive and respiratory syndrome (PRRS) helped breach that sense of security. "We became more aware of certain important diseases that could be spread by semen," he says. "We now know semen is a very important means by which disease can be introduced onto a farm."

In fact, viruses travel well in semen, says Friendship. "We are very gentle with the semen, keeping it at (the appropriate) temperature. (It's) a great place for these viruses to live. As we keep the sperm alive, we also keep (viruses) alive."

Some industry representatives agree that the PRRS virus is the main concern today. PRRS is regarded as one of the most economically significant swine diseases in Canada. Thanks to the evolution of diagnostic health testing, breakouts from genetic suppliers are rare, says

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Magnum Swine Genetics photo


*"The importance of healthy and good biosecurity practice is (immense)," says Andrew Beusekom, general manager of Magnum Swine Genetics Inc.*

Friendship.

However, the need for biosecurity remains. In fact, it is the business of genetic suppliers to keep this risk at bay.

### *Sense of responsibility*

In terms of biosecurity threats, artificial insemination poses a lower risk than other aspects of the industry, says Mike Luyks, who together with his family owns and operates Kaslo Bay Artificial Breeders, outside Port Stanley, Ont.

"Boar studs themselves (with proper biosecurity measures) are low risk," says Luyks. "We (genetic suppliers) move animals significantly less often than other parts of the pork chain (and) have lower traffic on our grounds (to name a few examples). But while low risk, (these facilities can) have a very high impact (on industry health)."

Andrew Beusekom, general manager of Magnum Swine Genetics Inc. located near Fort Macleod, Alta., also believes genetic suppliers

Kaslo Bay Artificial Breeders Photo

*The location of the boar stud – situated far from other swine operations – is an important part of a strong biosecurity program.*

share a great deal of responsibility.

"The importance of healthy and good biosecurity practice is (immense). If you were to put us into a pyramid, we (genetic suppliers) would be near the top. We affect anything (further down) in the pyramid," he says. "If disease transmission (is apparent), it will reflect very quickly back to the top of the pyramid (or source of the disease). We do not want that (source) to be us."

For Luyks, this responsibility of maintaining strict biosecurity affects many customers.

"We not only deliver to many different farms weekly (across) Ontario, but we also supply multiplication and sire line nucleus production," he says. "When we add up (these factors) and consider the many additional customers underneath the sire line nucleus and multiplication structure, (we know) there are a lot of reasons to stay on our game and implement (biosecurity) improvements whenever possible."

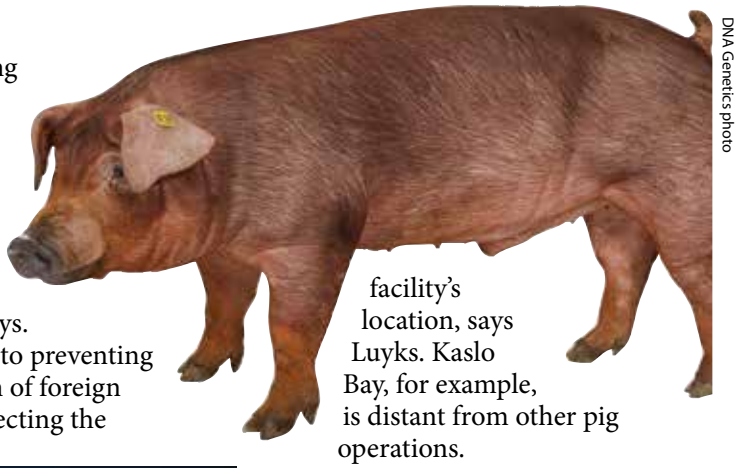
## *Biosecurity measures*

In the genetic business, preventing disease is vital not only to keep the operation itself viable, but also to ensure the security of clients' operations around the world.

"If your biosecurity (measures) are easy, you're probably not doing it right" is an adage that has stuck with Luyks. "None of the stuff we do in our operation is

easy, and it all adds real cost, but in comparison to a health break, it's way cheaper," he says.

Hoffmann similarly believes that a good biosecurity plan should be multi-layered. At DNA Swine Genetics, they sum up their health measures into three categories: bioexlusion, biomanagement and biocontainment. They first "prevent the introduction of a new pathogen to pigs," then "reduce the spread of pathogens among pigs" and finally "prevent the escape and spread of pathogens already present on pig premises," he says.



DNA Genetics photo

The first step to preventing the introduction of foreign pathogens is selecting the facility's location, says Luyks. Kaslo Bay, for example, is distant from other pig operations.

"This does not always make for easy logistics. We do not have many customers that are close," says Luyks. "Starting from an (appropriate) location really … sets the foundation for a (successful) biosecurity program."

Managing traffic on the farm is also crucial in any hog operation.

Having controlled and restricted access zones throughout the property and barns is crucial, says Beusekom. All entry points require staff to follow a shower-in-shower-out policy, leaving all street clothes and items that cannot be sanitized on the contaminant side.

"Testing out new employees, we always ask if they would like to take their phones in with them. (If they say yes), I then say I will take it through the shower area for them. The phones (always) end up staying in the contaminated area," he jokes.

When considering the health of the pigs, representatives from all three of these boar studs agree that a strong relationship with a veterinarian and regular health testing are absolute musts.

"If you are looking to maintain a certain health status, you need to know the current health status of your boars," says Beusekom, who practises weekly testing. "It's certainly not practical (to rely on monthly testing) and to assume your boars are clean (only) to find out there was a break the day after the last test. A (testing program) needs to offer maximum protection to the producer, while being realistic to work with and also allow(ing) you to sleep at night."

Both Luyks and Devries also

practise regular health testing.

"I believe boar studs need to pay extra critical attention to individual boar health and have a stringent, ongoing diagnostic monitoring of the major diseases we worry about in pig production," says Luyks. "Ultimately (they should) have a third-party health monitoring team … that has the authority to put the farm on hold if (any health concern) happens to justify it."

One of the main factors that Beusekom credits for Magnum Swine Genetics' strong biosecurity practice is its relationship with its veterinarian.

"This (relationship) cannot be put on paper; there are so many things that may not show up in a blood test," he says. "You just have to trust that through the vet-to-vet consultation, the (vets) have everyone's best interest in mind."

Moving beyond herd health and the facility grounds, the biosecurity practices must also continue off the property. This responsibility lies in the hands of the delivery services.

"From the biosecurity monitoring and testing side of things, the product goes into a delivery system where factors such as quality, temperature and further biosecurity practice come into play," says Beusekom. "We can do everything right at the boar stud, drop the ball on the delivery aspect and still be the cause of contamination."

DeVries ensures that the staff pay strict attention to biosecurity protocol.

"We go through a lot of Lysol; every driver has it," he says. "We have regular meetings with our drivers. They need to be using disposable boots and disposable plastic gloves. They have to disinfect doorknobs and floors.

"We want our last delivery to be as biosecure as the first. Therefore, we will not deliver to barns: only houses, garages or neighbours," says DeVries. "We also pay attention to the type of traffic on certain routes."

This staff cooperation and dedication should be part of the entire operation.

"Our team is quite longstanding; everyone knows biosecurity is a top priority," says DeVries. "When we do hire, for people (who) do not have a swine background, from day one, we engrain that biosecurity is core to the operation."

## *Conclusions*

Successful genetic suppliers understand that their success is influenced by their biosecurity.

"Without biosecurity, you have no health: it's just a matter of time (before there is a health break)," says Hoffmann. "Without health, pigs cannot maximize their genetic potential, which creates economic loss."

This loss is not an option for boar studs or any commercial producer.

"If you look at the overall spread of disease, 95 per cent of disease is spread via live animal contact. Incoming animals are the primary source," says Beusekom.

"We put a lot of effort into these incoming animals (as well as) employees and delivery service (personnel). We are left with the 5 per cent (other factors). We want to make sure our 5 per cent is well covered."

When covering biosecurity at the facility, no detail is too small, says DeVries.

Maintaining the new barns means hiring contractors and technicians who serve no other pig operation, says DeVries. Showers should be fully stocked with soap and shampoo, and entryways should not run out of disinfectant. Clean up the entryways to set an example for staff, he suggests.

"Facilities need to obtain and maintain a biosecurity mindset: this cannot be approached haphazardly," he says. "Biosecurity is a core part of why we do what we do. The consequences (of poor habits can be) very negative and very large.

"Operationally, we need to be very proactive from every angle, from our own production straight through to customers. From the beginning to the end." **BP**

*A larg*
*prov*

# DANES PLAN FOR TOMORROW'S PORK

## Staying one step ahead of consumer dema
## swine sector amongst the world leaders in

by NORMAN DUNN

*e-dimension creep area in Laurie Brosnan's farrowing pens ides complete freedom for sow and shelter for the piglets when needed.*

# MARKETS

## nd keeps Denmark's global export.

As far as pork is concerned, Denmark is an export machine in top gear: around one million sows produce an annual 32 million piglets. One-third leave the country at 30 kilograms per pig for feeding and slaughter in neighbouring Germany and Poland. The remainder are fed and slaughtered in Denmark. More than two-thirds of this production is exported.

In total, these pork exports earned just short of €4 billion (approximately C$5.5 billion) last year, making this small Scandinavian country one of the most export-oriented pork producers in the world.

There's never been any question about the quality of the meat that Denmark produces. But the sector now admits that it is beginning to lose market share to larger-scale, and more economical, pork producers from Spain and Germany.

"This (loss of market share) is one reason why we're involving all the important players in the Danish hog industry: universities, research scientists, advisers and farmers. (We want) their thoughts on what the world market will be asking from us in the future, giving us time to plan the right production strategies," says Dr. Vivi Aarestrup Moustsen, chief scientist at the Danish Swine Research Centre (SEGES).

A good example of this planning is so-called free-farrowing. In this system, sows are not continually restrained in crates in the farrowing pen. The Danes see that some countries – Norway, Sweden and Switzerland – won't buy imported pork if it comes from systems where sows are confined in this way. Consumer opposition is also becoming loud in Germany and the United Kingdom.

So Denmark's researchers are testing a series of different designs for free-farrowing pens where sows are free to move around with their piglets most of the time. At the Danish Agromek farm show in late 2016, an exhibit featuring 10 designs of free-farrowing pens underlined the Danish commitment to free-farrowing.

Another example of planning: hog production with no antibiotic input. American customers are already buying the first Danish shipments of this pork.

In Europe, there's also growing concern about the tail docking of young piglets, particularly where it's done without local anaesthetic. Consumers are paying premiums for pork from hogs that have been allowed to keep their curly tails.

Originally, tail docking was introduced to prevent injuries caused by tail biting amongst older hogs. But can tail biting be curtailed in other ways? The Danes are looking for answers here, too.

### *170 experts plan the way ahead*

A team of 170 professionals – scientists, veterinarians, extension advisers – within the farmer-owned SEGES supports and steers the research aimed at creating more pork marketing advantages for Danish producers. SEGES masterminds 12 projects to improve welfare, management, feeding, breeding and housing. The

*Laurie Brosnan, an Australian hog farmer from Central Queensland, uses Danish free-farrowing pens. He achieves piglet mortality as low as 8 per cent until the time of weaning.*



organization's ideas are tested in 120 swine-breeding and feeding units throughout Denmark.

"This strategy of always remaining a few steps in front of consumer demand means we're working really hard on options for non-confinement of sows during farrowing and suckling," explains Moustsen.

"Mostly, we're thinking about restraining sows for at least a few days during and after birth because this is when the piglets are most at risk from crushing. At the moment, we have some 4,000 farrowing pens with removable sow restraints in use on commercial Danish farms."

This figure represents about 1.25 per cent of all farrowing facilities. The government wants 10 per cent of farrowing pens to be non-restraining by 2021. The government aims to put such perceived improvements in swine welfare on pork labels and sell the branded pork at a premium. The schemes include guarantees that pigs have not had their tails docked and have had more straw bedding on

solid floors instead of wall-to-wall floor slats.

The SEGES team and Moustsen do not want sow performance to suffer. Breeding females in Denmark wean an average of 30 piglets annually. But the emphasis so far in free-farrowing pen tests has been to study designs and their effects on safe farrowing, animal cleanliness and ease of management.

### *Piglet survival remains crucial*

The farrowing equipment manufacturers are already looking closely at sow performance in higher-welfare environments. Claiming world market leadership in free-farrowing pen production and sales is the Danish firm Jyden.

"One of the main questions that all swine farmers (ask) is 'What happens to my piglet survival performance?'" says Dr. Janni Hales Pedersen, the company's product manager. (This scientist's doctorate is partly based on research into piglet and sow well-being in free-farrow systems.)

"The facts show that, as always, this (survival) depends on the management input. We've been supplying farms with these pens for 10 years now. The best-run farrowing units with full sow confinement still cannot be beaten for piglet survival. On the other hand, the best performing free-farrowing units always beat average piglet survival for confined sows."

Jyden supplies farmers in Europe with free-farrowing pens. In Australia, the company has one customer who has opted for free-farrowing in his 2,000-sow business. Laurie Brosnan runs the Bettapork business at Biloela in Banana County in Central Queensland.

In one farrowing shed, Brosnan has achieved a yearly 10 per cent piglet mortality from birth to weaning and, in the other shed, he has achieved just 8 per cent! "These figures are very hard to beat and show that unrestrained sows in farrowing pens do not automatically mean higher piglet losses," says Dr.

*Most designs feature a swinging gate system that can confine the sow for the first few days in the farrowing pen, a time when the litter is most at risk from crushing. The gate can be removed or simply swung out of the way. Good-sized free-farrowing pens need at least two square metres more floor area than conventional pens.*

Pedersen.

Of course, the right floor layout is crucial for success. This scientist stresses that there must be good shelter for the piglets in the creep area and a slanting wall against which the sow can lower herself more slowly when she wants to lie down, so the piglets have time to scramble clear.

"We are also dealing with a demand for more solid flooring and straw bedding in farrowing pens," she adds.

Here, the challenge is keeping labour requirements down by allowing enough room for the sow to defecate in an area away from the trough and maintaining cleaner, more easily managed pens.

All this extra space means that the average floor area in a free-farrowing pen measures at least seven square metres. The average floor area for a confined sow farrowing pen in Denmark is 5.4 square metres.

Back to SEGES expert Dr. Vivi Aarestrup Moustsen. This scientist reckons that this amount of extra space in a new farrowing barn adds the equivalent of approximately C$1,341 per pen or $480,000 more for a 1,200-sow herd. The Danish government is stepping in to compensate farmers for this extra cost up to a maximum of $480,000 per farm.

"There's also the real chance of producers securing a premium for their slaughter hogs produced in units with free-farrowing," says Dr. Moustsen.

## Pork without antibiotics

There's extra money already being paid to producers for pork produced without antibiotics, says Dr. Poul Bækbo, a veterinarian and senior adviser at SEGES.

Last winter, 23 pioneer farms supplying hogs to Danish Crown, the main national processor, were paid a premium equivalent to C$0.37 per kilogram carcass weight for the meat.

"Just now, between 3,000 and 4,000 hogs are slaughtered weekly under the scheme, and there are another 100 farms queuing to join up," says the SEGES vet.

Demand from consumers is certainly there, he adds. "In fact, we have a supermarket chain in the U.S.A. now buying shipments of antibiotic-free Danish pork for their shelves."

For this scheme, the vet servicing each participating farm plays an important role because he or she has to decide when an antibiotic must be applied to a hog on welfare grounds. Record-keeping is crucial in such cases, and all treated animals are naturally separated and slaughtered outside of the scheme.

Avoiding antibiotic use in the average herd is not easy. Dr. Bækbo reckons that 20 to 40 per cent of hogs on the pioneer farms end up with antibiotic treatment and therefore the farmer misses out on the premium for these animals.

A solid basis for the non-antibiotic production is formed by Denmark's existing "yellow card" program which records use of antibiotics on all hog production farms. A national average of treatments per herd is estimated each year.

Any herds exceeding this figure are awarded a yellow card; the local vet and Ministry of Agriculture advisers must be called in to determine ways of reducing applications. This approach is certainly working; tetracycline use dropped by 50 per cent between 2010 and 2014.

A national livestock program is also in place. The four-year program (which ends in 2018) aims for an overall 15 per cent reduction in antibiotic use on the farm.

## Keeping curly tails

Some consumers, particularly in Germany and the United Kingdom, demand pork from hogs that haven't been tail docked or at least have been docked while under a local anaesthetic, says SEGES.

In fact, a 2008 European Council


*Dr. Janni Hales Pedersen, product manager for swine farming equipment manufacturer Jyden, maintains that the best performing free-farrowing units can beat the average piglet survival figures that come from conventional units.*

directive makes "routine" tail docking illegal. But this regulation is usually ignored throughout Europe. Currently, over 90 per cent of Danish hogs are docked. The European Community countries where the non-docking law is rigorously enforced include Sweden, Finland and the United Kingdom.

Tail docking is seen as an effective way of reducing hog injuries caused by tail biting. But research, including that by SEGES, indicates that tail biting can be reduced in other ways. For instance, keeping young hogs occupied in their pens can help.

A survey last year of 2,500 piglets on a commercial Danish farm indicated that "enrichment material" – straw, chewing ropes or other attention-grabbing playthings – effectively halt aggression. But the SEGES scientists found that simply throwing such material into the pen and leaving it for a complete production cycle isn't enough.

When piglets become bored with the material, aggression starts again, researchers found. This enrichment material may have to be changed weekly to keep interest high and to avoid fighting and biting. SEGES staff are now researching piglet "body language" to identify and record the distinct signs that aggression is about to start in the pens. In these situations, the enrichment material can be changed as a pre-emptive measure.

Going by all the Danish work in this field so far, pork consumers can be sure of one point: whenever concerns crop up in the market about the welfare of hogs, SEGES scientists will be working on a solution. **BP**

by
JENNIFER JACKSON

# PRODUCER BALANCES FARM AND SCHOOL

***Pork, dairy and maple syrup operations provide this Quebec family with security and variety in daily activities.***

**Émile, René, Catherine and Philippe Roy**

An hour south of Quebec City lives jack-of-all-trades, René Roy. Roy co-runs not only a farrow-to-finish operation of 100 sows but also a dairy and maple syrup operation – while raising a family and pursuing his education. Roy may be busy but, to him, it's all about maintaining a balance.

Keeping the farm multifaceted has been a family priority since the farm was first established.

"One reason that we've been diversified this long is for the labour," says Roy. "By having only one (type of) production, you can (sometimes) get bored or have difficulties getting distance (from that work. With multiple types of production), you have the option to work in different (environments)."

Aside from the variety in work, being active in a number of sectors of the agricultural industry provides the farm with financial security should any of the operations decline in value.

On top of the farm duties, Roy is also finishing his PhD at McGill University. Roy is researching agricultural economics, focusing on environmental goods and services resulting from agricultural activity.

"I've always liked to learn. (Pursuing my PhD) is one way to continue to learn," says Roy. With the farm operation, "it may be a hard way (to learn), but it's still a way."

Education is a way to remain active and keep sharp in the industry, according to Roy. He compares his studies to a toolset. He enjoys increasing his "tools" through education and

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feels schooling gives him an edge.

"I feel that I can bring my farming experience to the academics and contribute to improve the situation of agriculture. The converse is also true: the tools that I have acquired with my academic training can help to find solutions when I sit on committees or I manage the farm," he says. "I have this opportunity because other members of my family" can take care of things when I'm away at school.

Balancing the farm operations and his education could not be possible without his family, says Roy.

"My parents are still active on the farm which gives me the opportunity to be more involved outside of the farm. My wife, Catherine, is also helping on the farm," he says. "I have the support of my family and, without them, this would not be possible. I never consider that I do (all this) alone."

### *Describe your role on your farm operation?*

I took over the farm in 2006 and now I run it with my brother. My parents are (also) still involved. In my case, (I am) mainly responsible for general management – making sure supplies are going well.

On the farm, I mainly take care of the pigs but I am also involved in the milk production. We (my brother and I) work in both parts of the livestock production.

### *How many people does your farm employ?*

It's a family farm so we don't employ anyone other than family. We have five of us working on the farm.

### *Hours you work per week?*

Work approximately 70 hours – but this number can increase depending on the time of year.

I like the work that I do, so I would not consider the hours a heavy load.

### *How many emails do you receive per day?*

Related to the work on the farm, 15. I can receive much more than (that), depending on the day and the (type of) files.

### *Hours a day on a cellphone?*

I would say a minimum of 30 minutes. I don't want (it to be) more than an hour because a cellphone discussion can consume a lot of time.

I'm probably one of the rare people that does not carry their cellphone all day. When I am working on the farm, I avoid picking up the phone.

### *Email or text?*

They each have their own place. Email is mainly for business and more official – it is much faster to write. My fingers are probably bigger than (those of) the average population – that does not work well for text.

If I have short (conversations) with my siblings, friends or suppliers that I have a good (connection) with, then I communicate over text.

### *Any favourite apps?*

In my case it's mainly the simple calendar, my emails – I'm using basic stuff.

(As opposed to the game Angry Birds), I have angry pigs sometimes – that's enough. (Laughing.)

### *Hours a day on the Internet?*

Between one and three, considering the time I am on email. Probably an average about 1.5 hours – this is also considering the time I spend with my kids looking for music and on YouTube.

### *How often do you travel?*

Once a year approximately – and when I say travelling, it's out of the province. Normally (travel is) business-related.

Catherine, Émile and René Roy

Vacations for leisure? Not very often. Sometimes (I will travel) with my wife but we tend to do activities in the province. With little kids, it's sometimes complicated enough (travelling in) a car than (it would be) a plane.

### *Where did you last travel to?*

Winnipeg – it was to represent Les Éleveurs de porcs du Québec (an organization that represents Quebec pork producers) on the committee of the development of Canadian Pork Excellence program (Excellence du porc canadien) of the Canadian pork council.

### *Number of hours in the office each day?*

I am usually targeting between one and two – sometimes it's more.

### *What do you like best about farming?*

Being my own employer, getting the rewards from my effort.

Also, I like the whole farming operation in general. Pigs, cows, maple syrup – for me, it's just fun.

### *What do you like least?*

The redundant paper work. Things that have to be done the same way every time – things that can probably be done by a computer, when delivering pigs, for example.

### *What is the single most important advice you've received or lesson you've learned?*

One thing is to consider all opportunities – never say no to an opportunity. I've never felt that I've missed anything by saying yes to an opportunity but I have felt regret sometimes saying no.

My parents are positive people and (taught me to) try to look at the bright side of things. Something my parents also showed me is to keep trying to move towards your goal. 'Even if you think you're not moving forward, you will (eventually) be on the bright side of the mountain.' (Your journey) can get dark but you have to keep focusing on the objective.

### *What's your top tip about farm succession?*

One word that comes to mind is agreement. You must not only agree that succession will (take place) but you must have an agreement of details regarding where the business should go. I know for some people the situations are different but there can't be success when there is disagreement between the generations.

### *What's your management philosophy or guiding management principle?*

Use your time wisely – you only have so many cropping years to make a positive impact, (making your) farm successful, sustainable and viable for the next generation.

### *What was the last piece of equipment you bought?*

Impact wrench.

### *Are you involved in any committees, boards, associations or volunteer efforts?*

I am a member of the regional board of directors for Les Éleveurs de porcs de la Beauce, (one of the regional syndicates for the provincial pork producers' association).

I'm a member-at-large for the sub-committee Health, Quality, Research and Development of Les Éleveurs de porcs du Québec: Comité santé qualité recherche et développement des Éleveurs de porcs du Québec.

(I'm also a) member of the pork production committee of La Coop Fédérée: Comité de la filière porcine cooperative.

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

Right now with young kids, I do not have many hobbies outside of the family.

Soon it will be soccer with the kids but, right now, taking care of the kids is my hobby.

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

Definitely morning – it's the time that I can think.

The rest of the day you are in the peril of the rest of the activities. I wake up early because I know at this time there is less disturbance and I can focus on the plans and ask what I can do today.

This question can be asked in the morning, as rest of the day I am in a problem-solving mode.

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

I tend to read classics. The last one was Great Expectations by Charles Dickens.

### *What does your family think of farming?*

It's a passion that is shared – not only by me.

My wife likes it. Even my older kid who is almost 2 years old – he comes to the farm and even starts to help me out. My youngest is six months old.

I find (the farm) is a good place for the kids to be – it's a place to learn things that are not taught in a classroom.

The kids can learn not only life lessons but also everything that is related to mechanics, welding and electricity. With all these things that you can learn on the farm, it's a rich place to be.

### *What's your most important goal?*

For me success is a balance between business, family and personal achievements.

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

It is clean and well maintained, but it is old.

### *What was your most memorable crop/production year?*

In terms of production, every year we have some improvements. Every year there is something unforgettable.

In 2014, we did major renovations in the barn.

The renovations were not all about the costs but rather we knew the changes (would make it) much better to work in the barn and for production. **BP**

Ontario
# Pork News & Views
Prepared and Edited by the OMAFRA Swine Advisory Team
ONTARIO PORK
April 2017

## 55th Annual South Western Ontario Pork Conference

On February 22nd, 2017 we celebrated the 55th annual SWOPC which was held at the University of Guelph Ridgetown Campus. Approximately 200 people gathered to wander the trade show and learn from speakers. The program began with a producer profile from Alec Boekhoven of Appin, Ontario, followed by Provincial Swine Specialist Dr. Laura Eastwood, who discussed the importance of creep feeding piglets. Dr. Bill Moore from South West Ontario Veterinary Services addressed the attendees by giving an overview of local disease challenges encountered in the region. This year we were fortunate to have Dr. Billy Flowers, a professor of animal science and physiology from North Carolina State University, join us. He gave two presentations on reproductive problems and management factors affecting sow longevity. The following article is a summary of the two presentations given by Dr. Flowers.

**Reproductive Problems**

In order to properly evaluate the reproductive problems within a given sow or group of sows, you first need to understand what happens at different stages of gestation. The first step in the process after conception and fertilization is the delivery of the 'pregnancy signal' to the sow between days 12-14. This signal occurs when there are a minimum of 5 fertilized embryos, and it indicates to the sow to proceed with gestation. By day 30 (give or take a day or two), embryo implantation should be complete and embryos will be firmly seated in the placenta. Bone calcification begins around day 38-40 of gestation. Having a grasp of this timeline is the first step to understanding when issues may be occurring.

For example, if you have a low number of total born piglets (and you are confident in semen quality and insemination technique), there was likely a large number of embryonic deaths sometime after the pregnancy signal was sent but before bone calcification begins, as the embryonic deaths are totally reabsorbed by the sow. The presence of mummies of various sizes indicates that death occurred after bone calcification began, but still with enough time for partial reabsorption by the sow (between day 38 and ~100). Stillborns occur when deaths occur near (days 100-114) or at the time of parturition and reabsorption does not have time to occur. Figure 1 outlines this concept. It shows 10 piglets that were born still or as mummies along with a graph and timeline as to when those 10 piglets would have died throughout the gestation period.

Dr. Flowers also discussed how to determine if a stillbirth occurred at the time of farrowing, or in the days prior to farrowing. The key is to look at the condition of the umbilical cord of the piglet. If the cord looks normal (like the one attached to the piglet in Figure 2), then the piglet likely died in the days leading up to farrowing. If the umbilical cord has blood pockets (like the second, unattached, umbilical cord in Figure 2), it is likely that the

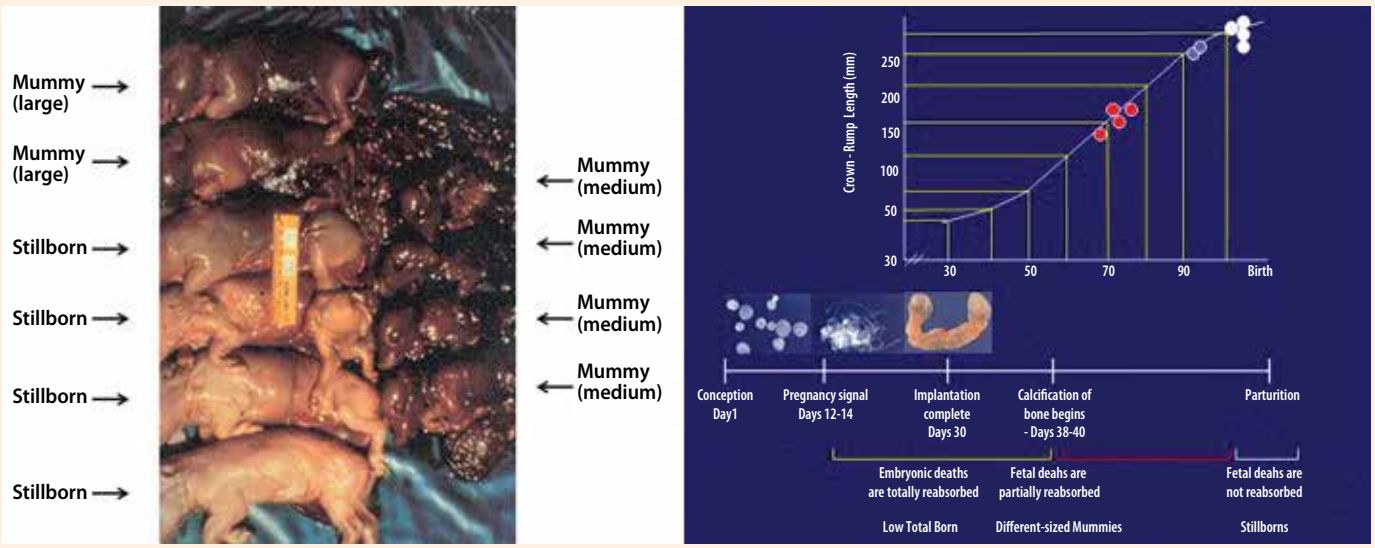


*Figure 1: The picture on the left shows 10 piglets that were born dead (4 stillborn, 2 large mummies and 4 medium mummies). The graph and timeline on the right indicate approximately when the fetal deaths would have occurred throughout gestation (medium mummies = red dots, large mummies = blue dots, stillborn = white dots).*

*Figure 2: Umbilical cord of a piglet that died prior to farrowing (cord attached to piglet) vs. an umbilical cord of a piglet that died during farrowing (presence of blood pockets).*

piglet died during farrowing. The blood pockets occur when the cord gets trapped around the pelvic region of the sow.

Dr. Flowers highly recommends that in addition to collecting the numbers of stillbirths and mummies on your sow cards, also collect information related to the size of the mummies and condition of the umbilical cords. By doing this, you will be able to identify approximately when reproductive problems occurred for any given sow, and you will be able to track that timeline back to determine if/what occurred around that time that may have caused the problem to occur. By doing this, you can work with your staff to address specific problems and improve reproductive performance in your sow herd.

**Management Factors Associated with Sow Longevity**

Dr. Flowers' second presentation was focused on improving sow longevity. He presented research data showing the reproductive performance of 2 barns which were supposed to be identical in terms of facilities, pigs, feed and SOPs (same system and multiplication flow). One of these barns is classed as a 'high longevity farm' (28% of sows farrowing 6 litters) whereas the other is classed as a 'low longevity farm' (8% of sows farrowing 6 litters).

In the two herds, there was no difference in parameters such as birth weight, litter size, weaning weights or piglet gains; however, there were large differences in the number of gilts not bred and ovarian structures indicating missed estrus, infertility and gilts that stopped cycling. Figure 3 shows some of the differences in management practices on each of the two farms. The primary differences were that the high longevity farm had a dedicated 'gilt' staff member (who kept very detailed heat check records for each sow) and used younger heat check boars that were collected on occasion. It was also observed that due to the dedicated gilt staff member, gilts in the high longevity farm were calmer and easier to handle than those in the low longevity farm.

In terms of farrowing management, the high longevity barn staff were quicker at assisting sows, following the SOPs well. The low longevity barn staff were not following the SOPs to the same extent, and had more sows with retained placentas. The high longevity farm also had much lower numbers of sows dropping feed intakes during lactation, thus there was less body condition loss in that barn.

After collecting all of this data, Dr. Flowers and his research team worked with the low longevity barn to implement management changes. Although still in the early stages of data collection, since initiating changes, the low longevity barn has significantly increased its animal retention and productivity to a level similar to that of the high longevity barn.

Dr. Flowers left the group with these final thoughts:

1. Most of the 'big things' on commercial farms are probably being done correctly in terms of managing gilts and sows.
2. It appears that there are subtle differences in how workers accomplish these tasks that account for differences in longevity.

*Laura Eastwood, Swine Specialist*
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| Entry of Gifton Farms until First Breeding - Farm Comparisons | | |
|---|---|---|
| | High Longevity | Low Longevity |
| Gilts delivered to farm that are not bred | 7% | 20% |
| Gilts per pen (12 ft x 12 ft) | 8 | 10 |
| Designated person - gift estrus/breeding | Yes | No |
| Gilt estrus/breeding separate from sows | Yes | Yes |
| Daily boar exposure per pen (min) | 15 | 15 |
| Heat,checkboars - age (months) | 14 | >24 |
| Heat, check boars - libido | Good | Moderate |
| Periodically collect heat check boars | Yes | No |

*Figure 3: Comparison of some management practices on each of the two farms from gilt entry until first breeding*

## Feasibility of Using a Specially Designed Milk Replacer Feeding System

**Introduction**

Genetic improvements in pig production have resulted in significant increases in litter size without an equal increase in the number of available mammary glands. This has made it challenging for pork producers to wean the extra piglets born alive. Supplementing milk in litters where sows are unable to adequately feed all their piglets is a practice that will save many of these extra piglets when cross-fostering is not an option. There are several milk replacer products and delivery systems on the market. Some of these systems are expensive and some labour-intensive. This project was undertaken to develop a cost-effective milk replacer feeding system to minimize labour and investment for producers interested in feeding milk replacer to specific pigs or litters. On some Ontario sow farms, where fewer sows farrowing each week limits the opportunities for cross-fostering pigs from large litters to available sows, the targeted use of milk replacer

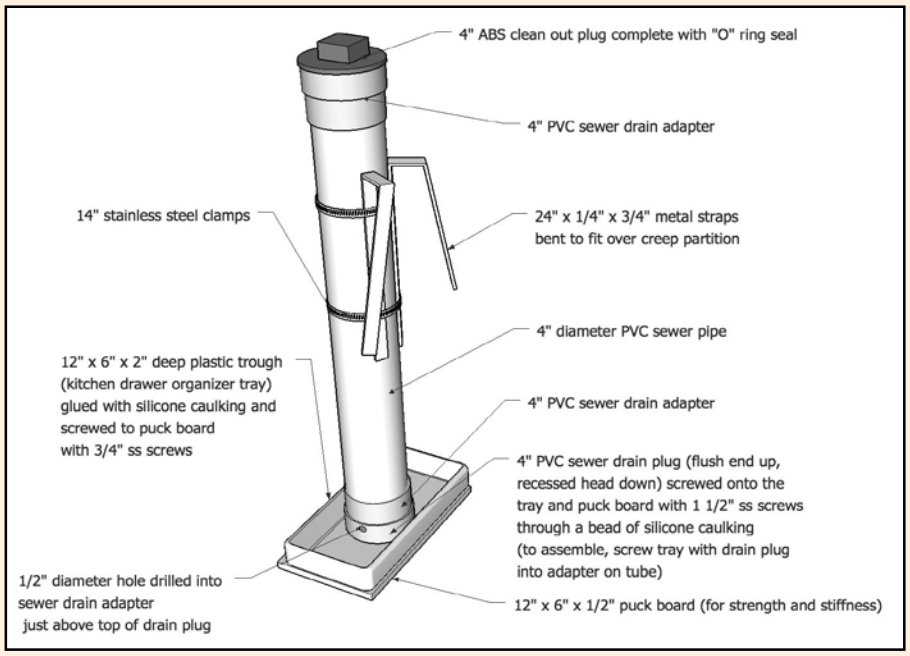


*Figure 1: Six-litre milk feeder*

was anticipated to decrease pre-weaning mortality and allow for better returns from our highly prolific sows.

Eight Ontario sow farms were selected for this project. The farms were provided with acidified milk replacer (Kid-O 5.5 Milk Replacer®, Serval Canada Foods Ltd.) and milk feeders. The two milk feeder versions used in the trial were similar, except for the reservoir capacity which was either 1.5 litres or 6 litres. All materials necessary for constructing the milk feeders were available at local hardware stores. Data were collected from June to December 2015. Figure 1 shows a diagram of the six litre prototype.

**Results:**

Producers decided which litters would be supplemented with milk replacer. According to the producers participating, the main reasons for using the milk replacer as a routine component of a piglet diet were: large litters with undernourished piglets; poor milking sows or sows that stopped milking; early weaning; improved transition from farrowing to nursery; sow death, and no sow available for cross fostering. A less common use for the milk feeder was to use it to feed all the underprivileged pigs from various litters.

With the 1.5 litre capacity feeder, producers reported that piglets, regardless of size or condition, were engorging on milk, especially if the feeder had been empty for several hours. This led to the conclusion that the palatability of the milk replacer was higher than originally expected. Engorging on milk can lead to intestinal problems because more nutrients are consumed in a short period of time than the young pig can fully digest. To increase milk availability for all pigs in a litter while reducing competition, the milk feeder size was increased from 1.5 litres to 6 litres. With the 6 litre milk feeder, less competition occurred between piglets because milk was available for several hours at a time. It was noted that pigs would drink freshly made up milk more readily than milk that had been left in the trough throughout the course of a day.

**Discussion:**

At the onset of this project it was assumed that most of the milk replacer offered during the experiment would be consumed by the smaller, undernourished pigs. However, all pigs in a litter, regardless of size or body condition consumed the milk. This finding impacted the predicted cost and time required to feed the undernourished pigs in the litter since it was necessary to supplement milk to all pigs within a litter.

Creating a group of undernourished pigs, although not a common practice

| Farm | Number of cards filled | Sow parity | Age at weaning (days) | Number of live born | Weight at birth (kg) | Number of still born | Number of deaths | Number of weaned pigs | Number of pigs: | | Litres of milk (total) | Number of days on milk replacer | Mean L/day | Weight at weaning (Kg) | Mean weight (Kg) | Cost (milk replacer) | Mortality rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Fostered on | Fostered off | | | | | | | |
| 1 | 9 | 5.56 | 23.89 | 13.22 | xx | 1.56 | 1.44 | 10.89 | 0.44 | 1.33 | 70.44 | 8.67 | 8.42 | 78.33 | 7.12 | 35.22 | 11% |
| 2 | 11 | 3.36 | 31.27 | 15.09 | 23.91 | 0.45 | 2.09 | 11.73 | 0.00 | 1.27 | 20.36 | 18.45 | 1.01 | 99.09 | 8.46 | 10.18 | 13% |
| 3 | 8 | 4 | 29 | 16 | xx | 1.5 | 1.38 | 12.63 | 0.13 | 2.13 | 19.09 | 12.25 | 1.48 | 104.83 | 6.16 | 9.55 | 9% |
| 4 | 11 | 5.45 | 19.36 | 13.82 | xx | 1.73 | 1.73 | 11.18 | 0.91 | 1.82 | 52.82 | 14.45 | 3.60 | xx | xx | 26.41 | 12% |
| 5 | 13 | 2.85 | 29.85 | 12.77 | xx | 3.08 | 2.23 | 9.69 | 0.69 | 1.54 | 13.88 | 8.92 | 1.56 | 83.92 | 8.64 | 6.94 | 16% |
| 6 | 13 | 6.92 | 20.54 | 13 | xx | 0.62 | 1 | 10.08 | 0.23 | 2.15 | 17.31 | 11.15 | 1.47 | xx | xx | 8.65 | 8% |
| 7 | 7 | 4.43 | 19.71 | 13.57 | xx | 0.86 | 0.71 | 12.14 | 0.00 | 0.71 | 29.29 | 8.29 | 3.04 | xx | xx | 14.65 | 5% |
| 8 | 11 | 4 | 21.73 | 13.45 | xx | 0.78 | 1.82 | 11.73 | 5.1 | 4.5 | 19.02 | 11.65 | 1.9 | xx | xx | 9.51 | 15% |

*Table 1: Average performance values for litters supplemented with milk replacer on each of the eight farms.*

during this study, has proved to be advantageous in previous trials. This practice reduces competition with heavier littermates, targets the milk to the pigs most in need, and improves pre-weaning performance.

No milk replacer limit per day was set; therefore producers decided the frequency and the amount of milk offered. While most producers were concerned about wastage and the cost of milk replacer, others were offering large amounts of milk daily. This, together with the number of days that milk was fed, were the main reasons why the cost per piglet ranged from $0.09 to $9.75 CDN. Some producers limited or stopped milk feeding after the first 2 weeks and introduced creep feed. Mixing creep feed into the milk trough and allowing piglets to feed away from the sow, while still being in her presence, may make the transition from farrowing to nursery smoother for piglets and in turn reduce their stress in the nursery post-weaning. Producers reported that feeding milk replacer increased creep consumption in the farrowing crates presumably by teaching pigs early on that there were alternative sources of nutrition beyond the sow's udder.

For producers weaning under 19 days of age, supplementing milk may have benefits for all pigs in the litter and should result in heavier, fitter pigs at weaning.

A better understanding of pig behavior and digestive physiology will improve our ability to offer supplemental milk to increase the survivability of underprivileged pigs without over-feeding or supplying milk to pigs that are well fed by their mother.

**Conclusions:**
This study demonstrated the feasibility of feeding milk replacer to piglets in a cost effective manner using an inexpensive feeder design. All pigs in a milk replacer-supplemented litter consumed milk replacer regardless of body condition, thus increasing the cost of feeding milk replacer to the targeted, under-nourished individuals in a litter. Limit feeding, rather than ad lib feeding, improved piglet survivability and ensured that the process remained cost effective.

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## Erysipelas Increase – Update

A year ago the OAHN swine network noted an increase in Erysipelas within Ontario. A higher than normal level of Erysipelas has continued since then. Both Quebec and the western provinces have reported a similar trend. Swine practitioners and provincial slaughter plants within Ontario have noted an increase in Erysipelas lesions in the fourth quarter of 2016. We have put together this fact sheet with important information for producers about this disease.

**Causative Agent:** Gram-positive, rod-shaped bacteria.

**Sources of Infection:** The most important source is from other pigs. 35 percent of healthy swine carry this organism. Spread is through nasal discharge, saliva, urine and in feces, and by rodents and wild birds.

**Susceptibility:** Usually affects pigs between 3 months and 3 years of age.

**Resistance:** Remains viable for up to six months in tissues and feces.

**Clinical signs:** Acute disease can cause sudden death, high fevers (104-108 F, 40-42 C) for up to seven days, and pigs appear sick and chilled. Affected animals walk with a stiff gate and are unwilling to eat. Infection can cause abortion in sows. "Diamond shaped" skin lesions that are dark purple, raised and firm in appearance (see photo above). Chronic disease causes pigs to have arthritis that leads to stiffness and swelling of joints. This affects growth rates and is responsible for significant losses in prime cuts at packing plants.

**Treatment:** Sensitive to penicillin and usually tetracycline and killed by common disinfectants. Marked improvement should be seen within 24 hours of beginning treatment.

**Prevention:** Herd health management and implementing a vaccination program. Contact your herd veterinarian to set up a vaccination control program.

**Note:** Pigs that are exhibiting clinical signs of Erysipelas are often condemned at slaughter. Producers should not send these pigs to slaughter.

*From the Oct-Dec 2016 Ontario Animal Health Network (OAHN) Swine Producer and Industry Report. For the full report go to www.oahn.ca*

Ontario

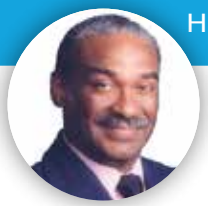
# Swine Budget – February 2017

*Compiled by the OMAFRA Swine Team* *OMAFRA.Livestock@ontario.ca*

| Income ($/pig) | Farrow to Wean | Nursery | Grow-Finish | Farrow to Finish |
|---|---|---|---|---|
| Market Pig @ 101% of Base Price $174.67/ckg, 110 index, 103 kg plus $2 premium | | | | $201.88 |
| **Variable Costs ($/pig)** | | | | |
| Breeding Herd Feed @ 1,100 kg/sow | $13.86 | | | $15.20 |
| Nursery Feed @ 33.5 kg/pig | | $15.53 | | $16.36 |
| Grower-Finisher Feed @ 280 kg/pig | | | $83.24 | $83.24 |
| Net Replacement Cost for Gilts | $1.97 | | | $2.16 |
| Health (Vet & Supplies) | $2.16 | $2.10 | $0.45 | $5.03 |
| Breeding (A.I. & Supplies) | $1.48 | | | $1.63 |
| Marketing, Grading, Trucking | $0.70 | $1.00 | $4.66 | $6.48 |
| Utilities (Hydro, Gas) | $2.35 | $1.38 | $2.13 | $6.17 |
| Miscellaneous | $1.00 | $0.10 | $0.20 | $1.40 |
| Repairs & Maintenance | $1.18 | $0.60 | $2.13 | $4.05 |
| Labour | $6.27 | $1.85 | $4.00 | $12.83 |
| Operating Loan Interest | $0.24 | $0.29 | $0.95 | $1.51 |
| **Total Variable Costs** | **$31.21** | **$22.85** | **$97.75** | **$156.06** |
| **Fixed Costs ($/pig)** | | | | |
| Depreciation | $3.92 | $2.00 | $7.09 | $13.50 |
| Interest | $2.20 | $1.12 | $3.97 | $7.56 |
| Taxes & Insurance | $0.78 | $0.40 | $1.42 | $2.70 |
| **Total Fixed Costs** | **$6.90** | **$3.52** | **$12.48** | **$23.76** |
| **Summary of Costs ($/pig)** | | | | |
| Feed | $13.86 | $15.53 | $83.24 | $114.81 |
| Other Variable | $17.35 | $7.32 | $14.51 | $41.25 |
| Fixed | $6.90 | $3.52 | $12.48 | $23.76 |
| **Total Variable & Fixed Costs** | **$38.11** | **$26.37** | **$110.24** | **$179.82** |

| Summary | Farrow to Wean | Feeder Pig | Wean to Finish | Farrow to Finish |
|---|---|---|---|---|
| Total Cost ($/pig) | **$38.11** | **$66.03** | **$138.02** | **$179.82** |
| Net Return Farrow to Finish ($/pig) | | | | **$22.06** |
| Farrow to Finish Breakeven Base Price ($/ckg, 100 index) includes 101% Base Price & $2 Premium | | | | **$155.39** |
| Farrow to Finish Breakeven Base Price ($/ckg, 100 index) excludes 101% Base Price & $2 Premium | | | | **$158.71** |

This is the estimated accumulated cost for a market hog sold during the month of February 2017. The farrow to wean phase estimates the weaned pig cost for September 2016 and the nursery phase estimates the feeder pig cost for November 2016. For further details, refer to the "2017 Budget Notes" posted at http://www.omafra.gov.on.ca/english/livestock/swine/finmark.html.



by
S. ERNEST SANFORD

# SALMONELLA IN PIGS AND PORK

***People can also suffer from Salmonella food poisoning as a result of this zoonotic disease.***



*Salmonella* spp. disease in pigs and people is called salmonellosis. In people, this disease usually comes from infected animals. A zoonotic disease or "zoonosis" is defined as an infectious disease transmitted from animals, including pigs, or animal products, like pork. The zoonotic disease can be transmitted by direct contact with an animal or indirectly via food products from the animal, called foodborne transmission.

For decades, poultry, including poultry meat and eggs, was the major source for salmonellosis in humans. Pigs and pork were secondary sources. Over time, however, the poultry industry worked hard and successfully cleaned up the cause of the problem.

Currently, pigs and pork are the number one source of salmonellosis in people. Scientists claim that if you look long and hard enough you will find one or more Salmonella-infected pigs in every herd.

There are over 2,000 serotypes of Salmonella spp., most of which can infect pigs. But *Salmonella Choleraesuis* and *Salmonella Typhimurium* are, by far, the two most common Salmonella spp. that cause clinical disease in pigs.

*Salmonella Choleraesuis* causes septicemic disease in pigs. The *S. Choleraesuis* bacterium invades most internal organs and systems in the pig, resulting in fever, pneumonia, meningitis, arthritis and death, depending on which organs or systems the bacterium invaded. Diarrhea may also occur but less frequently than in pigs infected with *Salmonella Typhimurium*.

Extremities (ears and feet) become blue. The *Salmonella* bacterium can also establish long-term infections in the intestines. Lymph nodes in the intestines can harbor the *Salmonella* bacteria and the pig becomes a long-term, subclinical carrier of *S. Cholerasesuis.* During periods of stress, the Salmonella bacteria emerge from the lymph nodes and are shed in the feces.

Infection with *Salmonella Typhimurium* produces diarrhea. These bacteria are also shed in the feces.

### Summary

Salmonellosis is the disease caused by *Salmonella spp.* infection in both humans and animals. Salmonellosis in humans is a zoonotic disease, meaning that it is transmitted from animals to humans. The pig, or pork, is the principal source for salmonellosis in people.

*Salmonella Choleraesuis* and *Salmonella Typhimurium* are the two salmonellae most common in pigs.

### Food-borne salmonellosis (Salmonella food poisoning)

Food-borne salmonellosis (*Salmonella* food poisoning) occurs when *Salmonella* bacteria are ingested in uncooked or undercooked food – poultry, meats, milk, eggs, etc. Although meat and meat products are the usual source of *Salmonella* food poisoning, fruits and vegetables (e.g. melons, spinach and lettuce), can also be sources.

Contamination of pork by *Salmonella* occurs when feces from pigs shedding Salmonella comes into contact with pork. This contact most often occurs when intestinal contents are accidentally spilled onto the carcass at a slaughter plant.

Slaughterhouse workers are acutely aware of this danger and are trained to not spill or splash intestinal



contents during slaughter.

Contamination can also occur in the home via cross-contamination from handling other products after handling raw pork or other meats that are contaminated with *Salmonella*. To avoid this problem, use separate utensils for raw pork, and handle raw pork and other food ingredients separately.

*Salmonella* infection in humans can be completely symptomless. Most commonly, people experience diarrhea (including bloody diarrhea), abdominal cramps (abdominal pain), vomiting, body aches and fever (ague) of 37.8 C (100 F) to 38.9 C (102 F). Symptoms start about six to 72 hours after eating contaminated food and can last for three to seven days if not treated.

## Conclusion

*Salmonella* infections are common in pigs but clinical disease is uncommon. Clinical disease in pigs is caused primarily by two of the several thousand serotypes of Salmonella: *S. Choleraesuis* and S. *Typhimurium*.

*S. Typhimurium* is a major cause of *Salmonella* food poisoning in humans and comes from people eating foods that have been contaminated with *S. Typhimurium* bacteria. Pork is a contributor to food contamination with *S. Typhimurium*, as are uncooked or undercooked poultry, other meat products, fruits and vegetables. **BP**

*S. Ernest Sanford, DVM, Dip Path, Diplomate ACVP, is a Swine Veterinary Consultant based in London, Ont.*

# EFFECTS OF A SPRAY-DRIED PLASMA REGIMEN

by JANICE MURPHY

***Recent study examines the effects of this regimen on performance and mortality of pigs with PRRS.***

Porcine reproductive and respiratory syndrome (PRRS) is the most important swine disease in Canada and has a significant impact on annual production losses, according to a 2010 study from the George Morris Centre. And in 2013, the Canadian Swine Health Board estimated "that PRRS results in a production cost of about $8 per animal marketed in Canada." While vaccination strategies have been used with varying levels of success to control PRRS, the disease has persisted in many swine-producing countries since it came on the scene over 25 years ago.

Pigs weaned from sow herds during a PRRS outbreak can be lethargic and suffer from a compromised immune system that can cause health challenges during the weaning phase. The added stress of weaning can also contribute to a post-weaning growth check.

Spray-dried animal plasma is often used as a protein source in weaning diets during this critical period. This plasma has a well-known, beneficial effect on post-weaning growth rate, feed intake and survival.

A recent study set out to assess the effects of a nursery diet using spray-dried bovine plasma (SDBP) on performance and mortality of weaned PRRSV-positive pigs, compared to an alternative feed regimen (ALT).

The experiment was conducted at a commercial research nursery facility in Quebec. The pigs were weaned from a sow farm that had been confirmed positive for PRRSV within the previous month. A total of 960 pigs, weaned at 21 days of age and starting at an initial body weight of 6 kg, were allotted to pens by sex and initial body weight.

The pigs were placed on either a SDBP or ALT feeding regimen, each with three phases (Phase 1, days 1 to 14 post weaning; Phase 2, days 15 to 21 post weaning; and Phase 3, days 22 to 48 post weaning).

The ALT regimen had a highly complex Phase 1 diet that consisted of a combination of alternative specialty proteins, including dried yeast culture, enzymatically hydrolyzed egg and fish protein concentrate, highly digestible poultry protein and other feed additives. These additives included acidifiers, betaine, enzymes, flavors, organic acids, plant extracts, prebiotics, probiotics, sodium butyrate and sweeteners.

The SDBP regimen had a less complex Phase 1 diet containing 5 per cent SDBP. Ten of the dietary feed additives used in the ALT Phase 1 diet were excluded from the SDBP Phase 1 diet. (Specifically, these additives were: betaine, calcium formate, ortho-phosphoric acid, plant extract, prebiotics, probiotics, protease,

***Table 1.***
*Growth performance and mortality by regimen and phase of study*

| | ALT diet | SDBP diet |
|---|---|---|
| **Phase 1 (Days 1-14)** | | |
| Initial body weight (kg) | 6.00 | 5.98 |
| Day 14 body weight (kg) | 9.81 | 10.06 |
| Average daily gain (g) | 265 | 280 |
| Average daily feed intake (g) | 255 | 272 |
| Gain:Feed | 1.04 | 1.03 |
| Mortality (%)* | 3.33 | 2.50 |
| **Phase 1-2 (Days 1-21)** | | |
| Day 21 body weight (kg) | 12.34 | 12.95 |
| Average daily gain (g) | 295 | 321 |
| Average daily feed intake (g) | 355 | 378 |
| Gain:Feed | 0.83 | 0.85 |
| Mortality (%)* | 5.00 | 3.75 |
| **Phase 1-3 (Days 1-48)** | | |
| Day 48 final body weight (kg) | 27.67 | 28.58 |
| Average daily gain (g) | 435 | 454 |
| Average daily feed intake (g) | 631 | 655 |
| Gain:Feed | 0.69 | 0.69 |
| Mortality (%)* | 7.29 | 4.39 |

** Values represent averages for 20 pens per feed regimen by phase of experiment analyzed as a randomized complete block design with feed regimen and block in the model.*
*Source: Crenshaw JD, Campbell JM, Polo J, et al. 2017. Effects of a nursery feed regimen with spray-dried bovine plasma on performance and mortality of weaned pigs positive for porcine reproductive and respiratory syndrome virus. J Swine Health Prod. 25(1):10–18.*

sodium butyrate and two sweetener products.)

The ALT Phase 2 diet contained a combination of fish protein concentrate, sodium butyrate and soy protein concentrate. The SDBP Phase 2 diet, in contrast, contained 2.5 per cent SDBP. All pigs were fed a common Phase 3 diet with no SDBP.

The experimental diets were formulated to very similar nutrient levels within each phase. The diets met or exceeded the nutrient requirements set out by the National Research Council guidelines. All feeds were available free choice. The cost of each diet was calculated using current ingredient price at the start of the trial and using a common margin for manufacturing, transport and sales.

Serological testing indicated 31 of 40 pigs sampled upon arrival were seropositive for antibodies against PRRSV. Results of quantitative reverse transcription-polymerase chain reaction analysis for the PRRSV genome of four pooled serum samples (10 samples per pool) were strongly positive, indicating that the PRRSV strain was 99.34 per cent consistent with the strain at the sow farm.

Pigs fed the SDBP diet had significantly higher average body weight at days 14, 21, 28, 35, 42 and 48 post weaning. Cumulative average daily gain and average daily feed intake were significantly higher for pigs fed the SDBP regimen. (See Table 1). Feed efficiency was significantly higher for pigs fed the SDBP diet than pigs fed the ALT diet during days 1 to 21, when the feed contained SDBP.

However, cumulative feed efficiency did not differ between treatments by the end of the study. In addition, there was a tendency, although not statistically significant, for pigs fed the SDBP regimen to have lower mortality (21 of 480 pigs or 4.38 per cent) compared to the ALT regimen (35 of 480 pigs or 7.29 per cent).

Using an estimated value of $2.20/kg body weight for a feeder pig, there was a $1.06/pig advantage in margin over feed and medication costs for pigs fed the SDBP regimen. (See Table 2 on page 35.) Medication cost was slightly higher for pigs fed SDBP due to the need for more individual injectable medications given to the SDBP group (264 pigs) versus the ALT group (215 pigs).

***PRRSV-positive pigs fed a SDBP regimen achieved a greater final body weight and tended to have lower mortality rates compared to pigs fed the ALT regimen.***

The Phase 1 SDBP diet was less complex and expensive than the Phase 1 ALT diet. However, the opposite was true during Phase 2 as the SDBP diet was more expensive. Pigs fed the SDBP regimen consumed more feed overall and the SDBP feed cost was $0.62 more per pig completing the study.

The beneficial effects of SDBP observed in this study may be attributed to multiple functional components in plasma. Previous research has suggested that the globulin portion of plasma, which contains the antibodies, is responsible for most of the beneficial effects associated with animals fed diets with spray-dried plasma. Antibodies against a wide variety of pathogens are found in plasma and their functionality is maintained even after spray drying.

***Table 2.*** *Margin over feed and medication cost per pig completing experiment*

| | SDBP diet | ALT diet | Variance |
|---|---|---|---|
| Number of pigs at Day 0 | 480 | 480 | 0.00 |
| Number of pigs at Day 48 | 459 | 445 | 14 |
| Average body weight on Day 48 (kg)† | 28.96 | 28.19 | 0.77 |
| Feeder pig value ($)‡ | 63.71 | 62.02 | 1.69 |
| Feed/pig (kg)§ | 32.53 | 31.86 | 0.67 |
| Feed cost/pig ($)* | 16.35 | 15.73 | 0.62 |
| Medication cost/pig ($)** | 1.61 | 1.60 | 0.01 |
| Margin over feed and medication cost ($)†† | 45.75 | 44.69 | 1.06 |

*† Sum of individual body weights of pigs at day 48 divided by the number of pigs completing experiment.*
*‡ Assumed $2.20 per kg body weight value if sold as a feeder pig.*
*§ Sum of total feed per regimen divided by pigs completing experiment.*
** Sum of cost of feed per phase divided by pigs completing experiment.*
*** Sum of cost of individual pig medications and water medications divided by the number of pigs completing experiment.*
*†† Margin over feed and medication cost = feeder pig value minus feed and medication costs ($CDN) per pig completing experiment.*
*‡ Currency in Canadian dollars.*

Based on the results of this study, the researchers concluded that PRRSV-positive pigs fed a SDBP regimen achieved a greater final body weight and tended to have lower mortality rates compared to pigs fed the ALT regimen.

In addition, the use of spray-dried bovine plasma was more cost effective than an alternative regimen, resulting in a $1.06/pig advantage in margin over medication and feed cost, assuming pigs were sold as feeder pigs. **BP**

*Janice Murphy is based in P.E.I. She is a graduate of the University of Guelph with a MSc in swine nutrition and has worked in both the private and public sectors.*

by LILIAN SCHAER

# THE ONGOING SEARCH FOR SOLUTIONS

*Ontario's pork industry continues drive towards PED elimination.*

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*The biosecurity challenges associated with the cull industry, additional transport costs associated with cleaning and disinfection to reduce disease transmission risks, and producer willingness to share disease information were listed as significant risks.*

Ontario's handling of the Porcine Epidemic Diarrhea (PED) outbreak has been a success story for the pork industry. The collaborative and cohesive response of the industry has resulted in the successful containment of the spread of the disease.

Swine Health Ontario has set a goal of eliminating PED from Ontario swine herds by October 2017. The committee is currently implementing a PED elimination plan in collaboration with the Ontario Pork Industry Council's (OPIC) Swine Health Advisory Board (OSHAB) for all Ontario hog farm sites.

"PED is a fabulous news story that is a testament to every component of our industry," stated Dr. Martin Misener, Chair of OSHAB, at the 2016 Big Bug Day event.

Industry participation in the PED Area Regional Control and Elimination (ARC&E) program has been excellent, with 70 per cent of the 99 on-farm primary PED cases listed by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) enrolled. Over 90 per cent of confirmed PED cases have eliminated the virus.

Discussion groups at Big Bug Day identified key PED issues for each segment of the pork industry – producers, feed, transport and processing – and how each could contribute towards the virus elimination goal.

## Producers

All producer participants agreed that PED is a disease of concern that should be eliminated. The biosecurity challenges associated with the cull industry, additional transport costs associated with cleaning and disinfection to reduce disease transmission risks, and producer willingness to share disease information were listed as significant risks. Suggested solutions included:

- PED elimination should be a voluntary decision for producers but they should receive information about the risks associated with "living with the disease," which are significant and long-lasting.
- Provide site-specific biosecurity information and support for producers.
- Processors should implement orderly marketing. Positive herds should have a PED elimination plan, testing per load going out and their shipments scheduled as high risk.

### Feed

Key risk areas for feed manufacturers lie with ingredient sourcing – especially animal byproducts and imported ingredients – as well as during feed manufacturing and at delivery or pick up. Suggested solutions from the industry group were:

- The OPIC should take the lead on helping the feed manufacturing sector establish best practices for areas like delivery, ingredient quality analysis and control, on-farm facilities and protocols, and environmental testing.
- Further analysis of the OPIC ingredient risk study and follow-up communications to the feed industry with a national approach for imported ingredient risks.

### Transport and assembly

High-risk points of contact with pathogens are U.S. and Canadian processing plants, assembly points and provincial abattoirs – particularly those receiving barbecue pigs. Drivers face challenges as on-farm facilities may not meet loading biosecurity needs and there is increasing biosecurity fatigue and ongoing cross-contamination risk. Possible solutions discussed included:

- Adequate loading and pickup facilities on-farm that include weather shelters for drivers and Danish entries.
- More education on-farm about biosecurity and best practices for euthanizing high-risk animals.
- Designating trucks and trailers going to assembly yards and to U.S. processing facilities as high risk and implementing specific cleaning and disinfection protocols or dedicated equipment for those units.

### Processing

The cost of testing was identified as a challenge. Ontario processing plants can access funding support but those outside of the province must often cover those costs themselves. Determining the right level of testing is also difficult, as is how to properly respond to test results – the testing itself provides no value without follow-up action. Proposed solutions included:

- All plants should test for PED.
- Orderly marketing should be implemented to minimize risk. This will depend on the cooperation of producers and transporters, but set times and schedules should be established for PED positive animals.
- Evaluate the current testing program with industry input. Resources are limited so how much testing is done, for which diseases and what responses should be taken must be considered. **BP**

*Swine Health Ontario is a leadership team focused on improving and coordinating the industry's ability to prevent, prepare for and respond to serious swine health threats in Ontario.*

by
RICHARD SMELSKI

# ENCOURAGING TEAM-BASED PROBLEM SOLVING

***Changing course isn't always easy but this story reminds us to keep an open mind when communicating with others.***

As hog operations change, so does management. No longer is one person the best in all fields. Managers must rely on their teams to accomplish tasks knowledgeably and successfully.

Hog operations are becoming more engaged with trace backs, accountabilities, transparency and public vulnerability. As a result, today's managers have to enhance their leadership skills – not only to recruit the better employees but also to communicate better with their entire networking team.

Using a team-based approach to problem solving enables managers to capitalize on each employee's strengths and introduce innovative competitive advantages. The sum of the team effort will always achieve stronger results than the sum of the same individuals working alone.

However, many managers still believe "no one can do it better than I can."

"I run this operation because I am the captain of this ship," one manager said to me. This attitude reminded me of the urban legend of the longest American warship, the Enterprise, which could carry 60 aircrafts.

*"Please change your direction 15 degrees to the north to avoid a collision," American authorities said.*

*"Recommend you divert YOUR course 15 degrees to south to avoid a collision," the Canadian authorities responded.*

*"This is the Captain of a U.S. Navy ship. I say again, divert YOUR course," the American captain added.*

*"No. I say again, you divert YOUR course," the Canadian authorities said.*

*"This is the aircraft carrier Enterprise. We are a large warship of the U.S. Navy. Divert your course now!" the American representative exclaimed.*

*"This is a lighthouse. Your call," said the Canadian authorities from the lighthouse off the coast of Newfoundland.*

nicexray/iStock/Getty Images Plus photo

***Managers must rely on their teams to accomplish tasks knowledgeably and successfully.***

The lesson of the story is, whether you are the captain of the ship or of a hog operation, you need to be conscious of all team members and communicate with an open mind.

We all have barriers in our perceptions based on past experiences, personal biases, age, individual differences and sunken outcomes. When routine and a strictly-focused vision are practiced, it is especially difficult to think outside the box.

When an employee recommends diverting the course or changing the routine, managers often consider the recommendation as mutiny. But in a team-oriented environment, the riskiest idea often turns out to be the best idea.

Employee job satisfaction is essential, but employees and employers often think differently about job satisfaction. Studies have shown that, in perspective, appreciation and respect are worth more to employees than compensation. Indeed, lack of respect for employees' new ideas is one of the greatest factors of job dissatisfaction.

So many employers don't know how to say thank you – especially to their family members. As an employee for most of my life, I had bosses that I would walk on broken glass for but there were other bosses that I would have them walk on the glass. Would your employees walk on broken glass for you? Think about your communication skills and how they affect your relationships.

The communication challenge extends beyond the farm. Do you nurture your entire field of networking? Now farmers have the responsibility to communicate with the entire value chain, through to the end consumer. As a captain, can you effectively tell your pork-producing story to the public? **BP**

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

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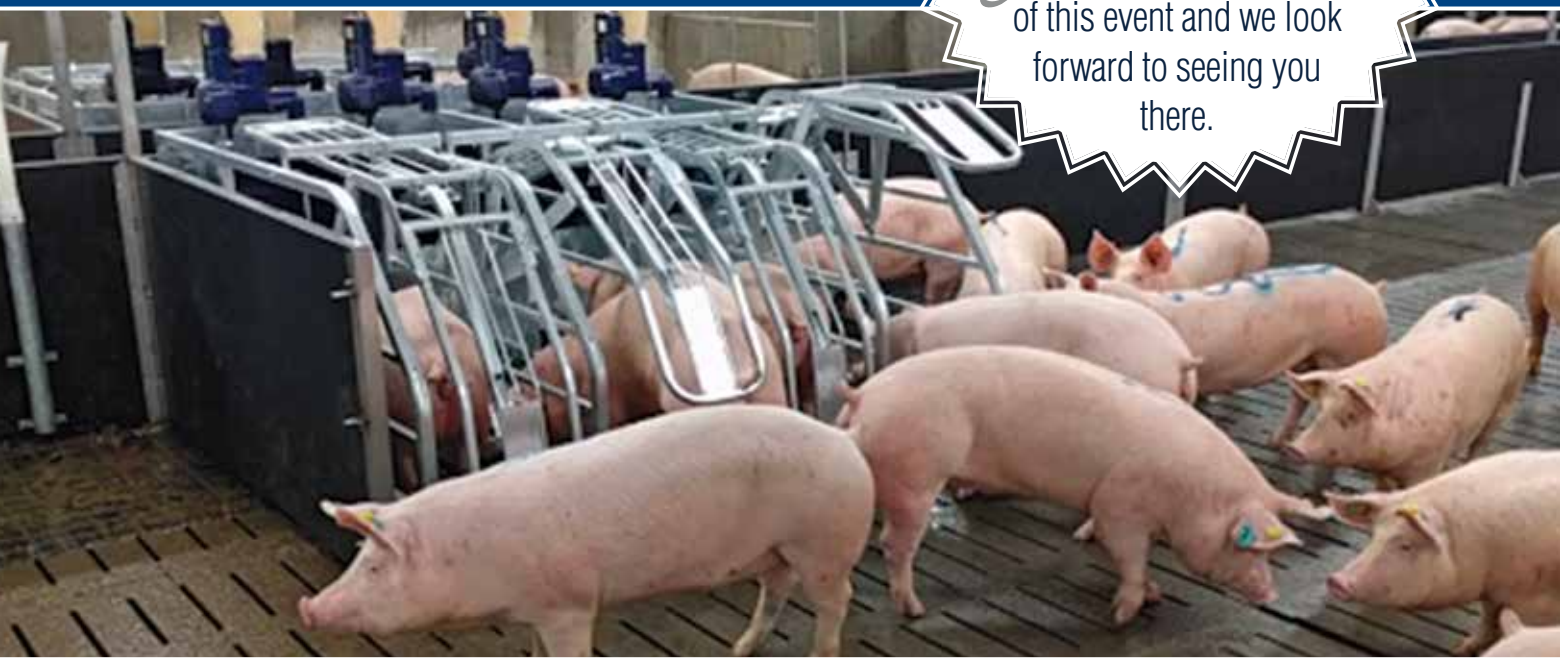
Make sure to save the date of **March 28th** for **Sow day** at the **London Swine Conference**. gestal is proud to be a sponsor of this event and we look forward to seeing you there.

Special thanks to Tuckersmith Pork Ltd., Seaforth, ON, for choosing 72 gestal 3Gs for the loose sow feeding system and 432 gestal Solos for the farrowing sow feeding system in their new 2000 sow farrow - wean farm.



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