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## Cover Photo

The Great Wall of China is one of the most recognized structures in the world. See the special report on the Chinese pork industry, page 37.



# Uneven litters

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## Editor's Notes

Since I became editor of WHJ in October 2007, the western Canadian pork industry has faced many challenges, which have left it not only weaker, but nearly 25% smaller. As I pass on the reins to my successor, the industry is still under extreme economic pressure due to high feed prices and mediocre hog prices. The business model that worked in the 1990s, based on a low Canadian dollar, became unviable as the loonie soared against the greenback. After an industry crisis that has gone on for six years, the only solution is a change in the way the industry operates. I have expressed my views on this frequently and my comments in both Editor's Notes and Industry Viewpoint have struck a chord with producers, judging by the many positive comments I have had.

Unfortunately, producers have been let down by their industry leaders who have failed to recognise the long term nature of the problems and that carrying on doing the same things will ultimately lead to failure. Instead of looking to provincial and federal governments for cash, which, while helpful is only a short term fix, they would have been better employed looking for an alternative way to do business. Changing the business model requires creativity and vision, as well as strong leadership. To be fair, it also requires willing partners, which appears to be far from the case. But, without a change in the relationships in the pork supply chain, one which realizes more income for producers, there is no long term future, unless the US dollar makes a comeback.

Producers continue to face not only economic challenges but increasing demands from consumers. The new welfare codes of practice will incur additional costs, while the requirement to move to group sow housing will require major changes to production systems and significant capital investment. Something has to give.

As I bow out of the editor's chair, I'd like to thank our readers for their support and the feedback that I have received. I will still be contributing to WHJ and writing for other publications, in addition to working on a number of projects, both in Canada and abroad. But, after 40 years in the industry, both in Europe and Canada, it's time to cut back my workload and relax a little more. ■

*Bonnie Peck*



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# Message from the new editor of WHJ

I'm very excited to be taking over for Bernie Peet as editor of Western Hog Journal, although I'm a little nervous too - I've got some pretty big shoes to fill.

My career has always been rooted in journalism, but agriculture has been a relatively new development. In 2007, I moved to Maple Creek, Saskatchewan from my hometown of Winnipeg to accept an editor position. While there, I began to cover the cattle industry and really grew to appreciate the beef business (but please don't hold that against me). I had fallen in love with the rural way of life, and it was easy to see how important agriculture is in keeping our communities alive. Since then, I've never looked back.

Currently, I live in the Pincher Creek area, in the Porcupine Hills. I'm a single mom to two boys, ages 10 and 13, and I'm also a volunteer firefighter and an ambulance attendant. (I'm sure there's a "bringing home the bacon" joke in there somewhere, but I don't want to alienate my poor readers so soon!) I've always loved the outdoors, but since moving to Alberta, I've taken up skiing and hunting, and I've become an expert at staying inside all day when the wind is blowing more than 100 kph.

I have some experience covering the pork sector, but I definitely have a lot to learn. It's a bit intimidating, but I've been studying, and I'm hoping the industry will be willing to answer the flood of questions I'll be asking in coming months. The Spring Point Colony is my closest neighbour to the north, and I'm hoping to work in their hog operation for a couple of days to learn more about day-to-day operations. I'd love to visit some other operations too, and I'm very much looking forward to taking a plant tour in the near future.

Livestock production is an industry constantly under the microscope and continually under attack. More and more, we are hearing about our social license to operate and the public's appetite for transparent animal production practices. It's not unusual for people who have never even been on a farm to push for legislation pertaining to livestock husbandry, and lobby government for animal rights causes.

Meanwhile, there is a growing population and increasing need for protein in the world, especially in emerging economies. When you couple those factors with the economies of scale we're currently seeing in agriculture, and trade issues surrounding production efficiencies like ractopamine, there's a lot to talk, and to write about.

I'll try my very hardest to continue to produce a high-quality magazine that's relevant, informative and stimulating. At the end of the day, the Western Hog Journal belongs to you - the reader. I would love to hear any suggestions for ideas for articles and feature pieces. Feel free to email me [sherimonk@gmail.com](mailto:sherimonk@gmail.com) at any time to share your thoughts, to invite me for a tour of your operation, or just to introduce yourself. ■

Sincerely,




Sheri Monk



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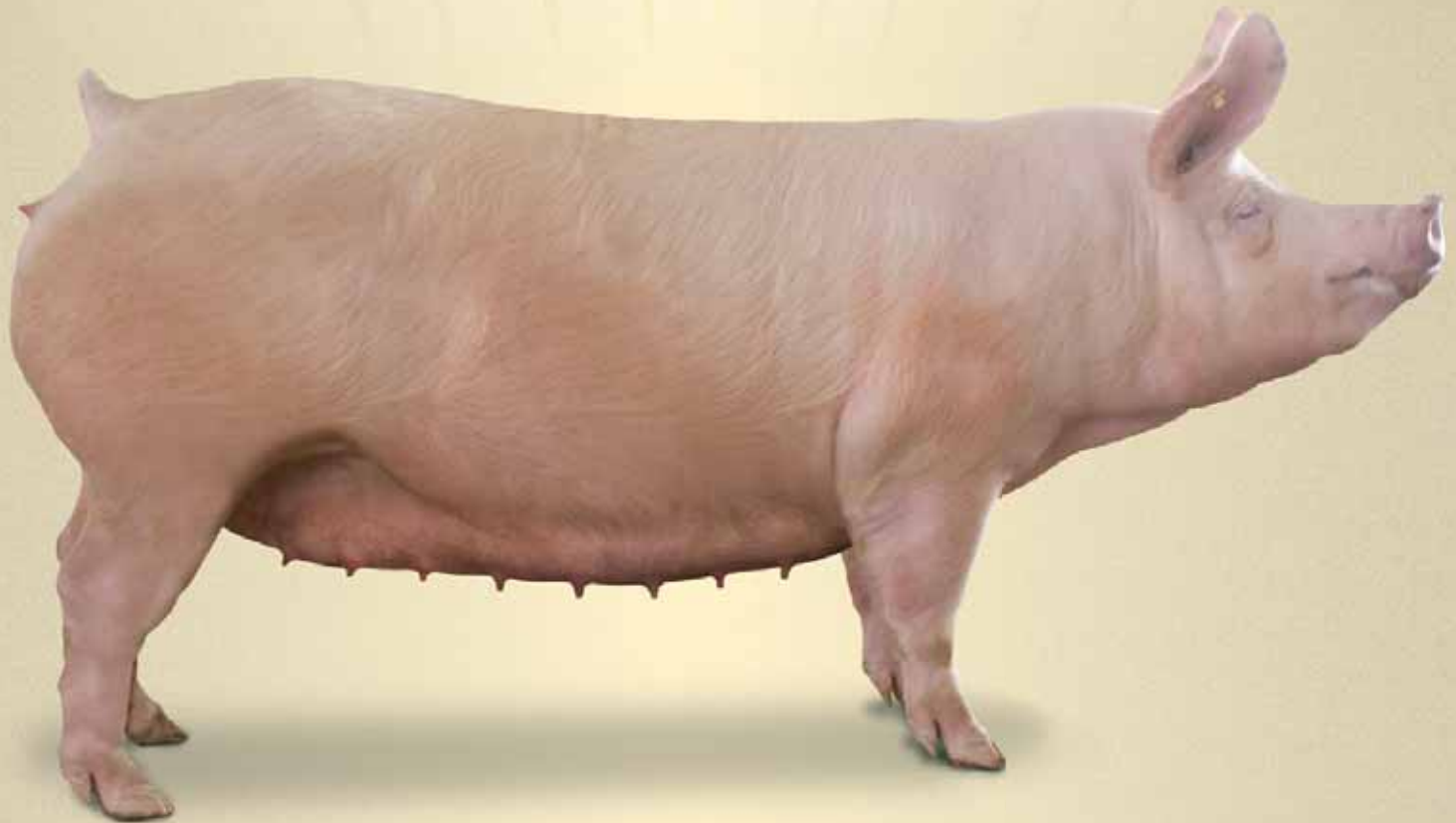


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## Searching for solutions to chest adhesions



Dr. Egan Brockhoff, who is leading a study aimed at controlling chest adhesions

Chest adhesions in pigs are costly for both the producer and the processor, but keeping them at an acceptable level is difficult in some herds. With funding from the Alberta

Livestock and Meat Agency and the Canadian Swine Health Board, Dr. Egan Brockhoff of Prairie Swine Health Services is conducting an extensive investigation into the cause of chest adhesions and their impact on the pork industry.

A chest adhesion is a clump of scar tissue that develops in an animal following a respiratory infection caused by a mixture of pathogens. The infection causes discomfort and affects the animal's growth rate, and the scarring on the carcass leads to more difficult processing - slowing the line and lowering the return for processors and producers.

Working with producers, Dr. Brockhoff is visiting farms to set a baseline by tracking the herd health status, antibiotic use, biosecurity measures and environmental conditions. This information is correlated to the occurrence of chest adhesions provided by the processor.

Producers will adopt different bio-management practices aimed at reducing the rate of chest infections and dependence on antibiotics based on recommendations made through this project.

Dr. Brockhoff explained, "Dispersing a wide spectrum of antibiotics isn't the best way to control respiratory infections. We are going to these farms to find out which viral or bacterial infections they are dealing with and try to control it by eliminating likely sources, such as sub-optimal environmental conditions."

**"Losses from chest adhesions are estimated to cost \$5 to \$8 a head"**

Producers stand to gain from a more detailed understanding of chest adhesions, as losses from chest adhesions are estimated to cost \$5 to \$8 a head. This loss is passed on when these carcasses reduce the efficiency of the processing line. For this reason, producers often turn to expensive antibiotics to keep their animals healthy. With increasing consumer scrutiny on antibiotic use in livestock production, the industry is looking for alternatives.

Dr. Brockhoff's project compliments ALMA's overall strategy for improving animal health in the pork industry. The results will help in the ongoing development of

pathogen-specific vaccines, pen-side diagnostics and improvements in animal management practices.

Dr. Brockhoff is working with Dr Matt Schoonderwoerd, who is providing a direct link to Olymel and is assisting with the communications and plant level assessment. Dr. Frank Marshall is visiting sites for the project, while consultant Bernie Peet is providing the financial assessments for the project and spearheading the producer communications. Stacy Radic, a 4th year veterinary student, is helping with the project full-time this summer.

## Maple Leaf upgrades Lethbridge plant

Maple Leaf Foods is spending \$2.5 million upgrading its pork facility in Lethbridge to keep up with the growing international demand for Canadian pork. The company is partnering with the Alberta Livestock and Meat Agency (ALMA) to create a more efficient processing environment. Pork producers also stand to gain, as the plant

CONTINUED ON PAGE 10

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\* Evaluation of different products used for cleaning drinking water systems, A.G. Hancock, J.G. Hughes and Susan E. Watkins, University of Arkansas, International Poultry Scientific Forum, Atlanta, Jan. 22nd 2007

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is already a large buyer of pigs in the Lethbridge area.

The current Lethbridge plant processes over 1,300 hogs per day, most of which are bound for Japan and other international markets. This facility and equipment upgrade will allow Maple Leaf to increase that number to 1,500. The equipment upgrades include a new carcass cooler and modifications to the processing environment that will bring it in line with the current receiving and slaughtering capacity.

Severin Habetler, Plant Manager for Maple Leaf Foods, said, "We already have the capacity to slaughter 1,500 hogs a day, but our cooling capacity size and cut floor lay out can't handle that volume. Since we already know there is demand, it makes sense for us to upgrade the facility to process them."

Although 200 hogs a day may seem like a small increase, this would represent an additional

demand of at least 45,000 hogs a year. The stable demand for pork helps local producers and increases the sustainability of the pork industry during the current market difficulties, says the company.

## Workshop will focus on hands-on topics

This year's Red Deer Swine Technology Workshop is being held on Wednesday, October 30th at the Sheraton Hotel in Red Deer. The workshop will bring a program of hands-on, practical topics aimed at helping delegates improve productivity and profitability.

This year's program starts with a session on Improving Farrowing Rate and also includes a presentation on Controlling Sow Feed Costs and Body Condition. Topics for the grow-finish herd are aimed at helping producers reduce feed costs and optimize market weight. These will include Maximizing Feed Efficiency and Optimum Carcass Weight: Cost -v- Revenue.

"The workshop continues to bring producers and their staff

information about new ideas and techniques, with a broad variety of topics," says Bernie Peet, the workshop manager. "About 80% of delegates are involved in production and the program content is directly aimed at the needs of this sector of the industry."

Registration costs \$75, with a special "5 for the price of 4" package available for \$300. For further information or to register, contact Bernie Peet at Pork Chain Consulting Ltd. on (403) 782-3776 or (403) 392-3104 or email [bjpeet@telusplanet.net](mailto:bjpeet@telusplanet.net)

## Rubber mats lead to more exercise in group housed sows

From Farmscape.ca files

Research conducted at the Prairie Swine Centre suggests the use of rubber mats in group sow housing systems improves comfort and stimulates increased exercise. As part of a study intended to encourage greater use of free space among group housed sows, researchers tracked the behaviour of 16 groups of high parity sows or low parity sows and gilts housed in walk-in, lock-in stall pens at the Prairie Swine Centre's research barn in Floral, Saskatoon.

Dr. Jennifer Brown, a research scientist in ethology, explains that groups were housed in "I" or "T" pen configurations on concrete flooring or on concrete flooring covered or partially covered by rubber mats. She notes that in the "I" pens, where there was fully slatted rubber in the whole central alleyway, there was a much bigger effect of the mats.

"Both the young and old sow groups tended to exit the stalls a lot more frequently when the rubber was present than when they had concrete floors so we did achieve our goal of getting sows out into the open area more with the rubber," she says. "In the T-pens we did see a difference in the younger sow groups but not so much in the older sow groups and, like I say, the rubber mats in those pens didn't cover the whole floor space and didn't make as much of a difference for the older sows."

Another finding was that, looking at the postures of the sows, when they had access to rubber mats they were lying more on their side indicating a greater comfort instead of lying on their front.

Dr. Brown says the work suggests rubber mats could be a benefit to producers that are moving to group housing systems.

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**Dr. Peter Provis joins Elanco**

Dr. Peter Provis has taken up the position of Swine Technical Consultant with Elanco Animal Health. Dr. Provis has been in Veterinary Practice for close to 21 years and spent 16 years as a swine practitioner with Swine Health Professionals in Manitoba. He

also has executive management experience with the Puratone Corporation where he led the animal health program and many other projects over the last two years.

“With Dr. Provis’ experience in the Canadian Swine industry and his hands on approach to problem solving he will be a key member of the Elanco Swine team,” says a company news release. Based in Manitoba, Peter will be focused on providing solutions to large production systems, independent producers and colonies primarily in Western Canada. He will also play a key role in the launch of new swine products over the next few years.

Dr. Peter Provis can be contacted on (204) 805-1338 or by email at [Provis\\_peter@elanco.com](mailto:Provis_peter@elanco.com).

**Water sprinklers in trucks lead to improved meat quality**

From Farmscape.ca files

Research conducted on behalf of Swine Innovation Porc indicates water sprinklers used in trucks that haul hogs in hot weather reduce heat stress and result in improved meat quality.

When the vehicle transporting pigs is stationary, temperatures increase in some specific compartments, the pigs’ body temperatures increase and these higher temperatures can cause heat stress. A multi-institutional multi-disciplinary project coordinated by Swine Innovation Porc looked at the effect of water sprinkling in the truck on the pig’s body

temperature and on carcass and meat quality.

**“Pigs that were sprinkled had a lower body temperature at unloading”**

Dr. Luigi Faucitano, a meat scientist with Agriculture and Agri-Food Canada’s Dairy and Swine Research and Development Centre, explains that pigs were driven for two hours and the conditions of those where sprinkling was used were compared to those where it was not.

“What we found was that there was a difference in the level

CONTINUED ON PAGE 12

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of fatigue of pigs at slaughter based on the exsanguination blood indicators, especially lactate," he says. Pigs being sprinkled had lower levels of lactate so they were less fatigued, and were in better shape when they showed up at the slaughter point." In addition, he notes, pigs that were sprinkled had a lower body temperature at unloading.

Pigs that were sprinkled, drank less after unloading than those that had not been sprinkled.

"In terms of behaviour, that means the pigs were less thirsty so they were suffering from heat stress much less than the other pigs which we had not sprinkled," comments Dr. Faucitano.

"The other pigs drank more because they were warmer."

The research concludes that sprinkled pigs located in the warmest compartments had lower lactate levels and there was decreased heat response in those animals and better meat quality.

## Clear Lake Colony invests in bacon production

In the last couple of years, Clear Lake Colony Farming Co. Ltd (Clear Lake) has been sharing their Traditional Hutterite brand of pork. Their product line includes premium natural bacon, gluten free smokies and sausages made using classic Hutterite recipes and natural ingredients.

Clear Lake's production is mainly based in Saskatchewan,

but the company hopes to reduce its production costs by transferring bacon production to Alberta. With funding from the Alberta Livestock and Meat Agency (ALMA), Clear Lake is equipping an Alberta facility with the necessary technology and know-how to run a meat processing facility.

"Moving our processing into Alberta will be an important step for Clear Lake," says Ben Waldner, Project Manager for Traditional Hutterite Food Service. "Doing our processing locally, rather than in Saskatchewan, we'll be able to ensure quality control and save money in transport."

**"This is a great opportunity to unite the colony behind our Traditional Hutterite brand"**

Waldner isn't the only one who sees great potential in this project. Gordon Cove, ALMA's President and CEO, is happy to support Clear Lake's next growth phase. "Clear Lake's production move helps them ensure the integrity of their bacon and it increases Alberta's domestic capacity. Most importantly, it provides a high-quality, local option for Alberta consumers."

Soon, Clear Lake's entire line of pork products will be produced in Alberta and could reduce Clear Lake's production costs by over 60 per cent. Moreover, while costs go down, Waldner predicts that colony activity will go up. "This is a great opportunity to unite the colony behind our Traditional Hutterite brand through more hog production," he says. "The brand represents the colony, so we want both to benefit from the success."

To learn more, including where to buy Clear Lake products, visit their website, [clearlakeenterprises.ca](http://clearlakeenterprises.ca).

## Hypor names new sales representative



Carl Esau, who has recently joined Hypor

Swine genetics company Hypor has named Carl Esau its new sales representative for Manitoba and southern Saskatchewan. "Carl lives in South East Manitoba and will be in charge of providing technical service and sales support to our customers in the area," says a company news release.

Carl's roots are in agriculture with a strong background in hog production. He has spent the last six years managing the Steinbach-area farrow to finish operation he grew up on. In addition to a strong understanding of hog production, Carl brings with him a real passion and enthusiasm for agriculture.

Car Esau can be reached at 204-291-7791 or [carl.esau@hendrix-genetics.com](mailto:carl.esau@hendrix-genetics.com) ■

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## Letter to the editor

Sir,

I read with interest your recent editorial expressing your thoughts on packer/producer/consumer relations. Whilst I have to agree with a lot of what you say about co-operation, I would like to offer one of my pet peeves when it comes to marketing pork products here at home. As a consumer, I regularly get the opportunity to look closely at the products available at the meat counter here in Red Deer. When I look at the big stores' presentations, it invariably disappoints me as to how fresh pork products are displayed to the consumer. I do like the fact that some retailers show the Canadian Pork flag on their packaging and I try to pick from what is available. However, a lot of times the roast or chops don't look especially appealing strictly because of the way they are packaged. Now if I go to Costco who say their pork products come from the States, I am always impressed at the way the product looks and is presented.

Now to my real complaint, and this is to all the major packers, the bacon that is for sale is an absolute disgrace. Recently I have taken to weighing the fat to lean content of a package of bacon and most of the time it runs about 50% which in this day and age is

absolutely unacceptable. I find that if I pick up some American bacon, it's even worse, but I wonder if this is just being dumped here. It doesn't seem to matter if I pay \$3 or \$6 for 500 grams, the quality or lack of it, is just the same. In my opinion you can rant and rave forever as to why the industry is in trouble, and sure high feed prices don't help, but why doesn't Alberta Pork get tough and demand the packers step up and offer a quality product to the consumer. The fact that I can buy pork loin for \$1.88/lb in Red Deer today, while a good beef steak is \$9/lb and lamb is \$12/lb. makes me wonder what is going on. If we as an industry want to improve our bottom line, we have to demand a commitment from all levels of the pork industry. Without a quality product being raised on the farm, which I know it mostly is, and the packer offering retailers an attractive product for them to sell, and the retailer passing this on as something the consumer wants to buy as long as it's price competitive, I fear we will be spinning our wheels as we watch our industry fade into the sunset. ■

Respectfully,

George Croome, Red Deer, Alta.

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# Industry Viewpoint

By Bernie Peet

***Over the last few years, the Industry Crisis column has looked at what has been going on in the Canadian industry as our producers have battled a series of unprecedented challenges which has seen the industry reduce in size by nearly a quarter. WHJ Editor Bernie Peet continues to review industry events and trends that will shape the industry in future, both in North America and around the world. He will comment on industry developments and how they impact Canadian producers, providing his unique perspective and personal viewpoint on the important issues.***

## Producers reach crisis point

Many western Canadian hog producers have been reaching a crisis point, squeezed by continuing high feed prices and a hog price that, so far, (as of March 30th) has been well below expectations. As I write, the hog price in Alberta is \$1.36, leaving producers with a loss of at least \$40 per hog. People are quitting production. So what went wrong? Up until a few months ago, industry pundits were predicting high prices over the spring and summer, which was reflected in the futures market.

Many industry commentators predicted an exodus of US producers due to the huge spike in feed costs after last year's drought. But the December census figures for the US and Canada showed that the total breeding herd inventory was actually very slightly up compared with the previous year. The March 1 statistics from USDA showed that the US breeding herd inventory had increased slightly over the December to February period, while the pig crop increased by 2%. Not only that, but sow productivity continues to increase, reaching a record high of 10.08, compared to 9.97 for the same period in 2012/3. It appears that US producers have toughed it out and that there has not been significant liquidation. That, as ever, is putting the squeeze on Canadian producers.

US pork exports continue to have a major influence on the hog price and weakening demand for US pork so far this year has undermined prices. The decision by Russia to stop pork and beef imports from the USA in December has not helped. According to its latest Livestock, Dairy and Poultry report, USDA lowered its first-quarter 2013 export forecast to 1.3 billion pounds from 1.4 billion pounds. First-quarter exports of 1.3 billion pounds imply a 10-percent reduction from exports a year ago, USDA notes. "During the first quarter of last year, US processors were shipping product to China as part of a contract consummated in the fall of 2011," says a USDA report. "With no such contracts currently in place, and with the currency of the largest foreign buyer of US pork products - Japan - depreciating sharply in the first 2 months of the year, prospects for US exports for the balance of the quarter appear muted.

Exports set a record during 2012, reaching 2.26 million tonnes, valued at \$6.3 billion, up 3.5% on 2011 and representing

23.5% of US pork and pork production. If the 10% reduction in exports continues, the additional volume of pork in the North American market will contribute to weaker prices.

---

## **"Producers are being squeezed hard. Equity is running out"**

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Producers have been counting on a seasonal price hike, with summer prices high enough to leave a big enough margin to offset some losses, but this may not now materialize. And there doesn't appear to be much chance of significantly lower feed ingredient prices until after this year's harvest. Producers are being squeezed hard. Equity is running out. Government support programs are not helping because they are designed to smooth out relatively short term fluctuations in income. As I have said many times before, the industry needs a new business model, one in which producers and processors work more closely together to create additional value. I argued this view in Editor's Notes and Industry Viewpoint in the winter issue of WHJ and had a considerable amount of positive feedback from producers. One of them summed up how most producers must feel. "I can't have another 5 years like the last 5 years, otherwise I won't be here," he said. For many producers, 2013 will be a crunch year and one that could decide their future.

## **Will Europe come to the rescue?**

High production costs and the impact of the partial ban on sow stalls which came into effect from January 1st, appears to be impacting pork production in the EU. "European Union pigmeat production was down 2 percent in 2012 compared with the year before, with the drop being most evident in the second half of the year - down 4 percent," notes a British Pig Executive (BPEX) report. "In December, European Union pigmeat production was down 8 percent year on year. And forecasts for this year indicate a further 3 percent decline, with significant drops in the second half of the year." Last year there were some significant falls in production from the important pig-producing member countries, according to

CONTINUED ON PAGE 16

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## Industry Viewpoint *Continued*

BPEX. Output in Denmark was down 7 percent on 2011, as the Danes exported more weaners.

European Union pig production is going to fall by more than was previously expected, if forecasts by member countries prove accurate. Eurostat is predicting a sharp fall in production in the third and fourth quarters of 2013. In quarter three this year, data from member countries predicts slaughter pig production down by 6.9 percent, compared to quarter three last year. And in the fourth quarter the fall will be even more pronounced - down 7.2 percent, compared to quarter four last year, Eurostat says. As we have seen before, the eastern European countries are predicted to be down the most, with double-digit third quarter reductions for Poland, Czech Republic and Hungary. Polish pig numbers have declined by a massive 40% over the last six years. "Low production efficiency, lack of vertical integration and inefficient farm structure consisting mostly of small-to-medium sized operations are the catalysts for the historical drop in the national swine herd," comments a USDA report on the industry.

BPEX predicts that this reduction in supply will impact pig prices from the third quarter onwards. Bearing in

mind that in 2012 there were over 13 million sows, producing 258 million market hogs, if the predicted reduction in production materialises, it will have a significant effect of world prices. While the EU market is not accessible to Canadian processors, exports from EU countries could drop sharply, opening up opportunities for North American processors in other countries.

### COOL proposals met with dismay

The long-running saga of US Mandatory Country of Origin Labelling (COOL), took a turn for the worse in March, as USDA's Agricultural Marketing Service (AMS) proposed changes that were met with dismay on both sides of the border. It proposed that the origin designation include information about where each of the production steps (born, raised and slaughtered) occurred. The proposal would also eliminate the allowance for commingling of muscle cuts. Currently, if an animal is born, raised, and slaughtered in the United States, it is labelled "Product of the US". The new rule would require the label to read "Born, Raised and Slaughtered in the US". Secretary of Agriculture Tom Vilsack said, "USDA expects that these changes will improve the overall operation of the program and also bring the current mandatory COOL requirements into compliance with US international trade obligations."

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**"Should the US not comply with its WTO obligations, retaliation will be inevitable"**

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The proposal met with disbelief and anger among pork industry players. The American Meat Institute (AMI) said, "Only the government could take a costly, cumbersome rule like mandatory country-of-origin labelling and make it worse even as it claims to fix it."

"Far from eliminating MCOOL, USDA has in my opinion very likely made

it more onerous," commented US economist Steve Meyer.

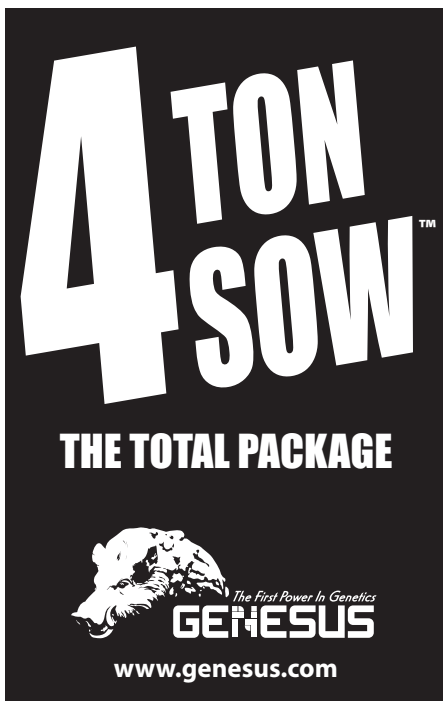
The Canadian government said, "The proposed changes will increase the discrimination against exports of cattle and hogs from Canada and increase damages to the Canadian industry. Our government will consider all options, including retaliatory measures, should the United States not achieve compliance by May 23, 2013 as mandated by the WTO."

"The USDA knows that the proposed regulatory changes are likely to increase the risk that Canada will be in a position to retaliate," said the Canadian Pork Council. "Lost live swine and beef cattle exports since COOL became mandatory in the fall of 2008 exceed \$1 billion annually. Should the US not comply with its WTO obligations, retaliation will be inevitable."

If the changes are implemented as in the proposal, it will create further demands on US processors which could reduce the demand for Canadian pigs still further. As Steve Meyer points out, "the USDA 'fix' is really no fix at all but just a ploy to a) appease protectionist US farm groups and b) set the stage for more negotiations, probably as part of the Trans-Pacific Partnership process. "This issue is far from settled," he concludes.

### US ethanol policy reduces meat consumption

The increase in grain costs as a result of corn-based ethanol blending mandates in the USA has not only led to a tripling of corn prices since 2006, but indirectly to a reduction in meat consumption, argues economist Dr. Tom Elam, President of Indianapolis-based FarmEcon LLC. The debate about ethanol has centred on the increasing cost of feedstuffs, he says, but it also seems to assume that the resulting higher feed costs and food prices are simply passed along to consumers. "The post-2006 record on US meat and poultry consumption reveals that the economic impact of increased ethanol



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production goes far beyond higher feed costs and meat prices,” Dr. Elam explains. “In fact, the effects on value of lost meat and poultry production may be at least as great as feed cost increases, and has caused harm to the US economy.”

Dr. Elam argues that one economic factor - per capita, constant-dollar (real) total consumer spending - is the major demand driver for per capita US total meat and poultry consumption. “Real per capita consumer spending accounts for 88% of the variation in per capita meat and poultry consumption,” he notes. “On average, each \$1,000 real spending increase was associated with a 2.0 pound increase in per capita total meat and poultry consumption.” But he says, this relationship started going awry after 2006 when meat prices started to increase as production costs went up due to higher feed prices. “By 2011, real consumer spending had fully recovered from the 2008-2009 recession,” he points out. “Meat and poultry consumption for 2012 and 2013 would be expected to be modestly above recession levels, and all time record highs.” That obviously has not happened, he says, referring to a drop in retail weight of meat per capita, from approximately \$220 to \$200 between 2006 and 2012.

“In 2007 and 2008, while ethanol consumption and the RFS were at lower levels, and corn production was more sufficient, there were relatively small net losses in total retail value,” Dr. Elam continues. “However, since 2009, the increasing squeeze on corn supplies has resulted in much higher potential value losses for meat and poultry. If corn production had been sufficient to supply both ethanol and potential meat and poultry demand, up to \$24.3 billion of 2012 meat and poultry value could have been created. However, he says, with corn in very short supply, from 2007 to 2013 the average consumer will see a 29% overall meat and poultry price increase, experience an 11% reduction in consumption, and pay 15% more for less of these foods.

## Olymel to phase out sow stalls by 2022

Canada’s second largest pork processor, Olymel, is to phase out sow stalls by 2022 at the latest. It was ironic that this news first emanated from the Humane Society International Canada, which welcomed the move, quoting from a company statement which no-one in the production side of the industry seems to have heard of prior to that point.

Olymel president Rejean Nadeau, writing in the March edition of La Coop Federee’s journal *La cooperateur agricole*, said the company believes the change is “inevitable” and is already underway in numerous countries.

Olymel spokesman Richard Vigneault, said, “This was a culmination of a long time of reflection and thinking about this issue, and the issue of our clients worldwide.” He added, “We wish others will follow this.”

CONTINUED ON PAGE 18

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## Industry Viewpoint *Continued*

The statement said, “Olymel believes that a ban on the use of gestation crates is inevitable in the medium and long term. Canada, along with the US, must follow suit.”

“Numerous world renowned experts are in favour of a ban on gestation crates in order to allow sows to better express natural behaviours; benefit from greater freedom of movement, better

socialization and a higher level of welfare.”

“Our company believes that the entire pork production sector will have to respond positively to the demands of an increasing number of domestic and international clients who favour pork products originating from facilities which do not use crates to house pregnant sows.”

“In 2017, 35% of pigs slaughtered in Quebec will have been born in loose housing systems.”

“2022 represents a realistic target for having 100% of pigs slaughtered in its Quebec and Red Deer, Alberta establishments come from pigs born in loose housing. Olymel strongly believes that Canadian producers need this period of transition and adjustment in order to implement the practice of raising sows in loose housing. However, we will spare no effort to achieve these goals more quickly, and to that end we will actively partner with producers and with our customers.”

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**“A ban on the use of gestation crates is inevitable in the medium and long term”**

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With the new Code of Practice for the Care and Handling of Pigs likely to require sow stalls to be phased out by 2024, the move to group housing is, as Olymel’s statement said, inevitable. The question is, how quickly can producers respond bearing in mind the weak state of the industry. While it could be argued that a 9 or 10-year phase out period is adequate time to make changes to production systems, experience in Europe - where they had 13 years - suggests that it will be a difficult transition, with many producers choosing to go up to the wire and then quit production.

Over the last year or so, announcements by major retailers and food service companies in North America that they wish to purchase pork from production systems without sow stalls, has heralded the end of confinement in gestation. Just prior to the Olymel announcement, Calgary Co-op announced that it would be phasing out pork and eggs from close confinement systems within five years. ■



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# Saskatchewan Pork Symposium

## Sow housing alternatives – Which one is best?

By Bernie Peet

When sow stalls were developed, they were seen as having a number of advantages over traditional group housing systems, especially because they allowed individual feeding and care of sows, notes Dr. Laurie Connor, from the University of Manitoba. They were an aid in maintaining appropriate sow body condition and prevented aggression between sows. And, from the producer's point of view, they allowed for easier management, with more sows per man than group housing.

“So, how did we get to where we are now?” asks Dr. Connor. “It’s a combination of factors, not only public concern about farm animal welfare but now there is also more scientific knowledge about how animals respond to confinement in terms of physiology and behaviour,” she says. There has been a shift in what people perceive about how we produce pork. The general belief, that housing sows for all of gestation in stalls is wrong, feeds back to retailers and processors. This is getting stronger, Dr. Connor believes, so we need to respond if we want to continue in the business of producing food. She looks at the alternative sow housing systems that producers might choose and their advantages and disadvantages.

Long term confinement is limiting behaviourally and sows can't choose their own environment, Dr. Connor points out. “Pigs are social animals and organise themselves in groups,” she says. “They show investigatory, foraging and rooting behaviour.” When housed in stalls, they lose muscle tone and bone strength is reduced. Obviously there are drawbacks to

group systems, she notes, such as mixing leading to aggression to establish a hierarchy, which may cause injuries. Management, needs to be different, perhaps better, otherwise there is the potential for a decrease in productivity, Dr. Connor says.

The goal of alternative group systems should be to maintain the advantages of

stall and group systems, while avoiding the drawbacks. “Key considerations include the type of group - static or dynamic, the space per animal, the overall system layout and the method and timing of introducing animals into groups, in order to minimize fighting and to maximize farrowing rate and litter size,” explains Dr. Connor. Feeding method is particularly important, she says. “Also, some genotypes are more conducive to group housing, but people are the most critical component. There are many components and many combinations which makes the choice of system quite daunting.”

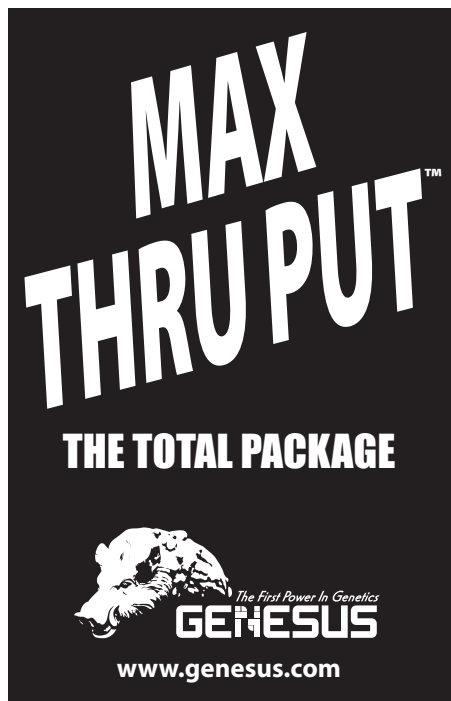
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**“Low ranking sows are more often displaced while feeding, standing and resting”**

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Dr. Connor points out that there are some welfare concerns with group housing, such as aggression at grouping. “Aggression is higher where there is continual mixing as in dynamic groups, or competition for resources such as feed, water or space,” she notes. “There may also be biting or chewing when there is no straw or other diversions. Depending on the feeding system, maintaining adequate body condition can be a challenge, and foot and leg injuries may arise from unsuitable floor surfaces and fighting.”

Access to resources is a common cause of aggression, says Dr. Connor. “Low ranking sows are more often displaced while feeding, standing and resting and are more likely to be



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threatened or bitten by a dominant sow.” This problem can be mitigated by providing sows with enough space so that subordinate sows can avoid more dominant sows without stress. “Dividing the lying area with partitions helps to provide subordinate sows with somewhere to hide and keeping sows in stable social groups helps to minimise problems,” she says.

**Group housing options**

Most likely feeding options for Canadian producers are electronic sow feeding, feeding stalls, trickle feeding or floor feeding, Dr. Connor suggests. “Floor feeding has a lower initial cost, but operating costs may be higher,” she says. “There is more potential for aggression and bullying, although experience in Ontario suggests that very frequent feeding may reduce the problem.” Also, she notes, as feed intake is not controlled, it is necessary to group sows according to size and body condition and it may be necessary to remove some sows from their groups.

**Electronic sow feeding**

Electronic sow feeding usually involves a group size of 50 to 200+ sows with 50-60 sows per feeder. “It can be used

with slatted or concrete floors without bedding, although the provision of some sort of foraging material is considered better because it avoids aggression around feeders due to lack of gut fill,” explains Dr. Connor. “The placement of feeders is also very important and the exit should be as far as possible from the entry to reduce the incidence of sows revisiting the feeder.” The electronic feeder station protects the animal while feeding and the correct amount for each sow can be provided. It is often possible to spray mark animals for various purposes, such as return dates, and this provides a lot

**“Aggression is minimal and is mainly on the first day after mixing sows, which is 2-3 days after insemination”**

of flexibility. “The big advantage of ESF from a management viewpoint is that people are not associated with feed, so they can walk through the sows without them getting agitated,” Dr. Connor notes. Potential disadvantages include aggression at the entrance to the feeder. It is more difficult to monitor and check individuals compared to stalls, but it just requires

CONTINUED ON PAGE 22

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**Table 1: Evaluation of an ESF system on a 1000-sow farm in Manitoba**

	First 6 mos (2009)	Next 12 mos (2010)	Last 9 mos (2011)	CDN Median*
Av. female inventory	654.7	964.4	1025.1	471
% repeat services	2.7%	4.3%	2.4%	7.3
Percent sows bred by 7 days	83.0%	94.2%	96.2%	---
Farrowing rate (%)	95.2%	93.5%	95.5%	85.8 %
Average parity farrowed	1.0	2.0	3.2	--
Litters / mated female/year	2.66	2.47	2.54	
Av. live pigs born per litter	12.20	13.19	13.70	11.60
Pre -weaning mortality (%)	6.5%	5.4%	7.1%	11.94
Av. weaning age (d)	27.3	25.7	26.2	20.60
Pigs weaned per female weaned	11.3	12.4	12.8	10.3
Pigs weaned per mated female/ year	26.95	30.72	32.46	24.57
Replacement rate (%)	-----	42.51%	36.91%	--
Cull rate (%)	12.3%	26.5%	30.41%	39.38
Death Rate (%)	2.5%	2.0%	1.7%	7.50

Characteristics highlighted are those which are typically impacted by a stress response

a different way of doing things, she believes. “You need to have a system that’s free of problems and have good support because there is no backup for feeding,” she stresses. “Also, some sows may be untrainable or take a long time to train.”

An evaluation of a new 1000-sow barn in Manitoba has shown that outstanding performance is possible with ESF (Table 1). While this was a new herd, so that performance clearly improves over the first few parities, the herd data shows excellent farrowing rate, litter size and pigs weaned per sow per year over the start-up period. Death rate is particularly low, which is an indication of both the system and quality of management. “Aggression is minimal and is mainly on the first day after mixing sows, which is 2-3 days after insemination,” Dr. Connor says. “The main contributors to success are the width of the slatted alleyway between the lying areas, partitioning in the resting areas, ample room around the feeder entrances and the general flow of animals in one direction.” Also, she points out, gilts and parity 1 sows are segregated and the standard of stockmanship is extremely high.

**Individual feeding stalls**

Individual feeding stalls may feature automatic or manual lock-in and are used with static groups of sows. Group size may be up to 70 and the pens should ideally have straw bedding, although slatted systems are also widely used. It is necessary to top up feeding manually if the base level is provided automatically to ensure sows are fed the correct amount according to stage of pregnancy or body condition. “This system provides sows with the opportunity to interact and socialize in a communal area, or remain alone in a stall if they wish,” Dr. Connor explains. “From the producer’s viewpoint, it allows individual feeding and can be used for both the breeding and gestation periods. Most importantly, it allows individual inspection and monitoring of sows.”

Feeding stalls with a ‘head and shoulders’ barrier are another option and may involve providing feed in a single drop or using a slow delivery method called ‘trickle’ or ‘bio-fix’ feeding. “Giving feed in a single drop means that faster-eating sows will displace those that eat slower,” notes Dr. Connor. “This may increase aggression although twice per day feeding can help in this respect.” With trickle feeding, the aim is to match the delivery of the feed to the eating rate of the slowest eating sows, so that sows remain at their feeding position. Therefore no feed accumulates and there is no advantage for a more dominant sow to move places. This system is generally used with small, static groups of sows.

**Floor feeding**

Typically, floor feeding systems involve static groups of sows in pens with part solid, part slatted floors. “There is the potential for a high level of aggression due to the

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Free access stalls are popular in Denmark, although they are a relatively expensive option

competition for feed,” comments Dr. Connor. “Also, it is not possible to feed individually, so management of body condition is a challenge.” The system requires a high level of management to ensure that sows are grouped according to age and body condition. When converting from sow stalls it is necessary to include housing for animals that don’t fit into the system or are disadvantaged.

**Deciding the best system for you**

There is currently considerable research going on into group sow housing in Canada and a number of extension and advisory initiatives are planned to aid producers to identify and build the most appropriate system. Currently two phases are being funded. Phase 1 deals with options and considerations, providing information tools for selecting the best option, while Phase 2 will provide engineering design scenarios including an computer workbook, design templates and design examples. Also a series of workshops are planned. Further phases will include on-farm conversions of existing gestation barns and addressing scientific and knowledge gaps identified in earlier phase of the project. ■

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Dr. John Patience, speaking at the Saskatchewan Pork Symposium

## Nutritional management of grow-finish pigs: energy and feed efficiency

By Bernie Peet

Feed efficiency is a dangerous target when used in isolation, says Dr. John Patience, from the Department of Animal Science at Iowa State University. It is influenced by many feed composition factors including energy, amino acid concentration and nutrient balance in addition to feed processing factors and which additives are used. It is also influenced by environmental factors such as temperature, pig health, access to feed and the pig itself, in terms of growth rate, protein:lipid ratio, start and finish weights and mortality. What really matters is caloric efficiency, says Dr. Patience. AgriStats performance records for 30 million grow-finish hogs during 2011 show that while FCE for Canadian pigs was 2.97 as compared to 2.72 for US pigs, caloric efficiency was exactly the same at 9.2 Mcal/kg gain. FCE is different due to the higher energy concentration in corn, but Canadian pigs grow faster, mainly due to their better health status. Also, feed cost, in terms of cost per Mcal energy, was lower in Canada, indicating that the critical issue in this comparison is the cost of calories, says Dr. Patience. He discusses why feed efficiency should always be a secondary driver for management decisions in the grow-finish herd.

“The cost per Mcal went up from 2.7 cents to 11.8 cents comparing 2005 with 2012 so we need to think about the cost of energy differently,” says Dr. Patience. “We also need to consider the relative cost of energy in different ingredients, for example the cost of energy from DDGS is far higher, at 14.5 cents/Mcal, than for corn at 11.8 cents. Therefore we need to know and monitor the cost of energy in the diet continually.

“One feed conversion point is now worth 47 cents per pig compared with 31 cents a few years ago, so we need to

consider the value of FCE differently,” Dr. Patience continues. “Over 50% of the cost of getting a pig to market is the energy component. And it’s something producers have control over, so we need to pay more attention to it.”

Energy level in the diet may have some performance implications. For example, research shows that increasing the ME content of the diet increases backfat thickness but has no effect of loin depth. Increasing the energy in the diet will increase growth rate, but only up to a point where it can’t be increased any more. “Where is your farm?” asked Dr. Patience. “If energy is expensive, can we reduce energy level in the diet and still maintain growth or if we reduce energy intake, will this also reduce growth?” Unless energy intake is lowered excessively, carcass lean should not be impaired, but it can be reduced as energy intake declines if the decline is excessive, or if amino acid balance is not appropriately adjusted, he concludes. He notes that increasing the energy content of the diet will always improve feed efficiency.

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**“Reducing maintenance energy costs increases the amount of energy that is directed towards lean gain”**

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About one-third of the energy that the pig eats goes to maintenance, 20% is used in protein deposition and 46% in fat gain, Dr Patience notes. “To maximize efficiency, we must reduce the energy spent for maintenance,” he suggests. “This can be done by optimizing thermal comfort, minimizing social stressors and maintaining the highest possible health standards because fighting disease uses up energy.” Maximizing growth rate by various means reduces the time spent in the barn, which results in fewer days of maintenance energy costs, he adds. Reducing maintenance energy costs increases the amount of energy that is directed towards lean gain.

The pigs' energy intake impacts how comfortable they feel in the barn, notes Dr. Patience. "Unthrifty pigs eat less than their healthy contemporaries and, because of this, they are chilled at a temperature that is perfectly comfortable for healthy pigs," he explains. "Therefore, unthrifty pigs need to be kept in warmer and less drafty conditions, for example by providing localized heating or covering their lying area."

Dr. Patience believes that quality control in the pork production process should focus on outcomes such as growth rate, barn throughput and carcass quality and less on inputs such as diet composition. Having said that, he stresses that the feed production components should be checked to ensure that feed delivered to the pigs meets their requirements for daily nutrient intake. "We need to confirm the composition of incoming ingredients in terms of both desirable and undesirable constituents," he explains. "We also need to ensure that feed mixing is achieving a uniform mixture according to the formulation."



Feeder space per pig in the finishing barn can have a significant impact on growth rate

Feeder space allowance can have an impact on feed intake and growth, notes Dr. Patience. In a trial comparing 4.1, 4.9 and 5.7 cm space per pig for finishing pigs, final body weights were 121.5, 122.2 and 122.9 respectively. "Along with final body weight being decreased, daily gain was significantly reduced with decreasing feeder space," comments Dr. Patience. "As pigs grow and their shoulder width increases, the effective feeding space per pig decreases, thus impacting gain." There

was also a trend for poorer feed efficiency as feeder space was reduced. "Although there was no difference in apparent daily feed intake, this could have been due to pigs having their mouths full of feed and backing up from the feeder and thus not utilizing the feed that supposedly disappeared," he suggests. Because of the impact of feeder space on growth, Dr. Patience believes that feeder space is much more critical economically when the cost of feed is high.

Dr. Patience concludes by stressing the need to pay more attention to the cost of energy in pig diets and to optimizing the efficiency of its use. "We must pay more attention to dietary energy because it is by far the most costly specification to meet in practical diets," he says. "We must also know the energy intake for our herds because herds differ widely in their daily energy intake and thus in their response to changes in dietary energy content." ■



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# Top 10 developments in swine nutrition, 1991 to 2012

By Bernie Peet

In 1975, one sow in the USA produced 720kg of pork per year, but by 2009 it was 1816kg per sow, points out Dr. John Patience, from the Department of Animal Science at Iowa State University. In 2009, the US produced 10.4 billion kilos of pork from about 5.8 million sows. “Using 1975 productivity, it would require 14.5 million sows, an increase of 8.7 million, to produce 2009 quantities of pork,” he says. “At an average sow feed cost of \$336/sow/year, the added cost of these sows, just for feed would be \$2.95 billion per year, adding \$26 to the cost of each pig sold.” The industry has been very focussed on doing its job well. Technology has changed our world. Improvements in nutrition have made a major contribution to higher output per sows and improved efficiency. Dr. Patience lists the 10 top developments that have had the biggest impact over the last 20 years.

1. Transitioning from ingredient-based formulation to nutrient and energy-based formulation. “We are supplying nutrients to the pig, not corn or soybean meal,” notes Dr. Patience. “This has made a huge difference to the industry!”
2. Transitioning from empirical definition of requirements to factorial definition of requirements, leading to growth modelling. “The factorial approach says that the pig requires lysine for maintenance and lean growth, and calculates requirements based on assumptions about genetic capability, feed intake etc.,” explains Dr. Patience. “The new NRC model takes into account many variables when making recommendations.
3. Formulating diets on the basis of amino acids rather than protein, then later on the basis of Apparent Ileal Digestibility (AID) and now Standard Ileal Digestible (SID) lysine. This has made a huge difference as it is much more accurate. “For example, if we take the value for protein, total lysine and SID lysine in wheat as a baseline with the value 100, the comparative value of crude protein in corn would be 61, but the value for SID lysine would be 71. This illustrates how much the value is underestimated by using crude protein,” says Dr. Patience. “Similarly, for protein sources, if we take soybean meal as having values of 100, canola meal has a value of 75 for crude protein, but only 60 for SID lysine, indicating that formulating on the basis of crude protein significantly overestimates its value to the pig.”
4. The adoption of more sophisticated energy systems, which is currently Net Energy (NE). Traditionally, Digestible Energy (DE) or Metabolizable Energy (ME) has been used in formulation. DE is the gross energy in the ingredient less the energy in the faeces and is about 85% of the GE. ME is the DE less the energy lost in the urine or gases emitted from the pig, which is about 82% of GE. NE accounts for the energy lost by the pig as heat and is only about 56% of GE. “As we move towards NE we are removing most of the variation related to the ingredient and the variations after that are related to the pig and how it uses that energy,” comments Dr. Patience. “Ideally we need to know how much energy goes for lean growth and how much goes into fat deposition, but often we don’t know that.”
5. Adoption of the phytase enzyme and formulation of diets on the basis of available phosphorus.
6. The release of the 2012 NRC requirements, with a stronger emphasis on factorial as opposed to empirical approach to defining nutrient requirements. “This publication is now 400+ pages and has grown hugely, with a greatly expanded database of ingredient information,” points out Dr. Patience. “It attempts to make ingredient nutrient content more robust and places a greater emphasis on net energy and effective NE. Also, it tells you how many sources of data there are for each ingredient, so you can see how much validity to put on the data.” In addition, he notes, it has an expanded emphasis on modelling to define nutrient requirements. A greatly expanded explanation of the scientific and philosophical basis of the recommendations presented in the book, helps you determine whether the approach is right for your farm.
7. The widespread availability of synthetic amino acids: lysine, methionine, threonine and tryptophan. “The use of synthetic amino acids reduces the quantity of soybean meal and other protein sources in the diet,” explains Dr. Patience. “It has been estimated that the widespread adoption of synthetic amino acids has reduced the quantity of land required to feed the US pig herd by 14 - 15%.”
8. Marker-assisted technology and hyper-prolific lines. “This has led to advances in productivity that could only have occurred if nutritional management was up to the task,” believes Dr. Patience. “Nutrition has kept up with genetics, and we have been able to feed a sow that is producing 30 PSY and also feed for the pig’s better growth potential.”
9. Adoption of increasingly sophisticated record keeping systems, which have driven the decision making process. “This has had a profound influence on the industry. Producers ask a lot more questions when they have better data,” says Dr. Patience. “They ask: If I’m below average or below target, what is going on nutritionally?”
10. The increasingly rapid change in emphasis from maximizing productivity to maximizing financial returns. A good example is a big focus on barn throughput while meeting weight targets.

“How did we ever operate without using these developments?” asked Dr. Patience. “Producers have adopted most of these, although the NE system is not being used as much as it should. Least cost formulation is only one step along the way, we need to know the pig’s response so we can optimise its nutrient intake based on performance.” ■



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# Manitoba Swine Seminar

## Rising demand for Canadian grain, says Cargill boss

By Myron Love

Cargill Limited President Len Penner paints a positive picture of a growing global demand for Canadian agricultural products, but also cautioned Manitoba hog producers attending the 2013 Manitoba Swine Seminar - held on January 30-31 in Winnipeg - that there are challenges ahead. "Success is going to require change," he said.

Cargill is one of Canada's largest producers and marketers of food and agricultural products. The company employs 142,000 people in 65 countries. In Canada, Penner reported, Cargill employs 8,400 and has annual sales of \$8 billion.

"Export is a key driver in Canada's economy," Penner said. "Half of Canadian agricultural products are exported."

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**"People want producers to grow food with as little harm to the environment as possible"**

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Penner spoke first about the rising demand worldwide for Canadian grains and record commodity prices for grain farmers. He reported that worldwide grain stocks are low, that producers are scrambling to stay ahead of population growth and suggested that grain prices are likely to remain high. "The world is not in danger of running out of food," he said, "but the market is volatile. The drop in corn production in the United States last year was the biggest contributor to production shock and commodity price increases." And, unless

there is a bumper corn crop this year, he suggested, feed costs will likely remain high for livestock producers.

"There are complex challenges ahead for agricultural producers in the areas of food security, food safety and sustainability," Penner noted. Food security is a worldwide issue - to have adequate nutrition available at reasonable prices.

As to food safety, Penner said, that means that consumers have to have confidence in the food production system.

"And there is a growing demand for sustainability," he added. "People want producers to grow food with as little harm to the environment as possible. We see it in Manitoba on the livestock side. Consumers see value in eating products that do no harm to the environment. And animal welfare has become a hot topic for consumers."

To meet these challenges, Penner suggested that producers adopt a collaborative approach. He recommended that producers get together and hire outside consultants to analyze their industry and identify real and potential issues. Once issues are identified, he suggested that all stakeholders in the value chain - from the producer to the retailer - should be involved in responding to those concerns. "Agriculture is too complex for any one group to figure out for themselves sustainable solutions," he said. "It has to be a collaborative effort."

Penner praised Manitoba's pork producers for the ability they have shown to adapt to change over the years. "I expect that Manitoba producers will continue to adapt successfully to new conditions," he said. ■



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# Manitoba to roll out PigTrace by year's end

By Myron Love



Jeff Clark, manager of PigTrace Canada

The Manitoba Pork Council officially launched the Manitoba edition of the PigTrace Canada initiative at the end of January and are working all-out to ensure all the province's hog producers are signed on by the "coming into effect" date next January.

"It's a matter of health and safety," Jeff Clark, manager of PigTrace Canada, told producers attending the 2013 Manitoba Swine Seminar in Winnipeg on

January 30. "If a producer is able to prove any penicillin residue or a broken needle in a carcass isn't from his farm, he can reduce any financial losses and return to the market more quickly." He reported that orders for the traceability

tags have been slow since they were made available at the beginning of October.

The Canadian Pork Council first introduced PigTrace Canada (PorTrace Canada), its National Traceability Program, in 2002 in response to increasing animal movement worldwide with the resulting increased risk of the spread of domestic animal disease. The aim of the program is to improve Canada's response to potential disease and food safety emergencies.

"A faster and more efficient response by animal health officials to disease and food safety programs improves the industry's recovery time and return to normal trade following a crisis," Clark pointed out. There was also pressure coming from major markets such as Japan and Korea. Traceability thus has trade benefits.

Last July, Clark reported, the Federal Government published preliminary new swine regulations. "There were many submissions in response which helped change some regulations for the better," he said.

CONTINUED ON PAGE 30

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He noted that the CPC's new PigTrace database and reporting tools (pigtrace.ca) are being released nationally. "Our goal is to get the program rolled out as soon as possible," Clark said.

He outlined the reporting requirements – locations of origin and destination, date and time of departures, license plates, animal quantities being shipped and animal IDs – to be reported within seven days of arrival or departure. He explained there are three methods of reporting – by direct entry on-line, through a file upload or system integration. He also showed his audience a mobile device that the Manitoba Pork Council is making available to all producers which will make it easier for them to connect to the Pigtrace database by secure log-in. The device can store data when the producer is out of network range and transmit the data when reconnected.

Clark also demonstrated how to fill in a PigTrace manifest and showed off MPC's new generic brochure and quick reference guide, part of a PigTrace welcome kit for producers.

Ear tags can be ordered on-line. Clark works out of the Manitoba Pork Council offices. The MPC phone number is 204 237-7447. ■

## Batch production requires discipline

**All in - all out is a cornerstone of pig production and disease control. However, many producers that claim to follow this practice actually operate variations of continuous flow, says British veterinary consultant Dr. John Carr. True batch production, which involves farrowing every 2, 3 or 4 weeks, means ensuring that the same things happen to each group of pigs. Unlike conventional weekly farrowing where sows that are 'out of line' drop into another weekly group, groups of sows in batch production have to be farrowed within a short period. This requires disciplined management to achieve. Dr. Carr explains some of the key aspects of batch production necessary for success.**

The number of sows per batch is determined by the number of farrowing places available. "The number of farrowing places per batch is the only stable feature within a pig flow model that is unaffected by season," Dr. Carr explains. "The space required to finish pigs and the number of sows to breed increases in the summer."

"For example, you can describe the farm by a potentially variable parameter, for example a 1000 sow unit," he continues. "As the farrowing rate decreases over summer, this means that fewer sows will farrow in the autumn and fewer pigs will be sold in the spring." The alternative, he says, is to describe the farm based on a fixed parameter, a "42 sows a week per batch farm". This farm will produce the same kilos of output per batch per week, but the herd size will vary from 1020 to 963 over the different seasons.

The weaning age (days) and batch length (weeks) determines the number of batch farrowing places needed, Dr. Carr notes. "For example, a one-week batch weaning of pigs at 27 days of age requires 5 farrowing rooms per batch," he says. "Each batch will have the same number of batch farrowing places. This is a key component missed on so many farms around the world."

### Calculating the batch size

Calculation of the minimum batch breeding target starts in the finishing herd, Dr. Carr explains. "The minimum number of pigs to be weaned per batch = area of the

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unobstructed finishing floor ÷ space required per finishing pig) ÷ finishing rate,” he says. “The finishing rate is the percent of animals remaining after post-weaning mortality and breeding gilt removal is accounted for.”

“The number of batch farrowing places required is the minimum number of pigs weaned per batch divided by the number of pigs weaned per batch farrowing place,” he points out. “From that we can calculate the batch breeding target, which is the number of batch farrowing places divided by the farrowing rate.”

**Example:** A farm within Canada on a fully slatted floor (Canadian Animal Care at Work 2006):

Pigs sold at 110 kg live-weight; 924 m<sup>2</sup> of unobstructed finishing floor is available per batch of pigs; 0.81 m<sup>2</sup> is the minimum space required per finishing pig; 95% is the current finishing rate; 12 pigs are weaned per

batch farrowing place; 85% has been the average farrowing rate over the last 6 months. (Note roundup breeding female requirements and that we must breed and farrow whole sows).

In this case the batch breeding target will be:

$$\frac{(((924\text{m}^2 \div 0.81\text{m}^2) \div 0.95) \div 12) \div 0.85}{1} = 118$$

## Management of batch production - 10 key points

### 1. Determining the first day of the batch

“It is vital that the breeding batch of females is actually the batch going to farrow,” stresses Dr. Carr. “To ensure that these groups of individuals are within the same batch, the start of the batch records must be the day after weaning. Thus if the farm weans on a Monday the first day of the batch is a Tuesday.”

### 2. Achieving consistent batch size

Achieving the target number of sows farrowing in a batch has traditionally been done by calculating the breeding target using the farm’s historical farrowing rate. However, says Dr. Carr, some variation is predictable, such as that associated with parity, season or wean-to-oestrus interval, and then it must be accounted for when setting the batch target.

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**“Breed all possible sows, including culls, during the breeding week then review the number of females that have been mated”**

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“Initially, to stabilize the batch, manipulate the culling program,” he advises. “If there is not a replacement gilt available to take the place of a sow intended for culling, then unless the sow’s welfare is compromised she should

be retained and re-bred.” He suggests culling only when sows are confirmed in pig. “Breed all possible sows, including culls, during the breeding week then review the number of females that have been mated,” he says. “If we retain the sow until the 28-day pregnancy check, we ensure that sufficient sows are pregnant before any culling takes place. If sufficient sows are pregnant, do not pregnancy-check the sow marked for culling, merely send her to market.” A possible further advantage of these surplus pregnant cull sows is that through pharmacological abortion, they may be used to fill holes in the future breeding program, Dr. Carr adds.

### 3. Gilt pool management

Long-term stabilization of the pig flow is only achieved by manipulation of gilt numbers, Dr. Carr believes. “The gilt requirement should be calculated when the batch is around 10 weeks of gestation,” he suggests. “The 10-week pregnant sows should be critically examined and, if there is likelihood that an individual will be culled, a gilt should be selected or delivered to the farm. This allows 9-10 weeks for the farm to provide introduction and acclimatization for the gilt before she joins the batch breeding group.

### 4. Disciplines must be followed

Staff need to understand the consequences of not meeting targets, Dr. Carr says. “Breeding targets must be reached within 7 days of weaning because, if this fails, then the age of the pigs at weaning becomes more critical and it may also be necessary to cull sows that fall outside of the program,” he points out. “Batching encourages farms to become teams – the staff start to realize the impact of breeding on over- and under-stocking.”

### 5. Organization of time

Depending on the batching program selected, it is possible to have variable staffing levels on the farm, Dr. Carr



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notes. For example, with 3-week weaning it is possible to have one week to breed, one week to farrow and one week to wean. "This can allow a more socially-acceptable family farming method," he says. "The whole farm works during farrowing, possibly working in shifts, but staff numbers are reduced when weaning."

**"Enhancing the newly weaned pig's feed intake in the first week post-weaning is a critical component to successful finishing"**

With the larger number of weaned pigs, weaning on Monday provides the best stockmanship to these weaned pigs.

"Enhancing the newly weaned pig's feed intake in the first week post-weaning is a critical component to successful finishing," Dr. Carr comments. The peak farrowing day moves to a Tuesday so that staff have the time to manage the piglet's first few days of life. He says that the added advantages of weaning on Monday are that with breeding occurring on Friday and Saturday, semen would be freshly delivered and this should further enhance litter size.

**6. Advantages of scale**

As with many businesses, as the farm group enlarges, there is an advantage of scale. For example, Dr. Carr says, with a fixed farrowing rate of 82%, as the group increases, relatively less sows are required to achieve the breeding target.

CONTINUED ON PAGE 34

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Similarly when you are selecting breeding gilts, batching allows a bigger group that enhances genetic improvement as you are selecting the best of a bigger group.

### 7. Advantages of health

If this approach is followed, it removes a major source of variation on farms, namely the chronic over- and under-stocking of finishing buildings with the associated vices and disease challenges, Dr. Carr believes. "As many pig diseases are age dependent, the gap in time between groups of pigs also offers the opportunity to reduce the impact of these diseases on the unit. The batch allows for more cleaning programs to be followed," he says.

"One advantage of enlarged batches has been to increase the number of small, compromised pigs so that these can be streamed in a different flow from the main group," he continues. "This practice has reduced medicine use by 70% on many farms. Batch farrowing is essential on farms that do not use antibiotics."

### 8. Setting targets, goals, real time assessment of different farms and budgets

Utilizing the batch farrowing place as a fixed parameter on the farm allows farms to be compared through a region and

globally, as this output is not dependent on weaning age or number of sows, suggests Dr. Carr. "The batch farrowing system allows easy prediction of absolute requirements for each batch," he explains. "Examples would include monitoring feed or medicine utilization. Many farms have now changed their whole recording system around the batch of pigs, ignoring the month, which is a variable time period."

### 9. Farm expansion

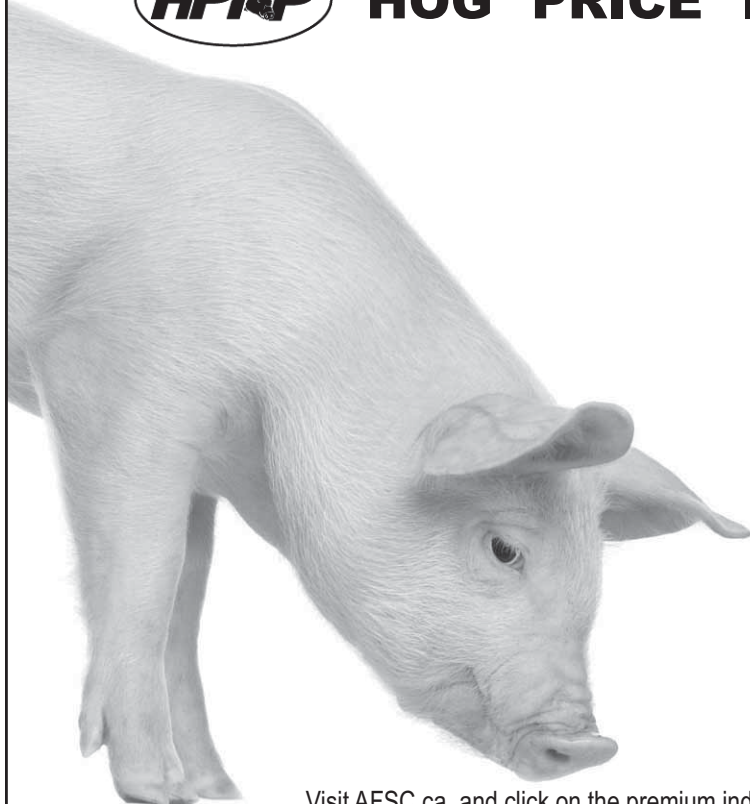
Batching allows farms to easily expand more easily, Dr. Carr points out. Using a farm currently batch farrowing 10 sows per week with 20-day weaning as an example, he says: "If the farm adopts a 4-week batch program, this results in a batch of 40 sows with 20-day weaning," he notes. "The farm can then double in size to a 40 sow, 2-week batch with 20-day weaning. Then if the farm doubles again, it would have 40 sows using a 1-week batch system with 20 day weaning."

### 10. Aim to make the farm boring

"The whole basis of batching is to make the same events happen batch after batch," Dr Carr concludes. "The aim is to make the farm as boring as possible with no over-stocking or under-stocking." ■



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# Quick response to welfare issues essential

By Myron Love



Terry Fleck, Executive Director at the Center for Food Integrity

Last December, an undercover videographer filmed scenes of seemingly needless cruelty in a Manitoba hog barn. The media seems to have presented the story fairly – thanks to the quick response from the Center for Food Integrity based in Gladstone, Missouri.

The Center quickly put together an Animal Care Review Panel, made up of a University of Manitoba animal sciences professor, an Ontario Veterinary College professor and a research scientist, who noted that while the

images may have been disturbing to watch, the method of euthanizing the piglets was a humane way to do it.

“In situations like this, anywhere in North America, we assemble an animal care review panel and try to respond within 48 hours with our own report,” said Terry Fleck, the CFI’s executive director, in an address to hog producers attending the Manitoba Swine Seminar on January 31, in Winnipeg.

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## “43% of those polled believe that commercial farms put profit above animal care”

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“Historically,” he continued, “when confronted by allegations such as these – or by pressure to change, the industry has responded by attacking the attackers and using science alone

to justify current practices. Too frequently, the industry confuses scientific verification with ethical justification. Not only are these approaches ineffective in building stakeholder trust and support, they also increase suspicion and skepticism that the food industry is worthy of trust.”

People want to do the ethical thing, Fleck noted. He cited statistics reporting that 44% of people polled were strongly concerned about the humane treatment of animals and that 43% of those polled believe that commercial farms put profit above animal care.

“The challenge that producers face is how to stem the erosion of public trust in our highly industrialized food system” Fleck said. “You can’t afford to lose your social license. Because the consumer defines you, your activities have to be in line with public expectations. If not, you may lose the options of self-regulation at the cost of less flexibility and higher costs.”

Fleck emphasized the need for producers to be transparent in their operations. He also urged producers to talk to consumers at every opportunity about why they do what they do. “You have a great story to tell,” he said, “so tell it. Tell your friends and neighbours and the people you do business with. Show the public that you share their values.”

Fleck observed that agriculture tends to be science-driven. “Science tells us if we can do something,” he said. “But society tells us if we should do it. We can increase support for today’s food system practices if we present information that effectively communicates that today’s agricultural practices are aligned with consumers’ values. We need to help people understand that what we are doing is already better aligned with their expectations than they may have thought.” ■

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# “Ag in the classroom” raises awareness in Manitoba schools

By Myron Love

**As more and more Canadians have left the farm over the past several decades, the problem of “agricultural illiteracy” has grown significantly. In today’s society, most urban dwellers no longer have any relatives still on the farm and agriculture is far removed from their thoughts and daily lives. That “agricultural illiteracy” is a condition that Manitoba’s “Ag in the Classroom” program is striving to reverse in the province.**



Johanne Ross, Executive Director of Agriculture in the Classroom

Although the program has been around in Manitoba since the early 1980s, it is only in the last ten years, under the dynamic leadership of Johanne Ross, that Ag in the Classroom has begun to have a real impact here. Speaking at the 2013 Manitoba Swine Seminar on January 30, in Winnipeg, Ross provided hog producers in attendance with an introduction to the initiative and an overview of some of the programs.

When Ross assumed the role of executive director of Agriculture in the Classroom – Manitoba in 2000, hers was a half time position. Now, Ross is full time and is supported by a staff of five and numerous volunteers.

“For most young people, agriculture is not sexy,” she said. “Our goal is to get up close and personal with kids of all ages and show them how exciting farming can be. While agriculture is not taught in the schools, the subject is easy to integrate into all areas of the school curriculum.”

“We try to keep our programs accurate, balanced and current.” So, for example, Ag in the Classroom staff worked with the Manitoba Pork Council (who, Ross noted, are huge supporters of the program) to develop the “Pork Challenge” for Manitoba Grade 10 students. This challenges Grade 10 students to think about where our food comes from, how its production impacts the environment, and how it affects our daily lives.

Then there is the “Amazing Agricultural Adventure” which Ag in the Classroom puts on three times a year for Grade 4 and 5 students. This is held at Richardson’s Kelburn Farm and the University of Manitoba’s Faculty of Agricultural and Food Sciences’ at the Brian D. Campbell Centre at the faculty’s Glenlea Research Station. Ross explained that this exposes up to 150 students a day over two days to the full agricultural spectrum. There are 16 stations the students visit, including two live hog stations.

“The ‘Amazing Agricultural Adventure’ is a fantastic way to get in front of live hogs and talk to workers,” Ross said. “They learn about bio-security and what’s involved in taking care of animals. But we have to be honest with the students. We are not in the business of raising pets. But we do respect and take care of our animals.”

One of Ag in the Classroom’s largest programs is its “Made in Manitoba” breakfast program. It started in Minnedosa (Ross’s hometown) where one school approached Ross with the idea. Now Ag in the Classroom puts on more than 50 breakfasts a year for students throughout Manitoba and some in Saskatchewan as well. “All the ingredients in the breakfast are Manitoba-grown,” Ross said. “I think we make the best pork sausages in the world in Manitoba. But the most important part of the exercise is to put faces behind the food. We recruit producer volunteers from the area to serve the breakfast and interact with the students. We are always looking for more volunteers. We also leave behind resource material for the teachers.”

Of course, getting teachers involved is vital. To that end, Ag in the Classroom runs three workshops a year - at the Food Discovery Centre in Portage La Prairie - for teachers. Ross reported that 30 teachers are accepted for each session and that there is a growing waiting list.

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**“I think we make the best pork sausages in the world in Manitoba”**

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Among completed Ag in the Classroom programs were Agricultural Literacy Week - March 3-10 - aimed at Grade 3-5 students - which the Manitoba organization launched two years ago and is now a national program - and “Discover Agriculture in the City” at the Forks in Winnipeg in mid-March.

Ross challenged her audience to pitch in and help Ag in the Classroom get the word out about agriculture as a career option. “You are the faces of the industry,” she said. “You need to be out there telling your stories about how challenging and exciting it is to work in agriculture. If you know any teachers, tell them about Ag in the School. And never turn down an opportunity to talk to young people about agriculture.” ■

## Chinese industry transforming, but profits elusive

China is described as “the pork powerhouse of the world” by Ron Lane, Business Manager for Asia with Genesus Swine Genetics. With over 51 million, or 51% of the world’s sows, what happens in the Chinese industry can have a large impact on other industries around the world. The traditional backyard production that China was so well known for is being replaced by new high-tech farms using modern genetics, capable of achieving much higher productivity. Ron Lane examines the structure of the Chinese pork industry, the trends that are occurring and what is driving them.

### Background

China has the world’s largest number of pigs, including about 51.30 million sows and around 446.79 million pigs on-farm inventory as to the end of January, 2013. The 446.79 million head for January is down 0.1 % from last year while the January sow inventory of 51.30 million is up 4.00 % from last year (year over year). The monthly change in sow inventory in China can change more than Canada’s total sow inventory. For 2012, the expected annual total slaughter was 714.27 million market pigs, with most being sold at around 100 kg live weight.

Traditionally, the raising of pigs was done on 3 types of farms. The backyard farm would have one or two sows or a few pigs to eat leftover garden or crop waste and would be slaughtered around Spring Festival (Lunar New Year in late January or early February). The second type of farms



Traditional Tibetan pigs

were labelled specialized pig households (SPH) and would have 10 to 20 sows, farrow to finish, or raise about 20 to 50 market pigs each time. The third is the newer, faster growing commercial farms that we know and operate in Canada. Since 2001, large specialized and/or commercial farms have been rapidly increasing in market pig production in contrast

CONTINUED ON PAGE 38

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Backyard pigs in China

to the formerly largest production base from the backyard farms (backyard production has dropped from 74% of total hog production in 2001 down to 37% in 2011). According to the Ministry of Agriculture, scaled pig production (greater than 500+ finishers per year) now accounts for 34% of the total output of pig production in China. Scaled or larger farms continue to expand and slaughter larger volumes. It is predicted that farms with the scale of 500-49,999 head for slaughter will account for more than 71.5% of total production in 2020. It is also estimated that one thousand farms will be the main production base in China.

### Negative returns

Profit margins are currently showing negative returns. At the end of February, the estimated national losses were from 15

RMB/head (\$ 2.41 USD/head) to 37 RMB/head (\$ 5.94 USD/head). In November, 2012, profit margins were showing a profit of 74 RMB/head (\$11.88 USD) average, but there was a vast range, with losses of 200 RMB/head (\$32.10 USD) in some major pork production regions. At that time, many farmers were saying they were below breakeven. Other farmers indicated some profits getting to 100+ RMB (\$16.05+ USD) per head). As recent as of January 9th, 2013, the profit margin was approaching 360 RMB/head (\$57.78 USD) marketed from a farrow to finish production unit. Average profit for 2012 was estimated at 177 RMB/ pig (\$28.41 USD). Average market pig price for 2012 was estimated at 14.54 RMB/kg, (\$ 2.33 USD/kg), down 19% compared to last year.

### Pork and the Consumer Price Index

The Consumer Price Index (CPI) is of great concern to the National Government. Rising food prices, and especially increasing pork prices, greatly affects the CPI. Food comprises 30.5% of the CPI and pork is estimated to be about one-third of the food portion of the basket or 8 to 10% of CPI as a whole. Thus, with these calculations in mind, the price of pork in the entire CPI weighs between 2.5% to 3%. This level is much larger than the world's major pork producing and consuming countries, such as Japan (0.66% factor), United States (0.34% factor) and in Germany (0.71% factor) on CPI. Currently, inflation was around 2.0% for November, 2.5% for December and was 2.0% for January, 2013 (with October being the lowest level-33 month low since February, 2010 at 1.7%). This is a drop from the high of 6.5% in July, 2011 (37 month high). Food prices are on the rise. In January, meat, poultry and other by-products were up in price by 1.4%. This affects about 0.11 percentage points on the CPI. However, pork was down in price by 5% and this reflects a nearly 0.18 percentage point drop in the CPI.

CONTINUED ON PAGE 40

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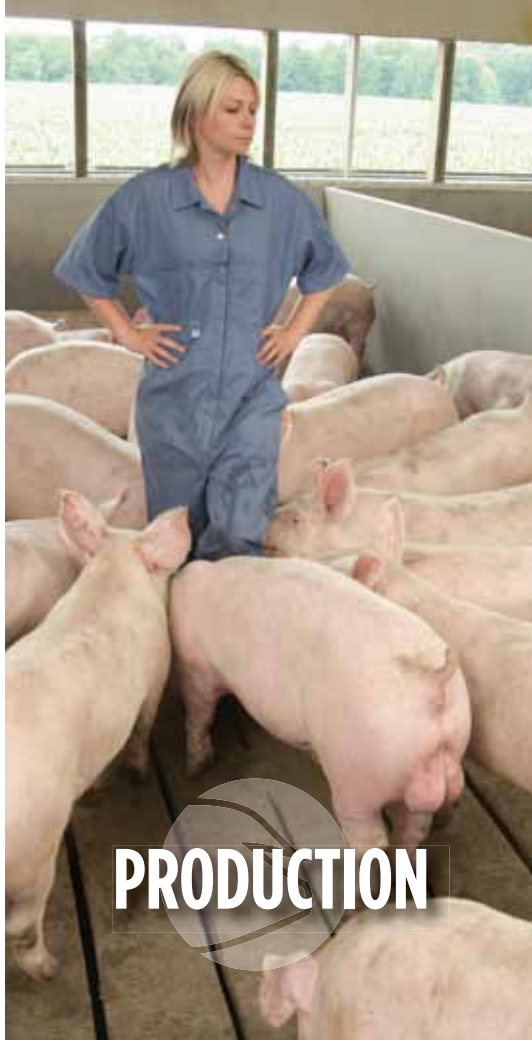
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In early March, the pig to grain price ratio was 5.97:1 as compared to 6 weeks before on January 13th, when it was at 7.52:1. For January, 2012, a 7.79:1 ratio was calculated. Since mid-January to current date (March 31), the pig to grain ratio has dropped from 7.52:1 to 5.97:1. A ratio of 6.00:1 is considered breakeven). Increased feed costs and lower market prices are chiefly responsible for the current losses that are being seen in the industry, a similar scenario to the North American markets.

### Disease a big challenge

Disease is always a huge challenge in China. Because of the total number of farms with pigs and the large population (>1.3 billion people), close proximity to cities, villages and towns, plus large number of pigs, bio-security is a limiting factor in pig production. Currently, less than 15 pigs/sow/year has been the stated national average per sow. Good producers will get 20 pigs per sow weaned and the rare top ones would be around 25 pigs/sow/year. Foot and Mouth Disease (FMD) was recently identified on a farm in Maoming City in Guangdong Province. At first, 88 pigs were detected with type A and eventually 948 pigs were slaughtered. The Ministry of Agriculture states that FMD has been contained and is now under control. On March 11th, 2013, several dead pigs

were reported floating in the Huangpu River, which is used to supply about 22% of the water for Shanghai with a reported population of 23 million residents. About 11,000 dead pigs were collected from the Municipality of Shanghai and another 5,500 were collected from the river in the neighbouring province of Zhejiang. Although no formal statement has been issued by any level of government, the main culprit seems to be FMD or PRRS and/or PCV-2.

In order to feed all these market pigs, there is a large demand for increasing domestic supply of ingredients, but the import from other countries is increasing especially corn and soybean meal. The drought of 2012 in the USA has affected global prices and is more noticed in the higher feed costs in China. A recent prediction by INTLFCStone Inc., a global commodity advisory group, predicted that China's corn imports could jump sevenfold to a record 28 million tonnes by 2015-2016. Local production is not likely to match rising demand. Furthermore, China's corn imports in 2011-2012 rose to about four million tonnes and may reach 13 million tonnes by 2012-2013 crop year.

Local corn production could reach 187 million tonnes in 2013. However, this level of corn production would be short by about 6.5% of actual projected demand. China will have imported 55.5 million tons (50.09 million metric tonnes) of soybeans this year (2012), up from 52.6 million tons (47.73 million metric tonnes) in 2011. In 2011, the average price of imported soybeans was \$ 566.80 per ton (\$624.61 US/metric tonne).

Although China's domestic supply of pork is showing growth, imports of pork were expected to rise by 8% in 2012. This is mainly due to rising demand. An USDA report suggests that total meat production for China will be around 81.4 million tonnes (a 3% rise year on year) for 2012. Pork output will reach 51.3 million tonnes, poultry will be around 18.7 million tonnes, beef will be around 5.70 million tonnes and sheep meat will be around 4.88 million tonnes for next year. Government incentives and/or subsidies to farmers contribute the most for this increase. Pork is almost two-thirds of China's total meat consumption. The net import of meat products was 1.569 million tonnes, an increase of 33.59%. ■

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## The Chinese pork industry: an overview

Globetrotting British reporter Stuart Lumb visited China recently and offers his view of a changing industry, where traditional methods operate alongside new facilities. With pork the meat of choice in Chinese households, improving production efficiency to meet the needs of a rapidly growing urban population is a priority for the country's government. He provides an overview of his visit which provides an interesting insight into the Chinese industry.

Driving through Henan province the black tarmac highway suddenly turns yellow. No, it's not the Yellow Brick Road, immortalized in the epic movie The Wizard of Oz, but thousands of freshly harvested heads of corn, spread laboriously by hand all over the highway. The tarmac warms up in the sun's rays and so makes an ideal cost-saving way of drying the province's corn crop. Shortly afterwards, we jump into the 21st century and are gazing intently at a huge bank of CCTV screens, which show pictures of pigs in a modern 1000 sow farrow to finish piggery.



Corn husks laid out to dry on the road

Similar technology greets the visitors to VIV China, which is held biennially in Beijing. The last such event attracted 300 Chinese exhibitors along with 150 international companies, with much of the equipment on show being similar to that

CONTINUED ON PAGE 42

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displayed at any other international show. Big bulk feed bins and conveying equipment were much in evidence, although the vast majority of pig feed and feed ingredients in China are still transported in 40kg bags. Some would argue that it's cheaper to employ staff to manually move feed around. However, labour to work on farms is not as plentiful as it used to be, with the drift from rural areas to the cities, lured by the promise of good wages. Labour costs will continue to rise as minimum wages improve. In 2012 there was a 13% increase in the minimum wage as set out in the State 12th Five Year Plan (2011-2015), with mandatory social welfare adding to the payroll costs.

Electronic sow feed stations have been in use in Europe for over 25 years and many of the big international companies

had their ESFs on display plus it was very interesting to note that several Chinese equipment outfits also had their own ESFs on show. Quite how many get sold is a moot point, although Big Dutchman pig consultant Roger Parfitt suggests that very large farms have installed ESFs to promote the image of embracing new technology. In contrast, there were plenty of traditional gestation stalls in evidence.

On the feed front, it was very significant that despite AGPs still being allowed in feed, many feed companies were promoting acidifiers and natural types of growth promoters. European and North American breeding companies were in evidence, eager to do business in the huge Chinese market and, given the rocketing price of feed, producers will be falling over themselves to take advantage of the superior genotypes that are now available to them.

### **Pork important in Chinese diet**

Pork and China are inextricably linked. Pork is such a fundamental and essential part of the Chinese diet that price rises cause great concern to the average man and woman in the street, such that China treats pork as a strategically important food. The standard of living is rising in China, which means more can be spent on pork per head. This, along with the rising population, means demand for pork will undoubtedly continue to be strong, especially for value added and convenience products. Annual per capita meat consumption had increased over fourfold since economic reforms in the late 1970s, standing at 37kg of pork, 13kg of poultry and 9kg of beef and sheep meat.

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**"It will take years to develop a widespread coordinated supply chain that consumers feel confident about"**

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With regard to future pork consumption, food safety was cited in a 2010 university survey as the number one concern for most consumers. Several food scandals have caused short term falls in consumption and it can take months to rebuild consumers' confidence. Significantly, consumers seem to be willing to pay a premium

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A large scale commercial farm in China

for pork produced in a secure supply chain. With the pork industry's current fragmentation it's expected that it will take years to develop a widespread coordinated supply chain that consumers feel confident about.

### Pork outlook

Pork consumption is likely to increase slowly at around 1-2% annually. Overall meat consumption will favour poultry over pork, due to the former's relatively lower price. Pork's share of consumption is expected to further decline to 62% by 2020, although given the sheer size of the pork industry, pork will retain its dominant position long term, and will continue to show the greatest growth in volume. It's predicted that consumption will increase in lower income categories living in urban areas, as well as by the rural population, which will become more urbanised as time goes by. The value-added segment will also grow, fuelled by demand from the urban middle class and from the more wealthy population groups.

### Pork prices volatile

Pig prices have been all over the board since 2006 due to supply and demand getting unbalanced. Small producers were quitting but not enough larger, more commercial, units were replacing them, leading to fewer pigs being produced. Soaring pig prices in 2008

and 2011 were indicative of shortages in those years. Furthermore, PRRS in 2008 caused a dramatic 20% decline in herd size that year, along with much price volatility. The main driver of inflation in 2011 was laid at the door of pork prices. Then in early 2012 pork/pig prices started to fall as production increased slightly, demand dropped and more pork was imported. Declining prices will impact profitability and discourage expansion, which could lead to another shortage of supply. Then again, this is the nature of the pig cycle, obeying the simple economics of supply and demand. However, the cycle can be distorted by imports, the release of pork kept in cold stores and subsidies / financial incentives for producers.

### Large scale production increasing

According to a 1979 survey by the Chinese Institute of Animal Science, there were 100 different Chinese breeds or strains divided into 6 regional types. It's generally assumed that the Meishan is the major Chinese breed. It is certainly highly prolific, hence its importation into Europe many years ago, but actually it is only one breed out of 100. Traditionally, Chinese farmers raised 1-3 pigs, for family consumption and for selling, but this is all changing. It's generally recognized that there are 3 types of producers:

backyard farms producing 50 pigs per year, specialised farms producing 50-3000 pigs and commercial units producing more than 3000 pigs.

Significantly, 74% of production came from backyard farms in 2001, declining rapidly to an estimated 27% by 2015. The large commercial units are increasingly buying equipment to replace labour, as automatic feeding systems are more accurate than feeding by hand.

The vast majority of finished pigs are bought by middlemen who sell them on to slaughter plants, although commercial sized operations usually sell their pigs on contract to a processor.

### Structural changes

The rapid change in China's pig production started in 2007 when backyard farms were hit far harder by disease than the larger units, due to bad sanitation and poor management. Backyard farms are more susceptible to variable input costs and market volatility. Furthermore, the result of urbanization and the migration of the rural population to the cities to get better paid jobs has pushed up the cost of rural labour, making backyard

CONTINUED ON PAGE 44



farming less competitive, compared to larger units.

A number of leading processors are establishing their own farms and developing vertically integrated operations. Wen's Group ( 7 million pigs/ year), CP Group, Zhengbang Technology Co, Muyuan Foodstuff Co. Ltd and the Chuying Agro-Pastoral Group all have farms with more than 500,000 pigs. The COFCO Group, the Shandon Liuhe Group and AgFeed have farms with more than 100,000 pigs. In the case of Wen's, the company breeds the pigs, but these are bought and finished by contracted producers, with feed being provided by Wen's.

A typical commercial 1000 sow farrow to finish unit is often integrated with a feed business. Breeding stock is based on top quality foreign genetics. Sows farrow on a weekly basis and 24-hour staffing of the farrowing houses is quite typical. Litters average 11-12

piglets born alive and weaning takes place at 28 days. Generally sows are inseminated twice, 24 hours apart, and many units have a boar stud which provides the semen. Creep feeding starts at 7 days. For the first week after weaning, zinc oxide at a maximum of 2,500ppm is included in the starter feed to control digestive upsets.

**"In the unit office there is often a huge bank of video screens relaying live CCTV shots of pigs and staff"**

Units employ their own vets who supervise wide ranging vaccination and medication programs. In the unit office there is often a huge bank of video screens relaying live CCTV shots of pigs and staff in the different pig buildings.

On the processing front, major national players are Shineway, Yurun and

People's Food. Despite overcapacity in slaughtering, Shineway plans on having a slaughter capacity of 45-55million pigs by early 2013, with Yurun announcing that it will be able to slaughter 70 million pigs by 2015.

### Imports and exports

In 2007 China was a net exporter of pork. Then, in 2008, it became a net importer due to internal supply shortages, importing from the US, Brazil, Denmark and the UK.

According to a recent Rabobank report, whilst China has increased pork imports in recent years, this should be seen as a temporary strategy rather than a long term one. One reason is that Chinese consumers prefer fresh pork compared to imported frozen product. Additionally, China's cost of pig production is currently one of the highest on the planet, due to low productivity (the national output is still less than 15 pigs/ sow / year) and poor feed conversion. Naturally, boosting productivity will boost pork output. Corn is a major feed ingredient and there is also scope for improving corn yields in China.

"If China could improve its corn yields and swine FCR towards US levels then goals of self - sufficiency are mathematically achievable. However, there are many challenges in achieving this success, such as the continuation of disease problems, food safety issues, logistics and the lack of a cold chain," says the Rabobank report.

"If China does not import pork, we believe that all indications suggest that it will need to import corn.....how much of each will depend on improvements in the supply chain," it concludes . ■

*The author wishes to express his thanks to Lu Nan, manager, Olmix China, for his invaluable help and assistance during the author's trip to China.*

**Reference:** Rabobank Industry Note September 2012. Industrialisation of China's Pork Supply Chain.



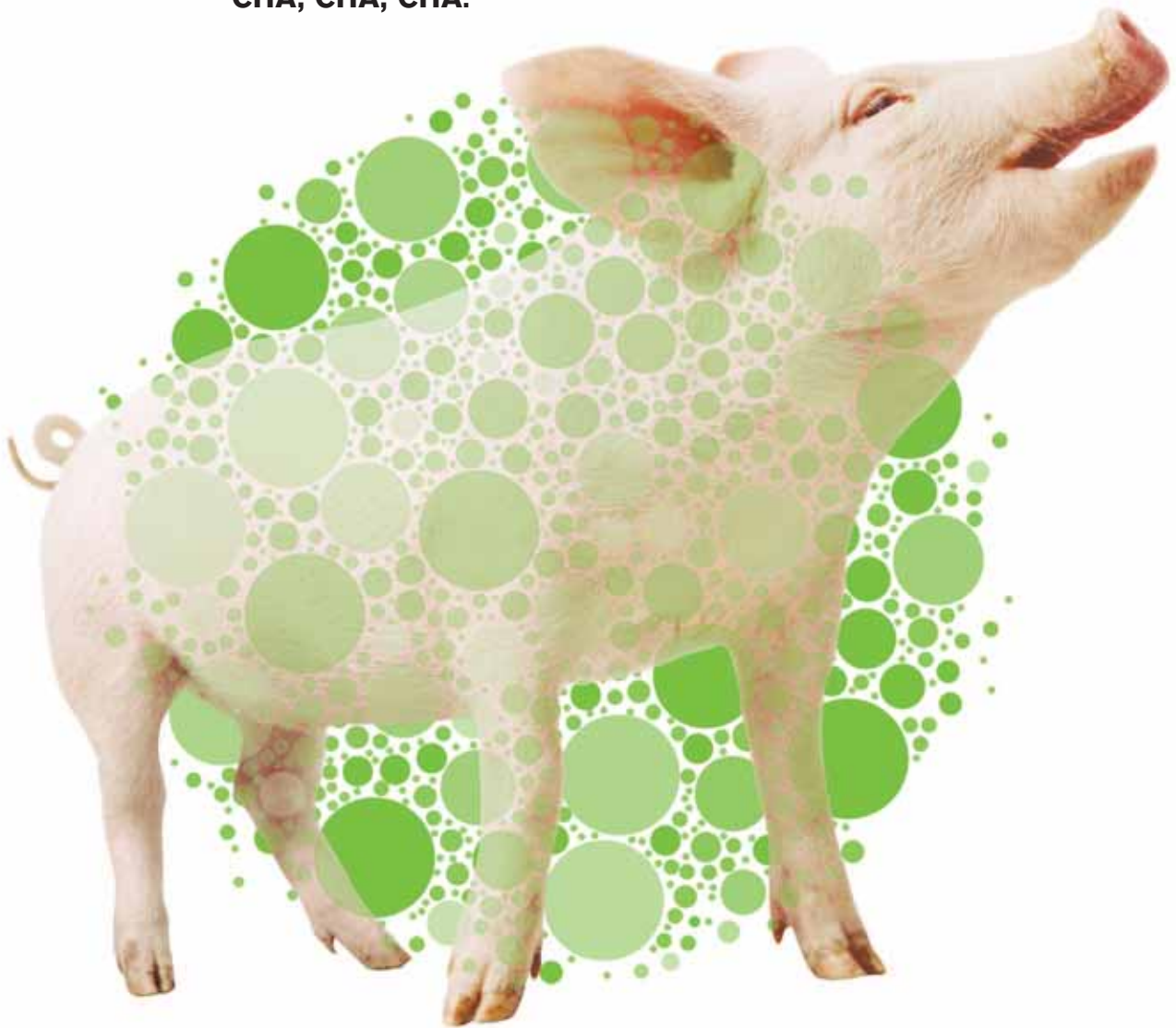
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## Good gilt management improves lifetime productivity

An effective gilt development and reproductive management program can improve sow herd retention rate which in turn should improve such characteristics as pigs per sow per year. This is due to the sow herd maintaining a high proportion of parity 2 and greater sows. However, there is poor agreement as to what gilt management practices are necessary to improve sow herd retention. In a recent issue of Michigan State University's Pork Quarterly, State Swine Specialist Ronald O. Bates, reviews the results of a Japanese research study (Kaneko and Koketsu, 2012) that evaluated sow productivity in 96 herds and related gilt management practices to sow performance.

The study worked with the sow productivity records and evaluated 15,574 gilt records. Each farm completed surveys that detailed their gilt management program.

Farms were categorised into three sow productivity categories, based on pigs per sow per year. Farms classified as 'High' achieved more than 23.8 pigs per sow per year. 'Intermediate' sow productivity farms fell within the range of 20.8 to 23.8 pigs per sow per year. Farms that were categorised as 'Low sow productivity' farms produced 20.7 or less pigs per sow per year.

"Age at mating was lower among High and Intermediate sow productivity farms compared to Low sow productivity farms," comments Bates (Table 1). "Gilts from high sow productivity farms also had higher farrowing rates than gilts from farms in

the other two categories. This was true for gilts that farrowed to their first service as well as those that recycled and subsequently farrowed after a later service."

**Table 1: Gilt reproductive characteristics for herds differing in pigs per sow per year**

	High	Intermediate	Low
<b>Pigs/sow/year</b>	<b>&gt; 23.9</b>	<b>20.8-23.8</b>	<b>&lt; 20.7</b>
Age at mating (days)	242.9 <sup>b</sup>	252.1 <sup>b</sup>	261.4 <sup>c</sup>
Farrowing rate, first mating (%)	89.0 <sup>b</sup>	82.5 <sup>b</sup>	75.9 <sup>c</sup>
Farrowing rate for returns (%)	66.9 <sup>b</sup>	66.4 <sup>b</sup>	56.5 <sup>c</sup>
No. born alive for 1st mating	10.6 <sup>b</sup>	9.8 <sup>b</sup>	9.9 <sup>b</sup>
No. born alive to returns	10.3 <sup>b</sup>	10.0 <sup>bc</sup>	9.6 <sup>c</sup>

<sup>a</sup> Adapted from Kaneko and Koketsu, 2012. <sup>b,c</sup> Means within a row with different superscripts differ (P<0.05).

In describing the gilt management programs for these farm categories, High and Intermediate sow productivity farms began boar contact with gilts at approximately 203 days of age while "Low productivity sow farms began boar contact with gilts at approximately 213 days of age," Bates explains. "Therefore, it appears all farms were trying to mate gilts at their second oestrus but High productivity sow farms began boar contact with gilts sooner."

A greater proportion (32 per cent) of High sow productivity sow farms used gilt development diets than Intermediate (8.5 per cent) and Low (0 per cent) sow productivity sow farms. Also age at farrowing was 13.7 days younger for gilts on farms that used direct boar contact to stimulate oestrus versus farms that used indirect boar contact. "This is in agreement with recent research from Michigan State University that reported that gilts that farrow at or before a year of age had improved sow longevity compared to females that farrowed after a year of age," Bates notes.

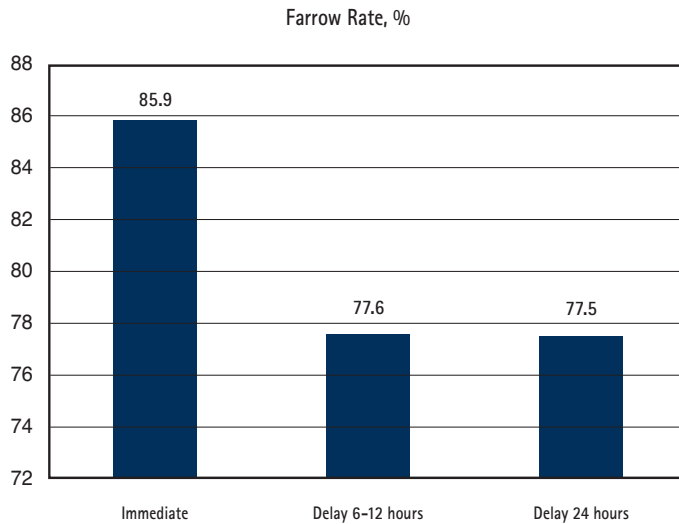
Farms also listed the time gilts were mated after being detected in heat. "Farms that mated gilts immediately after detected

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Figure 1. Farrow rate of gilts mated at different times after first detected oestrus



Adapted from Kaneko and Koketsu, 2012

heat had higher gilt farrowing rates than farms that waited either six to 12 hours or 24 hours to mate or inseminate gilts,” points out Bates (Figure 1). “This may be because ovulation occurs sooner within the oestrous period of gilts than sows. Therefore, mating immediately after gilts are detected in heat may allow for sperm to go through capacitation and be ready to fertilise eggs at ovulation.”

Although the gilt development practices identified as being beneficial in this study are not the only ones that can improve subsequent reproductive performance, it does suggest that the following be considered for gilt development programs:

1. The use of specialist gilt development diets
2. Commencing oestrus detection at approximately 6.5 months of age, with gilts mated at their second or later oestrus
3. Oestrus detection should be carried out with direct boar contact



Gilt Stimulation

4. For the heat in which gilts will be mated, mating should occur soon after they are detected in heat and while they are in standing heat
5. Gilts that have been served should be limit fed until pregnancy is confirmed and then fed to body condition
6. Gilts should farrow at approximately 11 to 12 months of age.

“Gilt development is an important aspect of sow farm productivity and attention to detail and consistent applications of fundamental gilt management practices should improve subsequent productivity and longevity,” concludes Bates. ■

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# Not withdrawing feed is costly for producers

By Eduardo Beltranena, Alberta Agriculture and Rural Development

Feed withdrawal or denying hogs access to feed on farm before shipping to slaughter is nothing new. In fact, it is a requirement of most producer-packer contracts. Existing barns were not designed to implement it, so producers tend to avoid it. These producers don't realize how it reduces their profitability. Not withdrawing feed from hogs before slaughter can also increase transportation losses and complicate packer operations due to carcass contamination. Most important, it threatens Canada's pork export markets because it compromises pork safety. It also affects consumers' shopping preference for pork. Herein I discuss the cost and benefits of on-farm hog feed withdrawal and provide suggestions for its implementation.

## Producers take the largest hit

Producers not practicing hog feed withdrawal take two main hits to their pocket: First, feed is wasted. Finishing feed for the fall of 2012 exceeded \$300 per tonne. Yet stomachs like those shown in Figure 1 were still seen at hog packing plants. Any feed left in the gut at the time of slaughter goes entirely to waste. Simply, 10 kg of finishing feed left in the gut implied \$3 loss per hog (Table 1). Second, there is a drop in dressing percentage. Feed in the gut swells live hog weight, but after evisceration results in lower carcass weight (Table 2). A 1%-point drop in dressing percentage equates to \$2 loss per hog. The worst of it is that these two factors are additive (\$3 + \$2 = \$5 loss/hog!).



Figure 1: Pig stomachs full of feed after evisceration

## Hauling dirtier hogs and transit losses

More feed in the gut increases in-transit defecation and skin contamination. Pigs that gorge on feed before leaving the farm are more prone to vomiting. Truckers tell us that hogs with full guts are much harder to move, increasing loading time and prod use. These hogs are more susceptible to die in transit or lairage due to their reduced ability to cope with the stress of transportation and mixing. Defecation and faeces caked to the skin increases contamination at the plant lairage pens and scalding tank. Dirtier hogs on arrival thus increase the pathogen load at the packer.

Table 1: Cost of undigested feed in gut wasted at evisceration


Feed in gut, kg	Finishing diet cost /1000 kg				
	\$200	\$225	\$250	\$275	\$300
3	0.60	0.68	0.75	0.83	0.90
6	1.20	1.35	1.50	1.65	1.80
9	1.80	2.03	2.25	2.48	2.70
12	2.40	2.70	3.00	3.30	3.60

## Contamination increases condemnations

Feed in the gut at the time of slaughter increases the chances of someone nicking or cutting it during evisceration. The weight of the hanging full guts creates tears in the intestines. According to the extent of digesta contamination, a part of or the whole carcass could be condemned, reducing payout to the producer. Even slight carcass contamination reduces line speed because someone has to trim it off. If the line stops, it costs the packer employee time, more labour, and line efficiency.

## Pork safety is compromised

Despite the best carcass washing efforts at modern plants, a single contaminated carcass can compromise neighbouring



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**Table 2: Carcass revenue (\$) as affected by dressing %**

Live pig weight, kg	Dressing Percent	Carcass weight, kg	/kg of pork \$1.70	Difference
125	80%	100.00	\$170.00	
125	79%	98.75	\$167.88	\$2.13
125	78%	97.50	\$165.75	\$2.13

ones hung on the rail or chilling. Further spreading of contamination can occur by butchers and equipment breaking the carcass into primal cuts or packaging. Contaminated pork could then spoil in transit for distribution. Fresh pork boxed for export may take up to 30 days to reach Asian consumers. A pork contamination scandal could cost Canada access to treasured export markets, which are competitively difficult to secure and retain. Contamination thus compromises the shelf life of pork.

**"A single contaminated carcass can compromise neighbouring ones hung on the rail or chilling"**

**Lower pork quality**

Hogs store cereal grain sugar as glycogen in the liver and muscles for maintaining body functions during fasting. But hogs that continue to eat feed before departing the farm can have too much glycogen. Upon exsanguination (bleeding), the lack of blood oxygen can cause muscle glycogen to break down too quickly, acidifying the meat before the carcass has time to chill. Muscle membranes then break and cellular juices leach out, increasing pork drip loss. Hogs that gorged on feed have a higher incidence of pale, soft and exudative (PSE) pork. Consumers would then avoid whitish, mushy pork sitting on a pool of juice at the retailer counter. In contrast, if hogs are

fasted for more than 24 hours and hurried to the kill floor, they can indeed run out of muscle glycogen and the pork does not acidify, increasing the incidence of dry, firm and dark (DFD) pork. Either type of pork (PSE or DFD) - and it doesn't need to be extreme - can be unappealing.

**What to do?**

Producers are most likely in breach of contract with packers if not practising feed withdrawal, which can have legal repercussions. Your contract could be suspended or terminated. Below is a prioritized list of actions to implement on-farm feed withdrawal:

**1. Know your packer's receiving hog policy**

Communicate with your packer or marketing agency. Find out at what time hogs must be at the plant by to be slaughtered the same day (e.g., 12 noon). Ask what the minimum lairage time at the plant is (e.g., 3h). Packers typically require hogs to rest and drink to rehydrate after transport to ensure animal well-being and minimize incidence of DFD pork.

**2. Know your transportation time**

Know the average hauling time (e.g. 3h). Account for time loading at the farm and unloading at the plant (e.g., 1h for both). Hogs travelling for slaughter to another province have a long haul that may require shorter on-farm feed withdrawn or even none at all. The stress of transportation slows down digesta passage rate almost to a halt. Discuss with your packer the feed withdrawal time required prior to long hauls.

**3. Count backward to narrow withdrawal**

Lower carcass contamination and optimum pork quality are achieved between 14 to 18h of hog fasting. If hogs need to be loaded by 7am for the same day kill, feed access should be denied as of late afternoon the day before. Thus, conduct hog weighing to ensure carcass weight falls within the grid core and sorting late the afternoon of the day before shipping or day(s) before.

CONTINUED ON PAGE 50

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5	36.24	68.14	90.99
5.5	39.87	63.96	100.09
6	43.49	69.77	109.19
6.5	47.12	75.59	118.29
7	50.74	81.40	127.39
7.5	54.37	87.22	136.49
<b>CENTS PER KWH RETURN ON INVESTMENT IN MONTHS/YEARS</b>			
4.5	1.7	1.1	0.7
5	1.5	1.0	0.6
5.5	1.4	0.9	0.6
6	1.3	0.8	0.5
6.5	1.2	0.7	0.4
7	1.1	0.7	0.4
7.5	1.0	0.6	0.4

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**Table 3: Simple calculator to estimate the opportunity revenue of implementing on-farm hog feed withdrawal**

Effect of reduced dressing %		Current Situation		Feed Withdrawal
Live weight of market hogs, kg		126		125
Dressing %		78%		80%
Carcass weight, kg		98.5		100
\$/kg pork 100 index		1.5		1.5
Index		110		110
Health bonus, \$		1		1
REVENUE PER HOG, \$	(A)	162.53		165.00
<b>Effect of undigested feed in the gut</b>				
Undigested feed found in gut, dry kg		10		2
Finishing feed, \$/1000kg		250		250
FEED WASTED PER HOG, \$	(B)	2.50		0.50
<b>Effect of trucking, condemnations losses</b>				
Breeding herd size, # sows		600		600
Hogs marketed/sow/year, #		25		25
Trucking loss due to feed, #/1000	3	450	2	300
Condemnation loss due to feed, #/1000	2	300	1	150
TRUCKING, CONDEMNATIONS	(C)	14250		14550
	A - B x C = \$	2,280,356		2,393,475
<b>Opportunity revenue of hog feed withdrawal, \$</b>			<b>113,119</b>	

**1. Fasting in finishing pens or the loadout**

The recommended barn setup is a series of pens with only water access in the loadout area. Pig density at these loadout pens should be similar to truck partitions, but hogs should be able to lie down for the night. Keep familiar hogs from the same finishing pen together to minimize fighting due to mixing. If you must fast pigs in finishing pens, weigh and tattoo hogs to ship days in advance. Deny feeder access by 7-8 PM and turn the lights off. The next morning, promptly remove hogs to ship after turning the lights on. Restore feed access for those that stayed, to minimize their out-of-feed event to while they slept. You have thus achieved the necessary fasting for hogs that have reached market weight and go to slaughter.

**Conclusions**

Table 3 provides a simple calculator that one can set up to enter your own values

to estimate savings in feed cost, carcass dressing, condemnations, and transport losses if not already practicing on-farm hog feed withdrawal. For a farm that ships two truckloads of hogs per week, \$1000 savings per week could payback for a \$50,000 renovation of the loadout area to setup holding pens with drinkers to fast hogs overnight.

In conclusion, hog feed withdrawal prior to slaughter minimizes feed wastage and improves dressing %. It reduces transportation losses, carcass contamination, and increases packers' plant efficiency. Safe pork should help maintain foreign market access and facilitate establishment of new markets. On-farm hog feed withdrawal will also increase the proportion of pork that meets export grade. And ultimately, it will also enhance consumers' shopping preference for Canadian pork. ■

# Low stress pig handling: Using characteristic patterns to solve pig handling problems

By Nancy Lidster

**At a course two years ago a producer told me they never have problems loading market hogs but that week it had been a battle. What could cause the problem?**

**There are characteristic patterns in the ways humans and pigs interact with each other. Low Stress Pig Handling seeks to identify, understand, and use those patterns to help us move pigs more effectively.**

**Handlers who move pigs easily tend to think and act differently than handlers who have difficulties. I'll be describing the extremes but keep in mind that most handlers fall somewhere in the middle.**

## Example

Two handlers are doing similar jobs under similar conditions:

Pigs are moving well for Handler A.

- What exactly is Handler A doing that encourages pigs to move?

Pigs are not moving well for Handler B:

- What exactly is Handler B doing that creates problems?
- What must change in order for Handler B to get Handler A's results?

Most handlers aren't all "A" or all "B". They are some combination:

- an A for sorting markets but a B for moving sows
- an A for loading feeder pigs - but not today

## Common differences between easy and difficult handling

**1. Differences in handlers' understanding and expectations,** in particular their understanding of how fear affects pigs' responses. The common industry shorthand of "flight or fight" provides a useful example.

"Flight or fight" response: When confronted with a perceived threat to its well-being, a pig must make a decision to flee or fight. The general characteristics of a pig make it an animal that is typically prey and more suited to flee, or escape, rather than to fight (Trucker Quality Assurance Handbook, Version 4).

Handler B is likely to interpret the words "Flight" and "Fight" more or less as follows:

Flight response = moving away from the handler = doing what the handler wants

Flight motivation = flee = fear = scared enough to run away

Fight response = coming back towards = not moving away = not doing what the handler wants

Fight motivation = not scared enough to run away or = being ignorant, defiant, disrespectful

Handler B believes we have to scare pigs to make them move.

Handler A knows pigs are easiest to move when we keep them calm.

There is a problem with Handler B's beliefs. We expect a deer in the wild to run away from danger. Confined domestic pigs are usually impeded by penning, other pigs, etc. *They are only able to move away from our pressure if we let them.* When we don't allow pigs to get away from our pressure, they get scared or defensive.

When pigs get scared or defensive they tend to:

- Pay closer attention to handlers
- Surge or pile away from the handler
- Stop
- Circle back
- Wedge
- Bunch together
- Refuse to move

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These defensive responses make pigs harder to move and typify what people associate with the “Fight” half of “Flight or Fight”. However, when pigs are coming back at us, refusing to move, or otherwise “fighting us”, it’s not out of ignorance, defiance, or excessive tameness. These are defensive responses caused by a handler who is working too close, being too threatening or not giving pigs release from pressure.

The harder we try to make pigs move away from us the more likely it is that they won’t. If we want pigs to move away from us we have to let them get away.

## 2. Differences in their responses to indicators of fear

Handler A will release pressure and give pigs the space and time they need to calm down and keep moving.

Handler B will move forward to block and force movement and by increasing pressure, intensify the problem.

## 3. Differences in how they drive movement

Handler A will set up and use “herd flow” to carry pigs forward when possible and will be attentive to giving pigs release.

Handler B will focus on pressure, the flight zone, and chasing pigs with no thought of release.

## 4. Differences in how they use hand held tools

Handler A will tend to rely less on tools, will usually work at a distance that prevents physical contact, and will limit contact with pigs even when it is possible.

If carried:

- Prod will rarely be activated
- Board will be carried mostly to the side or behind except when blocking
- Paddle will be used mainly as a visual, only occasionally for noise, and rarely for contact
- Shaker noise, voice, and hand contact will be limited and deliberate

Handler B will tend to rely heavily on tools and use them

excessively, stay close enough to allow physical contact with pigs, and will tend to be incessant / on autopilot with tool use and contact.

If carried:

- Prod will be activated frequently
- Board will be carried broadside, two handed, possibly white knuckled, and close to pigs
- Paddle will be used for incessant noise and contact as will shakers, voice and hand contact

## 5. Differences in how they work with others

Handler A will prefer to work alone or with the fewest people needed for the job.

Handler B will want many hands to make light work.

## Summary

Handler A and Handler B get different results because they think and act differently. When we change what we do we change what we get.

Fear works against us. Pigs are easiest to move and control when they are calm.

Most handlers are some combination of Handler A and Handler B.

When rushed, preoccupied, or anticipating problems, we tend to shift towards more Handler B – like behaviour.

## Back to our opening situation

Why did our producer experience problems loading market hogs that particular week?

I asked what he was thinking about while they were loading. He was going to be out of the barn for 3 days of meetings that week and he was thinking about all the work he had to get done.

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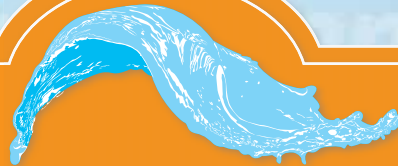


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## Semen quality - Safe from the boar stud to the farm

Thomas Jacob, Genetic Alliance Ltd., Acme, AB

**Semen quality is one of the keys to success in any sow unit. Getting closer to the summer months it is a good time to examine all aspects that can affect it. The last thing you want is poor quality semen that adds to the challenges of the hot weather and therefore affects your results and your bottom line. There are several aspects in the farm like the storage that have influence on the semen quality. But one of the most important things for the sow unit is to get a good product delivered in the first place.**



Good semen quality is important to achieve good results in a sow farm. Semen production in the boar stud is just the start of it

### Heat affects semen quality

The most important aspect that can affect semen quality is the heat in the summer. Once temperatures go beyond 28 degrees Celsius for an extended period of time boars have a hard time producing good quality semen. A good way to minimize this risk is having properly ventilated barns with cooling systems. Common systems are drippers that help the animals to cool down or high and low pressure misting nozzles that cool the air with water mist. Although these systems reduce the heat stress in hot weather, the number of poor quality ejaculates usually increases during the summer months. Also fevers or stress can affect semen quality. In boar studs animals with poor semen quality are taken out of production and monitored for at least six weeks. If their quality improves they are put back into production or culled if they do not get better.

Semen quality itself is defined by two parameters, motility and morphology. While motility looks for the movement of the sperm cells, morphology is



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Semen morphology can be checked with a simple stained slide

the count of normal shaped sperm cells. To check motility, appropriately trained staff judges the percentage of moving sperm with a 400 times magnification under a microscope. A more advanced way is a computer assisted semen analysis (CASA) where a PC-camera on a microscope takes multiple pictures of the cells moving and then analyses it. As motility is quite easy to check it is done during production. Morphology is a bit more time consuming and therefore often checked after the semen is processed, although there are boar studs that do morphology checks before diluting the semen to ensure the quality of their product. Morphology itself is defined as the percentage of normal shaped sperm cells. The semen is stained with an Eosine-Nigrosine stain and smeared on a microscope slide. Boar stud staff then counts the normal cells under a 1000-times magnification and determine the percentage of good cells. If boar studs have a CASA system there is also the option of doing morphology with it.

### Third party testing as an objective quality measure

No matter how the semen is evaluated, always make sure that the final product is checked from a third party on a regular basis. This makes sure that the equipment is working properly and problems are picked up early. Usually the third party testing includes morphology and motility as well as the concentration. Common concentrations range between 2 and 3 billion viable cells which mean cells that have normal morphology and motility. In North America pooled semen is standard but there are trials that use individual boars with a reduced concentration. Another aspect that

should be tested by a third party is bacterial growth. It is very important that the semen is collected as clean as possible and also processed with sterilized equipment. If there is any contamination the shelf life goes down as bacteria use up the sperm cells' nutrients and their metabolism products can harm the semen. To prevent this most extenders contain an antibiotic but it is essential to collect and process the semen as clean as possible in the first place.

### Long term extenders give the best shelf life

When it comes to extenders there is the choice between short and long term products. The so called BTS extenders are much cheaper but just give a shelf life of 3-4 days. They are used in farms that collect in-house on several days a week or in boar studs that ship over short distances like in Europe. Long term extenders are more expensive and have a shelf life between 5 and 10 days, depending on the product. These are standard in North America as semen is shipped over longer distances.

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**"Extenders with a membrane stabilizing agent protect the semen from about 10 to 24 degrees Celsius"**

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For most extenders the storage and transport temperature for the semen ranges between 16 and 18 degrees Celsius. However, some AI companies add a membrane stabilizing agent to the extender, which gives the semen a much wider protection against high and low temperatures. Extenders with a membrane stabilizing agent protect the semen from about

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10 to 24 degrees Celsius, whereas the older products had a two degree Celsius critical range.

No matter which extender is used it is important to protect the semen from the elements. In the summer it needs to be shielded from extreme heat, in the winter from extreme cold. Probably the safest method to ship semen is to transport in a temperature controlled environment like an air conditioned vehicle. The semen is packaged in coolers with gel packs or in electric coolers and kept in the delivery vehicle. This method is used by a lot of boar studs but it is only practical if there are a few farms on the same delivery route and the distance is not too far. For remote locations this method becomes quite expensive, especially if there are no other farms in the same area and delivery costs cannot be split. In that case many boar studs choose to ship by bus, courier or plane. Since most carriers cannot guarantee a temperature controlled environment it is very important that the semen is packaged well. The best option is a double walled Styrofoam cooler but it is also the most expensive. The semen is put in a small Styrofoam container which is then placed in a larger cooler. Depending on the weather conditions, warm or cold gel packs are added in the outside cooler. A more simple method is using thick single walled containers and adding gel packs to stabilize the temperature. This is cheaper but does not quite give the protection a double walled cooler provides. As the Styrofoam coolers are quite expensive some boar studs also use five day camping coolers that give a good protection from the elements. They are sent back by the customer to the boar stud, cleaned and reused for the next shipment.

### Check temperature on arrival

Once the semen arrives on farm it is important that the semen is put into the storage unit as soon as possible. Some farms use transfer coolers, often for biosecurity reasons, but these should be placed in a building at room temperature, rather than be left outside, to avoid extreme heat or cold. It is also a good idea to check the temperature of the tubes with an



When the semen arrives at the farm check the temperature to make sure it has not been exposed to extreme temperatures

infrared thermometer at arrival to make sure the semen has not been exposed to critical temperatures. If there are any doubts that the temperature dropped or increased too much many boar studs offer the service of adding a data logger to the shipment that records the temperature during the whole transport period.

From here on the semen quality is in the hands of the sow farm. The most important thing is having a big enough semen storage unit that holds the maximum amount of doses on a delivery day. Also the unit should be kept in a cool place and should be cleaned regularly inside and outside. To detect problems with the semen storage unit record the minimum and maximum temperature on a signoff sheet once or twice a day. Although the boar stud is doing the motility checks for the semen delivered it is recommended that the motility is checked on the farm as well. If there has been a problem during the transport or in storage it can only be picked up with motility checks in the sow unit. ■

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# Nutritive value of lentil, regular and low-oligosaccharides full-fat soybean fed to grower pigs

By T. A. Woyengo,<sup>1</sup> R. Jha,<sup>1,2</sup> E. Beltranena,<sup>1,3</sup> A. Pharazyn,<sup>4</sup> and R. T. Zijlstra<sup>1</sup>

<sup>1</sup>University of Alberta, Edmonton, Alberta; <sup>2</sup>University of Hawaii at Manoa, Honolulu; and <sup>3</sup>Alberta Agriculture and Rural Development, Edmonton, Alberta; <sup>4</sup>Nutreco Canada Inc., Guelph, Ontario

## Take home message

The high cost of conventional feedstuffs has increased the need for including alternative feedstuffs into swine diets. Soybean cultivars that have a low content of oligosaccharides (small-sized carbohydrates that cause flatulence) have been developed through breeding, and can be fed to pigs as full-fat soybean seed (FFSB). Lentil (a pulse) is grown in Canada for human consumption, but could also be fed to pigs. Low oligosaccharide FFSB has energy and amino acids (protein building blocks) availability values that are similar to those of regular FFSB. However, low oligosaccharide FFSB, like regular FFSB, has a higher energy value, but lower amino acid availability values than soybean meal. Lentil has a similar energy value to soybean meal, but has lower amino acid availability values than soybean meal. Thus, low oligosaccharide FFSB and lentil can serve as alternative feedstuffs for pigs.

## Introduction

Soybean is an excellent source of amino acids, the building blocks of protein. It is fed to pigs either as soybean meal after oil extraction or as full-fat soybean seed (FFSB). However, consumption of soybean by humans or pigs

can be limited by the presence of oligosaccharides (small-sized carbohydrates). The soybean oligosaccharides are not broken down by enzymes produced by animals, and may cause flatulence, diarrhoea and reduced availability of other nutrients for absorption into the body. Weaned pigs that have never consumed dry feed can be challenged the most by these carbohydrates. Thus, plant breeders have developed low oligosaccharide soybean cultivars. However, limited information exists on the nutritive value of low oligosaccharide FFSB.

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**"Up to 22.5% lentil can be included in  
diets for nursery pigs without reducing  
growth performance"**

---

Lentil is commonly grown in Western Canada for human consumption and most of it is exported. Lentil, as a pulse, has a high content of both protein and starch, and thus serves as a source of amino acids and dietary energy. We have shown that up to 22.5% lentil can be included in diets for nursery pigs without reducing growth performance. However, the amino acid availability and net energy value of lentil fed to pigs have not been reported.

Amino acid availability in swine feedstuffs is better defined using standardized ileal digestibility (SID) than apparent ileal digestibility. Apparent ileal digestibility of a nutrient is the proportion of the nutrient consumed that does not appear at the end of the small intestine. The SID of amino acids is derived from apparent ileal digestibility of amino acids by correction for basal endogenous amino acid losses, which includes protein





Figure 1: Regular full-fat soybean



Figure 2: Low-oligosaccharide full-fat soybean



Figure 3: Lentil

that it is normally eroded from the gut lining. These losses are typically estimated by feeding a nitrogen-free diet.

We conducted a trial to determine SID of amino acids for soybean meal, regular FFSB, low-oligosaccharide FFSB, and lentil fed to pigs. Soybean meal was included as a reference.

### Nutrient profile

The regular FFSB (Figure 1) and low-oligosaccharide FFSB (Figure 2) fed in the present study were obtained from Nutreco

Canada Inc. (Guelph, ON, Canada), and were micronized at approximately 105°C for 50 seconds to reduce trypsin inhibitors. Lentil (Figure 3) was obtained from Sunhaven Feed Mill (Irma, AB, Canada). The regular FFSB and low-oligosaccharide FFSB were similar in content of protein, fat (ether extract), amino acids, and trypsin inhibitor, which is the main anti-nutritional factor in soybean that may reduce protein digestion (Table 1). As expected, low-oligosaccharide FFSB contained less oligosaccharides (stachyose and raffinose) than regular FFSB. The soybean meal contained more protein

CONTINUED ON PAGE 60



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and amino acids, but less fat and fibre, and more trypsin inhibitor than regular or low-oligosaccharide FFSB. Lentil contained less protein, amino acids, and trypsin inhibitors, but more starch and fibre than soybean meal.

### Digestibility trial

The test feedstuffs and nitrogen-free diet were fed to grower pigs fitted with a tube in their ileum at the Swine Research and Technology Centre of the University of Alberta to measure amino acid digestibility of the test feedstuffs, and quantify endogenous ileal amino acid losses from feeding the nitrogen-free diet. Apparent total tract digestibility of gross energy, which is the proportion of the gross energy consumed that does not appear in faeces, was also measured. The SID of amino acids, and digestible and net energy values were calculated. The SID of amino acids was calculated using the nitrogen-free diet.

### “Lentil and soybean meal were similar in net energy value and cost of net energy”

Regular FFSB and low-oligosaccharide FFSB were similar in apparent total tract digestibility of energy (79.5 vs. 79.7%; Table 2). Soybean meal had 15% higher apparent total tract digestibility of energy than regular FFSB or low-oligosaccharide FFSB. Soybean meal, regular FFSB or low-oligosaccharide FFSB were similar in digestible energy value (4.45 vs. 4.44 or 4.45 Mcal/kg); however, soybean meal had 15% lower net energy value than regular FFSB or low-oligosaccharide FFSB that were similar in net energy value

(Table 2). Lentil had a lower apparent total tract digestibility of energy than soybean meal (86.7 vs. 94.1%) resulting in a lower digestible energy value for lentil than soybean meal by 12%. Lentil and SBM were similar in net energy value (2.62 vs. 2.61 Mcal/kg).

The cost of net energy for soybean meal (\$0.164/Mcal) was lower than that of regular

Table 1: Analyzed composition (on a DM basis) of feedstuffs

Item, %	Feedstuff <sup>1</sup>			
	SBM	R-FFSB	LO-FFSB	Lentil
Crude protein	52.3	43.2	43.4	27.4
Fat (ether extract)	1.78	19.1	20.6	1.63
Fibre (neutral detergent fibre)	7.93	12.1	13.5	15.6
Starch	0.19	0.53	0.35	28.6
<b>Amino acids</b>				
Lysine	3.30	2.76	2.64	1.75
Methionine	0.70	0.57	0.56	0.19
Threonine	1.93	1.61	1.60	0.93
Tryptophan	0.80	0.54	0.61	0.18
Trypsin inhibitor activity, mg/g	6.21	3.23	4.31	2.48
Stachyose	-	5.23	1.95	-
Raffinose	-	0.57	0.14	-

<sup>1</sup>SBM = soybean meal; R-FFSB = regular full-fat soybean; LO-FFSB = low-oligosaccharide full-fat soybean.

FFSB or low-oligosaccharide FFSB, which were similar in cost (\$0.181 vs. 0.175 /Mcal). The cost of net energy for lentil (\$0.170/Mcal) was similar to that of soybean meal.

The regular FFSB and low-oligosaccharide FFSB were similar in SID of most amino acids (Table 2). The SID of most indispensable amino acids (amino acids that cannot be formed in the body, and thus they have to come from the diet) for soybean meal was higher than that for regular FFSB or low-oligosaccharide FFSB by 30%. The SID of indispensable amino acids for lentil was 12% lower than that for soybean meal.

In conclusion, micronized regular FFSB and low-oligosaccharide FFSB are similar in net energy value and SID of most amino acids, implying that reduction in oligosaccharide (raffinose and stachyose) content of soybean through plant breeding had minimal effect on net energy value and SID of amino acids. The regular FFSB or low-oligosaccharide FFSB had higher net energy value and lower SID of amino acids than soybean meal, implying that micronized FFSB (regardless of variety) is a better source of dietary energy but not amino acids for pigs than soybean meal. However, the cost of net energy for the FFSB products was higher than that for soybean meal due to the higher price

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**Table 2: Standardized ileal digestibility of amino acids, apparent total tract digestibility (ATTD) of energy, digestible and net energy values and cost of net energy for feedstuffs**

Item	Feedstuff <sup>1</sup>				SEM
	SBM	R-FFSB	LO-FFSB	Lentil	
ATTD of energy, %	94.1 <sup>a</sup>	79.5 <sup>c</sup>	79.7 <sup>c</sup>	86.7 <sup>b</sup>	1.21
Digestible energy, Mcal/kg dry matter	4.45 <sup>a</sup>	4.44 <sup>a</sup>	4.45 <sup>a</sup>	3.91 <sup>b</sup>	0.07
Net energy, Mcal/kg dry matter	2.62 <sup>b</sup>	2.96 <sup>a</sup>	3.07 <sup>a</sup>	2.61 <sup>b</sup>	0.05
Price of feedstuffs, \$/tonne	429	536	536	443	-
Cost of net energy, \$/ Mcal	0.164 <sup>c</sup>	0.181 <sup>a</sup>	0.175 <sup>ab</sup>	0.170 <sup>bc</sup>	0.003
<b>Amino acid digestibility, %</b>					
Arginine	95.6 <sup>a</sup>	74.0 <sup>c</sup>	76.6 <sup>c</sup>	87.1 <sup>b</sup>	2.07
Histidine	94.4 <sup>a</sup>	76.8 <sup>c</sup>	74.5 <sup>c</sup>	86.1 <sup>b</sup>	1.93
Isoleucine	92.9 <sup>a</sup>	63.3 <sup>d</sup>	69.5 <sup>c</sup>	81.0 <sup>b</sup>	2.14
Leucine	91.4 <sup>a</sup>	63.1 <sup>d</sup>	69.8 <sup>c</sup>	80.0 <sup>b</sup>	2.13
Lysine	93.3 <sup>a</sup>	76.6 <sup>b</sup>	79.4 <sup>b</sup>	80.9 <sup>b</sup>	2.95
Methionine	95.8 <sup>a</sup>	69.0 <sup>c</sup>	78.4 <sup>b</sup>	88.6 <sup>a</sup>	3.79
Phenylalanine	91.6 <sup>a</sup>	66.9 <sup>c</sup>	68.9 <sup>c</sup>	81.7 <sup>b</sup>	2.10
Threonine	88.2 <sup>a</sup>	65.3 <sup>c</sup>	69.0 <sup>c</sup>	80.9 <sup>b</sup>	2.47
Tryptophan	92.9 <sup>a</sup>	90.3 <sup>a</sup>	86.6 <sup>a</sup>	72.4 <sup>b</sup>	2.20
Valine	88.7 <sup>a</sup>	65.2 <sup>c</sup>	68.4 <sup>c</sup>	76.8 <sup>b</sup>	2.01

<sup>1</sup>SBM = soybean meal; R-FFSB = regular full-fat soybean; LO-FFSB = low-oligosaccharide full-fat soybean.

of FFSB. Lentil had lower SID of amino acids than soybean meal. However, lentil and soybean meal were similar in net energy value and cost of net energy. Thus, lentil can serve as an alternative feedstuff for pigs.

### Overall recommendation

Full-fat soybean following heat-treatment, either regular or low oligosaccharide, and lentil are alternative feedstuffs for grower-finisher pigs. However, the amounts of full-fat soybean and lentil included in swine diets should be based on the targeted growth performance and price of full-fat soybean and lentil. ■

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# The effectiveness of sprinkling during transport

By Louise Thériault and Ken Engele on behalf of Swine Innovation Porc

Research funded by Swine Innovation Porc has found that sprinkling pigs on-farm prior to transport, and just prior to unloading at the packing plant, improves pig comfort

and meat quality when outside air temperatures exceed 20°C. The results were generated from a pan-Canadian project conducted in summer 2011 by Luigi Faucitano, Centre for Research and Development of the Dairy and Swine Agriculture and Agri-Food Canada, Sherbrooke, Quebec.

It has been generally accepted that high temperatures contribute to the mortality of pigs during transport, and sprinkling during transport effectively reduces the pig's body temperature. Currently there are no standard guidelines regarding when to sprinkle pigs during summer months; truckers sprinkle the pigs when they feel it is "hot". This study, the first of its kind in North America, has been conducted to provide a clear procedure to follow for the transport of pigs to the processing plant under summer conditions. To accomplish this, the efficacy of sprinkling was evaluated in a trailer in hot



Swine Innovation Porc

conditions on the welfare of pigs and meat quality, in addition to identifying the most suitable temperature for the maximum efficiency of the mist.

From June to mid-September 2011, nearly 5,000 market pigs were transported, for 2 hours, to slaughter in one of two pot belly trailers with a capacity of 208 hogs. The first trailer was equipped with a sprinkling system designed to sprinkle the pigs five minutes prior to departure at loading (on-farm), and 5 minutes before unloading at the slaughter plant in order to reduce the stress associated with loading and the wait before unloading.

Spraying 125 litres of water after loading on-farm and just prior to unloading at the plant was effective in reducing stress associated with transport, and subsequently improving meat quality of pig located in the most critical compartments of the truck when outside air temperatures exceeded 20°C. The results were obtained by measuring blood lactate levels at slaughter and pH in the loin muscle one hour after slaughter.

## Negative heat

The upper limit of the thermoneutral zone of pigs during transport is 30°C. Above this temperature pigs must use various behavioural and physiological mechanisms to maintain constant body temperature. However, when conditions are extreme, these regulatory capacities may be insufficient to dissipate heat and it is at this point that death by hyperthermia may occur.

### "At 20°C or more, sprinkling during transport is beneficial"

During summer, the temperature inside a pot-belly trailer can be hotter than the ambient outside temperature up to 6°C, especially in the lower compartments and those on the front of the middle deck. When these conditions exist it is beneficial to cool pigs through sprinkling, reducing body temperature in hot weather and improving the pig's well-being. The current guidelines for the use of sprinkler systems are based on industry practices and are inconsistent because some guidelines recommend watering pigs in a stationary vehicle at ambient temperatures of 15°C, while other guidelines recommend sprinkling at 27°C.

During the experiment, the outside temperature ranged from 14.1 to 25.8°C. Researchers collected additional data such as variations in temperature, relative humidity and ammonia levels in the trailers, in addition to the change in body temperature of pigs, stress and behavior of animals. The temperature of the pigs was recorded using temperature



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**What is an iButton?**

The iButton is a digital thermometer connected to a computer chip enclosed in a stainless steel box. In this project, the iButtons were orally administered 12 hours before loading pigs and recordings were made from the gastrointestinal tract during the handling and transport.



data loggers (iButton) which were orally administered. Several observations were made using video cameras in four compartments - one on the upper deck and two on the middle and lower decks.

**Relax in a shower**

Pigs transported in semi-trailer equipped with a sprinkling showed a lower blood lactate level than pigs transported with no sprinkling system. The lower lactate level indicates an improvement in their physical condition caused by reduced fatigue during slaughter. An hour after bleeding, the rate of acidification of the meat, as measured by the pH in the loin muscle, was lower in pigs showered, indicating a pig that was less stressed and which produced a better quality of meat.

Very few Canadian trucks are equipped with a sprinkling system because of uncertainty about its effectiveness and the

lack of guidelines for its use. Recommendations generated from this project will make a difference as they are now included in the training program “Canadian Livestock Transport”. Results led the researchers to conclude that sprinkling may help alleviate heat stress in transport, and without increasing slipping and falls during unloading.

**Acknowledgements**

The realization of this project was made possible through a financial contribution by Swine Innovation Porc, its private partners and Agriculture and Agri-Food Canada. ■



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## Porcine Circovirus and the breeding herd

By Dr. Egan Brockhoff, Prairie Swine Health Services, Red Deer, Alberta, and University of Calgary, Faculty of Veterinary Medicine

Should I vaccinate my sows for circovirus? No matter what swine meeting I attend around the world this is a question that producers, veterinarians and researchers are all asking one another and talking about on an increasing scale. These are challenging times, and of course everyone is interested



Veterinary students from the University of Calgary vaccinating sows

in maximizing their competitive advantage and looking for large or small ways to make any incremental improvements they can in production and performance. So how do I answer that question? Sometimes I feel like a bit of a politician when it is posed to me because there just isn't a black and white answer on sow vaccination yet. Yes, the piglet circovirus vaccines are a great success

and likely some of the most efficacious tools we have on the planet with respect to maximizing pig health. However, the discussion and research around vaccination of the breeding herd is less clear. What works for one farm may not work for another. Remember, even in sister flows we see considerable variation in productivity.

As feed costs rise so too does the cost of developing gilts and maintaining sows. Of course we want to continue to maximize our productivity and genetic improvement through

optimal parity distribution and replacements but what if we could achieve the same with less, or even better, achieve more with less? Exploring ways to continually improve lifetime productivity, farrowing rates, born alive, pigs marketed and optimizing feed conversion are all on our mind. On a day to day basis we can often see those big ticket items that make those monumental differences. Vaccinating piglets for circovirus was one of those monumental interventions, but what about your breeding herd?

There are four areas o your herd where you may consider vaccination for PCV2:

- Pigs at weaning
- Gilts for replacement
- Boars
- Sows

The choice to vaccinate in any of these areas of production should only be considered by you and your veterinarian if there is sufficient evidence of disease.

---

**"Most of our gilts at entry into the breeding herd (if not all in many herds) are now negative for PCV2"**

---

So the first question I think that needs to be answered is "can we find evidence that circovirus is affecting your breeding herd or your finishing herd?" For the breeding herd this is often done by examining your production records along with ruling out other common reproductive or pre-weaning mortality factors. What about your gilts and boars? Recent publications on gilt exposure to PCV2 show that most of our gilts at entry into the breeding herd (if not all in many herds) are now negative for PCV2. Will this impact

their reproductive performance? At the International Pig Veterinary Society (IPVS) there were a number of presentations on various ways to explore the impacts of PCV2 in your breeding herd and young pig populations. Recently there has been a number of farms report a positive benefit on their sow herd performance. Figure 1 shows selected reproductive parameters in approximately 22,000 sows before and after vaccination in a Canadian sow herd. In this sub-population there was a minor but statistically significant improvement in

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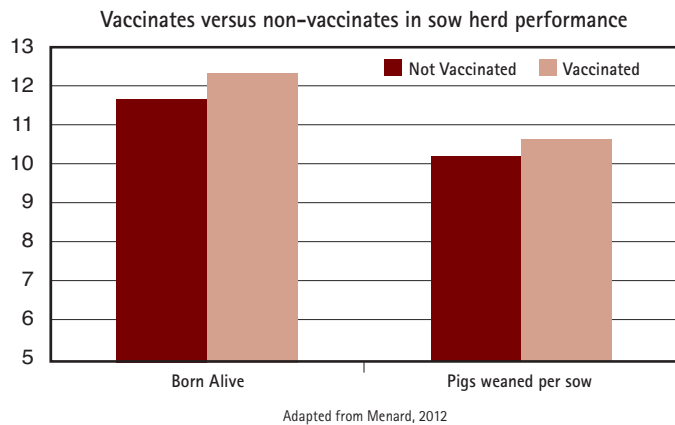
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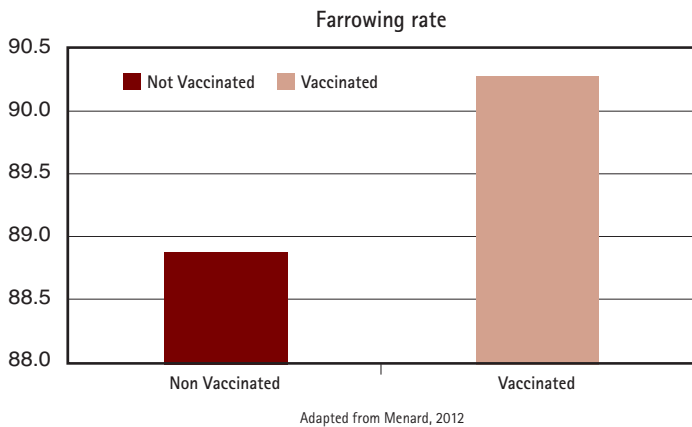
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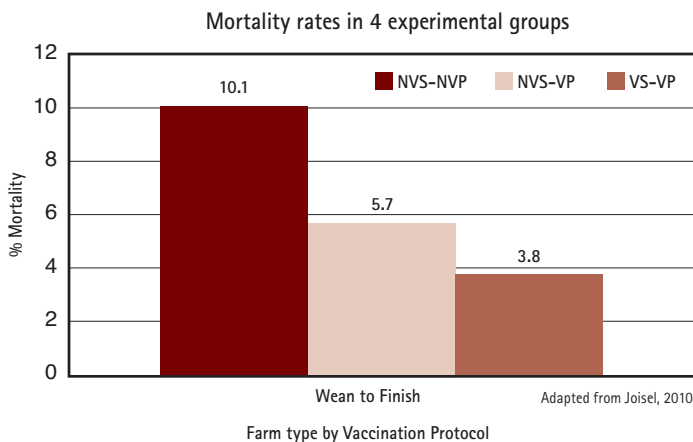
**Figure 1: Impact of PCV2 vaccination of select reproductive parameters**



**Figure 2: Impact on farrowing rate on PCV2 vaccinated and non-vaccinated females**



**Figure 3: Mortality rates in 4 experimental groups with different vaccine protocols**



reproductive parameters. The author further went on to study the impact on farrowing rate in this group of breeding females (Figure 2). In this there was also a clear and statistically significant improvement in production. Of course the challenge in small populations is realizing a net benefit from this improvement. In large herds the net benefit will be more economically significant.

Working with your veterinarian to explore all other possible concerns will often times lead us to conducting a field trial. Figure 3 outlines an interesting investigation where the researchers examined four experimental groups:

- NVS-NVP = non-vaccinated sows + non-vaccinated piglets
- NVS-VP = non-vaccinated sows + vaccinated piglets
- VS-NVP = vaccinated sows + non-vaccinated piglets
- VS-VP = vaccinated sows + vaccinated piglets

In this trial we clearly see a significant difference between the experimental groups of wean to finish pigs. The blue group on the left shows the impact this herd faced when both sows and piglets were not vaccinated. The red group represents a typical vaccination protocol in which the piglets are vaccinated but the sows are not. The green column represents a vaccinated population of sows and piglets. Within the context of this trial there was an improvement realized when both the sows and the piglets were vaccinated. Again, it is important to recognize that these results are for this farm and these groups of pigs. This experiment informs the discussion but does not define it.

Before we started having the discussion on breeding herd vaccination we had already started the discussion about what

CONTINUED ON PAGE 66

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Weak and ill-thrift piglets affected by PCV2 and secondary disease

to do with emerging early PCV2 infections. Already in 2009 we were starting to see evidence that PCV2 was moving back into younger and younger pigs as PCV2 vaccination at weaning began modulating this disease's expression. Are you seeing disease in your piglets or nursery? The photo above shows a common presentation of weak and ill-thrift piglets affected by PCV2. In herds such as these with early evidence of infection we, and many others, have been forced to return to sow vaccination to provide nursing and nursery protection to the piglets. Piglet vaccination has been maintained to ensure pigs are protected all the way to market.

The final topic I would like to review is boars and their semen. Regardless of whether you use natural mating or AI the impact on your herd is far greater than that of a single sow. It has been well documented that PCV2 can influence reproductive performance through increased abortions, mummies or stillborn. It has been reported that 7 month old boars infected with PCV2 will shed the virus in their semen for at least 47 days following the infection. Unfortunately the boar is often overlooked in our typical herd level vaccination and acclimation programs. Given the impact a single boar

can have on your herds' health and performance it may be advisable to vaccinate all boars for PCV2 prior to arrival in your herd or prior to their entry into the boar stud. For the past two years we have been recommending that all boars be vaccinated prior to their first breeding and annually thereafter.

PCV2 continues to influence our herds in many new and varied ways. Increasing amounts of research suggest that herds should consider the vaccination of both their replacement gilts and replacement boars at or near the time of selection. The choice to use a PCV2 vaccine in your mature breeding herd should only be considered if you and your herd veterinarian have diagnosed PCV2 as a production-limiting disease in the breeding herd or the early stages of the piglets' life. Further insight and research into PCV2 will continue to inform this discussion especially as this disease continues to change how it behaves in different herds at different times. I often describe herds as having their own finger print. What happens in one herd or affects a single herd may not happen in the same way or at all in the next herd. In many cases further vaccination is not necessary; working with your veterinary health team is the best way to determine the effects of PCV2 on your breeding herd. ■

<sup>1</sup> Jacela JY, Dritz SS, DeRouchey JM, et al. Field evaluation of the effects of a porcine circovirus type 2 vaccine on finishing pig growth performance, carcass characteristics, and mortality rate in a herd with a history of porcine circovirus-associated disease. *J Swine Health Prod.* 2011;19(1):10-18.

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<sup>6</sup> Sanford E. PCV-2 Related Reproductive Failure in Startup Herds. *Proc International Pig Veterinary Society* 2002.

<sup>7</sup> Opriessnig T, Kuster C, Halbur PG. Demonstration of porcine circovirus type 2 in the testes and accessory sex glands of a boar. *J Swine Health Prod.* 2006;14(1):42-45.

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# International Round-up

## Live yeast supports sow health

Post-partum dysgalactia syndrome (PPDS) is a primary cause of neonatal problems such as diarrhoea, crushing and poor growth) but is difficult to characterize because of its multiple symptoms and the difficulty in diagnosing the cause. Bacterial endotoxins from the sow's own gut have been implicated as being part of the cause.

On a unit suffering chronic PPDS, French researchers found greater bacterial endotoxin levels were present in the colostrum of sows suffering PPDS symptoms such as high temperatures and neonatal diarrhoea.

The high endotoxin levels found in colostrum were also found in blood samples taken from suckling piglets. To alleviate the symptoms, sows were fed a live yeast (*S. cerevisiae* CNCM-I 1079) at a rate of 2x109 CFU/kg for 3 weeks prior to farrowing.

Whilst the results were not significant, the yeast tended to reduce endotoxin levels present in colostrum as well as reducing the prevalence of sows with high temperatures.

Despite other studies where feeding sows live yeast improved litter growth and litter health, in this instance where only 30 sows were studied, there was no difference in performance or health between litters from supplemented and un-supplemented sows.

This data adds to a number of other studies which suggest the benefits of feeding live yeast to sows as an aid to both sow and piglet health.

Reference: Guillou, D., et al. 2013. Journées Recherche Porcine. 45, 269-270

## Reduced dietary phosphorous does not impact pig growth

Dietary phosphorus can be reduced below the current commercial standards without negative effects on pig health and performance, according to recent research carried out by the British Pig Executive. At the same time this will also result in a reduction in diffuse phosphorus levels in the manure and effluent, consequently reducing phosphorus load to the

environment, says a research report. From the producer's perspective, it reduces the need to add additional, costly P to the diet.

Three diets, all including phytase enzymes, with differing levels of P, were fed to grower and finisher pigs in two different farms. The trial was repeated over two batches. All pigs were housed in indoor straw pens distributed over three buildings on each farm with each building supplying one of the diets.

The levels of total P in the different diets for the growers were: Low: 3.76g P per kg feed, Medium, 4.03g P per kg feed and High: 4.29g per kg feed. In the finisher diets, the levels were 3.34g P/kg, 3.84g

P/kg and 4.09g P/kg. The High diets represented the current industry standard.

"As expected, average daily gain, lean meat percentage and feed conversion of pigs differed on different farms and between batches, but these differences did not relate to the amount of phosphorous in the pig's diet," notes the report. "Overall, the farm trials showed that pig performance was not compromised when the P content of growing and finishing diets was reduced below normal commercial levels."

Data on the amount of P in the pigs' faeces is expected to show a reduction in P excretion, says the report.

CONTINUED ON PAGE 68

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## **Brits have new weapon in the fight against illegal pork**

As the British industry fights to prevent imported pork which has been produced in sow stall systems entering the food chain, it will shortly have a new weapon that will identify the geographic location of pork and pork products. The British Pig Executive is close to announcing the launch of a new test known as Sira, which stands for Stable Isotope Ratio Analysis). It uses a database of natural chemical variations in pork samples from around the

United Kingdom to determine whether pork products carrying the Union flag really do come from the United Kingdom. Tests have been carried out on a database of 474 farm locations across the country, looking at isotopes (variants) of deuterium, carbon, nitrogen and sulphur, which are slightly different, area by area.

Trials with Sira show 90 percent accuracy in identifying whether pigmeat sold as British really is British. And the chances of imported pork, bacon and ham testing positive as being British are less than 5 percent.

Tests will continue to ensure total confidence in the system for all pork

products, including cooked products.

The BPEX work started several years ago and is nearing completion at a time when British consumers, politicians, and the media, are clamouring for greater supply chain transparency following the scandal of horse meat being found in beef products in several retailers.

## **USDA investigates improved carbon dioxide euthanasia**

Euthanasia is becoming an increasingly important topic, because it is under scrutiny by welfare organizations and consumers. Blunt force trauma procedure is humane when carried out correctly but most people find it aesthetically repugnant. There has been more interest in methods involving gases such as nitrogen and carbon dioxide in recent years, with research projects in Europe and North America investigating alternatives to current practices.

A concern with the use of CO<sub>2</sub> is the fact that pigs show an aversion to it, which raises welfare concerns. A two-step procedure in which pigs are anaesthetised with a mixture of nitrous oxide and oxygen before being euthanized with carbon dioxide may prove to be more humane than carbon dioxide alone, according to Don Lay of the USDA Agricultural Research Service.

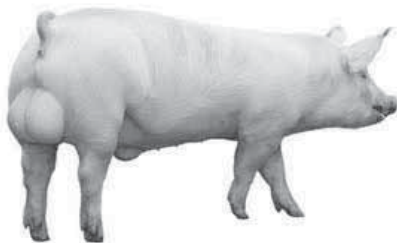
**"Euthanasia using nitrous oxide and oxygen was the only treatment that anaesthetised the pigs"**

Three projects were conducted by USDA researchers to determine the aversiveness and the effectiveness of different mixtures of gas to euthanize piglets. The gases tested included carbon dioxide, argon, nitrogen, and nitrous oxide. This research sought to identify a method of scientifically determining if pigs find a specific euthanasia method aversive, and to develop an innovative method of gas euthanasia using nitrous oxide.

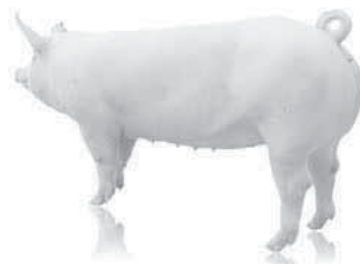
In two experiments, pigs were allowed to walk freely between one chamber filled with air and another chamber either gradually filled with gas or pre-charged with gas. This showed that all the gas

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mixtures adversely affected the pigs but that those with high carbon dioxide content were worse. Pigs exposed to the pre-charge gas rapidly entered a state of panic, in contrast to gas mixtures containing only 30 per cent carbon dioxide for which pigs were slower to panic.

In a third experiment, pigs were euthanized with four different gas mixtures. It was found that pure carbon dioxide or carbon dioxide mixed with nitrous oxide killed pigs more quickly and thus could be more humane than the other treatments. However, euthanasia using nitrous oxide and oxygen was the only treatment that anaesthetised the pigs. These pigs did not appear to feel pain.

Thus, a two-step procedure in which pigs are anaesthetised with a mixture of nitrous oxide and oxygen before being euthanized by immersion in carbon dioxide may prove to be more humane than carbon dioxide alone, the researchers concluded. Data on brain activity, such as the use of electroencephalogram (EEG), would help to confirm this finding, they say.

### Longer farrowing reduces sow fertility

Recently-published research from Finland suggests that sows that take a long time to farrow show reduced fertility following weaning. The objective of the study was to determine the effects of duration of farrowing on subsequent repeat breeding rate. It involved 148 sows on a commercial farm and the data analysis looked at the interactions between parity, weaning to oestrus interval, boar, number of inseminations, season, sow back-fat thickness, gestation length, duration of farrowing, number of live-born piglets, number of stillborn piglets, lactation length, and number of piglets weaned. Furthermore, two farrowing systems (crate vs. pen) were investigated.

The total duration of the previous farrowing was longer in sows that returned to service and were re-bred ( $357 \pm 207$  minutes, average  $\pm$  SD) than in those sows that held to their first service ( $255 \pm 126$  minutes;  $P < 0.01$ ). The other parameters were not statistically significant to the outcome of first insemination after weaning, say the researchers. They concluded that sows with a long farrowing duration have higher repeat breeding rate

at the first insemination after weaning and that this factor could be used as an indicator for subsequent fertility.

### Low meat intake compromises health

A recently-published study by British experts in human nutrition says that millions of people in the UK are putting their health at risk because of an inadequate intake of vital minerals and vitamins that's due, in part, to an inadequate intake of red meat.

The study - a review of more than 100 previous studies in the UK - found that people of all ages "can be worryingly low" in nutrients that are commonly found in meat, including vitamins A and D, iron, magnesium, zinc, potassium and selenium.

Mineral and vitamin intake in seven age groups was studied and this found that people in every age group were deficient in minerals and vitamins. However, the researchers note that beef, veal, lamb and pork are good to "rich" sources of high-quality nutrients and protein and can help improve human nutrition in the UK.

The British Scientific Advisory Committee on Nutrition now recommends that adults should consume 70 g (2.5 oz.) of lean red meat per day and up to 500 g (17.6 oz.) per week, according to the study.

**"People who regularly consume lean meat tend to also eat more fruits, vegetables and low-fat dairy products"**

"Meat has long played a central role in the human diet and is now recognized as an important source of essential nutrients and high-quality protein," says Dr. Carrie Ruxton, an independent dietician who co-lead the study. "Our review indicates that even in developed nations such as the UK, there is evidence of under-consumption of key minerals and vitamins that support long-term health, many of which are present in red meat."



People who eat insufficient meat could be short of essential vitamins and minerals

Furthermore, she points out that people who regularly consume lean meat tend to also eat more fruits, vegetables and low-fat dairy products, which suggests that including red meat in the diet does not displace other important foods.

"Meat had a central role in the diet of early man and continues to have such a role in modern times," Ruxton says. ■

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# View from Europe

## What do uneven litters cost?

Uneven litters - some nice big ones at birth, but too many small ones. A problem that has been with us for years. It is now coming into prominence with these welcome large litters of 14s or more due to genetics and better management. Canada is no exception in both these areas of good and bad news. Talking to one of my clients two years ago we had a long talk about how even his litters were, despite – if that is the right word – very prolific sows. He said he was certain that an uneven litter cost him a lot and sketched his reason why on the back of an envelope.

How right was he? This set me searching for evidence of any work done on the relationship between even and uneven litters in weight terms. I could find very little, if any, and nothing at all on what the difference early on might be in economic terms by slaughter weight. So I thought I would try to see if I could put some information into the pot.

### A two-farm trial

With the help of two interested clients, we had a go at finding out. This was a farm trial and not a scientific one. So it must be viewed in this light, but we did consult a rather hesitant statistician in setting it up (he was unable to visit the farms and wanted more replicates). If the end result were to comprise minor differences, this may have been important in setting it up, but two things have encouraged us to float the findings on the water.

1. The satisfactory difference in the economic benefit rather surprised us. (Table 1).
2. The groups of even-litter pigs looked so much better at slaughter – fit and with a better “bloom”.

I accept that in this case “one swallow does not make a summer”, so I hope others will see if the same sort of productive benefits which we found can be confirmed, as there is precious little information on how much profit uneven litters can cost us, as far as I can see. Secondly, while it was a farm trial, it was done on commercial money-making units under real conditions and with actual marketing returns at the end of it. We would have liked to measure more litters through to slaughter it is true, but production constraints and labour availability constricted us, which often happens with farm trials.

**Table 1: Following “even” and “less even” litters through to slaughter**

Average weight ranges at 24 day weaning, heaviest to lightest pigs.....		
	21 even litters	19 less even litters
Weight range at weaning	6.40 - 5.90kg	6.24 - 5.21kg
Total litter weight at weaning (kg)	73.2	70.1
Mortality to finish	3.6%	3.9%
Av. litter live weight at finish (kg)	1137	1129
Av. feed eaten/litter by finish (kg)	2615	2676

(The uneven litters were 8 kg lighter and ate 61kg more feed).

Thus extra MTF\* per even litter by finish weight – 18kg/tonne of feed.

Value at C\$ 1.75/kg/dwt. C\$ 31.50 per tonne of feed per litter

\*(Saleable) Meat per Tonne of Feed eaten to finish weight, which automatically takes into account FCR, ADG, mortality and dressing %.

### Results

We selected and weighed 21 “even” litters and 19 “less-even” litters of the same numbers (averaging 12.3 and 12.1 born-alive respectively) and deliberately avoided some of the litters where the differences in weight were considerable - the first line in Table 1 shows what the spread of weights were by weaning. We half expected this fairly modest difference (based on subjective judgement of the producer, his farrowing section-head and myself taken a few days after farrowing) before we set about weighing them, eg. “That litter’s lovely and that lot looks not so good” - to have provided a modest difference too. This turned out not to be the case by slaughter weight in economic terms (see below) even if the physical differences were there, but not radically so – see lines 4 and 5 in the table. This further supports my long-held belief that any early-pig trial should, wherever possible, be carried on to slaughter weight under identical



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rearing conditions – as we did here - so that some econometric guideline figures can be mentioned, using whatever assumptions the researcher cares to apply. Sure – just guidelines; but useful nevertheless to those of us at the sharp end.

I express the result in MTF terms as in addition to these performance attributes the extra income also indicates, if it is there, any equivalent reduction in the cost/tonne of the total grow-out feed.

**Comment**

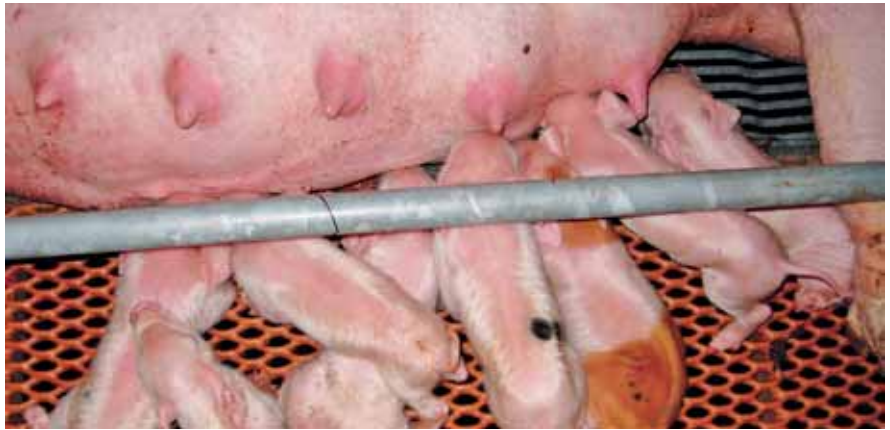
The encouraging amount of extra saleable meat secured from each tonne of feed eaten by the more even litters surprised us. Why was this? Probably because the less even litters took 3 days longer to reach the target shipping weights of the two farms, which accounts for most of the extra food they consumed, thus affecting MTF.

---

**“The uneven litters took 3 days longer to reach the target shipping weights of the two farms”**

---

This raises the possibility that a greater proportion of the lighter pigs did not compete so well for feed, or suffered some



Uneven litters are costly to producers, says consultant John Gadd

other form of competitive stress affecting their feed conversion, which was 0.07:1 (3%) worse. I wonder if penning those litters which look more uneven together during grow-out and giving them 33%-50% more trough/hopper space for 3 weeks or so post-weaning in the nursery will help towards giving them a better start? This is what the two farmers are now doing and I will report on this “before and after” trial in due course, including the extra costs of reduced accommodation.

Next month I will look at how to get more even litters - part two of this discussion. The information is there - but in my opinion awareness is lacking probably due to the complexities involved. ■

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# Water consumption a powerful tool in health monitoring

Automated monitoring of water consumption could provide a sensitive tool for real-time, continuous monitoring for the presence of sub-clinical disease in growing herds, according to a recent publication by the British Pig Executive (BPEX).

The drinking behaviour of diseased pigs has been found to deviate from the consistent patterns seen in healthy pigs. Behavioural changes appear in the sub-clinical stage of infection, before disease symptoms become visually apparent. Therefore, the automated monitoring of water consumption could provide a sensitive tool for real-time, continuous, monitoring for the presence of sub-clinical disease in growing herds.

---

**"This study demonstrates the potential of water consumption patterns as a powerful tool to monitor pig health"**

---

Previous work has examined changes within daily water consumption and found whole building and room consumption patterns to be sensitive indicators for all-in, all-out systems. Later research at Newcastle University investigated the sensitivity of monitoring water on a more detailed level, using total daily water consumption at pen

level, for deviations in daily water intake patterns that could indicate changes in health and performance.

## Trial details

Over two replicates, the daily water consumption of 24 pens of finishing pigs was monitored from entry to the finishing building (52.6kg) until exit for slaughter (85.3kg). Water was available ad libitum via two nipple drinkers per pen. To determine influence of drinker type, two types of commercial drinker were fitted equally across pens. Water meters fitted to the downpipe supplying each pen logged water use at five-minute intervals. Sensors also logged internal and external barn temperature. Meters and sensors were linked to a computer modem (Barn Report, Farmex Ltd.), from where data could be accessed via an internet connection.

Clinical disease symptoms and veterinary treatments were recorded for each pen daily; cough, diarrhoea and sneeze scores were recorded for each pen weekly. Pig weights were recorded every two weeks and pen feed consumption was recorded in the second replicate.

## Trial results

Pigs took an average of 6.6 weeks to reach slaughter weight. The average daily gain of all pigs was 0.70kg per day. Water



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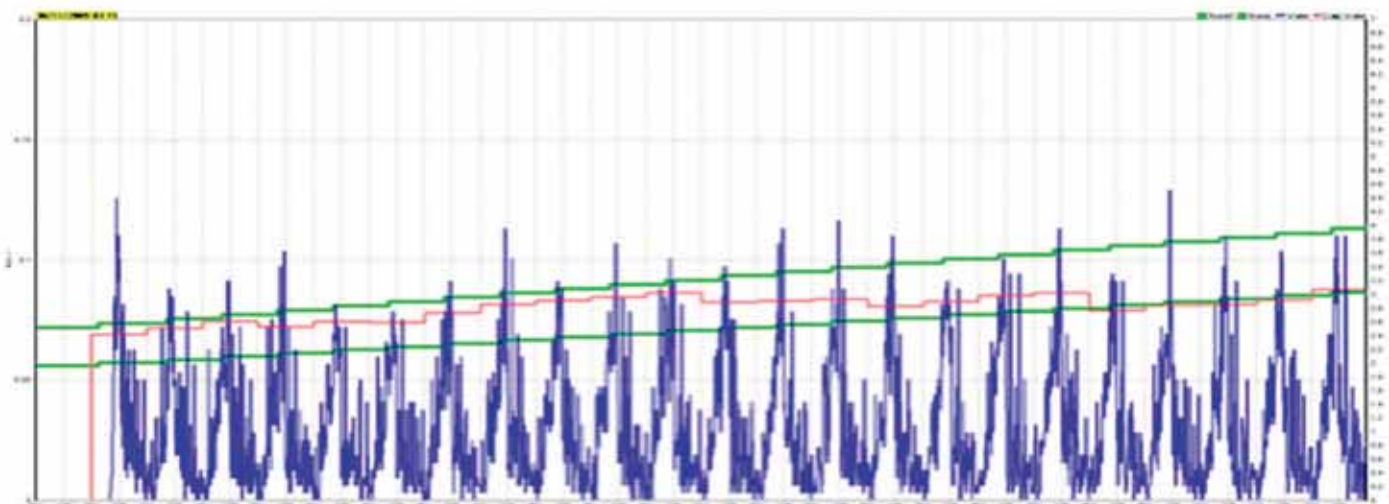
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Figure 1: Farmex Barn Report water consumption graph



consumption increased linearly, with a lower rate of increase as pigs neared slaughter weight. On average, pigs consumed (use plus wastage) 7.07 litres of water per kg of gain.

Daily variation in water use per pen was influenced by the weight of the pigs, the number of pigs within the pen, daily live weight gain, drinker type and the external minimum and external maximum building temperatures, accounting for 53 per cent of the total variation in daily water consumption. Relationships were also found between water use and pig body weight, average daily gain, FCR, building temperature and group size.

The average pen water consumption per pig in relation to observed symptoms of disease (as recorded by the health scores), showed a reduction in water consumption in pens suffering from scour at a clinical score of four in week two of the trial. However, this reduction was not statistically significant. Of relevance to sub-clinical disease detection, pens scored for occurrence of scour in the following week (one week later), had a strong tendency towards reduced water consumption in the current week.

## Conclusions

Even when recorded at a more detailed pen level, this study demonstrates the potential of water consumption patterns as a powerful tool to monitor pig health. Although at the level of a tendency, the reduction in water consumption in relation to the severity of scour is an encouraging finding for water consumption recorded at the pen level. A larger sample is needed to see if this would become statistically significant.

The relationships between body weight, live weight gain, feed intake, temperature and group size suggest the potential for modelling of water consumption to a level that delivers information not only on current and predictive information on pig health, but also on the rate of feed intake and growth performance. Research is on-going in this area and in the long run could lead to a sophisticated, fully automated

monitoring package for producers to simultaneously monitor environmental performance and health. ■

## Reference

Crabtree, H.G., Bird, N., Ravn, L. and Edwards, S.A. 2008. Changes in water intake patterns as an automated early indicator of pig welfare problems. Proceedings of the 4th International Workshop on the Assessment of Animal Welfare at Farm and Group Level. 82. February 2013

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