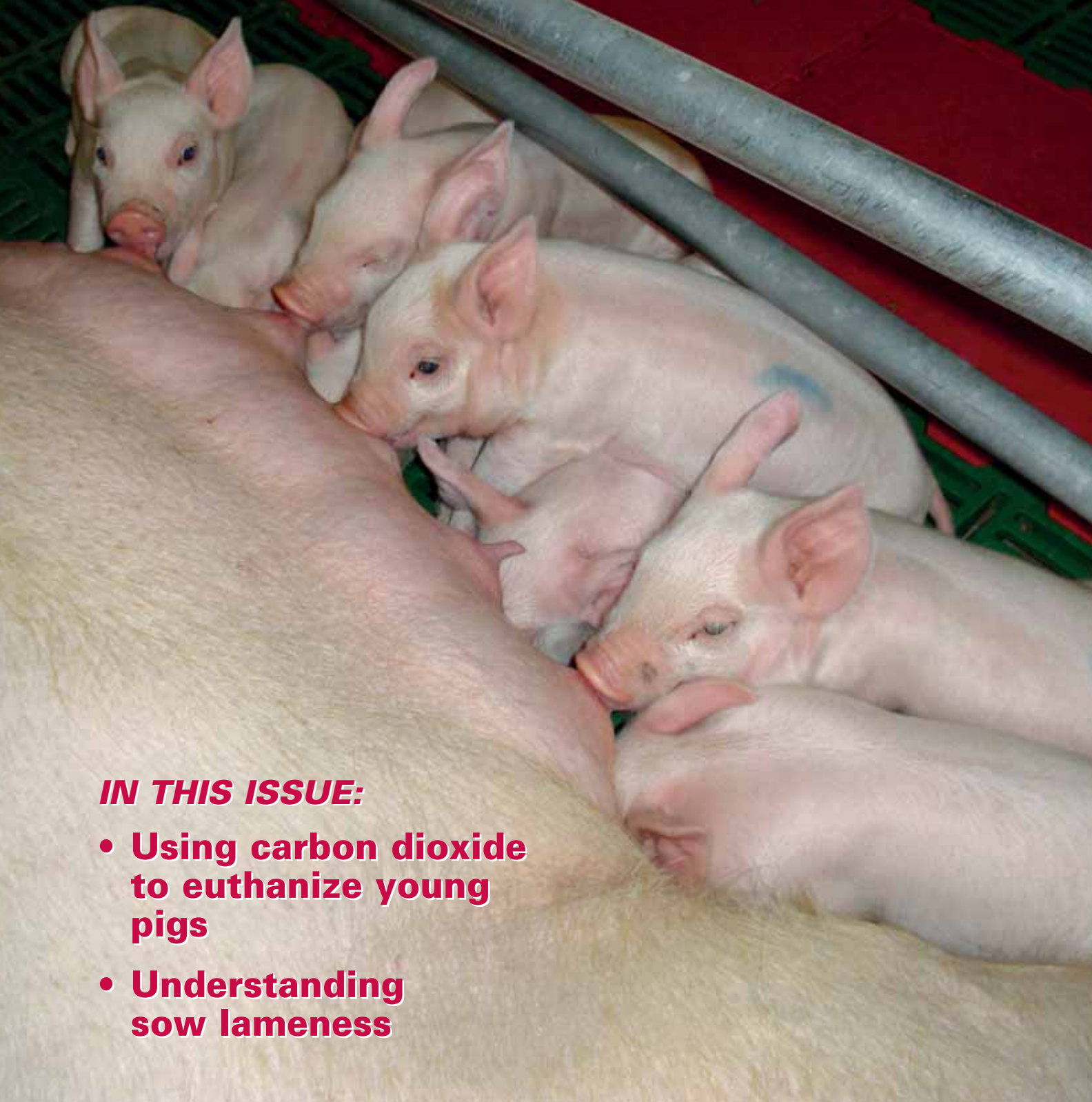


Western Hog Journal



IN THIS ISSUE:

- **Using carbon dioxide to euthanize young pigs**
- **Understanding sow lameness**



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*Same auto sort barns – Same time frames – USA high health herd – Genesis females

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Western Hog Journal

Volume 30, Number 5

SPRING 2009

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COVER PHOTO

A litter of piglets relaxes after suckling

WEBSITES OF INTEREST

PROVINCIAL ASSOCIATIONS

Alberta Pork	www.albertapork.com
Saskatchewan Pork	www.saskpork.com
Manitoba Pork Council	www.manitobapork.com
Nova Scotia Pork	www.pork.ns.ca
Ontario Pork	www.ontariopork.on.ca
PEI Pork	www.peipork.pe.ca

NATIONAL ASSOCIATIONS

Canadian Pork Council	www.cpc-ccp.com
Canada Pork International	www.canadapork.com
National Pork Producers	www.nppc.org

MARKETING ASSOCIATIONS

Manitoba Pork Marketing Co-op Inc.	www.mpmc.mb.ca
SPI Marketing Group Inc.	www.spimg.ca
Western Hog Exchange	www.westernhogexchange.com

OTHER SITES OF INTEREST

Banff Pork Seminar	www.banffpork.ca
Lacombe Research Centre	http://res2.agr.ca/lacombe/
Prairie Swine Centre	www.prairieswine.com
U of A	www.afns.ualberta.ca
VIDO	www.usask.ca/vido

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Published quarterly by Alberta Pork with cooperation from the British Columbia Hog Marketing Commission, Sask Pork and Manitoba Pork Council

SUBSCRIPTIONS:

For new subscriptions, change of address or other subscription queries, please contact Shannon Simonds at Alberta Pork, phone (780) 474-8288, fax (780) 479-5128 or email shannon.simonds@albertapork.com

Publications Mail Agreement
No. 40062769
Return Undeliverable
Canadian Addresses to
Circulation Dept.
4828-89th Street
Edmonton, Alberta T6E 5K1

PUBLISHER

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• Editor's Notes



A recent visit to a supermarket with visitors from the UK highlighted the unsatisfactory state of fresh meat retailing in Canada. Walking through the aisles of consumer goods and packaged food products, we saw the same manufacturer's names that one can see anywhere in the world – Heinz, Campbells, Proctor and Gamble, McCains and Unilever. Each of these has dozens of individual brands that most of us would recognize instantly and which are intended to evoke some positive feelings about the product or instil a sense of

brand loyalty. The fresh meat section was a stark contrast to the attractively packaged items from the big companies. Poorly trimmed pieces of pork, beef and chicken sat on polystyrene trays, covered with cling wrap, with a small black and white label giving basic information



a b o u t weight and price. No country of

origin, no brand, no proper labelling and no nutritional information – all in all, very badly presented. It's hardly surprising that the consumers we rely on to pay for the costs of production and getting that product to the shelf have no idea about the quality of pork we deliver and no loyalty to our product. All pork is perceived to be the same, there is very little branding and our product is often sold at giveaway prices.

In some parts of the world, notably Europe but also increasingly in parts of the USA, the situation is very different. Supermarkets present a range of differentiated pork products – value, extra-lean, free range, organic etc. – at various price points that appeal to people's aspirations and perceived values, creating a wider and more profitable market for pork. There are branded pork products and attractive packaging, which also help to increase sales. And, most importantly, some of the added value at retail level filters down to producers.

Canada's pork producers receive some of the lowest prices for their pigs in the world and that isn't because we don't produce a good product. Pork is sold as a commodity – right down to the retail level – and there is little value created in the chain between producer and customer. Until the participants in the pork chain find a way of increasing the perceived value of pork to the consumer and raising retail prices, producers are condemned to commodity production and low profitability.

Bonnie Peck

≡WHJ≡

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¹ Patience, J. et al. 2006. "Effect of Ractopamine in Finishing Swine Diets on Growth Performance, Carcass Measurements and Pork Quality." Prairie Swine Centre Inc. Data on file.

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New pig marketing company established

The Board of Directors of Manitoba Pork Marketing Co-op (MPMC) and SPI Marketing Group (SPI) have announced the establishment of a new company that will provide hog marketing services.

The new company, h@ms (hog administrative marketing services) will provide marketing, procurement, settlement, in-transit insurance and risk management services for the parent companies. Although the head office will be located in Winnipeg, with a satellite office in Saskatoon, the comprehensive service package offered by h@ms will not be limited to producers in Manitoba and Saskatchewan.

The parent companies (MPMC and SPI) will continue to operate and provide direction to h@ms via a Board of Directors that will consist of representatives from both provinces. h@ms is expected to be fully operational by 1 January 2010 but

some services are already being offered under the h@ms umbrella.

"We see no reason to limit the service package to Manitoba and Saskatchewan and hope producers and industry participants in other provinces will see the benefits and value of working with h@ms to provide hog marketing services," said John Preun, President of Manitoba Pork Marketing Co-op. "We also think there is potential in the future for processors to find value in the services provided by h@ms," added Don Kolla, Chairman of the Board for SPI.

Don Hrapchak, General Manager of SPI said, "The economic performance of the industry has pushed producers to be creative in minimizing costs over the last few years, and we (MPMC and SPI) felt our contribution to this would be the consolidation of services. This move will enable both organizations to continue to provide a high level of service at a reduced cost."

Manitoba Pork Marketing Co-op and SPI Marketing Group are producer owned organizations that represent over 500 producers that market approximately two million hogs annually.

Lee Whittington appointed President and CEO of Prairie Swine Centre



Lee Whittington, recently appointed President and CEO of the Prairie Swine Centre

Lee Whittington has been appointed President and CEO of the Prairie Swine Centre, following a worldwide search for a

successor to Dr. John Patience. "Mr. Whittington has demonstrated exceptional leadership over the course of his nearly 17 years with Prairie Swine Centre, but has distinguished himself most recently in working with the management team to address some of the most challenging times our industry has ever seen," said Chairman of the PSC Board Mr. Shannon Meyers. "The Board has great faith in the management team and staff under Mr. Whittington's guidance."

Mr. Whittington, previously the Manager of Information Services, joined the Centre in 1992 to develop and manage an industry-focused information program that would rapidly and effectively bring new research information to the pork industry. The technology transfer program and Mr. Whittington have received international recognition and several awards for the innovative and effective approaches used to speed the adoption of new technology by pork producers.

Mr. Whittington holds a Bachelor of Science (Agr.) from the University of Guelph, and an MBA from the University of Saskatchewan, and has previous experience in both sales and marketing management, technical sales support and as a swine nutritionist with a national feed company.

In looking forward Mr. Whittington notes, "Innovation and being close to the customer has allowed the Centre to achieve world-wide recognition for its near-market research programs.

This will continue to be a mainstay of our brand. We see a tremendous future for the Canadian pork industry once we get beyond the current cost/price crisis which has gripped the industry for most of the past three years. The Prairie Swine Centre sees a significant role for applied research to make the link between all players within the pork value chain. From cereal breeder to meat processing and consumption most of the innovation and value created in the chain takes place in the barn, that is where we excel as a resource to industry as well as academia."

continued on page 8



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Maple Leaf profits drop due to pork recall

The largest meat recall in history, in August last year, severely dented profits at Maple Leaf Foods, the company disclosed in its report of results for 2008. This led to a 40% profit drop in the fourth quarter of the year.

The recall involved Listeria contamination in a whole range of products, including a series of pork products. "The packaged meats recall significantly affected the business by an estimated \$59 million to \$69 million before taxes, of which \$19 million in one-time direct costs has been excluded in calculating adjusted earnings per share," the company said.

"Last year was a historically challenging year on many fronts as we managed through unprecedented spikes in global commodity prices, financial market meltdowns, and the largest product recall in Canadian history," said Michael H. McCain, president and CEO.

"Within this context, we are satisfied with the results we were able to deliver. They are a reflection of the diversity of our business, the capability of our people to manage through extreme adversity and the strength of our entire brand portfolio."

"While our profits were down 40% in the quarter, overshadowed by the product recall which, excluding one-time amounts, is estimated to have cost the company \$40 million to \$50 million before taxes, there were many areas where we showed substantial improvement."

"These included normalizing our bakery margins after absorbing the impact of commodity markets earlier in the year, increasing benefits from our protein business restructuring, and steadily regaining consumer confidence in the Maple Leaf brand. Our packaged meats volumes have almost fully recovered, although we must demonstrate that consistently and we continue to experience significant margin compression."

"Overall we are pleased with the early progress made in recovering our packaged meats business, and are even more confident in the direction of our transformational efforts. We look forward to improving trends in 2009."

Total sales figures for the fourth quarter increased by 5.2% to \$1.3 billion compared to the same period last year, and sales for the year were consistent at \$5.2 billion.

Eat more pork to reduce greenhouse gases

Eating more pork and poultry, at the expense of beef, can help to reduce our carbon footprint, said a Canadian scientist at a recent meeting of the American Association for the Advancement of Science (AAAS). Better still, he suggested, is to cut back on intake of all meats, according to a report in the Straits Times.

Simply switching from steak to salad could cut as much carbon as leaving the car at home a couple of days a week. "That is because beef is such an incredibly inefficient food to produce and cows release so much harmful methane into the atmosphere," said Nathan Pelletier of Canada's Dalhousie University.

Dr. Pelletier is one of a growing number of scientists studying the environmental costs of food from farm to plate.

By looking at everything, from how much grain a cow eats before it is ready for slaughter to the emissions released by manure, they are getting a clearer idea of the true costs of food. The livestock sector is estimated to account for 18 per cent of global greenhouse gas emissions and beef is the biggest culprit.

Even though beef only accounts for 30 per cent of meat consumption in the developed world, it is responsible for 78 per cent of the emissions, Dr. Pelletier said at the AAAS meeting.

A single kilogram of beef produces 16 kg carbon dioxide equivalent emissions: four times higher than pork and more than ten times as much as a kilogram of poultry, Dr. Pelletier said.

If people were to simply switch from beef to chicken, emissions would be cut by 70 per cent, Dr. Pelletier added.

Another part of the problem is people are eating far more meat than they need to, he says. "Meat once was a luxury in our diet," Dr. Pelletier said. "We used to eat it once a week. Now we eat it every day." If meat consumption in the developed world was cut

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from the current level of about 90 kg a year to the recommended level of 53 kg a year, livestock related emissions would fall by 44 percent, he said.

“Given the projected doubling of (global) meat production by 2050, we’re going to have to cut our emissions by half just to maintain current levels,” Dr Pelletier said.

Welfare groups call for end to confinement

With a number of US states having introduced legislation to phase out confinement systems such as sow stalls, battery cages and veal crates, the Humane Society of the United States (HSUS) turned its attention to Canada at a weekend meeting held in Winnipeg March 14-15th. Organized by the Winnipeg Humane Society (WHS), it was attended by a number of Canadian and international animal advocate groups.

“Millions of pigs and laying hens are kept so confined they can barely move for months on end. The Winnipeg Humane Society (WHS) is hosting animal advocates from across North America to bring this practice to an end,” said a WHS news release. “The strategy will be led by representatives of the Humane Society of the United States (HSUS) who were successful in pushing forward Proposition 2 in California – that spells an end to the intensive confinement systems for breeding pigs, veal calves, and laying hens.”

“The move to ban these confinement systems is gaining momentum worldwide, as five American states now join the entire European Union in banning gestation stalls in the hog industry, and more are showing interest in banning battery cages in the egg industry, too.”

“It’s time for Canada to join the ranks of progressive countries around the world when it comes to animal agriculture”, said Bill McDonald, WHS Executive Director. “These intensive confinement systems cause real and chronic suffering for the animals as well as contributing to a host of environmental problems. We need to push for sustainable animal agriculture in Canada, for the sake of the animals and the environment”.

CPI looks to Europe for new export opportunities

From Farmscape.ca

Canada Pork International is hoping the approval of a Quebec pork processor to export products to the European Union will create interest among other companies in targeting that market.



Confinement systems such as sow stalls are coming under increasing pressure from animal welfare groups

Montreal-based Lucyporc’s Yamachiche, Quebec hog slaughter and pork cutting plant was recently granted approval to export pork products to the European Union.

Canada Pork International assistant executive director Martin Lavoie says, while the approval process had been in place, it became less onerous with the 2005 signing of an equivalency agreement between Canada and the EU which allows the two regions to recognize each other’s pork processing facilities.

“Plants that want to export to the EU have to meet Canadian standards plus a series of additional conditions to export to the EU,” Lavoie explains. “Among them the main one is to have no carton in the cutting room. There is also the use of plastic skids instead of wood skids in the plant, actually in the area where the meat is exposed.”

Since Ractopamine has been allowed in Canada, any company that is interested in exporting to the European Union has to follow the “Paylean Free” segregation protocol, Lavoie notes.

He believes that, with some potential opening with the WTO negotiations, the future is brighter than it was before. “If you look at our competitors, it’s just in the last two years that the US and Chile have made significant use of the TRQs (Tariff Rate Quotas) available in Europe.”

Lavoie notes the EU is a huge high value market. He says hopefully, in the future, we’ll see interest among other Canadian companies in targeting the European Union. **≡WHJ≡**



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• Alberta Pork Congress Awards



Alberta pork producers gathered in Red Deer on March 18/19 for the province's annual trade event, the Alberta Pork Congress. The ever-popular awards banquet recognized leaders in the industry through the Olymel Reach For The Top quality awards and the Awards of Excellence.

Don Brookbank of Olymel presented \$500 to each of four category winners, selected from over 200 qualifying suppliers to the Red Deer plant. Winner of the Food Safety Award was South Bend Colony of Alliance, Alberta. "This award is for low brisket contaminations, which reduces the bacterial load in the plant," Brookbank said. "Also, it is for the producer that has the highest percentage of clear tattoos over the year and South Bend achieved a figure of 93.4%"

The High Health Award takes into account the number of total demerits, arthritis levels, adhesion levels and abscesses. "The producer with the lowest score when all these factors are combined wins this award," Brookbank noted. Winner of this category was Willow Creek Colony of Claresholm, Alberta.



Olymel's Don Brookbank (left) congratulates Martin Wipf of Willow Creek Colony, who won the Grand Champion Award

Wim and Linda Van Wijk of Horst Farm, Lacombe, Alberta, were second time winners of the Core Weight Award, having received the accolade in 2007. "This award is for the highest percentage of hogs hitting our core weight range of 90-100kg," Brookbank said, noting that the Van Wijks had achieved a figure of 91%. "This helps efficiencies in the plant and improves uniformity."

The fourth category, the Core Lean Award, goes to the producer with the highest number of hogs with a loin measurement in the 62-69mm range. Category winner was Newdale

Colony of Milo, Alberta. "This may sound like a low number, but this is a very consistent pig," said Brookbank.

The Olymel Grand Champion receives a prize of \$1000. "The winner must score the highest in all of the individual categories based on a weighted point system," Brookbank explained. Presenting the award to Martin Wipf of Willow Creek Colony, also the winner of the High Health Award, he noted that this supplier had been 3rd and 13th in other categories.

continued on page 12

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John Morrell (Iowa) 55.53 % lean 76.30% yield 261 pounds live wt	Springhill Farms (Manitoba) 17.2 mm backfat 67.7 mm loin 93.1 kg carcass	Maple Leaf Pork (Ontario) 16.7 mm backfat 65.3 mm loin 95.5 kg carcass	Hatfield's (Pennsylvania) 17.4 mm backfat 21.4% loin yield 22.3% ham yield 253 pounds live wt

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In the Awards of Excellence, the Industry Leadership Award, sponsored by Elanco Animal Health, was presented to Ciaran Ormond. The award seeks to honour an individual whose efforts reflect a commitment above and beyond the accepted expectations of the pork industry in Alberta. Ormond is one of five partners in Partners in Pork, based in Rimbey, Alberta. The company has three 1200-sow farrow to wean units with pigs being finished in contract or leased units



Ciaran Ormond responds after receiving the accolade of the Industry Leadership Award

throughout central Alberta. Brought up in Ireland, Ormond gained practical experience of pig production before going on to take an Advanced Pig Husbandry course at Usk College in Wales, after which he immigrated to Canada in 1980 to work for Dave and Judy Allen at Bacon Acres, Bentley. “The owners were very progressive and liked to try new things, which suited me. I was able to get involved in a lot of industry committees and work on some of the papers that I presented,” Ormond recalls.

Ormond has been involved with 12 committees or boards in his nearly 30 years in the Alberta pork industry. “We are fortunate to have a lot of high quality, motivated people, such as researchers, in Alberta,” he said. “Everybody is willing to share information, that’s what is great about this industry.”

The Farm Team Award, sponsored by Meyers Norris Penny, seeks to recognize the farm that operates in an exemplary manner through commitment and longevity of staff and through the virtues of hard work and cooperation. It celebrates the dedication of the team towards working together for the success of the farm. Recipients of this award were Peter Stahl and his team from Blue Sky Colony, Drumheller, Alberta, where they operate a 600-sow farrow to finish unit.

The Lifetime Achievement Award, sponsored by Prairie Hog Country, was presented to Jim Smith, of Innisfail, Alberta. This award seeks to honour individuals who have played an integral role in advancing the pork industry in Alberta. It celebrates their long-term commitment and unwavering dedication to the industry. Jim Smith started in pig production in 1972 and by 1980 was marketing 10,000 pigs per year. He became a delegate for the Alberta Pork Producers Marketing Board in 1982, a director in 1988, and eventually chairman for a period of four years.

Smith played a major role in the formation of Canada Pork International, becoming its first chairman in 1992. He was also instrumental in the development of the CQA program and chaired its committee during its early formative stages.



Jim Smith, receiving the Lifetime Achievement Award from Laurie Brandy of Prairie Hog Country

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• New Product Showcase



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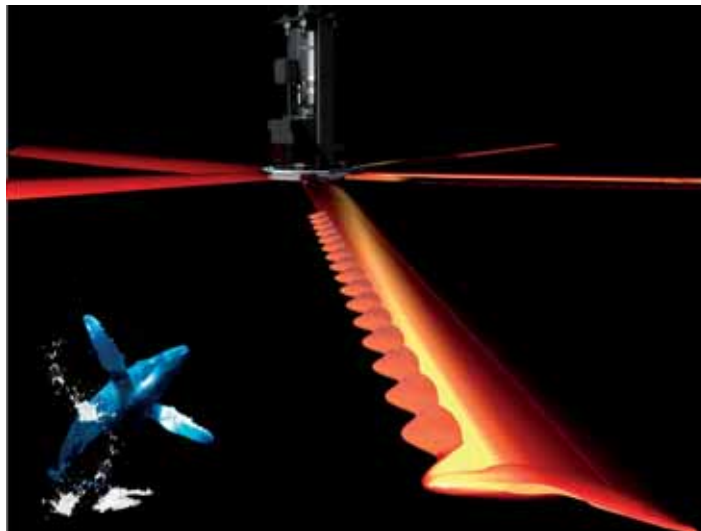
Envira-North Systems teamed up with a Toronto based company called WhalePower to be the first to bring the technology to the market place. The 'tubercle effect' featured in National Geographic and in a recent Discovery Channel presentation, is an example of bio-mimicry – advanced engineering inspired by the bumps on the leading edge of Humpback whale flippers which has evolved through a million years of field tests.

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"Our fans and other system products were always designed to help people drive down their energy costs and meet their green targets," said Envira-North CEO, Monica Bowden. "These new fans de-stratify the air more efficiently – that means they even out the temperature in any big space and make it a lot more comfortable." That de-stratification lowers the costs of heating and cooling by 35% and the reduced operating costs add a major bonus.

The fans come in sizes from 8 ft to 24 ft and have variable speed operation. "We're proud to introduce the first fans of the future to our customers," said Lambert, "They'll really help to make their buildings work better."

Seaforth, Ontario based Envira-North Systems Ltd., is Canada's largest supplier of industrial ceiling fans and claims 75 per cent of the Canadian market for industrial ventilation fans. Applications include hangars, warehouses, hockey rinks,



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Hot solution for tail biting

Marabo Products has introduced a new product for the treatment of tail biting. Chilli Stop is a topical paste applied to tail and surrounding area or to area of biting or suckling. As its name implies, it contains chilli and a bitterant. Chilli Stop is applied using a rubber glove, only a small pea sized application is required to the tail area or point of biting, sores open wounds etc. It is important to keep the application localized and not to over apply, says the manufacturer.

Chilli-Stop paste is available in 800-gram jars, enough for at least 200 applications. Marabo Products Canada Ltd. is based in Abbotsford, BC and can be contacted on 604-308-6240 or by email at marabou@mac.com. The company's website is www.supermarabo.com.

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Combined vitamin A and iron to prevent piglet anaemia

Piglets produced in confined systems do not receive sufficient iron from the sow's milk and are unable to consume iron in soil like wild or outdoor reared pigs. Therefore, administration of supplementary iron by injection is routinely carried out in most production systems.

A recently published study looked at whether vitamin A enhances the effect of iron in preventing piglet anaemia. Treatments consisted of control (no iron), 200 mg injectable iron (iron dextran) at 2 days of age (Day 2), and 200 mg injectable iron (iron dextran) with 2000 IU oral vitamin A (vitamin A palmitate) on Day 2. The study was continued until Day 21.

Blood samples were collected on Days 1, 7, 14, and 21, and liver and spleen samples were collected on Day 21. Haemoglobin concentration, haematocrit, total iron-binding capacity, and iron concentration were measured in plasma, liver, and spleen samples. Body weight was recorded on Days 0 and 21. Deaths were recorded through the study.

The results showed that weight gain and mortality did not differ significantly between pigs treated with iron alone and pigs treated with both iron and vitamin A. Haemoglobin concentration, haematocrit and iron concentration in plasma, liver, and spleen samples in pigs treated with both iron and vitamin A were higher, and total iron-binding capacity was lower, than in pigs treated with iron alone.



Administering Vitamin A when giving iron injections appears to enhance the effect of iron supplementation

The results showed that iron nutrition status is better in piglets provided with both iron and vitamin A than in piglets treated with iron alone.

WHJ comment: While there were no differences in piglet growth rate and mortality up to 21 days, the longer term effects were not observed in this trial and would be worth investigating. Also, in the trial, vitamin A was given orally, whereas it could possibly be combined with the iron injection, making it easier to administer. As the cost of vitamin A is low, it would be worthwhile evaluating the use

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of a combined iron and vitamin A injection on a commercial scale.

Reference: Jiang JF, Jiang JB, Zhu HS, et al. Combined treatment with vitamin A and iron to prevent piglet anemia. *J Swine Health Prod.* 2009;17(1):22–27.

High fibre gestation diets improve piglet growth

A recent study conducted by H. Quesnel and colleagues at INRA at Rennes in France and Agriculture and Agri-Food Canada at Sherbrooke, Québec suggests that piglets born from sows fed a high fibre diet during pregnancy grow faster than those from sows fed a standard control diet, without compromising sow body weight or backfat.

The aim was to investigate the effects of feeding sows a bulky diet during gestation on their physiological and metabolic adaptations during the period around farrowing and to determine how these effects may relate to sow and piglet performance.

From day 26 of gestation until farrowing, gilts were fed diets that contained 2.8 or 11.0 per cent crude fibre (control and high-fibre diets). Daily feed allowance provided the same amount of digestible energy daily (33 MJ DE per day). Throughout lactation, sows were allowed to consume a standard lactating sow diet ad libitum. Litters were standardized to 12 piglets beyond 48 hours after birth.

Sows had a catheter inserted into the jugular vein in late gestation in order to collect blood samples for analysis.

During gestation, body weight and backfat gain did not differ between treatment groups. However, during lactation, sows fed the high-fibre diet ate an average of 0.94 kg per day more than control sows. Also, piglets born from sows fed the high-fibre diet grew significantly faster than piglets from control sows. Body weight and backfat losses during lactation did not differ between the two treatment groups.

Sows fed the high-fibre diet during gestation had lesser concentrations of the hormone leptin, before farrowing than

control sows. Leptin concentrations were negatively correlated with feed intake during lactation. Leptin plays a key role in regulating energy intake and energy expenditure, including appetite and metabolism.

The researchers also looked at changes in blood glucose and insulin levels after the sows had eaten. In late gestation, the increases in glucose and insulin after feeding were delayed, and smaller, after a high-fibre meal than after a control meal. However, during lactation when the diets fed were the same, glucose and insulin profiles after a standard meal did not differ between sows from the two treatment groups.

The researchers concluded that the greater feed consumption showed by sows fed a high-fibre diet in gestation was accompanied by faster growth rate of suckling piglets without any sparing effect on maternal body reserves. They also suggested that the greater appetite of lactating sows fed a high-fibre diet during gestation is not related to changes in glucose and insulin metabolism but may be partly due to decreased secretion of leptin.

WHJ comment: Practical experience with bedded group sow housing, suggests that sows with access to good quality fibre, such as barley straw, consume a significant amount of fibrous material, which is digested in the hind gut. During lactation, these sows appear to have a higher feed intake than sows from non-bedded housing. It has been suggested that this is due to increased gut (stomach) capacity resulting in the ability to consume larger volumes of feed in lactation, although this trial suggests that there may be hormonal effects at play. In this study, the increase in average daily feed intake in lactation of 0.94kg was very large and was directly translated into faster piglet growth. However, the lack of effect on sow body weight and backfat is surprising given the magnitude of the increase in feed intake. Nevertheless, the overall effect is huge and it is difficult to think of any other changes to sow nutrition and management that would result in such a large change in feed intake. Incorporating high fibre levels

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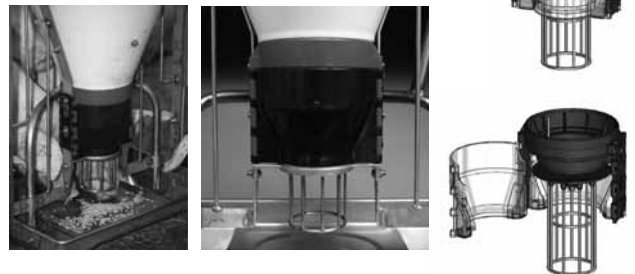
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into gestation diets is possible, but expensive due to their bulk versus their nutritional value. However, with such a large influence on lactation feed intake, it may be worth increasing fibre level beyond the normal levels. As the use of more fibrous raw material such as DDGS increases, this may happen to some extent by default.

Reference: Quesnel H., M.-C. Meunier-Salaün, A. Hamard, R. Guillemet, M. Etienne, C. Farmer, J.-Y. Dourmad and M.-C. Père. 2009. Dietary fiber for pregnant sows: Influence on sow physiology and performance during lactation. *J. Anim Sci.* 87:532-543. doi:10.2527/jas.2008-1231

Improved piglet care raises weaning weight

A field trial carried out recently by researchers in Ontario investigated whether maximal care of pigs from birth until 16 days of age would result in a significant alteration in the survival and growth performance of the pigs compared with control pigs born in the same time period.

Control pigs received the standard, commercial farm care. Pigs were cross-fostered between litters born within 24 hours of each other in order to equalize the numbers of pigs nursing each sow. The largest pigs in a litter were chosen to be fostered onto another sow. Cross fostering after one day of age was used for pigs which did not appear to be gaining access to a nipple or for pigs nursing a sow that became ill and had a shortage of milk.

Processing, performed on day 1, consisted of teeth clipping, tail docking, and an injection of 100 mg of iron dextran. Processing instruments were not cleaned between pigs. Castration was performed at approximately 10 days of age and all pigs received 100 mg of iron dextran on this day. Sows were given approximately 4kg of feed twice daily, and sows thought to be too thin by the producer were given 2/3 of a cup of soybean oil with 1 meal each day.

In the maximal care treatment, litters were managed in the same way as standard care litters, with the following exceptions. Pigs were dried off at farrowing, provided with a rubber mat in the creep area and given electrolytes. Chilled pigs were warmed and given colostrum or glucose. Surgical instruments used for processing were dipped into an antiseptic between pigs, the castration wounds were sprayed with iodine, and sows were fed 3 times rather than twice per day.

In this study, no pigs weighing less than 0.6kg at birth survived past 3 days of age. There was no difference in the overall death rate of pigs between the standard (8.3%) and maximal care (7.2%) study groups. However, small birth weight pigs, those weighing less than 1kg at birth, had a higher mortality in the standard care litters (40.0%) than in the maximal care litters (26.9%). Pigs that weighed less than 1kg at birth were heavier at 16 days of age if they were raised in a maximal care litter than if they were raised in a standard care litter. The death rate was higher for pigs born in the dry sow barn (16.7%) than those born in farrowing crates (7.4%). Of the pigs born in the dry sow barn, mortality among the standard care group was 50% while only 10% of those receiving the maximal treatment died. On average, the technician spent 18 minutes more per litter over the 16 days of the study for the maximal care litters than the standard care litters. Most of this time (85%) was devoted to cleaning and filling the electrolyte containers. The 16 days weight of pigs was 3.5% higher for pigs raised in maximal care litters. It was also higher in piglets that were on nursing sows in parities 2-4 or 7 or above. The 16-day weight of pigs was lower if the pig had had a small birth weight, if the pig was cross-fostered on day 1 or 2, or if the piglet was ill or lame between 4 and 16 days of age. Sow parity has a significant impact on the growth rate of nursing pigs, with litters from parity 2 or 3 sows having the highest growth rate. There was an uneven distribution of parity among sows in this study; however, this bias was in favour of the standard care.

Cross-fostering both before and after 1 day of life, demonstrated that this practice has negative effects on the 16-day weight. Pigs cross-fostered in the first day of life weighed 180 grams less at 16 days than those that were not fostered. This small decrease in weaning weights for large pigs fostered at day 1 may be warranted if the pigs left on the birth sow would consequently have higher weaning weights and/or survivability. This indicates that fostering the largest pigs in the litter in the first day of life has a smaller impact on weaning weights than fostering later in life. Pigs fostered after 2 days of life weighed 800 grams less at 16 days than those not fostered. Although this is a significantly lower weight, the pigs may have either died or had a smaller 16 day weight if they had been left with the birth sow.

WHJ comment: While the overall decrease in mortality prior to weaning achieved in the maximal care treatment was not large,



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the survival rates in both regimes was comparatively high, indicating good management on the trial farm. However, the mortality of pigs weighing less than 1.1 kg at birth and given maximal care tended to be lower than that of similar sized pigs in standard care litters. The researchers suggest that this may indicate that the techniques employed in this field trial may be useful for reducing the pre-weaning mortality due to chilling and starvation. The 16-day weight of maximal care pigs (3.7kg) with birth weights less than 1.1 kg was higher than those of corresponding standard care pigs (3.4kg).

The other major effect in this trial was the large effect on 16-day weight of fostering, especially when carried out on day 2 rather than day one. This indicates the importance of minimizing the number of pigs fostered and carrying out fostering as soon as possible after piglets have suckled sufficient colostrum from their own mother.

The extra time input for the maximal care treatment was 18 minutes per litter, which is not very much. The economics of this additional time will depend on the improvements in piglet survival and weaning weight achieved. On farms where mortality is higher than on the trial farm, extra time input is likely to be cost effective.

Reference: Dewey, C., Gomes, T., Richardson. K. Field trial to determine the impact of providing additional care to litters on weaning weight of pigs. Canadian Journal of Veterinary Research. 2008;72:390-395

Enrichment of pork products with DHA omega-3 lipids

Health Canada recommends that adults receive at least 200mg of docosahexaenoic acid (DHA) a day to promote proper brain development and immune health. However, North Americans typically consume only 80mg a day. DHA is a long chain omega-3 fatty acid normally found in fish. Pigs and humans can convert shorter dietary omega-3 fats, from plants such as flax, to DHA but only at a rate of less than 10%. Standard corn or grain fed pork typically contains less than 20mg DHA per 100g serving but this can be increased to around 70mg if the pigs are fed 15% crushed flax.

A trial was conducted by researchers at the Lacombe Research Station to determine if pork DHA content could be raised even higher, if DHA was fed directly. Barrows at 80kg were fed standard diets supplemented with a dried microalgae biomass containing about 18% DHA, at 0, 0.06%, 0.6% or 1.6% for 25 days prior to slaughter. Animal performance and meat quality parameters were not negatively affected, even at the 1.6% DHA (equivalent to 2880 mg DHA/day) dose.

Bellies from the animals were processed into bacon at a commercial meat plant. The bacon was then distributed for sensory evaluation in a home use test survey. Often feeding highly unsaturated fats to pigs can lead to problems of 'off' odours

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High omega-3 bacon may offer a marketing opportunity for the pork industry

caused by fat oxidation. Bacon from pigs fed diets of more than 0.6% DHA (1188 mg per day) began to have off odours and off flavours described as ‘barnyard’ or ‘fishy’ which correlated with the amount of oxidation, as measured by analytical methods. In a survey of 40 panellists, over 60% said they would choose omega-3 bacon over regular bacon; however only around 60% of those would buy bacon supplemented above the 0.6% level.

WHJ comment: There is increasing interest in “functional” foods that provide some health benefits and both pork and eggs enriched with omega-3 are now available. This trial suggests that DHA levels in the meat can be significantly increased by feeding a dried microalgae biomass, although this is an expensive ingredient. However, it also shows the problems of “off” smells and flavours associated with high levels of oils in the meat, in this case bacon. Despite this drawback, omega-3 bacon could provide a marketing opportunity for the pork industry, with the demand for healthier foods.

Reference: Meadus, W.J., Uttaro, B., Aalhus, J.L. Duff, P., and Gibson, L. Enrichment of pork products with DHA omega-3 lipids. *Advances in Pork Production* (2009) Volume 20, Abstract #6

The effect of PG600 at weaning on sow performance

Maintaining a consistent flow of good quality weaned pigs into the nursery should be the principal goal of a commercial swine operation and to achieve this producers must consistently meet weekly breeding targets. PG600 (400 IU eCG and 200 IU hCG; Intervet) has been proven to induce a synchronized oestrus in weaned sows. Researchers at the University of Alberta’s Swine Research and Technology Centre carried out a study to determine the effects of PG600 treatment at weaning on the percentage of sows bred and subsequent litter sizes.

First litter crossbred sows from a 5,000 sow commercial farrow-to-wean facility were initially allocated to the experiment by farrowing weight and genetics to 1 of 2 treatments: 1) PG: PG600 administered intramuscularly in the sow’s neck on the morning of weaning or 2) CON: no treatment at weaning. Sows were bred according to herd protocol depending on the day oestrus was first detected. Considering all sows assigned to treatment, there was no significant difference between PG and CON sows for the percentage of sows in heat within 7 days of weaning (92.1 vs 88.1%, respectively). The percentage of sows bred over a 3-day period (days 3-5 after weaning) was significantly higher in PG than CON sows (85.2 vs 75.2%, respectively) and consequently weaning to oestrus interval was reduced in PG versus CON sows (4.0 vs 4.4 days, respectively). For those sows bred within 7 days of weaning, farrowing rate (82.8 vs 86.4%), total born (12.2 vs 12.9) and born alive (11.6 vs 12.1) were statistically similar between PG and CON sows, respectively.

WHJ comment: Although the performance of sows treated with PG600 at weaning and the control sows was similar in this study, the advantage of administering PG600 at weaning was realized in a tighter and more synchronous breeding period of 2-3 days, which in turn, focuses heat stimulation, heat detection and breeding into a narrower time window resulting in a decrease in the spread of time at farrowing of the subsequent litter and thus age at weaning. Whether the cost of treatment is worthwhile will depend on the opportunity for improvement on the individual farm.

Reference: Patterson, J., Foxcroft G., Cameron, A., Smith T., Kummer, A, Schott R., L. Greiner, Conner L.J. and Francisco, C. The effect of PG600 at weaning on sow performance. *Advances in Pork Production* (2009) Volume 20, Abstract #21

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• Industry Crisis



Hog numbers fall, but liquidation appears to have slowed

Canadian hog numbers for January 1st 2009 continued their 3-year downward trend with a drop of 10.2% compared with one year previously. Total pig numbers fell from 13.8 million in January 2008 to 12.4 million a year later. However, despite the significant year-on-year falls, both total pig numbers and breeding stock numbers were only marginally down compared with the last two quarters suggesting that herd liquidation slowed down considerably in the second half of 2008. The exception was Saskatchewan, where total pig numbers fell by 16.6% and breeding stock numbers by 17.4% between July 1 2008 and January 1 2009.

During the three years to January 2009, total pig numbers have fallen by 17.9% and breeding stock numbers by 13.5%, while, according to Statistics Canada figures, the number of farms with pigs has dropped by more than one-third.

Hog inventories at January 1st, 2009

	Breeding pigs		Total pigs	
	1000 head	2007 to 2008	1000 head	2007 to 2008
Canada	1,404	-7.1	12,400	-10.2
Atlantic	25	-15.2	161	-37.1
Quebec	386	-2.1	3,900	-2.3
Ontario	360	-10.7	3,104	-15.0
Manitoba	344	-4.9	2,680	-4.6
Saskatchewan	102	-19.8	810	-31.4
Alberta	170	-4.5	1,630	-9.4
British Columbia	17	-5.6	116	-4.9

The USDA's quarterly Hogs and Pigs report, released on March 27th, gave little cause for optimism in the short term, with the winter pig crop (December 1, 2008 to February 28, 2009) at 99.4% of the previous year. "This suggests that the long awaited reduction in US slaughter numbers won't occur anytime soon," commented WHJ correspondent Dr. Mike Brumm. Contributing to the continuing high pig numbers in the US herd is a steady increase in productivity, notably the number of pigs weaned per litter, which reached 9.48 for the December 2008 to February 2009 period. Over the last two years, the almost universal use of Circovirus vaccines has been a major factor in this improvement. Also, it seems likely that the move towards later weaning, with an associated increase in subsequent litter size, is also involved.

The best news in the USDA report is that breeding herd numbers were down 3%, at 6.011 million, suggesting that numbers marketed could fall later in the year. However, whether that actually occurs will depend on the scale of productivity improvements and any future decline in sow numbers in response to low profitability. It should be noted that a 3% drop in sow numbers is 180,000 sows, compared to a drop in sow numbers in Canada of about 190,000 over the last 3 years. If the US had lost the same percentage of sows as Canada, it would have seen a drop of 720,000 sows.

Canadian producers on life support

With market prices still well below break-even at the beginning of April, as WHJ went to press, the question for many producers must

be how long they can go on losing money. And, with the widely-forecast hike in prices so far failing to materialize, combined with the effects of US COOL implementation and a world economic crisis, prospects for 2009 look rather worse than previously predicted. As producers move into a third year of losses industry leaders have, once again, appealed for both federal and provincial government support to arrest the continuing exodus from the industry.

In March, Federal Agriculture Minister Gerry Ritz announced an extension to the Cull Breeding Program, changing the initial start date for eligibility from November 1 2007 to August 1 2007. Producers have until 30 June to make claims for breeding swine culled during this period. The extended time period covered by the Cull Breeding Swine Program is expected to have the same requirements as the initial program.

The Saskatchewan government risked incurring a US countervail by rolling out a new provincial assistance program for pork and beef producers at the end of February. Agriculture minister Bob Bjoernerud announced a 71 million dollar program, calling on Ottawa to provide additional support. Pig producers are eligible to receive payments of 20 dollars for market hogs and 10 dollars for isoweans, weanlings and feeder hogs while cattle producers are eligible to receive 40 dollars for beef breeding cows and bred heifers produced between July 1, 2008, and January 31, 2009.

"In the absence of a national solution, we had to take action to help our producers," Bjoernerud said. "We will continue to work with our federal counterparts toward a national solution. In the meantime, we urge the federal government to come to the table and top-up this program with their 60 per cent share, or provide some other form of meaningful support."

Neil Ketilson, of the Saskatchewan Pork Development Board, slammed the federal AgriStability program, saying: "I think it just demonstrates the inadequacy of the AgriStability and the federal government's notion that the industry will be served by the present safety net process. It's really unfortunate the federal government didn't take the opportunity to have a nation-wide program that effectively could have addressed the industry's needs."

As we went to press, the Canadian Pork Council (CPC) proposed an emergency government aid program, saying that existing programs are inadequate. Such a move is likely to be controversial, despite the current hardships, because of the high risk of countervail by the US.

The Alberta Farm Recovery Plan (AFRP), launched last year, paid out its second tranche of cash in January, but around 50 producers are reputed to have received a nasty surprise in the form of a bill for repayment, rather than a cheque. It appears that due to the speed that the first payout was implemented in 2008, some producers were overpaid. After discussion between Provincial Agriculture Minister George Groeneveld and industry representatives, the government announced that overpayments could be considered as an interest-free loan until the end of 2010, with interest payable after that date. Alternatively, the amount may be converted to a 5 or 10-year term loan.

COOL becomes hot issue

Just after the final rules on US country of origin labelling were published in January and implementation had started, the new

Obama administration ordered a further 60-day review period immediately after coming into office, extending a long drawn-out saga that has created uncertainty and confusion on both sides of the border.

The outcome was revealed in a letter to the livestock industry dated February 20th by Tom Vilsack, the new US Agriculture Secretary, who expressed concern about certain aspects of the final COOL rules. While he allowed the existing legislation to go ahead from the March 16th implementation date, he suggested that the industry might voluntarily adopt some additional practices that would improve the amount of information for consumers. First of these was a request that labelling should include information about what production step occurred in each country, where multiple countries appear on the label. Second, he suggested that some processed meats should be labelled voluntarily according to origin. Finally, he asked for a change to the rule that allows a label for a ground meat product to bear the name of a country, even if product was not present in the processor's inventory, for up to 60 days. "Reducing the time allowance to 10 days would limit the amount of product with these labels and would enhance the credibility of the label," says the letter. Vilsack added that his department would be reviewing industry compliance in relation to his suggestions and that he may consider future changes to the COOL rules, reviving the uncertainty that has dogged COOL from day one.

With or without any further changes to the COOL rules, the flow of Canadian pigs to the US has slowed dramatically and stories of empty finishing barns in the Mid-West abound. Canadian pigs account for about 8% of US slaughterings and it remains to be seen how much this figure will be reduced. With several major processors, notably Smithfield Foods, saying that they will only purchase US produced hogs, it is likely that more pigs will remain in Canada.

Hytek Limited, of La Broquerie, Manitoba, announced in February that it will move approximately 40 thousand finishing spaces from the US to Saskatchewan, according to Farmscape.ca. The company purchased four finishing barns in Leroy, Saskatchewan, each capable of accommodating about ten thousand pigs ranging from 50 to 60 pounds up 260 pound marketing weight. Hytek vice president of production and genetics Claude Vielfaure says the production facilities are currently being populated and will supply finished hogs for the company's Neepawa pork processing plant.

European pig numbers still falling

Pig numbers in many European countries are still falling, according to statistics produced over the last few months. The latest figures, from DG Agri, the EU's directorate-general, show that total pig numbers fell by 4.7% to 152 million in EU27 countries, with the biggest declines seen in the Eastern European countries.

Key player Denmark, which has suffered from some of the lowest prices in the EU, showed a 7.4% drop in total pig numbers in the January census compared with January 2008. Finisher pigs over 50 kg showed a 14.7% drop, reflecting the increased number of live pig exports to Germany. And, while sow numbers were down by only 2.3%, unserved gilts fell by 11.4% indicating that the national herd will continue to shrink.

The high number of live pig exports, mainly weaners for finishing in Germany, is estimated at around 120,000 per week. Reduced

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numbers of market hogs has led to restructuring within the processing sector, including some plant closures and staff layoffs. The government is reported to be considering a levy on live pig exports following a request from trade unions representing processing plant workers. The exodus of pigs has increased in recent years because Danish Crown has had to compete with US processors in export markets who have had the benefit of a weak US dollar. The price paid to producers primarily reflects the returns from export sales because they represent about 85% of total production.

Undeterred by the problems faced by their farmer-owned own cooperative processor, Danish producers are exploring every avenue to find a profitable market for their pigs. Danish company HTC Agro is offering weaner producers the opportunity to invest in finishing units in Germany. "Danish producers often feel they are being cheated when they sell weaned pigs to Germany," HTC Agro director Torben Andersen told WHJ. "HTC has been working on a new business model that will make it easier for them to establish their own finished pig production." German

banks and credit organizations have reportedly shown an interest in lending capital as long as producers have a secure supply of weaners, he adds. HTC Agro also offers relief staff, contracts for market hogs and sale of liquid manure.

The total number of pigs in Germany also continues to go down, according to the latest figures from German agricultural market analysis bureau ZMP. In November 2008, the census data showed a total of 26.4 million pigs – about 732,000 less (-7.2%) than in the same period a year before.

The number of piglets and finishers has only come down slightly, but the number of sows has decreased quite a lot, says ZMP. Since last May, about 94,000 sows have been taken out of production and over the last year the sow population went down by 143,600 animals or 5.9%.

There was a large drop in the number of pig producers. Within one year, about 16.7% of the producers quit the industry. However, in November 2008, there were still 66,000 pig producers active throughout Germany, indicating that small farms still dominate.

The biggest drop in production has occurred in the newer EU members in Eastern Europe, where farm size tend to be small and the technological level considerably lower than in western Europe. For example, in Poland, the pig herd has fallen to its lowest since 1970, according to Michal Kolesnikow of the BGW Bank.

By the end of November, there were 14.2 million pigs in Poland, 7.7% down on July 2008 and 19.2% down year-on-year. "Some 4.6 million pigs have disappeared since the last peak of the pig cycle in July 2006," says Kolesnikow. "The magnitude

of the contraction is comparable to the size of the whole pig herd in the UK."

As a result of reduced sow numbers, pig meat production in Poland this year may be eight to ten per cent down on the previous year which in turn already had been ten per cent down on 2007.

Other Eastern European countries with sharp falls in pig numbers include Slovenia, down 21.4%, Czech Republic, down 19.8% and Bulgaria and Hungary, both with a drop of around 10%.

The long-suffering UK industry showed a relatively minor reduction during 2008, with a fall in total pig numbers of 2.6% and 2.8% fewer breeding animals. In fact, industry leaders appear to have their tails up at the moment following the clear success of recent publicity initiatives, including the "Pigs are worth it" campaign, the "Stand by your ham" song and, most recently, Jamie Oliver's TV program "Jamie saves our bacon" (see the article Celebrity chefs help to boost pork sales in this issue of WHJ).

Pig prices in the UK have been boosted by a dramatic drop in the value of the British pound against the Euro, which slumped from a range of 1.25 – 1.30 to 1.05 at the end of 2008 in response to the UK's banking crisis. The change has made it much less attractive for continental competitors to export pork to the UK, leading to strong prices for British producers. By the end of March, the hog price had reached around £1.55 or \$2.80/kg deadweight, while the average price in the EU was just £1.30 or \$2.34. As the reduction in EU breeding herd numbers results in fewer market hogs being slaughtered, the UK will continue to lead the upward increase in prices during the remainder of the year.

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Using carbon dioxide to euthanize young pigs

Carbon dioxide euthanasia offers a recognized option for terminating nursing and nursery-sized pigs that farm employees find acceptable, according to Jerry May, extension educator for Michigan State University.

“We are taught as livestock caretakers to provide the correct environment and care to allow all animals to thrive and meet their productive expectations. But even when provided the best of care there will be instances when animals become ill or injured and must be humanely euthanized,” writes May.

The National Pork Board has three broad standards for determining when euthanasia is warranted, he notes. According to the Pork Board:

- Animals showing no improvement, or having no prospect for improvement, after two days of intensive care should be euthanized.
- Severely injured or non-ambulatory pigs with the inability to recover should be euthanized immediately.
- Any animal immobilized, with a body condition score of 1, should be euthanized immediately.

In 2001, the Pork Board and the American Association of Swine Veterinarians (AASV) jointly published *On Farm*

Euthanasia of Swine – Options for the Producer outlining the acceptable methods of euthanasia for all stages of pig production. This booklet has become the on-farm euthanasia standard for many operations and is also widely used in Canada.

Many farms struggle with young pig euthanasia, May believes. “Blunt trauma, carbon dioxide, electrocution and anesthetic overdose are all listed in the booklet as acceptable methods of euthanizing nursing pigs,” he notes. “Electrocution is seldom used due to worker safety concerns and anesthetic overdose is used only under the supervision of a licensed agent, making that method impractical.”

Building a euthanasia device

Recently, May has had requests for information on boxes for using carbon dioxide (CO₂) to euthanize young pigs. The *On Farm Euthanasia of Swine* booklet lists carbon dioxide as an acceptable euthanasia method for all pigs up to 70 lbs, making this a suitable method for nursery pigs as well as small pigs in the farrowing barn. He was able to find information on the operation

continued on page 26

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1. de Grau, A.F., B. Thacker, C. Francisco, W. Wilson, R. Schlueter and A. Eggen. "Field trials to assess the performance of a conditionally licensed vaccine in Canada." Emerging Pig Diseases Symposium, Krakow, Poland. June 2007, p. 120.

of a carbon dioxide euthanasia device but very little on the practical side of building one on the farm, so he set out to put one together.

“Carbon dioxide is heavier than air therefore the container does not need a tight seal, although the cover should be secured so that the pig is not able to lift the lid and try to escape,” May explains. “Once the carbon dioxide is released to the container, it will stay contained until the space is disturbed or the carbon dioxide is ‘poured’ out.” Heavy plastic tote boxes or plastic garbage cans make excellent containers and May chose to use a plastic tote box. He cut one hole in the lid as an inlet for the hose carrying the carbon dioxide, then two small holes on the opposite end as an outlet. “The inlet for the CO₂ hose may also be placed near the bottom of the container, since CO₂ is heavier than air, however, be sure to have an outlet at the top to allow air to escape and to avoid pressure causing the lid to blow off when filling with CO₂,” he says.



The CO₂ euthanasia device constructed by Jerry May, extension educator for Michigan State University.

The container should be the correct size for the stage of production it will be used in, for example, a 30-gallon capacity should be used for nursery pigs, May suggests. “Don’t try to make them larger for bigger pigs,” he says. “The CO₂ chamber is the suggested euthanasia method for nursery pigs less than 10 weeks of age and 70 pounds but it is less practical for older and heavier pigs.”

Carbon dioxide is readily available where compressed gases are sold. Like acetylene and oxygen that you buy for the farm shop, carbon dioxide tanks are purchased under a lease/purchase arrangement and then returned and exchanged for refills.

Flow to the container must be controlled by a carbon dioxide control valve. “The valve used was a Victor with a rated flow of about 500 cubic feet per hour (CFPH) at 10 pounds per square inch gauge (PSIG),” notes May. “The carbon dioxide valves for welding deliver a low volume – up to 5 CFPH – which is not adequate for this purpose.”

May suggests using a heavy rubber hose to transfer the carbon dioxide from the tank to the box. “Frost will develop on the hose during use and light hoses may crack or break under these conditions,” he says.

“Use a control valve and the guidelines of its manufacturer to correctly provide the amount of CO₂ flowing into the chamber,”

May advises. “Generally, one pound of CO₂ in the cylinder equals 8.7 cubic feet of gas in the chamber. It is best to provide enough CO₂ to completely displace 100% of the chamber volume.” He cautions not to use dry ice as a source of CO₂. “In a few of the older publications, dry ice is sometimes mentioned as an economical alternative for very small animals,” he notes. “However, it is not an acceptable source of CO₂ for on-farm euthanasia of young swine, as high concentrations of the gas cannot be generated in a short period of time.”

For nursing pigs, the recommended carbon dioxide concentration for euthanasia is 60 to 70 per cent with a five-minute exposure time. The suggested optimal inflow rate is 20 per cent of the container volume per minute. “The container design should allow for it to be pre-charged with carbon dioxide,” May says. “Pigs should be unconscious within 45 seconds and experience respiratory arrest within five minutes.”

Employee considerations

It is important to consider the employees who perform euthanasia and “set the tone” for the procedure, May believes. “It should be performed in a respectful, calm manner,” he says. “Personnel training should include an explanation of how carbon dioxide affects the animal and causes death.”

Carbon dioxide is a gas which, when inhaled at the concentration being delivered into a closed chamber, causes an animal to lose consciousness. Once unconscious, all sensations are lost. An animal cannot see, hear or feel and essentially, is asleep. This first step usually occurs in less than 1 minute. “During this time, the operator may hear animal movement for a very brief period,” May explains. “The chamber lid should not be removed since this will cause the concentration of CO₂ to drop and may prolong the time to unconsciousness.” Within 5 to 10 minutes, the heart and lungs can no longer function, and the animal dies. Animals are then removed from the chamber by “pouring” them out. “It is unsafe for the operator to reach into the chamber because he/she may inhale the CO₂,” May warns. “Once the animal is ‘poured’ out of the chamber, check to determine that the animal is truly dead and not just unconscious. Lightly tap on its eye – if there is no eyelid blink, the animal is dead.”

Using carbon dioxide is considered relatively employee-safe, May points out. “Caution needs to be taken if the euthanasia box is located in a small enclosed work room,” he explains. “Carbon dioxide detectors, similar to smoke detectors, are available and should be installed if the unit is located in a tight space.” As noted above, dead animals should be dumped from the container rather than picked out by the worker to avoid breathing in the carbon dioxide.

“While everyone associated with raising pigs recognizes the need for painless and humane euthanasia of terminally ill or injured animals, most farm employees feel uncomfortable performing the task,” May believes. “Poor euthanasia practices can lead to employee dissatisfaction, poor performance and disrespect for healthy animals. Carbon dioxide euthanasia offers a recognized option for terminating nursing and nursery sized pigs that farm employees find more acceptable,” he concludes.

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Winning the welfare debate



In order to win the debate over the welfare of farm livestock, producers must redefine the terms, repackaging the concept and reposition the debate over the issue, communications strategist Dan Murphy told delegates at Alberta Pork's Annual General Meeting held in Calgary last December. "Animal welfare is one of the

most important things the industry is facing and it's a battle we can win," he says.

It is important to redefine the way in which we refer to animal care, believes Murphy. "The term 'animal welfare', is fashioned intellectually as a series of negatives, for example 'no cages', 'no confinement' and 'no suffering' and is based on what activists don't want to happen," he explains. "It assumes producers are guilty until proven innocent and that animal abuse is inherent in the production system." Producers are constantly fighting a rearguard action against all the criticism, he adds. Using the term 'animal well-being' is much better, says Murphy. "It's positive, it describes what is being done to farm animals and it involves the total health of the animal." And, he points out, it is measurable, based on morbidity, mortality, vocalizations and other criteria.

Farm animal welfare has become a major issue because 98% of people have no contact with agriculture, Murphy notes. "It's difficult to explain anything to them as they know nothing. Also, the press focuses on negative stories and no credit is given for the improvements that have been made in the industry," he says. On the other hand, activist groups are well funded, shrewd and relentless in their attacks. "They spend all day, every day, thinking about ways to demonize you and they have lots of money - the Humane Society of the USA (HSUS) has a budget of \$120 million," he told the audience. "They make every issue a crisis, framing the issues in terms of the evil, greedy producers versus the noble, crusading reformers." As a result, Murphy believes, consumers become predisposed to the myth of animal abuse. "To producers, well-being of their animals is *continued on page 28*

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1. de Graau, A.F., B. Thacker, C. Francisco, W. Wilson, R. Schlueter and A. Eggen. "Field trials to assess the performance of a conditionally licensed vaccine in Canada." Emerging Pig Diseases Symposium, Krakow, Poland. June 2007. p. 120.

just one of a list of priorities, but to many consumers it is now the primary consideration when they are buying food.”

The media compound the problem and are misinformed, according to Murphy. “Media people share the same disconnect with production agriculture as consumers,” he says. “They often fail to explore the complexity of issues impacting meat production.” Worst of all, he adds, they are unbalanced because they treat sound science and extremist rhetoric as if both were just different opinions worthy of identical treatment.

In order to create effective pro-industry messaging, the livestock industry needs to reposition itself in the same way as successful brands and companies, Murphy believes. This means identifying what makes you different, what you do that adds value, what you are proud of and how you want your customers to feel about your business, your products and your industry, he says. He suggests that producers might define who they are as ‘We are professional producers who raise livestock by combining the best science and the latest technology with time-honoured methods of animal husbandry and humane care to optimize the well-being of our herds.’ “We should say we are for families who want to purchase

safe, affordable healthy protein foods,” Murphy says. “We should say that we are different because we engage in a sustainable, economically viable business of raising food animals, focusing on maximum efficiency and minimal depletion of resources such as land, water and energy.”

The key to communicating with the consumer is to re-frame the debate, Murphy suggests. “As long as the debate is on the activist community’s terms, industry cannot win,” he says. “The conventional wisdom is that farm animals’ welfare is compromised by crates, cages and confinement. We need to counter that by saying that modern production systems are moving towards optimal well-being, an ideal environment that protects animals from disease, predation and suffering, while promoting natural behaviours.” An analogy that might resonate with consumers is how they treat their household pets, he suggests.


The use of antibiotics and other pharmaceuticals is also under attack by the media, Murphy notes. “These farm inputs are portrayed as a demonic trade-off between short term growth and long-term problems,” he says. “We need to counter by saying that over the last 30 years pork producers have increased yields and improved nutritional quality


while significantly reducing the use of antibiotics. The result is that less arable land is needed for food production, prices have remained highly competitive and more nutritious protein is now available to consumers.” The simple message is that modern production is better for the land and better for the pigs.

Getting these messages across requires the deployment of a variety of resources. “The messaging should be through positive success stories that put a human face on the business and focuses on the benefits and contributions of production agriculture,” explains Murphy. “It needs to deliver value messages relating to nutrition, the environment and economics.” All meat related messaging should contain seven critical terms, he believes. These are: sustainable, family, trust, responsibility, stewardship, husbandry and well-being. The messages need to be put across by everyone in the industry at every opportunity, whether it is through interviews, quotes, presentations, informal venues such as churches or the workplace, or directly to family and friends, Murphy says. “It’s everybody’s responsibility to get the message across, because the activists aren’t going away and the media aren’t going to educate themselves,” he concludes. **≡WHJ≡**



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Integrating foreign workers

The labour shortage in agriculture has become a significant problem for all farms especially for those that are located in more sparsely populated areas, says Dan Klippenstein, President and CEO of Excel Playgreen Group Inc. of Niverville, MB. As his hog production business expanded, it became impossible to source staff from the local area, especially when young people from rural areas were leaving to work in Winnipeg and other major centres, he told delegates at the Saskatchewan Pork Symposium, held last November. With a shortage of local applicants, he started hiring foreign applicants and going through the processes required to get them into Manitoba. In this extract from his presentation, he discusses some of the issues he encountered and the areas that need to be considered when workers arrive from another country.



Background

We hired our first foreign worker in 2002 and he came from the Philippines, arriving in December. He was a vet trained in the Philippines and our expectation was that he would be able to have an immediate impact on production

and performance. However, while he performed his duties well, we did not understand his culture and were not prepared for many of the challenges that he would face and how best we could help him adapt. We then continued to hire foreign workers and had a group of six come in June of 2003. This created some challenges, but it also created a community for the workers and they settled into the area. While the first worker never said anything we later found out that the other staff did not like having a foreign worker at the farm and likely subjected him to some discrimination.

Orientation

When a foreign worker arrives, they know very little about the area or the country and may find it quite intimidating. They are generally used to *continued on page 30*

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living in very populated areas so moving to a municipality of less than 2,000 can be a significant culture shock.

When an employee arrives we provide them with a week of acclimatization and orientation which also serves as a biosecurity measure. You are never quite sure if they came directly from a hog farm in their country or how long it is since they had contact with pigs. They also need time to get over jet lag and get their sleeping pattern adjusted to our time zone if they came from a different time zone such as the Philippines.

When they first arrive we give them access to a computer so that they can let their family know that they have arrived safely. It is our job to ensure that their family feels comfortable with their family member being far away from home. We have dinner with them and try to learn as much as possible from them about their country and teach them some of the Canadian ways of living. In some countries the boss never associates with the workers so they are always amazed that the boss would have dinner with them.

During this week we help them set up a banking account, apply for their Social Insurance Number, and Manitoba Health card. We take them shopping for basic things like bedding, suitable clothes depending on the weather, and some necessities. During the orientation week we have them spend time reading our production manuals and try to familiarize them with the Canadian production system. Most are used to studying and are able to understand the program by reading about it. Because we are also a breeding stock producer it is our policy to allow seven days without pig contact once they reach Canada.

Housing

One of the issues with bringing in foreign workers is where you house them and what services you provide. In Canada housing is essential and accommodations vary with rates and services. It is important to know what services are available locally so you can help them obtain the things they need. Initially we had a house trailer on the farm site where we housed foreign workers. It was about 6 miles out of town and was fairly isolated but close to the farm. We soon found out that this was not a preferred living arrangement. The issue was how they would get to town to buy groceries etc. We helped some of them purchase a vehicle and then to obtain a drivers

license. This helped somewhat but the workers still did not like living out in the country. They would not complain about living out of town but after a while would secure another job and leave the company. After we realized this, we secured more housing in town and moved the employees to town where they were more comfortable with their living arrangements. Transportation to the farm then became an issue, so initially we helped employees buy vehicles but then everyone wanted us to buy them a vehicle! We therefore gave each manager a vehicle so that they could ensure that staff could arrive at the farm on time.

As part of our housing program we provided a community computer in each house so that the employees could remain in contact with their family. Initially it was just dial-up access, however now there is high speed internet available making contact easier. We also provided a bedroom and bed for each employee as part of the rent and some basic furniture, table and chairs etc. in the common areas.

One of the problems that we had initially in group housing was that nobody would clean and very often the place ended up being a mess. We therefore had to implement a set of rules for living in group housing so that everyone felt safe and comfortable. Since houses were reasonably priced in town we decided to buy a number of houses which we could rent to employees at reasonable rates. Since most employees initially came without their families we would house employees in group housing based on bio-security considerations. This has worked very well and people live there until they feel confident enough to rent their own premises and move to their own place. When their families arrive, housing arrangements need to be adjusted and we help employees secure suitable rental housing.

Training program

Training was one of the issues that we were unprepared for. We expected the employees who had veterinary or animal science degrees would be able to contribute immediately, but found that it took about three months for them to adapt to the Canadian production system. Even for those employees that came with some production experience we found it was mostly back yard production and most of the employees had little or no commercial pig production experience when they arrived in Canada. We had to take a step back and work at developing a training program that would orient the employees to our production system and teach them our program. We did this with on-farm demonstration and production seminars with our veterinarians and other specialists. The advantage of the high skilled foreign worker is that they learn quickly and soon started to contribute significantly to the production team.

Cultural orientation

The culture of the area where you are recruiting from is likely very different than our Canadian culture. It is important to try to learn the culture of your employees which will help you understand them. It is also important to teach the foreign workers Canadian culture so that they have an understanding of how things work in Canada. It is important to work with

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your current staff to help them to adjust to different cultures in the barn and be accommodating to the new people and help them feel welcome. Early on this was very difficult for us since the head office was two hours away from the farm locations which meant that it was the farm manager's job to look after some of the needs of the foreign workers. Managers need to be trained to look after the welfare of their staff as much as the welfare of the animals in the barn.

Weather

Since many of the foreign workers come from a warmer climate it is important to provide them information on weather and requirements for clothing especially if they arrive in the middle of winter. Having someone take them shopping so that they buy suitable winter clothing that is effective in our cold temperatures is important. The cold temperatures are a shock for them.

Not only do the cold temperatures affect the workers, but also winter driving conditions are new to them. It's important to help them develop good winter driving skills and create awareness for them of the dangers of winter driving and that weather affects road conditions, including visibility and ice which may help you visit the ditch.

Communication

Depending on where the foreign worker comes from it is important that you can communicate with them. Initially we thought that it was not all that important that they knew English well, but we soon realized that it was very important. If the foreign worker does not have a good command of English it is difficult to provide direction on how to do the job. You can show them how to do it but you cannot explain to them why they should do it that way. Therefore it's difficult to discuss production issues in a conceptual manner. In some cultures you never disagree with the boss so if you ask them if they understand they say yes. However, if you press it further and ask them to explain what you want them to do you soon realize many times they don't understand. You then need to go through it again, possibly slower, to try and convey the information you are trying to impart to the employee until you feel confident that they understand. The poorer their command of the English language, the more difficult it is. The Canadian embassy does screen them if you say that English is

required; they test them to see what level their English is at. In some cases we have waived that requirement only to find that their English is not good enough and in most cases it ends with the person not making it in the long run.

Conclusion

Foreign workers are a good answer to a shortage of labour in agriculture. They are generally well educated and have a desire to work and to develop a good living for themselves and their families. They view the opportunities that Canada provides as something that they can only dream about in their home country.

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Celebrity chefs help to boost pork sales

By *Bernie Peet*

Despite the pervasive fast food culture in North America, and indeed in many other parts of the world, TV cooking shows are increasing in popularity and their chef presenters are now well-known personalities. Not only that, but these culinary stars are influencing our attitudes to food and even what we eat after watching their programs. Back in the 1980's, British TV chef Delia Smith developed a reputation for being able to empty supermarket shelves of particular ingredients used in her recipes, a phenomenon that became known as the "Delia Effect". On one famous occasion, she used cranberries (not as widely available in Britain then as they are now) and the following day every supermarket in the country had sold out. Now, her successors on British TV screens, high profile chefs such as Gordon Ramsey and Jamie Oliver, continue to influence viewers' shopping habits. The question for the pork industry is whether we can harness the

power of the celebrity chef to boost sales of our product.

It's quite clear when watching cooking programs that TV chefs are well disposed towards pork, recognizing that it is a lean, healthy protein source that is versatile and tasty. When it comes to bacon, many of them wax lyrical about its great flavour and how it can be used in so many ways to enhance dishes. Shouldn't we be able to tap into so much goodwill? Two examples, from Britain and the USA, suggest that not only can we benefit from cooperating with celebrity chefs, but that the effect on consumer buying habits can be significant.

Recently, the beleaguered British pork industry scored a massive win by cooperating with Jamie Oliver on a program called Jamie Saves Our Bacon, which highlighted the plight of the industry and showed viewers how they could help it to survive in future. At the core of the program were two messages – that British pork is produced to higher welfare standards than that in the rest of Europe and that misleading labelling by retailers often makes it difficult to identify the British product easily. "Britain has some of the highest animal welfare standards in the world where pig farming is concerned," says Oliver on his website. "But lower standards of animal welfare in some European countries mean those countries can pump out cheaper meat, which is why pork from the EU is undercutting ours. If we aren't careful, our British farmers will be driven out of the market completely and British pork will be something we tell our grandkids about."

The program didn't shy away from showing the detail of production, including procedures such as tail docking and castration, which many consumers find shocking. The studio audience was treated to a demonstration of semen collection, after which Oliver commented "I can tell you one thing – I won't be making a smoothie out of it!" Oliver described various production systems and praised the fact that nearly half of Britain's breeding sows are kept outdoors and a substantial percentage of finishers are housed in straw bedded systems. Standing in a sow stall –

banned in the UK – he condemned the system, saying that sows "eat at one end and s**t out of the other, but they have nothing to do."

For the cooking elements of the show, Oliver focused on preparing tasty meals from lower cost cuts such as pork shoulder, belly pork and neck fillet steak. He urged shoppers to descend on the supermarkets and butchers and buy up all the cheaper pork cuts, which they did. Sales of pork shoulder roasting joints soared 75% immediately after the show and total pork sales were up 15.8% in volume in the following week.

Despite the less than glamorous aspects of production that were highlighted, on balance, producer representatives felt the benefits of the program far outweighed the negatives. "Jamie Oliver did in 90 minutes what nine years of campaigning by the rest of us failed to achieve, namely to persuade consumers of the British pig industry's higher welfare standards," said Digby Scott, publisher of Pig World magazine. Barney Kay, general manager of the National Pig Association, said he was delighted with the program and described it as "one of the most significant things" to happen to the industry.

Chris Lamb, marketing manager for the producer-funded British Pig Executive, said the industry would not have been able to generate the same amount of publicity Jamie Oliver's show had. "This is a 90-minute advert endorsed by a man that Sainsbury's (supermarket) pays £1m a year to promote its brand. This is publicity that the pig industry just could not buy," he said.

While British producers are still basking in the glow of the Oliver Effect, on this side of the pond the USA's National Pork Board also enlists the help of celebrity chefs to promote pork. Larger than life personality and grilling guru Guy Fieri headed up a series of promotional activities last year, including the Pork Checkoff's "Bring it t-ON-g" Pork Grilling Challenge. Consumers were encouraged to submit their most creative, fun and boldest grilled pork recipes, along with a summary on why their dish is the

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nation's boldest, with prizes for the winners.

In addition, the first-ever The Other White Meat Tour criss-crossed the country last summer to share with America the secrets to great pork grilling. The pork mobile made stops in 23 cities from coast-to-coast to sample sizzling pork, conduct recipe demonstrations and offer up fun and free family-friendly activities.

Fieri's love of pork, grilling and bold flavours is evident in his recipes and his shows. His enthusiasm for all things pork is infectious and no doubt rubs off on viewers. "Grilling is like playing for grown-ups," Fieri says. "It's fun, easy and you can follow the directions or invent your own rules. Pork is your grill's best friend. Nothing else out there blends more harmoniously with so many different seasonings; from lean tenderloin and loin chops to baby back ribs, your options are endless. It doesn't matter which cut you toss on the grill because with pork, the taste is always off the hook," said Fieri. What better endorsement could we have for our product?

The National Pork Board enthuses about Fieri as much as he does about pork. "Guy is known for his bold style, and bold flavors are a hot culinary trend in 2008," says Traci Rodemeyer, its director of pork information. "Guy is also a self-proclaimed POP (Pal of Pork), which is reflected in his energetic, spirited style and spicy flavors like Mojo Pork Chops."

"The Pork Checkoff has been privileged to work with Guy on previous 'Don't be Blah' promotions, and we're thrilled to team up with him again," said Rodemeyer, who notes that the Pork Checkoff encourages consumers to visit TheOtherWhiteMeat.com for bold pork recipes, including those from Guy Fieri. "He's the perfect spokesperson for the Pork Checkoff because he is genuinely passionate about pork!" exclaims Rodemeyer.

The Pork Board has teamed up with other celebrity chefs in the past, including Tyler Florence, who played a pivotal role in a previous The Other White Meat/Don't be Blah campaign, when he acted as spokesperson to media and consumers. "Reaching these influential chefs is so powerful, because they can communicate a

pork-positive message to millions of consumers," says Ceci Snyder, assistant vice president of consumer marketing for the National Pork Board. "Chefs like Tyler Florence and Guy Fieri appeal to the young target audience we're trying to reach, and they take pork promotion to a whole new level," Snyder says.

There is no doubt that TV chefs have a major influence on the attitudes and eating habits of their viewers, although there is no real evidence of long term effects. Nevertheless, they have a high degree of credibility and have the potential to boost pork sales if industry organizations harness their potential effectively. **WHJ**

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0606-2401

Alberta Pork participates in successful recruitment mission to Mexico

By Marvin Salomons

The pressures from a global recession have businesses in Alberta looking to downsize and reduce their workforce. Despite this, Alberta's pork sector continues to experience labour shortages. The availability of qualified and experienced pork technicians or managers is critical to the viability of a pork operation and having the right people on a team can make all the difference to the bottom line. The economic downturn in the Canadian-Alberta economies is not seen as a positive factor when it comes to labour for the pork industry. Despite the increasing general unemployment rate the competition for and recruitment of qualified labour from the Canadian workforce remains an issue. Pork producers continue to point out that laid-off trade workers and young unskilled workers are reluctant to work in their pig operations. Careers in pork production remain a hard sell.

Producers report that the current labour situation is not as critical for them as it was a year ago, yet recruitment and retention of workers still requires an aggressive strategy. Farms continue to report labour shortages at all levels. Attraction of workers from outside of Canada remains a necessary component



Murray Roeske (left) and Marvin Salomons interviewing a prospective candidate at Mexi-Can's office in Monterrey, Mexico.

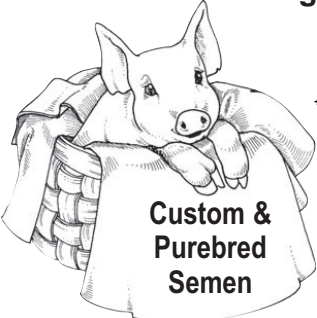
of an overall strategy to meet shortages for all skill-sets. Pork sector employers have tended to recruit management level positions from European-based markets while skilled and low-skilled technicians are predominantly sourced from Asian and Central American countries.


Over the past year Alberta Pork focused producers towards recruiting high quality workers from the Philippines. The Philippines presented a great opportunity to bring in workers with high quality pig production as well as English language skills. The results from an Alberta Agriculture & Rural Development organized recruitment drive to Manila in April 2008 were positive, with many workers already on Alberta farms or in various stages of the Embassy approval process. All in all producers are very satisfied with the quality of candidates they have been able to hire from the Philippines. Despite the success stories, there have been growing frustrations in getting timely visa approvals combined with increasing fee costs and that has lead the industry to re-examine its overall recruitment direction. Recommendations were made to identify and explore other sources for high quality labour. Mexico was targeted.


Mexico targeted for recruitment

Mexico has long been a source for workers in the agriculture sector with the highly rated low-skilled "Seasonal Agriculture Worker Program (SAWP)" making up a significant portion of the processing workload at the Canadian Embassy Office in Mexico City. The primary agriculture sector has also seen real successes in acquiring skilled workers from Mexico. For the pork industry, workers with skills in pig production are available


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and often can be found with animal science or veterinary science training. Many workers are eager to come to Canada for a better job and life but a negative factor is that most come with work experience in smaller-scale, remote pig operations plus have a lower command of the English language compared to their Filipino counterparts. Still, several Alberta pork operations initiated their own recruitment efforts in Mexico over the past several years with good success in attaining both skilled and low-skilled candidates.

An exploratory recruitment mission to Mexico was initiated with Alberta Agriculture and Rural Development. The Department, along with the Alberta Government Office in Mexico City, identified and secured the services of a local recruitment agency to assist Alberta Pork and other interested agrifood employers in a group job fair. Mexi-Can Labour Force, a Calgary-based recruitment agency with satellite offices strategically located in four Mexican centers – Guadalajara, Zacatecas (Jerez), Saltillo and Monterrey was contracted. Mexi-Can's offices are located in areas where livestock production is a major part of the local economy and with staff on the ground in these locations working with them presented a significant benefit.

Mexi-Can Labour Force organized candidate interviews for Alberta Pork at five venues over the week of February 8-13, 2009 (venues at all four office locations plus one venue at Rio Grande). Mexi-Can's history in the Mexico labour market brought a wealth of experience and contacts at both the local level as well as with the Canadian Embassy in Mexico City. The company knows the market and the ropes as it works with various employers across Canada bringing in over 1000 low-skilled and management workers into Canada each year. Presently Mexi-Can has over 200 visa applications being processed at the Canada visa office in Mexico City. Local staff used targeted ads to bring in candidates with pork production experience and English skills. Overall 58 interviews were conducted over four days. In addition, meetings were arranged with local agriculture / veterinary schools to assess the feasibility of utilizing their graduates in work experience programs or jobs on pork operations in Alberta.

Mexi-Can Labour Force provides services

Alberta Agriculture & Rural Development set-up the agreement with Mexi-Can in line with past recruitment projects. Mexi-Can agreed to assist pork producers with a package of recruitment and settlement services for a fee of \$2500 per candidate. Schedule 1 is a list of services that Mexi-Can has indicated they will provide along with the fee structure (Table 1).

SCHEDULE 1: Mexi-Can Labour Force (MCLF) Recruitment Services Package

- **Government approval:** Assist in getting Labour Market Opinion (LMO) from Service Canada.
- **Recruitment of talent in Mexico:** MCLF will have the qualified candidates ready for interviews and skill testing prior to employer representative's arrival to assure an efficient process.
- **Provide resumes (translated in English):** MCLF will provide translated resumes confirming previous experience.
- **Create job descriptions:** MCLF will work with producers to fully understand the job responsibilities, the hours, the compensation, etc. MCLF will provide each candidate with as much information as possible for them to consider before they proceed with an interview. MCLF will outline to candidates what living costs and employment deductions can be expected (See Table 2 for sample matrix)
- **Transportation:** MCLF will provide all transportation within Mexico.
- **Interview and Skill Test applicants:** Depending on needs MCLF will provide suitable interview rooms, testing equipment and facilities.
- **Applications for work permits to the Canadian Embassy –** MCLF will ensure all applications are filled out properly and submitted in a timely manner with approved payment to the Canadian Embassy in Mexico City.

continued on page 36



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¹ Armbruster, G. et al. Review of *Lawsonia intracellularis* seroprevalence screening in the United States, June 2003 to July 2006. *Proc. AASV*, 2007.

² Paradis, M. et al. Subclinical ileitis produced by sequential dilutions of *Lawsonia intracellularis* in a mucosal homogenate challenge model. *Proc. AASV*, 2005.

³ Data based on ADG and F:G differences over 21 days from treatment A, B, and F; base price of market hog of \$130/100 kg, carcass yield of 79.9%, index of 108, and nursery feed cost of \$250/tonne.

⁴ Guedes, R. Update on epidemiology and diagnosis of porcine proliferative enteropathy. *J. Swine Health Prod.* 12(3), 2004.

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- **Schedule applicant medicals and background checks in Mexico:** MCLF will oversee and pay all costs associated with the necessary CIC background checks and the medical tests required by CIC.
- **Arrange for passport and other government documents required for entry and to work in Canada:** MCLF will look after all of the necessary arrangements for each accepted candidate (i.e.: work permit, LMO, medical, passport, cover-letter, criminal record check).
- **Prepare Employer/Employee contracts:** MCLF will prepare and witness all employer / employee contracts required by HRSDC, and CIC.
- **Make all travel arrangements & escort workers to Canada:** MCLF will purchase return tickets from Mexico to Canada. *Note:* This will include all transfers within Mexico and Canada. In the event a candidate leaves employment early MCLF will be responsible for the return flight.
- **Passports and Criminal Checks** – MCLF will pay for all costs for passports and criminal checks for each successful candidate. *Note:* when a FBI check is required, the costs are significantly higher. Most candidates do not require a FBI check.
- **Assist foreign workers in clearing Customs, Citizenship & Immigration (CIC) at point of entry into Canada:** MCLF will have all needed documents at Canada Customs for the workers entry into Canada.
- **Assist Employer in locating and securing housing for workers:** MCLF will work with the employer to assure that the housing arrangements are in locations that will provide reasonable access to the job sites.
- **All necessary working documents** – MCLF will manage the entire process of acquiring Social Insurance Numbers and Provincial Health Care for every arriving worker before they start their work term.
- **Make banking arrangements for foreign workers:** As part of the contract with you, MCLF will ask for a cash advance for all of the foreign workers. This cash advance will be a cheque made out to the foreign worker and all of the necessary equipment if required (i.e. steel toed boots, hard hats, coveralls, etc.) should be considered when considering an amount of the advance. MCLF will help the foreign worker establish a bank account.
- **Provide ongoing support during the work term:** MCLF will provide a consultant to deal with any issues that might arise

with the foreign worker, assuring their successful transition to Canada.

- **Perform ongoing after hours interviews to assure a smooth transition to Canada:** MCLF will perform post employment interviews to clarify any concerns that the workers might have.
- **Provide a guarantee:** MCLF will provide a guarantee for all of the candidates accepted. This guarantee is for 1 year.

Table 1: Mexi-Can (MCLF) Recruitment Fee Structure Cost (\$CAD)

MCLF recruitment package fee to employer*	\$2,500.00
<i>* The above fee includes services noted in Schedule 1 and the fees noted below</i>	
Work permit application fees for successful candidates to Citizenship & Immigration Canada (CIC), Mexico City.**	\$150.00
All medicals fees for successful candidates to CIC, Mexico City.**	\$200.00
Passports and Criminal Checks for each candidate to CIC Mexico City.**	\$130.00
All flights costs, including transfers in Mexico and to Canada.	\$1250.00
<i>** IF DESIRED the following fees may be recovered from the worker by the employer: Criminal check fee, Passport fee, Work permit fee, Medical evaluation fees.</i>	

Table 2: Estimated Gross Pay versus Net Pay matrix based on Selected hourly rates

Description	\$12/hour	\$14/hour	\$16/hour	\$18/hour
Gross Monthly Pay	\$2,112.00	\$2,464.00	\$2,816.00	\$3,168.00
Federal Tax	-\$316.80	-\$399.60	-\$422.40	-\$475.20
Canada Pension Plan	-\$97.15	-\$113.35	-\$129.54	-\$145.73
Employment Insurance	-\$42.24	-\$49.28	-\$56.32	-\$63.36
Net Monthly Pay	\$1,655.81	\$1,901.77	\$2,207.74	\$2,483.71
Rent	-\$500.00	-\$500.00	-\$500.00	-\$500.00
Food and Entertainment	-\$300.00	-\$300.00	-\$300.00	-\$300.00
Total	\$855.81	\$1101.77	\$1,407.74	\$1,683.71

Note: This Table sets out approximate numbers only and exact amounts will fluctuate depending on the specific employer and place of employment. One month is based on an average of 176 hours of work. Food deduction is based on \$300 and includes a basic food and small entertainment budget.

Typical processing times

Processing times are a big factor in affecting a decision to proceed with a recruitment application and always are often a point of considerable discussion. Table 3 outlines what an employer and candidate can expect to see in work permit / visa processing times using the Canadian Embassy services in Mexico City. Many of the estimated times are derived from experiences by MCLF as of March 1, 2009.

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Table 3: Estimated Work Permit processing times and considerations (Mexico)

Application process or factor	Time
Labour Market Opinion (LMO) processing time	
• Assuming LMO pre-approval in place.	12-15 days
Work Permit / Visa processing time	
• Canadian Embassy (Mexico City) statistics show 98% take less than 28 business days (about 2 months time).	Expect 2.5 months
Medical checks	
• Embassy committed to sending Medical Form Section A within 3 days of receipt of the work permit application.	3 days
• Medical exams usually completed in 3 days of receiving forms.	Completed in 3 days of receipt
• Section A then is sent to Trinidad office. Less than 5% of applications are held up or declined due to a medical condition (ranges from high blood pressure to cancer).	
International security checks	
• For MCLF only one in last 200 submitted was not approved at Canadian Embassy in Mexico City.	
• Fingerprints may be requested to the application process.	Add 14 days
Other factors and considerations	
• Failure of candidate to disclose past work history or not including dependents can affect agent's decision.	
• Working illegally (i.e. USA) does not disqualify candidate but increased officer diligence onto application adds about one week to processing. This work history is required.	Add 7 days
• Connection to home country is assessed to determine commitment to return home after permit expires	Add 10-15 days
• Embassy requests for on-site interviews more likely with skilled versus low-skilled workers.	Add 10-15 days

- Calling Embassy for questions on application can slow processing. The less the interaction, the smoother and faster the process
- Ensure applications are complete and accurate
- Respond to Embassy questions in a timely and professional manner.

Pre-approval bulk applications, estimated processing time	6-7 weeks (March 1/09)
--	---------------------------

Interested in candidates?

All 58 resumes were brought back to Alberta and reviewed with about 30 making the initial recommendation list. Resumes can be viewed at the Alberta Pork office in Edmonton or at Pork Chain Consulting in Lacombe. Selected copies can also be faxed to any interested Alberta employer. For further information you can contact Murray Roeske (780-440-9794), Bernie Peet (403-782-3776) or Marvin Salomons (403-342-6696). Once selections are made, Lyle Tomie or Sean Laidley with Mexi-Can in Calgary (403-291-4838, www.mexi-can.ca) will assist in processing your candidates.

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Understanding sow lameness

By Ken Stalder, Linda Engblom, and Colin Johnson, Department of Animal Science
Iowa State University, Ames, IA 50011

The pork industry is becoming more interested in the length of time that sows remain productive within their commercial operations. Interest in lifetime productivity is a result of the very tight economic situation that virtually all pork producers are currently experiencing throughout the world. Hence, there is a need to gain a better understanding of the reasons that we cull sows from the breeding herd in order to improve lifetime productivity. Additionally, the general public is becoming more concerned with animal well being on the operations that produce this food. Finally, producers benefit economically when sows remain productive for a longer period of time in their breeding herds.

Culling sows and replacing them with gilts in the breeding herd is a dynamic process. Culling sows often involves a combination of factors including sow health, productivity, availability of replacement gilts, cull sow market price and a variety of other issues. When evaluating benchmark values from record keeping systems, it is commonly shown that reproductive failure ranks as the most prevalent reason for sow culling. Table 1 shows the culling reasons most commonly reported in US herds using PigChamp in 2008. As you might have guessed, reproductive failure continues to dominate the reason for culling sows from US commercial breeding herds and represent over 32% sows culled in 2007. The second most common reason for culling sows from the breeding herd is old age which represented over 20% of sows culled.

Lameness or locomotion problems (including "Downer") represented over 15% of the reasons for culling sows from the breeding herd from this data set. However, the actual figure of sows with locomotion problems could be higher since most sows only had one removal reason reported. While it is possible for producers to choose up to two, rarely is more than one removal reason reported. For example, it is easy to see that some of the sows culled for reproductive failure could have been a result of another issue. In other words, the identified culling reason may be a symptom of other breeding herd problems like lameness. Sows that have foot lesions and / or have unsound feet and leg structure, especially the more severe cases, are less likely to want to stand and eat which contributes to excessive weight loss and subsequent reproductive failure.

Table 1: Proportion of removed sows by removal reason from the 2008 PigCHAMP summary of US commercial breeding herds.

Removal reason	Proportion
Reproductive failure	32.1%
- Return to estrus/did not conceive	16.5%
- No heat	7.7%
- Farrowing difficulties/failure	3.9%
- Abortion	3.0%
Old age	20.3%
Locomotor disorders	14.5%
- Lameness	10.3%
- Downer	4.2%
Low productivity	10.5%
- Litter size at farrowing or weaning	7.0%
- Litter performance including growth	3.3%
- Litter abnormalities or dead litter	0.2%
Body condition	9.0%
- Inferior body condition/unthrifty	6.3%
- Injury/trauma	2.7%
Miscellaneous	7.1%
- Management/depopulation	4.5%
- Other including size and behavior	2.6%
Diseases	6.5%
- Udder/vaginal/urine organs	3.0%
- Gastrointestinal problems incl. ulcer	2.6%
- Infectious diseases	0.3%
- Heart or lung diseases	0.6%

Feet and leg soundness problems can begin at a very early age. Osteochondrosis has been shown to be prevalent in growing pigs with prevalence approaching 100% in some lines (Carlson, 2003). The removal due to locomotion problems among sows also mainly occurs in lower parity numbers (up to parity 5). In order to improve the feet and leg status of the sows in commercial breeding herds, it is essential that all replacement gilts are thoroughly evaluated for feet and leg soundness. This includes size and shape of claws as well

as leg "angles" or "positions" or leg "set". This is becoming one of the lost "arts" of the animal breeding industry and genetic improvement process. However scientific studies have shown that the leg "shape" impacts the projected lifespan of a sow. It has been shown that gilts are at a higher risk of being culled from the breeding herd earlier if they have buck kneed front legs when compared to gilts with normal front legs (Serenius and Stalder, 2007). Similarly, gilts that have upright or straight rear pasterns which makes the gilt appear post legged have been shown to exit the breeding herd earlier when compared to their normal counterparts (Serenius and Stalder, 2007). The trait that appears to positively impact sow longevity is soft or weak front pasterns. Several studies

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have indicated that gilts that have soft or weak front pasterns remain in the breeding herd longer than their normal counterparts (Serenius and Stalder, 2007; Grindflek and Sehested, 1996). Another trait related to the prevalence of foot lesions is uneven toe size. It has been reported that a difference between the medial and lateral toe (claw) greater than 1/2 inch or 12.5 millimeters is under genetic control but its exact inheritance is unknown. Hence, genetic suppliers and commercial producers maintaining an internal multiplication system for producing replacement females should be able to select against uneven toe size.

To confirm some of the paradigms we think we know about why sows are culled from the breeding herd, an evaluation of over 3000 cull sows at two Midwestern sow harvest facilities was conducted (Knauer et al., 2007). In this study, body condition, feet, shoulders, teeth, lungs, and reproductive tracts were visually evaluated for gross lesions on harvested sows. The most common foot lesions observed were rear (n = 2,064, 67.5%) and front (n = 1,024, 32.9%) heel lesions (Table 2). Cracked hooves were found on the front feet of 703 (22.6%) and rear feet of 552 (18.1%) sows. Rear digital overgrowth was observed in 644 (21.1%) sows. In total, over 85% of the sows had some form of a foot lesion ranging from minor to something most would consider very serious. Many of the sows had multiple foot lesions (Table 3). Because these lesions were identified on the feet of the sow after stunning had occurred, there was no way to determine if a particular lesion could be identified with lameness. It does suffice to say that the incidence of foot lesions is sufficiently high enough that producers should evaluate



This sow has a small inside toe. Uneven toe size is related to the prevalence of foot lesions.

their sow herd to determine the level and severity of foot lesions within their herd.

The other major finding from this study of slaughtered sows was the relatively low prevalence of acyclic ovaries. The incidence of reproductive lesions detected in the present study was less than the reported percentage of sows culled for reproductive failure from previous studies based on record keeping summaries. Acyclic ovaries would be indicative of sows that are not cycling. With such a high rate of reported reproductive failure from various

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¹ Pollmann et al., Journal of Animal Science, volume 56, no. 3, p. 640-644

² Bio-equivalency data submitted to Canadian regulatory authorities – data on file with Vétoquinol Canada Inc.

³ Unpublished independent trial conducted in 2005 by H.L. James, M. Sheridan, DVM, W.R. Cox, DVM, Dip. Path. – data on file with Vétoquinol Canada Inc.

Table 2: Frequency of lesions on 3,158 cull sows evaluated at two US Midwestern harvest facilities in 2005

	Frequency (no.)	%
Front feet, n= 3117a		
Heel lesions	1024	32.9
Cracked hooves	703	22.6
Digital overgrowth	109	3.5
Abscesses	20	0.6
Missing dew claws	4	0.1
Rear feet, n= 3058a		
Heel lesions	2064	67.5
Digital overgrowth	644	21.1
Cracked hooves	552	18.1
Missing dew claws	152	5.0
Abscesses	134	4.4
Ovaries, n= 3062a		
Acyclic	277	9.0
Cystic	192	6.3
Pregnancy, n= 3070a		
Pregnant	180	5.9
Normal	157	5.1
Mummified	15	0.5
Decomposed	8	0.3
Systemic lesions, n= 3083a		
Pneumonia 1- 10% ^b	153	5.0
Pneumonia > 10% ^c	145	4.7
Pleural adhesion	174	5.6
Peritonitis	54	1.7
Shoulder lesions, n= 3146a		
Abrasions	394	12.5
Open	150	4.8
Abscesses	12	0.4

^an= number of sows with recorded data.

^bPneumonia with 1- 10% lung involvement.

^cPneumonia with > 10% lung involvement.

benchmarking entities, the incidence of acyclic ovaries was relatively low. This could be the result of the fact that we were only able to conduct a visual observation of the ovaries and could not do any histology or any other tests to confirm the fact that the ovaries were in fact functioning. However, the discrepancy between reported reproductive failure of greater than 30% and the acyclic

Table 3: Foot lesion scores on 3,158 cull sows evaluated at two U.S. Midwestern harvest facilities in 2005

Lesions, no.	Front feet, %	Rear feet, %	Front and rear feet, %
0	48.5	19.5	13.6a
1	43.8	51.3	29.5
2	7.3	23.8	33.3
3	0.4	4.8	17.0
4	0.0	0.6	5.0
5	0.0	0.1	1.4
6	NAb	NA	0.2

^a13.6% of sows had no foot lesions on their front or hind feet.

^bNA = Not applicable.

ovaries observed in this study (9%) is sufficiently large to begin to question whether all the sows culled for reproductive failure are really the sow's fault or whether we have other challenges with things like estrus detection, timing of insemination and other factors. A previous study of a farm with reproductive problems showed less pathological findings in the reproductive organs than expected and concluded that breeding routines (e.g. estrus detection and insemination) needed to be improved (Dalin et al., 1997). It is possible that a great deal of financial reward might be gained through education in order to improve the stockmanship skills associated with the breeding herd activities where they would likely improve lifetime productivity of the sow herd.

As mentioned earlier, we evaluated body condition score (BCS) in this study of slaughtered sows in order to determine the associations between BCS and the various lesions. Sows were scored on the 1 to 5 scale with 1 being excessively thin and 5 being excessively fat. After scoring all sows, the incidence of BCS 5 sows was so small that they were merged with sows with a BCS score of 4. Lesions on the front feet decreased as BCS increased. In other words, as the sow became fatter or in better body condition, the incidence of various foot lesions decreased (Table 4). However, there was a different pattern of rear foot lesions. As body condition increased or sows became fatter, the incidence of heel lesions on the sole of the rear feet increased. Overgrown toes tended to decrease as body condition improved on the sows (Table 4). Cracked rear hooves followed a similar pattern with the incidence decreasing as sow body condition increased above a score of 2 (Table 4).

The relationship between the reproductive traits and body condition score was evaluated in this study as well although the data is not present here. As one might expect, the presence of acyclic ovaries significantly increased as BCS decreased or as sows became more poorly conditioned acyclic ovaries increase. Cystic ovaries were associated with fatter sows. In this case, cystic ovaries were observed in 192 (6.3%) sows, which increased significantly as BCS increased. Pneumonia was observed in 298 (9.7%) sows, and increased in frequency as BCS decreased significantly. The most frequently observed shoulder lesion among harvested cull sows was shoulder abrasions (n = 394, 12.5%). The presence of shoulder abrasions significantly increased as BCS decreased.

It is clear that feet and leg soundness impacts the ability of sows to remain in the breeding herd for a long and productive herd life. Focusing on feet and leg soundness and reducing the number of foot lesions is an area where producers and breeders have an

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Table 4: Frequency of lesions by BCSa on 3,158 cull sows evaluated at two U.S. Midwestern harvest facilities in 2005

Disorder	BCS				P-value ^b
	1	2	3	4	
Front feet					
Heel lesions, %	26.3	35.4	32.6	33.1	.41
Cracked hooves, %	32.9	24.9	20.4	17.6	.01
Digital overgrowth, %	6.3	5.3	2.7	0.5	.01
Abscesses, %	2.3	0.3	0.6	0.3	.02
Missing dew claws, %	0.7	0.1	0.1	0.0	.03
Rear feet					
Heel lesions, %	55.1	68.5	68.6	70.8	.01
Digital overgrowth, %	26.5	22.2	21.3	12.6	.01
Cracked hooves, %	19.1	20.7	17.7	12.6	.01
Missing dew claws, %	3.7	6.5	4.7	3.0	.16
Abscesses, %	6.1	7.8	2.9	1.1	.01

^aBCS = Body condition score (possible range 1 to 5, Patience and Thacker, 1989).

^bP-value= tests the linear association between trait and BCS.

^c% of sows with pneumonia and 1- 10% lung involvement.

^d% of sows with pneumonia and > 10% lung involvement.

^eRow means with different subscripts differ (P < 0.05).

opportunity to improve their animals from both a genetic and environmental perspectives. We also know that lameness and locomotion problems can contribute to reproductive failure, productivity and other common reasons for removing sows from the breeding herd. Improvement in feet and leg soundness and reducing the incidence of lameness and locomotion problems is one key to getting sows to remain productive for a greater number of parities thereby increasing the average parity at culling for commercial producers. Increasing the average parity at culling will ultimately lead to improved profitability of commercial breeding herd sows.



A hoof that has a crack and an overgrown sole – both can become much more severe than this and eventually cause lameness.

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Air inlets important in ventilation system design

By Mike Brumm, Brumm Swine Consultancy Inc., North Mankato, MN

When producers think of ventilation systems, they most often think about fans and controllers. To exhaust air from a swine production facility, you must have inlets to allow fresh air into the barn. While this sounds simplistic, all too often the inlets are added and managed as an after-thought to the ventilation system, not as a key component of the system.

In swine production facilities that rely on negative pressure (fans exhaust air from the facility as compared to positive pressure systems where fans blow air into a facility) for air exchange, the inlets control the air distribution in the barn. In most facilities, designers work with a designed air pressure difference between the outside air and the inside of the facility of 0.05 inches water gauge static pressure (12 Pa).

While this may be the design criteria for inlet and fan sizing and selection, all too often the systems get constructed and operated in a manner that compromises overall ventilation system performance.

The best tool to determine if a ventilation system is functioning as designed is a manometer (Figure 1). This device measures the static pressure difference between the source of the fresh air (outside, attic or hallway) and the facility or room being ventilated.

In the absence of a manometer, producers can estimate the static pressure by measuring the inlet velocity using a vanometer (Figure 2). For example, when the inlet velocity is approximately 800 feet per minute (245m/min), the static pressure can be calculated as being approximately 0.05 inches. If the velocity drops to 400 fpm (120 m/min), the static pressure is only 0.015 inches. If it is above 1000 fpm, static pressure is above 0.1 inches.

A common source of low or inadequate static pressure is unplanned openings into a room or facility. At farrowing sites, doorways to farrowing rooms that remain propped open is a common mistake that impacts air distribution within the room.



Figure 2: Using a Kestral model 3000 vanometer to measure inlet velocity. It measured 846 fpm in this photo

Static pressure as a consequence of inlet sizing and adjustment influences how far air is 'thrown' when it enters the room. For each 0.01 inch change in static pressure, the distance air is 'thrown' from an inlet changes approximately 2 feet (61 cm).

A common mistake made with inlets is to restrict air flow into the attic or hallway before air reaches the inlets to the facility or room. A general rule of thumb is to size the hallway or attic inlet area to be twice the size of the room or facility inlets. This also means these inlets are not restricted by lint or dirt on such things as fly screening or netting over the inlet (Figure 3). In general, inlets to hallways or attic areas should be covered with nothing smaller than bird netting (often 1" by 1" [25mm x 25mm]; Figure 4).

Let's assume you have a 200 head nursery room with inlets and fans sized for a total of 7000 cfm (35 cfm/pig). The desired inlet velocity into the room is 800 fpm. If the outside inlet into the hallway or attic that supplies fresh air to these inlets is twice the capacity of the inlets, the air entering into this inlet area must travel at 400 fpm.



Figure 1: Manometer to measure static pressure



Figure 3: A gable end attic inlet obstructed with dirt and lint covering the screening material



Figure 4: A correctly constructed eave inlet to an attic. Note the lip on the metal soffit material which acts as a deflector to minimize snow drift into the attic area

The math to determine the size of the outside or attic inlet becomes:

$$7000 \text{ cfm} / 400 \text{ fpm} = 17.5 \text{ ft}^2$$

You need 17.5 ft² (1.625 m²) of inlet into the hallway or attic to be sure this is not a point of restriction to the room inlets.



Figure 5: Incorrectly installed insulation stops that result in restrictions to air flow to ceiling inlets. While the upper rafter chord is a 2"x6", the actual inlet width when accounting for the purlins is only 4 inches. At this site, a minimum of 6" was necessary to meet the ceiling inlet capacity as installed.

In the case of soffit or eave inlets to attics, a common construction error that results in restrictions to air flow is incorrect installation of insulation stops (Figure 5).

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Farm assurance brings financial benefits



Martin Barker, managing director of Genesis QA

Farm quality assurance programs have proliferated over the last 10-15 years in response to increasing demands from retailers and consumers for evidence that food is being produced to defined standards. This has reflected the growing importance of issues such as farm animal welfare, food safety and the environment to the consumer; issues that are affecting buying decisions more and more. Yet, despite this trend, many primary producers remain sceptical about such schemes and view their cost purely as an expense, with no tangible benefits. But, says Martin Barker,

Managing Director of UK-based Genesis QA, it is possible for producers to extract value from QA programs because they generate a mass of potentially valuable data.

Speaking during a recent visit to Alberta, he said that QA programs not only need to be competitively priced, but also should enhance clients' performance and increase value by providing benefits. "Our company has been successful because we will often recover the full cost of membership through the benefits we provide, primarily from the data we collect," he says.

Data collected during on-farm audits can be used to rank farms, allowing the best producers to benefit. "We have been working with the world's insurers to derive benefit from this," explains Barker. "One large scale pig production company in Britain, which we ranked as one of the best, managed to save the equivalent of \$80,000 per year on insurance, compared to QA scheme membership fees of \$8,000." Producers with a lower ranking can be shown what they have to do to improve and given an indication of how much they could save on insurance, which provides an incentive, he adds.

"We also get paid by banks to rank their client portfolio against those of their competitors," Barker says. "At the same time, we can get improved access to finance and better loan rates for the higher ranked producers within the scheme."

Genesis QA was started "out of frustration" about 15 years ago, when assurance schemes for the main agricultural sectors were proliferating in the UK. "There were six single-sector schemes and as a mixed farming operation with cattle, pigs and sheep, we were constantly being bombarded with paperwork to fill in for the various schemes and had different inspectors coming to the farm," Barker explains. "We set up a whole-farm scheme, which took out all the elements common across all farm enterprises, such as feed storage, use of medicines, staff training etc. and put them all

together. This avoided all the duplication and created a 'mainframe with bolt-ons' approach. Also, a single farm approach saves significant cost by increasing the efficiency of farm auditors."

The Genesis system provides the platform for internationally-recognized certification that can be used by agricultural industry QA programs, food processors and retailers. "We can certify any set of standards, anywhere in the world," he says. "There is an equivalence process so that standards that are recognized by accreditation bodies in one country are recognized in most others." Genesis now provides services to 18 of the top 30 food groups in the world including Walmart, Tesco, Danish Crown and Smithfield.

Wherever possible, Genesis uses technology to benefit the producer and to create value. Central to data capture on the farm – by both the producer and auditor – is the Digipen, a regular ballpoint but bristling with electronics. It writes on special paper, which has minute dots, allowing it to track the letters and numbers via a camera in the tip of the pen. The data is packaged up by a microchip and sent via a Bluetooth mobile phone connection to a server, which stores the data. A pig producer who enters production data such as breeding and farrowing information can then get reports back very quickly, without having to enter the data again as with regular herd recording programs. This not only saves time but gives rapid access to reports and other information. "If a sow number is entered incorrectly, the producer gets an email back to his mobile phone, so he can go and correct the error immediately," explains Barker. "Where data is entered into a computer from written records, errors can take a long time to track down."

Because the data transmission is done via the mobile phone network, there is no need for an internet connection, which can be an advantage in rural areas. "Recently, a laptop computer, which incorporates an integral Bluetooth device for data transmission has become



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available and this is ideal for our system,” Barker notes.

Data from the farm can be combined with information from other participants in the production process such as the processor, trucking company, feed supplier and producer organizations. This allows sharing of the “pot” of data for mutual benefit and, again, prevents entering the same data more than once. “When a producer buys feed, the supplier generates a delivery sheet, which requires information to be keyed into a computer. If the supplier then uploads the data to the Genesis ‘Data Warehouse’, the producer can include it in his records without doing any data entry,” says Barker. “Similarly, the producer’s vet or adviser can access farm reports from the system.” However, he stresses, it is the producer that controls the data and only the producer can authorize access by a third party.

Because the farm data includes information about animal movements, the Data Warehouse can also be used as a traceability tool. “If there is an outbreak of a notifiable disease at an abattoir, we can show the locations of all the farms that have sent animals to that abattoir within a defined time period,” explains Barker. “Because data on movements is entered using the Digipen, it is available very quickly, which means that tracking of potential disease transmission is almost real-time.” He notes that Britain’s agriculture ministry has given Genesis a special exemption from completing the detailed paper movement records required by law that have to accompany each shipment of animals.

Similarly, data on medicines use can be used to identify regional trends. “If an increase in antibiotic use in pigs is noted in a particular area, it might indicate an increase in respiratory disease,” Barker notes. “The information can then be used to provide an early warning system for producers so that they can be more vigilant for that disease. It can also help veterinarians to understand trends in disease patterns and medicines usage.”

Information about farms can be used to benchmark an individual farm or group of farms against international or retailer standards. “Most farmers around

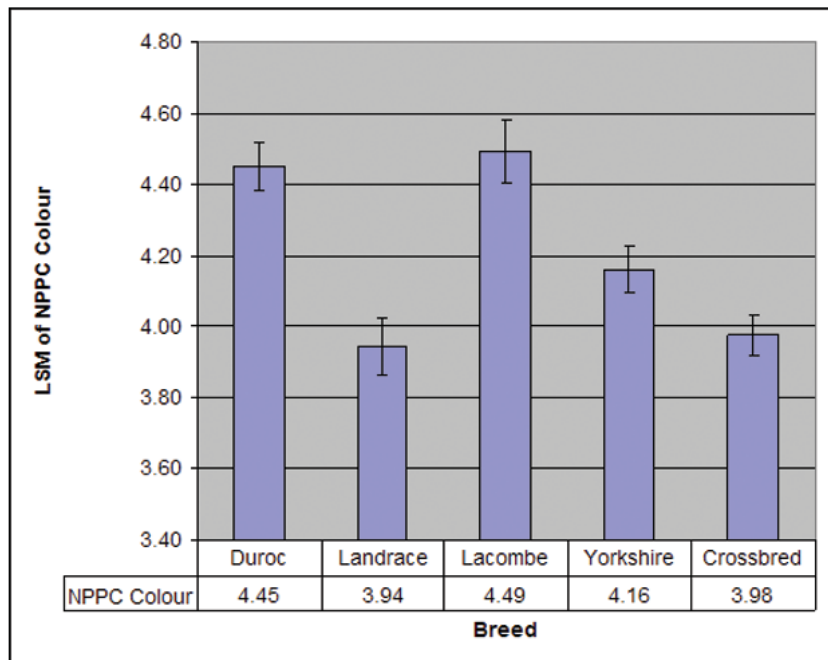
the world think that they are the best, but the reality is that whether they are in Canada, Australia or the UK, they operate to very similar standards,” Barker says. “We can tell a producer where he stands relative to certain standards and what he has to do to meet a particular standard,” he notes. Pork producers should have a baseline standard onto which they can bolt other modules, assuming there is a market for a different product, Barker says. “If you are in a market which requires higher

standards, you need to market your product effectively in order to get added value from it,” he advises.

“Quality assurance is an integral part of a mature supply chain, but many producers perceive it to be something completely different to what it is,” Barker concludes. “We imposed regulation and quality assurance in the UK 15 years ago, which was a burden on producers, but now we’ve evolved it to work for us and bring benefits.”

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Corn DDGS withdrawal rates for hogs: Animal performance, carcass traits and cost variables

Eduardo Beltranena, Malachy Young, Neil Campbell, Jennifer Aalhus, Michael Dugan, Matt Oryschak, and Ruurd Zijlstra

Take Home Messages

Feeding high levels of distillers dried grain and solubles (DDGS) may reduce feed cost. But corn DDGS is high in unsaturated oil that may soften the pork fat if fed at high levels to finishing pigs. Thus, feeding high levels of corn DDGS to reduce feed cost may affect pork quality. This experiment therefore evaluated feeding 30% corn DDGS and implementing three removal or withdrawal patterns of corn DDGS out of the finishing diets to minimize both feed cost for producers and mitigate potential packers concerns regarding pork quality. Our results showed that feeding 30% corn DDGS or implementing a withdrawal strategy did not affect hog growth performance, feed cost per hog, income over feed cost, or cost per kg gained. However, the rate of withdrawal of corn DDGS out of the finishing diets improved carcass dressing percent and estimated carcass pork yield.

Pork producers endured one of the worst feed crises ever over the last two years. Poor harvests in grain producing countries (Ukraine, Australia), speculative buying by hedge funds and lofty grain demand by bio-fuels plants contributed to sky-high grain prices. Subsidies for the construction of ethanol plants, government mandates of ethanol inclusion in gasoline and consumer rebates for hybrid and E85 vehicles will continue to pressure grain supplies over the next five years. Such unprecedented grain demand for bio-fuels suggests that there might be an ample supply of distillers' dried grain and solubles (DDGS), the main co-product of ethanol production.

An ample supply of DDGS would present producers with an opportunity to reduce their largest cost of production, feed. Feeding DDGS to hogs would also broaden the opportunity to deal with the ample supply. During ethanol production, most of the starch is broken down and fermented; protein, fibre and fat therefore concentrate about three times in DDGS compared to the parent grain stock. The advantage of corn over wheat is higher fat content in the grain. This higher fat content nearly triples in corn DDGS providing more dietary energy than wheat DDGS.

The high fat content in corn DDGS is mainly unsaturated oil. Feeding unsaturated oil to hogs softens the pork fat. Packers are thus mainly concerned with reduced pork firmness in fresh pork cuts. Loins are not as firm as from hogs fed wheat and barley-based diets. Bacon slices tend to stick and gel together. Processed pork products, like sausage, become oily and runny and have a reduced shelf life. Thus, there is a chance that feeding large quantities of corn DDGS in order to reduce feed cost could potentially affect pork quality for exports.

Implementing a withdrawal strategy as hogs achieve market weight after feeding high levels of corn DDGS would appear to be a solution. It would initially reduce feed cost for producers if growth performance is not affected. Reducing the inclusion rate or entirely removing corn DDGS out of the finishing diets as hogs approach market weight would also mitigate packers' concerns regarding the effects of unsaturated oil on pork quality. Thus, the objectives of this experiment were to first establish the effect of feeding 30% corn DDGS in order to minimize feed cost and, second, to evaluate three patterns of corn DDGS withdrawal or removal out of the diet as hogs near market weight to prevent impacting pork quality.

For this commercial-scale study, 1100 pigs (30 kg) were randomly cut into 50 pens at filling the barn. Barrows and gilts were penned separately, 22 pigs per pen. One-fifth of the barrows or gilts were fed a soybean meal control diet over five



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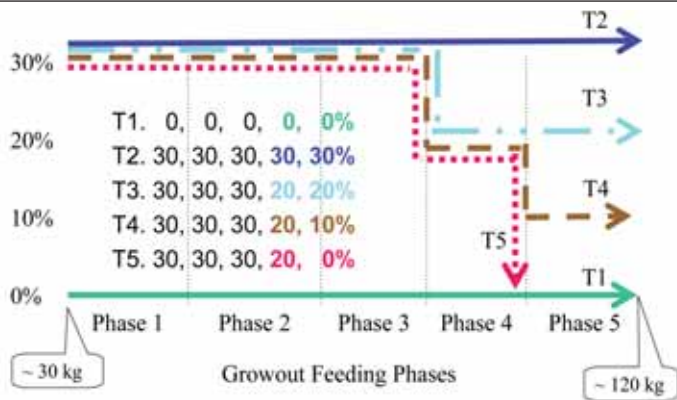
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growth phases until market weight (Figure 1). Four-fifths of the barrows or gilts were offered diets containing 30% corn DDGS replacing soybean meal instead for the first three grower phases. These hogs were then offered 20 and 20%, 20 and 10% or 20 and 0% corn DDGS in the last two finisher phase diets until reaching market weight (Figure 1).

Figure 1: Hogs were fed 0 or 30% corn DDGS during the first 3 grower phases. Three corn DDGS withdrawal strategies were implemented during the last 2 finisher phases



Growth performance during the trial was excellent. Feeding 30% corn DDGS or implementing the withdrawal or removal strategies described as hogs neared market weight did not affect daily weight gain, feed disappearance or feed conversion (Figure 2). Feed cost at the time this trial ran was so high that a 100 g more feed per kg gained represented \$2.40 extra feed cost per hog marketed.

Feeding 30% corn DDGS to market weight reduced warm carcass weight as a proportion of live weight (dressing percent) by 1.2% (Figure 3). High fibre diets thicken the hind gut that thus weighed slightly more at evisceration. Therefore, hogs fed 30% corn DDGS to market weight should be shipped nearly 2 kg heavier to achieve the same warm carcass weight as hogs fed no DDGS. Implementing

Figure 2: Feeding 30% corn DDGS or implementing a withdrawal strategy had no effect on daily weight gain (ADG), feed intake (ADFI) or feed conversion (F:G)

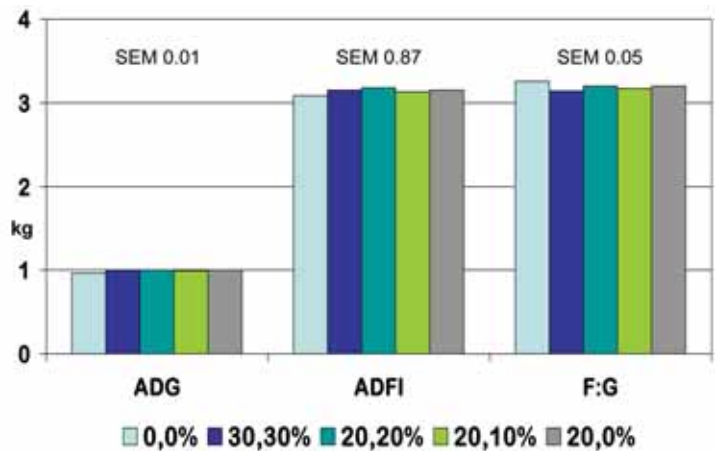
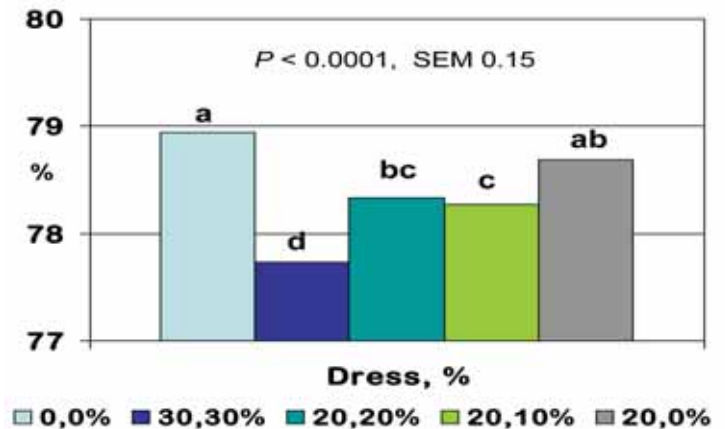


Figure 3: Feeding 30% corn DDGS reduced dressing percent. However, implementing a corn DDGS withdrawal strategy improved dressing percentage.



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the corn DDGS withdrawal strategies, however, improved dressing percent. The 20 and 20% or 20 and 10% corn DDGS withdrawal strategy were less effective than the 20 and 0% strategy, which improved dressing percent to the same level as controls fed soybean meal only (0 and 0%).

Figure 4: Feeding 30% corn DDGS reduced estimated lean pork yield. Implementing the 20 and 0% withdrawal strategy resulted in higher lean yield than controls.

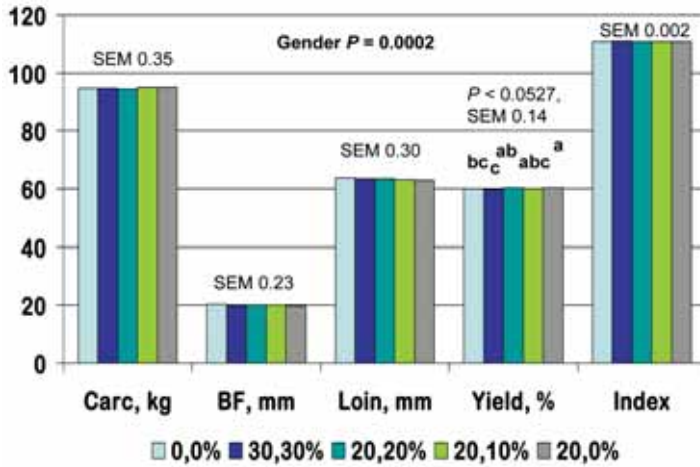
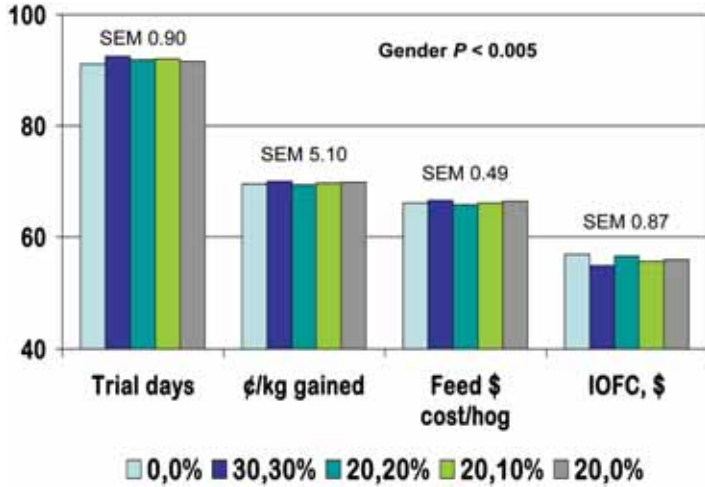


Figure 5: Feeding 30% corn DDGS or implementing the withdrawal strategies had no impact on cost variables.



Except for typical sex differences, feeding strategy did not affect warm carcass weight, backfat or loin depth and index (Figure 4). However, feeding 30% corn DDGS to market weight reduced estimated pork lean yield compared to controls fed soybean meal only. Implementing any of the corn DDGS withdrawal strategies improved lean yield. Implementing the 20 and 0% strategy resulted in even higher lean yield than feeding soybean meal only (0 and 0%).

Except for typical sex differences, feeding 30% corn DDGS or implementing any of the corn DDGS withdrawal strategies had no effect on cost variables (Figure 5). Feeding strategy did not affect the utilization of barn pig places as reflected by number of days on trial, feed cost per kilogram gained, feed cost per hog or income over feed cost (IOFC).

In conclusion, the results of this study indicate that feeding 30% corn DDGS or implementing a corn DDGS withdrawal strategy did not affect growth performance or cost variables. Feeding 30% corn DDGS reduced dressing percent and estimated lean yield, but reducing the inclusion of corn DDGS to 20% and then entirely removing corn DDGS out of the diet as hog neared market weight, improved dressing percent and increased estimated lean yield beyond that seen in controls fed soybean meal only.

Future articles of the Western Hog Journal will summarize the effects of feeding 30% corn DDGS or implementing the withdrawal strategies described here on yield of primal cuts, pork quality, sensory tests and processed pork products.

Acknowledgements: We acknowledge the financial support of Alberta Agriculture and Rural Development under the Agricultural Policy Framework, a federal-provincial-territorial initiative.

Funding was also provided by the US Grains Council, Agriculture and Agri-Food Canada and Alberta Livestock Industry Development Fund.

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Evaluating energy use in swine barns and potential energy conservation strategies

By Bernardo Predicala and Eleonor Navia, Prairie Swine Centre Inc.

In recent years, the energy cost component of the total production cost in swine operations has increased as a result of increasing global energy prices. The goal of this project is to assess current energy usage in different types of swine barns, followed by evaluation of various energy-conservation strategies that can potentially be applied in swine operations. A benchmarking survey of several swine operations showed that the average energy cost to produce each animal in these barns is about \$7 per head. However, wide variability in rate of energy use between different barns indicated significant opportunities to improve and reduce energy use in many barns. Actual barn monitoring and computer simulation identified areas in the barn that contribute significantly to energy use where potentially significant savings in energy bills can be realized. The project yielded valuable benchmark information on current usage of energy in various areas of the barn as well as comparative analysis of potential measures that can be used to save energy in swine operations. However, further work is necessary to evaluate the most promising energy-conservation strategies under actual barn conditions, and to integrate all these information into a package that can be readily used by pork producers.



INTRODUCTION

Many producers have started noticing the effect of increasing global energy prices in their operations as the energy component of their cost of production becomes significant. In previous years, the energy bills in a swine production operation were minimal compared to the other production cost components (such as feed and labour). From 1989 to 1997, the energy expenses in swine production ranged from 13.4 to 15.4% of the gross operating expenses (Khakbazan, 1999). The energy cost in 1989 was estimated to be \$4.00/pig sold (Barber et al., 1989). A large variability was observed and attributed to the differences in management practices, building construction/insulation, lighting schedules, and efficiency of equipment. However, the contribution of each factor was not quantified from the previous study. Steadily increasing cost of energy

prompted many producers to seek help in finding ways to reduce energy costs in their operations.

The overall goal of this project is to reduce energy costs in swine operations to reduce overall production costs. The specific objectives of this project are to:

1. Conduct a comparative evaluation of energy use (\$/pig marketed or \$/100kg pig marketed) in typical swine barns
2. Identify the energy intensive tasks in barns, potential areas for improvement, and best practices on energy management
3. Assess the impact of level of energy use on indoor air quality and performance of the operation
4. Quantify the impact of different energy-saving strategies on energy cost through building simulation

Materials and methods

Benchmarking

Benchmarking activities were conducted in two parts:

1. A survey questionnaire was sent out to different types of swine operations to determine the energy use per animal produced
2. Actual monitoring of energy usage in selected barns was conducted

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A survey questionnaire was developed to gather information from various barns such as physical location of the barn, type of operation, size of operation, average body weight of pigs going in and out of each stage of production (i.e. breeding and gestation, farrowing, nursery, and grow-finish), monthly production data on hogs marketed, and monthly energy (i.e. electricity and gas) costs for a three year period. Data from 28 swine facilities were collected in February 2007 and the average monthly utility cost per animal marketed (\$/pig marketed) in each facility was computed.

Based on the results of the survey, four barns were selected for actual monitoring of energy consumption. Two of the selected barns were among those which used the least energy per animal produced while the other two were among those which used the most energy. In addition to energy use, consideration was also given to the size and type of barn to ensure that varied types of barns were selected for actual monitoring. The amount of energy consumed was determined by taking actual measurements of electrical and natural gas consumed by all equipment in the barn during winter and summer seasons.

Within the selected barns, the actual production rooms monitored were randomly selected to represent each stage of production (i.e. farrowing, nursery, grow-finish, and gestation). The contribution of individual equipment to the total energy consumption was monitored by installing current sensors on the appropriate circuit wires in the electrical control panel. Measurement of natural gas or propane gas was done through sub-metering with diaphragm-type gas meters installed in gas supply lines to equipment. Temperature, relative humidity, and concentrations of ammonia, hydrogen sulphide and carbon dioxide were also measured. The level of fan energy consumption in the rooms being monitored was correlated with the actual measured indoor air parameters using simple linear correlation.

Evaluation of energy-saving strategies

To evaluate the impact of potential energy-conservation measures that can be applied in swine operations using computer simulation, the different processes that use energy in a typical swine barn building were modelled using principles of heat transfer and thermodynamics. The relevant impact of building material properties, ambient conditions, and management practices on the overall energy use in the barn was also considered in the computer model. The steps involved in simulating the barn building include model development, model validation, simulating the baseline case, and applying energy conservation strategies to the baseline case to determine the resulting impact on energy use.

The inputs to the model include building information (i.e. envelope, location and layout), operating hours, number of pigs, number of rooms per stages of production (i.e., farrowing, nursery, gestation and grow-finish), and inventory of equipment and their specifications. The outputs include the electrical and gas consumption per room and per entire production stage for one year.

Results and discussion

Benchmarking results

The energy survey was conducted from December 2006 to February 2007. From the three-year information (2004-2006) on energy consumption and hog production numbers obtained from 28 swine barns, energy cost per pig sold (\$/pig sold) for each barn was computed and summarized in Table 1. A wide range of variability in energy use between types of barns and even within the same type of barns was observed. Comparison between farrow-to-finish, nursery, grow-finish, and farrow-wean barns showed that the average energy cost between types of barns were significantly different ($P < 0.05$) for all comparisons except between grow-finish and farrow-wean barns ($P > 0.05$). The survey results also showed almost four times (4x) difference in energy consumption (per head) between the lowest and highest energy user barns. This indicated significant opportunities for improving energy use practices in some barns in order to reduce overall energy costs. These differences were expected because farrow-to-finish operations consumed the most energy on a per head basis, while barns that specialized in a single stage operation such as grow-finish, nursery and farrow-wean consumed less energy. This difference was attributed to the energy required for various operations in different stages of production from farrowing, gestation, nursery, and grow-finish. The variability in energy use between barns can also be attributed to the different fuels used (i.e. natural gas, propane and coal), equipment, and management practices employed in the barn. In order to determine the contribution of each factor, actual barn monitoring in different operations which used the most and the least energy per pig was conducted.

Table 1: Summary of benchmarking survey on energy costs in various swine barns

Type of barns	Size range	No. of barns, n	Energy cost per animal marketed			
			\$/head pig sold Range (min - max)	Average (SD)	\$/100-kg pig sold Range (min - max)	Average (SD)
Farrow-Finish	300 to 1,500 sow	9	3.0 -12.0	6.8 (3.41)	3.5-12.0	6.56 (3.05)
Farrow-Finish (excluding feedmill)	300 to 2,000 sow	7	3.8-13.0	6.5 (2.98)	6.0-11.5	6.75 (2.31)
Grow-Finish	10,000 to 40,000 feeders/weanlings	6	1.3-2.1	1.7 (0.58)	1.2-2.6	1.7 (0.74)
Nursery	130,000 to 140,000 feeders/weanlings	2	0.5-0.7	0.6 (0.12)	1.7-2.2	2.0 (0.41)
Farrow-wean	150 to 1,200 sow	4	0.8-4.3	1.9 (1.64)	8.2-17.8	12.2 (4.67)

The results of measurement of electrical energy consumption in the four monitored barns (Barns A, B, C, and D) are summarized in Tables 2 and 3. The wide variation in the actual electrical energy consumed in each stage of production for the monitored barns can be attributed to the differences in management practices employed in each barn.

For example, different strategies were applied for creep heating in farrowing rooms, i.e., Barn C used heat lamps only while Barns A and B used heat pads in combination with heat lamps. Furthermore, Barn A used heat lamps for 72 hours before and after farrowing while Barn B used lamps only for 24 hours after farrowing. The differences in equipment used and their efficiencies also contributed to the variation in energy consumption. Barns A, B and D used T12 fluorescent lamps while Barn C used more energy efficient T8 lamps. There were also differences in cfm/W rating of the exhaust fans, which are major contributor to energy usage during summer.

Table 2: Average daily electrical energy consumption in the four barns during summer

Rooms Monitored	Barn A		Barn B		Barn C		Barn D	
	kWh per head	kWh per 100-kg	kWh per head	kWh per 100-kg	kWh per head	kWh per 100-kg	kWh per head	kWh per 100-kg
Farrowing	3.75	1.63	2.67	0.40	4.95	2.2	-	-
Nursery	0.08	0.33	0.16	0.83	-	-	-	-
Grow-Finish	0.17	0.25	0.14	0.46	-	-	0.12	0.19
Gestation	0.40	0.16	0.24	0.10	0.36	0.14	-	-

As shown in Table 3, the average daily electrical energy consumption in grow-finish and gestation rooms during winter decreased compared to summer, mainly due to reduced ventilation and the heat generated by the pigs in these rooms was sufficient to maintain the room's set-point temperature. On the other hand, the increase in electrical energy consumption in the farrowing rooms for Barns A and B during winter can be attributed to longer operation of heat lamps in combination with the heat pads. Operation of heat lamps greatly depended on the management practices and barn staff working hours. Heat lamps on Barn A were turned on prior to farrowing while those in Barn B were set only after the sows already farrowed.

Table 3: Average daily electrical energy consumption in the four barns during winter

Rooms Monitored	Barn A		Barn B		Barn C		Barn D	
	kWh per head	kWh per 100-kg	kWh per head	kWh per 100-kg	kWh per head	kWh per 100-kg	kWh per head	kWh per 100-kg
Farrowing	4.64	2.02	3.17	1.27	3.95	1.76	-	-
Nursery	0.16	0.63	0.12	0.48	-	-	-	-
Grow-Finish	0.09	0.13	0.12	0.35	-	-	0.07	0.10
Gestation	0.28	0.11	0.14	0.06	0.25	0.10	-	-

The average electrical energy use for various pieces of equipment in the four barns monitored is shown in Table 4. As expected, exhaust fans used the most electrical energy during summer due to the high ventilation rate. For farrowing rooms, the highest contributor to electrical energy during winter was the creep heating system while in nursery rooms, the heater contributed the most to energy consumption during winter due to the high set-point temperature (28°C) in these rooms.

Table 4: Average daily electrical energy consumption (summer and winter average) in kWh/day

Equipment	Barn A	Barn B	Barn C	Barn D	AVERAGE
Heat lamps	19.61	3.29	68.15	-	30.35
Heat pads	15.63	15.25	-	-	15.44
Lights	19.50	5.70	50.15	18.17	23.38
Feed motor	1.13	0.34	4.10	7.23	3.20
Exhaust Fan	136.93	68.78	93.08	76.75	93.88
Recirculation Fan	13.31	-	35.20	-	24.26
Heater (blower)	24.56	-	4.26	-	14.41

Table 5 shows the gas consumption during winter in the four monitored barns. The grow-finish and gestation rooms required minimal or no supplemental heat during the measurement period because these animals generated sufficient heat to attain the setpoint temperature in these rooms. Nursery had the highest consumption in terms of energy consumed per 100-kg pig due to high room temperature setting.

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Table 5: Accumulated gas consumption for seven days in the four barns during winter

Rooms Monitored	Barn A		Barn B		Barn C		Barn D	
	MJ per head	MJ per 100-kg	MJ per head	MJ per 100-kg	MJ per head	MJ per 100-kg	MJ per head	MJ per 100-kg
Farrowing	134.44	58.45	177.33	66.92	125.35	55.71		
Nursery	41.00	164.01	26.12	366.2				
Grow-Finish	-	-	3.80	3.45			-	-
Gestation	0.65	0.26	-	-	-	-		

The barn monitoring results showed that the grow-finish and farrowing rooms and the ventilation fans were the highest contributor to electrical energy consumption in the barn, thus focusing on these areas can potentially provide significant energy savings from implementation of energy conservation measures.

The results also showed a medium to high negative correlation (i.e. -0.6 to -0.9) between the fan energy consumption and gas concentrations of NH₃, H₂S and CO₂ as indicators of indoor air quality. This confirmed that reducing ventilation rates would increase concentration of gases which can be hazardous to animals and barn workers. It also showed measures to reduce energy costs pertaining to fans and ventilation should be carefully considered so as not to compromise the health of the animals and workers in the barn.

Table 6: Estimated annual energy savings associated with different energy-saving strategies applied to a typical 600-sow farrow-to-finish operation

Areas	Average energy savings	
	kWh/yr	kWh/yr/sow
1. Fluorescent lighting	25,957	43
2. Low-wattage heat pad creep heating	47,391	79
3. High CFM/watt recirculation fan	9,872	16.4
4. High CFM/watt exhaust fan	42,501	71
5. Energy-efficient feed motor	1,846	3.1
6. Heat recovery (air-air heat exchanger)	88,404 m ³ /yr	147 m ³ /yr/sow
7. Radiant heater (propane gas-fired)	52,707 m ³ /yr	87.8 m ³ /yr/sow

Simulation results

For this part, a typical 600-sow farrow-to-finish operation was simulated as a baseline case. Applying various energy-saving strategies to the baseline case showed that significant energy savings can be attained in areas of ventilation and heating (Table 6). By using higher efficiency fans, the electrical energy consumption can be reduced by 21% (compared to baseline case) while the natural/propane gas consumption can be reduced by 70% using heat recovery systems (i.e. air-to-air heat exchanger). Furthermore, replacing conventional space heaters with gas-fired radiant heaters can reduce the gas

consumption by 40%. Applying conservation strategies to other areas such as recirculation fans, feed motors, lighting, and creep heaters can reduce energy consumption by 12% and 20%, 26%, and 39%, respectively. These simulated results need to be verified with data collected from actual implementation of these measures in an actual barn but these can also be valuable in selecting priority areas in the barn to focus on for energy conservation.

Conclusions

Based on the results of the study, the following conclusions can be made:

1. The average utility cost (electricity and gas) per animal marketed is about \$6.80, but could be as high as \$12.00 per pig for some operations. Benchmark information is important to swine producers in assessing the performance of their own operation and in developing a sound energy management plan.
2. Barn monitoring and energy audits revealed that among the potential areas where improvements can be made, ventilation and space heating are areas where implementing energy saving strategies can result to significant energy savings.
3. The negative correlation between fan energy consumption and indoor air quality implied that energy reduction strategies should be considered carefully to avoid compromising the health and safety of the animals and barn workers when implementing conservation measures.
4. Annual savings can be attained using energy efficient lighting, lower wattage creep heaters, ventilation fans with higher cfm/W rating, high efficiency feed motor, air-to-air heat exchanger for heat recovery, and propane-gas fired radiant heater.

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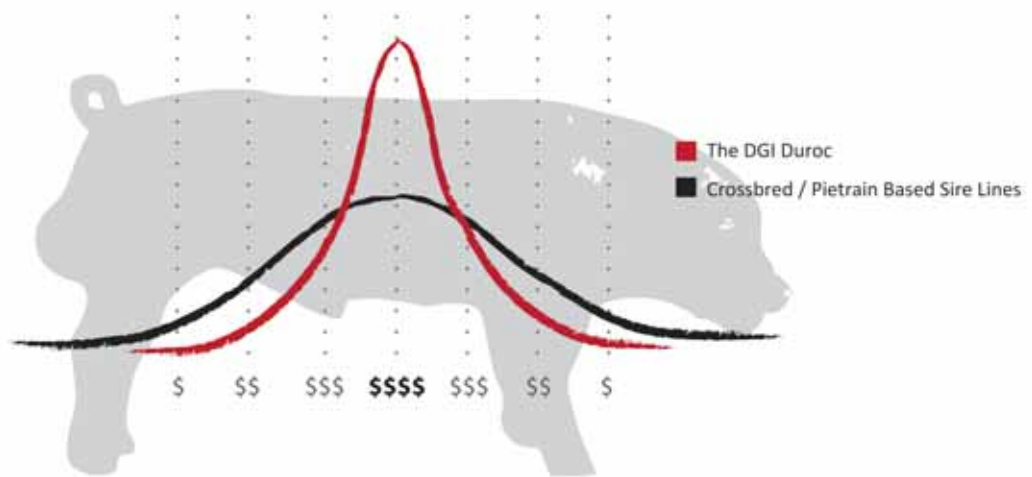
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Evaluation of vaccine performance: Part 1

By Western Swine Health Associates: Drs. Egan Brockhoff, Chris Byra, Gail Cunningham, Frank Marshall, Chris Misutka, & Peter Pawluk

Swine disease treatment and control is a constantly evolving science and a constant source of frustration to producers and veterinarians. We use biosecurity strategies to keep economically important diseases out of our herds. We treat through feed and water – as well as by individual injection – to help return sick pigs to health. We manipulate the environment – temperature; humidity; proper diet – to reduce stress on our pigs, and so to leave them as capable as possible to battle diseases that come. And we use various vaccination strategies to reduce clinical losses due to these infections.

More and more these days, pork producers find themselves in a debate over all aspects of farm management, from a public concerned about animal welfare, residue-free pork, and zoonotic disease. Increasing scrutiny of use of antibiotics in animals for food has led producers to reduce antibiotic use on their farms, or even to consider antibiotic-free pork. Vaccines have the advantage in these situations, because their prudent use can maintain health in the face of lowered antibiotic usage.

But, then, how come sometimes vaccines do not work as well as we expect them to? Or even when they do appear to work, how can we justify the cost of vaccination in the face of an ongoing challenging economic environment? This two part paper aims to address these issues. In Part One, we will look at some of the technical aspects of vaccine usage, and discuss options for when, why and how to use vaccines in the pig barn. In Part Two, we will discuss reasons for vaccine failure, and will summarize some basic rules for prudent vaccine use.

(When) do we need to use vaccines?

We are in difficult economic times in the hog industry. When times are tough, producers need to look at all cost inputs into their operation. Veterinary and medical costs make up to 2 to 5% of the total cost of raising a hog to slaughter, and so, although this

is not the only area that needs to be examined, this is one area where the costs can be measured quite accurately, and accurate measurement is the first step to efficient management.

During these times, vaccination usage is sometimes one of the areas that is cut back on. A recent paper from the Banff Pork Seminar suggested just this, but is this the way to go? Are vaccines a ‘luxury’ item that we can do without when times are tough? On some farms, we have seen the removal of erysipelas vaccination, for example, lead to increased incidence of arthritis at slaughter, and, in some cases, clinical classic erysipelas – with diamond skin lesions and pigs with fevers – has been seen. On another farm, removal of routine Parvo-Lepto-Erysipelas (PLE) vaccine in sows was followed by a herd farrowing rate drop of 15%. So, if we are to ask ourselves the question, “Can I afford to use this vaccine?” we must also answer the question, “Can I afford **not** to use this vaccine?”

How do vaccines work?

Simply stated, the purpose of vaccines is to build up the pig’s immune system, i.e. their ability to fight off an infection from a specific disease organism (pathogen). Vaccines usually do this by presenting a killed or modified form of the pathogen to the immune system. So, in essence, the immune system sees the disease organism but not the disease.

There are two aspects to the pig’s (and other species) immune system. One is the humoral immune system and the other is the cell-mediated immune system. The humoral immune system produces antibodies, which can bind with the pathogen and help to remove it from the host body. The cell-mediated immune system is made of specialized white blood cells that help to physically engulf the pathogen, and sometimes to directly kill this pathogen. When your veterinarian does a herd blood test to check for exposure to a specific pathogen, the test identifies the presence of antibodies (humoral) only.

Do vaccines prevent infection or disease or both? Do they prevent shedding? The answer here depends on the vaccine. In the example of PCV2 virus vaccines, we find that there is a difference in the amount of virus we can see in the bloodstream in the pig after vaccination. However, used correctly, all of the commercial PCV2 vaccines have been shown to be effective in reducing disease. Current licensed PRRS virus vaccines do not even prevent disease: they simply provide a means of exposing a herd to the PRRS virus at a time when the animal can handle the negative effects of the virus, and thus create a tool to help with herd stability. It is important to know what a vaccine is expected to do in regards to shedding and infection, when you are deciding

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on how to use the vaccine in your herd. For example, you would not want to bring in Mycoplasma positive gilts into a Mycoplasma negative breeding herd – even if the gilts were vaccinated – because you could not be sure that these vaccinated gilts would not bring Mycoplasma into the herd with them.

Vaccine...and booster?

Vaccines have traditionally required two injections for “ideal” stimulation of the immune system. Starting with the advent of one-dose Mycoplasma vaccines, pharmaceutical companies developed sustained release technologies to incorporate into their vaccines, allowing both an initial and booster dose of the vaccine from a single injection. Erysipelas vaccine is an example of a product that is supposed to be given twice, but often is only given one time on farm. In many cases, farms following this protocol have managed to avoid large problems; as a general rule, however, this should be avoided. One dose of a vaccine is better than no vaccination, but a booster dose prepares the immune system to respond more quickly in the face of a real infection. An interesting analogy would be to compare the immune system to a local police force. The first dose builds the police station, but it is the second dose that allows a rapid response to action, by putting more badges on the street.

Vaccinate sows or piglets or both?

In a hypothetical situation, a farm has a challenge with septicaemia and sudden deaths in the first two weeks in a grower barn (30 to 40 kg BW). The farm veterinarian conducts post mortems and identifies *Haemophilus parasuis* as the pathogen causing the problems: Glasser’s Disease. The strain of *H parasuis* is the same as that found in a number of commercial HPS vaccines. Should the producer vaccinate the sows or the piglets to protect against the negative effects of Glasser’s Disease? Or should he medicate the feed or water in this area?

Although the answer to the specific question above is probably to vaccinate the piglets, the answer to this problem is not always straightforward. Piglets vaccinated at 1 week and 3 weeks old can

mount an adequate response to an HPS challenge at 5 weeks old (AASV Proc. 2009; pg 399). However, vaccination of sows could also lead to a level of passively-derived antibodies in the piglets that is adequate to meet the same challenge, and vaccinating sows is a lot less work than vaccinating piglets. The key to protecting piglets through sow vaccination is to ensure adequate colostrum intake for each piglet, with the colostrum ideally coming from the piglet’s own dam.

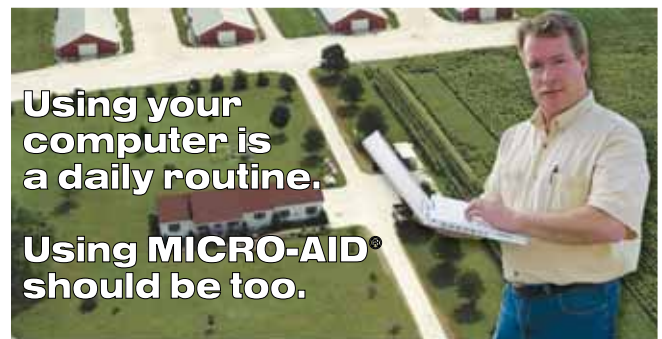
Half dose vs. full dose

Many producers are probably scrolling down to this part of the paper to see if we will address the question of PCV2 vaccines: should we give them full dose or half dose? Well, let’s address this issue.

In Canada, when PCV2 vaccines were beginning to be introduced, problems with PCVAD were significant. However, initial shipments of vaccine could not meet the demand, and so producers and their veterinarians got resourceful. Using a split dose (usually half dose) allowed more pigs to get vaccinated against this demoralizing disease, and many farms saw an excellent response to half dose protocols.

Now, however, supply is available to match demand, and so there is no logistical reason to continue to use PCV2 vaccines at half dose. However, times have been tough, vaccines are significant up-front costs, and many producers are reluctant to spend more if they cannot be convinced that there is a benefit. So

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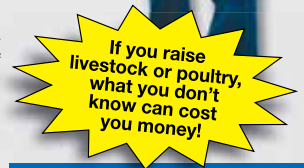
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which is the best way to go? they ask their vaccine expert: their veterinarian.

The answer is...it depends. In some farms, PCVAD hit harder, causing higher mortality, and lasted longer. Some barns are older, with more diseases, and poorer sanitation and pig flow. These are the farms that would benefit most from intensifying their protocols, by increasing their half dose PCV2 vaccination protocols to full-dose protocols.

Autogenous vs. commercial

There are four different types of vaccination protocols followed on hog farms: commercial vaccines, autogenous vaccines, Controlled Exposure Protocols, and natural exposure protocols.

Commercial vaccines are the ones that we are most familiar with. The recent PCV2 vaccines are an example of excellent vaccine technology, where appropriate administration of the

vaccine almost always produces a positive health response in the pigs.

In some cases, however, commercial vaccines are not available (e.g. *Actinobacillus suis*), or are problems are caused by strains of a pathogen not included in commercial vaccines (e.g. *E coli*, *Clostridium difficile*). In some these cases, a herd-specific (or autogenous) vaccine – made up from killed strains of the actual pathogens cultured on the farm – has been produced, and delivered appropriately to stimulate the desired immune response.

Controlled Exposure (CE) is more controversial, and has not been used extensively. Serum inoculation is the most common method of CE. In this protocol, sick pigs are bled and euthanized, and their serum is re-injected back into healthy pigs, at a stage before clinical signs are seen. CE was used – mostly out of desperation – in the early days of PCVAD, when no commercial vaccines were available, and producers with high losses were willing to try anything to reduce these losses. One of the big concerns with CE through serum inoculation is that we do not know for sure whether there are other undesirable pathogens in the serum of sick pigs, that can end up causing the herd more harm than good if they are spread throughout the barn.

Natural exposure is a protocol applied on many farms right now, as a way of vaccinating their sows and gilts. The protocol is called backfeeding, and it has been effective especially at reducing scours in piglets born to gilts. Specific backfeed materials to choose, and specific protocols to follow, should first be discussed with your veterinarian.

Summary

To sum up, vaccines are an important part of the health control “toolbox”, and they will only become more important as public scrutiny of their food supply continues. Vaccine protocols are variable, and no two farms will likely follow exactly the same strategy. In the second part of this report, we will investigate reasons why vaccines sometimes do not work as planned and we will summarize the basic points to ensure maximum benefit from the cost of adding an appropriate vaccination strategy on your farm.

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Blend feeding lowers feed costs

Preliminary results from a trial in Australia have shown that blend feeding can lower feed costs without affecting growth performance in pigs. The trial was conducted using a Feedlogic FEEDPro system.

The research compared pigs fed a two-diet blend to standard stepped diets and a single diet strategy. "Traditionally, pigs are fed three to four diets in the grower and finisher phase," said the trial researchers. "But we know that the pig's requirements for nutrients are constantly changing as they grow. So the pig is frequently fed a diet supplying excess nutrients, which means extra cost for no return."

Trial pigs were fed from 9 weeks of age to 19 weeks. The blend treatment was a combination of two diets altered frequently to closely match the pigs' required lysine to energy ratio at each stage of growth. The stepped treatment used three diets formulated to a standard three-phase program. The single treatment was formulated to be below the pigs' requirements for half of the 10 weeks and above the requirements for the remaining half.

The results suggest that both blend feeding and feeding a single diet reduced feed costs by an average of AU\$3.30 per pig compared to the conventional "stepped" diets, with no impact on growth performance. Further details, including full implications on carcass value, feed costs and changes in feed conversion over time will be available soon.

Shoulder ulcers still a problem in Danish sows

Recent results from the Faculty of Agricultural Sciences at Aarhus University show that there are still many sows with shoulder ulcers on Danish farms.

In the spring and summer of 2008 researchers from the Faculty of Agricultural Sciences examined 3,831 lactating sows on 98 different farms. The results showed that 17.2 percent of the lactating sows had shoulder ulcers to a

greater or smaller degree on one or both shoulders.

This is the first time a study has been made of the frequency of the problem on farms. Earlier studies have been carried out on slaughtered sows at the slaughterhouses and this has not given a proper picture of the situation on the farms.

In the new study the lesions are classified in three categories. Grade 1 is a superficial lesion, grade 2 includes all skin layers, while grades 3-4 are deep lesions. Thirteen percent of the sows had grade 1 lesions, while 4.2 percent of the sows had lesions classified as grade 2 or worse.

There was a big difference in the frequency of shoulder ulcers on the individual farms, says senior scientist Marianne Bonde, from the Department of Animal Health, Welfare and Nutrition, who headed the study. "We found sows with shoulder ulcers on all the farms we visited, but on many farms there were only a few sows with ulcers. On other farms there were problems with shoulder ulcers in more than 30 percent of the sows", she says.

The farms in the study were randomly selected via the central livestock register. The pig farmers were generally very interested in doing something about the problems, says Bonde. However, there is a great need for clarifying the causes of shoulder ulcers so they can be prevented. The data collected will form the basis for identifying important causes.

"We will now investigate the importance of the sow's general health such as body condition, problems stemming from pregnancy and problems with the legs and feet on the frequency of shoulder ulcers. We will also evaluate the influence of the housing conditions such as how much room the sow has to move around in the farrowing pen, which type of floor material they are lying on, and straw usage. We will also throw light on other elements, such as the conditions in the dry sow housing, feed, and the feeding system", Bonde explains.

NPPC responds to pig abuse documentary

The US National Pork Producers Council (NPPC) has condemned the mistreatment of pigs shown in a documentary first aired by HBO in March. "Death on a Factory Farm shows actions at a hog farm that are not condoned and in fact abhorred by responsible pork producers," it said. It noted that the NPPC had publicly condemned the mistreatment depicted in the documentary when it occurred in 2006 at a farm in Creston, Ohio. "For the documentary's producers to imply the situation shown in the film is in any way typical of swine husbandry in this country is grossly unfair to the farm families who work daily to feed this country and much of the world," said an NPPC news release.

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“Providing humane and compassionate care for their pigs at every stage of life is one of the ethical principles to which responsible pork producers adhere,” NPPC stressed. “The mistreatment shown in the HBO documentary does not reflect the practices the pork industry follows in caring for its animals. Mistreatment of animals is appalling to pork producers just as it is to others. We do not defend and will not accept such mistreatment.”

At NPPC’s March 5-7, 2009, annual meeting, pork producers reaffirmed the industry’s strong support for the well-being of its animals, saying: “The US pork industry recognizes its moral and ethical obligation to provide for the responsible treatment of animals. Any willful mistreatment or neglect of animals is unacceptable; pork producers do not and will not defend those who choose to participate in the mistreatment of animals. The US pork industry takes animal well-being very seriously and has a history of developing programs that help train producers and their employees on proper animal care, handling and transporting procedures. The US pork industry affirms its obligation to act swiftly to end any mistreatment and to take immediate corrective actions to fully restore proper and responsible animal care.”

Piglet feed supplements support immune system

According to studies by the US Agricultural Research Service (ARS), feeding dried distiller’s grains (DDGS) to piglets can give their immune systems an extra boost.



Feeding DDGS to nursery pigs helps to improve their immune function

The US ethanol industry generates an estimated 10-14 million metric tons of DDGS annually from the milling of corn grain that yields fermentable sugars for conversion into fuel alcohol. The majority of DDGS are fed to beef and dairy cattle.

But livestock producers also use DDGS to supplement the diet of older pigs. So Tom Weber, a physiologist at the ARS Swine Odor and Manure Management Research Unit in Ames, Iowa, partnered with research leader Brian Kerr and microbiologist Cherie Ziemer to study the effects of feeding DDGS to young pigs.

For their research on piglets, the team divided weanling pigs into four groups and fed them either a standard control diet or diets supplemented with DDGS, soybean hulls or citrus pulp. After one week, the researchers observed an increase in cytokine expression in the pigs’ small intestine, which they linked to DDGS consumption. Cytokines are chemical messengers that are essential for proper immune function.

This response reinforced findings of previous DDGS studies showing that pigs consuming diets supplemented with DDGS exhibited reduced levels of ileitis, a common inflammation of the small intestine.

Kerr and others have found that adult pigs can be fed with a corn and soy-meal feed that is up to 40 percent DDGS. However, piglets are given feed with a maximum DDGS content of 7.5 per cent, because their growth may be reduced when they consume too much fibre.

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Pork is seen as playing an important role in a healthy diet by British consumers

Brits get healthy pork message

Pork has long been perceived by consumers as a fatty meat, even though its fat content is now as low as or lower than chicken due to the huge genetic progress made over the last 30 years. With an increasingly health-conscious population it has been difficult to get the message that pork is a healthy option through to consumers. However, a long-running effort by the British Pig Executive (BPEX) now seems to be yielding results, according to a recent report.

The 'Pork and Healthy Eating' report highlights that more than 4.3 million people everyday eat pork and they are increasingly doing so within a balanced diet. When fresh pork is considered, consumers instinctively regard it as 'good' food.

BPEX Research and Insight manager, Richard Cullen, said, "This is a huge positive for pork and is particularly encouraging at a time when health remains high on the agenda for so many consumers."

It is important the industry continues to drive home the healthy attributes of pork through packaging and promotions, he believes.

The report also makes it clear that red meat including processed products such as

bacon and sausages are actually a low overall contributor to fat in the diet. While households purchase on average 71.7kg of fat a year only 2.7kg – less than 4 per cent – of that comes from fresh meat (much less than comes from yellow fats or savoury home cooking products). When it comes to saturated fats, slightly more than 4 per cent is accounted for by fresh meat but less than 2.5 per cent by sausages.

"Meat is usually eaten as the main part of a main meal and the contribution it makes to our total intake of salt and fat is much less than many would imagine," says Cullen. "Overall pork is perceived as healthy and this is a great platform for the industry to capitalize on."

Temple Grandin launches new sustainable and humane certification

Temple Grandin, the well known designer of humane livestock handling facilities, is launching a new certification program that evaluates both sustainable and humane practices, according to a report on the meat industry website Meatingplace.com. Niman Ranch, a US producer of "natural" pork, beef and lamb, which helped Grandin develop the program, issued a statement in February regarding the new program.

Starting in August 2009, companies that wish to carry the certification seal will be audited on 21 core principles which must be met by all farmers and ranchers receiving certification. The 21 core principles include the following:

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- Animals must be given the opportunity to care for, interact with, and nurture their young. In the case of swine, farrowing crates are not allowed.
- Practices must be implemented that prevent soil loss or degradation in production areas, minimizes unacceptable or unintended poor air quality for family, workers, and neighbors, and prevents water quality degradation of surface and groundwater resources.
- Animals must be fed a 100 percent vegetarian diet and have a feeding plan that will guarantee a sufficient, well-balanced diet to appropriately meet their nutritional needs at their stage in life and maintain required Body Condition Scores. Animals shall have access to their feed as long as is necessary for them to satisfy their nutrient requirements.
- Pasture and/or bedding are the preferred environments. To qualify as pasture, 75 percent or more of the land occupied by livestock in this program must have vegetation with a root system

With the core principles completed, Grandin and Niman Ranch are now in the process of developing separate guidelines for each species of animals, as well as an auditing plan.

Niman Ranch said it plans to be one of the first companies to be audited to carry the certification seal for their humanely and sustainably raised natural beef, pork, lamb and chicken.

“Using animals for food is fine, but we’ve got to do it the right way. This program provides farmers and ranchers a practical and

affordable way to give animals a decent life and minimize the impact on our environment at the same time,” Grandin said in the statement.

Antibiotics ban would hurt people and pigs

Legislation introduced in the US Congress would be detrimental to the health and well-being of pigs, would increase pork producers’ production costs and the price consumers pay for pork and could jeopardize public health, according to the National Pork Producers Council.

The bill, introduced to Congress on March 17th and sponsored by Louise Slaughter, Democrat from New York, would ban the use in livestock of animal health products that prevent or control diseases.

“This is irresponsible legislation,” said NPPC President Don Butler. “We are committed to maintaining the well-being of our animals, and we need access to a range of animal health products to keep our pigs healthy and, in turn, produce safe food products. This bill will prevent that, and we’ll see more pigs die and higher production costs, and that means consumers will pay more for pork.”

An Iowa State University study conducted by Dr. Scott Hurd found that when pigs have been sick during their life, they will have a greater presence of food-safety pathogens on their carcasses. Also, a 1999 ban in Denmark on some antibiotics used in pork production resulted in an increase in piglet deaths and in the amount of antibiotics used to treat disease.

The Slaughter bill, which ostensibly would prohibit the use of antibiotics that promote growth in livestock but which would also ban ones that prevent and control disease, was introduced to address the increase in antibiotic-resistant bacteria.

But a 2000 survey of human health experts found that 96 per cent of antibiotic resistance in humans is due to human use of antibiotics. Additionally, according to the Animal Health Institute, less than 5 per cent of animal antibiotics are used for nutritional efficiency – which promotes growth – and even the majority of those prevent diseases.


“Pork producers, under the direction of a veterinarian, have a moral obligation to use antibiotics responsibly to protect human health and provide safe food,” said Jennifer Greiner, DVM, NPPC director of science and technology. “Producers also have an ethical obligation to maintain the health of their pigs, and antibiotics are an important tool to help us do that.”

NPPC noted that the US pork industry has programs – the Pork Quality Assurance Plus and the Take Care: Use Antibiotics Responsibly programs – that include principles and guidelines on antibiotic use that help protect animal and public health and animal well-being.

US food traceability system inadequate

The US government’s ability to trace foods and ingredients has been found lacking, a federal report released on March 26th concluded.

Investigators from the Department of Health and Human Services attempted to trace 40 foods through the supply chain. They purchased items ranging from oatmeal to yoghurt and then attempted to trace them from the retailer back through the supply



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chain. Of the 40 products purchased, only five could be fully traced.

This, the report said, highlights the 'concerning' weakness of current US traceability systems and could potentially diminish regulators' ability to pinpoint the source of a disease outbreak or bioterrorism attack.

Federal law requires food companies to maintain records that would allow investigators to follow ingredients one step up or down the supply chain.

However, the investigation found that many companies fail to keep adequately detailed records. Indeed, one-quarter of company managers were totally unaware of the requirement.

The news comes amid growing criticism of food regulatory bodies in the wake of the salmonella outbreak linked to peanut products from the Peanut Corporation of America. Critics claim that the nation's disparate food regulatory bodies have proven themselves incapable of safeguarding the safety of the food supply in the US.

Pfizer launches boar taint website

Pfizer Animal Health has launched a new global website – www.boartaint.com – that will help to address the lack of information that has been available on this key area of swine production. The company is in the process of licensing its new boar

taint vaccine around the world and, if universally adopted, would mean an end to the routine practice of castration.

The new site carries a wealth of information about boar taint and highlights the fact that the pork industry goes to great lengths to make sure that consumers do not experience tainted meat. It aims to tackle some of the issues surrounding boar taint and the methods used to control it.

Pfizer Animal Health's Associate Director, Global Development, John Crane, said a significant reason for the site's development was the growing interest in food production from consumers and industry stakeholders.

"The website is designed as a global resource for anyone who wants to find out more about boar taint. This may be a consumer who is eager to know what has happened to their meat before it arrives on the plate, or a producer looking to change his production methods," he said.

Scientists have spent years looking for more efficient and animal friendly alternatives to the knife. Boartaint.com describes some of the alternatives that have been investigated and in particular the use of a vaccine to control boar taint. Information about how the vaccine works, how it affects growth rates and ensures consumer safety is also available online. The website includes video footage and comments from experts and the results of market research among consumers.

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Feeding the very small pig – the technical aspects

By John Gadd

In the first of two articles, John Gadd describes the latest thoughts on baby pig nutrition coming out of Europe. As he says “It is light years ahead of what we were doing 30 years ago”. But 30 years ago – is that relevant, you may well ask? He thinks it is because he is still coming across creep and post-weaning feeds which are only a little better than they were then. This article will be quite an eye-opener for many large farmers and feed manufacturers in North America as it shows how such diets have changed, especially since 1990. He also deals with the important subject of the perceived high cost of these changes.

First, some history

Way back in the 1970s, on our farm we were weaning 22,000 piglets a year. My boss, David Taylor, one of the original thinkers in pig production of the time, was worried about a slowdown in growth immediately after weaning. Our weaners were warm, well-ventilated, not overcrowded, clean(ish!) and our pig vet Terry Heard said disease was not a factor. This didn't stop David from banging the table and complaining about high feed costs to slaughter and uneven sale weights, and I was told to look into it. The baby-pig feed academic experts at that time (Prof. Colin Whittemore and Drs. Kidder and Manners) said a 3-day post-weaning check* was attainable rather than the 5 to 8-day stall-out we were getting. So I did some tests with our pigs involving much weighing and recording and could report several things:

1. Pigs from the occasional litter which only checked for 3 days or less, rather than our usual 7 to 8 days at 22 days weaning age, got to slaughter (90kg lwt. in those days) 3 weeks quicker.
2. Looseness rather than scour and a reluctance to eat enough after weaning (despite good stockmanship) seemed to be the two primary reasons for the slow-up.
3. The bigger pigs in the litter checked less, were less loose and got away faster.
4. We deduced from all this that the feed was probably the problem.

So back to our nutritionists who reformulated both creep and post weaning diets with far more milk by-products (skim and whey powders) which improved things noticeably. However this started David banging the table again when he saw the increased feed bills - which fortunately he didn't discover until I had some comparative performance results to show him. I was able to prove that the savings from an average of 18 days less finisher feed and overheads from those pigs fed the expensive starter foods covered their much higher cost/tonne more than twice over. The banging stopped. “Prove it!” he said – so we got all the farm's weaners on to the new “ hideously-expensive” diets. In order to keep the cost under control I then had quite a job to hold back the enthusiastic staff who saw the improvements from continuing them on too

long after weaning. So the idea of the ‘Link Feed’ was born - an idea I promoted commercially when I left practical farming for a time and entered the feed trade as a product manager.

* Post-weaning check (to growth). The time it takes for the newly weaned pig to regain the level of daily gain achieved immediately before it was weaned.

Three more lessons

5. These special diets only seemed to be effective for a few days post-weaning and to continue with them too long didn't seem to improve time to slaughter, while the increased feed cost/pig started to erode any savings to slaughter from the faster get-away from weaning.
6. Being a feed mill, as well as a large pig unit, another lesson we learned was that pellets with 20 - 30% milk powders were the very devil to make - too hard and brittle especially if they are small. So we tentatively got a specialist feed mill to make them for us - which started more table-banging as David hated giving any margin away to another feed mill. However the difference in uptake in the few days post weaning eventually won him round.
7. Thus we learned that texture, size and pellet hardness were just as important as taste. We had no problems with palatability as the starter feeds were delivered twice a week and eaten rapidly. I mention this 6-year learning curve because the same findings are just as true today – but at a higher degree of sophistication. So much for history – what, then, is the position today?



Modern piglet feed design

1. Digestibility is the key factor.

Sows milk does not aggravate the piglets' very delicate and sensitive villous structure. By weaning time sow's milk contains 5g/kg lactose, so high lactose levels are required in creep feeds and especially the immediate post-weaning feed - for palatability but also to get the pigs growing away with the minimum of check.

There are two snags to lactose. It is expensive and the further you are away from a dairying area the more expensive it becomes. Secondly, lactose is a mild laxative. Too much and the pigs get loose which can lead on to pathogenic scour. Levels between 20% to 30% are now advised for the first few days after weaning (Link Feed) then down to 10 -12 % for about a week (Prestarter) and (if needed) 5% for a further day or two if looseness is noticed, before the Early Grower feed containing no lactose takes over at about 14 days.

Two things to remember. Farms differ and the degree of lactose reduction will vary from farm to farm, so you are wise to experiment as we did at Taymix. Secondly, if you still get looseness problems on this regime then almost certainly your attention to management/stockmanship is called into question.

2 Some common ingredients are banned

Soya for one - this aggravates the still very delicate gut surface - use soy protein and extruded soybean if you have to.

"Cheap" fish and meat meals. Yes, use 10% fish meal but only the best grades, which will be 'low-temperature' fish meal which has been cooked slowly.

3. Too many non-starch polysaccharides.

These contain anti-nutrient factors which can interfere with digestibility by as much as 50%, and cause looseness as the weaner tries to flush them out of harm's way down the digestive tract. This may progress into full scouring as pathogens take advantage of insufficiently processed nutrients in the gut. Yes, the nutritionist can mollify the presence of such anti-nutrients in essential cereals like wheat and especially barley, while most parcels of rye and oats are best avoided. Corn is relatively innocuous in this area of nutrition (but may be a source of dangerous mycotoxins) NSPs can be neutralized by analysis and a variety of enzyme additions, but skilled analysis and a careful choice of the correct enzyme(s) is needed.

4. Heat-treated cereals

Cooking cereals makes them more digestible and palatable. It also reduces looseness especially if the cooked cereals have been finely ground. Cooking is essential for a Link Feed.

5. Pellets or meal?

Weaners don't take to large pellets and especially to any pellets with too many fines. They won't eat hard pellets - ideally they should just be able to be crushed between the fingers. Can't do it? We send them back!

The trouble with meal is wastage and dust, and congealed mouths. Yes, wetting it sorts these problems out but few stockpeople can achieve the very high and consistent level of cleanliness needed to avoid scouring. Bacterial degradation takes minutes rather than hours or days.

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6. Immunoglobulins

A really major advance in the past 10 years, which I think along with improved housing and stockmanship has revolutionized the lot of the baby pig. You are all aware of the classic graph which shows the fall-away in antibody protection between the highs of maternal immunity when the piglet is on the sow and the delay in the piglet building sufficient of its own immune defences once it has been weaned.

Adding selected animal plasma to the post-weaning feed at this time, (from 3 to 5%) which is especially rich in the IgG antibody, can be of great benefit and helps fill that immunoglobulin gap. But it is expensive - even 3% can increase the cost of a Link Feed by 35% or more. Also supplies may be short, and the public scare in Europe about adding animal by-products to farm feeds hasn't helped this product. Lastly, plasma is not very protective against the scouring pathogens.

But there is an alternative - pasteurized egg powder. This is obtained from hens specifically immunized against those pathogens which affect newly-weaned pigs. Such eggs (and they are considered 'politically-correct' too!) are rich in those useful immunoglobulins to such an extent that about 1kg of this special egg powder can replace 50kg of animal plasma - a lot cheaper. It is also more effective than plasma against the more common scours.

7. Use a specialized manufacturer

You can see from all of the above that baby pig feeds should be made by a specialist manufacturer or from a company

sufficiently large enough to have a dedicated mill. Farmers cannot achieve the necessary results even if they can obtain the correct technical advice, as they cannot buy the very specialized ingredients to achieve a compatible price.

8. Other options/additives

These include the special choice of minerals to achieve a correct electrolyte balance. This is a new area of baby pig nutrition because nutritionists have been alerted to how significantly dEB, as it is called, affects amino-acid availability and also NSPs in the weaner's diet.

Then there are things like herbs, prebiotics and even DDGS additives (which, with care, may enhance the pigs' immune status) along with other supplements which might help if they can measure up cost-effectively. I don't intend to discuss them until more proven results and usage experience arrive.

The old, old question of the 'dreadful' cost of these sophisticated diets!

If the sums are done on the published benefits by slaughter weight from the use of these two or three peri-weaning diets against the quite small amounts the piglet eats over this period, the REO (Return on Extra Outlay - the 'extra outlay' being the increased cost of the diets from the conventional diets used before - this lies between 2 and 3 to 1 based on 2009 European commodity prices.

I leave you to do your own local calculations (as I don't know what a specialist manufacturer would charge in your area for such improved diets) on the increased cost being set against your slaughter pigs being shipped between 14 and 20 days sooner and thus providing savings in feed cost. Don't forget your daily overheads saved either - as is often forgotten today - but they are quite significant as variable costs have become so expensive for all of us these past 5 years.

Misconceptions over value for money have arisen because much of the research results cease at the end of the nursery stage - for good statistical/research cost reasons no doubt - and the economic advantage is less at this premature cut-off point. But we sell slaughter pigs, not nursery pigs, and this is where the advantage of a cracking good start after weaning pays off for the farmer - at slaughter, not at 30-35 kg. Just do the sums, please.

How can you tell if you are buying the dietary sophistication needed?

Perhaps you should use this article to ask the key questions of the supplier!

The next article will cover how such sophisticated diets should be fed from the practical standpoint.

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Organic pork production thrives in Denmark

By Stuart Lumb

Brian Holm has always had an interest in homeopathy and organic food and in 1993 took the plunge and started farming. He bought 30ha of land near Kolding, Jutland and along with wife Ingeborg started off with a herd of 95 sows. His herd now has increased to 160, plus they now farm 140ha of which 100ha is owned, the other 40ha being rented. As well as pigs the farm supports 7500 layer birds. The land is light so it is ideal for the dry sows and lactating sows which are both kept outdoors. The remaining land is put down to wheat, barley and triticale. Brian is a member of the Friland co-op, which is part of the massive Danish Crown organization.

The sows, which are all LW/LR F1s, are kept in outdoor paddocks in groups of 20 and housed in large pig arks. The sows farrow in arks located in individual small paddocks and shortly after farrowing are run together in two groups of 10 sows and litters. They remain outside for 5-6 weeks after which they are brought into an indoor multi-suckling building, with each sow and litter having a nest area. Weaning takes place at 9 weeks of age. Boars are run with the lactating sows and sows get served whilst suckling with AI being used in addition to natural mating provided by Duroc and crossbred boars. The author recalls a farmer – ironically an ex – pat Dane farming in East Yorkshire – who successfully used this concept in the early 1970s. We just keep on re-inventing the wheel!

At weaning, pigs are combined into groups of 200. The grower-finisher houses have an open side and are 47% slatted, which is less than the 50% stipulated by Friland. Pigs are bedded on chopped straw and a decent covering must be provided. "The straw is actually put through a chopper at harvest and then baled so the farm staff have to be very careful moving the chopped straw bales round the farm!" commented Holm. Straw is also provided in racks, while small logs hung on chains provide a stimulus for the pigs. The space requirement for a 100kg finisher pig is a total of 2.3m², made up of 1.3 m² inside plus 1.0 m² outside. The finisher house contains a Domino pig sorter. This weighs the pigs automatically and sorts them by weight into two groups, with the heavier pigs having access to lower energy and lower protein feeds than the lighter group.

Under-floor scrapers take the manure into a large holding tank. The manure is quite liquid as the sides of the buildings are open and so a certain amount of rainwater finds its way down the slats.

The feeds are home milled and mixed and the arable areas provide 90% of the



Sows and litters in the multi-suckling building

annual pig feed requirements, with GM free organic soya being bought in to provide an additional protein source.

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6	1.3	0.8	0.5
6.5	1.2	0.7	0.4
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There has been major investment in the farm in terms of new buildings and feed equipment to the tune of nearly 2 million dollars.

The unit, which is run by two young Danes, is producing 18 pigs / sow / year, with the top Friland operator turning out 21. The unit's productivity may seem low, but it must be remembered that the system Brian operates is quite unusual, with sows being served whilst still suckling. Also the sows farrow outdoors and are not supervised, compared to sows farrowing in crates in an intensive indoor unit.

Brian is farming for the long term. "This year the pigs will lose money, but fortunately feed prices are falling, plus we have had three good years so we have some fat on our back. He reckons by early 2010 he will be breaking even again and in the black later in the year.

Friland monitors the farm regularly. Their welfare scheme is equivalent to the UK's Freedom Foods scheme, run by the RSPCA (Royal Society for the Prevention of Cruelty to Animals). Under the scheme the farmer can treat his own pigs after first having a vet in to carry out injections etc. Vaccinations are allowed and pigs are injected against Erysipelas, parvo, PPV and Ileitis. Male pigs are castrated.

Henrik Lauritsen is head of procurement for the Friland meat business. "We have 90 pig producers in our co-op and slaughter 3,500 pigs per week, both organic and free range. Our carcass weights range from 72 - 86kg with the average being 82kg. Sixty-five per cent of our pigs attract a quality premium of 3 Danish Kroner/kg (about \$0.60), based on a lean meat content of 56% or over. Organic producers also get an organic premium of 4 Danish Kroner/pig (\$0.90). In addition, there's a market premium of 2 Danish Kroner per pig plus a bonus of 0.7 Danish Kroner. This means organic producers receive 9 Danish Kroner/kg (\$2.00) more than conventional producers, but of course organic feeds are far more expensive than non - organic ones. For example, the GM-free organic soya costs 6 Danish Kroner/kg (\$1.30). "Our meat is sold through a number of Danish supermarkets ranging from the well known Netto to smaller local supermarkets such as Superbrugsen, with much being exported as well," says Lauritsen.

"We are still seeing growth, despite the credit crunch, but things can change very quickly given the current world economic situation," concluded Lauritsen. **≡WHJ≡**



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Australian industry remains buoyant

By John Riley

Australian producers continue to benefit from increasing market returns and a reduction in feed costs. In the 12 months from March 2008, the price received for a 75 kg carcass has increased from around \$2.42 per kilogram (C\$1.97) to around \$3.69 (C\$3.24) in March 2009. During the same period the cost of feed wheat has fallen from \$490 per tonne to \$220 per tonne, the market price for feed barley has fallen from \$350 per tonne to \$215 per tonne and feed sorghum is currently \$185 compared with \$250 per tonne twelve months ago.

The increase in pig meat price is due to a fall in the number of pigs consigned for slaughter from around 420,000 per month in early 2008 to 350,000 per month in early 2009. The adverse economic climate experienced by the industry in 2006-2008 resulted in a number of small to medium sized producers exiting the industry. The fall in sow numbers has resulted in several feed manufacturers restructuring their business and feed mills closing. In Queensland, one slaughter facility went into receivership but has since been purchased by the CHM Alliance. This company, which owns PIC Australia, has also purchased a 7,000 sow

farrow to finisher unit in Queensland from a Japanese based company. The Alliance is now the second largest pork production business in Australia behind QAF, the Singapore owned business of about 30,000 sows which operates in New South Wales and Victoria.

The level of imports of processed product into Australia continues to rise whilst exports continue to fall. However, as illustrated in Table 1 (source: Australian Bureau of Statistics) the volume of imports from Canada for the moving annual total (MAT) ending January 2009 was 17% down on the 12 months ending January 2008. Imports from Canada in January 2009 represented around 30% of the total processed pig meat imported.

Whilst the value of the Australian dollar against the US dollar has fallen from almost 90 cents to around 68 cents, the high domestic price of pork has resulted in exports to Singapore and Japan falling by a total of 20% in shipped weight in January 2009 compared with January 2008 (Table 2).

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Table 1: Country of origin for pork imports

PORK IMPORTS								
TOTAL			CANADA		DENMARK		USA	
Month	Volume Tonnes SW	Value \$AUD (million)	Volume Tonnes SW	Value \$AUD (million)	Volume Tonnes SW	Value \$AUD (million)	Volume Tonnes SW	Value \$AUD (million)
MAT - Jan 09	118,226	444.9	35,562	122.4	42,113	193.3	39,344	122.3
MAT - Jan 08	107,571	414.3	42,877	152.5	32,271	148.7	31,497	108.1
% Change	9.9%	7.4%	-17.1%	-19.7%	30.5%	30.0%	24.9%	13.2%
Jan-09	10,936	44.2	3,283	11.1	3,510	18.2	4,053	14.5
Jan-08	9,013	32.7	2,816	9.3	2,841	12.7	3,257	10.1
% Change	21.3%	35.0%	16.6%	19.4%	23.6%	42.8%	24.4%	43.9%

Table 2: Major export destinations for farmed Australian pork & offal

PORK EXPORTS								
TOTAL			SINGAPORE		JAPAN		NEW ZEALAND	
Month	Volume Tonnes SW	Value \$AUD (million)	Volume Tonnes SW	Value \$AUD (million)	Volume Tonnes SW	Value \$AUD (million)	Volume Tonnes SW	Value \$AUD (million)
MAT Jan - 09	41,691	\$137.6	18,922	\$69.9	1,464	\$6.4	9,884	\$36.9
MAT Jan - 08	46,993	\$151.6	23,384	\$82.8	1,594	\$6.6	11,472	\$43.0
% Change	-11.3%	-9.2%	-19.1%	-15.6%	-8.2%	-3.5%	-13.8%	-14.0%
Jan-09	3,064	\$11.7	1,772	\$7.74	44	\$0.41	454	\$1.8
Jan-08	3,841	\$12.5	2,154	\$7.67	74	\$0.24	835	\$3.2
% Change	-20.2%	-6.6%	-17.7%	0.9%	-40.6%	71.0%	-45.6%	-43.4%

Investing in new technology

After a period of low expenditure on repairs and renewals and almost no capital investment in the adoption of new technology, producers are now looking at opportunities to improve their production efficiency and improve the long term sustainability of their businesses.

One of their priorities will be to meet the requirements of the animal welfare legislation introduced in 2008 which limits the use of sow stalls to a six week period during gestation. The two main systems being considered by producers planning the upgrading of their units are electronic sow feeding and voluntary lie stalls.

The welfare codes also state that stockpersons working with pigs must be competent or are supervised by a competent stockperson. The industry's producer body Australian Pork Ltd (APL) is developing a formal system of competency recognition to meet more fully the code's requirements. An integral part of the competency qualification will be the Prohand program, developed with APL funding by Dr Paul Hemsworth and Dr Graham Coleman of the University of Melbourne. ProHand Pigs is an innovative computer-based training program which targets stockperson behaviour by focussing on their beliefs and attitudes towards pigs. It is available in North America through Ohio State University.

continued on page 70

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APP vaccine shows promise

Actinobacillus plueropneumoniae (APP) is a condition that depresses performance of pigs on many units throughout Australia. Recent research work funded by the Pork Cooperative Research Centre in conjunction with ACE Laboratories has resulted in a live vaccine being released for administration by aerosol to suckling pigs prior to weaning. The piglets are given a small challenge dose of live bacteria between 3 and 28 days of age whilst they are protected by maternally derived colostral immunity. The vaccine does not create disease but an immunological response when given to piglets of sows immune to the disease. In the past the normal practice has been to vaccinate pigs at six weeks of age and again about four weeks later. For herds with APP, the new vaccine is claimed to be worth about \$15 per pig.

The research is continuing to refine the product for release onto the international market.

Benchmarking shows room for improvement

Global benchmarking is an interesting exercise but great care is needed when interpreting the figures due to differences in a number of factors including market requirements, climatic conditions, government support etc. The Pork CRC recently published key performance indicators (KPIs) for pork production

in selected countries for 2007. The results in Table 3 at first glance suggest that the Australian industry has a lot of improvement to make to compete internationally.

Table 3: Costs and KPIs for selected countries

Country	Australia	Canada	USA	Denmark	Holland	Brazil	GB
COP(AUS\$/kg cw)	2.46	1.93	1.70	2.28	2.40	1.79	2.90
Feed cost(\$/t)	375	339	267	336	348	350	383
HFC	3.90	3.56	3.80	3.75	3.62	3.80	3.79
Carcass wt (kg)	72*	94	93	82	89	79	76
Pigs sold /sow/yr	20.0	20.6	20.9	24.5	24.7	18.5	20.1
Carcass wt /sow/yr	1428	1935	1945	2003	2200	1406	1536

* The Australian domestic markets demand for a light weight carcass is not in the best interest of the producer and results in reduced efficiency on farm and throughout the supply chain.

With the upturn in the profitability of the industry, many producers will take the opportunity to upgrade their facilities and uptake new technologies thereby making the Australian industry more internationally competitive.

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Pork Pad Thai

By Roy Kruse and Justin Chatlain, Alberta Pork



Yield: serves 4 ❖ Cooking time: 16 min ❖ Preparation Time: 30 minutes

Ingredients

3/4 lb	(375 g)	lean ground pork
1/2 lb	(250 g)	broad egg noodles (not cooked)
2 tbsp	(25 ml)	fish sauce
3 tbsp	(45 ml)	seasoned rice vinegar
2 tbsp	(25 ml)	granulated sugar
1/2 tsp	(2 ml)	red pepper flakes
2 tbsp	(25 ml)	vegetable oil
2 tbsp	(25 ml)	minced garlic
2 large		eggs, beaten
2 cups	(500 ml)	sliced green onions
2		fresh limes
1/4 cup	(50 ml)	chopped unsalted peanuts
1/4 cup	(50 ml)	chopped fresh cilantro
2 cups	(500 ml)	bean sprouts

Cooking Instructions

Cover noodles with boiling water and soak until just softened, about 7 minutes, or according to package directions. Drain and rinse under cold water; set aside.

Combine fish sauce, vinegar, sugar, and pepper flakes; set aside.

Heat oil in a large skillet or wok. Add garlic and cook briefly - do not allow garlic to brown. Reduce heat to medium, add pork and cook until pork is no longer pink, about five minutes. Stir frequently to break up pork; set aside and keep warm.

Add eggs to the same skillet, stirring vigorously until just cooked. Add fish sauce mixture and green onions; cook until warmed through and sugar has dissolved. Add bean sprouts, reserved noodles and pork; heat through.

Remove all to a serving platter. Squeeze juice from half a lime over noodles. Sprinkle with peanuts and cilantro. Garnish with remaining lime juice cut into wedges.

Nutritional information

Pork Pad Thai (1/4 of recipe); with noodles • Per 1 person serving

Calories	680	Cholesterol	228mg
Fat	33.5g	Sodium	818mg
Saturated	8.3g	Carbohydrate	60.6g
Monounsaturated	15g	Fibre	3.3g
Polyunsaturated	7.5g	Protein	37.4g

• Events Diary



May			
17-20th	25th Alltech International Feed Industry Symposium	Lexington, Kentucky	www.alltech.com
31-June 4th	2009 International Conference on Pig Reproduction	Banff, Alberta	www.ICPR2009.com Contact: Sue Charlton (780) 492-0063
June			
2-3rd	Trace R & D 2009	Winnipeg, Manitoba	www.trace-rd.com Contact: Dallas Ballance (204) 475-8585
3-5th	21st World Pork Expo	Des Moines, Iowa,	www.worldpork.org
7-14th	Advanced Swine Technology Course	Urbana, Illinois,	www.livestocktrail.uiuc.edu/porknet Contact: Gilbert Hollis (217) 265-9191
17-19th	Western Canada Farm Progress Show	Regina, SK	www.myfarmshow.designdata.ca
24-25th	Ontario Pork Congress	Stratford, Ontario	www.porkcongress.on.ca Contact: (529) 625-8811
September			
9-10th	Nottingham Feed Conference	Nottingham, UK	www.nottingham.ac.uk/feedconf
15-18th	SPACE 20009 Animal Production Show	Rennes, France	www.space.fr Contact: +223 482890
19-22nd	Allan D Leman Swine Conference	Minnesota, USA	www.cvm.umn.edu Contact: (800) 380-8636 or (612) 624-3434
October			
19-21st	VIV China	Beijing, China	www.viv.net Contact: +31 30 295-2772
21st	Red Deer Swine Technology Workshop	Red Deer, Alberta	Contact: Bernie Peet (403) 782-3776
November			
9-13th	Alberta Pork Regional Meetings	Alberta	www.albertapork.com Contact: Charlotte Shipp (780) 491-3525
24-28th	Agromek 2009	Herning, Denmark	www.agromek.dk Contact: +45 8675-4545
December			
9-10th	Alberta Pork Annual General Meeting	Edmonton, Alberta	www.albertapork.com Contact: Contact: Charlotte Shipp (780) 491-3525
2010			
January			
19-22nd	Banff Pork Seminar	Banff, Alberta	www.banffpork.ca Contact: (780) 492-3651
March			
6-9th	American Association of Swine Veterinarians 2010 Annual Meeting	Omaha, Nebraska	www.aasv.org Contact: (515) 465-5255
17-18th	Alberta Pork Congress	Red Deer, Alberta	www.albertaporkcongress.com Contact: (403) 244-7821
May			
11-12th	British Pig & Poultry Fair	Warwickshire, UK	www.pigandpoultryfair.org.uk Contact: Alice Bell (+44 (2476) 858-276 Contact: +45 8675-4545

Please let us know details of any events you would like to see listed above – call Bernie Peet on (403) 782-3776 or email whj@albertapork.com

Trace R&D 2009: Traceability Research and Development Scientific Conference and Strategic Workshop is being held on June 2-3 in Winnipeg and hosted by the University of Manitoba. This conference addresses traceability in the agricultural and food sectors and includes sessions on economics and market access, traceability and food safety, experience with traceability across the food chain, livestock traceability technologies and data handling. For more information, go to www.trace-rd.com or contact Dallas Ballance at (204) 475-8585



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