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Mission critical - Piglet care in the first 48 hours

Time for another look at feed conversion

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Cover Photo
VIDO recently opened the International Vaccine Centre, one the largest BSL3 containment facilities in the world

Managing nursery pigs

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Western Hog Journal

Editor's Notes

As I write, in mid-December, the hog price is holding up remarkably well for the time of year and 2011 looks like it will be the best year for Canadian hog producers since 2006. During the summer, producers were receiving $200 or more per hog, a return not seen for a very long time. Admittedly, margins have been curtailed somewhat by high feed prices, but overall it was a profitable year, with an opportunity to shore up battered balance sheets after the damage of the previous four years.

Feed prices are likely to remain a challenge in the coming years. The most likely scenario, according to Rabobank economists, is that corn holds above $6 for most of the year as ethanol production hits record highs and China imports more of the grain. The bank predicts corn at an average of $6.20 during the second half of 2012. Other feed ingredients will move in tandem, as always. In addition, volatility in feed ingredient prices seems a given, making it more important to lock into supplies when the price is attractive.

Higher hog prices in 2011 were driven by record US exports, up by 20% to 1.26 million tonnes by the end of September. Exports to China were up over 400% and those to South Korea by 130%. Although it is questionable whether these two countries will continue to import so much US pork, overall pork exports from the USA are likely to support North American hog prices in 2012.

Difficult times for producers across North America seem to have curbed any thoughts of expansion, but a recent USDA Hogs and Pigs Report showed that the average number of pigs weaned per litter has exceeded 10 for the first time, up from just 9 in 2005. This 2% per year increase, coupled with higher carcass weights, will mean that US pork production could grow by around 3% next year. With slightly declining domestic demand, the US has to keep working hard on exports.

So what does all this mean for Canadian hog producers? While world demand for pork is likely to be good, increased output from the US could keep prices in check, although production in the EU is falling, which may offset the US increase. Overall, 2012 is still likely to be a good year, but most likely rather less profitable than 2011. ■

Canadian Bio-Systems earns US organic certification for Omegazyme

Omegazyme, an enzyme supplement for poultry and swine feed products developed by Canadian Bio-Systems Inc. (CBS Inc.), has earned organic certification status from the United States Department of Agriculture (USDA). An equivalent CBS Inc. product is marketed in Canada as Superzyme-OM.

CBS Inc. develops and markets a range of products, including a wide range of liquid or granular enzyme concentrates and premixes that are tailored for feed, food and industrial applications. Omegazyme is designed for poultry and swine diets which use high levels oil seeds and meals along with cereal grains.

Omegazyme is a unique product of its kind in the world, says Rob Patterson, Technical Services Manager for CBS Inc. It allows producers to achieve their target amount of Omega-3 fatty acids in eggs and meat while using less flax. "The Omegazyme-enriched diet is easier for the animal to digest, meaning reduced potential for health issues," says Patterson. "Less flax requirement typically means lower feed cost which translates to higher profitability."

Organic certification adds another level of benefit for producers, says Patterson. "It's another way for producers to make their products more marketable and profitable. For organic producers it's a new tool they can use to improve production while upholding their organic status.

More information on the company and its products is available at www.canadianbio.com, or contact Rob Patterson at (403) 279-3339 or Toll free: 1-800-561-2474.

Silent tribute to an industry friend

A silent auction in memory of Bruce Winkler is being planned for the 2012 Alberta Pork Congress. Bruce lost a short but aggressive battle with cancer in December 2010. He had worked in the pork industry for his entire career, both in Alberta and Ontario.

This event will be held on Tuesday March 27th and Wednesday March 28, 2012 during the Alberta Pork Congress Annual Tradeshow.

All of the funds raised will be donated to the Alberta Cancer Foundation, specifically the Linac - MR invention, which was developed by Dr Gino Fallone and his team of medical physicists at the Cross Cancer Institute in Edmonton. "This new invention will allow doctors to see and treat cancer in real time, something not possible anywhere in the world before now," explains Laurie Brandly, the Auction Chair. "The Linac-MR will drastically reduce the number of healthy cells and tissue that receive radiation. This prototype machine combines the technology of a MRI image and radiation treatment simultaneously."

The late Bruce Winkler, in whose memory a silent auction is being held at the Alberta Pork Congress

Donations are being sought from both individuals and industry companies. To arrange a donation, contact Laurie Brandly on 780-986-0962 or the Alberta Pork Congress office on 403-244-7821.

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Technology Transfer Manager joins Prairie Swine Centre

Lee Whittington, President of Prairie Swine Centre, has announced the appointment of Ken Engele as Technology Transfer Manager.

Ken brings more than 14 years of swine industry experience, both on the commercial level, in addition to developing expertise in the areas of assessing the economic impact of hog marketing and research in the swine industry. At Prairie Swine Centre his work will focus on delivering an effective and timely communication with pork producers, and those organizations that service the pork industry. Ken will also be responsible for managing the Technology Transfer component of the Canadian Swine and Research Development Cluster.

The CSRDC consists of 14 research projects across Canada designed to reduce the cost of production and focus on product differentiation. Ken will be responsible for working with researchers funded by the program to ensure timely, accurate delivery of results from the research to the industry.

"It's great to welcome someone with Ken's background", notes Lee Whittington, President/CEO – Prairie Swine Centre. "He has excellent understanding of what makes the pork industry tick and how Prairie Swine Centre can meet the needs of Canadian producers."

Hog producers welcome new Farm and Food Discovery Centre

By Myron Love

"This is an exciting day for agriculture," said Karl Kynoch, chair of the Manitoba Pork Council, speaking at the grand opening on Friday, September 16, of the Bruce D. Campbell Farm and Food Discovery Centre at the University of Manitoba's Glenlea Research Station (just south of Winnipeg of Highway 75). The Manitoba Pork Council, Kynoch noted, contributed to the construction of the hands-on interpretive facility with a $1 million donation – and Kynoch topped that up with the presentation of a cheque for $20,000 to Dr. Michael Trevan, Dean of the university's Faculty of Agricultural and Food Sciences, to be used to help promote the centre and bring people out.

Farm and Food Centre opening – The "ribbon cutting" ceremony at the opening of the Bruce Campbell Discovery Centre (Karl Kynoch on far left)

The Bruce Campbell Discovery Centre is intended to demonstrate modern farming and food production. The exhibits include viewing windows that allow visitors to peek into a real swine research barn, a tractor operator's seat where visitors can "drive" through fields on a screen and a grinder where visitors can make their own flour.

"We believe this facility will be a wonderful tool to help tell the story of pork production and farming," Kynoch said. "We are also looking forward to bringing Manitoba Pork visitors from countries such as China, Japan, Russia and the EU to this centre so that they see firsthand what we do in Manitoba to improve food safety."

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Autogenous Swine Influenza vaccines now available in Canada

The Canadian Food Inspection Agency has approved the manufacture of autogenous Swine Infuenza Virus (SIV) vaccines by Gallant Custom Laboratories at their Cambridge, ON location. A newly renovated production facility houses a stand-alone state-of-the art production laboratory for the manufacture of autogenous viral vaccines, the first of its kind in Canada.

"An autogenous vaccine uses herd specific strain(s) that can easily be updated as new strains emerge and must be used under the direction of a licensed veterinarian," explains Jackie Gallant, President of Gallant Custom Laboratories. "SIV is a highly variable virus and reassortment can lead to a combination of genes from avian, human and swine strains. Variability of strains between regions, countries and continents can sometimes challenge the ability of commercially available SIV vaccines to cross-protect against evolving field strains."

Monitoring and understanding the strains in the herd is crucial when planning a vaccination program and will help in the decision whether to use an autogenous or commercially available product to address herd health problems. Gallant also offers diagnostic services to isolate, purify, identify and subtype SIV from swine samples and long-term storage of isolates is available for future vaccine manufacturing.

For further information, contact Gallant Custom Laboratories Inc. at 1 888-838-5223 or visit www.gallantcustomlaboratories.com.

Canadian institutions invest in genomics research

Genome Alberta has announced that it is leading a group of funding partners on two large-scale genomics projects, which will help improve Canada's livestock sector. These projects build on Genome Alberta's Applied Livestock Genomics Program, which was launched in December 2010.

"Application of genomics to improve swine health and welfare" is a C$12.4-million research project led by Graham Plastow from the University of Alberta, John Harding from the University of Saskatchewan and Bob Kemp from PigGen Canada.

> **"With the mapping and sequencing of the pig genome, scientists have an opportunity to apply genomic-based tools to the pork industry"**

With the mapping and sequencing of the pig genome, scientists have an opportunity to apply genomic-based tools to the pork industry. Similar tools are already part of the Canadian cattle industry and have revolutionized the

dairy industry around the world. Researchers will apply genomics to help reduce the impact of two of the most common diseases in commercial pig production – Porcine Circovirus Associated Disease (PCVAD) and Porcine Respiratory and Reproductive Syndrome (PRRS). Scientists are studying mechanisms in pigs that make them genetically less susceptible to these diseases, providing important new diagnostic tools for breeders and expanding our understanding of disease control mechanisms. Public perceptions about the use of genomic technologies to prevent disease in pork production will also be examined. This work will lead to new strategies for disease control in addition to new drugs, improved vaccines and a safer food chain by reducing the use of antibiotics.

Genome Alberta is one of Canada six regional Genome Centres and on this project is partnered with Genome Prairie.

Lambert Houwen, who has recently joined Genesus as General Manager

New General Manager at Genesus

Genesus Inc. has announced the appointment of Lambert Houwen as its General Manager, based in Oakville, Manitoba. His responsibilities will include the Nucleus farms, GGP production, logistics, transportation and selection, with ongoing support for visitors and customers. Houwen came from the Netherlands in 2000 and was previously production manager at Hypor Canada.

Alberta hog prices lower than other jurisdictions, report concludes

A report prepared for the Alberta Livestock and Meat Agency (ALMA) has confirmed what producer organization Alberta Pork has been saying for some time: hog prices are lower in Alberta than in other jurisdictions in Canada and the USA. However, says the report by Serecon Management Consulting Inc. and Informa Economics Inc., they are not out of line with the commercial reality of a virtual monopsony industry, with the dominant plant operating at less than 50% capacity and operating in a relatively high cost environment with respect to electricity and labour, and distance to market. (A monopsony, according to Wikipedia, is a market form in which only one buyer faces many sellers. It is an example of imperfect competition, similar to a monopoly, in which only one seller faces many buyers. As the only or majority purchaser of a product or service, the 'monopsonist' may dictate terms to its suppliers in the same manner that a monopolist controls the market for its buyers.)

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In addition to the pricing issue, the report says, the price discovery process in Alberta is not fully transparent. "Our findings suggest that it is complex and poorly understood by many stakeholders," it says. "Perhaps most importantly is the fact that the process appears disingenuous and uncertain to many producers, given the formula used for determining price is not clearly stated and can appear to vary with circumstances. While certainly not surprising, given the organizational structure of the industry, the formula elements appear to be set up in a way that equates the formula to a pre-determined price rather than having the formula set the price.

Noting that many producers are choosing to ship their hogs to processors out of the province, it comments: "producers appear to lack confidence that they are getting a satisfactory price, or feel that the quality of their hogs is not recognized by the current price discovery system in Alberta."

"Producers appear to lack confidence that they are getting a satisfactory price, or feel that the quality of their hogs is not recognized"

The report describes the supply chain in Alberta as "fractured", saying that "a major problem for the industry, representing a potential headwind for change, is lack of trust in the value chain and limited cooperation between key industry stakeholders. A new set of commercial risk sharing (ownership, price and/or margin) relationships between producers and the main processor could help to fix this."

It notes that although one processor offers forward pricing, there is a need for more extensive use of forward pricing and other risk management tools, such as are widely used in the USA, in order to reduce risk for producers.

An executive summary and the entire report can be downloaded from the ALMA website – www.almaltd.ca.

Pfizer launches new porcine circovirus vaccine

Nearly every pig in Canada receives a vaccine for protection against porcine circovirus (PCV), and now swine producers have a new option for efficacious protection with the registration of Fostera PCV from Pfizer Animal Health.

Fostera PCV is labelled for use as an aid in preventing viraemia and an aid in the control of PCV2-related lymphoid depletion for pigs three weeks of age and older.

Pfizer's new porcine circovirus, Fostera

It provides four months of immunity against PCV in a single 2 mL dose.

"Fostera PCV offers Canadian swine veterinarians and producers a new choice for long-lasting, consistent protection against PCV," says Walter Heuser, DVM, Swine Business Unit Director for Pfizer Animal Health. "Additionally, with our new one-day-of-age claim for RespiSure-ONE®, we provide an innovative mycoplasma and circovirus vaccination program which gives veterinarians and their producers the flexibility to vaccinate for these key pathogens before a disease challenge, giving the pigs the best coverage possible."

Fostera PCV is available exclusively through Canadian veterinarians. For further information, go to www.PfizerAH.com. ■

Industry Viewpoint

By Bernie Peet

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

Cautious optimism but no expansion

Despite the fact that 2011 was the best year for Canadian hog producers since 2006, there are few signs of any expansion in the national herd, with the October 1 census showing sow and gilt numbers almost identical to the same month in 2010 and total hog numbers up by just 1% to 12 million. The September US Hogs and Pigs Report showed a similar picture, with both breeding pigs and total pig numbers up a mere 1% year on year. High feed prices and caution following four years of losses seems to have stifled any appetite for growth.

Most of the increase in hog numbers was due to a 9.1% increase shown by Saskatchewan, from 770,000 to 840,000 head. This was accompanied by an additional 5,000 sows, representing a 5.3% increase and indicating that some empty barns have come back into use. Saskatchewan saw total pig numbers drop by 38.9% and sow numbers by nearly 29% in the five years to October 2011. Mysteriously, BC also showed an increase of 10,000 pigs over the year, although sow numbers barely moved, up 1% to 9,300.

> **"The total number of hog farms in Canada has reduced by 39.7% in the five year period"**

This goes against the five year trend, which has seen total numbers down by 34% and sow numbers down by 48%. In Manitoba, although total numbers remained

unchanged year on year, there has been a 25% increase in the number of hogs over 60kg, no doubt reflecting the higher number of hogs being finished rather than exported to the USA. Alberta showed almost unchanged numbers.

In the east, the changes in hog numbers over the year were small with Quebec having virtually unchanged total numbers but 1.4% less sows. It is interesting that while other provinces have seen large reductions in pig numbers over the last 5 years, total hog numbers fell by just 5.5% and sow numbers by 8.1% since October 2006. The story in neighbouring Ontario has been somewhat different, with total pig numbers down 27% and sow numbers 18% lower.

The massive decline in the number of producers that has been seen over the past five years seems to have slowed, with 1.7% fewer farms compared to October 2010. The total number of hog farms in Canada has reduced by 39.7% in the five year period, with BC down just 19.4% and Saskatchewan showing a 56.7% reduction. In the east, Quebec showed a 25.5% drop in farm numbers, while Ontario has lost 41.5% of its farms since 2006.

Although the dramatic fall in pig exports triggered by the US COOL legislation has slowed over the last couple of years, third quarter hog exports were down by 4.3% compared with the same quarter in 2010. Since their peak in 2007, they are down 42.6%.

Canada still competitive on production cost

While Canadian producers have not enjoyed the best economic conditions in recent years, at least their production costs are among the lowest in the world, according to the latest InterPig data for 2010. The group of pork industry economists collects data on both physical performance and costs of production from 14 countries, mainly in Europe, but also including Canada and two Brazilian states, Santa Catarina (SC) and Matto Grosso (MT). Unfortunately there is currently no data from the USA. As Table 1 shows, Canada has low production costs compared with most European countries and similar costs to the two Brazilian states.

Table 1: Average costs of production in 2010 (C$/kg carcass)

Italy	$2.50
Great Britain	$2.38
EU average	$2.23
Germany	$2.13
Spain	$1.98
Netherlands	$1.98
Denmark	$1.97
France	$1.95
Canada	$1.55
Brazil (SC)	$1.54
Brazil (MT)	$1.42

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Only the Brazilian state of Matto Grosso (MT) has significantly lower costs than Canada, while the average production cost in the EU countries surveyed is 44% above Canada's. The EU's cost regime is very different to Canada's, with higher feed, labour and fixed costs, while Brazil has significantly lower labour, other direct costs and fixed costs, but higher feed costs.

> **"Canada has significantly lower breeding herd performance than countries such as Denmark, France and the Netherlands"**

The InterPig production data shows that Canada has significantly lower breeding herd performance than countries such as Denmark, France and the Netherlands. Despite a relatively high carcass weight in Canada, this results in a low figure for the amount of carcass weight produced per sow. Many European countries have capitalized more effectively on high litter size genetics, with Danish producers selling 26.3 pigs per sow and those in the Netherlands 26.5. It should be noted that the Canadian data set is very limited and contains a number of anomalies, especially in the physical performance data.

WTO rules in favour of Canada on COOL complaint

The World Trade Organization (WTO) ruled in favour of Canada and Mexico in a complaint against the US mandatory country of origin labelling (COOL) law, which took effect in 2008. Following the law's implementation, US imports of Canadian cattle and hogs and Mexican cattle declined substantially.

The panel found that the COOL program is a technical regulation that is "inconsistent with the United States' WTO obligations," since it accords less favourable treatment to imported Canadian cattle and hogs than to like domestic products. Further, the panel found that COOL does not fulfill its legitimate objective of providing consumers with information on origin. Both factors constitute violations of WTO rules.

"The United States will almost certainly appeal the decision, but most observers believe the result will not change, thus paving the way for Canada, Mexico and, possibly, other countries to place punitive tariffs on US goods," comments American economist Steve Meyer. "The United States will have a year after the appeal ruling is received to make changes to the law to avoid the retaliatory tariffs."

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Karl Kynoch, Chair of Manitoba Pork, commented that "the impact of the COOL measure on Manitoba exports of weanlings was immediate and dramatic. From 2007 to 2010, weanling exports declined 30% in volume and at least $5-10 per animal in value." US feeders had to cope with extra record keeping and administrative costs when using Canadian piglets and feeder animals. "This, combined with retailers' decisions to sell only pork from animals born, bred and slaughtered in the USA, had a devastating impact on Manitoba hog producers," Kynoch says. "The Panel has found that these additional recordkeeping requirements are inconsistent with US WTO obligations."

COOL has been as unpopular with the US pork industry as it has in Canada because it interrupted mutually beneficial trade that had built up over many years. American Meat Institute President J. Patrick Boyle said that the ruling was not surprising. "We've contended for years in statements, letters and comments that this law was not just costly and cumbersome, but a violation of our country's WTO obligations. Given the industry's export exposure, it was a key argument and concern that we expressed in a 2010 letter to the US Trade Representative," he said.

Korea – US Free Trade agreement disadvantages Canada

Ratification of the Korea - US Free Trade Agreement by the Korean National Assembly will place Canada at a disadvantage in future unless the federal government is able to broker a similar deal. Tariffs on US beef imported by Korea will drop from 40 percent to zero over 15 years, and duties on US pork, which range from 22.5 percent to 25 percent, will be phased out over two years starting January 1, 2014.

The Canadian Pork Council (CPC) has called on the Federal Government to resume negotiations, pointing out that the concerns which led to suspension of negotiations in 2008 have been resolved or addressed in the Korea - US Free Trade Agreement.

"The negotiations with Korea have been stalled since 2008," said Canada Pork International Chairman Edouard Asnong. "Canada is the second largest exporter of pork to Korea and expects to ship $300 million of pork products mostly from Quebec, Manitoba and Alberta."

The pork industry is concerned that competitors like Chile and the EU who already have an FTA with South Korea enjoy preferential access and that it will completely push Canadian pork out of a key market.

"By 2016, the US will have no duty on chilled and frozen pork while we will pay 22.5% and 25.0% respectively, says Richard Davies, Executive Vice President, Sales and Marketing at Olymel. "Even though the full reductions will not occur immediately, they will cumulate quickly. With this disadvantage our Korean business will be gone within two years."

"Negotiations with Korea must be resumed," argues Barry Sutton, Vice President of Maple Leaf Foods. "The pork export sector was not pleased with the Korean offers in 2007. Nor were our US counterparts but they continued their negotiations until US pork received a better deal. We are asking the Government of Canada to stand up for our interests in the South Korea market."

Battle lines drawn as EU partial sow stall ban approaches

With barely 12 months to go before the EU partial stall ban comes into force, battle lines are being drawn as those countries which have completed the move to group housing confront those which are likely to miss the deadline. The EU legislation, which comes into force on January 1st, 2013, prohibits the use of stalls during gestation except for a period of 28 days after breeding. The law was passed in 1999, giving producers 12 years to comply.

"Nobody knows how many European producers will fail to convert to loose housing by January 2013, but the evidence

European pig producers have to phase out sows stalls except for 28 days after breeding by January 1, 2013

points to the majority failing to hit the deadline," says Britain's National Pig Association (NPA). "Some will quit, probably creating a shortage of European pork, and others will disregard the law and continue producing pigs."

Evidence from a range of sources suggests 20 percent of Belgian producers have yet to convert to loose housing, along with at least 20 percent of Irish producers, 70 percent of Spanish producers, 70 percent of Italian producers and most Polish producers. But these figures are only vague estimates, says NPA. "Nobody actually knows how many producers have converted, how many will have converted by January 2013, how many propose to quit, and how many plan to

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produce pigs illegally. Even Denmark and the Netherlands are currently only 70 percent compliant, although it is expected these countries' assurance schemes will quickly identify any law-breakers after January 2013."

John Howard, Market Director (UK) at the Danish Agriculture & Food Council says that the Danish industry will be ready. "Independently monitored assurance schemes, covering all pig suppliers to Danish Crown and Tican, require full compliance with all relevant legislation, in addition to more demanding requirements regarding welfare, safety and environmental standards," he said.

"A significant number of Danish producers are likely to cease production by the end of the year because they will not be able to market their pigs"

Changes in Denmark have been slowed by bureaucratic planning regulations and difficulties in getting money from banks in the economic climate that has prevailed since 2008. Obtaining permission for new buildings can take several years, so many producers have had to convert existing barns, which has resulted in fewer sows because group housing takes up more space than stalls. These challenges mean that a significant number of Danish producers are likely to cease production by the end of the year because they will not be able to market their pigs.

As ever with EU legislation, the northern countries, such as the Netherlands, the UK, Germany and the Scandinavian countries are more likely to be in compliance, whereas counties such as Italy, Spain and Greece tend to feel new legislation is optional. This is reflected in the estimates of current compliance, bearing in mind much of the numbers are little more than guesswork. The British Pig Executive (BPEX) recently made an assessment of the current situation and says that a majority of producers on the continent are not compliant.

The big question is what the EU will do after the end of the year when so many producers will be breaking the law. One option is derogation, delaying the deadline, but this is strongly opposed by Britain and Denmark. A Polish request for an extension until 2017 has been turned down by EU Health Commissioner John Dalli.

Pork producer organizations are watching closely how similar legislation relating to battery cages for hens is enforced. It became illegal to use battery cages after January 1st, 2012, but at least 11 EU countries are expected to be non-compliant. Commissioner Dalli has taken a hard line, slamming the expected failure of many member countries to implement the laying hens legislation, which was agreed in 1999. It was a "massive and damaging blow" which threatens to create distortions and confrontation between member countries and could undermine the European Union's credibility, he said. "Practical solutions" were required from January to prevent the illegal circulation of eggs produced from illegal battery cages, he added.

British producers seem to have little confidence in the ability of the EU to keep illegal pork out of the country. BPEX believes non-compliant, illegally-produced pork will inevitably enter the United Kingdom unless strong measures are taken to police the January 2013 partial stalls ban. It has called on retailers and foodservice companies to ensure all imports come

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from suppliers that produce to high welfare schemes such as the Red Tractor quality assurance program or equivalent.

"The only way to ensure significant amounts of illegally produced pork are not imported is for major retailer and food service companies to insist, and check, that all produce is fully traceable and meets United Kingdom or the new European Union standards," says BPEX. It is encouraging retailers and foodservice business to create dedicated supply chains to ensure security of supply of high welfare, legally compliant pork.

One obvious outcome of the legislation will be a sharp reduction in the number of producers over the next few years as enforcement and trade sanctions choke off markets for illegal pork. This could conservatively result in a 5% drop in pig numbers.

The European Commission will demand that member countries that cannot fully comply with the partial ban - probably the majority - ensure that any pigmeat from non-compliant pig farms is prevented from entering the European Union market. This will create a two-tier market for pork, which will not only lead to chaos for inter-country trade, but will inevitably lead to cheating, especially through the use of non-compliant pork in manufactured products.

Danish Crown bounces back

Pork and beef processing giant Danish Crown has been seeing results from its rationalization program carried out over the last two years. Its latest results show earnings increased from DKK 45.2 billion ($8.28Bn) to DKK 51.8 billion ($9.49Bn), with earnings of DKK 1,762 million ($323 million) compared with DKK 1,648 million ($302 million) the previous year.

"This is a testament to stability, and to the group having succeeded in creating organic growth in a challenged market," said a company spokesman.

The company's producer shareholders benefit from increased bonus payments,

Workers at Danish Crown are paid far more than their counterparts in Germany, which has reduced competitiveness (photo courtesy Danish Crown)

given at the end of the financial year. These amount to DKK 0.95 (17 cents) per kg for market hogs, DKK 0.80 (15 cents) for cull sows and DKK 1.30 (24 cents) for beef carcasses.

The improved prices Danish Crown has paid its producers more recently has led to an increase of 5% in the number of pigs sourced in Denmark. The company had suffered an exodus of pigs into Germany where producers claimed they were getting paid more.

Measures taken by Danish Crown have included shutting plants, hiring lower-paid workers, and cutting the total workforce from 15,000 to 9,000. In total it has stripped out around £250m in annual cost. But the cooperative says it must continue automating and streamlining as other countries are cutting their slaughter costs too. For identical jobs, where the wage index is 100 at Danish factories, it is 44 at German plants and 28 at Polish plants. ■

Swine Technology Workshop

Mission critical - Piglet care in the first 48 hours

Close attention to the farrowing process and management of the sow and piglet during the first 48 hours of life is the key to minimizing stillborn piglets and ensuring maximum piglet survival, says Martin Waldner, Hog Boss at Hartland Colony, near Bashaw, Alberta. The 800-sow unit weans over 30 pigs/sow/year, with 14.7 piglets born alive per litter and 12. 8 weaned. Sow body condition at farrowing and sow feeding, both before and after farrowing, are important contributors to such high performance, Waldner believes. With such large litters, good colostrum management is crucial to ensure high piglet survival, while the sow and piglets' environment is also a major factor. Waldner describes the management practices followed in the barn that are essential to his success.

Feed intake prior to farrowing has a big impact on the results after farrowing. We increase the feed by 1.5 to 2 lbs per sow per day 5 weeks before the farrowing date, which gives us a bigger and healthier pig born. Sows get a 2ml dose of Farrowsure Gold and Litterguard LTC 5 weeks prior to farrowing. All shots in gestation are hip injections.

Farrowing rooms are washed, disinfected and dried down before moving the sows in 5 days before their due date. Sow feeders are washed out after disinfecting too. After sows are moved in we lower all heat lamps to 24 inches off the slats, and check to make sure bulbs work. This means we shouldn't have to fix a heat lamp when a sow is farrowing and avoids piglets getting chilled without the heat from the heat lamp. Important notes on sow cards from previous farrowings are recorded on the wall in front of each sow, so sows red-flagged for having laid-on piglets or stillborns are monitored more closely.

On farrowing day the temperature in the room is raised to 22°C and every sow farrowing has a heat lamp behind her, on the right side, to ensure that the piglets are not chilled and are able to dry off faster, as a newborn piglet's temperature is around 39°C when it is born. A new born piglet uses its body temperature to dry off, therefore it is important to have extra heat at the farrowing site, like heat lamps, to help dry off the newborn piglets. Every crate has a creep area with an electric heat mat in it. When the piglets are 5 to 6 days old we turn off the heat lamps while the piglets are sleeping on the heat mats. The mats are set on a temperature curve; days 1 to 5 they are set at 35°C then the temperature is gradually reduced down to 20°C at day 28.

We farrow two rooms per week, 18 crates per room. Gilts and first parity sows are in one room and second parity sows and older are in the second room. Each room has 2 rows of 9 crates per side with a 6 feet by 8 feet creep area at the end of

CONTINUED ON PAGE 26

An enclosed creep area at the end of each row of crates is used to house piglets weaned at 10 days of age in order to provide suckling capacity for surplus newborn piglets

each row which holds litters weaned off at 10 days of age.

We split suckle big litters by moving the first 5 or 6 piglets into the creep area and closing off the entrance so they can't get out. The first pigs born are usually the biggest and strongest, therefore the later-born piglets might be robbed of their chance of getting colostrum, which the sow only produces for the first 12- 24 hours and which decreases rapidly after 12 hours.

Colostrum

This is the first milk produced by the sow and it contains all the sow's antibodies and easily absorbed nutrients. Colostrum is available in the sow's milk for up to 12 hours after farrowing, after this time the absorption of antibodies declines rapidly. A piglet that doesn't get colostrum has very little chance of surviving.

Fostering

All pigs must have adequate colostrum within the first four hours of birth with the maximum being 12 hours. When fostering piglets off a sow, we check the number of working teats and never put or leave more piglets on than there are teats that give milk. Dried up, inverted or damaged teats should not be counted. Also the size and shape of the teat is important for placing piglets. Piglets claim their teats by 12 hours after farrowing. With an average of 14.7 live pigs born per litter, we need to foster off 13 or more pigs per room of 18 sows, which means that one litter of 10-day old pigs from the previous week needs to be weaned into the creep area. We try to do this with second or third parity sows and they are used to foster surplus 1 to 2 day old pigs onto. It is always better to transfer the larger piglets and leave smaller piglets with the original mother. When fostering, it is important to match piglet size to the average size of piglets in the litter you are fostering to. It is a good idea to actually observe piglets nursing before deciding which ones to foster. In larger litters, two piglets might be constantly fighting over the same teat, so it makes sense to transfer off one of these piglets to another sow, reducing competition within the litter. We never transfer scouring piglets onto new healthy litters. It is best to treat these litters before they can be moved anywhere to reduce the spread of scours.

When fostering runts, we try to pick a sow that has smaller teats so the runts are able to nurse effectively. All litters that are fostered onto a different sow are sprayed with mineral oil to mask their smell from the new sow and the foster sow also has her nose sprayed with mineral oil.

"With an average of 14.7 live pigs born per litter, we need to foster off 13 or more pigs per room of 18 sows"

Piglets transferred to the creep areas at 10 days of age are started on milk for a couple days then weaned onto creep feed. Those pigs stay in the creep areas until that room is weaned at an average age of 26.5 days old weighing an average of 18.5 lbs (8.4kg) per pig.

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Managing nursery pigs in the first seven days after weaning

Managing pigs in the critical week after weaning requires the basics to be done well and attention to detail so that pigs get a good start in the nursery, says Shawn Morton, who operates a 7000-head specialist nursery barn located just east of Red Deer, Alberta. He focuses strongly on what he calls "The Three Basics" – feed, water and environment. Combined with careful attention to hygiene and health management, his approach results in excellent pig performance.

The nursery

Brookfield Pork is a 7000-place nursery located 20 minutes east of Red Deer, which was built in 2002. Weaned piglets come from Eclipse Pork, a 2500 sow unit about 15 minutes from the nursery. The barn is split into 14 rooms and pigs are weaned twice a week into the nursery.

The nursery is fully slatted with Matrix flooring and white plastic dividing walls. "The ceiling height is 10 feet so the rooms are bright and comfortable to work in," notes Morton. "The nursery is heated by fin pipes along the ceiling in each room. The rooms are heated by air being drawn into the rooms by air inlets where it tumbles over the heated fin pipes. Rooms are ventilated in three stages by three chimney fans spaced evenly in the centre of each room."

Preparing the nursery room

Good hygiene is essential to minimize the spread of disease, Morton stresses. "As our vet constantly tells us, the three most important points to pig health in the nursery are sanitation, sanitation, sanitation," he says. "We try to do a good job in this area."

Because pigs are weaned twice each week, on Mondays and Thursdays, there is always a room being prepared for the next batch of pigs. "Historically we have washed the rooms one day, left them to dry overnight and then disinfected the following day and left to dry again," Morton explains. "Earlier this summer we started a cycle of letting the rooms soak with a chemical detergent. We completed a cycle with an acid product and right now are in the process of using the base product. These products break down some of the film and deposits built up on the slats and penning."

> **"The three most important points to pig health in the nursery are sanitation, sanitation, sanitation"**

"We go into the room with our injector and wand, spray the room down and then let it soak for a half hour before we start washing," he continues. "We wash with hot water set at about 190°F and the pens and walls clean quite easily. We wash our rooms completely including ceiling, fin pipes, feeders, etc. The room is then left to dry overnight at 20°C."

"The next day the room is disinfected with Synergize which we are using as our disinfectant at the moment," Morton notes. "We do not use a foamer. We just use the chemical injector and cover all areas that pigs have contact with. The room is then left to dry overnight at 20°C and is ready for pigs the following morning."

The rooms are not pre-heated because as soon as the rooms are filled with pigs they rapidly warm up. "Only in extreme cold do we have a problem with rooms warming up," Morton points out. "During these times, we hang a basket fan on our fin pipes to increase the air flow over the fin pipes."

Weaning day

Pigs are sorted immediately they enter the nursery. Each room has six large pens holding 90 pigs each and a further four pens at the front and back of the room that each hold 25 pigs. "Pigs are sorted by sex and somewhat by size," Morton notes. "The smallest, poorest pigs are put in the two small pens by the door, which classify as our sick pens." Pigs are penned by sex because the finisher barns operate a split-sex feeding regime.

> **"Every pen in the barn is walked through and pigs are checked thoroughly for any health issues"**

"About a third of the time we will vaccinate upon entry with Mycoflex and Circoflex," Morton explains. "The rest of the time pigs are vaccinated two weeks after entry into the nursery. We vaccinate on entry only when extra labour is available or there is a holiday conflict. We have not been able to quantify or notice any difference in performance with the different vaccinating times."

After pigs are sorted a very thorough health check is completed. The most common treatment on pigs entering the nursery is for lameness, Morton notes.

Health management

"We spend a lot of time on health management in the nursery," Morton stresses. "Every day a health check is done which usually takes between two and three hours. Every pen in the barn is walked through and pigs are checked thoroughly for any health issues. For the first seven days after weaning we generally spend extra time."

"If a pig is treated it is marked on the back," Morton continues. "Each medication is given a colour so if staffing changes everyone knows what that pig has been treated with and for how long depending on the number of marks." Pigs that are very sick or have a chronic health problem are moved to one of the sick pens. If these start to get overcrowded the healthiest pigs are moved into the larger pen next to it.

"The most common issue is lameness which we treat with Penicillin and Predef. Other health issues such as poor doers or scours we will treat with Denagard or Trimidox," says Morton. "As we are Mycoplasma positive we vaccinate with Mycoflex. We do not give any water soluble medication for the first seven days."

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Paying attention to management basics such as hygiene, feed and water, health care and the environment delivers excellent results for Shawn Morton

Feed and water

Pigs are given a creep diet prior to weaning so they have some experience with solid feed and this helps in the transition period after weaning, Morton believes. Wet/dry feeders are used in the nursery and for the first 48 hours extra time is spent checking the feeder setting. "During the first 48-72 hours we adjust the feeder so that feed covers the whole pan," he explains." We also carry a feed scoop and will add some feed to each feeder for the first day or two. After the first 72 hours, feeders are adjusted back so that only about 50% of the pan is covered in feed."

> **"For the first couple of days after weaning pigs tend to use the mats as a comfort zone and will often sleep on them"**

In the sick pens a feed mat is provided for the first 5 days and a small scoop of feed is placed on the mat a couple of times a day. "We have no starve-outs with the wet/dry feeders but the mat just gives the challenged pigs some extra help," says Morton. "It also gives them a place to lie that is not slatted. For the first couple of days after weaning pigs tend to use the mats as a comfort zone and will often sleep on them."

The wet/dry feeders have water nipples in the pan and immediately after the pigs are sorted the nipples are used to put an inch or two of water in the pan. This is done three or four times on the day of weaning and then once the next day. "It not only gets the pig interested in the feeders and where the water is but usually allows each pig to get a drink right away," points out Morton. "We have no other water nipples in each room. By running each nipple it ensures they are functioning correctly and can be fixed if a problem occurs."

Environment critical

Critically important is a warm, dry environment for the pigs to enter into at weaning, Morton believes. "Rooms are always dry before putting pigs in and are set at 22°C while sorting and then warmed to 28.5°C," he notes. Over the first seven days, the set point temperature is held at 28.5°C and the fans are set at minimum ventilation. Pigs are in the nursery for about 46 days on average and the ambient temperature is brought down to 21°C by the time they leave. "In the spring, summer and fall air quality is excellent. In the winter, when the temperature is very cold the air quality can be poor but usually over short periods," Morton adds.

Production data

Over an average 46 days in the nursery, pigs grow from a starting weight of 6kg to about 27kg when they move to finishing, growing at a very respectable 460 grams/day, with a feed efficiency of 1.57. "We would like to see our feed conversion improve but with the wet/dry feeders we think we are fighting an uphill battle," Morton comments.

The attention to health management results in a death loss of just 2.6%. "Our death rate is about where we want it," comments Morton. "We tend to euthanize pigs with chronic health issues in the nursery because this reduces problems in the finisher barns. Rather than let the animals suffer, when we know they will not make the slaughter plant, they are put down sooner."

Driving down feed costs with alternative ingredients

By Dr. Eduardo Beltranena, Alberta Agriculture and Rural Development

Take home message

The cost difference per unit of feed energy (Mcal NE/kg) between canola co-products, DDGS and tallow or feed grade canola oil can be used as a guideline to decide what is the "best buy" among feedstuffs to reduce feed cost. Co-product variability due to local processing and seed quality (green, heated) needs to be considered and managed. Inclusion of these locally produced co-products returns the most in feed cost savings when fed to pigs during the late nursery and grower phase. Fed to finisher hogs, these can affect fat deposition and hardness plus cancel out the feed cost savings brought about by feeding lower energy feedstuffs (e.g., barley, distillers dried grains with solubles) as hogs approach market weight.

Introduction

In the last several months pork prices have increased, but producers won't forget what prices were the last 2 years. Feed commodity prices continue to be high and will likely remain there in the forcible future. Producers must strive to reduce feed cost as it directly impacts their profitability. There are several local, alternative feed ingredients that pork producers should consider to drive down feed cost. There are a few things to watch out for with these novel ingredients that I cover here.

Feeding distillers dried grains with solubles

Distillers dried grains with solubles or DDGS is the main co-product of ethanol production. In the Prairies DDGS is primarily derived from wheat. At times, there is also American DDGS derived from corn. The main difference between these two is fat content (Table 1). Corn DDGS has twice the oil content from wheat DDGS. Protein is also different, but they have similar available lysine content. A common feature of both co-products is higher phosphorus content and availability than the parent grain.

Nursery pigs

Dietary inclusions of DDGS in weaned pig diets should progressively increase (10% the 2nd week and 20% the 3rd week post-weaning). Due to taste and fibre content, restrict feed inclusions of wheat to 15% or corn DDGS to 30% in nursery diets for pigs up to 20 kg.

Table 1. Nutrient content of distillers dried grains with solubles (DDGS)

Nutrient, %	Corn[1]	Wheat[2]
Protein	27.38	39.79
Lysine	0.76	0.86
Avail. Lysine	0.67	0.70
Crude fat	10.48	4.69
Crude fibre	5.64	6.56
Calcium	0.04	0.18
Phosphorus	0.61	0.83

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Growout hogs

The high fat content of corn DDGS (10.5%) returns the most in feed cost savings when feeding high inclusions to growing pigs. Up to 30% wheat DDGS or 40% corn DDGS can be fed to hogs until a few weeks before slaughter weight. However, a DDGS removal strategy must be implemented to reduce the impact on pork fat hardness. For hogs fed high DDGS levels (30 to 40%), removal of DDGS from the diet (withdrawal) for 3 to 4 weeks before slaughter is necessary to restore pork fat hardness. Implement a 2-week withdrawal period if feeding DDGS at 15 to 20% of the diet. No removal is necessary if feeding DDGS at 5 to 15% of the diet through to market weight. Feeding corn DDGS softens pork fat more than wheat DDGS due to nearly twice the grain oil content.

> **"Feeding corn DDGS softens pork fat more than wheat DDGS due to nearly twice the grain oil content"**

Feeding DDGS reduces dressing percentage by ~0.5% units for each 10% increase in dietary inclusion. The high fibre content of DDGS increases gut fill and thickens the gut wall reducing carcass weight at evisceration. To compensate for this reduction in dressing percentage, producers should market hogs 2 kg heavier or completely withdraw DDGS from the finisher diet 2 weeks prior to slaughter in favour of lower-fibre feedstuffs.

Sows

Gestation sow diets can include up to 30% wheat DDGS or 40% corn DDGS. Limit wheat DDGS to 20% and corn DDGS to 30% in lactation diets and introduce DDGS progressively to avoid feed refusal and wastage if sows are not used to the taste of DDGS. Conservative dietary inclusions (5 - 15%) are recommended for sows for the first week after farrowing and wean-to-breeding period.

Table 2 shows 4 grower diets containing wheat DDGS. Each 10% increase in DDGS reduced feed cost by $7.80 through displacing soybean meal. In conclusion, feeding DDGS can reduce feed cost and increase producers' profitability, but the savings in feed cost vary regularly and by locations in Canada.

Table 2: Feed cost savings by increasing diet wheat DDGS inclusions by 10%

	0%	10%	20%	30%	For each
Ingred, %	**DDGS**	**DDGS**	**DDGS**	**DDGS**	**10%DDGS**
Wheat grain	67.53	61.82	56.13	50.44	-5.7
Soybean meal	15.00	10.00	5.00	—-	-5.00
Wheat DDGS	**—-**	**10.00**	**20.00**	**30.00**	**10.00**
Field pea	15.00	15.00	15.00	15.00	
Tallow	—-	0.60	1.20	1.80	0.60
Limestone	1.03	1.05	1.08	1.10	0.03
Phytase	0.04	0.03	0.02	0.01	-0.01
Salt	0.35	0.35	0.35	0.35	
L-Lysine HCl	0.13	0.22	0.31	0.40	0.09
L-Threonine	0.06	0.07	0.07	0.07	
Vitamin premix	0.40	0.40	0.40	0.40	
TM premix	0.40	0.40	0.40	0.40	
$/1000 kg	**266.62**	**259.40**	**251.25**	**243.27**	**($7.78)**

Central Alberta prices for September 10, 2011: wheat $200, SBM $424, DDGS $180, field pea $238, tallow $900, Lys. HCl $2670 per tonne

Feeding conventional canola meal

Canola meal has been fed to livestock in Canada for about 35 years. So what's new? It has been fed to pigs at conservative levels due to the taste and fibre that affects intake in young pigs. But canola meal has a lower cost now and there is lots more of it. Pushing feed inclusions of canola meal can reduce feed cost.

Nursery pigs

In a recent study at the University of Alberta, feeding increasing levels of canola meal (0, 5, 10, 15, to 20%) instead of soybean meal to 8kg pigs for 4 wk starting 1 wk after weaning did not affect average daily weigh gain (ADG), feed disappearance (ADFI), and pig weight at the end of the trial, but there was a trend towards slightly reduced feed efficiency (F:G).

> **"Pigs fed 24% canola meal reached slaughter weight only 3 days later than pigs fed no canola meal and did not affect carcass parameters"**

Growout hogs

We have pushed the inclusion of solvent-extracted canola meal in hog diets containing wheat DDGS. In a commercial-scale study at Lougheed, AB 550 barrows and 550 gilts (30 kg) were fed 0, 6, 12, 18 or 24% canola meal replacing field pea and soybean meal in diets with 15% wheat DDGS to market weight. Increasing canola meal inclusion reduced daily feed disappearance by 19 g and weight gain by 7 g for every 6% increase in canola meal inclusion. Pigs fed 24% canola meal reached slaughter weight only 3 days later than pigs fed no canola meal and carcass parameters were not affected.

Feeding expeller-pressed and extruded – pressed canola meal

Expeller-pressed and extruded-pressed canola meals contain more residual oil (~12 and 17%, respectively; Table 3) than conventional solvent-extracted canola meal (2-3%).

The difference between them is that the seed is extruded before pressing, increasing nutrient digestibility more than pressing alone.

Table 3. Nutrient content of expeller- and extruded + pressed canola meal

Nutrient, %	Expeller-pressed[1]	Extruded + pressed[2]
Crude protein	35.27	29.86
Crude fat	12.63	17.31
Calcium	0.59	0.60
Phosphorus	1.03	0.82
Lysine	2.09	1.21
Avail. lysine	1.95	1.04

[1]Viterra Canola Processing, Ste. Agathe, MB
[2]Cansource Bioproducts, Mayerthorpe, AB

Nursery pigs

Feeding 0, 5, 10, 15, or 20% expeller-pressed canola meal in substitution for soybean meal to 7.3 kg pigs for 4 wk did not affect daily weight gain, feed efficiency and pig weight at the end of the trial. As expected, the higher fat content of this co-product reduced feed disappearance. In conclusion, up to 20% expeller-pressed canola meal can replace soybean meal in late nursery diets without affecting growth performance.

Growout hogs

In a commercial trial at Lougheed, AB 1,100 pigs (25 kg) were fed 0, 7.5, 15, and 22.5% or decreasing amounts (22.5, 15, 7.5, and 0%, respectively) of expeller-pressed canola meal to market weight. For d 51 to 90, the 22.5% expeller-pressed canola meal regimen was reduced to 18% (22.5/18%) because of decreased ADFI for phases 1 and 2. Overall (d 0 to 90), increasing expeller-pressed canola meal inclusions in feed decreased daily

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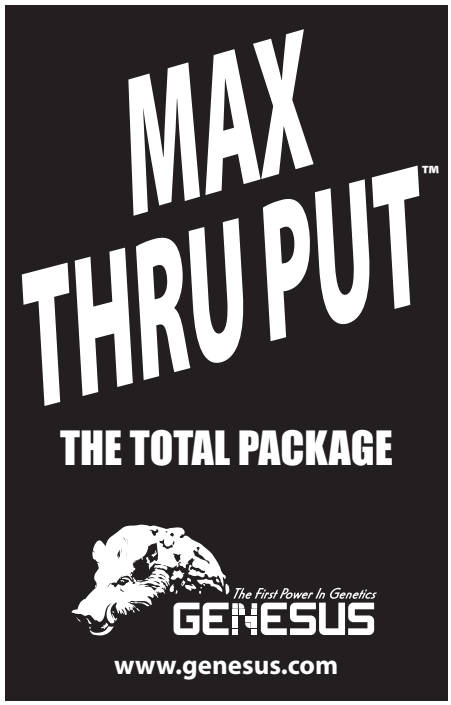

weight gain, feed disappearance and feed:gain. But increasing the dietary inclusion of expeller-pressed canola meal did not affect carcass backfat thickness, loin depth, or jowl fatty acid profile. We concluded that the amount of expeller-pressed canola meal included in hog diets should be targeted to an expected growth performance and carcass quality.

"Up to 20% expeller-pressed canola meal can replace soybean meal in late nursery diets without affecting growth performance

Feeding green canola seed

Green canola is the immature seed that imparts a green colour to the oil that is costly to remove, but feeding it to hogs may reduce feed cost. Gowans Feed Consulting conducted a study at Lougheed, AB where 1100 hogs (33 kg) were fed 0, 5, 10, or 15% green canola seed (~90% green) or declining green seed inclusion by growth phase to market weight. There were no effects of feeding green seed level on daily weight gain, feed disappearance, and feed:gain. Due to the higher co-product fibre content, dressing percent was lower for hogs fed 15% green canola seed, compared to controls.

Table 4 shows a least-cost formulated diet (far left) and 4 diets including the canola co-products discussed. The two diets on the far right appear more costly, but pigs would grow faster feeding on them as these provide greater feed energy. In conclusion, inclusion of these canola co-products can reduce feed cost and returns the most when fed to pigs in the late nursery and grower phase. Fed to finisher hogs, they can affect fat deposition and hardness.

Table 4: Grower pig diets including novel canola coproducts with increasing residual oil content vs. a least-cost formulated diet

Ingred., %	Least-cost	Expeller pressed	Extruded pressed	Screw pressed	Green seed
Wheat, ground	45.61	62.10	57.20	62.12	61.97
Soybean meal			5	5	5
Wheat DDGS	30	20	20	20	20
Expeller-press		15			
Extruded-press			15		
Screwed-press	14.74			10	
Green seed					10
Limestone	2.00	1.25	1.20	1.20	1.27
Phytase		0.01	0.02	0.02	0.02
Salt	0.35	0.35	0.35	0.35	0.35
L-Lysine HCl	0.40	0.42	0.39	0.44	0.44
L-Threonine		0.08	0.05	0.06	0.11
DL-Methionine				0.02	0.04
Vitamin px	0.40	0.40	0.40	0.40	0.40
Trace min px	0.40	0.40	0.40	0.40	0.40
$/1000 kg	225.05	233.31	241.98	241.24	255.87
Provided per Kg of diet					
gSIDlys/Mcal NE	3.80	3.80	3.79	3.79	3.81
NE Mcal	2.30	2.30	2.30	2.35	2.40
CP %	23.19	20.36	21.16	21.33	19.60
Ca %	1.05	0.71	0.71	0.71	0.71
AvPhos %	0.26	0.26	0.26	0.26	0.26

Central Alberta prices for September 10, 2011: wheat $200, SBM $424, DDGS $180, expeller-pressed canola meal $250, extruded-pressed canola meal $240, screw-pressed canola cake $230, green canola seed $350, tallow $900, Lys. HCl $2670 per tonne

Transport losses in market weight pigs

Transport losses, from dead and non-ambulatory pigs, while trending downward, represent growing animal welfare, regulatory, and economic concerns, according to Dr. Matt Ritter, with Elanco Animal Health, Greenfield, Illinois. Approximately 0.17% of all US market hogs transported become non-ambulatory or die at the packing plant and this corresponds to economic losses of approximately $46 million annually, he notes. Because transport losses are a multi-factorial problem they can be impacted by growers, loading crews, transporters, and handlers at the packing plant. He examines the factors that affect losses and the management strategies that can help to reduce the incidence of dead and non-ambulatory pigs, including better preparation of pigs for transport and minimizing stress throughout the marketing process.

Terminology and definitions

"Dead and non-ambulatory pigs are most commonly observed during unloading at the packing plant, but these losses can occur at any stage of the marketing process from loading at the farm to stunning at the plant," explains Dr. Ritter. Transport losses at US packing plants include:

- Dead on arrival (DOA) – a pig that died during transportation
- Dead in yard (DIY) or dead in pen (DIP) – a pig that died after unloading at the plant
- Non-ambulatory pig – a pig unable to move or keep up with the rest of the group at the plant

There are two types of non-ambulatory pigs, those that are fatigued and those that are injured.

"Fatigued pigs are pigs without obvious injury, trauma, or disease that refuse to walk at any stage of the marketing process from loading at the farm to stunning at the plant," explains Dr. Ritter. "Meanwhile, injured pigs have a compromised ability to move due to structural unsoundness or due to an injury sustained during the marketing process.

Incidence of dead pigs at packing plants

The percentage of dead pigs at USDA inspected plants is reported to the Food Safety Inspection Service (FSIS) as

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"swine condemned ante-mortem for deads". "These national statistics take into account all dead pigs at the packing plant such as dead on arrival, euthanized, dead in pen, and yard deads," notes Dr Ritter. "The annual data on the percentage of dead pigs at USDA inspected packing plants for the calendar years of 1991 through 2010 are presented in Figure 1.

1991 to 2001

The incidence of dead pigs at US plants was very low in 1991 (0.08%) and 1992 (0.07%). However, the percentage of dead pigs at US plants increased three-fold between 1993 and 1998 (Figure 1; 0.10% and 0.30%, respectively). "It is unclear why this value increased over this period, but some potential explanations include changes in genetics, increased live weights, and increased size of production operations," comments Dr. Ritter. "From 1998 to 2001, the percentage of dead pigs peaked and remained relatively constant; in the range: 0.28% to 0.30%"

2002 to 2010

From 2001 to 2002, the percentage of dead pigs at US plants decreased from 0.29% to 0.22%. "This decrease might be attributed to greater industry awareness of losses during the marketing process," suggests Dr. Ritter. "In 2002, the National Pork Board's Transport Quality Assurance™ (TQA™) program was made available, and there was a strong focus on research that yielded important results."

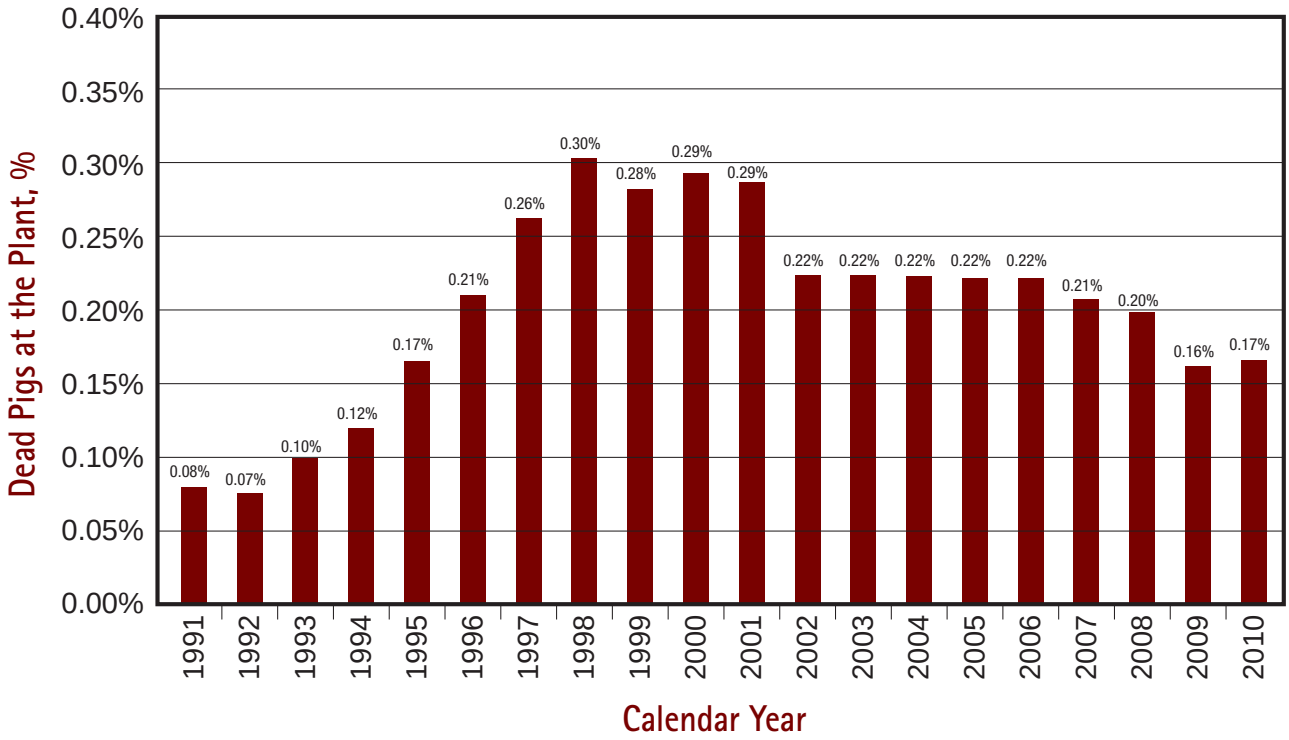
"The percentage of dead pigs at the plant then levelled off at 0.22% during the years of 2002 to 2006," he continues. "It is currently unknown why little change was made over this time period. However, it is important to note that during this same time period, several packers began to euthanize non-ambulatory pigs that had a low likelihood of recovering, and these pigs were reported as dead pigs to FSIS." Therefore, he says, the definition of a dead pig at USDA inspected plants has recently changed and now includes pigs that are euthanized at the plant. "Another important fact to consider is that porcine circovirus type 2 (PCV2) had a major impact on the health and mortality of finisher pigs marketed over this time period as the first commercial vaccine was not available in the US until July of 2006."

Meanwhile, dead pigs at the packing plant have decreased over the last four calendar years to 0.17% in 2010. "This improvement may be attributed to pork producers and packers working together to implement proactive management strategies to prevent, or at least minimize, transport losses," believes Dr. Ritter. "For example, on-farm and in-plant training programs, standard operating procedures for pig handling and transportation, loading assessments, handling audits, and databases for transport losses have evolved significantly over the past four years."

Incidence of non-ambulatory pigs at packing plants

"Unfortunately, national statistics are not available for the percentage of non-ambulatory pigs at the plant, and thus, commercial field trials are currently our best indicator of the incidence of non-ambulatory pigs in the US," continues Dr. Ritter. A total of 23 commercial field trials have been conducted in

Figure 1: Percentage of dead pigs at USDA inspected plants by year from 1991 to 2010



the US and the results from these studies have recently been summarized. "The percentage of dead pigs, non-ambulatory pigs, and total losses (dead and non-ambulatory) at the plant averaged across the 23 field trials (6,660,569 pigs) were 0.25% for deads, 0.44% for non-ambulatory pigs and 0.69% for total losses," he explains. "Non-ambulatory pigs

"The vast majority of fatigued pigs will recover if the stressors are removed and pigs are allowed to rest for 2 to 3 hours"

were classified as fatigued or injured in 18 of these field trials, and the rates of fatigued and injured pigs averaged across these 18 field trials (4,966,419 pigs) were 0.37% and 0.05%, respectively. Therefore, the majority of non-ambulatory pigs at the plant in US field trials were classified as fatigued."

Symptoms and metabolic changes in fatigued pigs

Fatigued pigs displaying signs of acute stress such as open-mouth breathing, skin discolouration, and/or muscle tremors, are in a metabolic state of acidosis, notes Dr. Ritter. "This is characterized by low blood pH and high blood lactate values, and pigs may have elevated body temperatures," he says. However, he adds, recent research has demonstrated that the vast majority of fatigued pigs will recover if the stressors are removed and pigs are allowed to rest for 2 to 3 hours.

Dr. Ritter says that it is interesting to note the striking similarities between the symptoms and metabolic characteristics of fatigued pigs to those of pigs with Porcine Stress Syndrome (a.k.a. the HAL-1843 mutation). A recent commercial field trial involving 2,109 pigs was conducted at four Midwestern US packing plants to determine the impact of the HAL-1843 mutation on the incidence of dead and fatigued pigs at US packing plants. "This study demonstrated that 98% of the normal pigs, 95% of the dead pigs, and 98% of the fatigued pigs evaluated were negative for the HAL-1843 mutation," Dr. Ritter observes. "It suggests that the HAL-1843 mutation has basically been eliminated from the US commercial pig population, and thus, has only minor effects on the overall incidence of dead and non-ambulatory pigs at the packing plant."

Predisposing factors for transport losses

Transport losses are a multi-factorial problem involving:

People: Handling tools and handling intensity

Pigs: Genetics, diet, gut fill, live weight, gender, health status, and previous handling experiences

Facility design: Pen size, pre-sorting strategies, aisle width, distance moved, and loading ramp angle

Transportation: Trailer design, mixing of unfamiliar pigs, loading density, and length of journey

Packing plant: Waiting time at the plant, unloading procedures, distance moved, facility design, and lairage time

Environmental factors: Season, temperature, relative humidity, and trailer settings for bedding, boarding and misting

"Removing just one stressor during the marketing process can improve the pig's well-being and can potentially reduce transport losses at the plant"

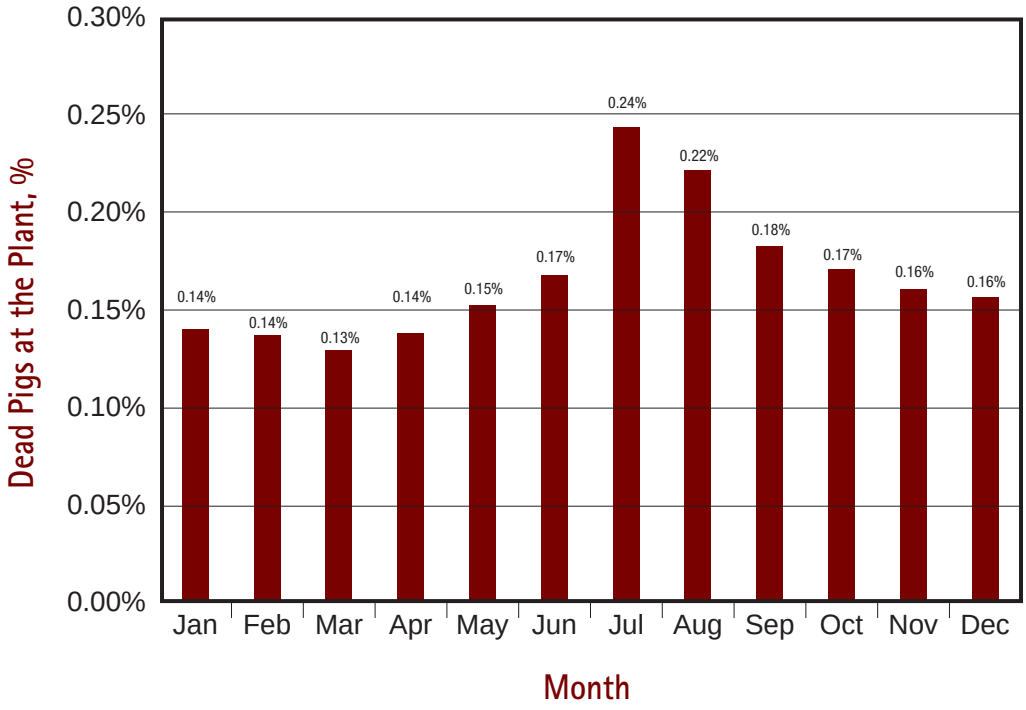
Of these factors, it is well established that transport losses are increased by the HAL-1843 mutation, aggressive handling with electric prods, crowding pigs during

transport and extreme weather conditions causing heat stress and cold stress," comments Dr. Ritter. "Also, keep in mind that pre-slaughter stressors have additive effects on the stress responses of market weight pigs," he says. "Therefore, removing just one stressor during the marketing process can improve the pig's well-being and can potentially reduce transport losses at the plant."

Seasonal variation in transport losses

Figure 2 illustrates the monthly incidence of dead market pigs at USDA-inspected plants for the calendar year of 2010. "The months of July, August, and September had higher rates of dead pigs than the 2010 average of 0.17%," notes Dr. Ritter. "This comes as no surprise as it is well documented that the percentage of dead pigs at the packing plant is highest during the summer months."

Figure 2: Percentage of dead pigs at USDA inspected plants by month in 2010



Meanwhile, several US field studies have reported that the rates of non-ambulatory pigs are the highest during the late fall and early winter months. "It is currently unknown why the rate of non-ambulatory pigs increases during the late fall and early winter months," comments Dr. Ritter. "However, some potential explanations include temperature stress, heavier market weights, increased numbers of pigs being harvested, and changes in health status."

Management strategies to reduce transport losses

"Management strategies to reduce transport losses under commercial conditions include better preparation of pigs for transport, such as walking pens daily, routinely handling and moving pigs, pre-sorting pigs prior to loading and withdrawing feed prior to loading," notes Dr. Ritter. "Also important is minimizing stress throughout the marketing process by minimizing electric prod use, moving pigs in groups of 4 to 6, minimizing distance moved from pen to truck, and utilizing transport floor spaces of at least 0.46 m2/pig." ■

The effects of increasing feed inclusions of co-products and reducing dietary crude protein on pork omega-3 fatty acid content and feed cost

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Take home message

Alternative feedstuffs can be included in pig diets to reduce dependence on feed grains, reduce feed cost, and produce specialty pork products. Co-products (Co-P) such as co-extruded flax seed and field pea, canola meal, dried distillers grains plus soluble (DDGS) are widely available in western Canada to include in pig diets as alternatives to imported soybean meal. However, these co-products are relatively high in protein, thus crude protein (CP) in diets should be taken into consideration in order to avoid excess nitrogen excretion. We conducted a commercial-scale study to evaluate the effects of 3 inclusion levels (low, medium and high) of Co-P (Linpro™, co-extruded flax and field pea; canola meal and DDGS) and 2 levels of dietary CP (regular, and 3%-unit reduction in CP) on growth performance, carcass traits, jowl fatty acid content and feed cost of hogs fed from 35 kg to slaughter weight. The results revealed that increasing dietary co-product inclusion above 30% reduced growth performance due to reduced feed intake, weight gain, and carcass traits, but it also reduced feed cost and enriched the omega-3 fatty acid content of pork.

Feeding co-products to hogs

The western Canadian pig industry is continuously searching for alternative feedstuffs to reduce feed cost. It is also possible to meet consumer expectations for specialty meat products such as omega-3 enriched pork by feeding hogs Prairie-grown flax seed. Claimed human health benefits of consuming a diet rich in omega-3 fatty acids include improved child learning, a reduction of mid-age cardiovascular disease and sustained mental function in seniors. Production of flax seed and field pea in western Canada has expanded and so has the availability of bio-industrial co-products like canola meal and DDGS. However, all these feedstuffs are relatively high in protein content, thus crude protein (CP) in feed should be considered as it is energetically costly to the pig to excrete excess dietary nitrogen. Furthermore, excretion of excess nitrogen can increase the environmental impact of hog manure. We therefore decided to evaluate feeding increasing levels of co-

Table 1: Effect of feeding increasing co-product level and crude protein level on carcass characteristics

Variable	Reduced CP			P-value			SEM	P-value		
	Low Co-P	Mid Co-P	High Co-P	Low Co-P	Mid Co-P	High Co-P		CP	Co-P	CP × Co-P
Day off test to slaughter	30.9c	35.5b	36.0b	31.7c	36.8b	38.6a	0.54	<0.01	<0.01	<0.01
Carcass weight, kg	94.8a	92.9b	92.5b	95.0a	92.6b	91.6c	0.29	<0.01	<.001	<0.01
Dressing, %	78.3	77.2	77.0	78.3	76.9	76.5	0.34	<0.01	<0.01	0.15
Backfat, mm	20.2a	19.8a	19.6a	18.7b	19.5a	19.9a	0.12	<0.01	<0.01	<0.01
Loin depth, mm	63.6b	62.7bc	62.0cd	64.6a	62.2cd	61.5d	0.36	0.703	<0.01	<0.01
Estimated lean, %	60.1b	60.2b	60.3b	60.8a	60.3b	60.1b	0.057	<0.01	<0.01	<0.01

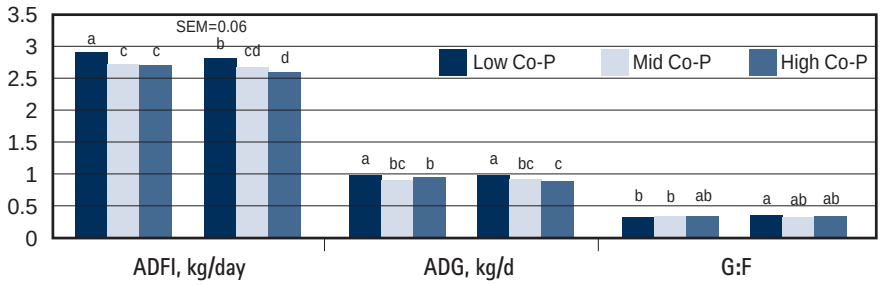
[a-d] Means within a row without a common superscript differ (P < 0.05)

products while addressing the increase in feed protein on growth performance, carcass traits, pork fatty acid content and feeding cost of growing-finishing pigs.

Nutritional profile of Linpro™

To enrich pork with omega-3 fatty acids, we fed a commercially available product, Linpro™ (Oleet Processing Ltd., Regina, SK). This feedstuff is made from co-extruded flaxseed and field pea. It effectively deals will the limitations of sourcing and stocking flaxseed and field pea separately and grinding them. Extrusion likely increases the nutrient availability of amino acids and fat in both feedstuffs and starch in field pea. Linpro™ tested 21.4% CP, 19.2% fat, and 8.35% acid detergent (indigestible) fibre. Approximately one-half of the oil content in Linpro is omega-3 fatty acids, which nicely complement the omega-6 fatty acid content of DDGS oil.

Figure 1: Effects of increasing co-product level and crude protein level on pen average daily feed intake (ADFI), average daily gain (ADG) and feed to gain ratio of grower-finisher pigs



The pig trial

Grow finish pigs were fed 3 levels of co-products (Linpro™, canola meal; and wheat/corn DDGS); low, less than 10% Co-P; medium, 35-45% Co-P and high, 45-65% Co-P. In addition, two levels of CP, regular and reduced by 3%, were fed. The lower level of CP was achieved by feeding crystalline amino

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Figure 2: Effects of increasing co-product level and crude protein level on jowl omega-3 fatty acid content

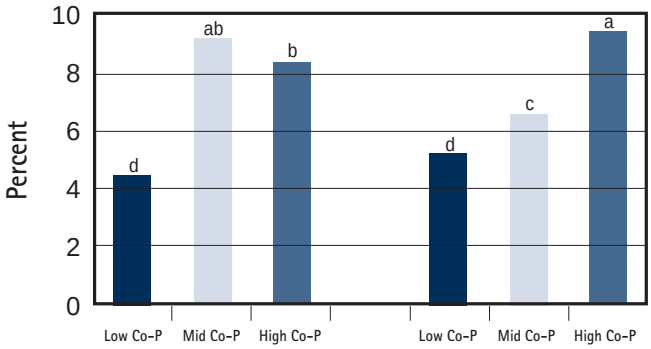
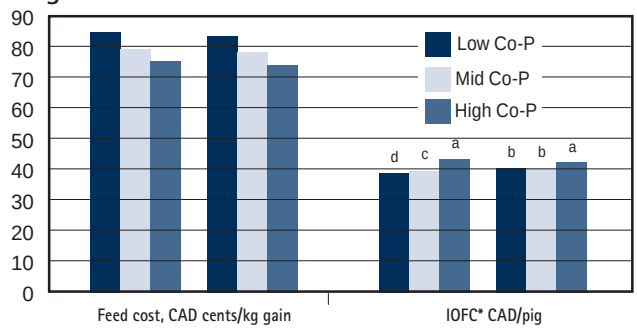


Figure 3: Effects of increasing co-product inclusion and feed crude protein level on feed cost, cost/kg gained and income over feed cost



acids. The co-products replaced barley, wheat and soybean meal in phased diets. The effects of these dietary treatments on growth performance, carcass traits, jowl fatty acid content and feed cost were evaluated

This commercial-scale study was conducted at the Drumloche test barn located at Lougheed, AB. In total, 1056 35-kg crossbred pigs (Duroc sire x Large White/Landrace dams) housed 22/pen were fed 1 of 6 regimens involving a co-product level and CP level combination over 4 growth phases for a total of 8 replicate pens per feed regimen.

Pigs were weighed at the start and end of each feeding phase (day 0 to 13, day 14 to 38, day 39 to 59, day 60 until slaughter weight) and pen feed disappearance was tracked to calculate average daily feed intake (ADFI), average daily gain (ADG) and feed conversion. After slaughter at 118 kg the eviscerated warm carcasses were weighed and graded and jowl samples were collected from 2 pigs per pen for fatty acid analysis.

Results

Increasing co-product inclusion decreased both ADFI and ADG of pigs for the entire study and also body weight (BW) at day 86 (Figure 1/Table 1). This performance reduction happened with increasing Co-P level from low to mid, but not further from mid to high level. For the overall study, pigs fed low Co-P level and low CP feed had 10% greater ADG than pigs fed high Co-P level and regular CP feed. The others pigs performed according to increasing Co-P level. The same reduction was observed for ADFI with the difference also being 10%. However, feed conversion was not affected by Co-P level, except for the first growth phase (d 0 to 13).

"Increasing co-product level from low to high reduced feed cost by 10% and 14% for reduced and regular crude protein feed, respectively"

The level of Co-P and CP level interacted, affecting carcass characteristics and days to slaughter (Table 1). Generally, increasing the feed Co-P level from low to mid decreased carcass traits and days to slaughter, but a further increase from mid to high Co-P level resulted in more pronounced effects for hogs fed the regular rather than the reduced feed CP level.

Increasing feed Co-P level from low to high inclusion increased jowl omega-3 fatty acid content by 82% (Figure 2). Decreasing feed CP level did not affect omega-3 fatty acid content.

Economics of feeding co-products

Increasing Co-P inclusion decreased feed cost both per tonne of feed and per kg of BW gained, and increased income over feed cost (IOFC). Increasing co-product level from low to high reduced feed cost by 10% and 14% for reduced and regular CP feed, respectively. Similarly, IOFC increased by 10% when Co-P level was increased from low to high and when reduced CP feed was used, but only increased by 4% when regular CP diets were fed.

Conclusions

Feeding locally-grown and processed co-products including coextruded flaxseed and field pea, DDGS and canola meal can be cost effective. These feedstuffs are viable alternatives to imported soybean meal as protein sources in grower-finisher pig diets formulated with reduced dietary crude protein content to optimize feed cost. An added benefit of feeding the coextruded flax seed and field pea product Linpro™ was enrichment of omega-3 fatty acid content of pork. Our results indicate that these co-products can be practically included in hog feed up to 30% and crude protein can be reduced by 3 percentage points in grower-finisher pig diets. However, the reduction in carcass weight and dressing percentage observed suggest that DDGS and canola meal should be reduced (<10% inclusion) in the final finisher diet to improve these carcass traits.

The FeedLogic feeder at the Drumloche trial barn delivers precise amounts of the required diet to individual pens

Acknowledgments

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Alberta Pork launches new strategic plan

Alberta Pork launched a new strategic plan focussed directly on the need of producers at its Annual General Meeting on December 8th. Having refunded a total of 2.1 million in levy fees to producers during its 2010-11 fiscal year, the new strategic objectives are to create an environment of profitability for producers, to develop the most informed and engaged industry and to build strong relationships with industry partners.

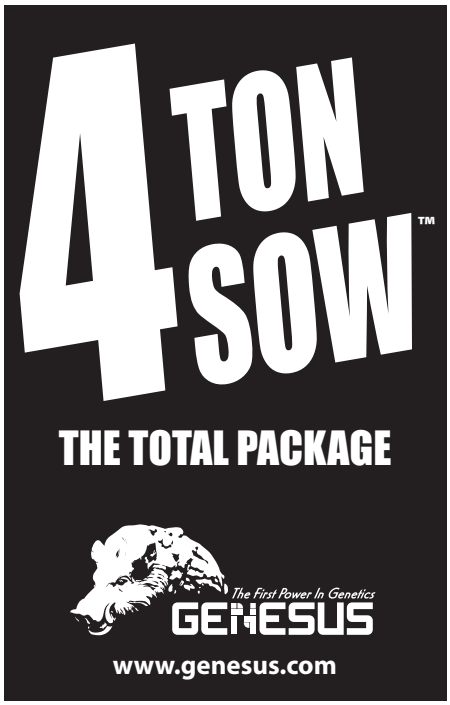
By way of background, chairman of the board Jim Haggins noted that the shrinking of the industry was not complete and some people were still leaving the industry, either voluntarily or due to bank foreclosure. Also, he said, more pigs are expected to be finished in the USA, because this gives producers access to risk management programs which create stability. The effect of this is that packers are losing volume, leading to reduced efficiency, he added.

In the longer term, the aging infrastructure is a time bomb, Haggins believes, with 41% of facilities built before 1995. There was not only a lack of capital and an unwillingness of banks to lend, but no real desire to build in the light of producers' experiences over the previous four years. "It will take 3-5 years of profits to rebuild confidence," he said.

On the positive side, there was a shifting of hog supplies to markets with better premiums and more marketing choice for producers. US producers were calling and asking for Canadian pigs, said Haggins. In addition, he suggested, there appears to be a new food price plateau established which may support industry profitability. However, he said, although empty barns can be filled and production increased, this won't happen unless there is long term profitability. "We must stabilize the industry to encourage new investment and grow our industry," he said. "We have the ability to compete with anyone, but we need a level playing field. It is more difficult for us to export pork to the US than it is for them to export pork to us."

Alberta Pork's Executive Director, Darcy Fitzgerald reported success with one initiative that the organization had been pursuing, improving the process for employing foreign workers. After several meetings with Jason Kenney, the Minister of Citizenship, Immigration and Multiculturalism and also Diane Finley, Minister of Human Resources and Skills Development, changes to the TFW were made. These include an increase in the length of LMOs from one year to two, or even three in some cases, and a reduction in the minimum wage that is required to be paid. The previous regional differences in wage rates have been removed and also wage rates in Alberta are now more in line with other provinces. The Alberta industry relies heavily on foreign workers and changes to the TFW process during the economic downturn made it harder and more expensive to hire people from overseas.

Fitzgerald also detailed a major new project aimed at understanding costs of production in Alberta. The first part of this, a pilot project, will involve 32 producers, gathering data on a quarterly basis and making it available to the industry at large. "We want to help producers reduce the cost of production where possible, thereby helping them to become more competitive," explained Fitzgerald. "It will allow producers to benchmark and to identify specific costs that are out of line, as well as identifying any system, facility or regional drawbacks." Consultants will deliver solutions and advice to address any areas where costs are out of line.



Research highlights opportunities to reduce energy costs

High energy costs have become a fact of life for hog producers and now represent a significant component of overall production cost. However, the efficiency with which energy is used varies enormously between individual barns, as demonstrated by a Prairie Swine Centre (PSC) survey of 28 barns reported in 2008. This indicated the need for producers to re-examine their existing barn design and management practices in order to optimize energy use.

Two potential opportunities to reduce costs were identified from the survey - the use of compact fluorescent light fittings and the possibility of dramatically cutting heating costs by using a heat exchanger unit. Subsequent research, published in PSC's 2010 Annual Research Report, show just how big the savings can be when modern heat exchanger technology is utilized.

Two novel systems – a heat exchanger and a ground source heat pump (GSHP) - were compared with traditional forced air convection heating by PSC research scientist Dr. Bernardo Predicala. They were installed in similar rooms of 120 finishing pigs and all energy usage was metered.

The heat exchanger was a 1500-cfm aluminum core heat recovery ventilator, which recovers the heat energy from exhaust air stream by transferring heat to the incoming fresh air stream. The ground source heating system involved burying 1800 ft of 3/4" diameter polyethylene pipes in 8.5 to 10 ft deep trenches close to the barn. A 20% methanol - 80% water solution, circulating through the pipes, was used to absorb heat from the ground for heating during cold conditions and enabled the ground to be used as a heat sink when cooling was needed in hot weather. The pipes were connected to a heat pump unit inside the barn.

Comparison of the energy consumption for the three systems was made over two finishing cycles during the winter of 2010-11. "The heat exchanger required the least energy for heating but had the highest consumption for ventilation," Dr. Predicala explains. "Heating requirement was reduced because the heat exchanger pre-heated the incoming cold air with heat from the warm exhaust air. However because the heat exchanger had a single speed fan the energy consumption for minimum ventilation was higher than for a regular first stage variable speed fan." The GSHP required less energy to extract heat from the ground and heat the room air compared to the conventional heater, Dr. Predicala notes.

Pig performance in all three rooms was relatively similar, but there were huge differences in overall energy cost. "After one heating season, the use of the heat exchanger and GSHP system resulted

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Using a heat pump unit resulted in a 52% reduction in energy consumption compared to a conventional forced-convection heater

in a 52% and 39% reduction in energy consumption for heating and ventilation, respectively, relative to the conventional forced-convection heater," comments Dr. Predicala. "However, we need to collect data from multiple heating and cooling seasons in order to fully compare the performance and feasibility of these three systems."

Clearly, such alternative systems come with a significantly higher price tag than conventional heating and ventilation equipment, but the large energy savings they generate could well make them cost effective in the long term. ■

Got colostrum?

By Dr. Dawn Magrath, Innovative Veterinary Services, Lethbridge, Alberta

It's often a question that we don't really know the answer to, isn't it? After a cow calves, or a ewe lambs, we know that if the offspring are up at the udder and sucking that they have received colostrum. With a sow, there may be 12-20 piglets born and unless we are there at the birth of every piglet (which is absolutely impossible) we will never likely see order of birth, or whether each piglet nursed for the same length of time.

Swine producers are working with the most prolific of all food producing mammals and colostrum intake can be one of the most challenging areas to manage. However we know that it is also one of the most important. Without ensuring that this essential transfer of immunity and nutrients occurs, we may be fighting a losing battle for the rest of that pig's life.

With the genetic advancements that have been made over the past 20 years, litter sizes have increased immensely. This is an advancement that everyone wants, because it is better to have too many piglets than not enough, right? Well that may be partly true, but the management techniques have to parallel any other improvements that are made, otherwise they are not captured. This may be as simple as extra time or more staff to allow better management of those larger litters to occur.

The pig is born with no circulating antibodies and is completely dependent upon the transfer of immunoglobulins from its mother (passive immunity). If adequate protection is not provided, these piglets are more susceptible to pathogens in the barn and more likely to go on and shed these pathogens in the nursery, so in effect they can perpetuate disease issues in your barns.

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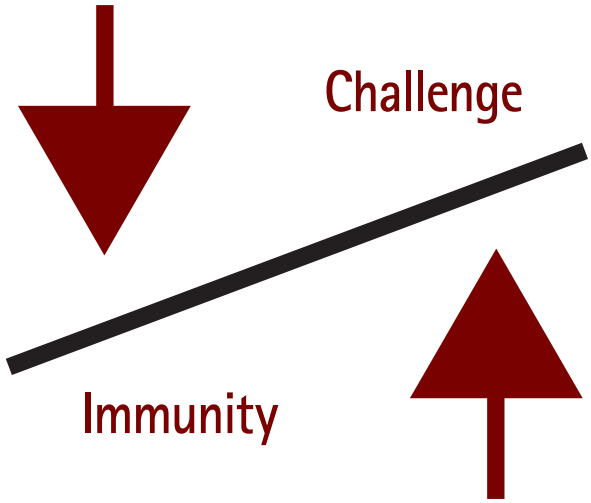
Not only is it important to ensure that every piglet receives colostrum, but timing of intake is critical. We know that the composition of colostrum changes rapidly post-farrowing and with large litters we may never know whether all piglets have had an equal opportunity at accessing this precious liquid. Within 6 hours, the antibody content of the colostrum is already reduced by one third. The absorptive capacity of the piglet gut is also decreasing and completely minimized within 24 hours of birth. For these reasons, it is important to take all steps possible to ensure adequate colostrum intake.

"Within 6 hours, the antibody content of the colostrum is already reduced by one third"

The minimum requirement to ensure protection is unknown; a general guide is 150-280g/kg bodyweight. A small piglet with poor vigour will be unlikely to consume adequate amounts to ensure health and long term performance. The intake is dependent on some sow factors as well, such as her ability to produce enough for the whole litter. Parity, nutrition and sow health are all factors to consider; it's not just down to the piglets as to whether they get what they need.



When there is an imbalance and the disease challenge is greater than immunity, the end result will be disease.

Some sow management principles to ensure high colostrum and milk yields:

1. Reduce stress prior to, during and after farrowing.
2. Feed rations that are appropriate for pregnancy and lactation.
3. Ensure sows have unrestricted access to fresh drinking water at all times.

Ensuring equal opportunity to access colostrum

To capture that 6 hour window for colostrum intake, we need to be around to supervise at farrowing time. This can be difficult if induction techniques are not employed. We know that most sows will typically farrow on the evening of their due date if allowed to farrow naturally. If we want to be present to monitor the process, we will likely be using an induction agent to allow us to manipulate the farrowing event when we want it to occur. Induction agents are usually administered 24 hours prior to the time that you want the sows to farrow. Calculation of your herd's average gestation length is essential and the use of such techniques should be decided upon with your herd veterinarian and results assessed.

Once farrowing has occurred, in order to to allow equal access to colostrum, you need to:

- Split suckle large litters. Mark piglets that have suckled and move them to a holding creep area, with a heat source.
- Weaker piglets may need assistance to get to the udder initially.
- We know that piglets that have received colostrum from their own mothers are healthier and perform better. Therefore it is better to split suckle litters and then foster. There is some newer research that suggests that cross

fostering can be done sooner, but I would only do so if you can really monitor these pigs closely and make sure that they do suckle as soon as possible.

- Ensure farrowing conditions are optimal for the piglet at birth - keep farrowing rooms warm and draft free.
- Cross-fostering can be done after we know a piglet has received colostrum to even out litter numbers, preferably within 36 hours to avoid having to compete with new litter mates again because teat order has already been established.

Summary

- Sufficient colostrum intake is crucial within the first 6 hours of life to maintain passive immunity.
- With important diseases in swine herds like Porcine Reproductive and Respiratory Syndrome (PRRS) and Porcine Circovirus, colostrum management has never been more important.
- Optimal sow health and care is just as important as piglet health.
- It is likely that induction agents will be necessary to allow supervision at farrowing.
- Environmental conditions need to be optimal for the piglet at birth to allow colostrum intake.

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Split suckling is a simple technique to ensure that all the piglets in large litters suckle adequate colostrum

Tis the season: Meningitis in grow-finish pigs

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

Figure 1: Common causes of Neurological Disease in Grow Finish pigs

- ☑ *Streptoccus suis*
- ☑ Glassers Disease
- ☑ Edema Disease
- ☑ Ear Infection
- ☑ Salt Poisoning
- ☑ Trauma

You can almost set your watch by it. The first real cold spell of the season arrives, usually with a nasty little wind showing it the way into our farms, and within a week or so the cases of neurological pigs begins to grow like a snowball following you down your favourite tobogganing run. Neurological disease in the nursery is not uncommon, but let's not forget about the grow-finish barn (Figure 1). The most common cause of grow-finish neurological disease in Canada is bacterial meningitis and the usual suspect is *Streptococcus suis* serotype 2 (Figure 2).

Bacterial meningitis may cause a range of neurological problems in the grow finish pig. Typically there is a sudden onset following a stressful event. The initial presentation is often an escalation in pigs found dead and as stockpersons become more aware of increasing mortality they begin to note an increase in other neurological signs including staggering, paddling and an abnormal head posture. It is not uncommon to also see an increase in lameness, septicemia or pneumonia associated with these neurological cases. Typically these clinical presentations are found in one age group within the grow finish population.

Where does *Streptococcus suis* Meningitis come from?

Streptococcus suis is a normal inhabitant of the pig's upper respiratory tract, genitals, and intestinal tract and is the most common bacterial agent isolated from neurologically affected pigs in the West. Pigs are typically infected at or shortly after birth but later infections are also common from affected faeces, oral secretions or dust. Most commonly the infected pigs do not develop clinical disease unless they are later exposed to a stressful event and are exposed to a virulent strain. Once the pigs are clinically affected they shed increasing numbers of the bacteria into the environment and to other susceptible pigs. This increased shedding and subsequent exposure can overwhelm their immune systems and lead to disease. As we increase stress, for example stocking density, we increase the likelihood of this occurring.

Winter is coming!

Just like you and I, the stressors associated with the change of season seem to get things stirred up. For the grow-finish pig this often results from a recent environmental stressor that resulted in a chilling event. We are typically very good at making sure our nursery heating and ventilation maintenance is up to standard before the cool weather of fall and winter

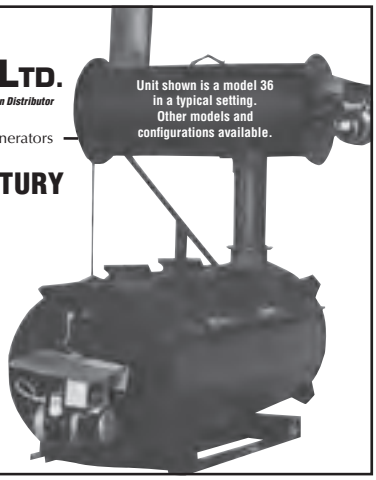
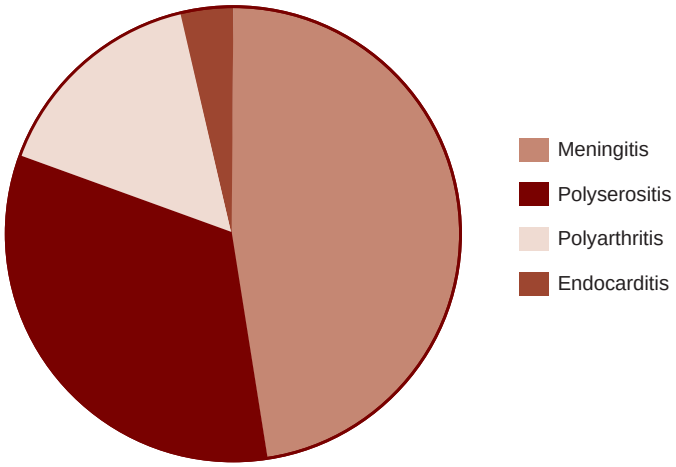


Figure 2: Presentation of *Streptococcus suis* (adapted from Madsen et al. 2002)



arrive but we often times forget about the grow-finish barns until much later. There are a few things to consider as you stock your barns.

- Transports should be adequately bedded and sealed up.
- Ensure the rooms are dry after winter washing to avoid evaporative cooling of the pig.
- Turn the furnace on well before arrival; the air temperature may read normal but the concrete may still be very cool.
- Do not use the pigs to warm the room. Warm the room first, then back off the mechanical heat as the room adapts to the pigs.
- Have your winter covers ready to be installed well in advance of winter's arrival.
- Use smoke candles in the grow finish rooms to identify drafts, make sure to get down to pig level (Figure 3 shows finishing pigs avoiding a cool draft).

Of course there are many other stressors that can push bacterial meningitis into the grow finish barn. Circulation of PRRS virus characteristically occurs within a few areas of the barn and we often find this viral circulation associated with increases of other secondary diseases such as bacterial meningitis. Many other diseases should also be considered as having the potential to lead to expression of a *Streptococcus suis* clinical break. Sudden changes in diet, water quality or handling should also be reviewed as potential challenges as well. A very common contributing factor that we often see is crowding. As the pigs arrive into their new grow-finish space they have a lot of free space, but as they grow it is very common to see increasing stocking density and, with this, increasing disease challenge.

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Figure 3

The importance of a diagnosis

A proper diagnosis along with early intervention will increase the likelihood of a successful outcome. As there are potentially many different causes of neurological disease in pigs it is valuable to understand and attain knowledge regarding what the disease actually is and isn't. Depending on the diagnosis there are a multitude of treatment and prevention options. In particular, understanding the difference between a Glasser's Disease versus *Streptococcus equisimilis* versus *Streptococcus suis* is significant. Although the treatment course may be similar, how you begin formulating prevention plans could vary greatly. Thus, understanding the aetiology will greatly impact how you may approach long term and short term disease management, control or eradication.

> **"A brisk walk through the barn will often allow you to find only the severely affected pigs"**

Early identification is key

Bacterial Meningitis is a medical emergency in an affected pig and a significant concern for the non-clinical population of that same contemporary group. Early identification is

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critical; once pigs become severely ataxic or are found down and paddling, the risk of a successful outcome declines. The importance of routine, thorough and systematic pen checking is critical. A brisk walk through the barn will often allow you to find only the severely affected pigs, those that are down or distressed. Your goal should always be early identification and intervention. This will reduce losses and lost opportunity. In the early stages you will have some sudden deaths but many of the other pigs will present with fever, mild depression, a gaunt or hollowed-out look, and reluctance to rise. If these affected pigs are properly identified they will respond positively to appropriate medical therapy.

Treatment

Treatment should focus on managing the environment, understanding the disease-causing agent, as well as addressing both individual and population animal treatment. Your veterinarian can help you determine the best course of treatment given the appropriate diagnosis. Individual treatment should provide therapy for many consecutive days and must consider the use of anti-inflammatories, oral fluids, and proper sick pen management. Population treatment through medicated fluids is a preventative measure and should not be used in place of individual treatment but rather in addition, if your veterinarian determines it to be a prudent course of action. At the same time you must address the contributing factors that have led to the clinical change. Remember, sick pigs do not drink as much water as healthy pigs. Clinically affected pigs are very unlikely to attain sufficient levels of appropriate and prudent antimicrobials from drinking water alone.

Prevention

Prevention of bacterial meningitis requires an understanding of the contributing factors including the host, the pathogen, and the environment. The pig and pig flow are important to understanding how this disease can circulate within a population. Mixing ages, overcrowding, and low entry weight are all factors to consider in a prevention plan in a grow finish flow. Understanding the pathogen and knowing what pathogens are specifically of concern within the population can give detailed insight into how you will approach and prevent a disease. Prudent use of antibiotics is of increasing social concern and knowing the pathogen and the antibiotics they are sensitive to can maximize prudent usage and minimize social concerns. The final factor to consider is the environment the pig is housed in. Proper maintenance of the pigs' environment is often the most critical of factors in the prevention of this disease.

Conclusions

With the arrival of winter, a seasonal change, or even strong cool winds, you can anticipate increased stressors on your grow-finish populations. Bacterial meningitis is not an uncommon finding in the grow-finish populations of our barns and when not properly addressed can cause significant losses in production and productivity. Understanding the contributing factors, the causal agents and the pigs' health and welfare are keys to the successful transition of your barn from summer to fall and winter. Early diagnostics and interventions are critical to a successful outcome that both minimize your losses and maximize your potential productivity.

Vaccination can help to improve your herd health

By VIDO Swine Technical Group

Vaccination has proven to be the most cost effective means of health intervention, both in human and animal health. Vaccines are used to prevent disease (prophylactic vaccination), cure disease (therapeutic vaccination) and prevent contamination of water and food products for human consumption (food safety vaccines). Research over the last fifty years has dramatically improved our understanding of the immune system and its response to vaccines. As a result of improved animal health millions of dollars are saved every year. So what are vaccines and how do they work?

How do vaccines work?

Vaccines depend on a healthy functional immune system. They are designed to mimic infections by pathogens, mainly bacteria and viruses, and to elicit a primary immune response the first time the animal is exposed. Part of the primary response is the development of a memory ("recall") response to that pathogen. Inducing a memory response prepares the animal for an encounter with the natural pathogen. The secondary or anamnestic response is typically faster, stronger, and longer lasting. In most cases it will minimize the risk of transmission into other units or barns. The purpose of prophylactic vaccination is to prepare the immune system for a potential encounter with the pathogen and, by doing so, reduce the severity of disease after infection. The induction of swine herd immunity, where the majority of the animals are vaccinated, is critical for preventing the spread of infections and avoiding severe diseases outbreaks. Prophylactic vaccines can be used in the face of an outbreak as a therapeutic to hopefully reduce clinical symptoms and transmission to other animals. Food safety vaccines may be used to control food or water contamination with pathogens that can cause severe disease in humans. Prominent examples are infections with *Salmonella* species, *Escherichia coli, Listeria monocytogenes* and *Campylobacter jejuni*. These infections normally do not cause any harm to the animal, but contamination of the carcass or meat products, or even ground water close to wells, can cause severe disease in humans.

Types of vaccines

There are various types of vaccines currently available to swine producers:

Inactivated vaccines (killed vaccines) are safe to use in that the pathogens have been inactivated by heat or chemicals and thus cannot be shed or revert back into the more virulent form. The disadvantage of inactivated vaccines is that they are often less potent (immunogenic). To improve their ability to induce an immune response (immunogenicity) they often require more immunizations (booster immunizations), a larger dose, and/or the addition of adjuvants.

Live-attenuated vaccines (modified live vaccines) contain live pathogens which have been attenuated (weakened) either genetically or through culturing in the lab. As a result of this attenuation they are safe to use and cause little or no disease. They are very effective and induce both humoral and cell-mediated immunity, thus stimulating two separate levels of protection.

Subunit vaccines contain only parts (subunits) of pathogens and are safe to use. They have the advantage that they are easy to produce, highly purified and compatible with other subunits allowing for multivalent vaccines. However, they are often less immunogenic and require more sophisticated formulations. Most vaccines for humans are based on this technology.

Vector-based vaccines incorporate either a bacterial or viral vector (i.e. attenuated viruses or bacteria) as a vehicle to deliver the subunits, as described above. They are very

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effective in inducing an immune response and have the advantage of being both safe and cost-effective.

DNA vaccines are starting to enter the veterinary market. For example, DNA vaccines are available against West Nile Virus in horses and melanoma in dogs. These vaccines contain recombinant DNA, without any pathogens or subunit proteins, and are very safe to use. Experimental studies have demonstrated that they are effective. However, their use in livestock is currently limited but will likely play a large part in the vaccine wave of the future.

Economic benefit of vaccination

Vaccines are the single most cost effective disease prevention method in the livestock industry. They help to improve herd health and, in combination with effective biosecurity measures, good management practices and optimal nutrition, can help you to save significant dollars per pig in production costs. However, it is important to realize that the main benefit of vaccines is in the prevention of diseases and not in the actual therapy of already developing infections. The use of vaccines should be planned with your herd veterinarian and be a long-term strategy rather than a short-term approach such as medicating feed or mass medication via antibiotic injections. As antibiotics are ineffective in preventing or treating viral infections, the use of vaccines is even more important for viral diseases such as PCV2, PRRSV, parvovirus and others. Your veterinarian can help you select the best combination of vaccines for your herd.

International trade and vaccination

Canada is a world-wide exporter of pig breeding stock shipping pigs to Asia, South America, Central America, Russia, USA, and Mexico. Canadian hogs are strictly regulated and subject to trade policies. For example, only minutes after the pandemic influenza virus was diagnosed in Alberta, several Asian countries had closed their borders to Canadian pork. The reason for such decisions is to prevent the introduction of new pathogens into the country via infected animals. Marker vaccines, or so-called DIVA vaccines (Differentiate Infected from Vaccinated Animals), allow the differentiation between vaccinated and infected animals through standardized testing. This facilitates the export of seropositive animals into countries with strict import regulations. DIVA vaccines represent the next generation of vaccines and will soon be available to Canadian producers.

Research to improve vaccines

Current research efforts are directed toward the development of new vaccines that are more effective following a single immunization, induce early onset of immunity, stimulate long-lasting immunity, are cost-effective and allow one to distinguish between vaccinated and infected animals. Many current vaccines do not require the use of needles and are administered

via an intradermal injector (needle-free), or the mucosal route. These vaccine delivery methods have the advantage of avoiding the use of needles which can present issues for carcass quality. Mucosal surfaces lining the respiratory tract, gastro intestinal tract and urogenital tract are the portal of entry of more than 95% of all pig infectious diseases and are the ideal site to initiate that first line of defence. Mucosal delivery of vaccines allows the induction of both local mucosal immunity as well as general systemic immunity. At present there are oral erysipelas, ileitis, and salmonella vaccine available on the market.

VIDO recently opened the International Vaccine Centre, one the largest BSL3 containment facilities in the world

Canada has heavily invested in the research infrastructure to deal with potential outbreaks of emerging diseases that could have catastrophic consequences for the industry. For example, VIDO recently opened the International Vaccine Centre, one the largest BSL3 containment facilities in the world. This facility will enable research on emerging diseases that could negatively impact the swine industry, such as recombinant influenza viruses.

As pork producers you realise that your herds are extremely vulnerable to diseases which can spread rapidly among animals. The best defence is to ensure that your pigs can protect themselves by having a strong and well prepared immune system. This can be accomplished by having a vaccination program that you and your veterinarian have developed in conjunction with good bio-security and proper nutrition. We at VIDO/International Vaccine Centre will continue to develop and improve the vaccines that can help you to improve your herd's health now and in the future. ■

International Round-up

Australian producers endorse increase in levy

Australian pig farmers have endorsed a proposal to increase the pig slaughter levy by 90 cents.

The levy funds are collected from producers to support the industry body Australian Pork Limited (APL) and the proposed increase will take the total levy allocated to APL from $2.35 per pig slaughtered to $3.25. The industry has not had an increase since 1994.

Currently the levy received by APL, via the Federal Government, is split into $1.00 for research and development and $1.35 for marketing. The proposed increase is only relevant for the marketing portion of the levy and will increase that part of the levy to $2.25.

After broad industry consultation, 235 producers, accounting for 83 per cent of eligible levies, voted on the levy proposal. Of those votes placed, 73 per cent were in favour of an increase and 27 per cent voted against.

The changes, which will be phased in over a four year period, must be approved by the Federal Government. "APL must indicate, through a business case, how the increase would be spent and demonstrate the proposed benefit of this expenditure for levy payers," says Andrew Spencer, the CEO of APL.

Seaweed extract improves gut health and boosts growth

Dietary supplementation with seaweed extract (SWE) after weaning improves gut health and enhances the performance of starter pigs, according to researchers in the Irish Republic. It also increases growth rate during the grower-finisher phases.

The study investigated the effects of supplementation with SWE in sows and weaned pigs on post-weaning growth performance, intestinal morphology, intestinal microflora, volatile fatty acid concentrations and immune status of pigs at days 11 and 117 post-weaning.

Gestating sow diets were supplemented with 10 grams/day of SWE from day 107 of gestation until weaning at 26 days. At weaning, pigs were divided into two groups based on sow diet during lactation and supplemented with SWE at 2.8grams/kg diet. A similar number of sows and pigs were fed control diets with no SWE.

Pigs weaned from SWE-supplemented sows had a higher average daily gain (ADG) between days 0 and 21 post-weaning than pigs weaned from non-SWE-supplemented sows. Also, pigs offered post-weaning diets containing SWE had decreased colonic E. coli populations on day 11 and decreased numbers of enteric bacteria on day 117.

The researchers concluded that SWE supplementation post-weaning provides a dietary means to improve gut health and to enhance growth performance in starter pigs. Dietary SWE supplementation increased ADG during the grower-finisher phases. However, there was no growth response to SWE inclusion in grow-finish diets when pigs were weaned from SWE-supplemented sows.

Reference: Leonard S.G., T. Sweeney, B. Bahar, B.P. Lynch and J.V. O'Doherty. 2011. *Effects of dietary seaweed extract supplementation in sows and post-weaned pigs on performance, intestinal morphology, intestinal microflora and immune status.* British Journal of Nutrition, 106(5): 688-99.

Higher feed intake in early gestation increases litter size

Increasing feed intake by 30 per cent during the first month of gestation improved sow body weight recovery after the lactation period and resulted in

increased litter size but did not significantly affect farrowing rate in the subsequent parity, according to researchers based at Wageningen University in the Netherlands. However, feeding 30 per cent more digestible amino acids during the same period did not improve sow recovery or reproductive performance in the subsequent parity.

The researchers evaluated the effect of feeding level and feed protein content in first- and second-parity sows. From days 3 to 32 after the first insemination, sows were fed either 2.5kg per day of a standard gestation diet, 3.25kg per day (+30 percent) of a standard gestation diet or 2.5kg per day of a gestation diet with 30 percent greater ileal digestible amino acids.

Sows fed the higher level of feed gained 10kg more bodyweight during the experimental period compared with those in the control and the high amino acid groups. Backfat gain and loin muscle depth gain were not affected by treatment.

Litter size, however, was larger for sows fed 30% more feed

Farrowing rate was lower, although not significantly, for sows in the 30% plus feed group compared with those in the control and plus protein groups (76.6 percent versus 89.8 and 89.8 per cent, respectively. Litter size, however, was larger for sows fed 30% more feed (15.2 total born) compared with those in the control and higher amino acid groups (13.2 and 13.6 total born, respectively). Piglet birth weight was unaffected by treatment.

For both first- and second-parity sows, the 30% plus feed treatment showed similar effects on bodyweight gain, farrowing rate and litter size.

This work shows similar results to a previous Danish trial in which high feed intake in early pregnancy increased litter size but reduced farrowing rate slightly. In both cases, they were working with high litter size sows, which appear to need a higher feed level in early gestation than normal recommendations.

Reference: Hoving L.L., N.M. Soede, C.M.C. van der Peet-Schwering, E.A.M. Graat, H. Feitsma and B. Kemp. 2011. An increased feed intake during early pregnancy improves sow body weight recovery and increases litter size in young sows. J. Anim. Sci., 89 (11): 3542-3550. doi: 10.2527/jas.2011-3954

Feeding chicory can reduce boar taint

Danish researchers are investigating the effects of chicory on boar taint in the hope that their findings can result in a targeted and efficient way of preventing boar taint via the feed.

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If pigs are fed chicory for 14 days prior to slaughter, this avoids unpleasant boar taint in the pork, according to work at Aarhus University. However, feeding chicory is not very widespread on Danish farms because it is too expensive.

The scientists are trying to understand how the beneficial effect of chicory originates, which would pave the way for new possibilities for feeding chicory or bioactive compounds from chicory or other plants. The scientists must first find out how feeding pigs chicory is related to reduced boar taint.

"We can see that there is a reduced skatole content in the pig's fat and blood when it has been fed chicory, so we investigated if this is because metabolism of the compound in the liver is improved for some reason. Then we conducted analyses to find the liver enzymes that metabolize skatole and androstenone and found that the enzyme content was higher and that enzyme activity was greater after feeding chicory," says Martin Krøyer Rasmussen from Aarhus University.

Skatole is produced by bacteria in the pig gut from which it is absorbed into the blood. The compound finds its way to the liver via the blood where it is broken down by enzymes. Androstenone, a pheromone produced in the pig's testicles, is also a problem. It is also metabolized in the liver, but if skatole and androstenone are not metabolized as fast as they are produced, they accumulate in the fat and give rise to boar taint in pork.

"In our studies we also found a clear effect of chicory on androstenone. We measured less androstenone in the fat, a higher level of the enzyme that metabolizes androstenone in the liver, and higher levels of the particular mRNA and protein that need to be present to build the enzyme," explains Rasmussen.

The next step for the scientists will be to find out if there is something bioactive in chicory that stimulates the liver directly or if the body is affected in some other way so that the liver reacts indirectly. There are also indications that chicory can reduce aggression in male pigs, Rasmussen adds.

Airtight storage of grain increases nutrient digestibility

Scientists from Denmark's Aarhus University have shown that phosphorus and protein in grain stored under airtight conditions have a higher digestibility in finisher pigs compared to grain stored under traditional conditions.

Traditionally, grain is stored with a water content of around 14 percent. With such low water content the grain can be stored under normal conditions without turning mouldy or rotten. However, in very wet harvesting conditions, it may be difficult to store grain with sufficiently low water content.

In the trials, wheat and barley, either with a normal low water content or with a water content about 3% higher, were stored for 6 months and then used in diets for finishing pigs over a period of 12 days.

Some of the phosphorus in grain is bound in a complex called phytate, which greatly reduces its availability to the pig. The enzyme phytase metabolizes the phosphate-rich complex phytate during storage. The content of phytate-bound phosphorus in the airtight grain decreased approximately seven percent in the time that the grain was stored. The result was a rise in phosphorus digestibility from 41 percent to 46 percent as a result of the low-oxygen storage.

"Protein digestibility increased from 78.2 to 80.7 percent in the airtight grain"

In addition, protein digestibility increased from 78.2 to 80.7 percent in the airtight grain. This is important with regard to how much surplus nitrogen risks being emitted to the environment, say the researchers. When the pigs utilize the phosphorus and protein from the grain better it has a beneficial effect on the environment. Instead of the surplus, non-digested nutrients ending up in the manure and, subsequently in the environment, they are metabolized and used by the pig.

Reducing antibiotics alone is not sufficient to eliminate MRSA

Reducing the usage of antibiotics as a means of eliminating Methicillin Resistant Staphylococcus Aureus (MRSA) is insufficient on its own, according to work carried out at Wageningen University in the Netherlands. The bacteria managed to spread rapidly in the Dutch pig industry and it is considered very likely that the widespread usage of antibiotics played a role in this spread.

"In 2007, MRSA was found in 30% of pig farms and by the end of 2008 this level had increased to 75% of all farms," says Dr Els Broens, who obtained her PhD with this study. "Larger pig farms with 500 sows and over were more likely to be positive for MRSA."

She found that the bacteria moved from farm to farm on animal transport and also that many pigs get infected when being transported to the plant, because the bacteria may be present in other pigs or on the animal transport vehicle. Pig producers and processing plant staff can also become infected when dealing with live animals. Dr. Broens stressed that there is no risk for employees working with dead pigs.

To avoid the transfer of MRSA from pigs to humans, the bacteria should be tackled at its source – at the farm - she said. Decreasing the use of antibiotics will not eliminate MRSA presence, because resistant bacteria populations can still spread and maintain themselves in pigs that are not fed antibiotics. Apart from a reduction of antibiotic usage, Broens suggested improved hygiene to prevent the spread on farms and between them. This would require a joint approach uniting producers, politicians, retailers and veterinarians, she concludes.

Cooler nights for nursery pigs reduces heating bills

Researchers at the University of Missouri have shown that lowering nursery temperatures by 15°F at night reduces heating fuel costs by nearly 30 per cent and electricity costs by 19 per cent during a five-week nursery period. Pigs reared in the lower-temperature regime grew at the same rate as pigs housed under normal nursery management conditions and did not exhibit any health problems.

Marcia Shannon, an MU Extension state swine specialist, joined researchers from four other universities - the University of Minnesota, Ohio State University and South Dakota State University - to test lower nocturnal temperatures in several temperate zones. While heating costs were higher in northern states, all locations showed the same percentage of savings.

"It costs approximately $1.50 to $2.00 to heat each pig in the nursery stage, and we reduced that cost by about 60 cents-per-pig," Dr Shannon says. "In the grand scheme of things, those savings might not seem like a lot, but that's $600 for every 1,000 pigs during the nursery stage."

The study built on research from 2007 that lowered temperatures 10°F from 7pm to 7am seven days after weaning. That research showed a 14 percent drop in heating costs and 11 percent reduction in electricity use. The results begged the question, how much more could producers save in heating costs? "We decided to see how far we could push that," Dr Shannon says. "We dropped temperatures 15°F, starting five days post-weaning."

MU studied 90 pigs at temperatures reduced to 70°F at night (7 pm to 7 am) and compared it to an equal size control group nursery with temperatures set at 86°F at night. Each week temperatures were also reduced 3.5°F for both normal and reduced temperature groups, a standard practice in normal nursery situations.

> **"We're looking at a different type of pig today with a higher rate of heat production"**

Lower temperatures might not have always worked for producers, but newer genetics have changed temperature needs. Now producers raise leaner, faster-growing pigs that have more energy and produce more heat, say the researchers.

"We're looking at a different type of pig today with a higher rate of heat production than we had back in the late 1980s or early 1990s," Dr Shannon says. "After the first 14 days in the nursery, we couldn't get a 15-degree drop at night because the pigs were large enough that they created enough body heat in the buildings." ■

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Time for another look at feed conversion

By John Gadd

Pig nutritionists seem pretty frustrated as they are not being given enough information by commercial producers to enable them to make full use of the new knowledge they have on feed ingredients, ration design and housing, as well as marketing contracts. "It is so frustrating," one of them remarked to me recently "that I have all this valuable information in the computer and yet have too few occasions when I can use it to the full."

> **"In Europe farm-specific diets are steadily taking over from 'off-the-shelf' feeds"**

Over here fish meal has become too expensive – so has soya, and now wheat! Some 'old favourites' are 'out' and new ingredients are suggested. In parts of Europe we are still restrained by law from using meat meal, chicken offal and other animal-derived by-products. This has brought into play a whole variety of other ingredients with techniques and additives to make some of them usable, providing the nutritionist has sufficient on-farm information from the producer.

Farm-specific ration design

While all this has been going on, in Europe farm-specific diets are steadily taking over from 'off-the-shelf' feeds bought from the feed compounders' price lists as of old. We now know that every pig unit is cost-effectively different – genetically, environmentally, there are market contract differences, variations in immune competence, disease level, and stockmanship skills – all these are dissimilar between individual farms. But nowadays the nutritionist can put together rations to better suit these inter-farm variations. He can design-in environmental differences, take account of different contract stipulations, talk to the customer's preferred genetic supplier so as to more closely match their claimed potential performance, avoid nutritional barriers like ANFs, crude fibre and too much protein, as well as securing alternative feed ingredients to dodge raw material price volatility and seasonal differences in supply.

And it pays

That farm-specific diet design is a valuable trend is confirmed by some 'before-and-after' results from using the same feed company and the same nutritionist. These show that on average FCE (30-105kg) improved by 0.18:1 and more importantly MTF (saleable Meat per Tonne of Feed fed) increased by 12 kg per tonne of feed used. Doesn't sound much? Over here that is equivalent to a 9% reduction in the feed price per tonne – and who wouldn't jump at that! All for doing nothing but regularly providing some information which the farmer has anyway and with an organized office can obtain with little trouble. The benefit comes from a differently formulated feed to match the on-farm conditions which the information reveals.

Why do I say when mentioning FCE "more importantly – MTF"? Because MTF is a more accurate measure of growout pig performance than FCE. Growout producers globally need to discard FCE as a measure of effective performance in favour of MTF.

Why?

1. Farmers find it difficult to measure FCE accurately enough to see how they are progressing. All my life as a farm adviser I have been asked to investigate the reasons for rises in FCE. The first thing any careful adviser does is to check that the information he has been given is correct. The average FCE inaccuracy has been 0.22:1 (range +0.13 better to – 0.38 worse). Researchers are fine - they have the time and resources to measure FCE accurately, but the hurly-burly of busy farm routine throws all but a very few producers well out, as I and others have found.
2. MTF does not involve any weighing of pigs or feed on farm

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and automatically adjusts for mortality and killing out percentage. In the latter case FCE does not, an important omission these days when we are paid on saleable meat.

3. MTF is simple to calculate and is done in the office.
4. MTF and FCE closely follow each other.

I first started using MTF with my own clients in 1984 and published my 'invention' - if that is the right word – of the term in Pig Farming magazine (Vol. 47 no 1. Jan.1999). I was immediately accused of heresy "for even daring to criticize such an important measurement term" and even recommending that FCE should be ditched in favour of MTF. I replied that it was only commonsense based on my clients' experience. Now many people are starting to use it, along the lines shown below.

Calculating MTF

This example involves pigs growing from 30 to105kg, typical in Europe today.

1. Establish how many pigs are produced per tonne of feed: eg. feed eaten = 2.38:1 (FCE) x 75kg (30-105kg) is 178.5 kg/pig
   Therefore 1000 kg (1 tonne) ÷ 178.5 = 5.6 pigs/tonne
2. Calculate saleable meat produced per pig across the growth period, eg. 75 kg liveweight gain with a 78% dressing percentage = 58.5 kg deadweight per pig
3. MTF (30-105kg) is therefore 5.6 pigs x 58.5 deadweight = **327.6 kg** What could be simpler!

Rolling average

I have found a three-month average to be sufficient to smooth out variations in numbers shipped per batch and for feed invoices arriving a little irregularly. It happens. The degree of variation of MTF to FCE was based on this and was still only 2 to 3%.

Breeding company JSR, now using MTF internationally, advise 6 months rolling average. Their MTF calculator can be found on www.jsr.co.uk/jsr-calculations.php although with the greatest respect to this great company, I prefer my own method shown above.

Always remember the weight range involved

As with the past FCE calculation it is important to mention the weight range used because a smaller, lower range will give a very different MTF benchmark to a longer, heavier range. Here is an example nearer to your industry and is very applicable to your higher slaughter weights (and thus higher FCEs).

Suggested Canadian example

1. Feed eaten from 30-120kg, a 90 kg range, (at say, 3.0 FCE) = 270 kg/pig
2. Pigs per tonne of feed is therefore 3.70 (1000kg ÷ 270)
3. Dressing percentage - 80% of 90 kg liveweight gain = 72 kg/pig
4. MTF(30 -120kg) = 72kg x 3.7pigs = **266.4kg**

Comparing the two examples the MTFs are quite different showing that when benchmarking targets, taking into account the weight ranges are important. I have used assumed FCE terms to give you a baseline, but with MTF they are superfluous as it is the meat produced per tonne of feed during the period (range) of growth which is the measure to bear in mind when making comparisons.

One American producer wrote to me recently saying that using my formula, which I sent to him, showed that "We US producers have much better MTFs than you in Europe, despite our higher FCEs!" But he was not 'comparing apples with apples' and had forgotten about their much higher slaughter weights. Don't you do so when making comparisons with your neighbours or national figures. MTFs are farm-specific.

Appetite – the amount of feed your pigs eat - brings me on to my next article where I list the information you must give to your nutritionist so he can design a farm-specific diet for you.

Group sow housing and feed costs challenge Irish producers

By Stuart Lumb

Irish pig farmers have had to contend for years with high feed costs and because of a mainly rural population, relatively low pork consumption at home, reports British correspondent Stuart Lumb. In this small industry, with just 150,000 sows, exports and home consumption are roughly the same. Producers are currently in the process of making the conversion from sow stall systems to group housing in order to comply with EU law that requires the change to be made by the end of 2012. But profits are thin to non-existent due to high feed costs, making new investment difficult, notes Lumb. He reports on some of the presentations given at the Irish Pig Farmers' Conference held in October.

High welfare group sow housing

With the EU partial ban on dry sow stalls rapidly approaching, Dr Laura Boyle looked at the different options available, suggesting which systems are best suited to ensuring that sows have a long and productive life, despite the fact that today's sows may be genetically superior to those of old, but which tend to be more fragile.

Well designed group systems can provide a better environment than stalls; conversely poorly designed systems can do the opposite. In good loose housing systems, sows can exercise, control their thermal environment and socialize, which they cannot do in even the best designed stalls. Unfortunately, there is also greater potential for very poor sow welfare in badly designed group systems particularly if sows have to fight for access to feed or have difficulty in avoiding aggressive encounters. Such group systems meet even fewer of the sows' needs than stalls and unplanned removal and mortality rates are likely to be even higher than in stalls. For this reason, wrong decisions made now with respect to group housing could have serious implications for the productivity and longevity of the Irish national herd in 5 years time.

System design

Systems should be based on how sows live in the wild, believes Dr. Boyle.

Small group size: Feral breeding pigs live in groups of less than 10 but this group number does not transfer well to the farm situation as the pen area doesn't give enough space for sows to run away to counter aggression from other sows.

Minimal remixing: Sows in the wild don't usually mix once in their established groups, which is why mixing in the farm environment is so stressful. Dynamic groups involve sows mixing and re-mixing on a regular basis but generally the large amounts of shared space means timid sows can escape from aggressive encounters.

> **"Sows prefer to lie with their backs against something solid and in large group systems wall space is lacking"**

Adequate space: When mixed, sows usually settle down after 24 hours but aggression still occurs, with the youngest sows in the group suffering most, along with lame, injured or thin sows. It is clearly not possible to give sows as much space as feral sows but providing divisions or hide areas help sows to escape from aggression. This is why free access stalls work so well, as sows are protected from aggression whilst feeding and also a sow can hide from direct aggression by escaping into a stall. Sows prefer to lie with their backs against something

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solid and in large group systems wall space is lacking. Solid floored lying bays encourage this behaviour and sows establish stable sub groups.

Synchronized feeding: Sows in the wild eat together and therefore group systems should mimic this, but at the same time be protected from aggression. Free access stalls meet this criterion whereas trough feeding or dump/drop feed systems, whilst allowing simultaneous feeding, also incur some aggressive behaviour. This problem can be partially alleviated by feeding higher fibre diets and/or reducing the frequency of feeding. Sows have to queue with ESF systems, but pigs are intelligent animals and quickly learn the system.

Functionally distinct locations: In the wild pigs have distinct feeding, dunging and sleeping areas and these should be replicated in loose housing layouts. If areas are not distinct sows tend to dung at random and the whole area becomes dirty, wet and slippery. This not only runs the risk of claw damage and lameness but results in dirty and unhygienic sows. Take the case of fully slatted finisher style pens with long troughs where all but the perimeter of the pen is usually wet and slippery. As the sows charge along the trough as feed gets delivered, a lot of slipping and falling occurs. This, reckons Boyle, is a major cause of the high levels of lameness associated with this type of group housing system.

Where an effort is made to differentiate zones there are three reasons why sows use them inappropriately:

a. Thermal comfort issues
b. Overstocking
c. Lack of distinguishing features between the different zones

Regarding the last point, just providing a slatted area for dunging and a solid area for lying is not enough, as these two areas are not truly distinct functionally. The lying area should be made warmer and more comfortable by the use of mats and/or straw.

> **"Culling for lameness is higher in group systems where little or no bedding is used and where fully slatted systems are the norm"**

Flooring: Flooring has a big effect on sow foot condition, lameness and longevity. Bare (solid/slatted) concrete flooring is abrasive, injurious, cold and is very uncomfortable. Culling for lameness is higher in group systems where little or no bedding is used and where fully slatted systems are the norm. However, not all slatted floors are equal and slats with a rib width of 125mm offer better support than an 80mm slat, resulting in less lameness. An 80mm slat is specified as the minimum legal width with a minimum gap of 20mm. Therefore the ideal combination is some covered solid area for lying combined with slats > 80mm rib width.

Sows prefer to eat all together, a requirement fulfilled by free access stalls, says Ireland's Dr. Laura Boyle

Conclusions

Group housing systems should ensure that sow health, performance and longevity are maximized and systems must be 100% legal. "Emerging issues with regard to sow welfare should also be taken into consideration," says Dr. Boyle. For example there is growing evidence that space allowances greater than the minimum standards set down by EU legislation contribute to welfare and performance improvements in group housed sows. This could mean that space allowances will be revised upwards in the future."

Strategies to reduce feed prices

Feed prices are significantly higher in Ireland than other EU countries and any scope for savings has to be looked at, especially in times of high feed ingredient prices, say advisors Peadar Lawlor and Michael Martin. Feed cost/kg is much higher than in many other EU countries and this is due to a combination of feed efficiency, the type of diets fed and their cost/tonne.

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Feed price/tonne

The composite feed price for Ireland was € 304/tonne in September 2011, which was € 23 to € 40/ tonne higher than the Netherlands, Denmark, France and Germany.

The contributing factors are:

- Higher ingredient prices - these tend to be higher with the extra transport costs as compared to many countries on the continent.
- Expensive diets - more expensive starter diets are fed in Ireland and GB compared to the rest of Europe and this is pushing up the feed costs/kg deadweight, the authors commented.
- Credit terms - In Ireland most feed is paid for about 6 weeks after delivery, against 7 days on the continent. The cost of credit amounts to about € 3/tonne.
- Diet specifications - As slaughter weights are increased there is a much greater financial incentive to modify the nutrient specifications of the diets (and reduce price/tonne) to match the nutrient requirements of the pig without compromising pig performance and whilst still minimizing feed cost/ kg deadweight. Formulating diets on a NE basis rather than DE, as happens in Ireland, could produce a savings of € 1.86/tonne.
- Feed delivery costs - Ordering full loads of feed could reduce costs by € 1.50/tonne.

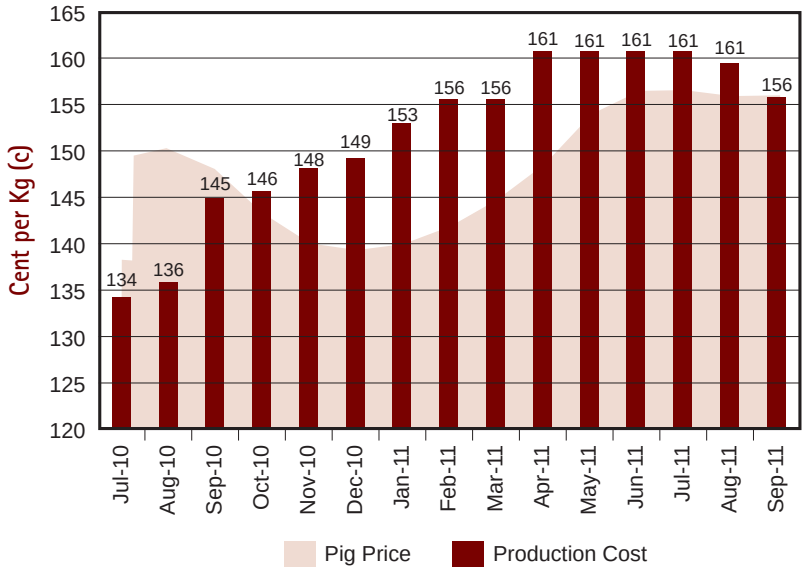
Conclusion

All in all, tightening up all round can result in a saving of up to € 20/tonne on feed costs.

The outlook for feed ingredients

The feed market has been extremely volatile and tough for producers over the last 18months, said Michael McKeon. July 2010 saw the largest monthly rise in international wheat prices since 1973, along with substantial increases in the price of barley and soybeans resulting in a composite feed price increase of 33% from July 2010 to July 2011. Pigmeat prices have not kept pace so most producers lost money in the year to September 2011 (Figure 1).

Figure 1: Irish pig prices and production costs, July 2010 to September 2011



The current wheat harvest appears very favourable, especially in the Black Sea region. This should allow a drop in wheat prices, dictated by the corn substitution demand, global economic outlook and the Southern Hemisphere harvest prospects. The supply of barley will be slightly tighter than in previous years resulting in a decreased price differential compared with wheat.

The corn supply is expected to be tight for the next 12 months even though a bumper harvest is forecast.

The soybean price outlook is to remain stable in the short term with a longer term view dependent on economic outlook, volume of imports into China and the scale of new planting. Another good South American harvest in spring 2012 would return a reasonable supply buffer to global stocks.

Review of 2011: Natural disasters and thin margins

By John Riley, IAS Management Services

2011 is a year which will be remembered as one which tested the resilience of primary producers and pig producers in particular as their business activities were affected by natural disasters, a booming mining industry and a strong Australian dollar.

The year started with widespread flooding in the eastern states and bush fires in Western Australia. The year ended with flooding in late November in New South Wales and more bush fires in WA.

The performance of the national herd was adversely affected by the floods in early 2011. Many pork producers experienced poor performance in both the breeding herd and the finisher barns due to inferior quality grains. Farrowing rate was adversely affected due to sows not coming into oestrus or aborting early in gestation. In the grower herd, feed rejection depressed growth rates and in the breeding herd feed rejection also resulted in sows losing condition which in turn resulted in poor reproductive performance. The problem was due to fusarium blight in the wheat and barley crops. The climatic conditions on the east coast in the last growing season were ideal for fusarium pathogens. To conserve soil moisture many grain growers in Australia practice zero till where the seed is planted into the uncultivated soil. The high rainfall and widespread once-in-a-hundred-years flooding resulted in the debris from the previous crop providing excellent conditions for the carryover of the fusarium pathogens. The fusarium pathogen survived as conidia and ascospores which were spread by the significant rainfall or splash from the old crop debris to the emerging crop.

The resulting crops had a high percentage of complete or partial white heads which, when fed to pigs, creates serious problems. Many producers include a toxin binder in their diets but the problem was so severe this year that inclusion levels were inadequate or the wrong binder was in use.

> **"Operating a 1400 sow unit producing 30 kg pigs with two skilled staff and eight backpackers is a challenge"**

Although there has been a shortage of slaughter pigs the expected seasonal increase in the market returns for bacon pigs has not materialized in 2011. The average price received for bacon pigs has been within the range of $2.65 to $2.75 per kilogram throughout the year. With production costs in the order of $2.50-$2.60 per kilogram the profit margins on even the more efficient units are less than exciting. The result is an industry which is concerned about market trends in 2012 and a lack of confidence to make the investment in modifications to housing systems needed to move from sow stalls to group housing of sows in pregnancy as required by the welfare codes.

A booming mining industry in Queensland and WA has caused significant labour problems for producers in those states. Pork producers cannot pay the same wages as the mining industry, which are often in excess of five times the farm workers' agreed rates, and are relying on back packers to run their businesses. The stress caused by a regularly changing inexperienced team of workers is resulting in some producers reassessing their future in the industry. Compliances with the welfare codes and the industry's Quality Assurance Scheme which refers to competent stockpersons is under threat when the team are backpackers, working for a few weeks in the rural area to earn and save money in order to move to the bright lights of the tourist strips as soon as possible.

In recent years the Philippines has been a source of skilled workers for the larger production units. However changes to the visa qualifications have made the employment of overseas workers more difficult and those in employment can, after a couple of years, apply for residency and move to the mining industry. Operating a 1400 sow unit producing 30 kg pigs

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with two skilled staff and eight backpackers is a challenge faced by one of my clients at the current time.

The strength of the Australian dollar continues to have an adverse effect on exports and makes imports attractive. Exports in the 12 months ending Sept 2011 totalled 35,420 tonnes with the major customer Singapore reducing tonnage by 11% compared with the previous 12 months.

Imports in the 12 months ending September 2011 totalled 13,180 tonnes shipped weight. Imports from the USA increased by 12.6% but imports from Denmark fell by 8.6% and imports from Canada fell by 24.5% year on year. Imports continue to be limited to processed product. If imports of fresh product were allowed the industry would almost certainly be decimated.

At the AGM of Australian Pork Ltd (the industry's peak body), delegates voted to increase the slaughter levy on every pig killed by 90 cents in three instalments over five years. The current levy of $2.25 per pig consists of $1.35 for marketing and $1 for research. The research component is matched dollar for dollar by the commonwealth Government. The 90 cent increase proposed would be used for marketing.

In November the Federal government announced the Carbon Farming Initiative (CFI). The CFI is a voluntary carbon offsets scheme being established by the Australian Government to provide new economic opportunities for farmers, forest growers and landholders while also helping the environment by reducing carbon pollution.

Pig production is an industry where the adoption of recognized and approved methodologies can qualify the producer for carbon credits. The approved methodology involves the capture of biogas generated by the decomposition of the piggery manure waste in anaerobic lagoons, and the combustion of the methane component of the biogas. The abatement activity includes:

- Covering anaerobic lagoons
- Installing a gas collection and combustion system (flares or electricity generation system)
- Collecting the biogas
- Combusting the methane component of the biogas

Work in New Zealand suggests that a 400 sow farrow to finish unit using a plastic cover on their effluent pond would have the potential to avoid methane emissions equivalent to about 1300 tonnes CO_2 per year. The value of a carbon credit is $23 per tonne resulting in a potential income from carbon trading of around $30,000 per year.

Lack of profit margins and pressure to comply with the animal welfare codes has limited interest in the government's initiative to date.

Hopefully 2012 will provide increased opportunities for Australian producers. If profit margins do not improve a number of producers are likely to exit the industry. ■

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