

# Western Hog Journal

will live together until piglets are 3 weeks old. Cause larger piglets to go on to the grower/finisher room, the weaners will be able to eat more. It will dry for a full day before another growth cycle.

**math!**

rogram weaner pig, and you gained 300 grams per day for the next three weeks... and 500 grams per day for the next three weeks... could you weigh after these seven weeks... needed to gain 500 grams per day for another seven weeks, how much would you weigh? How many more weeks would you need to get to market weight?

**Pig Growth Curves**

Age in Weeks	Gain	Loss	Net
0	0	0	0
1	150	10	140
2	300	20	280
3	450	30	420
4	600	40	560
5	750	50	700
6	900	60	840
7	1050	70	980
8	1200	80	1120
9	1350	90	1260
10	1500	100	1400

**Fighting or Playing?**

When piglets move into the weaner pens, they begin to fight immediately. They are figuring out their dominance or "pecking order." To learn more about growth and development of the pig, see the weigh scale down the hall.

**Kyle Hogg knows that...**

Pigs play-fight or "scrap" by facing head to head and swinging their head sideways.

**"Scrapping" or playing**

*(Accompanied by an illustration of a piglet and a cartoon piglet)*

**Can you find things around?**

- 1. Find a piglet in the pen.
- 2. Find a piglet in the pen.
- 3. Find a piglet in the pen.
- 4. Find a piglet in the pen.
- 5. Find a piglet in the pen.
- 6. Find a piglet in the pen.
- 7. Find a piglet in the pen.
- 8. Find a piglet in the pen.
- 9. Find a piglet in the pen.
- 10. Find a piglet in the pen.

**Small Pigs**



## IN THIS ISSUE:

- Industry crisis – special report
- Fatigue is major cause of trucking accidents

# Western Hog Journal

Volume 29, Number 3

WINTER 2008

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Industry Crisis – Special Report

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Fatigue is major cause of trucking accidents

## COVER PHOTO

Dan Smart, visiting the Pig Science Centre at the U of A for the *What's on Your Plate?* campaign

*(photo courtesy Ed Ellis)*

## WEBSITES OF INTEREST

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Saskatchewan Pork	<a href="http://www.saskpork.com">www.saskpork.com</a>
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Nova Scotia Pork	<a href="http://www.pork.ns.ca">www.pork.ns.ca</a>
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### NATIONAL ASSOCIATIONS

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National Pork Producers	<a href="http://www.nppc.org">www.nppc.org</a>

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SPI Marketing Group Inc.	<a href="http://www.spimg.ca">www.spimg.ca</a>
Western Hog Exchange	<a href="http://www.westernhogexchange.com">www.westernhogexchange.com</a>

### OTHER SITES OF INTEREST

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

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# • Editor's Notes



Economic conditions in the pork industry worldwide are currently the worst that anyone can remember. Only in the USA, where the weakness of the US dollar gives producers a huge advantage in export markets and where feed cost is comparatively lower than in most other countries, is the pain remotely bearable. Producers in the UK, Germany, Spain, France and Australia, to name but a few, have been publicizing their plight to consumers and politicians alike, just as producer organizations have here. High feed prices have hit every producer in the world. But Canada's producers are further disadvantaged by the strong loonie, higher costs for most other inputs such as labour, drugs and fuel and an uncompetitive processing sector, which pays less for their pigs.



There are already signs of liquidation in the national pig herd, which started in Alberta, but is also taking place in Manitoba and Ontario. In Europe and Australia, commentators are suggesting a significant contraction in the industry. Global pig numbers will have to fall until market prices reflect the increased cost of production. Restructuring is inevitable and it may take another 12-18 months for equilibrium to be reached.

Big Sky's Florian Possberg has bravely predicted a hog price of \$2.40/kg by May 2009 but, speaking at the Saskatchewan Pork Symposium, also quoted Lee Ioacocca, who turned around Chrysler in the 1980s - "The trick is to make sure you don't die waiting for prosperity to come." In the short term, government assistance in various forms will be valuable in surviving, and governments have certainly been responsive to the situation. But producers also need to have a longer term plan. An increasing number of barns are being converted to isowean production,

shipping pigs to the USA and finishing them under contract. Some producers have chosen to de-stock and wait until the economic situation improves, especially where their herd's health status is poor. Others are taking cost cutting measures and trying to maximize their income per hog in order to trim their losses. Difficult decisions must be taken by every hog producer in the country and, with the help of advisors, bankers and family members, the best solution identified to secure long-term survival. The one thing that is not an option is to do nothing and hope for the best.

Western Canada has many advantages that make it an attractive place to raise pigs, as Florian Possberg points out in our special "Industry Crisis" feature. He also notes the many opportunities to sell added value products in export markets. When the current situation improves, there is enormous potential for the pork industry in Western Canada. Let's hope that we can maintain the strength of our industry, prosper in the future and, in time, expand again.

*Bonnie Peck*

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## New animal research facility at the U of S

A new laboratory devoted to research into advanced reproduction techniques for livestock has recently been opened at the Western College of Veterinary Medicine (WCVM) on the University of Saskatchewan campus. Completed last April, the Westgen Research Suite is one of two open-plan laboratories in the veterinary college's new \$8-million research wing. The first scientists stationed in the Westgen Research Suite will focus on advancing reproductive techniques in cattle, swine, horses, and other livestock species.

Westgen, Westem Canada's Genetics Centre, contributed \$640,000 toward the research suite's construction. Based in Milner, B.C., the producer-owned, non-profit society has promoted the development and use of assisted reproduction in Western Canada's beef and dairy industries since 1944.

In the past three decades, WCVM scientists have pioneered new techniques in artificial insemination, spermatology, and embryo transfer for use in livestock. College researchers have won international recognition for groundbreaking studies of ovarian follicle development and the regulation of reproductive cycles.

WCVM's new research facility is part of the college's four-year, \$57-million expansion and renovation that passed the halfway mark in April 2007. The multi-phase infrastructure project will equip the veterinary college for the future challenges and demands in veterinary medicine, food safety and public health.

## Future of Winnipeg plant assured; second plant loses jobs

By Myron Love

By voting yes on a new contract, unionized employees at one Maple Leaf Foods plant in Winnipeg have assured their plant's future. But the future remains uncertain for employees at a second Maple Leaf plant whose employees turned down the company's request to re-open contract negotiations a year early. The decision has cost that plant about 550 new jobs that will go to the first plant instead.

The job shuffle is being sparked by the planned expansion of the company's meat cutting plant in Brandon. The company is

adding a second cutting shift in Brandon and increasing its workforce there from the current 1,300 to about 2,000 over the next two years. At the same time, Maple Leaf decided to move its ham boning operation from Brandon to its newer Warman Road plant in Winnipeg. However, because the Warman Road employees voted against renegotiating their contracts, which expire next May, Maple Leaf approached the employees at the Lagimodiere Boulevard plant instead.

"For the Lagimodiere plant employees, we have negotiated a raise of 3% a year over the next three years," says Blake Crothers, a spokesperson for United Food and Commercial Workers Union Local 832, which represents the Maple Leaf workers. "As well, the move of the ham boning operation to the Lagimodiere plant will increase the workforce to about 1,000. The new jobs will be skilled labour, which pays a higher hourly rate. Current employees will be able to apply for the new jobs."

The company is also promising a major expansion to the Lagimodiere plant - beginning in the spring - to accommodate the increased workload. Crothers reports that contract negotiations are slated to begin for the Warman Road employees in February or March. "The company is not sure what it's going to do about that plant yet."

## Hytek purchases Springhill processing plant

By Myron Love

Having been rebuffed by the City of Winnipeg and the provincial government in its efforts to build a major new hog slaughtering operation in the provincial capital, Hytek Ltd., one of Manitoba's largest hog producers, has shifted its focus to western Manitoba. On Thursday, October 11, Guy Baudry, vice-president of Hytek Ltd., which is based in south-eastern Manitoba, announced that Hytek has reached an agreement to purchase the Springhill Farms Hutterite Colony's hog-kill plant near Neepawa in western Manitoba.

Hytek had been the lead partner in OlyWest (along with Quebec-based Olymel Ltd. and Saskatchewan's Big Sky Farms). The consortium had proposed a 300,000 square foot hog processing plant in an industrial park in south Winnipeg that the

organizers estimated would have created at least 1,100 new jobs. While the proposal initially received municipal and provincial approval and millions of dollars in government incentives, public opposition in an election year for both levels of government persuaded the City and the province to scuttle the OlyWest project.

Baudry reports that Hytek plans to invest \$35 million in expanding its new plant's kill and specialty meat production capacities. The plant is allowed to slaughter up to 4,000 hogs a day but the current kill is about 3,400 hogs per day.

The expansion will add about 200 workers, raising the workforce to 550. The 20-year-old

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plant is the largest employer in the region. Baudry reports that current CEO Bill Teichroew and his management team will remain in place under the new owners.

Baudry notes that Neepawa is an ideal location for a new Hytek operation. "Our principal processing capacity has been in south-eastern Manitoba," he says. "In recent years, we have entered into partnerships with producers in south-western Manitoba and in north central Saskatchewan. The Neepawa plant is in a great location for processing the hogs from those farms." The company also has pork processing plants and marketing operations in the United States and China.

### Athletes fuel up for gold

Some of Canada's elite athletes will be fueled by Alberta goodness in their quest for gold.

The Canadian Sports Centre in Calgary is one step away from being a "sports institute" thanks to a recently launched program to help athletes refuel after long training sessions.

"The most important meal for an athlete is the post-training meal," says Kyle Shewfelt, Olympic Gold Medal gymnast. "Athletes are on a limited budget, but with this facility, our meals will be five dollars. It's the perfect program."



(L to R) Olympic athletes Kyle Parrot (speed skating), Lucas Makowsky (speed skating) and Kaillie Humphres (bobsleigh) along with James Ducs from Alberta Pork, helped kick off the Fuel for Gold Program. Photo courtesy Lisa Skierka

Fuel for Gold, sponsored in part by Alberta's turkey, beef, pork and egg producers, will enable these athletes to worry less about eating, and more about training he adds.

"We're not just trying to be good, we're trying to be great – and this program will help us get there," says Shewfelt.

And there's no question the products are produced by the province's farmers, says Chef Aurelio, the centre's official cook. In his gourmet-style meals, he requests and uses only Alberta beef, turkey, pork and eggs. "My goal is to build nutritionally balanced meals," he says. "The key is to start out with knock out products."

The partnership will also help showcase the quality of Alberta meat, says James Ducs, field service specialist with Alberta Pork. "We would like to have people see pork as a healthy alternative when making their meal choices," says Ducs. "We also strongly believe in the country that we produce in and we would like to see that succeed on a national stage as well."

*(Reprinted with permission of What's On Your Plate?)*

### New bio-fuel plants being built in Alberta

Work on the development of two new bio-fuel plants has recently been started in Alberta. Canadian Bioenergy Corporation, a leading supplier of premium bio-diesel in Canada, has partnered with Renewable Energy Group Inc. (REG) to build a bio-diesel production facility near Edmonton, Alberta. The plant, which is currently being constructed adjacent to Bunge Canada's oilseed crushing plant in Sturgeon County, is expected to produce 225 million litres (60 million gallons) of bio-diesel per year. Its requirement for canola will represent around 5% of total Canadian canola production.

Canadian Bioenergy is an expanding supplier of bio-diesel, with terminal locations in Vancouver and Calgary, supplying custom bio-diesel blends to customers throughout western Canada. REG has more than 10 years of experience in bio-diesel production, technology and marketing. REG's current network of bio-diesel facilities includes six plants, bringing the company's US network capacity to 600 million litres (162 million gallons) per year.

Alberta Ethanol and Biodiesel GP Ltd. will be constructing a bio-fuels complex just north of Innisfail, Alberta. The \$400 million plant, employing 100 people, will produce 379 million litres (100 million US gallons) of ethanol per year using wheat and a similar amount of bio-diesel made from canola. Ethanol production will consume over 3000 tonnes of wheat per day and produce 1520 tonnes per day of dried distillers grains with solubles (DDGS). Construction will be completed by 2009 and the plant should be operating fully by 2010.

The two plants will increase the availability of both DDGS and canola meal to livestock producers in Alberta.

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### Guelph University and UK genetics company to tackle boar taint

Research scientists at the University of Guelph will be working with UK-based swine genetics company JSR and representatives from leading processors to tackle the problem of boar taint.

Utilizing the most advanced gene marker technology, the team is aiming to identify the genes responsible for high levels of androstenone and skatole - the two compounds that cause boar taint - enabling them to accelerate the 'low taint' selection process. Eventually, it is hoped that boar taint could be virtually eliminated across the different breeds, boosting the popularity of pigmeat worldwide.

The scientists at Guelph have focused on the two ways in which levels of boar taint compounds can be reduced - by decreasing their synthesis and increasing their metabolism. Now, by identifying the genes controlling skatole and androstenone levels, and using markers responsible for the different functionalities of the genes, they will identify pigs with undetectable boar taint.

This has far reaching advantages, as Steve De Brabandere of the University's Business Development Office confirms. "Lines offering low boar taint will mean that males won't have to be routinely castrated to avoid the problem. Whilst castration effectively reduces boar taint, it also has repercussions in terms of compromised growth and pig welfare."

Initially, 32 markers were identified from 18 genes tested in eight commercial lines - involving 1,300 pigs in total - with significant marker effects in the different breeds. Now, however, a more complete set of 140 DNA markers from over 30 genes has been identified and the team is currently testing these markers in both the research cohort and animals from commercial lines to establish those that are most effective.

Dr Grant Walling, Director of Research and Genetics at JSR, said "With the expertise and support of our partners at the University of Guelph we expect huge strides toward getting values of androstenone and skatole well below the sensory

threshold, and we hope in the near future to be able to develop a line of pigs in which boar taint is undetectable to human taste."

### Canadian pork is leaner than ever Adapted from Farmscape

The Canadian pork industry is circulating two new fact sheets that provide updated information on the nutrient content of pork. "Pork a Healthy Choice" and "Pork a Lean Choice", developed by a dietician at Ontario Pork, are being distributed to health professionals and health educators across Canada. The documents provide nutrition information related to the Canadian Heart and Stroke Foundation's Health Check program and Canada's Food Guide.

Manitoba Pork Council home economist Marlene McDonald notes pork has already been recognized as a lean meat and new nutrient analysis conducted in 2006 and included in the 2007 Canadian Nutrient File shows pork is now leaner than ever. "The categories for meat are usually lean, extra lean and lean ground,"



Most of today's pork is now categorized as "extra lean"

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she explains. "Previously pork was a lean meat which meant that it had 10 percent fat or less. This new data that we received last year after the analysis indicates that all trimmed fresh pork cuts excluding ribs are now extra lean which means that they have 7.5 percent fat or less so this is great new information."

"In fact, if a composite is taken of these lean cuts, a 100 gram average serving of raw trimmed pork contains only 2.7 grams of fat," McDonald notes. "Now that's a composite of several cuts so some will be a bit higher and some will be even lower than that, but it's a very low benchmark so it really shows that pork is a very lean meat."

McDonald credits the further fat reductions to increased trimming and new feeding techniques where pork producers have responded to consumer demand for even leaner meat. The fact sheets are available through direct mailing or through the pork industry web site, [www.putporkonyourfork.com](http://www.putporkonyourfork.com).

### Hypor pigs fly to China

Hypor has delivered the largest single shipment of live hogs into China by air. It was also the largest shipment by air from Canada to China. The 816 breeding pigs made their way from the company's nucleus farm in Saskatchewan via Chicago and landed in Qingdao, Shandong province in China. The arrival of these Great Grand Parent (GGP) sows and boars is the first stage of stocking Hypor's joint venture farms in China.



The shipment of Hypor pigs arriving in China

"The logistics of pushing through such a large shipment are incredible. It is only possible through the professionalism and diligence of people managing the pigs from the barns in Canada, their transportation via road and air, all the way to their new home in China. All 816 pigs arrived alive and in good health," said Marc Broadbent, who manages Hypor China.



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## Industry denies meat and cancer link

The Canadian meat industry hit back at a recent report by the World Cancer Research Fund that advised people to stop eating processed meats, such as ham, bacon and salami, and to limit the consumption of red meat to 500g a week. The report examined 7,000 existing studies over five years and the result is said to be the most comprehensive investigation ever into the risks of certain lifestyle choices.

But the meat industry denied claims that eating meat was linked to certain cancers, notably colorectal cancer. "The Beef Information Centre, Canadian Pork Council and the Canadian Meat Council disagree with certain conclusions in the World Cancer Research Fund (WCRF) Report," said a news release. "Red meat producers value research on health issues, however, they urge caution with some of the report's recommendations."

The industry groups say that there is no convincing scientific evidence that consuming red meat, as part of a healthy balanced diet, increases the risk of cancer. "Cancer is a complex disease with many contributing factors including: physical activity, obesity, smoking, alcohol consumption, diet, as well as family history and age," said the news release. "There isn't one single food that causes or prevents cancer. A balanced diet, regular physical activity and a healthy body weight play a key role in cancer prevention."

## PEI producers offered exit funding

PEI pork producers met just before Christmas to review a government-funded exit strategy plan that would reduce producer numbers. The estimated \$2.8-million plan has been in the works for the past few months and will go before cabinet for final approval when producers have endorsed the project. Government has already written off about \$7 million in loans to the hog industry.

The exit plan consists of three components: one that will buy out producers at \$5 a pig based on a year's worth of production; one that will keep producers in and pay \$18 and slide to \$4 over a one year period of production; and one in which producers start off on the payment plan and have until June 27 to decide which component to select.

It translates into \$20,000 maximum to exit if a producer ships 4,000 pigs or more a year. Staying in means a

producer can receive up to \$48,000 for the year based on the same production numbers.

## Construction of new Saskatchewan hog slaughter plant targeted for spring of 2008

### Adapted from Famscape

Construction of a new hog slaughter plant in Saskatchewan, with a capacity of one million head per year, could start by Spring 2008, according to a spokesman for the Fishing Lakes First Nation, one of the partners in the Saskatchewan Slaughter Plant Initiative. Other partners in the project are Big Sky Farms and a producer group represented by the Saskatchewan Pork

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Development Board. The province of Saskatchewan is also giving support. The group has been working toward the construction of a new hog slaughtering plant since Maple Leaf announced last year that it would close its Saskatoon plant. An urban reserve will be created on the north side of Saskatoon, where the proposed plant will be located. Fishing Lake First Nation project consultant Jim Ramsay notes, "We've completed our first level review that shows, from a business planning and market analysis point of view, that it's a good project. It makes sense." He says, at this point, an additional three million dollar pool of funds is being raised from investors to hire the team that will design and build the plant, finalize the purchase of the land and create the urban reserve. A hundred million dollars is being budgeted for the first phase of the project, the construction of a one million head per year capacity kill and cut plant, but future plans include expansion into pork processing and selling processed meats.

"We've set up an investment group called Anishnabe Foods Limited Partnership," Ramsay explains. "That's a partnership investment group for first nations governments and that will be the source of the funds." He notes Fishing Lake First Nation is the founding member and 15 other bands in Saskatchewan and Alberta have expressed an interest in participating.

With completion of the first level of review investors are now being asked to make commitments. Ramsay says that there is a 90 percent likelihood that the project will proceed but the equity investment needs to be in place. However, Saskatchewan Pork Development Board general manager Neil Ketilson says that further work still needs to be done to ensure the success of the project. "We are in the process of putting a team together that will manage the process, sending out the engineer design tenders so that we're working with real numbers and not estimates out of a business plan."

"The other part of it is the marketing," he adds. "We need to make sure that our marketing strategy is correct and that we actually have somebody that's willing to buy the product and that we can make some money at it."

The proposed slaughter plant is expected to create 300 to 400 jobs and that number is expected to climb to one thousand jobs once the facility moves into further processing.

**Banff Pork Seminar program adjusted to reflect new industry challenges**

The Banff Pork Seminar has adjusted its upcoming program to tackle the pork industry's rapidly developing economic challenges. The 2008 Seminar will be held at the Banff Centre January 15-18.

A new plenary session called "Surviving the Cost Price Squeeze" will feature a line-up of leading speakers who will discuss ways for pork producers to survive today's growing threats to the pork industry. The program change is a response to recent developments such as a skyrocketing Canadian dollar, feedgrain costs, and declining processing capacity.

The 2008 Seminar, with a theme of "Changing the Industry with New Solutions," is split into three plenary sessions, one for each day of the conference, in addition to 12 breakout sessions. The plenary sessions tackle 'big picture' global and national issues in today's pork industry while breakout sessions focus on practical, farm level components of pork production.

The "Surviving the Cost Price Squeeze" plenary session will take place Friday, January 18. Greg Bilbrey of Agri Stats, Inc., a Fort Wayne, Indiana-based, agriculture-focused statistical research and analysis firm, will speak on decreasing production costs and will outline where and how to look for savings opportunities. This will be followed by Kevin Grier, who will discuss the future of the pork packing industry in Canada.

Finally, pork producer Clare Schlegel, president of the Canadian Pork Council (CPC), the organization which serves as the national voice for Canada's pork producers, will offer a producer's view of trade and the long term sustainability of the pork industry.

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# • New Product Showcase



## EnMaxT swine feed program now available in Canada

The EnMaxT swine feed program, developed by Ralco Nutrition, Inc., of Marshall, Minnesota, has recently completed the registration process for use in Canada. EnMaxT is available exclusively in Canada through Creative Feeds, Inc.

EnMax is the most technologically advanced swine feed program because it employs net energy formulation, crystalline amino acids and supplemental enzymes to improve diet digestibility, says the company. EnMaxT provides pigs with more energy from corn, wheat, barley and canola meal and reduces soybean meal use. Instead of stripping ingredients from feed rations to lower costs, EnMaxT maximizes the available energy of the ingredients.

Because of the net energy formulation, based on the energy pigs use to build muscle tissue, a higher value is placed on ingredients that have a lower heat increment, and consequently EnMaxT greatly reduces the detrimental effects of heat stress. Also, because crystalline amino acids are used, pigs do not need to break down excess amino acids. This leaves more energy for growth and means less ammonia is produced which reduces odour and lessens environmental impact.

The use of supplemental enzymes improves nutrient digestibility and feed conversion. EnMaxT allows for lower fat, soybean meal and phosphorus supplementation of the diet, which means swine producers save money.

For more information contact Carl Dorrn at Creative Feeds, Inc. Phone: 204-235-1042. Email: carl@creativefeeds.com, or go to [www.ralconutrition.com](http://www.ralconutrition.com)

## Oral iron supplement avoids the needle

Iron injection of piglets soon after birth is something that many producers take for granted and never give a second thought. However, the procedure carries a risk of infection at the injection site and is stressful for the piglets. An alternative approach is to supply iron as an oral supplement, something that is being done increasingly in Europe.

Protekta Inc., based in Lucknow, Ont., has recently introduced FerkoFer, a Danish oral iron supplement in the form of a dry powder containing micro-encapsulated iron of high biological value. The product is said to stimulate the natural rooting

behaviour of the piglet and give early oral uptake of iron from when they are only a few days old. It also has the benefit of getting piglets used to eating solids, prior to being given creep feed. The cost of treatment is similar to that for injected iron.

FerkoFer is provided at the rate of 3 measuring cups of 40 grams per litter of 12 piglets, as the only dry feed besides the sow's milk, during the period from day 2-4 after birth until the piglets are 10-12 days old. This corresponds to as little as 10 grams per piglet during the period. FerkoFer is placed on a dry and clean floor or, ideally, in a small feeder.

Trials have shown that blood hemoglobin levels after treatment with FerkoFer are similar or higher than where piglets have been given an iron injection. And, oral treatment avoids individual piglets being missed, says Morten Jacobsen of Protecta Inc. "Sometimes producers are surprised that some piglets look anemic and, with injection, this can also be due to poor injection technique or leakage from the injection site, leading to an inadequate dose."

Protecta also supply the Playfeeder, which they say is the ideal way of presenting FerkoFer and creep feed. It has been designed to stimulate rooting behaviour but has a ribbed bottom to reduce spillage as piglets nose in the trough. It also has three "sucking nipples" to satisfy piglets' curiosity and nosing instinct. During 2007, the Playfeeder won awards at two major trade shows in Europe.

FerkoFer and Playfeeder are available from distributors across western Canada. For further information, contact Morten Jacobsen on (519) 529-5888, email [protekta@protekta.ca](mailto:protekta@protekta.ca) or go to [www.protekta.ca](http://www.protekta.ca).



*The Playfeeder with FerkoFer iron supplement*

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## Major study profiles value of wheat and corn DDGS

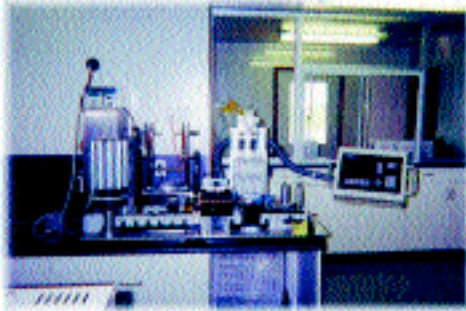
The rapid growth of the ethanol industry, including recently announced new plants in Canada, means that availability of by-product materials such as Dried Distillers Grains with Solubles (DDGS) will increase considerably over the next few years. This means that it is very important to understand the nutritional characteristics of DDGS in order to formulate diets accurately. While there has been quite a lot of work on the value of corn DDGS, its digestible nutrient content had not been verified and the nutritional value of wheat DDGS had previously never been described. Therefore its potential for use in the swine industry was not documented. However, a recently published extensive study, carried out at the Prairie Swine Centre, has evaluated the digestible nutrient content of both corn and wheat DDGS and a 4:1 mixture of wheat and corn DDGS. It also looked at the excretion patterns of nitrogen (N) and phosphorous (P) to measure the potential impact on the environment. Finally, it measured the effect of feeding DDGS on the growth performance of pigs, compared to feeding a wheat-based control diet.

The study on digestibility of nutrients showed that wheat had the highest total tract digestibility or DE (85%), while the figure for the three DDGS products was lower but did not vary much (77-79%). However DE content was highest for corn DDGS due its high (12.8%) fat content, intermediate for the wheat/corn blend and the wheat DDGS and lowest for wheat. The digestibility of lysine, measured as apparent ileal digestibility (AID) was 71% for wheat and similar in all the DDGS samples at 59-63%. Lysine content was highest for corn DDGS (0.51%), while wheat/corn and wheat DDGS measured 0.45% and 0.42 respectively and wheat had 0.37%. Wheat had the lowest P digestibility, at just 15%, whereas the DDGS samples had a range of 53-56% and were similar. Nitrogen excretion by pigs was highest for wheat and wheat/corn DDGS, intermediate for corn DDGS and lowest for wheat. Total P excretion did not differ among DDGS types, averaging 11g/d, while the figure for wheat was just 8g/d.

Some interesting differences between corn and wheat DDGS were identified. The crude protein content of wheat DDGS was 44.5% of the dry matter, compared to 30.3% for corn DDGS. However, the percentage of lysine was lower in wheat DDGS (0.72%) than in corn DDGS (0.83%), despite the total amino acid content of wheat DDGS being higher (40.2%) than corn  
*continued on page 22*



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DDGS, which had 28.3%. Wheat DDGS also had nearly twice the level of non-protein nitrogen, indicating that some of the lysine and other amino acids were damaged during the production process. It was noted that the wheat and wheat/corn DDGS samples had a dark colour with a slightly burnt odour, suggesting that the DDGS was overheated during the drying process. This was reflected in the low moisture content of the sample. In contrast, the corn DDGS was lighter in colour, with a sweet smell, indicating that it was dried in a more appropriate way. This illustrates the impact of the production method, especially the drying process, on the nutritional value of DDGS products.

The higher crude protein level in DDGS led to increased N excretion by pigs compared to those fed a wheat-based control diet. This was particularly the case with the wheat and wheat/corn DDGS diets, in part due to the high level of non-protein nitrogen. The higher urinary N excretion indicated that increased breakdown of amino acids had occurred. This has been shown to result from an imbalanced amino acid profile or a limitation in one or more of the essential amino acids.

Phosphorous digestibility was found to be higher (53-55%) in DDGS than in wheat (14.8%), where 60-70% of the P is bound to phytate, making it indigestible to the pig. This is because phytate is broken down during the ethanol production process, making the P more available. Because the level of total P in DDGS is more than twice that in wheat, P excretion was higher where DDGS-based diets were used, despite the higher digestibility. However, the higher P digestibility does offer the possibility of reducing P excretion through appropriate diet formulation.

The final part of the study involved a growth trial over a period of 35 days, with a starting weight of about 50kg. Body weight at the end of the trial, average daily feed intake and growth rate were significantly higher for pigs fed the wheat control diet rather than the DDGS diets, which all showed similar results. However, feed efficiency was the same for both DDGS and wheat-based diets. The reason for the reduced feed intake shown by pigs receiving the DDGS diets was not apparent, although it was suggested that it might have been due to reduced palatability or the higher fibre content. The authors also point out that the breakdown of surplus amino acids, due to an imbalance in the diet, would consume energy, leaving less energy to support growth.

Overall, the study concluded that wheat DDGS is a by-product with a higher nutritional value for pigs than wheat, although lower than corn DDGS. However, the high level of non-starch polysaccharides, the much lower fat content and the damage caused to the amino acid content compared to corn DDGS may be a constraint on its value to pigs. Improved fermentation and drying processes would increase the digestible amino acid content, while the use of enzymes such as xylanase would increase the digestibility of the higher levels of fibre in DDGS.

**WHJ comment:** This was a very detailed and comprehensive study of the nutritional value of both wheat and corn DDGS and provides a very detailed nutritional analysis of these increasingly available by-products. It was unfortunate that the quality of the wheat and wheat/corn DDGS was damaged during the production process, reducing its value. However, this should not have impacted the growth trial because diets were formulated to have the same amino acid levels. It should be noted that the diets formulated with DDGS contained 41% of the product, which may have reduced feed intake due to reduced palatability or due to the high fibre levels. Commercial recommendations are to use lower levels than this, usually no more than 25%, depending on the type of pig.

**Reference:** Widyaratne, G. P., and R. T. Zijlstra. 2007. Nutritional value of wheat and corn distiller's dried grain with solubles: digestibility and digestible contents of energy, amino acids and phosphorus, nutrient excretion and growth performance of grower-finisher pigs. *Can. J. Anim. Sci.* 87:103-114.

## The effect of spray-dried plasma in lactation diets

Spray-dried plasma (SDP) has been widely used in nursery diets, but not for other types of pig. A recently reported trial, carried out at a large production company in the USA, involved the use of SDP in the lactation diet.

Four experiments involving 265, 410, 894, and 554 sows (Exp. 1 to 4, respectively) were conducted to determine the effect of (SDP) at 0 or 0.25% (Exp. 1 and 2) and 0 or 0.50% (Exp. 3 and 4) in lactation diets. Experiments 1, 3, and 4 were conducted during the summer months, and Exp. 2 was conducted during fall to winter months. Experiment 1 used only parity 1 and parity 2 sows and Exp. 4 used sows of parity 3 and above, whereas Exp. 2 and 3 used all parity groups.

Sows fed SDP in Exp. 1 had a higher feed intake and a tendency towards a shorter weaning to oestrus interval (WEI). In Exp. 2, sows fed SDP showed a tendency towards increased body weight at weaning, but there was no difference in feed intake, litter size at weaning, litter weight at weaning and WEI. Parity 1 and 2 sows fed SDP in Exp. 3 had increased feed intake, but mature sows fed SDP ate less than those fed the control diet. Pig survival and litter size at weaning for all parity groups was not different between diets. The WEI for parity 1 sows fed SDP was significantly reduced and also tended to be reduced for mature sows fed SDP, but was not different for parity 2 sows. Also, more parity 1 sows fed SDP were detected in oestrus 4 to 6 days after

*continued on page 24*

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weaning, and fewer were detected in oestrus 6 days after weaning compared with control parity 1 sows. In Exp. 4, feed intake was reduced for mature sows fed

SDP; however, litter weight and average pig weight at weaning was increased, and more marketable pigs (weight > 3.6 kg) were weaned per litter.

The authors concluded that relative low dietary levels of SDP (0.25 to 0.50%) fed to parity 1 sows farrowed during summer months increased lactation feed intake and reduced WEI. Mature sows fed SDP during summer months consumed less lactation feed without compromising WEI, but had an increased litter weight, average pig weight at weaning and number of marketable pigs at weaning.

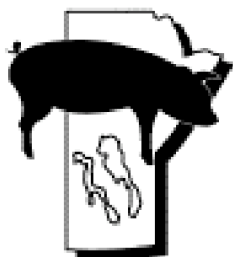
**WHJ comment:** Lactation feed intake in gilts has a major effect on subsequent productivity and it is a challenge on many farms to achieve a high intake over the lactation period. This trial suggests that the use of SDP in lactation diets, especially for gilts and during the summer months, is worth exploring further. More information on cost effectiveness would also be valuable.

**Reference:** J. D. Crenshaw, R. D. Boyd, J. M. Campbell, L. E. Russell, R. L. Moser and M. E. Wilson, 2007. Lactation feed disappearance and weaning to estrus interval for sows fed spray-dried plasma. *J. Anim. Sci.* 85: 3442-3453.

**WHJ**



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# • Industry Crisis



## Decline in pig numbers may be tip of the iceberg

The significant drop in pig numbers, shown in the October 1, 2007 Statistics Canada hog inventories, may be just the tip of the iceberg according to industry commentators and anecdotal evidence from across the country. Given that the data was collected in September, before the major exodus from production started taking place, the January and April 2008 figures seem likely to reflect an industry in very serious decline.

The October data (see Table 1) shows a 1.4% drop in breeding pig numbers and a 3.1% fall in total pig numbers. Biggest losers in terms of total pigs were Atlantic Canada (11.0%), Alberta (6.1%) and British Columbia (5.2%). The figures also reflect the large increase in numbers of weanling and feeder pigs being shipped to the USA for finishing. In the over-20kg category, Manitoba pig numbers declined by 13.6% compared with the same time in 2006 and Alberta numbers by 9.0%. While Manitoba based its past industry expansion on exports, Alberta generally has not, but a significant number of producers are in the process of re-engineering their barns to hold more sows and ship weanlings to the USA for finishing under contract. That means sow numbers could start to increase sometime during 2008, while numbers of pigs in the <20kg and >20kg categories will likely continue to decline.

**Table 1: Canadian hog inventories, October 1st, 2007**

	Breeding pigs		1000-head Total hogs	
	2007	2006-2007 (%)	2007	2006-2007 (%)
Atlantic	31	-1.9	290	-11.0
Quebec	399	-1.3	4,070	-2.4
Ontario	417	-2.1	3,790	-3.1
Manitoba	371	-0.5	2,910	-1.4
Saskatchewan	137	+1.7	1,340	-2.5
Alberta	188	-4.0	1,910	-6.1
British Columbia	18	-1.6	127	-5.2
<b>Canada</b>	<b>1,560</b>	<b>-1.4</b>	<b>14,437</b>	<b>-3.1</b>

From: Statistics Canada

How much production is lost will depend on when the economic climate improves, but predictions range from 10-30% of the industry. Steve Meyer, of Iowa-based Paragon Economics Inc., told delegates at the recent Saskatchewan Pork Symposium that North America was likely to lose 200-300,000 sows and that the loss would not be in the USA. If that happens, the national herd would decline by between 14% and 20%. Perry Mohr, of Manitoba Pork Marketing Co-op, expressed a more pessimistic view and said, in mid-November, that production could decline as much as 30-40%. "Many producers are at that point in their career where they don't think they're going to be around for another hog cycle and able to regain the losses that are currently being incurred," he said. "Many of them are deciding to shut their operations down. They're walking away from the industry with whatever equity they have and they're basically retiring their barns. I've had many, many cases of that over the last couple of weeks." Such predictions are supported by high levels of sow slaughter, according to Jim Long in his Fams.com Pork Commentary. "In conversation with sow brokers, we are getting the idea that Canada is liquidating its sow inventory by at least 3,000 sows per week, primarily in Alberta and Ontario," he says.

As the Canadian pork industry declines, the US industry continues to expand, albeit slowly in terms of sow numbers. In the final quarter of 2007, weekly hog marketings were up to 10% higher compared with the same period in 2006, primarily due to the huge impact of Circovirus vaccine use. Pork exports from the US have also increased, by 8% in September, compared with the previous year, while Canada's exports fell by 3.6%.



## Alberta producers get lifeline, but must have long term plan

*Jurgen Preugschas, past chairman of Alberta Pork*

Many pig producers in Alberta were given a lifeline in November, when they received cheques from the provincial government as part of the Alberta Farm Recovery Plan. In response to the critical situation faced by livestock producers, and after extensive discussions and lobbying by producer organizations, especially Alberta Pork, the government committed \$165 million, of which \$60 million would be available for pork producers. But this short-term help came with a condition - the pork industry must come up with a long-term survival plan.

The assistance was rushed through in record time, says outgoing Alberta Pork Chairman Jurgen Preugschas. "When we met with Minister Groeneveld, we said that we needed a result in 7-10 days, because producers were leaving the industry," he told producers at the Alberta Pork regional meetings in November. "Eighteen days later, Minister Groeneveld announced the Farm Recovery Plan - for government, that's warp speed!" The

assistance was rushed through in record time, says outgoing Alberta Pork Chairman Jurgen Preugschas. "When we met with Minister Groeneveld, we said that we needed a result in 7-10 days, because producers were leaving the industry," he told producers at the Alberta Pork regional meetings in November. "Eighteen days later, Minister Groeneveld announced the Farm Recovery Plan - for government, that's warp speed!" The

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government is also committed to helping the industry with its long-term plan, says Preugschas.

Of the many challenges facing the industry, labour has been a key factor in Alberta. One of the main hurdles to employing foreign workers has been the length of time it takes to obtain a Labour Market Opinion, the first stage in the process. Alberta Pork and the government have been working on the possibility of obtaining LMOs in bulk on behalf of the industry to eliminate the 5-month wait for approval to employ someone from overseas. "We are confident that we will have something in place by the start of 2008," says Stuart McKie, Policy Manager with Alberta Pork.

Another issue identified at industry meetings was the need to reduce feed costs. Alberta Pork has suggested a Bio-fuels Offset Program to compensate producers for the increase in raw material costs caused by federal government policy on renewable energy. It has asked government to offset 50 percent of the difference in feed grain prices due to the US and Canadian ethanol policies through a direct payment to producers. It also wants producers to have access to high yielding grain varieties through amendments to the rules on Visual Kernel Distinguishability. The opportunity for biogas production on hog farms, as a source of renewable energy, was identified as something that could be done to help reduce greenhouse gas emissions and which might be eligible for government support. Other factors that place the industry at a disadvantage to US producers are CFIA inspection costs and the high cost of veterinary supplies, such as drugs, Jurgen Preugschas

noted. "Insurance costs have also gone up sharply in the last few years," he added.

Alberta Pork has initiated a strategic and structural study of the pork supply chain in order to identify a long-term strategy for the industry, which will be completed by February 2008. An initial stage of this was to assess how many pigs will be produced in the province in future, through a survey of producer intentions. The study will look at how more value can be captured in the pork chain and identify a number of options for the industry. "We need to look at non-traditional ideas," stresses Alberta Pork director Don Erno. "Why can't we be unique in the way we go about this?" he asked. "I think that in the future, we will be looked upon as being very innovative."

### **Saskatchewan producers ask for help** *(Adapted from Farmscape)*

The Saskatchewan Pork Development Board, the Saskatchewan Cattle Feeders Association and the Saskatchewan Stock Growers Association have joined forces in an effort to encourage government to provide assistance to cattle and hog operations facing a cost price squeeze. A roughly 23 percent increase in the value of the Canadian dollar compared to its US counterpart since March combined with a 12 to 15 dollar per hog increase in feed costs has reduced returns to pork producers by about 40 dollars per head.

*continued on page 28*

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Sask Pork general Manager Neil Ketilson suggests that any time you have things that work beyond their control producers need a little help in the transition, especially when it's moved so quickly. He feels that the existing CAIS program is not as effective, as transparent and as timely as it should be. "We need to put some renewed emphasis and action into that thing so we can get payments into people's hands a lot quicker than what it is," he says.

The industry is also looking for a short-term cash injection through a loan program that would be repaid once the industry returns to profitability, says Ketilson. He notes that there were two previous occasions when this was done. "We had a program in 1998 and another one in 2001 and what it did was to give producers the difference between the long term average prices, about 140 dollars, compared to what the current market price is," he explains. "What they would do is they would be eligible for a loan on the difference. That loan would then be put back into their operation and it would build over time of course and then it would be ratcheted back once we get profitable times again."

Ketilson notes, because the loans would be repaid over time, the program should not be subject to countervail.

**Manitoba Pork Credit Corporation launched**

Through the recently launched Manitoba Pork Credit Corporation (MPCC), provincial hog farmers will soon be able to take advantage of the federal agriculture advance payments program. Eligible producers will be able to receive a cash advance up to a limit of \$400,000. The first \$100,000 is interest-free, allowing producers to meet short-term financial obligations. The

cash advance will be available only on animals being raised to market weight. Livestock is not eligible once it has been sent for slaughter, and animals that are, or were, used as breeding stock are not eligible.

The Manitoba program will be available on two classes of animals: weaned pigs (5 to 10 kg) being raised to market weight and feeder pigs (15-25 kg) being raised to market weight.

The applicant must own the livestock being covered under the plan. This means that contract feeding operations are not eligible unless there is partial ownership of the animals, in which case the cash advance would be pro-rated. All repayments to the plan must be supported by sales receipts and repayments will first be applied against any interest-free advances. Because applications to the program are based on marketing schedules, producers may apply for advances up to twice per year.

**Ontario producers rally to save their industry**

About 500 producers and industry leaders met in November at Mitchell, Ontario, to discuss the future of the Ontario industry, which has 420,000 sows. Pork producers predicted the end of the industry and the loss of 40,000 jobs if costs, prices and the soaring Canadian dollar stay at current levels.

"If it stays where it is, not one pork producer will be left in Ontario in over a year" said Rob Nyenhuis, president of Perth County Pork Producers (Perth is the largest pork-producing county in Canada).

Government officials present were not only asked for loans, but help in decreasing veterinary product costs that are as much as 240 percent higher in Canada than the US. "We are in an industry under siege, said a producer. "Equity levels are not nearly as high as most pundits believe. Sure, prices were higher over the last three years, but so are expenses. It will get better, but we expect that the Canadian industry will be significantly smaller - down 7 to 8% - a year from now."

Because of the crisis in the hog industry, Ontario Pork announced on November 17 that it had laid off 17 employees, or 25 per cent of its staff. The job cuts are the result of the projected downturn in hog volumes and decline in the number of farmers raising pigs, said Keith Robbins, a spokesperson for the producers' pork marketing agency. With lower volumes and fewer producers, the organization is receiving fewer service fees, Robbins said. "Our industry is in an unstable position, not only in terms of the producers we represent, but for our staff as well," he said.

**CPC appeals for immediate assistance**

The Canadian Pork Council has appealed to federal and provincial ministers for assistance, stressing that there is an immediate need to find solutions for Canada's hog producers. Noting that governments had indeed recognized the severe challenges facing the industry, he said that hog producers are facing a crisis "of epic proportions" which threatens to decimate the whole industry.

The Pork Council and its members met with federal Agriculture Minister Gerry Ritz, senior officials from Agriculture and Agri-Food Canada as well as federal Members of Parliament and many of their provincial counterparts during November to discuss what is needed to survive as an industry.

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“While helpful, the time has come for action to help Canada’s hog producers and their families. Producers need to make important financial decisions now regarding their future,” said Clare Schlegel, CPC’s President. “They need to know to what extent they will be able to count on their governments to help them transition through this extremely difficult period.”

The CPC is asking the government to make improvements to the current Canadian Agricultural Income Stabilization (CAIS) program and for a short-term loan for producers, as well as an immediate advance against future CAIS payments.

“The federal and provincial governments need to act immediately to provide our producers with the tools needed to weather this storm, and continue to contribute to our communities and the Canadian economy,” he said.

### Producers worldwide squeezed by feed costs

Pork producers’ organizations around the world have been publicizing their plight to consumers, retailers and governments after suffering unprecedented losses due to increases in feed costs. The UK industry, which has already declined to just 450,000 breeding pigs, from 800,000 ten years ago, predicted that 90% of its production could disappear within 12 months. A survey carried out in October last year asked producers how long they could survive under current conditions. Of those questioned, 35% said between one and six months, 31% said up to 6 months and 26% said six months to a year. Only 6% of respondents said they would continue production regardless.

British producers have been aggressively defending their industry, which has not only been paying some of the highest feed costs in the world but has had to cope with animal movement restrictions due to the outbreaks of foot-and-mouth disease. The British Pig Executive (BPEX) launched a “British pigs are worth it” campaign to alert consumers to the likely loss of production unless prices increase and asking for support. Meanwhile industry leaders asked the major food retailers to voluntarily increase the price paid for their pork so that the extra money would feed through to producers. This had some success but did not result in the magnitude of increase needed to return to profitability. Large amounts of imported pork from mainland Europe have also kept retail prices down.

Danish producers, who tend to take a long-term view of profitability, were urged by their industry organization, Danish Pig Production, to stay in production because the situation will improve later in 2008. “This situation is very serious for the whole Danish pig industry,” says a DPP news release issued in October. “The margin for the average producer of finished pigs is now negative, and the economic situation for weaner producers is equally poor. Nevertheless, some producers will be in the fortunate position of being able to use carry-over grain stocks until January, thus alleviating some of the current losses.”

“I fear, however, that the situation may tempt many producers to leave the industry, rather than continue to lose money,” says Nicolaj Nørgaard, DPP’s Deputy Director. He urged Danish pig producers to remain calm and not to take any precipitate action: “The important thing now is to stay cool. We expect a better balance between feed costs and market prices during 2008. Once a decision has been made to close down production, restarting

would be a much more difficult proposition, even if things have improved.”

The European Commission, which provides no direct financial support for pig producers, agreed assistance for increasing the amount of pork in storage in order to try and raise its price. This mechanism has been used in the past when supply has exceeded demand. Pork is then released back onto the market when supplies are tighter. By the end of November 85,000 tonnes of pork had been taken off the market, resulting in some improvement in prices for producers. However, the EU Commission also proposed the introduction of export subsidies as a means of further improving the price, noting that there was a need for further action because the sharp drop in the US dollar had reduced the competitiveness of European exporters. This move was immediately condemned by CPC, which said in a news release: “These European subsidies will force Canadian, US, Brazilian and other pork exporters to cut prices to remain competitive with their EU-based counterparts, compounding the economic difficulties the rest of us already face.” It noted that the export subsidy rates could run as high as \$0.75 per kilogram and are understood to be applicable for all export destinations. The EU Commission also announced plans to suspend import duties on all cereals, except oats, to help ease the pressure on grain markets and so reduce feed costs.

In Australia, producers appealed to the government to conduct an enquiry on the impact of pork imports on the industry and to

*continued on page 30*

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consider measures such as tariffs or quotas to stem the flow of imported pork. Andrew Spencer, CEO of producer organization Australian Pork Limited, said that Australian producers are caught in a vicious cost price squeeze with record levels of imports acting to suppress farm gate prices. Compounding this is the continued upward spiral of feed grain costs as a direct result of the drought. No industry can continue to operate under those circumstances, he added.

Australia imported 110,000 tonnes of frozen pork, equivalent to approx 3.1 million pigs, during 2006-2007, thereby displacing local pork in the ham, bacon and fresh pork markets, noted a news release by the organization. In recent years the industry has made significant progress in increasing sales of domestic fresh pork as well as in reducing its costs of

production. However with this surge of imports, all of these benefits are being undermined which has left the industry in a precarious position, it said.

There is no doubt that pig producers around the world are facing extreme hardship, which has already led to increased sow slaughterings in most countries. Over the next two years or so, there is likely to be considerable restructuring in the worldwide pork industry.

**I'm optimistic for the long term, says Big Sky CEO**

Despite the seemingly insurmountable problems producers face currently, the CEO of Big Sky Farms, Florian Possberg is optimistic about future opportunities for producers in western Canada. He sees significant restructuring of the worldwide pork industry taking place over the next 12-18 months, leading to a loss of about 10% of sows outside the USA and China, most likely more than that in Canada. However, he also sees the potential for the Canadian pork industry to grow again by providing high quality, added value pork products for export markets.

While Big Sky has shifted some production to the USA, Possberg says that the company is committed to finish a proportion of its pigs in Canada. "We're in a situation where we have high grain costs due to a world shortage of wheat," he explains. "Having operations in the US helps us overcome that problem, but finishing pigs in Canada is part of our successful future as well." He points out that the availability of grain changes year to year and may be less of an issue in future years. However, he expresses concern at the effect the growth of ethanol production is having on feed prices and the level of grain stocks worldwide. "There is very little inventory of food in our system," he notes. "We don't appreciate how close to the wire we normally run."

Companies like Big Sky have no choice but to weather the storm, says Possberg. "We do

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*Florian Possberg, CEO of Big Sky Farms*

have some advantages of scale, but we also have disadvantages,” he says. “Most producers can benefit from the CAIS program, but that doesn’t help us.” Family farms that grow crops can offset losses on hogs to survive the current situation if they see a future in hogs, he suggests. In the longer term, smaller operations can also fulfil profitable niche markets such as roaster hogs for the ethnic market or organic pork. “Big Sky Farms has new facilities and the infrastructure to produce pork and we have to excel at this because we don’t have any other business,” Possberg says.

But, while he describes the company as currently being in survival mode, along with all producers, he sees many opportunities for the future. “There are natural advantages for producing pigs in Canada,” he feels. “In Iowa, we see breeding barns that are producing 16 pigs per sow, while we are doing 25,” he explains. “That’s not because we are geniuses and they are slouches - it’s because they are in the middle of a huge hog population that has 15 to 20 strains of PRRS.” Because of our health advantages, he thinks that there are further opportunities to supply weanlings for a proportion of US production.

Possberg also sees potential growth in export markets and to capture more value from the products that are exported. “When we were visiting a store in Japan, I noticed that Canadian pork was priced 30% lower than the domestic product,” he points out. “The store operator said that the quality of Canadian pork was better and there was no problem with supply - the difference was all to do with perception.” Possberg notes that, in blind taste tests, Canadian pork comes out better. “The point is that we have a good product, but it’s under priced,” he says. “If we got 90% of the price of the Japanese pork and the extra 20% went to packers and producers, we would get a lot more value from what we export. I think that’s achievable.” Also, he says, Japan does not want to be 100% reliant on the USA for fresh pork and would rather have a significant amount coming from Canada and Australia.

There are also big opportunities in China and other Far-Eastern countries, Possberg feels. “There are 300 million middle-class Chinese now, looking to buy everything that western people have,” he explains. “People are also starting to be concerned about food safety and interested in new food products, including organic food.” Although the Chinese tradition is to

buy pork from ‘wet markets’ on the same day it was slaughtered, the high price of pork could make people consider chilled or frozen imported product, he feels. “If they haven’t been able to afford pork, they may be willing to try something different.”

Possberg remains optimistic that Canada, especially the western provinces, will continue to be a leading player in the international pork market in future. “We know we can produce grain in western Canada and producing hogs where the grain is grown is good business and something that’s sustainable,” he concludes. “I really believe that, whether we look at the next 2, 5 or 10 years, Canada will have a role in feeding the world.”

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## Semen quality crucial to sow fertility

*Many aspects of semen quality can have an effect on sow fertility and performance, whether semen is collected and processed on the farm or purchased from a boar stud. What condition is the semen in when we place it in the storage fridge? How was the semen produced? How was it transported? Are we always using top quality product? Do we really know how fertile each dose is? Tony Charanduk, Hypor's AI Specialist for North America, discussed the most important factors affecting semen quality at the Red Deer Swine Technology Workshop.*



### Four key factors in preparation

During preparation of semen there are four key factors that most influence quality, said Charanduk - the level of bacteria in the semen, the quality of the water used to make the diluent, the concentration of the semen dose and how the semen is cooled from body temperature down to the 17°C storage temperature.

One important factor that may limit semen performance is the bacteria level present in a dose of semen. "Semen extender formulas include antibiotics to handle a certain amount of bacterial contamination," explained Charanduk. "However, once these levels are exceeded the presence of bacteria will have a detrimental effect on semen performance." Attention to ensuring clean boar housing, a clean barn environment and, most importantly, sanitary collection are the first steps in keeping bacteria levels in semen production low, he said. Contamination from the barn environment is the most common source of bacteria in semen. The other potential sources are water, laboratory equipment, the lab environment generally and contact with the technician.

Regular monitoring of bacteria levels in water, extender and semen should be standard practice for AI studs, Charanduk noted. However, he said, operations sourcing semen from external sources should also check the semen they use from time to time and relay the results back to their supplier. When samples are checked, levels below 100 cfu/ml are acceptable and will most likely have little effect on performance. (cfu is "Colony Forming Units", a standard measure of bacterial level). When levels are in the high hundreds, or even thousands, poor fertility will be a result and may cause sow discharges, warned Charanduk.

Water makes up the majority of semen and yet it is often overlooked, he said. The ideal water to use in semen production needs to be bacteria free, distilled, de-ionized water that is as pure as possible. Bacteria and dissolved solids have a detrimental effect on semen performance. Water should always be tested even if it is purchased from an outside supplier, advised Charanduk. "When using in-house filtration systems be sure that all staff are aware of the maintenance required to keep the system producing the quality of water you expect," he suggested. "Our recommendation is to let the water companies make the water and stick to producing semen."

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Correct semen storage on the farm is critical to success with AI

continued on page 34

Concentration is another key factor in semen quality. Charanduk recommended that all semen doses produced contain a minimum of 2.8 to 3 billion live cells. "Many studies have shown that once we creep below the 2.5 billion level we will see a reduction in litter sizes and to a lesser degree farrowing rates," he said. He suggested that semen doses are tested on a regular basis to confirm that they contain the correct amount of cells, whether semen is being produced on the farm or purchased. "Always keep in mind that the 3 billion goal is an average and the actual dose will vary on both sides of 3 billion due to the accuracy of the equipment we use." Charanduk warned against diluting semen to less than 2.8 billion cells per dose. "As the average dose reduces, so do the samples that are below the average - when we move as low as 2.5 we will get some samples below 2," he said. "Sow performance is likely to be poorer at such a low level."

Another one of the understated aspects of semen preparation that can really have a detrimental effect on the life expectancy of semen is the cooling of semen from 35 to 17 degrees, Charanduk feels. He advised that semen should always be cooled to 17°C prior to shipping.

"Once at 17°C, the semen stabilizes and stays in a relaxed, stable state. If we do not get down to 17°C, the cells remain active, using up valuable energy," he says. "We want to achieve 17°C and maintain that temperature as much as possible, because it is temperature fluctuation that causes the greatest damage." He advised that semen should be cooled down as quickly as possible after processing, saying that there is no need to let it sit at room temperature before cooling to 17°C. He also suggested that, when semen is delivered from the supplier, the temperature is checked when it arrives. If it has not cooled to 17°C, the semen should be spread out in the fridge to cool as quickly as possible, because it will only cool slowly when there are many doses in the package. If semen consistently arrives at a temperature of more than 17°C, it could be due to the semen not being cooled properly at the stud or it may be warming up during transportation, he said.

**How do we measure semen quality?**

Both motility and morphology are important measurements of semen quality. Semen with greater than 70% normal cells is

considered fertile. However, sow performance is not always related to the percentage of normal sperm (Table 1). Normal cells are cells that are moving well, have no morphological problems and have intact acrosomes, explained Charanduk.

**Table 1: Variation in percentage of normal sperm cells and sow performance for individual boars**

Boar ID	Services	% normal cells	Farrowing %	Total born
7	30	70	93	13.18
12	29	83	83	12.74
14	31	66	45	9.22
16	27	47	100	12.04
17	27	84	52	6.5

*From: Lebowa and Wilson, unpublished data, 2005*

Motility is generally the most widely used quality parameter and predictor of sow performance. Table 2 shows how farrowing rate and litter size are reduced as the percentage of motile sperm decreases. Work at the University of Alberta has shown a correlation between motility on day 10 after collection and final fertility, said Charanduk. "At our stud we are collecting data on an ongoing basis to try and replicate these results."

**Table 2: The effect of semen motility on sow performance**

Motility(%)	# Services	Farrowing %	# Liveborn/litter
95.2	75	84.9	10.4
82.3	73	87.8	10.2
76.1	64	86.7	10.3
62.1	58	86.9	10.0
52.4	54	75.2	9.3
44.2	38	72.3	9.2
32.7	35	52.2	8.0

*From: Flowers, 1996*



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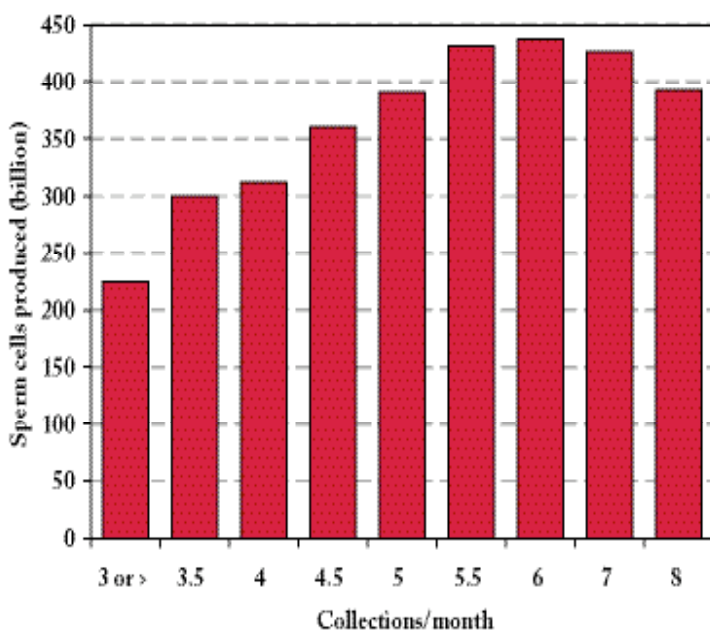
Seminal plasma is known to have a positive influence on ovulation, sperm transport and fertility, Charanduk noted. Insufficient levels of plasma will lead to white blood cells being retained in the uterus causing inflammation and reducing the fertility of the second insemination. Certain proteins in seminal plasma have been proven to directly affect fertility. Semen doses ideally require 8% to 12% seminal plasma. "As a result, it is recommended to pool boars with low volumes together with boars that have high volumes to ideally obtain 8% to 12% seminal plasma in a dose of semen," he said.

### Optimum collection frequency

Charanduk noted that, on average, boars in Hypor studs are collected 6-7 times per month and produce 30-35 doses of semen per week or 120-140 per month. This leads to optimal semen production, he said. Figure 1 shows how the number of sperm cells produced increases with frequency of collection, up to 6-7 times per month.

Most commercial studs pool semen from several boars. However, there is considerable variation in the performance of different boars, independent of some quality measurements, such as percent normal cells (Table 1). Charanduk suggested that producers collecting and processing their own semen should consider using only "super-fertile" boars, identifying the most fertile boars through the use of single-sire matings. "Hypor has a client producing over 29 pigs per sow and they use single-sire matings," he said. "They watch the performance of their boars very closely and poor boars do not get used. This is an interesting concept that needs to be reviewed in large scale operations."

**Figure 1: The effect of frequency of AI boar collection on number of sperm cells produced**



From: Hypor AI benchmarking 2005 (based on 22,186 collections)

### Quality control checklist

It is important to randomly test the semen you use on a regular basis, concluded Charanduk. "Whether you buy your semen or produce it yourself it is good practice to check the quality of the final product," he said. The Semen Quality Control Checklist summarizes his recommendations.

#### Semen Quality Control Checklist

##### Quality checks:

- Check semen motility with each shipment. Ensure that you have the correct procedures for doing semen checks because different extenders require different warm up times. Carry out the checks in a clean environment to get the most accurate results.
- Send samples to a laboratory to be counted with a Haemocytometer or a CASA system to check semen concentration. If you are producing semen on the farm, check the accuracy of your lab equipment.
- Send samples to be cultured for bacteria to ensure the product you are using is within the acceptable thresholds. This will be more important in the summer months because it is often when trouble arises.
- Always check the temperature of semen on arrival. If it is warmer than 17°C, spread the doses out in the fridge to lower the temperature of all the doses evenly. If the shipment arrives at 17°C leave the semen packaged together. If the product does not arrive at 17°C, question your supplier as to why this is.

##### Storage:

- Use a proper semen fridge because it will result in more stable temperatures. Keep a high/low thermometer in the unit at all times. Ideally, have the fridge connected to an alarm system.
- Locate the fridge in a temperature-controlled environment, which is neither too hot nor too cold, to minimize the influence of outside air on fridge temperature.

##### From fridge to sow:

- Warm the semen to room temperature before using by simply placing it on a table for 20 minutes or so. Never let the semen rise to room temperature and then put it back in the fridge.
- Only take doses out of the fridge that you are sure you're going to use. It is better to make another trip back to the fridge. Temperature change is the real semen killer.
- Small coolers do little to hold semen at 17°C, therefore, if using them, still only take out what you need that day.

##### In hot weather:

- Keep a closer eye on semen quality over the summer.
- Consider increasing semen concentration to improve summer fertility.
- Remember that, due to increased semen bacterial levels in the summer, the shelf life of semen is normally shorter.
- If you collect boars on the farm, do all you can to keep them cool - it is more important than you think!



# Batch farrowing leads to improved health and performance



Faced with a major disease challenge and poor breeding herd performance, a 10,000-sow production system in the US turned to batch farrowing, with dramatic results, veterinarian Dr. James Lowe told producers at the Red Deer Swine Technology Workshop. Not only was sow productivity increased, but also nursery mortality was slashed and growth rate improved substantially.

The production system comprised of four 2,500-sow units, producing piglets, which were then moved to one of four nursery barns, each with eight rooms in two buildings holding a total of 8,000 pigs. Historically, the system had poor performance, primarily due to a high level of disease, including PRRSv, Influenza, Circovirus, Streptococcus and Haemophilus parasuis. "Breeding herd productivity had not exceeded 21 pigs weaned per mated female per year and nursery mortality was 10-12%," said Dr. Lowe.

## Pig flow radically changed

Each sow farm historically flowed weaned piglets to one nursery, which was operated on a continuous flow basis with piglets moved between rooms at exit to maintain target weights for the finishing barn customers. "The key objective of changing to batch farrowing was to improve nursery performance through achieving all in-all out pig flow in the nurseries by being able to create large groups of pigs to fill one of the eight nursery buildings each week," noted Dr. Lowe. "In addition, there was a strong desire within the production system to elevate weaning age from the historical 16-18 day range to a 20-22 day range in order to capture the benefits of increased weaning age in both the breeding herd and the wean-to-market production system."

Each of the four sow farms had previously operated as independent units. In order to optimize pig flow it was decided that conversion of each farm to a four-week, five-group batch system would be optimum. "A four-week, five-group batch system breeds every fourth week, farrows every fourth week and runs the farrowing house on an all in/all out basis," explained Dr. Lowe. "The five groups refer to the five breeding groups that are required to operate this system within the sow farm." Because the four sow farms are all approximately the same size, the system

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chose to implement batch breeding on each sow farm on a staggered week basis. This resulted in Farm A farrowing in week one, Farm B in week two, etc. and provided approximately 4,000 pigs weekly to the nursery. "The 4,000 pig weekly batches could then be loaded into one nursery building on a site and the nursery buildings could be operated on an all in/all out basis with two weeks worth of weaning constituting a lot on a site," said Dr. Lowe. "The production system also decided that, because of the historical success, to operate nursery sites on an all in/all out basis so that the entire site was empty prior to reloading weaned pigs into the facility."

To implement this process, discussions were held on how to group sows between the four units. While there was significant short-term health risk, the best operational decision was to move sows between farms and initiate farrowing on a single farm per week, Dr. Lowe felt. Sows within the system were all retagged to a common tag system to facilitate movement and merging of records into a common database for farrowing planning. For twenty consecutive weeks, sows were moved from three of the farms to one in order to farrow on a rotating basis. Four weeks later, at weaning, breeding was initiated on that farm to create the breeding batches that would each form one of the five breeding groups in the system.

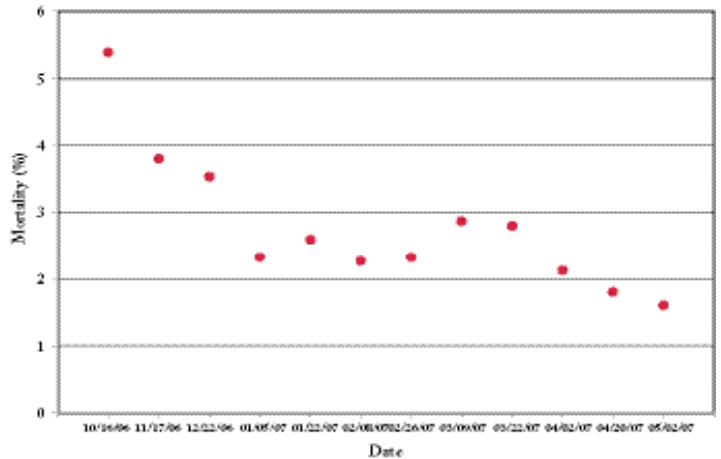
### Results dramatic

Production data showed a strong upward trend in total pigs weaned from the system following the change to batch farrowing, despite a 20% reduction in sow inventory to permit the increase in weaning age.

"Nursery performance has also dramatically improved since the project was initiated," Dr Lowe pointed out. "Prior to initiation, nursery performance was poor, with exit weights at eight-weeks post entry averaging approximately 44 pounds (20kg) and mortalities in excess of 12%," he said. "Once batching was initiated, nursery performance improved dramatically." This is shown in Figure 1, demonstrating the substantial decline in mortality over time. Average exit weights in the same number of days have increased to approximately 55 pounds (25kg).

There are numerous possible explanations for the reduction of disease transmission that has led to the improved performance, says Dr. Lowe. The most likely of these is the dramatic reduction

**Figure 1: Nursery mortality\* after conversion to batch farrowing. Each data point represents a group of about 800 weaned pigs**



\* Mortality rate expressed as a percentage of pigs started in the cohort at weaning that were recorded as mortalities during the growing period

in contact among breeding animals leading to reduced disease transmission, he suggests. "On the breed-to-wean farms, animals were only moved every fourth week and not on a weekly basis. As recycles were found, they were left in place and flagged to create strict four-week movements." This was initiated not as a practical disease reduction tool but as an organizational tool because of the way the farms were staffed with a breeding and farrowing crew rotating between the highly active farms on a weekly basis. The minimal staffing did not allow for large numbers of animal movements on the three weeks that the farm had low levels of activity. Therefore, for practical reasons, animal movements all became concentrated in one week.

In spite of significant initial doubts from production staff, overall response to the batch farrowing conversion has been positive, said Dr Lowe. "The improved nursery performance, the initial reason for the batch farrowing conversion, has met or exceeded expectation in every category. Staff morale has dramatically improved with the improved pig performance in the nurseries and system management has certainly been simplified."

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## Canada should not follow a “me too” ethanol policy, says report

A hard-hitting report from the George Morris Centre says that Canada should not be pursuing development of ethanol production just because it is US policy. “The US is attempting to wean itself off dependence on foreign oil through ethanol; in contrast, Canada is a petroleum exporter,” say the authors, Al Mussell and Larry Martin. “The US hopes to achieve environmental targets through bio-fuel adoption; however, when the amount of water used in ethanol production and energy used in drying distillers’ grains is factored in, the environmental benefit is less obvious - particularly when compared with policy alternatives like driving smaller cars and expanding public transportation.”

The report points out that Canadian agri-food policy has encouraged the development of the livestock and meat industry and the repeal of the Western Grain Transportation Act and Feed-Freight Assistance in the late 1980s and 1990s provided incentives for this in western Canada. Since 1990, the Canadian sow herd increased to about 1.55 million in 2007 compared with fewer than 1 million in 1990. Since the mid-1970’s, the Canadian beef cow herd has expanded by about 1 million cows. Part of this change is correlated with the cattle cycle, but it must also be noted that per capita beef consumption in North America declined significantly throughout this period, the report notes. In other words, relative to the size of the domestic beef market, the Canadian cow herd expanded significantly. This is underlined by the fact that effective meat output per cow and sow both improved markedly at the same time. The effects have been a dramatic increase in value, and a change in the structure of Canadian exports, notes the report. “It’s hard to avoid the conclusion that the strategic shift from grain exporter to livestock and meat has been a success for Canadian agri-food,” the authors emphasize.

Against this background the development of ethanol production makes no sense, argues the report. The reasons for its rapid growth in the US are not relevant in Canada, which does not need to wean itself off dependence on foreign oil. Also, it says, the environmental benefits of grain-based ethanol are just too modest to be taken very seriously, particularly when considered relative to the costs. Another part of the US policy goal is to drive up farm prices by mandating ethanol blends, but when Canada is so much smaller in ethanol production than the US, the efficacy of further increasing feed grain prices in Canada through this method is highly questionable. The report points out that US ethanol development rests squarely on the cushion of a \$US 0.51/gallon blending credit and a plethora of other subsidies. “In order for Canada to seriously pursue ethanol development, we must be willing to underwrite ethanol with the same subsidy, and at much higher volumes,” it says. “This will compete for scarce tax dollars with other worthy public projects.”

In its totality, ethanol should be viewed as a negative for Canada, conclude the authors. “It undercuts a clear and far-

reaching strategy to convert Canadian feed grains into meat and livestock for export to an increasingly prosperous world, and could hardly be occurring at a worse time for Canada’s beleaguered beef and pork supply chains. As it stands, Canadian bio-fuel policy sets us back to the mid-1980’s, instead of operating from the current market reality.”

Rather than attempting to drive ethanol as a solution to both farm marketing and environmental problems, governments should consider working within established agricultural marketing policy, the report advises. The policy goal of improving farm product markets could better be achieved through existing strategy by assisting the livestock and meat industry with its current difficulties, and by recapturing its historic competitive advantage with renewed investment, rather than by exacerbating the industry’s problems with policies that further drive up feed costs, it says. The environmental issues that grain-based ethanol purports to address could more easily be solved by focusing conservation efforts through innovation, such as more fuel-efficient engines, or bio-fuels that are not injurious to our strategy as a meat exporter. In this regard, Canadian firms are already leaders in cellulosic ethanol production technology, and their further success might be leveraged as part of a uniquely Canadian bio-fuel strategy, suggest the authors.

**Reference:** Ethanol as Public Policy in Canada: Understanding the Broader Policy Context. Al Mussell and Larry Martin, George Morris Centre.

### The downside of ethanol:

- Ethanol is reliant on massive subsidies and border protection to be economically viable. It does not have economic value without them
- Ethanol does little to reduce CO<sub>2</sub> levels, and is among the more expensive ways of reducing greenhouse gas emissions from automobiles
- Ethanol is only marginally energy efficient
- Ethanol production consumes large volumes of fresh water
- Ethanol growth will drive inflation in food and in the broader and is generating a food security issue in some countries, such as
- Further ethanol growth is being hampered by significant technical and distribution problems
- The ethanol plants’ margins have collapsed relative to historic levels and the profit outlook is very tight, both short and long term



# High litter size may compromise growth and carcass quality

By **Bernie Peet**



*George Foxcroft at the Swine Research and Technology Centre*

*The significant improvement in litter size achieved by breeding companies over the last 15 years has resulted in the potential to wean over 30 pigs per sow. However, there is increasing evidence that the progeny of these hyper-prolific sows may be compromised due to the effects of crowding in the uterus, leading to slower growth to market, reduced feed efficiency and poorer carcass quality. Dr. George Foxcroft and his team at the Swine Research and Technology Centre (SRTC) in Edmonton are leaders in the quest to find out the causes of this phenomenon and the implications for management of both the sow and the growing pig. He explains the mechanisms involved and how they may impact our production systems.*

“It is well known that birthweight, irrespective of any other factors, is a major determinant of performance from birth to

market,” he says. “A 1kg difference in birthweight becomes 2kg at weaning and 6kg at the end of the finishing phase. The low birthweight pigs take an extra 15 days to reach a market weight of 105kg.” The main reason for the slower growth, says Foxcroft, is that smaller pigs have fewer muscle fibres. “The number of primary muscle fibres is already determined by day 35 of gestation,” he explains. “A second generation of fibres then builds around the primary fibres and the whole process is complete by day 90, which means that after that time, no more fibres can be grown.” Therefore the growth potential of the pig is determined in the uterus, well before birth. Not only that, but carcass quality is affected by the number and type of muscle fibres. “Recent studies in Europe have shown that the lower birthweight pigs have a higher backfat level and lower carcass lean content,” notes Foxcroft. “Also, drip loss is higher and tenderness score lower.” (Table 1) Tenderness is thought to be adversely affected by the presence of some “giant” muscle fibres in the low birthweight pigs, whereas heavier piglets have almost none of these fibres.

**Table 1: Association between high and low birthweights in a litter and characteristics of postnatal growth, carcass characteristics and pork quality traits**

	Birthweight	
	Low (0.9kg)	High (1.8kg)
Overall ADG (kg/d)	0.650	0.690
Hot carcass weight (kg)	90.2	89.5
Lean meat content (%)	61.1	63.0
Backfat (%)	6.7	5.2
Tenderness score (10 point scale)	4.0	4.7

*From: Gondret et al., 2006: J. Anim. Sci. 84:93-103*

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Work at the SRTC has shown that even relatively modest overcrowding in the uterus (15 vs. 9 embryos) reduces the weight of the placenta at day 30, thereby limiting nutrient uptake, and this relationship was still the same at day 90 of gestation (Table 2). "These results show limited placental size early in pregnancy results in a continuing limitation in nutrient supply that already has measurable effects on foetal development at day 90" explains Foxcroft.

**Table 2: Characteristics of relatively crowded compared to non-crowded litters in the uterus of re-bred parity 3 sows. Non-crowded litters were created experimentally by ligating one oviduct in the "Non-crowded" sows during the first oestrous cycle after weaning and all sows were then bred at the second post-weaning oestrus.**

Effects at d90	Control (Crowded) N + 15	Ligated (Non-crowded) N = 15	P
Number of fetuses at d90	14.4 + 0.48	9.4 + 0.67	<0.001
Survival to d90 (%)	76 + 2.5	84 + 3.2	<0.05
Fetal weight (g)	588 + 18	679 + 18	<0.05
Placental weight (g)	219 + 8	274 + 14	<0.05
Brain:Liver wt ratio	1.2 + 0.04	1.0 + 0.04	<0.05
Brain:Muscle wt ratio	10.5 + 0.43	9.3 + 0.33	<0.05

From: Town et al., 2004: *Reproduction* 128, 443-154

The phenomenon whereby what happens in the uterus influences later performance is called "pre-natal programming of post-natal performance", a term first used in relation to human studies in which babies that were smaller at birth were found to have more health problems over their lifetime. Similarly in pigs, those with a lower birthweight are likely to have a poorer immune status and gut development and more health problems than the larger pigs. "Animals that are small at birth also have a greater brain size in relation to their other organs," explains Foxcroft. "This is because of the so-called 'brain sparing effect' whereby brain development occurs at the expense of less essential organs when nutrients are short." This phenomenon was demonstrated in the SRTC trial comparing crowded and non-crowded litters, where the ratio of brain weight to both liver and muscle weight was higher in the crowded litters at day 90 of gestation (Table 2). This, and other work by the SRTC team, shows how uterine overcrowding not only reduces the number of muscle fibres and consequently growth potential, but also the size of other organs such as the liver and the digestive tract which influence the pig's health and growth (Figure 1).

When the supply of nutrients to the embryos and foetuses in the uterus is restricted, the number of muscle fibres is reduced. Foxcroft and his team have shown that this is more likely to occur in highly prolific sows, especially those in later parities, due to limitations in uterine capacity. He points out that sows

with a very high ovulation rate may initially implant a high proportion of embryos but then lose them later on due to a lack of space and nutrient supply. Unfortunately, the space created by the lost embryos cannot then be used by the survivors to increase their opportunity for growth. Therefore, the remaining embryos are likely to be smaller due to the limitations of nutrient supply. "A litter from a sow that has 15 embryos at day 30, which all survive, will have a much higher birthweight than a litter that has 30 embryos at day 30 but loses 15 of them up to term," Foxcroft explains.

Most work on the effects of birthweight on performance has looked at the differences between pigs within a litter. However, the SRTC group has recently looked at the relationship between birthweight and litter size in large populations of commercial sows and focused on differences in average litter birth weight rather than individual piglet weight. Even though there was clearly a direct effect of litter size across all litter sizes studied on litter birthweight, only 23% of the difference in litter weights was explained by litter size alone. "Furthermore, when we looked at litters in the range 10 - 15 piglets total born, litter size only explained 200

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grams of the variation in litter weight, whereas the total variation was over 1kg,' says Foxcroft. "This shows that factors other than litter size are involved in determining the average birth weight of the litter."

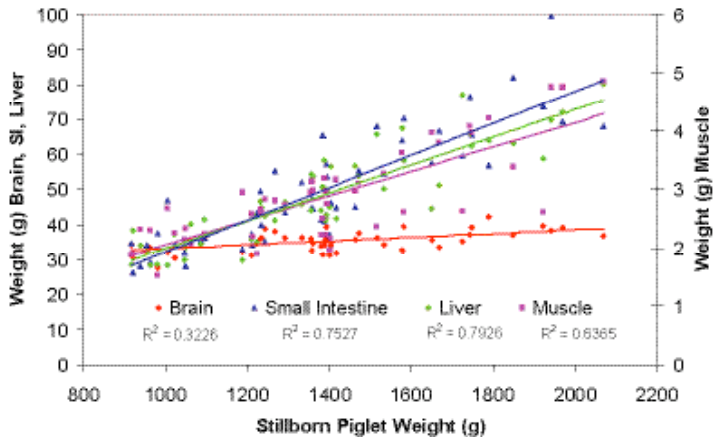
The researchers then compared the litter performance of sub-groups of high birthweight litters (average piglet weight of 1.8kg) and low birthweight litters (average piglet weight of 1.2 kg), all within the 10-15 total born range (Table 3). Although the average number of piglets total born was the same (12.3), the low birthweight group had 0.7 fewer liveborn pigs per litter and weaned 1.4 less pigs per litter. "Piglets from these low birthweight litters were typical of those that have been 'programmed' in the uterus making them unthrifty and likely to grow slowly," Foxcroft points out. Consistent with the "brain sparing" effect, dissections of average birthweight stillborn piglets in the same litters showed that the weight of the small intestine, liver and muscle increased with birthweight, whereas the weight of the brain remained relatively constant (Figure 1). "The key conclusion from looking at average litter birth weight, rather than the relative weight of individual piglets within a litter, is that all piglets from litters with a low average birthweight are compromised compared to piglets in high average birth weight litters, which has significant implications for management," he notes.

**Table 3: Characteristics of litters classified as having a higher than average (high) and lower than average (low) birth weight, and born in litter sizes of between 10 and 15 total pigs born**

	High	Low	P - Value
Average birth weight (kg)	1.8 + 0.01	1.2 + 0.01	<0.001
Total born	12.3 + 0.08	12.3 + 0.07	0.91
Born alive	11.7 + 0.09	11.0 + 0.09	<0.001
Born dead	0.6 + 0.07	1.2 + 0.06	<0.001
Weaned	10.8 + 0.10	9.4 + 0.10	<0.001

From: Smit, 2007, MSc Thesis

**Figure 1: Relationships between weight of still born pigs used for necropsy and the weight of the brain, liver, small intestine and semitendinosus muscle. (SRTC, unpublished data, 2007)**



From: SRTC - University of Alberta; unpublished data, 2007

Dr. Foxcroft feels that the timing of embryo losses during gestation has changed in today's highly prolific sows. It has generally been considered that the biggest losses occurred before implantation, with some later losses related to uterine capacity and this is likely still true for gilts and first parity sows. "However, in older, highly prolific sows it appears that there is an imbalance between the number of embryos surviving to the post-implantation period and the sow's uterine capacity," he suggests. His team has looked at the differences in survival rate of embryos in different parity groups. Sows ovulating 25 or more eggs were used to investigate the effect of parity on embryo survival in very prolific females. The average ovulation rate in each of the three parity groups was 27-28. However, compared to parity 2 and 3 sows, the number of viable embryos at day 30 and day 50 was lower in the parity 4-6 and 7+ groups (Table 4).

In the youngest parity group, the majority of losses occurred prior to day 30, whereas in the middle parity group, significant

*continued on page 42*

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losses occurred between days 30 and 50. The oldest sows also lost a high proportion of their embryos before day 30. "A young sow with a young uterus can take greater advantage of a higher ovulation rate," Foxcroft points out. Overall, though, he feels that a very high ovulation rate is counterproductive. "We're pumping too many pigs into the uterus and then we pay the price later," he feels. "This really sets us up for failure."

**Table 4: Percentage of sows with high ovulation rates (>25), and ovulation rate, viable embryos at day 30 (d30) and foetuses at d50 for sows with ovulation rates 25 or higher, in parities 2-3, 4-6 and 7+**

Variable	P2-3	P4-6	P7+
Percentage of high ovulation rate sows	16.7	43.8	38.8
Ovulation rate	27.0	28.3	27.4
Viable embryos - d30	16.8	16.8	13.3
Viable foetuses - d50	15.3	11.9	10.5

From: SRTC, unpublished, 2006

So, what are the consequences of using highly prolific sows for the production system as a whole? Conventional management practice is to split pigs purely on individual weights and to base nutrition on weight and sex. That may not be appropriate once we know more about the implications of the "programming" phenomenon, says Foxcroft. "We have shown that pigs from lower birthweight litters are compromised beyond their disadvantage purely due to birthweight," he says. "All pigs from such litters will still be relatively disadvantaged. Maybe we should be identifying these litters and treating them differently." He says that weighing the two pigs in the middle of the weight range in a litter gives a very close correlation with average litter weight. Identifying the low average birthweight litters would enable them to be given special care. He suggests that, because they will have a less effective immune system, ensuring they receive adequate colostrum should be a priority. Once more is known about the effects on growth, pigs could be grouped according to litter birthweight and fed different diets. "One thing we know for sure is that these pigs don't have good



*In future, management of nursery and finishing pigs may need to be based on the average weight of piglets in the litter, not individual pig weight.*

growth potential and will produce a fatter carcass," stresses Foxcroft. "We should therefore probably feed them a lower specification diet and slaughter them at a lighter weight than pigs from higher birthweight litters. Once we know more about these aspects, we may want to change our management practices accordingly."

Another approach to mitigating the problem is to implement new strategies for sow nutrition and management, especially for gilts and young sows. For example, work in the UK has shown that high levels of feed in early gestation can increase the number of muscle fibres at birth. "Supplementation of the diet with fish oils, L-arginine and other functional nutrients may also be beneficial", says Foxcroft. Other strategies include delaying breeding of sows after their first weaning, the use of a top dressing for gilts and young sows in late lactation and up to breeding, and using a higher lysine diet for gilts and second parity sows. "Some eggs are compromised even before they are released if the young sow is in a catabolic state at weaning," he suggests.

In the longer term, changes to genetic selection strategies could improve the situation. "If we move away from prolificacy expressed as total numbers born and put more focus on birthweight, survival rate and numbers weaned, we would be selecting for more thrifty pigs and, indirectly, for functional uterine capacity," Foxcroft feels. "We have to move from purely a numbers game to producing better quality pigs." And, he suggests, there may be differences in the genotypes already available to producers. "I think that there are probably dam lines out there that have a lower ovulation rate but high litter size and birthweight," he says. "Others may have a very high ovulation rate and similar litter size, but lower average birthweight. These differences in genotype could determine the performance of pigs through the programming mechanism."



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# Planning your production

## Part 2: Breeding herd influences on output

By **Bernie Peet**

In my previous article on production planning, I discussed the factors that influence output (kilos of pork) in the nursery and finishing herds. An example was shown of a herd marketing 500 hogs per week, which required 524 pigs/week to be weaned in the breeding herd. In order to maintain this number each and every week, we need to understand the output and efficiency factors that influence it. There are six key measures that need to be monitored and controlled, which are shown below with some assumptions that I will use for illustration:

• Pigs weaned/week	524
• Pre-weaning mortality	10%
• Pigs born alive/week	582
• Av. # born alive/litter	11.2
• Litters born/week	52
• Farrowing rate	84%
• Sows bred/week	62


While there are a wide variety of factors that influence these aspects of performance, these are the only numbers that influence breeding herd output. The relative effect of each of these factors on numbers weaned varies considerably. While many people put great emphasis and effort into minimizing per-wean mortality, it is actually far less important than the other factors. The most important by far is the number of sows bred each week, followed by farrowing rate. These are also the numbers that tend to vary most from week to week, which means they are the most important to monitor and respond to. It is important to react and adjust targets when one figure is above target, just as it is when it's below target. For example, if the farm makes improvements to its breeding procedures and farrowing rate increases to 90%, assuming all the other numbers remained the same, the number of pigs weaned/week would increase to 564 or 40 above target. The 8% more pigs in the nursery and finisher sections would lead to reduced growth, resulting in lower average carcass weight and reduced kilos of pork sold. In order to avoid this situation and

maintain the same output of weaned pigs, the target for number of sows and gilts bred per week needs to be reduced to 58. Producers often find it difficult to reduce target numbers "just in case something happens", but overproduction can be as harmful to the overall profitability of the business as being below target.



*Consistently meeting breeding targets is the first stage in achieving output targets*

There is also a tendency to accept a certain level of variation in breeding herd numbers whereas, because some of them are inherently variable, every route possible should be taken to reduce variation, otherwise control of output is lost. Farrowing rate does vary over time and there may also be seasonal differences. However, if a change in the target for number of sows bred per week is made, it's four months before the effect is seen. One way to deal with this is to respond to the percentage of sows still in pig when they are scanned. Usually, after that time, the percentage of dropouts is fairly constant. In my example above, the percentage



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of sows that do not return and are subsequently scanned positive might be 90%. Calculating this figure for each week's sows and comparing it with target will give a reasonable prediction of how many of the weekly group are likely to farrow. The target for percent pregnant sows at 28 days can be responded to more quickly than farrowing rate, for example, one could calculate an 8 or 10 week moving average and adjust both the farrowing rate target and number of sows bred/week accordingly.

The effects of seasonal variation in fertility can be mitigated by understanding the likely pattern in an individual herd and adjusting production targets to compensate for the reduction in farrowing rate, and possibly litter size, that often occurs in sows bred in the late summer and early fall. This requires additional gilts to be available for breeding at the appropriate time, which in turn means ensuring that extra gilts are purchased and acclimatized. Effort spent doing this will be well rewarded because progeny from sows bred at this time will be sold during the following summer when hog prices will be relatively high.

Now let's look at those aspects of management that most influence our ability to achieve constant output from the breeding herd:

**Productive sow herd size:** It is impossible to hit breeding targets if there just aren't enough sows and gilts available in the system. "Productive sows" means the number of sows and bred gilts in the herd, excluding un-bred gilts. Our example herd, with 52 farrowings per week, will produce 2704 litters per year (LSY). If each productive sow farrows 2.4 litters each year, that means the herd requires  $2704/2.4 = 1127$  sows to meet targets. Clearly then, productive sow herd size is a very important target to monitor and control. If the figure for LSY falls to 2.35, then the target herd size will need to be increased to 1151 in order to meet the weekly breeding target.

**Gilt pool size:** The correct productive sow herd size can only be maintained by introducing sufficient numbers of gilts to replace sows that are culled or which die. Gilt pool size is a good measure of the ability of the herd to maintain breeding targets. Let's assume that our herd of 1127 productive sows has a planned replacement rate of 45%, or 507 gilts per year. Target gilt pool size can then be calculated from the number of gilts that will be bred each week and the number of weeks from entry to service. So, in the example, assuming the average time in the gilt pool is 5 weeks and 10 gilts are bred each week, a gilt pool size of 50 is required. In practice, it's a good idea to have a safety margin of around

10% to allow for some dropout, making the target for gilt pool size 55. Gilt purchases should be planned to maintain this target.

**Culling policy:** It is obvious that productive sow herd size can be reduced by culling more sows than there are gilts to replace them. Consequently culling needs to take place with due regard to the target herd size. Unfortunately, in many herds, culling takes place without reference to output targets. Sows should never be culled until weekly breeding targets have been met, unless it is done on health or welfare grounds. Culling of surplus sows can then take place according to the number of returns to service or the number of sows in the group that are pregnant when scanned. This routine is a very valuable tool in controlling the number of sows that are bred each week.

*continued on page 48*

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**Herd parity profile:** Many aspects of performance, such as litter size, farrowing rate and pre-wean mortality vary with the age of sow. If the herd parity profile - the distribution of sows in various parities in the herd - varies, it will add to increased variation in output. Therefore, maintaining the correct parity profile through good management of culling and replacement policy while ensuring sows have a long productive life, will make a big contribution towards achieving constant output.

It should be clear by now that only by recording and monitoring the key output targets can constant output be achieved. By regularly adjusting targets in response to changes in the actual figures, the number of pigs weaned each week can be closely controlled. However, this requires discipline and the application of consistent management standards to be successful.

In addition to the numbers weaned per week, the quality of pigs weaned also affects performance from weaning to market. Weaning weight is the most important determinant of post-weaning growth and should be closely monitored. If weaning age is reduced because the number of farrowings is above target, weaning weight will be lower and performance will suffer. Maintaining the weekly farrowing target will result in the minimum variation in weaning age and weight. Assuming a



*Sufficient numbers of gilts into the breeding herd must be available to meet breeding targets*

constant number of farrowings, any deviation from the weaning weight target should be investigated and remedied in order to maintain not only the consistent numbers of pigs required by the nursery but also the high quality required to maximize growth after weaning.

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# Fatigue is major cause of trucking accidents



A new report on the causes of rollover livestock trucking accidents in Canada and the United States has identified that driver fatigue is the main cause. "Most people assume that bad weather is the main cause of rollover accidents, but this common belief is simply not true," says Jennifer Woods, a livestock consultant from Blackie, Alberta and author of the report. Her key conclusion was drawn

from the fact that the majority of accidents occurred between midnight and 9.00am, were single vehicle accidents where the truck rolled on the right hand side and that driver error was found to be the most common cause of accidents. Alberta Farm Animal Care (AFAC) and Alberta Agriculture and Food funded the project.

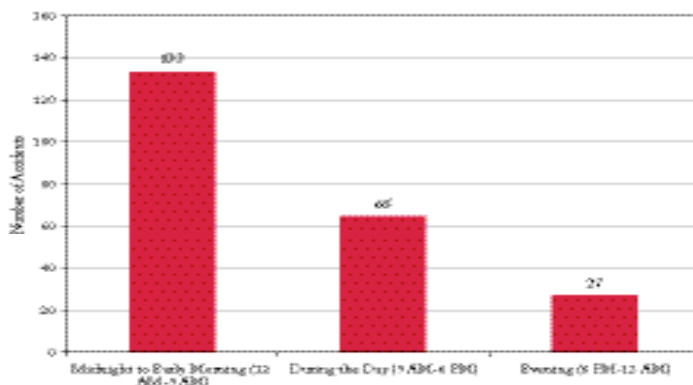
Woods documented 415 commercial livestock trailer accidents between 1994 and 2007, gathering information from a wide variety of sources, including the media, the emergency services, veterinarians, and government departments. The information documented, where available, included the date of the accident, location, time of day, type of animal, number of animals involved, number of animals killed, the position of the trailer following the accident, whether it was a single vehicle or multi-vehicle accident, the type of trailer, source of the information, and the cause of the accident.

The report notes that the highest number of documented accidents was recorded in October (12%), followed by November and August. July had the lowest number of accidents, with just 4.9%. "Weather had relatively little effect on the number of accidents when compared to other factors," she says. "During the months of December, January, and February, all of Canada and half of the U.S. is often covered in snow, causing potentially hazardous driving conditions. It was surprising that bad road conditions during the winter were not the main factor related to accidents."

Time of day was noted in 225 of the 415 documented accidents (Figure 1). Out of these, 59% occurred between midnight and

9.00am. However, Woods comments that her experience and transport company records suggest that about 90% of accidents occur during this time frame. "This is probably because most of the accident information gathered for the report was obtained from media outlets and accidents in rural areas that take place in the late evening and early morning are less likely to be reported," she suggests.

**Figure 1: Time of day the accident occurred**



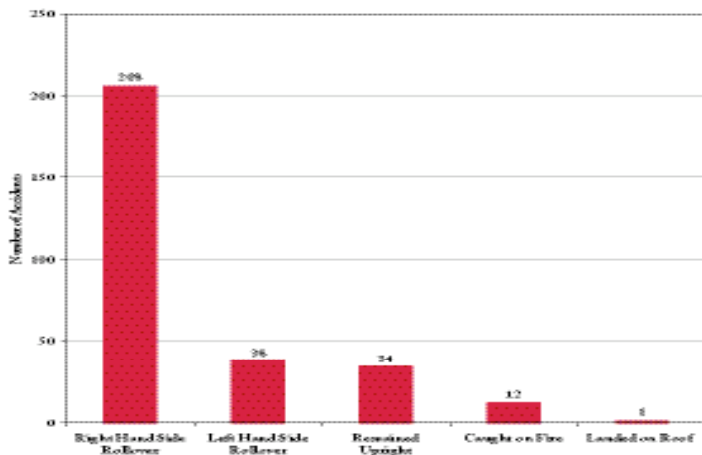
The results showed that 84% of trailers tipped up during the accident and, of these, 84% rolled onto their right-hand side, while only 15% rolled onto their left hand side (Figure 2). There are several factors that contribute to trailers going over on the right hand side, says Woods. "The right hand side of the road is the ditchside, so as the truck and trailer begin to drift, they often go to the right and hit the ditch," she notes. "Many of the roads in North America have very small shoulders, if any at all, which make inadvertent travel off of the primary road surface very unforgiving. The ditches can also be quite sloped, pulling the trailer into them."

Driver error was the cause of 85% of the accidents. Others at fault accounted for 10%, mechanical problems for 2%, and weather factors accounted for only 1%. Also, only 19% of accidents involved more than one vehicle, Woods points out.

Trucks carrying pigs were involved in 27% of the recorded accidents and, of these, 80% involved market hogs, 16% were carrying feeder or weaner pigs and 3% involved sows. Accidents involving pigs resulted in an average of 327 deaths per incident.

The timing of most accidents, the fact that they mainly involved only one vehicle, the high incidence of trailers rolling to the right and the high percentage of accidents caused by driver error, suggests that driver fatigue is the primary cause, says Woods. Fatigue is caused by irregular body clock schedule, lack of sleep, poor sleep, long work hours and medical problems, she explains. "It is natural for our bodies to feel tired between 1.00am and 6.00am no matter how much sleep you get during the day. Although there are fewer drivers on the road between midnight and 6.00am, statistics show they are more likely to have an accident." Research also shows that night drivers probably get around two hours less sleep than day drivers; it will be poorer sleep and they will feel more tired, she says.

**Figure 2: Position of the truck after accident**



One primary reason for driver fatigue is the high demands put on so many drivers due to a driver shortage and high industry turnover, Woods believes. “The fewer drivers on the road, the more pressure put on those who are driving,” she says. “Also, due to this shortage many companies are forced to hire unskilled drivers with little or no training on how to haul livestock. The recruitment and retention of qualified drivers is a huge challenge – especially for long-haul drivers.”

The current situation can be improved and some individual companies have implemented initiatives such as regular safety meetings, which are an effective part of accident prevention programs, says Woods. She quotes the example of Murphy Brown LLC, the production side of Smithfield Foods, which holds monthly safety meetings for their drivers. During these meetings, management personnel discuss a certain driver safety subject each month. Another example is a freight trucking company based in Pennsylvania that includes accident reports in their bi-monthly newsletter, with the details of what happened, what went wrong, and what was learned. The trucking company has found that once an accident is covered in the newsletter, they rarely see similar accidents happen again.

Better training and adequate preparation for dealing with an accident are the keys to reducing the number of accidents and the impact on animal welfare, Woods believes. “We must prepare the drivers, the transport companies, and the first responders to handle the accidents when they do happen,” she says. “Drivers must be provided with company policy and procedures to be followed in the event of an accident including instructions regarding who to call, what to do immediately following the accident, how to protect the animals and the public, how to work with the first responders when they arrive, and how to deal with the media.” To date, training programs for drivers have been quite limited, but that is changing, says Woods. The TQA (Trucker Quality Assurance) program, developed by the US National Pork Board, has been introduced in Canada and, from January 1, 2008 will include a new section covering accident prevention, driver fatigue management, delays and what to do when an accident occurs. Also, the Certified Livestock Transporter (CLT) program, developed by AFAC, includes accident prevention training.



First responders must also receive training in livestock accident response, Woods stresses. “They are on the front line when disaster strikes and it is the industry’s responsibility to assist in educating them on how to respond to livestock accidents,” she says. “Proper training of both drivers and first responders would reduce the financial loss to the operator and their insurance companies, and improve the welfare of the animals involved.”

One of the challenges will be to get the various sectors of the livestock industry to work together to reduce accidents, says Woods. “Transport seems segregated from the production and the processing sectors, with each saying it’s not their problem,” she feels. “We need to make sure that we have high standards in trucking and this is an industry issue, not just the trucker’s responsibility”

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# Consumer education initiative pays dividends

Over the last 50 years, knowledge of livestock production in the community at large has declined due to the ever-reducing number of people who have direct, or even indirect, contact with agriculture. The vast majority of the population now live in towns and cities and most have never visited a pig barn or a beef lot. This is especially true of the younger generation and the only way that most children are likely to see a livestock unit is through a school visit, possibly to the Pig Science Centre at the University of Alberta or the Pork Interpretive Gallery at the Prairie Swine Centre, both very successful industry initiatives.

Ignorance of livestock production has led to many misconceptions about the industry, fuelled by the propaganda of certain pressure groups and sometimes the popular press. Small wonder, then, that when it comes to issues such as the environment and animal welfare, producers often feel that they are always on the back foot. The challenge for the livestock industry as a whole is to get positive messages across, improve people's understanding of how food animals are produced and counter misconceptions. In 2004-5, Alberta Pork carried out the "Farm to Fork" advertising campaign, where the objective was to put a "human face" on the industry, while initiating dialogue on public issues. There are also ongoing activities, such as the Pig Rig and the Special Events Cruiser, part of the organization's Ambassador Program. Communicating with the consumer at large has become an important element in the work of producer organizations.

The challenge of engaging the public, much less influencing them, is one faced by all livestock sectors. Over the last two years, Alberta Pork has been working together with the other livestock product groups on an innovative campaign called *What's On Your Plate* (WOYP), which has just completed its second year.

The original idea for WOYP came in the fall of 2005, when the livestock groups approached the Alberta Livestock Industry Development Fund (ALIDF) for funding. The project initially involved producing a regular feature spread in the Edmonton Journal and Calgary Herald. "We asked ourselves what urbanites needed to know about the livestock industry," explains Jodi Hesse, Director of Policy and Communications at Alberta Pork. "We featured some producer profiles and covered themes such as environment, welfare, food safety and quality, economics and consumer health." Each month, one industry theme was covered with a corresponding producer profile, but the overall focus was to promote the livestock industry as a whole. A section of the feature called "Because You Asked" invited readers to ask questions about the industry and prizes were given for the best ones. "We guaranteed to provide an answer within a week and this was posted on the program's website - [whatsonyourplate.ca](http://whatsonyourplate.ca) - a question and answer was then selected to be featured in the next newspaper," says Hesse.

The feedback from readers was very positive. "Parents said that it helped them to initiate discussion with their children about the issues," Hesse points out. "We know that parents don't tend to have such discussions without a stimulus, such as the Pig Rig."

In its first year, WOYP was funded entirely by ALIDF as a development project, but for the 2007 program, the livestock groups shared the cost.

During 2007 there were a number of changes to the program. First, as a result of an Edmonton Journal survey, which suggested that more frequent publication would be most effective, the WOYP

feature appeared on the back page of the A-section every other Sunday. But the biggest change was the involvement of local actor and comedian Donovan Workum, who, as Dan Smart, set out to find where food comes from, visiting farms across the province in his (what else?) Smart car. Videos were made of the visits, which can be seen on the website and were also promoted in the newspapers. Dan also visited industry and consumer events such as cooking demonstrations and the Calgary Stampede. "Dan was a great advocate for the industry," enthuses Hesse. "He knew nothing about the livestock industry when he started but worked hard to understand the issues," she says. "He could identify misconceptions and how to overcome them and having a third-party advocate was very powerful for us."

Another element of the program was a competition to win the use of Dan's Smart car for a year. This will be awarded early in 2008 to a consumer who entered a draw. People were allowed on only one "free" draw, but for subsequent ones they had to participate in some way, for example by finding the Smart car logo on one of the livestock groups' websites.

Feedback from consumers suggests they have found the information educational and thought provoking, according to Hesse. "Because the messages were coming from multiple sources, it seemed to give them more credibility - they weren't just coming from Alberta Pork." Also, because an independent journalist wrote the articles, it provided a third-party look at the issues, she points out. "The producer profiling has been very effective and enabled us to show what we are doing to ensure food safety through the CQA program and the environmental controls that we have in place," Hesse comments. The success of WOYP has also been reflected in a huge increase in website traffic during 2007, with more than 100,000 unique hits every month and about 2500 comments and 100 questions from consumers. There has also been interest from schools, especially in rural areas, which have asked for copies of the Dan Smart videos.

Hesse feels that, overall, WOYP has been very beneficial to the livestock industry. "Although it's difficult to measure, improved perception of the industry helps us with issues such as permitting," she says. "It's also valuable now, when we are asking for public support in our time of crisis." Because of its effectiveness, WOYP will be continued during 2008, but the format changed to keep it fresh. "There was not much knowledge of hog producers and what they do. The campaign has shown that we're real people, living on farms and just trying to make an honest living," she concludes.



*Dan Smart visiting Dwight and Judy Peregrin's hog farm at Blackfoot, Alberta*

# Does a high water sulphur level increase odour and gaseous emissions?

*A recently published paper by Bernardo Predicala and John Patience of the Prairie Swine Centre, describes a study that was conducted to determine if high levels of sulphate in the drinking water results in an increase in odour and gaseous emissions from the barn or affects other swine manure properties.*

## Introduction

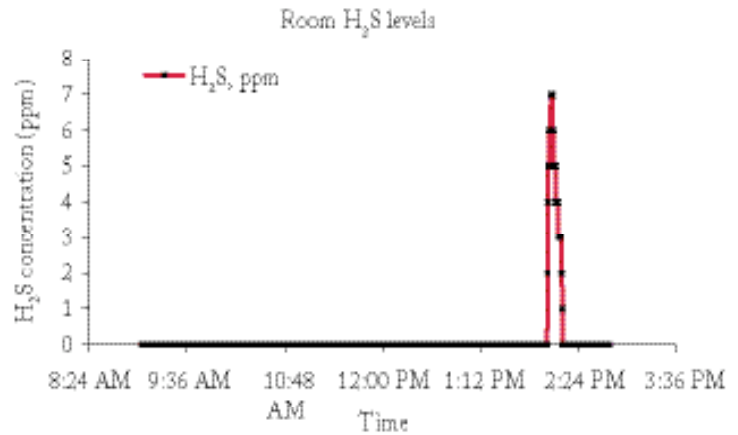
Sulphur intake is of particular concern because out of the 10 most odorous components of swine odour identified so far, six were found to contain sulphur. These odour components are produced mainly from anaerobic breakdown of unutilized nutrients excreted by pigs into the manure.

Drinking water can contribute significantly to sulphur intake of pigs. One major source is the sulphate content in water supplies, which has been found to exceed 1600 mg/L in certain geographic areas. Studies showed that pigs offered water with increased sulphate levels (up to 1800 mg/L) had increased prevalence of non-pathogenic diarrhea, although growth performance was rarely impaired. However, no one has assessed the impact of poor water quality on air emissions and swine manure properties.

The overall goal of this study was to determine the effect of varying levels of sulphur in drinking water on odour and gaseous emissions and on manure nutrient composition. Pig growth performance was also measured. Four water treatments were compared, normal water, with a low sulphate content and water with 600, 1200 and 1800 milligrams per litre of sulphate. The waters containing elevated sulphate were formulated to reflect the composition of water observed on commercial farms experiencing high mineral levels in their drinking water.

The 2-ft deep manure pits in the rooms used for the trial were emptied every two weeks. To evaluate the effect of the treatments on manure properties and gaseous emissions from manure under long-term storage, manure samples were collected from each room just before emptying the pits. The manure sample was transferred into a 205L (45 gallon) barrel, one for each room, and stored for an additional five weeks to simulate longer-term manure storage.

**Figure 1: Typical H<sub>2</sub>S levels monitored in a treatment room, showing no detectable values throughout most of the day, except during the plug-pulling event (indicated by the spike in H<sub>2</sub>S levels)**



## Gas levels spike when pits pulled

The levels of ammonia (NH<sub>3</sub>) and carbon dioxide (CO<sub>2</sub>) in each room were monitored continuously but were not markedly different between the different treatments. There was no statistically significant impact of the sulphate levels in the water on the concentrations and emissions of these gases from the treatment rooms.

Monitoring of hydrogen sulphide (H<sub>2</sub>S) levels in each room showed that they were extremely low, less than one part per million, which was less than the minimum that the detection equipment could measure. However, when the manure pit-plug was pulled to clear the manure from the pits, H<sub>2</sub>S levels increased



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during the approximately 15-min period in which the manure slurry was flowing out of the pit. A typical plot of the H<sub>2</sub>S levels during the plug-pulling day is shown in Figure 1; a similar pattern was observed in all of the rooms.

The peak H<sub>2</sub>S levels in the treatment rooms that received high-sulphate water (1200 and 1800 ppm) tended to be higher than in the low-sulphate rooms (Control and 600 ppm). However, these spikes occurred for only a short period of time and the high levels (288 and 134 ppm H<sub>2</sub>S for 1200 and 1800 ppm sulphate respectively) were dissipated to less than 10 ppm in less than 10 minutes. Nevertheless, it is possible that high-sulphate levels in drinking water could contribute to the generation of high H<sub>2</sub>S levels during manure clearing operations. If not conducted properly, this could potentially lead to exposure of barn workers and pigs to elevated H<sub>2</sub>S levels.

### Odour and emissions not affected

Odour concentration and emissions were not affected by the water treatment and high sulphate levels did not lead to an increase in the measurements of these parameters.

Analysis of manure samples collected from the manure pit of each room and from the barrels used to simulate longer-term manure storage showed no significant effect of water treatment on total nitrogen, ammonia-N, total solids or phosphorus in the room manure samples, but there were significant effects on potassium and sulphur levels. As would be expected, the manure sulphur level increased as water sulphate level increased.

Interestingly, comparison of nutrient levels in the barrel manure samples showed significant differences between treatments for all nutrients tested. Manure samples from the treatment rooms with sulphate added to the drinking water tended to have about 10% higher nutrient levels relative to the control samples (excluding S and Na which had 50% more than the control due to the treatment). Thus, it would appear that high-sulphate drinking water may result in better retention of nutrients in stored manure.


Pig performance was not adversely affected by high levels of sulphate in the pig's drinking water. During the study, no notable incidence of scouring or diarrhea was observed. The pigs' average daily gain ranged between 0.86 to 1.12 kg/day but was not different between treatments.

### Conclusions

Elevated levels of sulphate in the drinking water had no adverse impact on manure

nutrient composition, odour and gas (NH<sub>3</sub> and CO<sub>2</sub>) emissions or on the performance of grower-finisher pigs. Thus, water containing up to 1600 to 1800 ppm sulphate can be used for growing and finishing pigs with no concern for animal performance or for odour or gas emissions from the barn. However, we suggest one caution. When using high-sulphate drinking water, the potential exists for higher H<sub>2</sub>S spikes during manure handling operations. Appropriate measures should be taken to protect animal and worker health and safety. While water quality may impact other aspects of barn siting, growout pig performance and odour and gas emissions should not be a concern.

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# Feeding zero-tannin fababeans to hogs - effects on pork yield in primal cuts and loin quality

Chathurika Gunawardena, Wayne Robertson, Malachy Young, Laki Goonewardene, Ruurd Zijlstra and Eduardo Beltranena

In the previous issue of *Western Hog Journal* (Fall 2007, Vol. 29, No. 2), we summarized the growth performance and carcass traits of nearly 1000 hogs fed diets containing zero-tannin (ZT) fababeans (Snowbird) as a full replacement for either field pea or for soybean meal or half ZT fababeans, half soybean meal. In this article we report mainly the effects of the same diets on pork yield of the primal cuts and loin quality traits of these hogs. We wanted to ensure that feeding ZT fababeans would not compromise pork quality and jeopardize western Canadian pork export markets.

The study was conducted at the Drumloche Research Barn near Irma, AB. The pigs (Fast Pigs, SK) originated from the Lewisville herd within the Alberta Pig Company production system. Upon reaching a market weight of 118 kg, most hogs were shipped for slaughter to Britco in Langley, BC. A subsample of 96 hogs (24 per week) were shipped to Sturgeon Valley Pork at St. Albert, AB for slaughter on four consecutive Mondays. After an overnight chill, the half carcasses (sides) were shipped to Agriculture and Agri-Food Canada (AAFC) Lacombe Research Centre to establish the yield of primal cuts and evaluate pork loin quality.

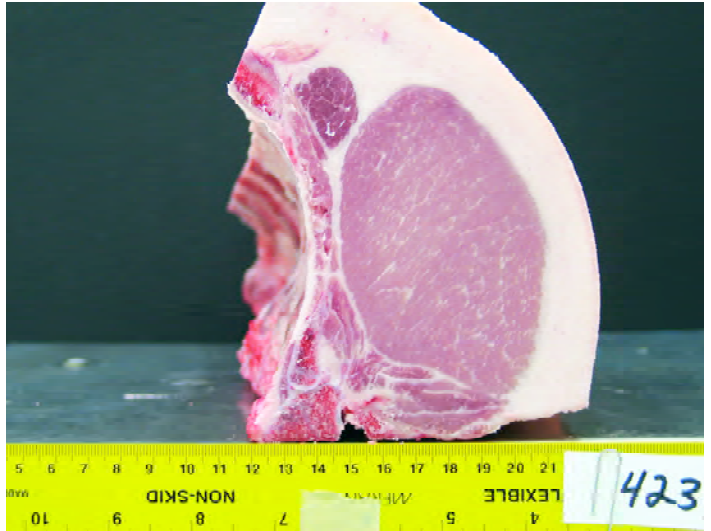


Figure 1. Cross-section image of a pork loin used to evaluate muscling (loin eye area), backfat thickness and marbling (specks of fat within the muscle).

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## Fat hardness

Pig carcasses can have very soft fat, very hard fat or something in between. Fat hardness is directly affected by what the pig eats. If the pig's feed contains saturated fats, such as tallow, then the carcass fat will also be more saturated and firmer. On the other hand, if the diet contains high levels of unsaturated fat, such as canola oil, then the carcass fat will also be more unsaturated and softer. Carcasses with fat that is too soft are undesirable because they are more difficult to process and the bacon is more difficult to slice. The hardness of bacon fat is very important to consumers. Bacon slices should separate well at cutting and cooking instead of gelling together. On arrival at AAFC Lacombe (Tuesdays), the half-carcass sides were re-hung in a carcass cooler. The next morning (Wednesdays, approximately 48 hours post-slaughter), the hardness of the second layer of fat beneath the skin, above the second thoracic vertebra, was measured using a durometer. The durometer we used had a scale with values ranging from 0 to 100. The higher the reading, the harder the fat.

## Backfat and ribeye dimensions

The amount of lean pork from a carcass and the corresponding payment to producers is estimated from backfat thickness and loin depth measured in the warm carcass. The loin was therefore sawn through between the third and fourth last ribs. This is the site where the grading probe was inserted at the slaughterhouse. A digital picture was taken of the cross-section (Figure 1) and used to measure backfat thickness and loin muscle depth. The picture was also used to measure the ribeye length and width and to calculate the area of this important muscle cut to consumers.

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### Loin marbling

Marbling refers to the small specks of fat within the muscle (intramuscular fat). The amount of marbling fat in pork chops can influence consumer perceptions of flavour and juiciness. The amount of marbling in the loin for each carcass side was subjectively scored in the cross section pictures taken (Figure 1). Scores were assigned using photographic marbling standards produced by the US National Pork Producers Council (NPPC). A marbling score of 2 or 3 corresponds to approximately 2 or 3% intramuscular fat, respectively.

### Pork yield of the primal cuts

As mentioned previously, the amount of lean pork from a carcass can be estimated from backfat thickness and loin depth. To first establish such a relationship, carcasses need to be cut out into primal cuts. The amount of lean, fat and bone is then weighed for each primal cut. Thus, on Wednesdays, the cold carcass sides were weighed prior to splitting them up into the five primal cuts: the picnic, the butt, the loin, the ham and the belly (Figure 2).



Figure 2. AAFC Lacombe Research Centre personnel cutting carcasses to determine lean yield and collecting muscle samples for pork quality evaluations.

Each of the primal cuts, except for the belly, was then carefully separated into fat, bone and lean pork (Figure 2). Each of these tissues was then weighed separately for each primal cut. The yield of the half carcass side for each hog was then calculated as the weight of the dissected lean pork in the picnic, butt, loin and ham plus the weight of the trimmed and squared belly (the bacon piece) and the side ribs. The added weight of lean pork from the primal cuts was then expressed as a proportion of the cold side weight.

The pork loin or back is the most valuable cut from the carcass. The loin eye muscle, referred to as the Longissimus, extends along the length of the back. This muscle is often evaluated as the most representative indicator of pork quality by meat researchers because of its high value to consumers.

### Loin colour, structure and firmness

The appearance of fresh pork is what primarily motivates a consumer to select one tray over others in a store display. Two highly experienced observers evaluated the front half of the loin eye muscle for colour, structure and firmness using several scales.

First, they rated the colour of the muscle using a five-point scale according to AAFC standards, ranging from one as extremely pale to five as extremely dark. Second, the observers rated the firmness and structure according to AAFC standards on a five-point scale, ranging from one as extremely soft, sweaty, dough-like, usually with open and grainy texture, to five as extremely firm, dry, sticky, with closed and grainless texture. Third, they rated the colour of the pork loins again using plastic resin models developed by the Japanese that can be useful when considering exporting to that country (Figure 3). Scores range from a one being extremely light to a six, which is extremely dark. Values of 3, 4 and 5, are generally desirable for the Japanese export market. Fourth, the colour and firmness, respectively, were also subjectively rated using the standards from NPPC. Colour was rated on a six-point scale; the palest loins rated 1 through the darkest loins rating 6. Firmness was rated on a five-point scale with one being very soft through to five being very firm.

To make the colour appraisal more objective compared to the subjective rating of the observers, a special instrument called a colour meter was used to measure light reflectance off the surface of the muscle (Figure 4). The colour meter was placed in full contact with a chop. When activated, the meter flashes a light and measures the characteristics of the light reflected back to it. The meter records four reflectance values:  $L^*$  is a measure of lightness; higher values indicate more light is reflected back making the surface appear brighter. Increasing positive values of  $a^*$ , indicate

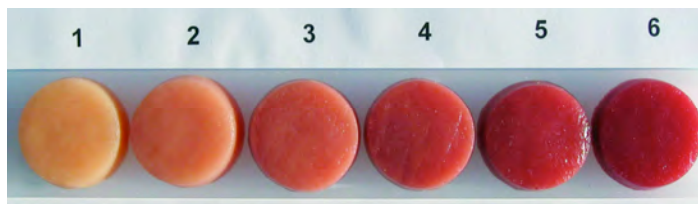


Figure 3. Trained observers rated the colour of the pork loins using plastic resin models developed by the Japanese that can be useful when exporting to that country. Values of 3, 4 and 5, are generally desirable for the Japanese export market.



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Figure 4. To measure light reflectance off the surface of the muscle, the Minolta CR-300 colour meter was placed in full contact with the chop, flashed a light beam and recorded four reflectance values.

increased levels of red, while higher positive values of  $b^*$ , indicate increasing yellow.  $C^*$  (chroma) indicates the degree of saturation, that is, how intense the colour is. Hue angle describes a specific tint, for example, light pink.

## Loin moisture and fat content

To consumers, the concentration of moisture in pork is important for juiciness and perceived tenderness. Thus, after evaluating the quality characteristics of the front portion of the loin eye muscle, it was ground for determination of water and fat content. The ground sample was dried in a convection oven at 102°C for 24 hours. The difference in weight between the wet sample and the dried sample indicated the moisture content.

Consumers have become more aware of the food they eat and are becoming more concerned about reducing fat intake. Fat around a retail cut can be trimmed with a knife, but the fat among muscle fibres (intramuscular) cannot. While consumers desire and select leaner pork in the retail counter, most meat researchers consider a certain amount of marbling fat necessary to ensure a consistent, satisfactory tasting experience unless the product is marinated or otherwise enhanced. So, to evaluate the amount of intramuscular fat, the fat among muscle fibres was extracted by boiling ground loin samples in petroleum ether. The amount of fat was then weighed after evaporating the ether. Loins from pigs with low marbling can have as little as 1% intramuscular fat. A desirable level of marbling that is thought to ensure eating quality without reducing the consumer intent to buy is 2.5 to 3%. Values above 5% fat are indicative of highly marbled pork.

*continued on page 60*

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**Loin drip loss**

When consumers buy fresh pork and take it home, they don't want to see excess juice in the package. So to evaluate drip loss, a chop was fabricated and weighed into a retail display tray. After 48 hours, it was unwrapped and weighed again. We considered the difference in weight as drip loss.

**Loin tenderness**

Consumers like moist, tender pork that is easy to cut and chew. We therefore evaluated tenderness by the amount of force required to slice through a core of cooked meat (shear force; Figure 5). A portion of the loin eye muscle was frozen and stored at approximately -25°C. After thawing at 4°C, two 2.5 cm thick chops were fabricated and cooked on a grill. Round cores were removed from the chops and sheared in a device called the Warner-Bratzler shear cell (Figure 5). Lower values indicated a more tender pork chop. Usual shear force values for broiled pork loin average between 4 and 6 kg.

**Results**

Table 1 summarizes the effect of dietary supplemental protein source on pork yield of the primal cuts. The diets fed had no effect on the proportion of lean, fat and bone in any of the four leanest primal cuts (the picnic, the butt, the loin or the ham), the four leanest cuts combined, or the four leanest cut plus the bacon piece and side ribs. Feeding ZT fababean thus resulted in similar



Figure 5. Tenderness was evaluated by the amount of force required to slice through a core of cooked meat (shear force) using an Instron Materials Testing System equipped with a Warner-Bratzler shear cell.

proportions of lean, fat and bone in primal cuts when it replaced field pea or soybean meal in the diet.

Typical sex differences were evident on pork yield in the primal cuts (data not shown). As expected, gilts had greater lean and lower fat compared to barrows, but the proportion of bone was not different between gilts and barrows.

Table 2 summarizes the effect of dietary supplemental protein source on fat hardness, backfat thickness, loin dimensions and loin quality measurements. The diets fed had mostly no effect in loin quality traits except for the Japanese colour scores, loin ultimate pH and drip loss.

The loin muscle of hogs fed the diet containing half ZT fababean and half soybean meal was slightly darker than that of hogs fed field pea or soybean meal. The loin muscle colour of hogs fed ZT fababean as full replacement for soybean meal or field pea was intermediate to the other diet treatments.

The loin muscles of hogs fed ZT fababean, either as a full replacement for field pea or full or partial replacement for soybean meal, had higher ultimate pH and lower drip loss. Both of these results indicate that hogs fed ZT fababean have greater muscle water holding capacity (juiciness), resulting in lower drip loss and therefore darker colour compared to feeding soybean meal or field pea.

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## Implications

The results of this second part of the study indicate that ZT fababeans can fully or partially replace either locally grown field pea or imported soybean meal as dietary supplemental protein source in hog diets. Instead of negative effects on fat hardness, backfat thickness, loin dimensions and loin quality traits, there were a few advantages of feeding ZT fababeans. Pork from hogs fed ZT fababeans was slightly darker, retained more water (juiciness) and had lower drip loss compared to pork from hogs fed either field pea or soybean meal.

The results of the live animal portion of this study reported in the previous issue of WHJ, also showed no detrimental effect of feeding ZT fababeans on growth performance and carcass characteristics of hogs. Therefore, Snowbird ZT fababeans planted in Alberta's Black or Grey Wooded soil zones is likely to result in more pork produced and higher income per cultivated land area compared to field pea in years with adequate rainfall (greater than 370 mm).

**Table 1: The effects of supplemental protein source (SBM, FABA, 50% SBM:50% FABA or PEA) in diets fed to hogs on the proportions of separable lean, fat and bone in the primal cuts and the amount of lean in the four leanest pork cuts (except belly) combined expressed as a proportion of cold carcass side (excluded head, tail, leaflard or kidneys)**

	SBM	FABA	50% SBM: 50% FABA	PEA
No. of sides dissected per diet	24	24	24	24
Picnic:				
Lean, %	64.2	63.7	63.6	63.7
Fat, %	27.2	27.4	27.8	27.6
Bone, %	8.3	8.7	8.3	8.3
Butt:				
Lean, %	59.1	58.7	58.2	57.9
Fat, %	36.1	36.1	36.9	37.0
Bone, %	4.5	4.6	4.6	4.7
Loin:				
Lean, %	55.5	54.5	54.8	53.3
Fat, %	32.1	32.8	32.5	34.1
Bone, %	12.1	12.4	12.3	12.5
Ham:				
Lean, %	61.5	61.1	61.0	60.8
Fat, %	23.7	24.0	24.4	24.5
Bone, %	8.5	8.5	8.4	8.4
Four primal cuts, kg	31.148	30.994	31.097	30.922
Lean in 4 cuts, %	61.1	59.4	60.5	59.3
Fat in 4 cuts, %	29.2	30.6	29.7	30.9
Bone in 4 cuts, %	9.5	9.7	9.6	9.4
Yield in 4 cuts + bacon + sideribs, kg	24.350	23.829	24.083	23.640
Lean as % of side	56.9	55.7	56.3	55.3

## Take Home Message

Alberta pork producers can be confident when feeding locally grown zero-tannin (ZT) fababeans in substitution for locally grown field pea or imported soybean in hog diets. Our results show that feeding ZT fababeans (Snowbird) as the sole source of supplemental protein in hog diets had no detrimental effects on pork fat hardness, backfat thickness, loin dimensions and loin quality traits. Consumers around the world may find slightly darker, juicier pork from hogs fed ZT fababeans to be a bit more attractive to purchase than pork from hogs fed soybean or field pea.

## Acknowledgements

Alberta Agriculture and Food funded the animal performance part of this project. We wish to recognize the superb in-kind contribution of Agriculture and Agri-food Canada for evaluating pork yield and loin quality traits. The Alberta Pulse Growers, the Saskatchewan Pulse Growers and SaskPork contributed partial funding to Chathurika Gunawardena as the project graduate student. Special thanks to Stan Landry as well as Chuck Pimm and his staff at the Lacombe Research Centre meat lab for their expertise and methodical approach to evaluating the carcass sides. We commend Ken Lopetinsky and Mark Olson at Alberta Agriculture and Food for their leadership in pulse research agronomy and extension.

*continued on page 62*



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**Correction**

In the previous article on feeding zero-tannin fababean to hogs, there was an error in Table 1 on page 48 of the magazine – “Test phase diets offered to hogs (31 to 118kg liveweight). The four headings denoting the diets used should have been SBM, Faba, SBM-Faba and Pea.

**Table 2: The effects of supplemental protein source (SBM, FABA, 50%SBM:50%FABA or PEA) in diets fed to hogs on fat hardness, backfat thickness, loin dimensions and loin quality measurements**

	SBM	FABA	50% SBM: 50% FABA	PEA
Number of sides evaluated per diet	24	24	24	24
Fat hardnessz, Durometer units	67.47	67.31	68.73	71.53
Measurements on digital picture taken between the 3rd and 4th last ribs (grading site):				
3/4 fat <sup>v</sup> , cm	1.68	1.72	1.74	1.86
7cm fat <sup>z</sup> , cm	1.59	1.58	1.68	1.78
Muscle depth <sup>x</sup> , cm	6.24	6.15	6.31	6.17
Ribeye max. length, cm	9.95	9.94	9.90	9.97
Ribeye max. width, cm	6.16	6.03	6.26	6.11
Ribeye area, cm <sup>2</sup>	45.46	45.31	46.16	46.06
NPPC marbling score	2.67	2.60	2.42	2.48
Subjective assessment of meat quality of the loin eye muscle:				
AAFC colour <sup>w</sup> score	3.06	2.98	3.25	2.99
AAFC structure <sup>w</sup> score	2.98	3.00	3.10	3.01
NPPC colour <sup>w</sup> score	3.02	3.15	3.21	3.01
NPPC firmness <sup>w</sup> score	3.27	3.17	3.25	2.88
Japanese colour <sup>w</sup> score	3.02 a	3.17 ab	3.40 b	3.04 a
Objective assessment of meat quality of the loin eye muscle:				
Minolta CR-300 colour meter				
CIE <sup>v</sup> L* (lightness)	53.40	52.25	52.05	53.78
CIE <sup>v</sup> a* (redness)	8.02	7.55	7.97	8.08
CIE <sup>v</sup> b* (yellowness)	5.30	4.68	4.84	5.31
CIE <sup>v</sup> C (saturation)	9.63	8.90	9.34	9.70
CIE <sup>v</sup> hue angle (tint)	33.38	31.67	30.91	33.09
Ultimate pH	5.51 a	5.56 b	5.55 b	5.49 a
Moisture, g/100g	73.72	73.78	73.71	73.81
Fat content <sup>u</sup> , g/100g	3.02	3.01	2.97	2.99
Drip loss after 48h, %	6.12 a	4.83 b	4.87 b	5.94 a
Shear force <sup>t</sup> , kg	5.11	5.22	5.27	4.94

<sup>a,b</sup> Values in a row with different letters beside them, indicate that the dietary treatments were statistically different.

<sup>z</sup> Measured in the second layer of fat beneath the skin above the second thoracic vertebra. Higher values indicate firmer fat.


<sup>y</sup> Depth of subcutaneous fat over the loin eye muscle measured at a point – the length of the eye from the chine bone.

<sup>x</sup> Backfat thickness and loin muscle depth measured 7 cm off the carcass midline between the 3rd and 4th last ribs.

<sup>w</sup> Higher values indicate darker colour, better structure and greater firmness.

<sup>v</sup> Higher values indicate: L\* brighter in appearance, a\* more red, b\* more yellow, C\* more intense colour; Hue indicates a tint (e.g., light pink, brownish).

<sup>u</sup> Chemical analysis of the intramuscular fat to confirm the subjective marbling scoring.

<sup>t</sup> Force required to shear 

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## Every pen, every pig, every day Identifying and treating sick pigs

By Don McDermid, Pfizer Animal Health

If you read Western Hog Journal's Fall 2007 issue, you got a taste of Pfizer Animal Health's new producer education program, *Walking the Pens*. Designed to help farmers identify and treat individual pigs, this program is one way that Pfizer supports the Canadian hog industry.

In the last issue we looked at how to give pigs the best possible start by creating the right barn conditions to prevent disease. Now we want to turn our attention to identification and treatment of sick pigs. As you read on, keep in mind these six simple words - every pen, every pig, every day. Each pen must be entered and every pig observed each day. Why? Early treatment is the key to getting ahead of the disease process. Identification and treatment of individual pigs saves lives.

### Identifying sick pigs

The difficulty in identifying sick pigs lies in their nature - they will attempt to hide their illness from you. Very sick pigs are easy to find - they look or behave quite differently. Unfortunately, they do not respond as well to treatment. However, pigs in the early stages of sickness are more difficult to find; but taking the time to look is well worth it because they will respond well to timely therapy, helping to limit no-value pigs or dead pigs in a herd.

The first indicator a pig is sick is its behaviour. Sick pigs may be lethargic and be closer to the wall or feeder. When you watch the pigs move, sick pigs may get pushed to the side or stumble when the pigs rush to the corner of their pen.

Appearance is also important. A sick pig's flanks may be sunken because of reduced feed or water intake. Their eyes may be dull or exhibiting black exudates (body fluids) and their ears lifeless. Some may have swollen joints or a stiff walk; others may be pinker due to fever. Some may exhibit subtle navel infections; others may exhibit belly pumping, coughing or diarrhea.

Walking the pens every day will help you be attuned to even slight behavioural and appearance changes - the first signs of disease. Pay particular attention during the first two weeks post-entry in a nursery, finisher or wean-to-finish barn, as movement is stressful for pigs and



*Tear stains under the eyes are a sign of possible sickness*

*continued on page 64*



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mixing different litters together may expose pigs to additional diseases. In addition, take note of environmental factors that may contribute to illness, such as air quality and temperature, and the proper functioning of drinkers and feeders.

When you witness changes in behaviour or appearance in your herd, it is important to contact your veterinarian to discuss treatment protocols.

With those thoughts in mind, let us now turn our attention more specifically to respiratory and neurological illnesses.

## Respiratory infections

While we can always hope for a quiet, “cough free” barn, the reality is that most times we enter the barn we will hear a percentage of pigs coughing. Some coughs are acute - a new, rapid-onset infection. Others are chronic - pigs that never recovered from an initial disease onset and have chronic damage or recurring infections.

Bacteria, viruses and the environment can all cause coughing. Early in the nursery, *Streptococcus suis* (Strep) and *Haemophilus parasuis* (HPS or Glasser’s) can be causes. PRRS, SIV and Circovirus can contribute to coughing at any stage. Mycoplasma pneumonia most commonly occurs in the grow-finish stage of production, though it may also occur in the nursery.

When you are walking the barns looking for coughing pigs, take the following steps:

**Walk and clap:** Walk to the end of the barn clapping your hands. Consider entering the pen furthest from the main entrance first. If you have a continuous pen, start looking for coughing pigs from the far end after walking through to get pigs up.

**Look at each pig:** Pigs with pneumonia may not cough; they may only experience “thumping” shallow, rapid breathing with or without coughing. Others may be lethargic and have a rough coat.

**Mark and treat as you walk:** Carry a marker and the treatment with you so you can identify and treat pigs as you find them. In a respiratory disease outbreak, you may not have time to treat all pigs as you find them. If so, mark pigs as you identify them and come back later with treatment. Consider having two people per pen with markers to identify sick pigs and use a



*A rough coat may indicate respiratory disease*

different colour to mark them after treatment.

Early treatment, as recommended by your veterinarian, is the key to success. For diagnosed problems on your farm, your veterinarian will outline treatments and determine which should be your first and second injectable choices. Each barn should have guidelines for treatments written by a veterinarian. The veterinarian will likely give you a percentage guideline to determine when mass therapy is needed.

Follow your veterinarian’s guidelines carefully to ensure you are meeting the needs of the group as well as the needs of individual sick pigs.

When a high percentage of the herd is coughing the veterinarian must decide whether to inject all pigs or inject obviously sick pigs and water medicate the others. It is also important to consider what sort of program is needed to prevent this from happening again. For example, you may use vaccination or pulse therapy of antibiotics in the feed or water.

If a barn is affected enough that water or feed medications are necessary, it is important to walk the barn *more* intensively and look for sick pigs needing injectable therapy. A frequent mistake with coughing pigs is to assume that when medication is in the feed or water that there is no need for injectable antibiotics. Sick pigs needing treatment are often eating or drinking at a reduced rate, and will benefit from injectable medicine.

## Neurological infections

The first signs of neurological infections may include circling, down and paddling, rough-haired, rapid weight loss, sunken, glazed or staring eyes. Slightly later or concurrent signs include widened or “stressed” eyes, a pinker tone to the skin (feverish) or a slight head tilt. If you catch pigs at the glazed eye stage they will respond more readily to treatment.

Two of the most common types of illness in the early nursery or wean-to-finish barn which are linked to these symptoms are *Streptococcus suis* (Strep) and *Haemophilus parasuis* (HPS, Glasser’s). Other causes include edema disease, salt

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*Incoordinated movement is likely a sign of neurological diseases*

toxicity/water deprivation and vitamin deficiencies, though the latter is less common. The incidence of the disease may be affected by weaning age, quality of ventilation, all-in/all-out strategies and possibly vaccination.

Regardless of the cause, it is important to get your veterinarian involved to get an accurate diagnosis. Early treatment with an antibiotic and anti-inflammatory/anti-pain medication is essential. Depending on the illness, your veterinarian may prescribe the following medications or good production practices to reduce incidences of the two most common causes of neurological infections:

### Strep and HPS:

- Tighter weaning ages coming from your sow farm
- Keeping primary infections such as PRRS under control
- Maintaining good ventilation
- Maintaining strategic pathogen control
- Medication programs in the pre-weaning phase

In certain herds with particularly pathogenic strains, your veterinarian may use vaccination programs to help prevent infections.

### Conclusion

Producers that take the time to learn how to identify the symptoms of illness and who check every pen, every pig, every day, should find that they only need to spend a few seconds per pig to identify those needing treatment. Doing so will lead to better disease prevention and to faster identification and treatment of diseases when they appear.

In the next issue, we will look at the veterinarian-producer relationship, and how to implement tools from Walking the Pens into your daily routine.

*Dr. Don McDermid is Manager of Veterinary Services in the Swine Group at Pfizer Animal Health.*

## Walking the pens - Identifying sick pigs checklist

*Slight changes in pigs' behaviour and appearance can indicate the beginning of disease. The following questions can serve as a checklist of items to look for when walking the pens:*

### Observations from outside the pen:

- Are the pigs as a group too lethargic?
- Are they too hot?
- Are they feverish?
- Are they treating each other well?
- Are there any loose stools on the floor or walls?
- How do the stools look in general? Too loose or just right?
- Is the pen too damp or is it dry?
- Is there wetness under the drinker? (There should be a little so we know it is working)
- How high is the drinker? (It should be shoulder high)

### Observations from inside the pen:

- Is there a pig standing by itself in the corner or lying against the wall, not interacting with the other pigs?
- Do any of the pigs have rougher hair?
- How do their ears look? Perky or lifeless?
- Do they have gunky or tear stained eyes?
- What is their skin colour? Is it pale? - possible ulcer. Is it too pink? - possible fever.
- Are they taking an interest in you or is their head down?
- Do you hear coughing?
- Are any pigs stumbling or walking stiffly?
- Do they have swollen joints?
- Do any pigs have loose stool on their rear end?

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# Benchmarking as a tool to improve productivity and profitability

By Western Swine Health Associates: Chris Byra, Gail Cunningham, Shawn Davidson, Frank Marshall, Chris Misutka and Pete Pawluk

## What is benchmarking?

Benchmarking is essentially comparing the performance of one farm against others. This can be done informally over conversation at coffee, or at producer meetings. It has the most meaning, however, when records are taken and the data analyzed in a standardized method across farms. The analysis involves calculation of key production parameters for each farm, then comparing them using statistical calculations that identify average, top, and lower end levels of production. This clearly identifies areas on farms where improvements can be made.

This process has become considerably more challenging in recent years as the industry has evolved from using one swine management software program to using several. It is unfortunate that these programs calculate key parameters in different ways, so direct comparison from one program to another is difficult. We have found the most appropriate way to adapt to these changes is to collect raw data from farms then use the formulas published by the US National Pork Board to generate key production parameters.

We also note that benchmarking is not intended to be an attack on producers or their suppliers, nor an expectation that all farms will reach the top levels of productivity. Benchmarking works when producers use the information to identify shortfalls in their production and make steady improvements over time. For that reason, benchmarking against your own historical data is of great value as well.

## Benchmarking physical performance

There literally are hundreds of production parameters that potentially could be benchmarked, but looking at too much data is often confusing. For this reason we try to focus on parameters that are indicators of overall production issues. Physical performance can be broken down into Reproductive Parameters, Health Parameters, and “Bottom Line” Parameters - or those that have the greatest impact financially.

Reproductive parameters focus on the usual suspects:

- Farrowing rate: is an indicator of overall breeding success and management in the breeding barn
- Litter size: Including total born, live born, and number of pigs weaned per litter. This gives us an indication of overall breeding herd productivity plus farrowing management and parity distribution (effect on stillborns)
- Litters per sow per year
- Pigs weaned per sow per year: This really is a “bragging rights” parameter with little link to overall profitability of hog farms. Throughput is a far more important overall indicator

Mortality rates are commonly used as a crude measure of health. They are easy to measure and are also very important to herd productivity. Mortality is broadly categorized into sow

mortality, pre-wean mortality, and post-wean mortality. From that, once a problem is identified, further analysis will lead to the underlying cause. Mortality rates are largely impacted by health status and management issues, but also have important effects on the feed conversion, barn throughput, and overall profitability.

The “Bottom Line” parameters are those that have the largest financial impact on the farm:

- Feed Conversion Efficiency: Can be an indicator of diet formulation, feed wastage, growth rates, and have a major impact on feed cost. Accurate calculation and benchmarking of feed conversion is especially important with producers coming to grips with rising feed grain prices.
- Pigs sold per sow per year: Both total pigs sold and premium market pigs sold. The difference between the two numbers is very important - if too many substandard or “cull” hogs are being shipped from a farm the financial impact can be dramatic. “Target weight market pigs sold per sow” is a far more financially important number than pigs weaned per sow, as we have observed in many situations where farms wean large numbers but can’t successfully move all those pigs into their target market.
- “Facility Utilization”: This is essentially a calculation of the percentage of pigs that are moving through a system, compared to its capacity. All barns have a target flow based on their floor space, and ideally we would like to wean 100% of target and sell 100 % of target. This is the key throughput parameter - and this is the one that pays the bills!

**Table 1: Example Western Swine Health Associates Client Benchmarking for January - June 2007 (note: Dataset incomplete)**

	Top 10%	AVERAGE	Bottom 10%
Sow mortality rate (%)	4.4	6.7	10.5
Farrowing rate (%)	91.6	87.9	83.6
Total born/litter	12.8	12.2	11.6
Live born/litter	11.7	11.0	10.3
Pigs weaned/litter	10.8	10.1	9.4
Pre-wean mortality (%)	5.7	8.8	11.6
Litters/mated female/year	2.50	2.40	2.27
Pigs weaned/mated female/year	26.1	23.8	22.2
Post-wean mortality rate (%)	3.0	6.7	9.7
Total pigs sold/mated female/year	24.7	22.6	20.7
Market hogs sold/mated female/year	24.0	22.3	20.6
Whole herd feed conversion	2.98	3.25	3.44

It is not uncommon to find farms that really excel in some categories, but do very poorly in others. Benchmarking is used to identify which parameters are which on each farm. Care must be

*continued on page 68*

taken not to interpret a farm's performance based on any individual parameter by itself. Assessing the overall performance of a farm requires careful consideration of many pieces of data.

**Benchmarking financial performance**

As margins continue to get tighter in pig production, accurate measurement of financial performance and ensuring your operation is cost competitive is a key element of survival. In benchmarking, we assess both the revenue and expense side of the operation.

Revenue is measured in gross revenue per sow, which is a function of the number of target weight market hogs sold and the value received for those hogs. We then assess both the revenue per pig (which is largely related to slaughter weight) and revenue per 100 kg (which is related to carcass quality/index, and marketing). This all relates back to the number of target market weight pigs shipped. Ensuring the maximum value is achieved for every hog has a tremendous effect on profitability.

Expenses are standardized to cost per 100 kg (live weight) of hog marketed. Standardization to a body weight ensures fair comparison between farms with very different shipping weights. Expenses are broadly broken down into categories as follows:

- Feed is of course the largest input in any hog operation, and the one that shows the greatest variance in benchmarking calculations. There are many factors that can influence overall feed cost including feed conversion, feed wastage, inappropriate ration transitions/feed budgets, diet formulation, and ingredient cost. In the past 3 years we have observed feed cost variance of as much as \$20 per 100 kg marketed between different farms. Having this information assists us to identify a problem, then dig deeper to address it.
- Health costs are highly correlated to health status and have ranged by as much as \$10 per 100 kg. Total health costs include health services and all medications (feed, water, and injectable).

- Genetics measures the cost of purchased breeding stock and royalties paid for in-house multiplication facilities.
- Utilities is a measure of electricity and natural gas going into an operation. Due to rising energy costs, many farms are much more aware of the utility bills than they may have been in the past. In most farms we can find efficiencies by optimizing our ventilation controls to minimize energy requirements. Benchmarking helps us identify which farms require this type of service.
- Labour cost is often poorly accounted for in many "family farm" type operations, but in all hog farms is a very significant cost.
- Freight is a function of location from market and varies greatly based on location. Freight has also become more of a factor in recent years with rising energy prices.
- Total costs encompass all of these, plus barn supplies, marketing costs, maintenance, insurance, office, interest on long-term debt, etc.

All put together, we can find variation in production costs as high as \$30 per 100 kg marketed using standardized calculations, putting some operations at an extreme cost of production disadvantage. Benchmarking is the tool that has allowed us to identify these farms and take steps to move them towards profitability.

In closing, we encourage all producers to get involved in benchmarking the performance of their operations. As producers are faced with increasing costs, and slimmer packer margins decrease the value paid for hogs, producers struggle to find ways to maintain profitability. Benchmarking can be a valuable tool to help identify shortfalls in productivity and cost of production issues that can be improved. As the Canadian industry strives to stay competitive in the global marketplace, producers can and should gauge their own production against that of their peers, to help their farms stay competitive.

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## Biofuels 'crime against humanity'

A United Nations expert has condemned the growing use of crops to produce bio-fuels as a crime against humanity. The UN special rapporteur on the right to food, Jean Ziegler, said he feared bio-fuels would bring more hunger.

Mr Ziegler's remarks, made at the UN headquarters in New York, are clearly designed to grab attention. He complained of an ill-conceived dash to convert foodstuffs such as corn and sugar into fuel, which created a recipe for disaster. It was, he said, a crime against humanity to divert arable land to the production of crops, which are then burned for fuel. He called for a five-year ban on the practice.

Within that time, according to Mr Ziegler, technological advances would enable the use of agricultural waste, such as corn cobs and banana leaves, rather than crops themselves to produce fuel.

The growth in the use of crops to manufacture bio-fuels has already led to significant increases in food prices, which affects the world's poorest nations more than the developed countries. The IMF (International Monetary Fund) has voiced concern that the increasing global reliance on grain as a source of fuel could have serious implications for the world's poor.

## New method for estimating sow weight

Scientists at Kansas State University have developed a method for estimating the body weight of sows using a 'flank-to-flank' measurement. This measurement is from immediately in front of the sow's back legs, over the back of the sow to the point of the other flank. In order to make measurement on the farm easier for producers, the researchers have also created a cloth tape with respective colour-coded sections, each of which corresponds to a certain weight.

An estimate of the body weight of a sow is the first important step to efficient feeding. According to Mike Tokach, state leader of K-State Research and Extension's animal science programs, the body weight determines around 80% of the feed needs of a gestating sow. However, a precise estimation of each sow's weight is extremely difficult.

"Once the weight group is established, a tool on the university's Department of Animal Sciences and Industry website can be used to determine correct feed amounts," said Tokach.

## Dutch fast food giants ban meat from castrated pigs

The fast food chain McDonald's has announced that it is to stop selling meat from castrated pigs in the Netherlands. "For

pork in our products Egg McMuffin and Big Tasty Bacon we will switch to animal friendly pork," commented spokesman Dirk van den Boogaart from McDonald's Netherlands. "This is because we switched to a different supplier. This supplier is from the UK and will supply meat from British pigs which are not castrated as from the end of October."

Burger King has also announced that from the New Year it won't be serving bacon from pigs castrated without an anaesthetic in the Netherlands. The company's pork will continue to come from England and Ireland. Several leading Dutch food producers have already said they will stop using meat from castrated pigs by 2009. There was a bid in the Dutch parliament in November for an outright ban on castration of pigs without an anaesthetic, but it was defeated.

## Newsham acquires Monsanto Choice Genetics

Newsham Genetics, LC, based in West Des Moines, Iowa, has now finalized the acquisition of Monsanto Choice Genetics, Inc.

The purchase is expected to bolster Newsham's expanding business base, says Mark Weaver, DVM, Newsham's co-chief executive officer. "We are excited for the opportunities in research, genomics and products that the combined power of these two businesses presents to the swine industry. Additionally, we are changing the name of our company to Newsham Choice

*continued on page 70*

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6	1.3	0.8	0.5
6.5	1.2	0.7	0.4
7	1.1	0.7	0.4
7.5	1.0	0.6	0.4

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## INTERNATIONAL ROUND-UP CONTINUED

Genetics to better exemplify our offerings," says Weaver.

Newsham Genetics placed high value on the significant investment made by MCG over the past 10 years in their genomics platform, says a company news release. Monsanto developed the most extensive swine genomic map in the industry, with over 6,000 genomic marker associations for swine performance. This technology will allow Newsham to accelerate genetic progress across many different traits for the industry.

As part of the agreement, a three-year research alliance has been established between the two companies. The alliance will focus on technology and the genomics platform to maximize the value created in the industry from these tools.

### Study finds antibiotics fed to swine in groundwater

A recent study by the University of Illinois has linked the routine use of the antibiotic tetracycline, used in swine production, to the presence of antibiotic resistance genes in groundwater. The study determined that the genes themselves "move" through populations of different species of bacteria. The findings were among the first to track antibiotic resistance genes rather than the organisms that host them.

The researchers found that these genes are transferred "like batons" from one bacterial species to another, a conclusion that has serious implications for antibiotics used to treat human disease. The use of tetracycline in pigs could lead to resistance to similar antibiotics important to human medicine, say the researchers.

"When it comes to resistance, bacteria are promiscuous. They easily swap the genes that make them impervious to antibiotics, making the threat very real that eventually bugs causing infections in humans will be the ones resistant to treatment," said David Wallinga, M.D., director of the Food and Health Program at the Institute for Agriculture and Trade Policy.

### Olympic pigs get daily exercise

The Chinese government has embarked on a program to raise pigs

especially for Olympic athletes, both from China and other participating countries. Qianxihe Food Group or Lucky Crane, the supplier of pork for the 2008 Olympics, recently announced the project, saying that its aim is to provide the athletes with the purest of meat with no substances that could interfere with doping tests.

The location of the pig farms are top secret for anti-terrorism purposes, but have been chosen carefully with regard to the quality of air, water and soil, says the company. The pigs are fed with a diet of special organically grown feed and Chinese herbal medicines. In addition, various press resources revealed that the pigs would be doing "at least two hours exercise every day".

Following a series of incidents involving contaminated food and other products produced in China, the government is no doubt keen to ensure that safe and wholesome food is supplied during the games. A Shanghai consultant, Laura Yang, is quoted as stating that the food safety applied during the Olympics is vital for the country's image. However, Chinese Internet bloggers have created an online uproar, fuelled by the growing frustration of ordinary Chinese with tainted food and inhumane working environments. Following the massive rise in the cost of pork during 2007, many people struggle to afford pork, which is the most widely eaten meat in China.

However, The Beijing Olympics organizing committee later denied the media reports. "It is absolutely unnecessary for the Beijing municipal government to require companies to produce so-called special Olympic pigs," the committee said in a statement, calling the reports "false and an exaggeration."

### Danish Crown extends European lead

Processor Danish Crown has consolidated its position as Europe's largest meat processor with recent announcements about acquisitions in the UK and Sweden. Its UK division, Tulip Food Service Ltd., is purchasing Geo. Adams & Sons, which processes about 8% of British pigs.

The takeover will create one of Britain's biggest meat conglomerates, having UK sales of £1.2 billion (\$2.4 billion) and a total of 9,000 employees.

Tulip has invested significantly in the UK market in recent years, in both production and processing sectors. It purchased UK integrated pig production company BQP in 2004, giving Tulip a substantial share of the outdoor-bred pork market. The new group, which will be called Tulip Ltd., will cover the complete range from farm to fork, including pig production, abattoirs and fresh meat operations, as well as significant bacon, cooked meats and other processed products.

Carsten Jakobsen, Chairman of Tulip Ltd, says that the primary goal is for a closer working relationship with UK supermarket customers and suppliers. However, Danish Crown assured that this would not be at the expense of producer livelihoods. The company is, after all, a successful farmer-owned co-operative-based business, it pointed out.

Danish Crown will also acquire the Swedish cooperative slaughterhouse KLS. Last year, KLS processed 207,000 pigs, 40,000 head of cattle and over 10,000 sheep. In the last few years, however, throughput has been decreasing and in 2006, the cooperative suffered losses of 4 million. The takeover is the second move in Sweden by Danish Crown in a relatively short period of time. Last August, Danish Crown acquired the Swedish slaughterhouse Ugglarps.

Danish Crown is the second largest meat processor in the world, after Smithfield Foods, processing 21.2 million hogs and 0.4 million cattle per year.

### German biogas project will light up 50,000 homes

A major new biogas project in Germany will produce enough energy to power 50,000 homes, according to a recent news release by Big Dutchman, whose subsidiary Agro Renewables GmbH & Co. KG will build the biogas plants. In the next two years the company is going to build modern biogas projects at approximately 40 locations all over Germany, which will achieve an output of more than 20 Megawatts (MW eL) of "green electricity". The heat produced by the biogas digesters will be used locally and the remains of the biogas-process are going to be used as high-quality fertilizer. The cost of the project is estimated to be 46.1 million euros.

### NPPC urges access to EU and Japan in WTO trade pact

The National Pork Producers Council has led a delegation of U.S. pork industry representatives to Geneva, Switzerland, for meetings with U.S. trade negotiators, World Trade Organization Director-General Pascal Lamy and trade officials from a number of WTO nations. Their mission was to underscore the necessity of completing a global multilateral trade agreement that includes new market access for U.S. pork products.

The NPPC said that significant new market access into the European Union and Japan is a prerequisite for pork producer support of the Doha Round of WTO negotiations, which started in 2001 and are ongoing. "EU trade officials understand that expanded market access for pork in the EU is key to concluding

a deal with the United States," said NPPC President Jill Appell, who led the delegation. "While EU pork consumption totals more than 20 million metric tons annually, U.S. pork exports to the EU currently are only about 20,000 metric tons a year."

The NPPC delegation made it clear to EU officials that the web of tariff and non-tariff barriers that currently restrict U.S. pork exports must be lowered. It made a similar appeal to trade officials from Japan. "While Japan is the top export market for U.S. pork," said NPPC CEO Neil Dierks, "we are only scratching the surface in that country."

New and expanded market access through trade agreements has been the most important catalyst for increasing U.S. pork exports, says the NPPC. "Since the U.S.-Canada Free Trade Agreement was implemented in 1989, exports of U.S. pork products have grown to more than \$2.6 billion from \$394 million."

### Bacon may help in heart attack survival

Cured meats such as bacon and ham, which contain nitrates and nitrites as preservatives, may help in heart attack survival

*continued on page 72*

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and recovery, suggests a recently published study from the USA. The researchers report that these compounds, also found in vegetables and drinking water, reduced heart cell death in the mice following a heart attack by 48%.

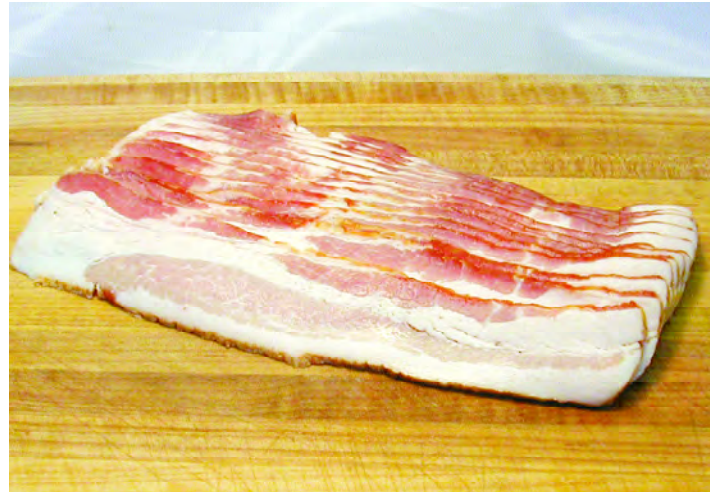
Animals with a low nitrite/nitrate diet had 59 per cent greater injury, say the researchers from the University of Texas Health Science Center at Houston.

Nitrites are added to meat to retard rancidity, stabilize flavour, and establish the characteristic pink colour of cured meat. However, some studies have suggested that increased consumption of nitrites from cured meat could increase the risk of lung disease.

“The public perception is that nitrite/nitrate are carcinogens but they are not,” says the lead author of the new study, Nathan Bryan. “If nitrite and nitrate were harmful to us, then we would not be advised to eat green leafy vegetables or swallow our own saliva, which is enriched in nitrate.”

He also notes that vegetables have up to 100 times more nitrate than processed meats, meaning nitrite and nitrate from processed or cured meats may account for only a small quantity of these compounds consumed in the diet.

The potential mechanism behind the observations is proposed to be from the formation of nitric oxide from nitrites. Nitric oxide is a molecule used by the endothelium (cells lining the surface of blood vessels) to signal surrounding



Cured meats, such as bacon, may help in heart attack survival and recovery (Photo courtesy Ontario Pork)

muscle to relax, leading to a reduction in blood pressure, reduced blood clotting and protection against heart attacks and strokes.

“Simple changes in our daily dietary habits such as eating nitrite and nitrate rich foods such as fruits and vegetables and some meats in moderation can drastically improve outcome following a heart attack,” added Bryan.

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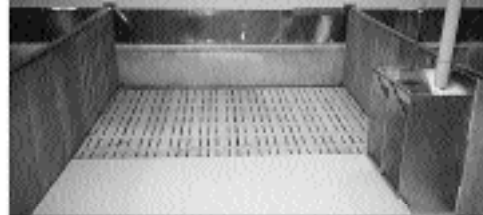
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## The “problem” of larger litters

By John Gadd

We had better do something about the situation where litters are getting bigger and bigger. Do something about it - when it is a good thing? The larger litters we are seeing these days are due partly to the steady improvement in genetics and partly to improved management and stockmanship. In 1995 my clients were averaging 10 born alive, 9 weaned (with 17% of litters nudging 12 or more). Now it is 11 b/a's, 9.8 weaned (20% around 12 or more) and the Danes are forecasting they will hit 13 b/a's as an average by 2016.

Nevertheless I am seeing across the world more smaller piglets born and fewer survivals to weaning which has to be set against this larger litter size. And there is more evidence of the “Thin Sow Syndrome” of the 1980s - remember? This time I prefer to call it the “Shattered Sow Syndrome!”

A Chinese breeder said to me years ago when we were over there hunting for their higher prolificacy. “Larger litters - yes, good. But more pigs lost to weaning - bad!” “Especially of total borns,” I suggested and he agreed... “We lose a lot late in the farrowing,” he said. He was getting litters of 16.

Larger litters - those a lot less prolific than that - are in danger of running our sows ragged. Of course at the start of lactation she should be in good condition, and that's not too difficult to achieve. But getting the sow to consume enough nutrients to make the milk needed to supply the needs of these increasingly larger litters is another matter. I give below the extent of the problem as I see it and this often surprises the breeder when he is shown the figures in Tables 1 and 2.

Thirty years ago expected sow performance, based on the sow needing to provide 4.25g of milk for each 1g of piglet gain, is given in Table 1. Most farmers found that this could usually be achieved


with the sow genotypes of the time, which were strong on “mothering” and milk-yield traits, and the “nuisance” of creep feeding seemed to be less important in those days.

**Table 1: The effect of genetic improvement on sow productivity over the past 2 to 3 decades on the amount of milk she needs to produce a litter of 10 piglets (Based on 4.25 g milk needed to sustain 1g of suckler growth)**

	Days after farrowing	Target daily gain (g/d)	Milk required kg/day	Food needed to produce that milk (at 3585 kcal/kg)
1980	1	90	3.83	2.00
	2	110	4.68	2.47
	3	130	5.53	2.87
	4	150	6.38	3.33
(a.d.g. 120g/day)				
2007	1	100	4.25	2.22
	2	120	5.10	2.69
	3	150	6.38	3.31
	4	180	7.65	3.99
(a.d.g 138 g/day)				

Today, added to bigger litters and perhaps later weaning, modern sows are also stronger genetically in passing meat-forming growth traits to their progeny, so that the need for adequate milk to sustain that demand is greater (Table 2). Added to this was the nuisance factor of needing a separate gestation feed three weeks


*continued on page 74*




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before farrowing, although in future with specialized late-gestation diets already being talked about, this objection, I guess, will disappear.

In 2007, average litter size can well be nearer 11 and not the 10 of 20 years ago, thus the feed intake/day soon after farrowing needed to sustain a 10% larger litter growing 18g/day faster is suggested in Table 2 below.

**Table 2: The added effect of a 10% larger litter size compared to 1980. Feed required, kg/day, in early lactation**

Day 1	2.44
2	2.96
3	3.64
4	4.39

Thus today about 1 kg more food intake/day could be needed by day 4 compared to 1980. This can be alleviated to some extent by increasing the nutrient density of the lactation diet, but in practice this compensates by only a small amount due to the appetite-limiting effect of a more energy-rich diet, which itself has a negative effect in hot conditions due to the heat increment effect of a higher-energy food on the sows appetite at this time. Many of us now are feeding the lactating sows wet by pipeline. This increases appetite, especially in summer conditions.

Incidentally - and you may well ask - why do I hark back as far as 20 years when doing these comparisons? I feel that insufficient fundamental work has been done on the nutrition of the sow genotype since then. Sure, this may raise a few hackles in academia, but surely trace mineral needs are an example? Also commercial nutritionists tell me they view the published nutrition requirements of the sow as being out of date in certain areas, and they use their own.

**Creep feeding now back in with a bang**

Far more important than it was 20 years ago. First, nutritionists now know how to design a baby piglet feed which won't cause undue gut disturbance. I say "undue" because the piglet can cope with these new sophisticated formulæ as long as the provision is little and often and in immaculately clean feeders. This takes time

and diligence, but if you want to reap the harvest of weaners being 1kg heavier and consequently 10 to 14 days quicker to slaughter (which is where the real benefit lies) then that is what is called for.

Next, in Europe anyway, more of us are weaning later (28 days) and this makes creep feeding as soon as possible - not "advisable" as some mistakenly say! - but mandatory and essential. This brings back into focus the idea of "imprinting" where a fat-soluble flavour is added to the late gestation diet. Being fat-soluble this flavour gets into the sow's milk. Within a day or two of suckling the piglets take more quickly to a creep feed which has the same flavour added to it. A neat idea which works.

Third, liquid or more accurately semi-solid creep diets will pay dividends, but they won't if the feeding gear is not kept scrupulously clean - hygiene again. If you are not prepared to "wash the dishes" to a high standard - don't touch it - they will only get loose.

**Speeding up farrowing time**

Another penalty of those larger litters. We all know that it is the last four pigs to be born which are going to snuff it if any of them are going to, usually due to hypoxia (shortage of oxygen) in the two from last, and anoxia (lack of any oxygen) in the tail end two. A major cause of stillbirths. And you don't have to be Einstein to figure that a litter of 12 or 13 takes longer to be born than one of 9 or 10. The longer it takes to expel them - the more will be lost, especially as bigger litters tend to have more smaller joeys. Remember Dr English's words "The piglet starts to die as soon as farrowing commences."

Another very neat and apparently successful idea is to feed a "sports drink" type product which has made an appearance on the market recently. Containing rapidly-available energy and other goodies which help the birthing process, it is administered from 8 hours to just before farrowing and applied in paste form by a dispenser rather like the "gun" builders use to seal cracks. Comprehensive trials show it has reduced average farrowing time from 160 minutes to 110 minutes and there is a marked reduction in stillbirths. A spin-off from this research is that it seemed to improve post-natal appetite in the sow, which resulted in piglets 0.5 kg heavier at weaning.

**Fostering will take some of the pressure off the sow**

With very large litters, not to foster some of the recently born elsewhere risks a severe loss of the dam's condition which could affect the numbers and viability of the next litter, unless the "skip-a-heat" technique is used on such overworked sows in lactation, but this lowers herd productivity by increasing costly "empty days" (non-productive days). However, while fostering is an answer, we suspect, in our experience of PMWS-AD over here, it runs the risk of inflaming this scourge, and you should always consult your vet first, foster really early anyway and go-see an experienced practitioner before you adopt it as a helpful solution to the large litter problem. **WHLI**

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# Artificial Insemination - a European review\*

By Stuart Lumb

*\*The majority of this article is a précis of a paper given by Dr Meritxell Donadeu of PIC Europe at the 2007 International Pig Science Conference held at the University of Nottingham, UK, along with additional comments by the author.*

Fifty years ago AI in pigs was practically unknown but today in many European countries it accounts for well over 90% of matings. Ironically England pioneered many of the AI techniques, yet has only in the last 10 years taken up the concepts with 80% of breeding now done through AI.

## On-farm AI

This system, also known as Do - It - Yourself (D-I-Y) AI, is not the preferred option, but is popular in some countries or regions such as Italy. It may be preferred for health reasons when the health status of the commercial studs is not acceptable - for example when the studs have boars positive for PRRSV and the recipient farm is PRRSV negative or when commercial farmers do not have confidence in the health status of the commercial stud. In some cases commercial studs are too far away and semen shipping is not a practical option. Disadvantages are that the quality of boars may be lower. Also more boars may have to be kept as insurance against lameness and infertility.

## Commercial boar studs

In countries such as the Netherlands and Germany the studs are co-operatively owned. In Spain and France AI studs operate as commercial companies or studs may be owned by breeding companies (UK).

## Recent developments in boar management and semen processing

**Housing and environment:** The latest trend is to house boars in deep sawdust instead of on solid floors or on other types of flooring. Deep sawdust keeps the boars clean and dry and only needs changing once or twice a year. Note that boars need to be wormed before entry and checked regularly for parasites.

**Welfare:** Current European legislation prescribes a living area of at least 6m<sup>2</sup> per boar, with some welfare groups recommending 7.5m<sup>2</sup>.

**Health:** The risk of disease introduction onto a farm can be looked at from two points of view. On the one hand, there are fewer diseases that can be spread via semen when compared with diseases potentially spread by the introduction of live animals. On the other hand, the frequency of semen introduction is high

*continued on page 76*

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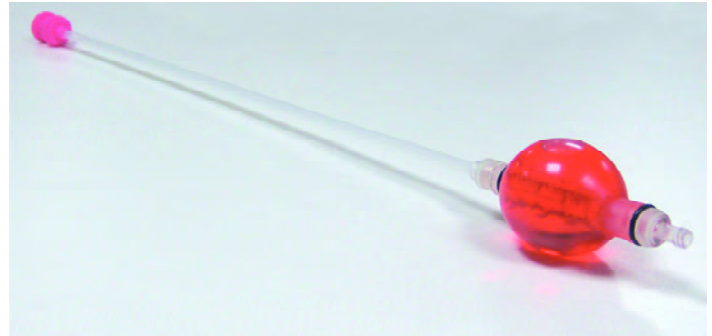
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(usually a minimum of once a week) so that increases the risk. The impact of a disease breakdown in a boar stud could be very large as many farms could be potentially affected. For example a 250-place boar stud would supply semen for approximately 75,000 sows.

Polymerase Chain Reaction (PCR) tests have improved over recent years. The tests can be used on semen, serum or both and PCRs are mainly used to monitor semen for the presence of PRRSv. The RT-nested PCRs are the tests with the highest sensitivity.

Testing semen, rather than blood, has the advantage that the boars do not need to be restrained for sampling, but has the disadvantage that the results might not be available before the semen is used. Because most viruses will appear in blood before they appear in semen, new blood sampling techniques are becoming more common. Blood samples are obtained from veins whilst the boars are mounting the dummy. Blood testing can be very useful, for example, when monitoring PRRSv negative studs for recent infection.

Semen washing is a relatively new technique, although not yet ready for use commercially. However, an adapted version has been proved to eliminate PRRSv from semen. A fertility study has recently been carried out to see if washing would affect semen quality and farm performance using PRRSv negative washed semen. Seventy-five inseminations were carried out using washed semen versus 47 using normally processed semen. For both groups the farrowing rate was over 95% and litter size was over 12, with the differences being statistically non-significant.



*The Cobiporc Neosem catheter*

### Semen collection and equipment

Over the last 6 years automatic collection machines such as Gene Diffusion's Collectis® have appeared on the market. An electro-pneumatic regulation unit enables the collection to take place mechanically and with this machine one employee can supervise up to 3 collection units, a big saving in labour. Semi-automatic collection units such as Minitub's Automate® have also recently come on the market.

### Semen processing

Recent developments in the measurement of semen concentration include the NucleoCounter®, produced by ChemoMetec A/S. This system uses fluorescent stains to count seminal DNA. Whilst being accurate, precise, simple and fast this technology is still relatively expensive for small studs.

### Quality control programs

Centres generally have their own QC programs. In the UK though, following industry concerns about semen quality the British Pig Executive (BPEX) met up with all the AI centres, the outcome of which has been the establishment of a common uniform quality standard, independently monitored by BPEX.

### Extenders for fresh semen

- Short - up to 3 days
- Medium - up to 5-6 days
- Long - up to 8-9 and even 10 days

Long term extenders have improved and have the benefit that PCR results can be available before shipment of the semen, but they are more expensive and there is still a perception that "fresher" is better.

### Semen containers

Semen is usually packed in bags, tubes or flat packs, which are flexible and can be coloured. The Gedis® is a 6-inch long catheter which contains the semen. This catheter is inserted through the vulva and the sow then absorbs the semen without human aid. French company Cobiporc has just



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launched their NEOSEM system. Semen is held under pressure in a container about the size of a golf ball. When the container is attached to the catheter the semen flows quickly into the sow.

## Catheters

The trend these days is for more and more plastic to be used to manufacture catheters, wrappers plus of course flat packs, blisters etc. All this is non re-useable which has bonuses as far as hygiene is concerned, but is adding to our ecological problems as plastic has to be disposed of correctly plus is generally non-recyclable. Going round the trade fairs a few companies are still selling the traditional Melrose re-useable rubber catheters, which older readers will remember using in their youth. Plastic is going to get more expensive, plus disposal costs will also increase. Perhaps an AI company might revisit here and consider developing a 21st Century re-useable catheter, one that is easier to sterilize & dry than the old style Melrose variety? Just a thought...

## Insemination techniques

In recent years intra-uterine insemination techniques have been developed. With this technique semen can be either deposited either in the uterine body or the uterine horn.

**Uterine body (IUBI):** The semen is deposited in the uterine body, approximately 8 inches further than with the cervical method. A double catheter is needed for insemination. Some studies showed that the sperm concentration could be reduced by two-thirds without affecting farrowing rates or litter size. Other studies though found that litter size was significantly lower using the IUBI technique.

**Uterine horn or deep intra-uterine insemination (DIUI):** A flexible catheter 70 in. long and 1/4 in. in diameter is inserted into the middle of one uterine horn. This technique requires a great deal of skill and has specialized application with frozen/ thawed semen, or sexed semen.

### Frozen/thawed semen

Using frozen/thawed semen is ideal where pig units are located in remote areas. Disease-wise, it allows the possibility of testing semen for pathogens before the semen is dispatched for use. The technique allows rare breeds to be preserved. Unfortunately it is expensive and also science still has not come up with ways of thawing semen successfully and so litter numbers are less than when compared with using fresh semen.



*Inseminating with the Cobiporc Neosem system  
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# Crate expectations

By Jane Jordan

Few would criticise the merits of the farrowing crate - it is reliable, efficient and possibly the best system available for nurturing neo-natal piglets. However, now that welfare is climbing the ranks of consumer concerns, a great crate debate is emerging in Europe. Denmark is leading the way in investigating alternative farrowing systems and, at the same time, finding out more about sow behaviour and performance in both crates and loose farrowing pens.

“Our industry wants to be ahead of any possible legislation that may be put forward in the future. Rather we act now to find suitable alternatives than wait for rules to be imposed,” says Dr Lene Pedersen, a research scientist at Denmark’s Aarhus University.

Dr. Pedersen is involved with a joint project between Aarhus and Copenhagen Universities and the Agricultural Research Centre at Foulum, investigating free-farrowing pens. The studies were set up in the mid-1990s and are part funded by the Danish Meat Association (DMA). The focus is on practical and profitable technology at a commercial level but as yet there are still no conclusive results. However, the research is providing a valuable insight into sow behaviour at farrowing and is also proving a good defence for the crate. It remains the most efficient system in terms of piglet survival rates, welfare, ease of management and sow performance.

Loose farrowing pens are viable if they are designed and managed carefully and there are benefits to sow health and welfare. For example, sows display fewer shoulder sores and are also calmer at farrowing and during lactation. Piglet mortality rates can also be minimized if pens are structured to encourage specific lying behaviour and escape routes for piglets. And, as with all production systems, performance is markedly better when high levels of stockmanship are implemented.



Dr Lene Pedersen, a research scientist at Denmark’s Aarhus University

## Not just sows

However, sow welfare is not the sole focus with a free-farrowing system, says Dr Vivi Aarestrup Moustsen, a scientist with DMA’s Pig Production sector. She has been studying farrowing systems since 2001. Trials at Denmark’s Agricultural Research Centre are currently testing a number of pen designs to establish which systems best suit piglet welfare, ease of management and staff access and safety - also vital areas of consideration, says Dr Moustsen.

Preliminary results show that in all designs piglets do need an escape route and a warmer creep area. They also demonstrate that sow behaviour can be manipulated by pen layout. Placing rails or obstacles in certain positions does ‘persuade’ sows to lie down in a particular place or direction. Researchers have also found that angled walls prevent sows from lying flush against pen sides. This prevents overlays and offers piglets a safe haven (Figure 1). Wall bars and centralized creep boxes also work well.

Figure 1: Piglet protection in a loose farrowing system



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Positive human interaction is also vitally important, especially before sows start to farrow. It helps to build confidence, in the animals and the staff, and the studies show that any interventions needed at farrowing or when piglets are treated or fostered, are far easier to do. But loose farrowing pens must offer some form of sow restraint and easy 'escape routes' for stockmen because safety is paramount.

The Danish researchers are also looking at how sows that are loosed housed in gestation, which are the majority in Denmark, adapt to confinement at farrowing and in lactation. Behavioural studies by Dr Lene Pedersen show that introducing sows to farrowing crates late in gestation and close to parturition can influence the number of live born piglets. Observations show that gilts which are introduced to crates the day before farrowing have a tendency for long, protracted farrowings, more difficulties and higher numbers of still born piglets. These animals also suffer higher neo-natal mortality rates. "Hypoxia (oxygen deprivation) during the birth process is the main reason for stillbirths. It's also attributable to other neo-natal mortalities such as hypothermia, starvation and crushing," says Dr Pedersen. Piglets subjected to a prolonged birth also tend to be weaker and less vigorous, which makes them more susceptible to chilling and overlay.

### Litter losses

Dr Pedersen says that as litter size increases, this becomes a greater issue - the bigger the litter, the longer the birth process, bringing with it an increased risk of hypoxia.



*Research into loose farrowing systems has been taking place in Denmark since the mid-1990s*

Some stress is inevitable when moving heavily pregnant sows into crates, but moving them as early as possible can counteract farrowing problems, says Dr Pedersen. "Our studies confirm that it takes sows between three and five days to settle down" *continued on page 80*

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after they are moved into farrowing pens. The nearer they are to their farrowing date when they are moved, then the more difficulties they seem to encounter when farrowing” she adds.

The stress induced by moving seems to compound the stress of farrowing itself and this appears to have a detrimental effect on piglet survival.

Investigations with loose farrowing systems reveal similar problems. However, in these situations the sows’ ability to carry out nesting behaviour seems to appease the stress associated with moving. DMA scientist Dr Vivi Moustsen says sows that are managed in loose farrowing pens display significantly different farrowing behaviours that those in crates. “Loose systems don’t disrupt maternal instincts, and sows do not display the unsettled behaviour often seen in crates,” she explained. These sows also have much easier births with fewer stillborn piglets. Dr Moustsen believes that to some extent this is due to environmental stability. Loose-housed sows experience a complete change of environment - from freedom to confinement - when they are put into crates, although they do cope well.

### Inadequate

There have been few developments related to farrowing systems in the past ten years, with only minor changes seen to pen/crate design. Many of the systems installed on Danish



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farms are really unsuitable for modern genotypes, says Dr Moustsen. “Sows are now 20 per cent heavier and 10 per cent longer than they were 10 years ago and litter size is up around three piglets to 14.9,” she explains. Weaning age has also increased and so litter weight and piglet sizes are far greater during lactation. On many farms pen sizes need to be increased to accommodate this higher stocking rate.

“We need to provide accommodation that enables the sow to nurse her young successfully without compromising welfare for her or her piglets,” said Dr Moustsen.

But loose farrowing is not the answer just yet. The stress factors may be reduced because sows are able to express innate behaviour at a critical period (nest building, rooting etc); and studies also show that overlays may not be such a huge problem. Once sows began to farrow, they will remain static, and continue to do so, for up to 20 hours after the first piglet is born, which allows the piglets to suckle easily and in relative safety. However, to be viable, loose systems must be workable, practical and efficient with the assurance that they will perform as well, if not better, than crates - and currently that’s not the case.

# • Pigs Down Under



By John Riley, IAS Management Services

## Canadian technology adopted profitably by Australian producers

The unprecedented high price of grain and depressed pig meat prices due to record levels of imports of pig meat from Denmark, the United States and Canada, is having serious financial implications for the pig producers Down Under. A spokesperson for Australian Pork Ltd the national body that looks after the political, research and promotional interests of the Australian industry stated recently that their members were losing \$50 on every pig slaughtered.

Results from a sample of IAS Management Services clients in Queensland showed an average loss of \$12 per bacon pig sold during the financial year ending June 30th 2007. The sample drawn from family farms with an average herd size of 470 sows have responded by reducing sow numbers to date by 31%, reducing the number of paid employees by 46%, reducing the fees to contractor growers by 20% and terminating their agreement with over 50% of the contractors. Every member of the group has been forced to obtain additional finance resulting in a decrease in the level of owner equity in the individual businesses.

As a result of the economic realities QAF Meat Industries, which owns about 60,000 sows and their progeny in New South Wales and Victoria has announced a reduction of about 15,000 in sows numbers and made 100 skilled staff redundant. QAF is a vertically integrated company and the largest producer of pork in Australia, representing 20% of national production.

To maximise market returns and reduce financial penalties several Australian producers have installed on their units a Super Sorter that was made in Alberta. One producer who has an alliance with two contract grow-out units has seen an immediate increase in market returns on the one unit where the Super Sorter has been installed. Both contractors manage pigs from 4 weeks of age in deep litter shelters with around 200 pigs in a group. The target sale weight is within the range 80 to 95 kilogram dressed carcass weight and under 13mm back fat.

On unit A the pigs are moved to fully slatted housing where the Super Sorter is installed one week before the anticipated load out date of the fastest growing pigs. On unit B the pigs are marketed directly from the shelter after visual selection.

The success of the introduction of the Super Sorter is illustrated in the scatter graphs showing slaughter weight plotted against back fat thickness at the P2 position. On site A there were no overweight pigs in the load and the under weights are at an acceptable level for a large group on a deep litter system. Having improved selection for load out the focus will now turn to improving the quality of the carcasses.

On site B the overweights incurred a penalty of 2.5% for every kilogram over 95kg and could also depress Feed Conversion Efficiency. A Super Sorter is currently being installed on Contract Grower unit B and becomes operational in early December after which market returns on that unit should improve.

Maximizing return from the market place is essential if Australian producers are to survive. In the short term the price of grain, which is at record levels here, is only expected to fall marginally but it is confidently predicted that market specifications will become more stringent with penalties on non-conforming carcasses increasing in severity. The ability of producers to meet the buyers' increasingly stringent specifications consistently is not helped by the adoption of housing systems based on large groups of pigs in deep litter systems.



The Alberta-made Super Sorter in use in a finishing barn in Australia

With the trend to housing growing pigs in large groups the installation of the Super Sorter is seen as a profitable investment resulting from the higher percentage of premium grade pigs loaded out each week.

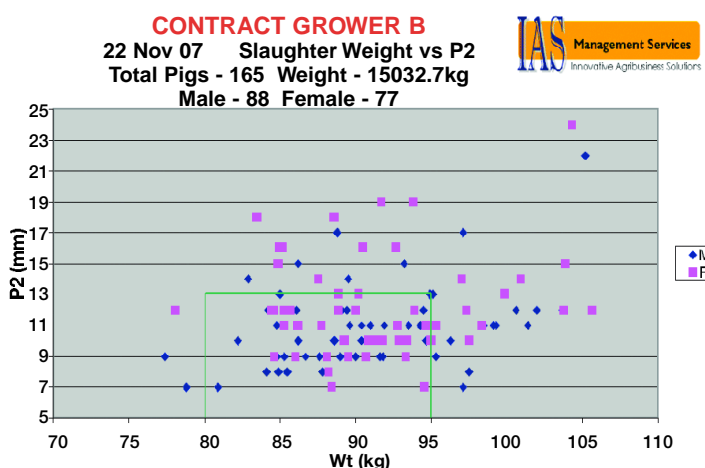
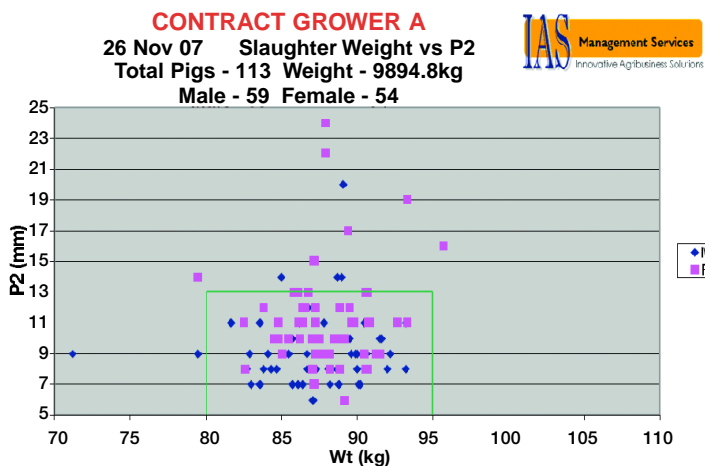
## Ileitis vaccine boosts growth and market weight

Clinical and sub clinical infection by *Lawsonia intracellularis* is a problem on many Australian pig units reducing growth rate, feed utilization and increased reliance on antibiotics. Product testing of the Boehringer Ingelheim Entrosol Ileitis vaccine on a commercial unit measuring before and after results has shown an increase in slaughter weight and an improvement in feed conversion efficiency. The pigs in the farm test were vaccinated at four weeks of age.

Table 1: Response to Entrosol Ileitis vaccine

	Pre -vaccination performance	Post vaccination performance
Birth to sale (days)	159	156
Average live weight at slaughter (kg)	101.6	102.7
Life time growth rate (grams/day)	638	658
Grower Herd FCR from 3 weeks to 101kg live weight	2.5:1	2.45:1

continued on page 82



**Table 2: The effect of chilled drinking water on sow and pig performance in lactation between November – April 06**

	Uncooled	Cooled	Sig
Av. drinking water temperature (°C)	25.4	21.4	
No. sows	80	80	
Av. parity	3.3	3.4	
<b>Total feed offered (kg)</b>	<b>146.6</b>	<b>155.9</b>	<b>(p=0.015)</b>
<b>Feed offered (kg/d)</b>	<b>5.64</b>	<b>5.87</b>	
Water disappearance (L/sow/day)	29	34	
Sow weight loss farrowing to weaning (kg)	9.00	8.77	
Sow fat loss farrowing to weaning (mm/sow)	2.00	2.37	
No. piglets on sow 2 days after farrowing	10.40	10.30	
No. piglets weaned	9.40	9.50	
Average piglet weaning weight (kg)	8.10	8.27	
<b>Av weight gained from start to weaning (kg)</b>	<b>6.50</b>	<b>6.70</b>	<b>(p=0.200)</b>
<b>Pre weaning mortality (%)</b>	<b>10.0</b>	<b>7.50</b>	<b>(p=0.151)</b>
Average days on test (days)	26.10	26.60	
Weaning to re-mating (days)	7.80	6.80	

**Cool water improves lactation feed intake**

High climatic temperature often over 30°C for days on end results in environmental temperature being a problem in the summer months of November to March. The effect in all but the very well designed sheds is a depression in daily feed intake in both the sow and the growing pig. In sows the result can be excessive weight loss during lactation and rebreeding problems loosely referred to as summer infertility and autumn abortion. In the growing pig reduced feed intake depresses growth rate and increases feed conversion ratio. In addition to reduced feed intake water consumption can be depressed if the supply offered is too high.

Work by Sara Willis, a nutritionist with the Department of Primary Industries and Fisheries in Queensland has found a positive effect on sow performance by providing a cooled water supply to lactating sows. In Australia and particularly in Queensland climatic temperatures can be over 30°C for extended periods from November to March (our summer). Optimizing feed intake is a problem in both the lactating sow and the growing pig. The results of the trial at the University of Queensland are included in Table 2. The results might have an application in parts of Canada in high summer or on units where the temperature of the water delivered to the animal is above the recommended temperature.

**Industry asks for safeguards on imports**

December 14th 2007 could be a watershed moment for the Australian pork industry. On that date the findings of a Pig Meat Safe Guards Inquiry are due to be delivered to the Federal Government. The industry is requesting that some action is taken to safeguard it from the effects of record imports (109,000 tonnes shipped weight) in the twelve months ending August 2007. The response from Government of Canada and Canada Pork International, as you would anticipate, present strong cases as to why imports of pig meat should not be affected. Similar cases have been made by government and industry bodies in Denmark and the USA. I do not believe that Australian producers are asking for imports to be banned but are simply asking for a government policy which achieves a balance rather than a seasonal glut of imports.

Australian producers struggling with the economics of pig production on the other side of the world are envious of the support given to the industry in Canada where the government has announced a \$25 million package for the Circovirus Inoculation Programme (CIP). The Aussie producer is even more envious of the assistance given to Danish producers through Private Storage Aids and Export Refunds currently at €31.10 per 100 kilogram and €19.10 per 100 kilogram respectively.

Whatever the outcome, the one sector of society which is guaranteed to be wealthy at the end of the inquiry is the legal profession but certainly not the producers in Australia or Canada.





## Orange Pork Chop with Rhubarb Compote

By Roy Kruse and James Ducs, Alberta Pork



Yield: Serves 6 ❖ Cooking Time: 20 Minutes ❖ Preparation Time: 30 Minutes

### Ingredients

6	6	Pork rib chops
1 tbsp	(15 ml)	cracked black peppercorns
1 1/2 tsp	(7 ml)	grated orange zest
1 tbsp	(15 ml)	fresh thyme leaves, or 1 tsp (5 ml) dried
1/2 tsp	(2 ml)	salt
1 tbsp	(15 ml)	vegetable oil

### For Rhubarb Compote:

3 tbsp	(50 ml)	balsamic vinegar
2/3 cup	(150 ml)	brown sugar
1 tbsp	(15 ml)	grated fresh ginger
2 cups	(500 ml)	fresh or frozen sliced rhubarb

### Cooking Instructions

#### Cooking Instructions

Combine pepper, zest, thyme, and salt. Rub pork with mixture. Heat oil in skillet and cook chops over medium heat until springy when touched, and with a hint of pink in the centre, about 5 minutes each side for a 3/4-inch (2.0 cm) chop.

If ribs chops are unavailable, rib steaks or centre cut chops/steaks are equally good choices.

Combine vinegar, sugar, and ginger in a saucepan and bring to a boil. Add rhubarb and return to a boil and simmer until rhubarb is tender, about 1 minute. Drain rhubarb thoroughly and set aside. Simmer remaining liquid until slightly thickened and reduced to about 1/2 cup (125ml). Stir in reserved rhubarb and cook until compote is of desired consistency; cool.

Store refrigerated for up to 2 weeks.

Makes 1 cup (250 ml).

Serve with pork warm or at room temperature.

### Nutritional information Orange Pork Chop with Rhubarb Compote

(1/6 of recipe) Per 1 person serving

Calories	272 Cal	Cholesterol	48.4mg
Fat	8.3g	Sodium	83mg
Saturated	2.2g	Carbohydrate	29.7g
Monounsaturated	3.9g	Fibre	2.1g
Polyunsaturated	1.3g	Protein	20.2g

# • Events Diary



## 2008

<b>January</b>			
15-18th	<b>Banff Pork Seminar</b>	Banff, Alberta	www.banffpork.ca Contact: Ruth Ball (780) 492-3651
15-17th	<b>Manitoba Ag Days</b>	Brandon, Manitoba	www.agdays.com Contact: Owen & Pat Beever (204) 571-6566
15-19th	<b>Agromek</b>	Herning, Denmark	www.agromek.dk Contact: +45 8675-4545
23-24th	<b>Iowa Pork Congress</b>	Des Moines, Iowa	www.iowaporkcongress.org Contact: (800) 372-7675
30-31st	<b>Manitoba Swine Seminar</b>	Winnipeg, Manitoba	www.gov.mb.ca/agriculture/livestock/swineseminar Contact: Dallas Balance (204) 475-8585
<b>March</b>			
5-7th	<b>VICTAM Asia 2008</b>	Bangkok, Thailand	www.victam.com/asia.php Contact: Andrew West + 44 1737-763501
8-11th	<b>American Association of Swine Veterinarians (AASV) Annual Meeting</b>	San Diego, California	www.aasp.org/annmtg/ Contact: (515) 465-5255
12-13th	<b>Alberta Pork Congress</b>	Red Deer, Alberta	www.albertaporkcongress.com Contact: (403) 244-7821
31st – 2nd April	<b>British Society of Animal Science Annual Conference 2008</b>	Scarborough, UK	www.bsas.org.uk Contact: +44 131 445-4508
<b>April</b>			
20-23rd	<b>24th Alltech International Feed Industry Symposium</b>	Kentucky, USA	www.alltech.com
<b>May</b>			
13-14th	<b>British Pig &amp; Poultry Fair</b>	Stoneleigh, UK	www.pigandpoultryfair.org.uk Contact: Alice Bell +44 2476 858 276
27-29th	<b>VIV Europe</b>	Moscow, Russia	www.viv.net Contact: +31 30 295 2772
<b>June</b>			
5-7th	<b>World Pork Expo</b>	Des Moines, Iowa	www.worldpork.org Contact: John Wrigley (417) 451-6004
18-20th	<b>Pan Pacific Pork Expo &amp; Uptake 2008</b>	Queensland, Australia	www.apl.au.com/pppe Contact: Natalie Wimmer +61 2 6285 2200
22-25th	<b>20th International Pig Veterinary Society Congress</b>	Durban, South Africa	www.ipvs2008.org.za Contact: +27 31 3321451
22-29th	<b>Advanced Swine Production Technology Course</b>	Illinois, USA	www.livestocktrail.uiuc.edu/porknet Contact: Gilbert Hollis (217) 265-9191
<b>September</b>			
20-23rd	<b>Allan D Leman Swine Conference</b>	Minnesota, USA	www.cvm.umn.edu Contact: (800) 380-8636 or (612) 624-3434
30th – 2nd Oct	<b>Pork Expo Brazil 2008 &amp; IV International Forum on Swine Production</b>	Parana, Brazil	www.porkexpo.com.br/index.php/pasta/2/ Contact: +55 3888-2077
<b>November</b>			
11-14th	<b>EuroTier</b>	Hanover, Germany	www.eurotier.de

## 2009

<b>January</b>			
20-23rd	<b>Banff Pork Seminar</b>	Banff, Alberta	www.banffpork.ca Contact: Ruth Ball (780) 492-3651

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







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Greg Billrey, Agri Stats Inc, Ft Wayne IN - Benchmarking & Production-Cost Relationships

Kevin Grier, George Morris Centre, Guelph, ON - Do we have a pork packing industry in Canada that will survive?

Clare Schlegel, Canadian Pork Council, ON - Our Producers Must Survive!!

*Other Survival Sessions include:*

- Data analysis - cutting costs, increasing revenue
- Market predictions production and prices in 2008
- PRRS vaccines -- effects of cutting doses & costs
- Reducing cost of feed
- COOL - trade impacts on CDN pig prices
- Foreign labour -- lower costs, how to manage

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**\*\*\*Walk In and One Day Registrations Accepted\*\*\***

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