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FALL 2009

Western Hog Journal

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- **London Swine Conference**
- **Preparing your production facility for the winter months**

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TRAIT	GENESUS 49 FARMS AVERAGE ALL	SMS 585 FARMS AVERAGE ALL	DIFFERENCE
Pigs weaned / Mated female / Year	26.78	23.30	3.48
Litters / mated female / year	2.45	2.36	0.09
Wean 1st Service Interval	6.45	7.01	-0.56
Female Death Loss	5.7	7.7	-2.0
Farrowing rate (%)	87.8	82.8	5.0
Weaned / female farrowed	11.06	9.95	1.11
Total born / female	13.56	12.59	0.97
Born live / female	12.25	11.42	0.83

Of the entire SMS database of 585 farms with 1,175,053 sows Genesus was the #1 herd and the only herd with over 30 p/s/y. Genesus also held 8 of the top 9, 12 of the top 15, and 15 of the top 20 spots for p/s/y.

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Western Hog Journal

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COVER PHOTO

Pigs in a large-group system at Hartland Colony, near Bashaw, Alberta

WEBSITES OF INTEREST

PROVINCIAL ASSOCIATIONS

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

NATIONAL ASSOCIATIONS

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

MARKETING ASSOCIATIONS

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

OTHER SITES OF INTEREST

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

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•Editor's Notes

Events over the next 12 months will determine the eventual shape of the Canadian pork industry, which is currently bleeding tens of millions of dollars every week. The Canadian Pork Council's Strategic Transition Plan suggests a reduction in total pigs produced from 31 million to 25.5 million, with 5.3 million fewer live pigs being exported to the USA, by 2014. Unless the current economic environment changes, that may turn out to be wildly optimistic. After three years of losses, most producers have little or no equity left.

As of the July 1 census, sow numbers had dropped by 230,000, or 15%, since 2004. If the government's Hog Farm Transition Program is successful in encouraging less viable producers to leave the industry, it could result in the removal of up to 150,000 sows. That would leave a breeding herd of 1.2 million sows and gilts, more than enough to produce 25.5 million pigs.

Where the rout will stop is impossible to predict. But when the smoke has cleared, the industry as a whole will have to re-invent and re-position itself for the future. That will mean recapturing the 25% of domestic market that is currently taken by imported pork and developing higher value products for both domestic and export markets. It will also mean a renewed focus on efficiency and cost reduction throughout the pork chain.

We should not lose sight of the fact that Canada, especially the west, is a natural place to produce pigs and has many inherent advantages. The pork industry in many countries around the world is under huge environmental pressure and is contracting, notably in Europe. Denmark, with a 20% smaller land mass than Nova Scotia, has as many sows as the whole of Canada! Pork is still the number one meat consumed around the world and demand is increasing steadily. There will still be marketing opportunities for Canadian products, which have established an excellent reputation for quality.

Despite the hardships that so many people in the industry have endured, there is a good future for pork production in Canada. While it is inevitable that we will have a smaller production base, the industry can and will be successful and profitable in future.

Barrie Peet

WHJ

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

11-11-0218-01212009

New drug improves survival of pigs with App

The bacteria *Actinobacillus pleuropneumoniae* can cause severe outbreaks of the respiratory disease App (formerly called *Haemophilus*) in growing and finishing pigs. Often the disease strikes so rapidly that pigs are dead before clinical signs are noted. It is also a difficult disease to treat during an outbreak because mass medication via the feed or water is expensive and it is difficult to achieve high levels of drug in the lungs. Recent research at the University of Guelph suggests that a new drug tulathromycin (Draxxin™, Pfizer) can improve survival rate of affected pigs significantly.

Kristen Reynolds, an MSc student working with Drs. Zvonimir Poljak and Bob Friendship in the Population Medicine Department at Ontario Veterinary College, has been studying various treatment approaches by performing a literature review and conducting clinical drug trials on farms. On a farm suffering high losses due to App, she found that a single intramuscular injection significantly improved survival rate compared to daily injections of penicillin at three times the label dose. Laboratory testing indicated that the strain of App was sensitive to both drugs. "Tulathromycin is reported to concentrate in lung tissues at high levels and for a long period of time (10-14 days), whereas penicillin has a much shorter half-life in lung tissue and despite the very high levels used in this study may not have provided sufficient protection," explain the researchers.

However, tulathromycin did not always prove significantly better than other treatment protocols when studied on other farms, they noted. Reynolds suggested that the reason for this difference in results was that on each farm the mixture of disease-causing organisms was different. "Tulathromycin works well against App but not very well against *Streptococcus suis*," she says. "Most importantly, on farms where the main concern is an underlying viral pathogen such as PRRSv or PCV2, all antibiotics are limited in their value, except as a means of controlling secondary diseases."

"New products such as tulathromycin may be valuable tools for fighting App and other diseases, but their use must be tailored to individual herds, with the herd veterinarian being involved in the decision-making process," she concludes.

Can boar taint be genetically controlled?

The issue of castration has become one of considerable debate and there are growing concerns about its welfare implications, especially in Europe. In North America and in many other countries around the world, male pigs are castrated to prevent off-odours and off-flavours (boar taint) in the meat. Boar taint is caused by the accumulation of two compounds, androstenone and skatole, in the fat of the animal. Androstenone is a steroid produced in the testes as the boar nears puberty. Skatole is produced in the intestines of both male and female pigs, as a breakdown product of the amino acid tryptophan, but it accumulates in the fat in intact male pigs since it is poorly metabolized and eliminated.

Castration prevents boar taint and boars have improved feed efficiency and lean gain. Therefore, controlling boar taint without surgical castration would not only have a large impact on productivity, but it would allay the increasing welfare concerns among consumers. Recent work at the University of Guelph suggests that the application of new genetic technology may be one route to eliminating the need for castration. Dr. Jim Squires and his co-workers Dr. Flavio Schenkel and Yanping You in the Department of Animal and Poultry Science have developed genetic markers for boar taint based on genes that encode for the enzymes involved in the synthesis and degradation of boar taint compounds.

"Genetics can affect both the production and metabolism of boar taint compounds," the researchers explain. "These effects can be found both within breed, among individual pigs and among different breeds. The heritability of both androstenone and skatole is moderate to high, but previous attempts to select for low boar taint have resulted in reproductive problems." The development of specific genetic markers for boar taint would minimize these negative effects on reproduction, they say.

The researchers currently have a database of 1300 animals, from 8 different lines, that have been used to identify and validate genetic markers, mainly single nucleotide polymorphisms (SNPs), which are DNA sequence variations. By looking at the association between these SNPs and boar taint levels, they were able to identify 54 SNPs associated with boar taint. The strength of the association of the SNPs with skatole and androstenone levels varied among the different lines of pigs and the strongest associations were in Duroc pigs.

"These findings represent a significant progress towards a genetic solution to boar taint," say the researchers. "The control of boar taint by selection assisted by genetic markers will potentially eliminate the need for castration, which will significantly improve the profitability of pork production and address animal welfare concerns," they conclude.

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Simulator enables "virtual walking the pens"

Pfizer Animal Health has launched a new on-line educational simulation that can be played from any standard computer - "Virtual Walking the Pens" - to help demonstrate the importance of individual pig care.

If even one pig gets sick, the entire barn is at risk. Walking the pens and observing each pig for health issues is the best way to ensure the whole population's health, and the barn's bottom line, says the company in a recent news release.

"We all know that we can improve on the training provided to contract growers and employees," says Eric Farrand, Pig Husbandry Team Manager at Pfizer Animal Health. "This simulation helps workers put basic animal husbandry and individual pig care concepts into action."

The simulation, available at www.individualpigcare.com/WTPGame, puts players in a barn situation where they are asked to make decisions and shows them how their actions regarding pig care will affect the entire virtual barn. Producers make decisions based on 24 virtual pigs as they walk the simulated pens. Those decisions are then projected across a 2,400 pig population to see how they affect the barn's profitability.

Producers have to make choices about feed, water, group and individual pig health issues based on their observations of the virtual pigs. They will have access to a virtual veterinarian who provides advice based on symptoms described by the producer. The score can be affected by the producer's choice to act on the advice or not.

"Virtual Walking the Pens" is intended to show producers how taking time to care for individual pigs could improve their bottom line. Allowing producers to visualize the cause and effect in a virtual setting can help motivate them to apply the simulated practices to each real operation.

The simulation lets players compete nationwide, but Pfizer Animal Health sales representatives can help set up the competition within individual systems as well. Each month a new scenario is presented and producers are encouraged to play as often as they want to improve their score.

New genetic technologies could revolutionize the pork industry

Livestock producers around the world will soon benefit from new advances in genetic technologies that will dramatically increase the rate of genetic progress and lead to massive benefits in productivity, efficiency and profitability, says swine genetics company Hypor.

Over the last 15 years there has been an increasing focus on the use of information technology systems to improve parameters which have a relatively low heritability. Statistical selection programs such as Best Linear Unbiased Prediction (BLUP) has allowed breeding companies to improve traits such as litter size, bringing significant advantages for producers. In the future, the application of new genetic technologies, based on biotechnology as well as computers, will increase the rate of genetic progress dramatically, says the company. These include DNA-based breeding technologies, reproduction technologies such as Embryo Transfer (ET) or semen handling and novel communication technologies for data collection.

"DNA technologies have been used in animal breeding for some 20 years now, although up until recently they have been for single genes, such as those for stress susceptibility (the halothane gene), ham cooking quality (the RN gene) and muscle development (the IGF2 gene)," says Hypor. "However, the pig has around 25,000 genes and the breeding value of an animal is the result of all of these. It is known that most performance traits are determined by at least tens or possibly hundreds of genes."

Today, a number of novel molecular technologies are available that allow measurement of many genes at the same time, giving much more accurate identification and faster measurement of gene sequences associated with desirable economic traits. "For this we use what are called single nucleotide polymorphisms, called SNPs

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Novel molecular technologies involving DNA are likely to accelerate genetic progress in swine breeding (Photo © istockphoto)

for short," explains Hypor. "Millions of such SNPs have been identified today for each of the main food animal species. We also know where these SNPs are located on the chromosomes (genome) since the genome sequence of these species has been determined for chicken and cattle and is due to be completed for pigs in 2009."

"Since the end of 2008 a pig DNA "SNP chip" carrying 50,000 SNPs has been available and we are using this in several of our projects", says the company. "The first pig SNP chip ever is now being shipped to research labs around the world including those of our research partners, including the University of Alberta."

"The dairy cattle breeding business is currently going through a true revolution with the introduction of "genomic" breeding values based on SNP assays," notes Hypor. "Through our early experience in poultry and with help of our extensive international research network, we expect to be among the first and best users of this novel genomic selection technology in pig breeding. This will provide massive benefits in productivity, efficiency and profitability to our customers around the world."

Dr. Harold Gonyou receives Canadian Society of Animal Science award

Dr. Harold Gonyou, Research Director and Research Scientist in Ethology at the Prairie Swine Centre, has been presented with the Award for Technical Innovation in Enhancing Production of Safe and Affordable Food by the Canadian Society of Animal Science. This award recognizes excellence in technical innovation and teaching with particular emphasis in the fields of biotechnology, genetics, physiology and animal behaviour.

In presenting the award, Dr. Luigi Faucitano, Meat Scientist with Agriculture and Agri-Food Canada noted "Dr. Gonyou's interest in the science of animal production began while on the family farm in Ontario, and developed as he earned degrees in Animal and Poultry Science, in the fields of animal physiology

and animal behaviour. Dr. Gonyou's nomination is based on his combining strong research, teaching and leadership roles in the field of animal behaviour, resulting in a significant impact on the efficient and welfare appropriate production of animals."

Noting the close link between the pork industry and Dr. Gonyou's work at Prairie Swine Centre over the past 17 years, Dr. Faucitano comments: "Harold possesses the ability to anticipate and address, using the study of animal behaviour, specific industry issues very early." Examples of Dr. Gonyou developing research-based solutions for the industry have included the design and management of feeders through the study of feeding and waste-causing behaviours, the development of production trends leading to group housing of gestating sows and large group housing for growing/finishing pigs. He also developed a stressful handling model to assist research programs addressing the incidence of non-ambulatory pigs at market. Dr. Gonyou currently leads a collaborative project involving five universities and research stations on pig handling and transport.

Lee Whittington, President of Prairie Swine Centre, noted "Dr. Gonyou's career represents a successful example of applying a relatively new field of study (applied animal behaviour) to practical industry challenges. By combining research, teaching, and technology transfer, Dr. Gonyou has successfully provided the tools industry needs to address changes in technology, best management practices and the marketplace."

Elanco reduces price of Pulmotil Premix

As a result of recent production advances associated with the manufacturing of Pulmotil Premix, Elanco Canada is lowering the list price of the product by 20 percent, the company announced at the end of August. The price reduction applies to 10 kilogram bags of Pulmotil Premix and is based on a treatment rate of 200 or 400 parts per million (ppm) for 21 days, followed by a withdrawal of 14 days.

"With this move, effective respiratory disease treatment in pigs has become even more cost effective," says Peter Mumford, Swine Marketing Associate, with Elanco Canada, noting that improvements in the manufacturing process for Pulmotil Premix have resulted in increased fermentation throughput in production facilities, which the company is able to pass on in the form of a significant price reduction.

Elanco swine veterinarian Dr. Isabelle Moreau, says that respiratory disease is difficult to treat when or after it occurs and Pulmotil Premix provides an excellent foundation for nursery-to-finisher health management by reducing the severity of respiratory diseases in nursery pigs. "Several studies, both our own and those of independent parties, have demonstrated that Pulmotil Premix provides a number of health and economic benefits including a reduction in nursery mortality and an increase in nursery exit weight."

Swine Marketing Associate Mumford notes that Pulmotil Premix is a product that has been developed specifically for the treatment of respiratory disease in pigs providing effective, fast-

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acting treatment, ease of use, improved uniformity, heavier pigs out of the nursery and, now, even more value for the money.

For more information about Pulmotil Premix, pork producers are encouraged to consult their veterinarian or feed consultant.

Pigs raised in large groups handle easier

From Farmscape.ca files

Research conducted at the Prairie Swine Centre indicates pigs raised in large groups are much easier to handle than those raised in small groups. Researchers have been studying the behaviour of pigs raised in large groups for the past seven to eight years. Work and reports from industry indicated that during shipment pigs raised in large groups handled differently than those raised in small groups so a study was conducted to evaluate the ease of loading and the effect of transportation on meat quality.

Dr. Harold Gonyou, a research scientist in ethology, says several hundred pigs were involved, 240 of which were used for data collection, with half raised in groups of 16 to 20 and half raised in groups of 240.

Gonyou notes that there were some differences in terms of how they handled being loaded and that both groups responded to stress. "We would see similar kinds of physiological response among the animals but the animals from the large groups loaded faster," he explains. "We reduced our loading time by about a third for those pigs. In both groups we loaded groups of four pigs at once and measured how long it took them to go up the ramp and onto the truck." He says that the same amount of force was used to move each group of pigs, but that there were slightly less signs of stress in pigs that came from the large groups.

Pigs raised in large groups are much easier to handle than those in smaller groups

Dr. Gonyou observes pigs raised in large groups are more willing to investigate and travel and they interact with other pigs better than those raised in small groups. He says reports have suggested the meat from pigs raised in large groups is better than from pigs raised in small groups but this study did not show that and there have been suggestions death losses during transport will be less among pigs raised in small groups but this study was not large enough to assess that.

Genetiporc and Designed Genetics form strategic alliance

Genetiporc and Designed Genetics Inc. (DGI) have announced a new strategic alliance aimed at marketing their respective products and programs in targeted Canadian, US, and international markets. The relationship provides both organizations with improved market access while remaining independently owned and directed. Genetiporc and Designed Genetics' customers will benefit from a broader range of products, improved customer service, and enhanced technical support, says a joint news release.

Genetiporc, based in Quebec, believes this strategic alliance is a positive step consistent with its development strategy. Genetiporc customers will now have access to a broader range of specialized sire lines to complement their maternal and terminal sire programs. Christian Breton, President of Genetiporc, says "This builds on the investment we made earlier this year with the Dynaporc Farms multiplication system and Verus Animal Health Alliance to oversee certain Genetiporc marketing and development activities. Designed Genetics will play a key role in marketing Genetiporc maternal lines and G Performer Boars in targeted markets as well as contribute to the further development of future product lines."

Designed Genetics, based in Manitoba, specializes in the development of Duroc terminal sires and with over 900 purebred Duroc sows in production has evolved into North America's largest purebred Duroc boar provider. Having built strong brand recognition for its sire lines, this alliance now allows Designed Genetics to diversify the products it sells by marketing Genetiporc's highly respected maternal lines to its many customers domestically and internationally.

JSR purchases PSC's Elstow unit

British pig breeding company JSR Genetics has purchased the Prairie Swine Centre's 650 sow Elstow research unit in Saskatchewan. The purchase was made in order to meet the increased worldwide demand for UK pig products and services, says the company.

Tim Rymer, Chairman of JSR Genetics, commented, "We are delighted to have completed the purchase of this excellent facility and to continue the link with the Prairie Swine Centre. We intend to use the unit as a Centre of Excellence for our genetic improvement program by utilizing the first class training facilities

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and interactive gallery for our customers and their technicians across the Latin American and Asian markets."

Dr Grant Walling, Research and Genetics Director, added, "The Elstow Nucleus will be connected to the UK, and our other nucleus units around the world, by our bespoke software JSR SELECT. This will further accelerate genetic improvement in our key traits. The Prairie Swine Centre is well known for its proficiency in R&D and our co-operation with them will bring additional expertise to our technical team's already excellent track record in applying research and development to facilitate outstanding performance, both for our customers and worldwide partners."

Workshop will focus on practical management

Speakers at the forthcoming Red Deer Swine Technology Workshop will be focussing on practical management related topics

aimed at increasing productivity and profitability. Topics include "Optimizing sow lifetime condition", "Getting the best from natural service boars", "Managing Farrowing Room Health" and "Giving a good start to the newly weaned pig".

Following the huge success of the "Maximizing piglet survival" video showcased at the 2008 workshop, a new video titled "Maximizing Grow-Finish margins" is being produced for the 2009 event.

Jim Gowans, one of the founders of the Red Deer Swine Technology Workshop, speaking at the 2008 event

"The workshop continues the one-day format that was so popular with delegates last year," says Bernie Peet, the Workshop Manager. "However, we will be moving the event to a new location in the Exhibition Centre at the Capri Hotel in Red Deer."

"Despite the challenges faced by the industry, we had an attendance of 200 last year and that reflected the hands-on approach of our speakers, who were all people with extensive practical experience and a proven track record," says Peet. "This year, we are taking the same approach and have a very strong panel of speakers."

The event is being held on Wednesday, November 4th. Registration costs $75, with a special "5 for the price of 4" package available. For further information or to register, contact Bernie Peet at Pork Chain Consulting Ltd. on (403) 782-3776 or (403) 392-3104 or email bjpeet@telusplanet.net

Dr. FX Aherne Prize for Innovative Pork Production

The Banff Pork Seminar is seeking applications from innovators in the pork industry who have developed an original solution to answer pork production challenges. The Dr. FX Aherne Prize for Innovative Pork Production recognizes innovators in the Canadian pork industry that are making a difference by applying new technologies or management techniques.

"Specifically, what are we looking for is an innovator who is capable of taking a new research concept, a technology, or even a management concept and applying it successfully in the production of pork," says Ruth Ball, the seminar manager. "The innovation could be in the areas of productivity, profitability, working conditions, animal well being, reduced environmental impact or pork quality and safety."

Entrants can be owners, production managers, herds-people or consultants in the Canadian pork industry. All innovations entered must be in use on a farm in Canada at the time of the entry.

Up to three prizes may be awarded, each valued at $1800, and includes free registration to the 2010 Banff Pork Seminar, accommodation for the innovator and a guest, up to $800 reimbursement for travel expenses and recognition at the seminar.

Applications are available online at http://www.banffpork.ca/prize/ and must be received by October 30, 2009. For further information, contact Ruth Ball on (780) 492-3651.

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• New Product Showcase

Pfizer Animal Health launches new SIV vaccine in Canada

Swine influenza virus (SIV) has frustrated Canadian swine producers for many years, requiring them to look for ways to manage the complex mix of flu strains circulating and prevalent in their herds. Producers now have a new option, FluSure XP™ from Pfizer Animal Health, the most current swine flu vaccine available in Canada.

"In the last 10 years we've experienced very dramatic changes in the evolution of SIV, notably the emergence of new strains of the virus," said Dr. Don McDermid, Swine Veterinary Services at Pfizer Animal Health. "The virus is like a moving target and that makes it extremely difficult for farmers to control. It challenges veterinarians and farmers to tailor vaccine protocols to deal with the complex mix of SIV in swine herds. Of course, it also means that current SIV vaccines may not be able to provide the coverage necessary for the changing mix of circulating viruses."

FluSure XP provides relevant, broad cross-protection against contemporary flu strains found in North America including strains from both H1N1 and H3N2 subtypes. These strains were chosen on the basis of recent surveillance data and previous efficacy studies. However, there is no data available to demonstrate FluSure XP's efficacy against the new A H1N1 global virus. FluSure XP is also the first swine vaccine to be licensed under new Canadian Food Inspection Agency (CFIA) and United States Department of Agriculture (USDA) guidelines designed to allow manufacturers to address vaccine updates more quickly; ensuring products are as current as possible.

While death rates are usually low, SIV will cause fevers, cough, loss of appetite and may increase the risk for other respiratory problems. Since there are no specific treatments for swine influenza infections, prevention and control are extremely important to keep herds healthy and productive. The challenge for the swine industry is to develop a surveillance system that rapidly indentifies the characteristics of new and emerging circulating viruses so that new vaccines can be developed.

"Our intention is to continue to update the vaccine as the market demands, protecting herds from the most prevailing strains," added Dr. McDermid. "Through our surveillance efforts, we are monitoring SIV trends to determine which strains are impacting the industry now as well as those that may become problematic in the future and require us to update the vaccine."

Pfizer Animal Health has assembled a committed team – the SIV Surveillance Team – with interdisciplinary backgrounds to monitor trends in SIV working closely with universities, veterinary diagnostic labs and customers.

For more information, or to arrange an interview with a Pfizer Animal Health representative, please contact Martha Linton at Hill and Knowlton for Pfizer Animal Health, on 416-413-4734 or email martha.linton@hillandknowlton.ca or Sarah Andrewes on 416-413-4605, email sarah.andrewes@hillandknowlton.ca

Fermented soybean product can replace fishmeal in piglet diets

PepSoyGen, a new protein source made from fermented soybeans, is now available in Canada from Winnipeg-based Pro-Ag Products Ltd. The product is manufactured in North Dakota by Nutraferma.

PepSoyGen was developed using fermentation technology to create a functional, soy-based peptide product ideal for inclusion as a primary protein source for young animal diets. SMPT is a fermentation process utilizing high protein soybean meal to produce low molecular weight soy peptides that are low in anti-nutritional factors such as Trypsin inhibitors. The concept behind PepSoyGen comes from a Korean tradition of fermented food products that dates back thousands of years. The fermentation process is used to improve flavouring and increase the availability of nutrients in the finished product.

The nutritional benefits of PepSoyGen include increased feed intake, high nutrient digestibility and absorption and improved growth performance, while the product is highly stable giving it a long shelf life. Patented strains of Aspergillus oryzae and Bacillus subtilus utilized in the manufacturing process remain viable in the finished product and provide a valuable source of direct-fed microbials. Recommended inclusion rate is from 3% to 8% of the diet.

University trials have demonstrated that piglets fed PepSoyGen performed equally or better than other commonly used feed ingredients for young pigs such as fishmeal or milk powders.

For further information, contact Pro-Ag Products Ltd., call 1-800-806-2737 or go to www.pro-ag.com. ≡WHJ≡

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Uncertainty, desperation grips the industry

With hog prices well under a dollar per kilo and losses of $50 per hog as WHJ went to press, Canadian producers have reached desperation point and many more could soon be forced to quit production. By the beginning of September, details of the federal government's loan guarantee program had still to emerge and the Hog Farm Transition Program was not in place, creating uncertainty among producers.

The program, outlined by Agriculture Minister Gerry Ritz on August 14, has three components:

- a $17 million pork marketing fund, to be administered by Canada Pork International to encourage expanded pork exports in order to offset pork markets lost due to H1N1 or disrupted due to US country-of-origin labelling (COOL);
- government-backed long-term loans to hog producers who can provide "credible business plans" to lending authorities, in order for farmers to repay federal advance payments, address liquidity issues or make long-term investments toward profitability; and
- a $75 million hog farm transition program to help producers who wish to leave hog production and commit to stay out for at least three years.

The Canadian Pork Council, which had previously lobbied for an $800 million bailout package, applauded the program. CPC Chair Jurgen Preugschas said that with some 42 thousand jobs across Canada at stake, the Canadian economy will be the big winner. Preugschas notes the program is completely trade neutral and is similar to programs in the US. He adds that Canada has reduced its sow herd over the past three years and will make further reductions and he believes the Americans now need to step up to the plate and follow Canada's lead in terms of reducing production. By the end of August there were signs that sow slaughter in the US had increased significantly, but the impact of that on supply won't be seen until well into 2010, by which time the Canadian sow herd will have suffered a further reduction.

CPC's Strategic Transition Plan anticipates a considerably downsized industry in five years' time. It provides a roadmap through to 2014 and describes several characteristics of a successfully restructured industry, including:

- Domestic disappearance of Canadian pork totalling 730,000 tonnes, an increase of 150,000 tonnes over 2008
- Exports of 4 million live hogs to the US, 5.3 million fewer than 2008
- Total pork exports of 1 million tonnes, 20% of which will be to the US
- Total domestic slaughter of 21.5 million head, 0.2 million fewer than 2008
- A reduction in total production from 31 million in 2008 to 25.5 million pigs
- Domestic market share of 88% compared with 75% in 2008

The transition plan also includes several additional strategic initiatives that will contribute to the long-term competitiveness of the industry, says CPC.

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Census points to continued decline

The July Canadian Hog Statistics report indicates that the reduction in hog numbers, which has been going on for four years, continues. The total number of hogs peaked in the October 2005 census, with a figure of 15.21 million and this is now down to 12.11 million. The number of sows and bred gilts declined from 1.58 million to 1.39 million, a decrease of 12%.

In the western provinces, total pig numbers have slipped by 14% over the last three years, with Manitoba down by 15%, Saskatchewan by nearly 42%, Alberta by 25% and BC by 14%. In the east, overall pig numbers fell by just over 16% during the same period, with Ontario down by 21% and pig production almost wiped out in the Maritimes. Even in Quebec, where the ASRA program continues to keep unviable producers in business, total numbers fell by 9%.

The number of sows tells a similar story and indicates that the decline in total pig numbers will continue for some time yet. The statistics show that the number of sows and bred gilts in Manitoba fell by just over 10% in the three years to July 1, 2009, significantly less of a fall than Alberta, with nearly 17% and Saskatchewan which showed a massive 29% reduction. It is interesting that, unlike Manitoba, where the expansion in sow numbers continued until 2007, Alberta's sow herd has been declining for most of the decade and has reduced from 210 thousand sows at the beginning of 2002 to 156 thousand in the latest statistics, a fall of 25%. With the ongoing impact of COOL and the huge reduction in numbers of piglets and feeder pigs being exported to the USA, it seems likely that Manitoba will see a significant drop in sow numbers over the next 6-9 months.

The number of hog producers reported by the census shows the fallout that has occurred in the industry in recent years. Ontario has shown a drop in producer numbers of nearly 23% over the last three years, while neighbouring Quebec now has 18% fewer producers. But, as with pig numbers, it is the west that has shown the biggest decline. Manitoba now has only 830 producers reported in the census, a drop of just under 30% in three years, while Alberta reports 950 producers, down more than 40%.

US producers ask for USDA help

In response to rising losses for US producers, in August the National Pork Producers Council urged the US Department of Agriculture to lend assistance to US pork producers to help them weather the economic crisis.

In a letter sent to Agriculture Secretary Tom Vilsack, NPPC requested $250 million in financial assistance and other actions that should help producers, who since September 2007 have lost an average of more than $21 on each hog marketed, according to NPPC.

It asked the agency to increase its purchase of pork under various federal food programs by an additional $50 million. It also asked for $100 million for addressing the H1N1 virus for the swine industry. This would include $70 million for swine disease surveillance, $10 million for diagnostics and H1N1 vaccine development and $20 million for industry support. NPPC urged USDA to work with the US Trade Representative to open export markets to US pork. "Several countries, including China, continue to impose unwarranted bans on US pork because of the H1N1 flu," said NPPC.

It asked the agency to study the economic impact on the livestock industry of an expansion of corn-ethanol production and usage. The US Environmental Protection Agency has proposed raising the cap on blending ethanol into gasoline to 15% from its current 10%, NPPC noted.

Industry requests were met to some extent with the announcement in early September that the US Department of Agriculture would buy $30 million worth of pork immediately.

Pork producers thought they would have to wait until after 1 October, the beginning of the federal fiscal year, for another

federal purchase of pork. Agriculture Secretary Tom Vilsack had said last month that no money was available this fiscal year.

Don Butler, National Pork Producers Council president, said, "The action by USDA to buy additional pork will benefit America's pork producers, the US economy and the people who benefit from government food programs. NPPC is extremely grateful to Secretary Vilsack for recognizing the plight of our producers and for taking action to help them."

The USDA will buy the pork for food and nutrition initiatives, such as school breakfast and lunch programs. More money could be available during the next fiscal year.

The USDA has already spent $62 million on pork in the last year to try to shore up hog markets.

Producers gathered in Calgary July 10th to publicise their plight

Producers rally to publicize plight

Across the country, producer organizations have organized rallies to bring their plight to the attention of consumers. Alberta producers and industry supporters gathered in Calgary mid-July for an industry crisis rally, stressing the need for some sort of government assistance. Pork production is a true value-added industry, supporting critically important jobs and economic benefits across the country, said John Middel, a central Alberta producer. "The grain we buy from grain producers is processed here rather than being shipped out of the country. We have processors such as Olymel, the largest employer in Red Deer. If there are no pigs there is no packing plant. The companies that provide us with services, construction companies that build and renovate facilities, and our banking industry will all suffer."

"The hundreds of people we employ on farms, who live and spend their money in these rural communities, will be lost," Middel added. "Some people may say if producers can't make it on their own they shouldn't be in business. But these producers have invested their lives in their operations to produce quality pork and the despair they are feeling is real. I don't think that as a nation and as a province, we want to turn our backs on these Canadian food providers."

In June, CPC Chairman Jurgen Preugschas was one of the keynote speakers at a public forum in Morris, MB organized by the Manitoba Pork Council, which attracted an estimated 500 to 600 industry stakeholders. The event brought together pork producers, their employees and their equipment and service suppliers to meet with federal MPs and provincial MLAs.

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"The purpose of the forum was to try to get the producers' message back to government," explained Manitoba Pork Council Chair Karl Kynoch, in an interview with Farmscape.ca.

"We really felt we needed to bring all the producers together and bring government together with the producers to allow them to be able to hear first hand what's really going on at the grassroots and allow government the opportunity to explain their situation and see if we can come up with some ideas to work together and move forward."

Kynoch urged producers to document their experiences to provide the evidence their industry leaders need to be taking to government. "We need them to be sending emails to their members of parliament, their MPs, their MLAs. They need to be personally hand written about their own experiences on the farm. It goes a long way when the MLAs and MPs receive letters from producers that are individually written about their own experiences. We need them to be calling their members and letting them know just what is really going on at the grassroots."

H1N1 worries reduce demand

Hog prices have been crippled by reduced demand as a result of fears over the possibility of becoming infected by the H1N1 virus through eating pork. While pork consumption has actually increased in some countries such as the UK, because the recession has led to more demand for value-priced meat, in many other countries, especially those in the Far East, consumption has dropped.

Some two-thirds of China's consumers ceased eating pork in the initial stages of the H1N1 influenza outbreak earlier this year, and more than one in five consumers still believe they can contract the flu from eating pork, according to a survey of 1,200 Chinese consumers commissioned by the US Meat Export Federation (USMEF).

Joel Haggard, senior vice president Asia-Pacific for USMEF, said that the world's largest pork producer and consumer may have been more affected by the H1N1 virus outbreak than previously suspected.

"In the early stages of the outbreak, 64 percent of Chinese consumers refrained from pork consumption," said Haggard. "Even several months after the initial outbreak, 21.2 percent of respondents said they still believe that eating pork can lead to catching the H1N1 flu. Although the Chinese government has been trying to educate consumers regarding the safety of pork, 54.7 percent of those who fear the connection between pork and H1N1 attribute their concern to the name "swine flu."

Conversely, an overwhelming majority of Canadians understand they can't get the H1N1 virus from eating pork, a recent survey suggests. The Canadian Press Harris-Decima survey found that just six per cent of respondents felt they could contract the flu from handling or eating pork, while 90 per cent said there is no such risk.

The poll also found that 87 per cent of respondents say they're eating just as many pork products as before the flu outbreak, with only three per cent noting a decline in consumption.

However, Gary Stordy, public relations manager for the Canadian Pork Council, said domestic sales continue to be "sluggish." "Certainly it is very positive that people understand that you cannot get H1N1from eating any kind of meat," said Stordy. "But even the slightest change in consumer perception - or consumption - can cause quite a backload in the system."

The reporting of cases of H1N1 flu in various parts of the world has not helped public perceptions of the risks of contracting flu from eating pork. In addition to cases in Argentina and Australia, the H1N1 virus has been found in herds in Quebec and Manitoba. The American Association of Swine Veterinarians announced in early September that H1N1 had been detected in several herds, including sow barns, nursery barns and feeder barns.

An AASV news release noted that the disease was very mild, with pigs showing only slight signs of respiratory illness. Death loss was not increased and pigs recovered within 4 – 7 days of the onset of illness. The virus did infect piglets born to infected sows and subsequently moved through the production system to nursery and finisher sites.

CFIA and the Council of Chief Veterinary officers say that farms where pigs have been diagnosed with novel H1N1 do not require quarantine or eradication of the pigs. "The novel virus does not behave any differently in pigs than any other influenza viruses commonly detected in swine herds and there is no evidence to indicate that animals play a significant role in the spread of the virus in the general human population." ≡WHJ≡

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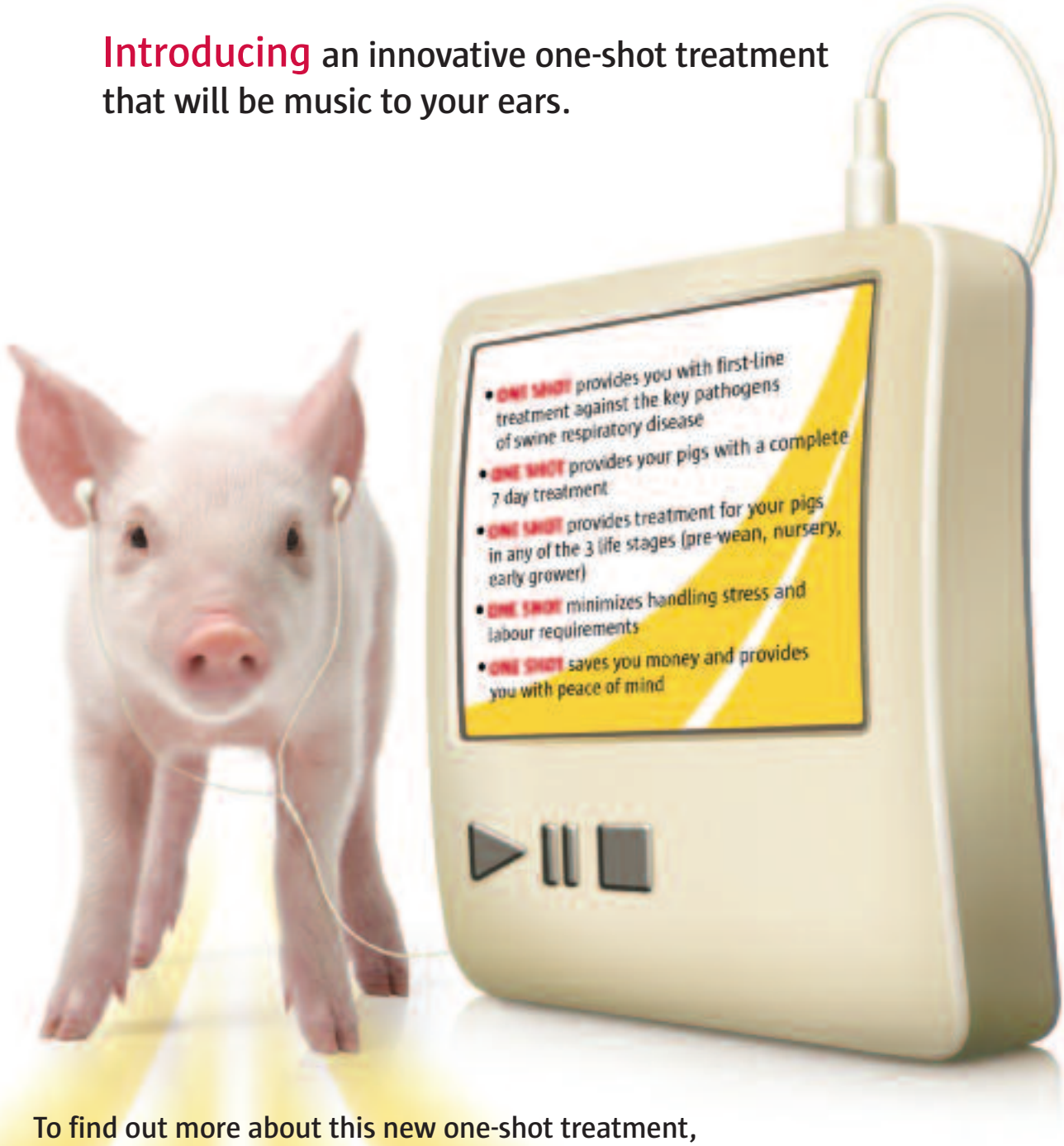

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• London Swine Conference

The London Swine Conference is aimed at providing a platform to accelerate the implementation of new technologies in commercial pork production in Ontario and facilitating the exchange of ideas within the swine industry. The event is coordinated by the Ontario Ministry of Agriculture, Food and Rural Affairs, Ontario Pork, Ontario Pork Industry Council and University of Guelph. It has established a reputation as an excellent communication medium within the industry and features speakers from Europe as well as North America.

Next year's conference will be held on March 31st and April 1st, 2010 and further details can be found at www.londonswineconference.ca

Nursery improvement – practical tips

While there are many aspects of nursery management that impact pig performance, UK-based nutritionist Peter Wilcock, of feed company Associated British Nutrition, says that creep feeding can give an excellent return on investment of between 3:1 and 9:1, depending on the market price. This is due to the impact of creep feeding on post weaning performance rather than its effect on weaning weight, he notes. Wilcock looks at this aspect of pre-nursery management in some detail and also looks at the benefit of a walk through the nursery unit by a specialist in order to identify areas for improvement.

Creep feeding

Introduction

Focusing on creep management and getting as many pigs on the sow as possible to consume creep feed will give subsequent post-weaning benefit and improve nursery exit weights.

Creep feeding is used in later weaning (> 21 days), however it has often been neglected in young weaned piglets (<21 days). The following shows that introducing creep earlier in life than was conventionally thought for piglets weaned pre-21 days may be a management tool that can increase the number of piglets consuming creep feed and so improve post-weaning performance.

Investing in creep feeding on a litter at $2.00 per litter can show a return of between 3:1 and 9:1 per litter dependent on pig price and also depending on the weaning weight improvement of using creep.

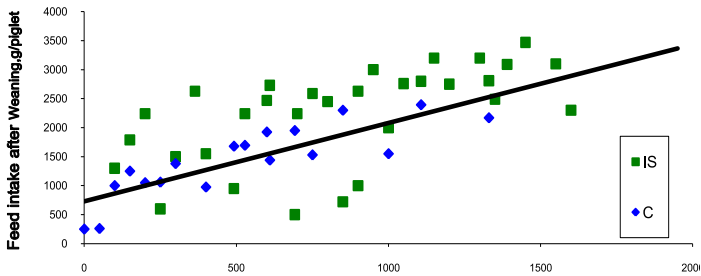
The benefits of creep feeding

Creep feeding is increasingly important because of increased litter size and the trend towards later weaning.

Although creep feeding is an important component in improving weaning weights, especially in later weaned piglets, it is more important in improving post-weaning performance. If pigs consume creep feed pre-weaning then there is less of a post-weaning feed intake lag and so post-weaning performance is enhanced.

This is shown in the following trial (Figure 1) when pre-weaning creep consumption was compared to post-weaning feed consumption. These results confirm that the more a pig eats as creep feed the better the post-weaning feed intake, something that as a pig producer we want to achieve in order to avoid that post-weaning lag.

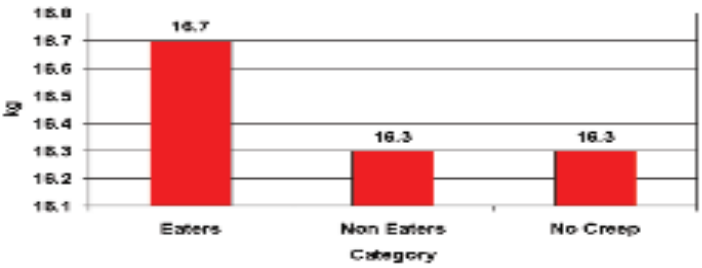
Figure 1: Creep feeding increases post-weaning feed intakes



Within the European markets average weaning would be approximately 24 to 28 days and the benefits of creep feeding are well known and proven. However new research in a US University (Sulabo et al, 2008) shows the importance that offering creep feeding can have on 21 days weaned pigs' post-weaning performance. The trial was interesting as chromic oxide (green colour) was added to the feed so that pigs could be identified as eaters or non-eaters based on the colour of the faeces. Pigs that ate feed would have a green colour to the faeces as chromic oxide is not absorbed by the piglet. This allowed the researchers to categorize pigs as eaters, non-eaters (offered creep but did not consume any) and no creep (no creep offered). The results (Figure. 2) showed that pigs that ate creep had an extra 0.4

kg gain over pigs that were non eaters and those that had no access to creep.

Figure 2: The effect of creep feeding on post-weaning gain



Recent research showed that pigs that ate creep had an extra 0.4 kg gain over pigs that were non eaters and those with no access to creep

These results show the importance of not only providing creep but also ensuring that the maximum number of piglets consume creep. The researchers showed in the trial that of the litters offered creep feed only a proportion of the piglets actually ate it:

60%	Ate creep	- Eaters
40%	Did not eat creep	- Non eaters

So as pig producers it is important to manage creep feeding to maximize the number of piglets that consume creep. One management tool the researchers looked at was introducing creep feed earlier than their standard practice. They therefore did a trial comparing pigs introduced to creep at their standard 14 days of life with pigs offered creep feed at day 7. The results showed that an extra 10% of pigs consumed creep feed when it was introduced earlier at day 7.

Based on pigs consuming creep feed at an average 100 g per piglet in the trial up to 21 days, for a litter of 10 pigs the feed consumed per litter would be 1.0 kg or $2.00 per litter. Pigs consuming creep showed an improvement of 0.4 kg per pig at 28 days post-weaning and based on lifetime performance could have an improvement of 1.2 kg per pig at slaughter. At a minimum 4 kg per litter (0.4 kg x 10 pigs per litter) and a maximum of 12 kg per litter (1.2 kg x 10 pigs per litter) then the return on consuming creep would be a benefit of between $6.00 to $18.00 per litter or a return of between 3:1 to 9:1 for a creep feed costing $2000 per tonne.

This shows some idea of cost benefits of creep feeding. Other work has tried to relate the effect of pre-weaning growth rate on slaughter weight at 170 days and showed that a 10 g improvement in ADG pre-weaning can improve live weight at slaughter by 0.96 kg. One management tool that can be used to achieve this extra growth is the use of a highly digestible complex (milk, cooked cereal, low soybean meal, etc.) as a creep feed. A highly digestible feed should be used because that stimulates feed intake in the piglet and Fraser et al (1993) showed that the use of a complex feed increased ADG pre-weaning by 20 g/day over a standard non-complex feed resulting in an increased weaning weight and subsequent benefit in post-weaning performance. Another practical tip to increase feed intake pre-weaning is gruel feeding, (Miller et al, 1999) whereby feed and water are mixed together and offered to the piglet. Results have shown an increased dry matter intake and average daily gain.

These results show the importance that focusing on creep feeding can have from a performance and financial perspective and show that it is not the importance of getting creep feed in front of the litter but ensuring that as many piglets in the litter consume creep as possible.

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Walk through by a specialist

It is often good to get a second opinion on a production system and so walking through the farm with the nursery specialist can often highlight areas where improvement may help. As an example of this, a nursery unit where the producer had commented on how performance was not meeting expected targets requested a walk through for advice.

Some of the areas in that unit were changed:

Point 1: Weaning weight had reduced by 1 kg due to pressure in the sow system but the nutritionist had not been informed and the same feeding program that had been originally used for the heavier weaned piglet was still being used.

Action: A program was placed relating to weaning weight coming in and if pigs fell below 5 kg weaning weight a new higher digestible feed was introduced.

Point 2: Pigs were being fed to days irrespective of feed intake during the period, meaning that pigs were moving to the next feed even if the first feed allocation had not been totally consumed. This meant that pigs were falling behind target performance as they were moving to the next feed lighter than expected.

Action: The feed program put in place for weaning weight was now based on kg per pig and the pig did not move to the next feed until the current feed allocation had been consumed.

Point 3: Pigs were not going to feeders and so feed uptake post-weaning was slow and this was reducing initial feed intake.

Action: To stimulate early post-weaning feed intake, mat feeding was introduced for 3 days post-weaning with mats placed in front of the feeder to stimulate feed intake.

Action: In addition to mat feeding, gruel feeding was introduced in a trough to allow for pigs to feed together as on the sow. A little gruel was also spread onto the feeder to try and get pigs attracted to the feeder.

Outcome: The pigs were fed the correct program and correct amount of feed according to weaning weight and early feed intake was stimulated by feed mats and gruel. This led to performance targets being met.

In this case, another pair of eyes helped the situation and some small changes helped target performance goals to be met. Although there was extra management time required to implement the changes, the producer was happy to do it as he saw the performance benefits in the pig.

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Effective ventilation

Good air quality in swine rooms can only be achieved if sufficient air is exchanged to remove both the respired moisture from the pigs as well as the ammonia gas produced by the decomposition of the manure, explains Larry Huffman of Huffman Engineering, London, ON. Regardless of the size of the pigs, in all rooms with slatted flooring and no bedding, this generally requires the use of some supplemental heat to both maintain the desired room temperature and still exchange sufficient air. Ideally, he notes, the ammonia gas level should be kept below 20 PPM and the relative humidity level under 70%. Huffman discusses some common mistakes regarding under-ventilating and heater management.

Air quality in swine rooms

The majority of swine enterprises utilize liquid manure handling systems. One of the main manure gases produced as part of the decomposition process is ammonia. Ammonia gas is water soluble and will readily attach itself to every moisture molecule found in the room air. Given that pigs regardless of size expel significant moisture into the room air from respiration, there is an abundance of water vapour available to absorb the ammonia gas. This gas combination is quite odorous and reduces air quality.

Table 1 shows the typical quantity of moisture that various classes of pigs contribute to the room air. This moisture must be exhausted from the room on a continuous basis to prevent the room from becoming very humid and hence very odorous. The table shows that pigs produce more moisture as they grow and hence the minimum ventilation rate must also be increased to keep up with the moisture production rate. Unfortunately, this does not happen automatically in most rooms during cold weather and thus air quality often deteriorates as the pigs grow.

Ammonia gas is easy to measure and should be kept under 20 PPM (parts per million) and preferably under 15 PPM, but that can be hard to achieve during cold weather. Passive type gas diffusion tubes are available that can be broken open and hung in the room for a measured length of time. When the gas tube is retrieved and the colour change reaction value read and divided by the exposure time, the average concentration of ammonia gas is determined. Should the result be higher than 20 PPM, then the room is likely being under-ventilated.

Table 1: Typical moisture production from pigs.

Swine Category	Animal Mass kg	Moisture Production L/Day
Breeding & Gestation	150	2.8
	200	3.4
Farrowing Sow	160	4.9
	200	5.4
Weaned Pig	5	0.8
	10	1.1
	20	1.2
Grow-Finish Pig	25	1.3
	50	1.9
	75	2.1
	100	2.2
	120	2.4

Source: OMAFRA Fanvent Analysis Program

All air exhausted from an animal room also expels significant heat energy along with the moisture and various manure gases. If sufficient air is exhausted to maintain a room relative humidity under 70%, the heat loss is sufficient to cause all swine rooms to be heat deficient during cold winter weather. Since all ventilation systems use temperature as the main control basis for operating the exhaust fans, the minimum fans are going to slow down or shut off rather than allow the room temperature to drop very much. Of course this control strategy will simply increase problems with poor air quality.

The proper solution is to add supplemental heat so that the exhaust fans can operate continuously and even increase their minimum speed as the pigs grow, to both remove the moisture

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Table 2: Supplementary heat requirements for swine rooms.

Pig Type & Size	Minimum Ventilation Rate	Outside Temperature 20°C	Outside Temperature -10°C	Outside Temperature 0°C
Breeding & Gestation	10 CFM/pig	500 BTU/h	250 BTU/h	0 BTU/h
Farrowing	17 CFM/crate	1000 BTU/h	600 BTU/h	200 BTU/h
5 Kg Pigs[a]	1.3 CFM/pig	225 BTU/h	180 BTU/h	130 BTU/h
20 Kg Pigs[a]	2.5 CFM/pig	50 BTU/h	25 BTU/h	0 BTU/h
25 Kg Pigs[b]	3.0 CFM/pig	200 BTU/h	100 BTU/h	0 BTU/h
40 Kg Pigs[b]	4.0 CFM/pig	110 BTU/h	0 BTU/h	0 BTU/h

Source: OMAFRA Fanvent Analysis Program

[a] Weaned pigs housed in a typical all-in, all-out nursery room
[b] Pigs moved from nursery room to an all-in, all-out grow-finish room

and still maintain the desired room temperature. Table 2 shows the typical quantity of supplementary heat required for each type of swine environment. Yes, even breeding and gestation rooms should be equipped with a heater for outside temperatures lower than about -10°C. All-in, all-out grow-finish rooms require some supplementary heat until the pigs reach about 45 kilograms.

Ideally, the minimum exhaust fan should be sized such that it should never need to shut off

Common mistakes to avoid

1. Not exhausting sufficient moisture

Under-ventilating a swine room during cold weather is the most common cause of poor air quality. This can occur due to several reasons:

- The minimum ventilation fan(s) may be allowed to shut off based on the room temperature dropping below the set point temperature and not re-start until the pigs have warmed the room back above the set point temperature. Ideally, the

minimum exhaust fan should be sized such that it should never need to shut off. If it does shut off, then it should not be allowed to be off for any longer than 3 minutes or the humidity level climbs too high and the room becomes quite smelly.

- The minimum ventilation fan(s) may be operating on the timer function of the ventilation controller whenever the room temperature drops below the set point temperature. The timer settings may not be allowing the fan to run a sufficient portion of the total cycle time such that the off time is longer than 3 minutes. The only time that a longer off cycle is acceptable is when the room is empty between animal groups. During these time frames, it is only the manure gases that continue to deteriorate the room air quality and shorten the life of all metal components within the room. Running the minimum exhaust fan at its slowest speed for a couple of minutes out of every 10 minute time cycle is usually sufficient to maintain reasonable conditions in an empty room.
- The minimum speed setting on the first stage ventilation fan(s) may not be set high enough to exhaust all of the moisture being produced. This can be checked by measuring the relative humidity in the room with a temperature/humidity pen. If the humidity level is above 70%, the ventilation rate must be increased. One can also measure the ammonia gas concentration to ensure it is less than 20 PPM. If not, increase ventilation rate.
- Very often the minimum ventilation is not increased as the pigs grow. While quite a few of today's ventilation controllers provide a minimum fan speed curve feature that allows the operator to program an automatic minimum speed increase based on growth days in the room, many producers do not use this feature. If a room is heat deficient, then the pigs will never cause a temperature increase during cold weather to have the ventilation fan speed up on its own. The operator must ensure that the minimum speed is raised each week as the pigs grow to keep up with their moisture production rate.

2. Stingy with the heat

All swine rooms should be equipped with some supplementary heat to ensure sufficient minimum ventilation can occur and the desired room temperature is also maintained. Yes, heat costs money, but so do poor air quality and animal discomfort (not to mention herdsmen working conditions). Even when heaters are installed in the various rooms, there can be air quality problems and also heat waste.

- Ensure all swine rooms are equipped with an appropriately sized heater and it is operated with the ventilation system controller to guarantee an interlock and minimize any unnecessary conflict between the two systems.
- If the relative start temperature for the heater is too far under the main set point temperature for the room, then often the heater will rarely turn on and, coupled with too low an exhaust rate, air quality can remain poor. Normally, a relative heater set point of 1.0 or 1.5°C below the main set point temperature for the room is good.
- The heater differential temperature (degrees of temperature rise) needs to be properly set for good economical heater operation. If the heater differential is too small, the heater does not run long enough to help dry out the air volume of the entire room and thus the room will remain quite odorous. On the other hand, the heater-off temperature is frequently set to match the main set point temperature for the room. This control strategy will almost always waste energy. With the heater sized for the coldest expected weather, it is over-sized for a good percentage of the year. Secondly, the typical temperature sensors that are used to control ventilation systems are relatively slow to react to a temperature change. Thus when a sensor signals a heater to shut off, the room temperature is actually still climbing, since the sensor has not fully responded to all of the heat energy available in the room. Any room temperature climb above the main set point temperature will automatically increase the speed of the first stage fan(s) and dump this extra heat. Therefore, the heater should always be shut off at least 0.3°C below the main set point temperature for the room.
- For many small rooms, a standard heater can be oversized such that it can alter the room temperature quite quickly. This can be stressful on the pigs and cause some heat waste. Many of today's box heaters have an adjustable gas orifice that can be partially closed to reduce the flow of gas to the burner and thus its heat output. Be sure to check whether or not your heater has this feature. It is very useful for all rooms housing younger pigs during the two swing seasons when less supplemental heat is required.

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Sow feeding management during lactation

Improvement to the genetic potential of lean and prolific dam lines make lactation feeding an issue of critical importance in the breeding herd, says Michel Vignola of Nutreco Agresearch, St-Romuald, Québec. He stresses that precise feeding programs in gestation that avoid over-feeding will help to increase lactation intake. Management practices after farrowing should encourage early and quick increases in feed intake, Vignola suggests, and these include wet-feeding, giving sows enough time to eat, monitoring of intake or simply feeding to appetite. The impacts of too warm ambient temperature on sow feeding behaviour and performance should also not be neglected, he says. In addition to these factors he also reviews the effects of people, water availability, comfort of sows and control of automated systems.

The challenges of modern sows during lactation

One of the challenges of feeding the modern sow is how to support increased milk production associated with higher litter size, Vignola notes. "Today's sows have to support litter growth rates of 2 to 3 kg/day or more," he says. "This corresponds to milk production of 8-12 litres/day or more." Secondly, the weight of sows at maturity - 260-290 kg - has increased leading to an increase in maintenance requirements. Also, at the start of their breeding career the replacement gilts have less fatty tissue reserves and therefore less 'buffer' energy stores, he says. The length of lactation has also declined, allowing for less time to attain higher feed intakes after farrowing. "Genetic improvement for both weight gain and lean has resulted in either a reduction in the sow's appetite or intakes have not increased in the same proportion as their energy requirements," Vignola explains. "The end result of the above is best summarized in Table 1 which shows energy requirements and feed required/day for the entire lactation, irrespective of the duration. As the ME content of the diet referred to in this table is fairly typical of current practices - 13.6 MJ ME/kg or 3250 kcal ME/kg - the amount of feed actually required could represent a real challenge in many farm situations." In reality, he concludes, appetite is often not sufficient and sows have to draw from their body reserves.

Table 1: Energy and feed requirements of lactating sows according to bodyweight and litter weight gain. (Noblet, Étienne and Dourmad, 1998)

Litter weight gain (kg/day)	2.0		3.0	
Sow bodyweight (kg)	200	300	200	300
Maintenance requirement (MJ ME/day)	24.5	28.9	24.5	28.9
Milk production requirement (MJ ME/day)	52.0	52.0	79.6	79.6
Total energy requirement (MJ ME/day)	76.5	80.9	104.1	108.5
Feed required for the entire lactation (kg/day)	5.63	5.95	7.65	7.98

Using body reserves could lead to excessive weight loss accompanied by a reduced litter weight gain (lowered milk production) and subsequent reproductive problems for sows, therefore everything possible must be done to maximize lactation feed intake, stresses Vignola.

Factors influencing lactation feed intake

1. ***Feeding during previous gestation:*** Any overfeeding during gestation will compromise the feed intake of sows or gilts in the following lactation, Vignola points out. "Very often, the problem with dry sow feeding is the feed allowance is set according to a subjective assessment of the need of each sow or group of sows, often leading to incorrect assumptions concerning the sows condition and therefore systematic over-feeding," he says. "Dry sows should be fed as precisely as possible using more objective techniques to assess individual body weight, body condition (score determined following visual appraisal and palpation at hip bone level), and ideally, measurement of back-fat depth." He notes that research conducted at Kansas State University has demonstrated that fatter sows at farrowing have lower feed intakes during lactation, lose more of their reserve and are less prolific at the next parity (Table 2).

Table 2: Effect of backfat at farrowing on feed intake, performance of sows in lactation and subsequent performances. (Young et al., 2004)

Item	P2 Backfat at farrowing, mm			P<
	< 17	17 to 21	> 21	
No. of sows	123	258	162	
Lactation daily feed intake, kg	6.06	5.93	5.73	0.04
Estimated maternal weight loss, kg	1.9	5.6	6.3	0.08
Sow Backfat loss, mm	2.1	3.2	4.8	0.01
Subsequent performance: # of sows	93	200	131	
Subsequent performance: Total born	11.8	12.1	11.1	0.02

Most authors agree that feed intake problems during lactation will most likely occur in sows with back-fat depths of 23 mm or more at farrowing. "The precision of the actual amount of dry sow feed delivered manually or by automatic feeding systems needs to be checked on a regular basis because feed density (bushel weight of grains, diet composition) and therefore volumetric measurements will vary with each load of feed delivered," Vignola explains. "Gestation feeding programs need to be validated by your nutritionist in order to more precisely adjust feed allowance settings to the specific diet density used on your farm and feeding targets such as bodyweight and back-fat gains, which could be genotype specific."

Finally, feed allowance toward the end of gestation needs to be increased in order to avoid a negative energy balance in the sow prior to farrowing. This also paves the way to higher feed intake in early lactation, Vignola suggests.

2. ***Management of feeding during lactation:*** A good principle is to ensure that the feed allowance the day after farrowing resumes to the same amount fed during the last 14 days of gestation, Vignola advises. "Feed allowances should be at least 2.5 kg but I regularly see sows eating 3 to 4 kg the day after parturition in situations where dry sow feeding is well controlled and the sows are in good condition and not overweight," he says. "The amount of feed offered daily should rapidly increase in the following days by at least 0.5 kg/day and ideally by 1.0 to 1.5 kg/day."

Research has repeatedly shown that too restrictive feeding patterns in early lactation (to prevent udder congestion, hypogalactia, piglet scouring, sow constipation and off feed events) can reduce total lactation feed intake for two reasons, Vignola points out. "First, feed intake in the last three weeks of lactation is not influenced by the intake in early lactation and second, the lost feed intake opportunities of early lactation cannot be recuperated in the later stages of lactation," he says. "Finally, large surveys have demonstrated that 30-35% of sows show a marked dip in feed intake for 2-3 days in the second week of lactation, while 30% of sows show no feed refusals at all. Therefore, it is better to tailor our feeding management toward the ⅔ of sows which do not show a marked drop in intake and target appropriate management

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The amount of feed given daily should be captured using a feed budget card, Michel Vignola advises (photo courtesy Hypor)

strategies for those sows that do refuse feed, rather than the other way round."

The amount of feed given daily should be captured using a feed budget card, clothes pins clipped on the crate or feeder or any other system to track daily feed intake, Vignola advises. This also improves communication and coordination between different workers, he notes. Alternatively, the KSU feeding method for lactating sows could work fine and calls for a high feed allowance right after farrowing (Table 3).

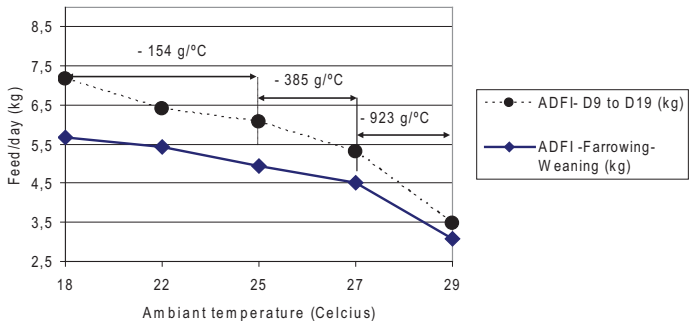
It is preferable to distribute 2 to 3 meals daily at equal time intervals, Vignola suggests. "Feeding as gruel by adding water stimulates intake by 3 to 12% but we should not add too much water as this could lead to feed wastage and too much dilution of the feed as well as possible fermentation and hygiene problems,"

Table 3: KSU suggested feeding procedure during lactation. (Goodband et al., 2006)

Number of 1.8 kg (4 lb) scoops to feed at each feeding from day 0 to 2			Number of 1.8 kg (4 lb) scoops to feed at each feeding from day 2 to weaning			
Feed in Feeder	Feeding		Feed in Feeder	Feeding		
AM	PM	AM	Noon	PM		
Empty	1	1	Empty	2	2	2
< ½ scoop	0	0.5	< ½ scoop	1	1	2
> ½ scoop lb	0	0	> ½ scoop lb	0	0	1

he says. "There must be feed available in the feeder during most of the day but feeders must be kept clean. These practices are referred to as feeding to appetite, which should be as close as possible to 'ad libitum' feeding."

Figure 1: Average daily feed intake of lactating sows exposed to increasing ambient temperature from farrowing to weaning or from day 9 to 19. (Quiniou et al., 2000)



3. Room temperature: The ambient temperature in the farrowing room is often overlooked as a source of intake problems, Vignola believes. "Sows produce a large amount of heat due to their high feed intake and rapid rate of milk synthesis," he explains. "Due to these high metabolic demands there is a zone of thermal comfort between 12 and 20°C." As temperature increases, a reduction in feed intake occurs, with the magnitude of the reduction more severe when temperatures exceed 22°C, as shown in Figure 1. These results highlight how the requirements of piglets at birth and during suckling are significantly warmer (26-30°C) compared to those of sows. Therefore, there is the need to compromise the choice for room temperature based on minimizing the negative effects for both the sow and the piglet. "Practical recommendations would be to maintain the room temperature at 18-20°C (65-68°F), remembering that for each °C above 20, the sow's appetite drops 0.15 kg/day and provide additional heating for the piglets," Vignola advises. "Supplementary IR lamps should be switched off at the end of farrowing. However, during summer time the room temperature will inevitably be too warm leading to heat stress for the sows."

Vignola suggests some strategies to reduce the effects of heat stress:

1) Use high energy feeds with lower fibre and crude protein content
2) Practice nocturnal feeding when outside temperature cools down
3) Increase number of feeding times
4) Use of air cooling or water dripping equipment

4. Water: It is essential to have good quality water and water quality guidelines, especially those related to chemical and microbiological specifications, says Vignola. Water quality should be properly checked annually, he advises. Water availability at the time of feeding is important with a recommended flow rate of 2 litres/minute. "Correct nipple position and ease of access to water are fundamental for optimum sow productivity and yet it is surprising how inaccessible some

watering devices are – either too high or too low," he says. "Also, beware that too high a water pressure could reduce water intake. As previously mentioned, wet or gruel feeding does help improve feed intake but be sure to correctly manage the amount of water provided and freshness of the feed."

5. ***People:*** Human beings can make quite a difference to lactation feed intake, Vignola notes. "There are obvious differences among similar farms and quality of management is certainly a major contributor to this variation: caring, knowledgeable, experienced and skilled people who can take time to treat each sow properly can impact feed intake more than any other single factor."
6. ***Comfort of the sows and equipment:*** Farrowing crate and floor designs should favour the maximum well-being of lactating sows, Vignola believes. Also, ergonomics of the feeders (size, volume, height and width) and the water nipple placement need to provide easy access to feed and water, he notes. "There are a plethora of different troughs and feeders on the market with no particular type being preferable to others, Vignola says. "Very often decisions regarding different ways or complexity of barn automation are based on cost but they should also consider the need to reduce manpower and training time. Each system has inherent pros and cons but the investment made to save time dedicated to manual repetitive tasks allows more time to observe animals and measure performance parameters thereby increasing management proficiency."

Conclusions

Successful feeding management of sows during lactation could be summarized as 'maximize feed intake', Vignola concludes. Positive consequences of maximizing lactation intakes on lean and prolific genotype, including improved wean to service interval, farrowing rate and subsequent litter size, have been observed in numerous research and commercial production systems (Figures 2 and 3).

Water availability at the time of feeding is important and drinker flow rate should be a minimum of of 2 litres/minute

Figure 2: Relationship between lactation feed intake and farrowing rate. (Goodband et al., 2006)

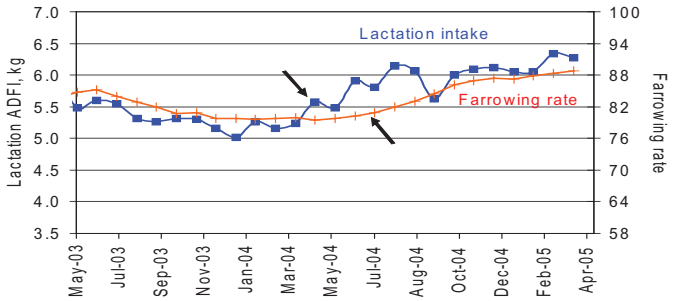
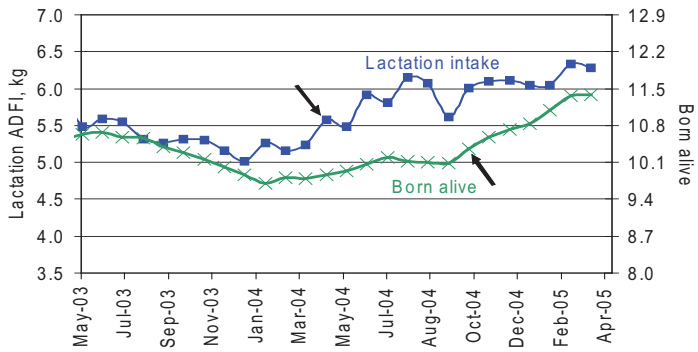


Figure 3: Relationship between lactation feed intake and subsequent born alive. (Goodband et al., 2006)



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Managing highly prolific sows

Genetic improvements in litter size have increased the productivity potential in pig production systems, notably in Denmark and France, but also increasingly in other countries. Since 1996, total litter size has gone up by an average of 0.2 piglets per year in French commercial herds, or 2.0 piglets over the 10-year period. With such rapidly increasing litter size, how should we manage the modern highly prolific sow? Guy-Pierre Martineau and Brigitte Badouard from the French National Veterinary School in Toulouse, discuss the management techniques that can be used to reduce stillbirth rate and increase piglet survival.

The approach to managing hyperprolificacy differs according to country, Martineau notes. For example, induced farrowing is a technique that is widely used in France in order to allow better supervision of the farrowing process and avoid weekend farrowings. However, in many Northern European countries, the use of prostaglandins is forbidden. "The case of Denmark is particularly interesting given that its productivity is one of the best in the world," he says. "Danish producers do not use prostaglandins because it is forbidden by law. How do they manage to have such a high level of productivity? How difficult is it?"

In 2006, mean live born of the top third French herds was above 13 live born piglets/litter. As the standard deviation is around 3, that means that ⅔ of the litters have between 10 and 16 live born piglets but also that 15% of the litters have over 16 total born piglets. "Beside the positive aspects - increasing numeric productivity - we have to take into account the lactation capacity of the hyperprolific sow, the variability of the piglet's weight at birth and also some differences in the management regarding cross-fostering," Martineau explains. One of the challenges has been that 40% of litters are now over 14 born alive and exceed the "normal" teat number of 14. In recent years there has been active genetic selection for number of teats within French nucleus herds (Table 1).

Table 1: Evolution between 2002 and 2007 of the % of purebred French sows with 16 functional teats (Boulot, 2008, personal communication).

	2002	2007
Large White (LC 110)	9.6%	29.9%
French Landrace (LC 330)	11.8%	34.4%

Another problem experienced on commercial farms is that the higher number of weaned piglets results in overcrowding in nurseries and finishing rooms. This is because most facilities were designed a few years ago when litter sizes were smaller than currently. "Consequently producers have to modify their routine management measures in order to face these overcrowding issues," Martineau explains. "Producers always wish to make their herds as profitable as possible and they are aware of the importance of having full batches on profitability and therefore a compromise needs to be worked out."

Another consequence of higher litter size is more variation in birthweights and weaning weights, leading to more variable growth from weaning to market and making it more difficult to operate a strict all-in all-out system, Martineau says. "Due to the variable rates of growth, it is difficult to stick fully to this principle and producers frequently move poor doing pigs between batches. There are many consequences of such a situation, mainly regarding the dynamics of infection such as PRRS."

The biggest challenge associated with high litter size is reduced average birthweight and an increase in the percentage of small piglets within the litter. Figures 1A and 1B show that the number of piglets with a birthweight of less than 1.0kg increases in larger litters. In litters of more than 15 total born, around 20 to 25% of piglets have a birthweight of less than 1kg. "Work by Le Treut has

Figure 1A. Effect of litter size on the birth weight distribution.

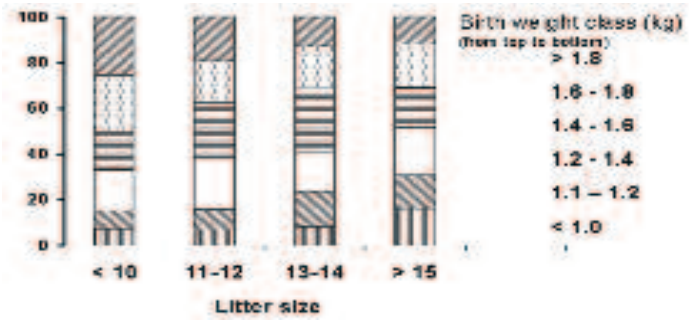
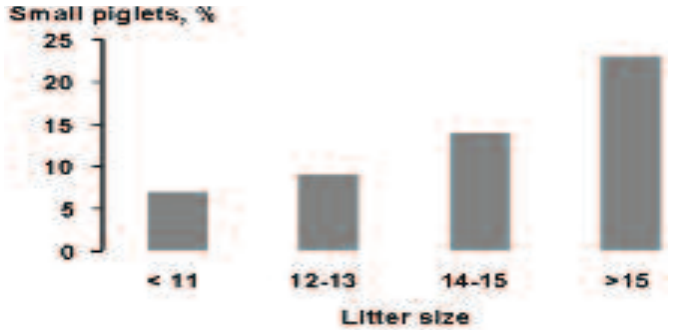


Figure 1B. Effect of litter size on the % of small piglets (<1kg at birth).



shown that there is a strong influence of weaning weight on age at slaughter: weaned piglets weighing 4-4.5 kg at 4 weeks reach market weight 28 days later than piglets of 10-10.5 kg," says Martineau. However, he notes, there are always light piglets in "conventional" or "standard" litters too, as shown in Figure 1.

MANAGING HYPERPROLIFIC SOWS

Feeding management

Two aspects of sow nutrition during gestation seem to be relevant to the hyperprolific sow, Martineau believes. First, it appears that giving increased amounts of feed for the first few weeks after breeding is not associated with an increase in embryo mortality. Secondly, there is a benefit of feeding more in the latter stage of gestation. "The influence of feed allowance during the last 14 days of gestation on farrowing progress and lactating performance has been studied in France in hyperprolific sows by Nathalie Quiniou," he points out. "In controlled experiments, the highest feed allowance seemed to make farrowing easier and improved neonatal vitality. However, this improved vitality was limited to the neonatal period."

Batch farrowing

Batch farrowing has been used in France since the 1970s. Instead of farrowing weekly, the system involves farrowing sows every two, three, four or five weeks, which creates larger batches of piglets, making all-in all-out management easier. Because more sows farrow at one time and other tasks such as weaning and breeding take place in different weeks, management can be focussed completely on the farrowing sows. Where litter size is very high, this has some advantages.

"One of the resulting benefits of adopting interval batch systems is that technical

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performance is improved due to uniform age and weight at weaning, consistent sow nutrition and phase feeding management and more effective use of all-in, all-out systems," Martineau believes. "Also, health performance is better due to improved disease control and better disease stability within the herd. There is no doubt that the recent adoption of batch farrowing in North America is linked with disease control, mainly PRRS as well as PCVAD."

Fostering

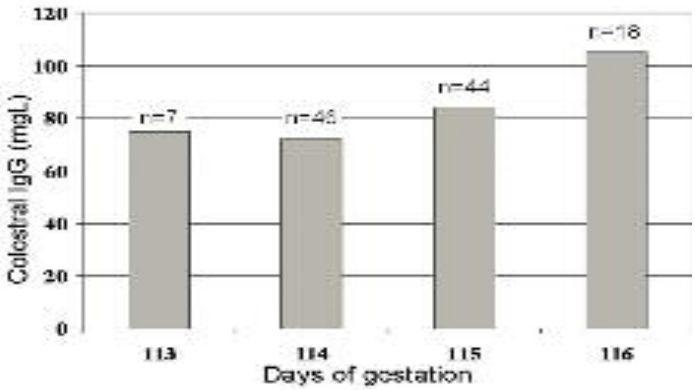
A major consequence of hyperprolificacy is increased fostering, Martineau notes. Various methods are used, including early weaning sows and using them as foster mothers to create udder space for surplus piglets. A database of 300 farms using computerized records was used to examine the extent and timing of cross-fostering being practiced in commercial herds in the Midwestern US and Canada in the mid '90s. The authors concluded that farms under use cross-fostering as a management technique. The late Peter English also said that "few stockpersons exploit it as fully as they might usefully do". However, in France, Martineau says, producers often over-use cross-fostering, which may create problems.

Induced farrowing

Although induced farrowing has many advantages, its use also carries some disadvantages. "The negative side effects were reported in a recent experiment by Gunvaldsen et al.," Martineau points out. "In this study, average gestation length in non-induced and induced sows was 117.0 and 115.1 days, respectively. For every day of gestation, piglet growth rate increased 26 g per day; therefore, body weights of pigs from induced litters were 576 grams lighter at 16 days of age due to slower growth. The relative risk of morbidity was 2.0 times higher in piglets of induced sows. Therefore, there was a tendency towards higher mortality during lactation in piglets of induced sows. This is why the authors concluded that an understanding of the objectives of a farrowing induction program and the average gestation length of specific sow subpopulations in herds was extremely important in order to avoid production loss associated with premature farrowings."

Martineau notes that there is a decrease in gestation length with increasing litter size, which has implications not only for birthweight but also for piglet immunity. "In a recent observational study, we measured IgG (immunoglobulin) content in colostrum samples from sows and blood samples from 6-day old piglets, he explains. 'There is a strong association between gestation length and IgG concentration in sows as well as in piglets (Figure 2).

Figure 2: Relationship between gestation length and IgG concentration (mg/L) in colostrum from sows from parities in 10 herds (Gin et al., 2008, data not published).



Economic impact of prolific sows

There is no doubt that there is an economic advantage with hyperprolificacy for pig producers, Martineau says. "In 2007, the difference of gross margin over feed and replacement costs was €54/inventoried sow/year," he notes. "The economical impact of hyperprolificacy was reported in 2004 by Gourmelen and Le Moan). Different scenarios of herd management were compared to an initial situation corresponding to standard (non-hyperprolific) sows. New accommodation investment costs related to the pre-weaning, post-weaning and fattening stages and labour costs were taken into account. According to this scenario, the difference in gross margin over feed and replacement costs varied from €34 to €126 /inventoried sow/year."

Conclusions

In answer to the question: How should we manage the modern highly prolific sow?, Martineau says that there is not one rule for farrowing sow and piglet management and that it has to be adapted according to the specific country. Some rules that were valid 10 years ago may now be obsolete, he suggests. French producers have developed strategies for dealing with high litter size and have adapted to the new circumstances. He believes that there has probably been too much emphasis put on maximizing litter size, which has compromised piglet viability. "In France, we are convinced that we have to stop the race to achieve the highest number of total born piglets per litter," Martineau concludes.

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Optimizing herd parity structure

Part two: How replacement rate and sow management influence parity structure

By Bernie Peet

Introduction

In the first part of this article, I looked at the influence of parity on various aspects of performance, what the correct parity structure in the breeding herd should be and how the pattern of gilt introduction affects the herd parity profile. In this second part, I'm going to review how replacement rate influences our ability to achieve the correct parity structure and look at which aspects of management are most important in maximizing sow longevity.

Determining replacement rate

In order to have any chance of developing the ideal parity profile, the correct replacement rate must be calculated to determine the correct numbers of gilts to be served each week. In order for herd size to remain constant:

Replacement Rate = Culling Rate + Death Loss

Replacement rate is expressed as a percentage of the herd replaced over a 12-month period. The annual rate is determined by:

- How many litters the sow has in the 12 month period (litters/sow/year)
- How many litters the sow has during the period she is in the herd (litters per sow lifetime)

Litters per sow lifetime, or longevity, is an extremely important measure but is not widely used as a measurement of breeding herd productivity. We can use it to determine replacement rate as follows:

- Assume sows in the herd have an average of 4.5 litters/sow lifetime and produce 2.4 litters/sow/year.
- This means that the whole herd will turn over in 4.5/2.4 = 1.88 years. We can therefore calculate the required replacement rate as 100/1.88 = 53%.

As litters/sow lifetime increases and/or litters/sow/year decreases, the required replacement rate will fall. It can be seen from Table 1 that litters/sow lifetime (LSL), or sow longevity, is far more important than litters/sow/year in determining the required replacement rate. LSL can be calculated by averaging the parities of all the sows that are culled or

die over a given period. Alternatively, it can be calculated from litters/sow/year (LSY) and replacement rate, provided the herd size has remained stable over the period in question. The relationship is: LSL = (100/Replacement Rate) x LSY. For example, if replacement rate is 46% and the LSY is 2.3, the LSL is (100/46) x 2.3 = 5.0. By way of providing some benchmarks, an LSL of 3.5 is very poor, 4 is poor, 4.5 is moderate, 5 is good and 5.5 or above is excellent. Many people assume they can achieve a replacement rate that is lower than what is actually possible because they do not understand the relationship shown above or calculate the appropriate figure. Often a figure of 40% replacement rate is quoted as being a suitable target but this requires sows to have 6 litters/sow lifetime if the LSY is 2.4, a figure achieved by very few herds. In most situations 45% will be a minimum and 50% more likely in high-performing herds with an LSY of 2.4 or more.

Table 1: The influence of litters/sow lifetime and litters/sow/year on required replacement rate

Litters/sow/year	Litters/sow lifetime			
	4	4.5	5	5.5
	Replacement rate			
2.3	57.5	51.0	46.0	41.8
2.4	60.0	53.2	48.1	43.7
2.5	62.5	55.5	50.0	45.5

It can be seen that sow longevity has a major influence on replacement rate. Therefore, to control replacement rate at an acceptable level, management strategies and practices which increase longevity need to be employed. This means minimizing the level of enforced culling and sow deaths, both of which determine longevity and replacement rate.

Controlling culling and death loss

Losses of sows and gilts due to culling and death loss are unnecessarily high in many North American herds, resulting in a very high replacement rate and low litters per sow lifetime. Surveys of herd recording data show that the majority of gilts and sows removed from the herd are "enforced " culls removed due to fertility problems, poor body condition, lameness and other health problems. It is clear from such industry data that high levels of enforced culling and death are a major obstacle to achieving the optimum parity profile. Far too many young animals have to be culled due to anestrus, returns to service, loss of condition or lameness. Not only does this reduce the performance potential of the herd, but it is also extremely costly. Consequently, investment in the necessary facilities, people, feed and genetics to improve this situation will be well justified.

Achieving the correct parity structure

Many aspects of management influence our ability to optimize the herd's parity profile, especially those that impact longevity. I have selected some areas of management that I find in practice to be in need of the greatest improvement. Brief recommendations are as follows:

- ***Plan replacement policy, don't just let it happen:***
  - Calculate required replacement rate based on current or expected longevity (litters per sow lifetime), litters/sow/year and death loss
  - In a new herd, commence culling at an annual rate of at least 45% to avoid the "Herd 3" parity profile or worse. Consider stocking half the herd with lower cost F2 gilts to minimize the effect of this policy on cash flow
  - Implement a well planned and regular gilt introduction program in order to meet the appropriate gilt service targets
- ***Take steps to maximize the number of gilts that reach parity 3 and beyond:***
  - Implement good acclimatization procedures to provide adequate immunity to herd diseases
  - Use well planned and predictable gilt introduction routines that result in gilts being served at a high enough age and weight, ideally a minimum of 135kg/300lbs, 220 days or higher and second estrus
  - Provide gilt group pens with sufficient space for good expression and detection of estrus - a minimum of 1.4m^2/15ft^2
  - Provide intense stimulation of unbred gilts with a mature boar to initiate a strong estrus cycle
  - Ensure adequate feed levels to allow females to reach their genetically-determined mature body size at parity 4-5
  - Give specific attention to achieving high feed intakes in first lactation to minimize body weight loss
  - Use flooring materials that are non-injurious and carry out immediate repairs to damaged flooring
  - Ensure rapid detection and treatment of sick, injured and disadvantaged sows and gilts

Above all, investment in people with the skills and knowledge to successfully implement the management procedures necessary to ensure high longevity will have the biggest impact on the ability to achieve the optimum herd parity profile. ≡WHJ≡

Preparing your production facility for the winter months

By Mike Brumm, Brumm Swine Consultancy, Mankato, Minn.

While it is still fall, temperatures have begun their gradual descent towards the January lows of -10 to -30°C. As every good manager knows, fall is the time to prepare facilities for cold weather operation, rather than having to do it in response to the first bitterly cold day in late November.

With the return of cold weather comes the increased reliance on propane or natural gas fired heaters in production facilities to maintain optimal temperatures. While the goal of supplemental heat in production facilities is to maintain temperatures at the lower end of the thermal neutral zone, all too often incorrect controller settings result in temperatures well above these lower zones, resulting in higher than necessary fuel bills, or facilities with poor air quality due to ventilation systems that are shut down too much in an effort to conserve heat.

In cold weather, facilities still need to have minimum ventilation for maintenance of moisture balance in the pigs' environment and removal/dilution of pathogens in the air such as air borne bacteria, etc. The Midwest Plan Service recommends the following as minimum ventilation rates for cold weather:

Breeding gestation/rate per pig	12 cfm
Farrowing rooms/rate per crate	20 cfm
Nursery rooms/rate per pig	1.5-2.0 cfm at weaning increasing to 3 cfm by 15 kg
Grow-finish rooms/rate per pig	4 cfm at placement increasing to 10 cfm by 75 kg

A major cause of higher than expected propane expense is oversizing of minimum ventilation fans. In large farrowing units in the US, it is not uncommon to have a series of 24 crate farrowing rooms. Many times these rooms have a 16" variable speed fan as the minimum ventilation. Sixteen inch diameter fans often have capacities in the range of 2500 cfm when operated at 0.05" static pressure. With 24 crates in a farrowing room, this is a capacity of 104 cfm/crate which is 5 times the minimum recommended rate.

With the majority of ventilation controllers available, it is next to impossible for the fan to be slowed down to 20% of its maximum capacity. The general recommendation for most

variable speed fans is that they be operated no slower than 50% of their rated rpm, which most often translates into approximately 40% of their rated cfm.

Even at this speed, most variable speed fans loose effectiveness in terms of maintaining capacity on windy days. That is, while fans may have a rating for cfm at 0.05 static pressure, even when operated at 50% of their rated speed, when operating in conditions of wind blowing into the fan, wind causing an uplift on the attic inlet, etc., it is not uncommon for the performance of the fans to drop to less than 40% of the performance at 0.05 static pressure. In general, the faster the fan operates relative to full speed, the better the fan is able to operate in conditions of high static pressure.

This suggests that now is a good time to review fan sizing and operating characteristics when used as a variable speed fan and if necessary, replace the fan with a more appropriately sized model.

Figure 1: *Insulated panels for winterizing unused fans. Note the ice on the uncovered fan shutter*

Figure 2: *Insulated fans in a finishing facility*

Fall is also the time to line up shutters and covers for use with fans that will not be operating during extremely cold conditions. In general, install covers (preferably insulated) on the warm side of the fan motor and blade (Figures 1 and 2). This way, the motor and blade remain in cold temperatures and are less subject to condensation and corrosion that can be an issue when covers are installed on the cold side of the devices (Figure 3).

Once every 4-5 years, have your propane supplier perform a high pressure test on all of your fuel lines. I continue to be amazed at how many producers report a significant number of leaks when this test is done.

If you have unvented space heaters installed in hallways and animal spaces, check to see if they are variable output. Variable output furnaces have a manual valve located between the control module and the flame that can vary the heat output of the furnace.

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Figure 3: *Insulated fans with cover on the cold side of the fan. Note the moisture condensation forming on the fan shrouds*

Keep in mind that a furnace is big enough if it shuts off on the coldest day of the year. At the same time, the longer the furnace runs per heat cycle, the more uniform the heat distribution in the area heated. With variable heat output furnaces, the furnace is set to a low output level until more heat is needed. This makes the heating cycle more uniform between seasons, making conditions in the animal space more uniform.

For production sites with pre-heat hallways for farrowing and/or nursery rooms, resist the temptation to operate the hallways too warm. The closer the room receiving air from the hallway operates to the ventilation rates specified above, the cooler the hallway must be to avoid having the room ventilation increase output. In general, preheat hallways should be set to maintain 7°C (45°F).

The reason for this low setting is the ventilation system in the animal space reacts as though the incoming air is the outside air temperature. The warmer the outside air, the larger the volume of air needed to remove excess heat produced by the animals. If the pre-heat hallways are set at 55°F, the room ventilation system reacts as though it were a warm spring day, something that you don't want during a January cold snap!

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Dietary nucleotides - a new ingredient for starter pigs

By Rob Patterson, Canadian Bio-Systems Inc.

Recently, there has been a notable increase in the amount of literature surrounding the inclusion of dietary nucleotides in starter pig programs. This is likely due to research that recognizes that inclusion of these supplements into the diets of young pigs can lead to improved health and performance. But what exactly are nucleotides, how do they work and how should they be included into a starter program are the questions this article will address.

What are nucleotides?

Similar to how amino acids are the building blocks of protein, nucleotides serve as the building blocks of DNA and RNA, the genetic currency of all living cells. Furthermore, just as there are many different individual amino acids, so too are there multiple nucleotides.

Chemically, nucleotides are one part non-protein nitrogen, one part sugar and one part phosphorus. Nucleotides can be found in all tissue types and are involved in almost all metabolic processes including energy storage and release, blood flow, tissue growth and immune functioning. In young pigs, these processes account for a large portion of biological resources. Thus, in order for proper growth, metabolism and maintenance to be achieved an adequate supply of nucleotides must be made available.

Pigs possess the ability to synthesize nucleotides and under optimal conditions this supply is enough to satisfy biological demand. However, during times of rapid growth or stress, demand can outpace supply, especially in tissues with high turnover such as the intestine, liver and blood cells. Therefore during stressful periods nucleotides become "conditionally essential". This means that for the pig to reach maximal growth, an external supply may need to be provided.

Where are nucleotides found?

Nucleotides are components of the non-protein nitrogen fraction of milk, yeast and other ingredients with high cellular density. Yeast and yeast by-products such as yeast cell wall and yeast extracts are typically the best nucleotide sources. However, there exists considerable variation between commercial products (Table 1). When procuring a dietary nucleotide supplement it is a good idea to obtain a certificate of analysis showing the total level of all nucleotides present in the product.

Why should nucleotides be included in starter pig rations?

The rationale behind nucleotide inclusion is that young mammals in particular appear to have an evolved requirement for dietary nucleotides during the first weeks of life. This requirement is well documented in human pediatric nutrition and has led most commercial infant formula to be fortified with a nucleotide supplement.

The primary source of nucleotide for young animals is from the non-protein nitrogen fraction

Table 1: Total nucleotide levels from various commercial feed ingredients (Source: Look Laboratories, 2009)

Supplement	Total Nucleotides, %
Animal Plasma	0.028
Skim Milk Powder	0.062
Whey Permeate	0.101
Yeast Extract Product #1	1.252
Yeast Extract Product #2	0.075

of colostrum and milk. Published studies have shown that as lactation progresses the concentration of nucleotides within colostrum and milk gradually become reduced. Most Canadian producers wean at around 21 days of age, earlier than many European countries and wild pig populations. Although this allows for more pigs weaned/sow/year, it also deprives these animals of nucleotides and other nutrients they would otherwise consume while nursing. Therefore, because modern production methods have shortened natural lactation length, and thus piglet nucleotide consumption, it follows that it may be beneficial to include an external source of nucleotides into commercial starter pig rations.

Will nucleotide inclusion pay off?

A good quality commercial nucleotide product, with total nucleotides exceeding 1%, will tend to be relatively expensive, usually around $12 - $15/kg. Based on performance improvements alone, a creep cost of $1,100/metric tonne (MT) and 2 kg/MT of supplement at $15/kg, one would require an FCR improvement of around 0.05 or 4 - 5% to cover the inclusion cost. Is this level of improvement realistic? Table 2 shows data from a commercial European herd that included a nucleotide product at 2 kg/MT, improved FCR by 0.10 and broke even. So yes, it is possible to cover your inclusion cost with

Supplementation of piglet diets with Dietary Nucleotides can give both performance and health benefits

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performance alone. However, one should be aware that such an improvement may not be realized in every production system and that factors such as inclusion level, piglet and dam age, genetics and environment will all contribute to overall nursery performance.

Table 2: Growth performance of starter pigs fed a control or nucleotide supplemented diet (Source: SCA Spain, 2005)

Parameter	Control	NT (2 kg/MT)
Start Weight (kg)	5.85	5.85
Finish Weight (kg)	7.24	7.51
ADFI (g)	137	147
FCR	1.10	1.00

So why bother using a nucleotide supplement without assurance that performance will be improved? From Table 3, it can be seen FCR was unaffected by 1 kg/MT nucleotide inclusion. However, the immune status and gut development of these pigs was significantly improved. In practical terms, an increase in pepsin (a digestive enzyme) production and greater small intestine weight likely reflects improved digestive capacity, while elevated IgA may reflect enhanced infection fighting potential within the intestine. Together, these health improvements could be enough to justify dietary inclusion if it leads to reduced infection or medication rates.

Table 3: Feed conversion and immune status of piglets fed control or nucleotide supplemented diets (Source: Lee et al., 2007)

Parameter	Control	NT (1 kg/MT)	Statistics
FCR	1.30	1.30	P > 0.10
Plasma IgA (mg/ml)	0.29	0.34	P < 0.05
Small Intestine Wt. (g)	684	744	P < 0.01
Stomach Pepsin	146.6	223.6	P < 0.01

In addition to the data in Table 3, Table 4 shows a similar immune response within the gut to the same 1 kg/MT inclusion level. Immediately after weaning, young pigs tend to experience shortened villus and crypt lengths which some have associated with reduced nutrient absorption and post-weaning growth lag. Here, both villus height and crypt depth were significantly greater in the nucleotide diet in comparison to the control diet. This suggests that nucleotide supplementation may have helped alleviate intestinal damage commonly associated with weaning.

Table 4: Intestinal structure of piglets fed control or nucleotide supplemented diets (Source: Domeneghini et al., 2007)

Parameter	Control	NT (1 kg/MT)	Statistics
Villus height, um (V)	147.8	215.0	P < 0.01
Crypt depth, um (C)	80.3	179.8	P < 0.01

The improvements in herd health shown in tables 3 and 4 will have an impact on the economics of a production unit. For example, superior gut and immune health will result not only in less mortality during episodes of disease but will likely lead to less medication use as well. This immune stimulating benefit can be seen in Table 5 which shows data from a commercial nursery study. The study showed that piglets receiving nucleotide supplementation required less antibiotic treatment than non-supplemented piglets and although not statistically significant, mortality was numerically reduced.

Table 5: Effect of nucleotide supplementation on the performance, antibiotic treatment and mortality due to diarrhea in a commercial nursery study (Source: Martinez-Puig et al., 2007)

Parameter	Control	NT (1 kg/MT)	Statistics
FCR	1.64	1.73	P > 0.10
Antibiotic Treatment (%)	15.63	1.53	P < 0.001
Mortality (%)	4.69	1.56	P > 0.10

When viewed together these studies suggest that nucleotide supplementation will improve growth performance in some situations but that enhanced immune health is often a more likely outcome. Given this, it is best to calculate a total feeding cost and use this as a benchmark for evaluating the inclusion cost of a given supplement. Using the following ration costs and body weight ranges: Creep $1100 (4.5 - 7 kg), Starter 1 $800 (7 - 15 kg) and Starter 2 $500 (15 - 25 kg), the net feeding cost can be calculated for a $15/kg product. When included into the creep at 2 kg/MT and into the starter phases at 1 kg/MT the net feeding cost would be approximately $0.53/pig, assuming FCRs of 1.15, 1.3 and 1.45 for each phase. A small price to pay to improve your herd health, reduce nursery mortality and reliance on medications, not to mention the potential for improved growth and feed efficiency!

Summary

To date, the exact mechanism by which nucleotides exert their health stimulating benefits is still not entirely understood. The literature suggests that multiple mechanisms are likely being affected and this seems probable given the broad biological responses that have been documented. What does seem clear is that supplementing starter pig rations with nucleotides appears to be an affordable insurance policy against the detrimental effects of disease and productions stress. Thus, as more research becomes available, it is likely that including supplemental nucleotides into nursery pig rations will become the norm rather than the exception.

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Designing a group gestation pen - it's more than square footage per sow

Part 1: Designing for sow behaviour

By Kathy Zurbrigg and Franklin Kains

Group sow housing is equal or less expensive to build than crated gestation and group housing barns are quiet, pleasant places for employees to work. For these reasons and more, the move towards group gestation housing is of benefit to producers. Understanding sow behaviour is key to designing gestation pens that maximize returns while minimizing problems associated with aggressive encounters between sows.

Sows and other animals in natural environments control the size of their group. They leave or join a group based on the costs and benefits that result from belonging to the group. One major benefit of group living is the security afforded by the herd. However, if food or other resources become scarce, competition and aggression between animals increases and drives some individuals out of the group. Domestic farm animals cannot leave or join a group when resources are limited. Therefore limited resources result in aggressive interactions because individuals cannot avoid confrontation by leaving the group.

It is often stated that domestic sows form a hierarchy or "pecking order" when grouped together. This is a misconception which perpetuates the belief that sows are naturally aggressive animals. Sows (and many other animals) only become aggressive when they feel threatened or they perceive that their resources (primarily food) are limited. If a housing system is designed in such a way that competition for food, water and preferred resting places are unnecessary or unproductive, sows do not waste energy on aggressive behaviours. New feeding strategies and design concepts created by Ontario farmers have decreased or eliminated aggressive encounters between sows. Producers preparing to renovate or build new sow gestation barns will benefit from understanding these successful designs and management strategies.

The most serious aggressive encounters between sows usually occur when they are mixed into a group after breeding. Prior to

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mixing, recently bred sows are commonly fed a high density ration once a day. Although nutritionally complete, this feeding strategy leaves some sows feeling hungry. As a result, when mixed into a group the hungry sows perceive feed as a limited resource. Therefore, some sows become aggressive to improve their ability to access feed within the group. In some systems, the resulting aggression at mixing and feeding times causes injuries, unequal allocation of feed and unacceptable variation in body condition.

Many different feeding systems for group housed gestating sows have attempted to address these problems. Few have been successful, in part because they perpetuate the sow's perception that food is limited. Electronic sow feeders (ESF) ensure equal feed allocation. The feeding station provides protection to the sow and controls her ration. However, the design is counterintuitive to normal sow eating behaviour. Sows prefer to feed and rest as a group. Aggression occurs in ESF systems as sows compete to enter the feeding station (Figure 1). Since feed is only available in one place and only one sow can eat at a time, the perception is that feed is limited and as a result aggression can occur. Aggressive encounters in ESF pens are minimized if the pens are straw-bedded, with a generous allocation of space per sow and a low number of sows per feeding station (< 60 sows per station). Unfortunately, these recommendations increase the labour and cost of ESF systems.

Figure 1: *Sows jostling to get into the electronic sow feeder*

As an alternative to ESFs some producers in Europe use a feeding stall system (Figure 2). In some systems each sow has a feeding stall with a lockable swing gate at the back. As the sow enters the stall the gate swings down behind her. When she is done eating, the sow can back out (the gate swings up). Occasionally timid or lame sows are reluctant to leave the stalls. In systems with an open feeding stall (ie. no back gate) fast-eating sows finish their ration first and may bite at other slower-eating sows until they leave their stall and surrender their remaining feed. When sows leave their feeding stall they enter a group area which is often fully or partially slatted. Fully slatted flooring in any group housing system is a suboptimal flooring choice. Sows are more likely to injure themselves if a claw is caught between the slats while the sow is involved in an altercation.

Figure 2: *Feeding stall system with free access to fully slatted group area*

Well-designed, group housing pens with floor feeding most closely approximate the natural behaviour of sows. These pens should have a level of complexity that allow timid sows to avoid aggressive encounters while deterring more aggressive sows from pursuing attacks. Sows can be sorted by size in the pens, providing an opportunity to feed the group according to its average body condition. Floor feeding allows the producer to spread feed out over time and space by dropping small amounts of feed over a wide area, several times a day. This decreases the sow's perception that feed is limited, eliminates piles of feed to hoard or fight over, and makes competition and aggressive encounters unproductive. In the next issue, key concepts for gestation pen designs will be reviewed and new options for drop feeding will be discussed.

A new DVD showcasing 4 Ontario farms using group gestation housing is now available at no cost through the Ontario Pork Producers Marketing Board and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). The DVD includes a handout detailing the layout and management techniques of each farm that are discussed in the video.

An earlier DVD (produced in 2002) is also available, which features 3 other group gestation housing barns in Ontario, including one that uses straw. To receive either or both DVDs contact: Kathy Zurbrigg, OMAFRA 519-846-3418 or Kathy.zurbrigg@ontario.ca

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Corn DDGS withdrawal rates for hogs: Backfat and belly quality

By Eduardo Beltranena[1,4], Michael Dugan[2], Jennifer Aalhus[2], Malachy Young[3], Neil Campbell[3], Matt Oryschak[1], and Ruurd Zijlstra[4]
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Take Home Messages

Feeding high levels of dried distillers' grain and solubles (DDGS) may reduce feed cost. Corn DDGS is high in unsaturated oil that may soften the pork fat if fed at high levels to finishing pigs, potentially affecting pork quality. We evaluated three withdrawal patterns of corn DDGS out of the two finisher diets (20, 20%; 20, 10%; 20, 0%) vs. constant feeding 30 or 0% corn DDGS to market weight. There was no difference in animal performance, so the magnitude of the advantage to pork producers depends on corn DDGS cost in relation to other feedstuffs. There were benefits of feeding 30% vs. no corn DDGS on loin quality and limited differences in sensory results. Our recommendation, therefore, is to maximize inclusion of corn DDGS in grower diets. The grower phase is when the high oil content of corn DDGS will return the most by contributing extra dietary energy. If bellies are the most important cut to packers, corn DDGS would be withdrawn sooner (e.g., 4 weeks prior to market weight) if hogs were previously fed diets with ≥30% DDGS compared to hogs previously fed up to 20% DDGS, where withdrawing DDGS two weeks prior to market weight would be sufficient. Although the 3 corn DDGS withdrawal strategies tested improved fat hardness, not even the most aggressive withdrawal strategy (20, 0%) restored fat hardness to that of controls. But is there a need to reach 'zero' impact on fat hardness when withdrawing corn DDGS? The extent and length of withdrawal should therefore be a compromise between impact on fat hardness and benefits on pork quality. We would advocate that packers consider paying producers an incentive to withdraw corn DDGS in the finisher phase(s) when corn DDGS prices are low and packers want to restrict adverse impacts on belly or fat hardness. The effects of feeding corn DDGS were more pronounced in gilts compared to barrows.

In previous issues of the Western Hog Journal, we summarized the effects of feeding corn dried distillers' grain plus solubles (DDGS) on animal performance, carcass traits, cost variables (Vol. 30, No. 5, pages 46 – 48), tissue composition, loin quality, retail appearance and sensory results (Vol. 31, No. 1, pages 48 - 52). We fed corn DDGS, no corn DDGS or implemented three removal or withdrawal strategies of corn DDGS out of the finishing diets. The goal was to optimize use of DDGS in hog diets to reduce feed costs for producers while mitigating possible pork quality concerns for packers. This final article reports the effects on backfat hardness and belly (bacon) quality from hogs so treated.

To recap the study design, one-fifth of the barrows or gilts were fed a control diet over five growth phases until market weight (Figure 1). Four-fifths of the barrows or gilts were offered diets containing 30% corn DDGS replacing soybean meal for the first three grower phases. These hogs were then fed 20 and 20%, 20 and 10% or 20 and 0% corn DDGS in the last two finisher phases, respectively, until reaching market weight.

We found that feeding 30 vs. 0% corn DDGS to market weight reduced backfat hardness measured over the second thoracic vertebra (Figure 2). Reducing to 20%, followed by entirely removing corn DDGS from the last finisher diet two weeks prior to hogs reaching market weight improved, but did not entirely restore backfat hardness.

As hogs grow, they lay down disproportionately more fat in the belly than in any other part of the body. We thus expected that feeding corn DDGS to finishing hogs would have the greatest impact on belly quality. Belly thickness was reduced by feeding 30 vs. 0% corn DDGS to market weight or reducing the dietary

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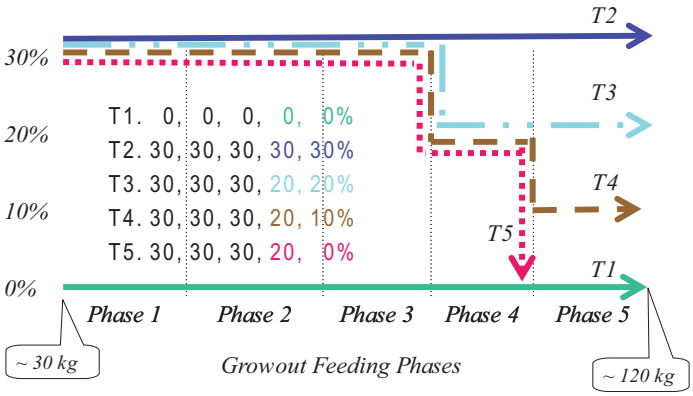
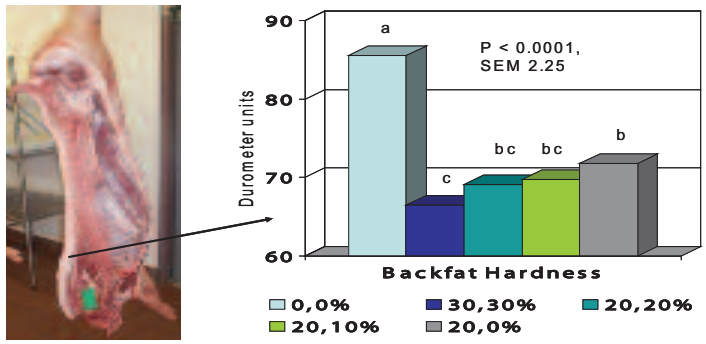
Figure 1: Hogs were fed 0 (T1) or 30% (T2) corn DDGS during the first three grower phases. We then implemented three corn DDGS withdrawal strategies (T3, T4, T5) during the last two finishing phases or hogs continued to be fed 0 or 30% corn DDGS.



inclusion from 30 to 20% over the last two finisher phases prior to market weight (Figure 3). When bellies were draped over a bar to rate belly fat hardness, feeding 30% corn DDGS to market weight or reducing the dietary inclusion from 30 to 20% over the last two finisher phases prior to market weight, reduced the distance between the two hanging ends and the angle formed at the bar

Figure 2: Feeding 30 vs. 0% corn DDGS to market weight reduced backfat hardness. Reducing to 20%, followed by entirely removing corn DDGS from the last finisher diet two weeks prior to hogs reaching market weight improved, but did not entirely restore backfat hardness.



compared to bellies of control pigs. Reducing corn DDGS in the diet to 20%, followed by complete removal two weeks prior to hogs reaching market weight (i.e., 20, 0% strategy) increased belly thickness, the distance between ends and improved (increased) the angle, but did not entirely restore belly fat hardness to that of the 0% DDGS control hogs. Bellies from barrows were thicker, had reduced edge fat area, greater distance between ends, and greater angle compared to gilts.

Figure 3: Feeding 30 or 20 vs. 0% corn DDGS to market weight reduced belly thickness. When bellies were draped over a bar to rate belly fat hardness, feeding 30 or 20% corn DDGS to market weight reduced the distance between the two hanging ends and the angle formed at the bar compared to bellies of control pigs. After reducing to 20%, followed by entirely removing corn DDGS from the last finisher diet two weeks prior to hogs reaching market weight, resulted in similar belly thickness closer to when feeding no DDGS, increased the distance between ends and improved the angle, but did not entirely restore belly fat hardness.

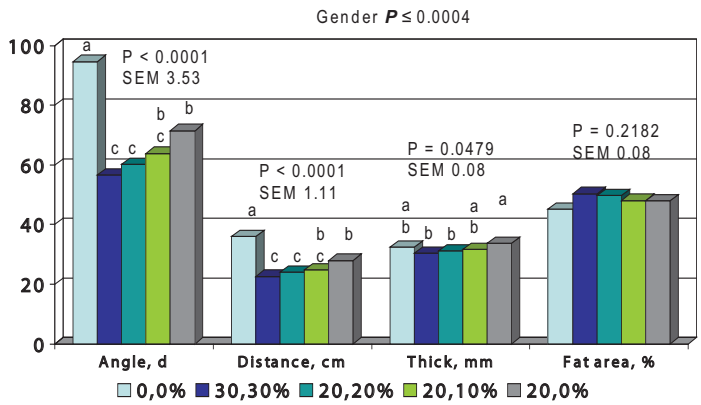
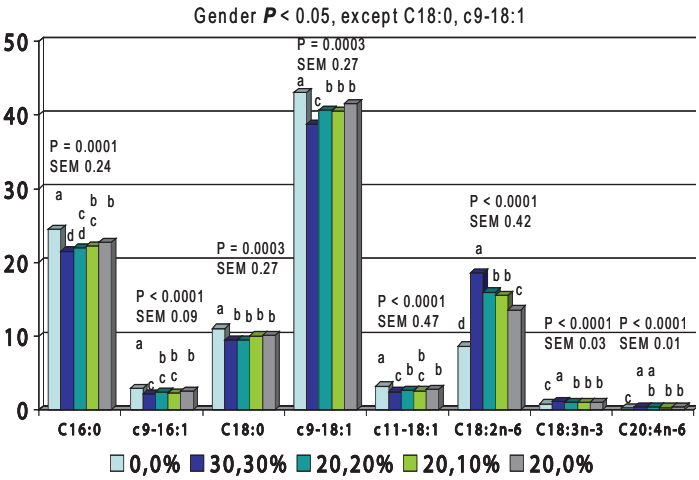


Figure 4: Feeding 30% corn DDGS to market weight increased the content of unsaturated fatty acids (C18:2n-6, C18:3n-3, C20:4n-6), and reduced the content of saturated (C16:0) and monounsaturated (c9-16:1, c9-18:1, c11-18:1) fatty acids in belly fat compared to control hogs. Implementing any of corn DDGS dietary withdrawal strategies for the last two finishing growth phases prior to market weight resulted in mostly intermediate fatty acids content (between the 30 and 0% DDGS).



Feeding 30% corn DDGS to market weight increased the content of unsaturated fatty acids mainly by increasing linoleic (C18:2n-6) combined with minor increases in ∝-linoleic (C18:3n-3) and arachidonic acid (C20:4n-6). Feeding 30% corn DDGS also led to concurrent reductions in palmitic (C16:0), palmitoleic (c9-16:1), oleic (c9-18:1) and eladic acid (c11-18:1) in belly fat compared to control hogs (Figure 4). Implementing any of the three corn DDGS dietary withdrawal strategies for the last two finisher phases prior to market weight resulted in fatty acid profiles intermediate to those of hogs continuously fed 30 and 0% DDGS. We observed similar results in loin fat samples (data not shown). Bellies from gilts had higher unsaturated and lower saturated fatty acids content compared to barrows.

Feeding 30% corn DDGS to market weight increased polyunsaturated fatty acids, omega-6, omega-3, and reduced saturated and monounsaturated fatty acids in belly fat compared to control hogs (Figure 5). From a human health perspective, this would have mixed implications as increases in the omega 6:omega 3 ratio and reductions in monounsaturated would be viewed as negative, while decreases in saturated fats would be positive. Implementing the three corn DDGS dietary withdrawal strategies for the last two finisher phases prior to market weight resulted in mostly intermediate content (between the 30 and 0% DDGS) of these fatty acids; the 20, 0% strategy was mostly different from the 20, 20 or 20, 10% corn DDGS feeding strategies, closer to controls. Bellies from gilts had higher polyunsaturated, omega-6, omega-3 and lower saturated and monounsaturated fatty acids content compared to barrows.

Adequately firm pork fat should have an iodine number below 70 to 74. This calculated number includes not only the extent of fat saturation, but also the proportion of each fatty acid in bacon. Feeding 30% corn DDGS to market weight resulted in a value of 73. Implementing the 20, 20% or 20, 10% dietary corn DDGS withdrawal strategies lowered the iodine number of belly fat to just above and below 70, respectively. Reduction to 20%, followed by complete removal of corn DDGS for the last two weeks prior to hogs reaching market weight, reduced the iodine number to 67. Bellies from gilts had higher iodine numbers than barrows (70 vs. 66).

In conclusion, in the absence of effects on animal performance, benefits from feeding corn DDGS for pork producers depends primarily on the cost of corn DDGS in relation to other feedstuffs. There were benefits of feeding 30% vs. no corn DDGS on loin quality and limited effects on sensory results. Our recommendation, therefore, is to maximize inclusion of corn DDGS in grower diets. The grower phase is when the high oil content of corn DDGS will return the most by contributing extra

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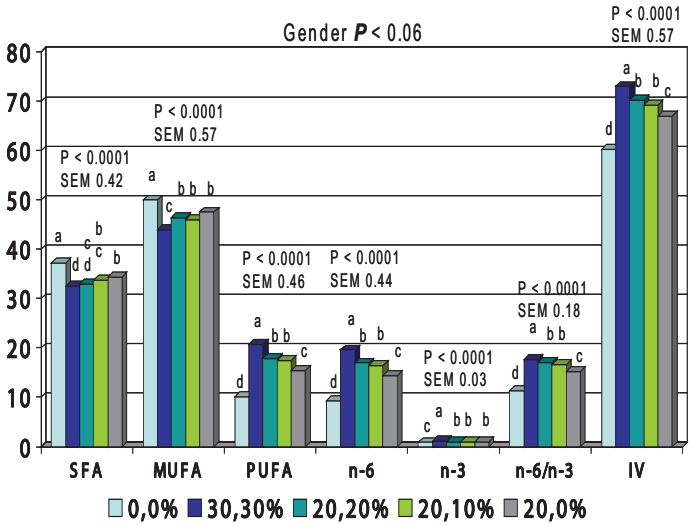
Figure 5: Feeding 30% corn DDGS to market weight increased polyunsaturated fatty acids, n-6, n-3, and reduced saturated and monounsaturated fatty acids in belly fat compared to control hogs. Implementing the three corn DDGS dietary withdrawal strategies for the last two finisher phases prior to market weight resulted in mostly intermediate content (between the 30 and 0% DDGS) of these fatty acids; the 20, 0% strategy was different from and closer to controls than the 20, 20 or 20, 10% corn DDGS feeding strategies. Adequately firm pork fat should have an iodine number (IV) below 70 to 74. After reducing to 20%, followed by entirely removing corn DDGS from the last finisher diet two weeks prior to hogs reaching market weight, lowered the IV to 67, still far apart from 60 in control hogs.



dietary energy. If bellies are the most important cut to packers, corn DDGS could be withdrawn from the finisher diet(s) two to four weeks prior to market weight, depending on the level of DDGS fed in previous phases. For instance, DDGS would be withdrawn sooner (e.g., 4 weeks prior to market weight) if hogs were previously fed diets with ≥30% DDGS compared to hogs previously fed up to 20% DDGS, where withdrawing DDGS two weeks prior to market weight would be sufficient.

Although the 3 corn DDGS withdrawal strategies tested improved fat hardness, it must be emphasized that not even the most aggressive withdrawal strategy (i.e., 20, 0%) restored fat hardness to that of controls not fed corn DDGS. But is there a need to reach 'zero' impact on fat hardness when withdrawing corn DDGS? The extent and length of withdrawal should therefore be a compromise between impact on fat hardness and benefits on pork quality.

We would advocate that packers consider compensating producers by paying an incentive or 'bonus' to withdraw corn DDGS in the finisher phase(s) when corn DDGS prices are low and packers want to restrict adverse impacts on belly or fat hardness. Current pork carcass grading systems in Canada do not include measurements of fat quality as part of their indices. The effects of feeding corn DDGS were more pronounced in gilts compared to barrows.

The fresh pork work described here was conducted at Agriculture and Agri-food (AAFC) Canada Lacombe Research Centre. Research preparing processed pork products with pork from hogs involved in this corn DDGS trial is currently being conducted at Alberta Agriculture and Rural Development, Food Processing Centre in Leduc.

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Optimal breeding productivity through careful management of sow herds: Part I

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

It is regrettable that our industry continues in "survival-mode" and for the foreseeable future that will unfortunately continue. The survivors that are still here obviously desire to be so and want to move forward in this new business era. With that assumption then, we have to get the drivers of the breeding herd correct! Success at the finishing end requires dependence on running the sow herd more efficiently and economically than ever before. There is no room for lack of implementation of proven research-based "best practices".

There continues to be significant opportunity for improvement in many of our sow herds today. As a graduate from veterinary college 27 years ago, it was rare for a sow herd to hit even 25 pigs per mated female. Today it is considered where you need to be. At this time our practice has 3-4 herds that sit with ≥30 pigs per mated female per year and many other herds hovering just underneath that magic number. However the concept of pigs/mated female/yr is simply nothing more than 'bragging-rights' today. In this business era everyone undoubtedly agrees that kilograms of pork produced *profitably,* is what truly pays the bills *(albeit today it is hardly doing so!).*

With the above facts in mind this paper is intended as a review of what careful breeding herd management practices and producer understanding is necessary to enable us to make progress economically in this 'new business era'.

The literature on the best practices for breeding herd management is boundless! Yet the implementation in many herds is still lacking! Our cherished friend, mentor and industry advocate Frank Aherne, coined the expression *"In God we trust... everything else requires data-....you cannot monitor what you don't measure"*. This was often voiced as the U of A SRTC's reason to be (1). It is this wealth of information from the research

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community that is for our industry to implement and take advantage of!

For the breeding herd in this 'new era' there are some very important details to understand to allow optimizing breeding productivity.

The discussion points covered here come with emphasis on staff efficiency and consistency at all levels:

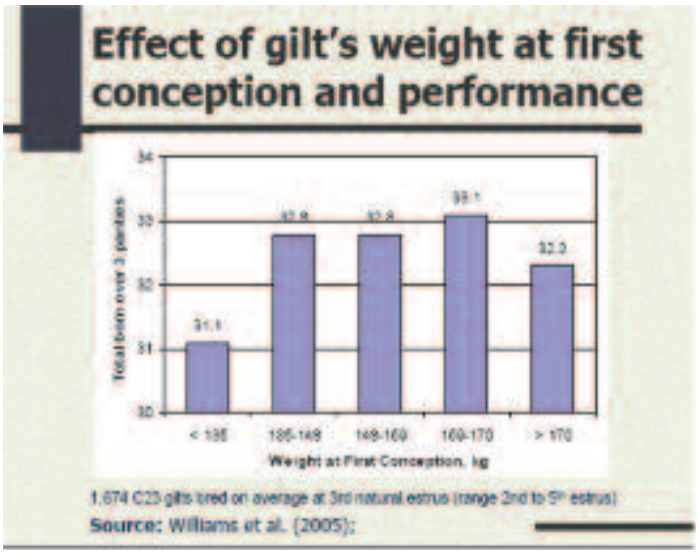
Gilt development implementation

Implementation of proper gilt development programs can lead to major increases in breeding herd efficiency. Whether our gilt supply is 'in-house' or supplied by a breeding company, an investment in proper gilt development housing is critical to the success of gilt programs. The average 'gilt pool' should represent somewhere between 5-8% of the breeding female population. Historically, when gilt development housing has been poorly managed and overlooked, the consequences can be economically devastating (1):

- High annual herd replacement rates >60%
- Large gilt numbers required to meet the above demand
- Overcrowded gilt development area
- Negative impacts on health and welfare
- Pressure to meet breeding targets forces the use of less fertile gilts using pharmacologic interventions
- Gilts are bred at suboptimal weights
- Herd Profitability is negatively affected

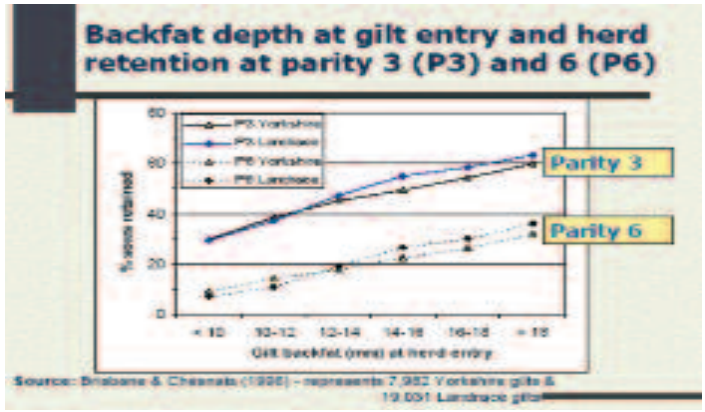
Today's research has clearly shown that our targets for selected gilts at first mating are: Minimum weight of 135 -140 kgs (300 lbs), 2nd or 3rd estrus. Work by Williams et al. (1) is illustrated below (Tables 1, 2, 3). This was regardless of back fat at breeding! Nutrition of the developing gilt has to be considered as a critical component to this weight being attained, at the same time as "flushing" her to ensure fertility. Where possible a specific gilt developer diet is implemented.

Table 1:



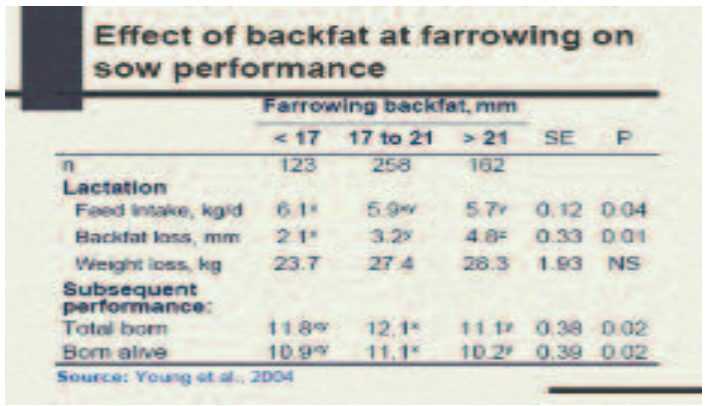
However, back fat at the gilt's first estrus still matters in terms of longevity in your herd:

Table 2:



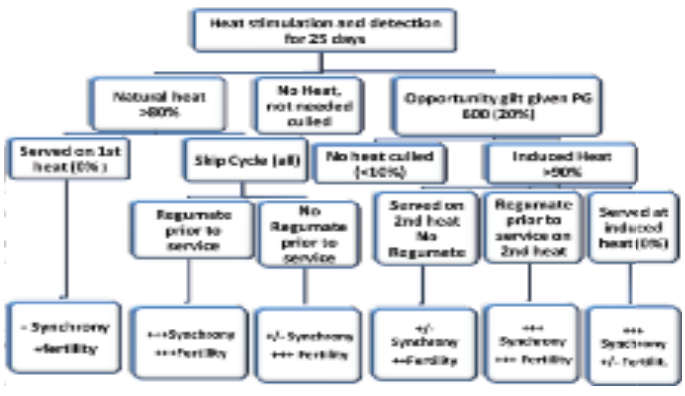
Back fat at 1st farrowing matters in terms of subsequent performance:

Table 3:



Actual measurement of back fat at the P2 position (last rib, 66 mm from midline) is the only true way to body score our sows. Subjective scoring is just that! It is not a measurement! For training of staff and better understanding of the sow cycle, P2 measurements at weaning, mid pregnancy, and pre-farrowing allow insight here.

The following algorithm chart is a time line flow for the gilt pool post arrival or once selected at 155-160 days of age. Assume appropriate "flushing" nutrition and animal identification from the outset.



(Adapted and modified from Thacker '06 Leman Preconference workshop).

From the onset of boar stimulation (15-30 minutes a day), those gilts not in heat within 14 days should be aggressively remixed. Thus within 30 days all purchased or home grown gilts started at 160 days of age should have an "event" recorded via this process, whether it be an HNS, or otherwise. This process allows all gilts to have the greatest chance of expressing their first estrus and be successfully bred. This 'entry to service' interval has to be looked at as an investment cost.

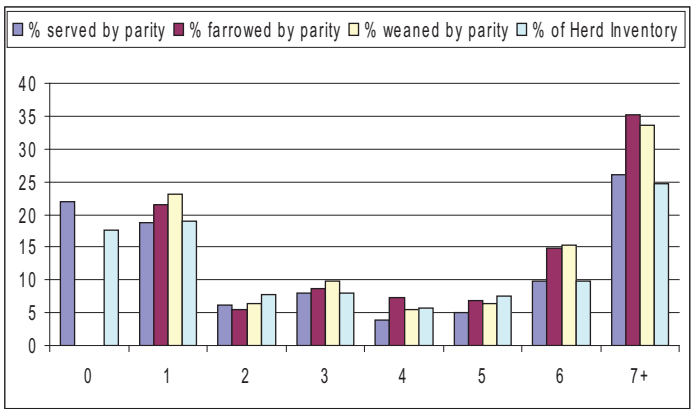
Parity distribution as related to gilt management needs

The ideal average parity at farrowing should be 3-3.5. To maintain this average it requires very diligent culling to allow proper numbers of animals to be introduced (target 35-40% replacement rates). A replacement rate of 40 % means you have to make consistent use of the *Farrowing Rate Projections* (easily seen for example in PigChamp computer programs) to see the "holes" in numbers served/week to ensure adequate numbers of gilts are available for the sow group coming out of the farrowing crates.

Note that we desire 30-45 days of acclimatisation and development for each gilt entering the herd at 220 lbs. This ensures 2 cycles prior to breeding and that she will farrow with enough body mass and gut capacity to allow good milk production without excessive losses in condition, thus ensuring breeding back in < 6 days at weaning time.

A major shift in the parity distribution (left or right) means that the herd will have poorer performance in terms of total born, born alive, # weaned, farrowing rates and pigs/female/year. Below is a graph of the "saddle- shaped" parity distribution; a herd that had gone through a start up 2.5 years previous and had not done diligence to culling and gilt inputs, and the consequences are reviewed below:

Graph 1: Parity distribution for this herd:



Consequences of letting the herd get too old (same as a start up herd scenario) are as follows:

- decreased farrowing rates (greater tendency to repeat with a discharge)
- decreased litter size
- increased variation in piglet size at birth in 6+ sows (more low viability piglets)
- leading to increased prewean death losses,
- increased stillborn piglets
- herd immunity issues - (greasy pig disease, septicaemias in nursery grow-finish)

Based on the sow performance monitor sorted by average born live, one goes to the bottom of the report and begins the cull list based on the following:

1. <25 pigs weaned by her 3rd parity
2. Born alive consistently < 10.0
3. Repeat estrus with an abnormal discharge. (Note differences between irregular vs. regular returns)
4. Sows that repeat twice in row
5. Generally sows of parity >7+
6. Sows with more than 2 mammary glands damaged (mastitis, injury etc).
7. Sows that come up lame post weaning and that don't immediately respond to Vit D, anti-inflammatory, antibiotic injections.
8. Sows treated (and once recovered) for bladder and kidney infections (pyelonephritis/cystitis)

Understand the details of the breeding process - get it right!

Wean to service intervals are the view into how well we have implemented gilt development to facilitate good body mass at the time of farrowing and 'gut capacity' to eat well during lactation. It reflects her condition losses during lactation which ultimately reflects fertility for the next cycle. It has been estimated that about 75% of the nutrients that a sow consumes during peak lactation goes to support production of milk for her litter. Consequently, it is quite common and actually normal for sows to have to mobilize protein and fat to meet the metabolic demands of lactation. When this happens, the sow loses weight and body tissues. If she loses too much body condition during lactation, her subsequent reproductive performance post-weaning can suffer. As a result, rebreeding intervals, subsequent farrowing rate and litter size can all be affected. Anything that can be done to increase feed intake during lactation should help improve weaning-to-estrus intervals (3).

Flowers (in a recent Benchmark.Farms.com article) summarized a comparison analysis of fertility by wean to service intervals across a large data base (Table 4):

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Table 4:

Weaning-to-Estrus Interval (days)	Farrowing Rate (%)	Number of Pigs Born Alive
< 5.9 (21 farms)	84.0 + 1.4	11.0 + 0.1
6.0 – 6.9 (40 farms)	83.9 + 1.0	10.9 + 0.1
7.0 – 7.9 (18 farms)	82.0 + 1.4	10.9 + 0.1
8.0 – 8.9 (13 farms)	80.8 + 1.5	10.4 + 0.2
9.0 – 9.9 (6 farms)	79.3 + 2.5	10.3 + 0.3
>10.0 (8 farms)	74.7 + 4.1	10.4 + 0.3

Belstra '99 (2) provides us with a summary of the understanding of how lactation length affects wean to service intervals and therefore subsequent fertility:

Figure 1: Effect of lactation length on weaning-to-estrus interval (WEI)

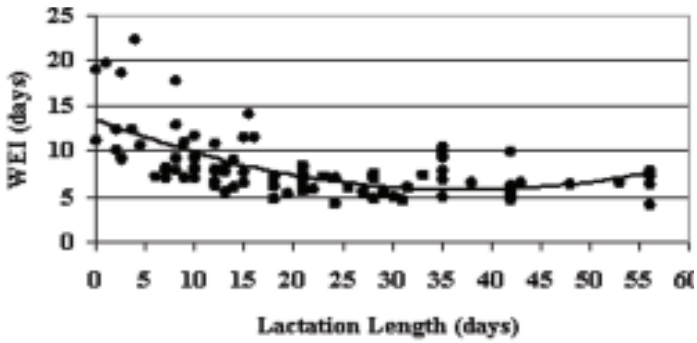


Figure 2: Lactation length versus conception rate:

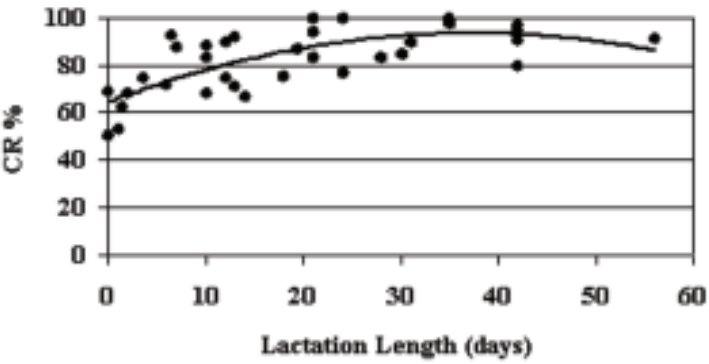
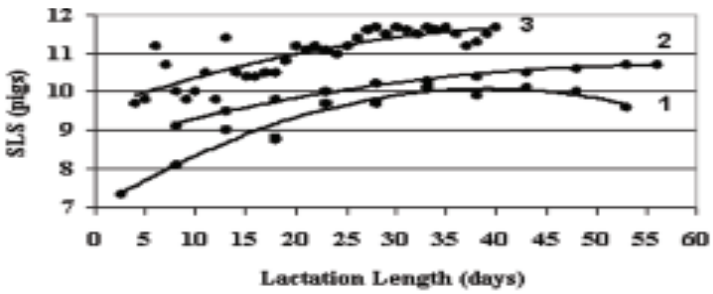


Figure 3: Lactation length on subsequent litter size: by parity 1, 2, & 3



With the above understanding one can quickly work out a practical breeding schedule to time the two inseminations properly as in Table 5 below:

Table 5

Day 1 7:30 am weaned	2	3	4	5	6	7
Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday
Delay from detection.. to start breeding am			36 hrs	12hrs	0	0
pm			24 hours	0 hrs	0	0
Time between breedings			24	24	10 -12 hours	11 -12 hours

The objective is to supply 2 inseminations well timed in the 24 hours preceding ovulation…which occurs 2/3 through the standing estrus time frame. Remember that as the wean-to-service day increases past the 4th day the standing estrus time is shrinking.

What this means is that:

1. If the sow first stands on Sunday am we delay the first breeding until 36 hours later…breeding at Monday pm and breed 2nd time 24 hours later
2. If the sow first stands on Sunday pm we delay the first breeding until 24 hours later - Monday pm …breeding again 24 hours later.
3. If the sow first stands on Monday am we delay the 1st breeding until 12 hours later - Monday pm …breeding a 2nd time 24 hours later
4. If the sow first stands Monday pm breed her then and 24 hours later.
5. If the sow first stands Tuesday am breed her immediately and 12 hours later and again 12 hours later if she is still stands.
6. If the sow first stands on Wednesday am breed her immediately and 12 hours later.

References:

1. Foxcroft, Beltranena, Patterson, Williams '05, U of A SBMW proceedings

2. Belstra '99, NCSU, North Carolina Healthy Hogs Seminar, Management strategies to counter act the negative effects of short lactation lengths (early weaning) on subsequent sow reproductive performance

3. Flowers, 08 NCSU, Benchmark.Farms.com Newsletter articles 'Watch wean to service intervals'

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• International Round-up

Red meat is vital source of iron

A recent report published in the UK highlights the importance of red meat as a vital source of iron in the human diet. The Scientific Advisory Committee on Nutrition Working Group on Iron has highlighted red meat as one of the most important dietary sources of iron and haem-iron in particular – the type more readily absorbed by the body.

The report says health professionals need to be more vigilant in looking for poor iron status in vulnerable groups at risk of iron deficiency, including anaemia. These include toddlers, girls and women of reproductive age and adults over 65. Appropriate advice on how to increase their iron intakes should be provided, it advises.

Maureen Strong, Nutrition Manager with the British Pig Executive and the English Beef and Lamb Executive said: "As well as red meat, the report also says food fortified with iron, such as breakfast cereals, make little practical contribution to the improvement of iron status."

The report also suggested the evidence used by the World Cancer Research Fund linking red and processed meat consumption with an increased risk of bowel cancer is not conclusive. As the evidence is based on prospective observational studies, it says, confounding factors such as smoking or obesity may have influenced the findings.

American poll reveals knowledge gap on meat safety

A recent poll released by American Meat Institute (AMI) reveals a significant knowledge gap among the public about meat and poultry handling, cooking and safety.

Only a third (34 percent) of Americans correctly answered that a hamburger is ready to eat when the internal temperature has reached 160 degrees F. One in five said that checking the middle of the hamburger to ensure that it is brown is the best approach – a practice experts say is not an accurate indicator that a burger is thoroughly cooked. Likewise, 18 percent wrongly said that checking to see if juices run clear ensures food safety.

The poll, which surveyed 1,000 Americans in May, found that men were much more likely than women to know how to identify when a hamburger is thoroughly cooked. While four in ten (41 percent) men knew that the internal temperature of a hamburger must reach 160 degrees F before it can be consumed only 26 percent of women knew this fact.

Overall, younger Americans were less knowledgeable about proper meat preparation than older generations, the survey found. Only 16 percent of 18-29 year olds knew to check the internal temperature of a burger.

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Consumers also were uncertain about proper storage temperatures. Only 36 percent of women were aware that refrigerators should be set at 40 degrees F or below. An additional one-third of women simply admitted that they don't know the correct temperature for a refrigerator.

Only one-third (32 percent) of Americans aged 18-29 knew that refrigerators should be set to 40 degrees F or below, compared to half (52 percent) of those age 30 and older.

The American public was divided over whether they believed meat and poultry products have more or fewer bacteria on them today than they did 10 years ago, according to survey results. While 22 percent of Americans thought that there is more bacteria on meat/poultry today than in the past, 26 percent believed the opposite is true and that today's meat/poultry has fewer bacteria. Two in ten (22 percent) thought the levels had not changed, and three in ten (29 percent) reported that they just don't know the answer.

British research looks at loose farrowing

A major new research project looking at welfare-friendly alternatives to the farrowing crate has just got under way in the UK with the building and evaluation of prototype designs. Costing a total of £690,000 ($1.3 million) over three years, it will be carried out by staff at Newcastle University and the Scottish Agricultural College at Edinburgh.

The study will involve one basic prototype layout with four different combinations of design and management and will entail 200 farrowings in the first development phase. A further 300 farrowings will be monitored in the second phase, when the prototype will be compared with standard crate systems on both research farms.

The basic design involves a free access 'nest' area, a dunging area and a lockable feeding stall. The nest incorporates particular features such as sloping walls, to help control sow lying behaviour, and a heated creep area.

"Confinement of the sow is of continuing welfare concern to the general public. While the farrowing crate offers many benefits in management and welfare to the newborn piglet, it does cause welfare problems for the sow around the time of farrowing," commented Professor Sandra Edwards from Newcastle University. "It is increasingly apparent that consumers want a less restrictive alternative and some major retailers are already specifying this in purchasing contracts."

"Our aim is to provide a commercially-viable alternative for indoor producers which will be acceptable in terms of piglet survival, capital cost and ease of management. If we can achieve this 'cost-neutral' option producers could then meet market demand without incurring production penalties."

It is planned to scale-up the best system and test this on commercial farms against conventional farrowing crates.

Carbetocin improves breeding performance

The use of carbetocin (Reprocine, Vetoquinol) at service stimulates uterine contractions, accelerating the transport of sperm through the uterus and up to the oviducts, resulting in an increase in the number and quality of sperm, say British veterinarians Adrian Cox and Jenny Hull. Trials on their clients' farms suggest that a significant increase in farrowing rate can be achieved and, in some cases, higher litter size.

Carbetocin is a synthetic Oxytocin analogue, which has a longer-lasting action than conventional Oxytocin products. It is licensed for use in sows to speed up the farrowing process, for the treatment of MMA and to improve milk letdown. While its use at service is off-label, and should be discussed with your veterinarian, there should be no problems when used at that time.

"When a sow is served, natural contractions of the uterus help to transport the semen from the site of deposition to the site of fertilization," explain the two veterinarians, writing in Pig World magazine. "These contractions are triggered by the presence of boars, the sows releasing a surge of Oxytocin. In addition, the boar's ejaculate contains both Oxytocin and similar acting hormones, further aiding sperm transport in naturally served sows."

Reprocine may be administered to sows at service in a number of different ways, say Cox and Hull. "It can be administered into the catheter before the semen sachet is attached, or alternatively it can be placed directly into the semen sachet immediately prior to service, gently rotating the sachet to mix it in," they say. "The latter method appears to provide consistently better results." Alternatively, Reprocine may be injected as a 0.5ml dose, say the authors, noting that overdosing may increase the contractions too much, triggering semen reflux and actually being counterproductive.

Trials were carried out at an 1100-sow high health indoor unit with excellent performance, weaning over 26 pigs per sow. Over a 9-month period, sows (but not gilts) were randomly selected to either a control group or a treatment group, which had Reprocine added directly to the semen prior to insemination.

The effect of using Reprocine at breeding on farrowing rate and litter size

	Reprocine group	Control group
Farrowing rate (%)	86.1	80.5
Average litter size (total born)	13.38	13.26

"The difference between the farrowing rates for the two groups is statistically significant," note the veterinarians. "There is no statistical difference between the recorded litter sizes."

Other farms have seen a 5-10% improvement in farrowing rate and, in the case of one outdoor unit, an increase in one pig per litter born, from 10.3 to 11.3.

Pork benefits from recession in Britain

British consumers are working out strategies to beat the recession – and pork is benefiting with sales up 9 percent in value, according to a recent report published by the British Pig Executive (BPEX). 'Pork and the credit crunch: How consumers are responding to the economic downturn' suggests consumers are shopping smarter as a result of the current economic downturn and credit crunch and, in effect, managing their household budgets more effectively, says a report in Pig World magazine.

By switching retailers, taking advantage of some promotions and trading down on some products, consumers are limiting their spend increases to 5 percent when grocery price inflation is running at 8.7 percent.

While meat generally has become more expensive over the past year, demand has remained constant. Consumers have, though, been changing their repertoire of meats with the result that pork has benefited: fresh pork meals increased 6 percent last year and retail value sales were up 9 percent in the 12 months to March 2009. In addition, research shows the recession appears to have enhanced the image of pork.

British pork producers are benefitting from increased sales during the recession

"I am heartened there are such encouraging signs for the pork sector," said BPEX chairman Stewart Houston. "Not only are pork and pork products meeting consumer needs during the recession, there are signs we can change their perceptions of pork and eating habits in the longer term."

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"For example, where pork may have been regarded in the past as the cheap alternative, it is increasingly being regarded as the value-for-money meat of choice."

Households with children, those in lower social grades and, obviously, those hit by redundancy, have been most affected by the recession. Single households and empty nesters, on the other hand, have had to make little change to their shopping habits.

Few consumers have noticed significant price inflation on pork and pork products, other than on bacon. Fresh pork consumption is up 6 percent year-on-year – with growth driven by almost all consumer groups but especially the over-45s. Sausages have seen both strong value growth as well as volume growth.

Organic food has no health benefits

Organic food is no healthier than ordinary food, a group of UK researchers has concluded, following a large independent review. They say that there is little difference in nutritional value and no evidence of any extra health benefits from eating organic produce, according to a report by the BBC. The Food Standards Agency who commissioned the report said the findings would help people make an "informed choice".

Researchers from the London School of Hygiene and Tropical Medicine looked at all the evidence on nutrition and health benefits from the past 50 years. Among the 55 of 162 studies that were included in the final analysis, there were a small number of differences in nutrition between organic and conventionally produced food but not large enough to be of any public health relevance, said study leader Dr Alan Dangour.

Overall the report found no differences in most nutrients in organically or conventionally grown crops, including in vitamin C, calcium, and iron. The same was true for studies looking at meat, dairy and eggs. Differences that were detected, for example in levels of nitrogen and phosphorus, were most likely to be due to differences in fertilizer use and ripeness at harvest and are unlikely to provide any health benefit, the report concluded.

Gill Fine, FSA director of consumer choice and dietary health, said: "This study does not mean that people should not eat organic food. What it shows is that there is little, if any, nutritional difference between organic and conventionally produced food and that there is no evidence of additional health benefits from eating organic food." She added that there were many reasons why people choose to eat organic, including animal welfare or environmental concerns.

However, the Soil Association – the UK's primary lobby group for organic food - criticized the study and called for better research. Peter Melchett, policy director at the Soil Association said they were disappointed with the conclusions. "The review rejected almost all of the existing studies of comparisons between organic and non-organic nutritional differences."

Cutting out pig movement paperwork

A pilot scheme being run by the British Pig Executive (BPEX) is aiming to create paperless recording of pig movements. British producers have had to record all pig movements for decades, but recent legislation requires completion of a Food Chain Information (FCI) form, which goes with the pigs to the processor. Producers taking part in the pilot scheme are able to electronically record and send the required information for both animal movements and FCI to the other parties involved in the process. "Three different methods were used, a website for those people who were on-line, a digital pen for those who were not and text messaging," said BPEX head of supply chain management Andrew Knowles, speaking to Pigworld magazine.

British producers may soon be able to record pig movements using text messaging

Information about pig movement and the farm of origin has to pass to the receiving farm or to the processor, while movement information is administered by local authorities. Electronic data transfer means that each party can get the information they need without duplication of effort and using only one document. Perhaps one of the biggest benefits is that information is live, resulting in much faster tracking of movements in the event of a disease outbreak. Producers are able to complete the information ahead of an animal movement and later send a quick text message to confirm the details, which is automatically sent to the processor. Live updates can be made when pigs have left the farm and when they arrive at the lairage.

The pilot project is being extended to include more producers and eventually it is hoped that the system will be rolled out to the whole industry. ≡WHJ≡

Time spent with the baby pigs is "Golden Time"

By John Gadd

Baby pigs? By this I mean from birth to mid-way through the nursery period, say 20 kg. My experience world-wide over the past few years suggests not nearly enough time is afforded to this critical area now that the hyperprolific sow is with us. I'm told that Canada, especially the Hutterite units, is not too bad in this respect, but they will be having the same problems with sow hyperprolificacy as everyone else, so I don't exclude them from needing to read this piece.

Three years ago I was getting concerned about the very large and heavy litters many producers were managing to achieve. More and more were getting 28 pigs weaned /sow/year and a handful 30. Today this handful has become a basketful. The "Hyperprolificacy Problem" is now with us. All credit to those experts whose productivity skills get the plaudits at benchmarking meetings. But many of them have run slap into a second (and third) litter fallaway, herd average empty days per year rising by 12 or more, with one less litter weaned per SPL (Sow Productive Lifetime) and a 22% rise in replacement costs. This alone is caused by those daft but enforced replacement rates of 42% or more, which result in a younger herd age and lowered natural immune defence against viral diseases.

Thin sows or shattered sows?

Twenty to 30 years back the "Thin Sow Syndrome" was common. Today it has been replaced by the "Shattered Sow Syndrome", not quite the same. "Thin sows" in this context were visibly and tactually recognized (condition score 2.0 or less), while today`s "Shattered sows" may not be all that thin at weaning (condition score 2.5 or a little more). They are damaged by poor rebreeding ability, partly caused by hormonal reasons and partly due to lack of maternal protein at the end of a punishing lactation, both of which are not so visibly obvious, if at all.

One of the problems leading to it is, as you are fully aware, that the sow's nutritional intake in lactation is frequently inadequate to provide sufficient milk to grow 13 sucklers at 190g/day by day 4 from farrowing, which is when the trouble starts. The modern sow just cannot eat enough of a modern lactation ration (Table 1).

Increasing the nutrient density of the feed beyond the current levels doesn't seem to work as the higher energy needed (to balance the additional protein the farrowed sow requires to avoid too much maternal loss) reduces appetite.

Table 1: Lactation feed intake (of a well- designed diet) required by day 4 of lactation.

Litter size	Kg lactation feed /day – by day 4.
10	4.0
11	4.6
12	4.9
13	5.2

Based on 4.25 g/milk needed for each 1g of piglet growth

So the sow then starts to plunder her own reserves in order to cope. She suffers an internal 'nosedive' in reproductive condition rather than an external 'nosedive' in fleshing as seen with the thin sow syndrome of past years. In those days the sow had to support about 43 kg of litter weight increase by 4 weeks (litter of 10 weaned at 5.5 kg - less 1.2 kg birthweights). Today it can be double (litter of 13 attaining 8 kg at 4 weeks - less 1.4 kg birthweights) ie. 86kg put on in 4 weeks.

Taking the load off the sow

Now I know and you know what are the most effective measures needed to lighten her load……..

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- Creep feeding
- Cross-fostering
- Split-suckling
- Split-weaning
- As good a nutrient intake in lactation as can be managed
- Nurse sows

Each of them takes time. A few together take up a great deal of time, even if you exclude nurse sows which is not for everybody now many of us are batch-farrowing. Are these super-productive units affording sufficient time? My experience with them suggests not.

I still visit about 50 pig units a year and since 2006, when the shattered sow syndrome started to bite, I have kept records of the division and use of labour whenever possible, taken from worksheets where available, or the proportional splits agreed between staff and management.

Table 2 provides this information from 50 of the 186 farms visited since I last started the project.

Table 2: Time spent (man-hours per sow per year) on various tasks

	(n)	120 - 330sows		(n)	875-2040 sows	
Total % breeding to weaning	40	14	50.7%	10	10.8	57.5%
Of this - nursery		**2**	**6.5%**		**1.1**	**3.0%**
Total finishing		8	30%		4.4	23.4%
Other tasks – records, repairs building etc		5.6	20%		5.5	17.1%

(Extracted from the full figures: all farms farrow-to-finish)

Table 2 in itself shows that far too little time is spent with the small pigs in the nursery. But what of the farrowing room? And measures taken to lift the load off the sow? It's more difficult to get information here and I rather suspected that I was being told by the stockpeople in the rooms what they wanted me to pass on to the boss!

So for the past 3 years I have been quietly observing and taking notes as I toured the farrowing barns, supplemented by casual spot-questioning (in a sympathetic manner commiserating with their job – a sly journalist's ploy!) the farrowing staff and section heads.

As I've said, I need about another 30 farms to stiffen the findings a little but the result of these questions on 28 units so far has been quite illuminating. The total time spent on breeding to weaning concurs quite well with the findings in Table 2 - about 50% of the time ie. of the pig unit's total labour load. However the bulk of this was spent on breeding itself and especially moving pigs, with feeding coming up second and farrowing third – the farrowing supervision itself, not the subsequent attention - tail and teeth clipping, castration, injecting etc. Incidentally, the time spent on the farrowing process is quite encouraging so as to reduce mortality to weaning which has been a long standing failing on 90% of pig farms.

Today's hyperprolific sows are in danger of suffering from "Shattered Sow Syndrome" says John Gadd

Only 2 minutes per litter per day!

What did bring me up short has been the replies to the time allocated to the first four sow-alleviating tasks described earlier, which came out at 1.8 man-hours per sow per year (108 minutes). Assuming 2.3 litters per sow per year, this is two minutes per litter per day. During these two minutes the stockpersons should attend to the routine post-farrowing tasks including those ongoing jobs mentioned above, plus such work as caring for the smallest pigs in the litter and all that this entails, checking for looseness and maybe recording birthweights etc.

Is two minutes enough to fit in all these 'taking the load off the sow' jobs as well as – to check and clean the creep hoppers at least twice a day, check the water likewise, check for looseness and take appropriate action, organize split-suckling, and/or split-weaning and cross-fostering, admittedly only done once (if you are good at them!) but needing a modicum of thought and planning and maybe readjustment where needed.

Two minutes a day/9 seconds a piglet – surely not sufficient?

After all – keeping the creep receptacles really clean and sweet to encourage the early uptake which I showed was so important in my last article, must take up half of those two minutes alone.

So, I am continuing to collect enough real farm information to firm up these thoughts on what, and how much time will be needed in future to counteract the downside of the 'hyperprolificacy problem' which can lead to the Shattered Sow Syndrome.

Two developments which come with progress! ≡WHJ≡

Better times in Blighty

By Stuart Lumb

Thirty years ago the UK led the world in terms of new techniques and management. How times have changed! In the last ten years the UK pig herd has dropped by 50% - to under half a million sows - due in part to herd output falling to around 20 pigs per sow per year. Disease was the major culprit, some not self -inflicted, like FMD. Bacon pigs are fetching 160p/kg ($2.90) deadweight currently. Overdrafts are dropping, producers are actually smiling and are finally replacing decrepit barns (held together by cobwebs), as evidenced by the fact that our few surviving building companies have bulging order books. It's ironic that the Canadian industry is currently going through what the UK experienced a few years ago. It may not be much consolation but be aware that us Brits can empathise with you guys. The weak pound has made imports expensive but having said that the UK has some extraordinary guys - pig producers, not marketing experts - who have spearheaded the "buy British" campaign. The UK consumer is now prepared to pay more for British pigmeat, despite the recession, helped by the high welfare ticket - with almost 50% of England's pigs now to be found on outdoor units.

Disease is the "Achille's Heel" of any pig industry. The UK has the best genetics in the world, but when disease gets into a unit pigs can't perform to their potential - likened to a car with a slipping clutch. PMWS and PDNS - Wasting Syndrome - first reared its ugly head in 1999. It took hold in the south of England and gradually crept north. Movement restrictions imposed as part of the FMD eradication program resulted in severe overstocking which made the effects of Wasting Syndrome even more Draconian. France came to the aid of the UK industry courtesy of the Madec Plan, which brought batch weaning and other management techniques to Britain. Rearing and finishing herd mortality peaked at 12% in 2004 plus on-going reproductive performance was poor. Help was at hand though in the form of PCV 2 vaccines. In 2007 the British Pig Industry Executive (BPEX) implemented a nationwide subsidized vaccination project involving 263,000 sows at a cost of £1.6m. Both breeding herd and finishing herd performance improved and the vaccination program certainly stopped many producers from quitting the industry. Of course things never stand still in terms of disease and as one is contained you can be sure another one is lurking in the shadows – in this case Swine Dysentery.

Swine Dysentery, or "bloody scours" is not a new disease but has been causing big problems in the UK pig herd. This

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bacterium can survive for 60 days in manure- contaminated puddles, plus carrier pigs can shed the bug for up to 90 days but show no clinical signs. It can cost £6-12 per finishing pig and control costs £4-5 per pig. Worryingly, resistant strains are appearing and in fact some straw based finishing operations have had to close down due to unsustainable losses.

There has been a big swing towards two site production in the UK, with weaners being trucked from mainly outdoor based producers in East Anglia to finishers located in N. England and Lincolnshire. Hauliers move these pigs in the afternoons having spent the mornings shipping slaughter pigs into the abattoirs. If the trucks are not cleaned out properly after hauling infected slaughter pigs then weaners can pick up the bacteria and a cycle of infection is then established. Multiple pick-ups where a truck picks up pigs from several units, make the situation worse. The haulier should not, under any circumstances, enter the unit. If unit staff are involved in loading pigs they should change into "off site" clothing and boots. After the pigs are loaded they then get changed back into their "on site" clothes. The end of the loading ramp should ideally slope away from the unit at an angle of 5 degrees so that washing water runs away, not into, the unit. In terms of biosecurity, vets suggests that grower / finisher units should seriously consider having two loading ramps, one for incoming weaners and a separate one for outgoing pigs .

If pigs are not responding to medication then emptying, thorough disinfection and resting barns are the only options for grower / finisher operators.

In the case of farrow-to-finish units, a partial or complete depopulation/repopulation along with a rigorous cleaning program will be necessary. A complete depopulation is the most effective but means no income for 4-9 months. Ideally timing should be such that the cleaning can be carried out during the summer when warm and dry conditions should prevail, for maximum cleansing effect. The unit should then be repopulated with dysentery - free stock.

Waddilove points out that over 55% of the spread was not by pig movement and most of these cases could have been prevented by good biosecurity.

In a perfect world we'd have no pig diseases. Of course going High Health or SPF is the nearest option, but maintaining this health status is very difficult and it's not an option in pig dense areas. Specific disease eradication is possible though, as evidenced by the eradication of Aujeszky's Disease in Great Britain. This was an industry initiative, funded by producer levy, which started in 1983 and was completed in 1989.

Methods of spread – East Anglia

	%
Pig movement	44.8
Local spread	10.4
Management	13.9
Contractor	13.4
Pig transport	10.4
Dead pig transport	3.4
Birds	6.9
Feed truck	3.4
Unknown	3.4

From: *Waddilove J, Pig World 2009*

To really get production back on track diseases have to be minimized and ideally eradicated. Thanks to funding from Yorkshire Forward, the county's regional development agency, a pig health improvement scheme has been set up in Yorkshire and Humberside. Why Yorkshire and Humberside? "Yorkshire Forward can see the logic of such a scheme plus we have many very large progressive operators in the county," commented consultant Sam Hoste, who along with fellow consultant David Thelwell, is leading the project on behalf of BPEX. Because the project is so big, it will be split into two parts. The first phase involves mapping of all pig units and attempting to determine their health status and disease load. Then, in 2010, eradication programs can start to be implemented. The planning phase will cost around £300,000 which will come from Yorkshire Forward, as part of the current Rural Development Program, and BPEX. Identifying the big units will not be a problem. However, locating smaller producers and hobby farmers will be challenging but extremely vital to the success of the scheme. The last few years has seen an explosion in the numbers of rare breeding stock, such as Gloucester Old Spots, literally kept in backyards for pork and gourmet sausage production and all these pigs have to be located, not to mention numerous pet pigs.

In addition, BPEX and NPA hope the health improvement scheme will be a mechanism to obtain a discount on the UK government's planned disease tax (related to Notifiable Diseases) which is expected to cost a 250 sow unit around £1,500 annually from 2012. If the scheme proves successful then a similar one could be rolled out in East Anglia.

After being in the doldrums for so long it's good to see some enthusiasm surfacing once again in GB Pigs Ltd. As the saying goes, there's life in the old dog, or rather pig, yet!

≡WHJ≡

Australian producers profitable

By John Riley, IAS Management Services

Whilst Canadian pork producers are suffering from low prices, Australian producers continue to achieve positive operating margins.

The cost of production (excluding interest on capital and depreciation) for a small sample of farms in Queensland for the year ending June 2009 was $2.29 per kilogram dead weight. The average market return in the same period was $3.21 for the 80.1 kilogram carcase produced. The average cost of feed during the recorded year was $391 per tonne and the average dead weight herd feed conversion ratio (FCR) achieved by the sample was 3.87:1.

However, the average price received in Australia for a 60-75 kilogram carcase fell from a high of $3.60 in February 2008 to $3.15 at the end of June 2009 and is currently at $3.10 per kg. The drop in market return is partly seasonal but the public reaction to swine flu has been a major factor.

Swine flu has been confirmed on three pig units in Australia to date with the outbreak resulting from human contact. The state governments have quarantined the affected units to control the spread of the disease.

The Australian industry still lacks confidence to invest in new technologies. The strength of the Australian dollar against international currencies has resulted in a drop of exports of pig meat to Singapore, Japan and New Zealand, whilst imports from Canada, USA and Denmark of processed products continue to increase.

The moving annual total (MAT) volume shipped weight (SW) of exports to June 2009 decreased by 13.5%. The MAT volume of shipped weight of imports increased by 24.4% in the same period, with an increase from Canada of 13.3%. However the total imports from Canada in June 2009 compared with June 2008 showed an increase of 66% to total 15,090 tonnes. The value of the imports from Canada totalled $15.8 million an increase of 60%. Canadian imports in June 2009 represented 36% of the total volume of imports.

In addition, the pessimistic forecast for grain production due to lack of rain in the eastern states is a concern to producers and does not encourage investment in upgrading existing facilities or investment in new facilities.

The performance of the growing pig in Australia compares favourably with world standards. However, sow productivity lags

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behind that achieved in other major pig producing countries. The Australian quarantine regulations prohibit the importation of breeding stock, semen and embryos thereby denying Australian producers access to the developments in genetic improvement, particularly sow productivity, available to their competitors around the world as illustrated in Table 1.

Table 1: Breeding herd performance - Canada v Australia

	Canada Pig Champ 2008	Australia CRC 2007-2008	USA Pig Champ 2008	Denmark
Pigs weaned per sow/year	22.10	21.20	22.86	26.8
Born alive per litter	11.35	10.70	11.29	13.6
Pre weaning mortality %	12.62	12.9	12.23	14.3
Weaned per litter	9.93	9.40	9.97	11.6
Weaning age days	20.14	23.0	19.88	26
Farrowing rate %	81.49	81.1	78.71	-
Sow mortality %	8.71	12.70	7.93	-

Source: *Proceedings of Optimising Sow Productivity- Technical Intervention Workshop- Mark Wilson, Melbourne 2009*

To improve sow productivity, the research effort in Australia concentrates on optimizing pigs born per litter, improving sow longevity and increasing piglet survival. At a recent conference in Melbourne more than 120 producers, consultants and researchers attended the Optimising Sow Productivity workshop.

The speakers, who included Dr George Foxcroft from the University of Alberta, drew on results of national and international research. Dr Foxcroft's view that pooling of boar semen was limiting the influence of the best boars in AI studs by "averaging" their influence was questioned by protagonists of the widely practiced semen pooling system in Australia. Dr Foxcroft introduced Australians to the use of Ovugel to reduce the number of services needed per sow to achieve a successful pregnancy and increase in total piglets born.

Dr Foxcroft spent some time discussing the removal of young parity sows from the breeding herd. He stated that 40%-50% of sows were removed before their 3rd parity, 15%-20% only produced one litter and 10% never farrowed a litter. He advised that gilts should be 180 kg when farrowing for the first time and should achieve a 35-45 kg increase in weight during their first gestation.

The University of Alberta's George Foxcroft, who spoke recently at a workshop on sow productivity in Melbourne, Australia

One of the local speakers, Dr David Cadogan, presented unpublished data on the use of Omega 3 fatty acids and the benefits of feeding salmon oil to lactating sows on piglets born alive and farrowing rate. Including 3 kg per tonne of salmon oil to diets fed to sows suckling their first litter increased pigs born alive from 10.2 to 10.6 in their subsequent litter whilst adding salmon oil to lactating diets fed to older sows increased pigs born alive from 10.5 to 11.3 and farrowing rate from 78.4% to 80.8% in subsequent parities..

Dr Cadogan also warned the delegates not to use safflower oil, sunflower oil or vegetable oil containing linoleic acid and Omega 6 fatty acids.

William van Wettere of Adelaide University spoke on the effect of adding Betaine to gestation diets in summer to reduce the effect of autumn abortion and summer infertility. He showed that adding Betaine increased both total piglets born and piglets born alive in third to seventh litter sows. No improvement was recorded in first and second litter sows.

At a conference earlier in the year on "Recent Advances in Animal Nutrition" Dr Robert van Barneveld, a recent visitor to Canada, spoke on the implications of the Carbon pollution reduction scheme in Australia for pig producers. At present the Australian Government does not consider it practical to include agriculture emissions in its carbon pollution reduction scheme. However, the government may consider agriculture in the emissions reduction program no earlier than 2015 given that agricultural emissions account for 16% of Australia's annual greenhouse emission inventory in 2007. Dr van Barneveld discussed opportunities to minimize enteric fermentation and improve manure management. The most effective mitigation strategy, he stated, was to burn methane from effluent ponds, but nutrition strategies including reducing feed wastage, using low protein diets, using metabolic modifiers like PST and more efficient energy utilization can also contribute to reducing emissions.

The plight of the Canadian producer is fully understood by their Australian peers having faced a similar situation in 2007. The high cost of feed and low market returns resulted in a decline in the national herd from around 330,000 sows to approximately 260,000 sows. The fact that the Australian industry is currently profitable provides little comfort for those producers who were forced to exit the industry.

≡WHJ≡

Soccer practice in 30 minutes pork piccata

Pork loin chop recipe for your stove top

By Roy Kruse and Justin Chatlain, Alberta Pork

Yield: serves 6 ❖ Preparation Time: 10 minutes ❖ Cooking Time: 25 minutes

Ingredients

6 centre-cut		Canadian pork loin chops, boneless (about 5 oz/150 g)
2		eggs
1 1/4 cup	(300 mL)	bread crumbs or Japanese panko crumbs
1 Tbsp	(15 mL)	caraway seeds, crushed
2 tsp	(10 mL)	dried parsley
2 Tbsp	(30 mL)	canola oil, DIVIDED

Cooking Instructions

Using a meat mallet, pound pork chops to 1/4" (1/2 cm) thickness. Whisk eggs together in a wide, shallow bowl. Stir together crumbs, caraway seeds and parsley in another wide, shallow bowl. Dip pork in egg then let excess drip off. Dredge in crumb mixture and set aside on a plate until ready to fry. Continue with rest of chops.

In a non-stick pan heat 1 Tbsp (15 mL) of the oil over medium-high heat. Pan-fry 3 or 4 chops (do not crowd pan) for 3 to 4 minutes per side or until golden brown. Continue to cook in batches until all pork is used. Keep cooked pork warm in a low oven or covered tightly in foil.

Nutritional information

Soccer practice in 30 minutes pork piccata *(1/6 of recipe); with noodles • Per 1 person serving*

Energy	346 kCal	Fat	11.7 g (2.6 g saturated)
Protein	41 g	Sodium	268 mg
Carbohydrate	17 g		

For more pork recipes, go to putporkonyourfork.com or porkfits.com

• Events Diary

October			
19-21st	**VIV China**	Beijing, China	www.viv.net Contact: +31 30 295-2772
November			
4th	**Red Deer Swine Technology Workshop**	Red Deer, Alberta	Contact: Bernie Peet (403) 782-3776
9-13th	**Alberta Pork Regional Meetings**	Alberta	www.albertapork.com Contact: Charlotte Shipp (780) 491-3525
22-25th	**Australasian Pig Science Association Meeting**	Cairns, Australia	www.apsa.asn.au Contact: +61 8 9368 3636
24-28th	**Agromek 2009**	Herning, Denmark	www.agromek.dk Contact: +45 8675-4545
December			
2-3rd	**Manitoba Hog Days**	Brandon, Manitoba	Contact: Tanis (204) 522.7020
9-10th	**Alberta Pork Annual General Meeting**	Edmonton, Alberta	www.albertapork.com Contact: Contact: Charlotte Shipp (780) 491-3525
2010			
January			
19-22nd	**Banff Pork Seminar**	Banff, Alberta	www.banffpork.ca Contact: (780) 492-3651
19-21st	**Manitoba Ag Days**	Brandon, Manitoba	Contact: +1 (2) 04 5716566
March			
6-9th	**American Association of Swine Veterinarians 2010 Annual Meeting**	Omaha, Nebraska	www.aasv.org Contact: (515) 465-5255
17-18th	**Alberta Pork Congress**	Red Deer, Alberta	www.albertaporkcongress.com Contact: (403) 244-7821
25th	**Alberta Farm Animal Care AGM**	Red Deer, Alberta	www.afac.ab.ca Contact: (403) 932-8050
26th	**AFAC Livestock Care Conference**	Red Deer, Alberta	www.afac.ab.ca/lcc.htm Contact: (403) 932-8050
31st-1st April	**London Swine Congress**	London, Ontario	www.londonswineconference.ca Contact: Linda Dillon (519) 482 3333
April			
12-14th	**BSAS Annual Conference**	Belfast, N Ireland	www.bsas.org.uk Contact: +44 (0) 131445 4508
20-22nd	**VIV Europe**	Utrecht, Netherlands	www.viv.net
May			
11-12th	**British Pig & Poultry Fair**	Warwickshire, UK	www.pigandpoultryfair.org.uk Contact: Alice Bell (+44 (2476) 858-276
26-30th	**European Pig Producers Meeting**	Eindhoven, Netherlands	www.epp2010.nl Contact: (0) 621 212426
July			
18-21st	**International Pig Veterinary Society Congress**	Vancouver, BC	www.ipvs2010.com Contact: (604) 6889655 ext. 2
September			
14-16th	**Brazilian Pork Expo**	Curitiba, Brazil	www.porkexpo.com.br
18-21st	**Allen D Leman Swine Conference**	St Paul, Minnesota	www.cvm.umn.edu/outreach Contact: 612 624-3434
November			
17-18th	**Sask. Pork Industry Symposium**	Saskatoon, SK	www.saskpork.com Contact: (306) 244-7752

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

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