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SWINE



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Welfare is a Science

Wisdom ...

“The earth is degenerating today. Bribery and corruption abound. Children no longer obey their parents, every man wants to write a book, and it is evident that the end of the world is fast approaching.

Assyrian tablet, ca. 2800 BC
 Courtesy: Dr. Peter Davies, University of Minnesota



Lee Whittington
 B.Sc., MBA, P.Ag.
 President/CEO
 Prairie Swine Centre

dramatically in Europe since 1950. The response has been a significant investment in research that looks at the well-being of swine for reasons of both productivity and welfare. The Prairie Swine Centre is pleased to have played a role in developing ethology as a science that can answer practical questions such as mixing strategies, group size, amount and quality of housing space, stress at handling and equipment evaluation. We don't often think about the science of welfare and the related **reductions** in the cost of production (COP). A review of recent ethology research activity just at Prairie Swine Centre suggests that 8 of the last 10 conclusions from behaviour/welfare research contributed directly to reducing COP for a total of \$14.00/hog.

When we asked Dr Harold Gonyou to recap the evolution of applied animal ethology (behaviour) research in Canada at our 20th Anniversary conference in 2012 he was able to identify that in 1980 there were 6 academic positions where the scientist would have a significant part of their time in applied behaviour research, of this he noted only two positions were actually filled at the time, one in
(Welfare is a Science...Con't on page 9)

Nearly 5,000 years ago has passed since the above thoughts were inscribed. There is some comfort in the enduring perspective that we all live in challenging times. Yes we do, what should we do about that?

Welfare as a science has come a long way in the past 25 years to address production concerns, along the way it has provided the tools needed to address the evolving social concerns around farmed livestock welfare. Although the current media in North America would lead you to believe that welfare concerns in swine farming are new and recently 'sprang up' on the radar that is not correct. The landscape has been constantly evolving for 300 years but most

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ONTARIO PORK



Saskatchewan
 Ministry of
 Agriculture



Photo courtesy of Prairie Swine Centre

Groups or stalls: Prairie Swine Centre weighs in

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What the science says on the question at the heart of today's debate

“Gestation stalls” — arguably no two words have become a greater lightning rod for controversy and passionate debate from many sides around the issue of animal welfare in livestock production.

But no matter the viewpoint one element that can be consistently relied upon to cut through the emotion and support informed and productive discussion is the science.

The Prairie Swine Centre is among the latest to add valuable scientific perspective to the conversation, with the release of a scientific review of the “group or stalls” question led by researchers Dr. Jennifer Brown and Dr. Yolande Seddon.

Bringing the basic facts to light

Among key findings, it summarizes that:

- There are both advantages and disadvantages to housing sows in stalls and groups
- The main advantages of stalls relate to their ability to provide individual nutrition and care to sows, and the elimination of injuries associated with aggression at mixing
- However, due to the restriction of sow activity in stalls, freedom of movement and the ability to perform a variety of behaviours are extremely limited
- The advantages of group housing are that sows have the opportunity to perform a broader range of behaviours and thus receive more exercise, with a range of associated health benefits
- The main drawbacks of group systems are

the increased incidence of sow injuries related to mixing aggression and competition at feeding which can result in uneven feed distribution

- Many of the concerns related to group housing (such as aggression and injury) can be resolved with good system design and stockmanship

The Bottom Line

For many, including the researchers who conducted the review, the major crux of the issue is whether or not a person accepts the importance of freedom of movement to animal's well-being.

There is simply no way of getting around that hurdle with a conventional approach to use of gestations stalls. That fact, of course, doesn't do anything to reduce the substantial economic challenge producers and industry face in shifting to new approaches. By the same token, if the writing is on the wall that freedom of movement is becoming a requirement- and that certainly appears to be the case in everything from the updated Pig Code under development to what OIE (World Organization for Animal Health) and other influential international bodies are declaring – it's important to recognize the bottom line. Although stalls have a value for producer and the sow, the science is not on the side of stalls when addressing the question of freedom of movement.

The silver lining is that the review does support that group systems have come a long way and for many, once the transition is made, can offer substantial benefits both from a welfare and a production efficiency point of view

Q&A: The science of sow housing

Perspective from Lee Whittington, President/ CEO, and Dr. Jennifer Brown, Research Scientist - Ethology, with the Prairie Swine Centre Inc.

Q: Why did Prairie Swine Centre tackle the gestation stalls question?

Lee Whittington: Obviously today there is a recognized media pressure to shift away from stalls and for more producers to incorporate group management systems. There's a tremendous need to understand the effect that shift will have on individual pork producers and their farms. Prairie Swine Centre has a responsibility to meet those evolving production system needs by anticipating the right questions to research and develop solutions.

We have and will continue to pursue research that helps provide the knowledge base to support management decisions. It's also important for everyone to have a broader understanding of what the science says overall and to that end we are a resource. Right now it's very timely for commercial producers to have an updated assessment of what the science says - that was why we developed the 'Groups or stalls' review.

Q: Freedom of movement seems to have become the 'tipping point' of the debate. Why is this concept so critical in determining the industry direction?

Dr. Jennifer Brown: Influential organizations such as OIE (World Organization for Animal Health) are saying that a certain level of freedom of movement is a requirement for animal welfare and that a lack of this freedom of movement is a disadvantage of conventional systems using gestation stalls. There are more and more indications that this is becoming the accepted logic among bodies that set welfare standards and also in what we are hearing and seeing in terms of societal expectations, trends in mainstream media and the intentions of food retailers.

(Groups or stalls...Con't on page 4)

Force Plates Assessment

Dr. Sabine Conte and
Dr. Nicolas Devillers,
Agriculture and Agri-Food Canada,
Dairy and Swine Research and
Development Centre, Sherbrooke, Quebec

Dr. Jennifer Brown and
Dr. Yolande Seddon,
Prairie Swine Centre

Lameness in sows is one of the most important welfare issues, responsible for up to 25% of culling reasons in gilts (Tarres et al. 2006, *Livest. Sci.* 100:121). However, detection and evaluation of lameness in sows have not been studied extensively. Until now, qualitative visual scores of gait, standing posture, difficulty in lying down and locomotion are the main methods used to measure lameness in pigs. However, accuracy of these qualitative methods can vary among observers. Therefore, there is a need for more objective quantitative methods to assess lameness in pigs.

The use of force plates to analyze weight distribution on limbs of cows shows promise (Chapinal et al. 2009, *J. Dairy Sci.* 92:581) and may be applicable to sows. Use of this technology in sows could lead to better early detection, quantification and understanding of sow lameness and advance research into the relationship between housing, social factors, nutrition and lameness.

The objective of this project was to develop a quantitative method for the evaluation of lameness in breeding sows. The specific objectives of this project were to: 1) develop a scale to measure sow weight distribution on each limb; 2) validate this device (repeatability and relation to lameness), 3) study the impact of analgesics (short term pain control) on weight distribution in lame sows. Work related to the project was carried out at the AAFC Dairy and Swine R&D Centre (DSRDC) in Sherbrooke, Quebec and at



Figure 1. Sow standing in the force plate

the Prairie Swine Centre (PSC) in Saskatoon, Saskatchewan. The third study on impact of analgesics is still under analysis and results are not available yet.

1) Development of the force plate scale:

A large crate (213 x 63.5 x 107 cm, inside) was built by Pacific Industrial Scale Co. Ltd (Richmond, British Columbia, Canada). The crate was large enough for the wider sows to move freely and the crate could be adjusted at the back for smaller sows. The scale platform was divided in 4 stainless steel individual quadrants (front: 101.6 x 30.5 cm, rear: 111.8 x 30.5 cm), with each quadrant lying on 4 single ended beam load cells. Each quadrant had a 500 kg weight capacity and was independent from the crate.

A removable middle line bar (203.2 x 1.3 x 15.2 cm) and transversal ridge (30.5 x 1.3 x 7.6 cm) were used to ensure that the sow had its feet in the corresponding quadrant. A feeder was installed within the crate frame in order to draw the attention of the sow in a standardised

direction and to keep her static for a period of time during measurement. A digital indicator (GSE 665) recorded the total weight and weight applied on each separate quadrant, with an average collection rate of 14 data points per second.

Calculations were then carried out to determine: 1) the percentage of total body weight distributed on each leg; 2) the ratio between weights applied on opposite (left and right) legs; and 3) the weight shifting that occurs between two opposing limbs (frequency, amplitude, between left and right limbs).

2) Validation: repeatability of the measures

Five visually non-lame and five visually lame sows were assessed on the force plate (twice on two different days). The within-sow coefficients of variation for each measure was lower than 15%. Measures taken from the force plate are therefore considered to be repeatable (Pluym et al., 2013 *Biosyst. Eng.* 116:64-74).

(Force Plates Assessment...Con't on page 4)

(Groups or stalls...Con't from page 2)

If this logic continues to be accepted and become the conventional thinking it will be more challenging for producers to use stalls in the future. So there is a lot going on here beyond the science that is driving the expectations.

From a scientific perspective, it's important to keep in mind that stall size compared to animal size changes over time, and research is ongoing to assess the factors of stall size and time spent in stalls as it relates to comfort and welfare. However with the bar rising on what is considered adequate freedom of movement, clearly there will be rising pressure to reduce time in conventional stalls and adopt greater use of group systems. What we know from science and will continue to learn from science can help producers transition to systems that better meet the new expectations.

Q: A big reason for stalls in the first place was to protect the animals and support their health through individual care. Aren't there real welfare drawbacks too with group systems?

Dr. Jennifer Brown: There is no one perfect system. We recognize that welfare can also be a

problem in groups, that's something that we are working on to assist producers to develop systems with new management ideas.. If you simply put sows in a group environment without taking certain management precautions there is going to be aggression issues, injuries and other problems. But as the review shows, there are things we know we can do to reduce aggression. Certainly in many group housing systems, it's really not a serious issue, and we also see that European producers are regularly achieving equal or higher production levels in groups.

Q: Clearly animal welfare is in the spotlight more than ever before. How is this driving the agenda both at Prairie Swine Centre and at level of your industry stakeholders?

Lee Whittington: Pork producers and industry have always been interested in the welfare of their animals. That really hasn't changed. What's become different is the welfare of the animals is now a social topic that other parts of society are engaging in. That has changed the whole

perspective just in terms of who is involved in this discussion. Certainly, this has heightened the awareness of producers and that's why producers like to see practical research that not only looks into welfare questions but helps provide new tools and new system designs that allow the pork producer to be successful.

To the credit of our producer stakeholders, animal welfare and behavior were among the priorities for research when Prairie Swine Centre was started two decades ago and that remains the case today. I think producers understand whatever challenge they face, they are better off the more knowledge they have that looks at solutions in the context of the overall swine enterprise. Obviously the health and welfare of the animals is critical to all aspects of profitable and sustainable production.

Regular improvements in areas such as early identification of potential issues that can be improved through research (such as lameness, system designs that improve the group environment) can all add up and make a big difference. We're always interested in finding those opportunities. 

(Force Plates Assessment...Con't from page 3)

3) Validation: relation with lameness

Sixty sows from AAFC and PSC were weighed on the force plate. Among them, 24 sows were visibly sound, 19 sows mildly lame and 17 sows lame using subjective gait scoring (gait scores 0 – sound even strides, 4 – the sow does not move; Main et al., 2000). Using force plate measures, only the weight shifting (WS) frequency and ratio of body weight (BW) applied between opposite legs differed among lameness scores. Indeed, WS frequency per minute for front legs (score 0: 22.5 ± 1.64 , score 1: 24.77 ± 1.86 , score 2: 33.3 ± 1.94 , $P < 0.001$) and hind legs (score 0: 20.4 ± 1.80 , score 1: 21.89 ± 2.04 , score 2: 31.3 ± 2.13 , $P < 0.001$) increased significantly with lameness. In this experiment, the ratio of BW applied between rear legs decreased with increasing lameness score (score 0: 0.72 [0.67-0.76], score 1: 0.71 [0.66-0.75], score 2: 0.62 [0.57-0.68], $P < 0.05$). Different results were found at the two sites. This could be due to various environmental and animal factors, such as housing system, floor type, herd management, parity or genetics (Pluym et al., 2011 Vet. Med. 56:101-109).

Overall, the results show that lame sows had more variation in the weight applied on their limbs and did more weight shifting. This was also

“Lame sows showed more variation in weight being applied to their limbs, in addition to more weight shifting”

observed in studies on dairy cows (Pastell et al., 2010, J. Dairy Sci. 93: 954-960) and weight shifting is suggested as a means of reducing pressure on a painful limb, by transferring weight to the opposite limb. The force plate scale thus proved to be efficient at discriminating lame sows from non-lame sows, with lame sows characterized by greater weight shifting between opposing limbs.

4) Pros and cons

Since the force plate scale is a quantitative method, it is a more objective method than visual measurement. This eliminates the need to train individual assessors and eliminates problems related to inter-observer assessment. Currently the system is expensive, but the force plate has the potential to be included into an ESF feeder or other automated technologies. However, the force

plate only provides information of weight bearing and thus provides no specific information related to gait disorder. A combination of static and dynamic observations (e.g. Force plate analysis followed by visual scoring) is recommended to provide a better assessment of lame sows.

The Bottom Line

Further research is required to increase the precision of measurement, to find threshold values that indicate lameness, and to develop associations between force plate measures and specific gait problems. The ultimate aim will be to develop systems that allow the early detection and diagnosis of lameness, and to make them an efficient and effective evaluation tool for the swine industry. 

Economic Costs of PEDv



Ken Engele
Prairie Swine Centre



Lee Whittington

It's said that it's easy to do a bad job of a 'bad job'. For those jobs that each of us hate to do it's easy to pay less attention to detail, after all we don't really care to do it in the first place. The problem with this approach the job now becomes more involved, complicated and more issues tend to arise because we didn't give it the attention it deserved when we first discovered it. However if we strived to do it right the first time – we would alleviate many future headaches and costs associated with the task at hand. A prime example would be producers dealing with a PEDv outbreak. Effectively making the best of a bad situation.

The first case of PEDv in the United States was identified on May 17, 2013 and subsequently it's estimated that 30% of the U.S. herd is impacted by PEDv - with PEDv positives cases being reported in Ontario and Manitoba producers need to review and maintain strict biosecurity protocols more than ever to limit the spread of this economically devastating disease.

PEDv was one of the topics covered (by Drs. Peter Provis, Kurt Pregchuas, and Egan Brockoff) in a series of producer meetings Prairie Swine Centre hosted (co-sponsored by Elanco Animal Health) across Saskatchewan, Alberta, and Manitoba throughout March and April. Based on record attendance, and the number of questions asked, pork producers are very interested in how to remain PEDv free, after all, producers who remain free of PEDv maintain a huge economic advantage to those PEDv positive operations. The presentation focused on the 'Clinical

Management and Economic Implications of PEDv specifically covering the areas of:

1. In-barn clinical progression
2. History of PEDv spread,
3. Outcomes at the farm level
4. Elimination of PEDv
5. Effective sanitation
6. Economic impact of PEDv.

Economic Impact of PEDv

Biosecurity is the key to prevention. While most resources available focus on the clinical symptoms, outcomes, management, and elimination not a lot of concrete information has been shared regarding the potential economic implications when PEDv hits an operation. Data presented by Dr. Peter Provis (Elanco Animal Health) focused on what type, and period of time, production losses would be associated with a PEDv outbreak.

PEDv Impact on Reproduction

- Sows infected with PEDv in the first 30 days gestation had a 12.6 % drop in farrowing rate
- Gilts infected in the first 30 days had a drop in born alive of 2.2 pig
- 100% mortality for 3 to 6 weeks

Performance Loss in Grower-Finisher

- ADG impact variable
- Negligible to 2 weeks growth lost
- Typically 3 to 7 additional days in finishing

18 Farm Retrospective Analysis

- 6 weeks to return to baseline productivity
- 1,500 to 2,800 pigs NOT weaned per 1,000 sows

The impact of management on a PEDv outbreak can be economically substantial. Utilizing the Prairie Swine Centre-George Morris Centre enterprise model – we examined two scenarios surrounding a PEDv outbreak: best case vs. worst case scenario. Best case scenario is one in which a PEDv positive operations works with their veterinarian and does everything right: feedback to 100% of the sows, tightened biosecurity, and rooms pass the white glove test after washing to name a few. While worst case farms misses those small things like ensuring all animals receive feedback.

Figure 1 highlights the potential impact on pre-weaning mortality under excellent and poor management strategies. Under the excellent management it takes 6 weeks to return to baseline

(Economic Cpsts of PEDv...Con't on page 12)

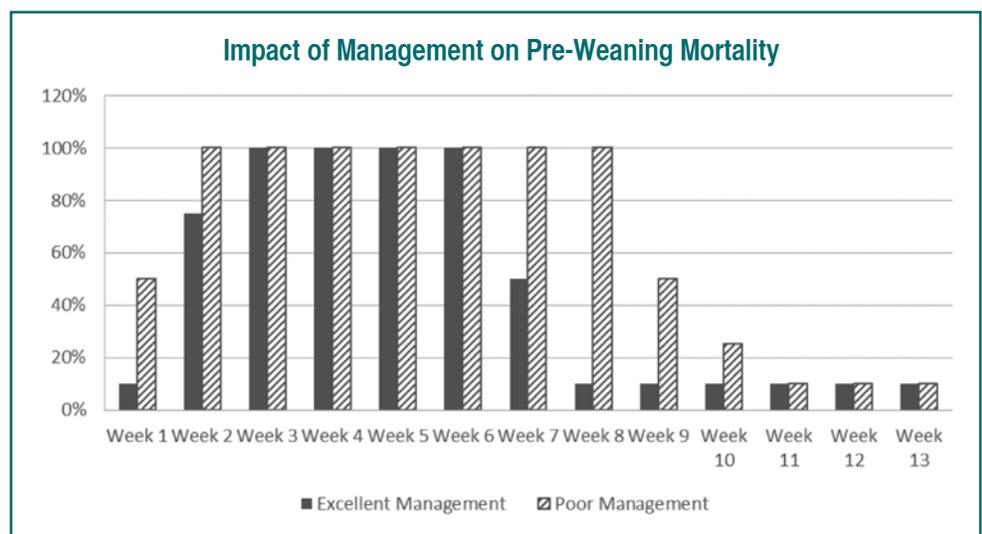
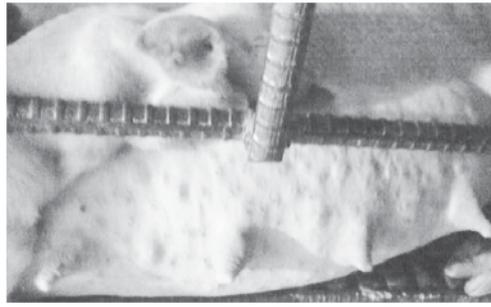


Figure 1. Impact of Pre-Weaning Mortality comparing excellent management compared to poor

SYMPTOMS IN SOW BARN

- Both sows and piglets are affected by PEDv.
- PEDv can kill up to 100 percent of infected suckling pigs.



▲ Sows often scour, become lethargic, and may vomit; they might also develop mastitis in the farrowing barn.



▲ Farrowing barn sequence of events after infection: Suckling pigs have watery diarrhea, become emaciated (razorback), and display abnormal behaviour such as lying atop the sow or other littermates; piglets waste away and most die within five days of birth.

PREVENTION

- PEDv is transmitted by infected
- **Biggest risk factor** is transport
 - Trailers must be scraped out in
 - returning to any swine premises
 - Ask your transporter if the trailer
 - washed before it arrives on your
- Wash facilities should follow protocol: <http://www.swinehealth.ca/Tr>
 - Make sure the wash facilities use
 - Trailers should be washed, disinfected
 - Use detergents and disinfectants
 - Recommended to wash trailers
- Farms can protect themselves with strict protocols: <http://www.swinehealth.ca/>
- Key areas to focus on include:
 - Deadstock (onsite composting)
 - Manure handling (haulers never
 - Loadout procedure (dedicated
 - Entry procedures (clean/dirty lines)
 - Visitor procedures (essential visitors
 - Disinfection of all equipment, tools
 - Quarantine facilities for replacement
- There is no available vaccination

DIAGNOSIS /

- Be vigilant for PED (TGE-like) symptoms
- Report all suspect cases to your veterinarian
- If PEDv suspected, send in samples for testing available at Veterinary Laboratory
- If infected, follow veterinarian's advice and alert visitors and neighbours

BIOSECURITY

and feces.

trailers returning from the U.S.

the U.S. and then washed before

in Canada.

er has been in the U.S. and/or

ur premise.

proper washing procedures:

transportation_Biosecurity.php

se fresh, non-recycled water.

infected, and dried (at 60°C for 20 min).

ts at labelled dilution rates.

s after visiting plants/assembly yards.

by practicing strong biosecurity

health.ca/On-Farm_Biosecurity.php

offsite pickup, or separate driveway).

er cross paths with on-farm traffic).

clothing; disinfection of loadout).

ne; dedicated clothing; shower-in).

visitors only; adequate downtime).

ools and supplies entering the barn.

ement gilts (if possible).

on.

TREATMENT

ymptoms.

ur herd veterinarian immediately.

mples (feces or intestine, fresh/chilled).

Diagnostic Services (VDS) Manitoba.

s instructions on eliminating the virus,

uring farms.

SYMPTOMS IN NURSERY / GROW-FINISH

- Nursery and growing pigs display more subtle symptoms.
- PEDv strips the small intestines in these pigs as well, but they are able to regenerate intestinal cells and recover.
- Little to no increase in mortality, although morbidity is quite high.



Nursery and growing pigs show signs of wasting (look unthrifty/thin).



Diarrhea (and possibly vomiting) is present in nursery and growing pens. Nursery pigs might become chilled and show abnormal behaviours such as piling.

Sow Lameness, Longevity and Temperament Workshops



Helen Thoday,
Prairie Swine Centre

Lameness, Longevity and Temperament of sows was the topic up for discussion at a series of workshops across Canada. Nearly 100 pig producers and associated industry representatives attended the workshops in Manitoba, Quebec, Ontario and New Brunswick to discuss the latest research in the areas of Lameness, Longevity and Temperament and what we need to consider when selecting a sow for the future.

The agenda covered some recent research outcomes from projects funded through Swine Innovation Porc. Conclusions of research results such as the new quantitative lameness assessment options and lameness levels in different sow housing systems were complimented by other up to date topics in this area, such as hoof trimming sows and economic analysis of lameness in sow barns.

Dr. Laurie Connor, University of Manitoba, introduced the day by explaining the vision behind the Swine Innovation Porc research program. This vision brought together like minded researchers from across Canada to address the issues surrounding lameness in our sow barns looking specifically at the welfare and economic analysis of lameness and its impact on longevity. This research used conventional and new technologies to identify and evaluate factors such as social characteristics, sow temperament, lameness, calcium and phosphorus balance and early reproduction management that may impact sow welfare and longevity in the sow herd. Dr. Connor



went on to focus the group on what lameness is, where it could be occurring in the herd. Dr. Connor presented figures to show it is not just an old sow issue, recent Irish work found that 39% of replacement gilts and 48% of pregnant gilts were found to be lame in a study over 68 sow herds (Quinn & Calderon Diaz. 2010).

One item covered in the workshops were the new options available to the industry that can quantify lameness. Previously lameness scoring has been subjective and differences can be found between assessors. Dr. John Deen, University of Minnesota suggested a simple two scale scoring system was easiest "is she lame or not lame?" Dr. Sabine Conte and Dr. Nicolas Devillers researched Kinematics and Force Plate analysis as a way of objectively measuring lameness (see article page 3). The Force plate takes measurements of pressure from all four feet as the sow stands in the crate. This analysis

can examine if there is any weight differentiation among the four legs and identify lameness. Due to the cost of the force plate system, it would be the most economical to adopt in multiplier facilities and in the future could also be incorporated into an ESF feeder to provide a time free lameness analysis for all gilts and sows over a long time period.

Dr. John Deen discussed why lameness is underestimated in sow barns and how we might be able to learn from the Dairy industry who continually works on lameness issues. Along with mastitis, dairy cattle lameness is sighted as the most prolific production issue facing modern dairy farmers today so why not the pig industry?

Longevity of sows is essential for improved costs of production. It is widely regarded that gilts do not pay for themselves until their third parity. So is it lameness or low productivity that leads to culling decisions? The sows that are being culled

Table 1: The Effects of Lameness on Production.

Lameness Effects	Non-Lame	Lame
Pigs born/day	0.049	0.028
Days to removal	137	90
Avg days in herd	215	147
Replacement rate	49%	67%
Mortality/removals	0.24	0.35
Calculated Productivity		
Pigs produced by sow	10.5	4.1
Pigs produced by replacement	6.6	8.7
Pigs produced	17.1	12.8

Source: John Deen, University of Minnesota

out prior to third parity because of productivity issues could indeed be lame.

Dr. Jennifer Brown from the Prairie Swine

important, this echoed a point Dr. Deen made about using our eyes more when it comes to observing problems in pig production.

To finish the session Dr. Yolande Seddon of the Prairie Swine Centre, presented work carried out outside of the cluster funding on Hoof Trimming Sows. Hoof trimming in other species is very common, cattle, sheep and horses are synonymous with hoof management but why not sows? The FeetFirst@Hoof trimming chute developed by Zinpro Corporation allows easy and low stress immobilisation of the sow so trimming can be quick and efficient.

The day ended with a general discussion and many topics were challenged such as what can be done now to look at lameness in

“Lame sows on average wean 6% fewer pigs, costing the producer up to \$5.00 per market hog sold”

covered the different temperament types identified in sows and how they could affect the productivity in the barn. As the industry thinks about moving forward to group sow housing, the interaction between sows and how stock people handle them require more consideration. The diverse range of group sow systems that are available will only add to the matrix of what type of sow will perform best in which systems.. Recent work (funded through Swine Innovation Porc) found that sows with more passive and fearful traits had greater numbers of piglets born and born alive in the free access system and confident sows showed a greater improvement of body condition score in slatted ESF systems. Temperament is heritable and is related to important production traits so will we have specific sows for specific housing systems?

Dr. Laurie Connor also discussed housing systems and how it impacts on lameness. Unfortunately in this area there is not a one size fits all answer. Even within different group sow systems there are options for group sizes, flooring types, partitions, space per sow, dynamic v static and feeder types. All these factors impact the lameness levels that you will see. Dr. Connor also reminded us that stockpeople are still incredibly

barns and what else do we need to know before the industry can set out a blue print for reducing lameness levels. Will the industry need to forgo something to achieve selection for lameness or can we manage our way through it by considering flooring types and stockmanship first.

The bottom line on lameness:

- Lamé sows wean on average 6% fewer pigs per year . This equates to a loss of \$5/market hog sold from lame sows
- All costs associated with lameness could vary between \$161- \$447 per lameness diagnosis.
- This does not include the opportunity cost on lost production of an early culled sow.

Acknowledgements

Funding for the project has been provided in part through Industry Councils from Agricultural Council of Saskatchewan (principal), the Conseil pour le developpement de l'agriculture du Quebec, Ontario Agricultural Adaptation Council and Agriculture and Food Council of Alberta Which deliver the Canadian Agricultural Adaptation Program (CAAP) on behalf of Agriculture and Agri-Food Canada 

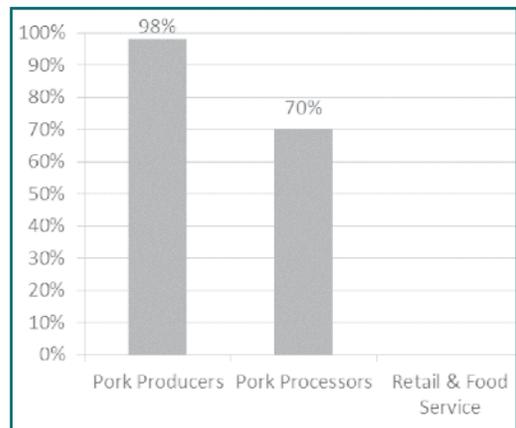
(Welfare is a Science...Con't from page 1)

wildlife biology and one a combined poultry/pig position. By contrast, today there is significantly more interest and industry as well as government resources going into the area where 22 positions existed in 2012, of these three have been discontinued with recent government scientific staff reductions and 2 are vacant. In the ebb and flow of industry, academic and government focus, the study of behaviour and the welfare of farmed animals have increased right along with perceived concerns by consumers, animal rights advocates, media exposes, and food chain supplier demands.

The increased need by industry has been our motivation to assist the industry to stay ahead of the curve and continually recruit new talent that can look at the pig in typical commercial facilities. Dr. Jennifer Brown joined PSC in 2011 and assisted in the transition to a new research team which includes recruiting Dr Yolande Seddon in 2012. Additionally a National Chair in Swine Welfare was conceived and the search for a leader identified a small group of potential academics with the research track record to allow us to build a significant and world class program to help guide pig welfare research for the industry in a sustainable manner.

The initiative would provide \$2.5 million of new research funding over 5 years. This will be accomplished by raising all of the funds from across the entire pork value chain and making application to Natural Sciences and Engineering Council (NSERC) to match industry's commitment.

Industry Fundraising Progress 2013 for the National Chair in Swine Welfare



At 63% of our target, the industry fundraising program is on target to leverage a total of \$2.5 million dollars in new funding for swine welfare research and industry outreach



Zephyr Piglet Gun



Helen Thoday,
Prairie Swine Centre

On-farm euthanasia of small piglets is an ongoing area of research due to the emotional attachment stock people can have with the visual process of euthanizing piglets. Although effective if carried out correctly, blunt force trauma as a way of dispatching piglets is seen as a method that needs improvement. Dr. Tina Widowski of the University of Guelph undertook an efficacy trial of the Zephyr Piglet Gun, a non-penetrating captive bolt, for euthanasia of neonate, suckling and weaned piglets up to 9 kg. The study found that overall, the Zephyr-E was a highly effective, single step method of euthanasia for piglets up to 9 kg. For all ages and weights of piglets in the trial loss of sensibility was immediate, involuntary movement ceased in less than 5 minutes and cardiac arrest occurred in less than 15 minutes. The device is now being manufactured by Bock Industries, Inc (Phillipsburg, PA). Training materials (brochure and instructional video) have been produced with support from Farm and Food Care (Ontario). The Zephyr-E provides a practical, science-based alternative to blunt force trauma for euthanasia of young piglets. Through the support of the Agriculture Council of Saskatchewan, a lead-user project was initiated, providing the opportunity to evaluate the feedback of the Zephyr on five commercial farms.

Verus Alliance Inc, based in Alberta found the Zephyr-E was easily adopted into the farrowing barn routine. After initial use they made some adaptations to make it more user friendly. This was achieved by attaching it to a portable compressor so it could be moved to the most

appropriate area of the barn depending on the week. The responsibility of piglet euthanasia was given to the member of staff that was responsible for the fostering of that weeks farrowings so there was a clear understanding of who must be checking and euthanizing any particular piglets - Alaistar Bratton of Verus Alliance explains why they wanted to trial the Zephyr and how it was adopted in to the barn.

"Adapting any new piece of equipment or system is always a challenge but as an industry we need to look forward to what other options for euthanasia are out there and at only \$700 per Zephyr gun that is definitely a cost we can suck up when you think about the use per year We found the gun lightweight, effective and safe for our staff to use. As long as our staff like it we would consider adopting it across all our sow barns".

Other producers in the trial still found the Zephyr gun difficult to adopt onto farm which seemed to be affected by their current Euthanasia system. Those using Blunt force trauma found the Zephyr a good alternative, however those with CO₂ systems found the Zephyr a system that was unappealing for staff. Feedback identified a need for staff to be well informed prior to a change in euthanasia system about what will be visually seen, and any changes in piglet welfare that should be considered. Staff will need to be aware of what is "normal" and what is the correct time line from loss of sensibility to cardiac arrest, as outlined by Dr. Widowski.

Research carried out by Teresa Casey-Trott at the University of Guelph as part of Dr. Widowski's overall Zephyr research, found that neonatal piglets had longer durations of convulsions, sustained heartbeat and more severe damage



The Zephyr non-penetrating captive bolt gun

than weaned piglets, suggesting age and weight effect traumatic brain injury. For stockpeople this could seem illogical that it would take longer for a tiny piglet to die and could easily lead the handler to think they have carried out the euthanasia process incorrectly.

The Zephyr gun is a good step toward moving on from blunt force trauma. Any form of euthanasia must match the requirements for the welfare of the pigs and requirements of euthanasia as outlines in the AVMA Guidelines for the Euthanasia of Animals: 2013 Edition.

The bottom line:

At a cost of \$700 per unit the Zephyr-E provides pork producers a reliable low-cost alternative for euthanasia of piglets.

A 4,000 sow unit with 10% pre weaning mortality per annum will mean euthanasia requirements for up to 10,000 piglets per year.

This will equate to around .07 cents per piglet in the first year. 



Gowans Feed Consulting Graduate Student Assistantship

Garrett Rozeboom,
Prairie Swine Centre

The position offered by The Prairie Swine Centre and sponsored by Gowans Feed Consulting is one that is unique, exciting, and applicable. The focus of the position is to train a student in both academia and the swine industry.

What enticed me about this position when applying was the ability to obtain a postgraduate degree and industry experience simultaneously. It has always been a goal of mine to obtain a postgraduate degree and transfer that knowledge into the swine industry. When I first saw this position, I immediately applied knowing that I could graduate with a master's degree, and at the same time I would receive industry training. This unique aspect will allow me to transition from school to employment. Through academics, research, and industry experience I have obtained valuable skills and knowledge

Education

The program requires the candidate to be enrolled as a fulltime graduate student at the University of Saskatchewan. The challenging curriculum and atmosphere have provided a great learning experience for me as a student. Like other masters students, I am required to maintain a full course load and complete a research project that is summarized in a thesis. Unlike other students, my studies and curriculum goes beyond the classroom and the university. This aspect creates an even more challenging and dynamic learning experience for the student.

Industry work

Gowans Feed Consulting provides a different aspect to the program and allows students to attain industry experience. Over my 2 year program, I spent 4 months completing a practical swine production program coordinated and hosted by Gowans Feed Consulting.

The first part of the program placed me in a

commercial sow barn where I helped conduct a birth to feeder swine research trial. While, at the commercial sow farm, I had the opportunity to not only work on a commercial research trial, and in daily production. I spent time in breeding, farrowing, gestation, and the nursery. I discovered and experienced new approaches to swine production. I have had previous experiences in other hog production systems, but I find that every system has new things to offer. I had the opportunity to learn more about the industry and large-scale commercial research.

The second part of my swine production program allowed me to work in a commercial feed mill. While, at the feed mill, I learned the importance of feed production and the factors and practices that go into producing a quality feedstuff. The skills and knowledge I gained at the feed mill are essential for me becoming a nutritionist. As a nutritionist, I will need to work with mill managers and understand the challenges and tasks that take place in a commercial feed mill. This understanding will allow me to ensure that the producer is receiving a quality product.

In the second year of the program, I was assigned a mock case study of a commercial swine operation. In the case study, I was asked to generate a feeding program (diet formulation for all stages of production and generate feed budgets and models), predict animal performance (based on feeding program), establish production flow (farrow to finish), and reply to potential producer questions. Through each of these tasks, I attained valuable skills and knowledge. I gained an understanding of how intertwined the production of pigs is and how the smallest changes greatly affect the big picture of hog production. The case study exposed me to the job of a nutritionist and all the factors that affect hog production.

Throughout the program, I have been able to travel and visit with the nutritionists from Gowans Feed Consulting. While interacting with them, I learned about diet formulation, production flow, and feed budgeting. I also had the opportunity to go on farm visits with them to interact with

producers, and problem solve. I learned much about their profession; responsibilities, important skills, and outlook for the pork industry. This insight allowed me to realize what is needed to be a successful nutritionist and professional within the swine industry.

Research

The majority of my program has been focused around a research project: the interaction between dietary energy (NE) and pig stocking density on late-finishing growth performance. In addition to growth, I plan to evaluate the impact of diet and pen density on profitability. Lastly, I also plan to study the influence of diet and pen density on pig behavior and well-being. The overall goal of my research is to create a sustainable model that will provide producers with the tools to help them reduce feed costs while maintaining optimal outcomes. Even though I have focused on my research, I have had the chance to be involved in other research projects conducted at the Prairie Swine Centre. This allows me to experience other research fields and exposes me to other problems and solutions in the swine industry. Being involved in research projects has helped me develop valuable research skills.

Conclusion

Now that I am two years into the program, this program has exceeded my expectations. Although the program has been challenging, I have grown immensely from the experience. I have had the opportunity to work within the industry, travel with a nutritionist on farm visits, and solve case studies. All of these opportunities add to the typical master's degree experience. By working with nutritionist, barn and mill managers, and professors, I have had the opportunity to learn from great industry professionals. I have also had the chance to network with professionals throughout the North American hog industry. From my studies and experiences, I've been given the tools to ease the transition from academia to the commercial swine industry. 

Sherry Wailing



Sherry Wailing joined Prairie Swine Centre in January 2013 in the position of Executive Assistant. Her role is to assist with the accounting activities as well as to assist the CEO/President with matters relating to the Board, staff and visitors. Her training in accounting and human resources as well as extensive experience with a variety of organizations, has prepared her well for this role. Sherry started here at the Swine Centre working two days a week and recently moved to four days a week. Born and raised in Saskatoon, Sherry has spent most of her life here, other than a few years in her early twenties when she worked in Calgary and then at Panorama Ski Hill in BC. Although she wasn't a skier, she says the two years she spent living in Invermere

and then at Panorama were some of the best times of her life. She often goes back to the area to visit friends.

After returning to Saskatoon, Sherry settled into a career of payroll and accounting, working full-time during the day and soon starting a part-time home based accounting business as well. She has continued this business for the past 27 years, providing payroll, accounting, and consulting services for small businesses and non-profit organizations.

In her spare time, Sherry enjoys travelling, gardening and spending time with family, friends and her two cats, Cally and Chloe.



Alberta Pork Congress

Red Deer, Alberta
June 10-12, 2014

World Pork Expo

Des Moines, Iowa
June 4-6, 2014

Red Deer Swine Technology Workshop

Red Deer, Alberta
November 5, 2014

Ontario Pork Congress

Stratford, Ontario
June 18-19, 2014

(Economic Costs of PEDv...Con't from page 5)

productivity with 4 weeks of total piglet loss; while under poor management it takes 10 weeks for baseline productivity to return including 7 weeks of total piglet loss. A similar trend to pre-weaning mortality can be seen with farrowing rate and born alive – the best case scenario has less of a total weekly impact over a shorter period of time. Using the data in figure 1 shows pre-weaning mortality, for the quarter in which the PEDv outbreak occurs, increases to 46% and 66% for the best and worst case scenarios respectively, while annualized returns increase from 10% to 18.9% and 23.9% respectively.

So what does this mean to the cash flow of the operation? Table 1 shows the economic impact per sow place taking into account changes in pre-weaning mortality, farrowing rate, born alive and finisher performance. We can see that in the best case scenario

Numbers game?

1. If a 2-3 day old piglet produces 1B virions per 1 ml of feces
2. 100 mls of feces will contain 100B virions
3. Assume a biosecurity cleaning procedure or processing procedure effectiveness of 99.999%
4. 1M virions remain!

the impact of pre-weaning mortality alone will set a producer back \$216 per sow place, which is substantial, but a huge improvement compared to the worst case scenario \$338 per sow place, a \$122 sow place difference!

While experiencing a PEDv outbreak would no doubt be heartbreaking and one which no producer should not have to experience. Performing an excellent job in a bad situation can pay huge dividends both in terms of dollars and cents and staff morale.

Table 1. Economic costs associated with a PEDv outbreak comparing good management and poor management practices.



Best Case Scenario			
	PWM	Combined	Finishing
Parameters	18.9%	18.9% PWM, 89.3% FA, 12.43 BA	3 additional days
Per sow place	-\$216.00	-\$243.00	-\$31.00
Worst Case Scenario			
	PWM	Combined	Finishing
Parameters	23.9%	23.9% PWM, 87.4% FA, 12.22 BA	7 additional days
Per sow place	-\$338.00	-\$432.00	-\$96.00



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