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PRAIRIE SWINE CENTRE 25 YEARS

Winter 2019 Volume 25, Number 1

Greetings from Prairie Swine Centre

Murray Pettitt,
CEO,
Prairie Swine Centre

My name is Murray Pettitt and I am the new CEO at Prairie Swine Centre. Although I began my position just this past summer, I am no stranger to the Centre. I previously worked at PSC from 1999 to 2009 and was the Research Scientist in the External Research Services Program (also known as Contract Research) for the last six of those years. I am extremely pleased and excited to be back at PSC and have this opportunity to lead an organization with an excellent reputation in providing useful, practical research results to the swine industry. This position will enable me to further strengthen our relationships with the pork industry and other researchers, and develop new relationships and collaborations in order to continue serving the needs of the ever changing swine industry. I am originally from rural Manitoba and my main area of research over the years has been reproduction, mainly boar and bull fertility, sperm cryopreservation and swine embryo transfer. I spent the last nine years in the Department of Animal and Poultry Science at the University of Saskatchewan where I was responsible for managing a research program that with the cooperation of industry collaborators is investigating markers of sperm function to identify the true fertility potential of individual boars and bulls. This research has the potential to allow for the identification of subfertile males with otherwise normal semen characteristics.

One of the keys to the success of the Centre has been focusing on the information needs of the industry and providing answers through our research in the areas of nutrition, engineering, ethology and contract research. Critical to this effort is our Technology Transfer program which is in constant contact with the industry to ensure the results are distributed as far and wide

(Greetings from PSC.. continued on page 3)

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Understanding the interaction between nutrition and pig health

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Michael Wellington, PhD Student,
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Understanding the interaction between nutrition and pig health

With new legislation eliminating the use of in-feed antibiotics for growth promotion in Canada and increasing consumer pressure to reduce antibiotic use in animal agriculture, it is critical that we develop alternatives to antibiotic use in order to maintain animal performance and health during immune challenge. An increased understanding of the interaction of nutrition and animal robustness (i.e., the ability to cope with an immune challenge), therefore, will be a key component in efforts to replace and/or reduce antibiotic use. Specifically, nutrition-based alternatives to antibiotic use need to be identified. Pigs are continuously exposed to microbial pathogens and immune-stimulatory antigens that negatively impact animal productivity. Pigs exposed to immune challenge, without exhibiting any clinical signs of disease, show reduced appetite and growth and less efficient use of nutrients compared to healthy animals. Previous studies have estimated a reduction in lean growth of 20-35% and feed efficiency of 10-20% in growing pigs at sub-clinical levels of disease (Williams et al., 1997; Le Floc'h et al., 2009). This decrease in performance can have a substantial impact on profitability of producers. Stimulation of the immune system alters protein and amino acid metabolism and utilization, with amino acids redirected from growth towards supporting the immune response. Of the amino acids, glutamine, arginine, threonine, and aromatic and sulfur amino acids are of particular importance as precursors for synthesis of many critical components of the immune response (Reeds and Jahoor, 2001). It is thought that provision of these amino acids may be important for improving pig response and growth

> "Feeding pigs high-fibre diets and stimulating the immune system both independently increased the threonine requirement for nitrogen retention. "

performance during times of stress and disease challenge. Pork producers have been incorporating increased amounts of co-products from the milling and biofuel industries and other feedstuffs in swine rations. These feedstuffs have higher fibre content and variable protein content and digestibility which may have a detrimental effect on overall pig immune status and robustness. It has already been established that an increased level of threonine is required in high-fibre diets. However, the impact and interaction of factors such as dietary fibre and health status on requirements for specific amino acids that are used for the immune response are not well characterized.

What We Did

A nitrogen-balance study was conducted to determine threonine requirement for maximum protein deposition when dietary fibre and immune system stimulation (ISS) were present alone and in combination. Ninety barrows (20.5 ± 0.75 kg initial body weight) were randomly assigned to 1 of 10 wheat and barley-based dietary treatments (n = 9). Diets consisted of a low fibre (12.5% total dietary fibre) or high fibre (18.5% total dietary fibre from sugar beet pulp and wheat bran added at 15% of the diet in a 2:1 w/w ratio) with graded levels of threonine (0.49, 0.57, 0.65, 0.73 and 0.81% standardized ileal digestible) fed at 2.2 × maintenance metabolizable energy requirements. After an 8 day adaptation period, two 4 day nitrogen-balance collection periods (pre-ISS and ISS) were conducted. Immune stimulation was induced by repeated injections of increasing doses of E. coli lipopolysaccharide. The threonine requirement was determined in each period based on the response in nitrogen retention to dietary threonine content using a quadratic regression statistical model.

What We Found

Feeding pigs high-fibre diets and stimulating the immune system both independently increased the threonine requirement for nitrogen retention when compared to low-fibre and non-stimulated pigs, resulting in an estimate of 0.78 and 0.76% SID threonine, respectively, compared to 0.68% SID threonine. The threonine requirement was also increased when pigs received both high-fibre diets and the immune stimulation (0.72% SID threonine), however, this was not further increased above what was determined for fibre and immune stimulation alone. The exact mechanism behind the interaction of fibre and immune challenge is unknown but may be indicative of a protective effect of fibre. Interestingly, stimulation of the immune system resulted in an increase in the variability of pig response to dietary threonine content, highlighting the difficulty in determining nutrient requirements and development of feeding programs during disease challenge.

Conclusions

This study was the first to confirm an increased threonine requirement during immune challenge in pigs and also the first to determine the interactive effects of both fibre and immune stimulation. This information will be important for the development of feeding programs that decrease feed costs and maintain animal performance while reducing reliance on antibiotics.

(Greetings from PSC.. continued from page 1)

as possible and that PSC stays in tune with the industry challenges of both today and tomorrow. The real key to our success though is the quality of the researchers and staff at PSC who are very passionate about what they do and the service they provide to the swine industry. I am enjoying working with them again to continue this tradition. Prairie Swine Centre will continue to provide practical, relevant nutrition, engineering and ethology research results to the swine industry and we are actively evaluating other areas where we could make significant contributions.

> "The position of CEO will enable me to further my interests in bringing science to agriculture, further strengthen our relationships with the pork industry and other researchers, and develop new relationships and collaborations in order to add to the long, successful history of Prairie Swine Centre's service to the pork industry"

I look forward to renewing old acquaintances and creating new ones at various events and meetings throughout the next year, or I can be reached at the Centre at either murray.pettitt@usask.ca or (306) 667-7440.

I would like to thank Lee Whittington, Prairie Swine Centre's previous CEO for the last 10 years, for his service to our organization over the last 26 years and wish him all the success in his future endeavors.

It's nice to be home.

Murray Pettitt, PhD

Acknowledgements

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Farrowing Systems
Auditing Best Management Practices - Part 5

Ken Engele,
Prairie Swine Centre

In 2017, on-farm best management practices were audited on a total of 24 farms throughout Canada as part of a national project titled From Innovation to Adoption: On-farm Demonstration of Swine Research. This article is part of an eight-part series reporting on these audits.

The most critical period in the life cycle of a pig is from birth to weaning. What we do in farrowing not only has a direct and immediate impact on piglets and their subsequent performance, but also impacts future breeding herd performance. Attention to detail quite often pays huge dividends in farrowing. When analyzing the data from the 21 audited farrowing barns across Canada, we can see that Canadian pork producers are doing an outstanding job when it comes to implementing best management practices in farrowing.

Weaning age

Results in Table 1 indicate that all of the audited farms incorporated a 3 to 4-week weaning period. Research has shown that nursery exit weights are similar regardless if piglets were weaned at 3 vs or 4 weeks of age[1].

Heat Source

Choosing the appropriate heat source is an important step in ensuring piglet survival. As seen in Figure 1, heat lamps and heat pads are utilized at a rate of 90% and 70% respectively, with a little under two-thirds of participating producers incorporating both lamps and pads. In this situation, heat lamps are typically utilized for the first number of days just after farrowing for maximum piglet benefit. After this introduction period, heat pads would be the only heat source available in order to keep utility costs in check.

Euthanasia

As presented in Figure 2, the most common method of euthanasia is blunt force trauma, followed by the Zephyr, which is a non-penetrating captive bolt. Approximately three-quarters of the farms audited received a 'partial compliance' score, strictly due to the fact that blunt force trauma and CO_2 inhalation are ranked as 'conditional methods' within the 2014 Code of Practice (page 61, Appendix N – Methods of Euthanasia).[2]

Creep Feeding

According to the data in Table 1, approximately 90% of farms audited utilize some type of creep feeding strategy during farrowing. Most producers generally implement creep feeding 5-7 days prior to the anticipated weaning date. Research has shown the provision of creep feed in the farrowing room did not affect piglet body-weight at weaning, regardless of weaning age (3 or 4-week weaning). However, the provision of creep feed in the farrowing room did improve performance in the nursery for piglets that actually consumed creep feed. The challenge is that only 4 to 40% of pigs consume it.[3]

> "Provision of creep feed in the farrowing room did not affect piglet body-weight at weaning, regardless of weaning age."

The manner in which creep feed is presented to attract piglets could be improved as a whole (Figure 3). Research has shown that piglets are observed at a significantly higher frequency at the tray feeder compared to the standard feeder. In addition, this different presentation of creep feed appeared to numerically increase the percentage of piglets per litter showing evidence of creep feed consumption.[3]

Conclusion

Overall, pork producers are doing a good job of staying on top of those key management issues that ensure optimal performance is achieved within the farrowing unit. Attention to detail is critical, especially in farrowing as it can have subsequent impacts in other areas of production.

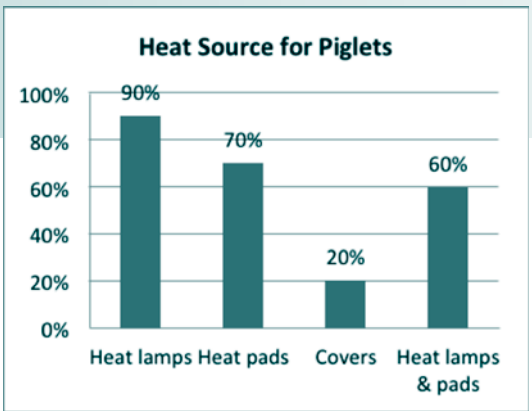

Figure 1. Heat source for piglets in farrowing rooms

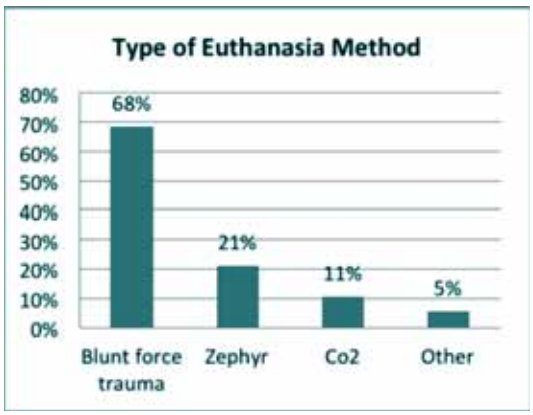

Figure 2. Type of Euthanasia method implemented on-farm

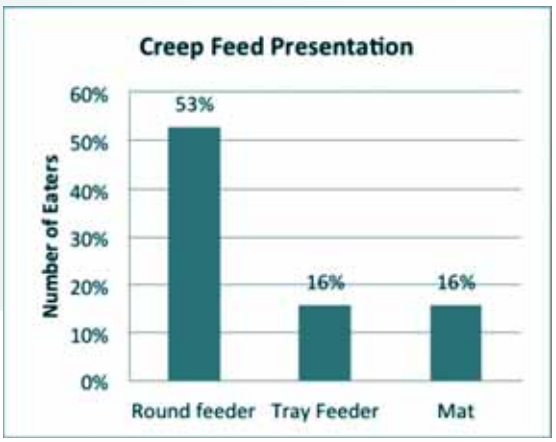

Figure 3. Type of Creep Feed Presentation

For Further Reading

1 Creep Feeding in the Farrowing Room: Do the Outcomes Depend on Weaning Age?
(English) http://www.prairieswine.com/creep-feeding-in-the-farrowing-room-do-the-outcomes-depend-on-weaning-age/

2 Code of practice for care and handling of pigs
(Français) http://www.nfacc.ca/pdfs/codes/porcs_code_de_pratiques.pdf
(English) http://www.nfacc.ca/pdfs/codes/pig_code_of_practice.pdf

3 Increasing Creep Feed Intake by Stimulating Exploratory Behaviour using Enrichment
(English) http://www.prairieswine.com/getting-more-piglets-interested-in-creep-feed/

4 Castration and tail docking of piglets
(Français) http://www.cdpq.ca/getattachment/Recherche-et-developpement/Projets-de-recherche/Projet-222/PQ-Decembre-2016-Bien-etre.pdf.aspx

Table 1. Audit results for 21 farrowing facilities

Category	Average Percentage of Farms		
Weaning age (weeks) It is recommended to wean piglets at 19 days of age or more.	100 %	0 %	0 %
Additional heat source, piglets It is recommended to install heat pads and covers for piglets in the farrowing crate.	71 %	29 %	0 %
Pain control used in piglets4 The use of analgesics is mandatory for castration and tail docking.	76 %	10 %	14 %
Euthanasia method used Pig must be rendered immediately insensible - must not return to sensibility prior to death.	24 %	76 %	0 %
Pen dimensions Pen dimensions of 6′ x 8′ receive a compliant rating, and 5′ x 7′ receive a partial compliance rating.	43 %	57 %	0 %
Feeder dimensions It is recommended that feeders in farrowing crates be more than 12 inches wide.	90 %	10 %	0 %
Creep feeding used The use of creep feed is recommended.	89 %	11 %	0%

Legend : Meets recommendation | Partially meets recommendation | Does not meet recommendation

Mitigation of accelerated deterioration of pig buildings

B. Predicala[1,2,] J. Cabahug[1,2,] A. Alvarado[1], R. Baah[1]

1 Prairie Swine Centre Inc

2 Department of Chemical and Biological Engineering, College of Engineering, University of Saskatchewan

When we look across the Canadian pork industry it becomes apparent that due to the age of most facilities a large percentage will need to be replaced or renovated over the next few years - as most buildings average between 20-30 years old. The majority of production units are completely enclosed utilizing a negative pressure ventilation system to maintain pig comfort. In order to reduce heating costs during winter months ventilation is generally turned down to a minimum ventilation rate. The combination of minimum ventilation and, in some areas high winds, causes exhaust air to recirculate within the facility leading to poor air quality. This in turn increases deterioration due to increased exposure to moisture and corrosive gases. This project set out to determine Canadian specific strategies for decreasing the current pace of barn deterioration.

With the overall focus of this project being to combat the rate of deterioration of swine facilities the first step was to conduct a critical literature review was under taken that identified solutions that were applicable to Canadian conditions. The second phase of the project included a survey of various stakeholder groups across Canada. The survey included producers, builders, material and equipment suppliers and academic and research and development organizations. The survey revealed that approximately 60% of producers struggle with rapid deterioration. Specifically, the structural components that they had issues with were: roofing (50% of the respondents); penning/ stalls (50%); exterior walls (40%); ceilings, trusses and/ or attic, and feeding and drinking system (30%). No significant issues with accelerated deterioration have been identified in partition walls between two rooms, manure and drainage system, and barn foundations.

Table 1. Summary of responses from producers, builders and equipment supplier on current status of pig barns in terms of barn degradation and their recommendations to mitigate them.

Structural components	Issues encountered (% of respondents reporting the issue)	Mitigation strategies
1. Roofing	- corrosion/rusting (100%)	- use of a thicker gauge of tin - better screws - application of paint on both sides of tin - modification of ventilation system so that barn air does not get in contact with the roof
2. Penning/stalls	- corrosion/rusting (86%) - cracks (29%)	- stronger support, use of heavier anchors (1/2" rather than 3/8") - use of solid rod; avoid welds in wet areas - use of stainless steel for first 6" of post or anything that has contact with manure or the floor - use of plastic (if not costly) instead of concrete or steel
3. Exterior walls	- corrosion/rusting (100%)	- plastic walls filled with concrete - thicker tin - concrete construction - better exhaust fans; proper ventilation
4. Ceiling	- corrosion/rusting (60%)	- use of screws, not nails - application of paint - use of plastic or fiberglass products
5. Trusses	- corrosion/rusting (80%) - moisture decay (60%)	- installation of ridge ventilation - use of galvanized or stainless steel, protective coatings and insulation - better ventilation to avoid back drafting
6. Feeding and drinking system	- corrosion/rusting (40%) - cracks (40%) - thicker PVC for drinking system	- use of steel feeders - use of plastics above pig level and steel at pig level - all intake hoppers and drive units should be stainless steel

Results:

Table 1 summarizes the issues encountered by producers and builders related to barn deterioration and their recommendations for mitigation. The most common issue was corrosion/ rusting of barn roof, penning/ stalls, exterior walls, ceiling, trusses, and feeding and drinking system. Some respondents have pointed out issues related to moisture decay in trusses, and cracks in penning/stalls, and feeding and drinking system.

(Mitigation ... cont'd on page 8)

Enrichment for sows: increasing positive behavior

Jennifer Brown PhD
Prairie Swine Centre

There is no denying that enrichment for pigs has been slow to catch on with pork producers. Besides the cost of materials and the time needed to install, clean or repair enrichments, producers may ask, "what's the big deal about 'pig toys'?" However, there is now an impressive amount of research showing the benefits of providing enrichment in to pigs, from reduced aggression, to fewer damaging behaviors, and increased growth.

On Canadian farms, interest in enrichment has grown recently due to changes in the Code of Practice requirements, stating that 'Pigs must be provided with multiple forms of enrichment… to improve the welfare of the animals through the enhancement of their physical and social environments.' This change, along with increasing adoption of group housing for sows led a team of Canadian researchers, directed by Dr. Laurie Connor at the University of Manitoba, to study how best to provide enrichment to sows in groups.

Most studies on enrichment have looked at grow-finish pigs because this is the stage when most damaging behaviours appear, such as tail biting or flank sucking, and the effects can be devastating. A few studies have been done on sows, with the general conclusion that feeding fibrous materials such as straw or hay is best: pigs are highly attracted to items that are both manipulable and consumable, and for feed-restricted sows the increase in gut fill is an added bonus.

On European farms, producers are required to provide 300g (about half a pound) of fibre per sow per day. But North American producers are reluctant to provide straw, largely due to biosecurity concerns and the potential for straw to clog liquid manure systems. Studies in Canada have therefore focused on object enrichments that could be provided in slatted or partially slatted pens.

Between 2014 and 2017, three studies were done to evaluate sows' interest in a variety of enrichments, including wood suspended on chains, cotton rope, loose straw and a dispenser for chopped hay. The enrichments were tested on two research farms, one with free-access stall housing and one with ESF. The way that the items were presented also varied- for example, comparing provision of one constant enrichment to a rotation of three enrichments, or varying the number provided at once from one to three enrichments per group of 28 sows.

> "The benefits of providing enrichment range from reduced aggression to increased growth."

While sows interacted with all of the enrichments, not surprisingly, loose straw (placed on a solid floor) was the most preferred. Not only was the straw consumable, it spread out over a larger area, allowing more animals to interact with it at the same time, compared to hanging enrichments. Between the object enrichments, rope was slightly preferred over wood enrichment. Rotating multiple enrichments resulted in more sow interaction than provision of a single enrichment, confirming that sows appreciate a degree of novelty in their daily routine.

The researchers hypothesized that dominant sows in a group may obtain greater access to enrichment than subordinates, so the impact of sows' social status on enrichment use and stress physiology was observed.

In both free-access stalls and ESF housing systems, dominant and subordinate sows used the enrichments equally. However, in the ESF barn, subordinate sows had higher cortisol levels than dominants, suggesting greater social stress in the ESF system. Sows in the ESF barn also used the enrichments about three times more frequently than those in free-access pens. Because the two barns had different management and genetics it is impossible to know what caused this difference. Sows in ESF are generally more active, but genetic differences cannot be ruled out and should be studied.

(Enrichments for sows ... cont'd on page 11)

(Mitigation ... cont'd from page 6)

Mitigation Strategies

Among the solutions to improve the building life span such as surface treatments, new material, ventilation system, control and maintenance (guide information), the latest has been pointed out by the participants as the least expensive one and the easiest to adopt by producers. However, few consider maintenance improvement as the best option to improve building life span. If the cost would not be considered as a decision parameter, new building material and ventilation system improvement should be the priorities. For producers, when the cost of the technology is not considered, an adequate ventilation system, sufficient insulation and high durability wall materials are the most attractive solutions to improve building life span.

Conclusion:

When considering all the potential strategies to mitigate building deterioration, it was apparent that considering appropriate ventilation, environmental control and air treatments, improvement of corrosion protection efficiency of building materials, and adequate building maintenance would have the greatest impact within Canadian swine facilities. These strategies still need to be evaluated in a barn to determine their full potential in increasing the lifespan of Canadian swine facilities.

Table 2. Summary list of potential solutions to rapid barn deterioration and their applicability to Canadian swine barns based on literature review and survey.

Category/Potential Solution	Description	Applicability
A. Building Design		
1. Wood		
Durable design	- use of timber with bigger dimensions,well-seasoned and with good detailing	Applicable
2. Metal		
Durable design	- rigid or batt insulation (e.g. 4-6 mil polyethylene) plus vapour barrier especially on truss assembly - appropriate design gap between insulation and wall or ceiling for moisture drying in the event of penetration - good vapour barrier on areas in close proximity to fasteners	Applicable
3. Ventilation (in general)	- use of stacks or discharge tubes to release exhaust air away from the animal building - extension of insulation and vapour barrier from inside the building to underside of vented overhangs - chimneys installed intermittently between trusses for ridge ventilation - separate ventilation for barn interior and the attic	Applicable; extent of current application in Canadian swine/ livestock buildings not confirmed
B. Building Material Selection and Treatments		
1. Wood	- use of naturally durable wood	
Chemical preservation	- oil-based preservatives (Creosote oil) - fixed water soluble preservatives - organic solvent preservatives	Applicable
Impregnation of wood with polymers	- improve the physical and mechanical properties of low grade wood species - use of copolymer derived from allyl alcohol and methyl methacrylate (optimum compatibility and compressive strength perpendicular to fiber increased by approximately 100 times while water absorption was reduced by 50%; biodegradation did not occur)	Applicable; Further investigation of effectiveness against deterioration needed
Bio-control	- wood treated with urea and ureolytic bacteria (Proteus sp. and Bacillus sp.) - combination of Proteus sp. and Trichoderma viride to inhibit growth and kill fungi	Further investigation of effectiveness needed
Titanium dioxide nanoparticles	- used to prevent fungal Hypocrea lixii (white-rot) and Mucor circinelloides (brown-rot)) growth in wood - applied on surfaces by spraying or simple brushing	Further investigation of applicability/ feasibility for use in livestock buildings needed

Category/Potential Solution	Description	Applicability
2. Metal		
Stainless steel	- known resistance to dry corrosion (oxidation) and attack of acidic condensates	Applicable
G90 hot-dip galvanized (G90 HDG)	- treated with zinc phosphate - recommended by U.S Steel for metal connectors in animal housing, G90 zinc coating are typically used in Canada (G60 for US)	Applicable
G90 hot-dip galvanized (G90 HDG)	- treated with zinc phosphate - recommended by U.S Steel for metal connectors in animal housing, G90 zinc coating are typically used in Canada (G60 for US)	Applicable
Duplex System	- e.g. G90 Duplex = G90 connector + paint and G185 Duplex = G185 connector + paint - G90 duplex or G185 connectors with vapour barrier and separate ventilation for attic space is recommended in animal buildings	Applicable
Avoidance of galvanic corrosion	- e.g. using stainless steel nails for stainless steel hangers and galvanized nails for galvanized hangers	Applicable
Use of other materials such as ceramic materials and polymers		Applicable
Galvanizing	- zinc layer application on steel and iron structures	Applicable
Coatings	- epoxy coating that is lead and chromate-free recommended for metal truss plates	Applicable
Repair of corrosion	- attacked metals - cleaning as a de-rusting method remains the advised method over use of rust converters	Applicable
3. Concrete		
Concrete mix composition	- use of sulphate-resistant binder-like type 50 Portland cement (equivalent to CEM IIIB concrete based on CSA A3000, 1998) as most effective among 8 concrete treatments - use of other supplementary cementing materials such as slag, fly ash and silica fume to minimize tricalcium aluminate (C3A) content of concrete mix - use of additives for concrete top layers (e.g. product "S" based on ground tuff) to increase life of concrete compared to regular sand-cement mix for top layer of animal housing flooring - also applies for protection of steel reinforcements	Applicable; feasibility and cost analysis needed for application in livestock buildings
C. Building Management/Production Practices		
Interior cleanliness and maintenance	- proper cleaning and disinfection; high pressure washing and use of cleaners to effectively remove aggressive residues and manure on surfaces - periodic inspection for leaks through vapour barriers and corrosion on connectors and fasteners - removal of corrosive agents from the attic and additional protective coatings must be provided to connectors	Applicable
Feeding method	- wet feeding method can make the degradation problem on barn floors worse - greater feeder-drinker distance to minimize lactic and acetic acid attack on concrete by the feed-water mix	Applicable
Others	- putting concrete or brick bin underneath nipple drinkers - protection of concrete floor itself by fibre cement-board, metal plate, rubber sheet, or a top layer "product S"	Applicable

Nursery Facilities
Auditing Best Management Practices - Part 6

Ken Engele,
Prairie Swine Centre

In 2017, on-farm best management practices were audited on a total of 24 farms throughout Canada as part of a national project titled From Innovation to Adoption: On-farm Demonstration of Swine Research. This article is part of an eight-part series reporting on these audits.

The requirements and management of weaned pigs seem quite simple on the surface. Providing a good environment that is dry and free of drafts, provides fresh air, has an appropriate quality and quantity of water and feed available are all important components to ensure optimal nursery performance. While it sounds easy, meeting these basic requirements may prove to be difficult in production facilities.

The results of the audits completed in 18 nursery facilities indicate that pork producers are overall doing a relatively good job ensuing that best management practices are adopted in their facilities. However, one potential area of improvement is in the adoption of enrichment.

Enrichment

Based on audit data, enrichment in the nursery is one area that requires additional attention of pork producers. As showed in Table 1, data suggests that only 11 % of farms audited currently incorporate enrichment into nursery facilities, with chains being the most common form of enrichment. According to the Code of Practice for the Care and Handling of Pigs (2014)[1], pigs must be provided with multiple forms of enrichment that aim to improve the welfare of the animals through the enhancement of their physical and social environments. The incorporation of enrichment into individual facilities is unique to each operation. Support tools regarding enrichment materials are available, which groups the types of enrichment into categories and outlines the advantages and disadvantages of each type.[2]

Length and Group Size in Nursery

It was found that the type, size, and age of nursery facilities varied across provinces. As seen in Figure 1, approximately 90 % of nursery facilities ranged between 5-7 weeks regardless of the size of operation. Figure 2 provides a cross section related to group size across facilities. While a high degree of similarity can be found in the number of weeks that pigs stay in the nursery, the same cannot be said about group size. Overall, there is a trend towards smaller group sizes (less than 50 pigs/pen), however the data indicates that some producers are comfortable with larger groups, as approximately one-third of producers use groups larger than 50 pigs/pen.

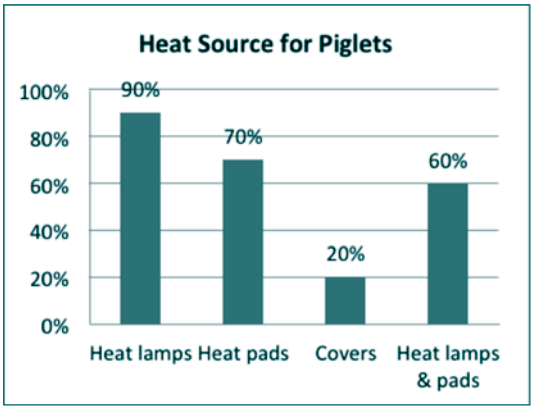

Figure 1. Average length (weeks) of nursery production

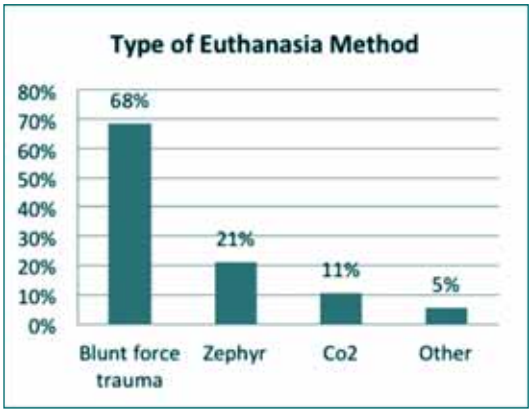

Figure 2. Average groups size of nursery pens

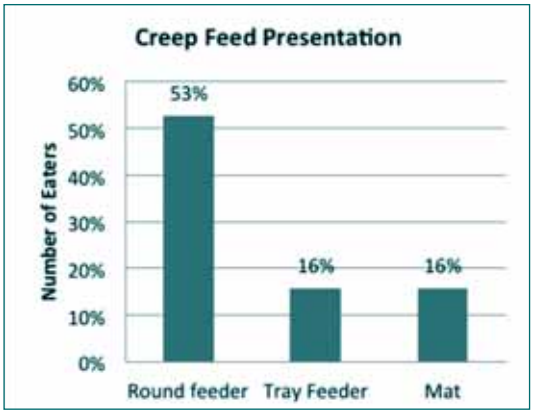

Figure 2. Average groups size of nursery pens

Table 1. Audit results for 18 Nursery facilities

Category	Average Percentage of Farms		
Enrichment used Pigs must be provided with multiple forms of enrichment	11 %	89 %	0 %
Euthanasia method used Pig must be rendered immediately insensible - must not return to sensibility prior to death.	72 %	28 %	0 %
How often are pens walked? It is recommended that pens be walked on a daily basis.	78 %	22 %	0 %
Feeder type It is recommended that dry feeders be used[3].	75 %	25 %	0 %

Legend

Meets recommendation

Partially meets recommendation

Does not meet recommendation

Euthanasia

As presented in Figure 3, the most common method of euthanasia within the nursery is a blitz/bolt gun, as a little more than half of participants reported using this method. Blunt force trauma and the Zephyr represent a little more than a third of euthanasia methods used, specifically for pigs less than 10 kg in weight. Approximately one-quarter of the audited farms received a 'partial compliance' score, strictly due to the fact that blunt force trauma and electricity are ranked as 'conditional methods' within the 2014 Code of Practice for the Care and Handling of Pigs (page 61, Appendix N – Methods of Euthanasia).[1] According to this Code of Practice, for any method of euthanasia to be considered acceptable, it' must render the animal immediately insensible and the animal must not return to sensibility prior to death.'

Conclusion

Overall, producers are doing an excellent job ensuring that best management practices are successfully incorporated in nursery facilities. However, one area that could use improvement would be an increased use of enrichment. The incorporation of enrichment can be done quickly with relatively little cost. The Code outlines the 6 "Ss" of successfully implementing enrichment to help producers choose which type is the best fit for their operation.

For Further Reading

1 Code of practice for care and handling of pigs
(English) http://www.nfacc.ca/pdfs/codes/pig_code_of_practice.pdf
(Français) http://www.nfacc.ca/pdfs/codes/porcs_code_de_pratiques.pdf

2 Enriching the living space of pigs to comply with the Code
(English) http://www.cdpq.ca/getmedia/cefa398c-ba4d-46c8-a1a0-ad5c04574e1c/Fiche-enrichissement-version-anglaise.pdf.aspx
(Français) http://www.cdpq.ca/publications-et-documents/publications-techniques-et-scientifiques/enrichir-l-espace-de-vie-des-porcs-pour-respecter.aspx?lang=en-CA

3 Dry and wet-dry feeders in the nursery, a comparison on the effects on piglets' performance
(Français) http://www.cdpq.ca/getattachment/0060bf59-5420-4 1f4-9a93-58a3d74d4ad7/TREMIES-ABREUVOIRS-ET-TREMIES-SECHES-EN-POUPONNIER.aspx

(Enrichments for sows ... cont'd from page 7)

In the third study, chopped hay was provided in small hoppers in the free-access pens, and was compared to wood enrichments. Again, the use of fibre attracted more sows, but because it was held in a small hopper only a few sows could access it at once. This study found that dominant sows had more access to the hay feeders than subordinates. Higher lesion scores were also observed when chopped hay was given, indicating that aggression can increase when sows are competing for a more desirable enrichment, so providing adequate levels of enrichment is important.

Overall these studies underscore why diffuse and consumable enrichments like straw are both attractive and effective for sows. Providing a number of enrichments and dispersing them throughout the pen will help to reduce any negative effects of social status. Researchers will continue to explore the potential benefits of various fibre sources, and to look for practical enrichments that promote sow interaction while posing minimal risk to biosecurity or liquid manure systems.

Following the trials, multiple farms with group sow housing participated in an extension study. Producers were used to seeing sows lying quietly for most of the day, and were surprised to see the sows' strong attraction to enrichments. Most of all they enjoyed watching the sows interacting with enrichments. So, while the production benefits of providing enrichment to sows may be hard to measure, the satisfaction of seeing sows busy and interacting in a positive way is ample reward for some.

Personal Profiles

Lucas Rodrigues

After obtaining his BSc degree in Veterinary Medicine in 2013 from the Federal University of Minas Gerais in Brazil, Lucas was appointed at the Department of Animal Science as an MSc scholar, supervised by Professors Dalton Fontes and Fernanda Almeida. His MSc studies focused on the effects of immunization against GnRF on heavy weight finishing gilts. During this time, Lucas was the recipient of a CAPES scholarship. In March 2016, he was hired as a Swine Nutritionist for Vaccinar Ltda., located in Brazil, and starting in June 2017, was appointed as a Technical Advisor for the west region of Paraná state, one of main pork producing regions in Brazil. Since 2016, Lucas has been continuously involved with the development of new products, diet formulation, feed mills consulting, feedstock reports and conduct of field trials. Lucas will be working on his PhD program in swine nutrition at the Prairie Swine Centre and University of Saskatchewan under the mentorship of Dr. Dan Columbus. His project will be examining the effectiveness of functional amino acids for maintaining animal health and performance. Funding for this research will be provided by Swine Innovation Porc and Evonik Nutrition & Care GmbH. Lucas has also been awarded a Saskatchewan Innovation & Opportunity Scholarship in his first year of studies.

Hydrogen Sulphide AWARENESS TRAINING

Prairie Swine Centre has developed an on-line course for individuals involved in the hog industry to take from the convenience of their staff room.

The on-line course takes you through six Modules covering the areas of: Properties, Exposure limits, Hazardous locations, Videos, Case studies and dealing with emergencies.

For more information please contact ken.engele@usask.ca

Coming Events

Saskatchewan Pork Expo
November 14-15, 2018
Saskatoon, Saskatchewan

Prairie Livestock Expo
December 12, 2018
Winnipeg, Manitoba

Banff Pork Seminar
January 9-10, 2019
Banff, Alberta

Manitoba Swine Seminar
February 6-7, 2019
Winnipeg, Manitoba

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