

Environment Website: Valuable Information Source

Ken Engele, BSA, P. Ag

Intensive livestock production and the hog industry are gaining increased media attention throughout Canada. Concerns of water (ground and surface) contamination and repugnant odours are two of the most widely expressed concerns of opponents of intensive hog operations. What are these concerns based on? Where can anyone with a vested interest (private or public) go to find an unbiased source of information regarding the hog industry and its interaction with the environment?

One source is the Environmental Issues Resource Centre (EIRC). A website managed by the Prairie Swine Centre Inc. and funded through HEMS (The Hog Environmental Management Strategy) and the Ontario, Manitoba, Saskatchewan and Alberta Pork Boards.

It was originally developed to serve as a resource to pork producers and local municipalities faced with revising local bylaws impacting location and operation of production facilities.

The EIRC consists of 14 chapters and approximately 650 articles on issues related to pork production. Chapters cover the areas of: Legislation and Regulation, Siting, Odours, Gas Emissions, Manure Management, Nutrient Management, Soils, Water, Dust in Livestock Buildings, Human Health, Sociology, Noise, Traffic and Dead Animal Management. The information contained within the EIRC explores the science of production and environment citing published materials from Canada, the United States and Europe.

What type of information will you find within the EIRC? Siting focuses on location of production units and their interaction with the environment in reducing nuisance (noise, odour) complaints and minimizing risks to water resources. Recent work (Adams,

Keeping In Touch

We have made a change in our phone numbers. Effective October 1 all our phone numbers starting with 477 will be changed to 667. (But our main phone line will remain 373-9922)



1999), set out to measure the distance of odour plumes generated from six large hog operations in southern Manitoba, and the impact various weather conditions (wind direction, velocity, temperature, humidity) and time of year had on the distribution of the plume. In addition, it provides useful information in locating future facilities; provides evidence to refute unsubstantiated odour complaints; and evaluates various odour control technologies.

Continued on page 2

In This Edition

Profile Of Stephanie Hayne 2

Nutrition Research Program 3

Management Training
 Fall Launch of Courses 5

PSC Elstow
 Research Farm Staff 6

Program funding provided by





Graduate Student Profile

Stephanie Hayne was born and raised in Halifax, Nova Scotia. She received a Bachelor of Science and Bachelor of Arts degree from Saint Francis Xavier University in Antigonish,



Stephanie Hayne

Nova Scotia. She has always had a keen interest in animal behaviour and welfare that was reflected by her working at an animal hospital for many summers, and deciding to pursue a career in research. Stephanie received a Master of Science in Agriculture degree from the Nova Scotia Agricultural College/ Dalhousie University in Truro, Nova Scotia. Her Master's thesis was entitled, "The responses of growing pigs exposed to cold in different housing conditions". She studied the behaviour and performance of pigs exposed to cold with varying amounts of straw bedding. Four straw bedding treatments were studied. Pigs with the least straw could compensate behaviourally when the effective environmental temperature did not drop below the lower critical temperature. Overall, pigs with the least straw grew less than pigs with the three greater amounts of straw.


Stephanie is currently working towards a Ph.D., under the guidance of Dr. Harold Gonyou, at the Prairie Swine Centre/ University of Saskatchewan.

Behavioural diversity within groups of juvenile pigs

For her Ph.D. research, Stephanie is studying the effect a change in the social environment has on individual behavioural characteristics and productivity. The social environment is a major component of the environmental influence affecting an animal's behaviour. Changing the social environment, as when pigs are mixed into groups of uniform weight, is expected to alter certain behavioural characteristics. Currently, there is little information on the effect a change in the social environment has on behaviour. Some research has focused on determining if certain behavioural characteristics are related to productivity. For example, some pigs have been shown to be more active than other pigs, some have shown different reactions to restraint and this has been related to differences in productivity. There have been attempts to re-group pigs based on individual behavioural characteristics which have been shown to affect their growth. Therefore, studying individual behavioural characteristics is important for commercial production and

understanding animal behaviour.

The first component of this study has been completed. The general activity and social behaviour of nine litters of pigs were recorded from birth to 18 weeks. The pigs were scored for injuries, weighed and feed consumption determined every two weeks. During the first and third week in the nursery (where the litters remained intact), the pigs were subjected to a series of behavioural tests. The tests included responses to: restraint, novel object, novel person, human approach and handling. For example, in the restraint test, pigs were held on their backs in a V-shaped trough for 60 seconds and the degree of struggling was scored. Four litters were mixed and five remained intact when the pigs were moved to grow-finish. The behavioural tests were repeated during weeks 4 and 9 of grow-finish. The data is in the process of being summarized and analyzed.

From this work, we will determine which behavioural variables are correlated and if mixing pigs caused a change in behaviour. The results of this experiment will determine the methods of the next experiment, which may include modifying the behavioural tests and studying the effect of different re-grouping strategies on individual behavioural characteristics and performance. 

Environmental Website: Valuable Information Source


Continued From Page 1

Manure management explores some of the in-barn management, storage, manure application and treatment methods that help intensive hog operations to remain environmental stewards of the land. Preliminary results conducted at the Prairie Agricultural Machinery Institute (PAMI), found manure to provide a tremendous yield increase in forages. Three application rates of 3,300 gal/acre, 6,600 gal/acre

and 13,200 gal/acre were tested, and applications had enough residual carry-over from year one to produce higher yields in year two relative to the control plots. Yields were two to four times higher when compared to control plots, with the greatest yield increase found in the crested wheatgrass.

These are just a few of the interesting articles found in the EIRC. Other literature within the EIRC consists of scientific research papers, reference text, conference proceedings, fact sheets and industry journals.

The Bottom Line

Each chapter is fully referenced making it a valuable tool for researchers, pork producers, policy makers, industry representatives and the general public. The complete publication is approximately 130 pages long available in paper format (English and French) as well as at <http://adminsrv.usask.ca/psci>. Anyone requiring further information or specific articles found in the EIRC can contact Ken Engele at 306-477-1839, or by e-mail engelek@sask.usask.ca 

Nutrition Research Program

Ruurd T. Zijlstra, Ph.D. and John F. Patience, Ph.D.

At the Prairie Swine Centre, the nutrition research program, along with ethology and engineering, seek to ensure the economic competitiveness and sustainability of our industry. The nutrition research program has three primary objectives: (1) to increase net income of pork producers, (2) to optimize use of locally available feed ingredients, and (3) to evaluate or develop procedures that will ensure continued environmental sustainability.

Improved Net Income

To increase net income, the main focus has been on ensuring that the feeding program can be matched to overall farm objectives. Overfeeding nutrients wastes money and underfeeding impairs performance; this may sound obvious, but increasingly, producers are focusing more attention on what previously was (wrongly) taken for granted. With declining margins for producers, we can no longer afford feeding excessive "safety margins" just as we cannot afford sub-optimal performance. In the last few years, our research focus has been on defining requirements for essential amino acids such as lysine, tryptophan, and threonine.

Amino acid requirements can be defined using a factorial approach, which allows easy application of the research results to a specific pork farm. Thus, the feeding program can be tailored to the genetics, feed intake, economic circumstances, etc., which exist on that farm. Amino acid requirements are expressed in grams per day or grams per kcal of DE and include components for both maintenance and growth (or lactation or conceptus growth in the case of sows).

Presently, research is underway to describe the impact of energy intake on

protein deposition, because energy is the main driver of growth. We are increasingly concerned that excessive attention paid to amino acid requirements, while ignoring the role of energy, is resulting in disappointing performance. Clearly, both amino acids and energy must be considered in developing a practical, effective feeding program.

A more recent focus of our research is variability. While there is much discussion on

uniformity, there is very little knowledge of the factors affecting uniformity, and whether or not decisions made by pork producers can have any impact. What is certain is that variability, for example in growth, is costing the pork industry millions of dollars, and improvements in uniformity at market would be welcomed by both producers and packers.

Optimize Use of Local Ingredients

While the Prairies are blessed with an increasing number of available ingredients, their use is not optimized by the pork industry. A better job needs to be done to characterize ingredients properly, i.e. according to nutrient composition that is important to pigs. One key issue is variability in nutrient content. Generally, ingredients available on the Prairies have a range in nutrient content of 15 to 20%. Our main focus has been digestible energy (DE) content, because with least-cost diet formulation, the greatest pressure is against available energy.

The objective of our ingredient

research is to identify chemical or physical properties that are related to changes in nutrient content, which can then be used to develop equations to predict actual nutrient content. For example, ADF can be used to predict changes in DE content of barley with an accuracy of 85%. In a collaborative research project (AAFC-PARC, CGC, CDC, AgroPacific Industries), near-

Overfeeding nutrients wastes money and underfeeding impairs performance; . . . producers are focusing more attention on what previously was (wrongly) taken for granted.

infrared reflectance spectroscopy (NIRS) could predict DE content of barley with greater than 90% accuracy. After initial calibration and implementation, NIRS technology will be adopted quickly because time-consuming chemical analyses are no longer required.

Processing of ingredients (e.g., enzyme supplementation) has been shown to improve energy digestibility in a manner that seems dependent on fibre content. We recently reported that responses to enzymes increases as the fibre fraction increases, meaning that supplemental enzymes that degrade fibre might be used to reduce variation in DE content among samples of barley.

Apart from differences in nutrient content, voluntary feed intake might also differ among samples of grains. In poultry, large differences in voluntary feed intake have been observed among wheat samples. We need to know if a similar situation exists in pigs.

Finally, collaborative research projects (PFRC, CDC) have focussed on ingredients that were specially processed or selected to increase nutrient content (e.g. dehulled wheat or oats). As the Prairie grains industry shifts to more local processing, such

Continued on page 4

Continued from page 3

by-products will become increasingly available.

Environmental Sustainability

To ensure that our industry remains environmentally sustainable, pork production must evolve with environment issues in mind. Thus, our research seeks to reduce nutrient excretion in the slurry, reduce gas emissions into the air and minimize total water usage.

Within nutrient management, nitrogen and phosphorus are currently most important. For nitrogen, matching



dietary amino acid supply to amino acid requirements is critical; in this respect, seeking to achieve environmental sustainability is completely consistent with minimizing feed costs, discussed in the first objective because nitrogen excretion into the slurry will be reduced. Nitrogen excretion can be further managed by excreting as much as possible in faeces as opposed to urine; this can be accomplished by including fermentable carbohydrates in the diet. However, the reduction of nitrogen excretion should occur without impairing protein deposition.

Changes in nitrogen excretion patterns in gas emissions from a barn are being studied in collaborative research with Dr. Stéphane Lemay, Research Scientist - Engineering. The reduction in urinary nitrogen through changes in diet reduces ammonia emission directly; further reductions can be achieved by


controlling the barn environment. Apart from gas emissions, odour emissions can also be reduced, in part, by changing diet composition.

Phosphorus requirements must be defined using the factorial approach, rather than the current percent of the diet, as this ensures that adequate but not excessive phosphorus is supplied to the pig. In addition, phosphorus digestibility needs to be improved by making phytate more

digestible. This can be accomplished by using supplemental phytase or other processing.

Water usage is being studied in collaborative nutrition-ethology-engineering research. Various studies are looking at the impact of diet composition on water intake, the effect of drinker design on wastage, and modelling water movement through the barn.

The Bottom Line

The nutrition research program is focused on practical approaches to improving net income or enhancing sustainability of our industry. In many cases, to achieve success, collaboration is required with other disciplines within the Centre, or with other research institutions with complementary expertise. 

The facts are ...

- Knowing actual feed intake can have a significant impact on diet formulation. In a recent lactation study involving 418 sows, average daily feed intake (ADFI) exceeded expectation, averaging 6.8, 7.4 and 7.2 kg/day for parity 1, 2 and 3+, respectively. Pork producers should monitor lactation feed intake; with this information, your feed formulator can make adjustments to diet density and provide the most effective feeding program at the lowest cost.
- The methods for reducing excess nitrogen (N) in manure may be significantly different from strategies to reduce phosphorous (P) excretion. Particle size affects N excretion while the use of phytase (enzyme) lowered P excretion by up to 35%.
- Efficiency of utilization of energy in the gestating sow is probably better than previously believed. In this study the target net maternal body weight gains were 35, 30, 20, 10 and 0 kg for parities 1, 2, 3, 4 and 5+, respectively. Total gain of the fetus and reproductive tract was assumed to be 20 kg for all sows. The barley, wheat, soy diet was fed once a day in quantities estimated to meet the digestible energy (DE) needs of sows of various parities and weights. Our sows gained an average of 10.6 kg above target leading us to conclude that current estimates of energy efficiency and utilization in the sow are probably low. The efficiency of Energy utilization is very well understood for maternal gain, protein gain and fat gain separately, however the modeling aspect of predicting growth for each factor are not as well understood.

Management Training Fall Launch of Courses

Mary Petersen, B.Ed.

The Management Training Program will launch the upcoming season with course delivery beginning in October in both Saskatchewan and Alberta.

Olds College will again host the delivery of the Management Training Program in Alberta. Advanced Production Analysis instructed by Annet Poppe of Sheridan, Heuser, Provis of Winnipeg, MB will be delivered October 17 & 18. Annet is well known throughout the prairies and brings with her 11 years of experience. Advanced Production Analysis is a practical course, which works on the premise that good planning and consistent assessment of production is essential for


ensuring predictable performance and profitability. Participants work through exercises and group activities to understand the value of planning and pig flow calculations. Learning which parameters are useful indicators and learning how to monitor and assess the indicators is all part of the course, which Annet makes enjoyable. Anyone who has had Annet as an instructor before knows the quality work that she does.

The Saskatchewan delivery of courses will begin on October 24, with Tara

Jaboeuf delivering Reproduction Management. Tara is a Swine Specialist with Saskatchewan Pork Central. Reproduction Management will examine the importance of

Anyone who has had Annet as an instructor before knows the quality work that she does.

-- Mary Petersen, B.Ed.

understanding how reproductive processes are regulated naturally and how this knowledge can be used to manage reproduction and recognize reproductive disorders and problems. 

Delivery Schedule — Alberta

Date	Course
October 17 & 18	Advanced Production Analysis
November 28 & 29	Barn Environment Systems
December 12 & 13	Managing Human Resources
January 10	Managing Piglet Feeding
February 6 & 7	Herd Health
March 27	Grow-Finish Feeding
April 24 & 25	Being an Effective Manager
May 15 & 16	Environmental Management
June 12	Conflict Resolution

Delivery Schedule — Saskatchewan

Date	Course
October 24	Reproduction Management
November 28 & 29	Understanding Swine Behaviour
December 12 & 13	Herd Health
January 9 & 10	Issues in Agricultural Management (Hog Barn Safety and developing Positive Employee Relations)
February 13	Managing Piglet Feeding
March 20	Budgeting
April 17 & 18	Environmental Management
May 8	Conflict Resolution
June 19	Grow/Finish Feeding

You're Invited

The Prairie Swine Centre would like to invite producers to the launch of the upcoming training season.

The evening program will consist of a guest speaker, introduction to the Management Training Program and the opportunity to socialize with fellow producers.

Alberta producers should mark October 10th on their calendars, as the Prairie Swine Centre will be hosting the informational evening at Olds College from 7-10 pm.

Saskatchewan producers are invited to attend a informational evening at the Radisson Hotel in Saskatoon from 7 - 10 pm October 24.

PSC Elstow Research Farm Staff

Mary Petersen, B.Ed.



From left to right: Troy Donauer, Amy Keefe, Bob Morey, Nicole Enns, Cory Selby, Jackie Havard

The PSC Elstow Research Farm would like to take the opportunity to introduce the 7 staff members who are working with Farm Manager, Troy Donauer, at the new 600-sow hog barn. The new facility, which opened its door to new gilts on April 1, 2000, is at the final stages of reaching full capacity. The breeding, farrowing and nursery areas are operating at full capacity and the grow-out area is currently half full.

Amy Keefe is the research technician, who is responsible for the day-to-day operation of the research projects. Amy was raised on a farm near Weyburn, SK, and spent many hours helping in the family hog barn. She completed a BSA in Animal Science from the U of S. She has been with the PSC since March where she began her duties in the Floral barn as part of the production team. In June she started her duties as research technician at Elstow.


Cory Selby, a breeding and grow-out technician grew up on a mixed farm near Colonsay, SK. It was here that he was first introduced to raising hogs. Cory began his duties in May and is pleased to be working in the new Elstow barn.

Jackie Havard was born in England,

but calls Colonsay, SK her hometown. She is a close neighbor to the Elstow barn as she lives 2 miles away. She enjoys having a scant 5-minute drive to go to work. She started her duties at Elstow as a production staff member in the farrowing and nursery areas, in April after having spent a month in training at Floral.

Robert (Bob) Morey spent one year working as production staff at the Floral barn before moving to the Elstow barn as a breeding and grow-out technician. Bob comes with 6 years of hog experience. He lives just south of Saskatoon with his wife and three children.

Nicole Enns grew up on a farm near Nipawin, SK and received her Veterinary Technician diploma from SIAST Kelsey Campus in Saskatoon. Prior to working full-time at Estow, she completed her practicum at Floral and worked weekends. Nicole is working in the nursery, farrowing area.

Tim McVicar and Mitchel Moldenhauer are high school students from the Colonsay area who are working part-time at Elstow. They are doing grounds work and work with the production team inside the barn on weekends. 

Coming Events

Western Nutrition Conference
Winnipeg, Manitoba
September 28 & 29, 2000

PSC Director's Lecture
Saskatoon, Sask.
October 17, 2000

Swine Technology Workshop
Red Deer, Alberta
November 1 & 2, 2000

Sask Pork Symposium
Saskatoon, Sask.
November 14, 15 & 16, 2000

Sask Pork Semi-Annual Meeting
Saskatoon, Sask.
November 22, 2000

Hog & Poultry Days
Winnipeg Convention Centre
December 6 & 7, 2000

Alberta Pork Annual Meeting
December 6 & 7, 2000

Banff Seminar
Banff, Alberta
January 23 – 26, 2001

Manitoba Swine Seminar
International Inn
Winnipeg, Manitoba
January 31 & February 1, 2001

Focus on the Future Conference 2001
Red Deer, AB
February 20 & 21

Sask Pork Expo
Saskatoon, Sask.
February 27 & 28, 2001

Alberta Pork Congress
Red Deer, Alberta
March 14 – 17, 2001



Centred on Swine is a quarterly newsletter produced by Prairie Swine Centre Inc. (PSCI).

Reproduction in whole or in part is prohibited without express written permission by PSCI.

Subscription Rates (includes GST):

\$32.00/1 year
\$61.50/2 years

Please send your cheque or money order to:

Lee Whittington, Managing Editor
Prairie Swine Centre Inc. P.O. Box 21057,
2105 - 8th St. E. Saskatoon, SK S7H 5N9 Canada
Tel: (306) 477-PIGS (7447) Fax: (306) 955-2510