



Enhancing Profitability through Swine Innovation

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Prairie Swine Centre
on behalf of Swine Innovation Porc



Overview

- The organization
- Canadian Research and Development Swine Cluster (Growing Forward 1)
 - Research areas
 - Research projects
- Benefit to the Pork Industry




Who is Swine Innovation Porc?

- Swine Innovation Porc is the brand name of the *Canadian Swine Research and Development Cluster*
- Multi-year (2010-2013) \$12 million program – Growing Canadian Agri-Innovation Program
 - Agriculture and Agri-Food Canada
 - Additional financial support from private sector and provincial government organizations. 22 organizations contributing \$1.8 million

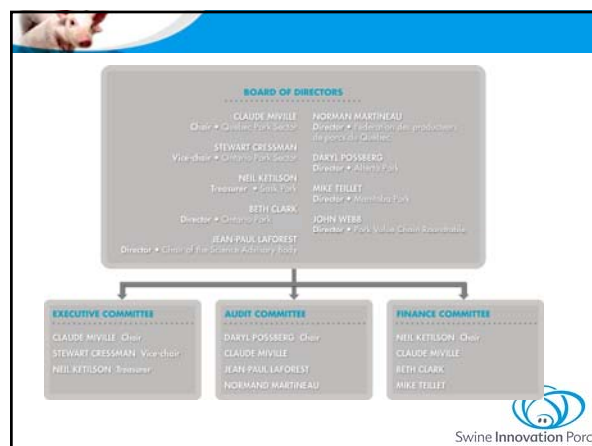


- Mandated by the Canadian Pork Council to support strategic planning for applied research and innovation in the pork industry.
 1. **Competitive environment**
 - Reducing cost of production
 2. **Market penetration**
 - Differentiation of products in key markets
 3. **Value chain**
 - Promote research that strengthens the integrity of the value chain
 4. **Innovation**
 - Organizational and scientific resources to permit innovation to flourish



Mission Statement

Swine Innovation is a corporation that is committed to facilitating **research**, **technology transfer**, and **commercialization** initiatives designed to enhance **profitability** and **differentiation** within the Canadian pork value chain


Research Program

- Consists of 14 research projects
 - 10 focus on increasing revenue, decreasing cost of production
 - 4 focus on product differentiation
- Collaboration is essential
 - 22 private partners, 100 researchers, 14 universities, 13 research centres (**16 Canadian organizations**)
- Technology transfer
 - Prairie Swine Centre & CDPQ




Areas of Focus

1. Food safety and microbial quality (1)
2. Animal welfare (4)
3. Environmental changes (1)
4. Equipment standardization (2)
5. Feed inputs and feeding (2)
6. Mycotoxins (2)
7. Genomics (2)




Animal Welfare

- Euthanasia Alternatives
- Most common method of euthanasia for pigs, up to 12lbs, is blunt force trauma
- Aesthetically not pleasing
- Proven to be effective and humane method of euthanasia




The Zephyr

- Explored development and effectiveness of a non-penetrating captive bolt (**Zephyr**) as a euthanasia alternative, for use in piglets up to 9 kgs, 20 lbs.




Tina Widowski,
University of Guelph




Zephyr - How Does it Work?


- Modified air gun incorporating a conically shaped head
- Depression depth of at least 9mm
- Powered through a air compressor
- Portable collapsible animal restraint



Zephyr – Producer Impact


- Effective and humane method of euthanasia in pigs up to 9kgs, 20lbs
 - Immediate insensibility and irreversible brain damage
- Advantages to blunt force trauma
 - Aesthetically acceptable
 - Effective for pigs up to 20lbs, blunt force trauma – 12lbs
- Bock Industries (Phone # 814-342-4385)
 - \$698/unit plus freight






Environmental Changes

- Improve acceptability of swine facilities by reducing their potential environment impact
- Project Objectives
 - Developing air cleaning technology to reduce the emissions & offensiveness of exhaust air (Bio-Trickling ATU)
 - Low capital and operating costs
 - Adaptable and easy to maintain
 - Reduce environmental impact of swine production




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Project Components

- Design of a air treatment unit (ATU) able to reduce gas, odour, and pathogen emissions from exhaust air (Lemay, Girard – IRDA)
- Evaluate effectiveness of ATU on a commercial facility (Predicala – Prairie Swine Centre)




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Bio-Trickling Air Treatment

- Exhaust air from ventilations fans in each room was passed through a biotrickling filter continuously
- Microorganisms transform pollutants into nontoxic and odourless compounds
- Booster fan was installed to account for increased airflow resistance




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Bio-Trickling Air Treatment





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Bio-Trickling Air Treatment Unit

- Video




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Bio-Trickling ATU – Producer Impact

- Bio-Trickling air treatment of exhaust air of grower-finishing rooms was effective in reducing:
 - Ammonia - 77%, Dust - 92%, Odour - 75%
- Higher the level of ammonia at the ATU inlet, resulted in a greater reduction in level of ammonia
- Water consumption tended to increase as it removed more contaminants (440-600 L/day)
- No impact on pig performance




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Equipment Standardization

- Addressing feeding management challenges
 - Nutrient requirements vary greatly within pigs in a group
 - Most feeding programs are based on feeding average, or most demanding pigs in a room.
 - Results in limiting performance (average) or feeding excess nutrients (most demanding)



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Precision Feeding System (PFS)

Focuses on feeding pigs individually with diets based on individual feed intake and growth patterns

- Meets individual nutrient requirements of individual pigs
- Maximizes growth potential of individual pigs
- Reduces over feeding of nutrients – lower output of nutrients excreted to the environment

Candido Pomar, Agriculture & Agri-Food Canada




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Precision Feeding System (PFS)





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Precision Feeding – Producer Impact

- Meeting individual nutrient requirements is expected to save a minimum of \$6/hog
- Beta sites will be established in 2013
- Demonstration site established in 2015
- Commercially available in 2018




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Feed Inputs & Feeding

Sow Nutrition during Gestation

- A single phase feeding program leads to overfeeding in early gestation, underfeeding in late gestation
 - Nutrient excretion
 - not meeting nutrient requirements
- Common practice to increase daily feed allowance prior to farrowing
 - Insufficient to account for increases in amino acids in the last 4 weeks of gestation



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Parity Segregated Feeding


Objectives

- Specifically refining requirements for amino acids
 - Lysine, threonine, isoleucine, and tryptophan
- Amino acid requirements are greater in late gestation
 - Day 45 fetal and mammary growth increase exponentially

Ron Ball & Soenke Moehn, University of Alberta




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Parity Segregated Feeding

- Implementation of a Parity Segregated Feeding Program
 - Consist of 2 diets that satisfy the highest and lowest amino acid requirements and can be mixed in appropriate ratios
 - Bump up feeding levels in last 4-weeks of gestation
 - 0.6 kg/day – gilts
 - 0.5 kg/day – 2nd parity
 - 0.4 kg/day – older sows




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Parity Segregated Feeding – Producer Benefit

- Supplies necessary amino acids and energy to match sows' requirements
 - Improved sow condition at farrowing
 - Better breeding success
 - Increased longevity
- Feed cost savings around \$10 sow/year
 - Savings are greater for older sows



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Genomics


Develop new genomic tools improve meat quality traits as well as enhance product differentiation and efficiency of pork production

- Detailed performance data, carcass data and meat quality data – on 700 nursery pigs
- 60,000 genetic markers (60K SNPs) evaluated
- Analysis of the 60K SNPs (and detailed data) can tell us which areas of the genome predict the traits we want

Brian Sullivan, CCSI




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Genomics – Why is it Important?

- We can predict traits with good accuracy using genomics!
- Young animals can be evaluated from a DNA sample (using the 60K SNP test) before any performance traits are measured
- Can be used to get early evaluations on traits measured later in life (like sow productivity)




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Genomics – Producer Benefit

- Faster improvement for performance and productivity traits
- Improve new traits such as meat quality
 - differentiate towards higher value markets
- Lower COP and higher value




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Additional Research Projects

- Sow Housing: Risk factors and assessment techniques for lameness, productivity and longevity – group and individually housed sows
 - Reliable tools for early detection of lameness in sows help to decrease culling for non-productive reasons
- Efficiency of Water Sprinkling after loading and prior to unloading
 - Provide the pork industry with a clear procedure for transport in warm conditions, limiting transportation losses & improving meat quality



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Additional Research Projects

- Development of Standards for Swine Production Systems
 - Benchmark current systems in swine facilities to determine the cost/benefit of system optimization
- New and Innovative feeding programs
 - Examination of novel feed ingredients (lentils, canola meal)
 - Compensatory growth




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Additional Research Projects

- Efficacy of feed additives in mitigating the negative impacts of mycotoxin contaminated feed
 - Evaluation of the efficacy of feed additives
- Mycotoxin contamination of Corn Hybrids
 - Determine under natural disease pressure whether there are differences between hybrids




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Take Home Message


- Swine Innovation Porc focuses on research projects that are practical, and dedicated to reducing cost of production or improving differentiation
- Projects potentially save producers anywhere from \$.50 to \$6.00 per hog



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QUESTIONS ???



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