


## Handling and Transport of Pigs: Report to Industry

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## Background to Project

- Dead on arrival rate for Canada is 0.10%
  - Excess of 16,000 pigs/year
  - Higher in summer
  - Variation due to farm (50%), packer (25%) and trucker (19%) (Dewey et al., 2004)
- Additional losses due to NANI (non-ambulatory, non-injured)


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## Background

- Additional losses due to carcass damage and reduced meat quality
  - Scratching and bruising of carcass
  - Acute stress results in PSE (pale, soft and exudative) meat
  - Extended stress results in DFD (dark, firm and dry) meat
- Shrink losses (\$5/pig) (Murray, 2001)
- Reduced marketability (40%) (Grandin, 1993)
- Reduced value due to bruising (6%) (MLC, 1985)

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## Background

- Vehicle design
  - Multiple compartments
  - Differing ventilation patterns
  - Multiple levels
  - Both internal and external ramps
- Canadian conditions
  - Temperature extremes
  - Distance to market


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## Research Group

- Dr. Renee Bergeron – Universities of Guelph and Laval
- Dr. Trevor Crowe – University of Saskatchewan
- Dr. Cate Dewey – University of Guelph
- Dr. Luigi Faucitano – Agriculture and Agri-Food Canada
- Dr. Harold Gonyou – Prairie Swine Centre
- Dr. Nora Lewis – University of Manitoba
- Dr. Stephanie Torrey – Agriculture and Agri-Food Canada
- Dr. Tina Widowski – University of Guelph


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## Graduate Students

- Jorge Correa
  - Ph.D.
  - University of Laval
- Emily Tamminga
  - M.Sc.
  - University of Guelph
- Sebastien Goumon
  - Ph.D.
  - University of Laval and Prairie Swine Centre


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## Industrial Partners and Federal Agencies



- Alberta Pork
- Sask Pork
- Manitoba Pork
- Ontario Pork
- Maple Leaf Foods
- Natural Sciences and Engineering Research Council
- Agriculture and Agri-Food Canada

– Additional support for Lennoxville-based project from Quebec producers and F. Menard



## Three Phase Project

- Phase 1
  - Studies under commercial conditions to identify factors contributing to losses
- Phase 2
  - Intensive studies to identify key components of stress factors
- Phase 3
  - Application of improved technology under commercial conditions



## Phase 1: Design

Quebec	Western
Short haul (1.5 hr) 1-2 hr lairage Two truck types Use of Paylean No electric prods CO2 stunning	Long haul (8 hrs) 1-2 hr lairage Single truck type No Paylean Prods at loading only Electrical stunning



## Seasons

- Studies conducted at both locations:
  - Summer
    - June, July and August
  - Winter
    - January, February and March
- Six transport days during each season at each location (36 loads of pigs)

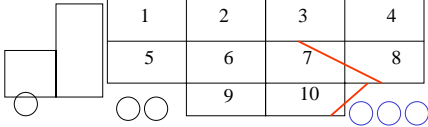




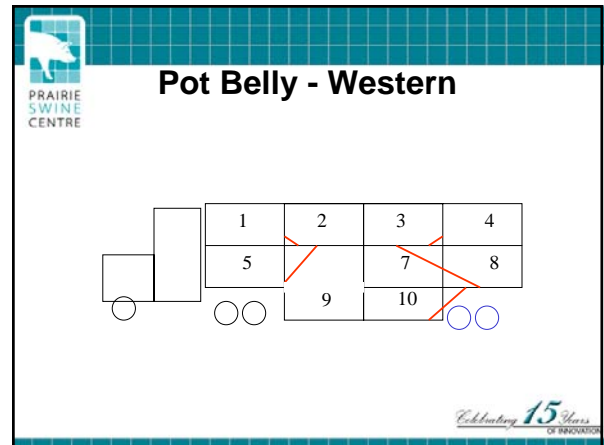
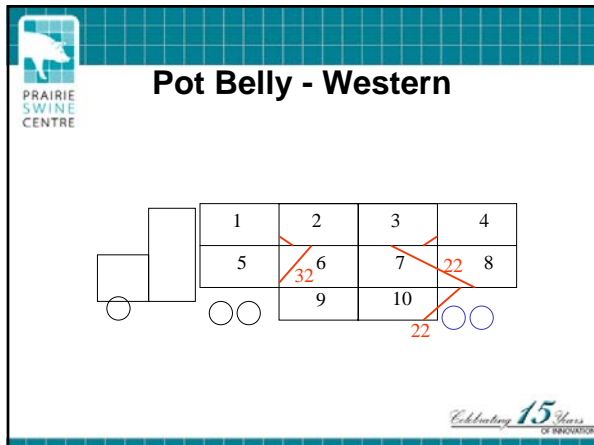
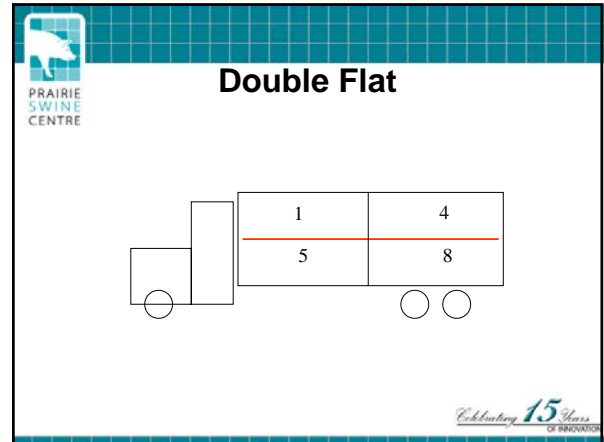
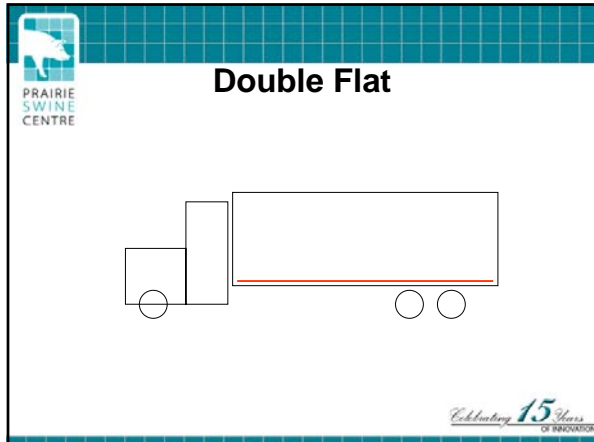
## Vehicle Types

Pot Belly	Double Flat	Pot Belly
<ul style="list-style-type: none"> <li>• Quebec</li> <li>• Pig specific</li> <li>• Two main internal ramps</li> <li>• 228 pigs</li> </ul>	<ul style="list-style-type: none"> <li>• Quebec</li> <li>• No internal ramps</li> <li>• Hydraulic lift for top deck</li> <li>• 85 pigs</li> </ul>	<ul style="list-style-type: none"> <li>• Western</li> <li>• Dual purpose</li> <li>• Three main internal ramps</li> <li>• 195 pigs</li> </ul>


## Pot Belly - Quebec



- What We Measured**
- PRAIRIE SWINE CENTRE
- Behaviour
    - At loading, during travel, at unloading, during lairage
  - Environmental temperature and humidity
    - In each compartment
    - From pre-loading until after loading
  - Core body temperature
    - In 17% of pigs
    - From pre-loading until stunning
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- What We Measured**
- PRAIRIE SWINE CENTRE
- Heart rate
    - On 17% of pigs
    - From pre-loading until unloading (western) or prior to stunning (Quebec)
  - Blood
    - On 25% of pigs
    - CPK (creatine phospho-kinase) and lactate
  - Carcass quality
    - On 25% of pigs
    - Surface damage, bruising
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## What We Measured

- **Meat Quality**
  - On 25% of pigs
  - Ham and loin
  - In cooler
    - pH and temperature
  - 24 hr post-mortem
    - pH, colour, light reflectance, conductivity
    - Drip loss after 48 hours


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## Limitations

- **Time of day**
  - Needed to arrive at plant early in morning
  - No travel during hottest portion of the day
- **Order of loading**
  - At Quebec site the PB was always loaded and unloaded first
  - Waiting time at farm and plant differed between trucks
- **Preparation of pigs**
  - Approximately 6 min of restraint to apply equipment, followed by rest


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## Today's Program

- **Dr. Stephanie Torrey**
  - Behaviour of pigs during loading, transport, unloading and lairage
- **Dr. Trevor Crowe**
  - Temperature and humidity conditions in the trailer
- **Jorge Correa**
  - Heart rate of pigs from the barn to the plant
- **Dr. Harold Gonyou**
  - Body temperature during transport
- **Jorge Correa**
  - Physiology at bleeding, carcass and meat quality
- **Dr. Luigi Faucitano**
  - A general discussion
- **LUNCH at 12:30**
- **Panel discussion: Research and industry direction**


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## Today's Sponsors

We gratefully acknowledge the contributions of:

**Maple Leaf Consumer Foods**  
Co-funder of the research program and  
Sponsor of today's program



And  
**Sask Pork**



Co-funder of the research project and  
coordinator of today's program.

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