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Welfare and Productivity Issues
When Using Pen Gestation Systems

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Videos for Presentation

• Slide 7: Sham chewing video (.wmv file) 22 sec.
  – This video depicts alternative behaviors expressed when bar biting is prohibited
• Slide 11: Social hierarchy during floor feeding (.wmv file) 5:20 min
  – This video depicts aggression occurring in a small group pen when floor-feeding
• Slide 23: ESF aggression (AVI file) 1:16 min
  – This video depicts aggression around ESF stations 30 minutes after the daily feed schedule starts

Frequently Used Terminology

• Animal Rights
  – Philosophical belief that animals have rights, including the right to live their lives free of human intervention
• Animal Welfare
  – Avoidance of unnecessary animal suffering
• Animal Well-being
  – Physical and mental state of being
  – Focuses on scientific aspects of welfare rather than social aspects – Fraser, 1993

Which animal has better welfare?
What can we measure to determine if an animal is in distress?

- Performance
- Productivity
- Behavior
- Endocrine levels
- Immune status and function

Behavior

- Maintenance behaviors
  - Eating and drinking
- Stereotypic behavior – repetitive behavior that serves no purpose
  - Oral-nasal-facial
  - Sham-chew
  - May serve purpose

Sow Housing

- Stall vs Group
  - No differences in sow well-being
    - Curtis et al., 2009; Salak-Johnson et al., 2007; 2012;
- Alternative group pen systems
  - No one system improves well-being over another
  - Management and pen design more of an influence on animal well-being

Welfare problems associated with stalls

- Most sows do not “fit” (McGlone et al. 2004)
  - Doesn’t meet minimum standards (lying full lateral recumbency)
- Limits socialization
  - Inhibits natural behavior
- Limits movement
  - Lesions
  - Stiffness of joints

Welfare problems associated with groups

Too much aggression

Stereotypic behaviour

- Sham chewing
- Mounting
- Vaginal lacerations

Small Group Pen – Floor Feeding

- Advantages
  - Simultaneous feeding
  - Simple pen design
  - Easy to renovate existing facility
  - Cheap
- Disadvantages
  - No individual feed ration
  - High competition
  - Aggression
  - Spread out food evenly
  - High variation of BCS
  - Difficult to manage
  - Harder to assess morbidity
  - Increase labor (scraping)
  - Worker safety issue
  - Walk through gates
Small Group Pen – Trickle Feeding

- Advantages
  - Simultaneous feeding
  - Simple pen design
  - Need feeding trough
  - Stalls or no stalls will impact greatly
  - Easy to renovate existing facility
  - Cheap
  - Increased cost of feed trough and feed system
  - Reduces aggression around feeding

- Disadvantages
  - No individual feed ration
  - still competition
  - Aggression
  - High variation of BCS
  - Worker safety issue
  - Walk through gates

Small Group Pen – Feeding Stalls

- Advantages
  - Simultaneous feeding
  - Simple pen design
  - Utilize existing stall
  - Quarter, half, full length stalls
  - Easy to renovate existing facility
  - Cheap
  - Use existing stall, feed system, trough, waterer
  - Reduces aggression around feeding
  - Longer the stall the more reduction in aggression

- Disadvantages
  - No individual feed ration
  - still competition
  - Aggression
  - High variation of BCS
  - Worker safety issue
  - Walk through gates

Solutions to Improve Welfare, Productivity, and Labor in Small Group Pens

- Allocate based on BW not parity
- Sort sows by nutritional needs
- Sort sows by competitive ability
- Spread food out evenly (floor feeding)
- Walk through gates (improves worker safety and sow welfare)
  - Walk in pens daily
    - Improves new acceptance and reduces chases
    - Easier to vaccinate and move
- Pen Design and resource placement
  - Location of waters
  - Stall vs. open flooring
- Feed high-fiber diet
- Floor-space allowance
  - 15O, 19O, 22O, 24O, 26O

Small Group Pen – Floor Space Allowance

![Image](image1)

Table 3. Main effects of treatment on productivity and litter-related traits for sows in pens at various floor space allowances at individual stalls during gestation (floor space measured as SFA)

<table>
<thead>
<tr>
<th>Floor</th>
<th>1.4</th>
<th>1.5</th>
<th>1.6</th>
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<td>12.0</td>
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<tr>
<td>Gestation weight</td>
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<td>260</td>
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<td>280</td>
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<tr>
<td>Litter No.</td>
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<tr>
<td>Birth No.</td>
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<tr>
<td>Wean No.</td>
<td>150</td>
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<td>180</td>
<td>190</td>
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<tr>
<td>Litter size</td>
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<tr>
<td>Litter size, %</td>
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<td>Normal births</td>
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<td>Neonatal deaths</td>
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<td>Farrowing time, min</td>
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Table 4. Effects of floor space on behavior for sows in pens at various floor space allowances at individual stalls during gestation (floor space measured as SFA)

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</table>

Salak-Johnson et al., 2012

Small Group Pen – Floor Space Allowance

- Aggression less in 15O/sow than larger floor spaces (25 and 35 ft²/sow)
- Less active (walk, stand, drink, ONF) in 15O/sow than larger floor spaces (25 and 35 ft²/sow)
Large Group - Free Access System

• Advantages
  – Reduces aggression
  – Identify problem sows
  • Easy and safe access to sows
  – Still have individual stall
  • Socially accepted by public
  • Satisfies individual sow’s needs

• Disadvantages
  – Variation in BCS
  – Gate checking
  – Lose space/expensive
  – Dynamic/static new hierarchy development

Murphy-Brown... DeDecker Thesis 2011

Free-Access Space Utilization

Effect of social status on percentage of time spent utilizing either group-pen or individual stall of gestating sows kept in a free-access stall system

Murphy-Brown... DeDecker Thesis 2011

Free-Access Group Pen Use

Effect of social status and time period on group pen utilization of sows kept in a free-access stall system

Murphy-Brown... DeDecker Thesis 2011

Housing Type on Sow Lesions

Effect of housing environment on sow productivity

Murphy-Brown... DeDecker Thesis 2011

Large Group - Electronic Sow Feeder System

• Advantages
  – Individual feed ration
  – Controlled feed ration
  – Less feed wastage
  – Access to data
  • Long-term improvements

• Disadvantages
  – High competition
  – Equipment/RFID maintenance
  – Tech savvy
  – Dunging patterns
  – Vaccinating
  – Gift training

Murphy-Brown... DeDecker Thesis 2011
Solutions to Improve Welfare, Productivity, and Labor in Large Group Pens

- Allotment – 8W
- Group size – > 60 sows
- Floor-space allowance – ≥190 m²/sow
- Slatted vs solid flooring
- Water placement
- Vaccination gates/pens
- Feeding strategy
  - Diet
  - 2 times per day

When to Mix Sows

Refrain from mixing until d35 of gestation if possible

Options with Group Pen Systems

<table>
<thead>
<tr>
<th>Feeding</th>
<th>Floor</th>
<th>Groups</th>
<th>Timing</th>
<th>Size</th>
<th>Floor Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>Slatted Static Wean 5</td>
<td>1.4 m²/sow</td>
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<tr>
<td>Trickle</td>
<td>Partial Dynamic Pre-implantation 10</td>
<td>2.4 m²/sow</td>
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<tr>
<td>Feed-stall</td>
<td>bedded Dynamic Post-implantation 20</td>
<td>3.3 m²/sow</td>
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<tr>
<td>ESF</td>
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<td></td>
<td></td>
<td>40+</td>
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</table>

4 x 3 x 2 x 3 x 4 x 3 = 864 options

Major Factors Associated with Conversion

- Existing Facility layout
- Slatted/solid flooring
- Feed system
- Square footage

- Costs of conversion
  - Small group pen (≤10 sows) with half or quarter stalls ($225-275/sow)
  - ESF system ($265-$295/sow)
  - Free-access ($~300+/sow)

Conversion Process

<table>
<thead>
<tr>
<th>Hog barn before conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hog barn after conversion</td>
</tr>
</tbody>
</table>

Conclusion

- All housing systems meet standards of well-being and will maintain equal productivity
- How you manage and design your system is what will improve well-being, productivity, and worker safety
  - Feeding strategy
  - Resource placement
  - Allotment
  - Body weight
  - Observations
    - Daily walk throughs reduce stress for sows and workers thus improve productivity