Thank you for participating in SowBridge 2011-12.

To start this presentation, advance one slide by pressing enter or the down or right arrow key.

Outline
Strategizing, formulating, manufacturing, and providing the feed

Variation in genotypes

<table>
<thead>
<tr>
<th>Line</th>
<th>Wt, lb</th>
<th>Backfat, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>238</td>
<td>21.6</td>
</tr>
<tr>
<td>B</td>
<td>234</td>
<td>23.6</td>
</tr>
<tr>
<td>C</td>
<td>232</td>
<td>22.4</td>
</tr>
<tr>
<td>D</td>
<td>248</td>
<td>24.9</td>
</tr>
<tr>
<td>E</td>
<td>242</td>
<td>19.8</td>
</tr>
</tbody>
</table>

Michigan State University at 205 d (puberty)***

<table>
<thead>
<tr>
<th>Y x L</th>
<th>Wt, lb</th>
<th>Backfat, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y x L</td>
<td>306</td>
<td>17.6</td>
</tr>
</tbody>
</table>

**NPPC Gilt Project at 180 d**

Strategy
Account for lean, fat, and skeletal accretion potentials of the varied maternal genotypes being raised, and their metabolism as sows

Breeding stock has changed again

- Know how to take care of the modern, maternal line females
  - Last decade of 1900 millennium
    - Prolific
    - Lean (Long, 1998)
    - Less appetite
  - First decade of 2000 millennium
    - Molecular genetics
    - Robustness
    - Fatness
    - Intake
Sow condition

Body fat and protein stores

Percent cull per year

http://www.pigchamp.com/benchmarking_summaries.html

Percent sow deaths per year

http://www.pigchamp.com/benchmarking_summaries.html

Nursery nutrition

- No research evaluating the effects of nursery feeding and management on subsequent reproduction or longevity
- At this time, no justification for “maternal line” nursery or nursery program
- Use typical nursery diets to maximize growth

Growing-finishing nutrition - puberty

- Nutrition
  - Little relationship between age at puberty and specific body composition
  - Severe starvation will delay
- Management
  - Crowding
    - 6-7 verses 10-12 ft²/gilt; #/pen?
  - Excessive pit gases
  - Darkness
  - Disease and parasites
  - Relocation
  - Boar contact

Strategies for feeding the gilt during the grow-finish phase

1. Maximum growth
2. Increase fatness
3. Slow growth
4. Patterned growth
Maximum growth

- Full feed to breeding
- Self-feeder
- Breed
  - 210 to 270 lb of age
  - 260 to 320 lb
  - 12 to 28 mm backfat

*Beltranena et al., 2009 (12 Non-negotiables)

Increase fatness

- Altered lysine:ME ratio
  - 1.9 to 2.1 g lysine per Mcal ME
- Add dietary fat
- Reduced protein intake restricts lean growth and redirects energy into fat deposition
- Growth rate
  - Same or slower

Altered energy:protein density to encourage fat deposition

<table>
<thead>
<tr>
<th>Nutrient Recommendations for Developing Breeding Sows fed fat diet*</th>
<th>Lysine, g</th>
<th>Ca, g</th>
<th>P, g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight, lb</td>
<td>45 to 50</td>
<td>50 to 55</td>
<td>150 to 180</td>
</tr>
<tr>
<td>Expected feed intake, lb</td>
<td>3.0</td>
<td>4.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

*All diets are fed under thermoneutral conditions.

Slow growth

- For gilts that can get too fat
- Delayed puberty
- Compromised locomotion
- Stale

Johnson et al., 2009

- 25% energy restriction from 123 d of age to breeding
  - Decreases likelihood of pubertal estrus by 226 d of age
  - Two lines
    - L45X experienced a decreased likelihood of producing a first litter if developed with restricted feeding
    - LW x L unaffected by development regimen

Patterned growth during rearing

- Stair-step compensatory growth during rearing
- Intermittent feeding of a high fiber diet during the pre-pubertal grow-finish period
Mycotoxins

- **Zearalenone**
  - Delays puberty and interrupts cycle,
  - Normalize 3 to 4 weeks after removal

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**Acclimation, isolation, quarantine**

- **Time to change body condition**
  - Full feed lean gilts
    - Increased energy
    - Decrease amino acid concentration
    - Make fatter
    - Avoid “too” thin - stale
  - Limit feed “average-lean” gilts
    - Avoid “too” fat - stale
  - Vitamin E 30 IU/lb

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**Late GDU – into gilt pool**

What are “stale” gilts?

- In the gilt pool
  - Koketsu et al., 1999
    - Age at entry = 184 d
    - Age at service = 256 d
  - Anestrus
    - No puberty
    - Late
    - Puberty but stopped cycling
    - Behavioral
      - Silent heat
What percent of gilts become stale?

<table>
<thead>
<tr>
<th>Source</th>
<th>Percent of replacement gilts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ehnvall, et al., 1981</td>
<td>6.0%</td>
</tr>
<tr>
<td>Linde, et al., 1984</td>
<td>7.7%</td>
</tr>
<tr>
<td>D’Allaire et al., 1987**</td>
<td>5.6%</td>
</tr>
<tr>
<td>Goodwin, 1998*</td>
<td>8.9%</td>
</tr>
<tr>
<td>Heinonen et al., 1998**</td>
<td>6.3%</td>
</tr>
<tr>
<td>Koketsu et al., 1999</td>
<td>7.6%</td>
</tr>
<tr>
<td>Miller, 2002</td>
<td>9.8%</td>
</tr>
<tr>
<td>Rozeboom, 2005</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Assumed breeding herd replacement rate of 50%**

*3.2% never cycled, 1.6% gilt cycling

How does this number relate to other gilt culling reasons?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percent of replacement gilts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not conceive</td>
<td>10.1</td>
</tr>
<tr>
<td>Stale</td>
<td>9.8</td>
</tr>
<tr>
<td>Death</td>
<td>7.3</td>
</tr>
<tr>
<td>Unknown</td>
<td>5.4</td>
</tr>
<tr>
<td>Lameness</td>
<td>4.8</td>
</tr>
<tr>
<td>All others, less than</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Miller, 2002

Why?

- Season

Why?

- Poor stimulation

<table>
<thead>
<tr>
<th></th>
<th>Boar contact</th>
<th>No boar contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gilts having 3 cycles</td>
<td>97%</td>
<td>66%</td>
</tr>
<tr>
<td>Inter estrous interval</td>
<td>20.5 ± 0.4</td>
<td>20.0 ± 2.3</td>
</tr>
<tr>
<td>Cycles per 100 d</td>
<td>4.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Long (&gt;25 d) cycles, %</td>
<td>3</td>
<td>32</td>
</tr>
</tbody>
</table>

Philip et al., 1997 and Siswadi and Hughes

What do you do to avoid gilts becoming stale?

- Restrict feed
- Change environment
- Boar exposure
- Patient heat detection
  - Record targets (Hughes, 2001)
    - 50% cycling by 26 wk
    - 85% cycling by 29 wk
    - 5% anestrous by 32 wk
    - Age at puberty 27 wk

Gilt pool - breeding

- Flush limit-fed gilts prebreeding
  - Ad-lib intake for 10 to 14 days to normalize ovulation rate
  - Not superovulation; only normalizes ovulation rate
Conclusions

- Genotype and farm-to-farm variation
  - The lean and fat accretion or growth patterns of the genotype used.
- Aim for targets
  - Age and body weight at “introduction” or the start of development.
  - Feed intakes of the specific genotype in each phase and in each season.
- Use nutrient specifications, diets, and intakes to achieve strategy

Live weight targets

Backfat targets