Keeping Gilts in the Breeding Herd and Productive

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Key aspects of a good gilt management program

- Worker knowledge, attitude, skills, motivation
- Implementation of a “strict” selection program
- Achieving appropriate body weight/condition at first breeding
- Minimizing accumulated non-productive days in the gilt pool
- Implementing a feeding strategy that starts with the replacement gilt and supports the sow through each successive litter.

Schematic diagram of an efficient gilt management system

Pre-select 1
- Requirements:
  - Confirmation
  - 12-14 nipples
  - No ruptures
  - No hernias
  - Acceptable growth

Market gilt

Selectable Pool
- Yes
- No

Nursery

Non-Select Gilts

Opportunity gilts

Growing gilts

Desired weight at breeding:
298 to 330 lbs

Predicting Estrus and Weight at breeding

[1.43 lbs/day x 140 days = 200 lbs @ 140 days of age]

"If" 1st estrus at 160 days of age
- 20 days x 1.43 lbs = 28 lbs
- Wt. at puberty = 228 lbs

2nd estrus at 181 days of age
- 21 days x 1.5 lbs = 31 lbs
- Wt. at 2nd estrus = 259 lbs

3rd estrus at 202 days of age
- 21 days x 1.6 lbs = 33 lbs
- Wt. at 3rd estrus = 292 lbs

4th estrus at 223 days of age
- 21 days x 1.7 lbs = 38 lbs
- Wt. at 4th estrus = 330 lbs

Effect of live weight at 175 days of age on puberty attainment and follicular growth

Proportion of gilts pubertal by 28 days of boar exposure
Proportion of follicles 3 to 6 mm

W.H.E.J. van Wettere (University of Adelaide) & P.E. Hughes (Pig & Poultry Production Institute, Roseworthy, South Australia, 2005.)

P<.05
Effect of live weight at 175 days (25 wks) of age on response to boar exposure

<table>
<thead>
<tr>
<th>Age at Estrus</th>
<th>Days to Estrus</th>
<th>Wt. at Estrus, lb</th>
<th>Backfat (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGB</td>
<td>180.9</td>
<td>21.8</td>
<td>273</td>
</tr>
<tr>
<td>DBG</td>
<td>183.8</td>
<td>24.8</td>
<td>286</td>
</tr>
<tr>
<td>FnBG</td>
<td>191.1</td>
<td>25.0</td>
<td>306</td>
</tr>
</tbody>
</table>

DGB – direct contact with v-boar (purposely built for boar stimulation)
DBG – direct contact with v-boar in gilt group pens
FnBG – fence line contact with v-boar and gilts in stalls

Full Direct Contact is an absolute requirement!

- Direct snout-to-snout contact between the boar and gilt is required for physical transfer of pheromones from the boar to the gilt.
- Pheromones in boar saliva are non-volatile substances.
- Therefore, direct physical tactile contact between the boar and gilt will ensure the maximal response to the full boar effect.

Boar stimuli act synergistically to elicit the boar effect

<table>
<thead>
<tr>
<th>Stimuli</th>
<th>% Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back pressure test (BPT) by human</td>
<td>48</td>
</tr>
<tr>
<td>BPT + sound of the boar</td>
<td>70</td>
</tr>
<tr>
<td>BPT + boar odor</td>
<td>80</td>
</tr>
<tr>
<td>BPT + sound + odor + sight</td>
<td>97</td>
</tr>
<tr>
<td>Physical contact with boar</td>
<td>100</td>
</tr>
</tbody>
</table>

Effect of full boar or fenceline contact on age at puberty of gilts

<table>
<thead>
<tr>
<th>Study 1</th>
<th>Study 2</th>
<th>Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full boar</td>
<td>Fenceline</td>
<td>No boar contact</td>
</tr>
</tbody>
</table>

Theriogenology 57:2015-2025, 2002
Effect of boar libido on average age at puberty of gilts

- High libido
- Low libido
- No boar exposure

<table>
<thead>
<tr>
<th>Study</th>
<th>Age at puberty, days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>170</td>
</tr>
<tr>
<td>2</td>
<td>180</td>
</tr>
</tbody>
</table>

Study 1 vs Study 2 (P < .01)

Method of boar exposure on puberty attainment of gilts

<table>
<thead>
<tr>
<th>Method of exposure</th>
<th>Age (days)</th>
<th>Wt. (lb)</th>
<th>BF (in.)</th>
<th>Pub. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gilts in stalls</td>
<td>186.2ab</td>
<td>306b</td>
<td>.68</td>
<td>85</td>
</tr>
<tr>
<td>Gilts to boar</td>
<td>179.7bc</td>
<td>273bc</td>
<td>.62</td>
<td>96</td>
</tr>
<tr>
<td>Boar to gilts</td>
<td>176.2b</td>
<td>284bc</td>
<td>.59</td>
<td>81</td>
</tr>
</tbody>
</table>

Study 1 vs Study 2 (P < .05)

Schematic diagram of an efficient gilt management system

- Selectable Pool
- Non-Select gilts
- Select gilts
- Opportunity gilts

- Pre-select 1 Requirements:
  - Confirmation
  - 12-14 nipples
  - No ruptures
  - No hernias
  - Acceptable growth

- Pre-select 2 Requirements:
  - Confirmation
  - 12-14 nipples
  - No ruptures
  - No hernias
  - Growth rate 2-2.5 lb/day (185-190 lb)

- Final select Requirements:
  - Soundness
  - 125% of breeding needs
  - Direct boar contact 160-190 days
  - Record heat

Effect of recording estrus on average age at mating and total born per litter

<table>
<thead>
<tr>
<th>Farm A - No record</th>
<th>Farm A - Recorded</th>
<th>Farm B - No record</th>
<th>Farm B - Recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg age mated, days</td>
<td>10.5</td>
<td>11</td>
<td>11.5</td>
</tr>
<tr>
<td>Total born per litter</td>
<td>258</td>
<td>249</td>
<td>266</td>
</tr>
</tbody>
</table>

Effect of estrous number at first mating on number of piglets born live

<table>
<thead>
<tr>
<th>Item</th>
<th>Estrous number at mating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First</td>
</tr>
<tr>
<td>Study 1 (3 litters)</td>
<td>30.9</td>
</tr>
<tr>
<td>Study 2 (3 litters)</td>
<td>29.1</td>
</tr>
<tr>
<td>Study 3 (4 litters)</td>
<td>37.8</td>
</tr>
<tr>
<td>Study 4 (5 litters)</td>
<td>51.6</td>
</tr>
</tbody>
</table>

Impact of breeding gilts at 2nd, 3rd, 4th of 5th estrus on total number of piglets born

<table>
<thead>
<tr>
<th>Estrus at first mating</th>
<th>Total born</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>33.9</td>
</tr>
<tr>
<td>3rd</td>
<td>33.1</td>
</tr>
<tr>
<td>4th</td>
<td>33.4</td>
</tr>
<tr>
<td>5th</td>
<td>33.6</td>
</tr>
</tbody>
</table>
Schematic diagram of an efficient gilt management system

Pre-select 1
Requirements:
- Confirmation
- 12-14 nipples
- No ruptures
- No hernias
- Acceptable growth

Pre-select 2
Requirements:
- Confirmation
- 12-14 nipples
- No ruptures
- No hernias
- Growth rate ≥ 1.3 lbs/day (185-198 lbs)

Heat select
Requirements:
- 125% of breeding needs
- Direct boar contact 160-190 d
- Record heat

Breed Group Management
Breeding at:
- 298-330 lbs
- 1st (10%), 2nd (32%), or 3rd (58%) estrus

Market gilt
Selectable Pool
Non-Select gilts
Opportunity gilts
Opportunity gilts
Opportunity gilts

Effectively heat-checking replacement gilts is a challenge!!

Impact of body weight at first service on total number of piglets born through 3 parities (PIC gilts)

Nutrition
- Heat-check and stall gilts at pubertal estrus and breed them at 2nd or later estrus
  - Undergo adjustment to stall
  - Adjust to a decrease in feed intake
- Limit feeding
- Full feeding

Impact of backfat at first service on total number of piglets born through 3 parities (PIC gilts)

Gilt Development Unit Design
- A properly designed gilt development unit with a boar exposure area is the key to successful puberty stimulation, estrus detection, breeding of gilts, and labor management.

Photograph from Jennifer Patterson, University of Alberta, Edmonton, Canada
Step 1. BEAR system provides signaling pheromones for heat detection
- Immediate fenceline exposure (auditory, visual and olfactory) with several boars is accomplished in the BEAR system.
- Gilts are identified in heat using the back pressure test by workers.

Step 2. BEAR system provides priming pheromones for puberty stimulation
- Fenceline exposure (sight, sound, and smell) with several boars.
- Direct exposure (sight, sound, smell, physical contact) with one mature V-boar
- Gilts found in heat for the first time should be recorded and bred at 2nd estrus.

Benefits of the BEAR system
- Layout is simple, cost effective to adopt and to implement in new or refurbished barns.
- Layout provides two gilt checking areas and a worker pass-thru space between the two areas.
- One person can simultaneously work two groups of gilts.

Benefits of the BEAR system
- Layout provides housing for up to six boars.
- The crates allow the teaser boars to face and enter/exit both gilt checking pens.
- Layout provides initial fenceline exposure to boars that are aroused, pheromone-loaded, and salivating.
Benefits of the BEAR system

- Gilts identified standing can be parked in a small pen. A teaser boar can then be let into the pen for additional physical contact to the remaining non-standing gilts.

- To establish the breeding at the desired weight range, a scale and crowding gate(s) are positioned to weigh gilts after the pubertal heat-no-serve estrus.

Benefits of the BEAR system

- Layout provides protection posts round corners to prevent gilts from getting injured by the boar.

- Both the pass-thru space and corner posts offer protection for the safety of the worker.

- Litter size at first farrowing is increased.

- Sow longevity is enhanced.

The End