Improving reproductive performance in pig herds

BPEX Workshop
Thursday 26 January 2006

J D Mackinnon BVetMed CertPM FRCVS
Pig Health & Production Consultancy
Litters per sow per in some EC countries

(BPEX 2005)

<table>
<thead>
<tr>
<th>Country</th>
<th>2002</th>
<th>2003</th>
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Average born alive per litter in some EC countries (BPEX 2005)

- Sp
- NL
- It
- Ire
- GB
- Ger
- Fr
- Den

Year:
- 2002
- 2003
- 2004
Average number reared per sow per year in some EC countries (BPEX 2005)

<table>
<thead>
<tr>
<th>Country</th>
<th>2002</th>
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<th>2004</th>
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<tbody>
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<td>Den</td>
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</table>
Breeding herd performance over 30 years
(MLC Pig Yearbooks)

Average born alive/litter
Average number reared/sow/year
Litters/sow/year

PRRS
PMWS
CSF
FMD

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Why the stagnation?

- Lack of competition?
- Complacency?
- Lack of profit?
- Lack of investment?
- Failure to take on new technology?
- Lack of training?
- Lack of genetic progress?
- Disease?
The realities of life...

- Reproductive failure is expensive
- Reproductive failure is usually multifactorial
- Conclusive diagnosis of causes of reproductive diagnosis is often never reached
- Seasonal (environmental) effects on fertility are underestimated
Reproductive failure is expensive

Cost per sow-day =

\[
\frac{\text{Total annual breeding herd expenditure}}{\text{Productive sows} \times 365}
\]

Cost of reproductive failure =

\[
\frac{\text{Cost per sow-day} \times \text{empty days/annum}}{\text{Pigs born alive (sold)/sow/year}}
\]
Real example

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>Productive sows</td>
<td>312</td>
</tr>
<tr>
<td>Farrowing index</td>
<td>2.25</td>
</tr>
<tr>
<td>Annual farrowing rate</td>
<td>78.3%</td>
</tr>
<tr>
<td>Pigs sold per sow per year</td>
<td>20.2</td>
</tr>
<tr>
<td>Annual breeding herd expenditure</td>
<td>£189,717.84</td>
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<tr>
<td>Cost per sow per day</td>
<td>£1.67</td>
</tr>
<tr>
<td>Empty days per sow per year</td>
<td>42.75</td>
</tr>
<tr>
<td>Cost per sow per year</td>
<td>£71.39</td>
</tr>
<tr>
<td>Cost per pig sold</td>
<td>£3.53</td>
</tr>
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</table>
Reproductive failure is multifactorial
Conclusive diagnosis of reproductive failure is often never reached 
*(based on Thacker, 1999)*

- A strongly held belief that only infectious agents cause reproductive failure
  - *Enthusiastic over-reliance on limited and dubious serology…*
- Failure to watch and appraise breeding management
  - *“You can’t tell me how to manage my service area….”*
- Failure to recognise the biological requirements of sows and boars
  - *“The buildings and facilities are perfectly satisfactory…”*
- Widely differing opinion on requirements for comfort, hygiene and body condition
  - *“I’ve always kept my sows like this…..”*
- Based on whole herd, historical facts, memory and anecdote
Seasonally-related sub-standard performance is a reality and is underestimated.

- Increase in returns to service
- Increase in phantom pregnancies
- Increase in the number of abortions
- Reduction in numbers born
- Increased pre-weaning mortality
- Lower weaning weights
Real Example: Returns to oestrus in a 1200 sow indoor herd using AI (1999-2002)
On which factors should we focus?

- Basic husbandry of gilts and sows
- Management of the weaning-to-oestrus/service interval
- Management and nutrition of boars
- Semen quality and storage
- Timing of insemination
- Management of early pregnancy
- Herd profile
Do not compromise gilts and sows at any time

- Be kind to gilts
  - “Hardening off” and “bugging-up” are potentially harmful
  - Properly managed development and acclimatisation is of paramount importance
- Lactation is the focal point of everything
  - You can’t feed too much during lactation
- Maintain as high a standard of health as possible
  - Appropriate biosecurity, vaccination, etc.
Partition of energy during lactation on high (16.7 MCals) or low (8.4 MCals) energy intake

*Mullan and Close (1989)*

Energy partition (Mcals/day)

- H - 6 pigs
- H - 12 pigs
- L - 6 pigs
- L - 12 pigs

Legend:
- Intake
- Milk
- Sow
Changes in body composition in lactation

Mullan and Close (1989)

Weight change (kg/day)

<table>
<thead>
<tr>
<th>Group</th>
<th>H - 6 pigs</th>
<th>H - 12 pigs</th>
<th>L - 6 pigs</th>
<th>L - 12 pigs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Lean</td>
<td></td>
<td></td>
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<tr>
<td>Other</td>
<td></td>
<td></td>
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Mullan and Close (1989)
Early advice on feeding sows in lactation

“For the first 10 days after farrowing, the sow requires no more food than was given in the last two weeks of pregnancy, but after this, it should be increased as she requires it”

Harmsworth’s Home Doctor 1926
Management of the weaning-to-oestrous interval (WOI)

There is a negative correlation between conception and subsequent litter size with WOI.

- Efficiency of farrowing and uterine involution
- Nutrition during lactation and bodyfat reserves
- Length of lactation
- Boar presence after weaning
- Stress factors after weaning
- Environmental temperatures
- Day-length/light intensity
Boar fertility, semen quality and semen storage

“Almost half of on-farm semen storage units were found to produce unacceptable semen storage temperatures………..”

Young, Dewey and Friendship (2005)
Timing is everything

Late Standing Heat

Normal Standing Heat

Early Standing Heat

Source: Weitze (1994) and unashamedly stolen from one of Christianne Glossop’s slides!
Accurate heat detection is essential for correct timing of insemination/service

- **Variation in intensity of oestrus**
  - Behaviour, external signs and duration of oestrus

- **Unsuitable environmental conditions**
  - Restricted movement, overcrowding, poor lighting, poor air quality, lack of boar stimulation

- **Inhibition of signs of oestrus**
  - Pain, injury, disease, fear

- **Signs of oestrus not observed**
  - Poor records, poor stockmanship, poor management, ineffective boar
  - Check for oestrus in free-standing sows or gilts twice per day
Effect of boars on the standing reflex of sows in oestrus (Signoret et al., 1961)

<table>
<thead>
<tr>
<th>Boar stimuli</th>
<th>% sows showing standing reflex</th>
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<tbody>
<tr>
<td>None</td>
<td>48</td>
</tr>
<tr>
<td>Sound and smell</td>
<td>90</td>
</tr>
<tr>
<td>Sight, sound and smell</td>
<td>97</td>
</tr>
<tr>
<td>Sight, sound, smell and touch</td>
<td>100</td>
</tr>
</tbody>
</table>
The first 35 days of pregnancy are critical

- Maintain boar presence
- Avoid environmental stress factors
- Be aware of social interactions between old (big) and young (small) sows and gilts
- Feed to condition, but perhaps do not overfeed
Social and endocrine interactions?

- Pheromones in boar saliva and pregnant sow urine?
  
  *(In pregnant mice, female urine decreases LH)*
  
  - Pregnancy in gilts fails in presence of sows *(Wilson and Love, 1990)*
  - Urine from stressed gilts inhibited onset of puberty in non-stressed gilts
  - Stressed gilts have lowered LH
    
    *(In mice, LH increases in presence of male)*
    
    - Early pregnancy is maintained by boar presence *(Wilson and Love, 1986)*
    - In the absence of boars, sows become seasonally anoestrus *(Mauget, 1982)*

- Bullying, pain and stress raise blood cortisol and lactate levels
Understanding of optimum herd profile

- Most of the problems are caused by 10% of the breeding herd
- The most productive sows tend to be in parities 3, 4 and 5
- Identify poor performers and cull them
- Use ultrasound scanning to identify failures early and to avoid “passengers”
- Females must be pregnant by 42 days after first service or culled
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Acknowledgement:
Derek Armstrong

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