Improving Piglet Survival

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Total pre-weaning mortality (stillbirths + live-born mortality) = 16-20%.

~ 2 million piglets die each year in the UK.

Economic concern ~ £72-90m potential loss per annum.

Welfare concern: death can involve chilling/starvation/overlying.
What pre-disposes live-born mortality?
Events pre-disposing postnatal mortality

- Low birth weight/viability
- Litter size
- Reduced colostrum intake
- Disease
- Sub-optimal temperature
- Lowering of body temperature
- Chilling
- Lethargy
- Starvation
- Overlying
- Physical trauma (e.g. savaging)
- DEATH

Edwards, 2002
Risk factor – Low birth weight
How can we improve piglet birth weight?

**Immediate**
- Improve piglet birth weight
  - Optimum nutrition during gestation and lactation
  - Maintaining high feed intake during lactation influences immediate litter growth rate and survival and influences the sow’s next litter

**Long-term**
- Genetic selection strategies
  - Select for optimum weight
  - Select for reduced within-litter weight variability
Risk factor – Chilling

Piglet core body temperature

Piglet is the most cold sensitive livestock neonate, born with very little adipose tissue and no brown fat.

Newborn = 0 minutes

Newborn = +1 minutes
Temperature profile of newborn Piglet A
How can we reduce the risk of chilling?

Immediate

• Improve piglet micro-climate (cf. outdoor study)
  – Limit routes of heat loss

Long-term
Piglet body temperature in different farrowing environments

<table>
<thead>
<tr>
<th>Time after birth (h)</th>
<th>Body temperature (°C)</th>
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<tbody>
<tr>
<td>Indoor</td>
<td>Outdoor</td>
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- Indoor: Increasing trend from 37°C to 39°C after 0h, 2h, and 24h.
- Outdoor: Increasing trend from 37°C to 39°C after 0h, 2h, and 24h.

Graph showing the body temperature of piglets in indoor and outdoor environments over time.
Improve the microclimate

Slat temperature

Slat and straw temperature
How can we reduce the risk of chilling?

Immediate

• Improve piglet micro-climate (cf. outdoor study)
  – Limit routes of heat loss

• Improve piglet birth weight
  – Birth rectal temperature correlates with birth weight

Long-term

• Genetic selection strategies
  – Select for physiological maturity at birth
    ⇒ Increased vitality
    ⇒ Improve first time behaviours
  • Correlates with body temperature
Sucking colostrum increases core body temperature

Behavioural landmarks
Piglets that are quicker to reach the udder, find a teat and suck are more likely to survive

Piglets sucking at udder
Risk factor – low colostrum intake

- Colostrum needed for immunity
- Colostrum available continuously throughout farrowing
- Colostrum available for 24-30h after farrowing starts
- Changes to milk after 30h
How can we improve piglet behaviour?

**Immediate**
- Improve micro-climate for piglets (cf. outdoor environment)
  - Behaviour correlates with birth rectal temperature
- Indirectly via improved maternal behaviour

**Long-term**
- Genetic selection strategies
  - Selection for placental efficiency
    - less chance of oxygen deprivation
  - Select for physiological maturity at birth
    - Increased vitality
    - Improve first time behaviours
Behaviour during farrowing

• Negative maternal behaviour will influence piglet survival
  – E.g. savaging

• Savaging is more likely when animals are:
  – Fearful (i.e. gilts)
  – In pain
  – Under stress (e.g. restriction)
  • Evidence that prenatal stress increases the risk that female offspring will savage as mothers (Jarvis et al. 2006)
How can we improve maternal behaviour?

Immediate
Decrease chances of negative maternal behaviour
• Minimise gestational stress
• Decrease sow stress particularly during nesting and farrowing
  – Give substrate to allow nesting behaviour
  ⇒ Improved farrowing behaviour
  – Minimise heat stress

Promote positive maternal behaviour

Long-term
• Genetic selection strategies
  E.g. Breeding for improved maternal behaviour
Can we breed for good maternal behaviour?

• The GENOMUM project
• Genetic selection for improved pre-weaning survival of outdoor pigs
• Two lines
  – HIGH SURVIVAL
  – AVERAGE

Achieved a 3% improvement in piglet survival
Can we breed for good maternal behaviour?

Crushing behaviour

P=0.002

No. of events

High Survival

Genotype

Average
Conclusion and take-home message

• The sow, piglets and their environment all interact to influence piglet survival
  – Solutions must focus on immediate (environmental improvements), as well as the long-term (biological “improvements” via genetic selection programmes) strategies
Acknowledgements