Cross fostering affects the performance of both small and heavy piglets throughout production

Anne Huting, Ian Wellock, and Ilias Kyriazakis
The problem

- Litter size as **breeding goal**

**United Kingdom (indoor breeding herds)**

- **Litter size as breeding goal**

- **Total piglets born/ litter**
- **Total piglets born alive/ litter**
- **Pigs weaned per litter**

AHDB pork
• Litter size as breeding goal

However, with increasing litter size:
average birth weight ↓
number of piglets born light ↑

AHDB pork
The problem

- Fatter carcass
- ↓ Growth performance
- Batch inefficiency
- ↓ Feed efficiency
- ↓ Profit

Profit
Management strategies

• Cross fostering
  • Reducing BW variation
  • Benefits **Light** piglets:
    • ↓ Mortality
    • ↑ Pre-weaning performance

➢ What is the effect on **Heavy** piglets?

• Creep feed
  • Additional nutrient source
  • Adaptation digestive tract
  • Reduces post-weaning growth check

➢ Does **litter composition** play a role?
Aim & Hypothesis

Aim: ‘What is the effect of litter mate weight and creep feed availability on performance of piglets born Light and Heavy?’

Hypothesis:

Cross fostering
- **Light** piglets in **UNIFORM** litters → perform better...
- **Heavy** piglets in **UNIFORM** litters → perform similarly...
  ... compared to those in **MIXED** litters

Creep feed provision
Piglets that are more likely to eat creep feed, are:
- **Heavy** piglets in **UNIFORM** litters
Litters with creep feed → perform better
Experimental design

Birth weight class
- 600 g – 1.25 kg
- 1.50 kg – 2.00 kg

Cross fostering (>12 - <24h after birth)
- UNIFORM
- MIXED

Creep feed (>d10 - weaning)
- Yes
- No

Light only
- Heavy only
- Light & Heavy
Measurements

General information:
Large White x Landrace
6 replicates per treatment

Birth (d0)
Weaning (d28)
Grower (d61)
Finisher (d88)
Slaughter (d165)

Daily Creep feed intake
## Results

### Pre-weaning removal

<table>
<thead>
<tr>
<th>Litter composition</th>
<th>UNIFORM</th>
<th></th>
<th>MIXED</th>
<th></th>
<th></th>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight category</td>
<td>Light</td>
<td>Heavy</td>
<td>Light</td>
<td>Heavy</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of pigs on trial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d0</td>
<td>144</td>
<td>144</td>
<td>77</td>
<td>77</td>
<td>144</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Reasons removal (%)**

<table>
<thead>
<tr>
<th></th>
<th>UNIFORM</th>
<th></th>
<th>MIXED</th>
<th></th>
<th></th>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Found dead &lt;d2</td>
<td>4.2</td>
<td>0.0</td>
<td>3.9</td>
<td>0.0</td>
<td>2.1</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>Lost BW &lt; d10</td>
<td>9.7</td>
<td>6.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.8</td>
<td>1.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.9</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Found dead (d2 - d28)</td>
<td>3.5</td>
<td>2.1</td>
<td>6.5</td>
<td>2.6</td>
<td>4.9</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Under 4 kg at d28</td>
<td>1.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.4</td>
<td>5.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.0</td>
<td>2.8</td>
<td>0.083</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18.8</td>
<td>10.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>23.4</td>
<td>3.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>14.6</td>
<td>0.001</td>
<td></td>
</tr>
</tbody>
</table>

---

**Model:** Chi-square
Results

- **Daily creep feed intake** \((LSM \pm 95\% CI)\)

**Model:** Proc GLM SAS; Random= batch; Back transformed data (log)
Results

**Daily intake** (g/day/piglet)  
\( (LSM \pm 95\% \, CI) \)

**Total intake** (g/piglet)  
\( (LSM \pm SEM) \)

- **UNIFORM (Light)**
- **UNIFORM (Heavy)**
- **MIXED**

Litter type \((P<0.05)\)
Results

- Pre-weaning performance ($LSM \pm SEM$)

![Graph showing weaning weight comparison between Light and Heavy UNIFORM and MIXED litters with statistical significance.](image)

**Model:** Proc Mixed SAS; Random= batch (litter); Weight= # of L and N piglets within litter
Results

- Post-weaning performance \((LSM \pm SEM)\)

**Grower**

- Body weight (kg): Light, Heavy

**Finisher**

- Body weight (kg): Light, Heavy

Litter type * Birth weight class \((P=0.0724)\)

Litter type * Birth weight class \((P=0.0203)\)

No effect on ADG nor scaled ADG

Model: Proc Mixed SAS; Random= batch (pen), Weight= # of L and N piglets within pen
Conclusions

The effect of cross fostering
- ↑ Performance of Light piglets in UNIFORM litters
  - ↓ # of piglets removed <4 kg at weaning
- ↓ Performance of Heavy piglets in UNIFORM litters
  - ↑ # of piglets removed for losing BW <10 days

Weaning weight advantage sustained to slaughter

The effect of creep feed provision
- Creep feed provision did NOT contribute to an improved pre-weaning performance
- Heavy piglets in UNIFORM litters ate the HIGHEST quantity
Acknowledgements

- Project sponsors
- Cockle Park farm staff
- EAAP Scholarship
Thank you for your attention.