Relationships between sow conformation and crushing events in commercial piglet production

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Background

- Farrowing crates introduced to reduce piglet mortality
  - Reduces sow movement, potentially reducing crushing

- Genetic selection to maximise back length and lean muscle growth rate for meat production
  - Resulting in change of sow body shape
  - Increased difficulty in the control of posture changes

- Potential for increased piglet mortality due to crushing by the dam

- However, confinement in a crate may also have an impact on sow movement control
Aim:

- To look at the relationship between:
  - Sow front and hind leg conformation
  - Sow leg defects
  - Farrowing floor type

- On piglet crushing events
  - Sow level
  - Piglet level
Data collection

- Data collection carried out on JSR multiplier herd
- 750 Landrace sow herd producing hybrid gilts
- 28-35 sows farrowing weekly
  - Regumate used to delay farrowing (approx. 50%)
- Farrowing floor surface
- Parity
- Administration of regumate
- Leg conformation (fore and hind)
- Leg defects - e.g. bursitis, long claws
Farrowing floor types
Leg conformation

Pigeon-Toed | Normal | X-shaped

Sickled front leg | Straight front leg | Buckled front leg | Severe buckle

Standing back | Normal | Standing under

Upright Pastern | Normal Pastern | Weak Pastern

Post-legged hind legs | Normal | Sickle-hocked

Buckled pastern | Weak pastern
Data collection

Piglet data

- Weight at processing (18-24 hours after birth)
- Piglet sex
- IUGR - status – defined by head morphology
- Reason and time of death

- Time span = 52 weeks
- Total of 21,159 piglets born
- 1,577 individual litters
Sow level – Total number of piglets crushed

- Claw length
  - Longer clawed sows crush more piglets

![Graph showing claw length vs number of piglets crushed](image)

Model = Proc Mixed (SAS) ; Sow ID = random factor

P = 0.032
Sow level – Total number of piglets crushed

- Farrowing floor type
- Difference between concrete/metal floor and concrete/plastic floor

Model = Proc Mixed (SAS); Sow ID = random factor
Sow level – Total number of piglets crushed

- Floor type x Regumate interaction
- No regumate (blue bars) – no difference between floor types
- Regumate (orange bars) – Concrete/plastic has more crushed piglets

Model = Proc Mixed (SAS) ; Sow ID = random factor

Farrowing floor type* Regumate interaction

P = 0.031

- No Regumate
- Regumate

- P < 0.001
- P = 0.001
- P = 0.039
- P = 0.059
Sow level - Total number of piglets crushed

**Hind leg placement*farowing floor floor interaction**

- **Standing back**
- **Normal**
- **Standing under**

**Farrowing floor type**
- **Concrete/Metal**
- **Concrete/Plastic**
- **Metal**
- **Plastic**

**Number piglets crushed**

- **Concrete/Metal**
  - **Standing back**: 1
  - **Normal**: 2
  - **Standing under**: 3

- **Concrete/Plastic**
  - **Standing back**: 1.5
  - **Normal**: 3
  - **Standing under**: 3.5

- **Metal**
  - **Standing back**: 1
  - **Normal**: 2
  - **Standing under**: 4

- **Plastic**
  - **Standing back**: 0.5
  - **Normal**: 2.5
  - **Standing under**: 3

**P = 0.011**
Piglet level – Probability of being crushed

Model = Proc Glimmix, Logit link, Binary Response (SAS) ; Sow_week= random factor

- Females
  - Lower log likelihood of being crushed

- No Bursitis
  - Lower log likelihood of being crushed

- No Regumate given
  - Lower log likelihood of being crushed
Piglet level – Farrowing floor type comparisons

- Concrete/Plastic floor
  Higher log likelihood of crushing compared to
  - Concrete/Metal slatted floor
  And
  - Fully Metal slatted floor

Model = Proc Glimmix, Logit link, Binary Response (SAS); Sow_week = random factor
Piglet level – Regumate within farrowing floor type

- Concrete/Plastic slatted floor
- Higher log likelihood of being crushed when the sow has been given regumate

Model = Proc Glimmix, Logit link, Binary Response (SAS); Sow_week = random factor

Farrowing floor type*Regumate interaction

P = 0.034

P < 0.001

P = 0.001

P = 0.015

P = 0.02

P = 0.025
Probability of being crushed by processing

- Weight $P < 0.0001$
- Weight x head shape $(P < 0.0001)$
- Effect of head shape differs as weight increases
- Difference in the interactive effect between IUGR (green) head shape and normal (blue) head shape $(P < 0.0001)$

Model = Proc Glimmix, Logit link, Binary Response (SAS) ; Sow_week = random factor
Conclusions so far ...

- **Sow level:**
  - Sow leg conformation and claw length interact with the type of farrowing floor on the total number of piglets crushed
  - Total number of piglets crushed is affected by the use of regumate to prevent farrowing and the farrowing floor type

- **Piglet level:**
  - Probability of being crushed increases in the presence of sow hock bursitis, being born male and with the use of regumate
  - Probability of being crushed is affected by the use of regumate to prevent farrowing and the farrowing floor type
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