The behaviour of low-risk and high-risk crushing sows in free-farrowing pens

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Introduction

- Permanent fixation in crates are against biological and behavioural needs of the sows (Damm et al., 2002; Baxter et al., 2011)

- Free-farrowing systems give the sows more freedom of movement and unrestricted contact with the piglets (Damm et al., 2002)

- Piglet mortality rates range from 11 to 34 % in free-farrowing pens (Pedersen et al., 1998; Weber, 2000; Marchant et al., 2001; Andersen et al., 2007; Baxter et al., 2015)
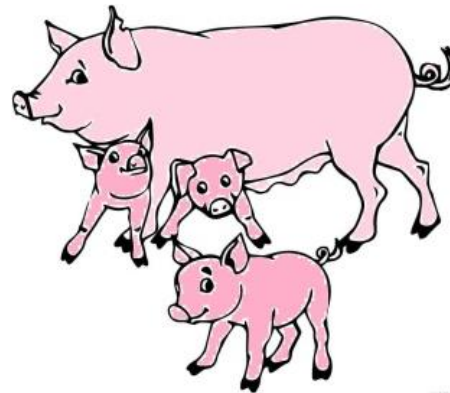
Introduction

Maternal performance

Litter size

Health of the piglets

Condition and age of the sow

Birth weight

Expertise of the sow

Expertise of the stockpersons

Lying down and rolling behaviour of the sow

Behaviour of the piglets

Pen design

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Lying down and rolling behaviour of the sow
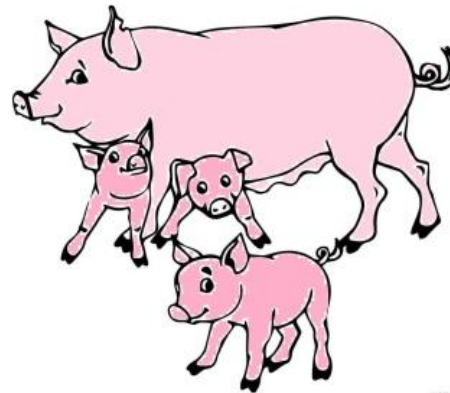
Behaviour of the piglets

Pen design

Aim of the study

Investigation of differences in the behaviour of

high-risk and low-risk crushing sows and their piglets

in free-farrowing pens

- April 2016 - January 2017

- Futterkamp research farm of the Chamber of Agriculture of Schleswig-Holstein

- 80 sows (Large White × Landrace)

- 4 batches

- 14 piglets per sow (litter equalisation)

80 sows

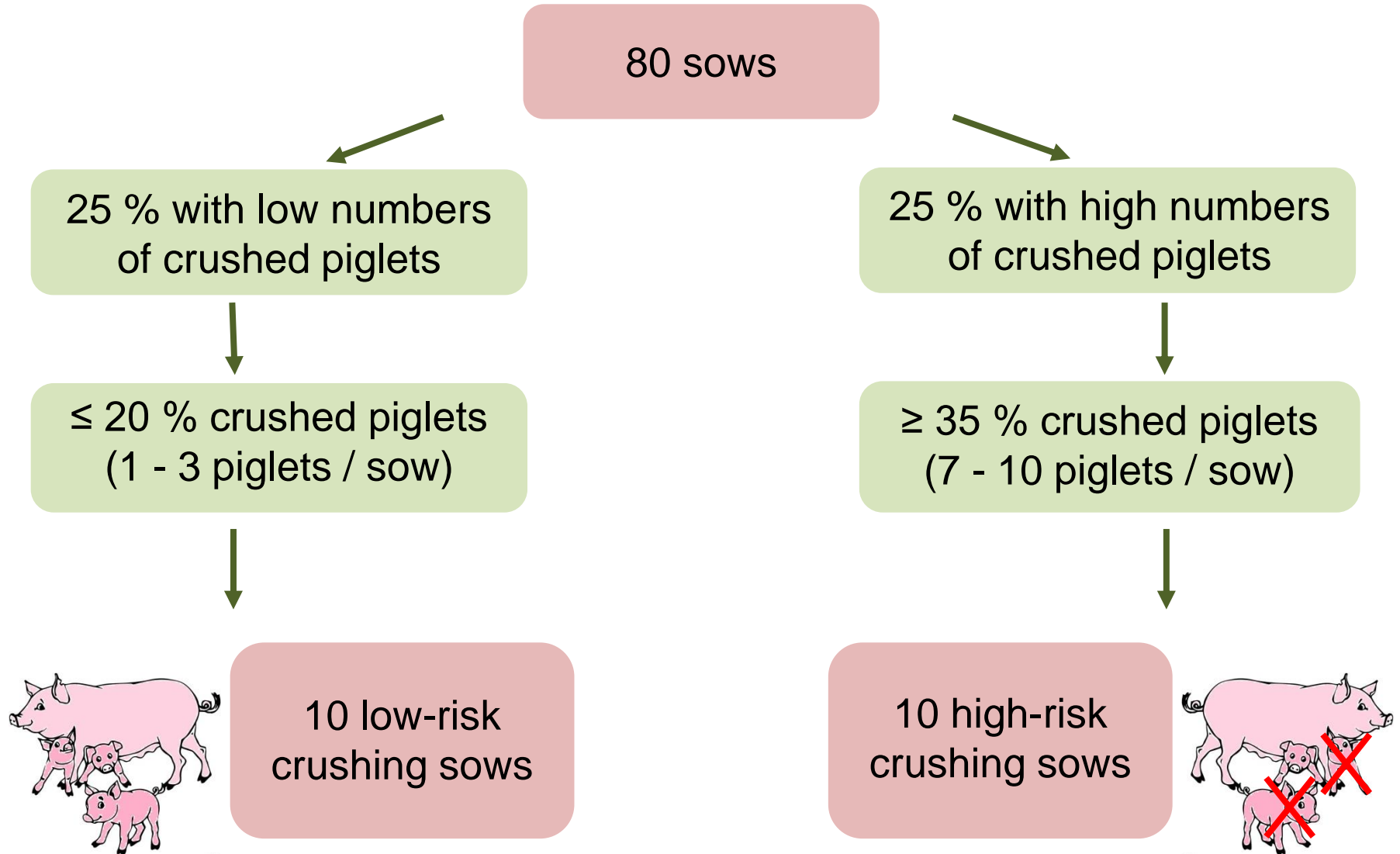25 % with low numbers of crushed piglets

25 % with high numbers of crushed piglets

≤ 20 % crushed piglets
(1 - 3 piglets / sow)

≥ 35 % crushed piglets
(7 - 10 piglets / sow)

10 low-risk crushing sows

10 high-risk crushing sows

- 72 hours post partum

- Event sampling

- Dangerous situations for piglets of being crushed

Lying down:
With pens walls,
without pen walls

Rolling:
Side to side,
side to belly,
belly to side

Piglets' position:
Nest, near sow,
active,
non-synchronous

Reproductive traits

- Piglets born alive, birth weight**: MIXED** procedure (SAS®)

- Crushed piglets: **GLIMMIX** procedure (SAS®, poisson distribution)

Behavioural parameters

- Lying down, rolling, piglets' position: **GLM** procedure (SAS®, MANOVA)

Fixed effects

- Group (high-risk crushing, low-risk crushing)

- Parity class (class 1: 1; class 2: 2-4; class 3: ≥5)

LSMeans of reproductive traits

	Low-risk crushing sows (n=10)	High-risk crushing sows (n=10)
Piglets born live	**14.0[a]**	**16.2[b]**
Birth weight / piglet (kg)	1.37	1.23

[a-b] Significant differences between the treatment groups ($p < 0.05$).

LSMeans of lying down behaviour

	Low-risk crushing sows	High-risk crushing sows
	(n=10)	(n=10)
Crushed piglets	**0.65[a]**	**2.64[b]**
Lying down 'with pen wall'	28.4[a]	24.5[a]
Lying down 'without pen wall'	8.10[a]	11.2[a]

[a-b] Significant differences between the treatment groups ($p < 0.05$).

LSMeans of rolling behaviour

	Low-risk crushing sows	High-risk crushing sows
	(n=10)	(n=10)
Crushed piglets	**0.52[a]**	**2.97[b]**
Rolling 'side-side'	**0.23[a]**	**9.37[b]**
Rolling 'belly-side'	13.8[a]	20.5[a]
Rolling 'side-belly'	**8.66[a]**	**23.5[b]**

[a-b] Significant differences between the treatment groups ($p<0.05$).

Piglets' position
Results

LSMeans (%) of piglets' position

	Low-risk crushing sows	High-risk crushing sows
	(n=10)	(n=10)
Piglet nest	25.5[a]	26.3[a]
Near sow	29.0[a]	39.5[a]
Active	**33.6[a]**	**21.7[b]**
Non-sychronous	11.8[a]	12.6[a]

[a-b] Significant differences between the treatment groups ($p<0.05$).

- 73 % of the crushed piglets during lactation were detected by video observation

- Same frequency of lying down movements, however, low-risk crushing sows had fewer crushed piglets

    - Pre-lying behaviour can decrease crushing
      (Burri et al., 2009; Marchant et al., 2001)

- Higher frequency of rolling movements of high-risk crushing sows

    - No pre-rolling behaviour described
      (Damm et al., 2005)

    - Slow rolling results in less losses
      (Weary et al., 1996)

- Piglets spend 90 % of the time after birth near the sow
  (Stanged and Jensen, 1991)

- Piglets of low-risk crushing sows were more active during postural changes

  - Stronger sow-piglet relations found in non-crated sows
    (Grimberg-Henrici et al., 2016; Arey and Sancha, 1996)

- High-risk crushing sows had significantly more live-born piglets and the piglets were lighter at birth (litter equalisation)
  (Philips et al., 2014; Andersen et al., 2005)

  - Piglet vitality and reactivity is correlated
    with birth weight and litter size
    (Roehe and Kalm, 2000)

Conclusion

❖ High variation in maternal behaviour and postural changes found

❖ No differences in the frequency of lying down movements detected

❖ High-risk crushing sows performed more rolling movements

❖ Piglets of high-risk crushing sows were less active during postural changes

Thank you for your attention

- ❖ High variation in maternal behaviour and postural changes found

- ❖ No differences in the frequency of lying down movements detected

- ❖ High-risk crushing sows performed more rolling movements

- ❖ Piglets of high-risk crushing sows were less active during postural changes