



Effect of comfort and enrichment for pregnant sows on performance, piglet birth characteristics and health during the suckling period

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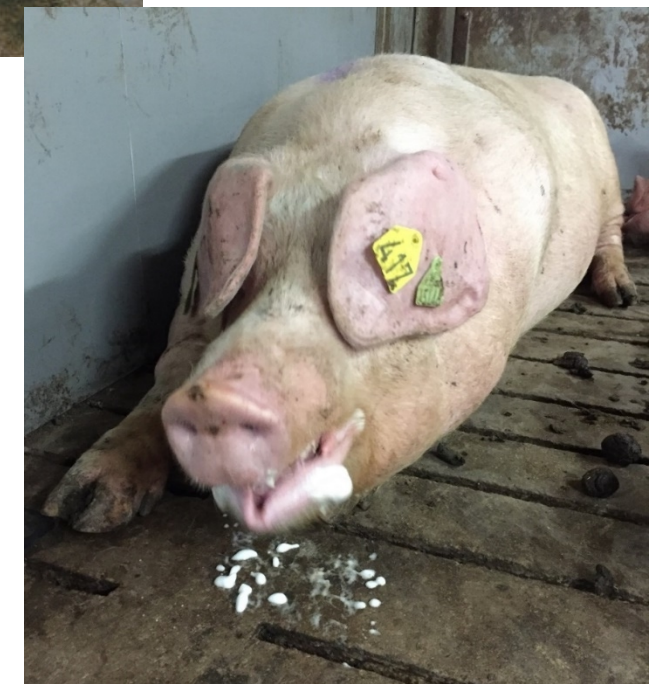


Introduction

- Conventional gestation housing/management associated with numerous sow welfare problems¹⁻⁶
 - Aggression
 - Skin lesions & injuries
 - Lameness
 - Feed-restriction & absence of enrichment
 - Hunger & lack of satiety
 - Unsatisfied natural behaviour motivation
- Behavioural problems e.g. oral stereotypies



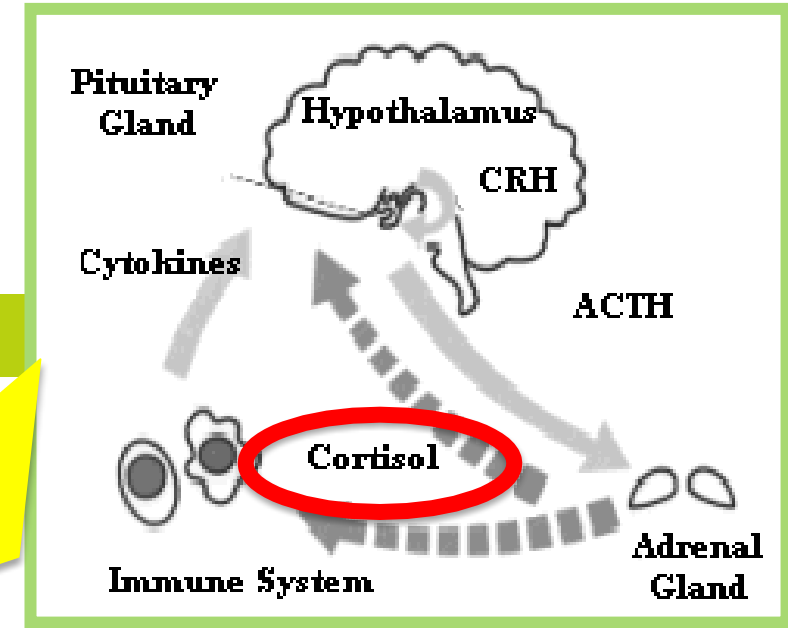
Chronic stress



1 Lagoda et al., 2022
2 Salak-Johnson et al., 2017
3 Martinez-Miro et al., 2016

4 Spolder et al., 2009
5 Tatemoto et al., 2019
6 Lagoda et al., 2023

Chronic stress → Prenatal stress



Risk Factors for Chronic Stress in Sows Housed in Groups, and Associated Risks of Prenatal Stress in Their Offspring

Martyna Ewa Lagoda^{1,2*}, Joanna Marchewka², Keelin O'Driscoll¹ and Laura Ann Boyle¹

- Piglet vitality
- Sow performance/litter characteristics
- Future performance of offspring
- Stress coping/immune function
- Health?



Stressor

Prenatal stress

- Major welfare problem in piglets
- Antibiotic use

→ Antimicrobial resistance



1 Lagoda et al., 2022
 2 Lagoda et al., 2023
 3 Merlot et al., 2013
 4 Marquardt et al., 1999

5 Casey et al., 2007
 6 van Staaveren et al., 2018
 7 Desrosiers 2013
 8 Xu et al., 2018

Improving the environment of conventional sow housing



Animal Welfare
www.cambridge.org/awf

Research Article

Indicators of improved gestation housing of sows. Part I: Effects on behaviour, skin lesions, locomotion, and tear staining

Martyna E Lagoda^{1,2} , Keelin O'Driscoll¹ , Maria C Galli³ ,
 Joanna Marchewka²  and Laura A Boyle¹ 

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Research Article

Indicators of improved gestation housing of sows. Part II: Effects on physiological measures, reproductive performance and health of the offspring

Martyna E Lagoda^{1,2} , Keelin O'Driscoll¹ , Maria C Galli³ , José J Cerón⁴,
 Alba Ortín-Bustillo⁴, Joanna Marchewka²  and Laura A Boyle¹ 

Cite this article: Lagoda ME, O'Driscoll K, Galli MC, Cerón JJ, Ortín-Bustillo A, Marchewka J and Boyle LA (2023). Indicators of improved

⇓ chronic stress in sows



⇓ Prenatal stress ↑ piglet performance, health etc. outcomes





Materials & Methods



⁷Sow management

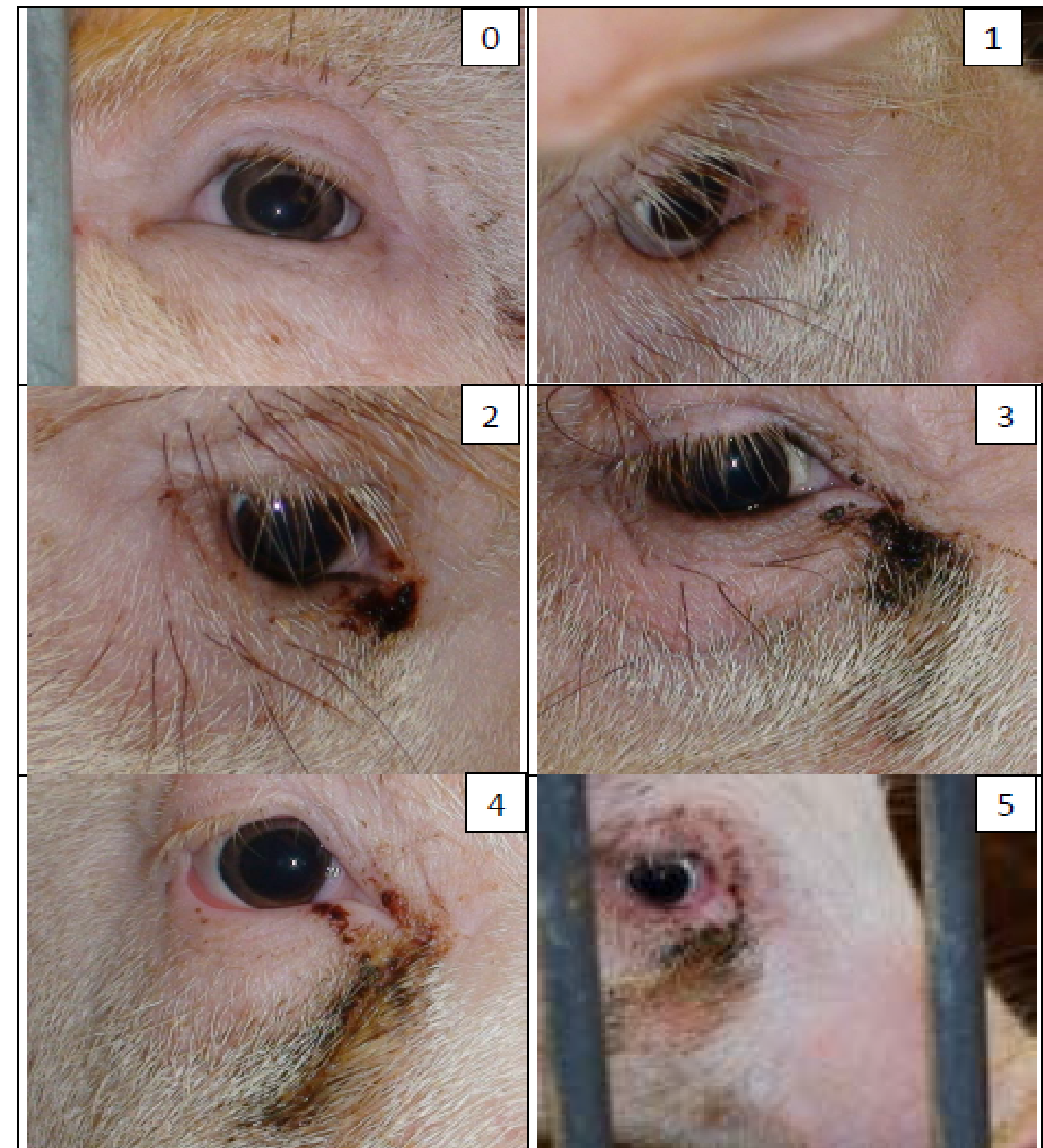
- Commercial, 2000-sow farrow to finish farm
- 240 sows; 6 time replicates
 - Improved n = 120 sows;
 - Conventional n = 120 sows
- Mixed into stable groups of 20 unfamiliar animals, on d30 post-service



Sow tear staining

- Mid-lactation & weaning
- Right & left eye scored separately

Description of tear stain	Score
No visible stains	0
Barely detectable stains not extending below eyelid	1
Visible stain < 50% in ratio to the eye	2
Visible stain 50-100% in ratio to the eyes	3
Visible stain > 100% in ratio to the eye, not extending below the mouth line	4
Visible stain extending below the mouth line	5



Haptoglobin in saliva

- Saliva collected from sows on d80 of pregnancy



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Litter characteristics

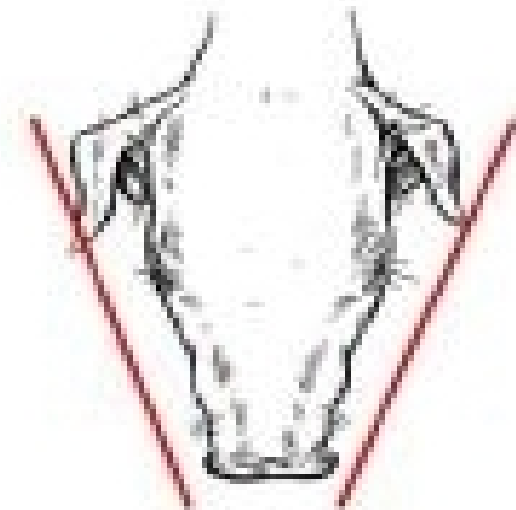
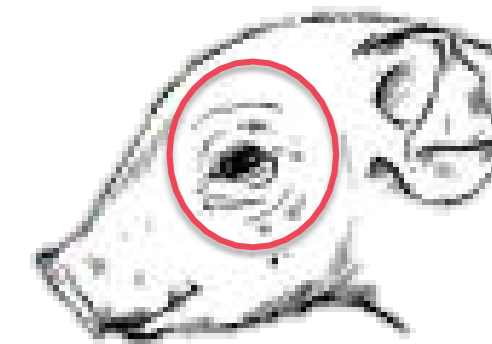
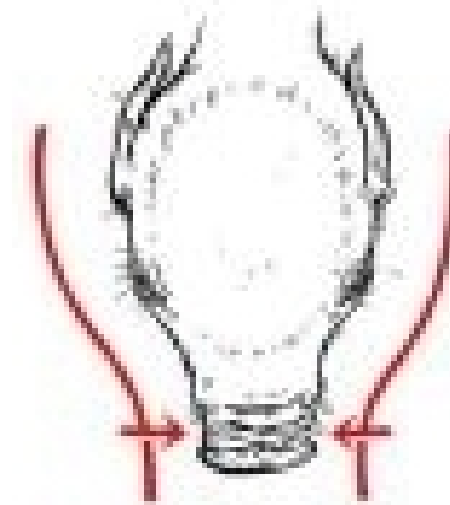
- No. piglets born alive
- No. piglets born dead
- No. mummified
- Total no. piglets born



Piglet characteristics

- Scored at birth
- Vitality
 - Vocalisation & escape attempts
 - Muscle tone
 - Position on return to crate
- Intra uterine growth retardation (IUGR)
 - Nose wrinkles
 - Bulging eyes
 - Cone head shape

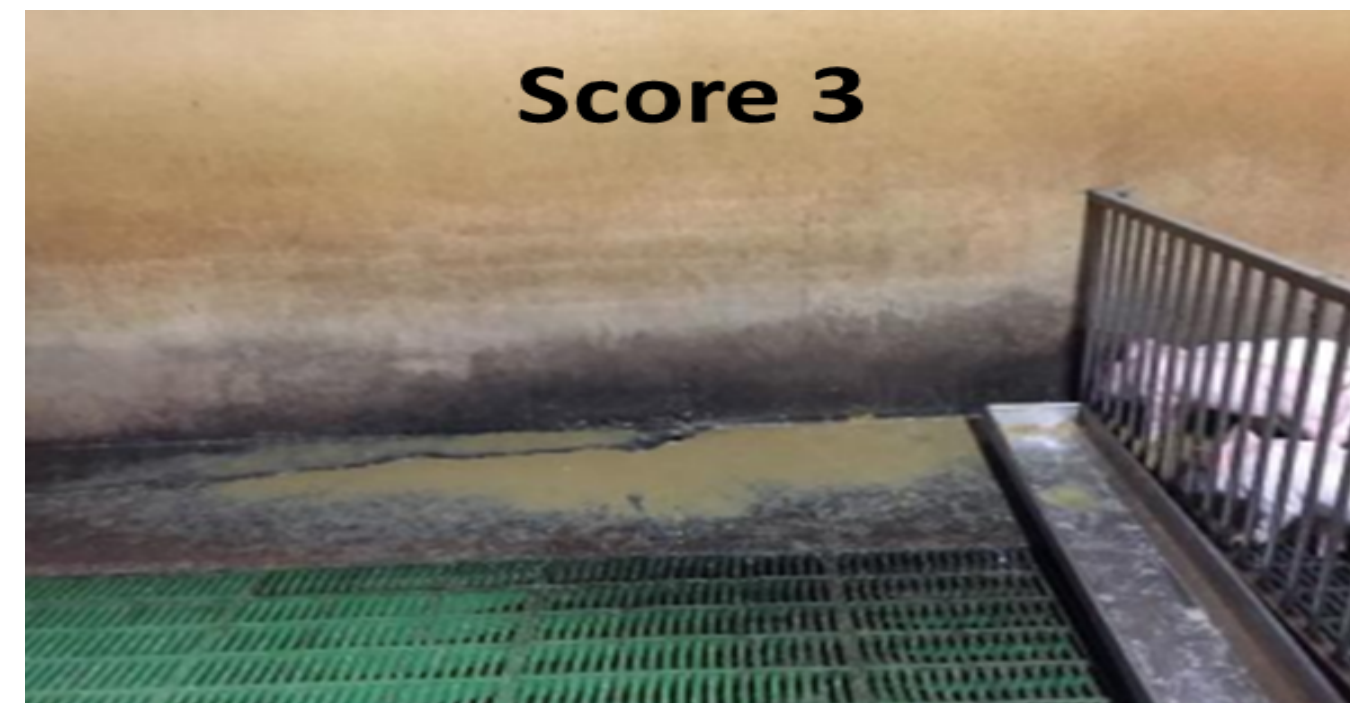
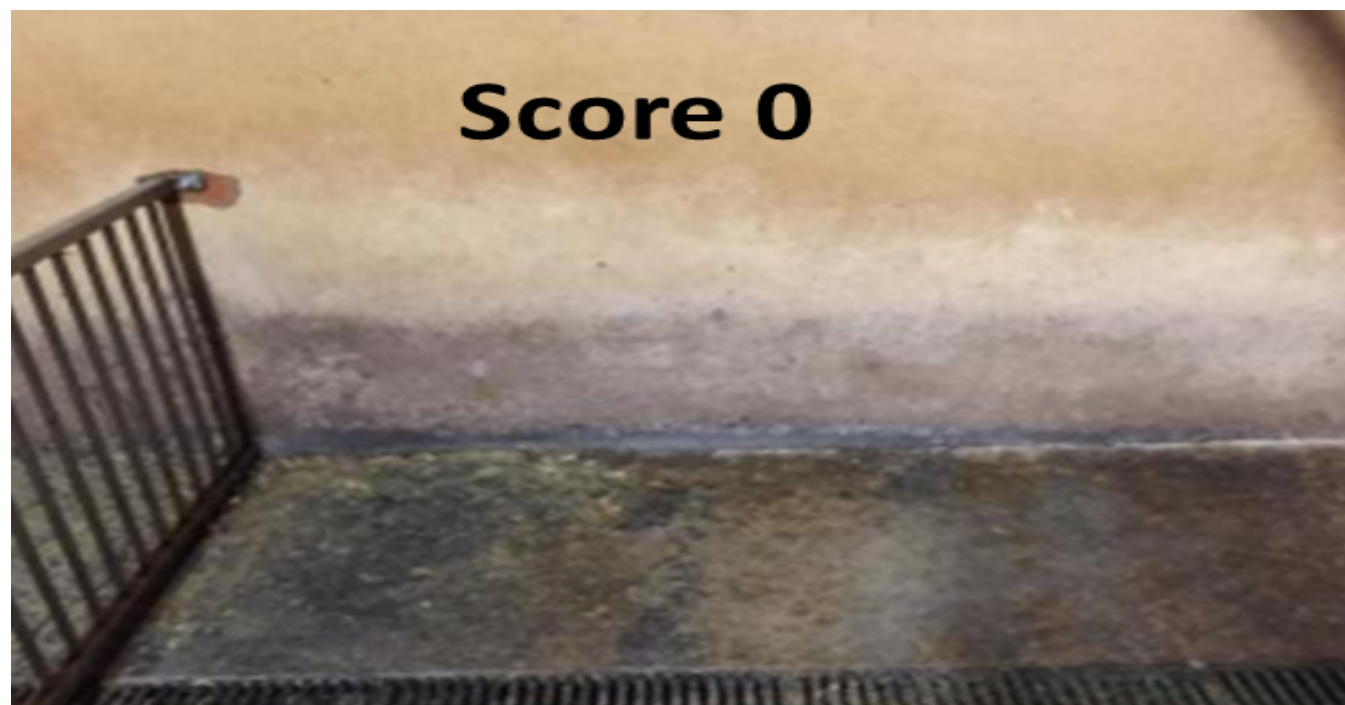
Vitality indicators	Vitality score	
	0	1
Reaction to handling - Vocalisation & escape	Piglet does not scream during handling, or piglet does not attempt to escape during handling	Piglet screams, or piglet attempts to escape
Muscle tone	Leg muscles are soft when pressed against handler's palm	Leg muscles are firm and piglet pushes back against handler's palm
Initial position on return to the farrowing pen	Piglet is on its back or lies on its side without trying to right itself (for > 20 s)	Piglet is immediately up on its four legs and moves away (within 20 s)



Diarrhoea

- Pens scored every 2nd day during lactation (n=10 scores per litter)
- Scores summed to give a total score per litter/sow during lactation

Description	Faecal score
Normal (dry, pelleted faeces)	0
Soft (soft faeces, with shape)	1
Mild diarrhoea (very soft or viscous liquid faeces)	2
Severe diarrhoea (watery faeces, or with blood)	3



Statistical analysis

- Generalized linear mixed models

- PROC MIXED & GLIMMIX;

LSmean \pm SE



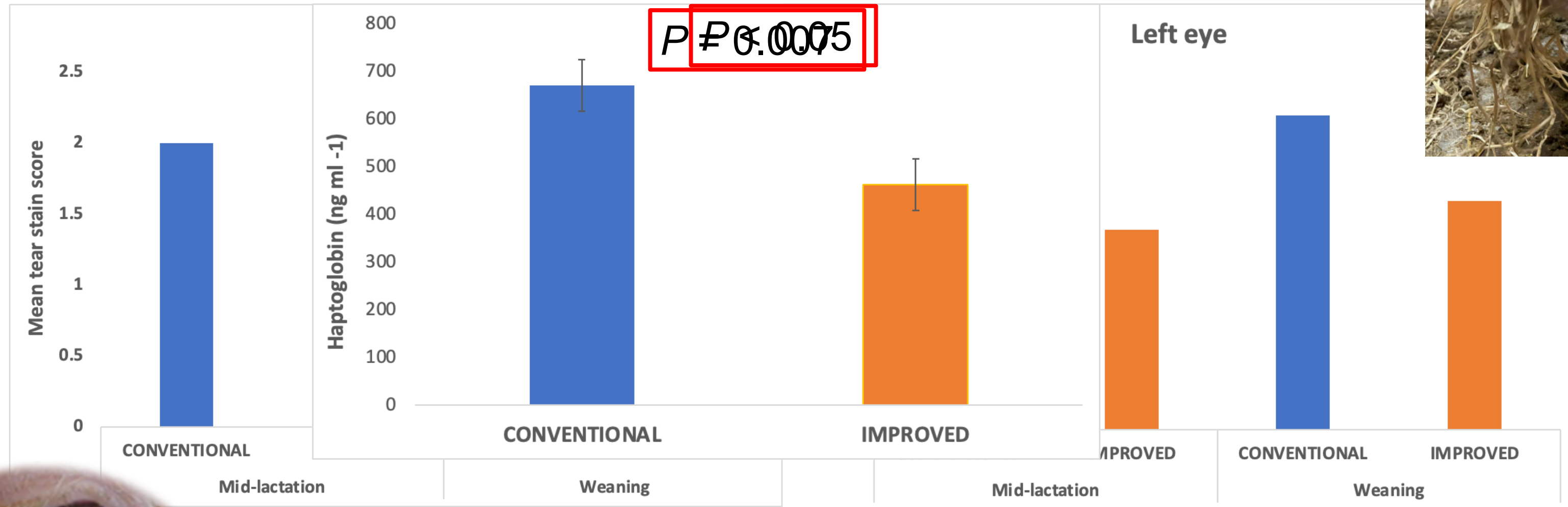
v9.4



Results



Salivary haptoglobin & tear stain scores



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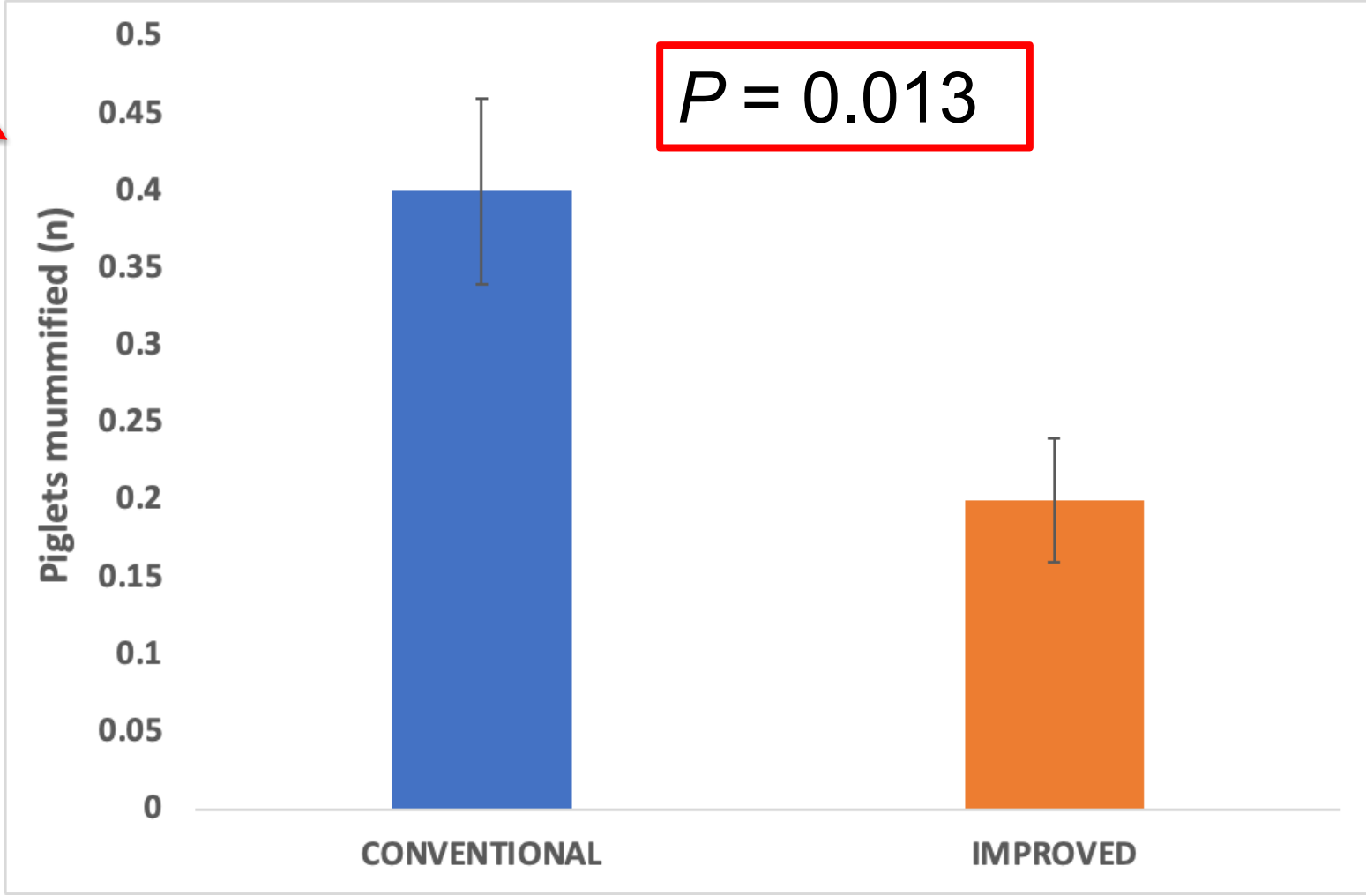
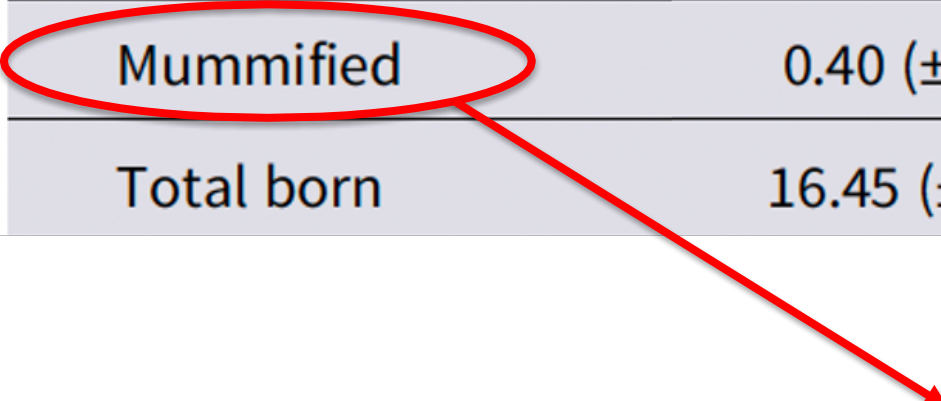
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Litter characteristics



Variable	CONTROL	IMPROVED	P-value
<i>Sow measures</i>			
Born alive	14.55 (± 0.28)	14.88 (± 0.29)	0.417
Born dead	1.43 (± 0.11)	1.19 (± 0.10)	0.113
Mummified	0.40 (± 0.06)	0.23 (± 0.04)	0.013
Total born	16.45 (± 0.30)	16.34 (± 0.31)	0.800



Piglet vitality & IUGR at birth

- No effect on vitality ($P > 0.05$)

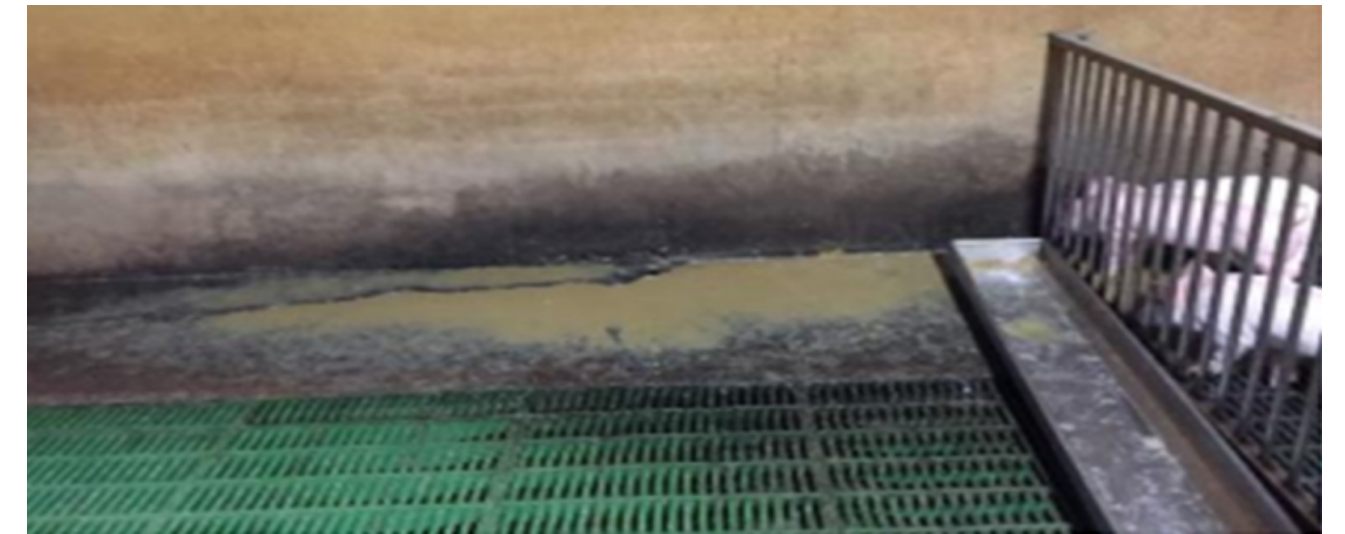
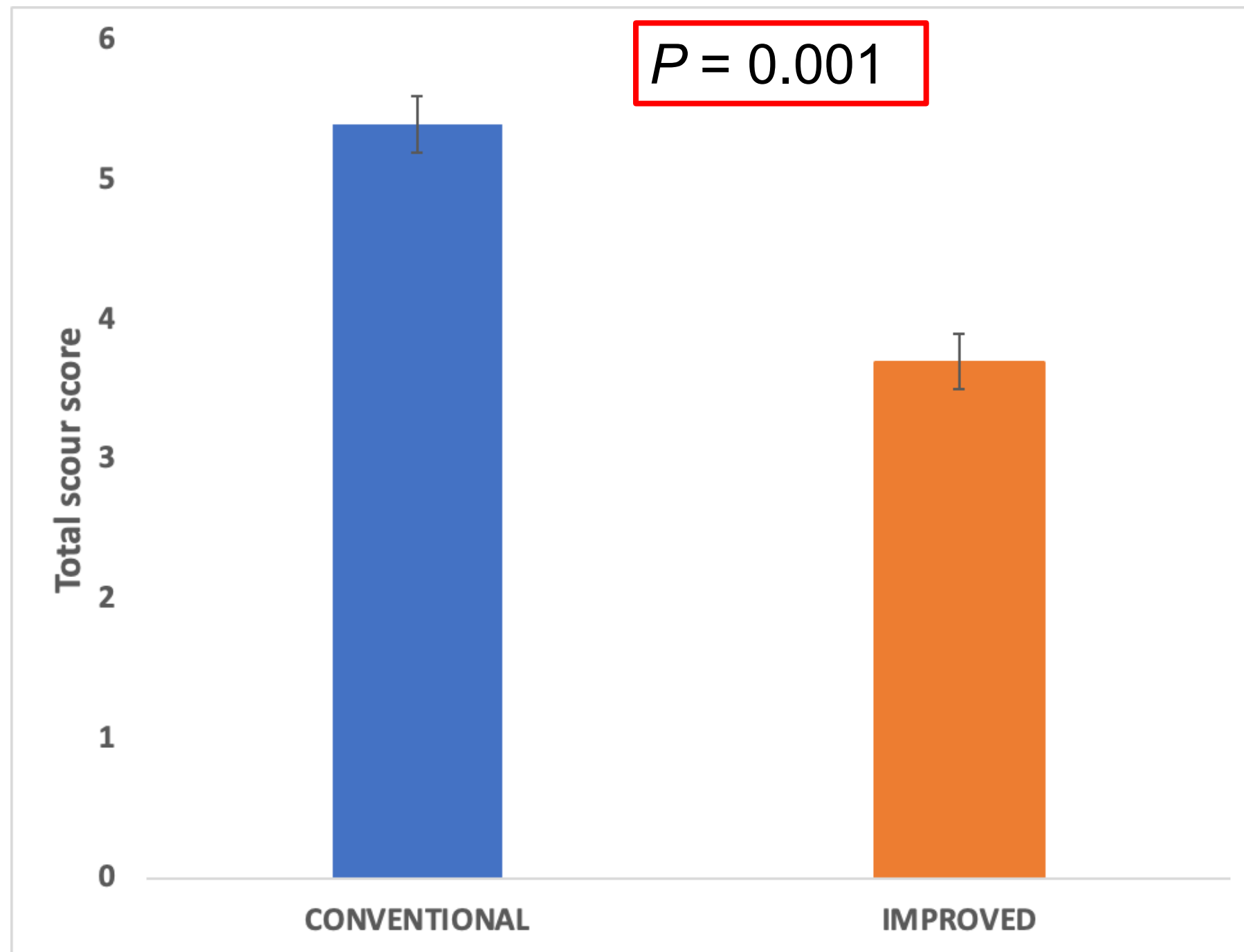
Table 5. Number of piglets per intra-uterine growth restriction (IUGR) score category at birth

IUGR score	CONTROL	IMPROVED
0	1,557	1,555
1	56	31
2	4	2
3	0	0



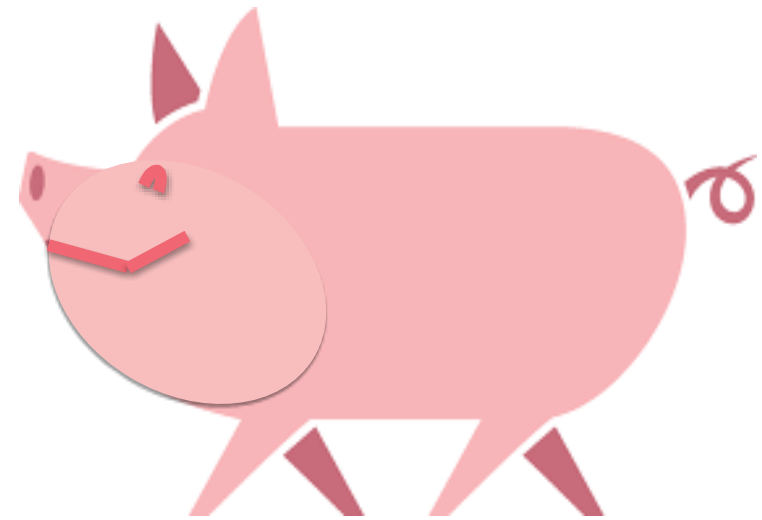
$P = 0.006$

Diarrhoea in piglets during suckling period (pen scores)



No. farrowing pens scored ≥ 2 in each treatment

Discussion



Improved housing

↑ **Sow welfare**

↓ Inflammation

↓ Tear stains

↓ **Chronic stress**

- Beneficial carry-over effect of the gestation housing environment once moved to farrowing crates^{1,2}

1 Espejo-Beristain et al., 2022

2 Lagoda et al., 2023

Discussion and conclusion



↓ **Chronic stress**

↑ Litter and piglet birth characteristics

↓ Diarrhoea

↓ **Prenatal stress?**

- Improving housing conditions for pregnant sows means healthier (and happier?) sows and piglets
- Potential incentive to pig producers to improve sow welfare during pregnancy

Acknowledgements

- SowWeanWel (0370) project
- Farm owner & staff at Ballylough farm
- Visiting students



WALSH SCHOLARSHIPS
PROGRAMME

