Moredun Research Institute

Pigs and Poultry - Optimising Production
16th January 2020

SRUC

SRUC'S PIG WELFARE RESEARCH

Emma Baxter
Emma.Baxter@sruc.ac.uk

Leading the way in Agriculture and Rural Research, Education and Consulting

People

Mhairi Jack

Marianne Farish

Agnieszka Futro

Jo Donbavand

Mark Brims, Elilidh Baker

SRUC

RESEARCH

CONSULTANCY

EDUCATION

PIG INFORMATION GROUP

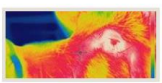
Pig Information Group

The Pig Information Group is made up of experts from SRUC and SAC Consulting who work on various topics relating to pigs. Our primary aim is to enhance communication with those in the pig supply chain.

People

E-newsletters

Pig Research Centre


Factsheets

SRUC EDUCATION

Education

Veterinary services

People

Mhairi Jack

Marianne Farish

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Sow research

- Dry sow
  - Social aggression and prenatal stress (Jarvis, Rutherford)
  - Automated detection of emotion (Baxter, Rutherford)
  - Welfare assessment – QBA (Wemelsfelder)
  - Sow satiety - feeding fibre, oral stereotypies (D'Eath, Baxter, Houdijk, Lawrence, Salazar)
- Farrowing sow
  - Analgesia to reduce pain at farrowing (Rutherford, Ison)
  - Developing free farrowing environments (Baxter, Jarvis)
  - Selecting the right sow for free farrowing (Baxter)
  - Improving piglet survival (Baxter, Roehe, Schmitt)

Kenny Rutherford

Susan Jarvis (now UofE)

Emma Baxter

Francoise Wemelsfelder

Rick D'Eath

Jos Houdijk

Alistair Lawrence

Laura Salazar

Sarah Ison (now WAPS)

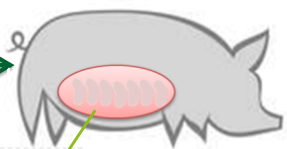
Rainer Roehe

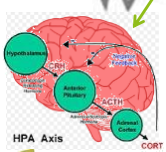
Océane Schmitt

Prenatal stress – Kenny Rutherford, Susan Jarvis

Can have indirect effects for developing offspring via prenatal stress (PNS)

Impacts directly on the sow





Stress can impact on fetal brain development

The Scottish Government

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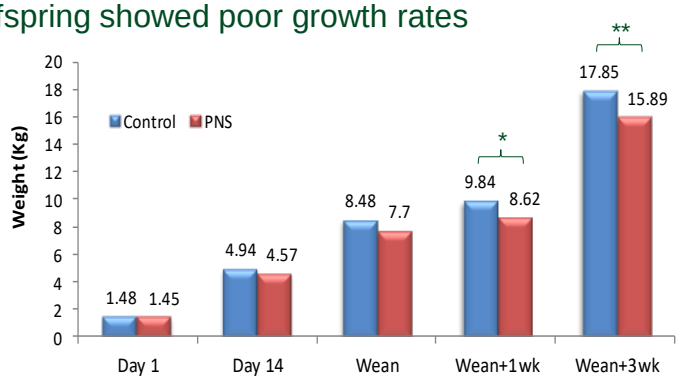
BBSRC
bioscience for the future

Outcomes for PNS offspring

- Increased stress and pain reactivity and increased disease susceptibility *(Rutherford et al. 2009 Bio Let)*
- Gilts from PNS sows showed poor maternal abilities *(Jarvis et al. 2006 Horm & Beh; Rutherford et al. 2014 Phys &Beh)*
- Offspring showed poor growth rates



More info: http://www.sruc.ac.uk/info/120579/mothers_matter email: Kenny.Rutherford@sruc.ac.uk

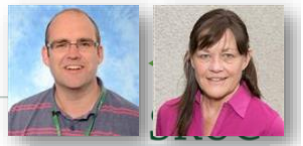
Sow satiety - Rick D'Eath, Emma Baxter, Alistair Lawrence, Jos Houdjik, Laura Salazar

- Ration feeding of dry sows resulting in hunger
  - Sows get ~50% of what they would eat ad libitum (*Read et al. in press*)
  - Abnormal oral behaviours, redirected foraging, aggression
- EU requirement to provide fibre
  - Which fibre types really help satiety?
  - Is hunger the cause of abnormal oral behaviours?

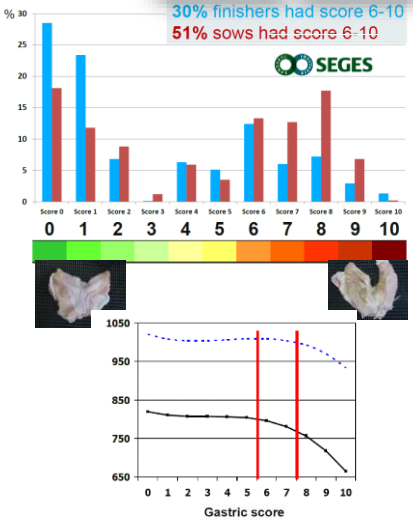
More info: Rick.Death@sruc.ac.uk Emma.Baxter@sruc.ac.uk

Gastric ulcers –

Kenny Rutherford, Jill Thomson



- Highly prevalent in many countries
- Main risk factor is feed structure and content
- What is the welfare relevance of different lesion severities?
  - Poor performance, effects on ADG
  - Pale pigs
  - Vomiting
  - Death
  - Pain? Pigs with ulcers show behaviours indicative of pain *(Rutherford et al. 2018 Lives Sci)*



More info: Kenny.Rutherford@sruc.ac.uk; Jill.Thomson@sac.co.uk

Welfare at farrowing: Emma Baxter, Susan Jarvis, Alistair Lawrence, Rainer Roehe

- The farrowing crate dilemma:
  - Crates introduced in 1960s
  - Fundamental and applied research at SRUC conducted for over 40 years demonstrating welfare detriments, mitigation strategies to protect both piglet and sow welfare, developing feasible alternatives

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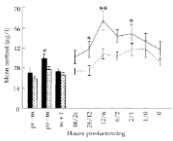
Department for Environment Food and Rural Affairs
SEVENTH FRAMEWORK PROGRAMME
JSR GENETICS
PIC
Sainsbury's
CIEL
The Scottish Government
GRAMPIAN COUNTIES FOOD GROUP
BPEX
QMS
RSPCA
SRUC
Newcastle University

From Pig Park to PigSAFE
40+ years of farrowing research

Crated sows sig. more stressed than loose

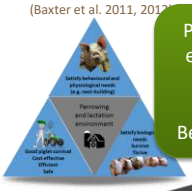
Edinburgh Pig Park

Stolba & Wood-Gush (1984, 1989) show natural behaviours still exist in domestic sows
NEST-BUILDING = BEHAVIOURAL NEED
Alternatives housing designed – Edinburgh Family pen



Stress physiology
Lawrence et al. (1992, 1994), Jarvis et al. (1997) show crated sows experience greater stress than loose housed sows

Re-designing the farrowing environment to optimise welfare and economics
(Baxter et al. 2011, 201…



PigSAFE can deliver equivalent survival
Better weaning weights
Better sow condition

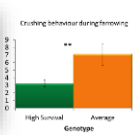
PigSAFE
Free Farrowing management
Free Farrowing selection
Supporting uptake

Commercial PigSAFE development
FREESOW – selecting right sow for FF
Optimise management in FF

2010s
2000s
1990s
1980s

Improving piglet survival
Baxter et al. (2008, 2009, 2011), Investigate indicators of piglet survival in different systems
Roehe et al. (2009, 2010) show you can breed for high survival

Breeding for high survival improves survival (3% points)



Free Farrowing
www.freefarrowing.org

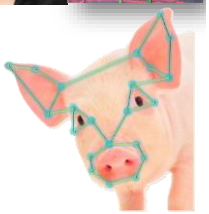
Welfare Assessment – QBA
(Francoise Wemelsfelder)

- Qualitative Behavioural Assessment
  - – Holistic assessment of animal body language
  - Emotional expression from demeanour
  - Not *what* animal is doing, but *how*
  - Descriptors created, look for agreement between experts
  - Assessment includes positives not just absence/presence of negatives

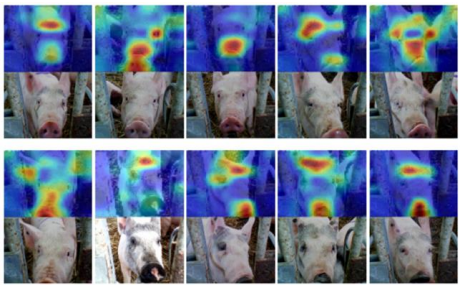
The Scottish Government

Welfare Quality
Science and society improving animal welfare

Automated detection of emotion in biometrically identified pig faces



- Pre-cursor project successfully used machine-vision technology to automatically identify individual pigs using their facial biometrics (Hansen et al. 2018. doi:10.1016/j.compind.2018.02.016) - **97% accurate**



BBSRC bioscience for the future

UWE Bristol University of the West of England

Centre for Machine Vision

brl

Automated detection of emotion in biometrically identified pig faces

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New project using this technology to:

- Identify different expressions indicative of negative and positive affective state
- Develop animal-centric welfare assessment tool (individuals, automated)

BBSRC bioscience for the future

JSR GENETICS

Garth Pig Practice Ltd

AGSENZ

SRUC

UWE Bristol University of the West of England

Centre for Machine Vision

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Piglet and weaner pig research

- Piglet
  - Tail docking (Sandercock, Rutherford)
  - Play, enrichment, positive welfare (Lawrence, Brown (UoE), Baxter)
- Weaner
  - Play, enrichment, positive welfare (Lawrence, Brown (UoE), Baxter)
  - Tails (D'Eath, Baxter, Sandercock, Chou)

Dale Sandercock

Kenny Rutherford

Alistair Lawrence

Sarah Brown (UofE, Roslin)

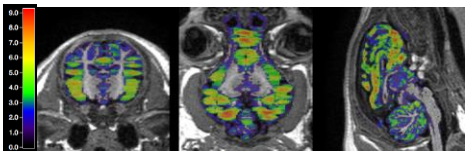
Emma Baxter

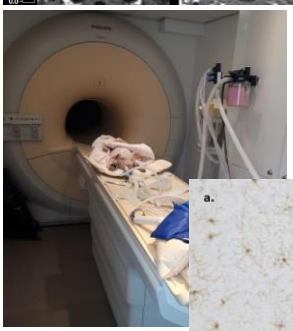
Jen-Yun Chou

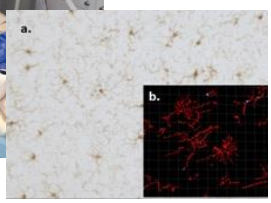
Rick D'Eath

Positive welfare: Play, enrichment Lawrence, Baxter, Brown (Roslin,UoE)

- Play important welfare indicator with production benefits
- Enriched neonatal environments stimulate play *(Martin et al. 2015 AABS; Brown et al. 2015 AABS)*
- Pigs that play more grow more *(Brown et al. 2015 AABS)*
- Environmental Enrichment (EE) improves average daily gain (33g per day avg diff between B and EE)
- EE piglets have improved brain health through favourable changes in mircroglial phenotype *(Brown et al. 2018 Beh Brai Res)*







Grower-Finisher pig research

- Social mixing aggression
(Turner, Camerlink, D'Eath)
- Tail biting
(D'Eath, Baxter, Sandercock, Chou)
- Gastric Ulcers
(Rutherford, Thomson)
- Microbiome, biomarkers
(Rutherford, Roehe, Auffret)
- Transport and Slaughter
(Mitchell, Kettlewell, Thomson, Baxter)

Simon Turner

Irene Camerlink (now UofV)

Rachel Peden

Rick D'Eath

Dale Sandercock

Emma Baxter

Jen-Yun Chou

Kenny Rutherford

Jill Thomson

Marc Auffret

Rainer Roehe

Malcolm Mitchell

Pete Kettlewell

Aggression: Genetics, behavioural, farmer attitudes: Simon Turner, Rick D'Eath, Irene Camerlink, Rachel Peden

- Researched over past ~15 years
- Skin lesions as proxy measure for aggression (*Turner et al. 2006, AABS)*
- Heritability 0.14 – 0.44 (heritability production traits 0.28 – 0.65)
- Distinction between front, middle and rear

- Gain a better understanding of why pigs fight (or not), who they fight and why they give up (or not) *(Camerlink et al. 2014, 2015, 2016, 2018)*
- Understanding farmer attitudes to aggression and mitigation strategies for reduction, how to translate research into practice *(Peden et al. 2018a,b)*

Pig Aggression - 7 Tips

Optimize regrouping

Mixing pigs helps to optimize group formation and allows precision feeding. Disadvantages such as stress, aggression and disease spread can level out the benefits.

Tip 1 Avoid regrouping when possible. If needed, than regroup pigs as young as possible. The older and heavier pigs are, the more likely that growth will be reduced and injuries occur.

Tip 2 Try to keep the number of unfamiliar pigs per pen as low as possible. The higher the familiarity, the fewer the fights. Caution: Do not put one or two unfamiliar pigs in an established group.

Careful selection of sows

Aggressiveness is heritable. Careful selection of the sows can thus reduce aggression in the population.

Tip 3 Score gilts on aggressiveness (e.g. 0 not aggressive – 5 aggressive) and take this score into consideration when selecting replacements.

Co-mingling litters pre-weaning

Co-mingling, or socialization, involves putting two or more litters together before weaning. This increases pigs' abilities to resolve dominance relationships quickly with limited long-term aggression.

Tip 4 Let litters co-mingle a few days before weaning (by removing barriers between crates) to reduce stress at weaning.

Pen conditions

When space is limited, pigs cannot properly retreat.

Tip 5 Providing plenty of space at mixing allows pigs to establish their hierarchy quickly.

Tip 6 Provide an obstacle behind which a pig can hide its head (e.g. straw bale) as this can substantially reduce injuries.

Tip 7 Enrichment material occupies pigs and keeps them from continued fighting. Caution: items can also be a resource to fight over, increasing aggression. Only provide an item if one pig can't control it (e.g. straw).

BBSRC bioscience for the future

The Scottish Government

Transport and Slaughter –

Malcolm Mitchell, Pete Ketterwell

SRUC

- Best practice for animal transport

- **Transport conditions**
- **Journey duration**
- **Stocking density**
- **Vehicle or container type**
- **Loading and unloading**
- **Genetics of the animal**

European Commission

defra
Department for Environment Food and Rural Affairs

More info: Malcolm.Mitchell@sruc.ac.uk; Peter.Kettlewell@sruc.ac.uk

Low Atmospheric Pressure Stunning (LAPS) in pigs: a humane alternative to carbon dioxide?

Dorothy McKeegan, Emma Baxter and Jessica Martin

defra
Department for Environment Food and Rural Affairs

Humane Slaughter Association

University of Glasgow

THE UNIVERSITY of EDINBURGH
The Royal (Dick) School of Veterinary Studies

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Summary

- Critical mass of science team and facilities to tackle challenges for pigs and producers at all production stages
- Wide range of funders, underpinned by Scottish Government

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FOR HIGHER AND FURTHER EDUCATION
2017

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