

Project number: 6026
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Preventing lameness in Irish pigs



Key external stakeholders:

Pig producers, consumers, policy makers, SME's (feed companies, suppliers of products to the pig industry)

Practical implications for stakeholders:

- The sustainability of pig farming is threatened by production diseases such as lameness because it increases costs of production, reduces productivity and sow longevity and threatens pig welfare because of the associated pain
- The environmental and dietary strategies investigated will reduce losses of young sows due to culling for lameness meaning that fewer replacement gilts need to be purchased/reared thereby reducing costs of production
- As sows will remain in the herd for longer, herd performance can be improved through a greater number of piglets produced per sow during her productive life
- Identification of risk factors for lameness in pigs in all stages of the production cycle associated with flooring and other management practices offers potential to improve the welfare of pigs on Irish farms and enhance the image of Irish pig farming
- Reducing lameness may reduce the use of parenteral antibiotics on pig farms which will help to reduce the risk which antimicrobial resistance poses to human and animal health

Main results:

- Very high prevalence of lameness in pigs and of claw lesions in sows is a welfare concern
- Most of the risk factors identified for lameness (and limb and claw lesions in piglets) were associated with the flooring used in pig accommodation
- Lameness in sows is set to increase with the change to group housing because of the strains placed on the locomotory system and claws by fully slatted floors
- Rubber flooring can help to overcome the problem of lameness in fully slatted group housing systems, it also improves sow comfort and may reduce culling for lameness
- Farrowing house floors with a high void area (e.g. slatted steel) should be avoided to protect claw health of sows and limb health of piglets during lactation
- In order to reduce lameness and improve longevity: replacement gilts should be housed separately from finisher stock from a young age, fed mineral supplements designed for claw health and fed a diet designed for slower growth rate to reduce joint lesions

Opportunity / Benefit: (See Section 5)

Collaborating Institutions:

University College Dublin, Belfield, Dublin 4, Ireland - UCD
University of Warwick, Coventry CV4 7AL, UK
EasyFix™ Rubber Products, Ballinasloe, Co. Galway, Ireland
Enterprise Ireland, Dublin, Ireland

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Dr. Amy KilBride (University of Warwick)
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1. Project background:

Lameness is a major production disease of pigs. It poses a major threat to the sustainability of current pig production methods because it represents a serious welfare problem and also because it has a detrimental impact on profitability. Lameness is defined as a deviation from the normal gait caused by lesions, diseases and other factors such as nutrition and housing systems, among others. The prevalence of lameness, risk factors for lameness and ways of addressing it (focusing on replacement gilts), was the topic of this project. Claw lesions are regarded as one of the main causes of lameness. Little is known of the prevalence of claw lesions in pregnant sows but studies of finishing pigs demonstrated an overall prevalence of foot lesions of 93.8% and of adventitious bursitis of 51%. Lame pigs have very poor welfare because they are in pain, suffer discomfort, are at a disadvantage when it comes to competing for resources, are more susceptible to other diseases and fail to thrive/reproduce. A study demonstrated that piglets with sole erosions and skin abrasions spent more time lying and less time in activities such as standing, walking, playing and fighting. These behavioural effects are indicative of reduced welfare. However, the impact of lameness on pig welfare is too often overlooked on pig units.

The root cause of most production diseases such as lameness lies in the interaction between the demands placed on animals for high productivity and the sub-optimal environment/management systems under which they are produced. This project attempted to address this complex interaction to reduce lameness, focusing on improving the environment and the nutrition of the replacement gilt to improve sow longevity. Addressing lameness in growing pigs represents an even more challenging research topic because of the clear positive relationship between growth rates and lameness and because of the ubiquitous use of fully slatted flooring which is a major risk factor for lameness.

2. Questions addressed by the project:

- What is the prevalence of lameness at each stage of the production cycle?
- What are the main causes and risks factors for lameness in Irish pigs?
- Does the change to group housing pose a risk for lameness in pregnant sows?
- What are the implications of feeding a gilt developer diet on indicators of lameness in group housed replacement gilts?
- What are the implications of housing pregnant sows in groups on rubber slat mats on their health, welfare and behaviour?

3. The experimental studies:

- (i) From a questionnaire and once-off visit based **survey of 68 Irish pig farms** we established the prevalence, causes and risk factors of lameness in piglets (pre-weaners; n=2948 animals inspected), weaners (n=3368), finishers (1289), replacement gilts (n=525), pregnant gilts (n=518) and sows (n=604) and lactating sows (n=544).
- (ii) **Limit feeding a developer diet:** 36 Large White × Landrace gilts were selected at 65kg, housed individually and assigned to one of 3 treatments: finisher, gestating sow or developer diets, at 65 kg. The experiment lasted 12 weeks and the gilts were then slaughtered at c. 140 kg which was the target weight that corresponded to service.
- (iii) **Ad libitum feeding a developer diet:** One hundred and eighty Large White × Landrace gilts were housed in groups of 18 pens and assigned to the same finisher, gestating sow and developer dietary treatments, from 65 kg to 140 kg over a 12 week period.
In studies 2 & 3, lameness, claw, limb, body and joint lesions were scored. Bone mineral density, growth performance and pig behaviour was also measured.
- (iv) **Evaluation of gestation housing system (loose vs. stall) and floor type (slatted steel vs. cast iron) during lactation** on lameness, body, limb and claw lesions and lying-down behaviour of 85 sows. Sows from 2 gestation housing systems were assigned to the experiment on transfer to the farrowing crate in which two floor types were installed.
- (v) **Longitudinal study of rubber flooring in a commercial farm:** 164 replacement gilts were housed in groups of 8 during two parities in pens with rubber covered or concrete slats. Lameness, claw,

limb and body lesions were scored.

- (vi) **Effect of rubber flooring on the behaviour of group housed sows:** 64 sows were housed in groups of 4 in pens with solid concrete floored feeding stalls and a slatted group area from 28d after service. Sow postural and spatial behaviour was recorded.
- (vii) **Effect of housing on rubber slat mats during pregnancy on the behaviour and welfare of sows in farrowing crates:** Sows from study 6 were transferred to the farrowing crate on day 110 of gestation where observations of postural and lying down behaviour were made.

4. Main results:

Study 1: Lameness prevalence was 28% in finishers at 18wks of age, 37% in finishers of 22wks of age, 39% in replacement gilts and 48% in pregnant gilts and pregnant sows. A high prevalence of limb abrasions, sole bruising and coronary band damage was observed in suckling piglets. All of the lesions recorded were associated with the presence of metal/steel slatted flooring in the farrowing crate. For finishers, replacement gilts and pregnant sows there was an increased risk of lameness associated with slat voids wider than 1.8mm.

In study 2, from the 5th week of the trial there were more lame gilts on the finisher and gestating sow treatments. All gilts on the finisher and gestating sow treatments had uneven claws by 12wk probably related to the inclusion of Availa Sow® in the developer treatment. Gilts on the developer treatment had lower joint lesion scores than gilts in the other treatments. There were differences in weight gain at weeks 4 and 10, with gilts on the developer treatment weighing less. This reduction in weight gain in the developer treatment may have contributed to the reduced joint lesion scores as fast weight gain is a known risk factor for joint lesions.

In study 3, from week 5-8 and 9-12 more gilts were lame and had more claw lesions on the finisher and gestating sow dietary treatments than on the developer treatment. Improvements in claw health could be attributable to the inclusion of the zinc, copper and manganese supplement, Availa Sow® in the developer treatment. There was no effect of treatment on joint lesion scores, bone mineral density, body weight, lying behavior or on carcass characteristics.

In study 4, 74% of group housed sows and 33% of individually housed sows were lame on transfer to the farrowing crate. The group housed sows had higher scores for claw lesions on the heel area and a higher risk of wounds on the limbs and swellings on the hind limbs (i.e. bursitis). However, individually housed sows were at greater risk of a wider range of claw lesions. These findings confirm that the problem of lameness in Irish sows will increase with the change to group housing systems. During lactation, sows kept on slatted steel floors in the farrowing crate were at higher risk of heel overgrowth and/or erosion, heel sole crack and horizontal cracks in the wall than sows on cast iron flooring.

In study 5, rubber pens were dirtier compared with pens left uncovered. Sows on rubber slat mats were at lower risk of lameness, swellings and wounds on their limbs compared to sows housed on concrete slats but at higher risk of claw lesions because of the dirtiness of the rubber flooring. The rubber slat mats were less abrasive than the concrete slats which explains the higher scores for toe length in sows housed on rubber mats.

In study 6, sows with rubber slat mats in the group area spent more time there than in the feeding stalls and stood less and lay more in the group area compared with sows housed on concrete slats. This reflects and confirms sows' preference for a comfortable surface for lying.

In study 7, flooring during gestation did not affect any of the welfare and behaviour variables recorded in the farrowing crate.

5. Opportunity/Benefit:

The findings of this project offer real solutions to pig producers to tackle the problem of lameness in their pigs with associated reductions in production costs and improved efficiencies/productivity potentially improving the profitability of their enterprise. There are real opportunities for feed companies to manufacture diets specially formulated to address the needs of the replacement gilt (developer diets) and for suppliers of products and services to the pig industry to develop new ways to overcome the risks for lameness associated with the floor types used on Irish pig farms. This project had an industry partner (EasyFix Rubber Products) who manufacture the market leading rubber mats for pigs. Solutions and improvement to some of

their current design flaws were identified and they were provided with independent evidence of welfare benefits associated with the use of rubber flooring for sows. This collaboration was facilitated by the Enterprise Ireland Innovation Partnership Programme which matched the funding provided by EasyFix.

6. Dissemination:

Main publications:

Calderón-Díaz, J.A., Fahey, A.G., KilBride, A.L., Green, L.E. and Boyle, L.A. 2013. Longitudinal study of the effect of rubber slat mats on locomotory ability, body, limb and claw lesions and dirtiness of loose housed sows. *Journal of Animal Science* 19: 1-15.

Calderón-Díaz, J.A., Fahey, A.G. and Boyle, L.A. Effects of gestation housing system and floor type during lactation on locomotory ability, body, limb and claw lesions, and lying-down behavior of lactating sows. *Journal of Animal Science* *In press*.

Calderón-Díaz, J.A. and Boyle, L.A. 2013. Effect of rubber slat mats on the behaviour and welfare of group housed pregnant sows. *Applied Animal Behaviour Science* *In press*.

Popular publications:

Boyle, L., Green, L., KilBride, A., Quinn, A., Fahey, A., Calderón Díaz, J. (2012). Overcoming lameness in Irish sows. *TResearch* Volume 7: Number 3. Autumn 2012. P 36-37

*Quinn, A., Calderón Díaz, J.A., Boyle, L. (2013). Lameness in Pigs. End of project research dissemination booklet. 26th July 2013; 30 p

* On 26th July 2013 an open day was held at Moorepark at which the findings of this project were disseminated. Invites went out to all stakeholders in the pig industry. There were presentations and demonstrations of locomotion scoring and of claw lesions and joint lesions by the project team.

7. Compiled by: Dr. Laura Boyle