

# DOES LAMENESS IN SOW INFLUENCE HER REPRODUCTION ?

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# 1. Introduction



LAMENESS

- Pain and distress WELFARE ISSUE

- Premature culling ECONOMIC LOSS
- Bad performance

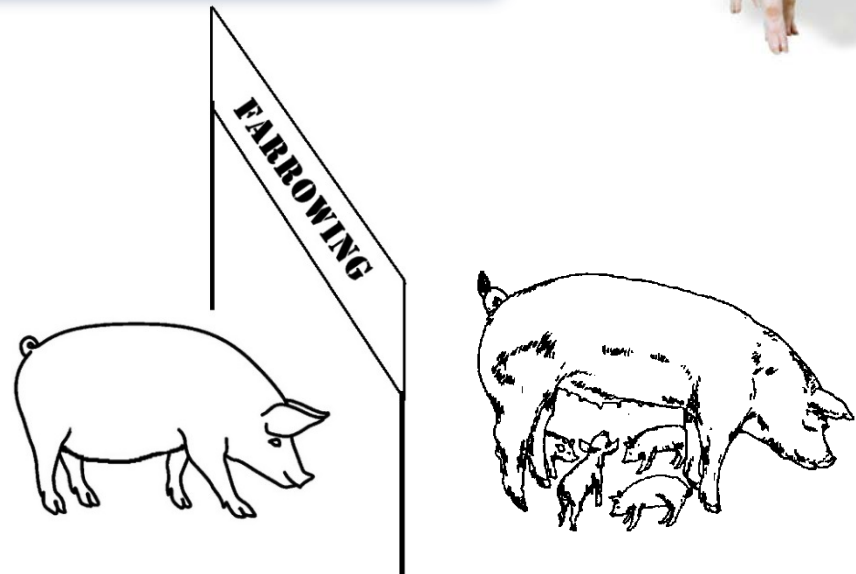
?

Other important traits

AIMS

1. To **describe** leg conformation and reproductive performance of a Yorkshire population
2. To investigate **genetic correlation** between lameness traits and fertility traits

## 2. Materials and Methods- Data



### PERFORMANCE TESTING

4.5 months of age  
100 kg of weight



### Leg conformation traits

- + Growth, fat, teats...
- purebred Yorkshire
- both genders

### FARROWING

1 year or older of age



### Fertility traits

- purebred sows
- purebred and crossbred litters

## 2. Materials and Methods- Data



Old  
score

New  
score

**LAMENESS/  
CONFORMATION**

$r_g$

**FERTILITY**

## 2. Materials and Methods- Data



**Old  
score**

- Movement (**o\_move**)
- Overall leg score (**o\_all**)  
(1-3\*: *bad---best\**)

**New  
score**



## 2. Materials and Methods- Data



**Old  
score**

- Movement (**o\_move**)
- Overall leg score (**o\_all**)  
(1-3\*: *bad---best\**)

**New  
score**

- Movement (**n\_move**)
- Front leg quality (**n\_front**)
- Rear leg quality (**n\_rear**)  
(1-4\*-7: *worst---best\*---worst*)

**LAMENESS/  
CONFORMATION**



**FERTILITY**

## 2. Materials and Methods- Data



**Old  
score**

- Movement (**o\_move**)
- Overall leg score (**o\_all**)  
(1-3\*: *bad---best\**)

**New  
score**

- Movement (**n\_move**)
- Front leg quality (**n\_front**)
- Rear leg quality (**n\_rear**)  
(1-4\*-7: *worst---best\*---worst*)
- Toes quality (**n\_toes**)
- Standing under (**n\_grav**)  
(4\*-7: *best\*---worst*)

**LAMENESS/  
CONFORMATION**



**FERTILITY**

## 2. Materials and Methods- Data



**Old  
score**

- Movement (**o\_move**)
- Overall leg score (**o\_all**)  
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score**

- Movement (**n\_move**)
- Front leg quality (**n\_front**)
- Rear leg quality (**n\_rear**)  
(1-4\*-7: *worst---best\*---worst*)
- Toes quality (**n\_toes**)
- Standing under (**n\_grav**)  
(4\*-7: *best\*---worst*)
- Overall leg score (**n\_all**)  
(1\*-6: *best\*---failed*)

**LAMENESS/  
CONFORMATION**



**FERTILITY**



## 2. Materials and Methods- Data



Old  
score

- Movement (**o\_move**)
- Overall leg score (**o\_all**)  
(1-3\*: bad---best\*)

New  
score

- Movement (**n\_move**)
- Front leg quality (**n\_front**)
- Rear leg quality (**n\_rear**)  
(1-4\*-7: worst---best\*---worst)
- Toes quality (**n\_toes**)
- Standing under (**n\_grav**)  
(4\*-7: best\*---worst)
- Overall leg score (**n\_all**)  
(1\*-6: best\*---failed)

**Fertility traits**  
(1<sup>st</sup> and 2<sup>nd</sup> parity)



## 2. Materials and Methods- Data



Old  
score

- Movement (**o\_move**)
- Overall leg score (**o\_all**)  
(1-3\*: bad---best\*)

New  
score

- Movement (**n\_move**)
- Front leg quality (**n\_front**)
- Rear leg quality (**n\_rear**)  
(1-4\*-7: worst---best\*---worst)
- Toes quality (**n\_toes**)
- Standing under (**n\_grav**)  
(4\*-7: best\*---worst)
- Overall leg score (**n\_all**)  
(1\*-6: best\*---failed)

### Fertility traits

(1<sup>st</sup> and 2<sup>nd</sup> parity)

- Total born piglets (**NTB**)
- Born alive piglets (**NBA**)
- Stillborn piglets (**NSB**)
  
- Weaning to service interval ( $\leq 7$  days) (**WSI7**)
- Weaning to service interval ( $\leq 30$  days) (**WSI30**)

**LAMENESS/  
CONFORMATION**

$r_g$



**FERTILITY**

## 2. Materials and Methods- Analysis



- **SAS v9.3 (SAS Inst. Inc., Cary, NC)**

Normal scoring method for conformation traits and NSB trait

- **DMU package (Madsen and Jensen, 2007)**

Multivariate analysis

**[Trait1    Trait2    Trait3]**



**Fertility trait at 1<sup>st</sup> and 2<sup>nd</sup> parity**

*Fixed effect = hy\_farrowing/weaning, breed of boar*

*Random effect= hys\_farrowing/ weaning, ID*

**Conformation trait**

*Fixed effect = hy\_birth, gender*

*Random effect= pen, litter, ID*

**Eg. [o\_move    NTB1    NTB2]**

### 3. Results – Descriptive statistical conformation



Trait	Range	Best	Mean	SD
Old movement	1-3	3 ←	<b>2.8</b>	0.4
Old overall leg	1-3	3 ←	<b>2.6</b>	0.6
New movement	1-7	4 ←	<b>4.2</b>	0.6
Toes quality	4-7	4 ←	<b>4.2</b>	0.5
Front leg quality	1-7	4 ←	<b>4.1</b>	0.8
Rear leg quality	1-7	4 ←	<b>4.4</b>	0.8
Standing under	4-7	4 ←	<b>4.2</b>	0.4
New overall leg	1-6	<b>1</b>	<b>2.8</b>	<b>1.3</b>

### 3. Results – Descriptive statistical fertility



Trait	Mean	SD
Total born 1	12.3	3.3
Total born 2	13.2	3.0
Born alive 1	11.1	3.1
Born alive 2	12.2	3.4
Stillborn 1	1.1	1.5
Stillborn 2	1.1	1.5
Weaning to service 7_1	5.1	0.9
Weaning to service 7_2	4.8	0.8
Weaning to service 30_1	5.6	16
Weaning to service 30_2	4.9	1.3

### 3. Results – Heritabilities $h^2$



	Trait	$h^2$	(SE)	
Conformation	Old movement	0.05	(0.00)	<b>Low heritability</b> <b><math>h^2</math> [0.02 – 0.16]</b>
	Old overall leg	0.08	(0.00)	
	New movement	0.03	(0.01)	
	Toes quality	0.06	(0.01)	
	Front leg quality	0.16	(0.02)	
	Rear leg quality	0.13	(0.01)	
	Centre of gravity	0.02	(0.01)	
	New overall leg	0.08	(0.01)	
Fertility	Total born 1	0.07	(0.01)	<b>Low heritability</b> <b><math>h^2</math> [0.05 – 0.11]</b>
	Total born 2	0.11	(0.02)	
	Born alive 1	0.06	(0.01)	
	Born alive 2	0.08	(0.02)	
	Stillborn 1	0.07	(0.01)	
	Stillborn 2	0.06	(0.01)	
	Weaning to service 7_1	0.09	(0.02)	
	Weaning to service 7_2	0.10	(0.02)	
	Weaning to service 30_1	0.05	(0.01)	
	Weaning to service 30_2	0.07	(0.01)	

### 3. Results – Genetic correlation $r_g$



	Old movement	Toes quality	Front leg quality	Standing under
Total born 1	0.19	-0.15	0.07	- 0.56
Total born 2	0.24	-0.25	0.17	- 0.68
Born alive 1	0.24	-0.36	-0.09	- 0.62
Born alive 2	0.34	-0.26	0.09	- 0.77
Stillborn 1	0.00	0.34	0.29	-0.02
Weaning to service 30_2	- 0.29	0.09	0.08	-0.05
SE	0.09-0.12	0.14-0.19	0.11-0.15	0.17-0.27

## 4. Results- Summary



- ❖ **Conformation traits:** close to best score (except new overall leg score)
- ❖ **Low heritability** for both conformation and fertility traits (0.02–0.16)
- ❖ **Genetic correlation**
  - **Better 'old' movement** →
    - **Higher total and alive piglets**
    - **Shorter return** to heat after weaning
  - **Better toes quality** →
    - **Higher born alive** and **lower stillborn**
  - **Standing under** →
    - **Lower total and alive piglets**



# ACKNOWLEDGEMENT



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**THANK YOU FOR YOUR ATTENTION !**