SRUC

Effects of journey time to slaughter on the welfare of pigs

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

Transport Regulation

(Acts whose publication is obligatory)

COUNCIL REGULATION (EC) No 1/2005

of 22 December 2004
on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97

Journey times for pigs

- EC 1\2005 prescribes a maximum journey duration for pigs of 8 hours on standard vehicles
- For higher standard vehicles the maximum journey time is 24 hours
- The effects of differing journey times upon pig welfare should be the basis of improved definition of maximum journey duration

Journey times for pigs

- **Study in two phases:-**
  - **Survey of pig journeys to slaughter**
    - **From a haulier perspective**
    - **From a slaughterhouse perspective**
  - **Examination of the effects of journey length on indices of stress and welfare at a single slaughter house - journey characteristics , conditions and behaviour and meat quality measures**

Journey types data bases

- Data base – haulier perspective
- Data base – Slaughterhouse perspective

- Data cover a 12 month period (same)
  - Analysis of Haulier diaries and records - calculation
  - Analysis of AMLs and eAMLS

Haulier perspective

• Total number of journeys	3305
• Total number of fat pig journeys	1984
• % Fat pig journeys	60
• % journeys 0-2 hours (no)	40 (793)
• % journeys 2-4 hours	34 (680)
• % over 4 hours	26 (514)
• % over 8 hours	0.8 (16)

Slaughterhouse perspective

• Total number of journeys	7105
• % journeys 0-2 hours (no)	14 (990)
• % journeys 2-4 hours (no)	45 (3210)
• % journeys 4-6 hours (no)	28 (1985)
• % journeys 6-8 hours (no)	9.5 (677)
• % over 8 hours (no)	3 (243)
• % multi pick-up (no)	24* (1709)
◦ 22*	

Comparison: haulier - slaughterhouse

	Haulier	Slaughterhouse
Total journeys (fat pigs)	1984	7105
% journeys 0-2 hours (no)	40 (793)	14 (990)
% journeys 2-4 hours (no)	34 (680)	45 (3210)
% journeys 4-6 hours (no)	13 (262)	28 (1985)
% journeys 6-8 hours (no)	12 (236)	9.5 (677)
% journeys > 8 hours (no)	1 (16)	3.5 (243)

Summary of data bases

- **Comparison of journey times for haulier and slaughterhouse perspectives:-**
  - **The majority of slaughter journeys are under 6 hours duration (87% haulier : 87%slaughterhouse)**
  - **The commonest duration category was 0-2 hours (haulier – wheels turning) and 2-4 hours (slaughterhouse)**
  - **74% (haulier) and 69% (slaughterhouse) of journeys were under 4 hours**
  - **Only 1% (haulier) and 3.5% (slaughterhouse) of journeys were over 8 hours duration**

Single slaughterhouse study

Single slaughterhouse study

- Data collection

- On Arrival
  - Vehicle and journey information
  - Lameness scores
  - Injuries
  - General health / appearance
  - Lorry / pig weights (carcase weights)

- Behaviour
  - 1 hour
  - 51 pigs

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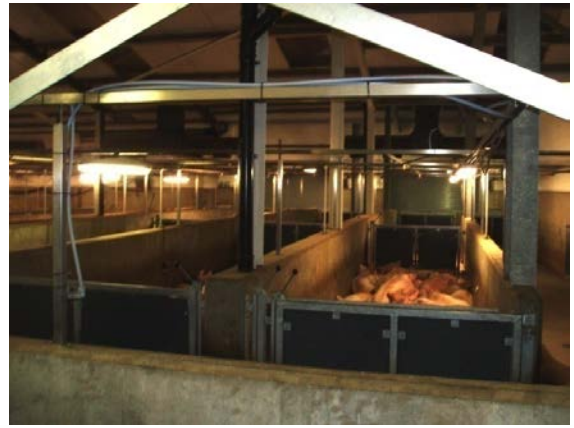


- Behaviour
  - 1 hour
  - 51 pigs

Behavioural measures

- **Continuous behaviours**
  - **first and second pig starts drinking**
  - **first and second pig lies down**
  - Record **fighting throughout the observation** period

Behavioural measures

- **Instantaneous sampling**
  - **Behaviour scans are made every five minutes, starting 5 minutes after the last pig enters the pen up to 60 minutes after penning. This means there will be 12 scan intervals starting at 5 minutes and ending at 60 minutes.**

- **Drinking**
- **Standing**
- **Sitting**
- **Lying down**
- **Fighting**

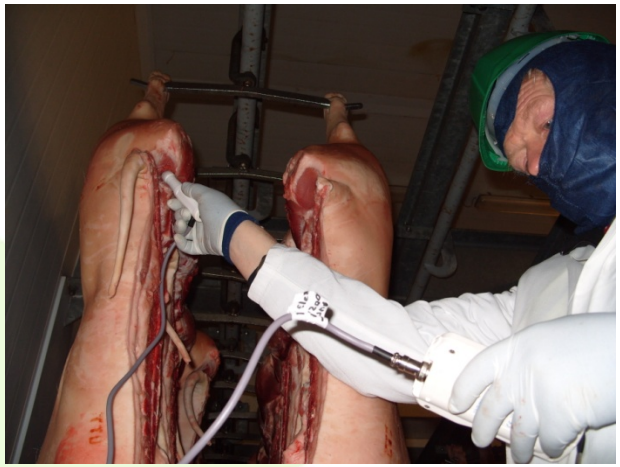
Meat Quality (stress?) Measures

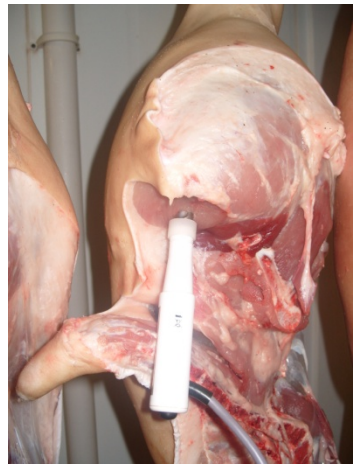
- **Kill at 1 hour – pigs on line**
- **First 20 pigs of each batch of 51in chiller and labelled**
- **pH_i – 2 muscles (+ meat temp)**
- **$Colour_{45}$ (L, a, b – Minolta colour meter)**
- **pH_{24} and $Colour_{24}$ (+ meat temp)**
- **Calculate Hue and Chroma**

Semimembranosus and longissimus lumborum

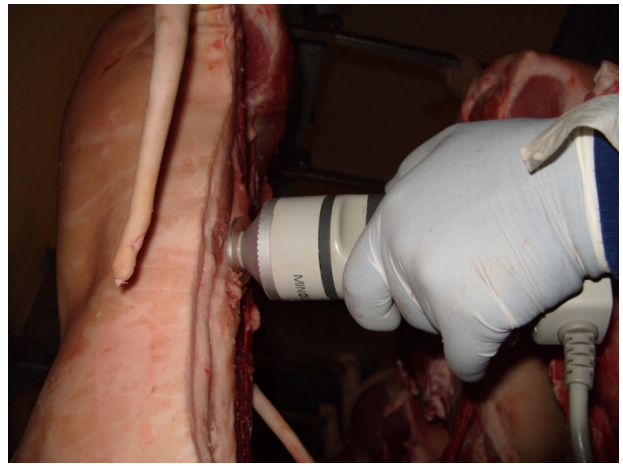
Single slaughterhouse study

Single slaughterhouse study





Single slaughterhouse study



Single slaughterhouse study

Data were analysed by:-

GLMM (logit link function)

Logistic regression models

REML

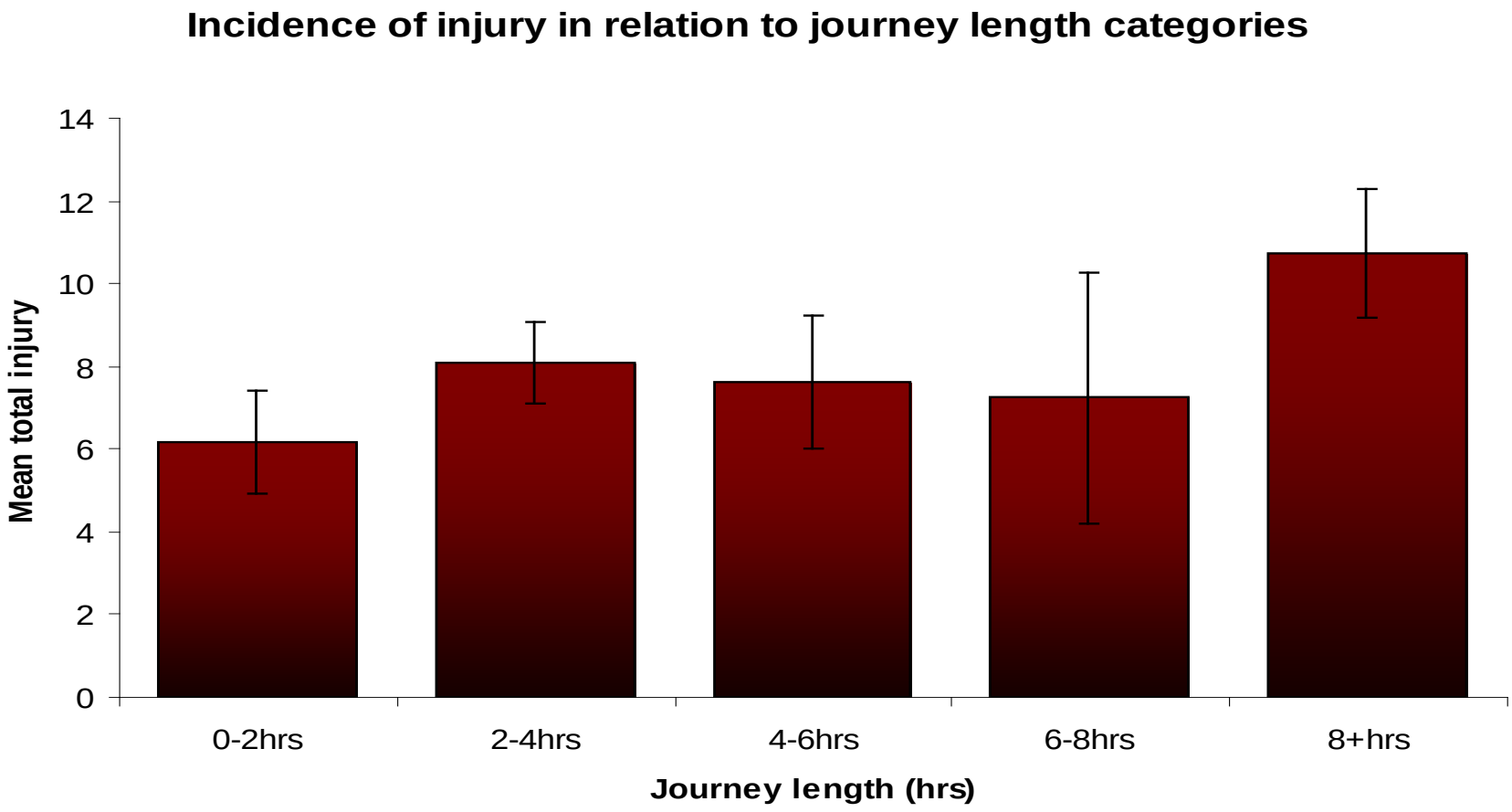
Single slaughterhouse study

Total 84 journeys – November - August

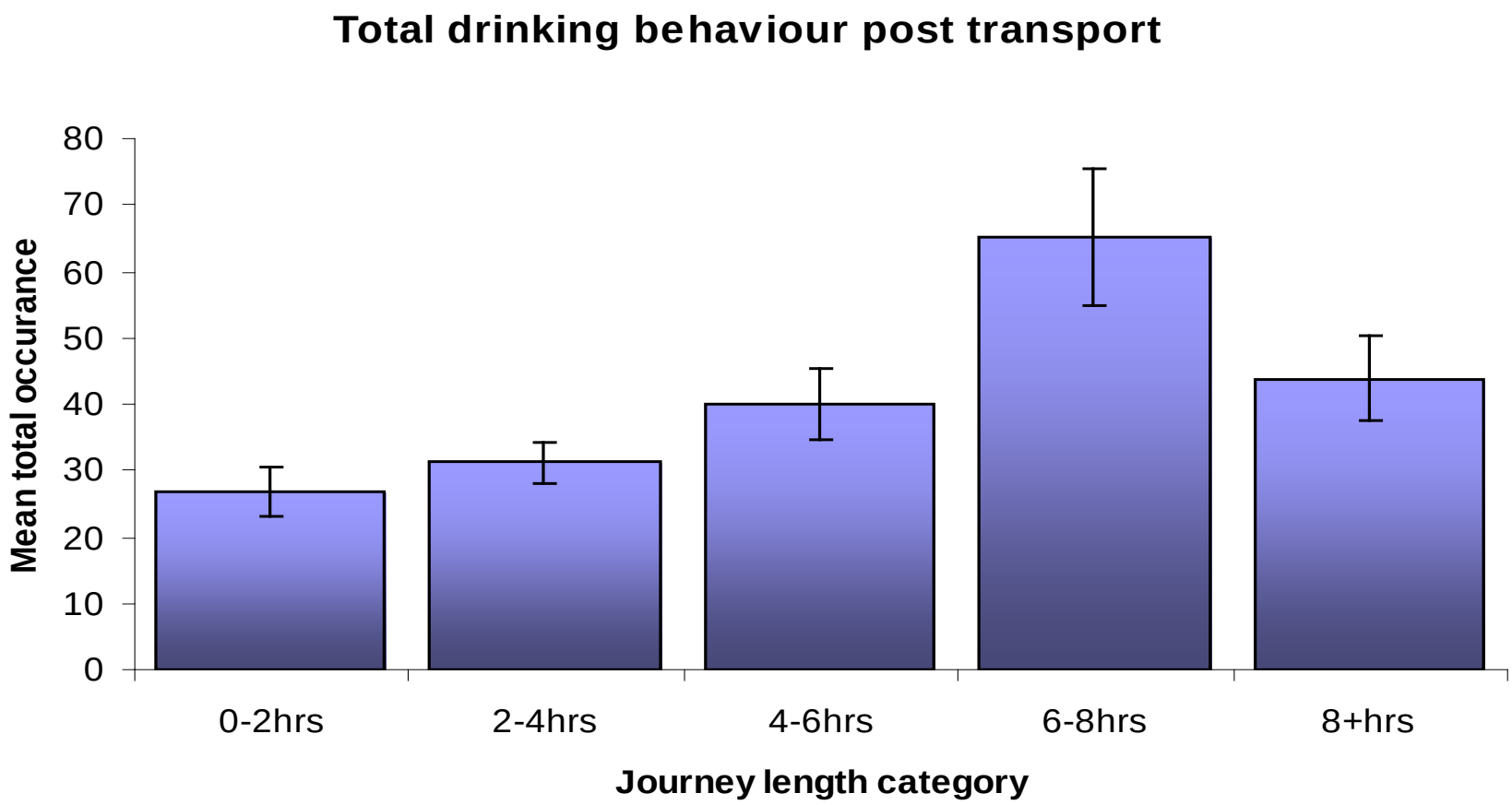
Sampled journeys

	Experimental trial / study journeys	SH data base
% journeys 0-2 hours (no)	23 (19)	14 (990)
% journeys 2-4 hours (no)	45 (38)	45 (3210)
% journeys 4-6 hours (no)	23 (19)	28 (1985)
% journeys 6-8 hours (no)	5 (4)	9.5 (677)
% journeys > 8 hours (no)	5 (4)	3.5 (243)

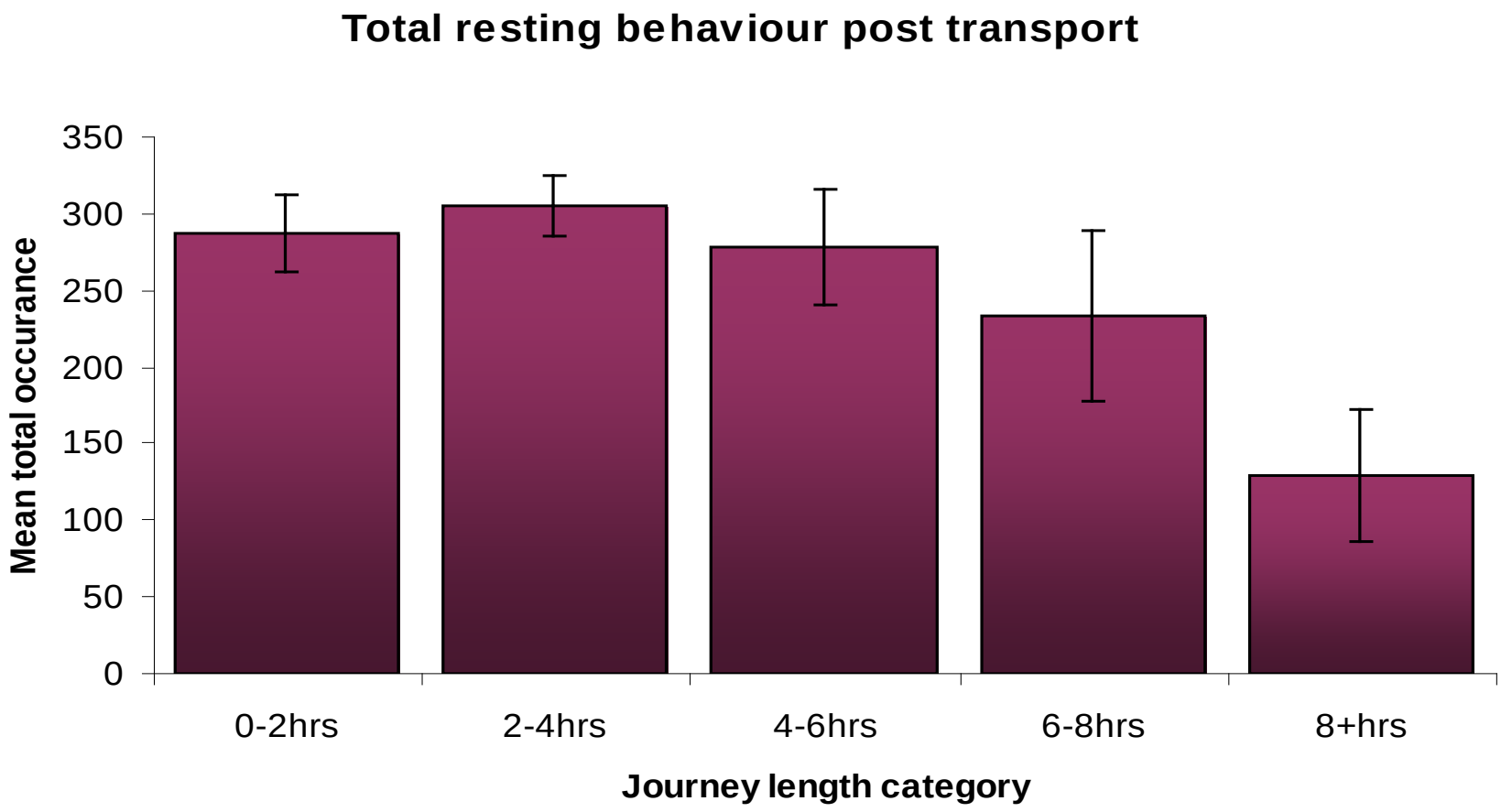
Injury


Incidence of injury in relation to journey length categories
Mean total injury
14
12
10
8
6
4
2
0
0-2hrs
2-4hrs
4-6hrs
6-8hrs
8+hrs
Journey length (hrs)

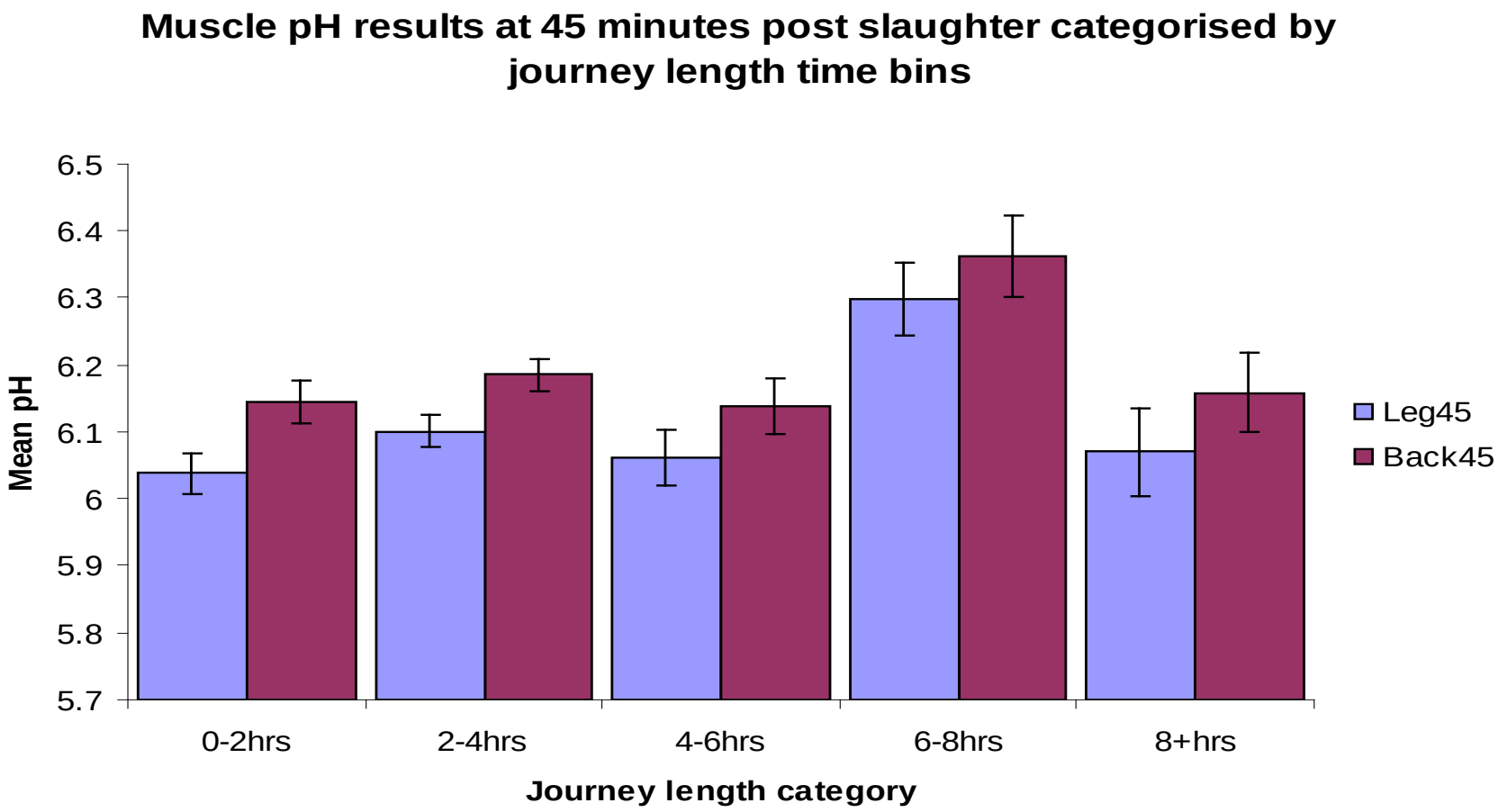
Drinking Behaviour



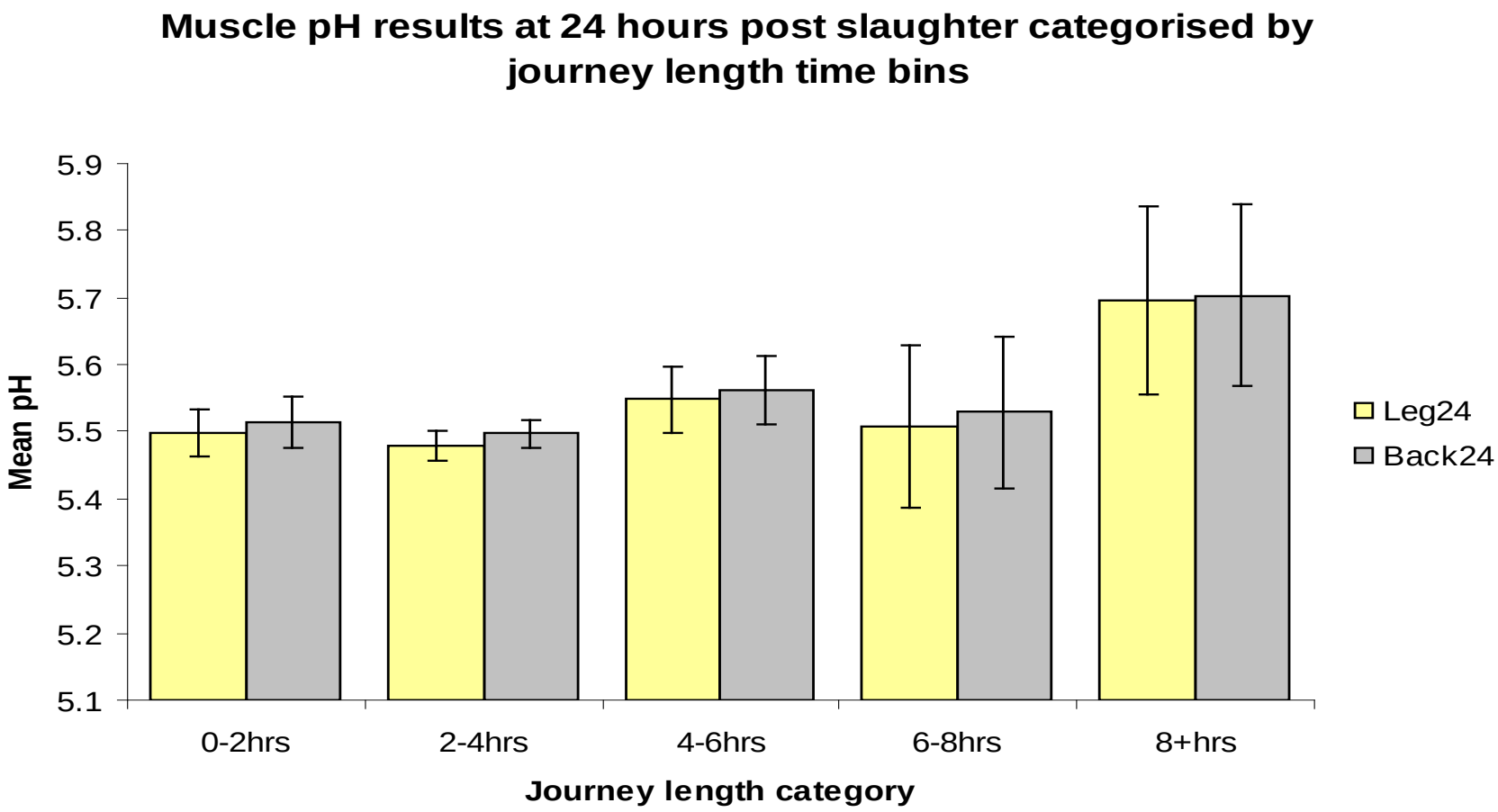
Resting Behaviour



Meat Quality Measures



Meat Quality Measures



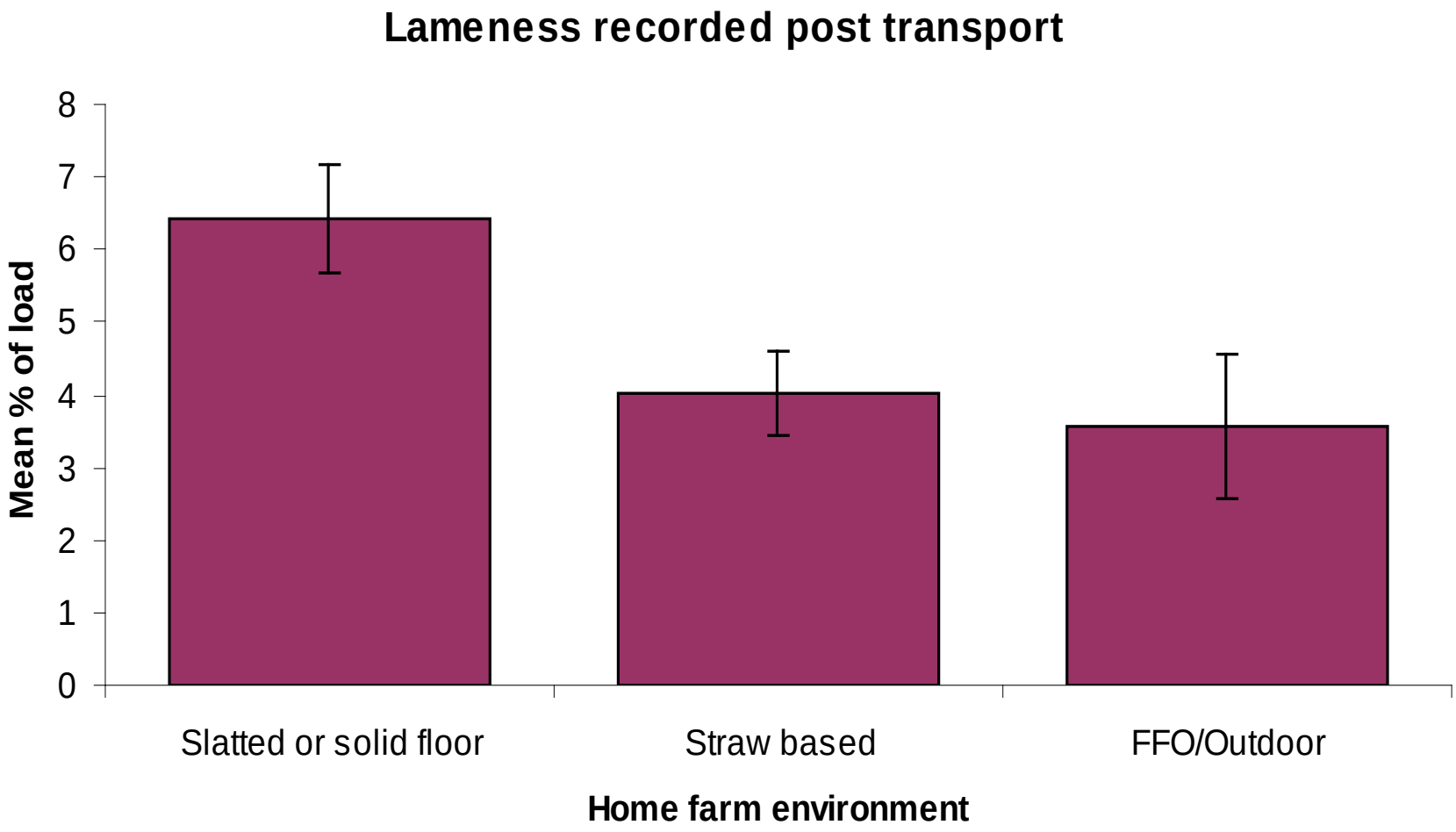
Other factors examined

- Farm type \ production system
- Abattoir Standing Time (AST)
- Mean, max and min temperatures on days of travel

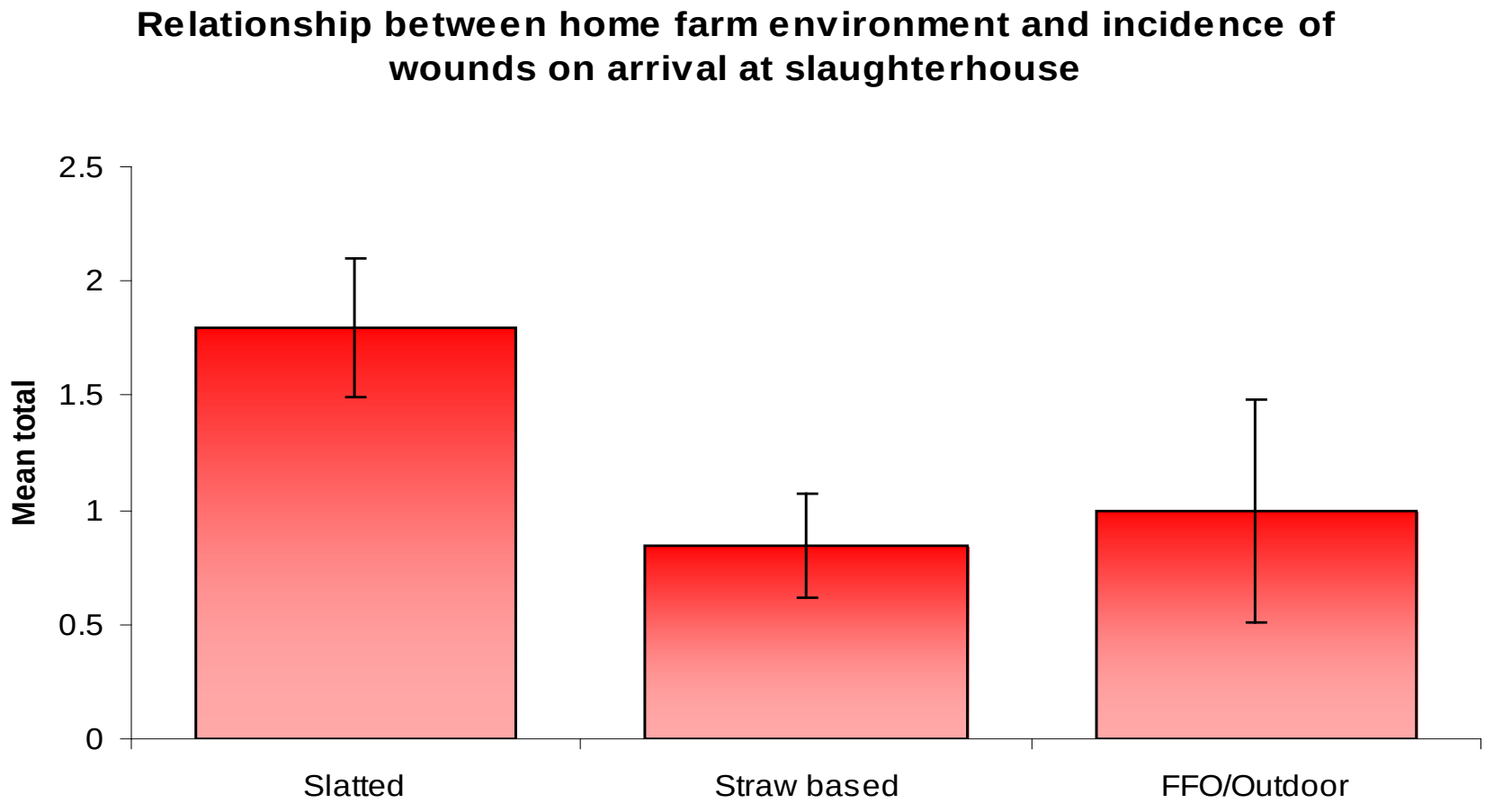
Production systems for delivered pigs

Environment	Number of loads monitored
Unknown	2
Slatted/solid floor	49
Straw based (yards, pens, courts)	26
organics/outdoor	7

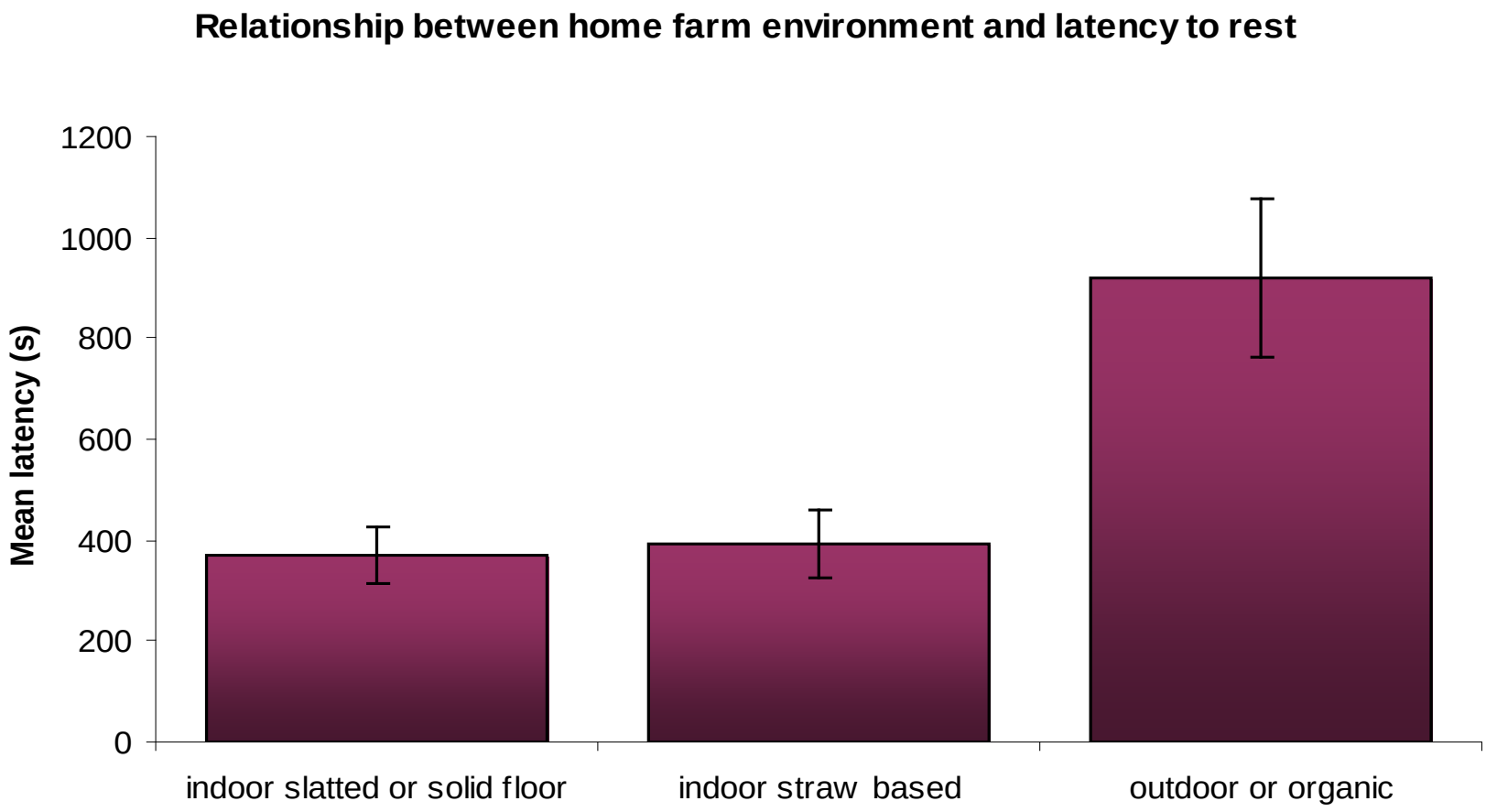
Lameness


Lameness recorded post transport
Mean % of load
8
7
6
5
4
3
2
1
0
Slatted or solid floor
Straw based
FFO/Outdoor
Home farm environment

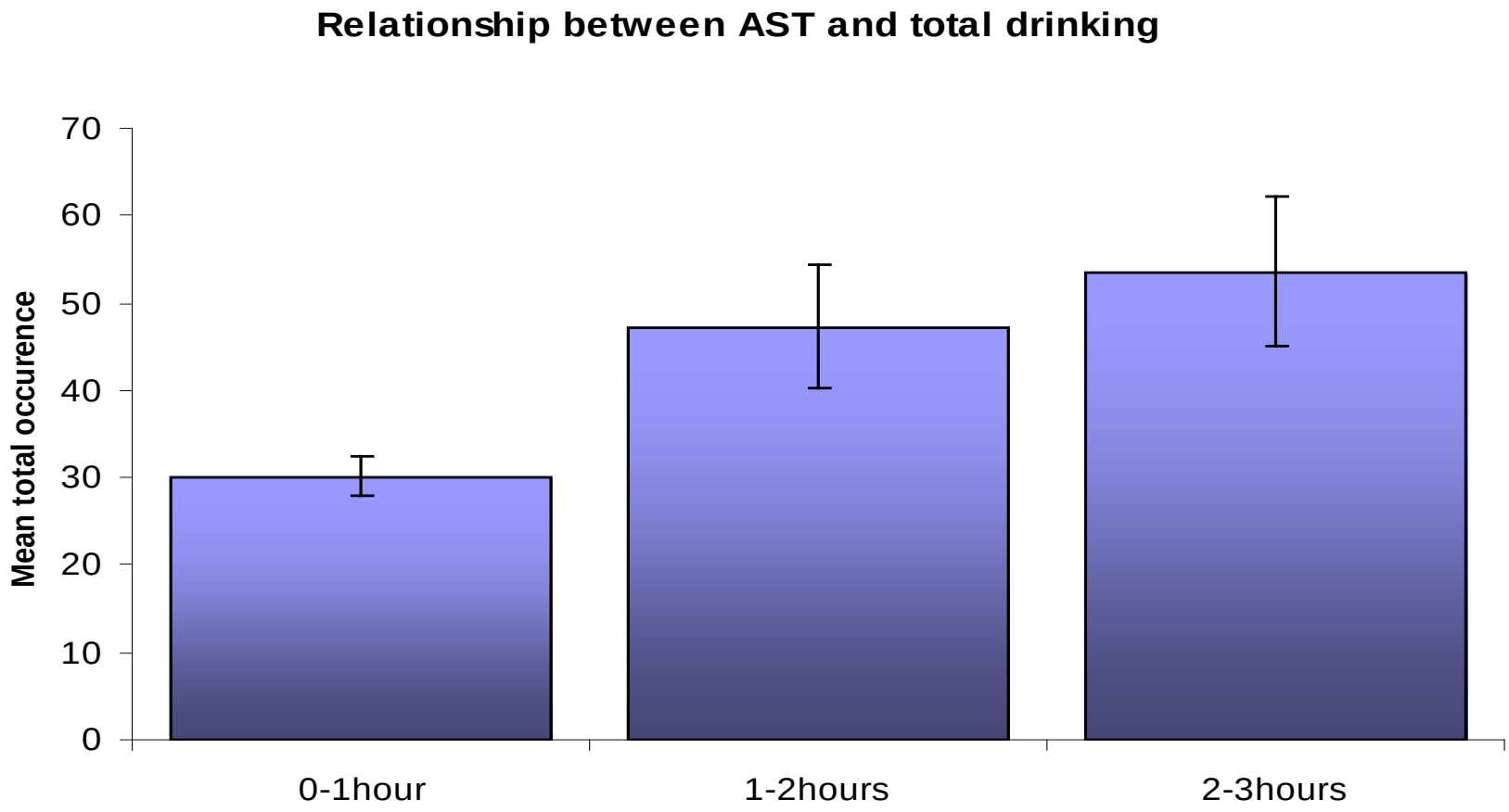
Wounds


Relationship between home farm environment and incidence of wounds on arrival at slaughterhouse
Mean total
2.5
2
1.5
1
0.5
0
Slatted
Straw based
FFO/Outdoor

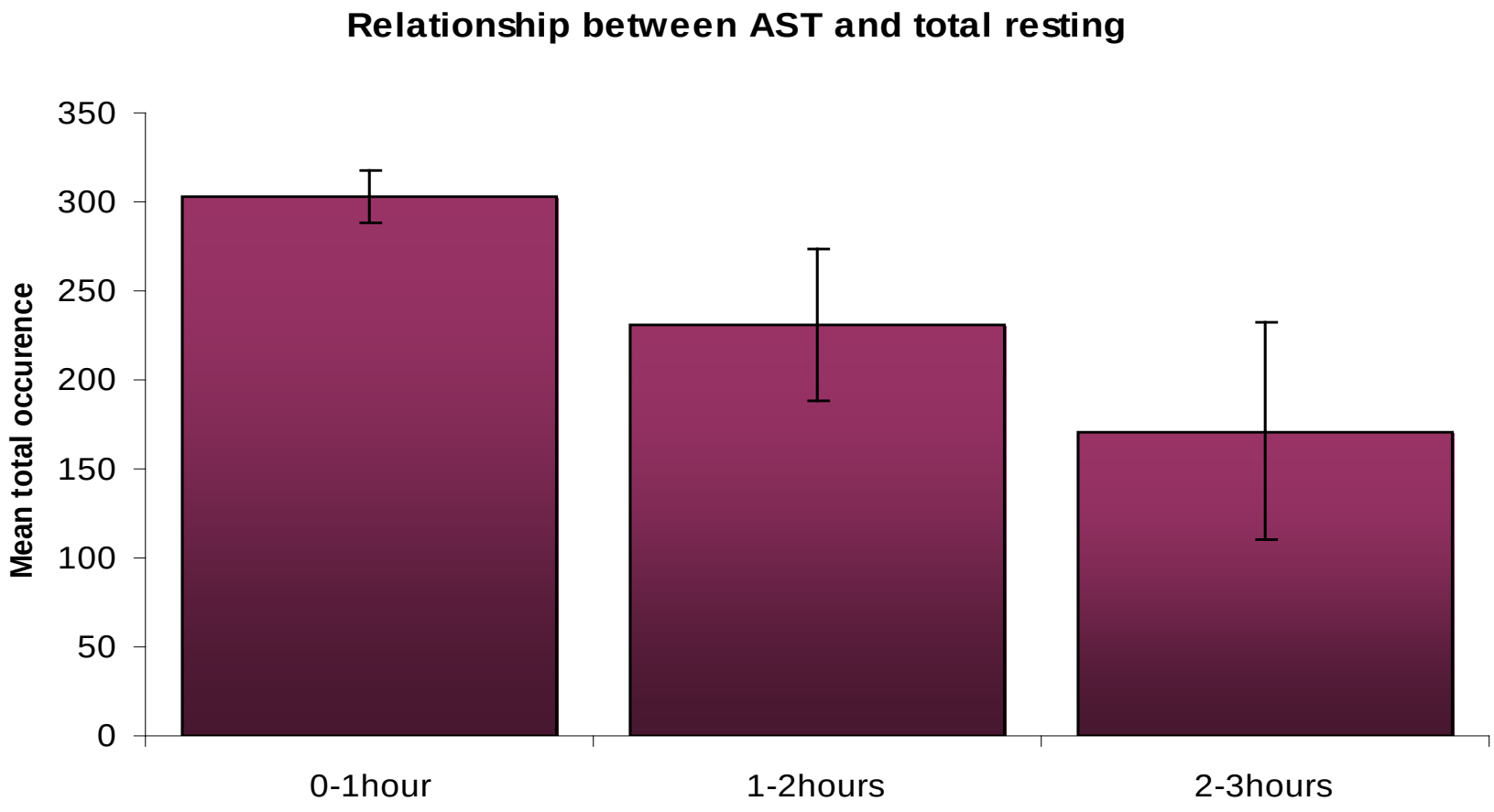
Home farm system



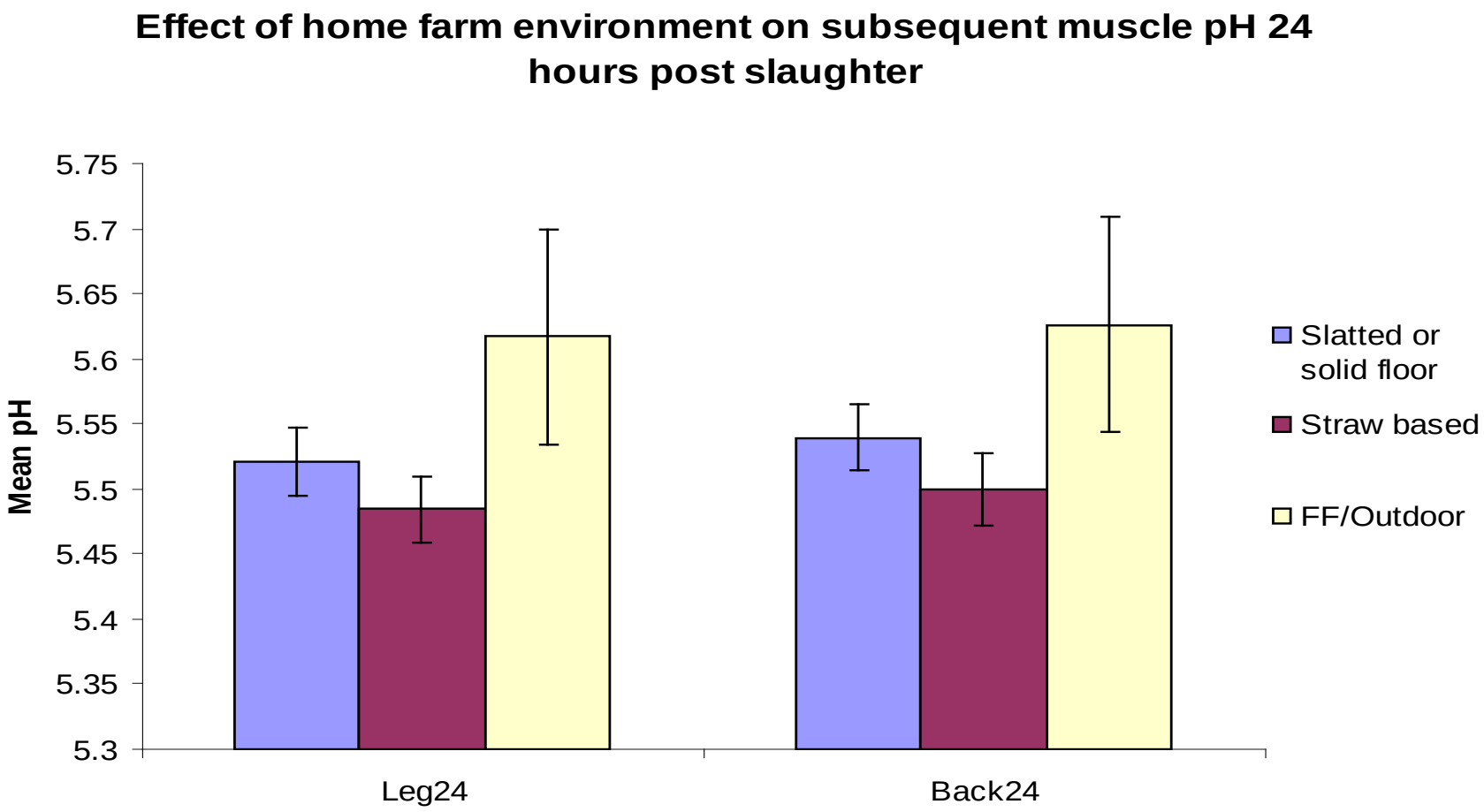
Standing time – Drinking behaviour



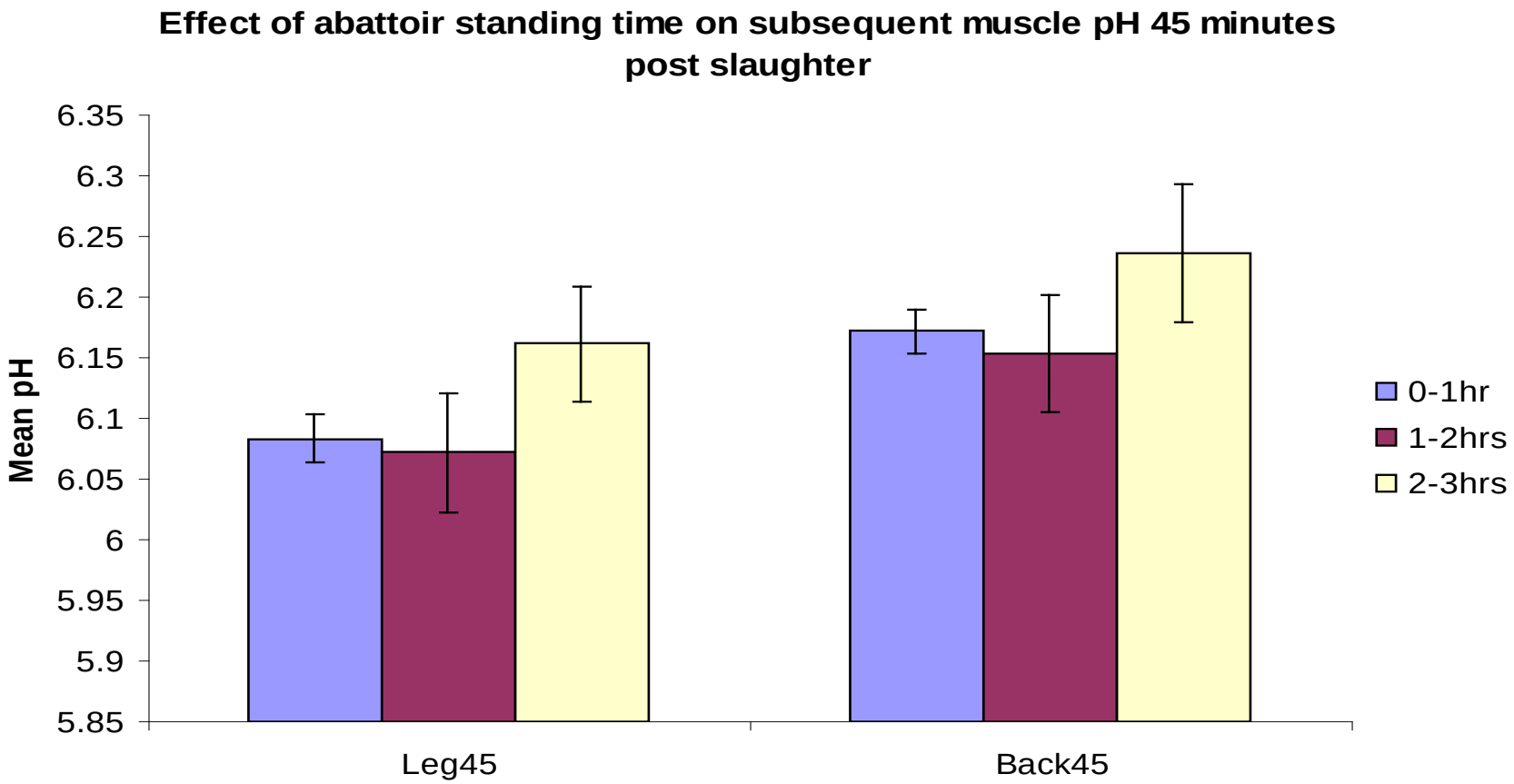
Standing time – Resting Behaviour



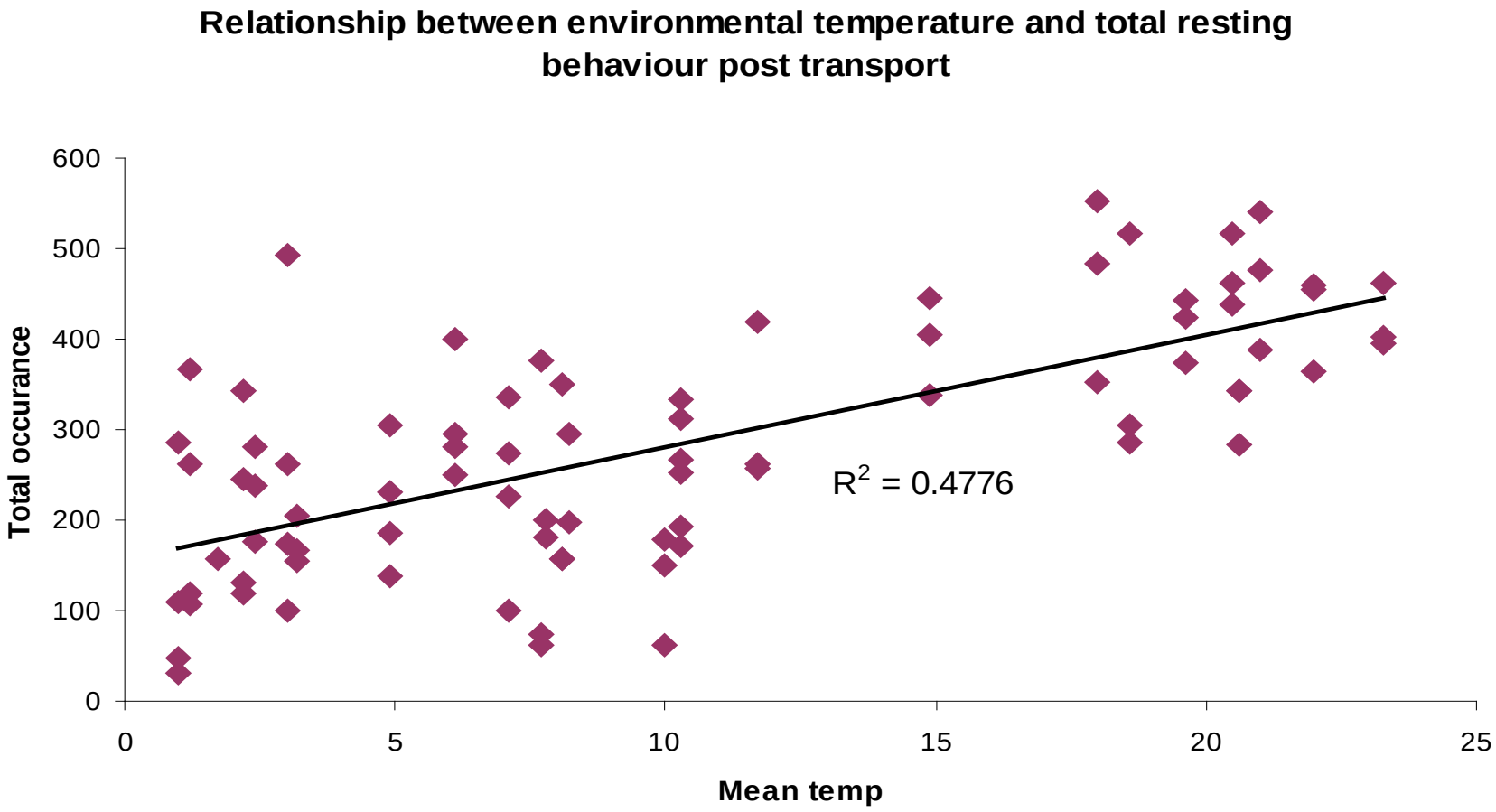
Meat Quality Measures



Meat Quality Measures



Thermal conditions



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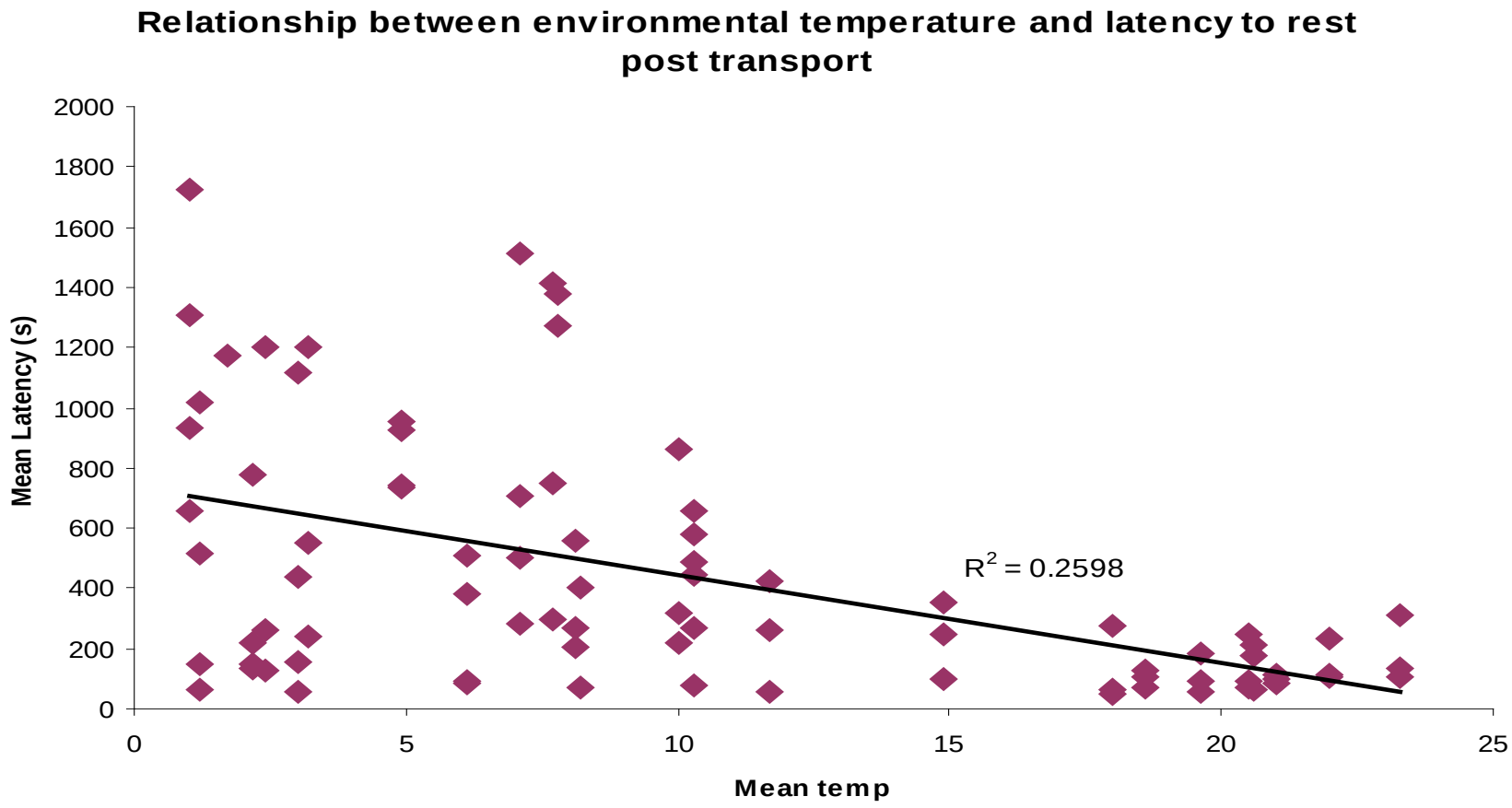

Correlation matrix

	JLL	TRest	Lat Rest	Lame %	pH45L	pH45B	pH24L	pH24B	Li45L	Li45B	Li24L	Li24B	C45L	C45B	C24L	C24B	H45L	H45B	H24L	H24B
JLL																				
TRest																				
Lat Rest	0.331	**-0.676**																		
Lame%	*-0.232*																			
pH45L		-0.204																		
pH45B		-0.203			**0.893**															
pH24L		**-0.359**	0.204	*-0.221*	0.317	*0.270*														
pH24B		**-0.363**	0.206	*-0.241*	0.342	0.298	**0.986**													
Li45L							*-0.228*	*-0.245*												
Li45B		*0.229*						-0.205	*0.249*											
Li24L							-0.282	-0.281	**0.633**	0.290										
Li24B							*-0.272*	-0.289	0.309	**0.672**	**0.509**									
C45L	*0.244*		*0.214*																	
C45B	0.187						*0.253*	*0.268*	-0.330				**0.432**							
C24L				*0.245*	-0.196	*-0.241*			-0.211				0.208	*0.223*						
C24B		*0.226*			*-0.254*	-0.299								**0.489**	**0.535**					
H45L									*-0.224*											
H45B				*0.246*						0.185		*0.215*								
H24L											**0.636**	**0.415**					*0.271*	*0.240*		
H24B							*-0.275*	-0.294	0.284	0.296	**0.466**	**0.630**			*-0.275*	-0.299			**0.623**	

P < 0.001	P < 0.01	*P < 0.05*	P < 0.1 (trend or tendancy)

Summary

- There were no significant correlations/ relationships to support the hypothesis that commercial journey time would affect the measures of stress/welfare in the sampled journeys

- Several other factors may affect post-journey behaviour and meat quality

Summary

- **These include:**
  - **Production system**
  - **Abattoir standing time**
  - **Temperature**

- **Clearly the effects of these factors (and their combinations) will be exacerbated by extended journey time**

- **Journey time per se (in the range studied) does not appear to constitute a major threat to welfare or product quality (measured indices – proxy?)**

Summary

- **The assumption that journey time may be studied under “commercial conditions” to detect direct effects upon welfare and production efficiency is confounded by the multiplicity of other factors impinging upon the relevant measures**

In summary

- **There were no statistically significant indications that journey time had a detrimental effect of the pigs transported under commercial conditions in this study**
  - **when all the current regulations and recommendations for practice were adhered to.**

Thank you for your attention!

The problem of “journey times”

- The legal journey time is first animal loaded until last animal unloaded
- This includes all stops, delays and hold
- All of these may affect ventilation and internal conditions
- Periods of acceleration and motion may differ in “same journey time”
- Inaccuracies in recording (AML) may lead to erroneous estimates of journey time (e.g. multiple pick-ups)
- Constraints on “access” and type – representitive?
- Relating journey time alone to outcomes is difficult in small and uncontrolled samples

Legal journey times?