What’s all the fuss about pig transport?

Malcolm Mitchell
Is there a fuss about pig transport?

Yes – all animal transport is still a matter of major public and political concern
• Legislation and review

• Proposals from FAWC and other welfare groups.

• Responsive strategy from research and industry communities
EC 1/2005 was aimed at protecting the welfare of animals during transportation.

It was implemented throughout the Member States of the European Union in 2007.

The Regulation is due for review and possible amendment.

Any changes or modifications must be based upon sound fundamental and applied science and not be derived from emotive concerns or political expediency.
FAWC - 2009

• FAWC Report 2009:- “Welfare ought to be monitored regularly over an animal’s life on the farm, during transport, at animal gatherings and at the abattoir, including the manner of death

• “A life worth living or a good life”
“There are no new rules in the offing from Europe for animal transport legislation and no decision on whether new regulations are needed is likely to be taken before 2012 at the earliest”.

These reassurances were given to Nigel Miller, vice-president of NFU Scotland and Scottish MEP Alyn Smith during a meeting with EU welfare officials in Brussels.

But EFSA are currently reviewing ALL of the REGULATION
Transport legislation

• Legislation must be dispassionate and objective

• Sound and relevant science can provide the basis
The vehicle thermal micro-environment is a potential major source of stress and reduced welfare in all transported animals.

EC 1/2005 has established the “acceptable thermal conditions for livestock”

What scientific evidence has been gathered to support or refute these standards?
Three research projects in UK/Europe on pig transportation:

1. Understand and alleviate physiological stress during the transport of pigs (experimental – climate chambers)

2. Road Transport of Farm Animals in Hot Climates (field trials - commercial conditions)

3. Transcontinental road transport of breeder pigs - effects of hot climates (field trials - commercial conditions)
• No major detrimental effects upon pigs of 100kg body weight within the temperature range -10°C to +30°C on journeys of up to 8 hours duration
• At -10°C shivering and huddling prevent hypothermia but the "stress“ not severe.
• At temperatures of 34-35°C and RH>60% there was evidence of hyperthermia, fatigue and electrolyte / hydration changes
• The recommended thermal envelope (acceptable range) for pigs on normally ventilated transporters should be between -10°C and +30°C for periods of up to 8 hours with absolute minima and maxima of -15°C and +35°C (<65%RH) (Mitchell et al 2002)
Studies were undertaken to investigate the deep body temperature responses of pigs to hot weather transportation in Spain in mid-summer.
Project 2 - Experimental journeys – Spain
Experimental journeys

Methods:

- 8 hour journeys using "experimental commercial vehicle"
- 45 minute mid-journey break
- Commercial space allowances
- Natural ventilation
- Continuous measures of deep body temperature (DBT) (and other physiological indices)
Experimental journeys

Temperature

Water vapour density or humidity
<table>
<thead>
<tr>
<th>Journey</th>
<th>Species</th>
<th>Mean temp (°C)</th>
<th>Max temp (°C)</th>
<th>Mean VD (gm⁻³)</th>
<th>Max VD (gm⁻³)</th>
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PIGS (DBT Journey 1)
### Effects of transportation on deep body temperature

**Journey** | **Species** | **Control DBT (°C)** | **In transit DBT (°C)** | **Change (°C)** | **Stat sign**
--- | --- | --- | --- | --- | ---
1 | Pigs | **40.4 ± 0.4** | **39.9 ± 0.5** | -0.5 | p < 0.05

All pig journeys | Pigs | **39.2 ± 0.4** | **38.9 ± 0.5** | -0.3 | NS

1 = HOTTEST JOURNEY
Summary – Project 2

• No severe heat stress was identified in any of the pigs in this study despite elevated temperatures at or above the limits imposed in legislation

• Pigs actually cooled down in transit (possibly due to convective cooling)

• Most importantly in adapted animals heat stress in transit does not occur under conditions that would induce severe heat stress in non-adapted animals
So perhaps “one size doesn’t fit all”!? (Legislation)

When might heat stress affect animals more markedly

Travelling from one climate zone to another?

Export breeder pigs move from northern (temperate) to southern Europe (hot)
Project 3

Experimental journeys

- 7 journeys
- Edinburgh to Malaga
- 3000km – 72 hours
- Control post in France (24 hours)
- Commercial vehicle (80 gilts @ 100kg)
- Destination – abattoir in Humilladero
Route

[Map of European routes with highlighted areas and a ferry image]

[Three sailors on a ferry deck with SAC logo]
Vehicle employed in ALL studies
Temperature-humidity recording
Animal measures / preparation
Temperature logger implants
Behavioural recording
Internal truck temperatures

Shipment 23 - In vehicle temperature and vapour density (whole journey)
## Internal truck thermal conditions

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<th>Enthalpy</th>
<th>$\text{Ranking}_{\text{Ent hmax}}$</th>
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Mean deep body temperatures (last 22 hours)

Mean body temperature (°C) during last 22 hours of shipment

Leave Fougeres

Arrive Humilladero

Reading
# Mean body temperature – last 22 hours

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<th>Shipment</th>
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Deep body temperature profiles

Shipments 23 - mean body temperature (all pigs)

- Control period upper limit
- Control period lower limit
- Feed
- Arrive control post
- Leave control post
Mean duration of drinking over three hours post transport

![Graph showing mean duration of drinking for different journeys.](image)
• The study covered a typical range of thermal conditions and transport micro-environments for Southern Europe

• Physiological and behavioural measures were correlated with the vehicle thermal micro-environment

• On none of the journeys was severe thermal stress identified
• The deep body temperature did not exhibit any major excursions outside the normal ranges recorded in the home pen.

• The only exceptions correlated with feeding and arousal during lairage.

• Whilst journeys undertaken in conditions close to or at the limits of temperature prescribed in the current regulation were associated with some physiological adaptive responses these did not constitute a major threat to welfare of the animals.
• The results suggest that if transportation is undertaken in a manner consistent with current legislation, on appropriate vehicles and with high standards of personnel and practice there is little threat to the welfare of the pigs even in relatively hot conditions.
Studies involving both laboratory based and applied field work can usefully inform policy and legislation.

These results reported herein may facilitate the development of **smart sensors** which assess the potential risk to the animals and form the basis of control systems in future vehicles.
• It is proposed that by using a sound scientific approach a reliable basis may be established for improvements in transport practices conditions, procedures, vehicles design and operation and relevant practical legislation
Thanks to the “team in the field”
<table>
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<th>University of Zaragoza</th>
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<th>ROSLIN INSTITUTE</th>
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The findings, views and opinions expressed in this review have been presented to the “Great and the Good of Europe” in a Stakeholder Workshop in 2009 and were well received and applauded by Policy makers and Government Officials!!!