

Low Input Breeds - ECO AB Symposium,  
Wageningen (The Netherlands)  
March 15-16. 2011



Development of integrated livestock breeding and management strategies to improve animal health, product quality and performance in European organic and 'low input' milk, meat and egg production





## Ethical Problems and Breeding Goals


### Subproject 3: Pigs

Sandra Edwards  
Newcastle University




Stakeholder Congress on Ethical Concerns  
Wageningen, March 15 2011

## An Ethical Overview




RESPECT FOR	WELLBEING	AUTONOMY (choice)	JUSTICE (fairness)
<b>Animals</b>	Animal welfare	Behavioural choice	Intrinsic value (integrity)
<b>Farmers</b>	Satisfactory income and workplace	Managerial freedom (independence)	Fair trade rules
<b>Consumers</b>	Food quality and safety	Choice and democracy (public wishes)	Affordability
<b>Environment</b>	Conservation	Biodiversity	Sustainability



Mepham & Millar (2001)

2

## Ethical conflicts




- › Animal welfare v farmer income & affordable food
- › Animal welfare v management choices
- › Animal integrity v product quality
- › Environmental impact v „naturalness“
- › Animal integrity v technological advance

**Breeding?**

	W	A	J
A			
F			
C			
E			

LowInputBreeds 3


## Income v welfare (1)



- › Breeding for prolificacy
  - › Piglet survival

**Breeding?** ✓

	W	A	J
A			
F			
C			
E			




— Farrowing crates      — Farrowing pens

Weber et al. (2007)


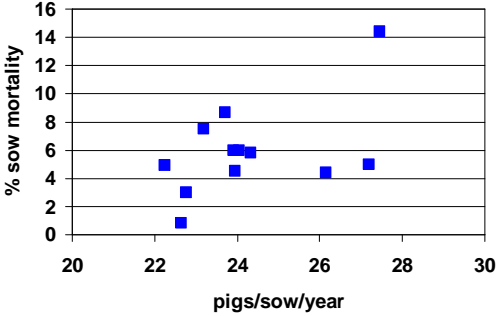
- › Neonatal survival of piglet ( $h^2 = 0.04 - 0.2$ )

LowInputBreeds 4

## Income v welfare (1)



- › Breeding for prolificacy
  - › Sow longevity

Interpig (2009)


› Longevity of sow ( $h^2 = 0.05 - 0.25$ )

Breeding? ✓



	W	A	J
A			
F			
C			
E			

5

## Income v welfare (2)



- › Breeding for lean tissue growth rate
  - › Fast and efficient growth, lean carcass
  - › ? Reduction in Robustness
  - › ? Ability to adapt to low input conditions





Breeding? ✓



	W	A	J
A			
F			
C			
E			

6

## Income v welfare (2)




- › **Breeding for lean tissue growth rate**
  - › Metabolic function (ability to function with low quality diets)
  - › Immunological function (natural ability to resist disease)
  - › Skeletal function (predisposition to OCD and leg weakness)


**Breeding?** ✓

	W	A	J
A			
F			
C			
E			



7



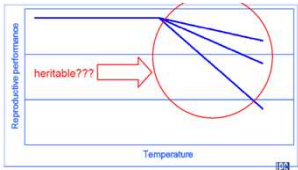
## Income v welfare (2)



- › **Breeding for lean tissue growth rate**
  - › Thermoregulatory function (esp. in low input systems)
  - › Loss of fat insulation (piglets and pregnant sows)
  - › Loss of heat tolerance (finishing pigs and lactating sows)


**Breeding?** ✓




**LIB project**  
**Saskia Bloemhof**

	W	A	J
A			
F			
C			
E			


8



## „Naturalness“ v environmental impact



- › **Feed conversion efficiency**
  - › Low input systems use feed less efficiently so give greater environmental impact
  - › Traditional breeds - slower growth, greater fatness
  - › More natural environments – greater waste, climatic penalty




**Breeding?** ✓

	W	A	J
A			
F			
C			
E			


› **N.b. Correlates of breeding for efficiency**

LowInputBreeds 9

## Management v welfare (1)



- › **Modified social organisation**
  - › Modified group size and composition
  - › Lack of group stability
- › **Breeding for reduced social problems?**
  - › Aggression in pigs ( $h^2 = 0.2 - 0.4$ )
  - › Tail biting in pigs ( $h^2 = 0 - 0.3$ )



**Breeding?** ✓

	W	A	J
A			
F			
C			
E			

LowInputBreeds 10

## Management v welfare (2)



- › Restriction of natural behaviour
  - › Early weaning age
  - › Barren housing conditions
- › Important Ethical issues but not solved by breeding



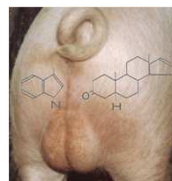
Breeding?

	W	A	J
A			
F			
C			
E			

## Product quality v integrity



- › Castration
  - › Mutilation to reduce boar taint in meat
  - › Problem greater in low input systems
    - › traditional, early maturing breeds
    - › slower growth and imbalanced dietary protein



Breeding?

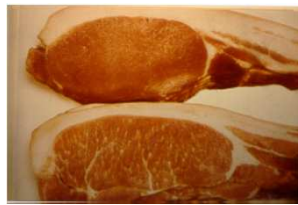
	W	A	J
A			
F			
C			
E			

- › Boar taint compounds ( $h^2 = 0.25 - 0.75$ )

## Product quality v Genetic diversity



- › **Fat composition and human health**
  - › Fatter animals (traditional breeds) have more saturated fat
  - › Saturated fat increases human health risks
  - › ? Can we breed for unsaturated fatty acids , esp omega-3



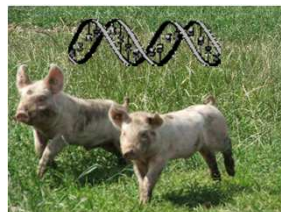
Breeding? ✓

	W	A	J
A			
F			
C			
E			

## Technology v integrity



- › **Genomic selection**
  - › Use of genetic markers, SNP information
  - › Not biological (phenotypic) information as used in traditional selection
- › **GM animals**
  - › Possibility of enhanced traits for low input systems



Breeding? ✓

	W	A	J
A			
F			
C			
E			



**The authors gratefully acknowledge co-funding from the European Commission, under the Seventh Framework Programme for Research and Technological Development, for the Collaborative Project LowInputBreeds (Grant agreement No 222623)**



15