Relevance of animal-based indicators for pig welfare assessment – Part I

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Some ideas on welfare assessment

#1 Animal welfare can't be assessed by using only one indicator

Animal welfare: elements to be considered

- **Emotions: absence of negative emotional states, such as pain and chronic fear, and presence of positive emotional states**

- **Adequate biological functioning**

- **Possibility to express normal behaviour**

(after Duncan and Fraser, 1997)

Animal welfare: elements to be considered (II)

- **The three elements overlap and interact with each other**

(Mason et al, 2001; Mendl, 2001)

Sow:

- Nest-building (behaviour)
- Stress (biological functioning)

(*Cronin et al., 1993*)

Piglet:

- Cerebral hypoxia (biological functioning)
- Hunger and pain (emotions)
- Death

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#2 Indicators have to be:

- Valid
- Reliable
- Feasible

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#2 Indicators have to be:

- Valid-the indicator tells us something about welfare e.g. a change in the indicator reflects an increase / decrease in welfare
- Reliable
- Feasible

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#2 Indicators have to be:

- Valid
- Reliable-inter-observer reliability and intra-observer reliability
- Feasible

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#2 Indicators have to be:

- Valid
- Reliable
- Feasible-time & money

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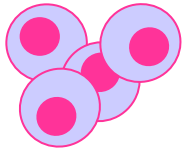
#2 Indicators have to be:

- Valid
- Reliable
- Feasible

Are cytokines valid, reliable and feasible?

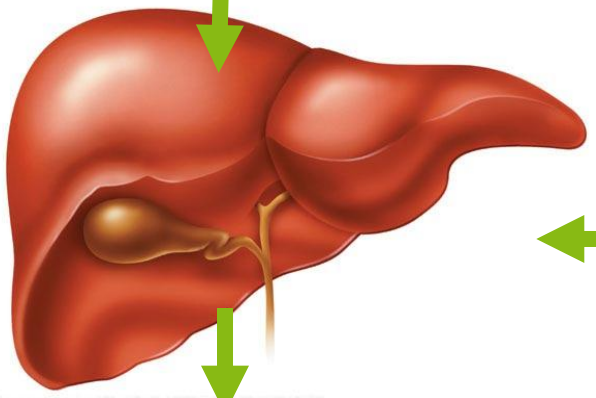
What about cortisol?

Tissue damage



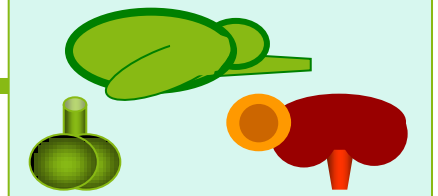
Monocytes
Macrophages

Cytokines



Cortisol

HPA axis



Acute phase proteins

+ APP

- APP

(Gruys et al., 2005)

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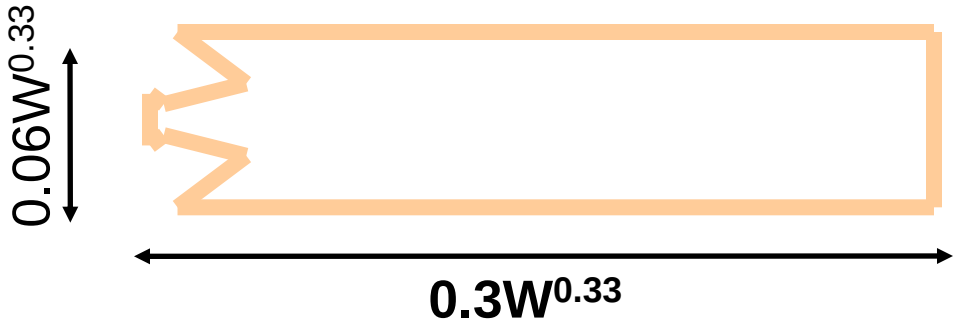
#3 There can be animal-based and resource-based indicators

Some ideas on welfare assessment

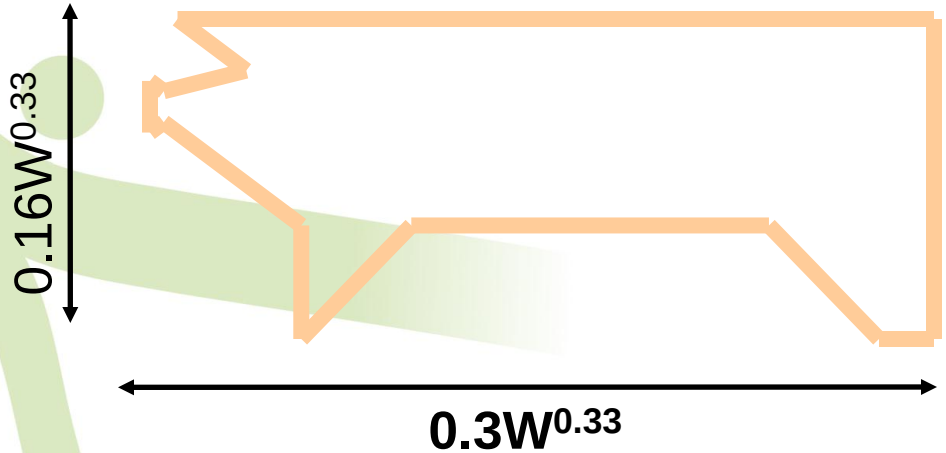
#3 Animal-based indicators give us direct information on the animals' state and can be used across systems and conditions

Example: stocking density

Floor area requirements (100 Kg. BW)



Aprox. 0.4 m2



Aprox. 1 m2

(Petherick and Baxter, 1981)

Recommended space allowance –thermoneutral conditions

BW (Kg.)	Space per animal (m^2)
< 10	0.16 (0.15)
10 - 20	0.28 (0.20)
20 - 30	0.36 (0.30)
30 - 50	0.50 (0.40)
50 - 85	0.72 (0.55)
85 - 110	0.85 (0.65)

Recommended space allowance – heat stress

BW (Kg.)	Space per animal (m^2)
< 10	0.22 (0.15)
10 - 20	0.35 (0.20)
20 - 30	0.46 (0.30)
30 - 50	0.65 (0.40)
50 - 85	0.92 (0.55)
85 - 110	1.10 (0.65)

It is more complicated:

Heat stress depends on effective temperature and this is affected by:

- Air temperature
- Floor
- Ventilation

And even more so!:

Recommended stocking density also depends on:

Health status

Group size

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#3 Animal-based indicators give us direct information on the animals' state and can be used across systems and conditions

Example: presence of rooting material-tail biting

Tail-biting in fattening pigs

- Multifactorial problem
- Likely to start as redirected rooting behaviour
- Other risks factors have been described

(SCAHAW, 1997; Moinard et al., 2003)

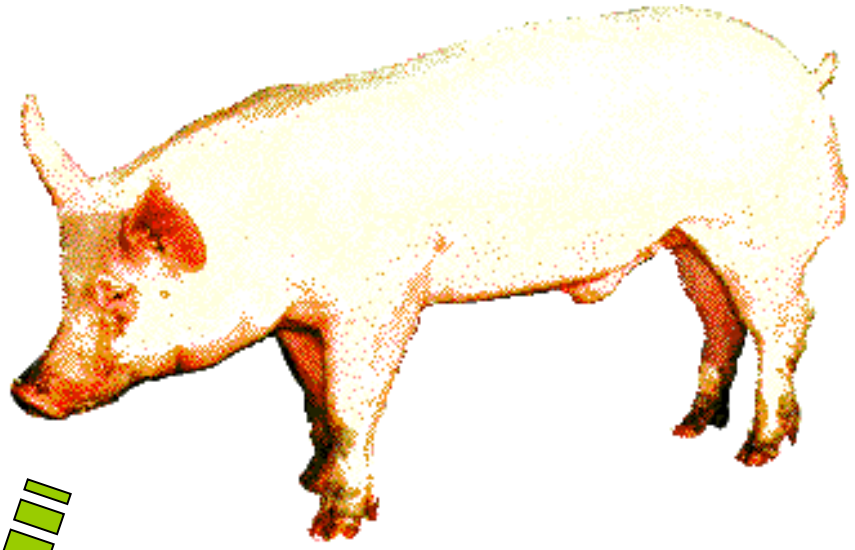
Some risk factors for tail-biting

- Poor health status
- High stocking density (more than 110 Kg / m^2)
- Partially or fully slatted floor
- More than 5 pigs per feeding space

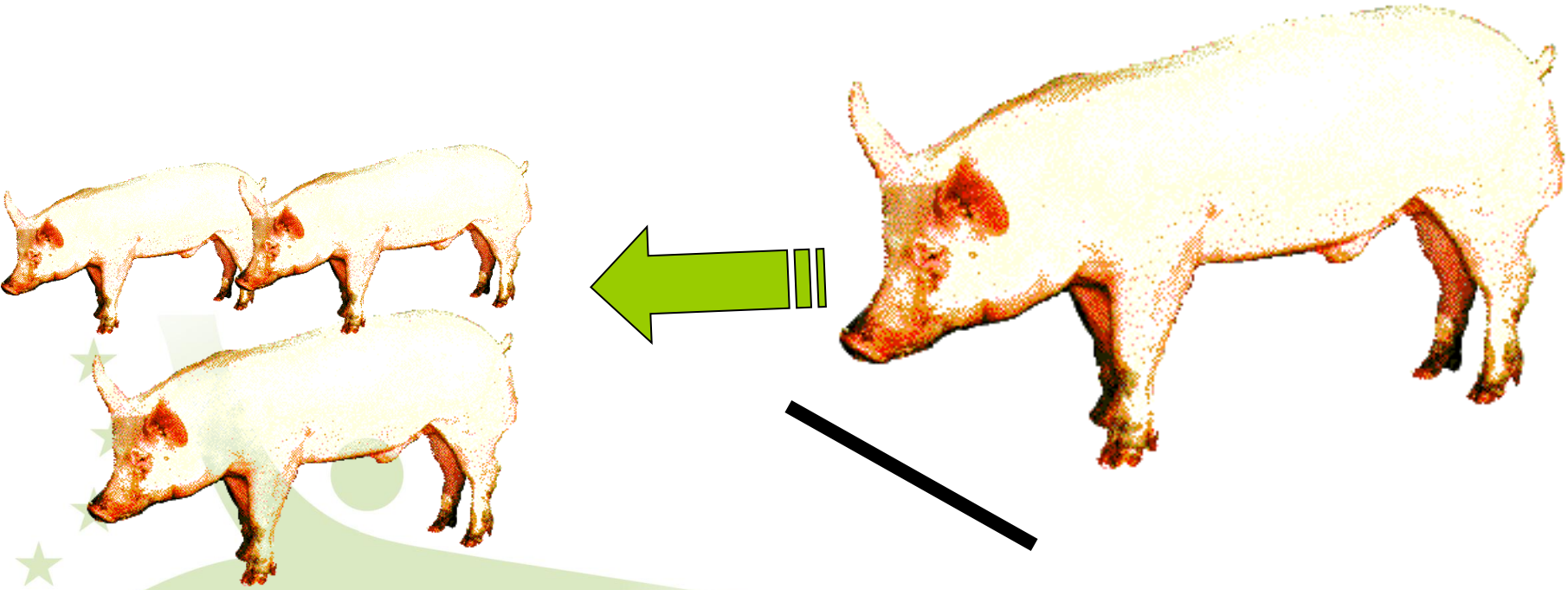
(Moinard et al., 2003)

REDIRECTED ROOTING BEHAVIOUR

In natural conditions, pigs spend 50% of their active time rooting



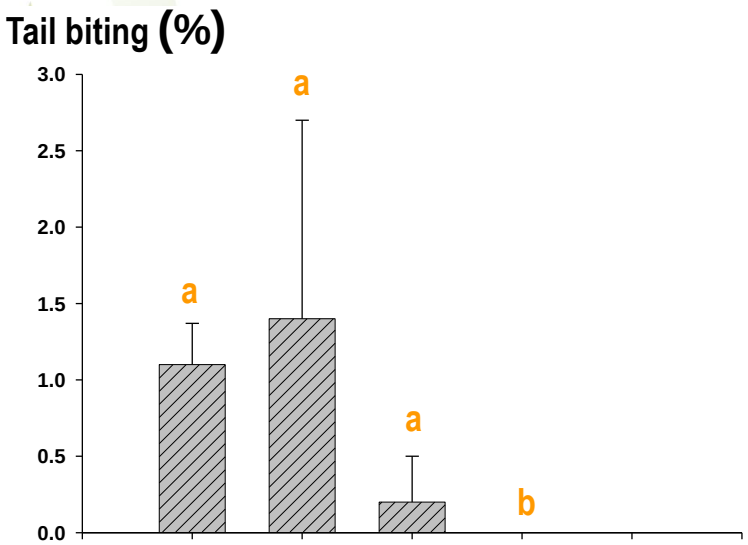
REDIRECTED ROOTING BEHAVIOUR



Absence of rooting material

GOOD HEALTH

TAIL BITING



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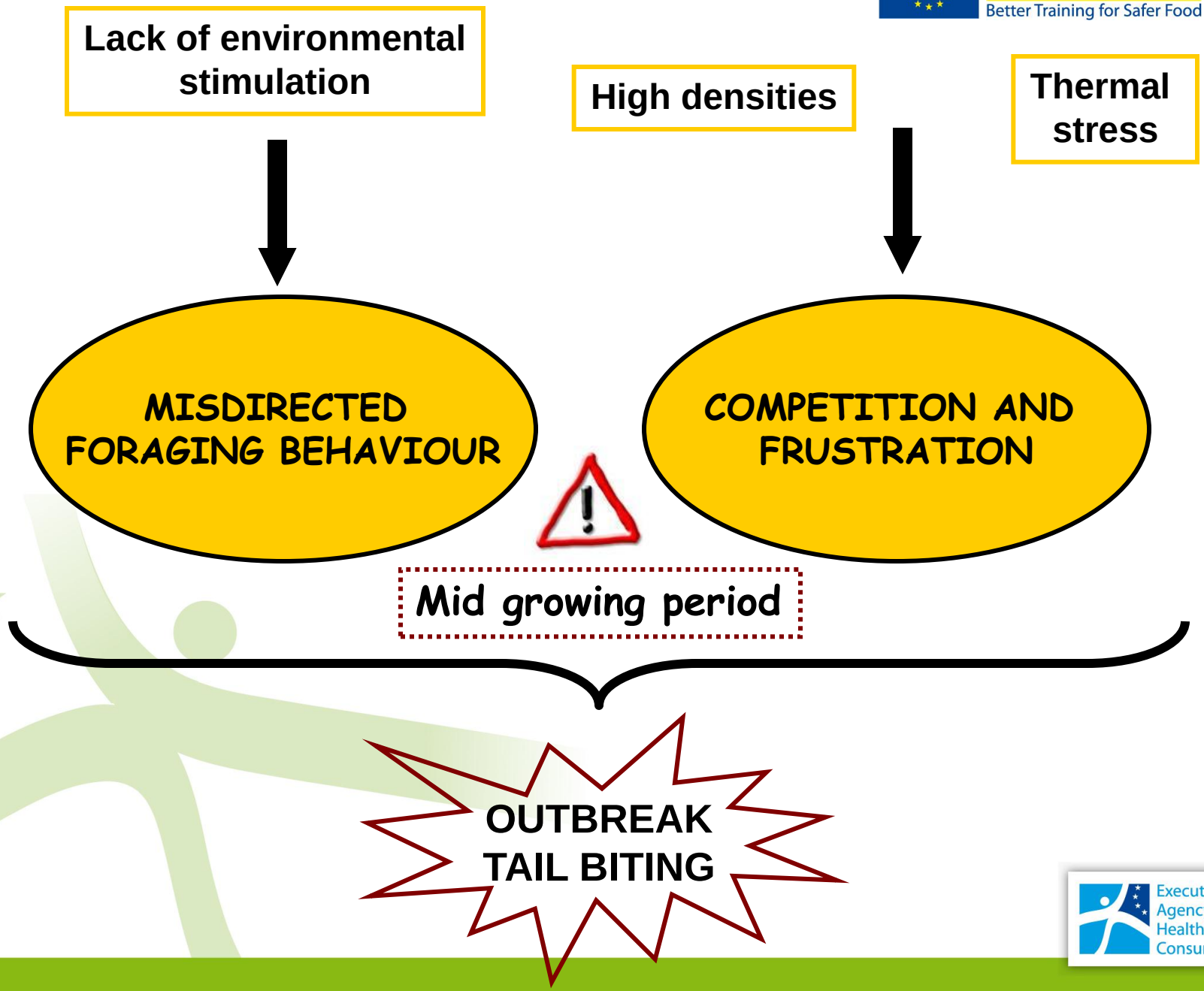
Lack of environmental stimulation
High densities
Thermal stress
MISDIRECTED FORAGING BEHAVIOUR
COMPETITION AND FRUSTRATION
Mid growing period
OUTBREAK TAIL BITING

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#4 Resource-based indicators are also needed

Lack of animal-based indicators

Selection of improvement strategies

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#5 Indicators have to be combined into protocols or monitoring systems

Why on-farm welfare monitoring systems?

To identify animal welfare problems on a given farm

To assess the effectiveness of improvement strategies

To provide information to consumers and other stakeholders

Welfare Quality

Science and society improving animal welfare

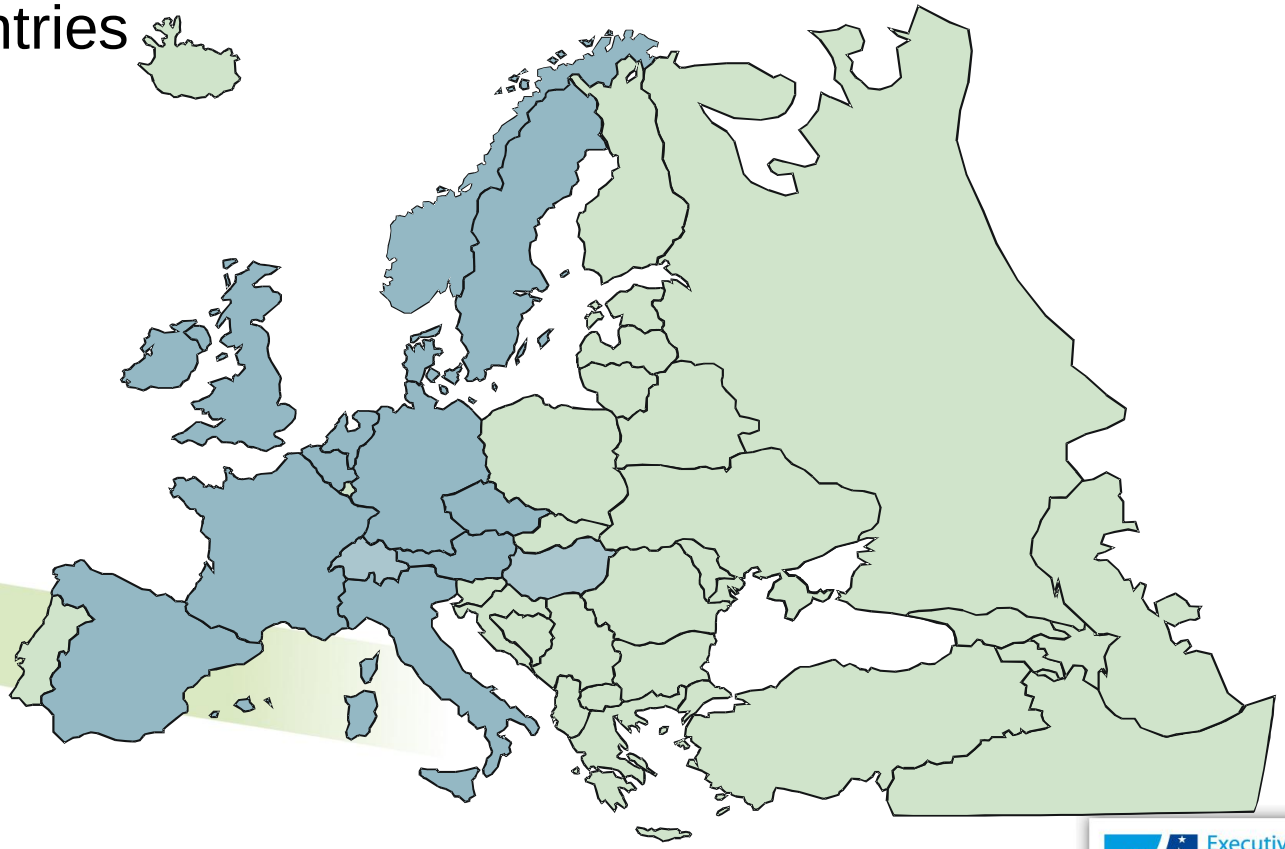
www.welfarequality.net

SIXTH FRAMEWORK PROGRAMME

17 milion € (14.4 milion EU contribution)

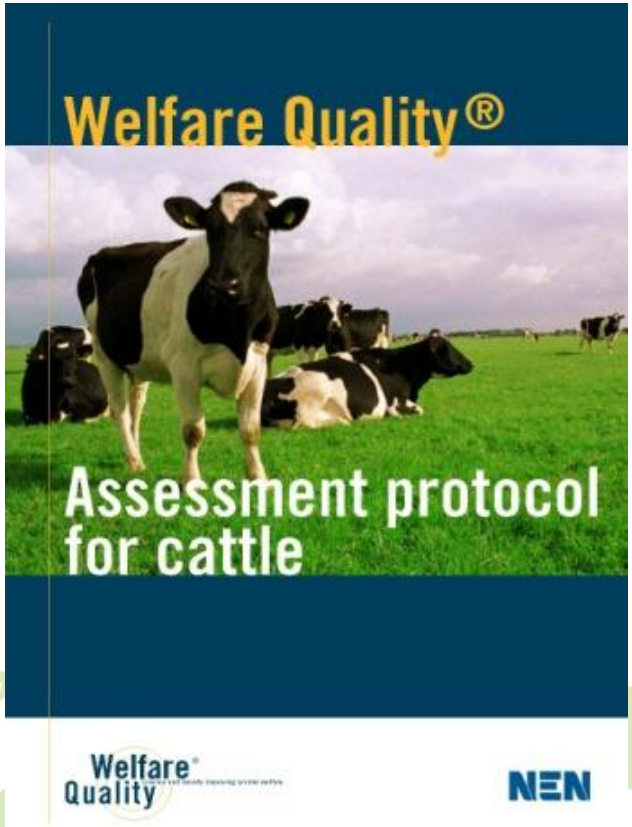
41 partners

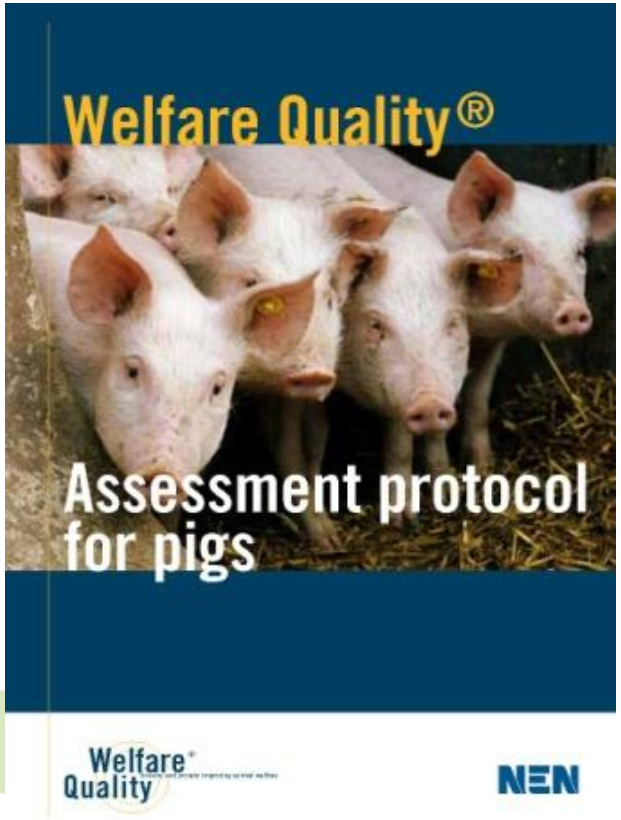
13 + 4 countries

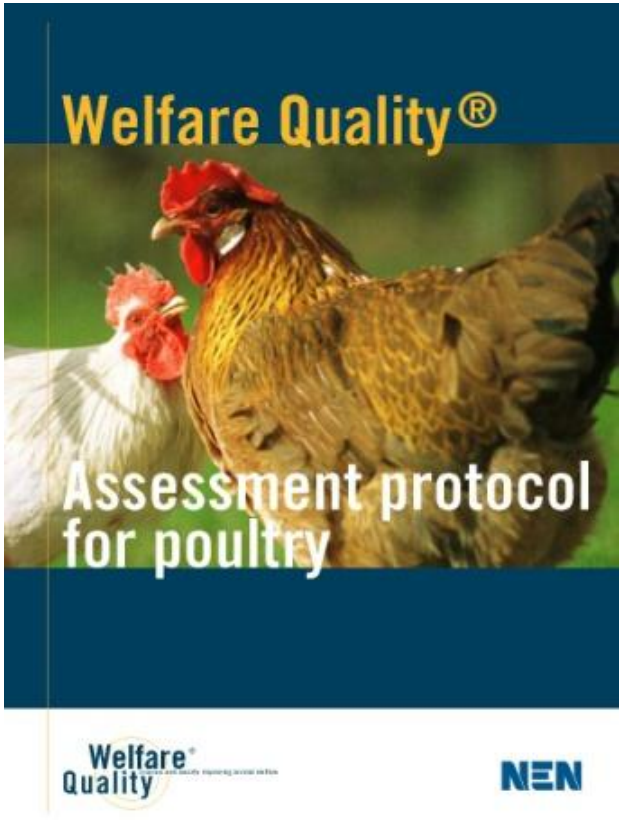


www.welfarequality.net

Welfare Quality asessment potocols®







The Five Freedoms

- Freedom from thirst, hunger and malnutrition
- Freedom from thermal and physical discomfort
- Freedom from pain, injury and disease
- Freedom to express normal patterns of behaviour
- Freedom from fear and distress

(FAWC, 1992)

The Welfare Quality® four principles

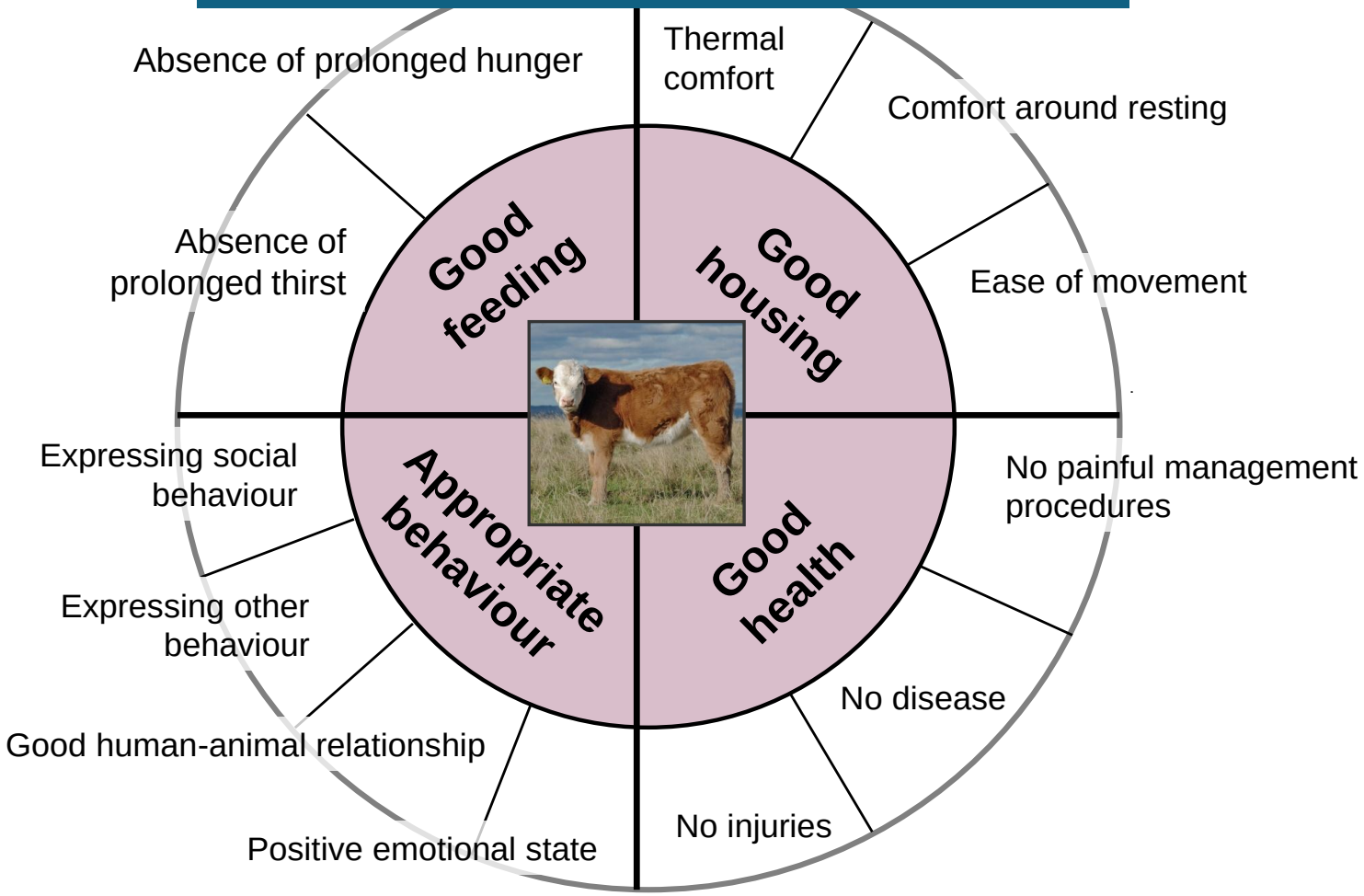
- Are the animals properly fed and supplied with water?
- Are the animals properly housed?
- Are the animals healthy?
- Does the behaviour of the animals reflect optimized emotional state?

INTEGRATION OF PARAMETERS IN AN OVERALL ASSESSMENT

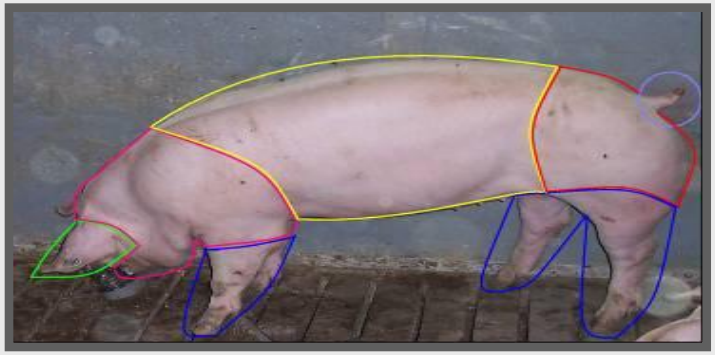
Welfare Quality

4 PRINCIPLES	12 CRITERIA	PARAMETERS
Good Feeding	1. Absence of prolonged hunger	Body condition score
	2. Absence of prolonged thirst	Water supply
Good Housing	3. Comfort around resting	Bursities, Manure on the body
	4. Thermal Comfort	Shivering, Panting, Huddling Temperature
	5. Ease of movement	Space allowance
Good Health	6. Absence of injuries	Wounds, Lameness, Tail biting
	7. Absence of disease	Respiratory and enteric problems Skin condition, Hernias Criteria of euthanasia
	8. Absence of pain induced by management prodedures	Castration Tail docking
Appropriate Behaviour	9. Expression of social behaviours	Positive & Negative social behaviours
	10. Expression of other behaviours	Exploratory behaviour
	11. Good Human-Animal relationship	Human-animal relationship test
	12. Positive emotional state	Qualitative Behaviour Assessment

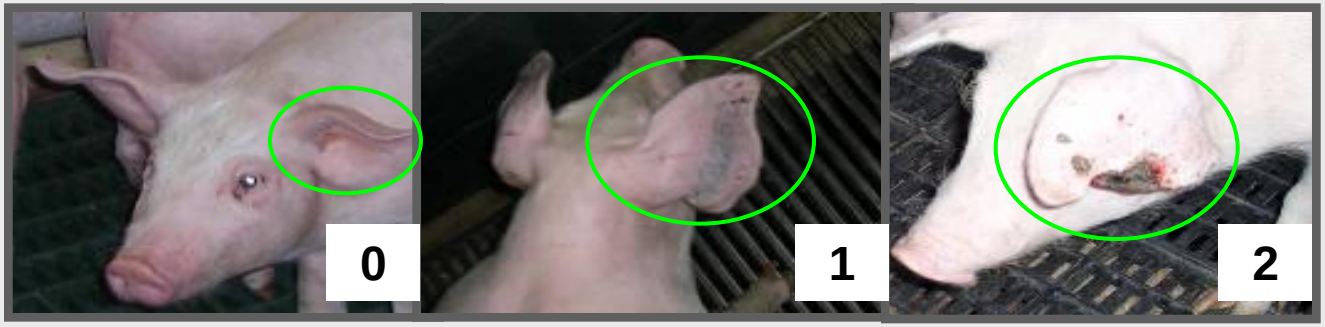
Four principles and 12 criteria



- Wounds
- Scratches
- Location



Ears



Photos: University of Newcastle

E

Exp
behaviour

Good human-animal relationship

Positive emotional state

No disease

No injuries

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gency for
Health and
Consumers

Some ideas on welfare assessment

#6 Animal-based indicators can be of several types:

- Appearance of the animal
- Health
- Behaviour
- Physiology
- Production
- Carcass / Meat-quality

Some ideas on welfare assessment

#6 Animal-based indicators can be of several types, but mainly…

Appearance of the animal

Health

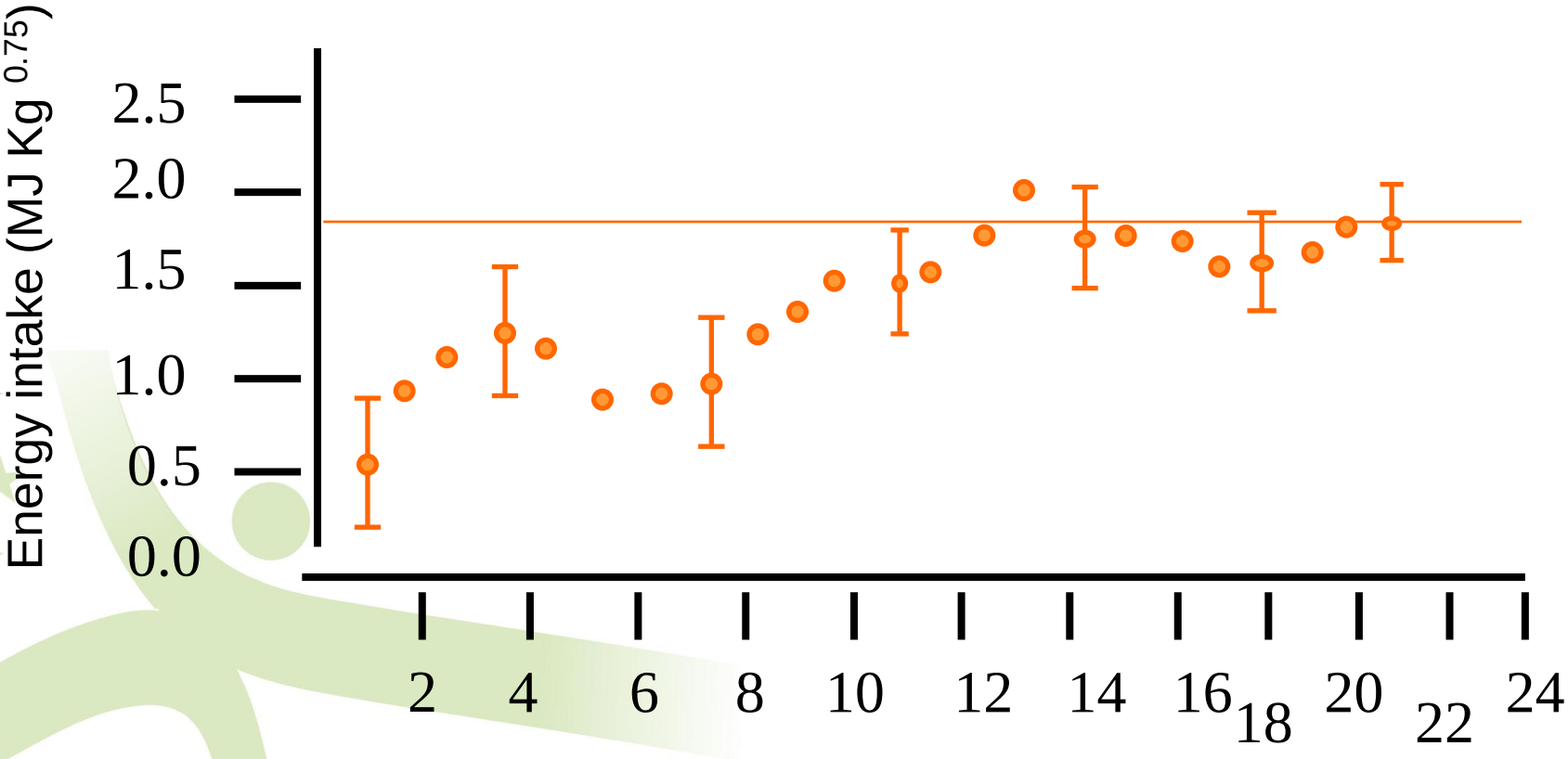
Behaviour

(Carcass / Meat-quality)

Some ideas on welfare assessment

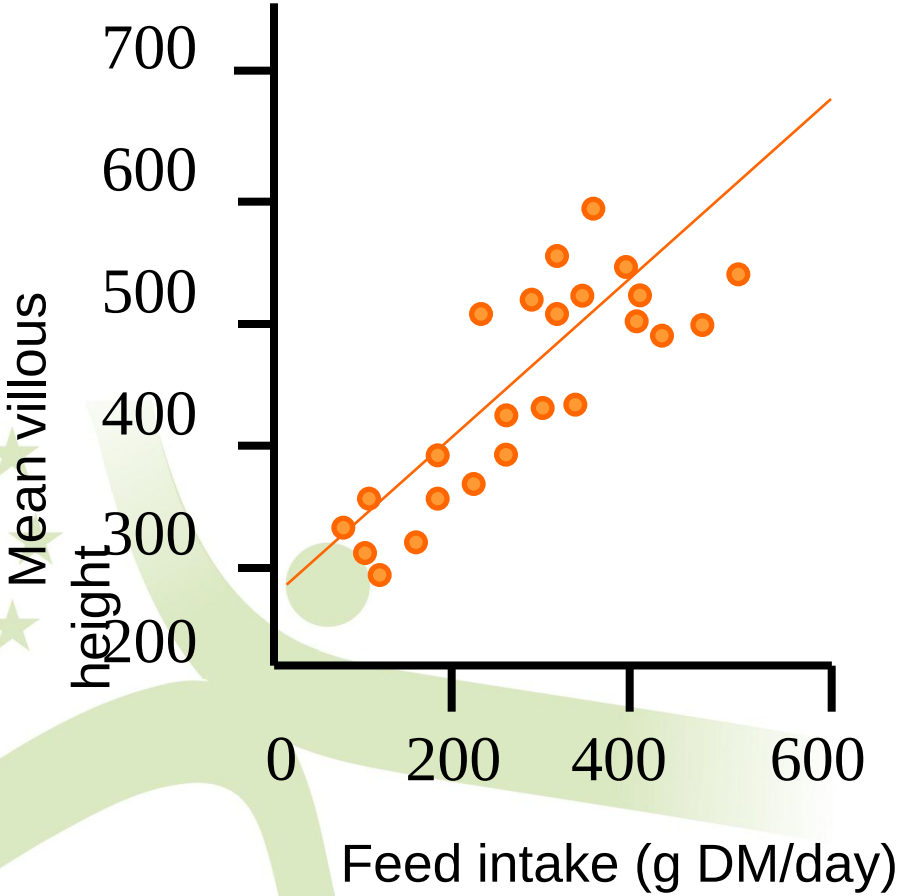
#6 What are the problems with physiology / production?

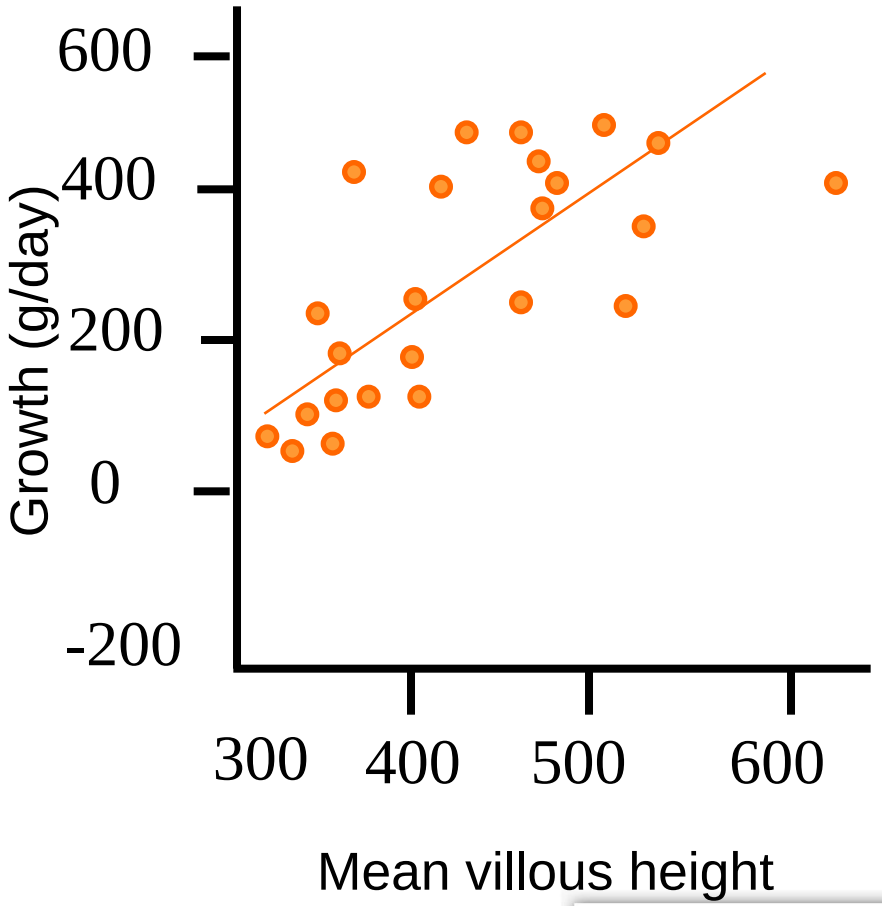
Feed intake after weaning



(Robertson et al., 1985)

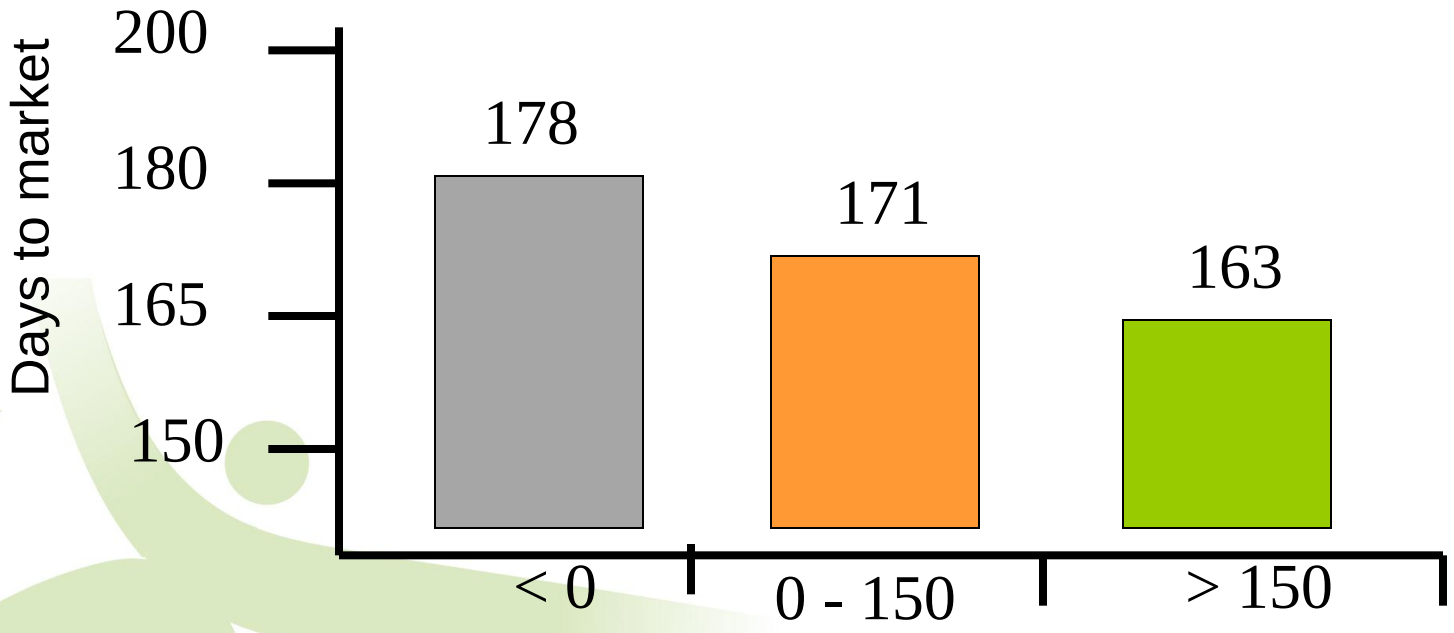
Feed intake after weaning





(Pluske, 1993)

Feed intake after weaning



Growth (g/day) during the first week after weaning

(Pollmann, 1993)

Some ideas on welfare assessment

#7 Integration of the different indicators to obtain a final value (“overall welfare”) is difficult

Methodology to integrate welfare measures into an overall assessment