

# Better Training for Safer Food *Initiative*

Training course on “Animal Welfare in pig production”

Animal health and welfare aspects  
of different housing and husbandry  
systems for pig production

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**Herning, Denmark, 14-17 Oct, 2014**



**Development of loose housing systems**



## Presentation

**Work as a senior scientist at Aarhus University, Denmark**

**Research group for Animal Behaviour and Stress Biology**

**Interests & current projects:**

Sow housing- and management

Neonatal piglet mortality

Enrichment, foraging and exploration

Tail biting

# Housing and husbandry with major impact on pig welfare

2

In this talk highlights on:

Space requirements for group housed pregnant sows

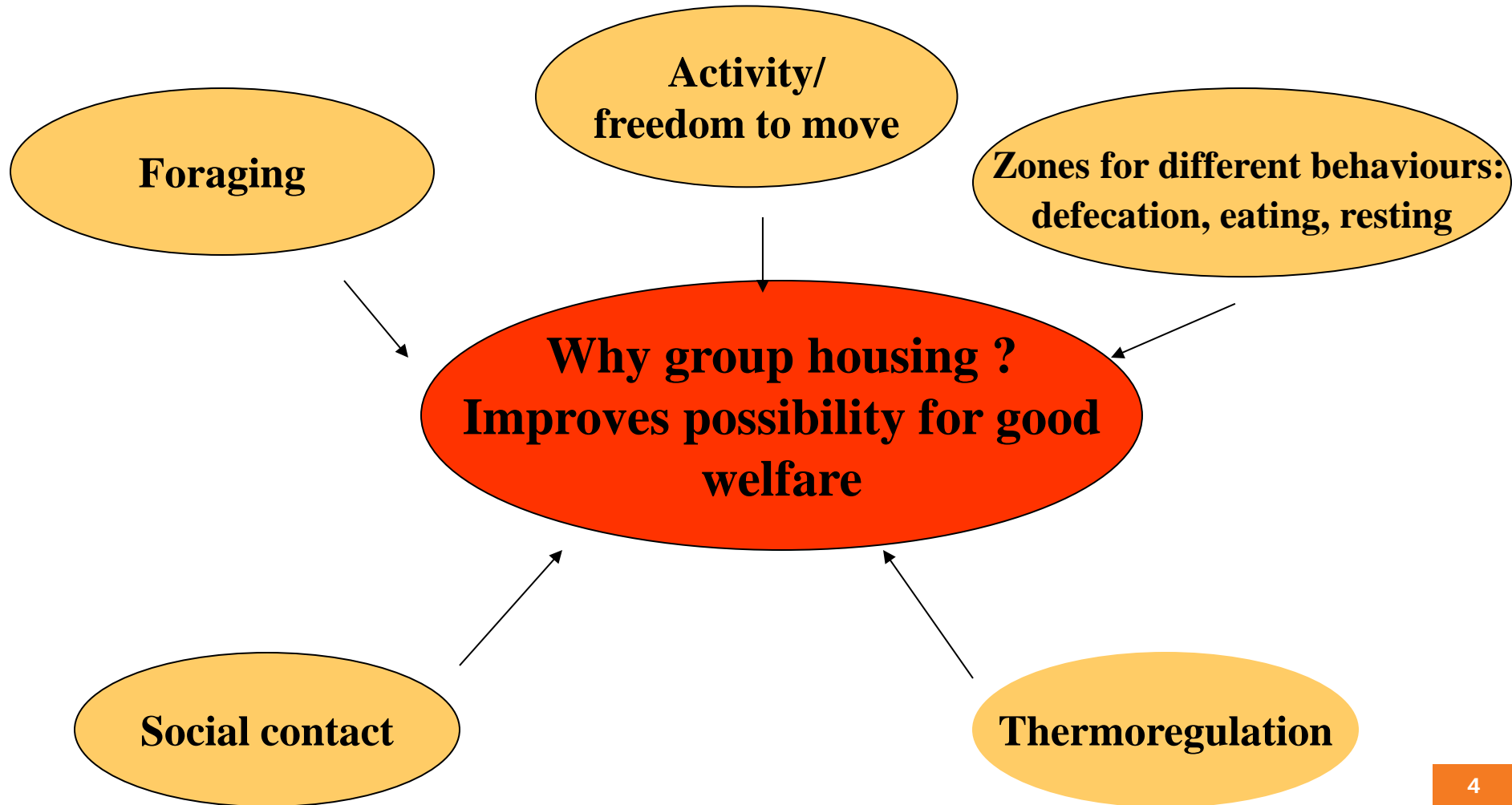
Space for sows and piglets in farrowing unit

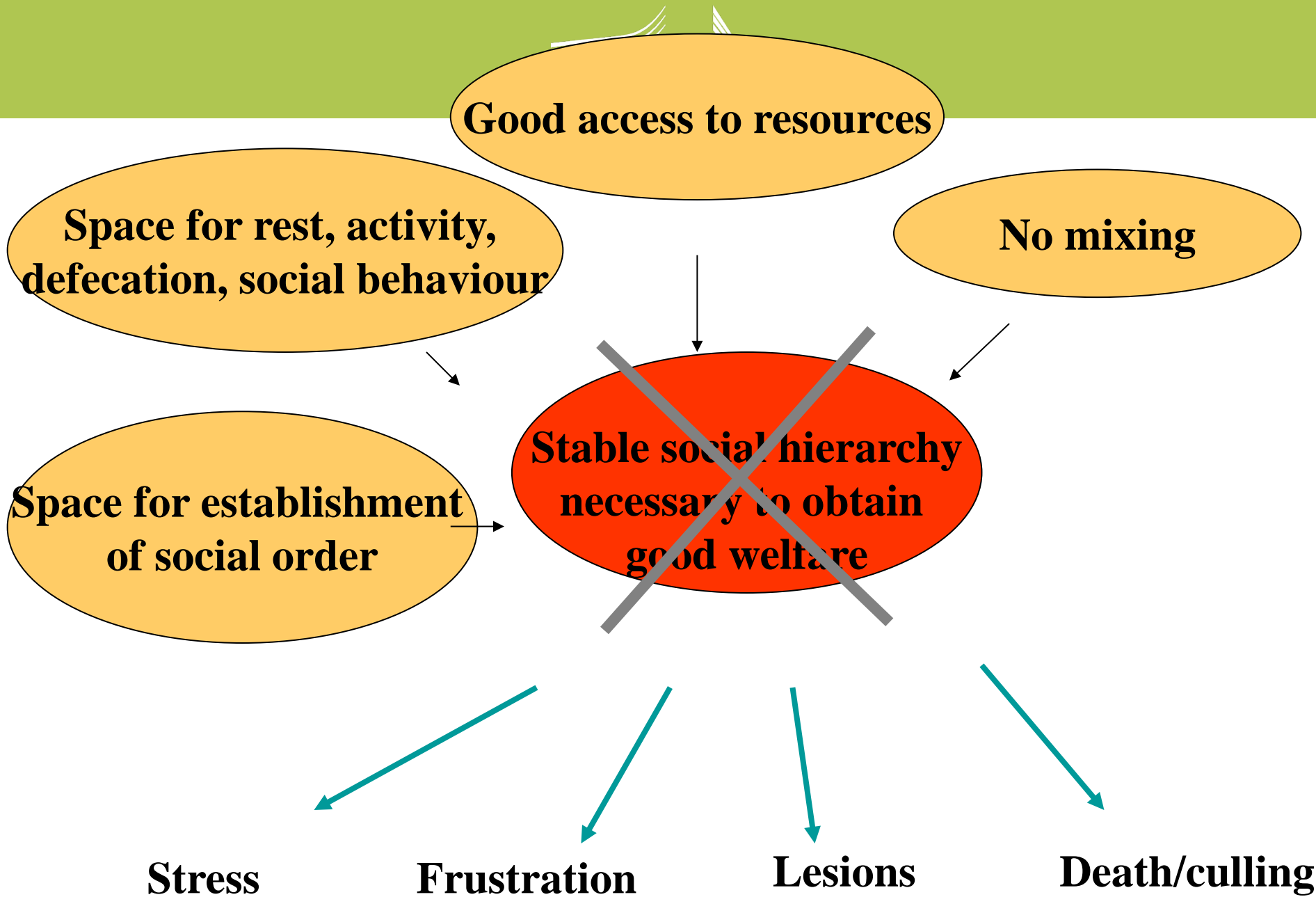
Fibre in the diet for pregnant sows to prevent hunger



## Council Directive 2008/120/EC requires:

- Sows and gilts must be kept in groups from 4 weeks after service to one week before the expected farrowing date
- Minimum unobstructed floor area allowance of 1.64m<sup>2</sup> (gilts) and 2.25m<sup>2</sup> (sows)
  - Group size <6 requires 10% more space/animal
  - Group size >40 may have 10% less space/animal
- >2.8 m between walls

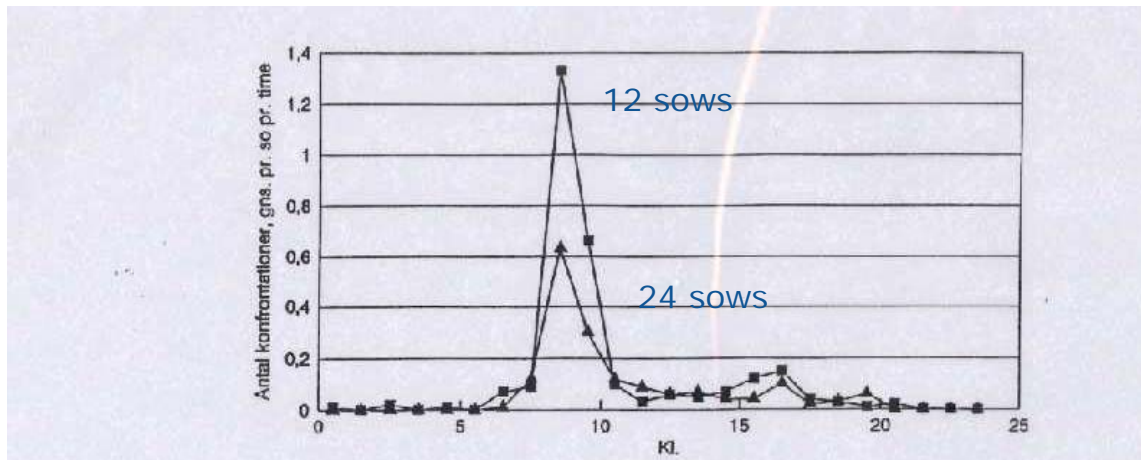




**Sufficient space is not ONLY  
a matter of square meter  
per sow**



# More total space in large groups result in less aggression

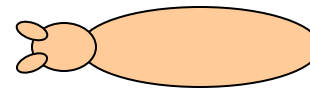


**12 vs. 24 sows per group:**  
**Both groups have 2.2 sqrm per sow**



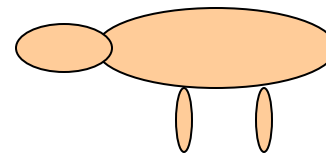
# Different space for different activities

*Lying- ventral*



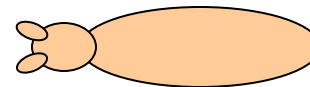
*0.8 m<sup>2</sup>*

*Lying- sternal*



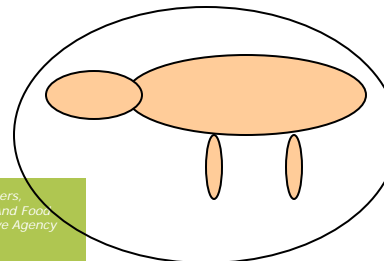
*1.1-1.6 m<sup>2</sup>*

*Standing*



*0.8 m<sup>2</sup>*

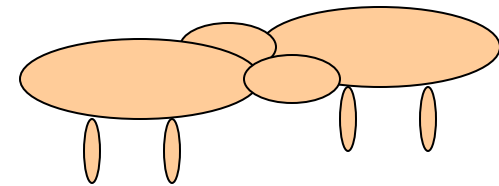
*Moving sow*



*2.6 m<sup>2</sup>*

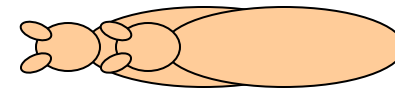
# Space for social activities

*Establish social rank/unstable rank order  
(space for fighting ~ 6-7 m<sup>2</sup>)*



*Stable rank order (signals and individual  
distance) ~ 2-3 m<sup>2</sup>*

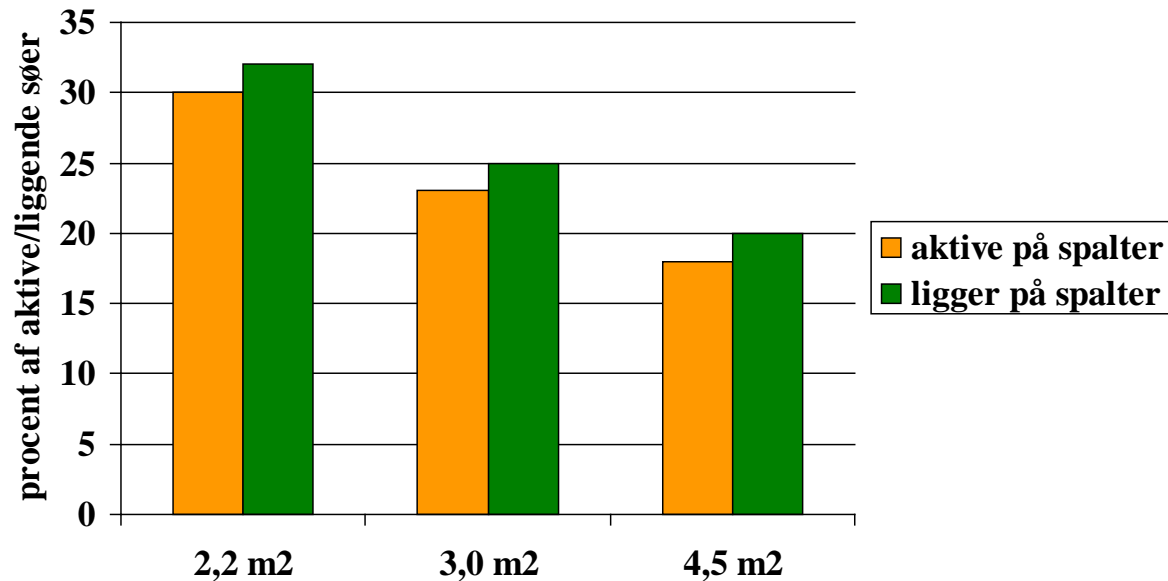
*Oestrus behaviour ~ 6-7 m<sup>2</sup>*



# Not all space have the same value for the sows

*Eg. Sows avoid slatted floor area if given a choice:*

*% of sows on slatted floor decrease with increasing space*



## Low quality of space limit the use: no peaceful resting place



# Space limitations even with sufficient total space



**Narrow passages**



## Space limitation at feeding

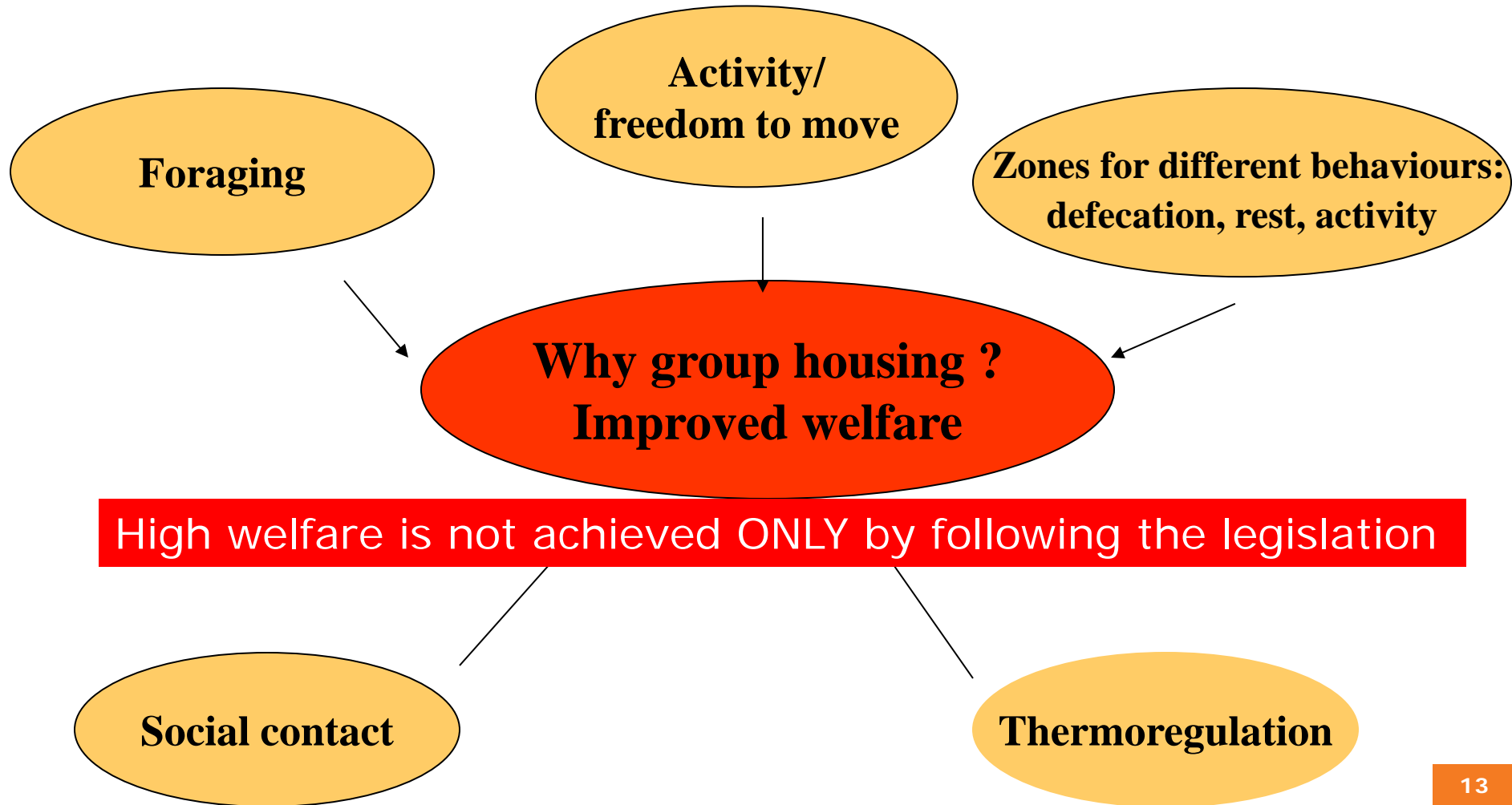


**ESF with sows  
standing in line**

**Floor feeding: all sows  
active at same time**



**Subordinate sows  
never get access to feed**



# Farrowing pens: sows and piglets

Council Directive 2008/120/EC requires:

Sows:

1. Accommodation for pigs must be constructed in such a way to allow the animals to rest and get up normally
2. An unobstructed area behind the sow/gilt for the ease of natural or assisted farrowing

Piglets:

3. The piglets must have sufficient space to be able to suckle without difficulty.
4. A part of the total floor, sufficient to allow the animals to rest together at the same time, must be solid or covered with a mat, or be littered with straw.



Are there sufficient space  
for the sow to rest and get  
up normally ?



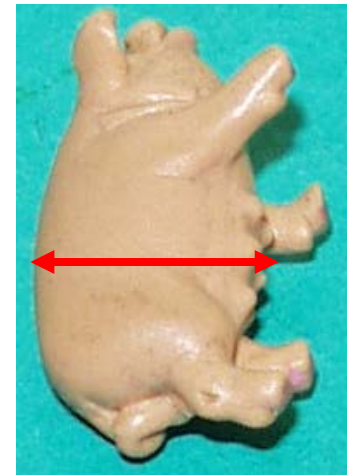
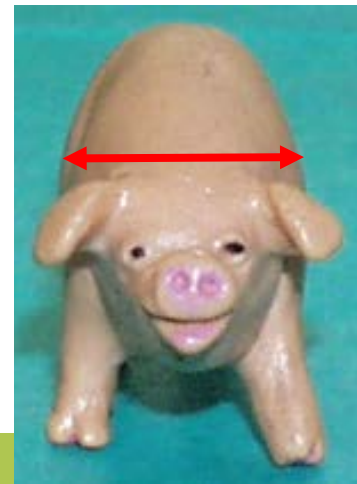
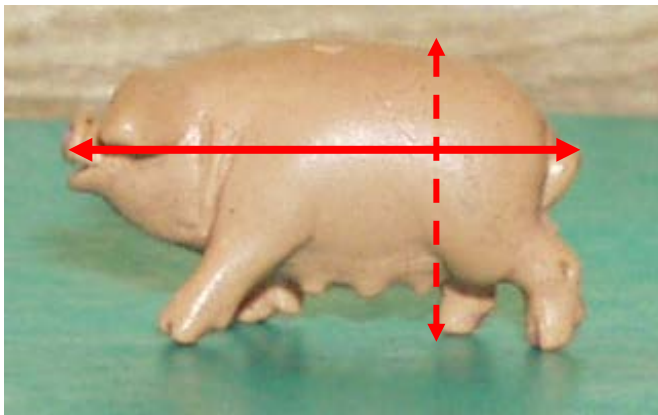
Are there sufficient space  
for piglets to suckle  
without difficulties ?



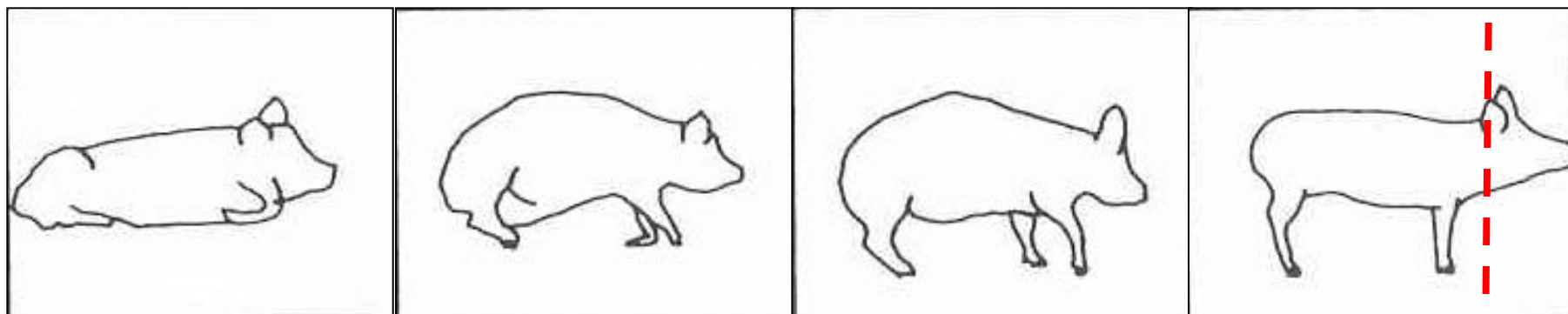
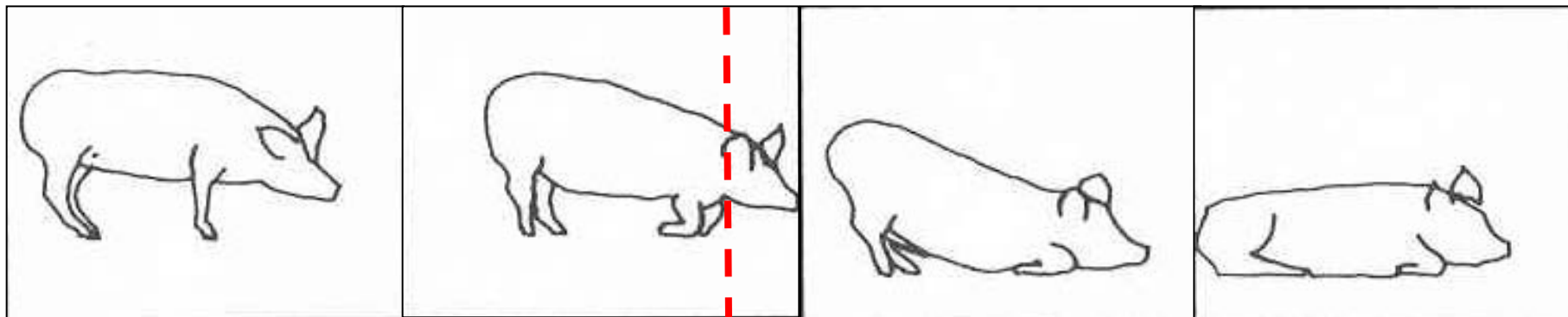
Can 12 piglets rest  
together at a solid floor  
when 4 wk old ?

# The physical dimensions of sows<sup>(Moustsen et al. 2011)</sup>

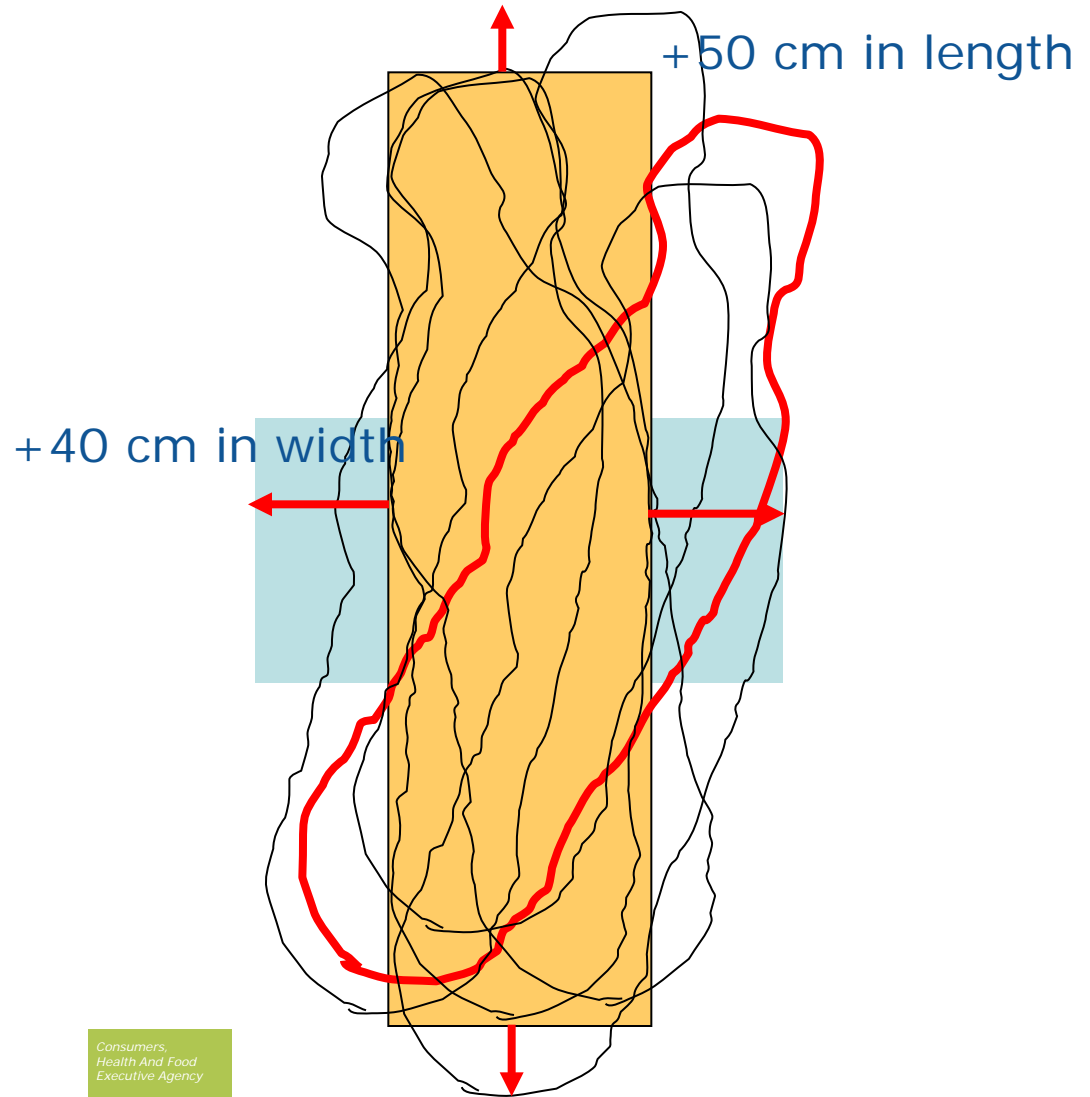
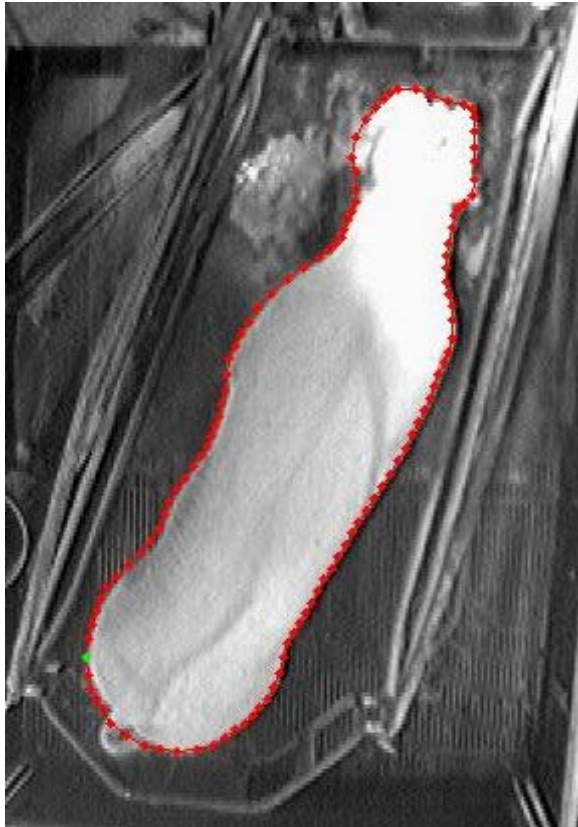
(cm)	Length	Height	Shoulder width	Depth
Mean	184	88	42	63
Max.	205	101	54	78
<b>95 pct.</b>	<b>200</b>	<b>95</b>	<b>47</b>	<b>71</b>



# Posture changes take up space



# Dynamic space for movements





# Mean pen size measured in 84 DK herds

(Pedersen et al., 2013)



# Are there sufficient space for the sow to rest and get up normally ?

	Lenght	Side
Physical dimension, 95 %	200 cm	71 cm
Dynamic space (image analysis, unpubl)	+50 cm	+40 cm
Median size of DK crates (Pedersen et al., 2013)	198 cm	57-64 cm

# Space for piglets (Moustsen and Poulsen, 2004)

Position	10 piglets at 4 wk	12 piglets at 4 wk
Sternal lying	0,69 m <sup>2</sup>	0,8 m <sup>2</sup>
Partly lateral lying	1,08 m <sup>2</sup>	1,3 m <sup>2</sup>
Lateral lying	1,70 m <sup>2</sup>	2,0 m <sup>2</sup>
Length	0,56 m (1 piglet)	



# Are the crates sufficiently large ?



*Crates are often too narrow for sows to rest and get up normally*

*Some sows may be too long to accommodate in standard pens*

*The solid floor area in fully slatted pens are not sufficient to accommodate 10-12 piglets resting (often only 0.4 m<sup>2</sup>)*

*The space at one side is often too narrow to allow piglets to suckle without difficulties*

# Feeding of pregnant sows: hunger

Council Directive 2008/120/EC requires:

Member States shall ensure that all dry pregnant sows and gilts, in order to satisfy their hunger and given the need to chew, are given a sufficient quantity of bulky or high-fibre food as well as high-energy food.

## Definition of hunger ?

*A negative subjective state experienced by the animal, when chronically underfed with energy (D'Earth et al., 2009).*

*Hunger: animals subjective experience of its feed intake in relation to its demand for feed*

# Why is bulky feed and reduced hunger important for welfare ?

- Pregnant sows experience hunger during the majority of the 24 h cycle
  - aggression, lesions, stereotypies
- Sows are hungry few h after feed delivery
- They are fed a high energy feed without fibre
  - Energy is only available during a short boost after the meal
  - Low bulk effect and fast transport through the stomach/intestinal tract
- Sows are often fed only once daily
- Feed intake last < 15 min



# Animal welfare

Restrictively fed pregnant sows suffer from hunger

Ad lib fed sows get obese and may suffer from reproductive problems

Does fibre in diet solve the problem?

**Healthy  
Lean  
Reproductive**

**Freedom from**

- Pain and discomfort
- Fear and stress
- Hunger and thirst

**Biological function**

**Subjective experience**

# Can 35 % fibres in the diet reduce hunger ?

*Measure of hunger: How much extra food will sows work for?* (Jensen et al., 2012)

How many panel presses will sows perform to get extra feed:

1,1,5,5,10,10,... for 30 g feed

Control (2.6 kg)

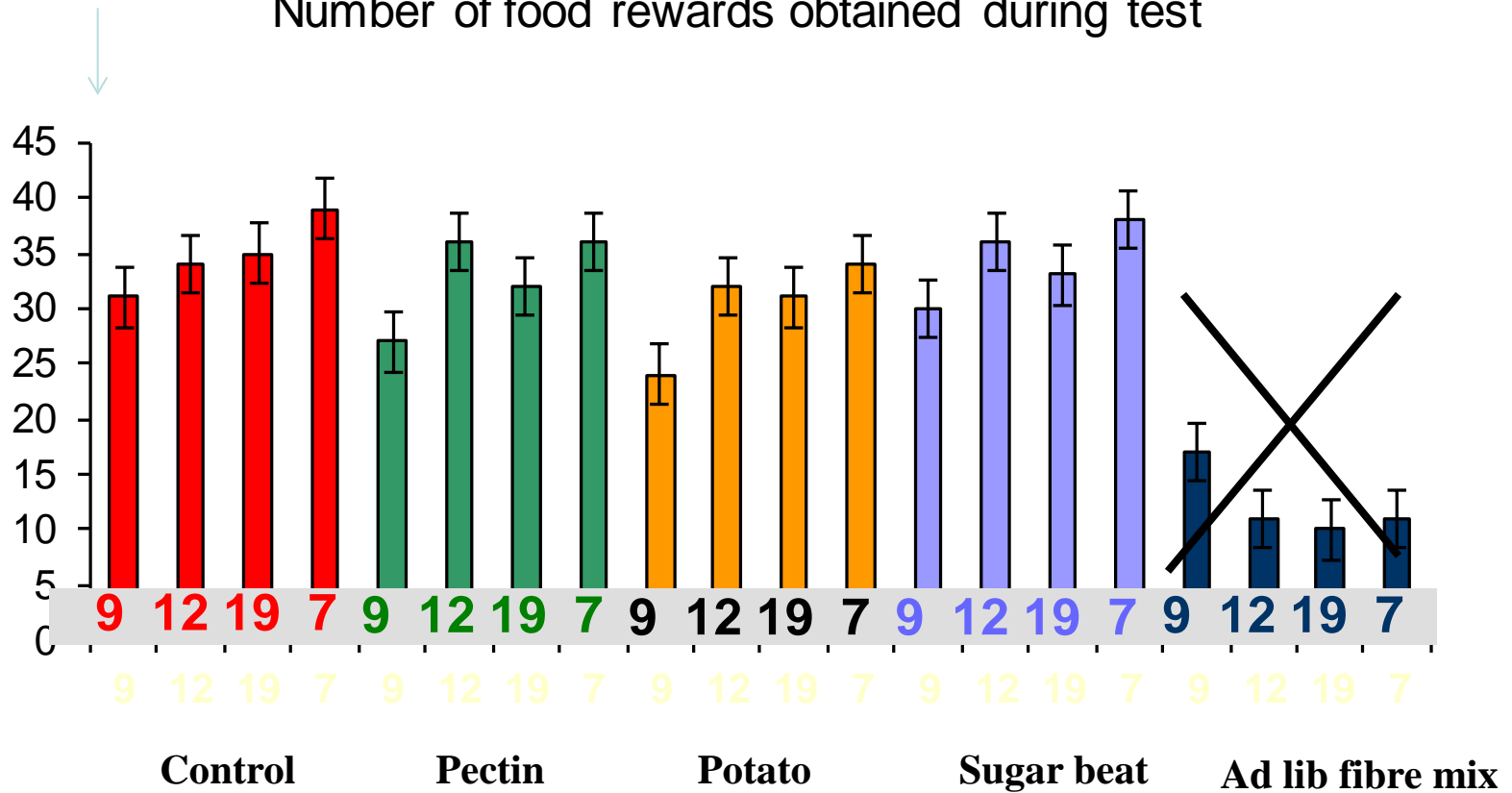
Three fiber type (2.6 kg)

Ad lib diet with fibre



## Feeding at 08

Number of food rewards obtained during test



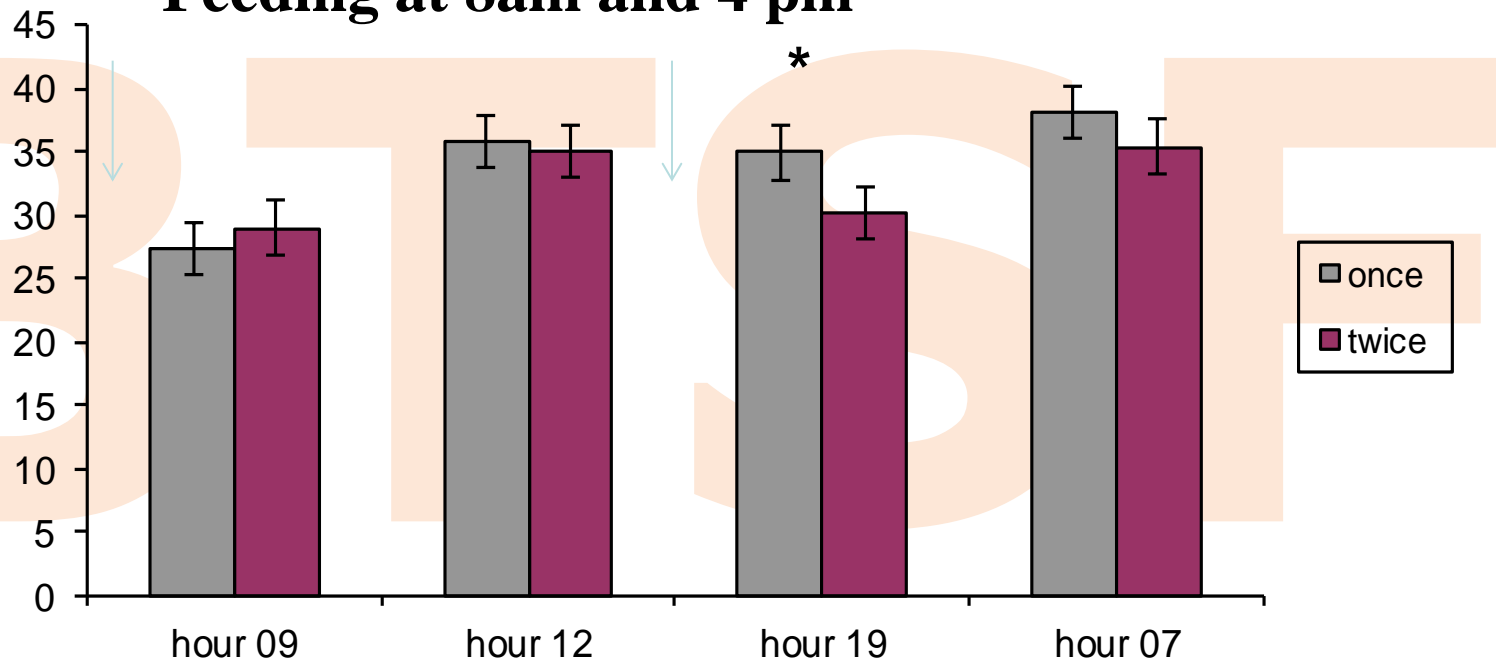


# One vs. two daily feeding

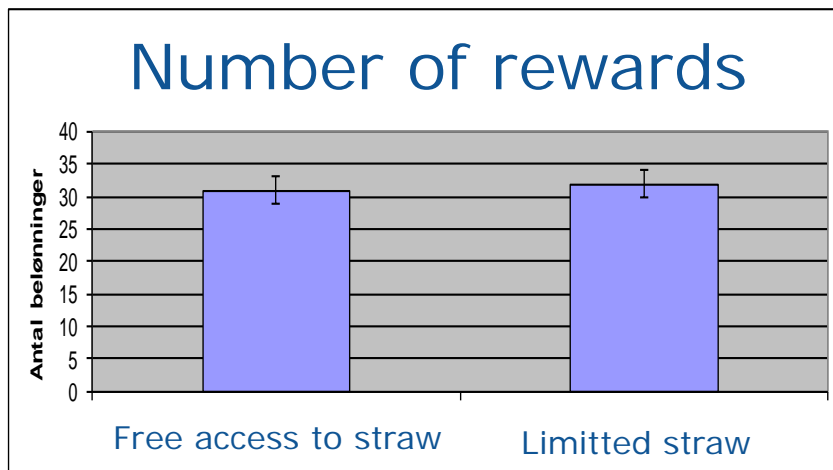


Number of food rewards obtained during test

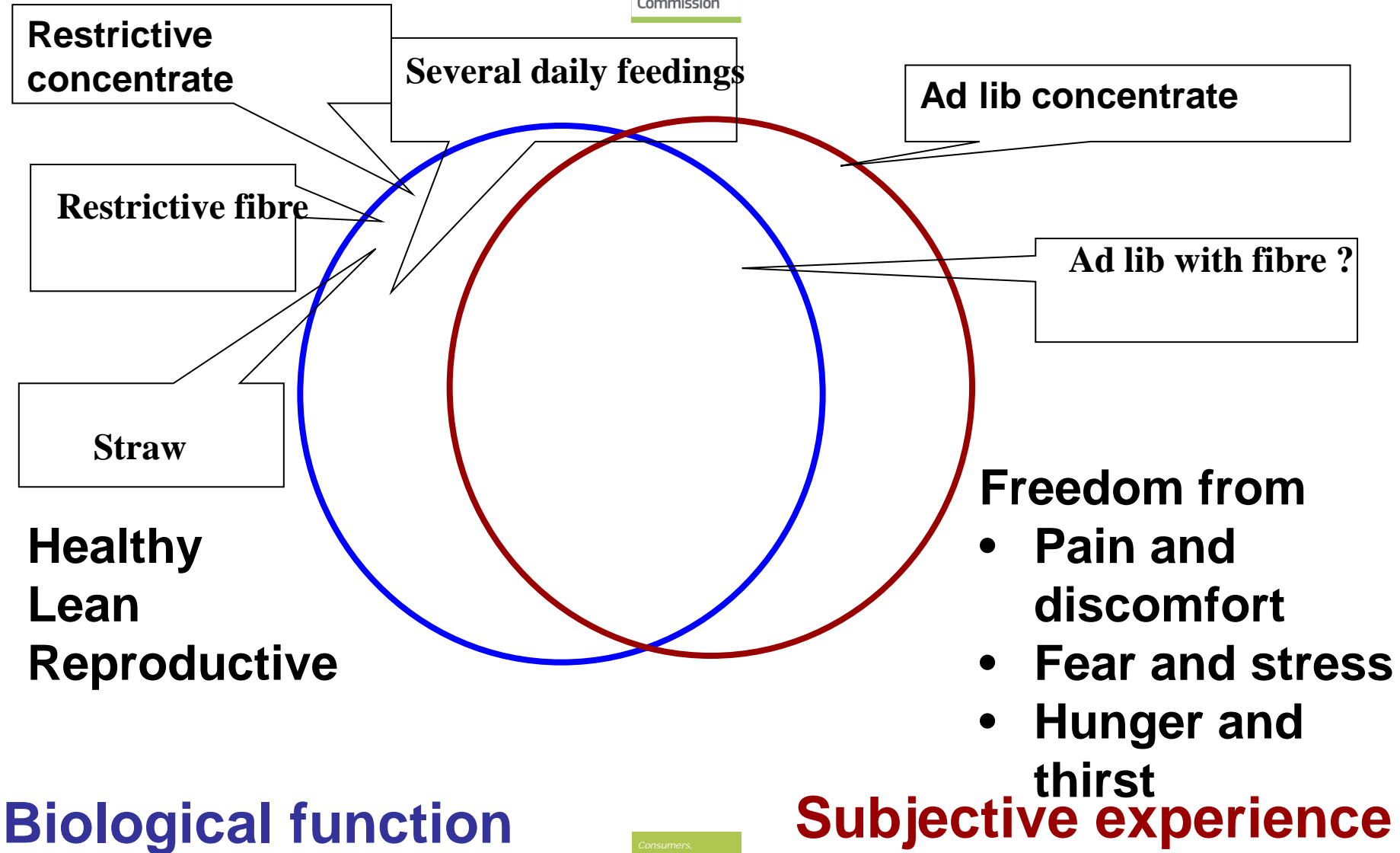
## Feeding at 8am and 4 pm



# Free access to straw



**No effect on hunger of free access to straw**





A photograph showing a piglet lying in a metal cage. The piglet is light pink with a small green mark on its side. It is surrounded by other piglets of various colors (pink, brown, white) who are also lying down. The cage has metal bars and a metal grate floor. Hay is visible on the left side of the cage.

**Thank you for the  
attention**

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## **Better Training for Safer Food BTSF**

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