Housing of lactating sows

Farmtec
11th September 2024

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SEGES INNOVATION

FACULTY OF HEALTH AND MEDICAL SCIENCES
UNIVERSITY OF COPENHAGEN

Expectations of hyperprolific sows

- We ‘want’ sows:
  i. Capable of nursing many, strong, viable piglets
  ii. To remain in the herd for >6 farrowings with high productive performance
  iii. To be resilient & require low inputs for labour & medication

- We expect sows to:
  i. Have uncomplicated farrowings
    - Despite with large litters it is a marathon of 4-8hrs
  ii. To produce large amounts of milk continously
    - 16 L/day on average
  iii. To release many fertile eggs & conceive promptly after weaning

Think sows as high performing athletes

‘’Prepare them to give birth to and feed many piglets

•Conditions – our responsibility:

- *Housing*
- *Nutrition – before, during and after*
- *Physical conditions – and avoid injuries*

And not just conditions (shoes) – also tieing the shoe laces

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Expectations and conditions

- High expectations regarding the sows' performance
  - Must provide conditions for them to be able to meet our expectations

Housing

+

Nutrition

+

Management and produc er / barnstaff needs

+

+

Species specific needs: Meet basic requirements for welfare

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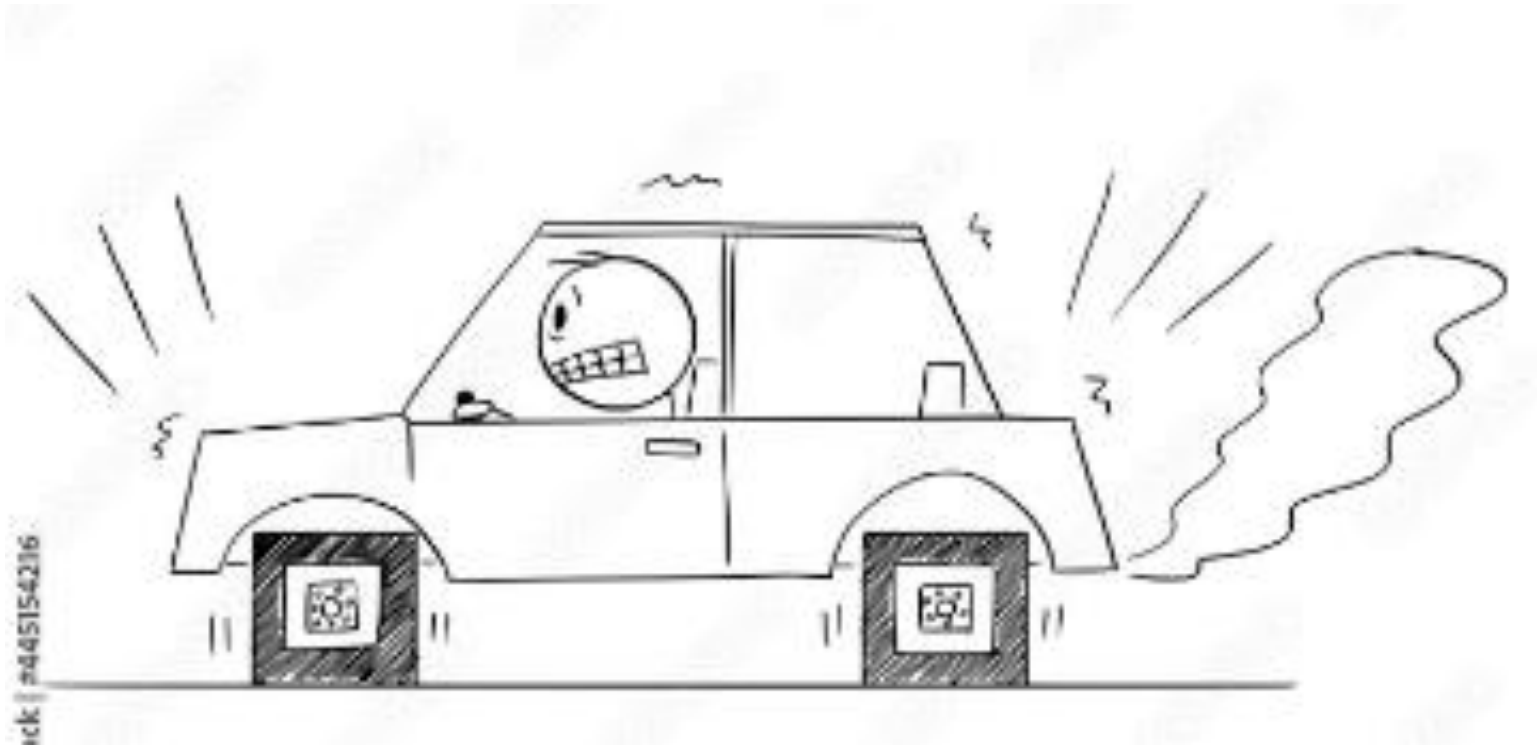
The importance of optimizing the farrowing environment

- It may sound obvious but….Get the basics right!



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End the cage age

The 'End the Cage Age' initiative was submitted to the Commission on 2 October 2020, having gathered 1,397,113 statements of support. See press release.

In its response to the ECI, the Commission commits to table, **by the end of 2023, a legislative proposal to phase out, and finally prohibit, the use of cage systems for all animals mentioned in the Initiative**.

In particular, the Commission's proposal will concern:

- Animals already covered by legislation: laying hens, sows and
- Other animals mentioned in the ECI:rabbits, pullets, layer bree ducks and geese. For these animals, the Commission has alr Food Safety Authority) to complement the existing scientific ev conditions needed for the prohibition of cages.

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Space allowance

Space allowance and pen dimensions
Important – and irreversible decisions

- Pen - size
  - Recommendations from E
    - 7,8 m^2 ≈ piglet survivability loose farrowing at same level as permanent crating
    - 4,5-9,8 m^2 (+1,2 m^2 for piglets)
  - German requirement
    - 6,5 m^2
  - Turning space
    - At least 153 cm
    - SEGES analyzing new trial data

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Decisions before building and running afterwards

- Key decisions
- Once you've build – conditions are given - live with it….and optimize within conditions

- Start with successful implementation
  - Include in design and thoughts:
    - What do pigs do
    - When do they do it
    - Why do they do it
    - How do they do it
    - …

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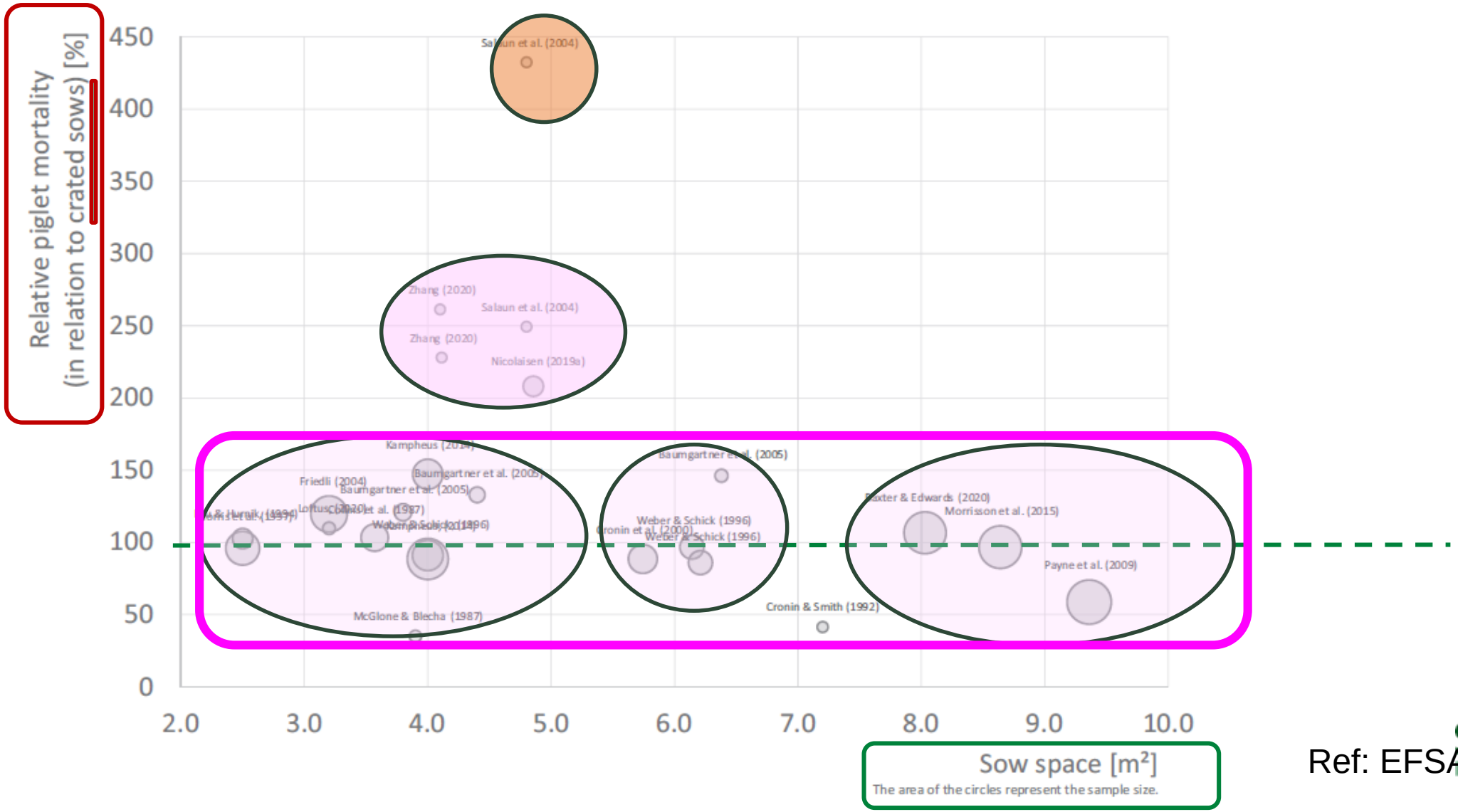
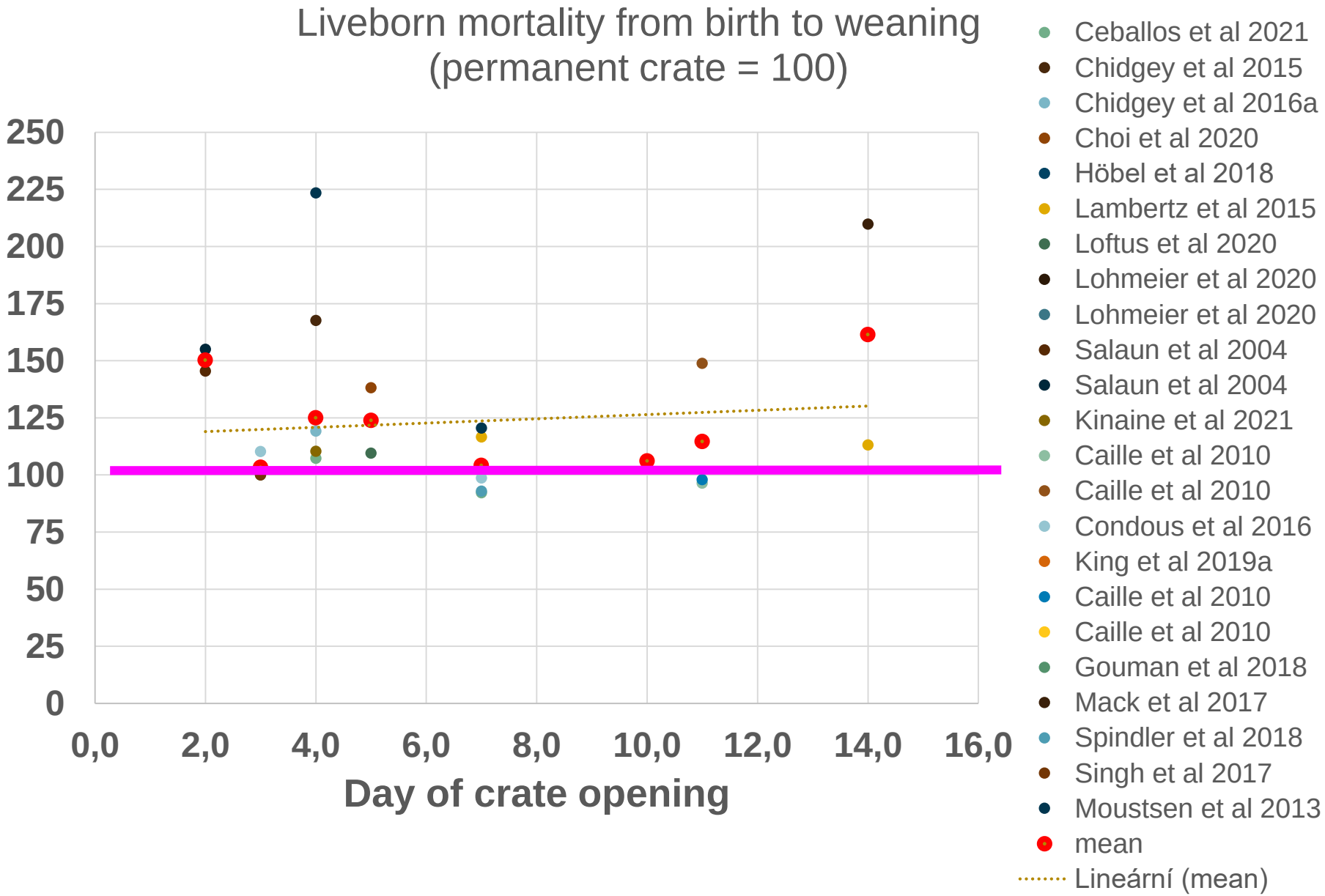
Space & piglet survivability



Ref: EFSA SO 2022

Temporary or permanent confinement



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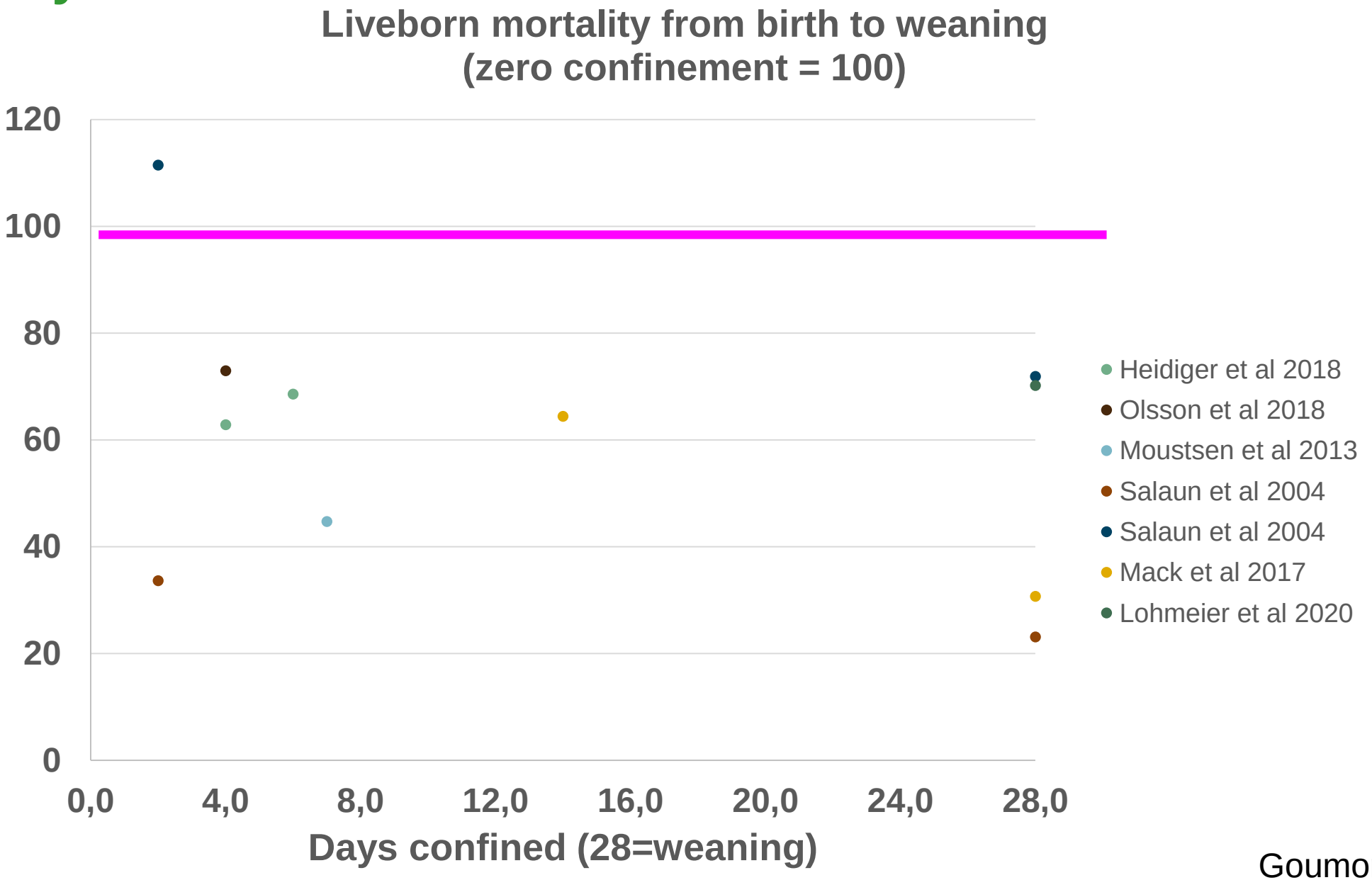
Goumon et al., 2022

Temporary confinement or zero confinement



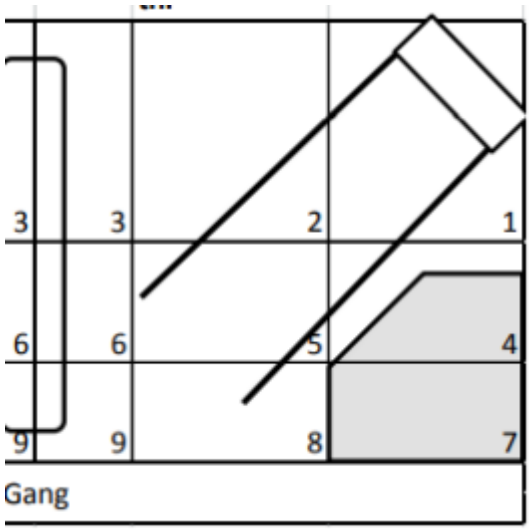
Goumon et al., 2022

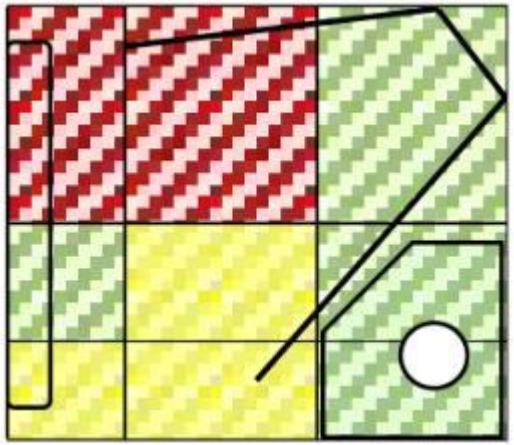
Equalsided pens

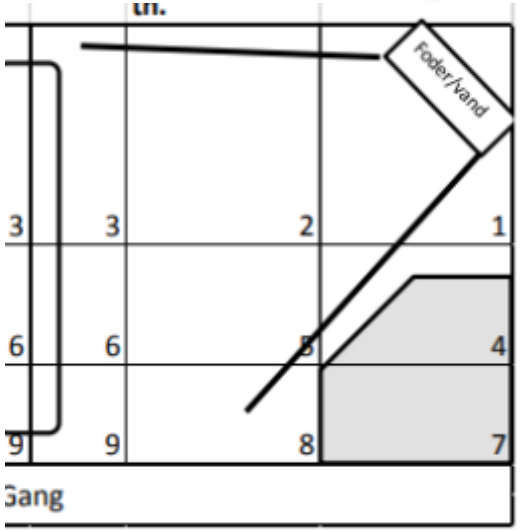
- 240*240
  - 2009-littersize
- Sows dunging behaviour – fully slatted

Figur 6. So opbokset kortvarigt omkring faring.

Figur 7. Løsgående so.







Erfaring 1721

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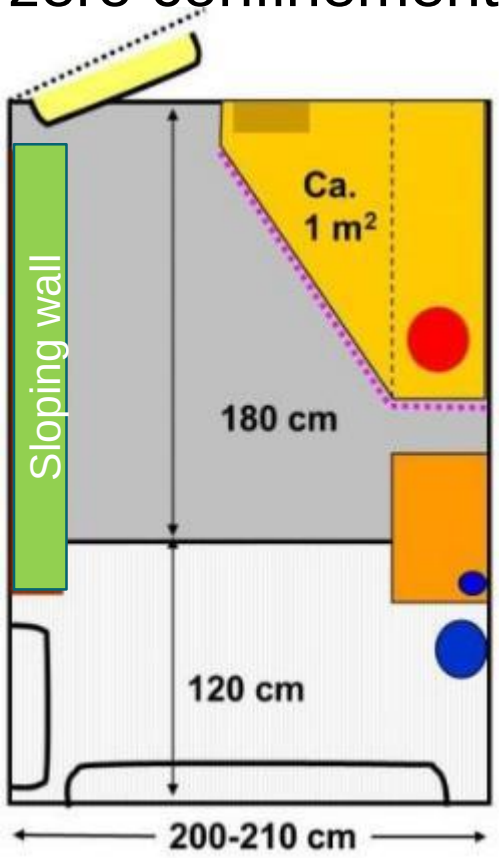
Rectangular pens

- Free Farrower – zero confinement



1. Creep area along passageway

- All piglets need checked upon EVERY day
  - Safe
  - Fast
  - Reduce risk of disease transfer

3. Sow walk (turn) away from feeder when dunging

2. Sow resting/nesting area next to creep

- Sows choose to lie close to piglets hule
  - Partly solid flooring (reduced slurry surface)
    - Reduce environmental impact
      - Partly solid floor is cheaper than aircleaner
    - Warm dry floors prior to / during farrowing increase piglet survivability
    - Maintain nestbuilding and rooting-/enrichment material in pen (and not in slurry pit)

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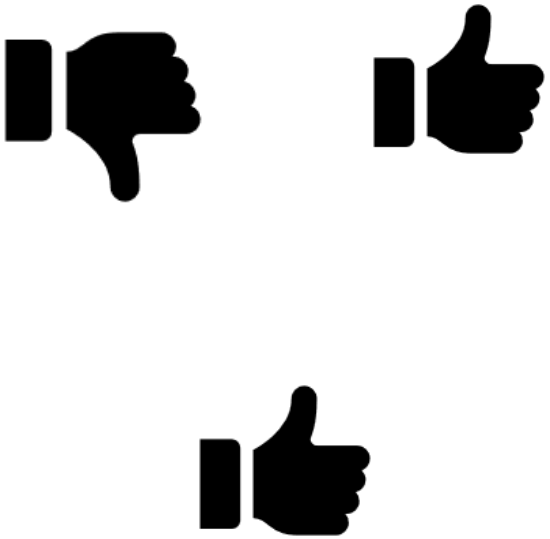
Spatial dimensions



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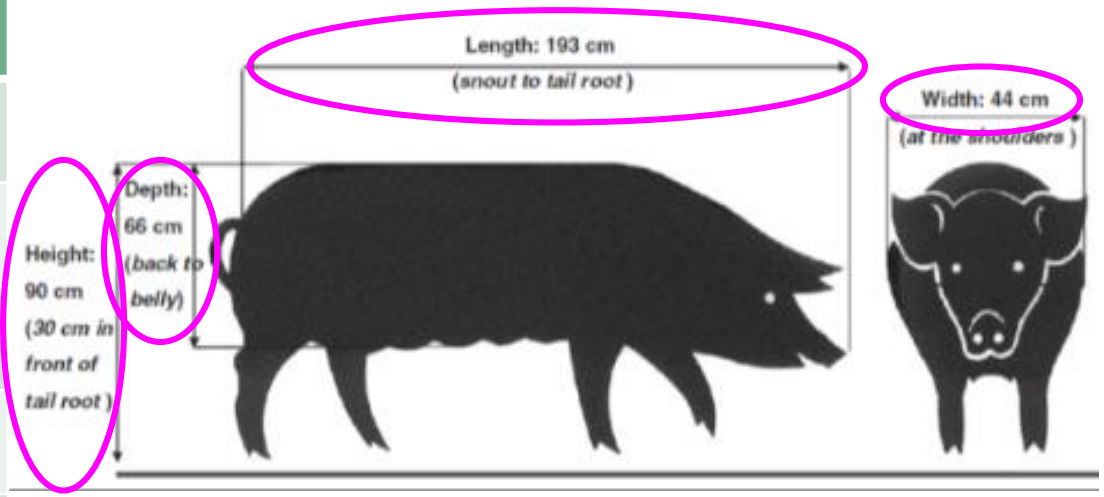
Sow dimensions

Danish crossbred sows in commercial herds in 2017

Year	2017	
Sows:	N = 103, ≥ parity 5	
Dimension	Ave. ± s.e.	95% percentile
Length, cm	192 (±0.6)	203
Height, cm	90 (±0.4)	96
Width, cm	43 (±0.5)	48
Depth, cm	65 (±0.6)	72



Moustsen et al., (2011)
Livestock Science 141, 272-275

Moustsen & Nielsen, Meddelelse 1113, www.svineproduktion.dk
Nielsen et al. (2018), Livestock Science 209, 73–76.

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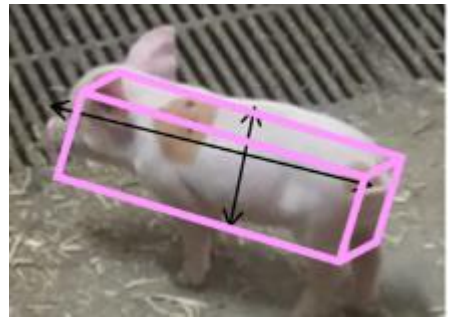
Piglet dimensions



	Age	
Dimensions (cm)	< 1 week (n = 42)	3 weeks (n = 65)
Length	31.3	44
Height	17.8	24.5
Width	7.3	11.5
Depth	8	12.5
Piglet weight (kg)	1.4	5
Space/piglet (m^2)	0.02	0.06

Data: SEGES pig production

Total area (m^2) required: space at maximum piglet age & number housed within the pen

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Beyond static sow dimensions: space for movement

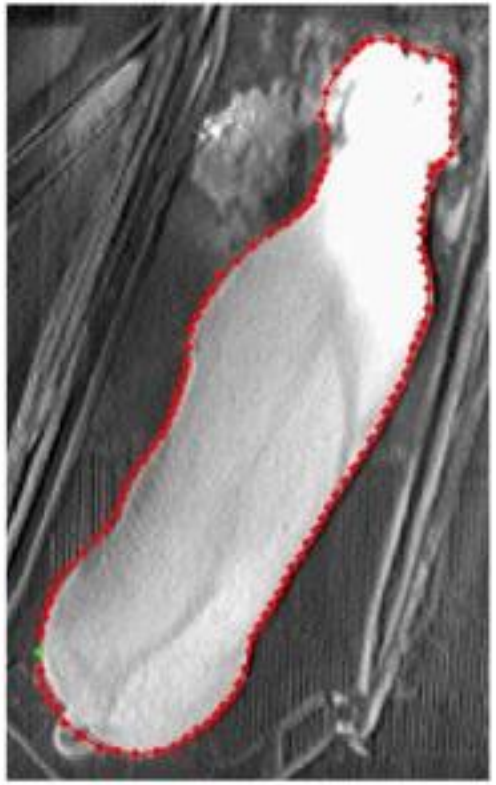

Figure 1.
Line around a standing sow, before movement

Moustsen & Duus, Meddelelse 722, www.svineproduktion.dk

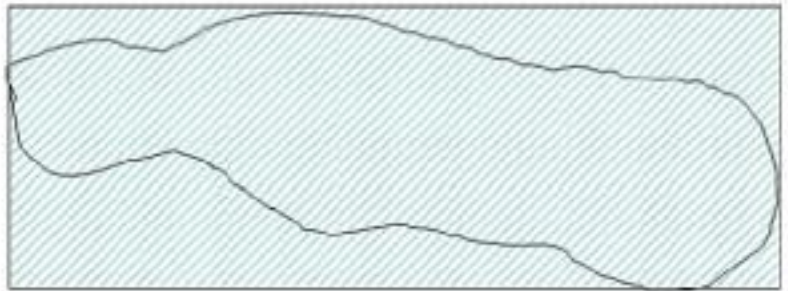

Figure 2.
Frame around the sow before movement was initiated

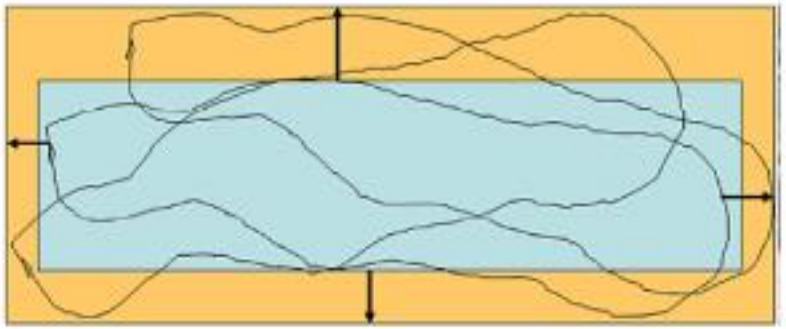

Figure 3.
Frame after movement – showing area used during manourvers to rise and lie down

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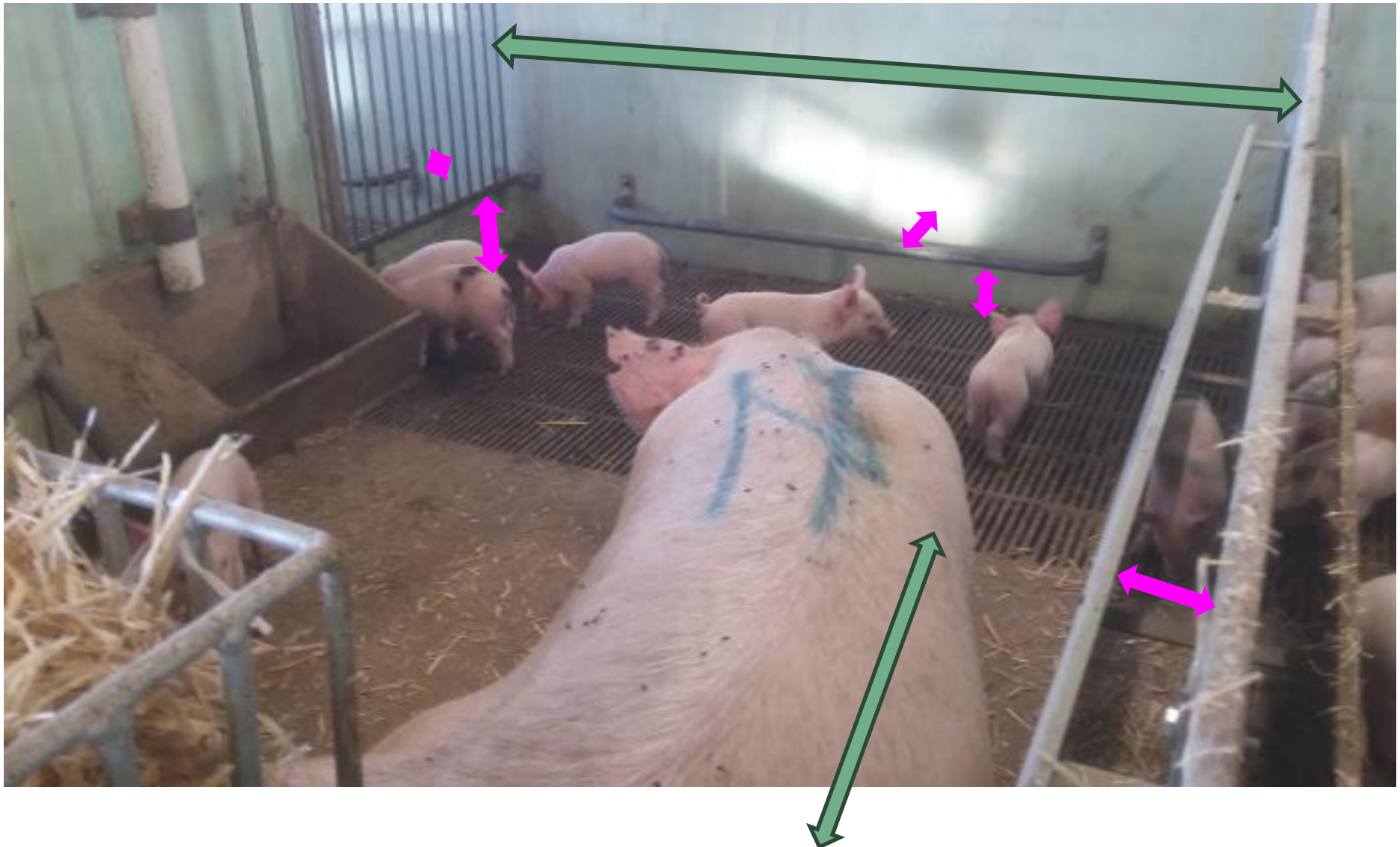
Dimensions – pen equipment

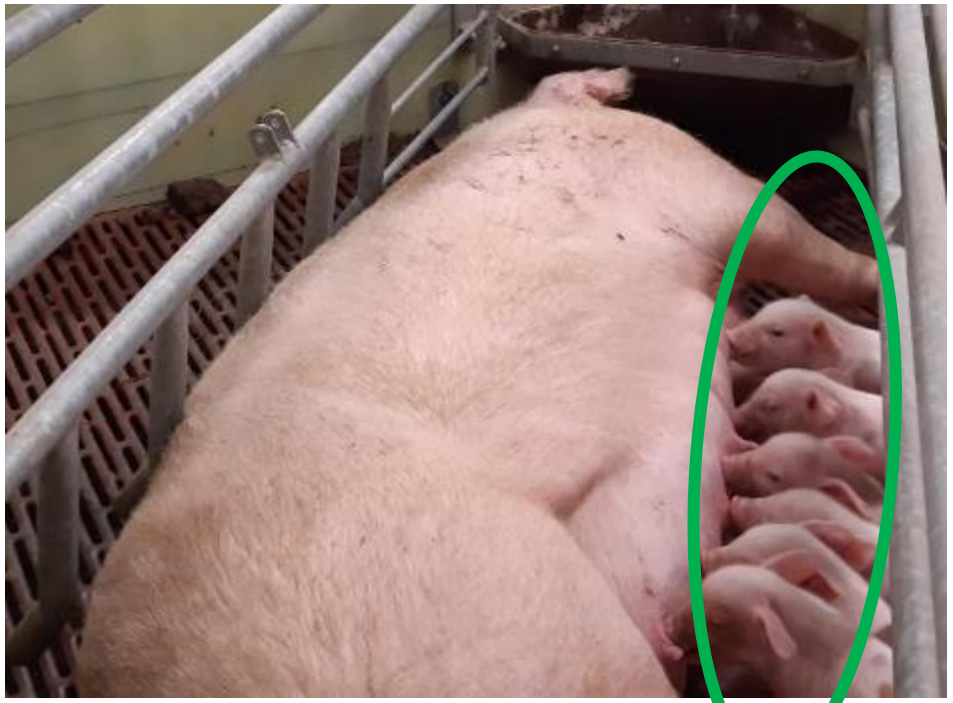


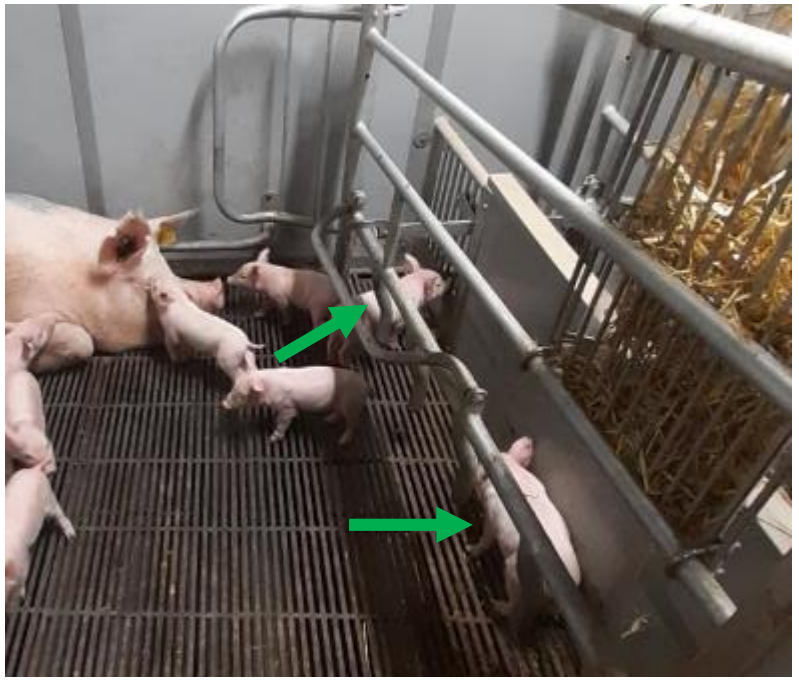
Sows:
Dunging
Lying
Thermoregulate
…

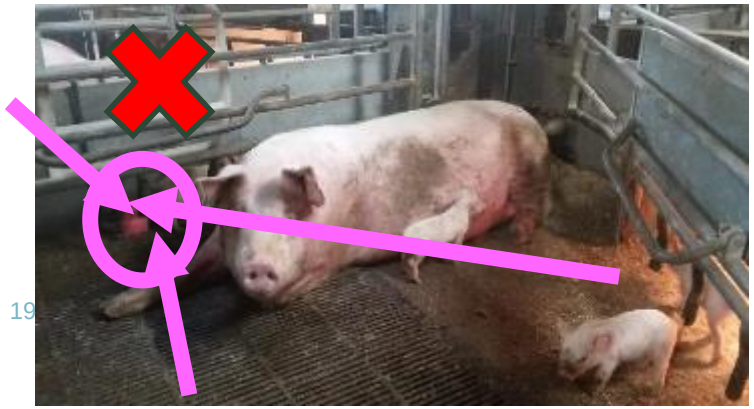
Piglets:
Shoulder width
Safety zones
…..

‘Ideal’ pen size - space for piglets

- Dimensions*number
- Piglet dimensions
  - Birth,
  - One week
  - Four-five weeks
- Litter size in pen
- Functional areas
- Piglet safety zones





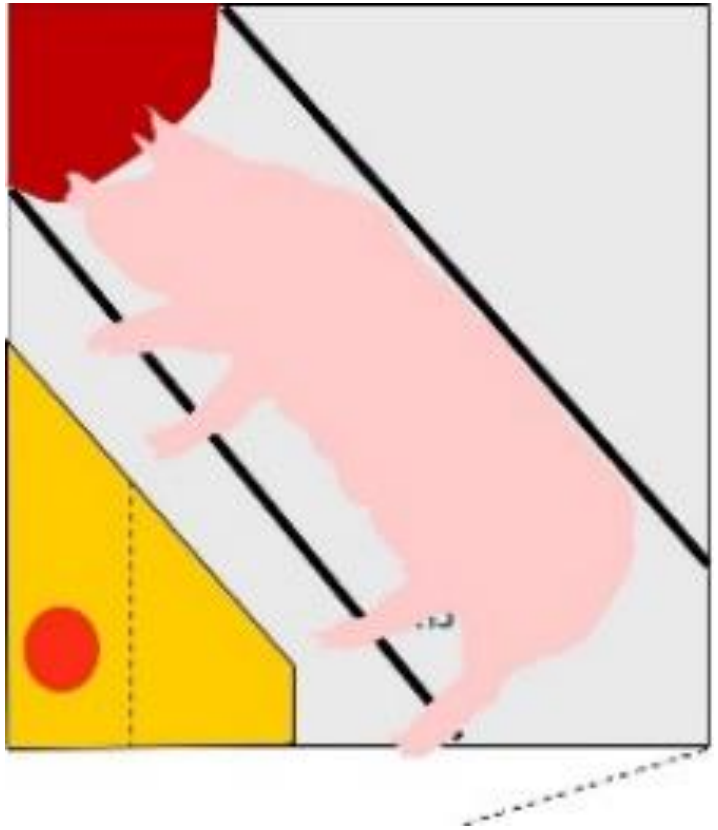


Sows’ confined for the first days post farrowing

Read more in Erfaring 2308

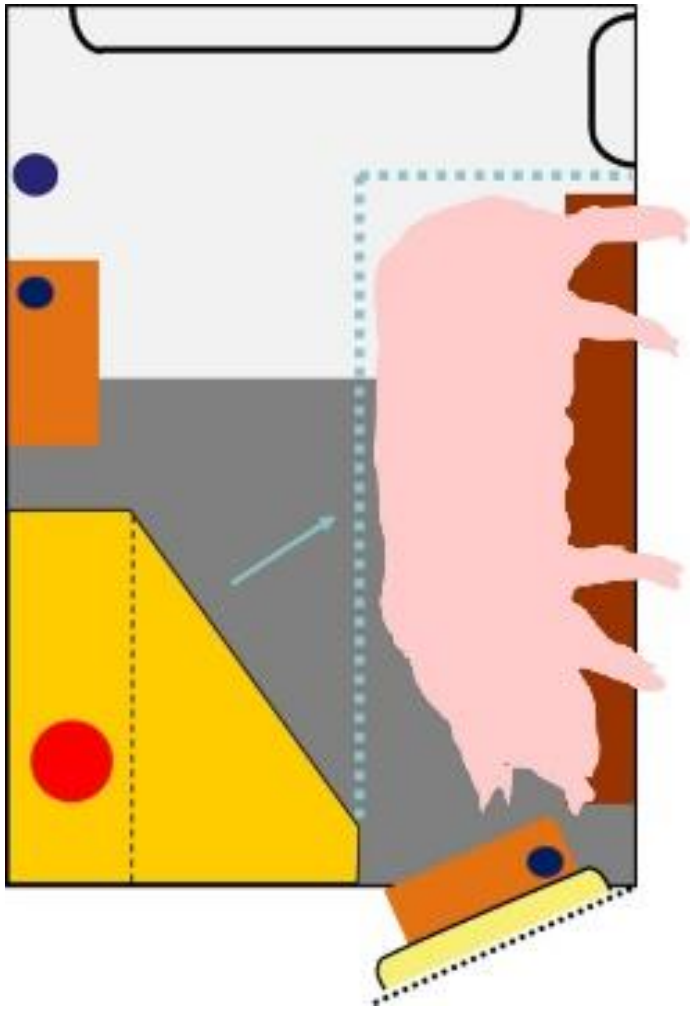
Equalsided pen

– Sow is lying diagonally when confined



Rectangular pen

– Sow is parallel with pen side when confined



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Space – temporary confinement and loose

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‘Ideal’ pen size – space for the sow

- Sows’ dimensions
  - Minimum

- Planar width – turning space
  - Minimum
  - Ease of movement

Planar width of 153 cm
Planar area of 3.17 m^2

considered necessary to allow unobstructed turning for sows with the 95-percentile weight.

Needs further research

Trial - How much space is needed for turning?

- Later pregnant sows
  - Parity two or older (11 sows <= parity 4; 15 sows >= parity 5)
- Test pen
  - 120-140-160-180-200-220 cm
- Turning
  - Initial – one turn to ‘understand’ the principle
  - Thereafter - random order of pen dimensions
  - Three turns per pen dimension
- Registrations on site
- Videorecording (few/some turns missing)
- Automatized analysis (including neural network)

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How much space needed to turn……
















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Turning – preliminary analysis

- On site registrations
  - Sow: Parity, weight, length, depth, width
  - Complete/uncomplete turn
  - Start and stop of each turn
- Automated analysis
  - Number of pictures (≈ estimated time per turning)
  - Angle 1
  - Angle 2
  - Distance

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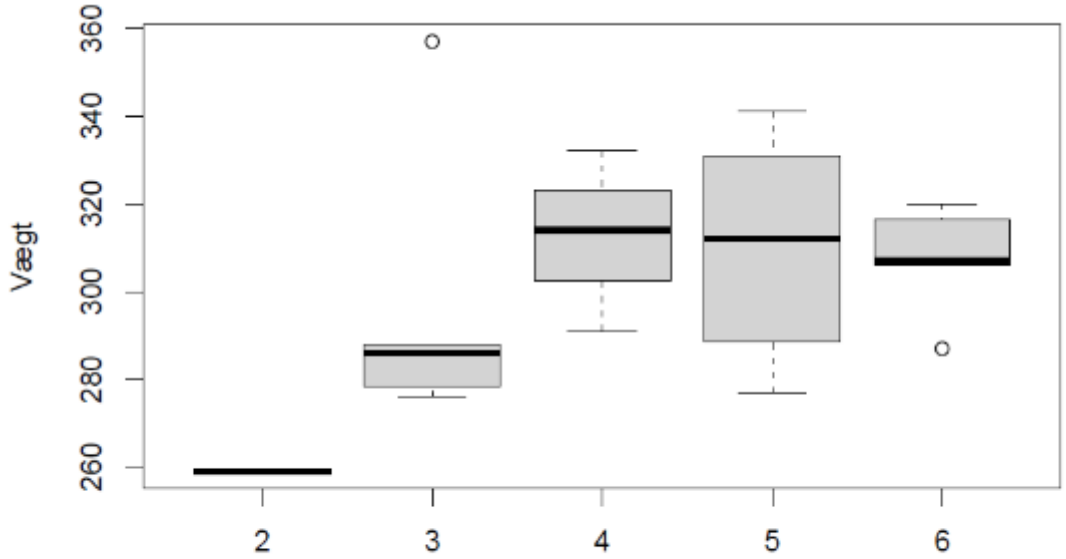
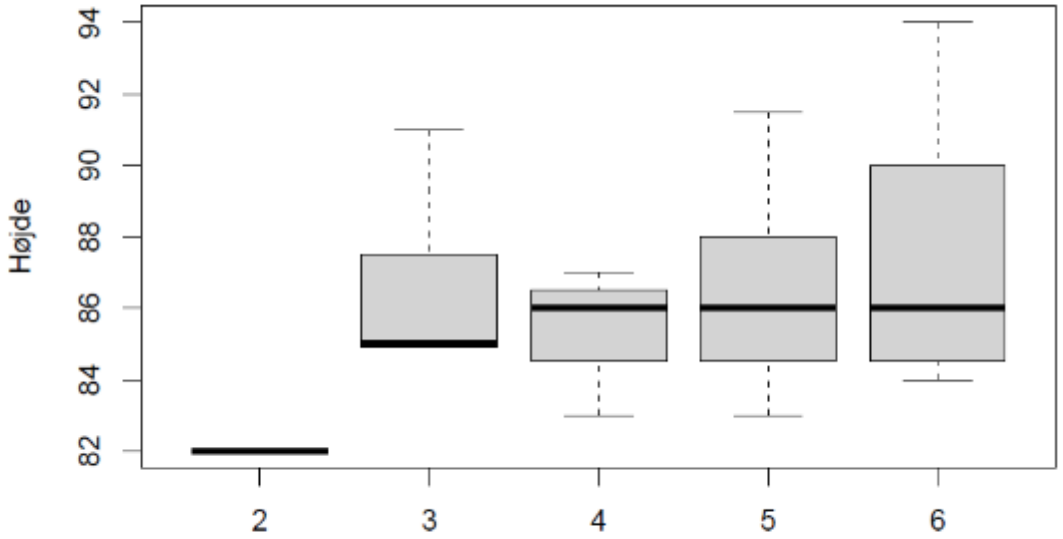
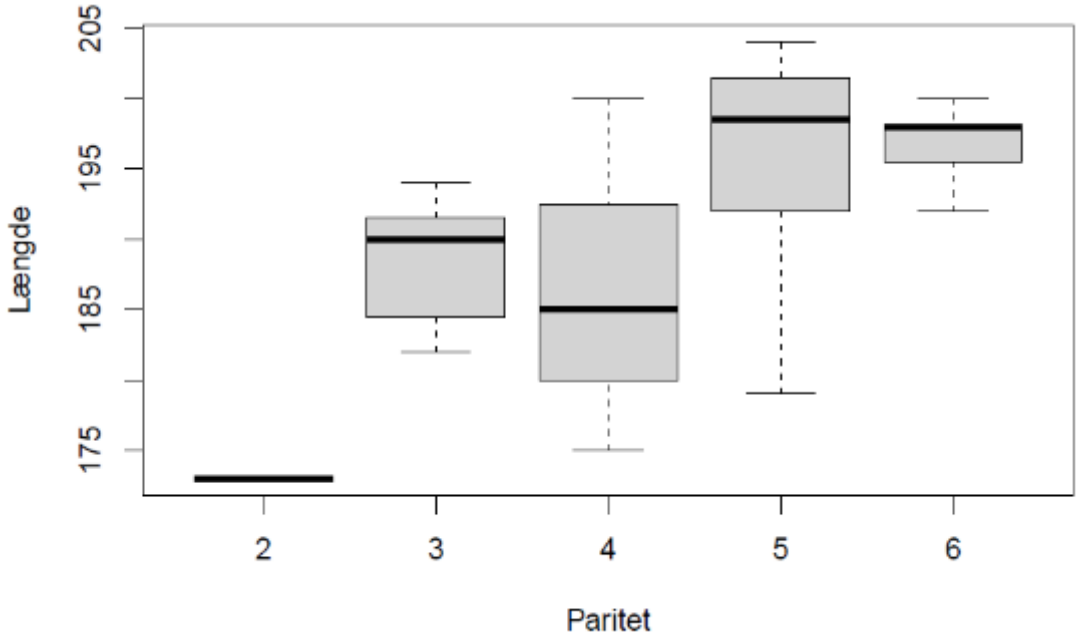
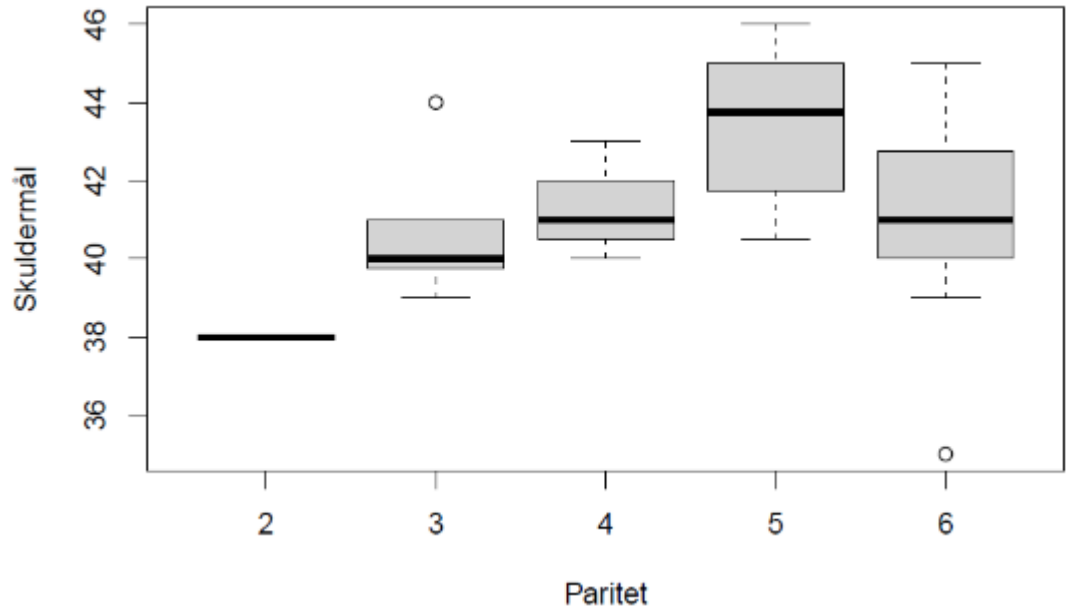
Turning – preliminary results (1)





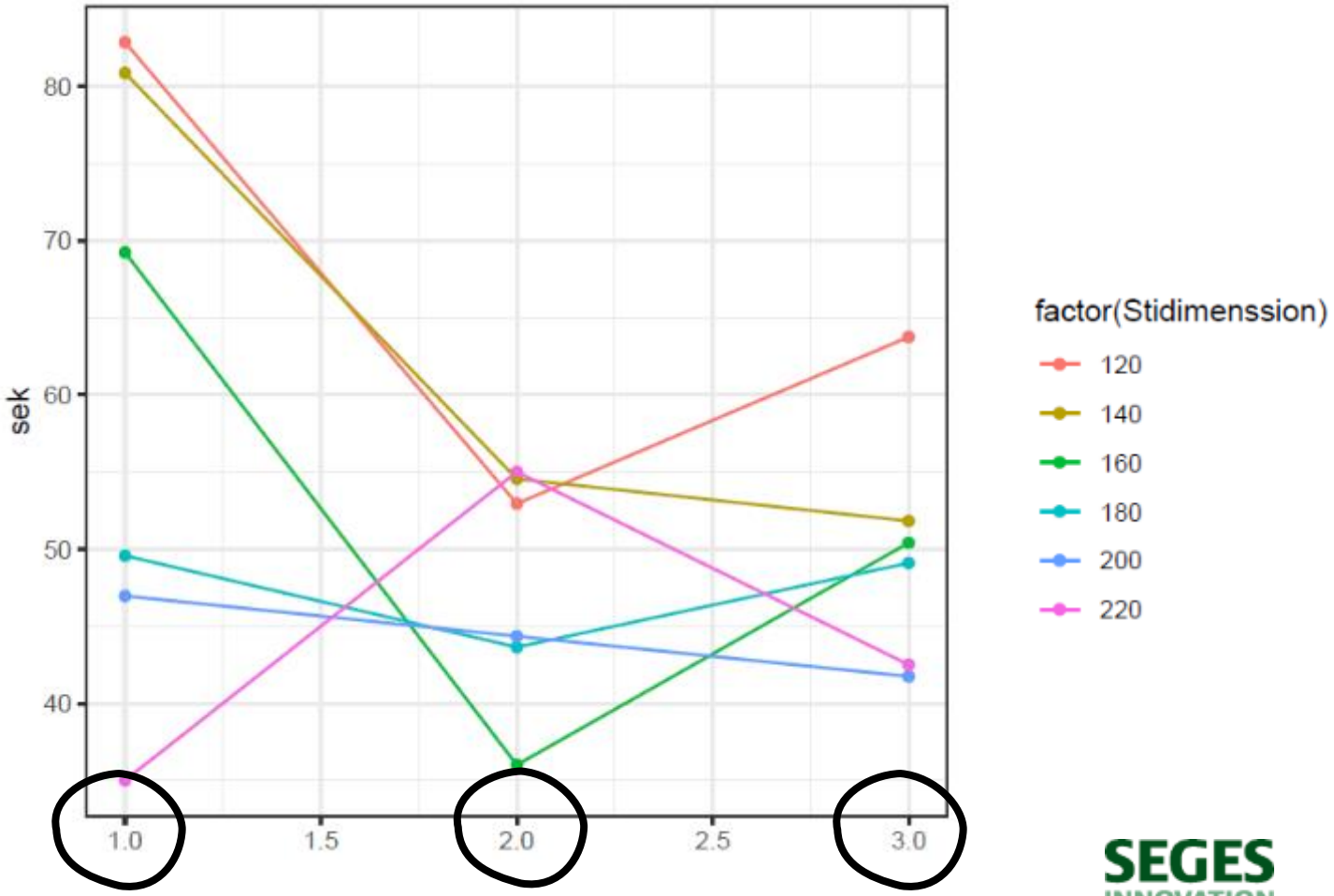




Turning – preliminary results

Stidimenssi	120	140	160	180	200	220
n	22	23	26	23	23	25

```
##       Stidimenssion
## obs    120 140 160 180 200 220 Sum
##   0      1   0   0   0   0   0   1
##   1      3   0   1   1   0   0   5
##   3     13  20  20  20  20  19 112
##   Sum   17  20  21  21  20  19 118
```



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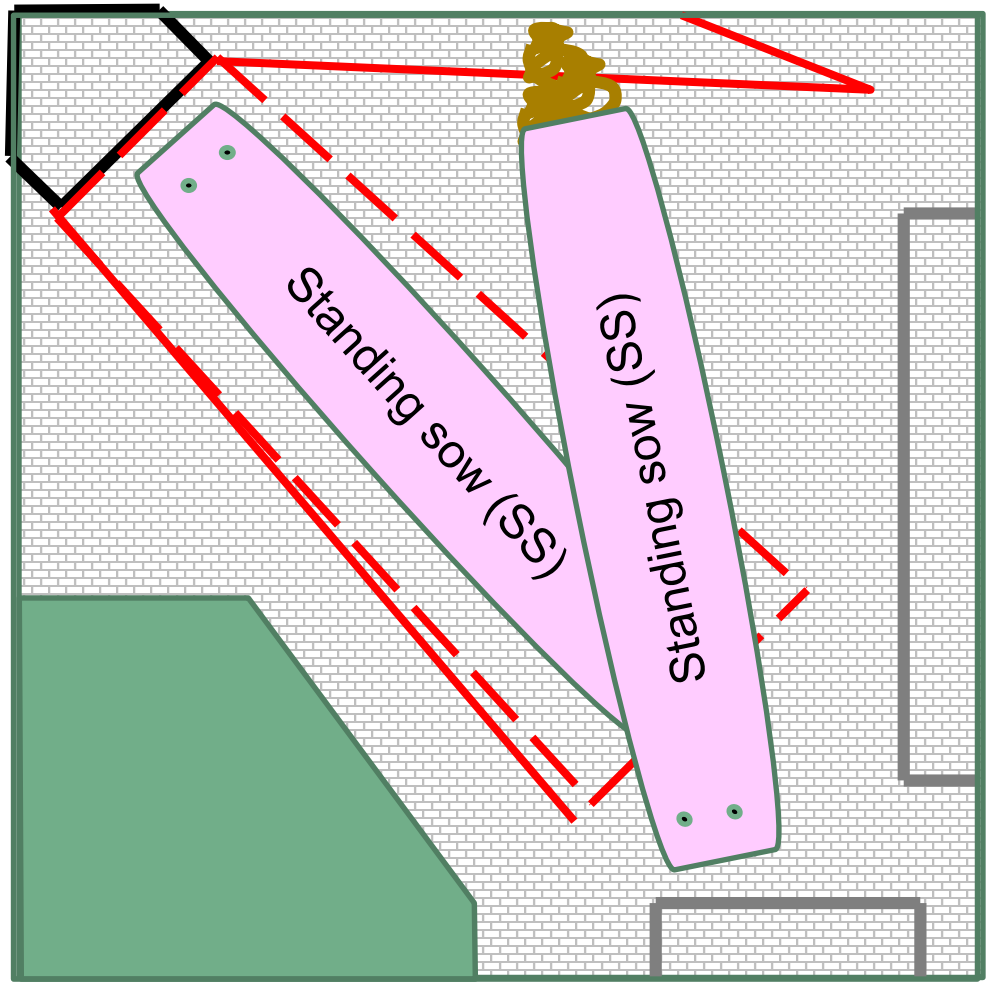
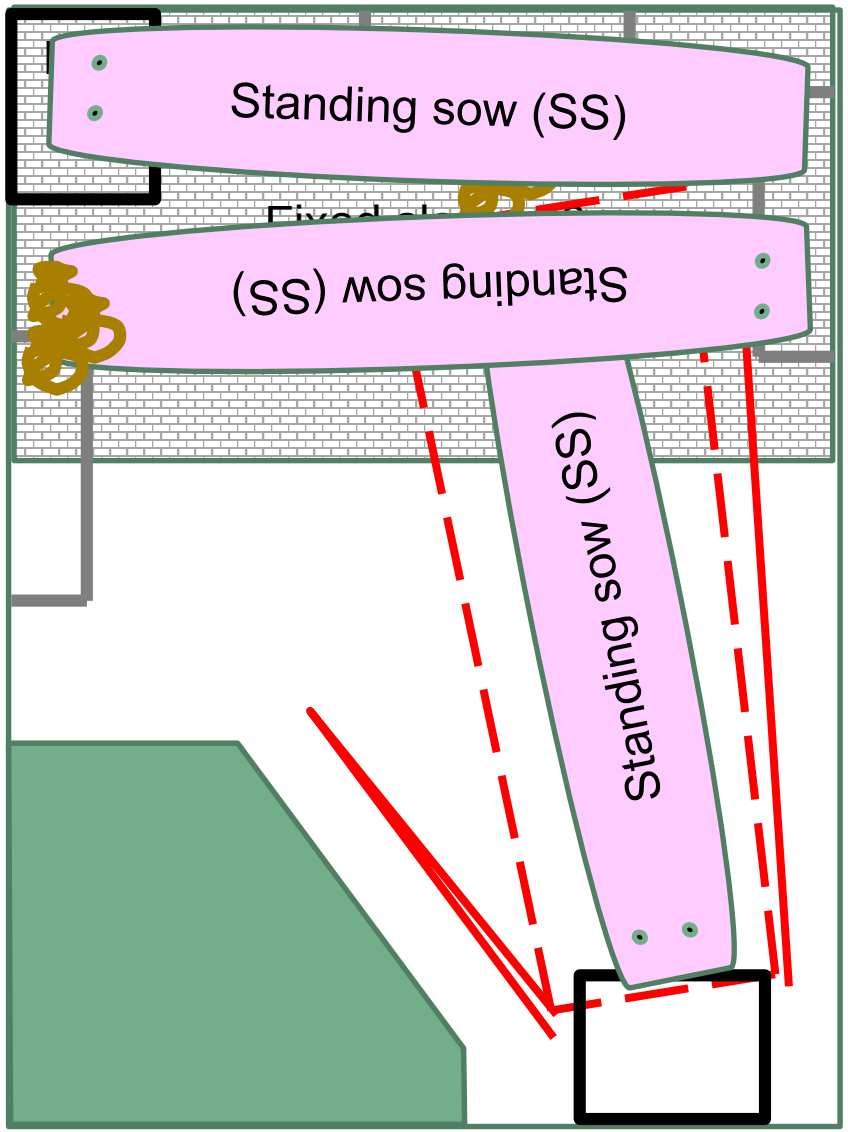
Pens of 6,5 m² can be different

Equalsided pen (*255*255*)



Rectangular pen (*220*300*)



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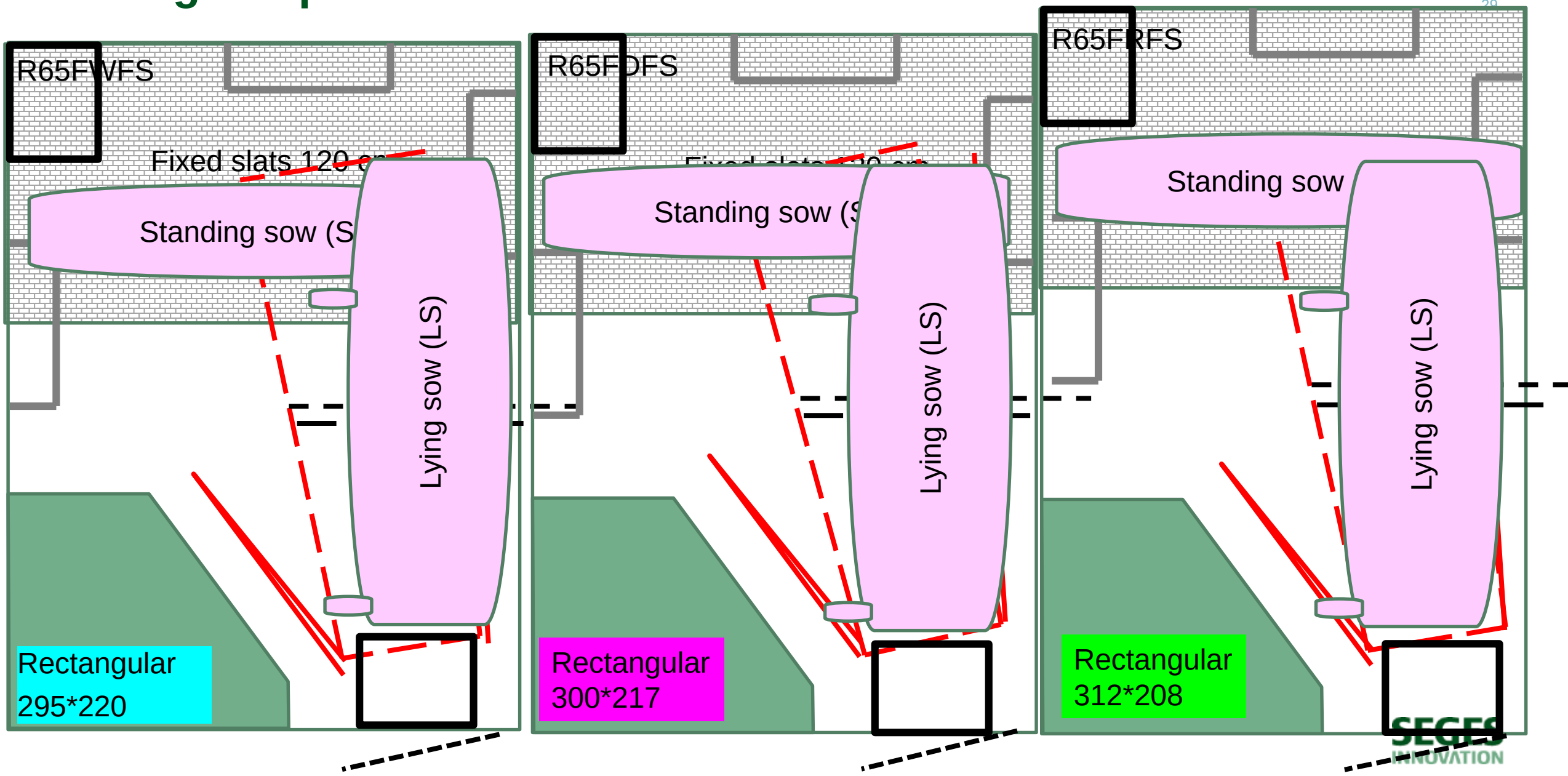
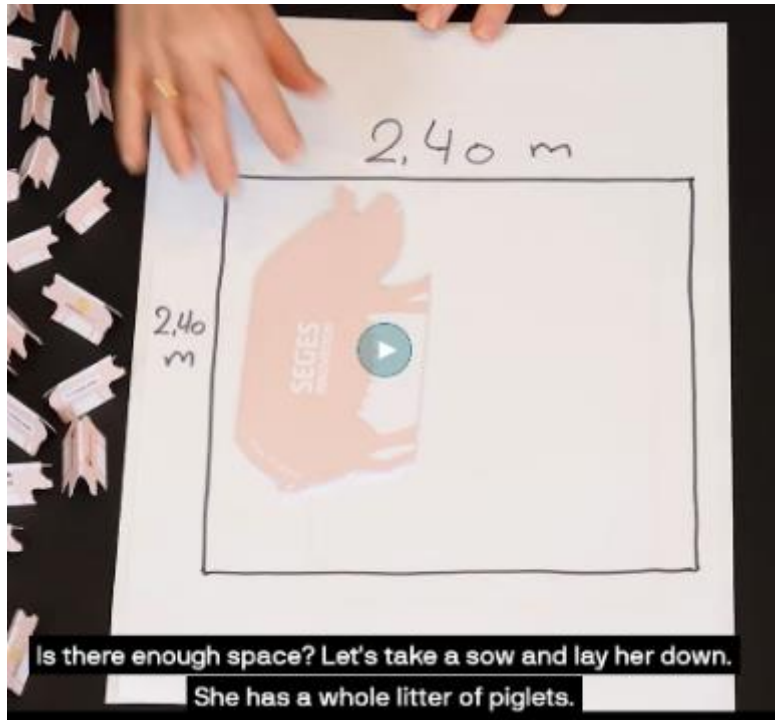
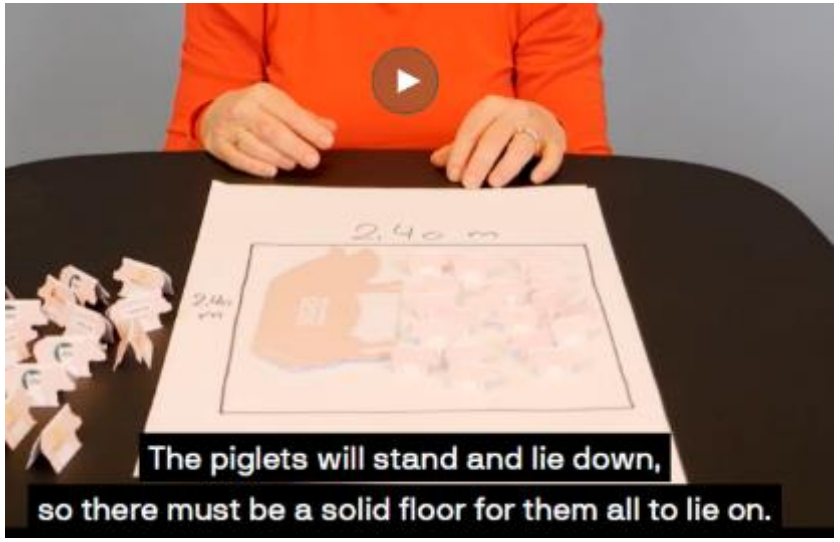
Rectangular pens 6.5 m²



Decision support tool

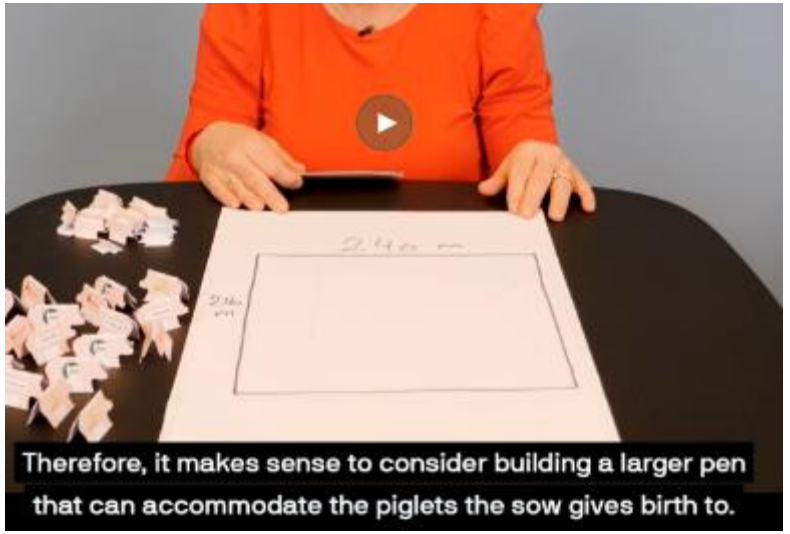
- Is the design criteria meeting the needs of the sow, piglets and caretakers?





- Papgrise og checkliste hjælper dig til bedre staldindretning - SEGES TV

Video – with English subtitles



Pen layout – work conditions

- First decision regarding design
  - Creep area along passageway
    - Safety
    - Efficency
    - Reduce risk of transferring diseases
    - Easy access
    - Worker wellbeing
      - Human – animal relationship
      - Quality of and in care

Area and pen dimensions – welfare and environment

Equalsided – fully slatted:

Solution **under** floor

Rectangular pen – option for partly solid floor:

Solution ***above*** floor

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Conclusions

- Step 1 - Animals
  - Understanding the animals needs/requirements – sufficient space….
    - Dimensions
    - Activity
- Step 2 - Animals
  - Future production
    - Loose
    - Larger litters
    - Sustainability
- Step 3 -
  - Farm staff
  - Legal framework
- Step 4 – Supporting the animals
  - Understanding the animals
    - in design and implementation for technologies
    - when providing the animals with choices
- Step 5 – and the most obvious – also needs a fresh look….
  - Feed, water, air…

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More information can be found in eg:

frontiers in Veterinary Science

REVIEW
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Review of Temporary Crating of Farrowing and Lactating Sows

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Journal Pre-proofs

Animal board invited review: The need to consider emissions, economics and pig welfare in the transition from farrowing crates to pens with loose lactating sows

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Transitioning from crates to free farrowing: A roadmap to navigate key decisions

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Take Home Message

- The farrowing environment sets the conditions for sow and piglet productivity and their welfare

- Set the conditions in the farrowing environment which leads to high welfare and productivity

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