IMPROVING PIGLET ROBUSTNESS THROUGH GENETICS AND FARROWING HOUSING

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ANIMAL WELFARE IN ORGANIC PIG

Welfare is an important quality of organic meat

Reason for consumers to pay high price

Outdoor rearing on paddock facilitate high animal welfare

- Nest building
- Thermal choices
- Enriched environment and exploratory behaviour
- Social behaviour and learning

ORGANIC PIGS IN DK

- Organic production: Outdoor on paddock
  - Farrow in small individual huts on paddock (UK style A-huts)
  - Provided with a wallow when >16°C
  - Some have trees planted to provide shadow and reduce nutrient leakage
  - Deep straw bedding during winter to reduce cold stress

- Current genotype used in DK organic:
  - Highly prolific LY crosses from Danbred: Avg. 18.7 totalborn pig per litter
  - Selected for high number of live pigs day5, under indoor conditions
  - Intensive management needed to ensure survival of piglets: nurse sow, milk etc.
  - Huts => limitted possibility for management of large litter size

Challnged by high mortality rate up to 30 % of total born

PIGLET MORTALITY: A WELFARE CHALLENGE

- *Unsustainable* in terms of welfare, ressource use, and economic
- An organic live pig is worth approx. 100 Euro
- Focus on reducing piglet mortality in PPILOW project

LEVERS TO REDUCE PIGLET MORTALITY

Genetic selection in outdoor environment

French task in PPILOW, INRAe

Results from Danish project POrganiX

Improve housing design and management

Danish task in PPILOW

Aarhus University and Vanggaard Staldmontage

COMPARISON OF TWO SOW HYBRIDS

- Two groups of 30 sows: 15 TN70 and 15 DanBred => followed across 5 parities
- Individually fenced paddocks with 5 m wide area of poplar trees
- Access to insulated A-framed huts
- Weaning at 10 weeks of age

GER

DIFFERENCES BETWEEN HYBRIDS

Received: 6 February 2023 | Revised: 20 April 2023 | Accepted: 27 April 2023
DOI: 10.1111/asj.13840
RESEARCH ARTICLE
Animal Science Journal WILEY

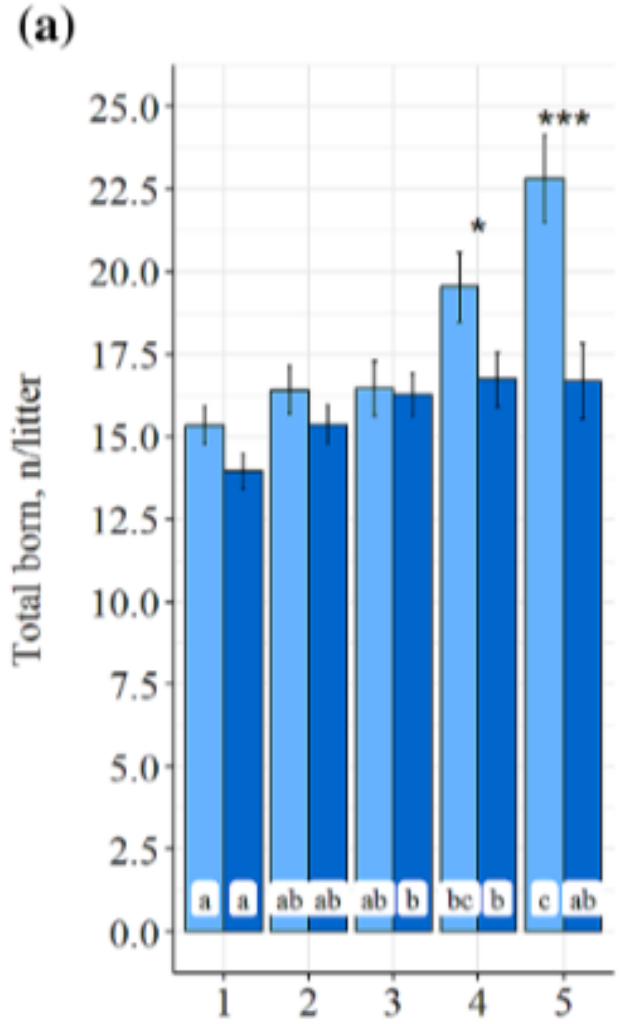
Changes in piglet and litter characteristics across parities in two highly prolific sow hybrids in an outdoor organic herd

Cecilie Kobek-Kjeldager | Mona Lillian Vestbjerg Larsen | Lene Juul Pedersen

Number of born:

TN70

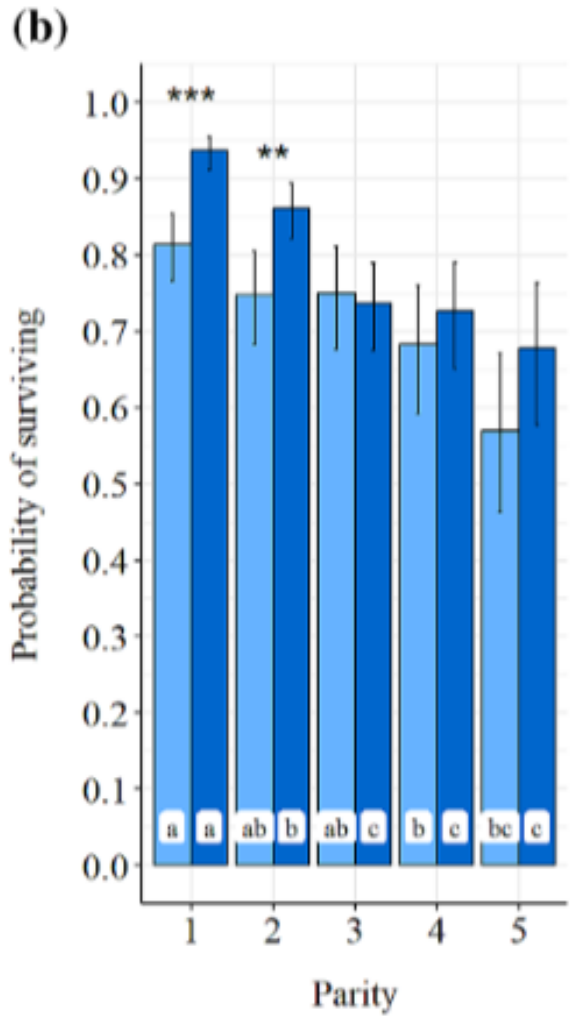
DanBred



Survival rate:

TN70: 88 %

DanBred: 81 %



Same number of weaned: parity1-3:13 pigs, parity4-5: 12 pigs

DIFFERENCES IN WEIGHT

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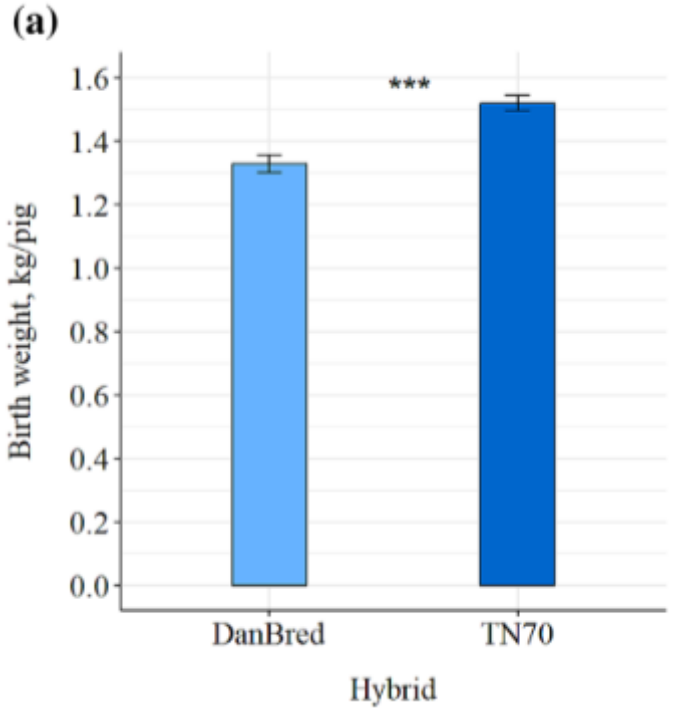
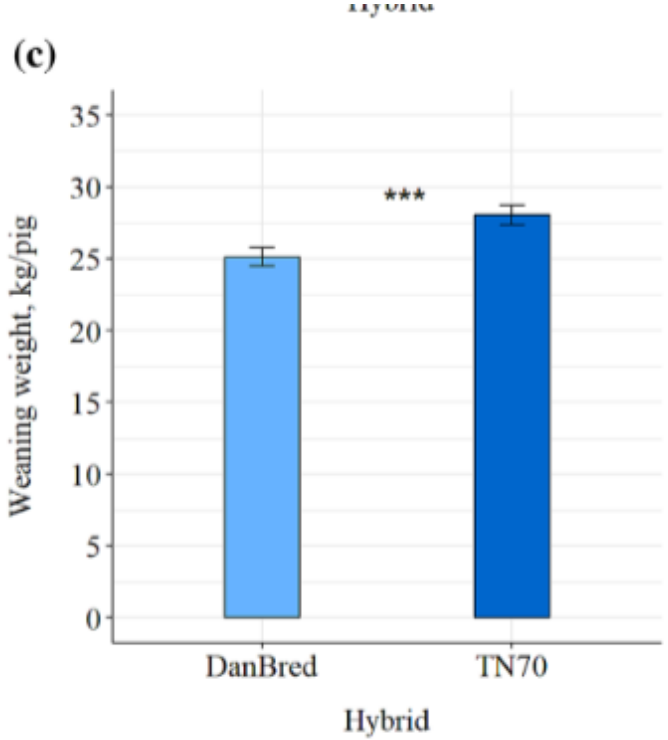
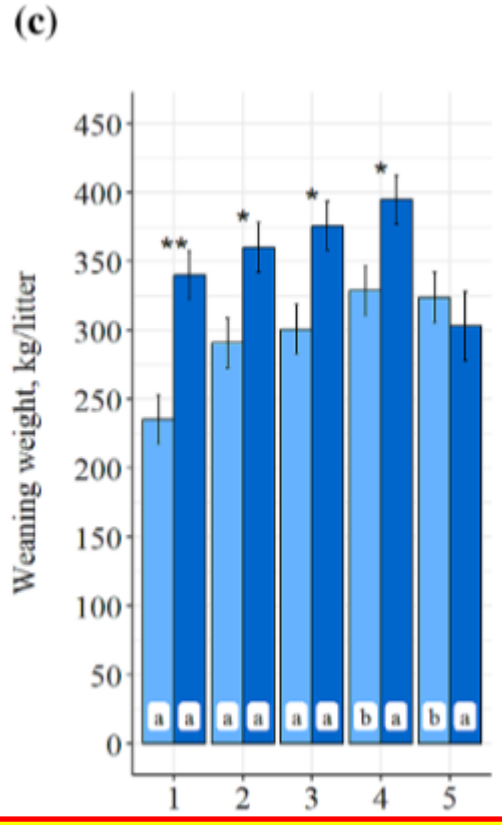
TN70 => heaver at birth



TN70 => heavier at weaning



TN70=> higher total litter weight



Heavier pigs at birth and weaning in less prolific breeds

BEHAVIOURS CAUSING CRUSHING

Observtions of 72 crushing events from two hybrids: what characterized crushing events ?

- Poor maternal behaviour: No/Yes (low responsiveness)
  - Lack of nosing piglet before posture changes
  - Flopping down withour body control
  - Low responsiveness to piglets' alarm scream when crushed
- Crushed aganist walls: No Rarely (1%)
- Piglets cluster in middle of pen: Yes (> 50-100 % of crushing events)
- Low viability of crushed piglets: Yes (38% of crushed in Danbred;16 % in TN70)

CONCLUSIONS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Behaviour, Health and Welfare

Behavioural characteristics of fatal piglet crushing events under outdoor conditions

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Cruhsing can likely be reduced by:

Breeding for more robust piglets e.g. using less prolific breeds

Improve care of small and weak piglets => need for another hut design

Provide a heated creep area for piglets => need for another hut design

Potentials to reduce mortality further through better hut design....

CHALLENGES OF CURRENT HUTS

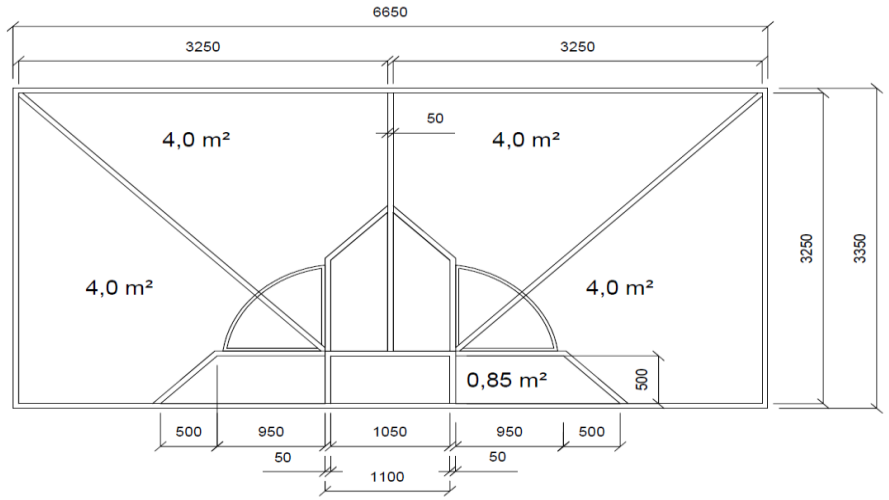
- For the farmer
  - Poor working conditions
  - Supervision after farrowing very difficult
  - Cross fostering and care for weak piglets very difficult

- For the sow and her offspring
  - Hut sizes do not fit large sow
  - Cross fostering difficult =>high competition => low colostrum intake
  - Themal challenges => too hot during summer, too cold during winther

PPILOW DEVELOPMENT FOR OUTDOOR REARING

PPILOW

PROTOTYPE USED AT BERTRAM ORGANIC



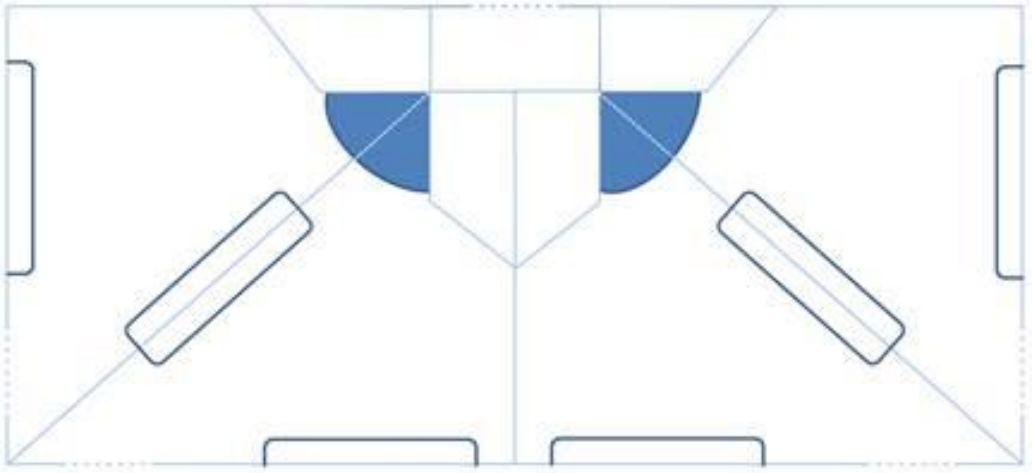
- Hut with room for 4 sows in separate pens, each of 5 sqrm. => facilitate cross fostering
- Food and water inside hut => to stimulate appetite and reduce waste
- Piglets have access to a creep area in the corner of each pen
- Personnel have access through own entrance separated from animals => 100 % overview from upright position
- Mobility of hut facilitated by an aggregate mounted on hut and tractor
- Fencing easy by winding rolls attached to each hut

PRODUCTIVITY AT BERTRAM ORGANIC

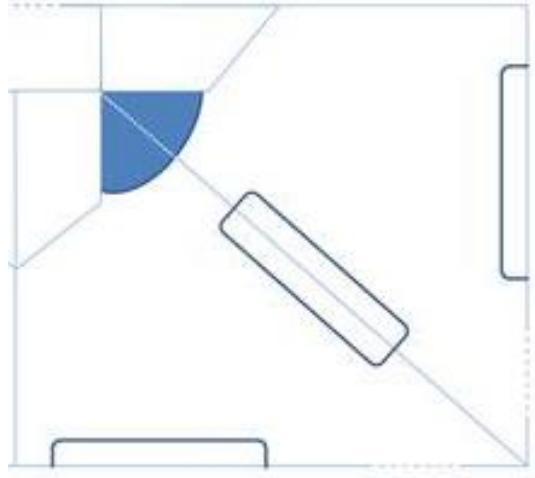
- Number of total born piglets per litter: 18,5 (16,7 liveborn + 1,5 stillborn)
- Number of weaned pigs per litter: 12,3
- Mortality rate of liveborn: 26,3 %
- Number of weaned pigs per sow per year -
  (2,0 litters yearly with 7 week weaning age): 24,4 pigs per sow per year
- Weaning weight of litter: 17,8 kg at day 50 in lactation

VANGGAARD'S FARROWING HUT - FROM DANISH DESIGN TO EU DESIGN

From 4 paths (Danish design)



To 2 paths (EU design)

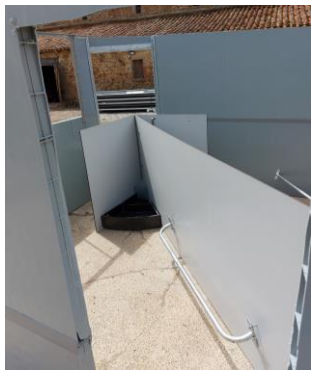


PPILOW

EU DESIGN – TEST HUTS: FRANCE ITALY BELGIUM

Assembling / setting up test huts France and Italy







EU DESIGN – TEST HUTS: FRANCE ITALY BELGIUM

Assembling / setting up test huts France and Italy





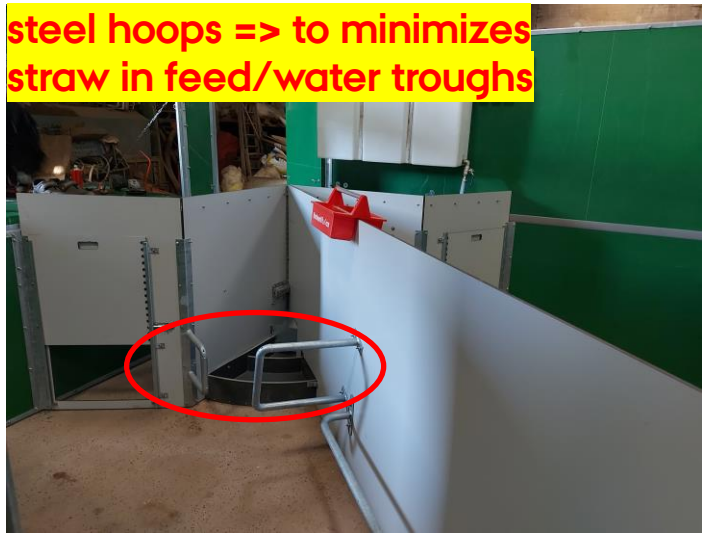



EU DESIGN – TEST HUTS: FRANCE ITALY BELGIUM

Assembling / setting up test huts Belgium - Adjusted design during the project test period

Steel hoops with a support function for the sow when she lies down

steel hoops => to minimizes straw in feed/water troughs



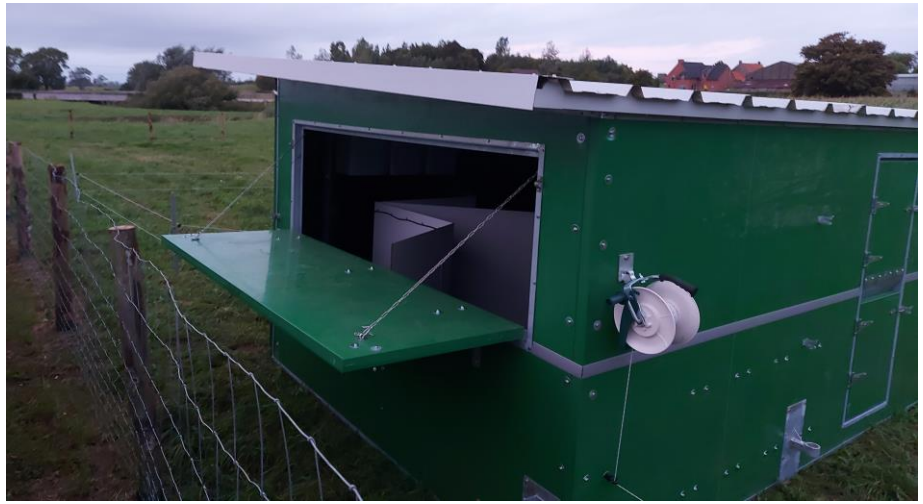
wider roof overhang above the ventilation opening

Transport wheels placed under the hut

wider doorway - sow entrance

EU DESIGN – TEST HUTS: FRANCE ITALY BELGIUM

Assembling / setting up test huts - Fence solution Belgium



EU DESIGN – TEST HUTS: FRANCE ITALY BELGIUM

Collection of test data - common protocol for all countries (France, Italy, Belgium)

Farmer or farmname _____

Breed _____

Sow number	Sow year of birth	Parity	Farrowing date	Weaning date

For each answer, circle the adapted one

- Unfolding of farrowing : normal - long but went well - too long - problematic

Comments:

_____

- Farrowing : nocturnal - diurnal

- Vitality of piglets: weak litter - healthy litter - litter with a couple of problems

Comments:

_____

Total piglets born	Piglets born dead	Piglets crushed	Total piglets weaned

- Is there a system for preventing the sow to lie down too rapidly ? Y - N

If yes: useless – seems useful – very useful – I could not do without this anymore

- Easiness to provide care to piglets:

very complicated – a bit complicated – easy – very easy

Comments:

_____

	SOW					PIGLETS		
Questions	Health issues? (write down which ones)	Body condition[1] (week 0, 1, 4, 7)	Relation to humans[2] (week 0, 1, 4, 7)	Lying in shadowalo naside the hut ?	Sowinside the hut ?	Health issues? (write down which ones and, if possible, the number of piglets involved)	Use of the nest by the piglets ?	Lying in shadow alongside the hut?
Before farrowing		Thin Normal Fat	Aggressive Afraid Not interested Familiar Very familiar	No *Sometimes* *yes often* *all the time*	No *Sometimes* *yes often* *all the time*		No Sometimes yes often all the time	No *sometimes* *yes often* *all the time*
Week after farrowing (week 1)		Thin Normal Fat	Aggressive Afraid Not interested Familiar Very familiar	No *sometimes* *yes often* *all the time*	No *sometimes* *yes often* *all the time*		No sometimes yes often all the time	No *sometimes* *yes often* *all the time*

[1]

[2] Aggressive : grunts when we approach ; afraid : moves away ; not interested : does not change its behaviour ; familiar : approaches and stays calm ; very familiar : stays all the time close or in contact.

EU DESIGN – TEST HUTS: FRANCE ITALY BELGIUM

Collection of test data - common protocol for all countries (France, Italy, Belgium)

week 2				No *sometimes* *yes often* *all the time*	No *sometimes* *yes often* *all the time*			No sometimes yes often all the time	No *sometimes* *yes often* *all the time*
week 3				No *sometimes* *yes often* *all the time*	No *sometimes* *yes often* *all the time*			No sometimes yes often all the time	No *sometimes* *yes often* *all the time*
week 4		Thin Normal Fat	Aggressive Afraid Not interested Familiar Very familiar	No *sometimes* *yes often* *all the time*	No *sometimes* *yes often* *all the time*			No sometimes yes often all the time	No *sometimes* *yes often* *all the time*
week 5				No *sometimes* *yes often* *all the time*	No *sometimes* *yes often* *all the time*			No sometimes yes often all the time	No *sometimes* *yes often* *all the time*
week 6				No *sometimes* *yes often* *all the time*	No *sometimes* *yes often* *all the time*			No sometimes yes often all the time	No *sometimes* *yes often* *all the time*
Week 1 post weaning		Thin Normal Fat	Aggressive Afraid Not interested Familiar Very familiar	No *sometimes* *yes often* *all the time*	No *sometimes* *yes often* *all the time*			No sometimes yes often all the time	No *sometimes* *yes often* *all the time*

OTHER IMPORTANT FARMING ISSUES

- Mud puddle present (in summer)? Y - N
- Pasture[3] available for sow and piglets? Y - N
- Type of feed used for sows[4]: _____
- Amount of feed fed daily to the sow on average (kg): _____
- Type of feed used for piglets[4]: _____
- Start date of feeding piglets: _____
- Amount of feed fed daily to the piglets on average (kg): _____
- Therapeutic interventions performed on sow and/or piglets: Y - N

If yes, date and motivations: _____

- Vaccinations performed on sow and/or piglets: Y - N

If yes, date and motivations: _____

- Mutilations performed on sow and/or piglets: Y - N

If yes, date and motivations: _____

- How many times a day are the animals checked/fed? _____
- Is there always only one animal handler? Y - N

If not, how many? _____

DISCUSSION LATER WITH THE FARMER (after some batches ; once per season)

- Welfare of the sow compared to the other system present on the farm:

Less good – same – better

⇨ why ?

_____

- Welfare of the piglets compared to the other system present on the farm :

Less good – same – better

⇨ why ?

_____

[3] Pasture is defined as a grassed area with more or less constant food value
[4] If analyses are present, please attach

INTERESTED IN MORE INFO.....

www. staldmontage.dk

RESEARCH ACTIVITIES TO SUPPORT HUT INNOVATION

Access to a heated creep area =>

- Piglets uses creep area earlier and spend less time close to the sow => reduced risk of crushing
- Improve growth performance

Pen features that slow down sow movements =>

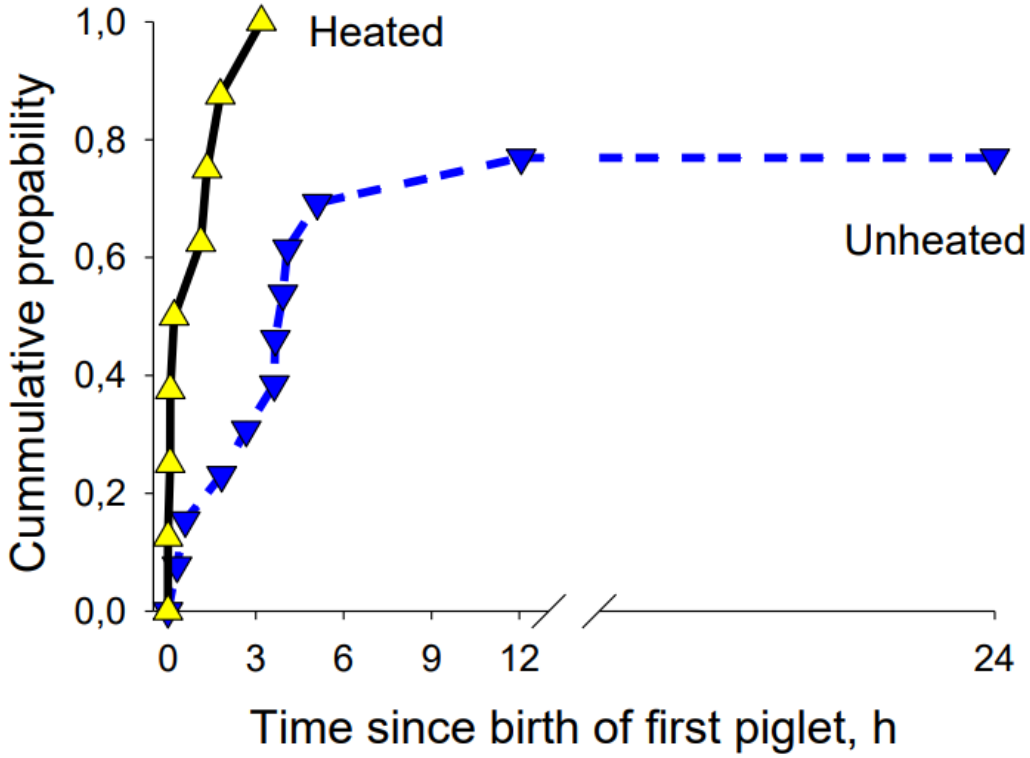
- Reduce sow behaviour related to piglet crushing
- Improve survival

Welfare benefits of outdoor rearing =>

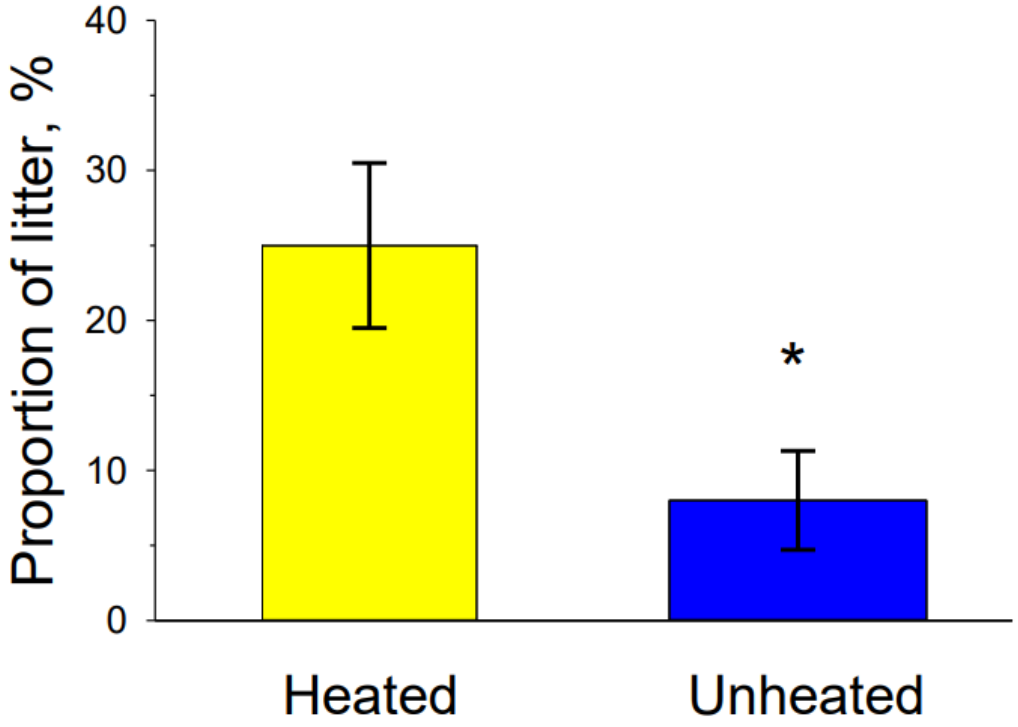
- More nest building, outdoor foraging and general activity
- Sow and piglet uses outdoor area according to season (more during summer than winther)

HEATED VS UNHEATED CREEP AREA

First piglet per litter entering the creep area

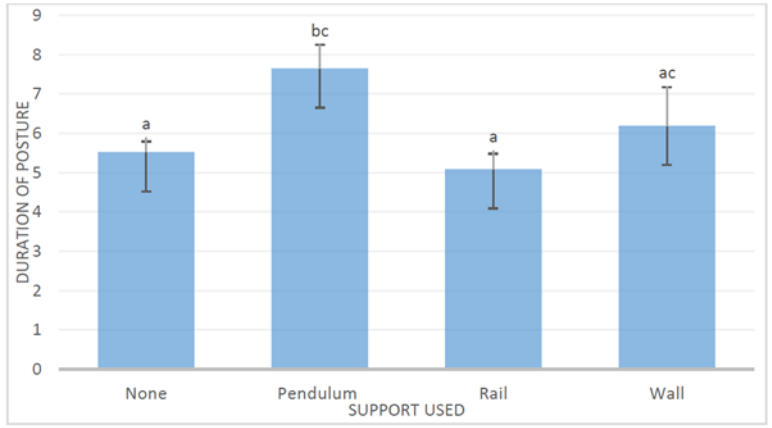


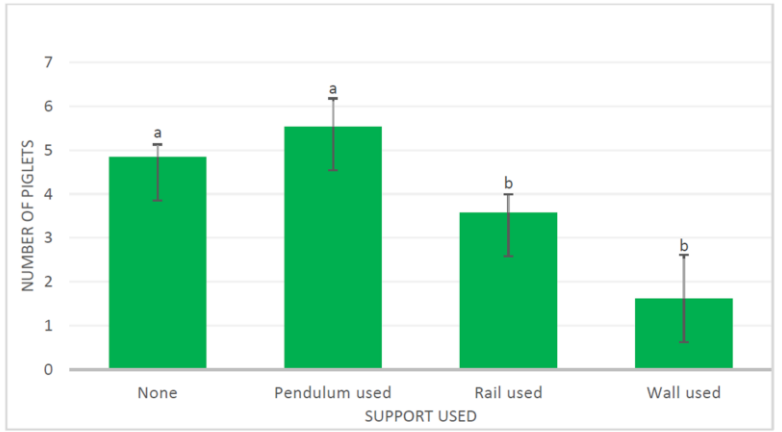
Piglets inside the creep area, Day 2



Earlier and more extensive use of heated creep area

PEN FEATURE TO PREVENT CRUSHING





Pendulum prolonged postural changes – but sows avoid it.

When sows lie down using the pendulum more piglets were in risk zone;
Fewest when lie against wall

CONCLUSION

Heated creep area:

Provide thermal protection for neonatal piglets

Reduce the number of piglets lying in the nest/risky zone

No effect on growth was detected

☺ Improve hut design

Pendulum:

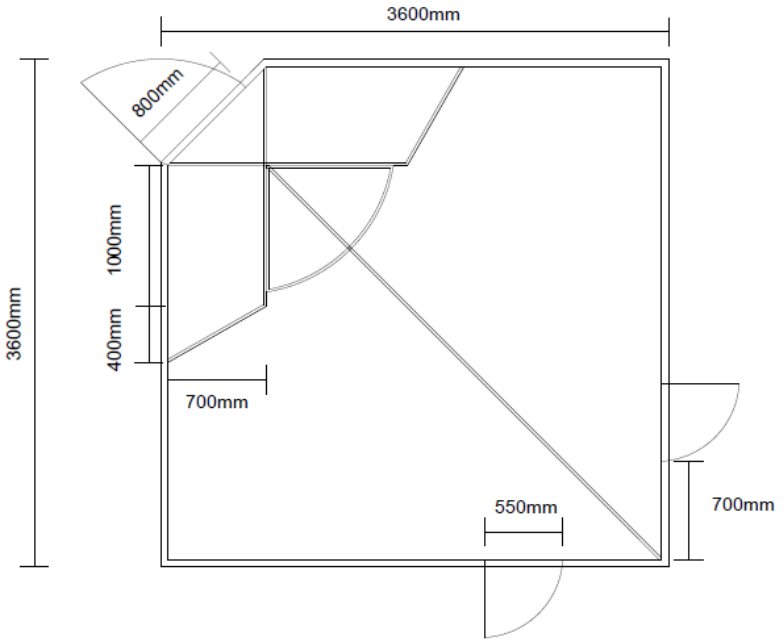
Pendulum prolong postural changes – but sows avoid to use it.

More piglets in risk zone when sow uses the pendulum and less when using the wall

No effect on risk of crushing was detected

☹ Better to attract sow to use sloping walls

QUESTIONS?



PPILOW PARTNERS

Thank you for your attention

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