Physical and social environment for sheep

– Effects on spacing behaviour, social interactions and activity budgets in housed ewes

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Overview

- Background
- Aim of thesis
- List of papers
- Results
- Summary of the findings

Background

- Norwegian sheep are typically held in expanded metal floor pens with 0.7-0.9 m^2 per animal
- 2003: new EU regulation for organic agriculture
  - Demands at least 1.5 m^2 per animal
  - 0.75 m^2 per animal should be solid resting surface

Aim of thesis

- To study the effects of the physical and social environment on spacing behaviour, social interactions and activity budgets in housed ewes
- Sub questions:
  - 1. How much space to sheep really need when indoors?
  - 2. Will sheep show less aggression in large groups than in small?
  - 3. Could a narrow resting platform on top of slatted floors be a solution for increasing resting comfort?
  - 4. Can extra pen partitions increase the utilization of a solid resting platform?
  - 5. How will sheep utilize an outdoor yard as part of the total area under different weather conditions?

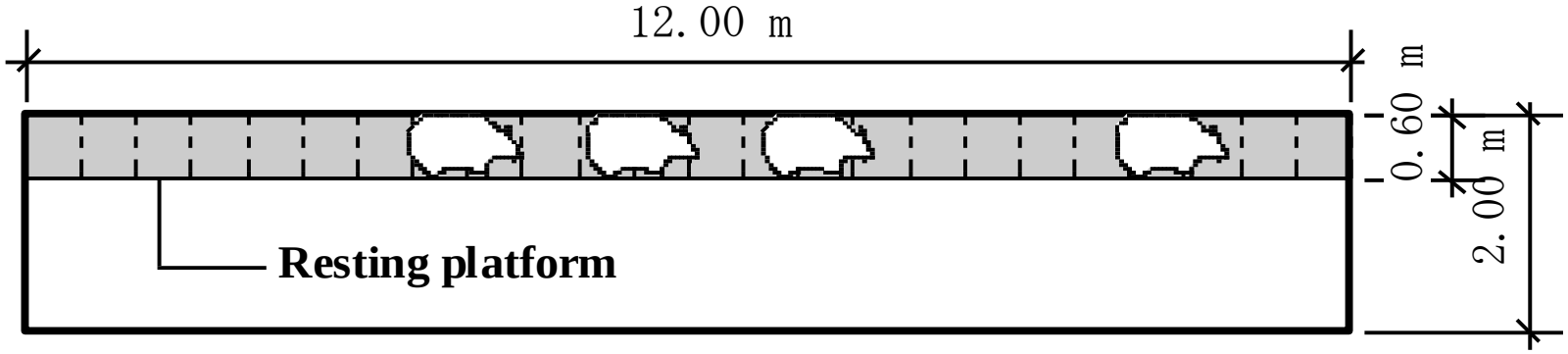
List of papers

1. Differences in the spacing behaviour of two breeds of domestic sheep (*Ovis aries*) – influence of artificial selection? (Submitted to Ethology)
2. Feeding, resting and social behaviour in ewes housed in two different group sizes (2009, Appl. Anim. Behav. Sci. 116, 198-203)
3. The effect of shape, width and slope of a resting platform on resting behaviour and floor cleanliness for housed sheep (2009, Small Rumin. Res. 87, 57-63)
4. The effect of different pen partition configurations on the behaviour of sheep (2009, Appl. Anim. Behav. Sci. 119, 66-70)
5. Outdoor yards for sheep during winter - Effect of feed location, roof and weather factors on resting behaviour and activity (Submitted to Canadian Journal of Animal Science)

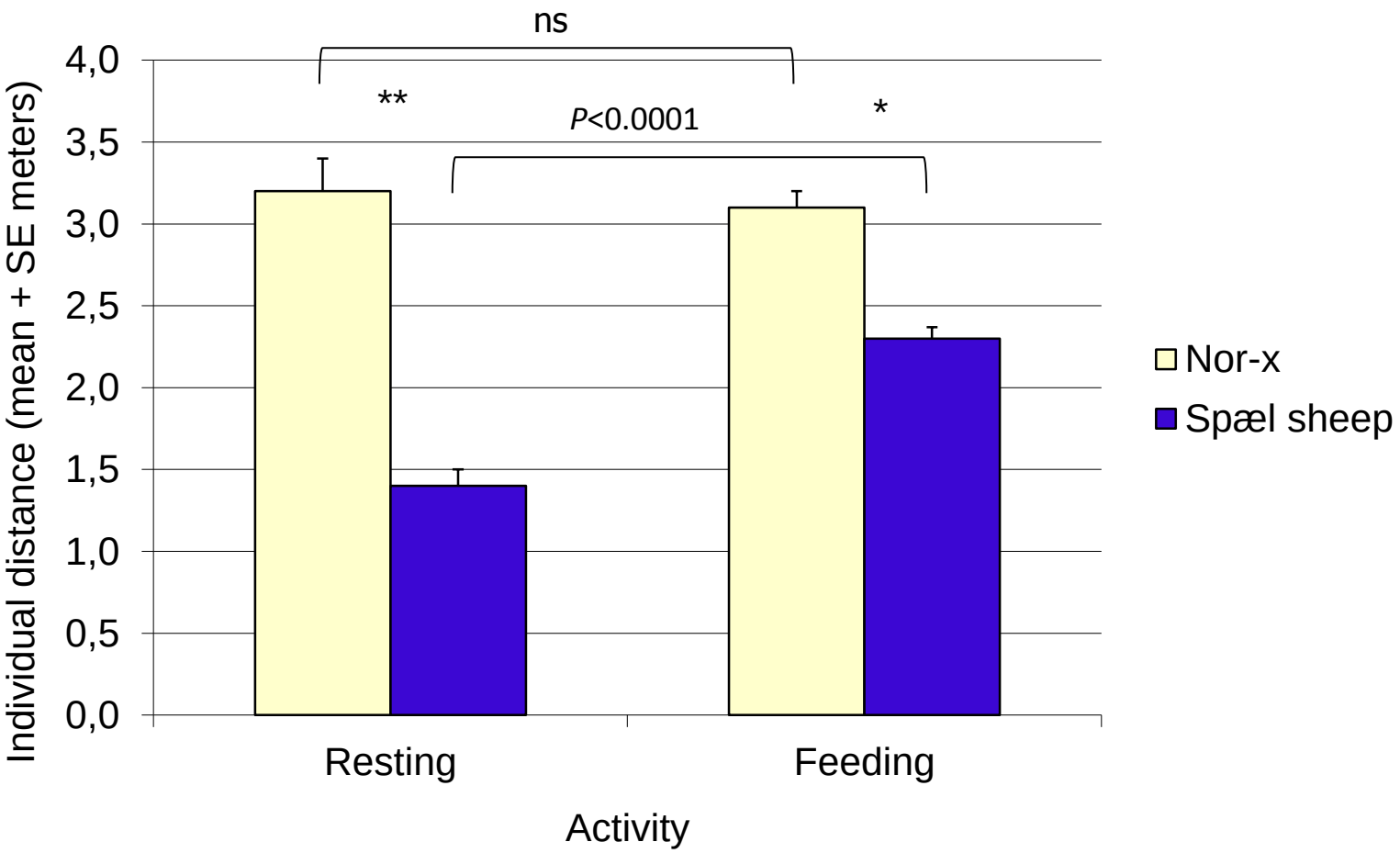
Q 1. How much space do sheep really need when indoors?

Paper 1. Individual distance

- Aim: to investigate the individual distance during resting and feeding for two breeds of sheep

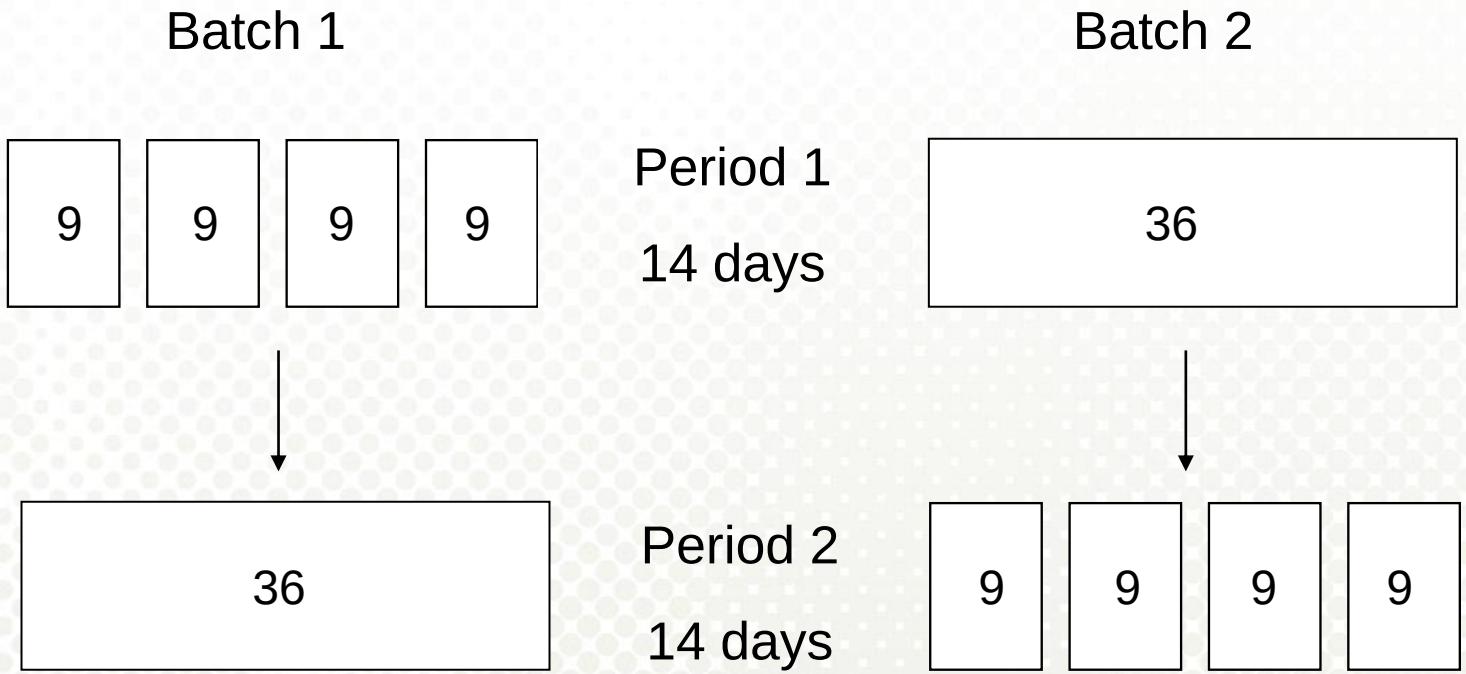


Results: Individual distance



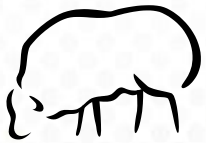
Q 2. Will sheep show less aggression in large groups compared to in small?

Paper 2. Effect of group size



Aim: to test the effect of group size on the activity pattern, social interactions and feed intake in sheep

Results

	**Small** 9	**Large** 36	**P-value**
Feeding	19.1 ± 0.4	19.8 ± 0.4	ns
Queuing	4.1 ± 0.2	3.1 ± 0.2	<0.001
Stand/walk	10.8 ± 0.4	13.1 ± 0.5	<0.0001
Resting	64.7 ± 0.5	62.8 ± 0.6	<0.0001
Displacements	7.1 ± 0.6	7.4 ± 0.5	ns
Other aggressive interactions *	12.0 ± 0.8	12.2 ± 0.8	ns

* pushing, mounting, kicking, butting and threatening

Q 3. Could a narrow resting platform on top of slatted floors be a solution for increasing resting comfort?

Paper 3. Resting platforms on slatted floors

•Aim: to investigate the effect of shape, slope and width of a solid resting area on the resting behaviour of sheep. We also evaluated the cleanliness of these platforms related to cleaning frequency

- Sheep needed at least 0.9 m /animal of platform length
- Increasing the slope from 0% to 5% did not affect resting behaviour but platforms became drier and cleaner
- More sheep rested on the slatted floors when given narrow platforms (0.5 m)
  - Wider platforms (0.6 m) became more dirty
  - Platform width should be adjusted to the size of the breed
- In pens with a larger platform area more sheep were observed to rest on the platforms rather than on the slatted floors
- Daily cleaning of the platform is recommended

Q 4. Can extra pen partitions increase the utilization of a solid resting platform?

Paper 4. Additional walls on the resting area

- Aim: to investigate the effect of different pen partitions on resting pattern, use of the resting area and competition for resting space

Control

Three walls

Cubicles
5
C5
S 16.01 13:10:05

Parallel wall
2
C2
S 23.01 10:50:01

Cross wall
3

Perpendicular wall
4
C4
S 24.01 06:09:23

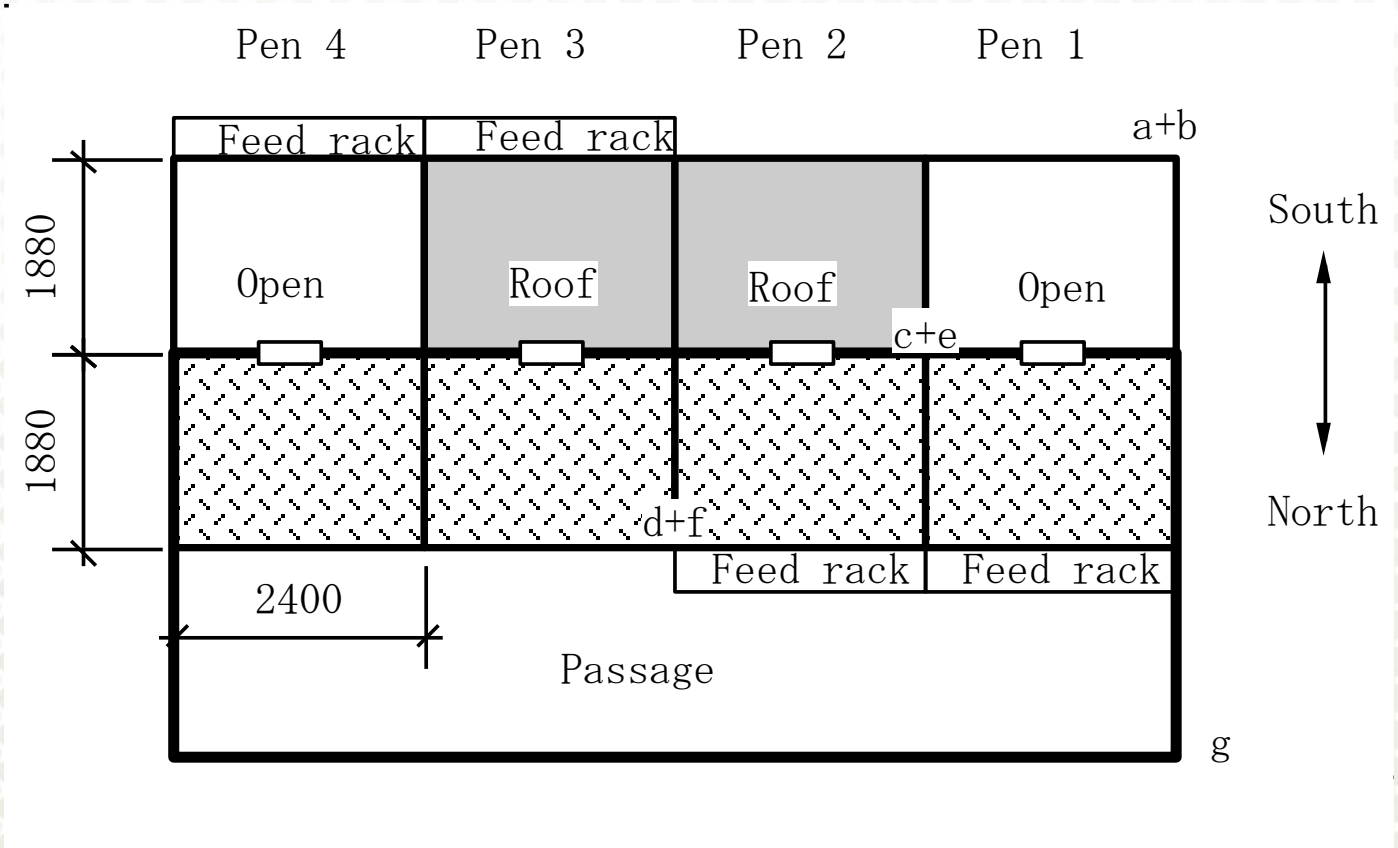
Results

- No difference between the pens in total resting time
- No difference in number of displacements from the resting area
- No difference in the resting synchrony
- Blocking access to the resting area especially in pen with cubicles

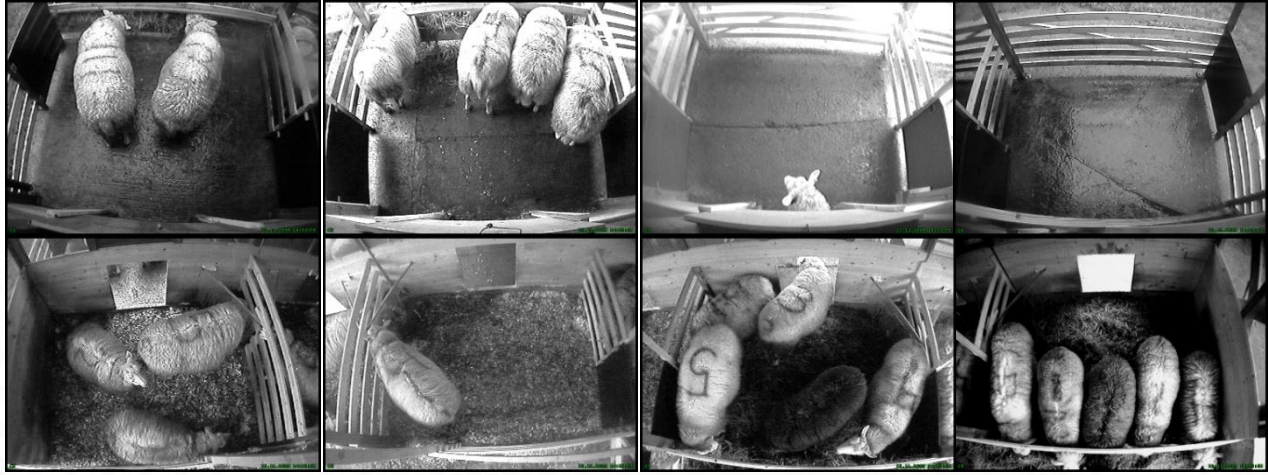
Q 5. How will sheep utilize an outdoor yard as part of the total area under different weather conditions?

Paper 5. Use of outdoor yard

- Aim: to investigate how sheep utilize an outdoor yard dependent on weather factors, feed location and the presence of a roof covering the yard



Results



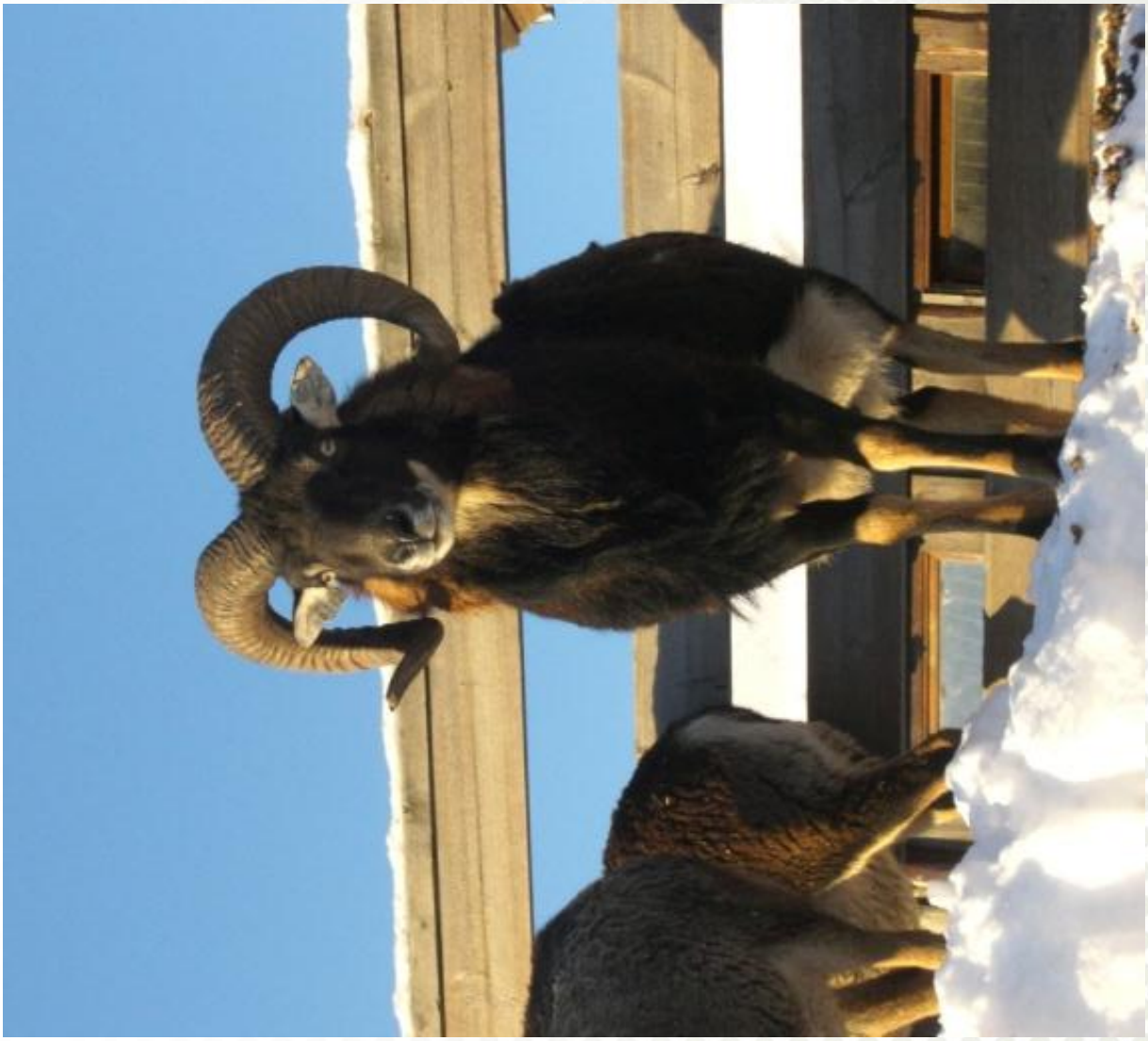
- Weather factors had limited effects on ewe behaviour
  - Precipitation more important than temperatures per se
- Ewes spent more time outdoors in yards that:
  - Were covered with a roof
  - Had feed located outdoors
- Location of feed outdoors:
  - Sheep choose to rest indoors, where they are less disturbed by traffic

Summary of the findings

1. The mean individual distance was 2.2 m during resting and 2.7 m during feeding. This is however breed dependent
2. The level of aggression is probably more dependent upon space quality and animal density than changes in group size per se
3. Resting platforms of wood may be a cheap and easy way of increasing the resting comfort of sheep in slatted floor pens. The perimeter length should be at least 0.9 m per animal
4. For sheep it is probably more important to have sufficient space for resting simultaneously combined with the possibility to maintain visual contact than to avoid resting in physical contact
5. Weather had little impact. A roof covering the outdoor yard may be beneficial in areas with a lot of precipitation. If a dry resting place is provided indoors, then the feed should be located outdoors

Thank you for your attention

- Acknowledgements
  - The Norwegian Research council
  - Norwegian Food Safety Authorities
  - The Økosau Hordaland project
  - The farmers participating in the studies
  - Staff at the Animal Production Experimental Centre UMB



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