

BEHAVIOUR OF DAIRY COWS IN THE WAITING AREA OF LARGE UNINSULATED COWSHEDS

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SUMMARY

The objective of the current study was to investigate dairy cows' behaviour in the waiting area (WA) of the milking parlour (MP). Some cows have to wait for milking up to five hours per day, which may considerably influence their welfare.

The experiments were carried out at three large uninsulated loose housing cowsheds. In the WA less than 2% of cows were engaged in grooming, vocalization, mounting, licking and conflict; up to 8% of cows showed exploring behaviour. The percentage of ruminating, grooming and exploring cows in the WA increased, whereas the percentage of vocalizing, licking and conflict activities decreased. The cows of the last milking groups can be considered the lowest rank in the feeding group; their possibilities to behave normally are most limited.

Keywords: dairy cow, behaviour, waiting area, loose housing, large cowshed, milking order

OBJECTIVE

Nowadays uninsulated loose housing cowsheds with automatic systems are gaining popularity in the whole world because of low building cost and the environment that safeguards the animal welfare. The loose housing of dairy cattle has developed rapidly in Estonia since the 1990s (Veermäe et al., 2001). The first large uninsulated cowshed was introduced in 2002, now about 30% of the cattle are kept in uninsulated cowsheds with more than 300 dairy cows. However, some concern has been expressed over the systems in which the cows are housed throughout the year, as the behavioural restriction implicit in these systems is associated with poor welfare (Haskell et al., 2003). The current study focused on the cows' possibilities to behave naturally in the WA.

MATERIAL AND METHODS

The experiments were carried out at three large uninsulated loose housing cowsheds. Cowshed I was introduced in 2003. In 2004 there were 519 dairy cows with milk production of 6374 kg. Cows (Estonian Holstein) were in 4 feeding groups and milked in 2*12 DeLaval tandem milking parlour two times per day. The size of the waiting area was 171.5 m².

Cowshed II was introduced in 2002. In 2004 there were 561 dairy cows with milk production of 7916 kg. Cows (Estonian Holstein and Estonian Red) were in two feeding groups and milked

in 2*20 Strankgo tandem milking parlour three times per day. The size of the waiting area was 196 m².

Cowshed III was introduced in 2004. There were 357 dairy cows (Estonian Holstein and Estonian Red) in 6 feeding groups with milk production of 7675 kg. Cows were milked in 2*12 DeLaval tandem milking parlour three times per day. The size of the waiting area was 140 m².

Cow groups were defined as follows (figure 1)

Feeding group – a group of cows in the WA before the start of milking. This group has fixed size and is kept separately according to the feeding-management system in the cowshed.

Waiting group – a group of cows in the WA during milking. The size of the waiting group decreases in the course of milking while subsequent milking group passes the MP.

Milking group – a group of cows on either left or right side of the MP during one milking round.

Milking round – milking of left and right milking groups on the MP (order number).

In every cowshed observations were carried out on the waiting area during three milking. In total 266 milking groups and 3522 dairy cows were observed (cowshed I 121 milking groups and 1388 cows; cowshed II 54 milking groups and 1062 cows, cowshed III 91 milking groups and 1072 cows).

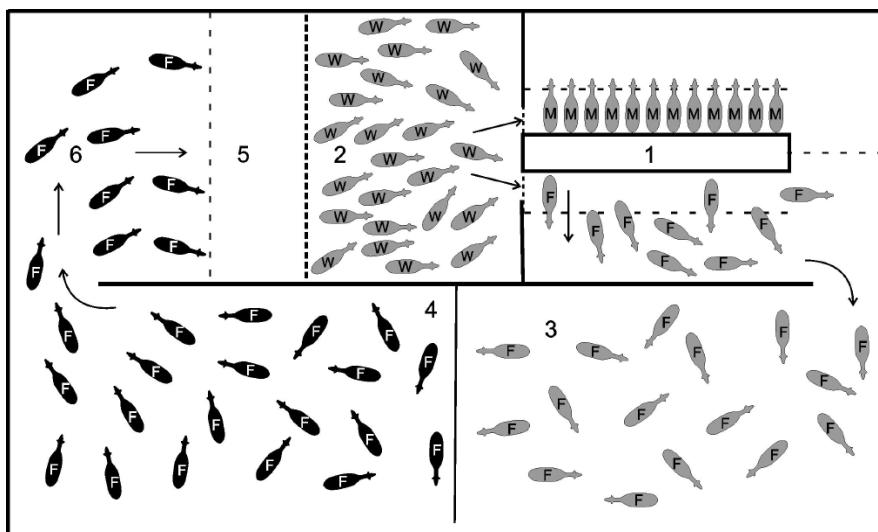


Figure 1. Feeding, milking and waiting group cows

Cows' activities (falling down, grooming themselves, licking other cows, mounting, vocalizing, exploration, conflict), stockperson's activities – talking to animals (vocal) and touching and the usage of cows' mover (push) were registered continuously. The number of ruminating cows was registered every 10 minutes.

Behavioural data were calculated per “**waiting group**” – “the number of cows” in the waiting area per time interval between milking rounds (average for left and right side of MP). Cows' activities were characterized by the number of occurrences per group (%) and per animal in the WA; rumination was characterized by % of animals. Statistical analysis was carried out using the EXCEL.

RESULTS AND DISCUSSION

No of cows in the WA in time decreases according to the MP size, whereas the waiting time increases (figure 2).

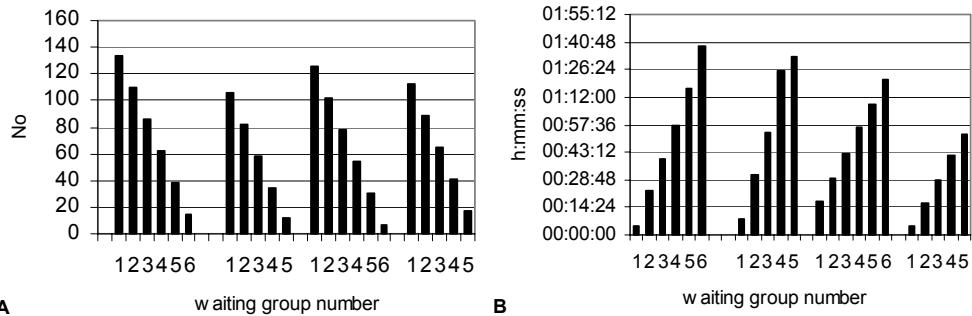


Figure 2. A. The number of cows in the WA (cowshed I); B. Cows' waiting time in the WA (cowshed I)

The percentage of ruminating cows in the waiting group in the WA increased in all cowsheds as milking proceeded. However, about 1/3 of all cows were ruminating in cowsheds I and II; in cowshed III 52.8% of cows were ruminating (figure 3).

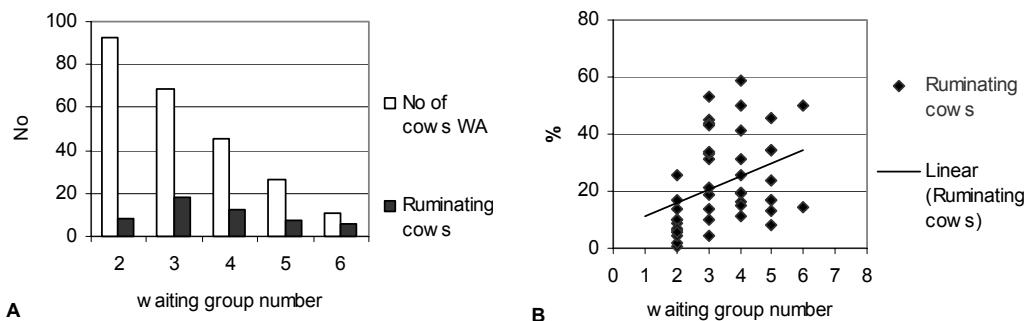


Figure 3. A. Total number and number of ruminating cows in the WA (cowshed I); B. Percentage of ruminating cows in the WA (cowshed I)

The activity of cows in the WA was low in all cowsheds. Less than 2% of all the cows were engaged in different activities, except for exploration behaviour (figure 4).

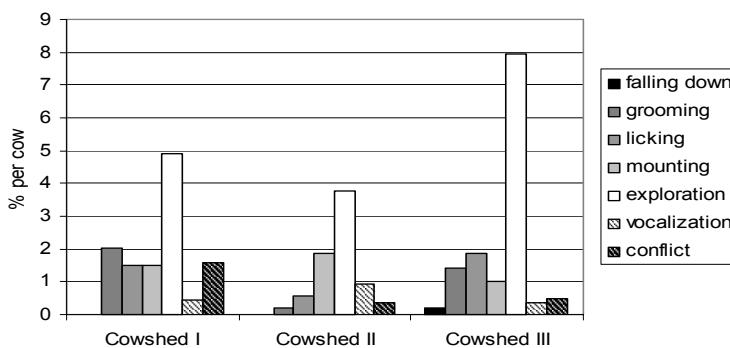


Figure 4. Cows' activities in the waiting area per all cows

The number of conflicts was the highest in cowshed I, where 1.4% of the cows of the second waiting group were engaged in conflicts. There were also lickings (subdominant cows' behaviour toward dominant cows) in the first groups (figure 5B). No lickings and conflicts were observed in the last group. Mounting and vocalization activities also had a decreasing tendency. Cows in the last groups performed more exploration and grooming activities (figure 5A). During the observation period only some falling down incidences were observed in cowshed III, where the cows had been only one month.

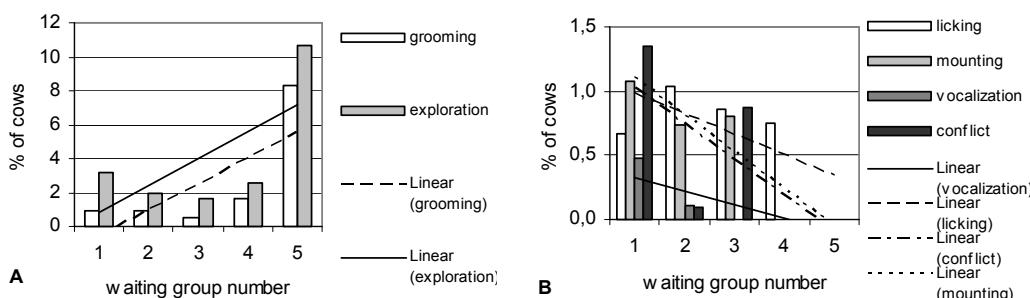


Figure 5. A. Increasing activities in the WA; **B.** Decreasing activities in the WA

A prominent feature of the social system of dairy cattle is the consistent order of entry into the milking parlour (Rathore, 1982). Cows with low dominance values are forced to spend more time waiting for milking. At the same time, cows' motivation to be milked is not very high. Individual cows may find milking either positively or negatively reinforcing, but overall, the motivation to be milked is weak. Food is significantly more rewarding than milking (Prescott et al, 1998). Geri and Hama (2003) compared the behaviour of Holstein-Friesian cows when entering the milking parlour and at the feeding trough. There was no correlation between the entrance order to the milking parlour and the dominance order at the feeding trough. The younger cows were dominant when entering the milking parlour, and the older, heavier cows at the feeding trough.

The time that the cows spend lying as opposed to standing is of interest both from the cow's and the dairy farmer's point of view (Österman and Redbo, 2001). High producing dairy cows spend about 40–50% of the day lying down and adequate rest is necessary to ensure high

production. Preferred lying time for cattle is 10 hours per day. Belonging to the first milking rounds gave certain priorities to the cows: less standing time in the WA and after returning to the cowshed unlimited access to the feeding table and stalls.

In contemporary large loose housing cowsheds WA is the area, where the cows' possibilities for normal behaviour are the most limited: locomotion activity is strongly restricted and behaviour is controlled by dominance order. Cows in the WA have no possibilities to lie down or eat. Limited space per cows inhibits locomotion and social activity. Dairy cows are close together, there are no possibilities for low ranking cows to withdraw from aggression or to leave the area.

The cows' possibilities for normal behaviour in WA were limited in all cowsheds (figure 4). The most prevalent activity was rumination (figure 2). Only healthy and unstressed cattle will ruminate normally (Lidfors, 1996). In current study up to 52% of cows were ruminating in the WA of cowshed III, where the feeding group size was the smallest, waiting time the shortest and space for one cow the biggest. In cowsheds I and II only 1/3 of cows found the WA comfortable enough to perform ruminating activity there. Low percentage of ruminating cows in the WA indicated uncomfortable environment.

It is impossible to distinguish between the cows from different milking groups in the WA. Therefore the results of observations represent "substracted" image: what changes in cows' group behaviour can be found after the each milking group had left the WA, and which activities are representative for the last waiting groups. Despite of some increase in space per cow ($2\dots3 \rightarrow 4\dots5 m^2$), the cows' activity remained low. The same tendencies in activity pattern were found in all cowsheds. It appeared that the cows' social activity decreased: the number of conflicts and lickings dropped, there were no lickings and conflicts in the last waiting groups. The same trend was followed in mounting and vocalization activities (except mounting activity in cowshed II). At the same time exploring and grooming activities increased. The last WA cows that regularly had to wait for milking for several hours per day were calm and patient in their behaviour, exploring and self-grooming activities were dominant. They were not more reluctant to milking.

From the point of welfare waiting area is a critical part of technology at large loose housing cowsheds. It is functioning as a "sorting unit", where "problem" cows are sorted into last milking groups. Cows, which are more or less voluntarily in the last milking groups, can be considered as the lowest rank in the group; their normal behaviour possibilities are the most limited and therefore it is reasonable to focus welfare evaluation on this group on animals.

CONCLUSIONS

In the waiting area less than 2% of cows were engaged in grooming, vocalization, mounting, licking and conflict; up to 8% of cows were engaged with exploring behaviour. The percentage of cows' ruminating, grooming and exploring activities in the WA increased in connection with the decrease of waiting group size whereas the percentage of vocalization, mounting, licking and conflict activities decreased.

Cows, which are more or less voluntarily in the last milking groups, have fewer possibilities to behave normally, therefore it is reasonable to focus on these cows in welfare evaluations.

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