9. Wissenschaftstagung Ökologischer Landbau.
Beitrag archiviert unter http://orgprints.org/view/projects/wissenschaftstagung-2007.html

Reducing cross-sucking of group housed calves by an environmental enriched building design

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Keywords: cattle, animal health, agricultural engineering, organic calf housing

Schlagwörter: Rind, Tiergesundheit, Landtechnik, ökologische Kälberhaltung

Abstract:
Group housing is a natural and economic way of raising calves. One major disadvantage of group housing calves is the occurrence of cross-sucking as an abnormal behaviour. The main objective of our study on organic calf housing was the reduction of cross-sucking related to milk feeding. A new feeding stall with automatic gates was attached to an automatic teat feeder. One gate opened to an enriched area immediately when the calves had finished their milk meal. In this zone calves could use rubber teats or a hay net (treatment optimized). The design for the control group used a simple feeding stall without attached enriched zone. 168 female calves (German Holstein) from one origin (herd) were randomly assigned to 14 groups with 12 calves each. Thus, each treatment could be repeated seven times. Two groups were used for preliminary testing of housing and technique. Calves were fed whole milk, according to EU-organic-farming-guidelines. The behaviour of calves was observed directly for 20 minutes following milk intake. In addition, 24 hour video observation completed the behavioural monitoring. The videos were analyzed with the continuous sampling method; statistical analysis was done with the SAS statistical software package and non-parametric procedures. As one result, cross-sucking of calves decreased significantly in the optimized housing treatment compared to the control treatment: cross-sucking behaviour occurred for 12% of the calves of the optimized treatment vs. 60% cross-sucking calves in the control treatment. Regarding the intensity of cross-sucking, the control group showed 200 cross-sucking bouts per 100 calves and meal, in comparison with a frequency of 16 bouts of the optimized treatment. Our study supports the thesis, that design of housing and environment could be used to reduce cross-sucking of group housed calves. However, future research should be done to evaluate interactions between feeding techniques, environment and physiological processes related to cross-sucking behaviour of calves.

Introduction and Objectives:

Organic dairy farmers are obliged to house calves in groups, starting with the second week of their life. One major disadvantage of group housing calves is the occurrence of cross-sucking as an abnormal behaviour. Cross-sucking can result in illness and economical losses. Thus the main objective of our study on organic calf housing was the reduction of cross-sucking after milk feeding to optimize group housing.

Milk feeding of calves could be done artificially with bucket, bucket with teats, automatic teat feeders or natural by suckler- or foster-cows. Artificially reared calves housed in group often show cross-sucking behaviour, which will not occur in group housed calves fed by their mothers or foster cows. Preferred parts of the body for cross-sucking of male calves are scrotum and prepuce, as well as udder area, navel and ears (SAMBRAUS 1985). Cross-sucking may lead to inflammatory diseases of navel or ears, bezoars or defects of udder. As one major reason for cross-sucking artificially reared calves, unsatisfied sucking activity is mentioned. Calves reared by

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their mother suck 6 times per day within the first 3 months with a mean duration of 10 minutes (SAMBRAUS 1985). Bucket fed calves need 2 – 3 minutes per milk meal (SAMBRAUS 1985), which is corresponding to the duration of a milk meal for the automatic teat feeder with less than 3 minutes (FERRANTE et al. 1991). Thus, a lack of sucking activity exists, increasing the motivation of cross-sucking (LIDFORS 1993, SAMBRAUS 1985) lasting approximately the same time as a natural milk meal does (SAMBRAUS 1985). The intensity of cross-sucking decreases within 20 – 30 minutes (GRAF et al. 1989, LIDFORS 1993) or within 10 minutes (de PASSILLÉ et al. 1992). Reduction of milk flow or interruption leads to an extended duration of milk intake (de PASSILLÉ 2001), but is not affecting cross-sucking (JENSEN & HOLM 2003). In contrast to that, higher milk intake and more but smaller milk meals per day could reduce cross-sucking (BRUMMER 2004). An addition of 2 g of glucose per liter milk or milk replacer will lead to reduced cross-sucking as well (EGLE et al. 1999). Further solutions for the reduction of cross-sucking are self-locking feed stalls (BRUMMER 2004, WEBER & WECHSLER 2001), fixing calves with head locks after the milk meal (MAITY & TOMER 1998) or the presence of (sealed) artificial teats (de PASSILLÉ 2001).

Methods:

168 female calves (German Holstein) from one origin (herd) were randomly assigned to two treatments: control and optimized treatment with 12 calves per group. Thus, each treatment could be repeated seven times. Two groups were used for preliminary testing of housing and technique. The calves were fed whole milk 12 weeks according to EU organic farming guidelines, provided by an automatic teat feeder with identical functions per treatment. The housing of the control group was a two-floor-system with deep litter lying area and elevated solid floor in the feeding area. The feeding area consisted of a concentrate feeder, hay rack and feeding stalls with a self-locking door in the rear.

Lying and feeding area of the optimized group (treatment) were separated by an exercise yard. A new feeding stall with automatic gates was attached to an automatic teat feeder. One gate opened to an enriched area immediately when milk intake was finished. In that protected area calves could use three sealed rubber teats fixed at a bucket. A net filled with a hay bale was hung up at the truss. A simple gate was used as one-way exit to the remaining feeding area and to prevent other calves from outside to take a short cut into the so called post-feeding area without a milk meal.

Tab. 1: Observation-days related to milk intake and age of calves.

Observation-day	**Milk-intake [l]**	**No. of meals**	***Age [d]***
1	5.0 – 7.0 l	2 – 3	*25 - 51*
2	3.5 – 5.0 l	2	*52 - 75*
3	2.5 – 3.0 l	1	*76 - 84*

The lying area in both treatments measured 2.25 m² per calf, feeding area was 1 m² / calf. The optimized treatment groups had an additional exercise yard of 11 m² area per calf, equipped with an automatic calf-brush, and a 10 to 15 cm strong layer of soft wood chips (pine wood). The general behaviour of calves was observed by using 24 hour video observation. Cross-sucking behaviour of each group was observed 20 minutes immediately after the milk meals on three (twin-) observation-days at the same time (late afternoon). The relation of observation-day, milk intake and age of calves is described in Tab. 1. Statistical analysis and data management were performed with SAS statistical software package (9.12). Because of negative

tests of normality non-parametric procedures (Mann-Whitney, Kruskal-Wallis) were used to analyze the data.

Results:

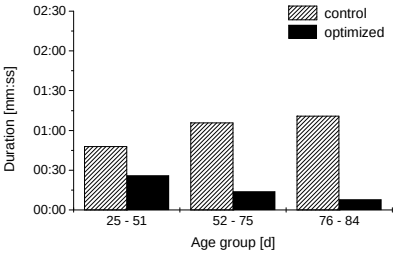

Fig. 1: Mean duration of time staying in feeding stalls after milk intake.

Immediately after milk intake the calves of control group remained in the feeding stall despite the fact that the artificial teat was no longer available. Mean duration of time spent in the feeding stall after the milk meal was significantly different between treatments (Fig. 1). The older the calves were, the longer they stayed in the feeding stall after milk intake regarding control group. While standing in the feeding stall, between 45 and 66% of the calves of the control group were suckling on the feed stall, whereas only 12 to 28% of calves of the optimized group showed the same behaviour.

Within the control treatment 59 to 74% of calves in the control treatment were observed with cross-sucking behaviour compared to 12 to 17% of the optimized treatment (Fig. 2). Differences between both treatments were significant or highly significant. The mean duration of cross sucking bouts was not significantly different between treatments regarding age group 1 and 2, but was significantly different for age group 3 with 122 sec (control) and 40 sec (optimized). The frequency of cross-sucking bouts, related to 100 calves, increased from 80 to 200 bouts within the control group depending on the age of the calves, whereas the bouts of the optimized group varied from 9 to 16.

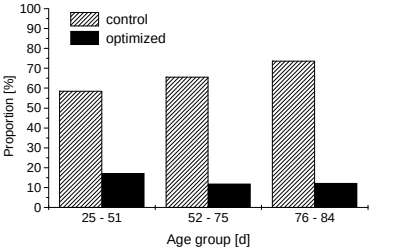

Fig. 2: Proportion of calves in both treatments observed with cross-sucking behaviour.

Conclusions:

As one result, cross-sucking of calves decreased significantly in the optimized housing treatment compared to the control treatment: Cross-sucking behaviour occurred for 12% of the calves of the optimized treatment vs. 60% cross-sucking calves in the control treatment. Regarding the intensity of cross-sucking, the control group showed 200 cross-sucking bouts per 100 calves and meal, whereas the frequency of the optimized treatment was 16. Our study indicates, that design of housing and the enriched post feeding area could be used to reduce cross-sucking of group housed calves. However, future research should be done to evaluate interactions between feeding techniques, environment and physiological processes related to cross-sucking behaviour of calves.

Acknowledgements:
This study was funded by grants of the Federal Organic Farming Scheme supported by the Federal Ministry of Food, Agriculture and Consumer Protection.

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