Effects of Different Factors on Dairy Calves Behaviour

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Abstract
The purpose of this study was to study the effects of age, sex, and father on behaviour of calves. The study included 40 dairy calves kept in group housing. Maintenance behaviours were conducted at the age of 90, 130 and 170 days. The social behaviour was determined during 1 h feeding on access to limited amounts of feed during three consecutive days in 155th day of the age. Maintenance activities were significantly increasing with the age. Calves spent lying on the left side and ruminating while lying on the left side longer time. The most periods of total lying, lying on the left side, and lying on the right side were found at the age of 130 days. Period number was increasing within ages in ruminating while on the left and right sides, ruminating while lying, and total ruminating. Father lineage was significantly manifested in times of total standing, total eating, number eating and lying periods. No significant differences were found between males and females behaviour, and among fathers in social index.

Keywords: age, behaviour, calf, father, sex, welfare.

1. Introduction

Housing and management conditions can affect rest in young ruminants [1, 2, 3,]. Group housing can promote growth through an increased feed intake caused by a social facilitation, especially at weaning [5, 6, 7]. On the other hand, group housing may disturb calves resting behaviour; especially if the space is restricted [8, 9, 10]. Lying time, frequency and duration of lying bouts has been used as a measure of cattle comfort [11, 12, 13]. The time of rumination is increased when cattle are recumbent on the left side rather than the right side.
The effects of age and rearing was significantly showed [14, 15, 16, 17, 18]. The calves that had always been in groups achieved hierarchical ranks higher than calves kept individually. Male calves were more active than female calves social behaviour [19, 20]. Significant effect of father lineage on the heifers behaviour was also determined [20, 21].

2. Materials and methods

We assessed 40 Holstein calves (23 males and 17 females) descended from 3 fathers (Father 1, n=12; Father 2, n=16; Father 3, n=12). The calves were kept in pens of loose housing. The calves will be moved from the calf barn into the experimental barn at the age of 10 weeks. The group compositions were the same throughout the study. There were kept 20 calves in a pen 9 x 4.5m.
Three observations of maintenance behaviour were realized, at 90, 130, and 170 days of age. At intervals of 10 minutes the general activity of each of the animals were recorded using following categories: lying (laterality and semi laterality on the left and right side), standing, eating concentrates, eating of forage fodder, drinking, ruminating, walking, mooing, grooming myself

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and others, defecating, urinating, licking the walls, sniffing the walls or others animals.

The social dominance rank was determined by recording herd mate encounters during 1 h feeding on access to limited amounts of feed during three consecutive days in 155th day of the age. Feed trough (2 x 0.5 m) was limited such that only 14 animals within each pen could feed at once. The main types of encounters recorded were threat, butt, and physical combat, displace, and turn away. The dominance value was calculated by dividing the number of animals that a calf dominated. A mean dominance value of each animal was calculated by using the average of three observations. The social index was calculated by dividing the number of win duels by the number of total duels.

The data were analyzed using a General Linear Model ANOVA by the statistical package STATISTIX, Version 9.0. Significant differences between groups were tested by Comparisons of Mean Ranks. Values are expressed as means ± SE.

3. Results and discussion

The results of duration of maintenance behaviour showed that almost all activities were increasing with the age (Figure 1). Differences were significant (P<0.001). Total standing was an exception. Time was steadily decreased from the age of 90 days to the age of 170 days (663.21±9.85 min., 610.96±9.68 min., 555.96±10.00).

Almost all activities were increasing with the age. Times spent lying, ruminating and feeding were increasing with the age, similar as the number of bouts lying while ruminating, lying on the left side with rumination, ruminating and lying bouts on the right side. Calves require more rest than adults [21, 22, 6]. Calves spend most of their time lying when very young, but this rest time decreases with age, especially after weaning [11, 12, 23]. These support also our findings on total standing time which was steadily decreased from the age of 90 days to the age of 170 days.

Total time of eating in the age of 130 days was significantly higher opposite to other ages (289.18±7.40 min., 395.93±7.20 min., 316.93±6.91; P<0.001). In the age of 130 days the calves performed more eating behaviour. This time elevation with subsequent decreasing is hard to explain. The behaviour of dairy calves can be affected by housing system and management [24, 25]. The patterns of activity during a day depend on housing conditions, diet and daily lighting rhythm. Changes in the time budget may reflect adaptation to specific conditions. However, used animals were kept in the same environment during experiment.

Calves spent lying on the left side and ruminating while lying on the left side longer times. The most periods of total lying (41.13±0.69), lying on the left side (20.86±0.48), and lying on the right side (20.31±0.66) were found at the age of 130 days. Periods number were increasing within ages in ruminating while lying on the left and right sides, ruminating while lying, and total ruminating. Eating periods were decreasing from the age of 90 to 170 days (16.82±0.33, 15.22±0.29, 15.14±0.31).

Calves spent longer time lying on the left side and ruminating while lying on the left side. The development of a functional rumen may influence calves laterality during recumbence [24, 1, 23]. Left side laterality decreased with age. Environmental factors may play a major role in developing laterality during ontogeny [8, 3, 23].

In comparison behaviour of calves according to fathers we found that genotype of Father 3 was significantly manifested in times of total standing (641.67±12.18), total eating (366.67±10.18), and number eating periods (16.53±0.36). Father 1 progeny was realized on higher time of total lying and number of lying periods (836.67±12.71 min., 40.83±0.87).

Genotype of fathers was manifested in times of lying, standing, eating, and number eating periods. It is very difficult to explain this phenomenon. There is a lack of sources; nobody has probably dealt with this problem except for us.

The most successful in competition were calves after Father 1. They had the most win (8.25±1.56, 6.13±1.43, 7.26±1.57) and total duels (16.64±1.04, 15.34±0.95, 12.90±1.05, P<0.05). No significant differences were found among fathers in social index, however, the highest value were recorded in Father 3. We found higher number of win duels in female calves and contrary a lower number of total duels.

Calves descended from Father 1 were the most successful in competition, however, no significant differences were found among fathers in social index. The most social encounters are recorded on

the days the calves were grouped [26, 18]. It may be from our results concluded that the decreasing of social contacts by long common stay in stabile group has effect on the competitive behaviour. It would be probably reversed by mixing non-familiar calves. Early experience affects an animal's initial dominance, which may be determined at a young age [27, 28]. Just how young dominance is established may be open to question [29].

No significant differences were finding between male and female sex in maintenance behaviour. This finding is supported also by results of other authors [19, 21, 10, 30] which insist that the age is not such a significant factor. However, dairy males may have longer lying times than females. Under modern husbandry, from weaning to 5-6 months, calves are usually kept in groups of the similar age and with both sex. The behaviour of herds with a natural sex ratio distribution has been little studied.

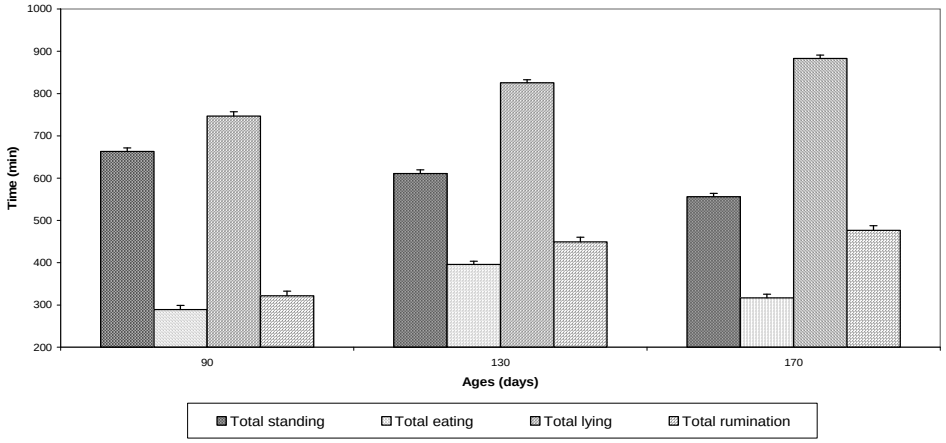

Figure 1. Times of maintenance activities according to age

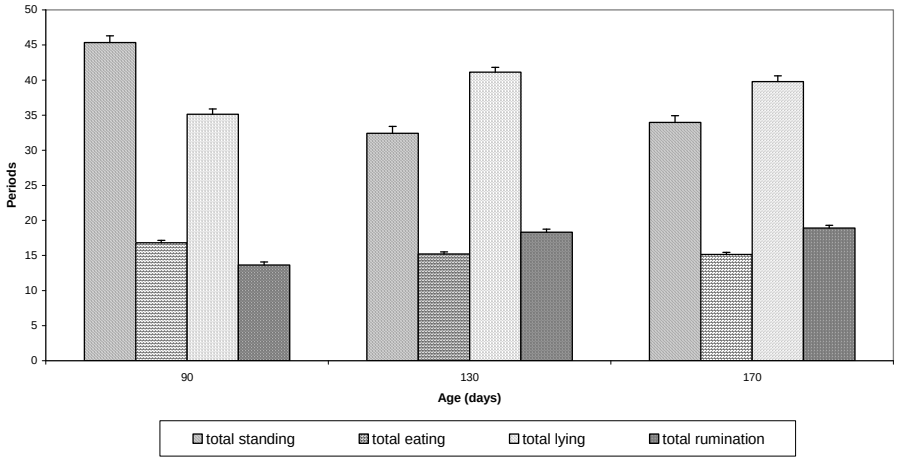

Figure 2. Number periods of maintenance activities according to age

4. Conclusions

The results showed that almost all maintenance activities were increasing with the age. Period's number was increasing within ages in ruminating while lying and total ruminating. Effect of father lineage was manifested in times of total lying, standing, eating, and number eating and lying periods. No differences were finding in sex observation

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