MONITORING AND ASSESSMENT OF THE NIGHT FEEDING BEHAVIOUR OF DAIRY COWS IN TWO DIFFERENT YEAR SEASONS

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ABSTRACT

Heat load impairs feed intake and milk production of dairy cows (Moody *et al*., 1968; Berman *et al.*, 1985). Brosh *et al.* (1998) suggested that, in hot weather, feeding cattle at night might reduce the heat load imposed upon them by their increased heat production during the hours following a meal because this increased production is complemented by decreased heat output at other times of the day. Hence, animals would produce less metabolic heat during daytime and more during the cooler night hours. The objective of this research was to compare feeding night behaviour of Czech Pied cattle dairy cows in two different year season. Group was completely monitored with two outdoor network cameras VIVOTEK technology (IP7330 and PZ6122). Our assessment hypothesis was that captured cows standing in feeding area with the head on feeding channel in monitored hours was actively feeding. Statistically the highest difference was found in number of feeding cows in 04:00 a.m. on behalf of autumn period (2.08 cows) or 181 % higher, where we found $p < 0.057$. Between other assessed periods we didn't find any higher difference. In average, the percentage of feeding cows during assessed night hours was higher in autumn period, than the summer.

Key words: network camera, season, dairy cows, night feeding, summer and autumn

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INTRODUCTION

Loose housing systems provide dairy cows with the possibility for locomotion and allow them to express a variety of natural behaviours. Furthermore, a well-established social environment may have a positive effect on the adjustment of individuals to the environment through social facilitation and learning, and it has been suggested that a stable social relationship within a herd may be beneficial in reducing the effect of generally stressful conditions (Bouissou et al., 2001).

Loose housing systems are preferred to reduce labour input with increasing herd size as well as to meet animal welfare requirements. In order to minimize investment costs for new or reconstructed stables these loose housing systems are often built in open-fronted buildings or even in buildings open to all sides (M. Zahner et al. 2004) as is case on farm where this research was conducted.

As a consequence of these housing systems, cows could suffer to a wide range of climatic conditions what could negatively influence their behaviour, feed intake, production and health.

This raises the question of whether dairy cows are able to cope with these housing conditions (M. Zahner et al. 2004).

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The objective of this research was to compare feeding night behaviour of Czech Pied cattle dairy cows in two different year season.

MATERIAL AND METHODS

The aim of research was to investigate night feeding behaviour of cows in two different year seasons.

Housing system and animals. This research was conducted at Genagro a.s. dairy farm of Czech Pied (Flekvieh) breed. In the experiment barn is accommodate almost 400 dairy cows divided into four groups (each has about 100 heads). It's a modern construction type of cowshed, with cubicles housing. The barn has opened sides, without possibilities of closing. The research group of cows is placed on east-south part of cowshed, counts 98 (±3) cows placed in 103 cubicles. Cows are bedded on separated manure which is partly mixed with straw, with approximately 6 m^2 living space per cow. Feeding is ad libitum and cows are fed with TMR. Feed was served two times per day about 04:30 in a.m. and 04:00 p.m. They had continual access to water.

Observation period. Test was managed in 2009, in months July, August and October, i.e. summer and autumn period.

Monitoring. Group is completely monitored with two outdoor network cameras VIVOTEK technology (IP7330 and PZ6122). The snapshots are captured four times per hour in the period from 01:00-22:00. In this research we investigated cow's feeding behaviour from 01:00-05:00 a.m. Numbers of cows

standing in feeding area was calculated from snapshots in full (±10 min) hours, so in 01:00, 02:00, 03:00, 04:00 and 05:00. It was totally investigated 8 random chosen nights in hot (summer) and 8 random chosen nights in autumn period, when average daily temperatures were lower. Totally, it was examined 160 snapshots.

Our assessment hypothesis was that captured cows standing in feeding area with the head on feeding channel in monitored hours was actively feeding.

RESULTS AND DISCUSSION

The characteristics of night feeding distribution are presented in tables 1 and 2. Statistically the highest difference was found in number of feeding cows in 04:00 a.m. on behalf of autumn period (2,08 cows) or 181% higher, where we found p<0,057 (Table 3). Between other assessed periods it we didn't found any higher difference.

On the base of chart 1, we see that the feeding frequency is similar in both period, with almost same tendency of decreasing of feeding cows, after 01:00 from 7,01% to 2,55% in 04:00 during summer days and little bit lighter decrease was found in autumn period from 6,5% at 01:00 to 4,63 at 04:00 (Tab 3.), and with increasing of number of feeding cows at 05:00 as consequence of feed serving time.

Feeding frequency was in almost all assessed hours lightly higher in autumn, than in summer period, except at 01:00.

CONCLUSION

In this work we did not find the significant differences in feeding behaviour of dairy cows, as a consequence of different environment conditions. Based on the literature, was expected that the night feeding frequency will be more expressed in summer period as a consequence of decrease feeding during hot daily period, but results was opposite. So, we can conclude that night activity of dairy cows in this case was more related to herd behaviour, than the environment. In average, the percentage of feeding cows during assessed night hours was higher in autumn period, than the summer.

SUPPLEMENT

Tab. 1 Distribution of night feeding in summer period and average daily temperature

Day/hour	1:00	%*	2:00	%	3:00	%	4:00	%	5:00	%
4.7.2009	10	10,2	9	9,18	6	6,12	3	3,06	24	24,48
8.7.2009	9	9,18	9	9,18	3	3,06	1	1,02	12	12,24
9.7.2009	8	8,16	9	9,18	5	5,1	3	3,06	9	9,18
14.7.2009	4	4,08	3	3,06	1	1,02	1	1,02	20	20,4
17.7.2009	5	5,1	3	3,06	1	1,02	4	4,08	11	11,22
14.8.2009	6	6,12	2	2,04	4	4,08	4	4,08	17	17,34
15.8.2009	9	9,18	3	3,06	4	4,08	3	3,06	9	9,18
16.8.2009	4	4,08	4	4,08	3	3,06	1	1,02	20	20,4

*from 98 cows

Tab. 2 Distribution of night feeding in autumn period and average daily temperature

Day/hour	1:00	%*	2:00	%	3:00	%	4:00	%	5:00	%
3.10.2009	12	12,24	10	10,2	4	4,08	3	3,06	11	11,22
4.10.2009	5	5,1	7	7,14	3	3,06	5	5,1	25	25,51
5.10.2009	6	6,12	7	7,14	5	5,1	4	4,08	19	19,38
6.10.2009	9	9,18	3	3,06	1	1,02	4	4,08	15	15,30
7.10.2009	3	3,06	7	7,14	6	6,12	4	4,08	13	13,26
8.10.2009	4	4,08	5	5,1	8	8,16	4	4,08	9	9,18
9.10.2009	6	6,12	8	8,16	8	8,16	6	6,12	20	20,4
10.10.2009	6	6,12	7	7,14	7	7,14	7	7,14	19	19,38

*from 98 cows

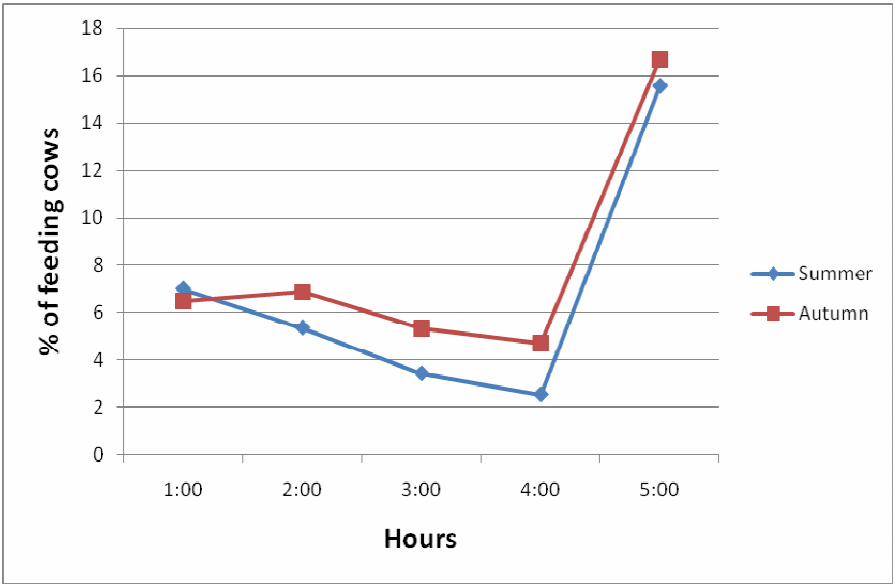
Tab. 3 Differences of night feeding behaviour of summer and autumn period

No.	Hours	01:00	02:00	03:00	04:00	05:00
1.	**p<**	0,712*	0,278	0,104	0,057	0,69
2.	**Av. S**	7,01	5,36	3,44	2,55	15,56
3.	**Av. A**	6,50	6,89	5,36	4,63	16,70
4.	**Dif.***	0,61	-1,53	-1,92	-2,08	-1,14

*S-A: summer – autumn difference

Dif. - Difference between summer and autumn period (columns 2nad 3).

Chart 1 Feeding trends in summer and autumn period in % of cow per hour



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