Study on Resting Behavior in Three Months of Age Calves from Romanian Black and White Breed During Summer Season

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Abstract

The aim of this paper was to measure the main aspects that characterize the resting behavior of three months old calves during the summer season. During the experiments the following resting behavior aspects were determined: number of resting periods, the length of resting periods. Results showed that in the summer season the total length of laying down periods was 254.7minutes in the morning, 237.4 minutes in the afternoon and 334.2 minutes during the night. In the summer season calves stood down in 4.5 periods during the morning, 4.7 periods during the afternoon and 3.8 periods during the night. There were significant differences between morning and night ($p<0.05$) and between afternoon and night ($p<0.05$) for total time spent lying down by calves. In the summer season the total time spent resting (sleep and rest laying down) was 113.4 minutes in the morning, 158.5 minutes in the afternoon and 158.3 minutes during the night. There were significant differences between morning and afternoon ($p<0.05$) and between morning and night ($p<0.01$) for total time spent resting by calves.

Keywords: calves, resting behavior, Romanian Black and White breed.

1. Introduction

In the last years major progresses in video recording devices, the reduced costs for electronic equipment, video cameras and video recorders made possible very precise studies of cattle behavior [1, 2]. Very precise data obtained from those studies were used to develop new and better technologies for cattle [3].

Resting behavior is one of the most important behaviors with a big influence on the animal production. Farmers are interested in having calves that rest as much time as possible [4].

This paper presents a study of resting behavior of calves during summer season.

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2. Materials and methods

Researches were carried out during the summer season in July 2007 at the university research farm, on a number of 10 three-month old calves from Romanian Black and White breed.

Calves were regrouped after weaning and housed in two 4.1 x 5.0 m pens bedded with straw.

The behavior of calves was video recorded for a period of two days.

To record the behavior of calves a surveillance video system was used. The system consisted in 4 CCTV (CC9622BIR) cameras with a 720 x 480 video resolution connected to a PC unit which had the capacity to store images at 125 frames per second. The video system recorded in a digital format and had software that allowed editing the recordings. The video system permitted to record the date and hours in a mode that included minutes and seconds, which helped the timing process.

Calves were fed with 2.0 kg of concentrates mixture and 3 kg of alfalfa hay per head per day.
For a better interpretation the recorded material was divided in three periods for every 24 hours of surveillance: 07:00 to 15:00 (morning), 15:00 to 23:00 (afternoon) and 23:00 to 07:00 (night).
In the processing of recorded data, the resting behavior was observed for calves by counting and timing the periods.

3. Results and discussion

In the summer season the total length of laying down periods was 254.7 minutes in the morning, 237.4 minutes in the afternoon and 334.2 minutes during the night (Table 1).
In the summer season calves stood down in 4.5 periods during the morning, 4.7 periods during the afternoon and 3.8 periods during the night.
The average length of a laying down period was 58.8 minutes in the morning, 51.5 minutes in the afternoon and 89.8 minutes during the night.
In 24 hours calves stood down 826.3 minutes during 13.0 periods with an average length of 64.1 minutes.
There were significant differences between morning and night ($p<0.05$) and between afternoon and night ($p<0.05$) for total time spent lying down.
There were also significant differences between morning and night ($p<0.05$) and between afternoon and night ($p<0.05$) for the length of a laying down period.
There were significant differences between afternoon and night ($p<0.05$) for the number of periods spent lying down.
Calves spent laying down 826.3 minutes representing 57.4% of a day length.
In the summer season the total time spent resting (sleep and rest laying down) was 113.4 minutes in the morning, 158.5 minutes in the afternoon and 158.3 minutes during the night (Table 2 and Figure 1).
There were significant differences between morning and afternoon ($p<0.05$) and between morning and night ($p<0.01$) for total time spent resting by calves.
Calves spent resting (sleep and rest lying down) 430.2 minutes during the summer season, representing 29.9% of a day length.

Table 1. Laying down behavior of three months old calves (daily variation)

Day period		07:00-15:00	15:00-23:00	23:00-07:00	In 24 hours
Laying down periods	X±SEM	4.5±0.31	4.7±0.26	3.8±0.20	13.0±0.54
	SD	0.97	0.82	0.63	1.7
	v%	21.6	15.2	16.6	13.1
	min.	3.0	4.0	3.0	11.0
	max.	6.0	6.0	5.0	16.0
Total length of laying down periods (min.)	X±SEM	254.7±10.8	237.4±14.8	334.2±15.8	826.3±14.5
	SD	34.3	46.7	50.1	45.9
	v%	13.4	19.7	15.0	5.56
	min.	199.0	153.0	281.0	753.0
	max.	312.0	303.0	425.0	900.0
	%*	53.1	49.5	69.6	57.4
Length of a laying down period (min./period)	X±SEM	58.8±3.97	51.5±4.80	89.8±5.37	64.1±2.51
	SD	12.54	15.19	16.99	7.95
	v%	21.3	29. 5	18.9	12.4
	min.	33.2	34.0	60.0	52.9
	max.	71.3	75.9	110.7	75.6
Differences and their significance		I1 - I2	I1 - I3		I2 - I3
Laying down periods		-0.2^{ns}	0.7^{ns}		0.9*
Total length of laying down periods (min.)		17.3^{ns}	-79.5*		-96.8*
Length of a laying down period (min./period)		7.3^{ns}	-31.0*		-38.3*

*-% from possible time (8 or 24 hours)
- I1 – time frame between 07:00-15:00, I2 – time frame between 15:00-23:00, I3 - time frame between 23:00-07:00
- ns = $p>0.05$, * = $p<0.05$, ** = $p<0.01$, *** = $p<0.001$
- positive values are in the advantage of the first compared segment and the negative values are in the advantage of the second segment

Table 2. Resting behavior of three months old calves (daily variation)

Day period		07:00-15:00	15:00-23:00	23:00-07:00	In 24 hours
Total time spent resting (min.)	X±SEM	113.4±6.17	158.5±13.00	158.3±10.90	430.2±22.4
	SD	19.52	41.20	34.50	70.8
	v%	17.22	25.97	21.78	16.45
	min.	74.0	97.0	116.0	314.1
	max.	142.0	214.0	208.0	514.0
	%*	23.6	33.0	33.0	29.9
Differences and their significance		I1 - I2	I1 - I3		I2 - I3
Total time spent resting (min.)		-45.1*	-44.9**		0.2^{ns}

*-% from possible time (8 or 24 hours)
- I1 – time frame between 07:00-15:00, I2 – time frame between 15:00-23:00, I3 - time frame between 23:00-07:00
- ns = p>0.05, * = p<0.05, ** = p<0.01, *** = p<0.001

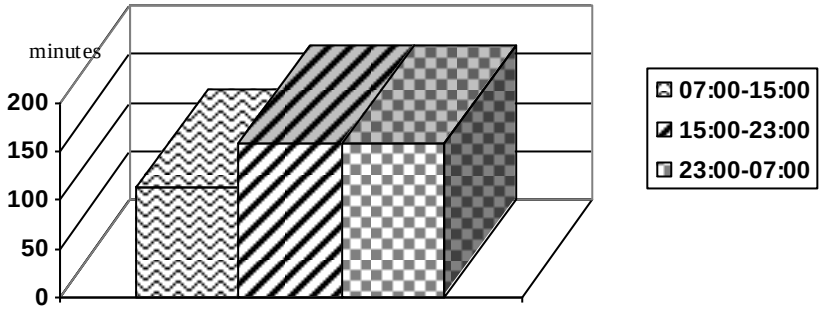

Figure 1. Average values for the time spent resting by calves

4. Conclusions

Calves spent laying down 826.3 minutes representing 57.4% of a day length.
Calves spent resting (sleep and rest lying down) 430.2 minutes during the summer season, representing 29.9% of a day length.
There were significant differences between morning and night (p<0.05) and between afternoon and night (p<0.05) for total time spent lying down.
There were significant differences between morning and afternoon (p<0.05) and between morning and night (p<0.01) for total time spent resting by calves.

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