

Study on Resting Behavior in Six Months of Age Calves from Romanian Black and White Breed During Winter

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Abstract

The aim of this paper was to measure the main aspects that characterize the resting behavior of six months old calves during the winter 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 winter season the total length of laying down periods was 150.6 minutes in the morning, 171.0 minutes in the afternoon and 358.3 minutes during the night. In the winter season calves stood down in 3.2 periods during the morning, 3.0 periods during the afternoon and 3.1 periods during the night. There were very significant differences between morning and afternoon ($p < 0.001$), between morning and night ($p < 0.001$) and between afternoon and night ($p < 0.001$) for total time spent lying down by calves. In the winter season the total time spent resting (sleep and rest laying down) was 46.4 minutes in the morning, 36.3 minutes in the afternoon and 132.7 minutes during the night. The differences between morning and afternoon were not significant ($p > 0.01$), but the differences between morning and night ($p < 0.001$) and between afternoon and night ($p < 0.001$) were very significant 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 video cameras and video recorders made possible very precise studies of cattle behavior [1]. Very precise data obtained from those studies were used to develop new and better rearing 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 [2], [4].

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

2. Materials and methods

Researches were carried out during the winter season in January 2007 at the university research farm, on a number of 10 six-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.

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Calves were fed with 1 kg of concentrates mixture, 10 kg of corn silage 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 winter season the total length of laying down periods was 150.6 minutes in the morning, 171.0 minutes in the afternoon and 358.3 minutes during the night (Table 1).

In the winter season calves stood down in 3.2 periods during the morning, 3.0 periods during the afternoon and 3.1 periods during the night.

The average length of a laying down period was 49.1 minutes in the morning, 57.1 minutes in the afternoon and 119.5 minutes during the night.

In 24 hours calves stood down 679.9 minutes during 9.3 periods with an average length of 73.9 minutes.

There were significant differences between morning and night ($p < 0.001$) and between afternoon and night ($p < 0.001$) for total time spent lying down.

There were also significant differences between morning and night ($p < 0.001$) and between afternoon and night ($p < 0.001$) for the length of a laying down period.

Table 1. Laying down behavior of six 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	3.2±0.29	3.0±0.21	3.1±0.18	9.3±0.37
	SD	0.92	0.67	0.57	1.16
	v%	28.7	22.2	18.3	12.47
Total length of laying down periods (min.)	X±SEM	150.6±8.5	171.0±15.7	358.3±12.1	679.9±26.6
	SD	26.9	49.7	38.3	84.1
	v%	17.9	29.1	10.7	12.37
	%*	31.4	35.6	74.6	47.2
Length of a laying down period (min./period)	X±SEM	49.1±3.25	57.1±3.47	119.5±8.28	73.9±3.61
	SD	10.28	11.0	26.20	11.4
	v%	20.9	19.2	21.9	15.43
Differences and their significance		I1 - I2	I1 - I3	I2 - I3	
Laying down periods		0.2 ^{ns}	0.1 ^{ns}	-0.1 ^{ns}	
Total length of laying down periods (min.)		-20.4 ^{ns}	-207.7***	-187.3***	
Length of a laying down period (min./period)		-8.0 ^{ns}	-70.4***	-62.4***	

*-% 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

- positive values are in the advantage of the first compared segment and the negative values are in the advantage of the second segment

- ns = $p > 0.05$, * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$

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	46.4±4.4	36.3±3.4	132.7±9.1	215.4±11.8
	SD	13.7	10.7	28.9	37.2
	v%	29.7	29.6	21.7	17.3
	%*	9.7	7.6	27.6	15.0
Differences and their significance		I1 - I2	I1 - I3	I2 - I3	
Total time spent resting (min.)		10.1 ^{ns}	-86.3***	-96.4***	

*-% 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 = $p > 0.05$, * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$

There weren't significant differences between day periods for the number of periods spent lying down.

Calves spent laying down 679.9 minutes representing 47.2% of a day length.

In the winter season the total time spent resting (sleep and rest laying down) was 46.4 minutes in the morning, 36.3 minutes in the afternoon and 132.7 minutes during the night (Table 2).

There were very significant differences between morning and night ($p < 0.001$) and between afternoon and night ($p < 0.001$) for total time spent resting by calves.

Calves spent resting (sleep and rest lying down) 215.4 minutes during the winter season, representing 15.0% of a day length.

4. Conclusions

Calves spent laying down 679.9 minutes representing 47.2% of a day length.

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There were significant differences between morning and night ($p < 0.001$) and between afternoon and night ($p < 0.001$) for total time spent lying down.

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