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

Stelian Acatincăi, Iulian Tripon, Ludovic Toma Cziszter, Dinu Gavojdian, Silvia Erina, Simona Baul, George Gabriel Răducan

Banat's University of Agricultural Sciences and Veterinary Medicine, Faculty of Animal Sciences and Biotechnologies, 300645 Timişoara, Calea Aradului, 119, România

Abstract

The aim of this paper was to measure the main aspects that characterize the resting behavior of six 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 77.2 minutes in the morning, 129.4 minutes in the afternoon and 347.5 minutes during the night. In the summer season calves stood down in 1.8 periods during the morning, 3.8 periods during the afternoon and 3.5 periods during the night. There were significant differences between morning and afternoon ($p<0.01$), 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 summer season the total time spent resting (sleep and rest laying down) was 8.8 minutes in the morning, 39.1 minutes in the afternoon and 120.7 minutes 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 resting by calves during the summer season.

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, 2, 3]. Very precise data obtained from those studies were used to develop new and better technologies for cattle [4].

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 [5].

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

* Corresponding author: Stelian Acatincăi, Tel: +0040-256277107, Email: sacatincai@yahoo.com

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 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.

Calves were fed with 2.3 kg of concentrates mixture, 10 kg of fresh grass 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 77.2 minutes in the morning, 129.4 minutes in the afternoon and 347.5 minutes during the night (Table 1).
In the summer season calves stood down in 1.8 periods during the morning, 3.8 periods during the afternoon and 3.5 periods during the night.
The average length of a laying down period was 43.6 minutes in the morning, 34.1 minutes in the afternoon and 101.1 minutes during the night.
In 24 hours calves stood down 554.1 minutes during 9.1 periods with an average length of 61.0 minutes. There were significant differences between morning and afternoon ($p<0.01$), 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 afternoon ($p<0.05$), between morning and night ($p<0.001$) and between afternoon and night ($p<0.001$) for the length of a laying down period.
There were significant differences between morning and afternoon ($p<0.001$) and between morning and night ($p<0.001$) for the number of periods spent lying down.
Calves spent laying down 554.1 minutes representing 38.5% of a day length.
In the summer season the total time spent resting (sleep and rest laying down) was 8.8 minutes in the morning, 39.1 minutes in the afternoon and 120.7 minutes during the night (Table 2 and Figure 1).
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 resting by calves. Calves spent resting (sleep and rest lying down) 168.6 minutes during the summer season, representing 11.7% of a day length.

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	1.8±0.13	3.8±0.13	3.5±0.17	9.1±0.23
	SD	0.42	0.42	0.53	0.74
	v%	23.4	11.1	15.1	8.1
	min.	1.0	3.0	3.0	8.0
	max.	2.0	4.0	4.0	10.0
Total length of laying down periods (min.)	X±SEM	77.2±6.34	129.4±11.80	347.5±8.01	554.1±16.3
	SD	20.0	37.3	25.3	51.5
	v%	26.0	28.8	7.3	9.3
	min.	50.0	86.0	297.0	500.0
	max.	98.0	192.0	381.0	671.0
	%*	16.1	27.0	72.4	38.5
Length of a laying down period (min./period)	X±SEM	43.6±2.53	34.1±2.58	101.1±4.85	61.0±1.46
	SD	8.0	8.1	15.3	4.62
	v%	18.3	23.9	15.1	7.6
	min.	27.5	23.0	82.8	51.2
	max.	51.0	48.0	122.7	67.1
Differences and their significance		I1 - I2	I1 - I3		I2 - I3
Laying down periods		-2.0***	-1.7***		0.3^{ns}
Total length of laying down periods (min.)		-52.2**	-270.3***		-218.1***
Length of a laying down period (min./period)		9.5*	-57.5***		-67.0***

*-% 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	8.8±0.61	39.1±2.68	120.7±10.7	168.6±11.3
	SD	1.93	8.48	33.7	35.7
	v%	22.0	21.7	27.9	21.1
	min.	6.0	27.0	60.0	1169.0
	max.	12.0	48.0	185.0	240.0
	%*	1.8	8.1	25.1	11.7
Differences and their significance		I1 - I2	I1 - I3		I2 - I3
Total time spent resting (min.)		-30.3***	-111.9***		-81.6***

*-% 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

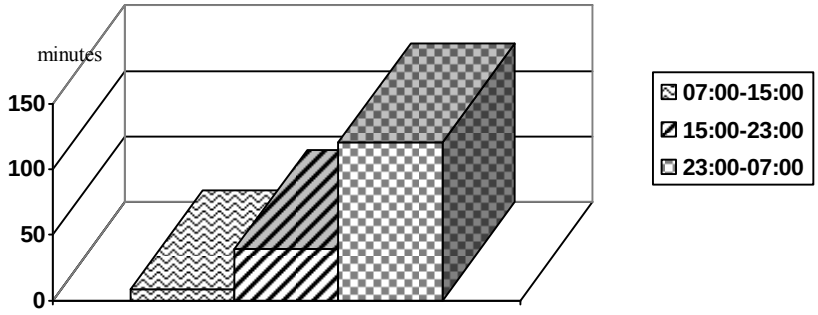

Figure 1. Average values for the time spent resting by calves

4. Conclusions

Calves spent laying down 554.1 minutes representing 38.5% of a day length.
Calves spent resting (sleep and rest lying down) 168.6 minutes during the summer season, representing 11.7% of a day length.
There were significant differences between morning and afternoon ($p<0.01$), between morning and night ($p<0.001$) and between afternoon and night ($p<0.001$) for total time spent lying down.
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 resting by calves.

References

1. Cziszter, L. T., Szucs, E., şi Sossidou, E.,N., Bazele relaţiei dintre bunăstarea animală şi calitatea produsului, Editura Agroprint Timişoara, 2010.
2. Păcală, N., Bencsik. I., Dronca. D., Petroman, I., Petroman, C., Cean, A., Caraba, V. and Boleman, A., Possibilities of reducing the variability of the development stages and the quality variability of the embryos obtained from embryo donor cows, Journal of Food, Agriculture & Environment, 2011, 9(1), 219 – 221, www.world-food.net.
3. Szűcs, E., Konrád, Sz. & Sossidou, E. N., Basics of animal welfare and product quality, Edited by: WELANIMAL Edition, Gödöllő, 2009
4. Acatincăi, S., Etologie. Comportamentul animalelor domestice, Ed. Eurobit, Timişoara. 2003
5. Cean, A., Pacala, N., Boleman, A., Fast freezing of mouse embryos in classic straws with one equilibration step, using two vitrification media, Special Abstracts / Journal of Biotechnology 150S (2010) S1–S576, doi:10.1016/j.jbiotec.2010.08.331