

## RESEARCHES ON FEEDING AND RUMINATION BEHAVIOR IN SIX MONTHS OF AGE ROMANIAN BLACK AND WHITE CALVES

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### Abstract

*The aim of this paper was to measure the main aspects that characterize the feeding and rumination behavior of six months old calves from Romanian Black and White breed. During the experiments the following feeding and rumination behavior aspects were determined: number of feeding periods, the length of feeding periods, number of ruminating periods, and the length of rumination periods. Data was computed using ANOVA/MANOVA. Results showed that calves spent feeding, on average, 212 minutes in the morning, representing 44% of that time period, 175 minutes in the afternoon, respectively 37% of the 8-hour time frame and only 55 minutes during the night (12%). Calves ruminate, on average, more during the night (226 minutes) compared with morning and afternoon (104 and 135 minutes, respectively). The length of a rumination period was between 27 minutes in the morning and 38 minutes during the night. When treated together the length of feeding and rumination behavior had very closed values. Calves spent feeding and ruminating 316 minutes in the morning, 310 minutes in the afternoon and 281 minutes during the night. The total length of feeding and rumination behavior was 907 minutes representing 63% of a day. Calves fed themselves during 11 periods a day and ruminated during 14 periods.*

**Key words:** calves, feeding behavior, rumination behavior, Romanian Black and White breed

### INTRODUCTION

The behavior of young cattle as well as the behavior of all domestic and wild animals is one of the most interesting biological processes that involve a large amount of endogenous and exogenous factors: the nervous system, sense organs and glands with internal secretion, microclimate factors, motivational factors, genetically factors, technological and social factors [2].

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. Very precise data obtained from those studies were used to develop new and better technologies for cattle.

Feeding behavior is one of the most important behaviors with a big influence on the animal production. A long time spent feeding increases the animal production [3].

Rumination behavior is also very important especially for young ruminants.

Farmers are interested in having calves that ruminates as soon as possible [1].

This paper presents a study of feeding and rumination behavior of six months old calves from Romanian Black and White breed

### MATERIALS AND METHODS

Researches were carried out 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 10 kg of corn silage, 1 kg of concentrates mixture and 3 kg of alfaalfa hay per head.

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 feeding and rumination behavior was observed for calves by counting and timing the periods.

Data obtained from this observations was processed with ANOVA/MANOVA.

## RESULTS AND DISCUSSIONS

Feeding behavior of six months old cattle from Romanian Black and White breed is shown in Table 1. The table shows the average indices and dispersion values for the total duration of feeding, number of feeding sequences and the average length of a feeding period.

Calves spent feeding on average 442.1 minutes a day, respectively 211.8 minutes in the morning, 175.3 minutes in the afternoon, and only 55 minutes during the night.

Calves fed themselves during 11.1 feeding periods distributed in 3.9 in the morning, 4.5 in the afternoon and 2.7 during the night. The length of one feeding period was on average 40.5 minutes for 24 hours, respectively 55.8 minutes in the morning, 39.5 minutes in the afternoon and 20.6 minutes during the night.

Table 1.: Feeding behavior in six months old calves (daily variation)

Day period		07:00-15:00	15:00-23:00	23:00-07:00	In 24 hours
Feeding periods	X±SEM	3.9±0.23	4.5±0.27	2.7±0.21	11.1±0.41
	SD	0.74	0.85	0.67	1.29
	v%	18.9	18.9	25.0	11.6
	min.	3.0	3.0	2.0	9.0
	max.	5.0	6.0	4.0	13.0
Total length of feeding periods (min.)	X±SEM	211.8±12.2	175.3±14.1	55.0±4.7	442.1±14.7
	SD	38.7	44.5	14.9	46.4
	v%	18.3	25.4	27.1	10.5
	min.	149.0	89.0	30.0	368.0
	max.	285.0	245.0	71.0	518.0
	%*	44.1	36.5	11.5	30.7
Length of a feeding period (min./period)	X±SEM	55.8±4.2	39.5±3.13	20.6±1.43	40.5±2.42
	SD	13.29	9.89	4.53	7.66
	v%	23.8	25.0	21.9	18.9
	min.	37.3	22.3	14.0	30.7
	max.	76.0	50.8	28.0	51.8

\*-% from possible time (8 or 24 hours)

Table 2 presents the average values for rumination behavior of six months old cattle. Calves ruminate, on average, 464.5 minutes (7 hours and 44.5 minutes) on a day, respectively 32% of a day length.

Calves ruminate more during the night (225.6 minutes) compared with morning and afternoon (104.2 and 134.7 minutes, respectively).

The number of rumination periods increased from 3.8 during the morning, to 4.5 in the afternoon and 5.8 during the night. Calves ruminated during 14.1 periods in 24 hours.

The average length of a rumination period had almost similar values in the morning and afternoon of 27.6 and 30.4 minutes. During the night the average length of a rumination period was bigger 38.5 minutes. In 24 hours the average length of a rumination period was 32.9 minutes.

Behavior that renders consumption and mastication during feeding and rumination in six months old cattle from Romanian Black and White breed is presented in Table 3. Calves allocated to feeding and rumination of feed 906.6 minutes (15 hours and 6.6 minutes) per day.

Table 2.: Rumination behavior in six months old calves (daily variation)

Day period		07:00-15:00	15:00-23:00	23:00-07:00	In 24 hours
Rumination periods	X±SEM	3.8±0.25	4.5±0.22	5.8±0.20	14.1±0.10
	SD	0.79	0.71	0.63	0.32
	v%	20.76	15.71	10.9	2.2
	min.	3.0	4.0	5.0	14.0
	max.	5.0	6.0	7.0	15.0
Total length of ruminating periods (min.)	X±SEM	104.2±8.59	134.7±7.51	225.6±18.3	464.5±16.4
	SD	27.16	23.76	57.9	51.9
	v%	26.1	17.64	25.68	11.2
	min.	72.0	105.0	141.0	343.0
	max.	146.0	180.0	303.0	529.0
	%*	21.7	28.1	47.0	32.3
Length of a ruminating period (min./period)	X±SEM	27.6±1.71	30.4±1.91	38.4±2.09	32.9±1.12
	SD	5.41	6.04	6.61	3.55
	v%	19.6	19.9	17.2	10.79
	min.	18.0	21.6	28.2	24.5
	max.	37.7	40.3	48.3	37.8

\*-% from possible time (8 or 24 hours)

The length of feeding and rumination was 316.0 minutes in the morning, 310.0 minutes during the afternoon and 280.6 minutes during the night.

The number of feeding and rumination periods was 7.7 during the morning, 9.0 in the afternoon and 8.5 during the night. In 24 hours the number of feeding and rumination periods was 25.2.

Table 3.: Consumption and chewing behavior in six months old calves (daily variation)

Day period		07:00-15:00	15:00-23:00	23:00-07:00	In 24 hours
Feeding and rumination periods	X±SEM	7.7±0.40	9.0±0.21	8.5±0.31	25.2±0.39
	SD	1.25	0.67	0.97	1.23
	v%	16.26	7.41	11.43	4.88
	min.	6.0	8.0	7.0	23.0
	max.	9.0	10.0	10.0	27.0
Total length of feeding and ruminating periods (min.)	X±SEM	316.0±11.8	310.0±13.8	280.6±21.2	906.6±26.4
	SD	37.2	43.7	67.2	83.6
	v%	11.8	14.1	24.0	9.2
	min.	243.0	219.0	171.0	720.0
	max.	359.0	360.0	371.0	1007.0
	%*	65.8	64.6	58.5	63.0

\*-% from possible time (8 or 24 hours)

## CONCLUSIONS

Calves spent feeding on average 442.1 minutes a day representing 31% of a day length. Calves fed themselves more in the morning 211.8 minutes and less during the afternoon 175.3 minutes and during the night 55 minutes.

Calves ruminate, on average, 464.5 minutes on a day, respectively 32% of a day length. Calves ruminate more during the night (225.6 minutes) compared with morning and afternoon (104.2 and 134.7 minutes, respectively).

Calves allocated to feeding and rumination of feed 906.6 minutes on a day, respectively 63% of a day.

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