

BEHAVIOURAL INDICATORS IN THE NUTRITION-EXCRETION PROCESS OF THE HOLSTEIN-FRIESIAN CATTLE EXPLOITED AT S.C.D.A. SIMNIC

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Key words: *ruminaton; nutrition; ingestion; defecation; urination.*

ABSTRACT

Within their nutrition process, Holstein-Friesian cattle have an acceptable behaviour: ingestion, rumination, watering, defecation and urination occur more frequently during the day than during the night, which is normal if we consider the fact that most of the food is administered during the day. In terms of duration, the nutrition process, seen from the perspective of the indicators of ingestion, rumination and watering, lasts for 730 minutes, which represents 50,59 % of the 24-hour lapse of time. The frequency and the duration of the rounds of standing up and sitting down highlight, by the results, the fact that Holstein-Friesian cattle are influenced by the stressful factors in their shelter; these stressful factors produce anxiety, perturb the rest and can consequently perturb production as well.

INTRODUCTION

The cattle behaviour during the nutrition process influences significantly the quantity and the quality of the milk production; the repercussions are economical since the forage value is very important to the structure of the milk cost price.

This is why we determined the frequency and the duration of certain nutrition indicators (ingestion, rumination, watering) and we added the main indicators of excretion (defecation and urination). One of the characteristics of exploiting cattle in large farms is the high capacity of accommodating shelters, whose consequence is the risk to disturb a high number of animals whenever a cow moves. This situation is generated, on one hand, by the small rest space and, on the other hand, by the perturbations produced when administering forage and when accomplishing different sanitary-veterinary actions. All these are stressful factors which lead to diminishing the rest time of the animals and of the production as well.

MATERIAL AND METHOD

An important factor in the technology of exploiting dairy cattle is the biological material which populates the farm. This should correspond to the requirements of the exploiting technology, both productively and behaviourally.

The research was accomplished during the years 2014-2015, on a lot of 30 Holstein-Friesian cows within the farm.

The Friesian race is Dutch (from the Eastern Frisia province) and was formed by crossbreeding the old populations of brachycera black and white parti-coloured cattle with primigenius cattle. The resulted biologic material was submitted to an intense selection (starting from the 18th century), in order to produce milk, and starting from 1930, in order to produce meat as well. The improvement means were: breeding as a clean race, by forming numerous lines and families, and guiding the copulation.

The primary data for the frequency and the duration of the rounds within the nutrition-excretion process were collected based on auscultation and the pulse rate, based on timers. In order to establish the other indicators, we used proceedings of directly observing the animals and the timing method.

In order to establish the average values of the observed behavioural characteristics, the primary data have been statistically processed, determining thus the following statistical indicators: average (\bar{X}), variance (s^2), standard deviation of the average (s), variability coefficient ($s\%$) and standard error of the average (sX).

RESULTS AND DISCUSSIONS

1. Frequency of rounds during the nutrition-excretion process

Within 24 hours, the ingestion rounds have an average value of $\bar{X} = 9.35 \pm 0.26$, and within the lapses of time of day and night, their values are $\bar{X} = 6.20 \pm 0.17$ and, respectively, $\bar{X} = 3.15 \pm 0.1$ (chart 1).

From the data analysis, it results that the frequency of the ingestion rounds during the day is almost twice higher than during the night. This situation is fully justified, considering that most of the food is administered during the day.

Within 24 hours, Rumination occurs, in average, with a frequency of 11.73 ± 0.24 . Within the lapses of time, the frequencies are of 7.55 ± 0.19 during the day and of 4.18 ± 0.13 during the night. For rumination, frequency is still higher during the day than during the night, but the percentage difference is between them is smaller.

The animals' watering has an average frequency of $\bar{X} = 8.10 \pm 0.22$ within 24 hours; during the day, its average is $\bar{X} = 5.32 \pm 0.11$ and during the night, $\bar{X} = 2.78 \pm 0.07$. We may see that the frequency differences in watering are in line with those in ingestion, which is actually natural because it is known that watering is tightly connected to eating.

By studying the same behavioural indicators, A. Dumitriu establishes, for the Romanian parti-coloured race and for the crossbreeds of Holstein-Friesian x Romanian parti-coloured, the values of 14.72 and 14.44 for rumination, 8.20 and 8.80 for watering.

Regarding the excretion process, urination occurs, within 24 hours, with an average frequency of $\bar{X} = 8.48 \pm 0.18$. During the day and, respectively, during the night, the average values of the urination frequency are $\bar{X} = 5.36 \pm 0.12$ and $\bar{X} = 3.12 \pm 0.66$. The difference between the lapses of time, which favours the frequency during the day, may be explained by the higher consumption of water during this particular lapse of time, a fact which is also illustrated by the higher frequency of daily watering.

Within 24 hours, defecation has an average frequency of $\bar{X} = 9.59 \pm 0.19$; during the day, its average frequency is $\bar{X} = 6.40 \pm 0.10$ and during the night, $\bar{X} = 3.19 \pm 0.09$.

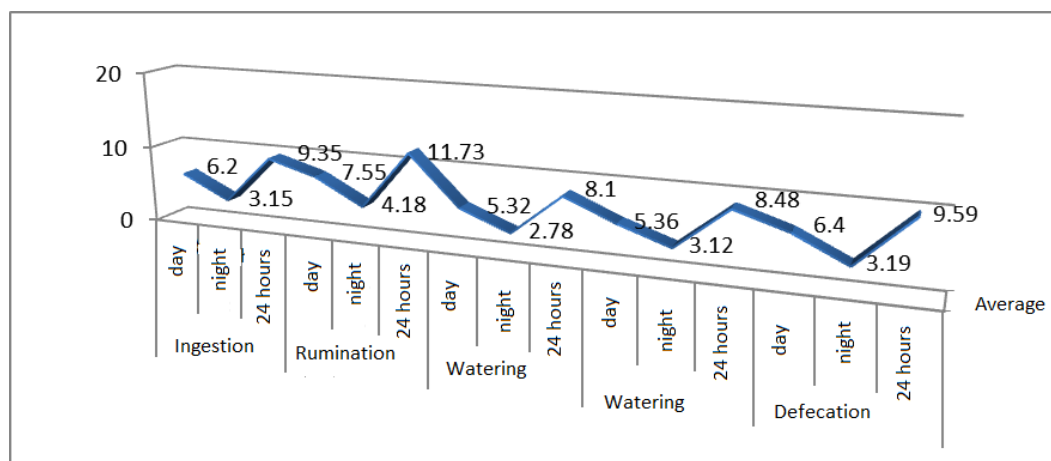


Chart 1. Round frequency during the process of nutrition and excretion

2. Round duration during the nutrition-excretion process

Out of the total 24 hours (1440 minutes), the indicators of the nutrition process have average values lower than $\bar{X} = 295.32 \pm 0.37$ minutes for ingestion (20.50 %), $\bar{X} = 430.54 \pm 9.32$ minutes for rumination (29.89 %) and $\bar{X} = 453.41 \pm 15.21$ seconds for watering (0.29 %). It results that, during the nutrition process, animals consume food, water and ruminate for about 720 minutes, that is 50.59 % of the total 24 hours (table 1 and chart 2).

The differences between the nutrition indicators highlight the fact that the longest duration is spent for rumination which lasts 31.41 % longer than rumination.

The report between the duration of the nutrition indicators during the day and during the night highlights the fact that ingestion, rumination and watering occur during the day in 56-80% of the cases.

Table 1.

Round duration during the process of nutrition and excretion (n = 30 cows)

Specification	Lapse of time	$\bar{X} \pm s_x$	Variability estimations			Safety limits for p = 5 %
			Limits	s	s %	
Ingestion (minutes)	day	230.0 ± 3.39	175 – 256	24.79	10.69	223.36 – 236.64
	night	65.35 ± 2.23	30 – 80	12.21	18.58	60.98 – 69.72
	24 hours	295.35 ± 6.37	205 - 356	36.83	12.47	282.84 – 307.80
Rumination (minutes)	day	275.50 ± 7.33	225 – 310	40.12	14.56	261.14 – 289.86
	night	155.04 ± 4.61	104–224	25.25	16.28	146.01 – 164.07
	24 hours	430.54 ± 9.32	326 - 540	51.03	11.85	412.28 – 448.80
Watering (seconds)	day	290.38 ± 8.06	184 – 402	44.10	15.18	274.59 – 306.17
	night	163.12 ± 5.50	116 – 215	30.11	18.45	152.34 – 173.90
	24 hours	453.41 ± 15.21	299 - 615	83.22	18.35	423.60 – 483.22
Urination (seconds)	day	80.24 ± 2.37	60 – 120	13.01	16.21	75.60 – 84.88
	night	55.13 ± 1.00	37 – 97	5.51	9.99	53.17 – 57.09
	24 hours	135.35 ± 3.73	113 - 223	20.43	15.09	128.04 – 142.66
Defecation (seconds)	day	39.00 ± 0.86	32 – 52	4.75	12.17	37.32 – 40.68
	night	25.45 ± 0.51	15 – 35	2.80	11.00	24.46 – 26.44
	24 hours	64.40 ± 1.70	56 - 76	9.34	14.50	61.07 – 67.73

Regarding the indicators reflecting the excretion process, the data in table 1 highlight the fact that their duration is much shorter compared to the one established for the nutrition indicators. Within 24 hours, defecation and urination last, on the whole, about 200 seconds, that is a little bit longer than 3 minutes, which represents 0.22 %. In this case, the excretion process lasts longer during the day and shorter during the night, as well, in line with the values determined for the frequency indicators of defecation and urination.

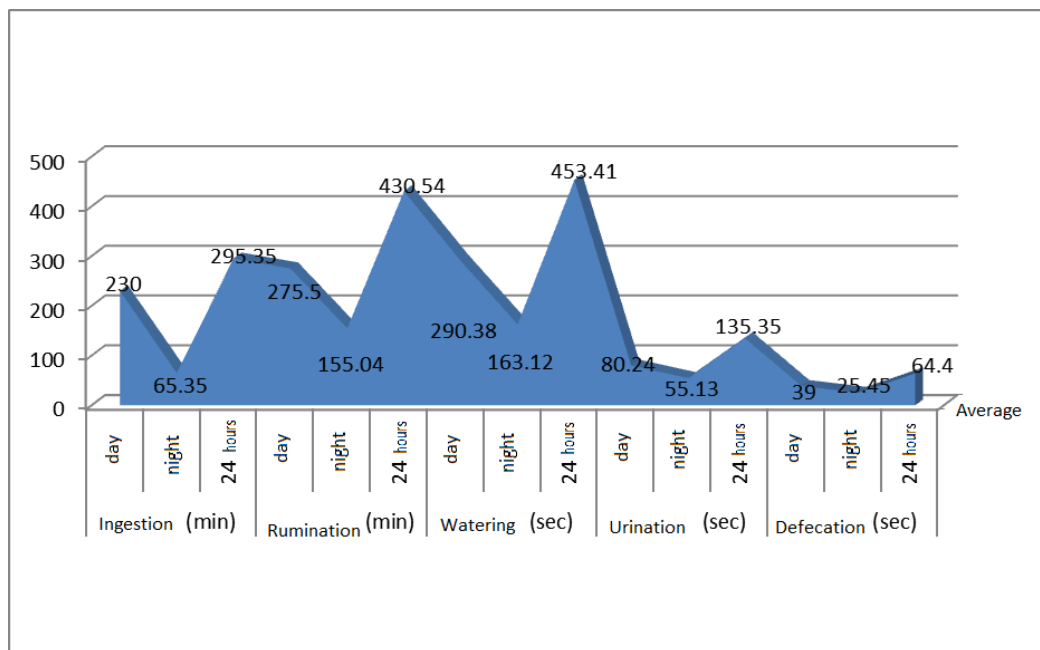


Chart 2. Round duration during the process of nutrition and excretion

CONCLUSIONS

Based on our research and of their results concerning certain behavioural aspects manifested by the Holstein-Friesian cattle from S.C.D.A. Șimnic, we may draw the following conclusions:

1. The frequency and the duration of the rounds of standing up and of sitting down highlight, by means of their values, the fact that Holstein-Friesian cattle are influenced by the stressful factors in the shelter; these stressful factors produce anxiety, perturb the rest and can consequently perturb production as well.
2. During the nutrition process, Holstein-Friesian cattle have acceptable behavior: ingestion, rumination, watering, defecation and urination occur more frequently during the day than during the night; this situation may be regarded as normal if we consider the fact that most of the food is administered during the day.
3. Concerning the duration, the nutrition process, seen by means of the indicators of ingestion, rumination and watering, lasts for 730 minutes on the whole, which is 50.59 % of the total 24 hours.

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