Growth Dynamic and Physiological Status of Calves for Meat Production

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Abstract

Cattles' farming for meat is an activity specific for Romanian animal breeding sector. Generally, beef cattle farmers acquire calves from the local population. The condition and welfare of calves can be determined based on weight gain and haematological indices. The purpose of our research was to determine the growth dynamic of calves subjected to fattening and to determine the physiological status on growth stages, by haematological investigations. Our research was conducted at the SC ITL AGROCOMPLEX farm – Lechința, Bistrița-Năsăud County. Growth indices (TG – total gain; ADG – average daily gain) were determined based on successive measurements and weighing. The physiological status was determined by haematological analyses (WBC, RBC, HGB, HCT, MCV, MCH, MCHC, leukocyte formula). The experiment lasted for 33 days, 10 calves being studied. The initial mean weight was 53.5 ± 0.513 kg, and the final mean weight was 91.7 ± 0.445 kg, resulting a total gain (TG) of 38.2 kg and an average daily gain (ADG) of 1.158 kg/day. Generally, the obtained haematological values showed a gradual improvement of the physiological status of calves. Starting with somewhat higher leukocyte values ($WBC_{initial} = 10.61 \pm 0.329 \times 10^9/L$), their level slowly decreased towards the end of the experiment ($WBC_{final} = 8.92 \pm 0.204 \times 10^9/L$). Regarding other haematological indices, these presented relatively constant values: $RBC_{initial} = 9.44 \pm 0.151 \times 10^{12}/L$ vs. $RBC_{final} = 9.35 \pm 0.114 \times 10^{12}/L$; $HGB_{initial} = 9.92 \pm 0.234$ g/dl vs. $HGB_{final} = 9.24 \pm 0.155$ g/dl; $HCT_{initial} = 30.5 \pm 0.604\%$ vs. $HCT_{final} = 30.15 \pm 0.389\%$. The obtained results show optimum values for growth dynamic. Also, the haematological indices indicate good maintenance, growth and feeding conditions existent in the farm, the indices improving during the experiment.

Keywords: *calves, meat production, growth dynamic, haematology*

INTRODUCTION

Bovine farming for meat represents a good alternative for farmers, considering an overproduction of milk and its decreasing market price. Haematological investigations reveal the physiological status of farm animals (Jackson and Cockcroft, 2002). Depending on the conducted analyses, measures can be taken regarding the feed structure and the quantity of feed that needs to be administrated to the animals, and also the environmental conditions that need to be ensured (Van Saun, 2000). All these lead to a growth dynamic suitable to the proposed objective, in our case this being breeding calves for meat production. The finality of haematological investigations can be found in the economic efficiency of farms.

AIMS AND OBJECTIVES

Our research had the objective of determining the growth dynamic of calves subjected to fattening and determining the physiological status on growth stages, by haematological investigations.

MATERIALS AND METHODS

Our study was conducted in a fattening calves farm from Bistrița-Năsăud County. 10 calves were studied, in terms of the weight gain, within a period of 33 days. Also, haematological indices were determined at the start of the study, after two weeks and at the end of the study. Blood samples were collected from the jugular veins. Calves were acquired from local farmers and weaned and

Tab. 1 Daily forage intake administered to the calves in the first stage of fattening

Forage	Feed ratio		kg/day	DM (kg)	Nutrition units	DCP g	Ca g	P g
	%	kg						
Mixed fodder I*	50.00	0.50	1.00	0.805	1.028	182.98	0.918	4.622
Hay	25.00	0.25	0.50	0.430	0.245	42.00	3.200	0.950
Forage milk powder	25.00	0.25	0.50	-	-	-	-	-
Total ration	100.00	1.00	2.00	1.235	1.273	224.98	4.118	5.572

Note: *(maize, barley, soya bean grist, wheat bran, premix) DM-dry matter; DCP-digestible crude protein

Tab. 2 Daily forage intake administered to the calves in the second stage of fattening

Forage	Feed ratio		kg/day	DM (kg)	Nutrition units	DCP g	Ca g	P g
	%	kg						
Mixed fodder II*	71.43	0.714	5.00	4.007	4.988	741.80	6.138	29.85
Hay	28.57	0.286	2.00	1.720	0.980	168.00	12.80	3.80
Total ration	100.00	1.00	7.00	5.727	5.968	909.80	18.938	33.65

Note: *(maize, barley, soya bean grist, wheat bran, premix) DM-dry matter; DCP-digestible crude protein

Tab. 3 Calves growth indices (TG and ADG) in the 33 experimental days

Measurement sessions	MU	X ± sx	Total gain TG (kg)	Average daily gain ADG (kg/day)
1 (23.02.2016)	kg	53.50 ± 0.513	38.20	1.158
2 (11.03.2016)	kg	72.60 ± 0.508		
3 (25.03.2016)	kg	91.70 ± 0.445		

Tab. 4 Values and variability of the haematological parameters

Specification	MU	Session 1 (n=10)		Session 2 (n=9)		Session 3 (n=10)	
		X ± sx	V%	X ± sx	V%	X ± sx	V%
WBC	x 10 ⁹ /L	10.61±0.329	31.04	8.88±0.151	17.05	8.92±0.204	22.86
LYM	x 10 ⁹ /L	6.4±0.245	38.36	5.9±0.165	27.90	6.06±0.214	35.37
MON	x 10 ⁹ /L	0.22±0.029	129.99	0.1±0.004	37.65	0.16±0.023	146.68
NEU	x 10 ⁹ /L	3.76±0.189	50.24	2.59±0.133	51.53	2.54±0.1	39.55
EOS	x 10 ⁹ /L	0.16±0.009	56.13	0.27±0.015	54.93	0.16±0.007	44.78
BAS	x 10 ⁹ /L	0.01±0.001	105.41	0.01±0.001	75.00	0.01±0	52.70
RBC	x 10 ¹² /L	9.44±0.151	16.02	9.17±0.104	11.30	9.35±0.114	12.14
HGB	g/dl	9.92±0.234	23.59	8.96±0.17	18.96	9.24±0.155	16.74
HCT	%	30.5±0.604	19.81	28.95±0.452	15.61	30.15±0.389	12.90
MCV	fl	32.3±0.263	8.13	29.16±0.69	23.66	32.3±0.17	5.27
MCH	pg	10.42±0.115	11.04	12.22±0.827	67.67	9.84±0.065	6.57
MCHT	g/dl	32.32±0.155	4.79	29.88±0.178	5.95	30.5±0.136	4.45

later fed according to the daily forage intake, as presented in tab. 1 and tab. 2.

Growth indices were determined (TG – total gain; ADG – average daily gain) based on successive measurements and weighting. The physiological status was determined by haematological analyses (WBC, RBC, HGB, HCT, MCV, MCH, MCHC, leukocyte formula).

RESULTS AND DISCUSSION

The growth indices of the calves from the 33 days of experiment are presented in table 3. The mean total gain obtained was 38.20 kg, while the average daily gain was 1.158 kg/day. The mean values and the variability of the haematological parameters of the studied calves are presented in table 4. A gradual decrease in the leukocyte

number can be observed, similarly to the other study (Benesi *et al.*, 2012).

CONCLUSION

Based on the gathered data it is notes a good calf growth dynamic and a gradual, but significant improvement of the physiological status. This demonstrates good growth condition and a good quality of the administered feed.

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