

COMPARATIVE RESEARCH ON PRODUCTIVE PERFORMANCE OF CATTLE BREEDS RAISED IN NORTHEASTERN ROMANIA (BRUNA AND PINZGAU)

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Abstract

The main aim of this study was to compare the milk performance realized by cattle of Bruna and Pinzgau breeds. The analysis was performed in two herds at the first and second lactations. Both breeds were kept in the same conditions and with the same feeding. The first lactation records were analyzed according to the following linear model: $Y_{ij} = \mu + H_i + C_j + e_{ij}$. The second lactation records were analyzed according to the following linear model: $Y_{ijk} = \mu + H_i + C_j + J_k + e_{ijk}$. The analyses of covariances were processed and calculated the production of fat-protein corrected milk (FPCM) and energy content in milk (ECM) according to the following formulae: $FPCM = 0.22M + 7.5F + 15P$, respectively $ECM = 37.68F + 16.75P + 16.54L$. The differences in milk production between Bruna and Pinzgau, at first and second lactations, were not statistically significant. The Bruna breed cattle achieved higher fat, protein and lactose percentage at the first and second lactations. These differences were statistically highly significant ($P < 0.01$). Also, we registered a high value of energy in 1 kg milk of the Bruna breed.

Key words: milk yield, cattle, Bruna and Pinzgau breed, Indigenous condition

INTRODUCTION

In Romania, beginning with 1990, has dramatically decreased the number of cows, but increased the interest of private farmers for the two Romanian breeds. Thus, the subject of this research was to compare the milk yield traits of the cattle of Bruna (B) and Pinzgau (PZ).

MATERIAL AND METHODS

The analysis was performed in two herds. At the first lactation the dairy cows of Bruna breed were compared with contemporaries of Pinzgau breed, calved in the same period. Both breeds were kept in the same stall with the same feeding. Linear models with fixed and random were used for the statistical analysis of milk yield traits data records. First lactation records were analysed according to the following model:

$$Y_{ij} = \mu + H_i + C_j + e_{ij}$$

where,

Y_{ij} : a milk yield observation

μ : an overall mean

H_i : a herd effect

C_j : a cow effect

e_{ij} : a residual error effect, which contains effects of factors that we have not considered in the model

At the second lactation the dairy cows of Bruna breed were compared with contemporaries of the Pinzgau breed. The breeds were kept in two stalls with the same technology. The basic feed ration was the same for both breeds. Second lactations were evaluated according to the following model:

$$Y_{ijk} = \mu + H_i + C_j + J_k + e_{ijk}$$

where,

Y_{ijk} : a milk yield observation

μ : an overall mean

H_i : a herd effect

C_j : a cow effect

J_k : a year of calving effect (the environment is always different each year)

e_{ijk} : a residual error effect

The analyses of co variances were processed and calculated the production of fat-protein corrected milk (FPCM) and energy content in milk (ECM) out of the estimated values of the studied parameters

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according to the following formulae.

$$\text{FPCM} = 0.22M + 7.5F + 15P$$

$$\text{ECM} = 37.68F + 16.75P + 16.54L$$

where:

M - quantity of milk in kg

F - quantity of fat in kg

P - quantity of protein in kg

L - quantity of lactose in kg

RESULTS

Least square mean values of the studied traits in cattle of Bruna and Pinzgau breeds are given in *tables 1 and 2*. Statistically significant differences ($P < 0.01$) were found only with the content and production of fat, lactose content and weight of dairy cows which were better in the Bruna breed. Higher content of proteins in milk was noticed in the Bruna breed however, the difference was not

statistically significant. We noticed a marked increase in yield in the second lactation compared with the first lactation in both breeds. The Bruna dairy cows produced more milk compared with the Pinzgau, however the difference was not statistically significant. Only the differences in lactose percentage in milk and weight after the second calving were statistically significant ($P < 0.01$), which were better in the Bruna breed. The highest milk production was achieved in the Bruna breed in both lactations. The production of fat-protein corrected milk (FPCM) and the energy in milk (ECM) in cattle according to breeds are given in the *graphics 1 and 2*. The highest production of fat-protein was achieved in the Bruna breed. This breed achieved also the highest production of energy in milk.

Table 1 Least square means estimation and standard errors for milk yield traits according to breeds – 1-st lactation

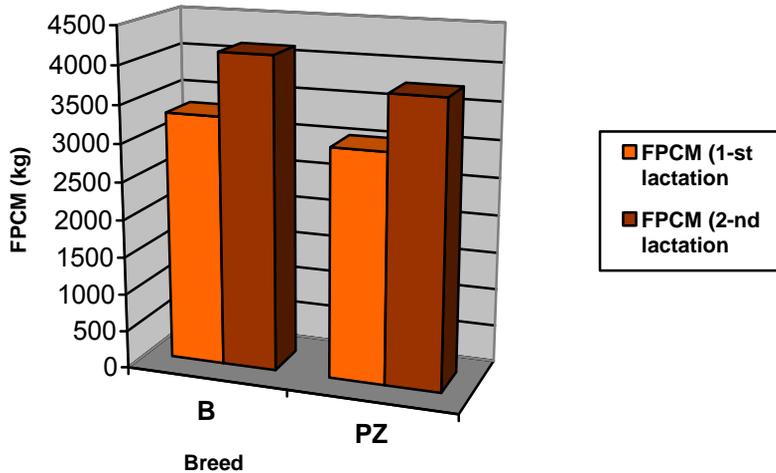
Breed		Bruna n=25	Pinzgau n=25	F value
Trait		$\bar{X} \pm s_{\bar{x}}$	$\bar{X} \pm s_{\bar{x}}$	
Milk	(kg)	3219.61±87.00	3046.09±82.94	1.14-
Fat	(g/100g)	4.32±0.06	3.99±0.10	21.36++
Fat	(kg)	139.06±3.98	121.53±6.99	10.13++
Protein	(g/100g)	3.25±0.02	3.20±0.04	2.70-
Protein	(kg)	104.61±2.63	97.47±4.62	0.36-
Lactose	(g/100g)	4.64±0.02	4.42±0.04	7.26++
Lactose	(kg)	149.36±4.40	134.63±7.73	2.16-
Live weight	(kg)	538.89±1.63	517.87±2.87	43.20++

+ $P < 0.05$; ++ $P < 0.01$

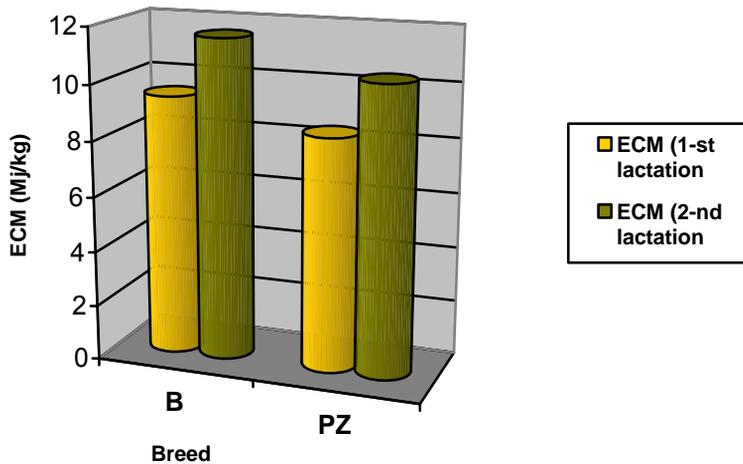
Table 2 Least square means estimation and standard errors for milk yield traits according to breeds – 2-nd lactation

Breed		Bruna n=20	Pinzgau n=20	F value
Trait		$\bar{X} \pm s_{\bar{x}}$	$\bar{X} \pm s_{\bar{x}}$	
Milk	(kg)	3980.36±89.16	3679.85±77.2	2.74-
Fat	(g/100g)	4.16±0.15	4.00±0.00	0.71-
Fat	(kg)	165.57±11.81	147.16±6.31	0.89-
Protein	(g/100g)	3.40±0.06	3.36±0.00	0.37-
Protein	(kg)	135.32±7.85	123.61±4.19	3.49-
Lactose	(g/100g)	4.72±0.04	4.59±0.00	13.45++
Lactose	(kg)	187.85±12.12	168.86±6.48	1.14-
Live weight	(kg)	590.22±3.29	565.58±1.70	17.35++

+ $P < 0.05$; ++ $P < 0.01$



Graphic 1. FPCM at the Bruna (B) and Pinzgau (PZ) at the 1-st and 2-nd lactations



Graphic 2. ECM at the Bruna (B) and Pinzgau (PZ) at the 1-st and 2-nd lactations

DISCUSSION

The cattle of Bruna breed achieved higher milk production than cattle of Pinzgau breed, but these differences, at first and second lactations, were not statistically significant. The Bruna breed cattle achieved higher fat, protein and lactose percentage at the first and second lactations. These differences were statistically highly significant ($P < 0.01$). The high content of lactose in milk of Bruna and Pinzgau breed cows can be evaluated positively, and it can be related to the better

shape of udder. It's necessary to take into account the high value of energy in 1 kg milk of the Bruna breed.

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