Researches Regarding the Effect of Cow Parity on Milk Yield and Milk Quality in Romanian Black and White Breed

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Abstract
Effects of cows age on milk yield fat and protein percentage was studied in Romanian Black and White breed. On average cows produced 5125 kg of milk with 3.87% fat (198.46 kg) and 3.18% proteins (163.48 kg). The highest yield was reached at the third lactation, when cows produced (5705 kg milk, 219.2 kg milk fat, and 184.2 kg proteins). Cows produced with 1052 kg ($p<0.001$) more milk during the third lactation than in the first lactation and 650 kg ($p<0.05$) more milk than in second lactation.

Keywords: fat, milk yield, parity, proteins, Romanian Black and White breed

1. Introduction

Milk production in qualitative and quantitative, is influenced by several factors, acting directly or indirectly on the animal organism. These factors act simultaneously on the milk and the milk quality. Some of them have greater influence on the quantitative and the other part on milk quality [1].
The causes of milk production changes from a wide lactation are multiple, most important being productivity, metabolism intensity, volume and structure of the udder, digestive ability, health, condition of cow at calving, feeding regime before and after calving [2].
Maximum milk production is generally made at different lactation in relation to precocity of the race and degree of improvement.
Romanian Black Spotted breed is a breed specialized for milk production (the improvement is 60% to 40% for milk and meat), maximum lactation is achieved at lactation 3-4 [3].

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The peaking of dairy production at early age is of economic interests together with maintaining the production level as long as possible and a milk production per lactation as close to maximum production [4].

2. Materials and methods

In order to get milk production for Romanian Black Spotted breed, regular checks were made on milk production, determining the quantity of milk;
125 lactations were studied from Romanian Black Spotted breed, born and raised on the University research farm, which gave birth in November 2002 - November 2004, and completed a normal lactation and total to date of October 30, 2005.
In the literature there have been numerous proposals for determining the number of controls, so that animal production estimates have a high probability.
Research for this paper started in November 2002 on the 13th evening and 14 mornings, using the ANARZ technique, sampling in parallel the milk samples from each control and the individual

cows. Data from each control were divided into five classes according to the order lactation, namely: first lactation, second lactation, third lactation, lactation fourth, fifth lactation and over the fifth lactation.

Such data were processed statistically using Microsoft Statistics. They calculated the average and dispersion indices on total lactation and normal lactation and lactation in order of variance analysis using ANOVA/MANOVA, we determined the effects of this factor on the amount of milk control.

3. Results and discussion

Table 1, is rendering the mean values and dispersion indices for total and normal lactation for milk production in relation to lactation order. The average production of cows was quite good ranging from 5125 kg milk per total lactation and 4603 kg milk per normal lactation. The table shows that the maximum yield for both normal and total lactation was reached during the 3-rd lactation (5705.4 kg and 5127.7 kg respectively). The amount of milk gradually increased from lactation 1 to lactation 3 and then began to decline.

Table 1. Average values and dispersion indices for milk quantity on total and normal lactation depending on the lactation order

Lactation order	n	Total lactation			Normal lactation		
		$X \pm S_x$ (kg)	s	Cv (%)	$X \pm S_x$ (kg)	s	Cv (%)
1	37	4652.6±130.03	790.95	17.00	4193.6±107.15	651.75	15,54
2	23	5055.4±218.69	1048.79	20.74	4544.6±178.63	856.70	18.85
3	29	5705.4±162.81	876.74	15.36	5127.7±136.16	733.25	14.30
4	14	5437.9±257.50	963.47	17.71	4908.0±212.50	795.09	16.20
5 and over	22	5028,2±199.32	934.88	18.59	4469.4±168.95	792.47	17.73
Total	125	5125.0±87.39	977.08	19.06	4603.4±71.57	800.17	17.38

Variability of the traits was higher in lactation 2 (20.74% and 18.85% for total lactation and for normal lactation). Lowest coefficient of variation was recorded in lactation 3 (15.36% and 14.30% for total lactation ad for normal lactation).

The smallest amount of milk was recorded in lactation 1 (4652.6 kg and 4193.6 kg for total lactation and for normal lactation).

Table 2, is rendering the mean values and dispersion indices for the amount of fat on total and normal lactation compared with the order of lactation. Lowest amount of fat is found in lactation 1 (179.52 kg to 156.30 kg for total lactation and for normal lactation) and then gradually increase to 3-rd lactation where peaked (219.20 kg to 191.20 kg per total lactation and per normal lactation) and after 3-rd lactation begins to decrease.

Table 2. Average values and dispersion indices for fat quantity on total and normal lactation depending on the lactation order

Lactation order	n	Total lactation			Normal lactation		
		$X \pm S_x$ (kg)	s	Cv (%)	$X \pm S_x$ (kg)	s	Cv (%)
1	37	179.52±8.906	31.343	17.45	156.30±4.020	24.450	15,64
2	23	198.05±11.585	40.236	20.31	172.14±8.535	40.934	23.78
3	29	219.20±6.436	34.660	15.81	191.20±6.032	32.484	16.99
4	14	215.53±8.390	43.349	20.11	188.76±11.687	43.728	23.17
5 and over	22	192.53±5.153	41.774	21.69	171.85±9.451	44.330	25.80
Total	125	198.46±3.559	39.788	20.05	173.68±3.685	41.196	23.72

Variability of the traits was higher in lactation 5 and over (21.69% to 25.80% on total lactation and for normal lactation) and lowest in lactation 3 (15.81% to 16.99% for total lactation and for normal lactation). In Table 3, are rendered the mean and dispersion indices for the amount of protein in milk on total lactation and normal lactation compared with lactation order. The

average amount of protein was 163.48 kg on total lactation and 142.03 kg on normal lactation.
The highest coefficient of variation was achieved in lactation 4 (27.20 for total lactation) and lactation 2 (37.54 for normal lactation) and the lowest value was reached in lactation 1 (17.42% for total lactation) and lactation 4 (19.99% for normal lactation). The lowest amount of protein was recorded in first lactation, both on total lactation and normal lactation, and highest in lactation 4.

Table 3. Average values and dispersion indices for proteins quantity on total and normal lactation depending on the lactation order

Lactation order	n	Total lactation			Normal lactation		
		$X \pm S_x$ (kg)	s	Cv (%)	$X \pm S_x$ (kg)	s	Cv (%)
1	37	148.36±4.248	25.843	17.42	130.28±5.240	31.876	24.47
2	23	160.04±6.825	32.731	20.46	135.46±7.690	36.854	27.20
3	29	184.18±6.098	32.839	17.82	160.83±7.005	37.721	23.45
4	14	177.23±10.666	39.908	22.52	153.49±8.202	30.689	19.99
5 and over	22	156.44±6.660	31.239	19.97	136.56±6.347	29.772	21.80
Total	125	163.48±3.047	34.066	20.84	142.03±4.156	46.469	32.72

4. Conclusions

Milking cows from Romanian Black Spotted breed from University research farm achieved:
- On the total lactation the average production was 5125.0 kg of milk, 198.46 kg of fat with 3.87% fat and 163.48 kg of protein with 3.18% protein
- In normal lactation average milk yield was 4603.4 with 3.78% fat and 173.68 kg fat, 3.18% protein and 142.03 kg protein;
- Maximum milk production in lactation 3 was achieved both on total lactation (5,705.7 kg milk) as well as the normal (5127.7 kg milk). Maximum amounts of fat, protein have been achieved throughout the lactation 3 on total lactation and normal lactation.
- Minimum values for milk production were recorded both in total lactation (4,652.6 kg milk) and the normal lactation (4,193.6 kg milk).
- For the total lactation there were no significant differences ($p<0.001$) between lactation 1 and lactation 3 (-1052.8 kg milk) and significant differences ($p<0.05$) between lactation 2 and 3 (-650 kg milk).
- For normal lactation, the differences are significant ($p<0.05$) both between lactation 1 and 3 (-934.1 kg milk) and between lactation 2 and 3 (-583.1 kg milk).

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