Study Regarding Milk Production and Days in Milk in the Fleckvieh-Type Romanian Spotted Breed from S.C.D.C.B. Arad

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Abstract
The objective of this study was to determine the influence of the lactation rank on the milk production level and total days in milk in the Fleckvieh-type population raised at the Research and Development Station for Bovine Raising - Arad. Researches were carried out on 350 lactations, as follows: 52 first lactations, 66 second lactations, 81 third lactations, 79 fourth lactations, 43 fifth lactations, and 29 sixth lactations. The average lactation was 344.65 days, with the longest lactation the fourth parity (359.31 days), while the shortest was found in the first (331.82 days). The milk production was on average 6035.66 kg with a maximum yield of 6692.81 kg reached in the fourth lactation, and the lowest in the first lactation (5745.86 kg). The first lactation represented 86% of the maximum lactation. There were significant differences for milk production between the first two lactations and lactations 4, 5, and 6, as well as between the fourth lactation and lactations 5 and 6.

Keywords: days in milk, lactation rank, milk production, Romanian Spotted.

1. Introduction

Milk production differs from one lactation to another, being influenced by a series of factors acting directly or indirectly [1, 2]. The genetic potential, metabolic type, udder size and structure, diet, health as well as cow body condition score have a great influence on the milk production.
During the productive life, lactations follow a Gaus-type curve, thus the lowest production is observed in the first lactation [3]. Milk production increases in time, reaching a maximum between the third and fifth lactation, according to the precocity of the cows. After the maximum production is reached a reduction in production is observed. In practice, one would like to attain a production close to maximum and to maintain it as long as possible.

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2. Materials and methods

The study was carried out in the dairy farm of the Research and Development Station for Bovine Raising – Arad on Romanian Spotted cows of Fleckvieh-type. A total of 350 lactations were studied, divided into six groups as follows: 52 first lactations, 66 second lactations, 81 third lactations, 79 fourth lactations, 43 fifth lactations and 29 sixth lactations.
Traits were milk yield per lactations and lactation length.
Data were statistically processed, calculating the average, standard deviation and variability of the traits. Differences according to lactation order were tested using t test.

3. Results and discussion

Table 1 presents averages and dispersion indices for milk production.

Table 1 Average and dispersion indices for milk production according to the lactation order

Lactation	n	x	SD	V%
1	52	5745.86	499.45	8.69
2	66	5821.06	479.06	8.22
3	81	5980.11	470.18	7.86
4	79	6692.81	489.61	7.31
5	43	6166.2	357.93	5.8
6	29	5807.96	342.41	5.89
	350	6035.67	439.77	7.3

According to data presented in Table 1 the lowest milk production was obtained in the first lactation (5745.86 kg), while the highest in the fourth lactation (6692.81 kg). After the fourth lactation the milk production gradually decreased. The first lactation represented 85.85% of the maximum lactation.

Table 2 presents the production differences between lactations, and their statistical significance.

From data presented in Table 2 it is very obvious that the maximum production attained at the fourth lactation was significantly higher both than the production in first three lactations and the production in the fifth and sixth lactations.

Significant differences were observed between almost all lactation studied. The only non-significant differences were between lactation 2 and lactations 1 and 6 and between lactation 3 and lactation 6.

Table 2 Differences and statistical significance for milk production according to the lactation order

Lactation	6	5	4	3	2
1	-62.1***	-420.34***	-946.94***	-234.24**	-75.19^{ns}
2	+13.09^{ns}	-345.14***	-871.75***	-159.05***	-
3	+172.14^{ns}	-186.09**	-712.69***	-	-
4	+884.24***	+526.6***	-	-	-
5	+358.24***	-	-	-	-

These differences could be explained by the fact that the Romanian Spotted breed is a dual-purpose breed, with more emphasis on beef than milk; therefore its precocity for milk production is lower. Milk production is changing from lactation to lactation. Averages and dispersion indices for lactation length according to the lactation order are presented in Table 3.

Table 3 Averages and dispersion indices for lactation length according to lactation order

Lactation	n	x	SD	V%
1	52	331.82	12.49	3.76
2	66	348.62	17.36	4.98
3	81	351.11	21.6	6.15
4	79	359.31	17.26	4.8
5	43	340.83	11.88	3.48
6	29	336.24	12.09	3.5
	350	344.66	15.45	4.45

First lactation was the shortest (331.82 days), while the longest lactation was the fourth (359.31 days, Table 3). First lactation cows had 92.34% days in milk compared to the fourth lactation cows.

Differences and their statistical significance are presented in table 4.

Table 4. Differences and statistical significance for lactation length according to lactation order

Lactation	6	5	4	3	2
1	-4.41ns	-9.01***	-27.48***	-19.28***	-16.79***
2	+12***	+7.78**	-10.69***	-2.48ns	-
3	+14.86***	+10.27**	-8.2**	-	-
4	+23.07***	+18.47***	-	-	-
5	+4.59ns	-	-	-	-

Number of days in milk was significantly higher in the fourth lactation compared to those in the other lactations. Fourth lactation was over 20 days longer than first and sixth lactations (27.48 days and 23.07 days, respectively, $p<0.001$), over 10 days longer than second and fifth lactations (10.69 days and 18.47 days, respectively, $p<0.001$), and 8.2 days longer ($p<0.01$) than the third lactation.

Other significant differences were observed among lactations regarding the days in milk, showing that the precocity of this trait is not that good for this breed.

4. Conclusions

- Milk production presents a Gauss-type shape curve from lactation to lactation, showing an increasing stage, a plateau stage and a decreasing stage.
- The lowest milk production was obtained in the first lactation, being 85.85% of the maximum production recorded at the fourth lactation.
- Significant differences were observed between the most of lactations regarding the milk production.
- Number of days in milk was higher in the fourth lactation, while the lowest value was observed in the first lactation.
- Both milk production and lactation length were significantly influenced by the lactation order.

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