STUDY ON THE PERFORMANCE OF MILK PRODUCTION IN A FARM IN THE DORNELOR BASIN, SUCEAVA COUNTY

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Abstract

This paper aims to highlight the productive performance of cattle, in a dairy farm, located in the Dornelor Basin, Suceava County. This farm belongs to the farmer Popescu Ovidiu, from Coșna locality, Suceava County, who has 53 cows registered in the National Register of Farms. The data taken from the Genealogical Register of the breed from lactation I and II, were statistically processed in the following indicators: age of first calving (days), duration of total lactation (days), milk production at total lactation (kg), percentage and amount of fat at total lactation (kg), percentage and amount of protein at total lactation (kg), duration of normal lactation (days), percentage and amount of fat at normal lactation (kg), percentage and amount of protein at normal lactation (kg), duration of gestation (days), number of calves/gestation, milk production/head/day (kg), calving interval (days). The breeds exploited in this farm are represented by Bălțată Românească and Fleckvieh. In order to highlight the quality of milk obtained from the studied cows, a statistical processing was performed in the following indicators were taken into account: somatic cell number (NCS thousand/ml), fat percentage (%), protein percentage (%), percentage of lactose (%), percentage of urea and milk acidity (ph). From this statistical processing it appears that at the second lactation the milk production is higher compared to the lactation I, as is normal, and the parameters regarding the quality of the milk register values that show us that the milk obtained from the studied cattle is a qualitative milk.

Key words: Dornelor Basin, milk production, family farm

INTRODUCTION

The Dornelor Basin, a mountainous area, attracts the attention of specialists, researchers for studies and analyzes with a tourist, agrotourism potential, high by the varied gastronomy specific to the area, the traditions, culture and hospitality of its inhabitants, but also by cattle raised in the area.

This area has a tradition in raising animals, an activity that justifies the use of pastures and hayfields in the localities of Dornelor Basin, due to the fact that all these localities are at an altitude that argues their belonging to the mountainous area of Romania.

The number of cattle registered at the level of Suceava county represents 5.26% of the total number of cattle registered at national level in 2020, respectively 2,369,930 heads. Compared to 2019, the number of cattle in Suceava County decreased from 128,038 heads to 124,850 heads (ANSVSA-2019,2020). The causes of the reduction of cattle at national level and especially in the mountainous area are multiple and are represented by depopulation of rural areas, aging population, lack of jobs, reduced opportunities for capitalization of milk and beef, insufficient programs for development of areas in terms of agricultural activity, high costs of producing the animal feed base, lack of mechanization of farms, land parcelling and low prices for the sale of milk and beef, prices that do not cover the costs incurred by the farmer on the farm. Regarding the registration of cattle in the Associations that hold the Genealogical Register of Milk or Meat Breeds, lately, it has been found that there is an upward trend, farmers being aware that payments for zootechnical coupled support to cattle for the

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production of milk or beef cattle may offset part of the expenditure incurred on the farm.

MATERIAL AND METHOD

In order to highlight the productive performances obtained at a herd of dairy cows from a farm in the Dornelor Basin, a statistical processing of the raw data taken from the Genealogical Register of the Breed from lactation I and II was performed. This farm belongs to the farmer Popescu Ovidiu, from Coșna locality, Suceava county, who has 53 cows registered in the National Register of Farms, but the statistically processed data come from 12 dairy cows. The indicators studied were the following: age of first calving (days), duration of total lactation (days), milk production at total lactation (kg), percentage and amount of fat at total lactation (kg), percentage and amount of protein at total lactation (kg), duration of normal lactation (days), percentage and amount of fat at normal lactation (kg), percentage and amount of protein at normal lactation (kg), duration of gestation (days), number of mounts / gestation, milk production / head / day (kg), interval between calvings (days). The breeds exploited in this farm are represented by Bălțată Românească and Fleckvieh. In order to highlight the quality of milk obtained from the studied cows, a statistical processing was performed following the indicators: number of somatic cells (thousand NCS / ml), percentage of fat (%), percentage of protein (%), percentage of lactose (%), percentage of urea and milk acidity (ph). The primary data were systematized, processed and interpreted by methods specific to such research (, ± s, s, V%, p significance test, confidence interval). It is recommended that the estimation of a theoretical parameter be done by means of an interval not of a single value. This interval is called the confidence interval. The estimated parameter most likely belongs to the confidence interval. A string of values of an estimator of interest calculated so that for a chosen error probability to include the true values of the variable. The range defined by the critical values will include the population estimator with a probability of 1-α. Also, the data analysis was done in terms of merging and correlating with numerous field observations.

RESULTS AND DISCUSSIONS

The results of the statistical processing in terms of the productive performance of milk production at lactation I in the dairy herd studied are shown in Table 1.

Table 1 Statistics on milk production at lactation I, for the studied cattle herd

Farm	Character	n	$\overline{X}$	$\pm s_{\bar{x}}$	s	V%	Minim	Maxim
Popescu Ovidiu	Age of first calving (days	10	833.50	39.511	124.946	14.990	665.00	1030.
	Duration of total lactation (days)	12	346.92	11.398	39.484	11.381	296.00	421.00
	Production of milk (kg)	12	**5155**	248.755	861.712	16.715	**3707**	**6813**
	Fat (%)	10	**4.20**	0.180	0.569	13.523	**3.59**	**5.00**
	Fat (kg)	10	230.46	34.510	109.132	47.354	3.57	383.00
	Protein (%)	10	**3.44**	0.045	0.141	4.109	**3.14**	**3.66**
	Protein (kg)	10	212.90	11.268	35.632	16.737	170.00	261.00
	Duration of normal lactation (days)	10	303.90	1.100	3.479	1.145	294.00	305.00
	Production of milk (kg)	10	**5104**	135.961	429.948	8.423	**4380**	**6023**
	Fat (%)	10	**4.17**	0.182	0.575	13.781	**3.54**	**5.51**
	Fat (kg)	10	210.50	8.831	27.925	13.266	179.00	250.00
	Protein %)	10	**3.36**	0.040	0.128	3.809	**3.13**	**3.51**
	Protein (kg)	10	189.20	10.360	32.761	17.316	156.00	243.00
	Duration of gestation (days)	12	274.42	5.190	17.977	6.551	246.00	302.00
	Number of calves/gestation	12	1.07	0.047	0.161	15.134	1.00	1.50
	Production of milk (kg/ zi)	12	**14.57**	0.599	2.074	14.241	**10.31**	**16.80**

At the farmer Popescu Ovidiu, 12 dairy cows from the Bălțată Românească and Fleckvieh breeds were studied, and the following characters were studied: age of first calving (days), duration of total lactation (days), milk production at total lactation (kg), percentage and amount of fat at total lactation (kg), percentage and amount of protein at total lactation (kg), duration of normal lactation (days), percentage and amount of fat at normal lactation (kg), percentage and amount of protein at normal lactation (kg), duration of gestation (days), number of mounts / gestation, milk production /head/day (kg), interval between calvings (days) (table 1). The first character studied is represented by the age of the first calving which varied between 665 days and 1030 days with a statistical average of 833 ± 39,511 days, the coefficient of variability being 14.99%. The duration of total lactation registers a statistical average of 346.92 ± 11,398 days, with variations between 296 days being the minimum value and 421 days being the maximum value (table 1). The milk production obtained on the total lactation from the studied cows amounted to 5155 ± 248,755 kg, being the statistical average registered, with values between 3707.00 kg and 6813.00 kg milk. The percentage of total fat lactation varied between 3.59 and 5.00%, with a statistical average of 4.20%. The percentage of total protein lactation recorded a statistical average of 3.44 ± 0.045% with variations between 3.14 and 3.66% (table 1). At the normal lactation, its duration recorded a statistical average of 303 ± 1,100 days, the coefficient of variability being very small, respectively 1.14%. Milk production at normal lactation was 5104 ± 135,961 kg, with variations between 4380 kg milk and 6023 kg (table 1). The percentage of fat at normal lactation varied between 3.54% and 5.51% with a statistical average of 4.17%. Regarding the percentage of milk protein obtained from the studied cattle, it varied between 3.13% and 3.51% with a statistical average of 3.36 ± 0.040% (table 1). The gestation duration in the studied cows varied between 246 kg and 302 kg, with a statistical average of 274.42 ± 5,190 days. Another indicator analyzed is the number of calves/gestation which recorded a statistical average of 1.07 ranging between 1.00 and 1.50 calves /calving. A quantitative indicator of milk production is represented by milk production/cow's head which amounted to 14.57 ± 0.599 kg, with variations between 10.31 kg and 18.80 kg, the coefficient of variability being v = 14.24 % (table 1).

The data from the second lactation, coming from the 12 heads of dairy cows from the Popescu Ovidiu farm, were statistically processed and are represented in table 2. The duration of total lactation at the second lactation recorded a statistical average of 411, 50 ± 56,632 kg, with variations between 252 and 801 days, the coefficient of variability being 47.67%. It can be seen that the total milk production at the second lactation recorded a statistical average of 6383 ± 225,876 kg, with variations between 5320 kg and 8087 kg, the coefficient of variability being 12% (table 2). Regarding the percentage of milk fat at total lactation at lactation II, it amounted to 4.64 ± 0.109% statistical average, with a minimum value of 3.96% and 5.22% maximum value. The percentage of milk protein at total lactation, at the second lactation, varied between the minimum limit of 3.29% and 3.50%, with a statistical average of 3.42 ± 0.020% (table 2). Milk production on normal lactation, at the second lactation, amounted to 5388 kg ± 134,348 kg, with variations between 4794 kg and 6311 kg. The fat percentage of milk at normal lactation at lactation II, recorded a statistical average of 4.36 ± 0.074%, with limits between 3.96% and 4.70% (table 2). Regarding the percentage of milk protein obtained from the cows studied from the analyzed farm, it recorded a statistical average of 3.47 ± 0.116%, the minimum value being 3.16% and the maximum value 4.35% (table 2).

Table 2 Statistics on milk production at lactation II, for the studied cattle herd

Farm	Character	n	$\overline{X}$	$\pm s_{\bar{x}}$	s	V%	Minim	Maxim
Popescu Ovidiu	Total lactation (days)	12	411.50	56.632	196.1	47.674	252	801
	Production of milk (kg)	12	6383	225.8	782.4	12.257	5320	8087
	Fat (%)	12	4.64	0.109	0.376	8.105	3.96	5.22
	Fat (kg)	12	299.33	13.350	46.247	15.450	249	423
	Protein (%)	12	3.42	0.020	0.070	2.054	3.29	3.50
	Protein (kg)	12	222.00	6.113	21.175	9.538	200.00	273.00
	Normal lactation (days)	12	304.08	0.917	3.175	1.044	294.00	305.00
	Production of milk (kg)	12	5388.25	134.34	465.3	8.637	4794.0	6311.0
	Fat (%)	12	4.36	0.074	0.256	5.876	3.96	4.70
	Fat (kg)	12	225.42	3.621	12.544	5.565	215.00	250.00
	Protein (%)	12	3.47	0.116	0.400	11.519	3.16	4.35
	Protein (kg)	12	192.42	7.947	27.530	14.307	163.00	226.00

If we analyze these data we can see that the milk production at total lactation on the second lactation is higher than the milk production at total lactation, at lactation I, increasing from 5155kg to 6383 kg and at normal lactation at lactation I the production of milk increases from 5104 kg to 5388 kg at the second lactation, as is normal.

If we analyze the milk production obtained from the cows studied, from a qualitative point of view, we will take into analysis the following indicators: number of somatic cells (thousands of NCS / ml), percentage of fat (%), percentage of protein (%), percentage of lactose (%), percentage of urea, percentage of casein and milk acidity (pH) (Table 3).

Table 3 Milk production quality statistics for studied dairy cows

Farm	Character	n	$\overline{X}$	$\pm s_{\bar{x}}$	s	V%	Minim	Maxim
Popescu Ovidiu	NCS (mii/ml)	12	90.92	2.580	8.939	9.832	79.00	112.00
	Grăsime (%)	12	4.14	0.155	0.539	13.000	3.59	5.00
	Proteină (%)	12	3.40	0.047	0.163	4.809	3.12	3.66
	Lactoză (%)	12	4.63	0.090	0.313	6.747	4.12	5.12
	Uree (%)	12	31.42	0.783	2.712	8.633	28.00	36.00
	Cazeină (%)	12	26.25	0.401	1.390	5.295	24.50	29.00
	PH (%)	12	6.71	0.020	0.069	1.034	6.56	6.78
	Lapte/ zi (kg)	12	14.57	0.599	2.074	14.241	10.31	16.80

In table 3 are represented the statistics of milk production quality in the studied cattle herd, respectively statistically processed data from 12 dairy cows. The first indicator studied is the number of somatic cells in milk from cows from the Popescu Ovidiu farm, which records a statistical average of 90.92 ± 2,580 thousand / ml milk, with variations between 79 thousand / ml and 112 thousand / ml, framing is in the European Standard of

maximum 400 thousand somatic cells / ml milk. The fat percentage of milk obtained from the studied cattle varied between 3.59% and 5%, with a statistical average of 4.14 ± 0.155%. The coefficient of variability recorded in the fat percentage of milk is 13%. The percentage of milk protein recorded a statistical average of 3.40 ± 0.047%. Regarding the lactose content of milk, values of 4.12% minimum value and 5.12% maximum value are registered, with a statistical average of 4.63%. The urea content of milk achieved a statistical average of 31.42 ± 0.783, and the values varied between 28% and 36%. The casein content of milk is another indicator studied which records a statistical average of 26.25 ± 0.401%, the minimum limit being 24.50% and the maximum value 29%. The acidity of milk obtained from the cows studied recorded values between 6.56% and 6.76%, with a statistical average of 6.71 ± 0.020%. Finally, the last indicator studied is the production of milk / head / day which achieved a statistical average of 14.57 ± 0.599 kg of milk, the coefficient of variability being 14.24%.

Figure 1 shows the variation of milk production at total and normal lactation at lactation I and II. It can be seen that milk production at total lactation at lactation II is higher compared to milk production at total lactation at lactation I, respectively 5135 kg milk at L1 compared to 6383 kg milk at L2 (figure 1). With regard to milk production at normal lactation, it can be seen that at lactation II it is higher than at lactation I, respectively 5388 kg of milk compared to 5104 kg of milk (figure 1).

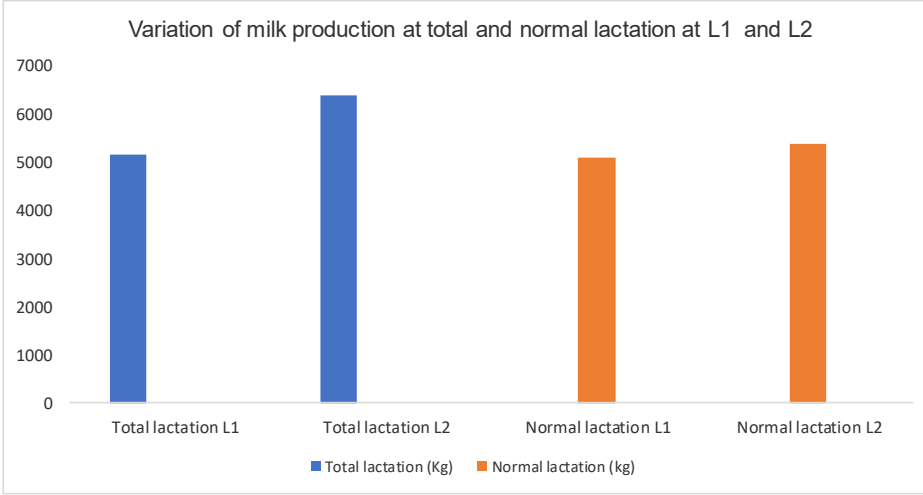

Figure 1. Variation of milk production at total and normal lactation at L_1 and L_2

The variation of the percentage of fat and protein at total and normal lactation at lactation I and II are represented in figure 2. Thus, the percentage of fat of milk obtained from the studied cattle is higher at the second normal and total lactation, respectively 4.64% and 4.36% than at the total and normal second lactation, is 4.20% and 4.17%. There were also variations in the proportion of protein recorded in total and normal lactation in lactation II, so we have 3.42% in total lactation 1 and 3.44% in lactation II total. At the total normal lactation, a percentage of 3.36 protein was obtained for the analyzed milk and 3.47% for the normal second lactation.

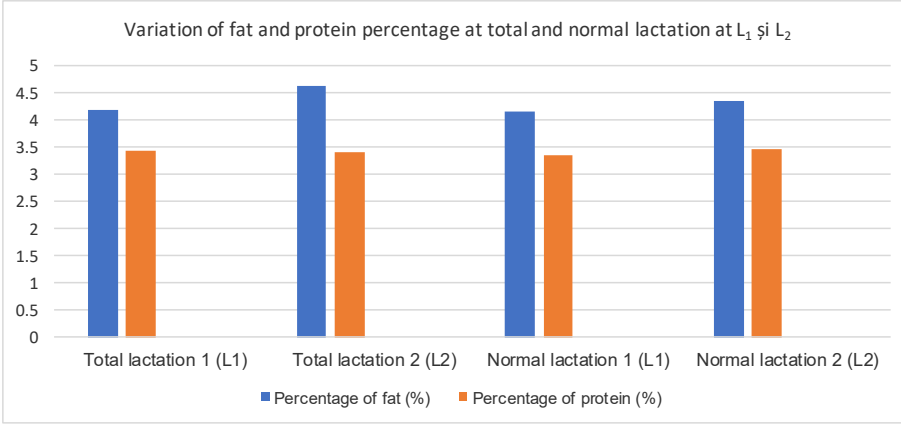

Figure 2 Variation of fat and protein percentage at total and normal lactation at L_1 and L_2

CONCLUSIONS

The following conclusions can be drawn from the analyzed data:

1. The farm under study (Popescu Ovidiu) is a family farm that exploits dairy cows of the Bălțată Românească breed and the Fleckvieh breed;

2. The results obtained from the analyzes performed on the milk production of the studied cows show that the milk production at lactation II is higher than at lactation I, both at total lactation and at normal lactation;

3. The analysis of the parameters that highlight the quality of milk obtained from the cows studied shows a variation in the proportion of fat and protein in both normal lactation and total lactation at L1 and L2, values that increase at lactation a-II- compared to lactation I;

4. The milk obtained from the studied cattle is a quality milk, which falls within the quality standards of milk.

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