RESEARCH ON THE INFLUENCE OF REPRODUCTIVE INDICES ON MILK PRODUCTION FROM A CATTLE FARM IN THE MOUNTAIN AREA OF ROMANIA

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Abstract

The paper proposes an analysis on the influence of reproduction indicators on quantitative and qualitative milk production, obtained in a cattle farm in the mountainous area of Romania. The farm is located in the Dornelor Basin, Suceava County, with a herd of 20 cattle heads for Bălţată Românească, of which only 13 heads are registered in the Genealogical Register, benefiting from payments for the coupled support. In this sense, the following reproduction indicators were statistically processed: the age of the first calving, the service period, the calving interval and the number of calving / calving. The quantitative and qualitative indicators on milk production were also analysed: duration of lactation, total milk production, daily milk/head production, % fat and% protein. From the statistically processed data it appears that the age of the first calving influences the total milk production, this registering values between 4821 liters/head and 8468 liters/head with a daily production between 12 and 23liters milk /head.

Key words: reproduction indicators, milk quality, cattle, mountain area, Romania

INTRODUCTION

Mountain areas are an environment with specific features. Compared to other rural areas, mountain areas face special challenges and have special needs. In the context of the current agricultural policy of the European Union (EU), they are included under the name of disadvantaged areas, as they are generally characterized either by a low growing season (due to high altitude) or by steep slopes, even if they are located at a lower height, either by a combination of these two features. These conditions pose problems for agriculture and for the rural economy of these regions [5]. Ensuring the means for the balanced development of mountain resources, on a par with other areas in Romania and the EU, in terms of income and living conditions, must benefit from intense preventive and efficient support from the state. Mountain areas must benefit from a specific policy defined according to the principles of sustainable development, which

ensures the needs of the present without compromising the chances of future generations. Also, the strategic orientations aim at reducing the imbalance between the most favoured and the disadvantaged mountain regions, marked by permanent natural constraints, aiming at the whole economic, social, cultural and environmental issues. Mountain policies must facilitate inter-municipal and inter-regional cooperation within the national framework, cross-border and trans-national cooperation [8]. Cattle breeding is an intensive branch of agricultural production, a means of capitalizing on feed resources and ensuring the essential means of subsistence necessary for man [1]. Thus, cattle provide 95% of the amount of milk consumed worldwide, 30-35% of meat and about 90% of all heavy hides processed in the world tannery [4].

MATERIAL AND METHOD

In order to highlight the influence of reproduction indices on the quality and quantity of cattle milk, a dairy farm was studied, located in Dornelor Basin, Suceava County, which has a herd of 20 dairy cows from the Bălţată Românească breed, of which

only 13 heads are registered in the Genealogical Register [9] and benefit from payments for coupled support. The quantitative and qualitative indicators on milk production were also analysed: duration of lactation, total milk production, daily milk / head production % fat and% protein. The primary data were systematized, processed and interpreted by methods specific to such research ($\overline{X}$, ± 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

Reproductive performance affects profit of dairy herds because it directly affects milk produced per cow per day, number of replacements produced, and rates of voluntary and involuntary culling [2]. The reproduction indices registered in the farm under study can be observed in table 1 and are represented by the age of the first calving, service period, calving interval and the number of mounts /calving.

Table 1 Reproductive indices recorded in the cattle studied

Current number	Specification/ Animal code	Reproductive indices			
		The age of the first calving (days)	Service period (days)	Calving Interval (days)	Number of mounts/calving
1.	RO501003755767	930	85	370	1.000
2.	RO507003808155	790	86	371	1.500
3.	RO505004747091	635	89	375	1.000
4.	RO505005666386	665	90	376	1.000
5	RO503001473656	730	87	373	1.500
6.	RO501001473663	730	90	376	1.500
7.	RO507002833158	1030	88	374	1.500
8.	RO505003383106	1000	87	373	1.500
9.	RO509002281340	1030	92	381	1.500
10.	RO504005478986	820	87	380	1.000
11.	RO505005478989	790	85	370	1.000
12.	RO500004788404	730	88	374	1.000
13.	RO507004788405	730	90	376	2.000

When calculating the arithmetic mean, the following results were obtained: for the age at first calving we have an average of 816 days, service period 87 days, calving interval 375 days and 1.3 mounts / calving (table 1 and figure 1). The age of the first calving influences the total milk / cow production. Breeding activity on a cow farm must and can be monitored on a monthly basis by estimating three very important breeding indicators, namely:

1. The fertility rate (F%) which represents the number of cows left pregnant from the total number of cows sown for the first time after calving and which, normally, must be between 60 - 70%.

2. The sowing index (Ig) which represents the number of sowings performed to obtain a gestation; this indicator is inversely proportional to the fertility index: the higher the fertility on a farm, the less sowing is used to obtain a gestation. This index should normally be between 1.5 - 2 I.A./pregnancy.

3. Service period (SP) means the calving interval to mating or fertile sowing; this interval should normally be between 75 and 95 days.

The duration of the "service period" has an influence on milk production over the entire period of operation. The sexual rest of the cows must be of 60-90 days, because the early sowings after calving, as well as the late ones, lead to the decrease of the productive level at the future lactations.

The duration of "calving – interval" influences both the level and the rhythmicity of milk production.

A calving interval more than 12 months leads to a decrease in the amount of milk for life. Regarding the quality parameters recorded in the cattle studied, it can be seen that the milk production / head of the animal differs from one animal to another, being between 12 and 23 liters / head, the average being 15.2 liters (table 2 and figure 4). The fat percentage was between 3.5% and 5.44%

with an average of 4.51% (figure 3). The percentage of milk protein ranged from 3.22% to 4.52%, with an average of 3.57%. Total milk production ranged from 4821 liters to 8468 liters (Table 2 and figure 2). The quality of the milk is influenced by a series of factors that depend on the potential of the animal, on the maintenance conditions (shelter, microclimate, feed, watering), as well as on the hygiene ensured during milking and after milking. The number of somatic cells (NCS) in milk, indicates to the farmer the state of health of the cow's udder and the total number of germs (NTG) gives us indications about the way the cows are milked and especially how the milking utensils are hygienically maintained, as well as at what temperature the milk is stored after milking.

Table 2 Quality parameters recorded in the cattle studied

| Current number	Specification/Animal code	Duration of lactation (days)	Milk production (kg)	Fat (%)	Protein (%)	Amount milk / day (kg)
1.	RO501003755767	448	6101	4.580	3.440	13.00
2.	RO507003808155	287	7986	4.680	3.630	12.00
3.	RO505004747091	472	6782	4.250	3.290	15.00
4.	RO505005666386	700	7299	4.260	3.740	12.00
5.	RO503001473656	277	8086	3.520	3.220	12.00
6.	RO501001473663	293	6310	3.950	3.550	21.00
7.	RO507002833158	407	4821	4.520	4.520	15.00
8.	RO505003383106	251	7642	5.010	3.400	12.00
9.	RO509002281340	273	5422	4.400	3.480	19.00
10.	RO504005478986	273	6459	4.460	3.400	23.00
11.	RO505005478989	285	5836	4.910	3.430	20.00
12.	RO500004788404	700	8243	4.710	3.620	12.00
13.	RO507004788405	700	8468	5.440	3.710	12.00
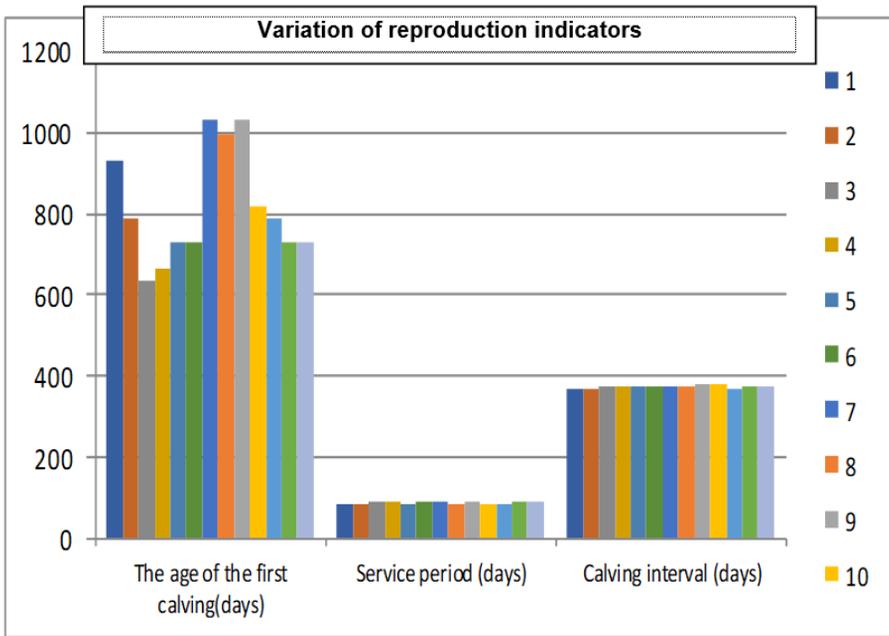
Fig. 1 Variation of reproduction indicators
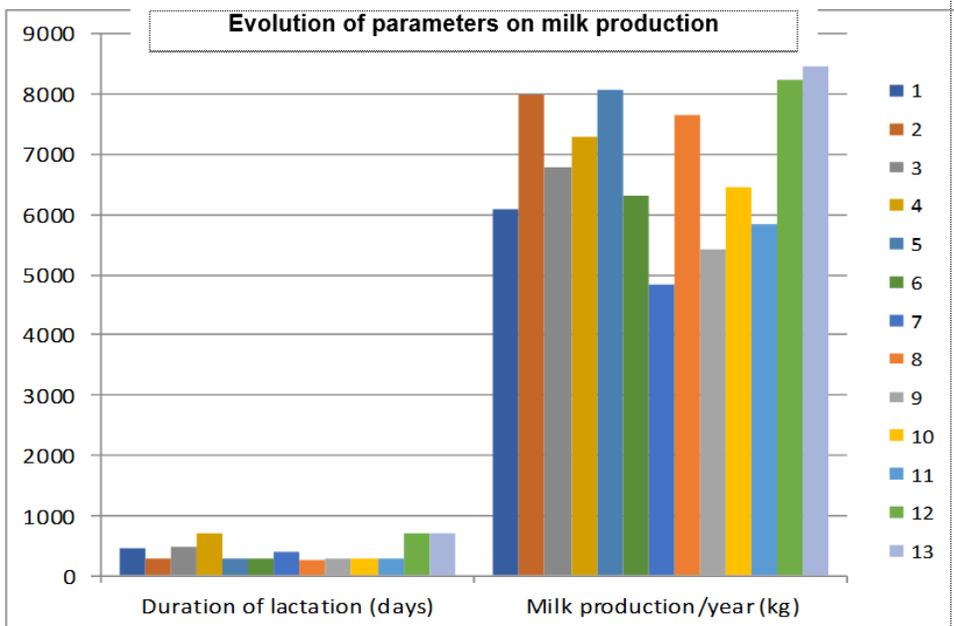Note: 1-10 represent animal cod

Fig. 2 Evolution of parameters on milk production
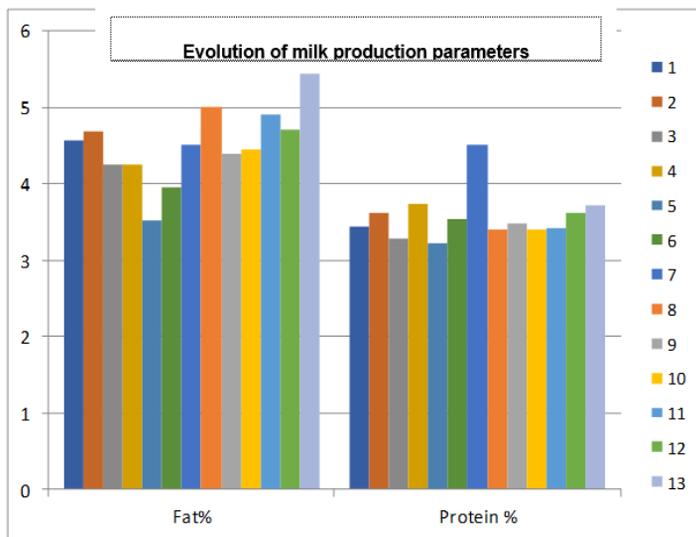Note: 1-13 represent animal code

Fig. 3 Evolution of milk production parameters
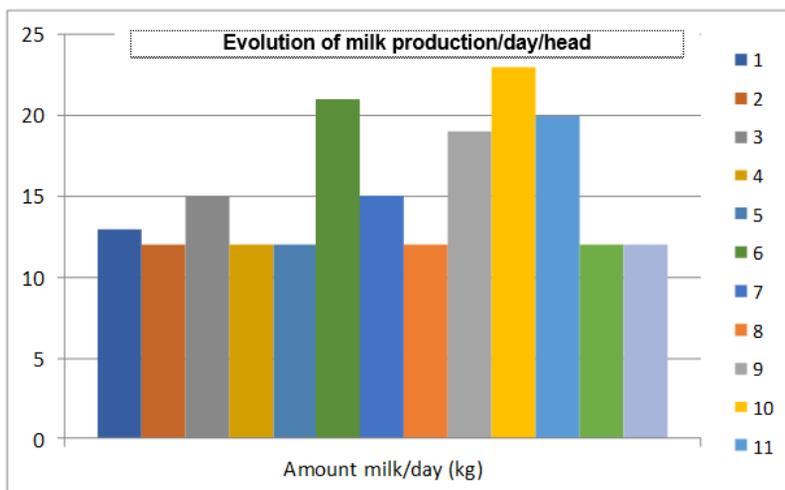Note: 1-13 represent animal code

Fig. 4 Evolution of milk production /day /head
Note: 1-11 represent animal code

The analysis of the reproduction indices presented in table 1, shows that the values recorded at calving interval, service period, number of mounts / calving are within normal limits, only the indicator of the age of the first calving can be improved by applying profitable breeding practices and programs. One of the modern practices for profit in cattle is the extension of the biotechnology of artificial insemination by using material from bulls with superior breeding value in the direction of milk and meat production [6]. The values of these indicators positively or negatively influence the milk production of the animals. Operating technologies have remained largely traditional, but with the frequent use of livestock effluent storage facilities, so that greenhouse gases from these

sources have not exceeded the permitted limits [7]. Regarding the welfare of cattle that is being talked about more and more in the E.U. and which ultimately determines the level and quality of production, farmers know and want to implement the five fundamental freedoms: freedom from discomfort - animals must have an adequate living environment, which includes a shelter and a comfortable area of rest; freedom to express their natural behaviour - animals must be given sufficient space and the company of animals of the same species; freedom from hunger and thirst - animals must have unlimited access to fresh water and adequate food to maintain their health; freedom from fear and stress - animals must be treated in a way that does not cause them mental suffering; freedom from pain and disease - animals must be provided with a rapid diagnosis and appropriate treatment [3].

CONCLUSIONS

1. The farm under study is a family farm, with 20 dairy cows belonging to the Bălțată Românească breed, located in the mountain area, respectively the Dornelor Basin, Suceava County;

2. Of the 20 head of cattle, only 13 head of dairy cows are registered in the Genealogical Register.

3. The reproduction indices analysed in the herd of cattle registered in the Genealogical Register show variations in terms of age at the first calving between 635-1030 days, with an average of 816 days, service - the period recorded an average of 87 days, calving - the interval registered values of 375 days, and the disassembly / calving number registered a value of 1.3.

4. Milk production recorded values between 4821 liters and 8468 liters, with a daily production recorded between 12 liters and 23 liters / day / head.

5. The milk harvested from the bulls studied showed values of the percentage of fat between 3.52% and 5.44% with an average of 4.51%, and the percentage of protein varied between 3.22% - 4.52%, with an average of 3.57%.

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