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THE INFLUENCE OF LACTATION ON THE MILK YIELD OF ESTONIAN RED AND MOLDAVIAN BLACK SPOTTED CATTLE BREEDS

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Abstract

The research was focused on the influence of lactation on the milk yield in terms of quantity and quality, as well as on the speed of milking and total content of fat and protein in the milk of Estonian Red and Moldavian Black Spotted cattle breeds in the first and third lactation. The researches were conducted in the cattle breeding farm of the Experimental Technological Station „Maximovca" and in the laboratory of Cattle Breeding and Exploitation of the Scientific and Practical Institute of Biotechnology in Animal Husbandry and Veterinary Medicine. We studied the following indices: milk yield by performing control milking, assessment of fat, protein and lactose content and milk density by laboratory analysis of the milk, milking speed, the amount of total fat and total protein.

***Key words**: Analysis, Cattle, Milking speed, Quality, Total fat, Total protein.*

INTRODUCTION

Cattle breeding is an ancient occupation, which today has become a representative one, as it allows to obtain a variety of products - milk, meat, leather, biomass, etc. At present, high yields of milk obtained from cattle, with a high content of fat, protein and lactose represent the result of human labour. The specialists in selective breeding have worked for centuries with local, moderately productive, cattle creating specialized dairy breeds as Holstein breeds. Taking into account current market conditions, when it is necessary to obtain high and qualitative yields in short terms, it is crucial to know the productive and qualitative characteristics of cattle breeds at different ages in current breeding conditions. As for the milk production and its quality [9], it can be mentioned that milk production, fat, protein and sugar content change as the animals age. If one intends to buy dairy cows and to raise them in small and medium-sized farms, it is necessary to know the productive and qualitative characteristics of the cow breeds raised in the country in order to achieve an essential economic efficiency.

MATERIALS AND METHODS

The researches were performed in the cattle breeding farm of Experimental Technological Station „Maximovca" of the Scientific and Practical Institute of Biotechnology in Animal Husbandry and Veterinary Medicine. As research material, we took the cows raised in the farm and divided them into groups. The first group included Estonian Red breed, the second group – Moldavian Black Spotted breed and also the cows were distributed depending on the lactation number: the first and third lactation. The cows of Estonian Red breed were grouped as follows: 12 cows in the first lactation and 17 cows in the third lactation. As for Moldavian Black Spotted breed, the situation was as follows: 20 cows in the first lactation and 14 cows in the third lactation. All animals were kept in identical breeding conditions according to the loose housing system. We studied the following indices: milk yield by performing control milking, assessment of the fat, protein, lactose content and milk density doing the analysis of milk in the Laboratory of Cattle Breeding and Exploitation of the SPIBAHVM using the apparatus „Ecomilc Total". Milking speed was determined in the milking parlor, using a pine tree milker and a timer to control the length of time, and then comparing the obtained amount of milk and the time. The amount of total fat and total protein was determined by multiplying the milk yield by the percentage of fat and protein, then dividing by 100.
The obtained data were processed biometrically using the Excel program. Milk density was converted from degrees of the aerometer (1.02677 ˚A – for Estonian Red breed) = % - in percentage 26.77%.

RESULTS AND DISCUSSIONS

According to the analysis of data on the milk yield of the breeds used in research, we obtained the results shown in Figure 1.

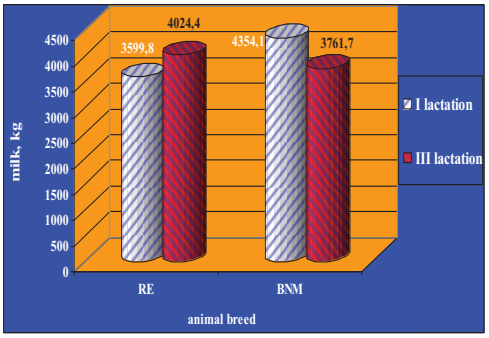

Figure 1. Milk yield characteristics

The data in Figure 1 show that the highest amount of milk was obtained from cows of Estonian Red breed in the third lactation - 424.58 kg of milk and from cows of Moldavian Black Spotted breed – in the first lactation - 592.4 kg of milk, but many researchers consider that the maximum milk yield can be obtained in the IIIrd and IVth lactation from cows of Black Spotted breeds [8].

High nutritional value of milk fats as well as the ease of their assessment served as reasons to consider the fat content as basic criterion to weigh the breeding and productive value of the dairy animals [10].

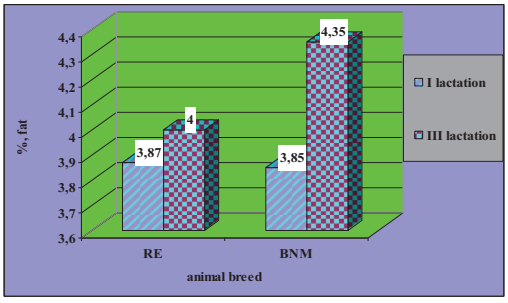

Figure 2. Characteristics of the fat content of milk

According to data presented in Figure 2, we can mention that the fat content of milk of Estonian Red breed is by 0.13% higher at cows in the third lactation compared to the first lactation as for the Moldavian Black Spotted breed it is also higher in the third lactation by 0.05%.

As reported by the authors [9], there is a direct connection between milk fat content and milk density, and if milk is degreased, its density increases, and vice versa when increasing the fat content - milk density increases too. Figure 3 indicated milk density of the studied dairy cattle depending on the breed and lactation number of these cows.

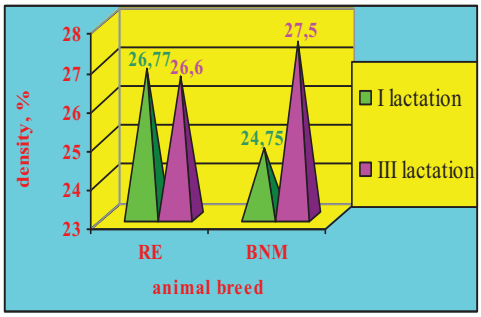

Figure 3. The density of milk in percentage

The data in Figure 3 show the density of milk, which is by 0.11% higher in the milk obtained from cows of Estonian Red breed in the first lactation, while for the cows of Moldavian Black Spotted breed, milk density is by 2.75% higher in the third lactation.

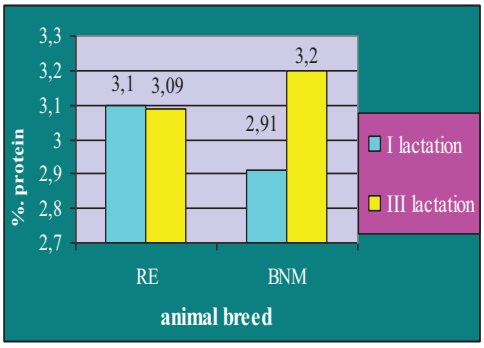

Figure 4. Protein content of milk

The cows of Estonian Red breed have higher protein content in the first lactation - by 0.1%, while the cows of Moldavian Black Spotted recorded a greater percentage of protein in the third lactation - by 0.29%.

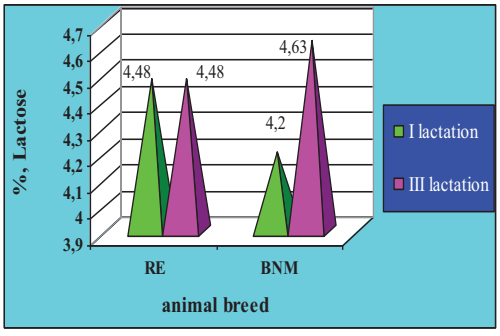

Figure 5. Lactose content of milk

According to the figure above, the lactose content of milk of Estonian Red cows is 4.48, regardless of lactation number, while the highest

lactose content of milk - 4.63 was obtained from cows of Moldavian Black Spotted breed in the third lactation, which is by 0.43 % higher than in the first lactation. In conditions of intensive technologies, the cows are milked using a milking equipment and special attention is given to the selection of aptitude for mechanical milking. Increased speed of cow milking reduces labour costs and time to obtain 1 q of milk, fact which influences the economic efficiency of breeding cows for milk yield.

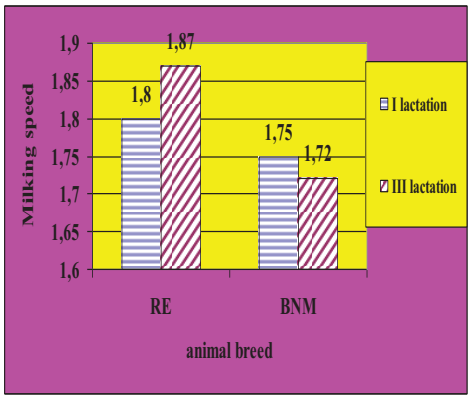

Figure 6. Milking speed

The results presented in Figure 6, show that the milking speed of cows of Estonian Red breed in the first lactation is lower than the milking speed of cows in the third lactation by 0.062 l/min, while in the case of Moldavian Black Spotted breed the milking speed of cows in the third lactation is by 0.023 l/min lower than the milking speed of cows in the first lactation.

The authors [9] consider that when increasing the speed of milking, the obtained milk has a higher fat content. Therefore, we calculated the amount of total fat in kg as it is necessary in the production of butter and other dairy products, which require an increased amount of fat content in milk.

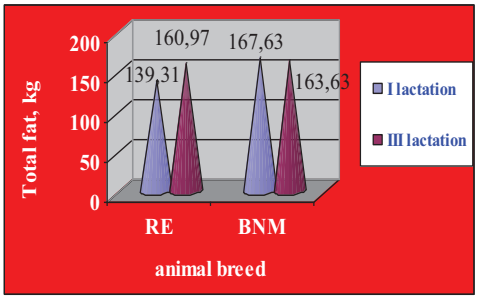

Figure 7. Total fat amount in the milk obtained from the entire lactation

According to Figure 7, the greatest amount of fat in the milk from the entire lactation of Estonian Red breed was obtained from the cows in the third lactation, i.e. by 21.66 kg more than from the cows in the first lactation. As for the Moldavian Black Spotted breed, the largest amount of fat in the milk from the entire lactation yield was obtained from the cows in the first lactation, approximately by 4.00 kg more than the total amount of fat obtained from cows in the third lactation.

In the European Union, according to the traditions of cheese-producing countries, the milk that is used to produce cheese contains a greater amount of protein compared to drinking milk, therefore they choose to breed cows producing milk with high percentage of protein. Taking into consideration all the facts mentioned above we calculated the total amount of protein in milk obtained from the studied cows.

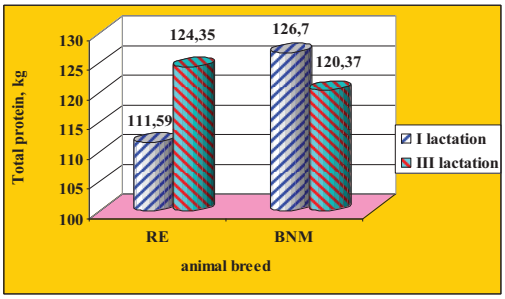

Figure 8. Total amount of protein in the milk obtained from the entire lactation

Figure 8 shows that the largest amount of total protein in the milk of Estonian Red breed was obtained from cows in the third lactation, which is by 12.76 kg of protein more than from the cows in the first lactation. The cows of Moldavian Black Spotted breed recorded the largest amount of total protein in the first lactation, which is by 6.33 kg of protein more than from the cows in the third lactation.

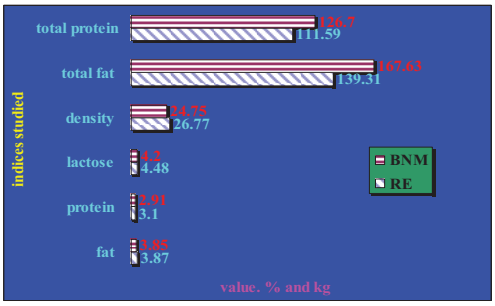

Figure 9. Indices studied for the mentioned cow breeds in the first lactation

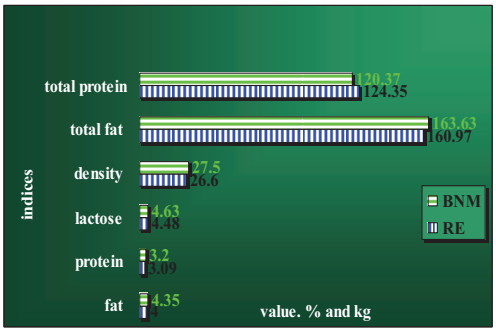

Figure 10. Indices studied for the mentioned cow breeds in the third lactation

CONCLUSIONS

According to the research results we can draw the following basic conclusions:

1. It was found that depending on the lactation number and animal breed, milk yield indices, its quality and content of total fat and total protein varies from one lactation to another, and namely:

2. Regarding the milk yield per lactation, the highest milk yield was obtained from cows of Moldavian Black Spotted breed - 4354.15 kg of milk in the first lactation and the lowest milk yield was obtained from cows of Estonian Red breed - 3599.83 kg of milk in the first lactation.

3. Fat percentage, milk density, percentage of protein, and lactose percentage are superior in the milk of cows of Moldavian Black Spotted breed.

4. As for the milking speed, the highest speed was recorded by the cows of Estonian Red breed in the third lactation.

5. With reference to the fat content of milk, the cows of Moldavian Black Spotted breed are superior in both lactations.

6. The amount of total protein in the milk from the entire lactation shows that the largest amount of total protein was obtained from cow's milk of Moldovan Black Spotted breed in the first lactation.

REFERENCES

Bucătaru N, Radionov V., 2001. Increasing cattle for milk. Inform AGRO

Chilimar S. et al., 2001. Type intrarasial Black Spotted cattle in Moldova International Symposium "50 years of higher education in Iasi livestock"

Dranca D., 2008. How should show a good cow milk. - Farm, Nr. 1

Drummers N.V., 1983. Dairy business. - Ear Publishing, Moscow

Georgescu Gh et al., 1982. Cattle breeding technology. - Publisher didactic and pedagogical Bucharest

Georgescu Gh., 1988. Treaty of cattle. - Publishing Cherry, Bucharest

Lupan B., Sergiu Chilimar, Vasile Ujică, 1997. Technology cattle. - Central Printing House, Chisinau

Markov K., Altman A., 1963. What factors influence the composition of milk. - Publishing USDA RSFSR, Moscow

Novikov E., 1981. Molocinoe productivnosti carov v cnighe scotovodstvo. - M: tom. I

Radis D., 2004. Dairy farm in the Netherlands. Rev. "Farm"