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PHENOTYPIC CORRELATIONS OF MILK PRODUCTION IN PRIMIPAROUS DAIRY ROMANIAN BLACK SPOTTED BREED FROM PESTREŞTI-ALBA FARM

CORELAȚIILE FENOTIPICE ALE PRODUCȚIEI DE LAPTE LA VACILE PRIMIPARE DIN RASA BĂLȚATĂ CU NEGRU ROMÂNEASCĂ DE LA FERMA PETREŞTI-ALBA

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The aim of the study was to investigate the phenotypic correlations and the regression curve among the main phenotypic parameters of milk yield in a herd of 63 primiparous Romanian Black Spotted breed dairy cows from SC Dorin&Sanda SRL, Petreşti-Alba farm. The phenotypic correlations for milk, fat and protein yields were estimated. A positive and very high correlation of +0.99 was registered between milk and fat yields. Between milk and protein yields the correlation was also high and positive, +0.99, with a very close value of the correlation between fat and protein yields, +0.98. Results obtained show that among the main parameters of milk yield there are very strong phenotypic correlations.
Key words: *milk, milk fat, milk protein, yields, correlation,*

Introduction

Milk is a biological product with a complex chemical composition that is synthesized in the udder, relying on blood proteins, vitamins, carbohydrates and minerals. Milk quantity and quality from each individual and for all dairy cows, depends on: genetics, milking method and equipment, transport, dairy cow age, milking frequency in 24 hours, mammary repose, nursing length, season and dairy cows' health.

The most variable milk components are fat that can oscillate among-3.2 - 4.5% and proteins with the lowest value of 3.0 and the highest of 3.6%. In many countries, protein is now the most important constituent of milk, both to the processor and to the producer. Due to changing consumer attitudes towards fat, protein is now more in demand and processors that manufacture protein-based products want milk with an increased protein concentration. A change in milk composition using traditional breeding techniques occurs slowly, although new techniques of genetic manipulation may allow faster progress in the future. Yields

of milk, fat, protein and total solids are not easily impacted by genetics. Conversely, environmental factors such as nutrition and feeding management will impact yield more than the actual percent composition of the major milk constituents. The priority placed on each genetic trait depends upon its economic or profit impact. Genetic selection should be directed toward increasing fat, protein and nonfat solids yields.

Materials and Methods

Researches were carried on a 63 primiparous dairy cows herd, belonging to Romanian Black Spotted breed, from SC Dorin&Sanda SRL farm, Petreşti-Alba. During lactation, the total milk yield for each cow was recorded. Lactation records were standardized to 305 days, except records of cows that went dry with less than 305 days of milk. For phenotypic parameters calculations, Statistics for Windows version 4.5.A and Microsoft Excel version 2002 programs were used.

Results and Discussions

For the selection efficiency, which is equal with $1/\sqrt{n}$, where "n" represent the number of traits, was estimated the value and the sign of phenotypic correlations among the analyzed traits. In selection, for the strong and positive correlated characters, only one character could be taken and the other ones are being naturally selected. Genetic improvement is slower when selection is made for more than one trait at a time. A breeding program must be focused on selection for the most economically valuable traits. The use of breeding to improve milk composition must be clearly understood, since selection to improve one production trait may lead to a decline in another. Selection based on milk yield will result in an increase in milk, fat and protein yields, but will reduce fat and protein percentages.

Table 1

Phenotypic correlations for the couple of traits in Romanian Black Spotted heifers

Parameters	Milk yield	Fat content	Protein content
Milk yield	1.00	0.99	0.99
Fat yield	0.99	1.00	0.97
Protein yield	0.99	0.97	1.00

Phenotypic correlations between milk production and fat yield in the first lactation in the Romanian Black Spotted primiparous dairy cows, is positive and very high, +0.99. The higher the heritability the faster the genetic progress is made in improving this trait. Between milk yield and protein yield, correlation indicates a value of +0.99, which is a high and positive correlation. Correlation between the third couple of traits: fat and protein yields, has a positive high value of +0.97. In order to establish among which of the analyzed traits there is a better correlation

that can be used in the selection program of Romanian Black Spotted dairy cows, we used the regression curve for each couple of traits. In the first figure is presented the equation of the regression curve, where the independent variable (x) is represented by milk yield, while the depended variable (y) it is fat yield. After the calculation of the regression function differential was made, we find out that for a milk yield of maximum 7078.1 kg, the fat yield can be roughly 270.4 kg.

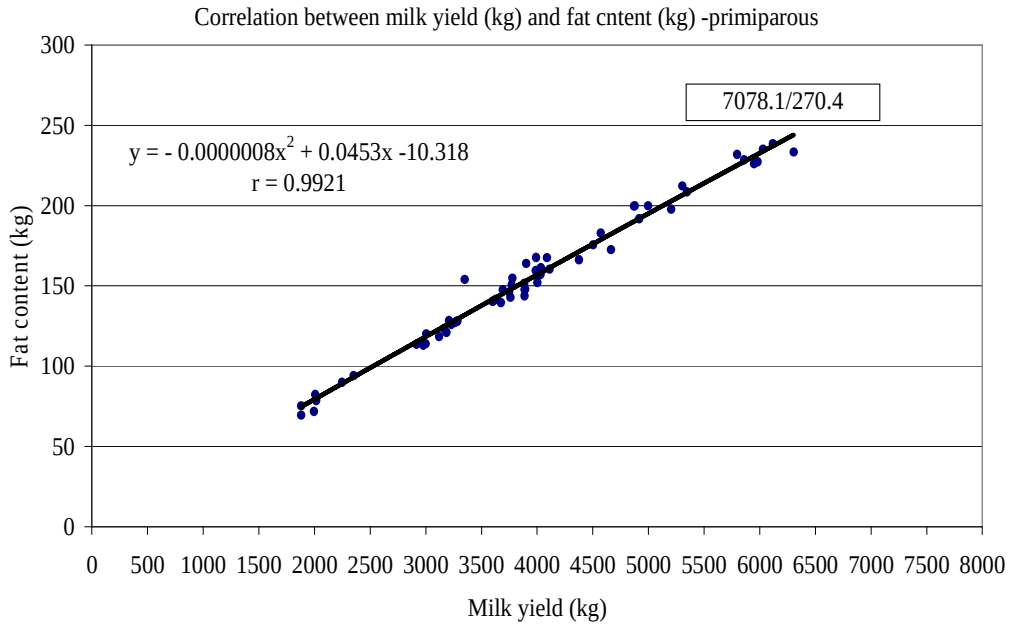

Figure 1.

These results indicate that the Romanian Black Spotted primiparous dairy cows herd from Petreşti has a great productive potential for that can be obtained such fat content.

In the studied herd the maximum milk yield was 6305.7 kg while for the fat yield was registered a maximum quantity of 214.3 kg, as it can be seen after the spreading values in the first diagram.

In the second figure is illustrated the regression curve and equation between milk yield and protein yield. An improved milk yield is an important objective in selection. The regression function differential indicates that the value of both traits in the primiparous dairy cows is good enough for this herd to be accepted in the nucleus of selection. In this case the maximum estimated values are 8025 kg for milk yield and 390.5 kg for protein yield.

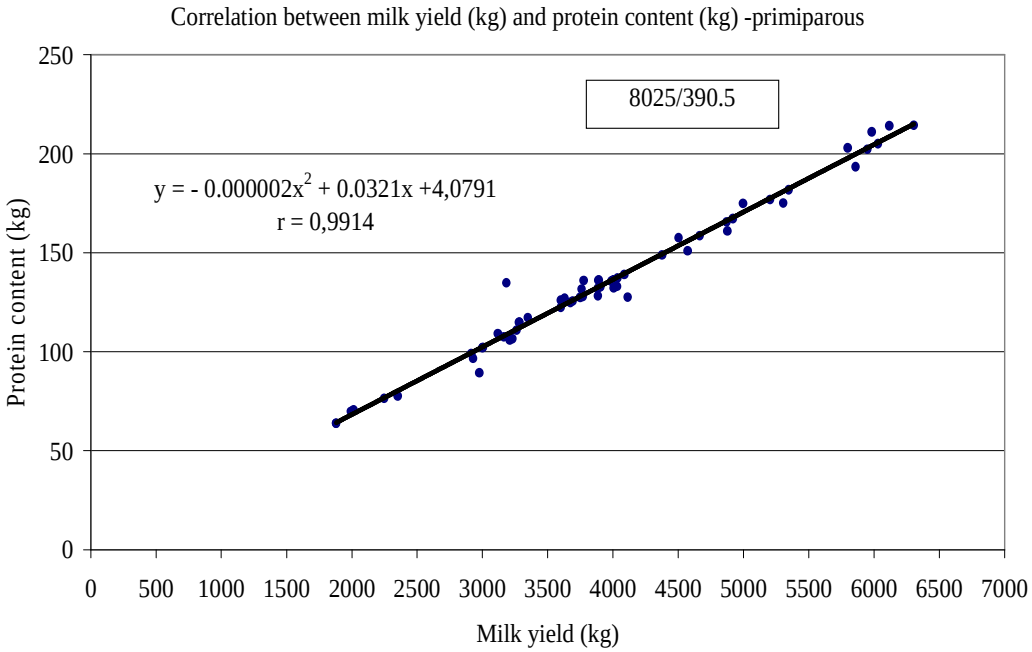

Figure 2.

Regression curve and the differential equation for the fat yield, respectively protein yield, are rendered in the third figure.

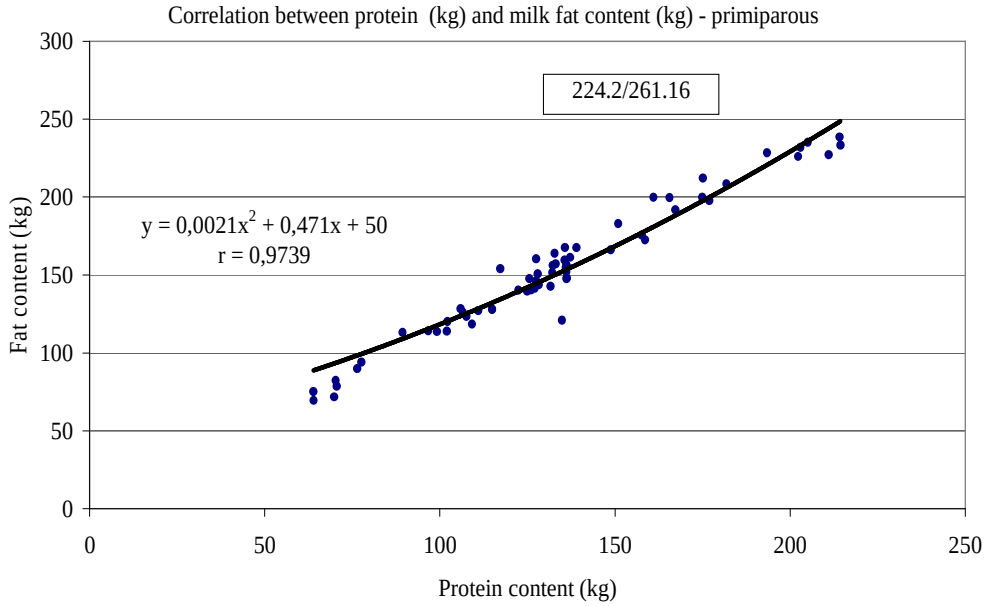

Figure 3.

Values obtained for this couple of traits indicates that the highest protein yield of 224.2 kg can be realize when it will be obtained a fat yield of 261.16 kg.

But no matter the results obtained, these yields of milk, fat or protein can't be realize and then improved without adequate feeding and animal welfare.

Conclusions

1. Data reveals that there is a very high and positive correlation, between milk yield and fat yield, being +0.99.
2. Also, between milk and protein yields, the correlation was high and positive with a value of +0.99, as well as for the correlation between milk fat and protein yields, +0.97.
3. It is already known that the concentration of milk fat and protein is highest in early and late lactation and lowest during peak milk production through mid-lactation. Making evidence the positive correlations among the analyzed couple of traits, it is an instrument for the dairy breeders to make a better and efficient selection.
4. Heifers should be considered as a herd replacement only if the parameters of milk production of the dams are above the herd average.
5. As a final conclusion it can be stated that the high values of the phenotypic correlation coefficients are for the specialists a valuable instrument in the selection work.

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