PHENOTYPIC CORRELATION BETWEEN COUPLE OF MILK PRODUCTION TRAITS IN ROMANIAN SPOTTED BREED DAIRY HEIFERS FROM S.C. AGROSEM S.A. PIŞCHIA, TIMIŞ COUNTY

CORELAŢII FENOTIPICE ÎNTRE PERECHI DE CARACTERE ALE PRODUCŢIEI DE LAPTE, LA PRIMIPARELE DIN RASA BĂLŢATĂ ROMÂNEASCĂ DE LA FERMA S.C. AGROSEM S.A. PIŞCHIA, JUDEŢUL TIMIŞ

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The aim of the study was to establish the phenotypic correlations between milk yield parameters of 95 Romanian Spotted breed dairy heifers and their subsequent milk yield and composition in the first lactation. Correlation coefficients among estimated milk, fat and protein yields were high and almost the same. Between milk and fat yield there was a positive and very high correlation ($r = 0.9873^{***}$). Also the correlation coefficient ($r = 0.9719^{***}$) registered for the couple of traits milk and protein yield was high, while between fat and protein yield the correlation coefficient had a value of 0.9568^{***}. The strong positive correlations among couple of traits show that these can be improved in the dairy heifers, using selection by independent culling levels.

Keywords: dairy heifers, correlations, milk, fat, protein

Introduction

The main goal of a dairy producer's genetic improvement program should be to produce replacement cows with the greatest possible genetic capability for making a profit. Fulfilling this goal requires strong, healthy cows that produce high levels of milk of desirable composition. Milk recording gives cattle breeder's regular information on milk yield and milk composition for each dairy cow in the herd. Results help breeders in herd management and represent the basic source of information for the prediction of breeding value. Replacement heifer management has received considerable attention in recent years, most likely due to an increased emphasis on business management by dairy producers. Replacement heifers are expensive to raise, are labor intensive, and return on investment is relatively slow. Research on replacement heifers is limited and is spread out over many years.

Protein and fat content are the most important components that dictate the purchase price of milk. They are influenced by various genetic as well as environmental factors, such as nutrition, stage of lactation, age of the animal, season, climatic effects, milking system, milking time, udder health, etc. Fat content is the most variable component of milk and besides the factors listed above also depends on completeness of milking, sampling procedure and milking interval. Klopčič (et al, 2003) reported that a longer milking interval from one to five hours significantly increases fat content and decreases milk yield one day later. In such cases, the increase in fat content is expected. Protein content does not vary to the same extent as fat content. Energy supply has the strongest impact on the protein content. Sufficient energy supply enables maximal synthesis of proteins in the rumen, representing as much as 60 to 80% of all proteins that digest in the small intestine (Hanus et al., 1995).

The protein content of milk produced is an excellent guide to the overall health and nutritional status of the herd. If milk protein content is good then few major problems exist with feeding and management. Cows which are back in calf tend to produce higher milk protein and so herd fertility can benefit milk protein. Heifers have higher milk protein in their first lactation, with a decline of 0.05% between the first and fourth lactation. Maintaining a young herd by implementing an economic replacement rate will improve milk protein. Also, if a strategic breeding programme is in place to raise milk protein a replacement rate of 20-25% will enhance the rate of genetic progress in all profitability traits.

Materials and Methods

The studies were carried out on a population of 95 dairy heifers held in a dairy cattle farm located in west Romania. Individual milk, fat and protein yields were obtained from the Pischia farm data evidence. A multitrait model was used to estimate phenotypic parameters: milk, fat and protein yields. Phenotypic correlations between couple of traits were analysed.

Results and Discussion

Data of milk recording provides the basis to control herd management and genetic improvement of cows. Breeding values are predicted for 305-day yields in order to select heifers for replacement. Knowing the genetic relationship between lactation curve traits, each animal breeder would be able to select cows based on performance records of the lactation course (Tozer and Huffaker, 1999).

For choosing the improving method for studied traits, phenotypic correlations were estimated between milk and fat yield, milk and protein yield, fat and protein yield in the studied dairy heifers for the first 305 days of lactation.

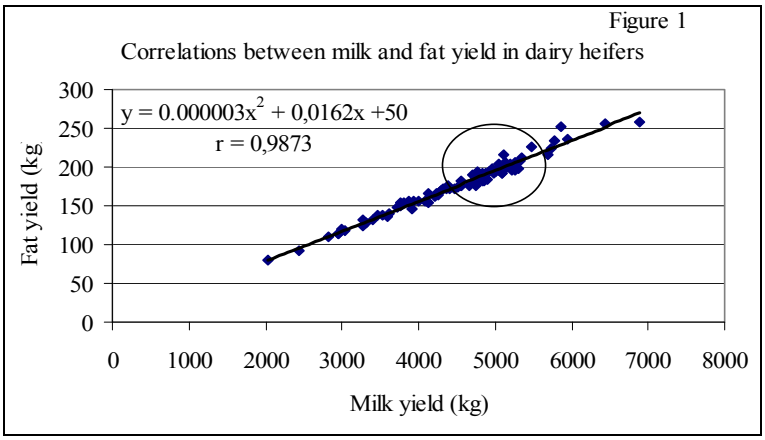
After estimation of phenotypic correlations the following values were obtain:

Table 1

	Milk yield	Fat yield	Protein yield
Milk yield	-	0.9873	0.9719
Fat yield	0.9873	-	0.9568
Protein yield	0.9719	0.9568	-

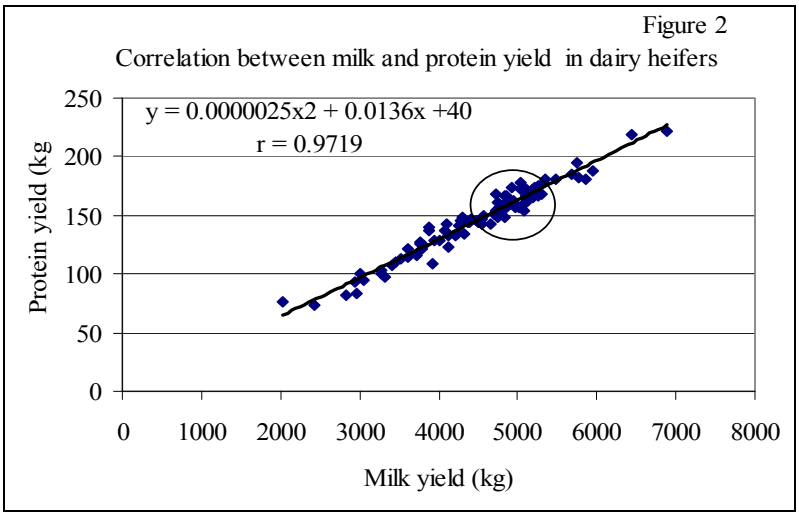
For these pair of milk yield traits were estimated the linear regression.

Figure 1



Correlation between milk and fat yield (figure 1) shows that the increasing milk yield is associate with the fat yield increasing which means that between the couple of traits there is a positive and very high correlation ($r = 0.9873^{***}$). As figure 1 show, a significant group of primiparous dairy heifers with high yield and milk and fat is situated around 5000 kg milk and 200 kg fat. Regression line confirms that for a production of 5 400 kg milk a maximum of 224.96 kg fat can be obtained.

Figure 2

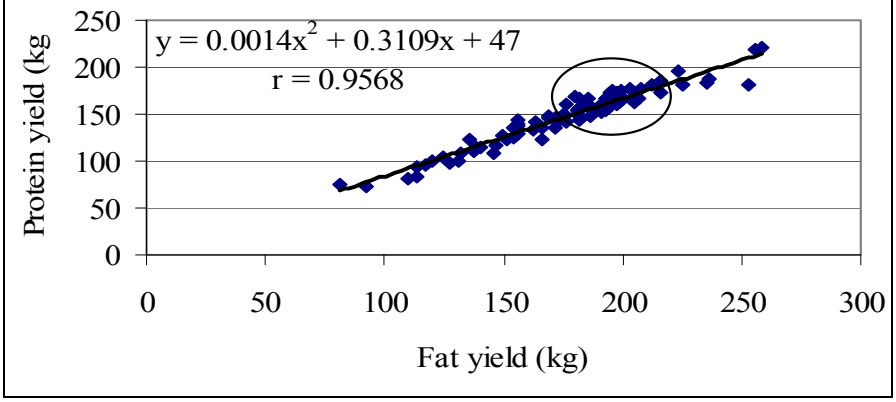


In the figure 2 is reveal the phenotypic correlation between milk and protein yield for the total morning and evening milking of 305 days in the population of dairy heifers studied.

For this couple of traits there is a high, positive and significant correlation (r = 0.9719***). The maxim of protein yield of 187.97 kg can be obtained at a 5440 kg milk yield. The main group of dairy heifers is situated among 5000 kg of milk yield and between 150-200 kg protein yields as figure 2 show.

Figure 3

Correlation between fat and protein yield in dairy heifers



In the third figure is displayed the regression line for correlation between fat and protein yield. The correlation coefficient is positive high and very significant (r = 0.9568***). Regression line show a maximum yield of fat of 222.07 kg when it can be obtained the highest protein yield of 185.08 kg in the population of the dairy heifers studied. Generally, fat and protein content of milk are positively correlated within a population of dairy cattle.

Conclusions

1. Correlation between milk and fat yield shows that the increasing milk yield is associate with the fat yield increasing which means that between the couple of traits there is a positive and very high correlation (r = 0.9873***).

2. Phenotypic correlation between milk and protein yield was high, positive and very significant (r = 0.9719***).

3. Correlation between fat and protein yield was positive, high and very significant (r = 0.9568***).

4. Values of estimated phenotypic correlations in the studied of dairy heifers population can be used as a guide in the genetic improvement using selection by independent culling levels.

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