

**PHENOTIPIC CORRELATIONS AMONG COUPLE OF  
CHARACTERS IN DAIRY ROMANIAN BLACK SPOTTED  
BREED FROM PESTREȘTI-ALBA FARM**

**CORELAȚIILE FENOTIPICE ÎNTRE PERECHI DE  
CARACTERE LA VACILE DIN RASA BĂLȚATĂ CU NEGRU  
ROMÂNEASCĂ DE LA FERMA PETREȘTI-ALBA**

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*Phenotypic correlations among milk yield, fat yield and protein yield were estimated using an animal model and records of 101 cows enrolled in the SC Dorin&Sanda SRL farm, Petrești-Alba. Among the productive traits investigated, the highest correlation was observed between the milk and fat yields 0.98. Between milk yield and protein yield coefficient correlation was 0.97, and also 0.97 between fat yield and protein yield. It was concluded that these phenotypic parameters could be used for the genetic evaluation of dairy cattle in Romania. Regression coefficients among the three couple of traits indicate the same high and positive values. The yield traits (kg) are all positively related.*

**Key words:** *milk, fat, protein, yield, correlations*

### **Introduction**

The commercial value of milk historically has been influenced by milk components. In the early years of production testing, when milk was marketed in the form of butter, the importance of butterfat to any dairy producer's income was overwhelming. Consequently, one of the major advances in dairy cow recording of production data was to determining the fat content of milk.

The protein in milk has a quality higher than many other foods but the quantity of milk protein is low due to high water content. Milk protein contains all the essential amino acids required by the human body for optimum growth. For this reason more of the protein can be used for protein anabolism so there's less chance the protein in milk will be converted into fat and stored. The objectives of this study were to estimate genetic and phenotypic correlations among milk yield, fat and protein yield from lactation records of Romanian Black Spotted cows enrolled in the farm official milk-recording program. A phenotypic correlation is the correlation between records of two traits on the same animal and is usually estimated by the product-moment correlation

statistic. These parameters were needed to plan out future breeding programs as well as to predict breeding values.

### Materials and Methods

The analyzed data were provided by the data files of the farm and the Improving and Reproduction Center Sebeş-Alba for cows involved in the official milk-recording program. The traits studied were milk yield, fat yield and protein yield. During lactation, morning and evening milking of each cow was recorded within an interval standardized to 305 days, except records of cows that went dry with less than 305 days of milk. Data were edited for errors, redundancy, and incomplete observations.

### Results and Discussions

Milk definitely serves as one of the excellent sources of proteins and this can be attributed to its rich quality protein content. Though it doesn't contain a large quantity of proteins, the quality of proteins that milk provides the body is simply amazing. Protein in milk contains all the essential amino acids that the body requires. The total protein component of milk is composed of numerous specific proteins. The primary group of milk proteins is the caseins. There are 3 or 4 caseins in the milk of most species; the different caseins are distinct molecules but are similar in structure. All the other proteins found in milk are grouped together under the name of whey proteins. The major whey proteins in cow milk are beta-lactoglobulin and alpha-lactalbumin.

Table 1 shows estimates of phenotypic correlations. There was a very high positive genetic correlation of 0.98 between milk and fat yields suggesting that selection for milk yield would increase also fat yield.

Table 1  
Phenotypic correlations among milk yield, fat yield and protein yield in Romanian Black Spotted breed dairy cows

Variable	n	Milk yield	Fat yield	Protein yield
Milk yield	101	1.00	0.98	0.97
Fat yield	101	0.98	1.00	0.97
Protein yield	101	0.97	0.97	1.00

Between milk and protein yields there is also a positive and high correlation of 0.97, the same value being found for the correlation between fat and protein yields. This means that the higher the milk yield is the higher the fat and protein yields are.

Correlation between milk yield (kg) and fat yield (kg) - dairy cows

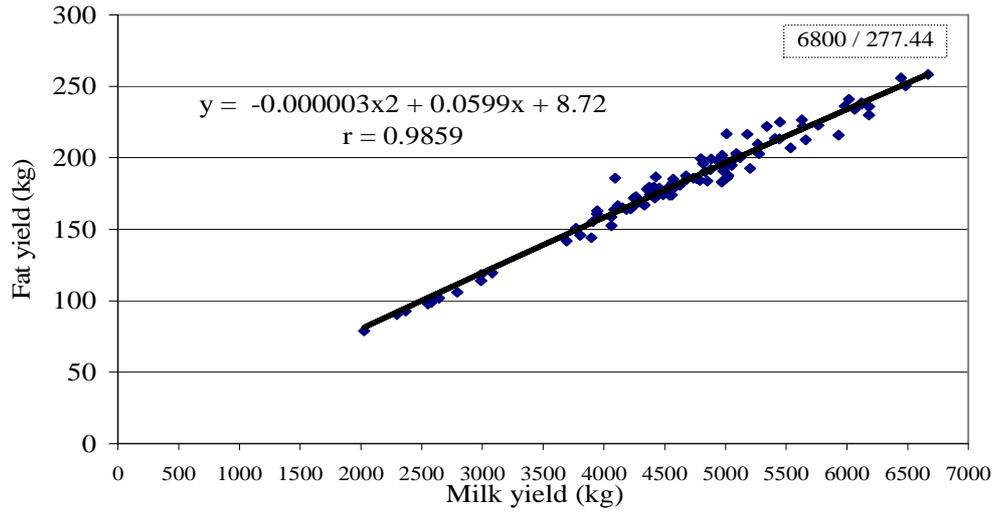


Figure 1

Correlation between milk yield (kg) and protein content (kg) - dairy cows

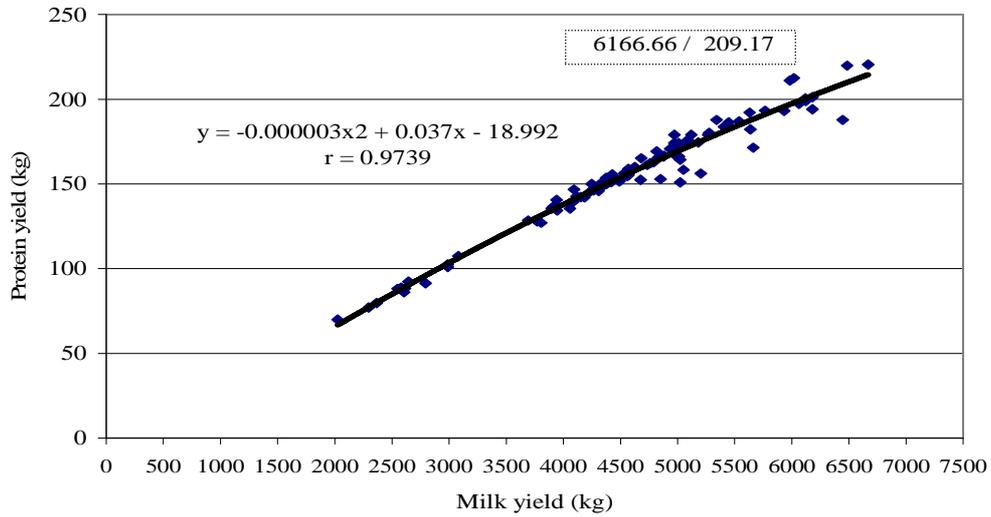


Figure 2

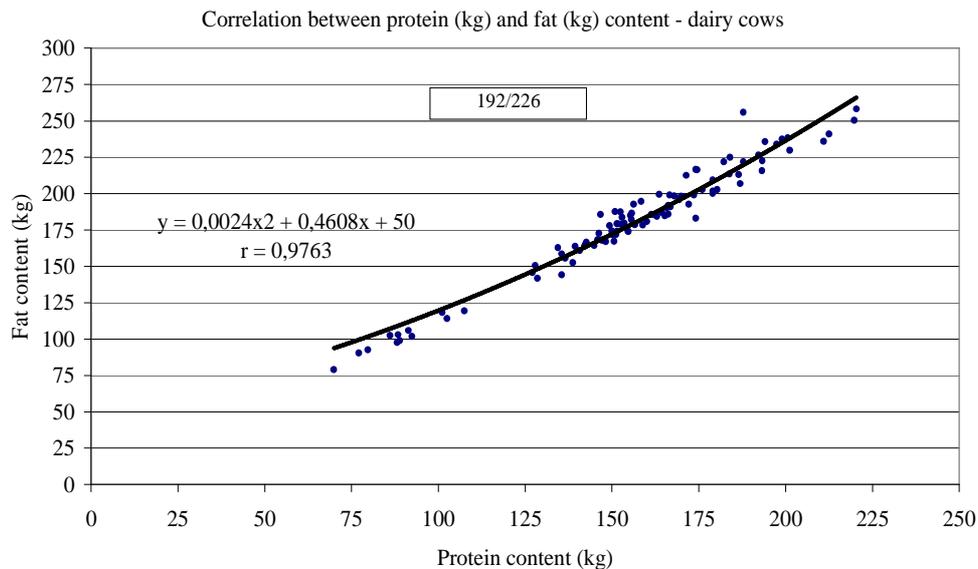


Figure 3

The association between two variables, or traits, can be measured by a regression coefficient, or by a correlation coefficient. In the first diagram above is presented the relationship between milk yield and fat yield. The measure of correlation coefficient indicates a value of + 0.9859, between milk yield and fat yield, for those 101 dairy cows. As the distribution of the real values shows, the maximum fat yield of 277.4 can be attained when 6800 kg milk yield will be realized, as Figure 1 shows.

As regarding the relation between milk and protein yields, this is presented in Figure 2. The real data values spreading up and down the regression curve indicate that an ideal protein yield of 209.17 kg can be obtain when a milk yield of 6166.66 kg will be attained.

In the Figure 3, the results of differential regression function predict for the third couple of traits shows that a maximum protein yield of 192 kg will be obtained only when the fat yield will be 226 kg. The value of the correlation coefficient was positive and very significant (+0.97).

### Conclusions

1. Milk production per cow was the result of the attitude of the farmer as well as the genetic capacity of the cow.

2. Phenotypic correlation for milk fat yield was a little higher compared to protein yield. Between protein and fat yield the value of phenotypic correlation was +0.97, between milk yield and fat yield +0.98 and between milk yield and protein yield +0.97.

3. The estimate of milk protein yield from known milk and milk fat yields is subjected to greater error than is the similar estimate of milk energy yield, and this, in the absence of direct protein determinations, favors the use of milk energy rather than milk protein.

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