

Summary

The rearing of dairy cattle in exploitations of different sizes known some peculiarities regarding the breed genetic value of the livestock, degree of technical-material endowment, fodder resources, mechanization of the activities on technological level, labour, economic administration and last but not least the farm capacities, the ways of using the yields or even the tradition present in each area.

At the level of national economy, Moldova region has a complex profile due to its wide range of natural resources specific to mountain hill and field areas.

In Vrancea, dairy cattle rearing is harmoniously combined with the wine growing, there existing a rich experience in the management and dairy cow breeding.

Taking into account that dairy cattle rearing is based on knowledge regarding the individual and the livestock population, as well as on interrelations between the genotype and environment, in order to obtain some maximum yields it is important to establish the phenotypical and genetic parameters in dairy cattle, the structure and dynamics of populations well as the ways of using and organization of the yield.

In order to achieve the objectives mentioned above, the author of the thesis entitled *„Contribution to the study regarding the influence of genetic value and management on yield and reproduction performances in a dairy cattle farm”* has analysed the evolution of the livestock and the yields obtained, the structure of the livestock depending on its origin, the management of the technological factors, the degree of mechanization involved in technological

processes, biological value and level of genetic amelioration of the populations „*Baltata cu negru romaneasca*”, reared in the private farm Doaga –Vrancea.

Having in view all these aspects, an experimental protocol has been established in which the objectives and the involved activities have been stipulated.

Biological material was represented by 321 cows and 81 heifers, as strain used for improving the breed, to which young cattle were added reaching a total number of 700 animals kept in Doaga farm, genetically monotorized over a period of 15 years (approximately three generations).

For an elaborate study, the researches have been structured as follows:

◆The study of milk yield and reproduction indices, on successive lactations and on total population for:

◆active population;

◆-population coming out of the stock;

◆In the case of two variants, the study has been carried out in two subvariants:

◆population having at its origin indigenous bulls;

◆-population having at its origin bulls from abroad;

◆The phenotypical parameters under study have been:

◆the duration of total and normal lactation;

◆quantitative and qualitative indices of milk yield, fat and proteins;

◆body development estimated on the basis on weight and main body dimensions;

◆-appreciation of body building on the basis of total score and udder points;

◆-reproduction indices: VPF, CI, RM, SP;

◆-productive longevity.

◆The genetic parameters under study have been:

◆heritability and repeatability of the yielding traits, reproduction, development and body building;

◆phenotypical and genotypical correlations between the main traits under study;

◆bulls used in reproduction and amelioration value;

◆-milk quality (NTG and NTCS) and the use of the yield.

Results

As for as the productive performances of BNR cattle population from Doaga farm are concerned, these include animals with a high genetic value, with average yields of more than 7000 kg milk, do to the influence of the sires used and favourable environmental conditions.

◆The analyses have shown that the cows resulted from bulls brought from abroad have given an average yield of 7496.44 kg milk on normal lactation, and the cows resulted from indigenous bulls have given 7367.79 kg milk, in other words a genetic gain of 1.74% (128 kg milk). Depending on lactation, the differences are much higher, the maximum difference being of 6.07% (436 kg milk) in the second lactation.

◆The active population from Doaga farm has given 7420 kg milk as compared to the population coming out of the stock whose average yield on normal lactation was of 7291 kg milk. It was noticed an improvement from one generation to another, the genetic being of 1.85% or 135 kg milk. The genetic amelioration has progressed slowly, and the technological factors of exploitation and management had an essential influence.

◆The age at first calving as a basic index in estimating the reproduction precocity, was of 835.97 days (27 month and 25 days), below the average of the breed grown in Romania. This fact means a good reproductive precocity and it points out that the young female cattle of reproduction have benefited of good feeding and care during their growing period.

◆ Interlactation period, depending on lactation, had different average values, rising above the optimum value at all lactations. On total population, the average value of this index was of 80.6 days.

◆ The interval between calvings has exceeded at all lactations the value of 400 days which is considered the maximum acceptable limit for this synthetic index of reproduction. The average value for all lactations was 439.48 days, but the individual variability was very high, expressed by the maximum values of dispersion indices.

◆ Service-period had average values of 60-80 days, most of the cows being inseminated in the second or third oestrus (sexual heat). There were also some isolated cases with a service-period duration much too long.

The duration of the service-period has influenced the interval between calvings and the fertility index, as it has resulted from our research.

From the analysis of the origin value of the bulls used in reproduction the following aspects have resulted:

For active population, the bulls used at artificial inseminations brought from abroad, had an ascending line with a high genetic value. Thus, mothers (M) have given a yield of 7694.13 kg milk, with a content of 4.18% fat and 3.34% proteins, and grand mothers from father's side (MT) have produced 13115.70 kg milk with a fat content of 3.93%.

For the population coming out of the stock the genetic value of the mothers (M) was 7190.56 kg milk, with 4.10% fat and 3.38% proteins, and grandmothers from father's side (MT) have produced 11529.10 kg milk with 4.22% fat content.

◆ The body weight at first-calf cows was 611.79 kg for the cows coming out of the stock and 561.36 kg for the cows from active population, the differences being significant. The cows resulted from bulls brought from abroad had a higher body weight of 27.7 kg as compared to the cows resulted from indigenous bulls, the differences being distinctly significant.

◆ The height at withers was 134.56 cm at the population coming out of the stock and 134.65 cm at the active population, the differences being non-significant.

◆ As far as the total score is concerned there were not recorded significant differences between autochthonous and imported population, aspect proved by Fischer and Tukey tests.

The existing variability reserves from population for the morphological characters and body traits point out the possibility of improvement by selection in order to get the desired type of for BNR breed.

◆ The results regarding the study of productive longevity have shown that the average duration of use was 2.77 normal lactations, with limits between 1 and 7 lactations. Milk quantity on productive life was of 23328.9 kg, but the nucleus from this farm has been very heterogeneous, standard deviation being $s=11626.52$ kg and variation coefficient $V\%=49.83$.

The highest productive performance was noticed at cow code no. 000101, the daughter of the imported bull code 51030, who produced 53914 kg milk and 4058.5 kg proteins + fat, which means 25.85 kg milk and 1.947 kg fat + protein per day of productive life.

Analysing the productive longevity separately for the two groups of cows resulted from indigenous and imported bulls one can notice significant differences. Thus, cows resulted from indigenous bulls were used for 1-6 lactations, but the majority of the cows (61.1%) were used for 3-4 lactations. The average duration of use was 1281 days (4.2 lactations) and an average yield of 27369.61 kg milk, which means 21.76 kg milk/day of productive life. The daughters resulted from imported bulls were used between 1 and 7 lactations, but most of them (78.6%) between 1 and 3 lactations. The average duration of use was 923.71 days (3.02 normal lactations) and an average yield of 21831.16 kg milk, which means 23.63 kg milk per day of productive life.

◆ Analysing some indices of fitness such as organic resistance, the frequency of genital diseases, abortions and calf mortality, for the group of cows resulted from imported bulls, one could notice a higher frequency of these affections, so we may conclude that there was a smaller organic resistance and a weaker adaptation to environmental conditions from Doaga farm.

Having in view the age at first calving and the duration of use it was established the index of yield use. The results have shown that on total population the index of use was 76.06% and a value of 79.41% for the group with the origin of indigenous bulls, 76.08% for the group with the origin of imported bulls, respectively.

◆ The analysis of the intrapopulational structure pointed out the existence of 27 families of paternal semisisters with more than 5 individuals from which 7 genetic families resulted from indigenous bulls and 20 families resulted from imported bulls.

From those 7 families with the origin of indigenous bulls the most valuable was family bull code 19992, with an average yield of 7029.64 kg milk, 274.84 kg fat and 222.34 kg proteins at first normal lactation.

Among those 20 genetic families with origin of imported bulls the most significant ones were the families bull code 51167 with 38 daughters, code 51454 with 28 daughters, code 51453 with 18 daughters and code 51662 with 16 daughters, with performances over 7000 kg milk at the first normal lactation. There was also a family with more than 8000 kg milk, and the family bull code 51451 formed from 8 paternal semisisters has produced an average yield of 9611.99 kg milk, being the most valuable genetic structure from Doaga farm.

Analysing the indices of reproduction, on genetic groups, it was noticed that the imported bulls had a favourable influence, which was reflected in the yielding performances, as well as on body development and improved body building as compared to the group with indigenous origin.

◆ The analysis of milk yield variability of BNR livestock from Doaga farm and of coefficients of heritability and repeatability pointed out the distinctions of different genotypes and genetic heterogeneity expressed by the high rate of genetic composition from total variation.

◆ Analysing the values of phenotypical correlations among the milk populations and other selection characters, one can notice the existence of some negative and weak correlations with the protein and fat percentage and between milk yields and fat quantity, and proteins respectively, the correlations are positive and strong, being determined by the same set of genes. This aspect has been well illustrated by the coefficient of regression straight line presented in the thesis.

The values of the coefficients of phenotypical correlation between the milk yield from the first lactation and the yield on productive life, fat quantity and protein respectively, are significant in size and degree of intensity, which points out the importance of selection to discover the valuable individuals even from the first lactation.

The genetic correlations between the milk yield and lactation duration, fat quantity, total quantity of proteins, body weight and total score for body conformation and also milk and fat quantity on production life are strong and positive which points out the existence of pleiotropic genetic determinism for these groups of traits.

◆ The analysis of the amelioration value of indigenous and imported bulls used in BNR population from Doaga-Vrancea farm, leads to the general conclusion that the imported bulls had a positive influence on the genetic amelioration of the livestock under study. As far as the

influence of the indigenous sires is concerned, it was less striking, in the majority of the cases the sires' influence being non-significant or even worsening. Analysing the genetic evolution of the livestock, sometimes it was noticed a relatively small genetic gain, although there were used indigenous and imported sires tested as ameliorators. Their daughters haven't performed at the expected level due to rearing conditions sometimes critical, the exogenous factors having a decisive influence on the indices of milk yield and reproduction.

◆ The quantity of delivered milk has maintained at a level higher than 21000 hl annually, with a total of 66420 hl during the three years under study and a total value of 9845573 lei with TVA.

◆ Milk quality, estimated on the basis of the total number of germs and the total number of somatic cells, points out that the delivered milk integrates within the European standards, as a result of the modernized milking technology, hygienic shelters for the cattle, milk handling and preserving in refrigerating tanks until delivery. The increase of milk quality which was delivered during the three years under study was reflected in the milk price and bonuses obtained for the quality of the delivered milk.

The analysis of milk quality and the monthly evolution of the quality indices make us conclude that the milk obtained in Doaga farm and destined for human consumption integrates itself within the standards of international quality and entirely corresponds to the norms of food safety. Making a correlation between the milk quality and the delivery price it results that the milk was delivered at smaller prices as compared to its quality and the expenses made for cattle management. Hence the profit obtained was no significant and bellow the material inputs.

Synthesizing the results of our research, carried out on cattle population from elite farm Doaga-Vrancea, one may conclude that BNR cows, belonging to this population, are well adapted to environmental conditions specific to the region, and the productive performances superior to other nuclei of the same breed from other farms, have pointed out the high genetic value of the livestock under study. The wide variability of the productive and reproduction traits has offered significant possibilities of genetic amelioration, by using modern criteria and methods known today, including embryo transfer and genomic selection.

To increase the genetic productive potential it is necessary to act more intensively by using imported bulls with high genetic value, which is the main source of genetic progress in cattle population. At the same time it is important to improve the technology and the standard of rearing young replacement cattle, make account of reproduction management, yield processing and use, of administration concerning the technological and economic factors.

Starting from the present organization of the cattle genetic amelioration system and keeping in mind the significant results obtained in the amelioration of Bălța cu negru

românească breed, it is important to protect and support elite farms which offer the most valuable genetic inheritance, main nuclei which should be situated at the top of the pyramid of amelioration in supplying the biologic material with special genetic qualities well adapted to pedoclimatic conditions from our country. Among these elite farms we could also include Doaga farm, which at present offers a biologic material with superior genetic value, to many farms, where bulls of high genetic value were used, with improved conditions for cattle rearing