

Variability of Productive Traits Under Different Types of Selection

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Abstract

The article discusses the influence of various types of selection on the variability of productive traits of Alatau cattle in the meat and dairy direction of productivity based on a comprehensive assessment. To conduct research on this issue, four groups of daughters of cows obtained from linear, crossed, purebred imported and crossbred bulls were selected using different types of selection. It was revealed that cows obtained from linear bulls with homogeneous selection had a negative relationship of milk yield with ancestors with fluctuations from -0.107 to -0.019 , and vice versa, cows obtained from linear bulls with moderately heterogeneous and heterogeneous selection had a positive relationship of milk yield with ancestors with fluctuations from 0.030 to 0.309 .

Keywords: Breed, Selection, Lines, Crosses, Hybrids, Purebred, Variability, Heritability

1. Introduction

Cattle breeding in the Kyrgyz Republic has been and remains one of the important livestock sectors. It is enough to note that in 1988-1990 good results were achieved in this livestock sector. For example, the average milk yield per forage cow (534 thousand cows, data for 1989) was 3213 kg of milk per lactation. However, due to the reorganization of collective and state farm production, the transition to market relations and the creation of numerous farms and peasant farms, and other objective and subjective reasons, this branch of livestock farming has undergone significant changes [1]. Breeding and productive qualities have deteriorated; in many farms they haphazardly began to crossbreed the Alatau breed with many breeds of livestock of different directions of productivity without considering the influence of the types of selection on subsequent results, which led to a very large number of outbred, crossbred animals with low productivity. According to numerous scientific and experimental studies in the field of dairy cattle breeding conducted in the Kyrgyz Republic, it is known that the realization of the genetic potential of cows' milk productivity is the main factor in further increasing milk production, increasing the efficiency and profitability of dairy cattle breeding. It should be noted that one of the main tasks in the modern conditions of development of dairy farming in the country facing zootechnical science is the qualitative transformation of dairy farming in the republic by creating highly productive herds of livestock [2,3].

The results of scientific research in the field of dairy farming have established that milk productivity is influenced by many factors, a number of them act together, and therefore it is very difficult to determine the measure of the influence of each of them separately. However, despite this, special scientific research by many scientists and practitioners is to some extent possible to determine the degree of importance of certain factors, which is very important for further improvement of the breeding and productive qualities of livestock. In connection with the above, there was a need to conduct research and analyze the influence of selection types on the variability of productive traits of cows.

2. Materials and Research Methods

The following zootechnical documents served as the material for this scientific work: cards of breeding cows - form MOL-1; breeding bulls form MOL-2; catalogs of genealogical diagrams of sires used on the farm; artificial insemination logs; breeding plan; livestock valuation report for recent years; primary documents of zootechnical accounting [4]. Digital material was biometrically processed using Excel software.

3. Research Results and Discussion

The research was carried out on the breeding farm "Atalyk Group" in the Alamedin region of the Kyrgyz Republic. The influence of different types of selection of the Alatau breed on the milk

productivity of offspring and its variability when using linear and cross-bred bulls (including imported ones, mainly American-bred Swiss) has been studied. When conducting research, data were used from 63 cows from 88 linear, 39 from 5 crossbred, 98 from purebred imported and 60 cows from 4 crossbred bulls of different evenness for 1 lactation, as well as 78 cows from 10 bulls of different origin for the highest lactation, producing in the breeding farm «Atalyk Group».

Studies have shown that the actual productivity of cows with uniform selection varied from 3233 kg of milk, with a fat content of 3.81% from crossbred bulls to 3408 kg from purebred imported bulls. With moderately heterogeneous and heterogeneous types of selection, the variation in cow milk yield turned out to be less. The variability in milk yield of daughters of linear bulls, when using different types of selection, decreased compared to mothers; of daughters of crossed bulls with a homogeneous type of selection increased, with a moderately heterogeneous and heterogeneous selection it decreased. In daughters of purebred imported bulls, with a homogeneous and moderately heterogeneous type of selection, it increased, and with a heterogeneous type of selection, it remained at the level of variability of mothers; in daughters of crossbred bulls with homogeneous and moderately heterogeneous types of selection increased, and with a heterogeneous type of selection, on the contrary, decreased [5]. It should be noted that the variability in milk fat content was relatively low in all cases.

The standard deviation of mothers' milk yield for 1 lactation, when using linear bulls of different types of selection, varied from 529 to 703 kg, and their daughters - from 495 to 646 kg with an average of 423 to 649 kg.

When using crossed bulls, the standard deviation of mothers' milk yield varied from 505 to 955 kg, and their daughters - from 630 to 776 kg, with an average of 549 to 741 kg.

When using purebred imported bulls, the standard deviation of milk yield of mothers varied from 503 to 781 kg, and of their daughters - from 854 to 924 kg, with an average of 893 to 875 kg.

When using crossbred bulls, the standard deviation of milk yield for mothers varied from 643 to 831 kg, and for daughters - from 636 to 752 kg, with an average of -647 to 746 kg, respectively.

The correlation between the milk yield indicators of ancestors, parental indices of the bulls used and their daughters in most cases, when using bulls of different origins, was significant with fluctuations from negative to positive. In 8 cases out of 24, the correlation was negative, of which 6 cases were not significant. The highest and most positive correlation was between the milk yield indicators of ancestors and daughters when using crossbred bulls in different types of selection.

Type of selection	MO	RIB	RID	Mother	Daughter
Daughters of the Linear Bulls					
Homogeneous	23.51	22.69	21.94	22.77	21.77
Moderately heterogeneous	28.39	31.97	17.95	25.23	20.69
Heterogeneous	39.46	37.22	24.93	25.31	22.39
Daughters of crossed bulls					
Homogeneous	20.92	15.54	20.34	22.53	24.69
Moderately heterogeneous	23.51	22.69	21.94	22.77	21.77
Heterogeneous	30.10	21.11	20.56	27.26	24.90
Daughters of purebred imported bulls					
Homogeneous	7.79	16.57	7.75	9.88	21.39
Moderately heterogeneous	7.79	16.57	7.75	9.88	21.39
Heterogeneous	7.76	10.88	9.13	12.94	23.75
Daughters of crossbred bulls					
Homogeneous	25.68	16.31	23.28	23.16	25.56
Moderately heterogeneous	25.68	16.31	23.28	23.16	25.56
Heterogeneous	28.84	18.40	18.16	22.76	23.97

Table 1: Variability of Milk Yield Among Ancestors and Descendants (in%)

In terms of fat content in milk, the correlation was in most cases high and significant at different levels, in 6 cases out of 14. However, in 20 cases the correlation between fat content in milk was negative and unreliable [6].

The results of the studies showed that the productivity of 678 cows during the highest lactation, originating from 35 bulls of different origins with different types of selection, the milk yield of mothers varied from the standard deviation from 831 to 1068 kg, for daughters - from 935 to 1030 kg.

The correlation of milk yield between ancestors and daughters in most cases was highly reliable, both overall across the entire array and with individual types of selection (P 0.01). With a homogeneous selection, a positive and significant correlation was

found only between the parental milk indices of bulls and the milk yield of daughters (P 0.05). In terms of fat content in milk, the relationship between ancestors and daughters was in most cases negative and unreliable.

Type of selection	MO- daughter	RIB- daughter	RID- daughter	Mother- daughter
Daughters of the Linear Bulls				
Homogeneous	-106	-107	-0.06	-0.19
Moderately heterogeneous	0.30	101	0.96	100
Heterogeneous	176	174	209	104
Daughters of crossed bulls				
Homogeneous	164	117	200	209
Moderately heterogeneous	-116	-147	-0.09	-119
Heterogeneous	-296	-232	-0.66	298
Daughters of purebred imported bulls				
Homogeneous	0.15	272	0.066	120
Moderately heterogeneous	-114	0.93	-0.94	-0.63
Heterogeneous	-0.46	0.14	0.42	129
Daughters of crossbred bulls				
Homogeneous	233	223	245	235
Moderately heterogeneous	216	221	309	220
Heterogeneous	297	299	396	0.32

Table 2: Correlation of Milk Yield Between Ancestors and Daughters at Different Types of Selection Based on Milk Yield

Thus, cows obtained from linear bulls with homogeneous selection had a negative relationship of milk yield with ancestors with fluctuations from -0.107 to -0.019 and, conversely, cows obtained from linear bulls with moderately heterogeneous and heterogeneous selection had a positive relationship of milk yield with ancestors with fluctuations from 0.030 to 0.309.

Cows obtained from crossed and purebred imported bulls with homogeneous selection had a positive relationship between milk yield and ancestors with a variation from 0.015 to 0.272.

In moderately heterogeneous and heterogeneous selections, the relationship between cow milk yield and ancestors varied from negative, ranging from -0.296 to 0.298.

Cows obtained from crossbred bulls with different types of selection had a positive and significant correlation of milk yield with their ancestors [7]. Only when there was heterogeneous matching between mothers and daughters was the correlation positive and insignificant ($r = 0.032$).

Type of selection	MO- daughter	RIB- daughter	RID- daughter
Milk yield, kg			
Homogeneous	0.64	125	0.51
Moderately heterogeneous	186	223	234
Heterogeneous	227	219	278
By fat content (%)			
Homogeneous	0.50	0.03	-0.17
Moderately heterogeneous	-112	-0.84	-0.52
Heterogeneous	-0.48	-0.07	-0.48

Table 3: Correlation Between Milk Yield and Fat Content Among Ancestors and Daughters with Different Types of Selection for Milk Yield

4. Discussion

To obtain good milk yields, it is necessary to know the reasons

for the decrease in productivity in order to prevent them in time and eliminate them when they occur [8]. There are many factors

influencing productivity. As is known, within the same animal species, sex and age, the level, character and qualitative side of productivity depend on the action of two groups of factors: 1) hereditary breed and individual characteristics of animals; 2) conditions of existence and exploitation of animals. Selection and selection of pairs is the most important element of gene pool reproduction and a technique for improving dairy cattle breeds. Properly organized methodological selection followed by targeted selection increases the efficiency of selection and breeding work in cattle breeding. In this regard, numerous studies have been conducted to study the influence of types and types of selection on the subsequent productivity of livestock [9,10].

- Mukhtarova O.M. notes that paratypic factors, the level of productivity of the maternal herd, as well as exterior and constitutional features, make it possible to conclude that animals obtained by breeding three lines with the maintenance of one through the father of the mother, mother and father showed the best productivity results in contrast to contemporaries obtained by crossing multiple lines.
- Z.M. Aisanov, G.T. Torchokov, based on their research on the influence of the type of selection on milk productivity, revealed that the animals of the moderately heterogeneous selection group were characterized by the highest milk yield than those of the animals of the homogeneous and heterogeneous selection groups.
- Ignatieva S.P. in her research “assessing the effectiveness of types and types of selection for productivity and kinship” notes that the greatest effect of increasing milk yield per generation is associated with the compatibility of pairs in varieties of cross-lines; daughters from cross-lines outperformed peers from intra-line selections by 233 kg.

The above data from studies by different scientists are contradictory, i.e. There is no consensus on the effect of selection types on livestock productivity. In this regard, we conducted a study to study the influence of selection types on the variability of productive traits, the data of which are given above. For the first time in the Kyrgyz Republic, such research is being conducted on the Alatau breed, and the data obtained must be taken into account in further livestock selection.

5. Conclusion

Based on the above and the results of the experimental data obtained, we made the following conclusion: cows obtained from linear bulls with uniform selection had a negative relationship between milk yield and ancestors with fluctuations from -0.107 to -0.019, and vice versa, cows obtained from linear bulls with moderate - heterogeneous and heterogeneous selection had a

positive relationship between milk yield and ancestors with fluctuations from 0.030 to 0.309; cows obtained from cross-bred and purebred imported bulls (Schwitz of American selection) with homogeneous selection had a positive relationship between milk yield and ancestors with a variation from 0.015 to 0.272.

With moderately heterogeneous and heterogeneous selections, the relationship between cow milk yield and ancestors varied from negative, ranging from -0.296 to 0.298. Only when there was heterogeneous matching between mothers and daughters was the correlation positive and insignificant. ($r=0.032$). The above data indicate that during further selection of Alatau cattle it is necessary to take into account the influence of the type of selection on the subsequent productivity of animals.

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