Economic use of cows of red-motley dairy breed in pedigree factories of Voronezh region

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Abstract. The article describes the milk productivity of the main genealogical lines of cows of the Voronezh type of red-mottled dairy breed of cattle bred in the Voronezh region, taking into account the linear affiliation. A sample of cows produced breeding plants area of PZ "Druzhba" and PZ "Bolshevik". Analyzing the results of milk production and longevity of livestock, paid attention to the number of cows on lactations; percentage of disposal to 1 lactation; milk yield for 305 days of lactation, kg; milk yield of average productivity for 305 days of lactation, kg; average age of cows in lactations; lifetime productivity of cows, kg.

1. Introduction
The main direction in the breeding business with dairy cattle is still the use of the best specialized dairy breeds of the world gene pool, in particular the Holstein breed, crossed with bred domestic breeds in order to increase the potential of dairy productivity and manufacturability of animals [1].

Due to universal productivity and good ability to acclimatize red-mottled dairy breed of cattle in a short time spread in 12 regions of the Russian Federation, including five regions of the Central, three-southern, three regions and the Republic of Mordovia of the Volga district, in the Republics of Buryatia, Altai, Khakassia, Altai and Krasnoyarsk territories, the Amur region and the Chechen Republic of the North Caucasus Federal district.

The best herds on productivity and number are concentrated in farms of Krasnoyarsk Krai and in the Central Federal district of Russia [2].

The specific gravity of red-mottled dairy breed according to N. I. Strekozov (2008) amounted to 3.7%, according to I. M. Dunin (2010) – 5.5% and according to the Yearbook on breeding work in dairy cattle in the farms of the Russian Federation on 01.01.2018 g – 4.5% of the total number of dairy cattle bred on farms of all categories in the Russian Federation, thus the number of livestock for 2 years (from 2008 to 2010) increased by 1.8% and for 7 years remains at the same level, with an annual decline in cattle in the territory of the Russian.

The basis of the principle of selection and consolidation of breeds for a certain zone and areas presents economic necessity and economic feasibility. According to the established order in one area it is expedient to breed two-three breeds, and in each economy one, seldom two.

In order to achieve economic feasibility, cost-effective milk production and provision of the population with adequate food, it is necessary to have highly productive herds. But do not forget that
more adapted and adapted to a certain habitat animal are able to produce more milk [2, 6].

On 01.01.2019 Total breeding livestock of a dairy direction of efficiency (red-white breed, Simmental breed and black-and-white breed, Montbeliard, Jersey) – 96.0 thousand heads (117 % compared to last year), including cows – 42.2 thousand heads (121 % compared to last year). The proportion of breeding cattle to the total population is 46 %, cows-43%.

According to operational data on 01.01.2019 gross milk production in tribal enterprises made 322.6 thousand tons (122 % to level of last year) and the average productivity in forage-fed cow amounted to 8401 kg, 142 kg above the level of 2018 and 1480kg above the average regional rate (by area 6921 kg).

The level of milk productivity and the composition of milk are determined by many factors, which in their influence can be combined into two main groups: external and internal. External factors are determined by the influence of the environment, internal-genetic data and physical condition. [7]

The development of the genetic potential of animals in each subsequent generation contributes to the cultural management of livestock reproduction, that is, 100 % use of artificial insemination of animals. For each year in JSC "Breeding "Voronezh" 250.0 thousand doses of high-quality biomaterial were used.

Work on improving the breed composition is carried out not only with the use of domestic, but also with the involvement of foreign breeding resources.

2. Problem statement
In modern conditions of milk cattle-breeding, production and longevity of cows largely determines the rational use of pedigree resources of the breed and enhance the economic efficiency of milk production.

However, as the world experience and the experience of the leading breeding farms of Russia shows, the higher the genealogical potential of animals, the lower the term of their economic use.

In this regard, with the further improvement of the red-mottled breed of cattle and, in particular, the Voronezh type, it is important not only to increase the level of productivity of the qualities, but also to rise the term of their use.

We made the analysis of duration of use of a shelter in the leading breeding plants PZ "Friendship" and PZ "Bolshevik" of Voronezh region. The analysis included 3,544 cows eliminated from these herds with complete lactation over the past 15 years. This livestock belonged to the three main genealogical groups: Montik of Ciftan, Reflexin Sovering and Vis Back Idea. Moreover, in each genealogical group was selected offspring derived from bulls, both local and imported.

3. Materials and methods
The experimental work was conducted in a leading tribal plant of the region: PZ "Druzhba" and PZ "Bolshevik". The analysis included 3,544 cows eliminated from these herds with complete lactation over the past 15 years. This livestock belonged to the three main genealogical groups: Montik of Ciftan, Reflexin Sovering and Vis Back Idea. Moreover, in each genealogical group was selected offspring derived from bulls, both local and imported collective farm PZ "Druzhba", PZ "Bolshevik" Voronezh region, and in research laboratories "Voronezh State Agricultural University after Emperor Peter the Great". The objects of our studies were cow red-and-white dairy breed.

4. Discussion of results
PZ "Druzhba" of Pavlovsky district, PZ "Bolshevik" of Khokhol'skiy district of Voronezh region occupy a leading position on breeding a Voronezh-type of red-motley breed of cattle.

The results of milk productivity and productive longevity of the analyzed population depending on the genealogical affiliation and origin of the bulls are presented in table 1, 2 and 3, and figures 1, 2 and 3.

These tables indicate significant differences in the duration of use of the cows produced from local and imported sires. Thus along the lines of Montvic Chiftain this difference amounted to 0.16 lactation, Reflection of Sovering 0.32 and Vis Back Ideal 0.4 lactation. Thus there is a clear trend in the changes of average milk production and lifetime productivity. Thus the average milk yield of cows produced
from local bulls in all three groups is lower than in the offspring from imported stock by 62-135 kg. Lifetime productivity is higher by 623-2241 kg.

Table 1. Production Longevity of Montvik Chiftain Line

| lactation | local bulls | imported bulls |
|-----------|-------------|---------------|
|           | % of retirement by the 1<sup>st</sup> lactation | milk yield for 305 days of lactation | % of retirement by the 1<sup>st</sup> lactation | milk yield for 305 days of lactation |
| 1         | -           | 5540          | 403          | -           | 6124          |
| 2         | 20.2        | 6352          | 289          | 28.3        | 6385          |
| 3         | 49.0        | 6535          | 204          | 49.3        | 6431          |
| 4         | 54.0        | 6728          | 173          | 57.0        | 6485          |
| 5         | 70.5        | 6023          | 111          | 72.5        | 5933          |
| 6         | 87.5        | 6129          | 75           | 81.3        | 5844          |
| 7         | 90.0        | 6012          | 8            | 98          | 6123          |
| 8         | 95.1        | 5944          | 3            | 99.3        | 5422          |
| 9         | 98.2        | 6105          | -            | 100         | -             |
| 10        | 99.6        | 5632          | -            | -           | -             |
| 11        | -           | 100           | -            | -           | -             |

Table 2. Production and Longevity of Cows of Reflection Sovering Line

| lactation | local bulls | imported bulls |
|-----------|-------------|---------------|
|           | % of retirement by the 1<sup>st</sup> lactation | milk yield for 305 days of lactation | % of retirement by the 1<sup>st</sup> lactation | milk yield for 305 days of lactation |
| 1         | -           | 5561          | 415          | -           | 6183          |
| 2         | 19.9        | 6284          | 275          | 33.7        | 6244          |
| 3         | 47.4        | 6425          | 166          | 60          | 6301          |
| 4         | 54.3        | 6531          | 133          | 67.9        | 6105          |
| 5         | 67.5        | 6108          | 89           | 78.5        | 6083          |
| 6         | 85.2        | 6002          | 56           | 86.5        | 5425          |
| 7         | 91.5        | 5958          | 34           | 91.8        | 5623          |
| 8         | 97.3        | 5998          | 14           | 96.6        | 6003          |
| 9         | 98.5        | 5551          | 2            | 99.5        | 4740          |
| 10        | 99.1        | 4893          | -            | 100         | -             |
| 11        | -           | 100           | -            | -           | -             |

Table 3. Production and Longevity of Cows Vis Back Ideal Line

| lactation | local bulls | imported bulls |
|-----------|-------------|---------------|
|           | % of retirement by the 1<sup>st</sup> lactation | milk yield for 305 days of lactation | % of retirement by the 1<sup>st</sup> lactation | milk yield for 305 days of lactation |
| 1         | -           | 5935          | 404          | -           | 6284          |
| 2         | 25.0        | 6401          | 294          | 27.2        | 6725          |
| 3         | 37.1        | 6637          | 183          | 54.7        | 6503          |
| 4         | 50.9        | 6585          | 154          | 61.8        | 6591          |
| 5         | 59.5        | 6415          | 103          | 74.5        | 6123          |
| 6         | 85.1        | 6218          | 64           | 84.2        | 5935          |
| 7         | 88.5        | 6006          | 7            | 98.2        | 6111          |
| 8         | 97.1        | 5934          | 1            | 99.7        | 5240          |
| 9         | 98.7        | 6106          | -            | 100         | -             |
| 10        | 99.8        | 5924          | -            | 100         | -             |
| 11        | -           | 100           | -            | -           | -             |
Figure 1. Diagram of milk average productivity yield for 305 days of lactation

Figure 2. Diagram of average age in lactations

Figure 3. Diagram of life productivity
5. Conclusion

To conclude with, it is necessary to note that all the above mentioned aspects indicate the need for wider use of read-motley dairy breed of local bulls in the regional breeding farms. This will allow the prolongation of economic use of the cows and the increase lifetime milk productivity.

References

[1] Artemov E S, Vostroilov A V and Nezhdanov A G 2011 Productive qualities and reproductive functions groups of cows for custom-made pairing of red-motley breed Vestnik of Voronezh State Agrarian University 1 70-74

[2] Vostroilov A V and Artemov E S 2011 Voronezh region it’s an area of milk cattle breeding zone Actual problems of animal husbandry, veterinary medicine, processing of agricultural products and commodity science: Materials of scientific and practical conference of faculty and postgraduate staff of faculty of technology of animal husbandry and commodity science and faculty of veterinary medicine 139-145

[3] Strekozov N 2008 Dairy cattle breeding in Russia: present and future Zootechny 1 18-22

[4] Dunin I M, Adgibeok K K and Lozovaya G S 2011 Prospects of breeding of red-mottled breed of cattle in the Russian Federation Zootechny 12 2-4

[5] Dunin I M and Amerchanov Ch A 2018 The Yearbook on breeding work in dairy cattle breeding in farms of the Russian Federation (Forest Glades: FGNU Vniiplem).

[6] Baranikov A I and Pristupa V N 2008 The technology of intensive animal husbandry (Rostov n/D: Phoenix)

[7] Parshin P A, Vostroilov A V, Kuznetsov N, Nikulin I A and Parshin V I 2007 Productive qualities of cows and calves when included in the diet of biologically active substances Veterinary Pathology 44(2) 200