Genetic identification of beef and dairy cattle breeds in four regions of Russia

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Introduction

Genetic identification of cattle is carried out in Russia using immunogenetic analysis and various identification methods. No organization, other than the institutions of the Russian Ministry of Agriculture, does not carry out the identification process in accordance with international ISAG rules. The issue of harmonization of microsatellite analysis and analysis of gene chips is a prerequisite for determining the credibility of the origin of bulls for calculating the breeding value (from 2018). Today, an important task is the formation of a unified system of genetic identification of animals in Russia is an important task. There are many different companies that genotype livestock as they want, without coordinating their methods with ISAG, hiding behind nepotism issued by other scientific organizations in the EU (ВИЖ, МойГен, МГУ, ВНИИГРЖ, Мираторг, Сколково, Кивелью и т.п.) and presenting these data as the basis for genomic selection in Russia, which is not correct by approaching the genotyping of livestock in Russia.

Materials and methods

The genetic identification of animals and the definition of their relationship by parents were conducting. In the Moscow, Arkhangelsk, Tyumen and Yaroslavl regions genotyping of bull sperm was carried out at analysis of 11-15 microsatellite loci (BM1824, SPS115, TGLA53, TGLA227, ETH3, BM2113, TGLA122, BM1818, INRA023, ETH110, ET225, INRA124), which are fully comply with the standard ICAR panel. The analysis involved the breeds - Yaroslavl, Kholmogory, Holstein, Black-and-white, Salers, Abrac, Aberdeen Angus, Hereford, (351, 150, 95, 302, 125, 1600, 175, 222 heads respectively). A panel of microsatellite loci was developed and jointly tested by Grodno State University, which is already certified according to the ISAG standard for genotyping cattle.

Results and discussions

When conducting genetic testing of livestock numbers, the first thing we encountered was the errors in the overwhelming evidence of the origin of animals. The reason for such errors that occur during the primary accounting can be three - it is an unintended error, a data distortion error to fit the genotype under the genotype of the father and mother, an error of poor-quality genotyping and then fit the data under the correct result.

Unfortunately, in the breeding farms to obtain benefits and subsidies from the state, there is a practice of distorting the initial data of identification, as well as the use of outdated immunogenetic testing, which allows to dispel errors due to the lower resolution of the method.

In the course of the study, errors of mother registration were detected from 1%, while the father of such errors revealed 0.3-0.5%. At the same time, the largest number of errors was found in commercially aggressively promoted Holstein breeds (from 7% of errors and black-and-white cattle of Holstein-Frisian origin - from 11% of the errors during primary accounting.

Such errors were revealed for beef cattle significantly less - 1-24%, despite the fact that this cattle usually mate with one another freely and artificial insemination is used to a weaker degree.

The most negative point is that at present any company in Russia that has not passed certification, but which has the possibility of genetic testing, can genotype animals and transfer data to breeding enterprises that enter distorted data into animal productivity databases and evaluate their breeding value significantly erroneous in individuals or in scientific organizations, and not at the state level. Currently, there are no laws that would limit liability for data corruption and force enterprises to keep correct records of the origin of animals.

The only thing that could be done to improve this situation is to create a network of laboratories that are loyal to the Ministry of Agriculture and who are testing in accordance with the international standard despite the overall sad picture of the situation. Unfortunately, immunogenetic testing of livestock is still the prevailing method of testing, while genotyping databases on microsatellite loci and genetic SNP chips are in the hands of commercial companies (conducting genomic selection today!) and closed, so according to Russian legislation cannot be tested for the validity of the data.

Conclusion

A transition is underway to the ICAR and ISAG standards in the field of genetic identification of animals in three regions of Russia for competent management of breeding and breeding work, as well as the sale of genetic material and breeding animals at farms in the framework of genetic expertise testing.

As the only and key research institute in Russia, VNIIPLEM MARF collect data on the genotyping of livestock and organize the acquisition of these data in accordance with the international ISAG / ICAR standard, forming proven animal pedigrees matrices and evaluating the breeding value of cattle since 2018. In work specialists following to recommendations ICAR and developers of tribal evaluation methods.

This work was supported by the grant of the Ministry of Agriculture of the Russian Federation No. 082-03-1290.