

MOLECULAR-GENETIC RESEARCH IS BEING CARRIED OUT IN CATTLE

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ABSTRACT

The article presents the preliminary results of molecular genetic studies of the blood of breeding bulls- producers of domestic Bushuev cattle breed for the purpose of their genetic certification and early prediction of breeding and productive qualities.

KEYWORDS: *Bushuev Breed Gene Pool, Molecular-Genetic Research, Genetic Passport, DNA, Selection.*

INTRODUCTION

The preservation of genetic diversity in our republic, including the preservation and reproduction of the valuable gene pool of cattle of the disappearing national Bushuev breed, is one of the pressing problems of today. In solving this problem, the use of molecular-genetic methods and genetic markers, a great achievement of modern genetics, plays an important role.

Molecular-genetic studies provide an opportunity for cattle DNA to study changes in important genes that control farm-beneficial productivity indicators in takibi, determine the formation of their high-performance determinant, and predict cattle offspring and productivity indicators early.

THE MAIN PART

Today, the number of heads of white cattle of the Bushuev breed is decreasing, the only cattle breed created in our republic. Another correct way to preserve its valuable gene pool is to conduct a molecular-genetic analysis of the blood of moles of this breed and predict their useful signs for the farm in advance.



Figure 1. Purebred cow of the Bushuev breed



Figure 2. Bushuev purebred bull

In order to carry out this promising research work in the field of Biotechnology, the Research Institute of livestock and poultry has developed a scientific and practical project on the topic “Development of molecular panels for the creation of a genetic passport of animals of a unique breed”, prepared on the example of the unique Bushuev breed. This project successfully passed the competition of projects of the Ministry of innovation development of the Republic of Uzbekistan and received a positive assessment at the scientific and technical Council of the ministry.

The project aims to preserve genetic diversity in the Republic, including preserving and reproducing the valuable gene pool of our endangered national Bushuev breed cattle by conducting molecular genetic research in the history of New Uzbekistan, and solving the problem of creating a genetic passport of the breed.

A genetic passport is an electronic base of animal DNA. It will reflect the unique genetic and immunological characteristics of the animal, productivity, and the ability (immunity) to resist various casuals. It is considered an innovation document that covers the molecular-genetic study of animal DNA specific STR and SNP genotyping I polymorphism.

Also, this project is aimed at the implementation of the tasks of the “Program of measures for the implementation of priority activities of the Ministry of innovation development for 2021-2022” approved by the decree of the president of the Republic of Uzbekistan dated April 1, 2021 PF-6198.

The scientific novelty of the project is that for the first time in the conditions of Uzbekistan, in order to preserve and restore the gene pool of cattle of the Bushuev breed, animal blood is evaluated polymorphically by protein types, genetic markers are used, molecular panels are developed, and their use in selection and breeding work is introduced into production.

Research is carried out on farms of Tashkent and Syrdarya regions. Although the project was not funded by the project, scientists of the Institute in August 2022 received 3 heads of the Bushuev breed, including the nickname “Katlavan”, which is being cared for and used in seed production at the Uzbek State Enterprise in the Kibray District of Tashkent region. Blood was drawn from purebred Bulls No. 55720, inv No. 00012916, whose nickname was “Barbos”, and whose nickname was “Sherhan” and inv No. 00012920.

Blood samples were submitted to the Uzfa Institute of genetics and Experimental Biology of plants for genetic analysis.

RESULTS AND DISCUSSIONS

Identification and isolation of genes that carry hereditary diseases of cattle is carried out using the PZR apparatus. Thanks to this, the incidence of cattle is reduced by up to 25%. Or cattle morbidity can be reduced by up to 50% due to the exclusion of these genes from DNA by identifying the genes that carry a certain disease in cattle. For example, in genetic passports, CVM (complex Vertebral Malformation) leads BLAD – leukocytes to adgesia deficit, that is, immunodeficitis, which causes the spine to be intolerant to complex heart porogic diseases. It has been proven in research that the presence of genes in the DNA of cattle in the combination of DUMPS destroys the fetus (embryo) in the cow's womb. And in the MFC combination of genes – calves can not walk at all.

The study of the above marker gene changes is carried out in a molecular-genetic way, using the necessary genetic markers. When targeted selection work is carried out according to the results of genetic tests, multiple hereditary diseases are prevented in newborn calves, the maximum content of casein protein in milk creates an opportunity to increase the milk productivity of cows.

The reaction of amplification of DNA fragments is a German-made programmer “Rotor-Gene Q” “QIAGEN Hilden” the amplifier of his firm is held in the optimal temperature and duration modes, developed for each individual set of primers.

Using molecular-genetic methods from the blood of purebred cattle of the Bushuev breed Thermo Fisher Scientific the firm invitrogen DNA was separated by reagents.

№	Stage 1
1	A sample of the blood of cattle of the Bushuev breed is taken 300 mg.
2	200 mg meselium is crushed into a homogenizer in a liquid H ₂ medium.
3	The finished homogen is placed in 1.5 Eppendorf.
4	Pure Link Genomic Digestion buffer 180 mkl is adjusted
5	Protenase-K is administered 20 mkl.
6	Add to the thermostat for 55C ⁰ degrees of incubation and stir every 10 minutes, kept stirring for 2 hours.
7	Taking from the thermostat t-20 C ⁰ degrees put in the refrigerator.

As a result of molecular-genetic analysis at the rate of one of the studies, DNA was extracted from a blood sample of purebred Bulls of the Bushuev breed. DNA samples 0.9% in agarose gel 1xTBE (pH 8.3) it was examined by the method of gel-electrophoresis with a buffer, and after that the gel was stained with a solution of etidium bromide (EtBr) of 0.5 mcg/ml. In the device “Vzglyad” (Helicon, Russia), which visualizes the results of Gel electrophoresis and documents the transilluminator “Quantum-312” and gels, gels were taken into the picture.

Figure 3

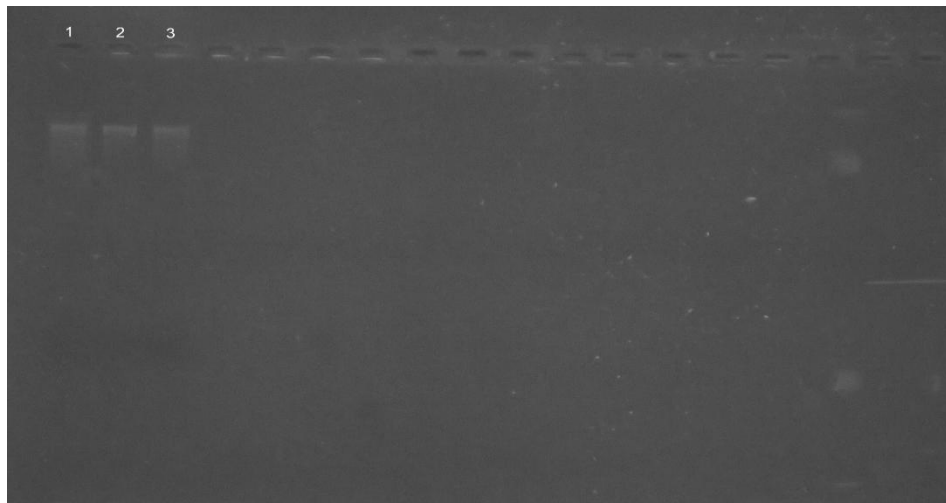


Figure 3. Electropherogram of cattle of the Bushuev breed.

EXPECTED RESULTS

1. The blood of purebred Bulls of the Bushuev breed is studied on the basis of genetic markers in relation to protein, polymorphic systems, and indicators of productivity and petting of the breed are determined.
2. By studying and analyzing the protein polymorphic systems of their blood, research will continue on the development of the molecular panel of the breed and the creation of a genetic passport;
3. Molecular panels will be developed to conduct bioinformatic analysis of STR loci, select high variabel and informatic STR loci, design prymers, create a genetic passport of the Bushuev breed of moles;
4. Affecting milk productivity and milk quality CSN3, CSN2, BLG, LALBA DGAT1, PRL, PIT-и GH bioinformatic analysis of genes, study of important functionally significant gene information, design allele special prymers and fluorescent TaqMan probes;
5. The DNA of animals of the Bushuev breed is genotyped by samples of STR loci and milk productivity and milk quality.

Within the framework of the project, the cooperation and solidarity between the **CSN3 (kapa-casein) gene**, which stands on the 6th chromosome of cow's DNA and controls milk productivity, and the **V-allele**, which controls the protein contained in milk and other quality indicators, is determined. Animals with few important genes that affect productivity are released (braked) into the pooch.

Once the project is funded, the following scientific results are expected as a result of its implementation:

1. In order to preserve the gene pool of cattle of the unique Bushuev breed created in Uzbekistan, their DNA markers are determined, and genes with valuable economic properties are evaluated polymorphism. To genetically passport animals of this breed, molecular panels are developed and a genetic passport is created.

2. An electronic database (Bank) of genetic information of animal biomaterials of the Bushuev breed is created. They will then be integrated into the international genetic database.

3. The results of the project will be commercialized and a patent will be obtained.

This molecular-genetic study in cattle was carried out for the first time in the history of the new Uzbekistan and is the first important step in the implementation of the genetic passport of our cattle of the National Bushuev breed.

We hope that this important promising project will be funded in the coming days, for the first time in the history of New Uzbekistan, the valuable gene pool of our cattle of the National Bushuev Breed will be preserved, a genetic passport will be created, their head number and productivity will be increased, selection and breeding work will be improved.

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