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Today conservation of biodiversity is one of the most important priorities in the world. Polymorphism of farm animals is a key to successful breeding; it provides animal adaptation to environmental changes. Impoverishment of genetic resources of farm animals can lead to various negative consequences, such as significant decrease of the effectiveness of selection, existing breeds will not be able to successfully resist to infectious agents evolving constantly; valuable material for the study and analysis of breed origin will be lost.

Local breeds created by national selection are valuable genetic resources. Lacking high performance in most cases, they are usually characterized by high resistance to various diseases.

Ukrainian Grey cattle, as a representative of the local native breeds, are an interesting object of population research in respect not only of adaptive characteristics, but also genetic mechanisms providing phenotypic expression of certain features of productivity.

Recent advances in molecular genetics have made it possible to identify genes associated with qualitative and quantitative characteristics of cattle. The most informative one in this regard is the DNA marker systems based on structural analysis of polymorphisms of genes involved in formation and operation of economically useful traits. The most common potential DNA markers of characteristics of cattle productivity include genes of growth hormone (bGH), beta-lactoglobulin ( $\beta$ LG), thyroglobulin (TG5), calpain (CAPN). bGH gene is an important regulator of somatic growth of animals and has lactating and fat-mobilizing effects. CSN3 gene is linked to milk protein ability and technological properties of milk. Different allelic variants of  $\beta$ LG gene are associated with high content casein and whey proteins in milk, fat percentage and positive impact on milk production. Milk products and falsification detection of milk are controlled by this gene. Its role has been proved in antimicrobial activity to pathogens of mastitis. TG5 gene is a precursor of thyroid hormones such as triiodothyronine and tetraiodothyronine participating in formation of fat cells and the formation of meat marbling. CAPN gene is involved in proteolysis during ripening of meat and leads to higher tenderness of meat.

The aim was to investigate the allelic polymorphism of genes of growth hormone, beta-lactoglobulin, thyroglobulin and calpain in Ukrainian Grey cattle.

Blood samples (n = 136) from Ukrainian Grey cattle at "Markeyevo" breeding farm (Kherson region) were studied. Molecular genetic studies were conducted at Laboratory of Genetics of Institute of Animal Breeding and Genetics nd. a. M.V. Zubets of NAAS. DNA isolation from whole blood was performed using standard commercial kit "DNA-Sorb-B" (produced by AmpliSens, Central Research Institute of Epidemiology, Russia). Polymorphisms of genes of GH,  $\beta$ LG5, TG and CAPN1530 was investigated by PCR-RFLP. Electrophoretic separation of restriction fragments of DNA was performed in 1.5% and 2% agarose gels in tris-borate electrophoresis buffer.

The results of DNA testing of beta-lactoglobulin locus for A- and B-allele variants in animals of Ukrainian Grey breed found that most of the cows were carriers of homozygous BB genotype of  $\beta$ LG gene. It was determined at every second investigated animals. Homozygous AA genotype was found only at two cows or it is 4%. AB genotype was represented at 45% of animals.

Thus, the study found a significant prevalence of frequencies B allele over A allele (0.736 and 0.264, respectively), which leads to overwhelming homozygotisation of one of these alleles. B allele in beta-lactoglobulin gene is associated with high content of casein protein in milk and a high percentage of fat.

The values of expected and observed heterozygosity at this gene were not significantly different.

The study of gene polymorphism of thyroglobulin found that at the population of the represented breed, the most often seen heterozygous genotype was CT, carriers of which were 57% of the animals. In homozygous state C allele was in 31% of the animals, and T allele – only in 11%. Regarding the level of heterozygosity, we received that actual heterozygosity exceeded theoretically expected one. However, difference is statistically insignificant. Consequently, for thyroglobulin gene Ukrainian Grey cattle belong to breeds that carry the highest frequency of desired C allele for marbling of meat.

The analysis of gene polymorphism of bGH indicates the absence of the animals with genotype VV in the investigated sampling, low percentage of heterozygotes (3%) and a significant portion of homozygotes for L allele (98%).

Significant differences on levels of actual and expected heterozygosity for somatotropin gene we haven't found.

One of the markers of quality characteristics of meat productivity of cattle is CAPN gene. In general, the animals of Ukrainian Grey breed are characterized by the absence of polymorphism for calpain gene. All the studied animals were carriers of homozygous genotype for preferred G allele (1,0). This feature of the genetic structure of the studied population by calpain gene, animals of which are reproduced in a small array, shows breed-specific high genetic potential by quality characteristic of meat productivity, namely, the tenderness of meat.

It was revealed that the population of Ukrainian Grey breed was characterized by low level of polymorphism for genes which cause milk production and meat quality indicators. Thus, homozygous genotype BB dominated for beta-lactoglobulin gene; homozygous LL genotype (98%) was also significantly prevalent and VV genotype was not detected for growth hormone gene; only genotype GG was generally found for calpain gene. And heterozygous CT genotype (57%) dominated only for TG5 locus of thyroglobulin gene.

**Keywords:** cows, economic-useful traits, molecular genetic markers, alleles, QTL-markers, PCR-RFLP