

# Genotypes database of pedigree cattle population in Kazakhstan and the introduction of a calculating mechanism for livestock parentage verification



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**Aim of work:** creation a national database and collection of genotyped DNA samples of cattle in Kazakhstan and the introduction of an automated statistical and mathematical calculation of the local pedigree cattle parentage verification.

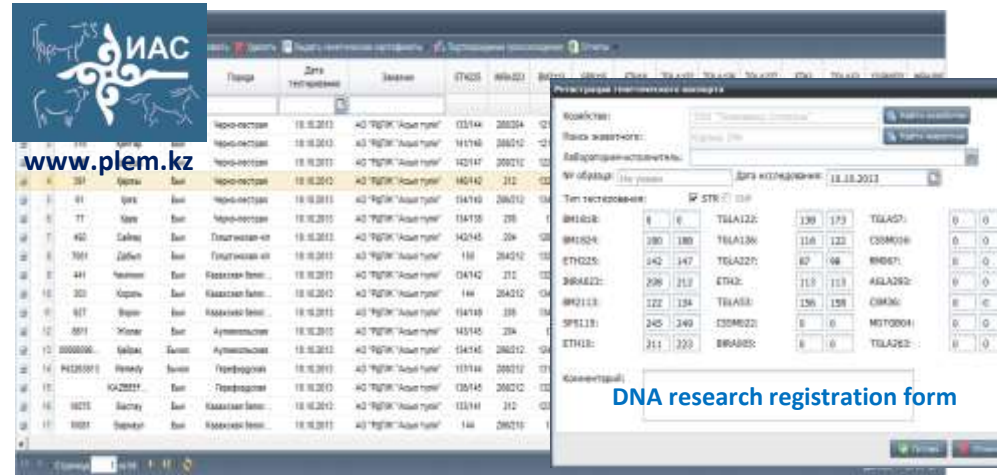
**The research objectives:**

- to collect biological samples and information about animals, genotyping the STR DNA loci, to study the distribution of lengths of repeats of microsatellites;
- to create a database of genotypes and implement a mechanism for calculating the reliability of origin.

The object of research is sires and calves of the Auliekol, Kazakh white-headed, Hereford, Aberdeen-Angus breeds and Obrak breed of North Kazakhstan



DNA and STR locus testing have been performed at the University of Queensland's Animal Genetics Laboratory (Australia)



Pic.1-Demonstration of the mapping of animal STR genotypes in the IAS system

$$R = \prod_{i=1}^N r_i \quad (1),$$

where  $r_i$  are local statistical frequencies for each of the studied loci from their total number  $N$ , and is calculated as:

$$r_i = 2p_i - p_i^2, \quad (2),$$

where  $p_i$  – the frequency of the corresponding  $i$  allele in the population

Table 1-List of farms and the amount of DNA studied

Farm	The number of samples (hair), units	DNA tested, samples	Name of breed
Mambetov company	95	95	Aberdeen-Angus
SKSOS LLP	58	58	Kazakh-White-Head
Krymskoe LLP	197	196	Kazakh-White-Head
Prirechnoe-Agro LLP	83	81	Aberdeen-Angus
Alimgaziev-Akylbel LLP	36	36	Auliekol
Adlet-T LLP	53	53	Kazakh-White-Head
Olshanskoe LLP	20	20	Kazakh-White-Head
Moskalevskoe LLP	116	115	Auliekol
Nur-Zhailau NS LLP	93	93	Aberdeen-Angus
Semenovka-AE LLP	60	60	Obrak
Total	811	807	-



Pic.2-Animal genetic certificate in the National DB

Tabl.2-Frequencies of homozygous alleles (states) for 21 microsatellite DNA loci in the context of rocks,%

The number of homozygous alleles in a single DNA sample	Name of breed					For all breeds
	Kazakh-White Head	Aberdin-Angus	Auliekol	Obrak	Hereford	
1	1,23	0,40	-	-	-	0,83
2	4,09	-	1,32	3,33	-	2,82
3	8,17	2,40	2,65	1,67	14,29	5,98
4	13,35	8,40	5,30	5,00	-	10,80
5	16,76	7,20	15,89	21,67	-	14,78
6	18,39	16,40	17,22	25,00	14,29	18,19
7	16,08	15,20	18,54	13,33	42,86	16,20
8	10,76	13,20	20,53	16,67	28,57	12,87
9	7,22	14,80	10,60	10,00	-	9,30
10	2,04	10,80	5,30	1,67	-	4,24
11	1,23	5,60	-	-	-	1,99
12	0,54	4,00	2,65	1,67	-	1,58
14	0,14	1,60	-	-	-	0,42