

# Genetic Uniqueness And Socio-Cultural Conservation Values of the Endangered Yakutian Cattle

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## Introduction

The Yakutian Cattle from the Sakha Republic in the Russian Federation are the last remnants of the Siberian aboriginal cattle. The breed is endangered and the current census size is 1,200 animals, of which <600 are dairy cows and about 30 breeding bulls. The census size has remained stable during the recent years. Up to 74% of the Yakutian Cattle are distributed in the Eveno-Bytantay district locating about 150 km north of the Arctic Circle. In this region, the permafrost depth is several hundred meters. The breed is adapted to the harsh Siberian environment, long and cold winters and short summers. Currently, the breed is protected by a law concerning the conservation and use of the breed.

The local farm animal breeds are considered to represent distinct values, from the direct-use values to the potential value for the future animal breeding and food systems. Various values have been identified and discussed by many researches and policy programmes. The existing international conventions define the basic objectives and methods of conservation, and additional international, national and local measures and programmes are ongoing.

Here we present a multidisciplinary approach to examine values of the Yakutian Cattle and motives for their conservation. We study genetic divergence of the Yakutian Cattle from other Eurasian cattle breeds and evaluate their values by interviews of animal owners, policymakers and other stakeholders, socio-cultural studies, demographic data, history and literature research, and media analysis. In our analyses, we have taken into consideration the values and practices of the communities where the breed exists. Participatory and bottom-up approaches are called for in order to realise the aims the policies have set (UNESCO & UNEP (2003); FAO (2007)).

## Material and methods

**Examination of genetic distinctiveness.** The neutral genetic diversity of the Yakutian Cattle was examined by analysing 30 autosomal microsatellites, 5 Y-chromosomal microsatellites and mitochondrial DNA (mtDNA) D-loop sequences (255 bp) and were compared with the respective data of 20, 54 and 34 Eurasian cattle breeds (Li et al. (2007); Kantanen et al. (2009)). Within-breed diversity was quantified by expected heterozygosity averaged across

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the autosomal loci and average allele number per locus (Li et al. (2007)). Genetic diversity between the breeds was computed according to  $D_A$  distance of Nei et al. (1983). Multiple mtDNA D-loop sequence alignments were performed using the Clustal X package (Thompson et al. (1997)). Haplotype diversity was computed for mtDNA and Y-data and reduced median-joining and median-joining network were constructed for mtDNA- and Y-haplotypes, respectively. More detailed description on analyses and information on the used computer programs are available in Li et al. (2007) and Kantanen et al. (2009).

**Identification of distinct socio-cultural values.** Materials for identifying socio-cultural values of the Yakutian Cattle were obtained from several different sources. We conducted a total of 71 interviews with animal owners, villagers, researchers, animal breeding experts, local residents and public officers in the Eveno-Bytantay District and in Yakutsk (the Capital of the Sakha Republic) in 2005. The interview data was analysed through a qualitative content analysis. Two anthropological field trips were conducted in 2004 and 2005 and everyday life in the District was analysed through an ethnographic documentation study. In addition, we analysed articles published in two Sakha newspapers (Yakutia and Sakha Sire) concerning the Yakutian Cattle and their conservation, investigated original statistical materials on demographic data and conducted history and literature research.

## Results and discussion

Based on our multidisciplinary studies, we identified six different values in the Yakutian Cattle: ecological, economic, social, political, cultural and ethical (Table 1). The genetic analysis revealed that the Yakutian Cattle displayed Y-chromosomal haplotype, which is not common in the European breeds, and mtDNA haplogroup T4, which has not been found so far in the Near Eastern or European breeds (Kantanen et al. (2009)). The breed showed genetic distinctiveness and a lower level of within-breed variation (Li et al. (2007)), but appeared to have its ancestries in the domesticated Near Eastern cattle (Kantanen et al. (2009)). The Yakutian Cattle have experienced a long period of genetic isolation, and may be based on a small founder population.

The most obvious value of the Yakutian Cattle to the inhabitants of the Eveno-Bytantay District is use for local food production. Besides providing food, the cattle produce manure for the construction of cowsheds and for fertilizing soil used in the greenhouses and home gardens. Oxen also serve as means for transporting. The local residents appreciated the traits of the cattle: good health, resistance to diseases, adaptation to the local weather conditions, modest feed requirements, ability to find water by themselves, high fat content of the milk and the general multipurpose nature of the cattle.

Although private households now own 70% of the cattle, we noticed that cattle production, with all its implications, extended to a wider social sphere, to the community at large. For example, haymaking represented a common effort. Summertime, which passes in a few weeks, has to be used efficiently and co-operation is essential. Working together, in the various phases of the work and in the allocation of material resources and know-how, contributes to the formal and informal networks within the local community.

The Yakutian Cattle were often mentioned as being the only cows that survived in the harsh climate conditions of northern Sakha with poor nourishment. The cattle were of crucial importance for keeping the northern area settled. The animals were regarded as the guarantee for the self-sufficiency of the remote, isolated district, which implies that the main reason to conserve the cattle has not changed since the old times.

In the Eveno-Bytantay District, keeping Yakutian Cattle, Yakutian Horses and reindeers as well as hunting and fishing, represent the core of the local livelihoods and the local culture. The current cattle production system was found to constitute a complex mixture of historical, symbolic and identity values. We found continuities, breaks in traditions, as well as recently received traditions and new practices. In general, the cattle contributed to the ethnic and regional identity of the local residents. Some of the interviewees talked about the long common history of the cattle and the Yakutian people: the breed belongs to them and makes them different from the other people and other villages.

**Table 1: Values of the Yakutian Cattle identified with the multidisciplinary analysis.**

<b>Value category</b>	<b>values/functions</b>	<b>description</b>
Ecological	genetic diversity	material for cattle breeding
	adaptability to local ecological system	living in harmony with nature
	intrinsic	preservation of genetically unique breed
Economic	products	milk, meat, hide, manure
	services	transport
	genetic diversity	material for cross-breeding
Social	social security	savings, education for children
	social inclusion	working possibilities, jobs
	social interaction	co-operation in cattle keeping, exchange of food and services
	gender relations	production and reproduction of work share
Political	regional policy	keeping the northern villages settled
	asset for strategic negotiation	keeping the Eveno-Bytantay district and northern villages settled
Cultural	identity	ethnic identity
	sense of place	regional identity
	scientific	research on the genetic diversity and the origins of the Yakutian people
	educational	transferring the cultural values/capital
Ethical	moral responsibility	preservation of the breed for the future generations

## Conclusion

At the local level the values of the cattle were more related to everyday livelihood strategies of single households and families, whereas the representatives of the republic, in line with the newspapers, highlighted the importance of the cattle for Sakha's food production and for national identity. Thus, individuals at different levels were in favour of conserving the cattle, but for different reasons. The local residents and experts were more concerned about developing economically sustainable cattle production, whereas the experts in Yakutsk were concerned about the conservation of genetic resources. The genetic studies have indicated that Yakutian Cattle show genetic distinctiveness and have high genetic value for the maintenance of cattle diversity.

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