

Article of the month - The Yakutian cattle: A cow of the permafrost

Juha Kantanen

Siberia's last remaining indigenous breed of domestic cattle, the *Sakha Ynaga* (in Yakutian language), or Yakutian Cattle, inhabit the lands surrounding the Lena River in Russia's remote Sakha Republic (Yakutia). A Finnish multidisciplinary team of researchers from MTT Agrifood Research Finland and the University of Helsinki's Aleksanteri Institute explored the genetic uniqueness of the Yakutian cattle and the effect of social and cultural factors on the survival of the breed through periods of major upheaval in Russia's history. The findings of this study have now been published in the book *Sakha Ynaga - Cattle of the Yakuts*.

The last Siberian native cattle breed

About 150 kilometres north of the Arctic Circle, exists a unique population of Yakutian Cattle in the harsh conditions of the world's coldest populated region. The relationship with the Yakutian Cattle has enabled the people of the region to inhabit this land of permafrost, where the temperature can drop to -50°C , where winters are long and summers short and where grain production is not possible.

The Yakutian Cattle are currently an endangered cattle population of small census size. The Laboratory of Cattle Breeding of the Yakutian Research Institute of Agriculture in Yakutsk maintains records on the Yakutian Cattle. The current population is 1,200 head, of which more than 500 are dairy cows. The population size has remained stable during recent years. Up to 74% of the Yakutian Cattle are distributed in the three northern villages of Dzhargalakh, Kustur and Batagay-Alyta (also called Sakkyryr), collectively termed the Eveno-Bytantay district. During the last decade, the Yakutian Cattle were returned to the southern part of the Sakha Republic from where they had vanished and are therefore currently found also in the village of Uluu-Syhyy and on four farms closer to the capital of Sakha, Yakutsk City.

The Yakutian Cattle are purebred aboriginal cattle population that produces milk and meat. Animals have been used also as a source of draft power. Yakutian Cattle are characterised by their small size, deep but relatively narrow chest and short, firm legs. The live weight of cows ranges from 350 to 400 kilograms and that of bulls from 500 to 600 kilograms. The breeding bulls stand from 115 to 127 centimetres high, on average 121 centimetres, at the withers. The wither height of cows is typically 110 to 112 centimetres.

The current average annual milk yield of the Yakutian Cattle is approximately 1,000 kilograms. The milk has a high percentage of fat and protein, on average 5.03% and 4.69% respectively.



A multidisciplinary study

During its four field research expeditions to Yakutia, the Finnish research team gathered important findings on the many genetic and sociocultural dimensions involved in animal genetic resource conservation. The material for the study came from DNA marker analyses, field observations, interviews with inhabitants from the northern Siberian villages and with local and governmental authorities, media research, statistical demographic data, and historical records. The research project was part of the Russia in Flux research programme of the Academy of Finland. The genetic analyses were also part financed by the Finnish Ministry of Agriculture and Forestry.

The researchers shed light on the importance of Yakutian Cattle to cattle owners, villagers, researchers and local authorities in the region, and to the future of the region's villages.

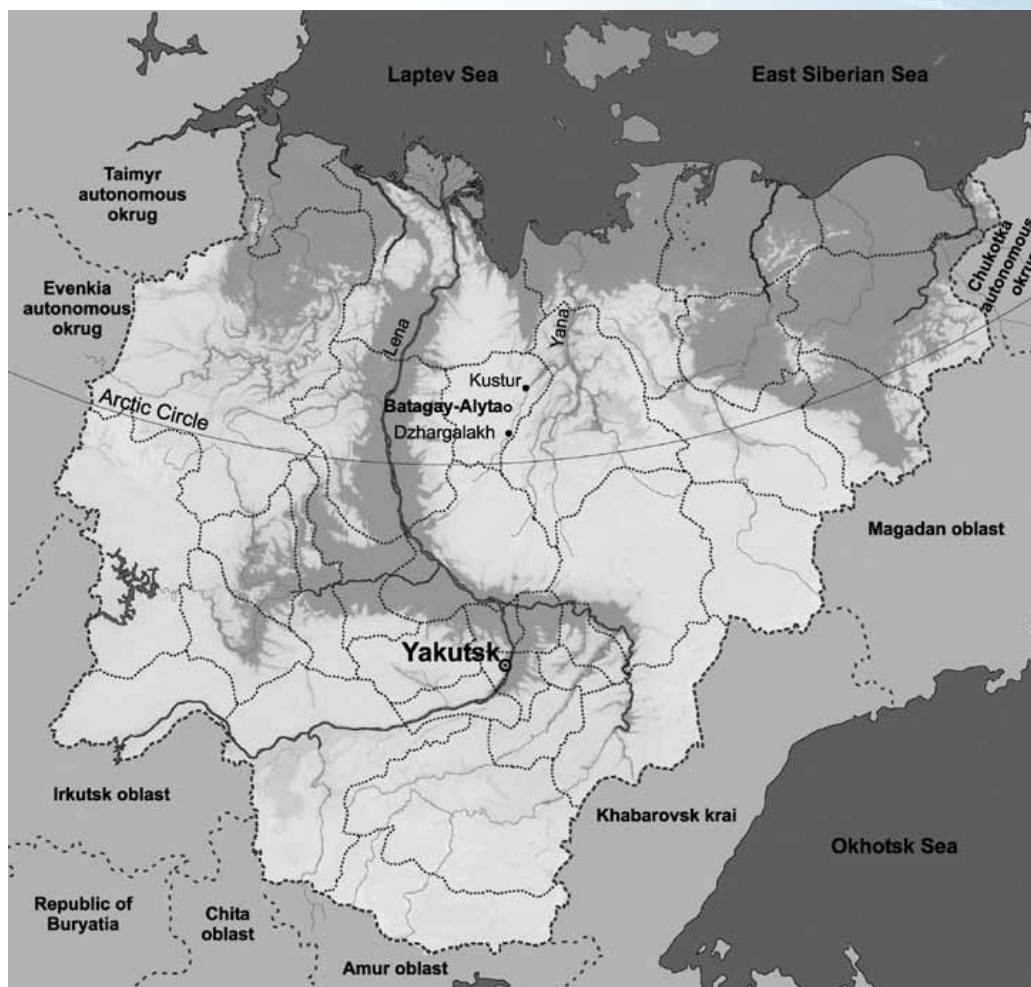


Figure 1. Geographical location of the Eveno-Bytantay district in the Sakha Republic.



DNA marker analyses

The genetics of the Yakutian Cattle have been investigated by comparing DNA marker data of the Yakutian Cattle with the DNA data of several European and Asiatic cattle breeds. These studies have revealed insights into the history of the Yakutian Cattle and the current genetic diversity.

Analysis of mitochondrial DNA (mtDNA) sequences showed that the taurine T3, T2 and T4 mtDNA haplogroups are segregating in the Yakutian Cattle. The T4 has found so far in eastern Asia, but not in the Near Eastern cattle breeds. The mtDNA study indicated that the Yakutian Cattle share prehistorical maternal ancestries with the domesticated Near Eastern cattle. In addition, the Y-chromosomal data suggest that the Yakutian Cattle have affinity with some European and Near Eastern cattle breeds.

Analysis of autosomal DNA markers showed that the Yakutian Cattle are differentiated from other studied breeds and display a lower level of genetic diversity than several other Eurasian cattle breeds. This observation can be explained by long-term geographic and genetic isolation at the northern limit of the species range. On the other hand, foundation stocks of the Yakutian Cattle might have been small.

Socio-diversity as a guardian of biodiversity

The Yakutian Cattle have many distinct values. Six different value categories were identified: ecological, economic, social, political, cultural, and ethical. The rural people of northern Siberia have traditionally relied on their cattle during times of social upheaval, such as the Russian revolution and the soviet collapse. During the soviet era, it was the actions and defiance of traditional cattle breeders and individual scientists which saved the Yakutian Cattle from otherwise certain loss through crossbreeding.

Views were shown to be unanimous regarding the need to preserve the breed, but the reasons for holding this common view varied. The local inhabitants and experts saw the cattle as vital to securing the self-sufficiency and vitality of their local village communities. Their main goal was to develop economically sustainable cattle production. The view among the experts and authorities in the republic's capital Yakutsk were, on the other hand, primarily interested in preserving the cattle's gene pool for the development of agriculture throughout the wider republic. The region's press media and, but also the Yakutsk authorities, emphasised the importance of the cattle as part of the cultural heritage of Yakutia. This shared desire to preserve the Yakutian Cattle has led to the Sakha Republic's own, and possibly the world's very first, domestic breed conservation law.

The biggest indigenous herd is currently held on the former Lenin Sovkhoz state farm in the village of Kustur, the present-day experimental farm of the Agricultural Research Institute of Yakutia, but it is also common for ordinary people such as teachers, bakers and reindeer herders to keep a few cows for their own domestic use, and the cattle are also bred by several private farmers and co-operatives. The study indicated how the conservation of genetic resources is supported by such diverse social structures.

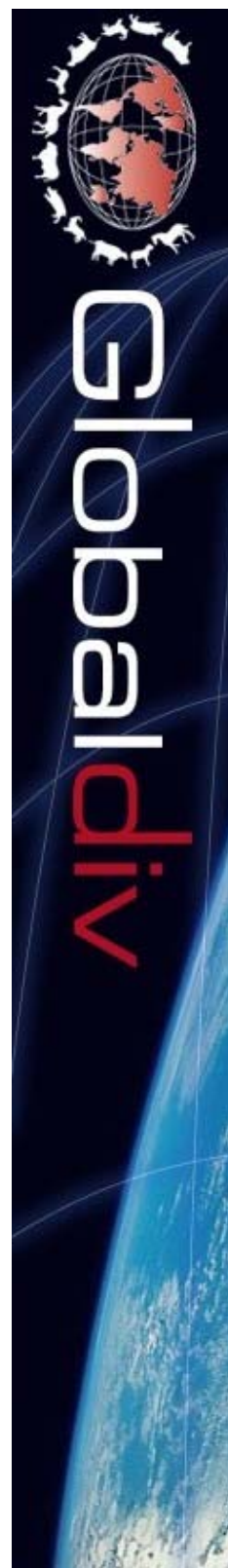




Figure 2. The bull in the state farm is nervous because two new bulls arrived in the cowshed last night. The rotation of bulls between the three villages (Dzhargalakh, Kustur and Batagay-Alyta) was launched after a ten year break. Photograph by Anu Osva.

The book can be ordered - see bibliography section of this newsletter

The breed (??) of the month - The Alpaca

Mike Bruford (Cardiff University) and Jane Wheeler (CONOPA, Lima, Peru)

First, an explanation! The question-mark in the title refers to the fact that (1) the alpaca is not a breed, but a domestic species (*Vicugna pacos*), and (2) the modern alpaca does not have any recognised breeds: it is a domestic animal for which the word 'breed' is singularly inappropriate! Indeed there are many reasons why the breed concept is non-operational in South American livestock, some of which are explained below.

