Culture and genes uncover the secret of economic resilience of horse herding

Stammler Florian[1], Kantanen Juha[2,3], Ivanova Aytalina[5] , Ivanov, Revoriy[4], Nikitina Nadezhda[4], Konstantinovy, Vladislav & Lyudmila[6]

[1]Arctic Centre, University of Lapland, Rovaniemi, Finland , [2]Natural Resources Institute Finland, FI-31600 Jokioinen, Finland, [3]Department of Environmental and Biological Sciences, University of Eastern Finland, FI-70211 Kuopio, Finland, [4]YaNIISKh, Sakha, Russia [5]North-Eastern Federal University, Sakha, Russia, [6]Private horse herders, Sakha, Russia

Background:
Farming and herding all over the planet, but even more so in the Arctic, is considered economically unviable in market capitalism, unless heavily subsidised by the state. Research within the Arctic Ark project has focused on viability of traditional animal husbandry cultures and practices with genetically specific Arctic breeds of animals. We found how the combination of herding cultures and specific characteristics of the animals contribute to explaining why in some areas Arctic pastoral animal livelihoods are viable even economically.

Overall aim:

Discover the 'secret' of environmentally, culturally and economically sustainable pastoral animal husbandry and clarify to what extent the specifics of the Arctic animal breeds contribute to sustainability

Sakha horse & husbandry: basics

- Sakha Horse (Equus caballus), officially 181182 of three sub-types adapted to local habitats, numbers have increased from 120000 in 1999.
- 1/3 privately owned, not part of the agricultural subsidy systems.
- 2000+ horse herders, many more owners
- Slaughter yield of of 6 months old foal is 106 kg on average
- Horse meat, especially foal, dietary: high level of polysaturated fat acids, and healthy balance of amino-acids in the protein (Gomboeva & Plotnikov 2014).
- can graze year round, even in winter at -60 degrees, if kept on the right pastures (hilly thermocarst landscape *alaas*). Additional feeding needed if used for riding, to increase slaughter weight or to minimise spring losses

materials & methods: Case study Sakha horse husbandry (Russia):

- The husbandry of Sakha horses serves as a case study, as we identified the comparably highest degree of environmental, economic and cultural self-sufficiency of Arctic pastoral animal husbandries.
- Anthropological fieldwork and genetic sampling was carried out 2016-2018 among private horse-herders in the Republic of Sakha (Yakutia). Genetic sampling was carried out by the interdisciplinary team jointly with horse owners.

Genetic specifics of horse

- Sakha horses were imported to the region by humans in the middle ages. They are genetically different from the 5000 year old Pleistocene horses found in the region.
- In terms of evolution, horse genetic adaptation to the harsh Arctic environment was extremely fast
- Genes show selection signatures, particularly in immunological genes, body size, specific physiological traits,
- For example, gene SLC8A1 is responsible for calcium transfer and oxidative stress, also found among Sakha humans and cattle. Other genes specifically found include those for regulating body size, hair formation, and blood circulation

Cultural significance of Sakha horse

- Horse is the ethnic symbol of the Sakha people
- Foal meat is considered not only dietary but also enjoys most cultural prestige
- milk used for ritual purposes and as festive food
- hair is believed to have healing qualities
- tale used for spiritual purification
- *Serge* horse pole for tying horses to it serves as chief spiritual symbol found on almost every ritual site

Findings and discussion

- Horse herding in Sakha (Yakutia) is a viable sustainable livelihood and economically profitable due to a combination of natural and cultural factors
- The physical specifics of the Sakha horse with its adaptation to the harsh Arctic climate make this animal the most self-reliant of local pastoral animals.
- Husbandry practices support animal independence and require minimal care and input, in comparison to cattle or reindeer breeding
- The high cultural prestige and the high value of meat create demand on the local market to the extent that meat can be produced without state subsidies
- Due to cultural preferences, foal meat can be priced higher than beef, while horse husbandry costs less money and effort for the herder
- Private herders add value by selling processed production and ritual food (sausages, minced meat, mare-milk, etc)

Husbandry practices

- Horses are let to roam freely in herds (*tabun*) on pastures, usually 1 stallion +- 10 mares.
- Reproduction under natural selection
- Riding horses trained and kept around the house with hay feeding
- Slaughter-season November/December
- Milking season June
- Herders ride on horseback checking the whereabouts of the herds regularly
- Herders monitor and help horses in extreme situations (too deep snow, iced-over pastures, wet snow freezing to the horse fur, causing disease)

The ArcArk team celebrating with horse herders Vladislav & Lyudmila Konstantinov the end of a year-round anthropological-genetical monitoring

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