

GENETIC ASSESSMENT OF ISOLATED REINDEER (*RANGIFER TARANDUS*) POPULATION FROM TUVA, RUSSIA

Dotsev A.V.¹, Kharzinova V.R.¹, Schimit L.D.², Sergeeva O.K.³, Goncharov V.V.³, Laishev K.A.⁴, Romanenko T.M.⁵, Fedorov V.I.⁶, Senchik A.V.⁷, Okhlopkov I.M.⁸, Medvedev D.G.⁹, Reyer H.¹⁰, Wimmers K.¹⁰, Brem G.^{1,11}, Zinovieva N.A.¹



Figure 1. Domestic reindeer from Tuva

Introduction

Reindeer herding is traditional in Tuva, Russia. This region is located in the southern part of the country, on the border with Mongolia. During the last three decades, the census size of Tuva reindeer has decreased drastically, from 15,000 to 1,500. The aim of our study was to assess genetic characteristics of reindeer from Tuva region.

Material and Methods

Samples of Tuva reindeer (n=12) were genotyped using Illumina BovineHD BeadChip. To perform the comparison with other ecotypes of domestic reindeer we added samples of all the breeds, which are officially recognized in Russia: Chukchi (n=12), Nenets (n=31), Even (n=12) and Evenk from Yakutia (n=12) and Krasnoyarsky krai (n=19). Reindeer from Mongolia (n=11) as well as wild reindeer from Yakutian and Taimyr tundra (n=20), and Baikal and Amur taiga (n=9) were added to our dataset.

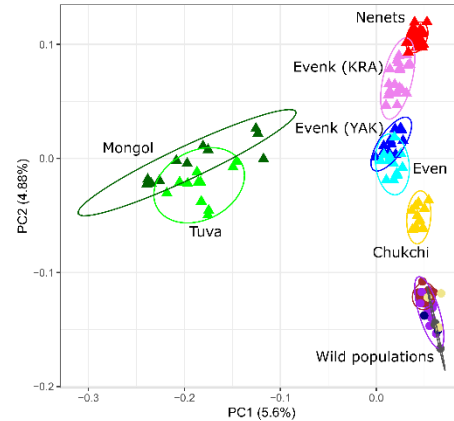


Figure 2. Principal components analysis of reindeer populations based on 7202 SNPs

Results

After quality control, 7,202 SNPs were selected for subsequent analyses. PCA revealed that Tuva reindeer clustered together with Mongolian. The F_{st} genetic distance was lowest between these two groups – 0.039. F_{st} between Tuva and all the other breeds ranged from 0.092 (Evenk from Yakutia) to 0.137 (Chukchi) and was highest with wild reindeer - 0.146. Allelic richness was lowest in Mongolia and Tuva reindeer - 1.288 ± 0.004 and 1.301 ± 0.004 , respectively. In all the other breeds this parameter ranged from 1.323 ± 0.004 (Chukchi) to 1.356 ± 0.004 (Evenk from Yakutia).

This work was supported by Russian Science Foundation grant 16-16-10068P

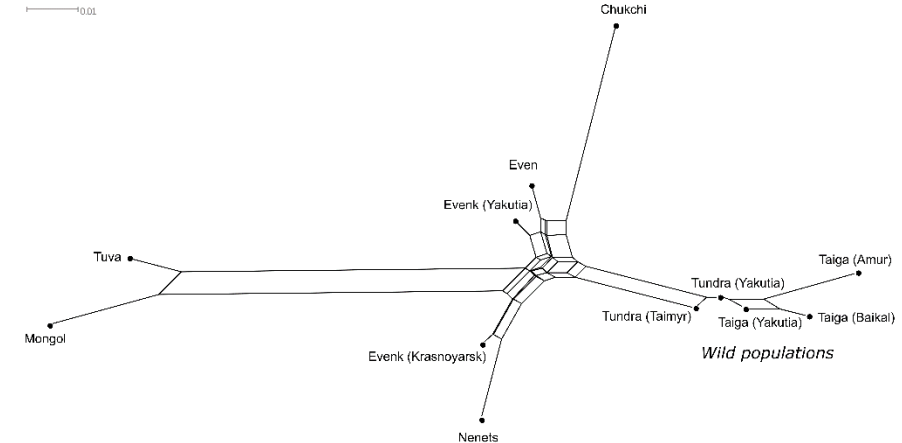


Figure 3. Neighbor-Net analysis of reindeer populations based on 7202 SNPs

Conclusions

In our study, it was shown that reindeer from Tuva do not belong to any official breed in Russia and genetically are very close to Mongolian ecotype. This information should be considered in programs for restoration of Tuva reindeer.

¹L.K. Ernst Federal Science Center for Animal Husbandry, Moscow, Russia.

²Tuva State University, Tuva Republic, Russia.

³Research Institute of Agriculture and Ecology of the Arctic –Branch of the FRC KSC SB RAS, Norilsk, Russia.

⁴FGBNU «North-West center of interdisciplinary researches of problems of food maintenance», St. Petersburg, Russia.

⁵FCIARctic Nenets Division — Agro-Experimental Station, Federal Agency of Scientific Organizations, Naryan-Mar, Russia.

⁶FGBNU YANIISH, Yakutsk, Russia.

⁷Far Eastern State Agrarian University, Blagoveshchensk, Russia.

⁸Department of game management and bioecology, Irkutsk State University of Agriculture, Irkutsk reg., Russia.

⁹Institute for Biological Problems of Cryolithozone, Yakutsk, Russia.

¹⁰Institute of Genome Biology, Leibniz Institute for Farm Animal Biology (FBN), Dummerstorf, Germany.

¹¹Institute of Animal Breeding and Genetics, VMU, Vienna, Austria.