

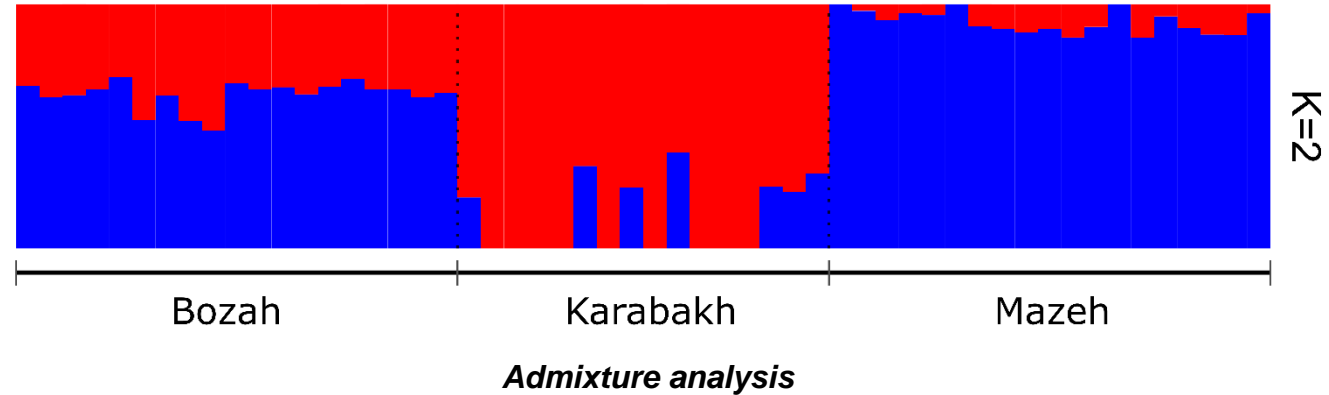
GENOME-WIDE SNP ANALYSIS OF THREE AZERBAIJANI SHEEP BREEDS

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Azerbaijani sheep breeds are of particular interest since this region is in close proximity to the proposed place of domestication. Molecular genetic studies of local breeds will help shed light on the history of sheep breeding.

Material and methods

Our work was aimed to identify genetic characteristics of three sheep breeds from Azerbaijan: Bozah (n = 19), Karabakh (n = 16) and Mazeh (n = 19). For genotyping, we used Illumina OvineHD BeadChip (AgResearch) containing around 600 thousand SNPs. PLINK 1.9 was used to perform quality control. Genetic diversity parameters and pairwise F_{ST} distances were calculated in the R package diveRsity. Cluster analysis was performed in Admixture 1.3 software. Neighbor-Net was constructed in SplitsTree 4.14.6 program.

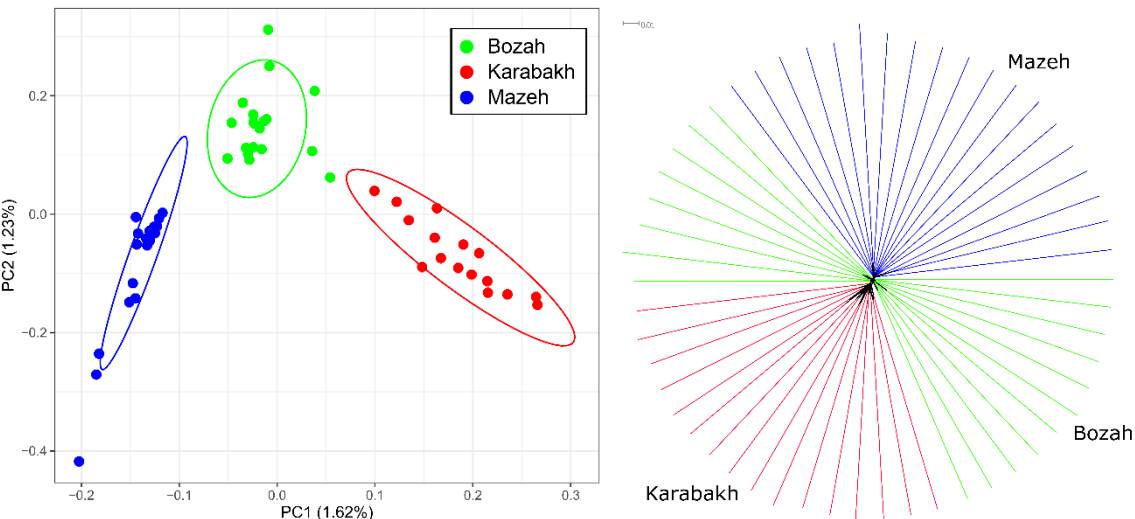


Results

After all quality control procedures, including LD pruning, 286663 SNPs were selected for subsequent analyses. PCA revealed that, while all the breeds formed their own clusters, only 1.62% of genetic variability was explained by the first component (PC1). Cluster analysis conducted in Admixture 1.3 showed that Bozah was derived from Karabakh and Mazeh breeds. However, based on CV error, the number of clusters (K) judged to be one. Pairwise F_{ST} distances were quite low, with highest value – 0.017 (between Karabakh and Mazeh) and lowest – 0.006 (between Mazeh and Bozah). The global fixation index (F_{ST}) was 0.01, which indicated that 99% of genetic variability was within breeds. Expected heterozygosity was similar in Bozah and Mazeh (0.363 ± 0.000 and 0.360 ± 0.000 , respectively) and a little lower in Karabakh breed – 0.353 ± 0.000 . Neither heterozygosity excess nor deficiency was observed in all the studied breeds. The inbreeding coefficient (F_{IS}), ranged from 0.001 in Karabakh to 0.011 in Mazeh.

Conclusions

Our results demonstrated that the studied Azerbaijani sheep breeds were genetically proximate. Moreover we found that Bozah contained genetic components of Karabakh and Mazeh breeds.



Principal component analysis

Individual Neighbor-Net

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