

Phylogenetic_relationships_between_ancient_and_modern_populations_roedeer

The extant roe deer (*Capreolus* Gray, 1821) includes two species: the European roe deer (*C. capreolus*) and the Siberian roe deer (*C. pygargus*) that are distinguished by morphological and karyotypical differences. The Siberian roe deer occupies a vast area of Asia and is considerably less studied than the European roe deer. Modern systematics of the Siberian roe deer remain controversial with 4 morphological subspecies. Roe deer fossilized bones are quite abundant in Denisova cave (Altai Mountains, South Siberia), where dozens of both extant and extinct mammalian species from modern Holocene to Middle Pleistocene have been retrieved.

We analyzed a 629 bp fragment of the mitochondrial control region from ancient bones of 10 Holocene and four Pleistocene Siberian roe deer from Denisova cave as well as 37 modern specimen belonging to populations from Altai, Tian Shan (Kyrgyzstan), Yakutia, Novosibirsk region and the Russian Far East. Genealogical reconstructions indicated that most Holocene haplotypes were probably ancestral for modern roe deer populations of Western Siberia and Tian Shan. One of the Pleistocene haplotypes was possibly ancestral for modern Yakutian populations, and two extinct Pleistocene haplotypes were close to modern roe deer from Tian Shan and Yakutia. Most modern geographical populations (except for West Siberian Plains) are heterogeneous and there is some tentative evidence for structure. However, we did not find any distinct phylogenetic signal characterizing particular subspecies in either modern or ancient samples.

Analysis of mitochondrial DNA from both ancient and modern samples of Siberian roe deer shed new light on understanding the evolutionary history of roe deer. Our data indicate that during the last 50,000 years multiple replacements of populations of the Siberian roe deer took place in the Altai Mountains correlating with climatic changes. The Siberian roe deer represent a complex and heterogeneous species with high migration rates and without evident subspecies structure. Low genetic diversity of the West Siberian Plain population indicates a recent bottleneck or founder effect.

Abstract

Background: The extant roe deer (*Capreolus* Gray, 1821) includes two species: the European roe deer (*C. capreolus*) and the

Siberian roe deer (*C. pygargus*) that are distinguished by morphological and karyotypical differences. The Siberian roe deer

occupies a vast area of Asia and is considerably less studied than the European roe deer. Modern systematics of the Siberian

roe deer remain controversial with 4 morphological subspecies. Roe deer fossilized bones are quite abundant in Denisova

cave (Altai Mountains, South Siberia), where dozens of both extant and extinct mammalian species from modern Holocene

to Middle Pleistocene have been retrieved.

Methodology/Principal Findings: We analyzed a 629 bp fragment of the mitochondrial control region from ancient bones of

10 Holocene and four Pleistocene Siberian roe deer from Denisova cave as well as 37 modern specimen belonging to

populations from Altai, Tian Shan (Kyrgyzstan), Yakutia, Novosibirsk region and the Russian Far East.

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reconstructions indicated that most Holocene haplotypes were probably ancestral for modern roe deer populations of Western

Siberia and Tian Shan. One of the Pleistocene haplotypes was possibly ancestral for modern Yakutian populations, and two

extinct Pleistocene haplotypes were close to modern roe deer from Tian Shan and Yakutia. Most modern geographical

populations (except for West Siberian Plains) are heterogeneous and there is some tentative evidence for structure.

However,

we did not find any distinct phylogenetic signal characterizing particular subspecies in either modern or ancient samples.

Conclusion/Significance: Analysis of mitochondrial DNA from both ancient and modern samples of Siberian roe deer shed

new light on understanding the evolutionary history of roe deer. Our data indicate that during the last 50,000 years

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replacements of populations of the Siberian roe deer took place in the Altai Mountains correlating with climatic changes. The
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