

Into the great wide open: The Rise of the Steppe's steppe pastoralists groups of the Caucasus

During the Bronze Age, the Caucasus served as a pivotal crossroads between Asia and Europe, acting as both a melting pot and birthplace for the earliest steppe pastoralist societies. New ancient DNA (aDNA) evidence reveals how Neolithic lifeways spread through diverse populations and how mountain-steppe interactions shaped the genetic and cultural landscapes of Eurasia.

New Study on the Greater Caucasus Region

Led by the Eurasia-Department of the German Archaeological Institute (DAI) and the Max Planck [Institute for Evolutionary Anthropology \(MPI\)](#), a recent study spans over 6,000 years and integrates both genomic and archaeological data from the wider Caucasus region, including more than a hundred newly published individuals. These findings offer unprecedented insights into key patterns of cultural, economic, and demographic shifts that drove the rise and fall of Eurasia's first mobile pastoralists: "It is precisely this interface of the different eco-geographic features and archaeological cultures that makes the Caucasus so interesting to study", explains geneticist Wolfgang Haak, senior author and principal investigator of the study at MPI.

Genetic and Cultural Interactions in the Caucasus

Nomadic pastoral economies focused on livestock and dairy products, [wheeled transport](#), and the first steps towards [horse domestication](#) was established in the steppes north of the Caucasus mountains around 3500 BC. This study tracks the genetic emergence and transformation of these pastoralist populations throughout the Caucasus region during the height of these major economic changes: They started in the mid-5th millennium BC, when a Neolithic population with southwest Asian (*Anatolian*) genetic ancestry migrated across the Caucasus, and encountered different hunter-gatherer groups inhabiting the piedmonts and the neighbouring steppes. They were coined as *Caucasus* respectively *Steppe ancestry*. Interestingly, this genetic demarcation remained largely intact during the rapid spread of technical, social and economic innovations in the 4th millennium BC, which revolutionized lifeways in Western Eurasia. By the Early Bronze Age, the Maykop culture, for example, displayed five distinct genetic profiles. In contrast, the well-known archaeological cultures of the 3rd millennium BC – the Yamnaya, Catacomb, and North Caucasian groups – share a nearly identical genetic profile. "This is a peak time of knowledge and technology transfer in the North Caucasus region, when we see very similar cultural elements in genetically different groups, but also many signs of mixing and mingling", explains Sabine Reinhold, co-lead author of the study.

Into the great wide open

In the late 4th millennium BC, communities north of the Caucasus began to adopt their lifestyle to a more mobile economy, likely better suited to the vast, open landscapes of the Eurasian steppe. The archaeological record attests to critical innovations for instance in herd management and dairying practices, but likewise in mobility: "Durable foodstuffs such as the early forms of cheese, together with innovations in transportation, first enabled the large grasslands of the Eurasian steppe to be permanently populated. It helped to establish continent-wide networks of communication that still today connect the Atlantic and the Pacific." adds Svend Hansen, director of the Eurasia Department, PI of the [ERC Advanced Grant ARCHCAUCASUS](#) and co-senior author of the study. This combination paved the way for a fully nomadic pastoralist life-style at the turn the 3rd millennium BC, practiced for instance by groups associated with the Yamnaya cultural complex and *Steppe ancestry*, which soon after expanded across the entire western steppe zone – as far as Mongolia in the east, and the Carpathian Basin in the west.

Social and Kinship Networks

New genetic methods also addressed the biological relatedness of the individuals studied, thus enabling us to investigate social and biological kinship as a possible basis for the spread of technological innovations. One surprising finding from the study was that the geographical distance between biologically related individuals of the different genetic profiles varied considerably, suggesting very tight kinship ties within the *Caucasus ancestry* and much broader regional social networks for the *Steppe ancestry* people.

“Our integrated study is a beautiful example of human resilience, adaptability and innovation in the light of ecological, economic and socio-political changes”, concludes Svend Hansen. “It highlights the importance of the Caucasus for the cultural developments in Eurasia, but also how important it is to collaborate with many disciplines in the research of these processes.” The diverse forms and geographic reach of kinship and social networks among 4th millennium BC steppe pastoralists provide a fascinating foundation for future interdisciplinary research.

Publication

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Fig. 1: Social innovations: Gigantic burial mounds like Komsomolec 1 or ‘Marfa’ in the North Caucasus were built at the beginning of the Maykop epoch as a sign of prominent elites. Later, they were used as cemeteries by subsequent populations, thus enabling bioarchaeological studies over long periods of time. © Sabine Reinhold // DAI Eurasia-Department

Fig. 2: Innovations: The invention of wheeled vehicles was one of the most important innovations of the 4th millennium BC. K. Hellström and her team have reconstructed one of these wagons and found it to be roadworthy, even over difficult terrain. © Dirk Mariaschk // DAI Eurasia-Department

Fig. 3: Innovations: Sheep are essential to the prosperity of mobile livestock herders in the steppe. Secondary products such as milk and wool were already being used in the 4th millennium BC. © Jana Eger // Jana Eger

Fig. 4: Culinary innovations: Dairy products such as softcheese, which is still consumed in the Caucasus today, are durable and transportable. They made it possible to farm the steppe on the basis of cattle breeding. Svend Hansen // *DAI Eurasia Department*

Fig. 5: 4 Innovations: The processing of precious metals such as silver is a technical innovation that revolutionised the display of wealth. The 'royal' regalia of the Maykop culture, made of gold and silver, are among the oldest finds of this kind. © V. S. Terebenin, GE St. Petersburg // *DAI Eurasia Department*