

Ancient DNA supports the western Carpathian Basin as a corridor of the Neolithic expansion

Szécsényi-Nagy et al. reported in a recent paper an exceptional large Neolithic mitochondrial (mtDNA) and Y-chromosomal DNA dataset from the East-Central European Carpathian Basin. The study region was an essential waypoint on the Continental route of the spread of agriculture from the Near East into Central Europe. Plant cultivation and animal husbandry appeared in the Carpathian Basin in the early 6th millennium BC as characteristic of the southeast European Körös and Starčevo archaeological cultures.

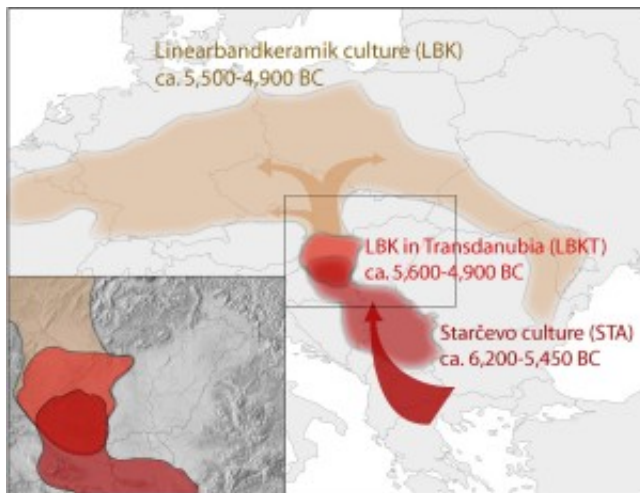


Fig. 1. Geographic distribution of the Starčevo, Linearbandkeramik cultures and the Continental Route of the European Neolithisation. The shaded areas of the maps show the distribution of the Starčevo culture and the Linearbandkeramik in Transdanubia and Central Europe, while the arrows show the directions of the farmers' expansion into Central Europe. The absolute dates refer to the whole dissemination areas of the cultures.

The latter culture gave rise in the western Carpathian Basin to the first Central European farming culture, the so called Linearbandkeramik culture at around 5,600/5,400 BC, which spread rapidly into today's Germany and beyond. The aims of our archaeogenetic investigation were to i) study the genetic diversity of the Early Neolithic Carpathian Basin cultures from both the mtDNA and Y-chromosome perspectives, ii) reveal their potential genetic origins in Eurasia, iii) investigate the contribution of the Starčevo population to the genetic variability of the Linearbandkeramik population in the Carpathian Basin and in Central Europe, and iv) to assign their role on the Continental route of the European Neolithic dispersal by direct comparisons with largely contemporaneous and archaeologically related Neolithic populations.

Our research group generated 9 Y chromosomal and 84 mitochondrial DNA profiles from Mesolithic and Neolithic specimens from western Hungary and Croatia, attributed to the Mesolithic hunter-gatherers, early Southeastern European Star?evo and Linearbandkeramik cultures (6th millennium BC). Comparing our results with ancient DNA data from other regions of Europe, we observed population discontinuity between Mesolithic foragers and early farmers, and genetic continuity between farming populations of the 6th-4th millennium BC across a vast territory of southeastern and Central Europe. Our population genetic analyses highlight the key role of the Star?evo culture in the formation of the Central European genetic diversity. We point out that archaeological cultures of the Carpathian Basin provided the genetic basis of the first Central European farmers that were the ancestors of subsequent prehistoric populations existed for several thousand years long. Considering our results in the light of newly available ancient genomic data, we observe a remarkable consistency of the different marker systems. Furthermore, the nine novel Y chromosome DNA profiles offered first insights into the Y-chromosome diversity of the earliest European farmers, and further supported the migration of these people from the Near East into Central Europe along the Continental route of Neolithisation.

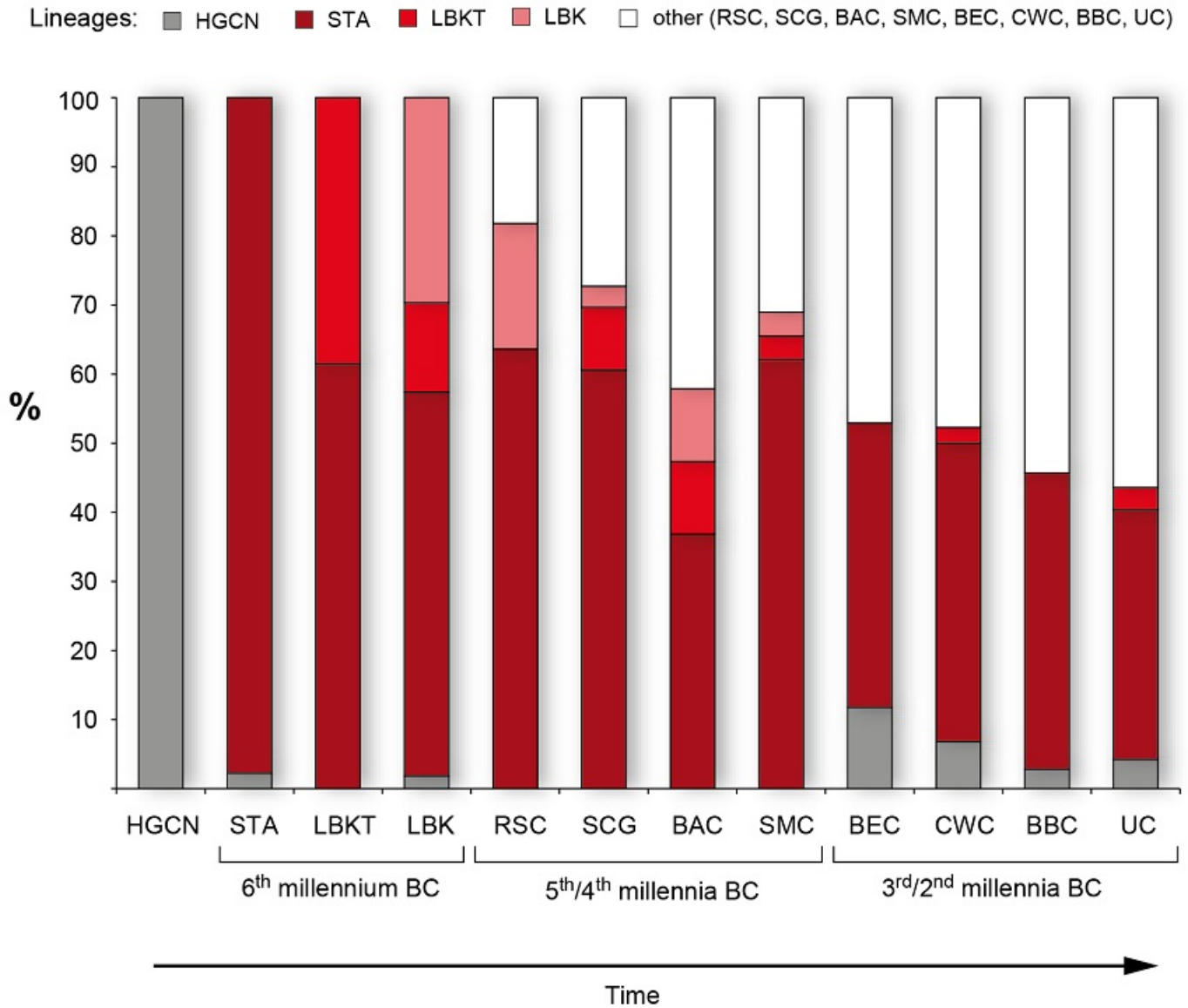


Fig. 2. Results of the ancestral shared haplotype analysis. The bar plot shows the proportions of ancestral mtDNA lineages associated to hunter-gatherer (grey), Star?evo, Linearbandkeramik (red and rose) and other subsequent populations (white) in the Central/North European hunter-gatherer, two Carpathian Basin and nine Central European populations ranging from the Early Neolithic to the Early Bronze Age.

When compared to large sets of modern-day population data, both mitochondrial and Y-

chromosome DNA supports a Near-Eastern origin of the Star?evo and LBK cultures. Together these results demonstrate the significance of the western Carpathian Basin as a prehistoric corridor on the Continental route of the Neolithic expansion, connecting the Near East with Central Europe.

The joint analyses of the two uniparental inherited genetic systems (mtDNA and Y-chromosome) let us conclude that men and women had a similar roles in the Early Neolithic migration process but their dispersal patterns were determined by sex-specific rules. This genetic data suggests patrilocal residential rules and patrilineal social organization for the early farming communities, underlining the role of demographic factors, which, depending strongly on cultural practices, notably shaped prehistoric and extant genetic diversity.

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Publication

[Tracing the genetic origin of Europe's first farmers reveals insights into their social organization.](#)

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