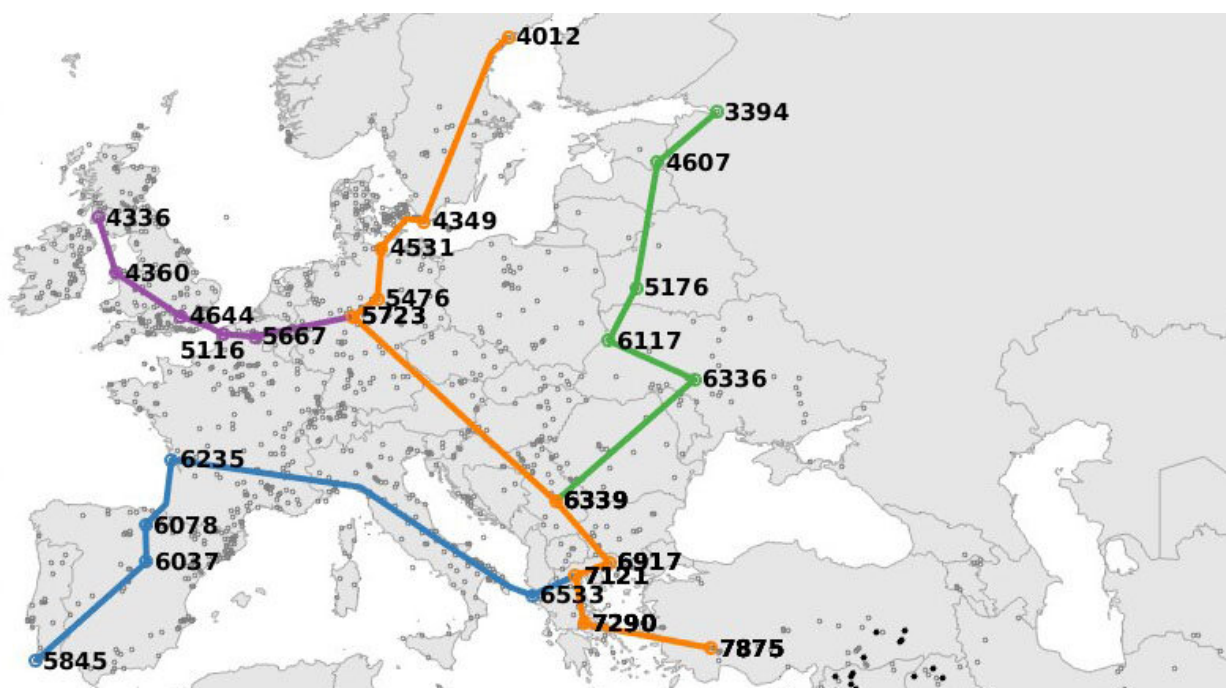


New research shows climate was the key factor impacting the movement of the first farmers across Europe

July 16 2020, by Dr Lia Betti



Credit: University of Roehampton

The research, a collaboration between the University of Roehampton, the University of Cambridge and several other institutions, combined archeological data with palaeoclimatic reconstructions to show for the first time that climate dramatically impacted the migration of people

across Europe, causing a dramatic slowdown between 6,100 BCE and 4,500 BCE.

The research team, including Dr. Lia Betti, Senior Lecturer of the University of Roehampton, assembled a large database of the first arrival dates of Neolithic farmers across the continent and studied the speed of their migration in relation to climatic reconstructions of the time. They also re-analysed ancient DNA data to understand the interaction between early farmers and local hunter-gatherers.

They discovered migration started quickly out of south-eastern Europe, with Neolithic farmers pushing out the existing hunter-gatherer population. This was demonstrated by how little the DNA of the two groups mixed. As they moved north, the climate became less suitable for the crops they had brought with them. Their pace of movement slowed, changing how they interacted with local hunter-gatherers, which can be seen through increased genetic admixture of the two groups.

To test that climate was the key factor causing the slowdown in migration, the team used palaeoclimatic reconstruction to calculate the number of Growing Degree Days (GDD) for the areas that the farmers encountered during their expansion. GDD are commonly used in agriculture as a measure of the heat available in a year for the crops to grow. The expansion slowed down along different migration routes whenever early farmers reached regions where the number of GDD was less than required to support the original crop package. This conclusion was further supported by the fact that the only route that had not slowed down in expansion was along the Mediterranean, suggesting that those who moved along that path could continue to expand rapidly in the favourable warm climate.

Comparing ancient DNA data from local hunter-gatherers and [early farmers](#), the authors also demonstrated that the challenging climatic

conditions for farming in Northern Europe led to closer relationships between the two groups and higher admixture. Exchanges of goods and local hunting knowledge may have allowed the first farmers to persist in these regions despite poor crop yields.

This research shows how climate has significantly impacted the migration of people since the beginning of our history. The climatic suitability of places to live and settle played a key role in determining where different human groups could thrive, in turn changing the genetics of entire continents.

Dr. Lia Betti, University of Roehampton, said: "This study required a huge amount of work to sift through hundreds of archaeological articles, books and reports in different languages to build a detailed model of the expansion of farming in Europe. We are very proud that our database will now be available to the scientific community and the public, to facilitate future research. We have also come up with new methods to identify the main routes of past human migrations and to determine if [climate](#) had a significant impact, which we hope will allow us to investigate the reasons behind prehistoric waves of [migration](#) in other areas of the globe".

More information: Lia Betti et al. Climate shaped how Neolithic farmers and European hunter-gatherers interacted after a major slowdown from 6,100 bce to 4,500 bce, *Nature Human Behaviour* (2020). [DOI: 10.1038/s41562-020-0897-7](https://doi.org/10.1038/s41562-020-0897-7)

Provided by University of Roehampton

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