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Ancient DNA Traces France’s Winegrowing to the Bronze Age

Genetic analysis of grape seeds suggests some French vineyard varieties have endured since the Middle Ages

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New genetic analysis of ancient grape seeds suggests that winegrowing in France began more than 4,000 years ago and that some grape varieties now associated with French vineyards were already present in the Middle Ages.

The findings, published in Nature Communications, come from a study of 49 grape pips recovered from archaeological sites, most of them in France, and dated from the Bronze Age to the late Middle Ages. By sequencing DNA preserved inside the seeds, researchers were able to trace relationships between ancient vines and modern ones, identify signs of long-distance plant exchange and reconstruct early farming practices that helped shape European viticulture.

The work adds a molecular layer to what archaeologists had already pieced together from seed shape and other physical evidence. Those earlier studies had shown that wild and domesticated grapes coexisted in France and that cultivation expanded with Mediterranean trade around 600 B.C. The new DNA results support that timeline and suggest that growers were already moving plants and knowledge across the region much earlier than previously documented.

The researchers said the seeds came from damp archaeological contexts that helped preserve fragile genetic material. The DNA was extracted in a specialized ancient-DNA laboratory in Toulouse and then read using high-throughput sequencing methods capable of reconstructing nearly complete genomes from degraded samples. In total, the team analyzed about 500 million genetic letters.

That level of detail allowed the scientists to compare ancient vines with modern ones and to infer how they were propagated. Some were likely produced through crossing, which mixes traits from different plants. Others appear to have been maintained clonally through cuttings, layering or grafting, a method that keeps a favored variety genetically unchanged over time.

One of the clearest findings was a medieval seed that appears genetically identical to modern pinot noir, the grape closely tied to Burgundy. The result suggests that at least some emblematic varieties have remained stable for centuries.

The study also points to broad connections across Europe and the Mediterranean. Genetic signatures indicate influences from Iberia, the Balkans and the Near East, reflecting the movement of vines and agricultural practices over long distances. That exchange helped build the diversity of grapes cultivated in France and elsewhere.

Researchers said the approach could do more than confirm known history. Ancient DNA may eventually help identify traits such as berry color or flavor-related characteristics in lost varieties, offering clues about how grapes adapted to past climates and how ancient societies selected them for cultivation.

The findings arrive as wine regions face pressure from warming temperatures and shifting growing conditions. By documenting how grape diversity evolved over millennia, the researchers said, ancient DNA can help provide a deeper record of resilience, selection and change in one of France’s most important agricultural traditions.