DNA sleuth hunts wine roots in Anatolia

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Grapes in the valley of vineyards in Diyarbakir, Turkey, an ancient winemaking region. There are easier places to make wine than the spectacular, desolated landscapes of southeast Turkey, but DNA analysis suggest it is here Stone Age farmers first domesticated the wine grape.

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Today Turkey is home to archaeological sites as well as vineyards of ancient grape varieties like Bogazkere and Okuzgozu, which drew the curiosity of the Swiss botanist and grape DNA sleuth Jose Vouillamoz, for the clues they may offer to the origin of European wine.

Together with the biomolecular archaeologist Patrick McGovern, Vouillamoz has spent nearly a decade studying the world's cultivated and wild vines.

"We wanted to collect samples from wild and cultivated grape vines from the Near East—that means southeastern Anatolia, Armenia and Georgia—to see in which place the wild grape was, genetically speaking, linked the closest to the cultivated variety."

"It turned out to be southeastern Anatolia," the Asian part of modern Turkey, said Vouillamoz, speaking at the EWBC wine conference in the Turkish city of Izmir this month. "We propose the hypothesis that it is most likely the first place of grape vine domestication."

McGovern's lab at the University of Pennsylvania Museum also provided archaeological evidence of wine's Anatolian roots after analysing residues of liquid recovered from vessels thousands of years old.

Author of "Uncorking the Past" and "Ancient Wine", McGovern used a sensitive chemical technique to look for significant amounts of tartaric acid—for which grapes are the only source in the Middle East.

While Georgia, Armenia and Iran all played a role in ancient winemaking, preliminary evidence from pottery and even older clay mineral containers, seems to place the very first domestication of the wild Eurasian grape Vitis vinifera in southeastern Anatolia sometime between 5,000 and 8,500 BC, McGovern said.

Southeast Anatolia is part of the Fertile Crescent, the name given to a vast area stretching through modern-day Iraq and Iran to the Nile Valley in the south, widely seen as the birthplace of the eight so-called "founder" crops—from chickpea to barley—that are the world's first known domesticated plants.

Evidence found by the research duo suggests that for wine too, hundreds of today's grapes find their roots in "founder" varieties descended from the wild grapes of the region.

File picture. While Georgia, Armenia and Iran all played a role in ancient winemaking, preliminary evidence from pottery and even older clay mineral containers, seems to place the very first domestication of the wild Eurasian grape

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Through DNA profiling, Vouillamoz says he has isolated 13 of these "founder" grapes by tracing the family trees of European fine wine grapes.

He believes farmers across southeast Anatolia or the Near East started domesticating the wild Vitis vinifera grape around the same time—giving rise to the 13 "founders".

Vineyards in Diyarbakir, Turkey. Southeast Anatolia is part of the Fertile Crescent, the name given to a vast area stretching through modern-day Iraq and Iran to the Nile Valley in the south, widely seen as the birthplace of the eight so-called "founder" crops—from chickpea to barley—that are the world's first

known domesticated plants.

This, he says, debunks the long-held notion that most Western European grapes were introduced independently from the Middle East, Near East or Egypt, Turkey or Greece, at different times and in different places.

One of the "founders", Gouais Blanc, is a good example.

"He gave birth to at least 80 varieties in western Europe, including Chardonnay, Gamay, Furmint, and Riesling," said Vouillamoz, who recently co-authored, "Wine Grapes," a monumental opus on 1,368 vine varieties. "I call it the Casanova of grapes."

Standing in a gully between Elazig and Diyarbakir, Daniel O'Donnell, chief winemaker at the Turkish winery Kayra, gestured to the great expanse of mountains where wild grape vines still grow in gullies and washes.

"It is a wine-making pilgrimage to come back here and find, genetically, 8,000, 9,000-year old vines," said O'Donnell, who arrived here from California in 2006.

"It's mind-blowing to be a Napa guy paying attention to the fine details, the minutiae of wine making, and come here."

But this heritage is now under threat.

In the Kurdish Diyarbakir region, where women on subsistence farms tend the vines and goats do the pruning, phylloxera is killing vineyards that have not been grafted onto disease-resistant rootstock.

"Unfortunately, phylloxera has arrived here. Every year we see the vines die," said Murat Uner, wine production manager at Kayra.

Phylloxera annihilated vineyards in Europe in the late 19th century. Wild vines are somewhat protected by their eco-system, but cultivated vines are extremely vulnerable.

"We explain it to them, but they don't want to listen," says Uner.

The frustration is shared by winemakers who are trying to develop the Turkish wine industry, and experts who fear the loss of an irreplaceable genetic diversity within these ancient varieties.

"They are incredibly lucky to have this," said Vouillamoz. "It has been lost in many places."