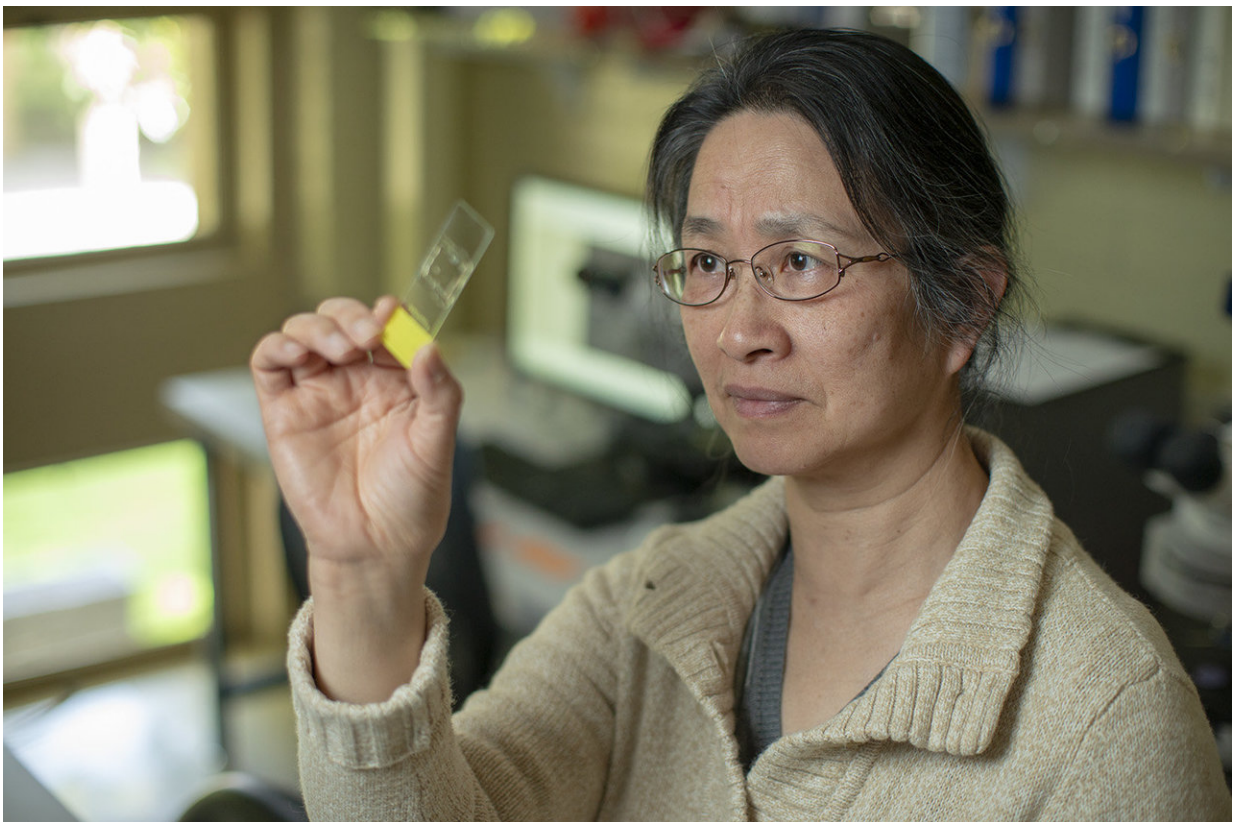


New evidence supports the hypothesis that beer may have been motivation to cultivate cereals

September 12 2018, by Melissa De Witte



Under a microscope, Professor Li Liu finds and records starch grains. Credit: L.A. Cicero

Stanford University archaeologists are turning the history of beer on its

head.

A research team led by Li Liu, a professor of Chinese archaeology at Stanford, has found evidence of the earliest brewmasters to date, a finding that might stir an old debate: What came first, [beer](#) or bread?

In a cave in what is now Israel, the team found beer-[brewing](#) innovations that they believe predate the early appearance of cultivated cereals in the Near East by several millennia. Their findings, published in the *Journal of Archaeological Science: Reports*, support a hypothesis proposed by archaeologists more than 60 years ago: Beer may have been a motivating factor for the original domestication of cereals in some areas.

'Oldest record of man-made alcohol'

Evidence suggests that thousands of years ago, the Natufian people, a group of hunter-gatherers in the eastern Mediterranean, were quite the beer connoisseurs.

Liu and her research team analyzed residues from 13,000-year-old stone mortars found in the Raqefet Cave, a Natufian graveyard site located near what is now Haifa, Israel, and discovered evidence of an extensive beer-brewing operation.

"This accounts for the oldest record of man-made alcohol in the world," Liu said.

The researchers believe that the Natufians brewed beer for ritual feasts that venerated the dead.

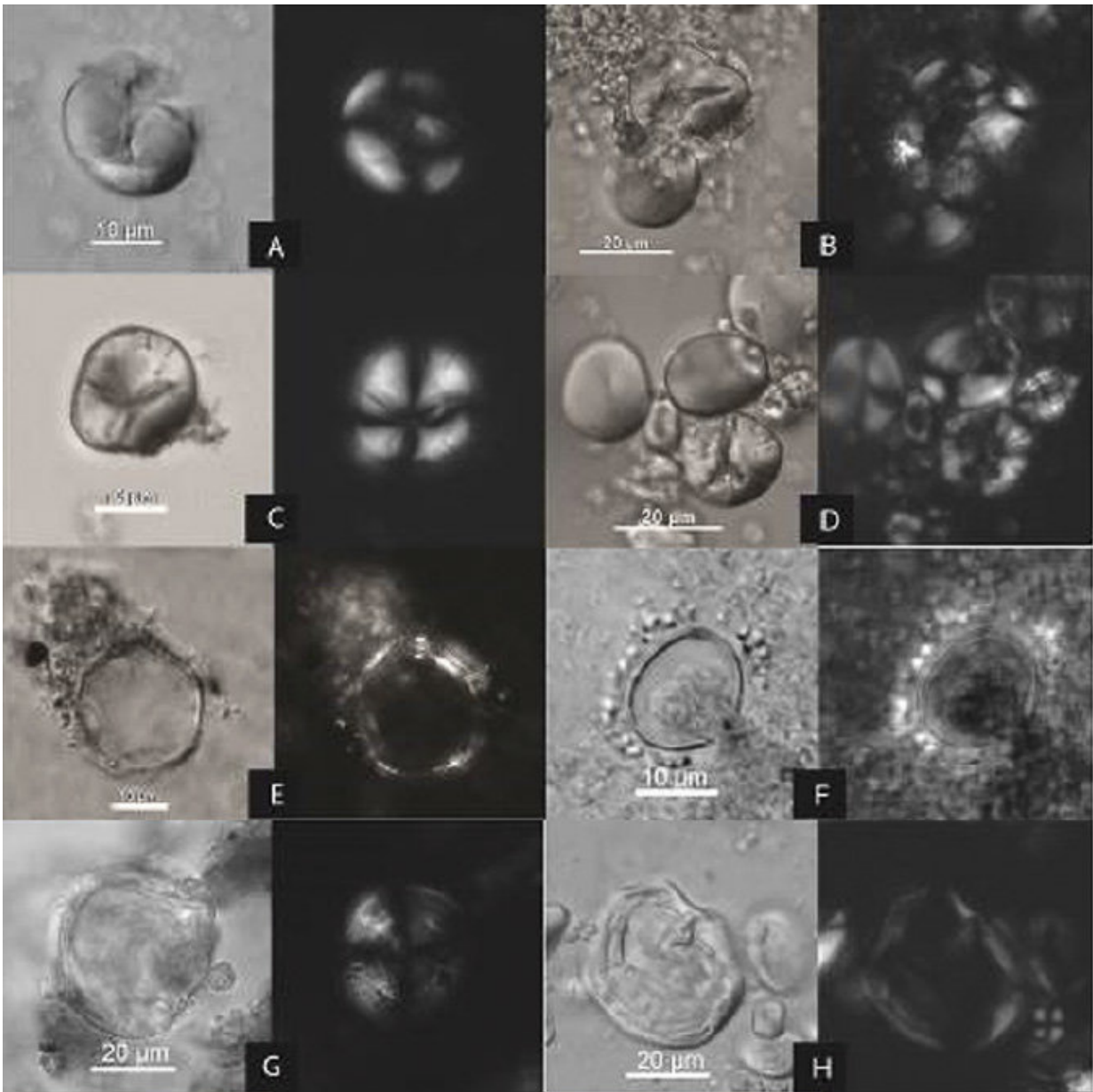
"This discovery indicates that making alcohol was not necessarily a result of agricultural surplus production, but it was developed for ritual purposes and spiritual needs, at least to some extent, prior to

agriculture," Liu said about their findings.

In her lab analysis, Liu said she was surprised to discover evidence of beer brewing in the residue samples they gathered.

"We did not set out to find alcohol in the stone mortars, but just wanted to investigate what plant foods people may have consumed because very little data was available in the archaeological record," said Liu, who is the Sir Robert Ho Tung Professor in Chinese Archaeology at Stanford's School of Humanities and Sciences.

As Liu notes in the paper, the earliest bread remains to date were recently recovered from the Natufian site in east Jordan. Those could be from 11,600 to 14,600 years old. The beer finding she reports here could be from 11,700 to 13,700 years old.



Microscopic traces of ancient starches extracted from the Raqefet Cave (left) are compared to the references Liu and her research replicated in their beer brewing experiments. Credit: Li Liu

Ancient beer brewing

Ancient beer is far from what we drink today. It was most likely a multi-ingredient concoction like porridge or thin gruel, said Jiajing Wang, a doctoral student in the Department of East Asian Languages and Cultures and a co-author on the paper. Wang has helped Liu research ancient alcohol since 2015 when they first looked at 5,000-year-old brews in China before turning their attention to studying the Natufian culture.

In the Raqefet Cave, Liu and Wang unearthed residual remains of starch and microscopic plant particles known as phytolith, which are typical in the transformation of wheat and barley to booze.

The researchers believe that the Natufians used a three-stage brewing process. First, starch of wheat or barley would be turned into malt. This happens by germinating the grains in water to then be drained, dried and stored. Then, the malt would be mashed and heated. Finally, it would be left to ferment with airborne wild yeast.

All of these steps provided clues to help the researchers make their claim.

To test their hypothesis, the researchers conducted a series of experiments to recreate each step the Natufians would have taken to brew their beer.

These brewing experiments allowed the researchers to study how starch granules changed during the brewing process and make comparisons to what they discovered.

Liu and Wang's brewing experiments showed a clear similarity to what the Natufians concocted.

The researchers also analyzed the artifacts that were excavated. They

found that the traces left on the ancient stone mortar closely resembled their own lab experiments of pounding and crushing grain seeds, a process required for beer brewing.

Historical significance

The discovery of ancient brewing shed new light on Natufian rituals and demonstrate the wide range of technological innovations and social organization within their culture, the authors conclude in the paper.

"Beer making was an integral part of rituals and feasting, a social regulatory mechanism in hierarchical societies," Wang said about their findings.

And those rituals were important to the Natufian culture, she said, noting that the discovery of [beer-brewing](#) at the graveyard signifies the emotional ties the hunter-gathers had with their ancestors.

More information: Li Liu et al. Fermented beverage and food storage in 13,000 y-old stone mortars at Raqefet Cave, Israel: Investigating Natufian ritual feasting, *Journal of Archaeological Science: Reports* (2018). [DOI: 10.1016/j.jasrep.2018.08.008](https://doi.org/10.1016/j.jasrep.2018.08.008)

Provided by Stanford University

Citation: New evidence supports the hypothesis that beer may have been motivation to cultivate cereals (2018, September 12) retrieved 9 April 2024 from <https://phys.org/news/2018-09-evidence-hypothesis-beer-cultivate-cereals.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is

provided for information purposes only.