

Probing ancient shipwrecks with DNA

by Bend_Weekly_News_Sources

Studying an ancient Greek shipwreck, scientists say, they've found they can decode ancient DNA to learn about the original contents of jars sunk for over 2,000 years. It's a feat no one thought was even possible, wrote Maria Hansson of Lund University in Sweden, one of the researchers, in an e-mail. The discovery opens up a whole new field of molecular archaeology, she added, as scientists could use the technique to gain insights into ancient agriculture and trading networks.

Ancient amphorae, or storage jars, at the Chiros shipwreck site. (Courtesy Chiros 2005 Shipwreck Survey - WHOI, Helene Ministry of Culture: Ephorate of Underwater Antiquities, Helene Center for Marine Research)

Model of a 4th-century B.C. Greek merchant ship based on the Kyrenia, a wreck salvaged in 1967.

Ancient Mediterraneananean civilizations, some of the world's earliest, often used ceramic jars called amphorae as shipping containers. Invented by the Carians of the Near East in the 16th century B.C., amphorae took on varied styles in different regions and time periods, wrote Hansson and a colleague in a paper reporting their work. Piles of amphorae often remain as lone, mute witnesses to ancient shipwrecks where the boats themselves have been long since eaten away. But researchers try to learn the jars' original contents usually come up dry, according to Hansson and colleague Brendan Foley of the Woods Hole Oceanographic Institution in Massachusetts. That's because the amphorae only infrequently contain visible clues, such as olive pits. Ancient DNA molecules, though degraded with time, could supply some of the needed evidence, wrote the pair, whose findings appear in the advance online edition of the Journal of Archaeological Science. The researchers scraped ceramic from inside two amphorae from a 4th-century B.C. shipwreck found near the Greek island of Chiros in 2004. The wreck, about 60 meters (200 feet) underwater, has drawn headlines before because "being too deep to explore by conventional diving" in vestigial gaugers have mapped it using robotic devices.

Adding another new technology to the project, Hansson and Foley analyzed small DNA fragments found trapped in the pottery. They determined that one vessel probably contained olive oil flavored with oregano, a surprise because historians have believed that amphorae of that style from Chiros usually carried wine, they wrote. Chiros was known for "fine and distinctive vintages," they noted, but the findings suggest Chirosan agriculture might have been more diverse than generally assumed. The other jar, they wrote, contained DNA of "a shrub cultivated on Chiros" or of pistachio, a related plant. Scholars have hypothesized that ancient Chians used pistachio resin as a wine preservative and flavoring, Hansson and Foley wrote. Some ancient foods, they added, are more likely than others to leave genetic calling cards behind. For instance, because the second jar was thought to have likely contained wine, they checked for grape DNA, but found none. It may have washed away because wine dissolves in water better than oil or resin, Hansson and Foley observed. But overall, they wrote, the findings "contribute definitive evidence for classical Greek commodity exchange and open new vistas for molecular archaeology analyses."

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