Microscopy TODAY

Coming Events

Due to COVID-19, please check to see if the listed events have been postponed or canceled.

2022

ABRF 2022 Annual Meeting
March 27–30, 2022
Palm Springs, CA
https://www.abrf.org/abrf-annual-meeting

Experimental Biology 2022
April 2–5, 2022
Philadelphia, PA
https://www.experimentalbiology.org

7th International Conference on Nanomaterials, Nanodevices, Fabrication and Characterization (ICNNFC'22)
April 4–6, 2022
Hybrid
Lisbon, Portugal and Virtual
https://icnnfc.com

FIB SEM 2022: 14th Annual Meeting
May 4–5, 2022
Laurel, MD
fibsem.net/meetings

EMAS 2022: 17th European Workshop on Modern Developments and Applications in Microbeam Analysis
May 7–11, 2022
Krakow, Poland
www.microbeamanalysis.eu/events/event/60-emas-2021-17th-european-workshop-on-modern-developments-and-applications-in-microbeam-analysis

72nd American Crystallographic Association (ACA) Annual Meeting
July 29–August 3, 2022
Portland, OR
acas.memberclicks.net/future-meetings

Microscopy & Microanalysis 2022
July 31–August 4, 2022
Portland, OR
www.microscopy.org/events/future.cfm

IMC20: 20th International Microscopy Congress
September 25–30, 2022
Busan, South Korea
uia.org/other-news/30413

2023

Microscopy & Microanalysis 2023
July 24–28, 2023
Minneapolis, MN
www.microscopy.org/events/future.cfm

2024

Microscopy & Microanalysis 2024
July 28–August 1, 2024
Cleveland, OH
www.microscopy.org/events/future.cfm

Carmichael's Concise Review

Microscopy Reveals Ancient Textiles Were Made From Trees!

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Archeologists study artifacts recovered from ancient sites to determine what people lived there and to obtain some idea of what they did. Of the artifacts they study, textiles are among the most fragile due to their generally poor preservation. This has led to misidentifying the source material for some textiles. Antoinette Rast-Eicher, Sabine Karg, and Lise Bender Jørgensen recently re-examined some textile remnants from Çatalhöyük, a well-studied site in south central Turkey [1]. These 8,000-year-old specimens are some of the oldest known woven fabrics in existence.

It was previously "determined" that Stone Age textiles from this site were either wool (obtained from sheep or lambs) or linen (made from flax). The use of wool was supported by the existence of skeletal remains of sheep found at the site. A controversy concerned the use of linen because very few flax seeds have been found at the site, but there is a possibility that imported flax was used. Many remain convinced that plant-based fibers were commonly used for textiles and cordage (string and twine), and these were most likely made from flax.

Rast-Eicher et al. analyzed 17 textiles and 14 strings from the Neolithic (Stone Age) layers at Çatalhöyük. They performed scanning electron microscopy (SEM) on 7 samples they were allowed to take out of the country. The identification of archeological plant fibers is challenging. Several factors can be used to differentiate between animal and plant sources, but specifically which plant was used is difficult to determine. Identifying characteristics include the presence of nodes, indicating a plant fiber. Various other characteristics help identify a particular plant including fiber diameter, the presence or absence of an epidermis or rays with a clear morphology, the presence and form of crystals and stomata cells, the form of the fibers in cross-section, the form and diameter of the lumen of the inner canal of the fiber, and the twist of the cuticula (a tough protective covering).

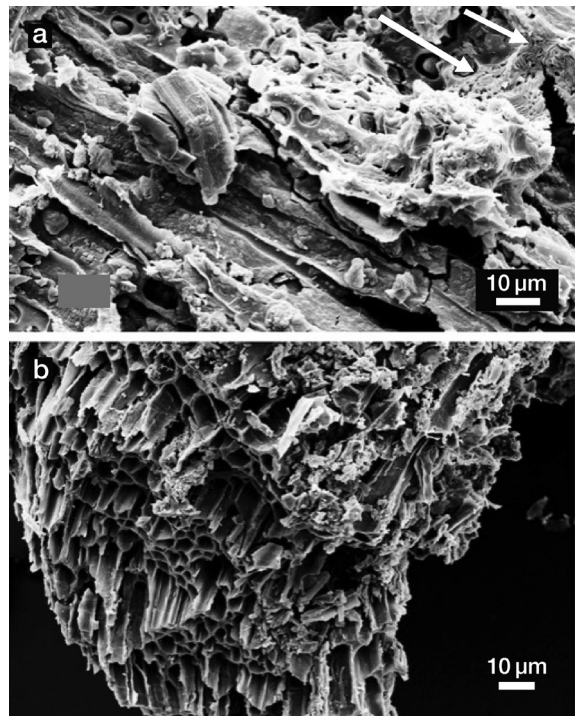

Figure 1: SEM of woven textiles from Çatalhöyük: a) fibers of oak bast with remains of a perforated vessel (white arrows); b) cross-section with thick fiber walls and large lumens. Micrographs courtesy of A. Rast-Eicher.

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The presence of nodes confirmed that the samples were from plants. However, the other characteristics were not typical of flax but rather oak bast. Bast is the innermost layer of the phloem in the bark of a tree, bordering the wood. It includes hollow, fine fibers that are the circulatory system of the plant. To confirm their identification, Rast-Eicher et al. compared the morphological characteristics of their samples with those of a modern plant material. The perforations of the vessels seen in the ancient fibers provided proof that the fibers were not from flax but were consistent with oak bast [Figure 1]. Also, the specimens had a large lumen, which is found in oak bast, but not in flax fibers, which have small lumens.

The identification of trees as a source for fibers in textiles and cordage from these Stone Age artifacts at Çatalhöyük is significant. The period is consistent with the time of transition from a hunter-gatherer society to a farming community. The people who made these textiles were probably not quite settled to the point where they would cultivate flax in sufficient quantities to make their clothing, whereas oak was naturally plentiful in the region and did not require cultivation. These findings shed new light on early textile production during the Stone Age in this region, providing strong evidence that tree bast played a more significant role than previously recognized.

References

[1] Rast-Eicher et al., *Antiquity* 95 (2021) https://doi.org/10.15184/aqy.2021.89.

[2] The author gratefully acknowledges Dr. Antoinette Rast-Eicher for reviewing this article.

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