



## Project Gallery

# Artisans of the Stone Age: the utilisation of plant- and wood-based raw materials at the wetland site of Järvensuo 1

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Rare organic artefacts, including wooden figurines and fishnet fragments from the Stone Age (c. 6000–2000 BC) were found in 2020 and 2021 during excavations of a wetland site in Finland. The first results from analysing the artefacts, crafting methods and raw materials provide novel insights into artisanship, material know-how and visual culture of northern hunter-fisher-gatherers.

Keywords: Finland, Fennoscandia, Stone Age, organic artefacts, crafting methods

## Introduction

Archaeological knowledge of hunter-fisher-gatherers in the boreal geographical region of Fennoscandia is incomplete because research still relies heavily on materials from drylands (e.g. Nordqvist & Kriiska 2015). Acidic, micro-organism-rich podzol soils do not preserve organics, so sites usually yield durable materials only. Paludified lake environments in northern Europe possess immense wetland archaeological significance (Siiriäinen 2004; Groß *et al.* 2019; Koivisto 2021) because prehistoric populations used them actively and many sites have paludified and turned into mires. As such, they host rare organic remains that provide access to the usually invisible components of the past.

As part of a wetland archaeological project, *Perish and Fade Away* (University of Turku 2019–2022), small-scale excavations at the lake settlement of Järvensuo 1, south-west Finland, increased our knowledge of the organic material record of northern hunter-fisher-gatherers. In 2020 and 2021, we excavated two evaluation trenches totalling 25m<sup>2</sup> across a paludified lakeshore zone to assess the preservation state of the drained peatland environment (Figure 1) (Koivisto & Lahelma 2021; Koivisto 2023). Organic artefacts (n = 87) from the Stone Age (c. 6000–2000 BC) were recovered from the site, making up about 70 per cent of all the finds. The assemblage included tools, figurines and utensils made of wood, bark and plant fibres and—most significantly—rare textile remains, cordage and knots, related to prehistoric net-fishing practices. The time-consuming conservation process is still taking place so most artefacts are in a wet state and analysis is in the early stages. Nevertheless, here we present the initial results of a study focusing on the manufacturing techniques, material know-how and use of organic raw materials in the region.

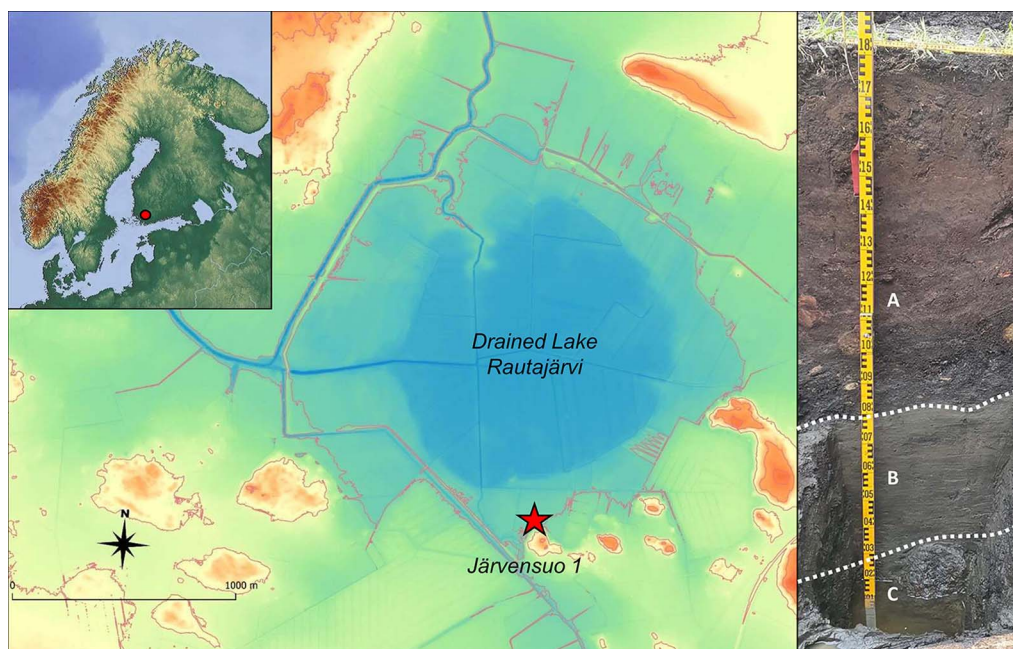


Figure 1. Location and stratigraphy of Järvensuo 1. A) peat; B) fine detritus gyttja; C) coarse detritus gyttjalsand. The cordages were found in the oldest horizon (C) representing shallow water conditions. Wood and bark artefacts were found in all horizons, most abundantly in the youngest horizon (A), reflecting the paludified shoal zone (elevation data by National Land Survey of Finland; photograph by S. Koivisto).

## Materials and methods

The study involves archaeological, technological, palaeobotanical and comparative ethnographic research on the wood- and plant-based materials and their radiocarbon dating. Wood, technology and tool-mark analyses included visual characterisation, microscopy and 3D modelling, which will be repeated after conservation. Tree bast identification was carried out using transmitted and polarised light microscopy and modern reference material. Taxa-specific identification was based on the morphology of fibres and calcium oxalate crystals. Designation of the most plausible—locally available—raw materials was supported by plant macrofossil analysis conducted on systematically collected soil samples from archaeological horizons (Figure 1). The results were scrutinised, evaluated and contextualised through comparative archaeological and ethnographic literature review.

## Results

*Pinus sylvestris* and *Betula* sp. were the most frequently utilised species in artefact crafting, both as wood and bark raw materials. The flexible laths for wooden fishing structures were split from knotless pine. Piles and stakes were made from coniferous and deciduous species, with their ends carved pencil-shaped, with a few strokes from all sides, or obliquely from one side only. The unique snake figurine (Figure 3C & H; Figure 4) (Koivisto & Lahelma 2021)

was skilfully sculpted from a single piece of *Juniperus communis*. Stone Age carpentry techniques included faceting, dimpling and hewing, along with splitting, notching, smoothing and grooving (e.g. Figure 3C, E, G, H & Figure 4). Fishnet floats were made exclusively from tree bark containing various forms of perforated and grooved pine bark floats and simple birch bark rolls (Figure 3B & F). A direct radiocarbon dating of a shuttle-shaped pine bark float yielded a Late Neolithic date of 2461–2209 BC at 95.4% (Figure 2).

The cordages were made by twisting strands of tree bast instead of plant fibres. A direct radiocarbon date of 4933–4725 BC at 95.4% was obtained from one of the knots (Figure 2), placing it in the Mesolithic-Neolithic transition. Species of *Tilia*, *Populus*, *Quercus*, *Ulmus*, *Juniperus* and *Salix* are the most likely candidates for the tree bast used in cordages (Figure 3D & Figure 5), which agrees with comparative studies (e.g. Miettinen *et al.* 2008; Berihuete-Azorín *et al.* 2023). Diverse and abundant lake and woodland resources were locally available during the main occupation phases, which probably explains why people used the site for such a long time.

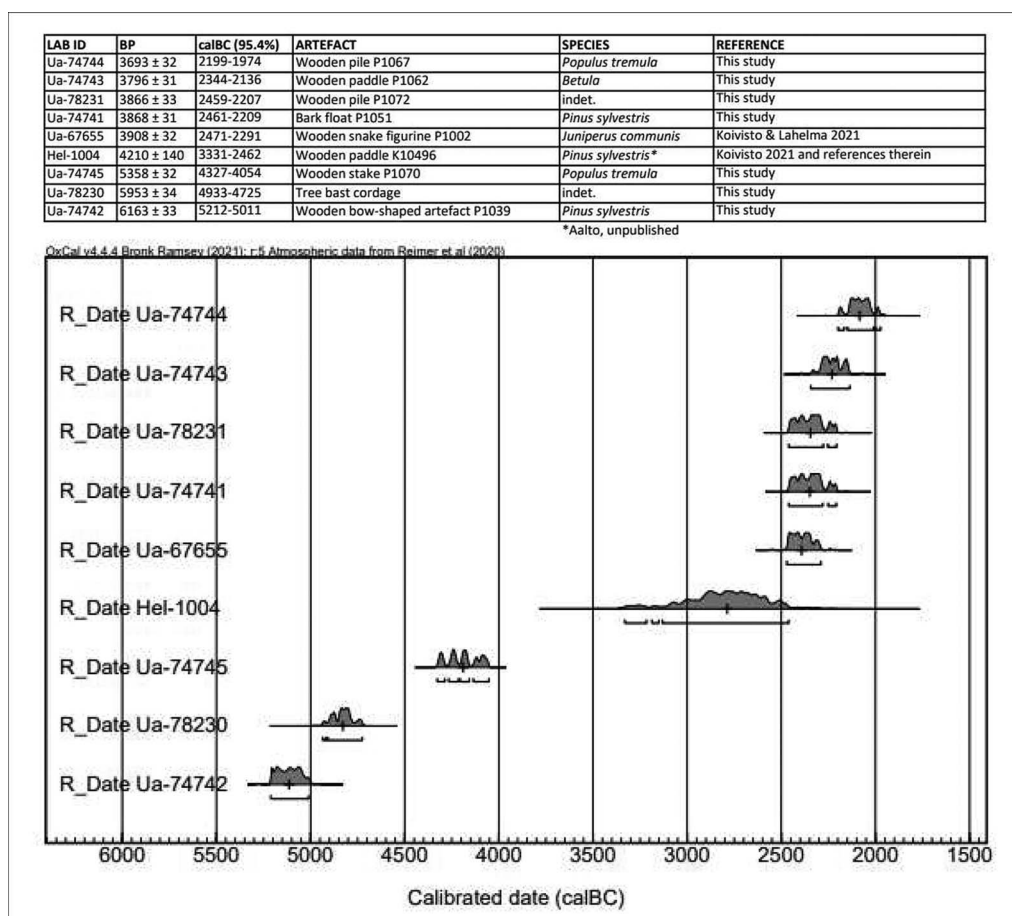


Figure 2. Radiocarbon dates of organic artefacts calibrated in OxCal v4.4.2 (Bronk Ramsey 2009) using the IntCal20 calibration curve (Reimer *et al.* 2020).

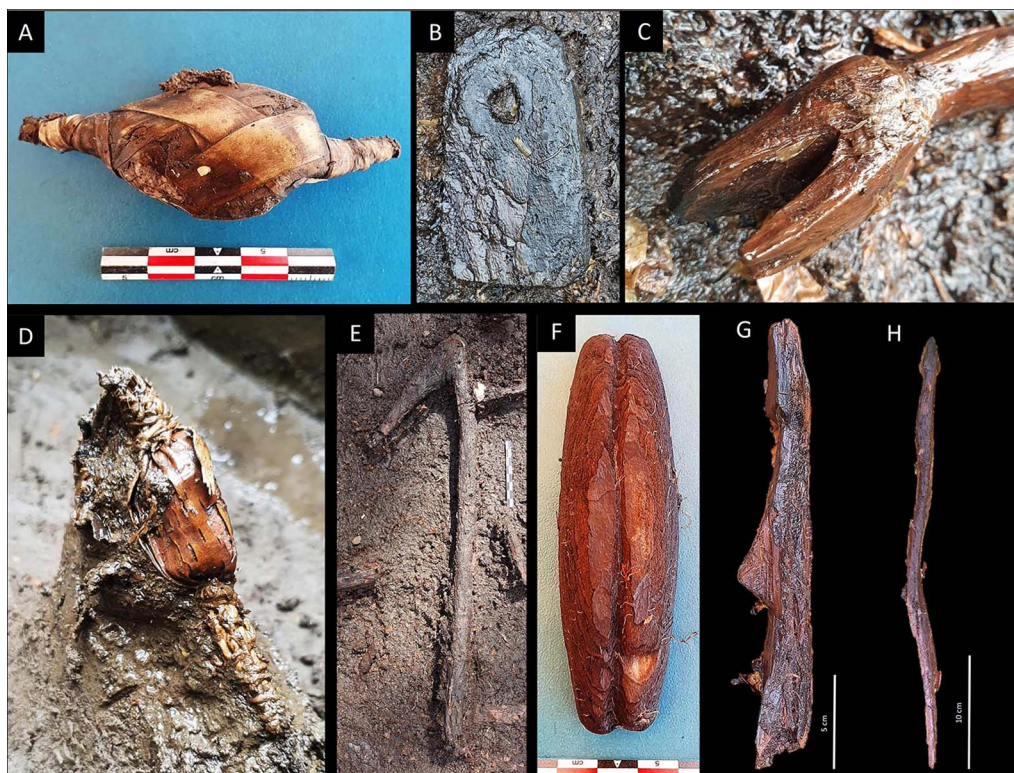


Figure 3. A) and D) fishnet pebble sinkers with birch bark wrapping and bast cordage; B) and F) pine bark fishnet floats; C) carved head of a wooden snake figurine; E) wooden shaft/hook; G) carved ladle/figurine; H) snake figurine from above (photographs by S. Koivisto).

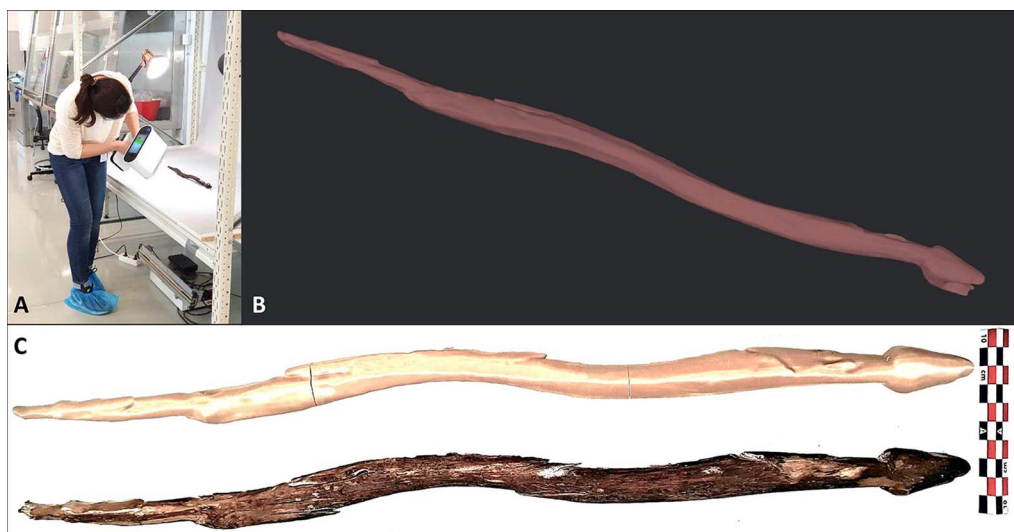


Figure 4. A) 3D scanning; B & C) the model and original snake figurine after conservation (photographs by S. Koivisto).

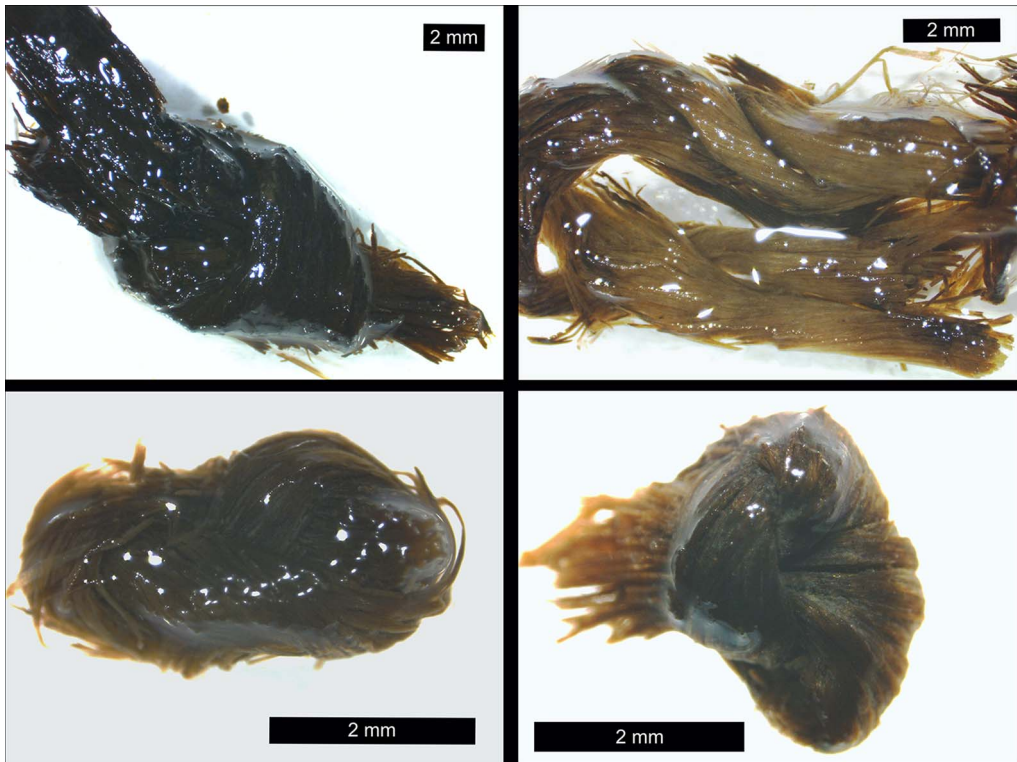


Figure 5. Microscopy imaging of the bast cordage knots and fibres (photographs by J.A. Suomela).

## Significance and future work

Organic materials are thought to represent at least 90 per cent of the potential archaeological record (e.g. Coles 1987), therefore, owing to environmental conditions that prevent preservation of wood, bark and other organics, our understanding of northern hunter-fisher-gatherers is severely limited. There are extremely few comparative materials to Järvensuo 1 from boreal Fennoscandia (e.g. Kauhanen 1974; Miettinen *et al.* 2008), eastern Baltic (e.g. Vankina 1970; Rimantienė 2005) and northern Europe (e.g. Myking *et al.* 2005; Jørgensen 2013). In fact, along with the hitherto oldest net find from Antrea, *c.* 8400 BC (Miettinen *et al.* 2008), the site has yielded one of the earliest examples of directly dated tree bast cordages in Fennoscandia, where similar finds have mostly been dated contextually, from *c.* 4300 BC onwards (e.g. Stjernquist *et al.* 1953; Jørgensen 2013). Globally, cordages are occasionally found in well-preserved archaeological contexts, for example, in fishing gear (e.g. Berihuete-Azorín *et al.* 2023), in constructions requiring durable binding (Hardy 2008) or woven textiles (Rast-Eicher *et al.* 2021). Thus, Järvensuo 1 significantly increases knowledge of the northern Stone Age. Our work on its versatile materials will continue to assess the artefacts and their manufacturing methods in even more detail. By doing so, we aim to challenge the dominant dryland approach in northern archaeology, promote wetland studies and provide a more diverse and nuanced picture of our past.

## Acknowledgements

We would like to thank Tuomas Aakala for wood species determinations and Jasmin Ruotsalainen and Wesa Perttola for 3D visualisation. We acknowledge the provision of facilities by the Aalto University OtaNano – Nanomicroscopy Center (Aalto-NMC).

## Funding statement

Fieldwork was funded by the Academy of Finland (322331). The Ella and Georg Ehrnrooth Foundation supports the current study.

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