

# A 5,000-year-old barley grain discovered in Finland changes understanding of livelihoods

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Researchers determined the age of millennia-old barley grains using radiocarbon dating. Credit: Santeri Vanhanen, CC-BY 4.0 licence

On the basis of prior research, the identity of the Pitted Ware Culture from the Stone Age has been characterized as hard-core sealers, or possibly even related to Inuits of the Baltic Sea. Now, researchers have discovered barley and wheat grains in areas previously inhabited by this culture, leading to the conclusion that the Pitted Ware Culture adopted agriculture on a small scale.

A study carried out in cooperation with parties representing the

discipline of archaeology and the Department of Chemistry at the University of Helsinki, as well as Swedish operators in the field of archaeology (The Archaeologists, a governmental consultant agency, and Arkeologikonsult, a business), found grains of barley and wheat in Pitted Ware settlements on Finland's Aland Islands and in the region of modern Stockholm.

The age of the grains was ascertained using radiocarbon dating. Based on the results, the grains originated in the period of the Pitted Ware culture, thus being approximately 4,300-5,300 years old. In addition to the [cereal grains](#), the plant remnants found in the sites included hazelnut shells, apple seeds, tuberous roots of lesser celandine and rose hips.

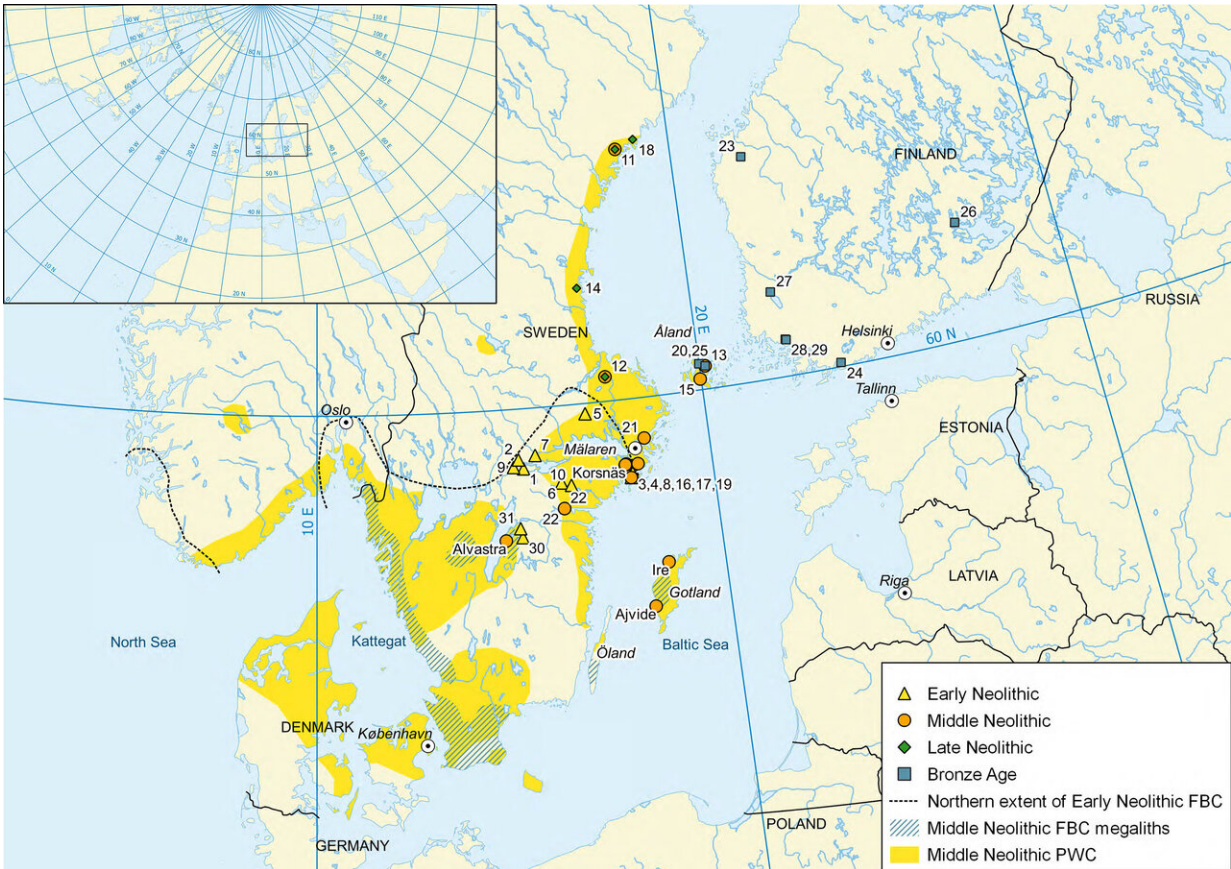
The study suggests that small-scale farming was adopted by the Pitted Ware Culture by learning the trade from farmers of the Funnel Beaker Culture, the latter having expanded from continental Europe to Scandinavia.

Other archaeological artefacts are also evidence of close contact between these two cultures.

"The grains found on Aland are proof that the Pitted Ware Culture introduced cultivation to places where it had not yet been practised," says Santeri Vanhanen, a doctoral student of archaeology at the University of Helsinki.

## **Cereal perhaps used to brew beer?**

The 5,000-year-old barley grain found on Aland is the oldest grain of cereal ever found in Finland. The researchers also found a handful of barley and [wheat grains](#) a few hundred years younger, representing either common wheat or club wheat.



In the study, the age of cereal grains found at the sites tagged with numbers in the map were determined with radiocarbon dating. These findings demonstrate that hunter-gatherers adopted farming on the Åland Islands on the southwestern coast of Finland and in eastern Sweden already 5,000 years ago. Credit: Santeri Vanhanen, CC-BY 4.0 licence

"We also dated one barley grain found in Raseborg, southern Finland. This grain and the other earliest grains found in mainland Finland date back some 3,500 years, some 1,500 years behind Åland according to current knowledge," Vanhanen explains.

In prior studies, it has been extremely difficult to demonstrate that the

[hunter-gatherer](#) population would have adopted farming during recorded history, let alone in the Stone Age. Research on ancient DNA has in recent years proven that the spread of [agriculture](#) in Europe was almost exclusively owing to migrants.

"We find it possible that this population, which was primarily specialised in marine hunting, continued to grow [plants](#) as the practice provided the community with social significance."

From time to time, an abundance of pig bones are found at Pitted Ware sites, even though pigs were not an important part of their daily nourishment. For instance, the bones of more than 30 pigs were found in a grave located on the island of Gotland.

"Members of the Pitted Ware [culture](#) may have held ritual feasts where pigs and cereal products were consumed. It's not inconceivable that grains might even have been used to brew [beer](#), but the evidence is yet to be found," Vanhanen continues.

## **Grain age determined through radiocarbon dating**

The research relies primarily on archaeobotanical methodology, which helps examine plant remains preserved in archaeological sites. In this study, [soil samples](#) were collected from the sites, from which plant remains were extracted using a flotation method. The plant remains are charred; in other words, the grains and seeds have turned into carbon after having come into contact with fire.

Plant remains can be identified by examining them through a microscope and comparing them to modern plant parts. The age of individual [grains](#) can be determined with radiocarbon dating, based on the fractionation of the radioactive carbon-14 isotope. This way, the age of a grain aged several millennia can be determined with a precision of a

few centuries.

**More information:** Santeri Vanhanen et al, Maritime Hunter-Gatherers Adopt Cultivation at the Farming Extreme of Northern Europe 5000 Years Ago, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-41293-z](https://doi.org/10.1038/s41598-019-41293-z)

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