Plant macrofossils in grubenhäuser from Viking Age in Denmark

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These examples demonstrate how plant macro-remains preserved in grubenhaüser can reveal different aspects of daily life in the building and the community around it, as well as the site economy, the internal organisation of the building etc. However, this is only possible if samples for analysis are taken in the right place. It is therefore very important to plan sampling so the use of the building is directly reflected – i.e. from the occupation layer and not later deposited layers. If samples are taken in the correct place, the plant macrofossils can aid archaeologists in the interpretation of the grubenhaus - its use and internal fixtures and fitting. In the examples given here, it is clear that the composition of the two macrofossil assemblages is very different, reflecting two very different activities within the grubenhäuser. This was also clear from the archaeological evidence, but perhaps, as we obtain more and more archaeobotanical evidence from grubenhäuser, the plant macrofossils will also help interpret these structures where there is no archaeological evidence to reflect their function.

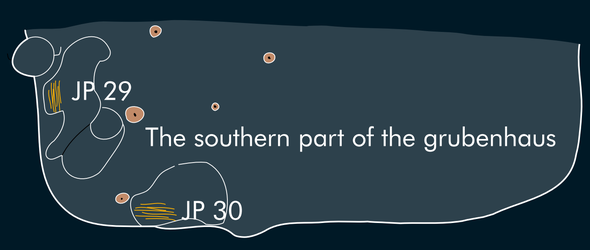
Threshed rye straw as a floor covering in a grubenhaus (1)

A Viking Age *grubenhaus* (pit-house) at the rural site of Tjæreborg on the west coast of Jutland contained a floor layer, partly preserved by fire. During excavation, it was noted that the burnt patches consisted of straw and other carbonised material (see picture). Two of these patches were sampled for plant macro-remains and were analysed at the Department of Environmental Archaeology and Conservation at Moesgård Museum. Archaeobotanical analysis revealed that one of the samples (JP 29) not only contained abundant straw, but also large quantities of chaff and grain of rye (*Secale cereale*). The proportion of grains to chaff, combined with the presence of straw, reveals that the floor had presumably been covered with threshed rye straw. The other sample (JP 30) contained smaller quantities of straw, chaff and grain, but many weed seeds (mainly *Carex sp.*, *Poaceae* and *Chenopodium album*). Together with lumps of organic material, these indicate that underneath the layer of straw there presumably was a layer of turf. Some more peculiar macrofossils in the samples also indicate that JP 30 comprised more solid material than the straw layer in JP 29, as the latter contained abundant mouse faeces, while JP 30 only contained a few.

Archaeobotanical analysis of floor covering is not know from other excavated grubenhäuser in Denmark. However, according to weaving experiments preformed by Eva Andersen (1989: Grophus som vävstugor? C-uppsats in Archaeology, Lunds Universitet VT, Lund), straw on the floor of a grubenhaus provides better light in the house and constant humidity, both of which are beneficial for weaving. The interesting point is that the archaeological investigations of the grubenhaus from Tjæreborg uncovered several loom weights and the archaeobotanical analysis also revealed small pieces of cloth. A combination of the archaeological and the archaeobotanical evidence, together with experimental archaeology, therefore seems to make an interpretation of the grubenhaus as a weaver's hut very plausible.

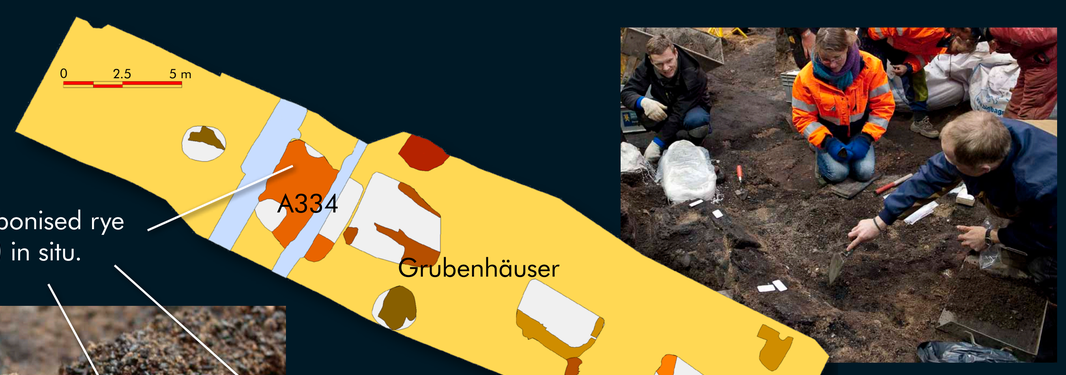
Carbonised chaff of rye *(Secale cereale)*.

Carbonised grain of rye *(Secale cereale)*.



Carbonised straw of rye in situ.

Carbonised straw of rye flotated.



Concentration of carbonised rye grain *(Secale cereale)* in situ.

The above concentration of grain as block lifted sample.

The grain concentration in grubenhaus A334 in Viking Age Aarhus (2)

During a recent excavation of Viking Age layers in Aarhus, a burnt grubenhaus, dated to the late 10th or early 11th century A.D. was uncovered. The house, which contained both a hearth and wall benches built of sand, was probably used for habitation.

A large concentration of carbonised grain was found scattered on top of the original floor layer. A very preliminary examination of the cereals indicates that the grain consists partly of cleaned rye *(Secale cereale)*, in one area of the concentration, and probably partly of oats *(Avena sativa)* in another area.

On excavation, the grain concentration was sampled in the form of subsamples and stored in plastic bags. Part of the concentration was, however, taken up as a block, because it was found that the grain was mixed with other organic material such as wood. Consequently, more careful excavation in the lab was to be preferred. During the excavation of a different area of the grubenhaus parts of a well preserved carbonised basket were discovered. Careful excavation of the block-lifted sample in the lab will hopefully reveal traces of other carbonised organic objects, for instance remains of the containers in which the grain was originally stored.

This recent find will, when fully analysed, provide important information on the processing and storage of grain in a Danish Viking Age town. Previous archaeobotanical investigations of a burnt grubenhaus from late Viking Age Aarhus, which can be compared to the new grubenhaus A334, mainly revealed remains of rye *(Secale cereale)* and barley *(Hordeum vulgare sp.)*. The earlier investigation also produced a few examples of pea *(Pisum sp.)*, a species that is very rare in the Danish prehistoric archaeobotanical record. It will be very interesting to see whether this new find also includes rare species such as pea, or perhaps exotic and possibly imported species. It is expected that these new investigations will make an important contribution to the history of plant use in the earliest towns in Denmark.

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