Cereal chaff used as a temper in a loam-weight: new evidence from a Slovenian Late Neolithic pile-dwelling site

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The site and the object of the research

Stare gornje, Late Neolithic pile-dwelling site (app. 3160 – 3100 cal BC) was first excavated in 2006 (Gl. Turčič). Stare gornje is one of the oldest known mound structures in the area and is one of the oldest wooden wheels with an axe was found (more info: Velušček 2009).

Large (22 cm high and up to 14.4 cm wide) pyramid-shaped loam-weight was found at Stare gornje. The wall of the weight was burnt, but its inside not completely. The interior unburnt clayey material was dug out and wet-sieved across 2 mm and 0.355 mm mesh size sieves.

Conclusions

- new evidence of an intentional use of cereal by-products at Late Neolithic pile-dwelling site in Slovenia was detected, i. e. using cereal chaff as a temper for a loam-weight
- the original material (unburnt clay including large quantities of chaff) for making the weight was gained inside the object and analysed
- it was possible to identify the actual quantity and variety of straw and chaff used for tempering (see Tabs. 1 and 2), which is, according to our knowledge, the first time in the history of archaeobotany: more than 1600 carbonised and half-carbonised identifiable cereal macroremains in less than 1 litre of sediment were sorted and counted
- cultivation of the main crops (emmer, einkorn and barley) at Slovenian late Neolithic pile-dwelling sites was confirmed again (see: Tolar et al. 2011)
- among the chaff, new unusual “strange” type of emmer spikelet forks was discovered
- an experiment was made in order to reconstruct how the chaff became half-charred and charred inside the weight although only outer parts were fired. Most probably, the temperatures were high enough (and the oxygen-content very low) to carbonise the temper material inside the weight, but not high enough to burn the clay. As Jacomet et al. 2002 have found during another experiment, temp. of 150-200 °C lasting over several hours, can to lead a complete charring and excellent preservation

References:


Results

Under stereomicroscope, plant macroremains (mostly cereal straw and chaff) used as a temper were recognized.

Numerous carbonised and half-carbonised cereal by-products were exceptionally well preserved in the unburnt, central part of the loam-weight, which was protected from post-depositional influences.

Among identifiable CM barley (Hordeum vulgare) rachis fragments (Fig. a) and glume wheat (emmer (Triticum dicoccum), Fig. b) and einkorn (T. monococcum) (Fig. c) chaff remains prevailed (see Tab. 2).

Cereals by-products prevailed (Tab. 2), other plant macroremains (seeds / fruits of different taxa) were recognised as well: Poaceae fam. (incl. Bromus and Panicum cf.), Papaver somniferum, Chenopodium album, Verbascum cf. blattaria, Hypericum perforatum, Quercus sp., Cyperaceae fam., besides: Fungus spores, charcoal frg., fish bones and scales.

Tab. 2: Absolute no. (counts) of CM (cereal macroremains) in cca. 1 litre of clayey material.

<table>
<thead>
<tr>
<th>CM</th>
<th>Hordeum vulgare naked</th>
<th>T. dicoccum</th>
<th>T. monococcum</th>
<th>T. monodicus</th>
</tr>
</thead>
<tbody>
<tr>
<td>rachis frg.</td>
<td>443</td>
<td>25</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>grain</td>
<td>12</td>
<td>3</td>
<td>89</td>
<td>74</td>
</tr>
<tr>
<td>spikelet fork</td>
<td>24</td>
<td>11</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>rachis frg. with spikelet fork</td>
<td>9</td>
<td>4</td>
<td>321</td>
<td>596</td>
</tr>
<tr>
<td>rachis frg. with glume base</td>
<td>9</td>
<td>4</td>
<td>321</td>
<td>596</td>
</tr>
</tbody>
</table>

"Strange" type of emmer spikelet fork was recognized (Figs. a, b). It looks like an exceptionally big, maybe 2-grained emmer variety.

Fig. a: The right side represents the "typical dicoccums" and the left side the "strange" ones.