Presence of Avena sp. in Early Belgian Neolithic sites: just a weed or real food?

Alexandre Chévalier¹ (alexandre.chevalier@naturalsciences.be)
Dominique Bosquet², Aurélie Salvetti³, Mona Court-Picon¹

Between 1993 and 1999 archaeological rescue operations have been undertaken by the Belgian Walloon region in collaboration with the Royal Belgian Institute of Natural Sciences on the high-speed train line between the French border and the town of Liège on the eastern part of Belgium. Since 2000 different kind of analyses, including four combined archaeobotanical methodologies - seed, wood charcoal, phytolith and starch grains – have been applied to the LBK sites found on the High Speed Train path.

Both wood and palynological data clearly indicate a progressive forest clearing, with the implementation of cereal agriculture and a soil degradation during the LBK occupation of this region. Seed analyses indicate a heavy dietary reliance on cereals, mostly wheat with very scarce barley evidence. In contrast with the eastern LBK sites that seem to prefer einkorn wheat (T. monococcum), emmer wheat (T. dicoccum) dominates the assemblage in both Remicourt «en Bia Flo II» but also in the other sites in Middle Belgium, which cannot really be explained by different ecological conditions, but local cultural differences. No oat carapace has been found in the Hesbaye LBK sites, and only one occurrence of Avena sp. is documented at the genus level for the Northwestern Europe LBK at Willez-la-Tour-Holzdorf in Luxembourg.

Pulse (Vicia sp.) and lentils (Lens sp.) as well as couple of wild plants, either weeds or fruits, complement the LBK everyday diet at Remicourt «en Bia Flo II». Opium poppy seeds ('Papaver somniferum L.') found at Remicourt «en Bia Flo II» come from the structure 141 that is associated with the external house MV, in other words with the first LBK peopling phase in Belgium. It is however impossible to know whether the seeds are from the domesticated subspecies P. somniferum subsp. somniferum or from the wild one P. somniferum subsp. segitum and therefore if opium poppy was cultivated for its seeds or narcotic properties, or was a weed associated with wheat and barley agriculture.

Phytolith and starch grain analyses have been applied to grinding stones from the site of Remicourt «en Bia Flo II» in order to identify more precisely the plants processed and, most probably, eaten by the LBK settlers. The archaeological site has been excavated between 1997 and 1998 on 6,847 m². It comprises 235 structures distributed in two sectors: a village of at least 10 houses surrounded by a wooden fence with an opening on its eastern side divided by a sidewalk, namely a ditch with a profile in V, and a house located 130m away from the village, facing the opening. Among the structures there are 182 pits whose function are unknown. Most of them uncovered charred botanical remains, fir industry, sickles, ceramic sherds and querns.

Based on ceramic typology the external house was dated from the Middle to Late LBK while the village was dated from the Late to Final LBK. This chronology has been confirmed by C14 dates. The external house is dated between 5301BCE and 4990 at 2σ and the village is dated between 5266 and 4913BCE at 2σ.

Nine grinding stones from different pits have been selected among a collection of 358 querns reflecting as much grinding activities (47%) than polishing and abrasion ones (39%). Phytolith analyses are not very informative: the identification taxonomic level is very high, and with the exception of the grinding stone #277 on which we found a small number of very specific morphologies we couldn’t associate to any taxa, all the querns seemed to have been used to grind various kind of plants, including dicotyledons, but none with any evidence of cereals processing.

It is unlikely that these phytoliths and starch grains come from the domesticated oat, A. sativa, which appears way later in Northwestern Europe, around the Second Iron Age. A. sterilis cannot be considered, for its starches are really different and it has also a more southern natural distribution than Belgium. Avena fatua, would fit both the ecological conditions and the morphological variability, but local cultural differences. Bristle oat (Avena strigosa Schreb.) may also be suggested for it fits better the archaeological morphology and size than A. fatua.

Because of its very low archaeological occurrence, both as macro- and micromorpha, we don’t think that oat has been grown separately. However it may have been more than a tolerated weed, and grown together with barley or wheat as a “cultural contaminant”. In fact bristle oat originates from the Mediterranean area, as do opium poppy and barley. Together with other material culture features, such as Egozinel type sickle blades, bristle oat may have constituted some sort of initial cultural package brought up north by the first LBK settlers, that would eventually be abandoned by subsequent LBK settlers.

1) Royal Belgian Institute of Natural Sciences
2) Service Public de Wallonie, Service de l’Archéologie
3) Muséum national d’Histoire naturelle
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Phytoliths of Avena sp. from Fexhe-le-Haut-Clocher, pit 89, polarised light
Phytoliths of Avena sp. from Fexhe-le-Haut-Clocher, pit 89, phase contrast
Phytoliths of Avena sp. from Fexhe-le-Haut-Clocher, pit 89, epifluorescence
Starch of Avena sp. in bright and polarized light from structure 125, #SR274
Starch of Avena sativa L., in bright and polarized light (ROSC reference collection)
Starch of Avena fatua L., in bright and polarized light (ROSC reference collection)
Starch of Avena sterilis L., in bright and polarised light (ROSC reference collection)
Starch of Avena stivgas L., in bright and polarised light (ROSC reference collection)

The presence of oat starch grains on one of the querns could be considered a potential contamination if there weren’t other evidences of oat presence in Hesbaye. Analyses on sediments from the pit 89 associated with the pioneer house at Fexhe-le-Haut-Clocher indeed uncovered evidence of Avena sp. phytoliths.

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In turn, starch grain analyses were very informative and we could identify wheat (Triticum sp.), barely (Hordeum sp.), oat (Avena sp.) peas (cf. Pisum sp.) and acorn (Quercus sp.).