[Supplementary material]

Timber for the trenches: a new perspective on archaeological wood from First World War trenches in Flanders Fields

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Wood anatomy and species identification

Sample preparation

Hand-cut thin sections were made for wood species identification with razor blades and observed under ×100 up to ×400 magnification with transmitted light microscopy. In those cases when anatomical features could not be observed clearly on these hand-cut sections or when species identification required more detail, thin sections of 10–20µm in transverse, tangential and radial plane were made with a microtome, bleached and dyed with safranin and alcian blue, in order to highlight the anatomical structure of the wood (Schoch *et al*. 2004).

Description of wood anatomical features

Wood anatomical characteristics were described by the corresponding feature number (ft.) according to the IAWA list of microscopic features for softwood (Richter *et al*. 2004) and hardwood (Wheeler *et al*. 1989) identification. Taxonomic identification was performed using identification keys (Schweingruber 1990; Esteban *et al*. 2004*;* Heinz 2004), illustrated atlases of microscopic thin sections (Greguss 1955; Jacquiot 1955; Schweingruber 1990) and online databases of wood anatomical descriptions accompanied by images showing anatomical details (‘Inside Wood’, http://insidewood.lib.ncsu.edu/search and ‘Wood anatomy of Central European species’, http://www.woodanatomy.ch).

Species identification

In total at least 16 different species were identified. The spectrum is dominated by wood from coniferous trees (79.6 per cent), with pine (*Pinus sylvestris*), spruce (*Picea abies*) and silver fir (*Abies alba*) as the most abundant species (Figure 7 in main article). However, 16 timbers required further attention as their wood anatomical characteristics (Figure 8 in main article) allowed us to exclude native European conifers.

First, four beams from the Zonnebeke church dugout and one plank from site Ooststraat in Ypres (site 22; sample nr. 158 sp. 14) display highly similar anatomical features. The wood is characterised by a gradual transition from earlywood to latewood (ft. 43) and axial resin canals are present (ft. 109). Although the longitudinal tracheids become smaller in the latewood, the cell walls are approximately equally thick in early- and latewood. The rays are uniseriate and 5 to 15 cells high (ft. 103), excluding the fusiform rays containing intercellular canals. No biseriate bordered pits were observed on the earlywood tracheid cell walls (ft. 45 absent). Numerous earlywood ray tracheids are present with dentate (ft. 82) to slightly reticulate (ft. 83) cell walls. In the cross-fields two to three large pinoid pits are present (ft. 91). After consulting identification keys and anatomical atlases of conifer species, a strong resemblance with the wood of pine trees (subgenus *Pinus*, section *Trifoliata*) from the subsection *Contorta* was found. This subsection includes species, native to North America (Prasad *et al*. 2007), as *P. banksiana* (Jack pine) and *P. contorta* (lodgepole pine), carrying needles in fascicles of two.

Second, the wood of one plank from the Ooststraat in Ypres (site 10; sample nr. 140, sp. 214) and one plank from the find location Sint-Elooi 3 (site 5) display growth rings that are distinct with an abrupt transition from earlywood to latewood (ft. 42) (figure 8a). On both samples, the latewood tracheids are clearly thick-walled (ft. 55) and axial resin canals are present (ft. 109). The rays are uniseriate and 5 to 20 cells high (ft. 103). Biseriate bordered pits are frequently present on the radial walls of earlywood tracheids (Figure 8d in main article). Very numerous ray tracheids are present with thick dentate, but mostly reticulate cell walls (ft. 83). In the cross-fields 2-6 pinoid pits are present (ft. 91) (Figure 8b-c in main article). These features correspond to pines from the subsection *Australes* (subgenus *Pinus*, section *Trifoliata*), and more particular to the group of Southern yellow pines, native to the Southeast of the U.S.A. (Prasad *et al*. 2007). This group of North American pines, include *P. taeda* (loblolly pine), *P. palustris* (longleaf pine), *P. elliotti* (slash pine) and *P. echinate* (shortleaf pine), which all carry needles in groups of two to three.

Quite similar in its wood anatomical composition is a plank from the find location Sint-Elooi 3 (site 5; sample from feature nr. 2007). On thin sections of the transverse plain, growth rings with resin canals and an abrupt transition from earlywood to latewood were observed. The rays are primarily composed of tracheids with dentate to reticulate cell walls, but in the cross-fields no more than four pinoid pits (usually 2–3) were observed. Also the frequency of biseriate bordered pits on the radial cell walls of earlywood tracheids is lower compared to the timbers described in the previous paragraph. Taking into account the observed characteristics, this plank from Sint-Elooi 3 probably originates as well from a pine tree of the subsections *Australes*. Most likely it concerns one of the Southern yellow pines, but probably a different species compared to the timbers described above.

And last, microscopic images of the wood from eight planks that were found in the trenches at Ypres-Wieltje (site 8) revealed the occurrence of distinct, narrowly spaced and nearly horizontal helical thickenings in longitudinal earlywood tracheids. Along with the occurrence of 2-4 small pits (taxodioid and piceoid) in the cross-fields, the occurrence of axial resin canals with thick-walled epithelial cells (ft. 116) and other characteristic wood anatomical features allowed to determine the species as *Pseudotsuga menziezii* (Douglas fir or Oregon pine).

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