

Dendrochronological research on beech in Belgium: the case of 12th graves from the Nivelles Abbey (Brabant wallon) and future archaeological prospects

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In 2011-2013, the Royal Institute for Cultural Heritage was entrusted with the dendrochronological analysis of approximately one hundred planks from the graves of two zones of cemeteries that were excavated on the grounds around the Nivelles Abbey by the Archaeological Service of the Service Public de Wallonie (SPW-DGO4). These planks, mostly in beech (*Fagus sylvatica*), have been well preserved for almost ten centuries, in the humid subsoil of the Grand Place.

The objectives of the dendrochronological research were several:

- Find relative dating between planks/graves/cemeteries
- Date absolutely the graves/cemeteries
- Enrich the technical study of the wooden graves
- Bring information on the beech forests which supplied Nivelles cemeteries
- Locate the provenance zones of these beeches.

The project encountered a huge initial challenge, as hitherto there was no historical beech chronology available for Belgium (and more generally few for western Europe). A second challenge was to record reliable tree-ring series on planks made of a species that can form partial rings (ring which are not visible on the whole circumference of the trunk). From a practical standpoint, these two challenges brought with them many difficulties. However, they were largely surpassed and yielded interesting and original results; this paper will present our main conclusions.

Relative dating between the woods reveals some contemporaneity between the graves and absolute dating determined periods of intense use of both cemeteries, in terms of *termini post quem*. Furthermore, the dating of these wooden samples has allowed for the construction of the first beech chronology for Belgium, running from 902 to 1149 AD.

Although the delivered planks were selected to be best suited for dendrochronology, technical information could be obtained from this material, for instance the growth rhythm of the trees, cutting methods, identification of planks from the same tree(s), either in the same grave or in different ones, etc.

The research of the geographical origin of the trees used in Nivelles reveals – at first sight – a local provenance of the beech, although it seems difficult to locate it precisely due to the response of *Fagus* to local climatic conditions, in opposition to species such as oak.

Forest management is being studied, with the help of agronomists and forest historians. It shows many different patterns in the growth of the trees that probably reflect different growth environments, those having still to be better described.

Since this study, other projects on archaeological remains from different sites in Belgium, ordered to *van Daalen dendrochronologie*, have been undertaken, which have led to good results and have allowed for extending this beech chronology of a century back in past.