Branch age and diameter:
useful criteria to recognize woodland management in the present and past?

C. Vermeeren[1], K. Hänninen[1] & W.A. Out[2]

Often assumed in archaeological material: woodland management (pollarding/coppicing). Can we prove it?

Assumption: branches in managed trees have better access to light and experience less competition than in unmanaged trees, resulting in accelerated growth, long straight branches and increased wood production.

Method: analysis of the diameter and age of branch wood. Models for unmanaged and managed wood have been developed (**figure 1a**) and tested with modern-day data. A version with diameter selection is also presented (**figure 1b**).

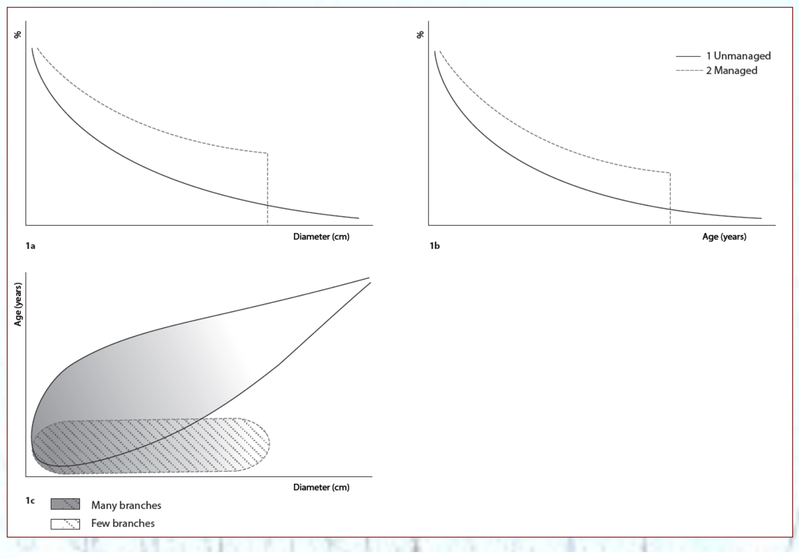


fig. 1a Models for managed and unmanaged wood

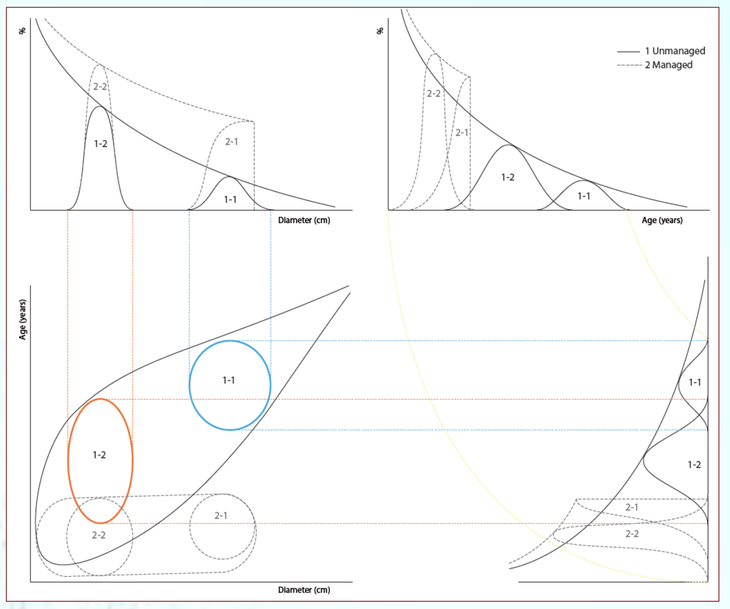
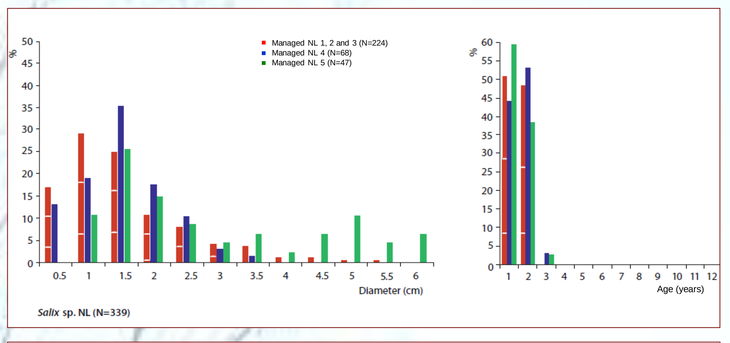


fig. 1b Models with diameter selection

Results of modern-day trees study: willow

Figure 2: diameter- and age-distribution, and age/diameter scatter plot of unmanaged and managed willow (*Salix*) in the Netherlands and Denmark. The age distribution of managed wood ends abruptly.

Conclusion: the scatter plot shows large overlap in the small diameters, but in the diameters larger than 2 cm **distinction is possible.**



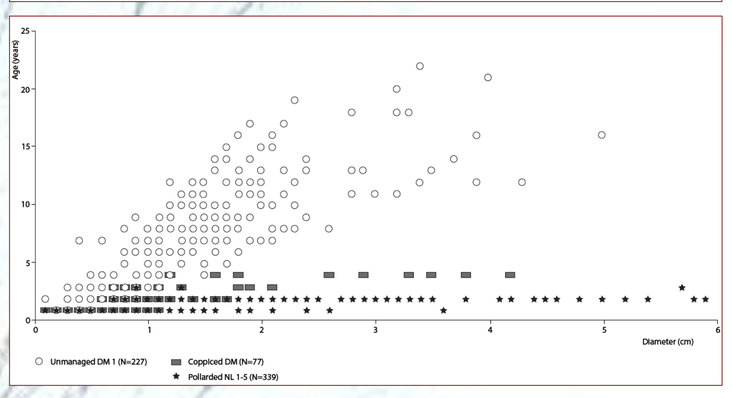


fig. 2 Data on managed and unmanaged willow

Application to archaeological data: two examples

Figure 3a: data of fish traps from Late-Neolithic Emmeloord (van Rijn) made of willow (*Salix*), plotted in the modern-day data. It concerns young, thin branches, so age/diameter analysis does not allow conclusions about management, but **diameter selection** is clear.

Figure 3b: selection of data of willow (*Salix*) and hazel (*Corylus*) wickerwork in Early Medieval Coppergate, York, kindly made available by Dr. A. Hall, plotted in the modern-day willow data. Willow comes from **unmanaged trees, selected for their diameter**. The results from this hazel selection seem to point exceptionally to the use of **managed trees,** but modern-day data are needed for this taxon.

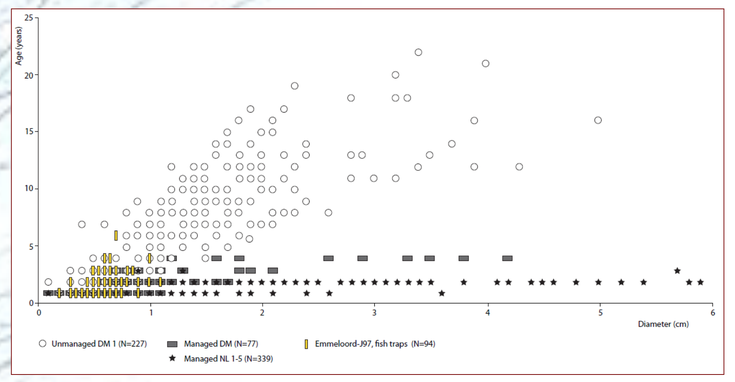


fig. 3a Willow from Late Neolithic Emmeloord (van Rijn) plotted in willow data

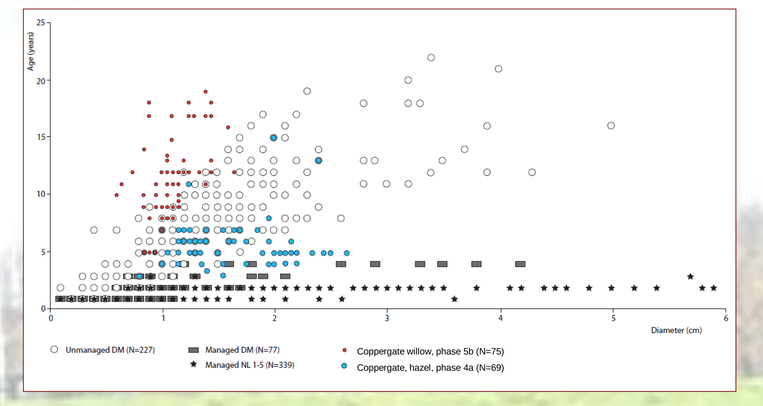


fig. 3b Willow and hazel from Early Medieval Coppergate (Hall) plotted in willow data

Conclusions

The modern-day age/diameter data confirm that **distinction is possible between managed and unmanaged wood.** The pattern is clearest in the scatter plot, small diameters excluded.
Large, narrow peaks in archaeological age/diameter datasets may be explained by diameter selection.
Recommendation for archaeological studies: large sample sizes, plotted per taxon (N≥100), diameters >2 cm.

See the handout for extra information!

1. BIAX *Consult*, Hogendijk 134,
1506 AL Zaandam, the Netherlands
vermeeren@biax.nl, hanninen@biax.nl
2. Institution Milà and Fontanals, CSIC, C/Egipcíaques, 15, 08001,
Barcelona, Spain w.a.out@imf.csic.es