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# Historical dynamics of *Quercus* spp. versus *Fagus sylvatica* in forests of the Lorraine Plateau (France) documented by pedoanthracology.

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## Abstract

In central European temperate deciduous forests, *Fagus sylvatica* is among the most competitive tree species. However, locally the oaks stand (*Quercus petraea* or *Q. robur*) are often dominant and beech remains sporadic. These two species are potential trees of the natural forest dynamics, but their distribution and frequency is influenced by on-going and past forest management.

On the Lorraine plateau, we find oak trees on well-drained station where theoretically the beech should dominate, while it is supposed to be limited on hydromorphic soils. The actual ecological niches of these forest species remain unclear. To explore that key issue for forest management we defined two research assumptions: i) Oak species have been favored by past and present forest management ii) while beech has been limited in its expansion.

To test these assumptions, we conducted a soil charcoal analysis on the Lorraine Plateau. We sampled 12 forests in brunisol and luvisol soil types. For each site, one trench (10m) was opened to determine the pedological context and for soil sampling. Macroscopic charcoal assemblages were extracted of the soil samples by wet and dry sieving. The charcoal pieces were then sorted-out and taxonomically identified.

Preliminary results based on 1000 charcoal pieces clearly highlight the anthracological potential for our questioning. *Quercus* is the dominant genus (55% of the identified pieces) of the charcoal assemblages, *Fagus* (15%) is identified in almost all sites. Other occurring taxa are *Carpinus* (12%), *Pomoideae* (1.6%) and *Prunus* (0.65%). The radiocarbon dates indicate that oaks and beech have been growing together at local scale for millennia in well-drained soil conditions.

Soil charcoal analyses bring new arguments for the hypothesis that the historical forest management influenced significantly the current distribution of forest species to a state that does not reflect the natural potential of the mature forest of the Lorraine Plateau.

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