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Overmature periurban Quercus-Carpinus coppice forests in Austria and Japan: a comparison in view of carbon stocks, stand characteristics and conversion to high forest

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Periurban coppice forests have a long history and tradition in Austria, as well as in Japan. Although developed in a slightly different context, such forests faced nearly the same fate during the last century. While these once served biomass almost exclusively as a feedstock for thermal energy, their significance decreased with the increasing use of fossil fuels and coppice management was consequently abandoned and the area developed, or these forests were converted into high forests with different management aims.

This study tries to assess the status of periurban forests that were previously managed as coppice in a comparative approach between Austria and Japan. The focus is stand structure, biomass and C stocks, as well as a comparison with high forest. In Japan, we further directly assessed the consequences of coppice to high forest conversion on soil chemistry.

We found remarkable similarities in species distribution and total C stocks. While lower diameter classes are dominated by Carpinus, Quercus is only found in larger diameter classes, indicating the overmature character of both stands due to the lapse from a recognized system of coppice management with occasional fuelwood harvesting in the past decades. Total C stocks are comparable, but SOC is significantly higher in Japanese Andosols. The conversion of coppice to high forest in the 1960's in Japan had a notable impact on soil chemistry. This concerns especially the N cycle and we also observed fewer phenolic compounds in mineral soil after conversion.

The authors find that there may be multiple benefits for restoring coppice management to these periurban forests. This includes increased biomass production capabilities and carbon sequestration as well as a better habitat provision and a higher biodiversity.