# Restoration of Central European coppice forests through utilization

## -Re-sprouting ability of "aged" *Quercus petraea* stools-

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## Introduction

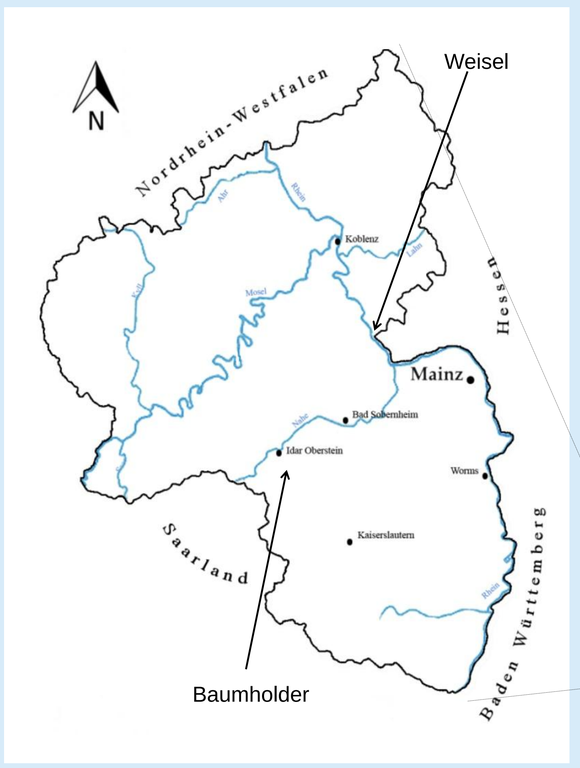
In Central Europe, traditional management of oak coppice forest was abandoned at the beginning of the last century, leaving large tracts of forest developing into aged coppice stands. Recently renewed interest in coppicing has developed in many European countries because of the increasing importance of fuel wood as a substitute for fossil fuels and the preservation of coppice forests as a historical landscape element and habitat with high nature conservation value. However, there are uncertainties about the re-sprouting ability of large and old oak stumps.

Fig. 1: Left: Typical appearance of an aged oak coppice stand. Is their ecological value threatened by their abandonment? Right: Traditionally managed coppice.

## Research questions

1) Do *Q. petraea* stumps in aged coppice forests develop enough sprouts to guarantee a subsequent crop.
2) Is the re-sprouting intensity of *Q. petraea* stumps depending on harvesting method and stool characteristics?
3) How strong is the influence of browsing on stump survival and sprout growth?

## Study site and sampling design




Two experimental sites were established near the cities of Weisel and Baumholder in Rhineland-Palatinate, southwest Germany (Fig. 2). The experimental network consisted of 40 individual 600 m² plots. It covers a total surface area of almost four hectares and was set up during winter 2008-09.

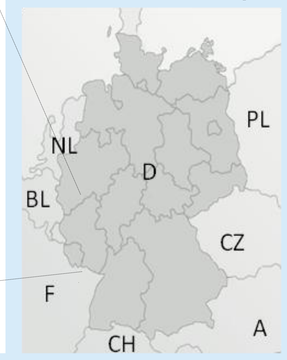



Fig. 2: Location of study sites.

All study stands were completely harvested (Fig. 3, clear-cut without leaving standards) prior to budbreak using different harvesting methods: (1) motor manual/conventional chainsaw cut, (2) traditional deep cut (cutting height at ground level) and, (3) fully mechanised harvest (Fig. 3).

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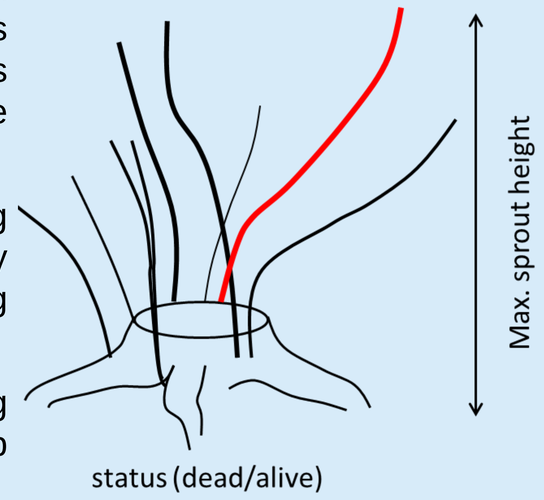
Fig. 3: Research stand in Baumholder shortly after coppicing (left). Fully mechanised Harvest at study site Weisel (right).

## Materials and Methods

• Stump mortality and sprouting vigour of oak stumps was quantified two vegetation periods after coppicing. On that account, transects (5x30 m in size) were established in 48 of the total 64 plots.

• Mortality of all stumps within the sampling transects was visually characterized by determining the presence or absence of living sprouts.

• Sprouting vigour was quantified by recording the height of the tallest sprout per stump (maximum sprout height).




## Results

Fig. 4: Mortality [%] of stumps of *Q. petraea* in relation to the three harvesting methods (M=motor manual, H=fully mechanized, T=traditional low cut) and fencing at the study sites Weisel (W) and Baumholder (B).

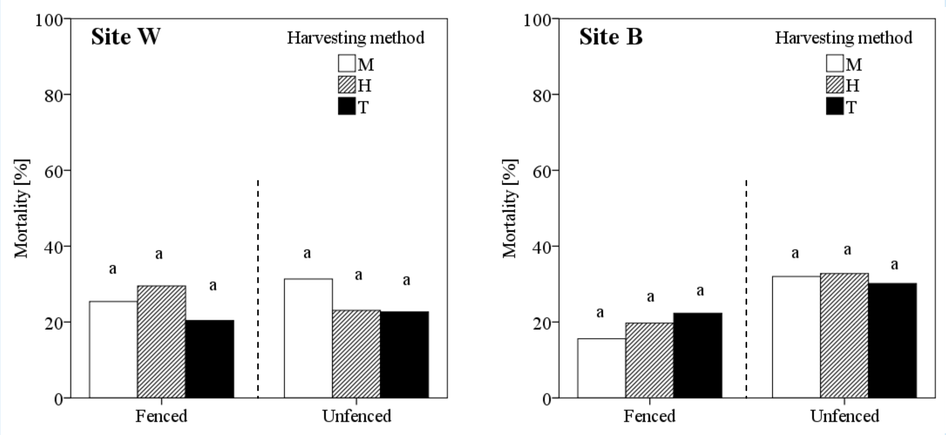



Fig. 5: Maximum sprout height [cm] of *Q. petraea* per stumps in relation to different harvesting methods (M=motor manual, H=fully mechanized, T=traditional low cut) in fenced areas of the study sites Weisel (W) and Baumholder (B).

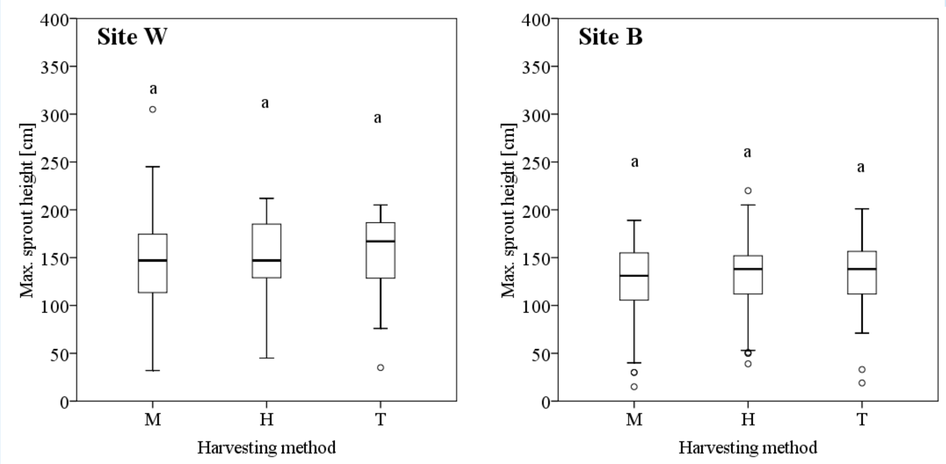
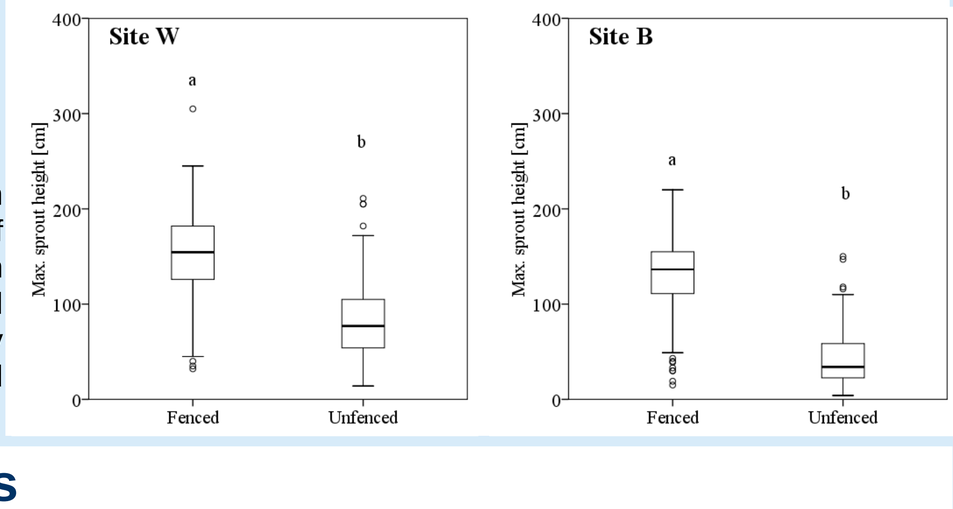



Fig. 6: Maximum sprout height [cm] of *Q. petraea* stumps in fenced and unfenced areas at the study sites Weisel (W) and Baumholder (B).




## Conclusions

• On average 16% of all *Q. petraea* stools died within two vegetation periods after coppicing. Stump mortality was higher in unfenced areas.

•Two vegetation periods after coppicing, numerous new stump sprouts were recorded. Growth of the new sprouts was mainly influenced by browsing.

• Our results indicate that the re-sprouting ability of 80-100 year old oak trees originating from former coppice management is still high and little influenced by harvesting methods.

## Acknowledgment

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