# Does coppicing contribute to the conservation of rare tree species?

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## Introduction

The abandonment of coppice forests is thought to be the major reason for the rare occurrence of *Sorbus domestica and S. torminalis* in Central Europe. Although the timber of both species is of high value, there is little quantitative information on their regeneration and growth dynamics. To support management and conservation efforts, we examined the growth and regeneration of both species before and after coppicing.

Fig. 1 *Sorbus domestica and S. torminalis* growing next to each other in an aged coppice forest.

## Research Questions

1) Does regeneration of *S. domestica* and *S. torminalis* depend on coppicing?
2) How did diameter and height growth of *S. torminalis* develop since the last copping?
3) How does *S. torminalis* regenerate subsequently to coppice cuts?

## Sampling design

- For age determination and growth analysis increment cores were taken form 46 *S. domestica* trees 50 cm above ground level (Fig. 2). For comparison of tree age neighboring oaks (*Quercus petraea*) were measured and cored similarly (N=73).
- In three 1 ha plots height and diameter of all *S. torminalis* individuals > 1,3 m was measured. For age determination, 80 trees, which represented the full diameter range of trees on site, were felled. Stem discs were cut at ground level (Fig. 3).
- Regeneration and growth of *S. torminalis* after coppicing was studied within an area of 0.5 ha which was felled and fenced during winter 2008/2009. Over the four subsequent years (2009-2012) regeneration was inventoried annually.

## Materials and Methods

Fig. 2: Coring of *S. domestica* *50 cm above ground level.*

Fig. 3: *S. torminalis* stem disc, sanded and partly dyed.

•For age determination a master chronology was generated for every study site.

•The master chronology was used for visual and calculatory crossdating.

## Results

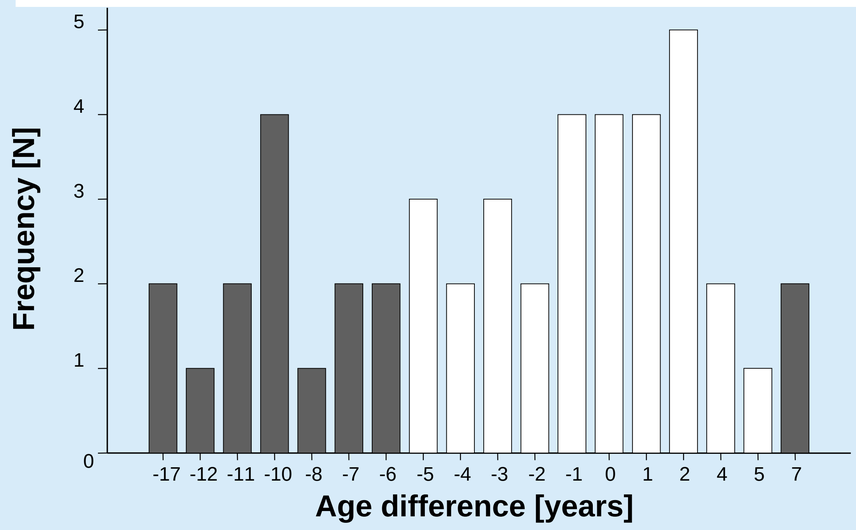


Fig. 4: Difference between age of *S. domestica* and neighboring *Quercus petraea* trees growing in aged oak coppice forests. White bars indicate age diffrences between -5 and +5 years.

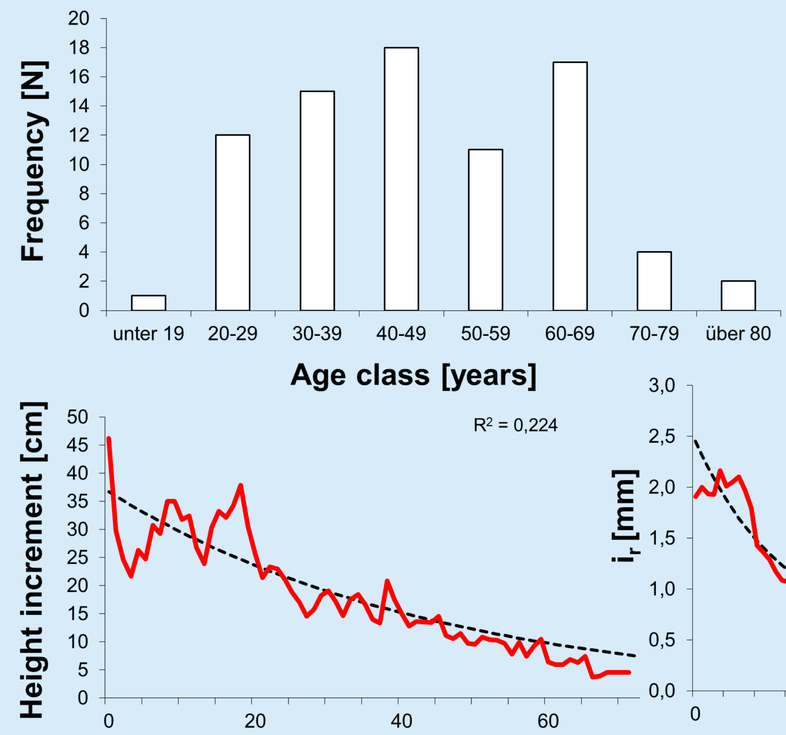


Fig. 5: Age structure of *S. torminalis* (N= 80). Trees younger than 19 and older than 80 years are summarized.




Fig. 6: Height (left) and diameter increment (right) of *S. torminalis* with time since coppicing. Solid lines show means; dashed lines represent regression curves. N= 20.

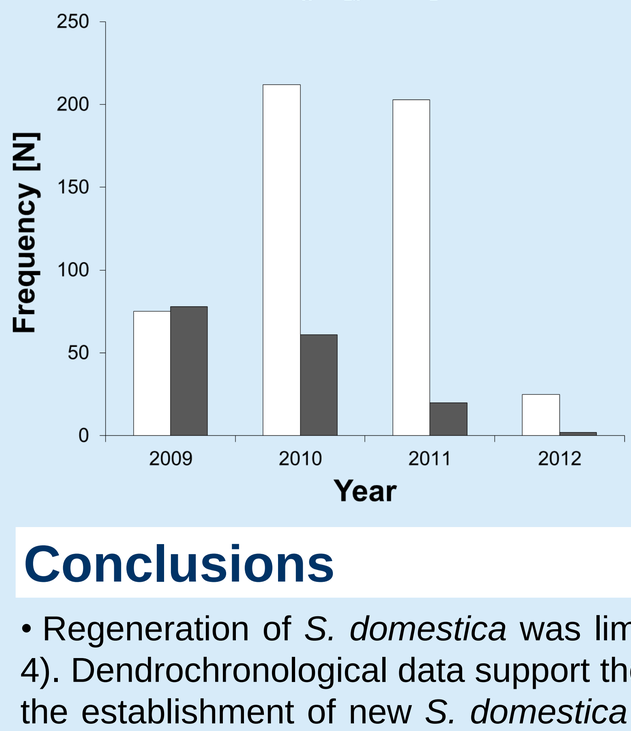


Fig. 7: Occurrence of vegetative regeneration of *S. torminalis* which established after coppicing. White bars indicate root sprouts (N = 515), dark bars indicate stump sprouts (N = 161).

## Conclusions

• Regeneration of *S. domestica* was limited to the last coppicing event (Fig. 4). Dendrochronological data support the hypothesis that coppicing promotes the establishment of new *S. domestica* cohorts. Therefore, abandonment of coppicing in these forests does threaten the status of *S. domestica*.

• Regeneration of *S. torminalis* was continuous and not limited to the last coppicing event (Fig. 5). Owing to its high shade tolerance, *S. torminalis* regenerated and survived under the canopy of the surrounding oaks (Fig. 6). The abandonment of coppicing seems to have no effect on species abundance.

• Our results indicate that *S. torminalis*, analogously to seedling banks in other tree species, establishes a persistent bank of root sprouts in undisturbed forests. Release of root sprouts occurs with coppicing and likely other disturbances (Fig. 7).

• In order to preserve occurrence of both species, a) the resumption of coppicing should be taken into consideration wherever advisable or b) be released form interspecific competition.

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