

Growth, Quality and Regeneration of Sessile Oak (*Quercus petraea* (Matt.) Liebl.) in Coppice with Standards in Franconia/ Germany



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MLÁDEŽE A TĚLOVÝCHOVY



OP Vzdělávání
pro konkurenceschopnost

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Growth, Quality and Regeneration of Sessile Oak (*Quercus petraea* (Matt.) Liebl.) in Coppice with Standards in Franconia / Germany

***Růst, kvalita a regenerace dubu zimního (*Quercus petraea* (Matt.) Liebl.)
v lese středním ve Frankonii - Bavorsko***

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1) Introduction

CWS is a very old silvicultural technique – it dates back at least to the 13th century

Ellenberg 1978, Hausrath 1982, Bärnthol 2003, Burschel & Huss 2003

Nowadays, CWS is of absolut minor importance and share because yield and revenues are thought to be too low BMVEL 2004, Albrecht & Müller 2008, Hochbichler 2008, Beinhofer & Knoke 2009

BUT:

There are still CWS forests – also in Germany and the Czech Republic

Utinek 2004, Hochbichler 2008, Beinhofer et al. 2009

Modern hardwood silviculture imitates CWS in some aspects

Wilhelm et al. 1999, Wilhelm & Rieger 2013

-> Therefore, it is worth to investigate this old and rare silvicultural technique

2) Some theory about CWS

Forest practitioners with local tradition are real CWS specialists – up to recent times

CWS is a mixture of high forest and coppice on the same area Hartig 1861

Scientific description of CWS was done already long time ago

Cotta 1828, Hartig 1861, Heyer 1893, Hamm 1896

Structural ideas and recommendations are available

Cotta 1828, Hartig 1861, Heyer 1893, Hamm 1896 & 1900, Vanselow 1941, Schaeffer & Schaeffer 1951, Köstler 1955, Mayer 1977, Grütz 1986

However, quantitative studies are hardly available Utinek 2004, Hochbichler 2008, Mosandl et al 2010, Pyttel 2012

Important to quote:

CWS is very valuable to biodiversity – but it is a highly artificial forest cover

Brand 1997, Bolz 1999, Coch & Müller-Bauerfeind 2002, Treiber 2002 & 2003, Müller-Kroehling 2007, Albrecht & Müller 2008, Short & Hawe 2012

3) Study area & experiment's structure



	„Weigenheim“ (W)	„Iphofen“ (I)
geology	brown soil clay and loam poor in nutrients	brown soil dry sand beds richer in nutrients
topography	plain	slopy
altitude a.s.l. [m]	270 - 490	
precipitation [mm/a]	700	
Ø temperature [°C]	8,5	
vegetation period [d/a]	170	
potential natural forest cover	beech-dominated	

Summa & Mosandl 2009, Mosandl et al. 2010

3) Study area & experiment's structure

2 sites

3 treatments

- passive transformation into high forest since the 1960s (C)
- traditional and local coppicing practice (T)
- modified CWS with high pruning of oak maidens (M)

2 replications

-> 2 sites * 3 treatments * 2 replications = Σ 12 plots à 0,25ha

Coding: IM = Iphofen in treatment modified

WC = Weigenheim treatment control



4) Results

Main stand – volume and increment

-> „CWS“ ranges widely in terms of volume and increment



4) Results

Main stand – basal area and canopy cover

4) Results

Maidens* – dbh increment

Trees grew as „Pseudo-Solitaires“

The results show potentials of oak growth

Year-rings of 4-5mm are possible

Krissl & Müller 1989, Mosandl et al. 1991, Spiecker 1991, Hochbichler 1993, Kerr 1996, El Kateb et al. 2006, Nagel 2007, Dong et al. 2007, Beinhofer et al. 2009, Hein 2009, Wilhelm & Rieger 2013, Pretzsch et al. 2013

*Maiden: Well shaped young trees of generative origin that are maintained during the coppicing to serve for the next timber generation – in this study the maximum dbh is 20cm and only oak is respected.

4) Results

Maidens – branch-free bole length

Pruning up to 6m lead only for very short time to branch-free logs

Every single tree formed epicormics following the high pruning (up to 74)

Slenderness was not found to be related with production of epicormics

Hubert & Courrad 2002



4) Results

Regeneration – number of young plants

4) Results

Regeneration – mean heights 2011

oak is quite small in comparison to other species – consequences?

shade tolerant species grow higher

undesired shrubs could tamp other species of higher value

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Regeneration – mean heights 2011



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4) Results

Regeneration – resprouting of stumps

the bigger the stump the more shoots were produced

this finding is opposite to other studies based on *Q. alba*

Johnson 1977, Weigel & Peng 2002, Gould et al. 2007, Sands & Abrams 2009

the fraction of coppice shoots was quite small (<23%)

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4) Conclusions and recommendations I / II

- CWS is a form of forest cover that ranges widely in terms of volume, basal area and canopy cover
- Not every forest called CWS is a true CWS
- CWS shows potential to produce in short time big dimensioned oak timber, but timber quality is unsatisfying
- Single pruning of maidens to improve timber quality cannot be recommended based on the findings in this study

4) Conclusions and recommendations II / II

- Maintaining a circle of shrubs like *Crataegus* around the maidens could help to improve timber quality
- If oak should be kept as an important species for the future, tending seems to be absolutely necessary
- The numerous generative regeneration provides a high potential to develop a future forest which is expected to be greatly affected by climate change

**Thank you very much
for your attention!**

