

# Quality and growth of sessile oak under different tending regimes



Dipl. Ing. Alexander Abt



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Tento projekt je spolufinancován Evropským sociálním fondem a Státním rozpočtem ČR InoBio – CZ.1.07/2.2.00/28.0018



# Quality and growth of sessile oak (*Quercus petraea* (Matt.) Liebl.) under different tending regimes. Experiences from 29 years of investigation

*Kvalita a růst dubu zimního (*Quercus petraea* (Matt.) Liebl.)  
v různých pěstebních režimech.  
Výsledky 29 letého výzkumu.*

Dipl.-Ing. Alexander Abt  
13.11.2013



Mendel  
University  
in Brno

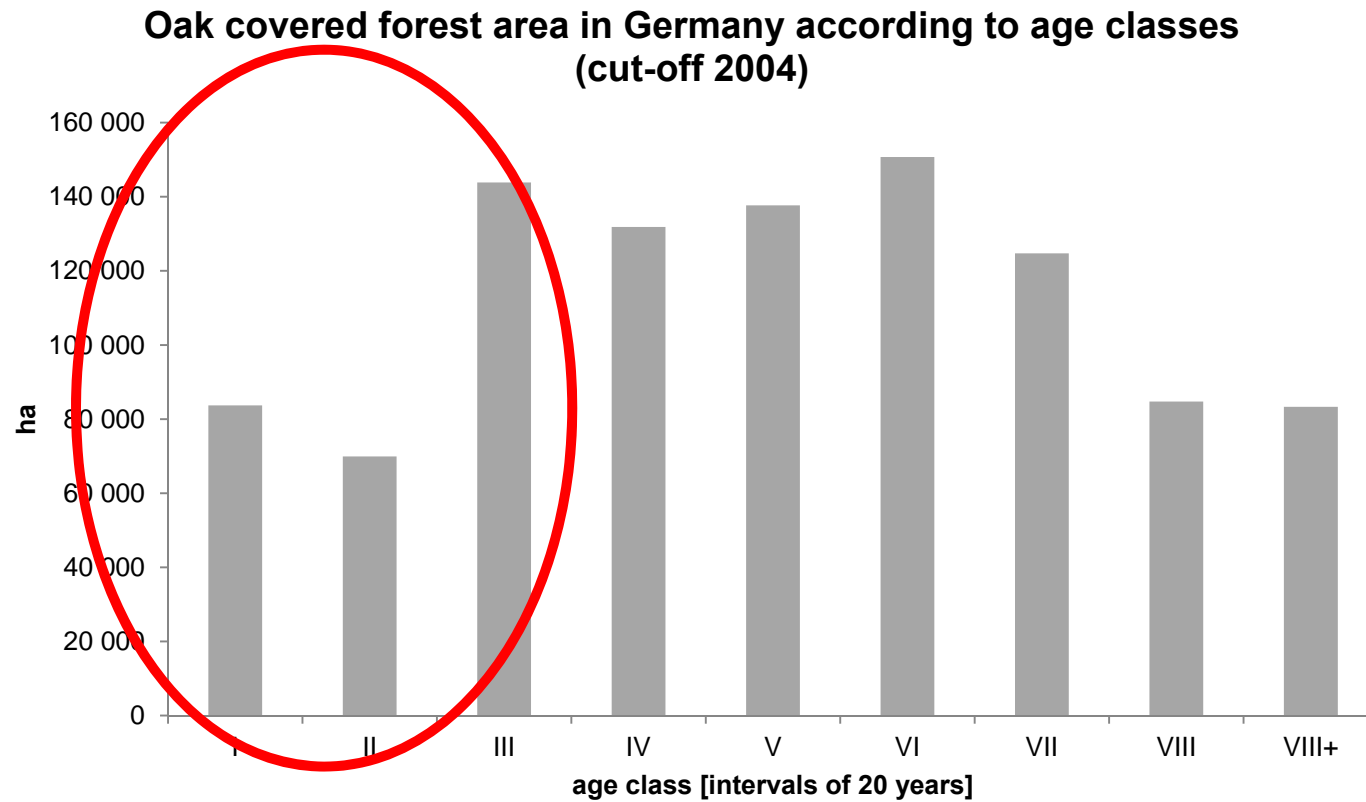




## Content

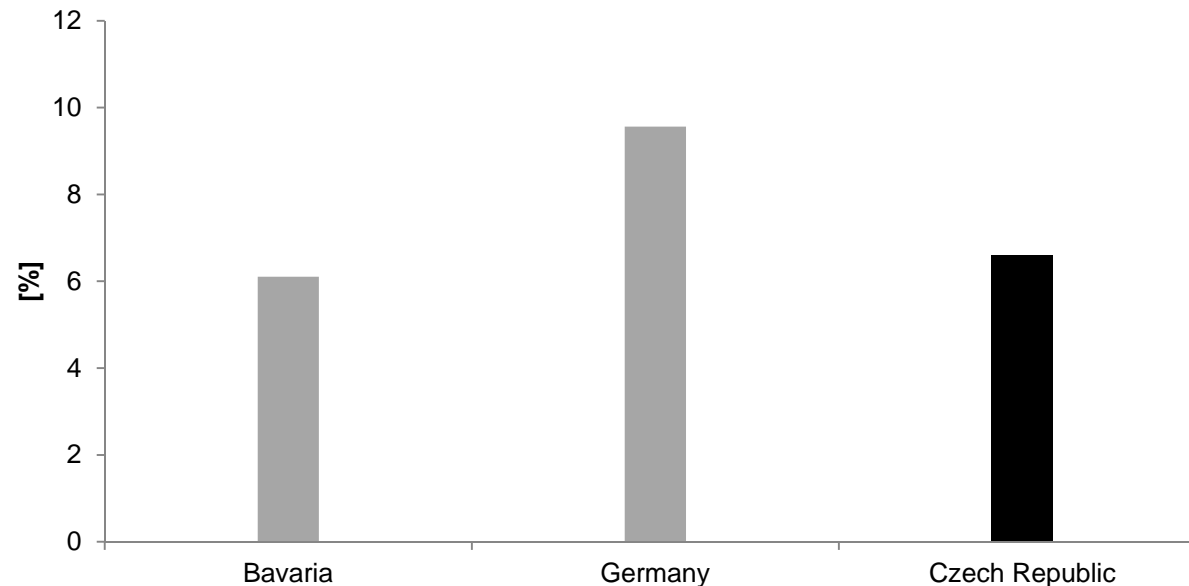
- 1) The role of oaks in Germany today and tomorrow
- 2) Background of the oak tending experiment carried out by TUM
- 3) The oak tending experiment
- 4) Some results for
  - dbh
  - branches
  - the stem form
  - the proportion of oak
- 5) Conclusions

# 1) The role of oaks in Germany today and tomorrow



## 1) The role of oaks in Germany today and tomorrow

Recent proportion of oak in forest cover

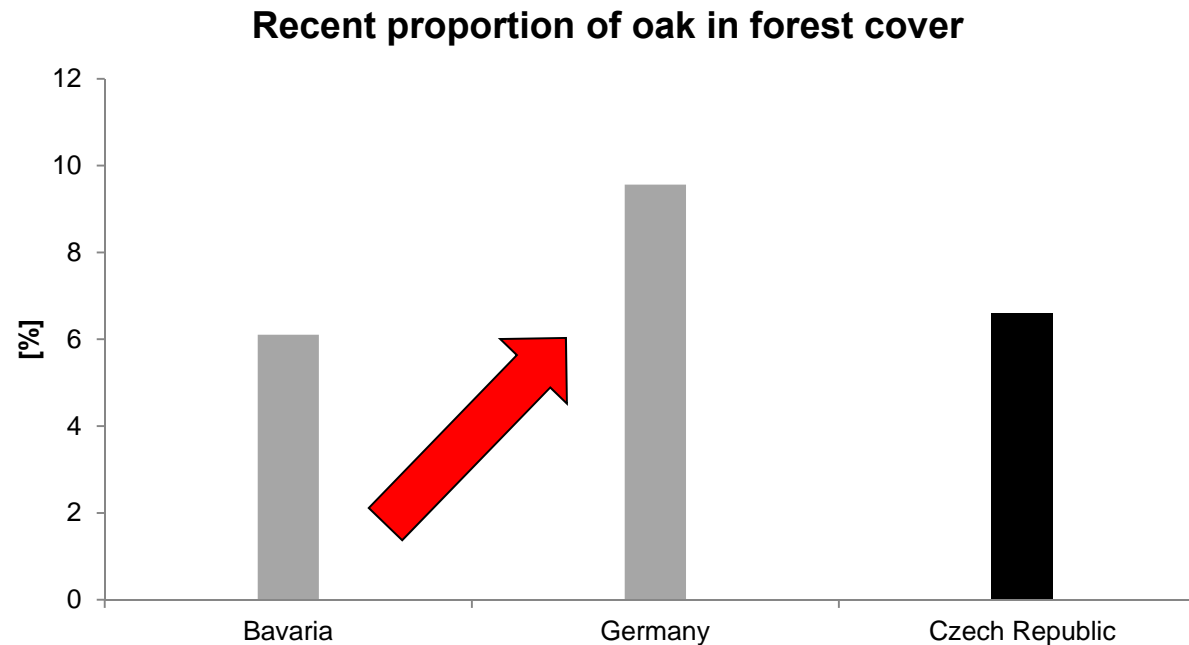


Volume as well as proportion in area are thought to increase in the next years

Therefore the silvicultural challenges will increase also

Cejchan & Slaby 2007  
Reif et al. 2010  
Roloff & Grundmann 2008  
BWI<sup>2</sup>

## 1) The role of oaks in Germany today and tomorrow



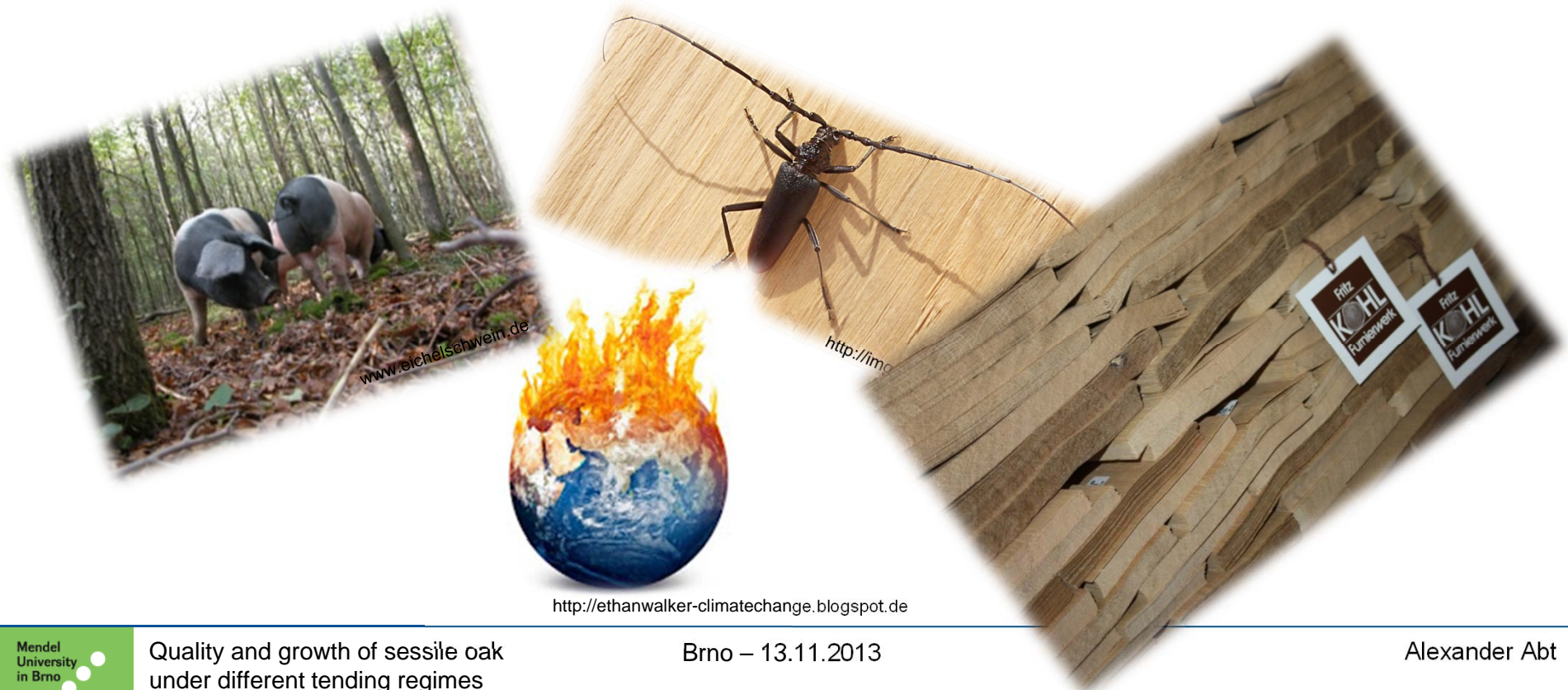
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## 1) The role of oaks in Germany today and tomorrow

So **WHY** the share of oak is thought to increase?



## 2) Background of the oak tending experiment carried out by TUM\*

In the 1980s a (very intense) discussion started about

rotation times

interest rates

silvicultural targets and techniques

oak in general

-> Money

-> Money

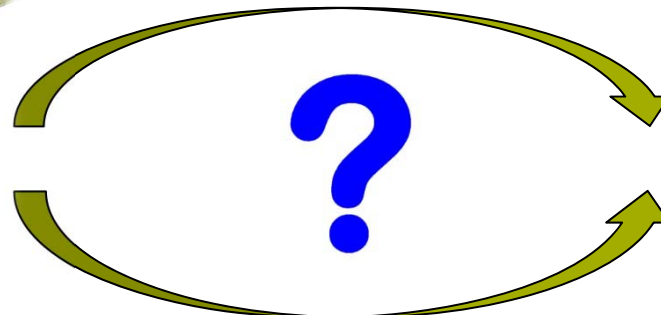
-> future crop trees

-> forest decline

*„Science!!! Help us!“*



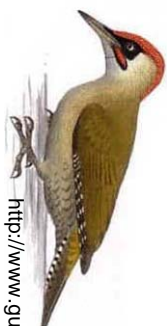
<http://www.duden.de>



\* Until 1999 the institute of silviculture was part of Ludwig-Maximilians-Universität München (LMU)



### 3) The oak tending experiment



http://www.guidodaviegher.be/fotos/vo\_Groene%20specht.jpg

#### Location



	„Spessart“	„Fränkische Platte“
geology	red sandstone	shell limestone
topography	hilly - mountainous	plain
altitude a.s.l. [m]	350-600	150-300
precipitation [mm/a]	up to 1000	550-600
Ø temperature [°C]	6-8	8,5-9,5
potential natural forest cover	beech-dominated	beech-dominated

Preuhsler 1990  
 Fleder 1981  
 Vanselow 1960  
 wikipedia.org 2013  
 Küster 2000

<http://upload.wikimedia.org>



### 3) The oak tending experiment

Established in 1984

2 sites: Spessart region (red sandstone)  
Franconian Plate (shell limestone)

3 age classes (5 stands):  
thicket stage (Spessart and Franconia) aged 13 years in 1984  
pole stage (Spessart and Franconia) aged 18/25 years in 1984  
early timber stage (only Spessart) aged 49 years in 1984

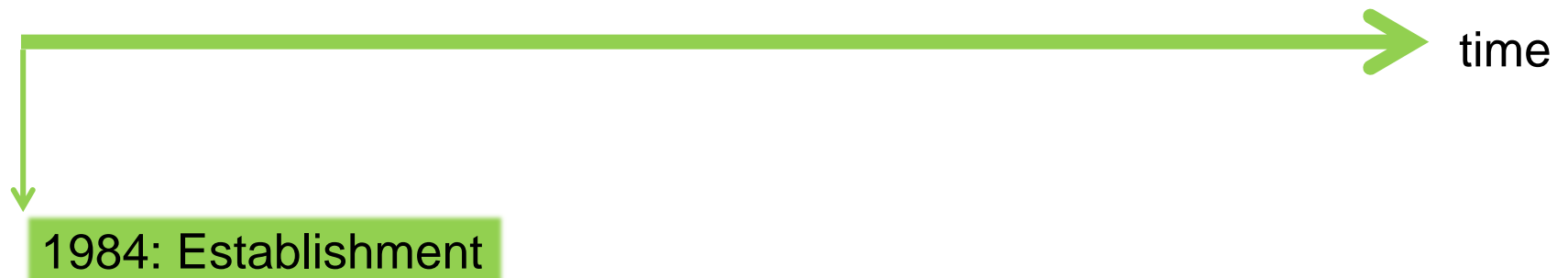
4 tending regimes:  
control  
negative selection  
moderate promotion  
intense promotion

Every plot is repeated

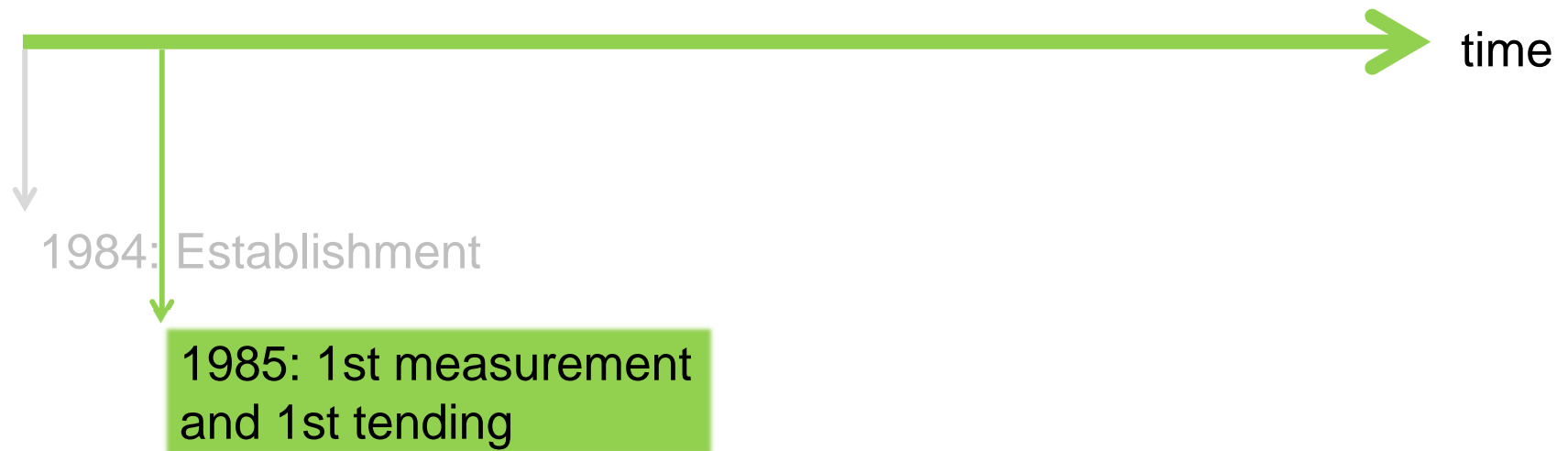
-> 5 stands\* 4 tendings \* 2 replications = **Σ40 plots** (á min. 1225m<sup>2</sup>)



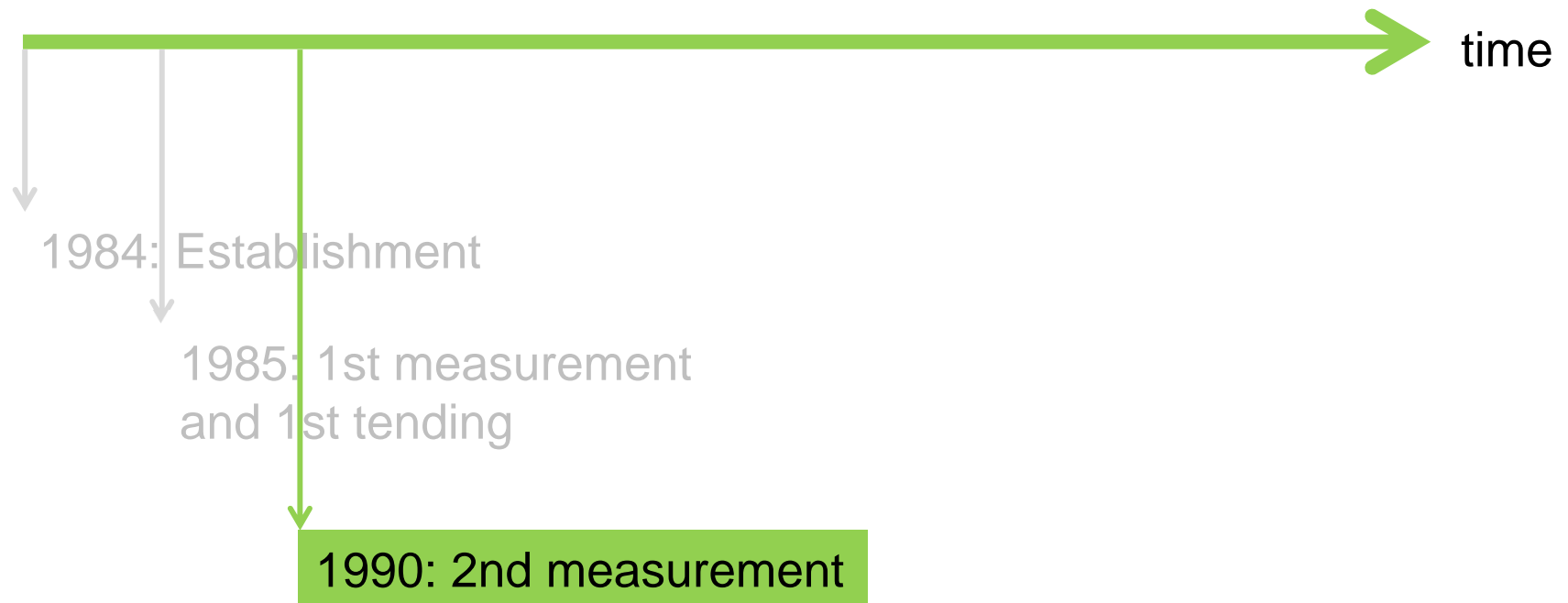
## Progress in the experiment



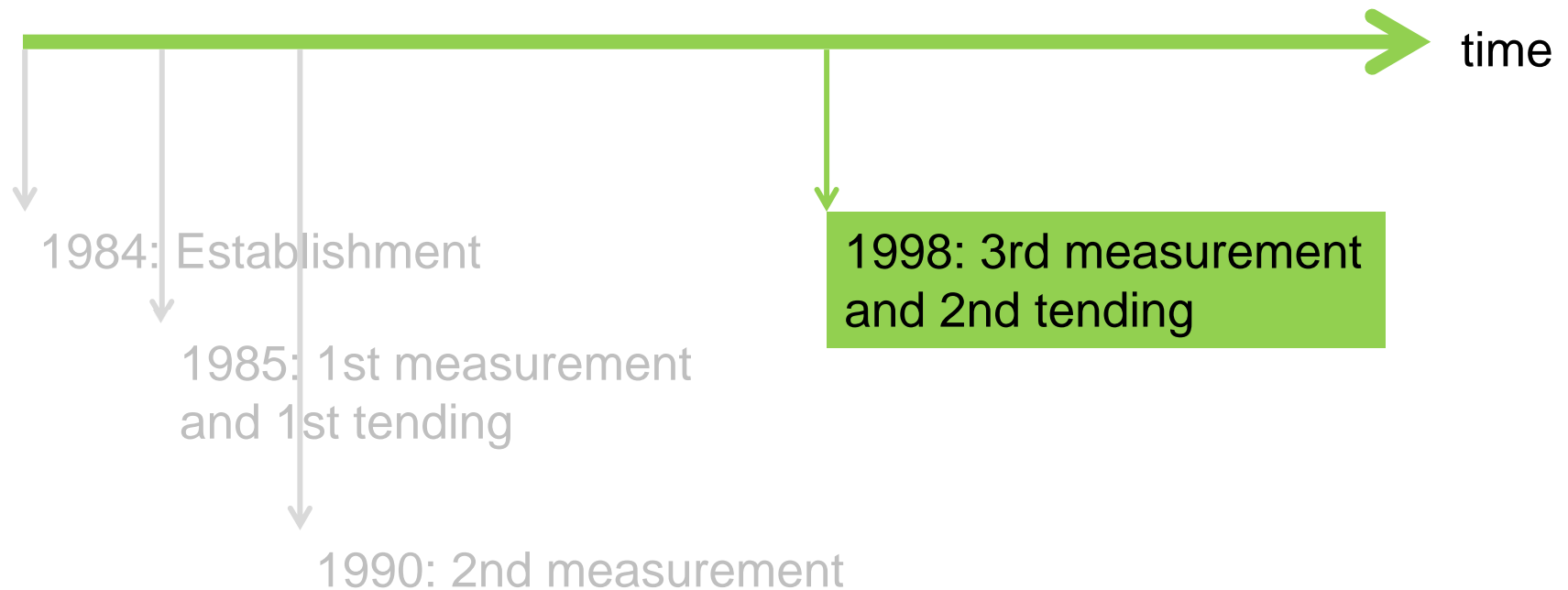
## Progress in the experiment



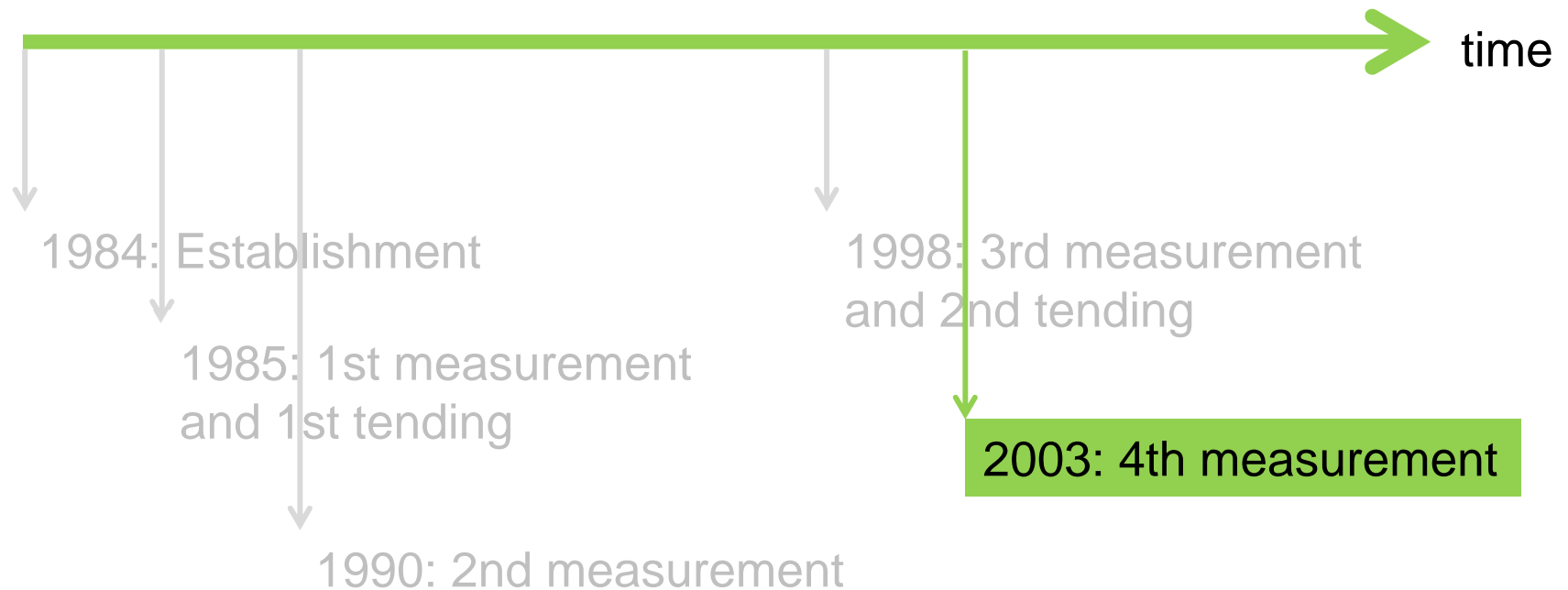
## Progress in the experiment



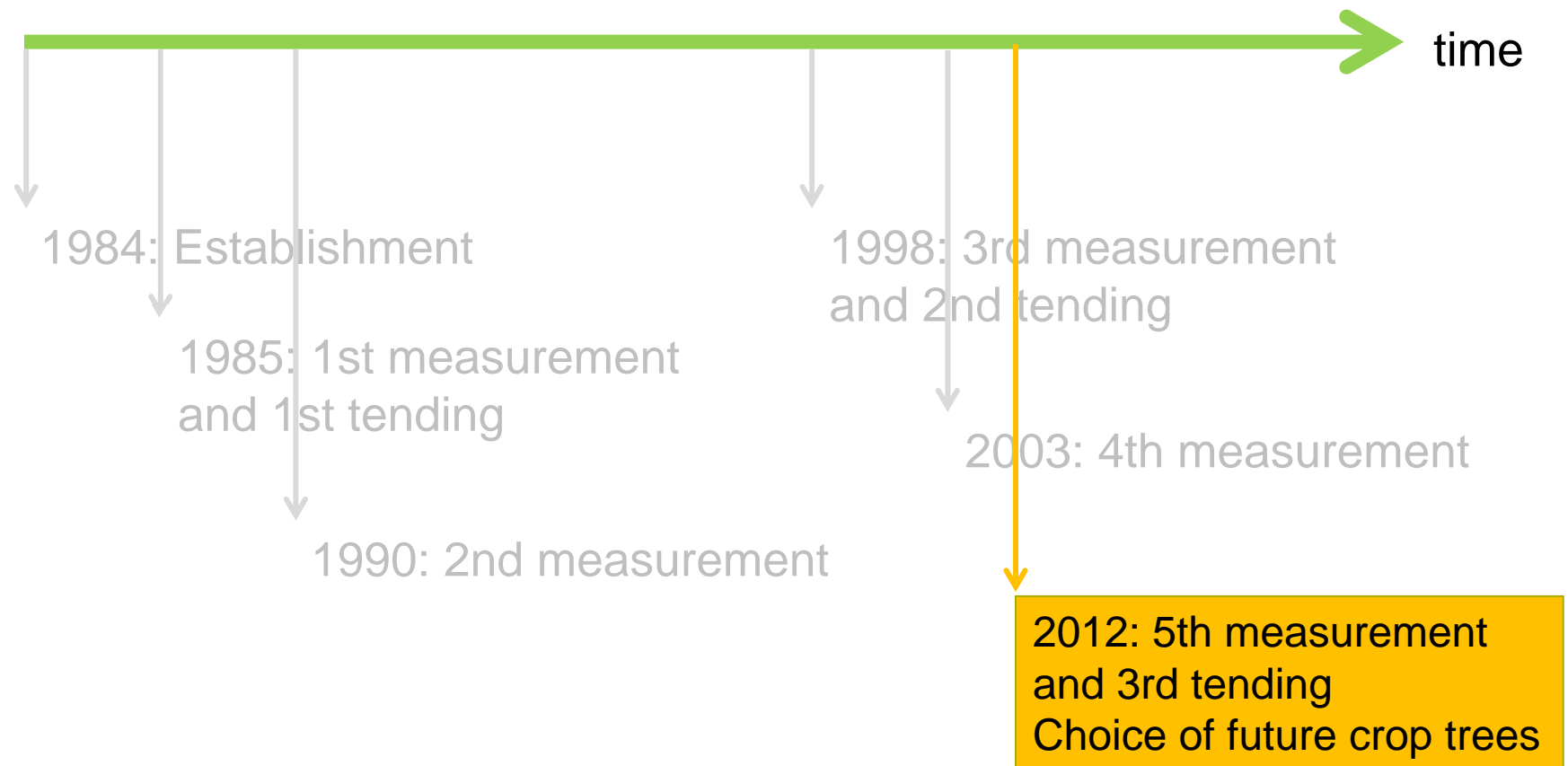
## Progress in the experiment



## Progress in the experiment



## Progress in the experiment







#### 4) Controlling the diameter growth

site

-> site (shell limestone or red sandstone) is of minor importance

age class

-> is important ( $p < .05$ ) – only the youngest stages showed a reaction

silvicultural regime

-> negative selection retarded the dbh development

Fleder 1981, Hochbichler 1987, Spiecker 1991, Mosandl et al. 1988 & 1991 & 1998 & 2002, Küster 2000, Dong et al. 2007



#### 4) Controlling the branch-free bole length

height of crown base

branch-free bole length

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site

age class

tending regime



#### 4) Controlling the branch-free bole length

	height of crown base	branch-free bole length
site	n.sig.	shell limestone > red sandstone
age class		
tending regime		

#### 4) Controlling the branch-free bole length

	height of crown base	branch-free bole length
site	n.sig.	shell limestone > red sandstone
age class	sig.	sig.
tending regime		



#### 4) Controlling the branch-free bole length

	height of crown base	branch-free bole length
site	n.sig.	shell limestone > red sandstone
age class	sig.	sig.
tending regime	n.sig	sig.



#### 4) Controlling the stem form - crooks

site

-> not significant

age class

-> not significant

tending regime

-> not significant

97,6% of oaks were NOT crooked





## 5) Conclusions

Intense and early positive promotion of oak is sensfull, because

- the dbh increment (in young stages) can be enhanced
- the quality of the potentially highly valuable logs is not decreasing
- oak is kept maintained

-> Therefore, the traditionally long-lasting rotation times of European oak forestry could be shortened without loosing the superior quality of oak from our forests





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