

## Silvicultural principles for growing valuable broadleaved species

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## To start with .....

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*birchbeer*



## My presentation

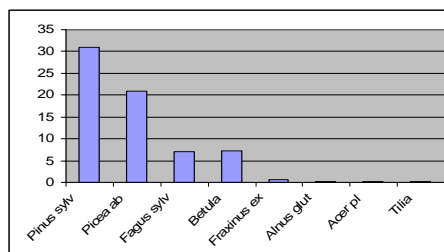
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- 1 Intro: aim of presentation, what are we talking about? (species, areas)
- 2 Basic needs for growing valuable timber
- 3 Stand management and important principles

## 1 Aim; what are we talking about?

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- Aim
- Species: *Fraxinus exc.*, *Acer ps*, *Prunus avium*, *Juglans regia*, *Tilia sp.*, *Sorbus torminalis*, *Betula sp.*, *Alnus glut.*
- Areas: low % of European forest area
- High (potential) economic value





## Species characteristics

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- produce quality timber
- need good sites
- height growth: rapid to 10-20 yr
- development of heavy branches in free growth



## Growing quality timber

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- General goal: as fast as possible, as much as possible valuable timber per ha
- Definition of valuable stems:
  - straight
  - knotfree
  - faultfree
  - diameters >30 cm
  - lengths .. X 250 cm

Like these

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## 2 Basic needs for growing quality timber

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- suitable site
- right phenotypical characteristics
- adequate stand management (establishment/regeneration method, cleaning, thinning, pruning)



## Suitable site

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- site characteristics which allows good growth:
  - high nutrient level
  - continuously moisture
  - no stagnant water (except Alnus)



## Right phenotypical characteristics

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- good growth (height and diameter)
- straight stem
- small (right angled) branches

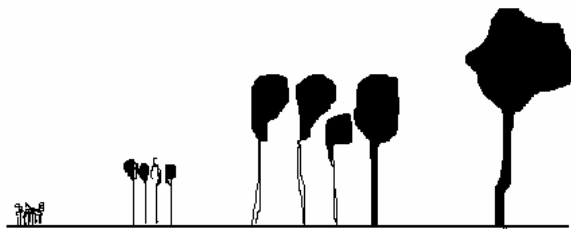
## Adequate stand management

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Stand management  
=  
backwards thinking

## Forest development stages

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<i>Development stage</i>	<i>Silvicultural goals</i>	<i>Silvicultural measures</i>
1. Seedling/establishment	Sufficient number of young trees with good shape and growth	Choice of provenance
		Site preparation
		Stocking (number of plants per ha)
		Mixture of species
		Game protection
		Fertilization
		Weed control
		Pest control
2. Young stage	Branch free bole of (potential) final crop trees	<b>Pruning</b>
	Healthy stand	Removal of "wolf" trees
	Final crop trees	Pre-commercial thinning
		Pest control
3. Thinning stage	Optimal diameter growth of final crop trees	Selection of final crop trees
	No dieback of lower branches	<b>Thinning</b>
4. Adult/regeneration stage	Usable stems (diameter , quality)	<b>Thinning</b>
	Species composition of the next generation	Final harvesting
	Silvicultural goal(s) of the next generation	Choice of remaining seed trees
		Fertilization
		Site preparation
		Weed control
		Pest control

## Most important aspects

Management of :

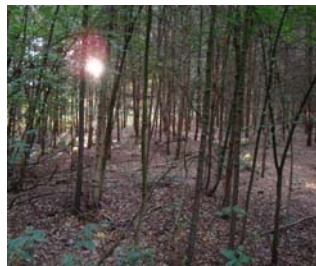
- knot/branch development
- diametergrowth
- avoiding other timberdefects

## Two ways

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### Tradition

high stemnumber  
long knotfree bole  
long rotation



### Other way

low stemnumber  
shorter knotfree bole  
shorter rotation



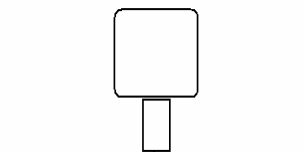
## Two ways

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○ Traditional

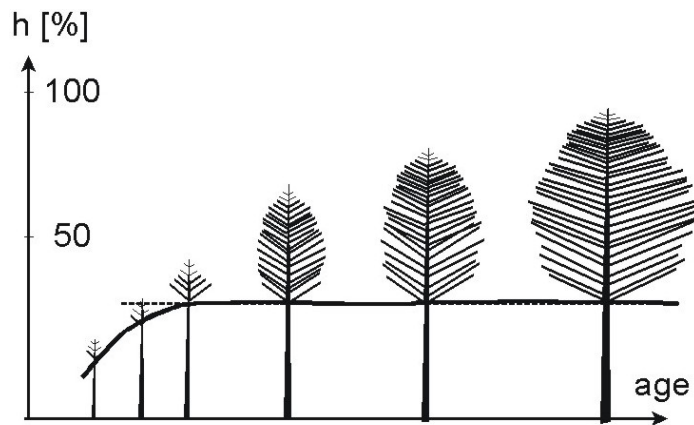


○ Other

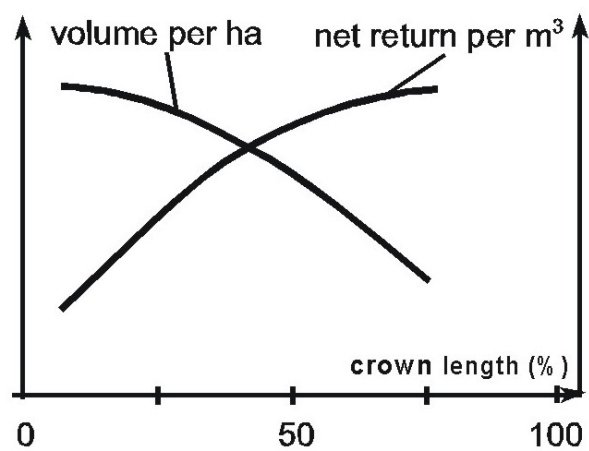


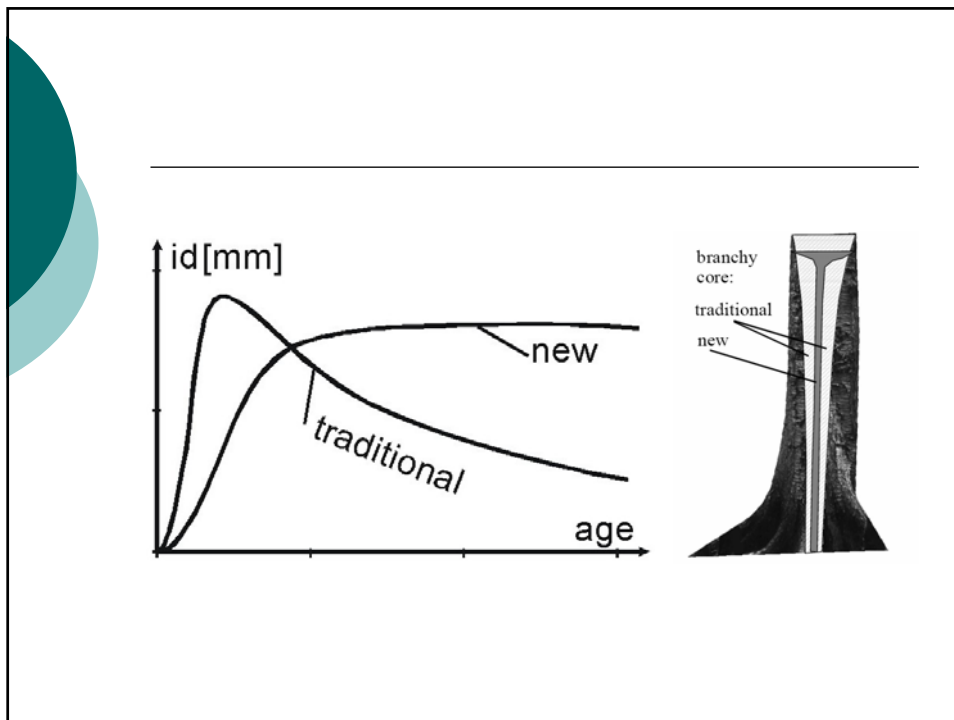


## Management of knotfree bole and crown length



## Crownbase?





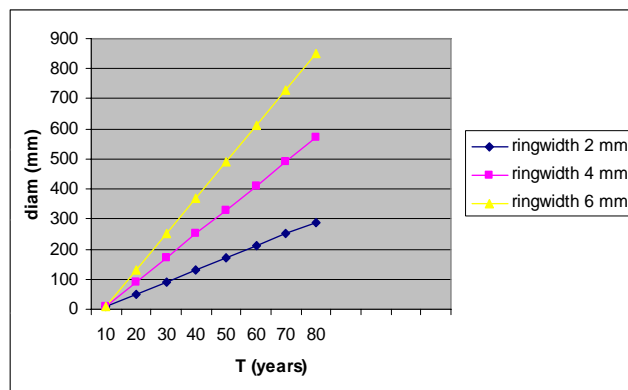
## Pruning

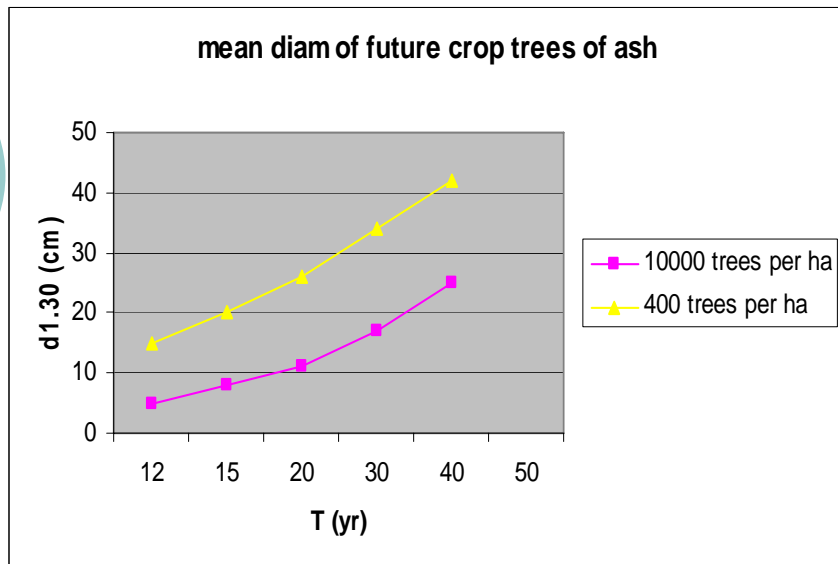
- When enough density natural pruning will do (birch, black alder, ash, Acer)
- When heavy thinning starts early or trees are planted very wide, ARTIFICIAL PRUNING is needed and HAS TO START EARLY (branches max 3 cm; birch 2 cm)

## Pruning IN TIME!



## Management of diameter





## Advantages (+) and disadvantages (-) of narrow and wide spacing

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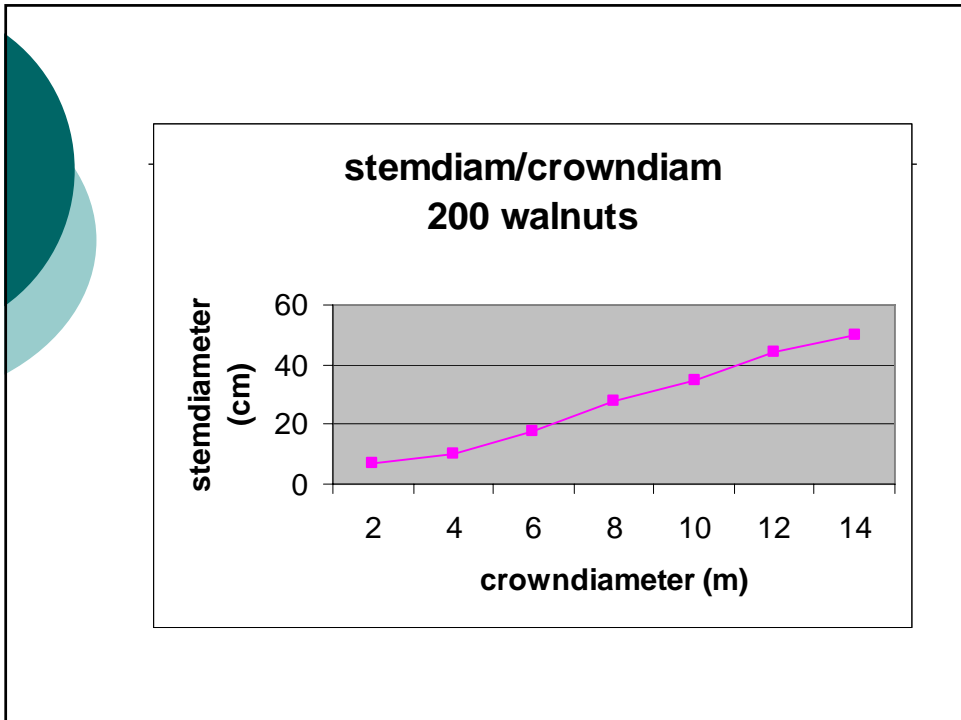
	<i>Narrow spacing</i>	<i>Wide spacing</i>
Costs	-	+
Closing of canopy	+	-
Necessity of thinning	-	+
Necessity of pruning	+	-
Diameter increment	-	+
Vitality/resistance against diseases and pests	-	+
Chances for undergrowth, underplanting	-	+

## Research

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OGT

Open Grown Trees



### Important other aspects

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Blackheart (Ash) >>> T < 60 yr  
Heartrot (Alder) >>> T < 60 yr  
Blackspots (Birch) >>> mix ?

