

Structural Thinning **a thinning strategy for** **conversion of even age forests** **to permanent forests**

DI Dr. Eckart Senitza
Ingenieurbüro Waldplan
Poitschach 2
9560 – Feldkirchen i.K.

waldplan • at
Planung - Beratung - Waldprojekte

starting situation – stand types

- Mixed Stands: Fi/Lä, Fi/Ta/Bu, Fi, LH
- History of stand and site: former farmland
- Afforestation of meadows
- Uneavenaged Mixed Stands
- Afforestation – nature regeneration – combination
- Highly or very low structured Stands
- What is Structure and what is in needed for ???

Foto: Günther Flaschberger

starting situation – stand types

- What is Structure and what is in needed for ??
- Vertical and horizontal differentiation and irregularity
- Broader diameter distribution
- Different growth dynamics (Types, species)
- Microclimate
- Light effects down to the ground

Foto: Günther Flaschberger

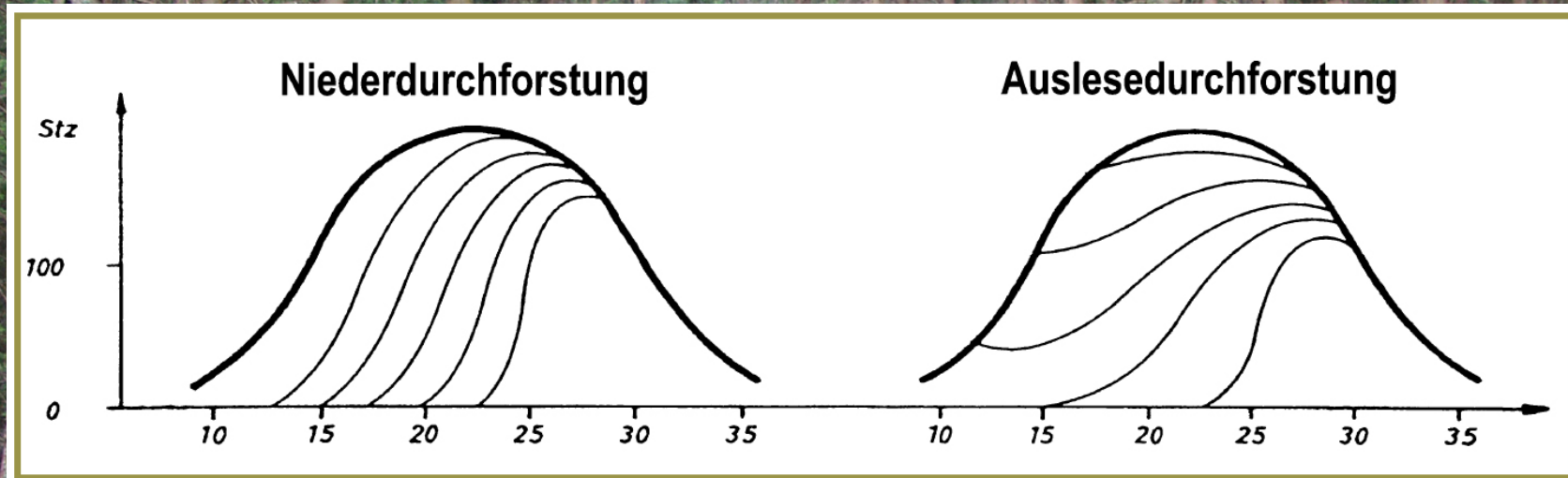
starting situation – stand types



definition – structural thinning

- Structural thinning is a kind of selection thinning (with low number of future trees) with permanent opening of crown cover until the beginning of target diameter harvesting (after age 70 years) (*Reininger 2000*)
- "Structural thinning is a thinning method, that should help to make future thinning needless !"
- "Structural thinning is the switch on the way to automatic production"

Comparism of diameter distribution

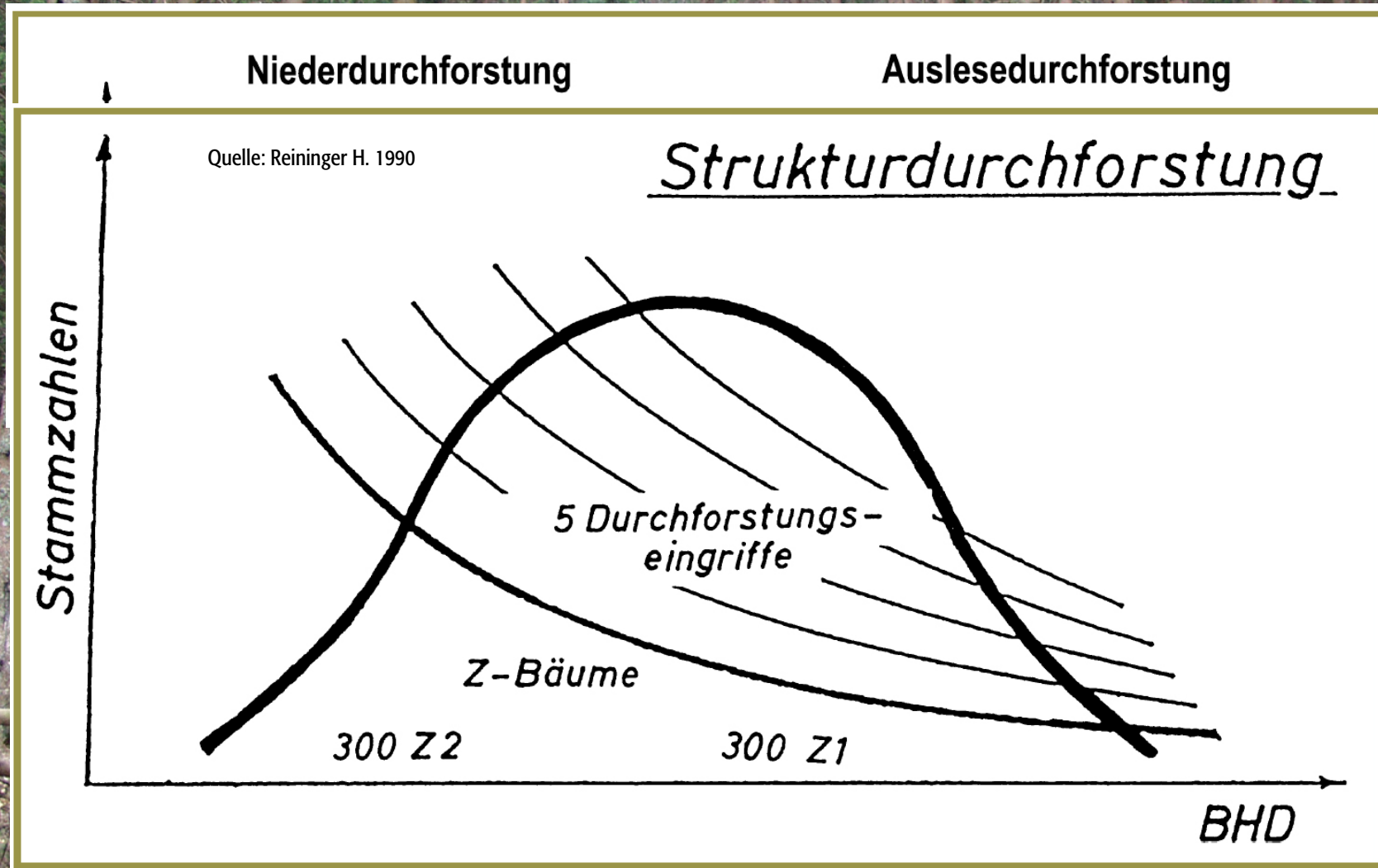


Even with 40 years of low thinnings you find strong self differentiation !

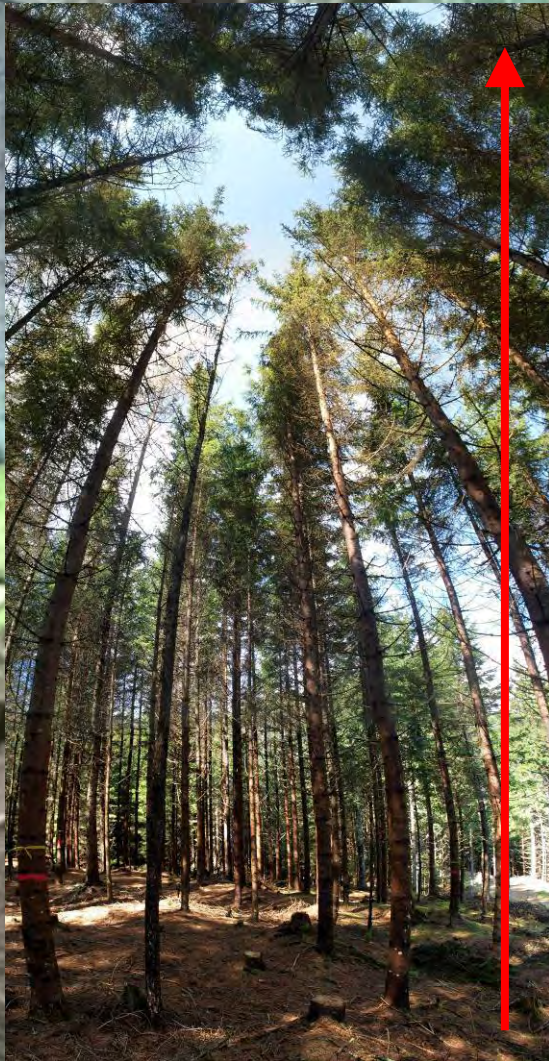
Secondary trees react as strong as those from the main stand (+50% increment)

Pruning = important precondition

Comparism of diameter distribution



Selection and Marking



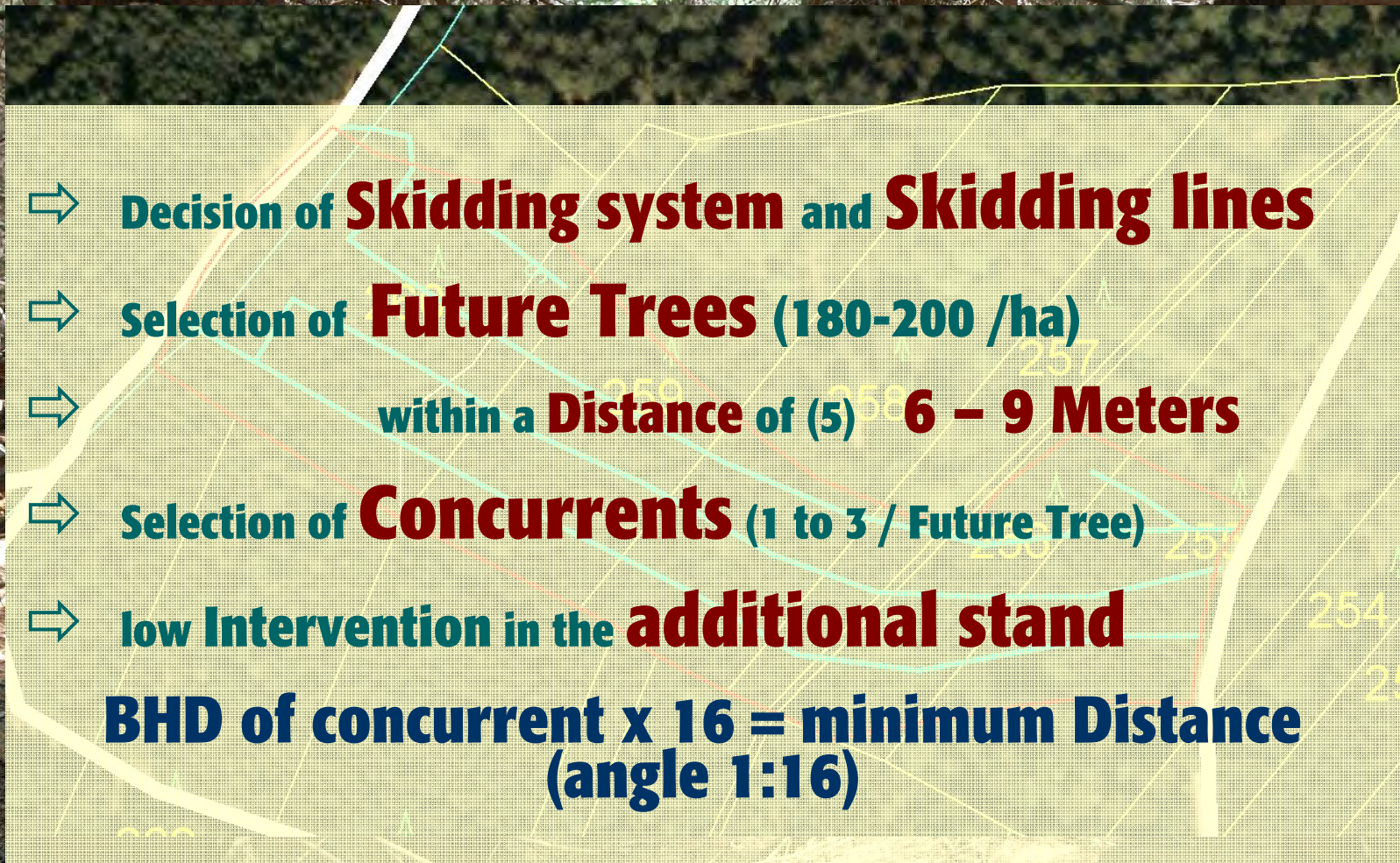
- **Future Tree ?**
 - ✓ Check from bottom to top
 - ✓ Negative criteria on bottom
 - ✓ Positive criteria on top
 - ✓ "Questions to the tree" ?
 - ✓ Criteria of Future Trees ?
- **Concurrent Tree**
 - ✓ Relation of BHD (1:16)
 - ✓ Crown size and quality
 - ✓ Mixture of species

Goals

- Concentration of increment to the **Value Trees**
 - Support and Saving of **Mixed species**
 - Improve **Stability** of the single tree (H/D-Relation)
 - Improve **Stability of the whole stand** (vertical structure)
 - Maintain the structure and **Diameter Distribution**
 - Preservation of **Microclimate + secondary trees**
- ⇒ **Combination of shorthand and longterm goals of the measurement**

Foto: Günther Flaschberger

method - guideline

- 
- ⇒ Decision of **Skidding system** and **Skidding lines**
 - ⇒ Selection of **Future Trees** (180-200 /ha)
 - ⇒ within a **Distance** of (5) **6 - 9 Meters**
 - ⇒ Selection of **Concurrents** (1 to 3 / Future Tree)
 - ⇒ **low Intervention** in the **additional stand**
- BHD of concurrent x 16 = minimum Distance
(angle 1:16)**

example 3 – Blauwald

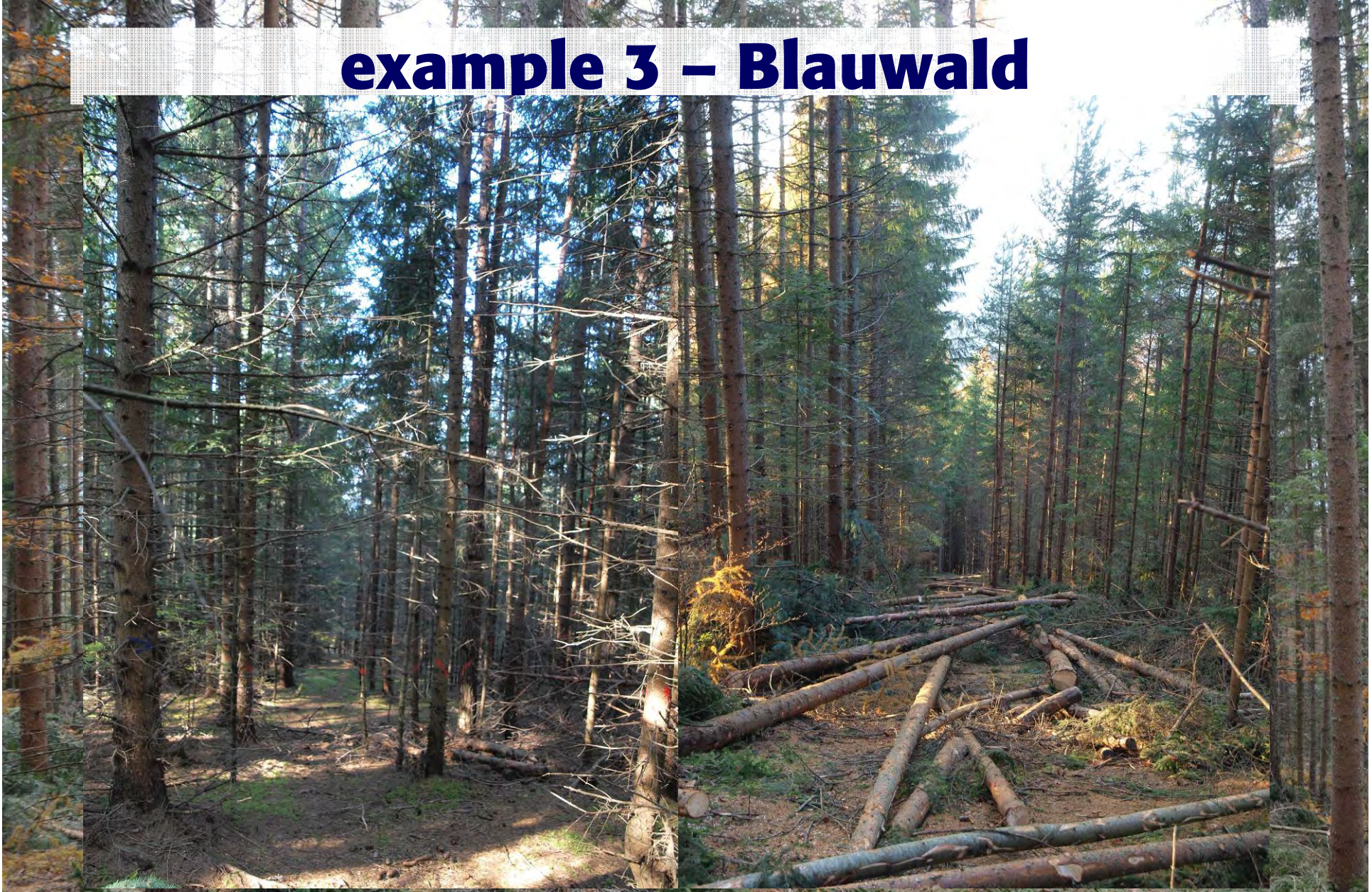
- Stem number: 2000-2500 St. /ha
- Mixed stand: raw pine, larch, silver fir, beech and spruce
- Big differences in quality, bark damages from deer
- 55 Jahre, OH: 24m, FiBru: 10 dGZ100

example 3 – Blauwald

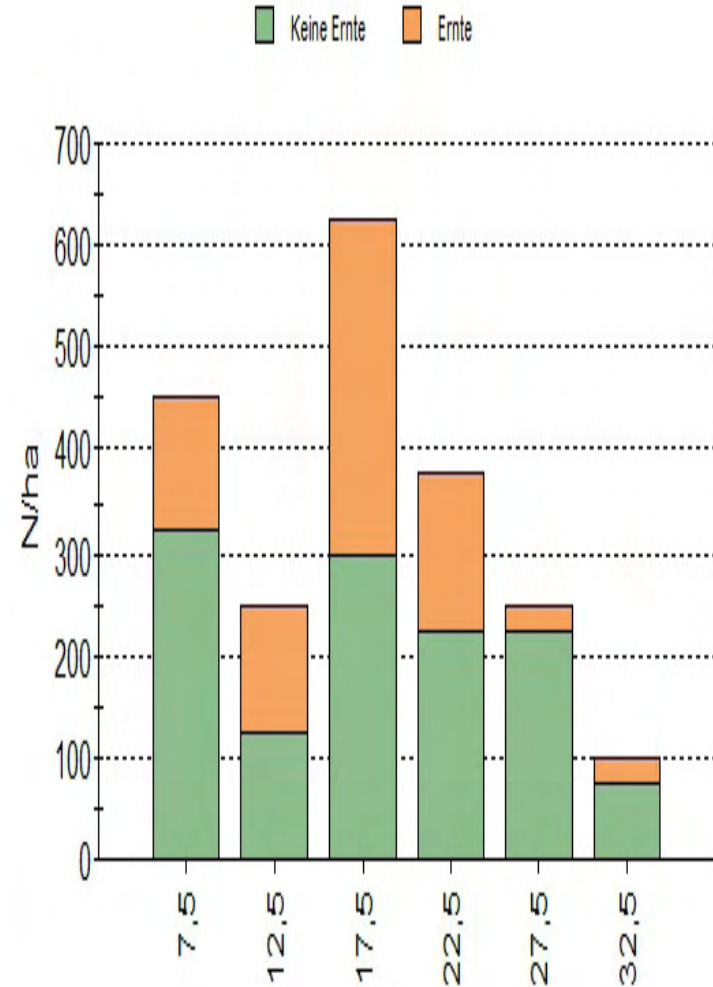
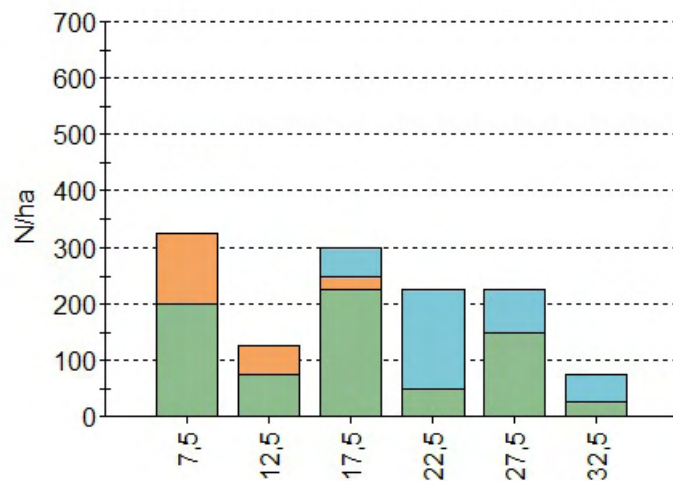
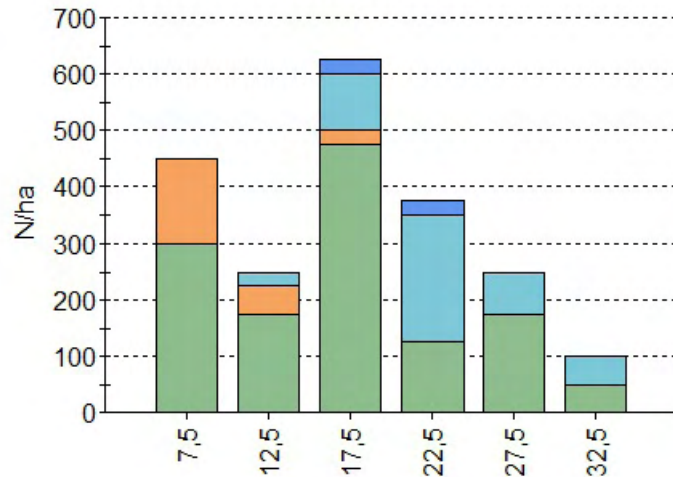
Status	Stz/ha	Anteil	Efm/ha	Anteil
Z-Bäume	175	7%	68,6	16%
Bedränger	150	6%	48,65	11%
Indifferent	2300	88%	311,5	73%
Gesamt	2625	100%	429,1	100%
Entnahme	950	36%	140,7	33%

Status	Stz/ha	Anteil	Efm/ha	Anteil
Z-Bäume	200	8%	95,9	22%
Bedränger	450	17%	86,8	20%
Indifferent	1400	53%	219,8	51%
Gesamt	2050	100%	402,5	94%
Entnahme	775	30%	132,3	31%

example 3 – Blauwald



example 3 – Blauwald



comparism of variants

A)



B)



C)



D)



microclimate- "hot spots"



➤ Trail distance 14m – trail width 3m => **20%** open area

➤ Trail distance 20m – Trail width 2m => **10%** open area

➤ **higher evaporation**

➤ **loss of increment**

Teaching Methods

- Establish permanent example stands
- Teach the principles + Decision Matrix
- **Marking exercises in small groups (max. 6)**
- Discussion + exchange of experience
- Cutting the trees - Thinning
- Evaluation + Discussion
- **Iterative Learning to find the best solution according to the site and the stand !**

Teaching Methods



Teaching Methods



Key Facts

- Number of future trees / ha: 180-200
- Minimum distance of future trees: 6-9 m
- Effort for marking: 6-8 hrs./ha ~ 200,- €/ha => 2,- €/cbm
- Support (EU supported) for 1st Thinning: 300,- €/ha
- Cost for the thinning: 20-25-(30) €/fm
- Sortiments – Income: Media 16 cm ~ 50-55 €/fm; Media 14 cm ~ 41 €/fm
- Marginal return – Motormanuell – Harvester: ~ rel.similar (23,-€/fm)

⇒ **Marking + Quality of Work = crucial**

Costtrap: big machines, high harvest volume, no marking

⇒ Loss of increment, structure, substance, stability + future chances

Summary



**Sometimes
You need a
hard head
to push
something
through !**