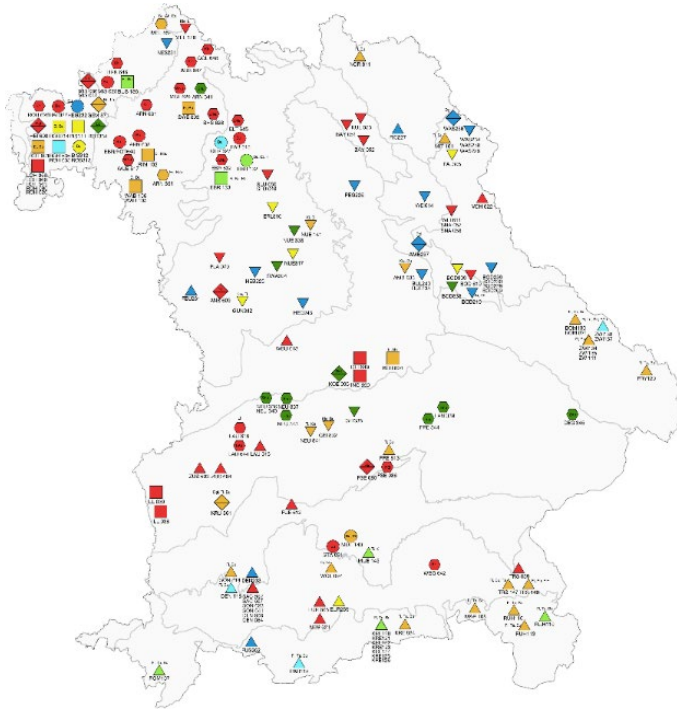


Long Term Research Plots as ALTERFOR Demonstration Sites

Peter Biber, Leonhard Steinacker, Enno Uhl

Long-Term Research Plots

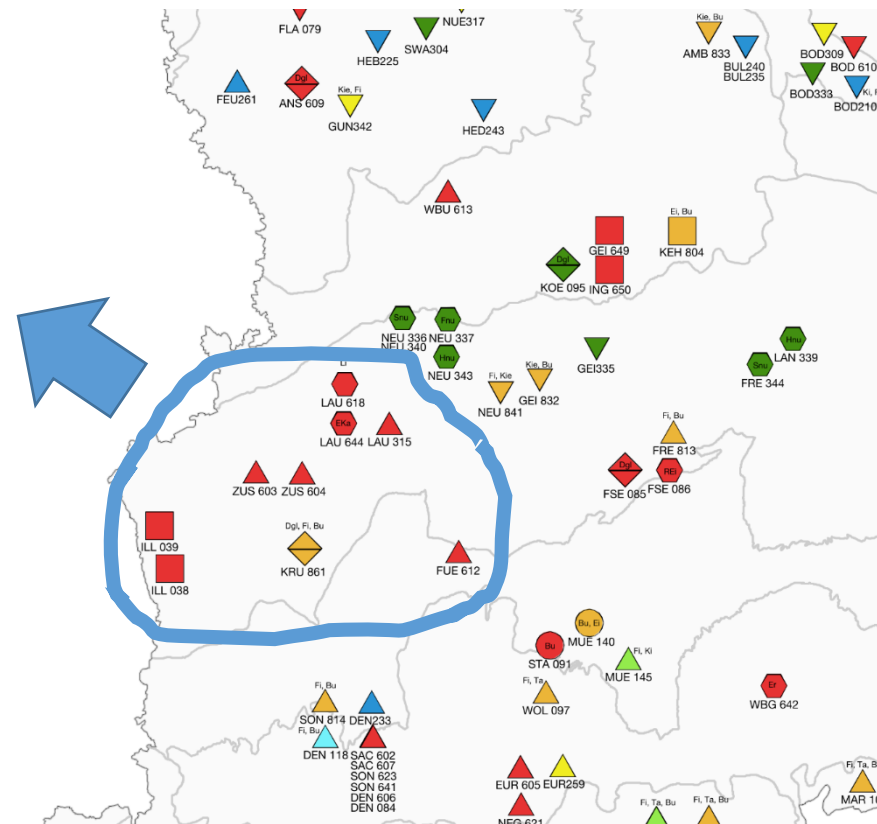


- We manage this network (~ 141 trials, 865 plots), our empirical backbone
- Standard factsheets (permanently updated)
- Very ALTERFOR-informative plots in or close to the AWF case study

Long-Term Research Plots

as ALTERFOR demo sites

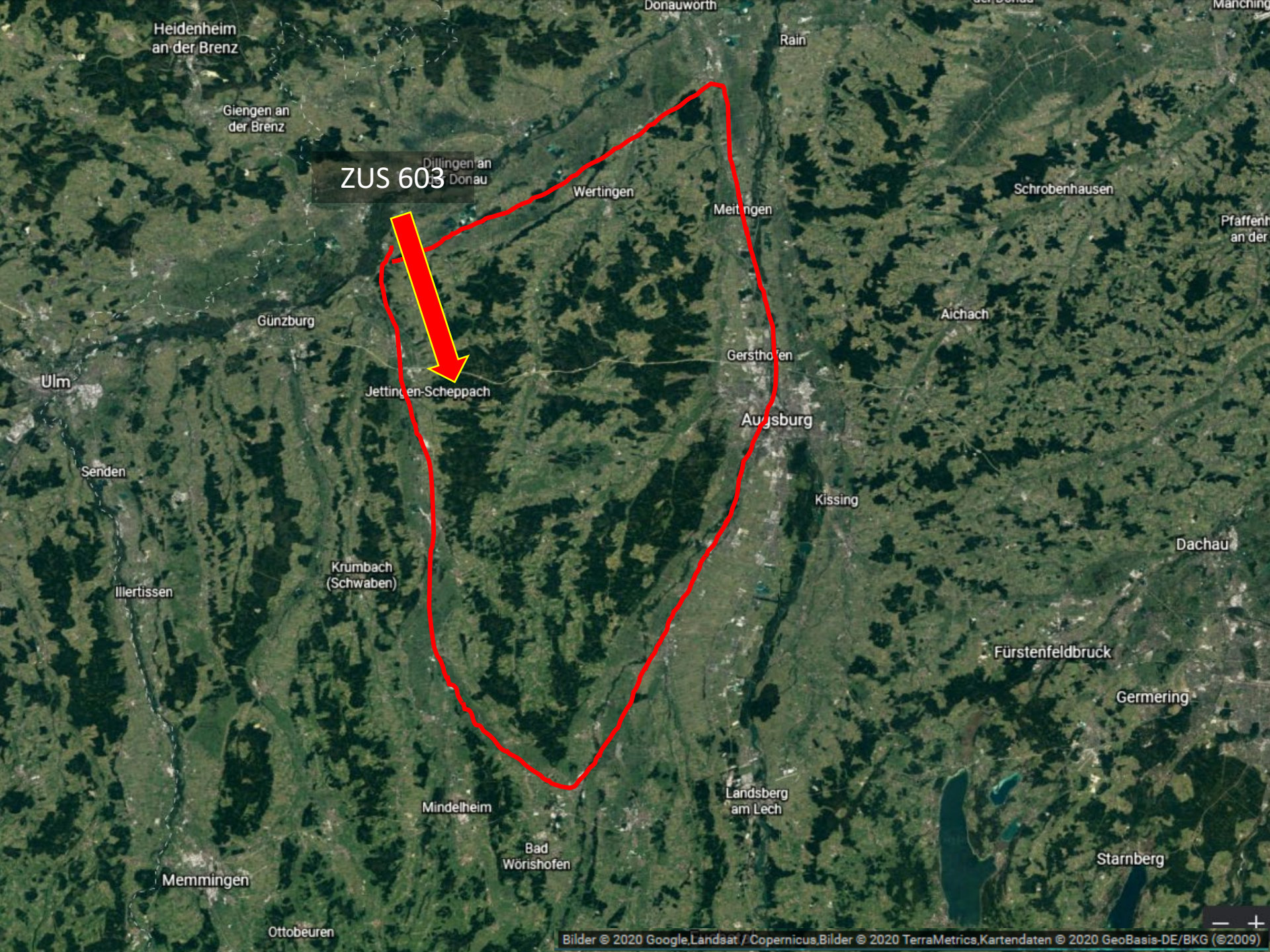
- Nine trials, each with several plots
- Species: Norway spruce, Douglas fir, European Larch, European beech, common oak
- Covering broad variety of treatments (including extremes)
- Partly, climate effects can be separated from treatment
- Our three aFMMs are covered



Norway spruce thinning and spacing trial Zusmarshausen 603

ALTERFOR demo site for the forest management
models „production“ and „set aside“

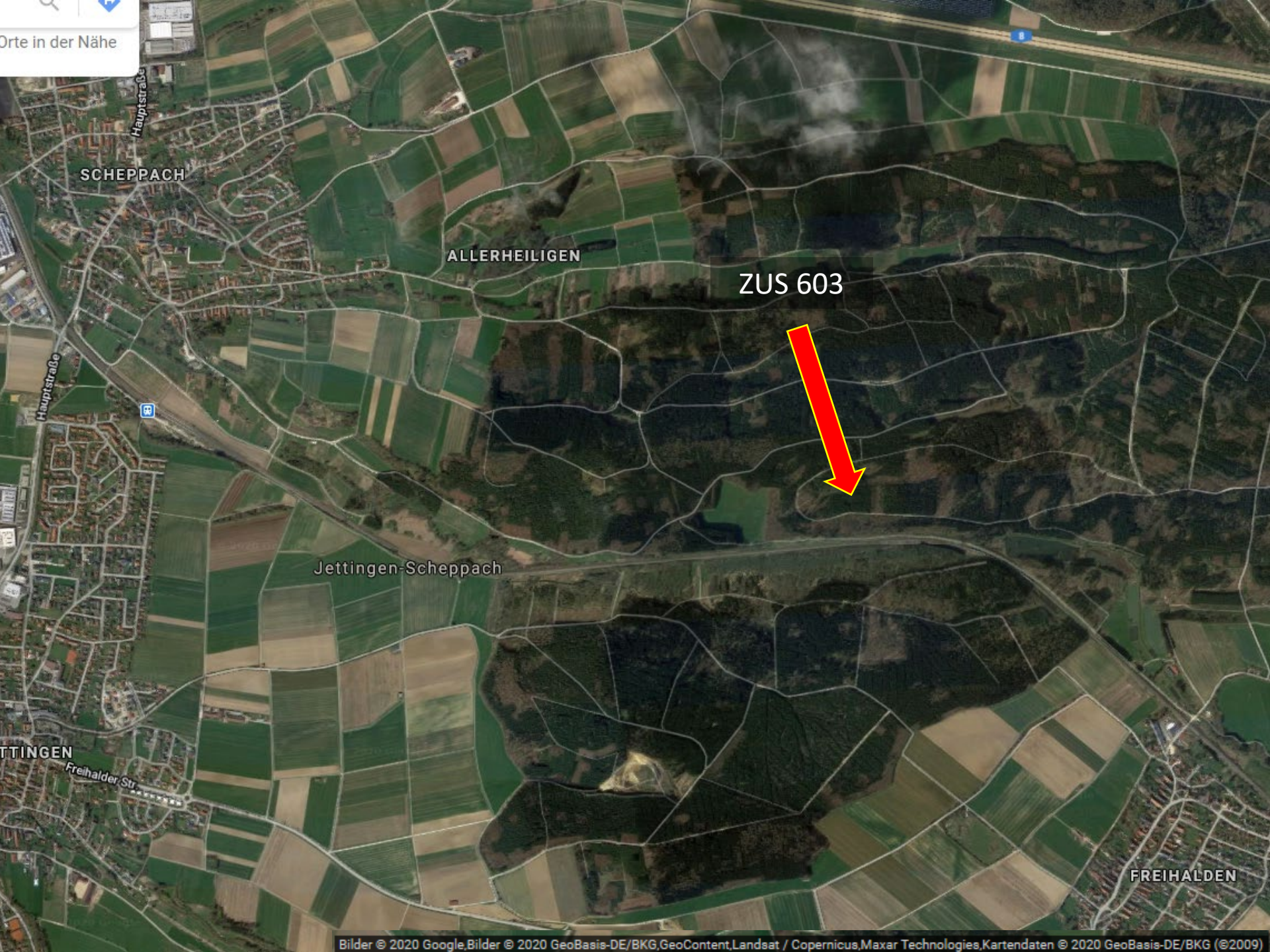
Peter Biber & Leonhard Steinacker



ZUS 603



Jettingen-Scheppach



Orte in der Nähe

SCHEPPACH

ALLERHEILIGEN

ZUS 603

Jettingen-Scheppach

TTINGEN

FREIHOLDEN

Norway spruce trial ZUS 603 – Quick facts

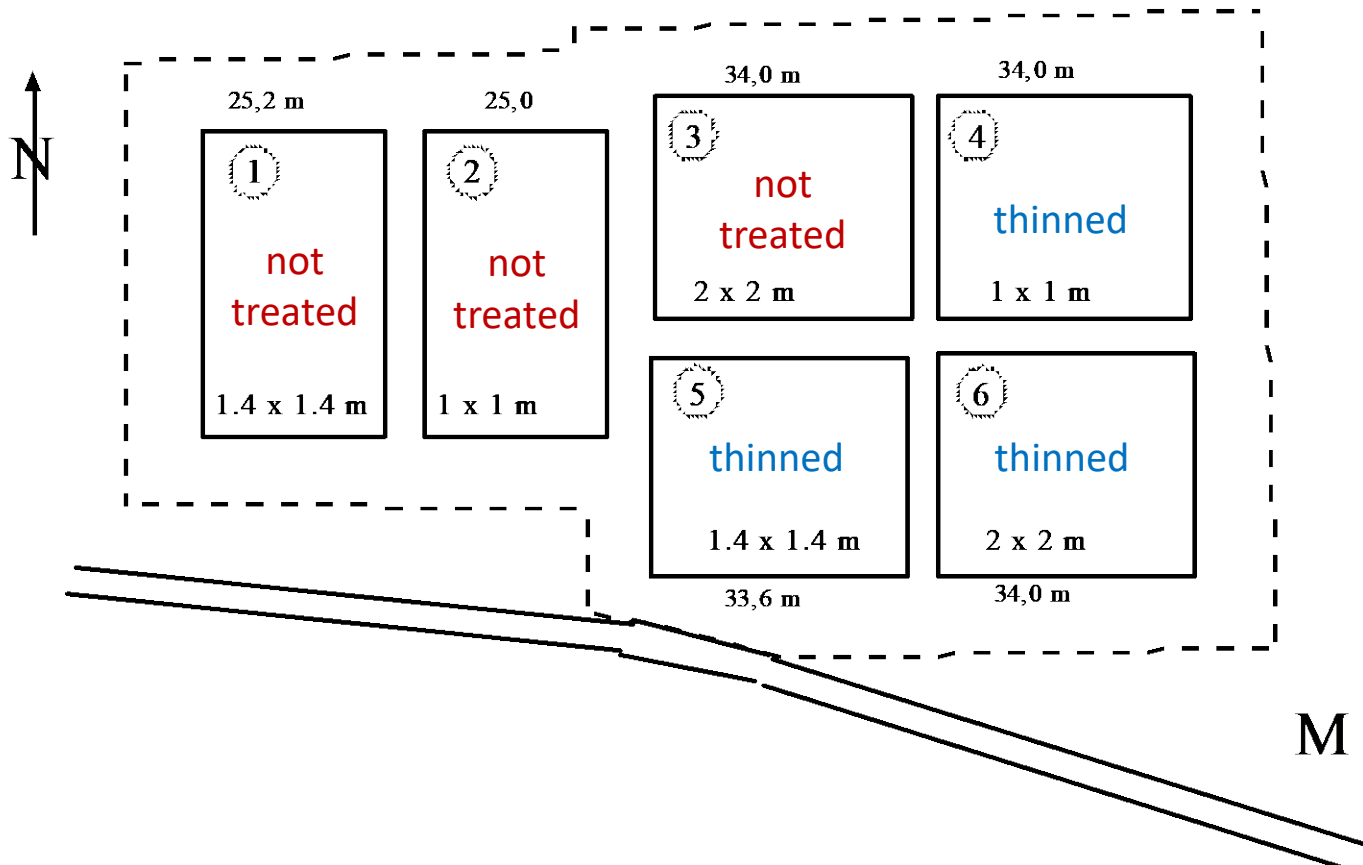
Research question: Effect of initial spacing and thinning strength on production and structure

Established (planted) spring 1968 with four-year old trees

Very good site conditions for spruce growth

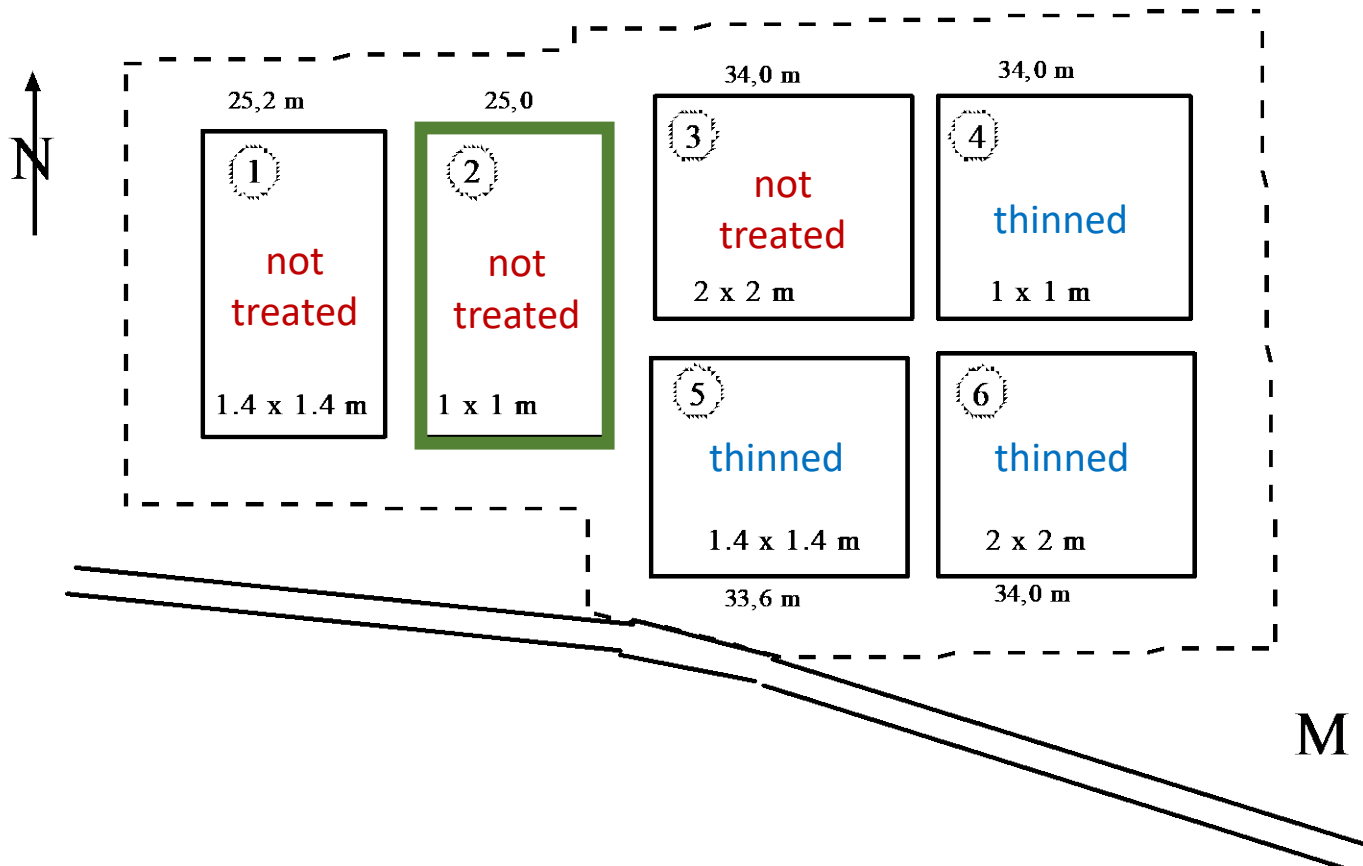
Six plots about 0.1 ha each,
Nine surveys so far between 1974 and 2017

Initial Spacing	Treatment	A-Grade
1 x 1 m ² (10000 trees/ha)	Light selective thinning (300 elite trees/ha)	Self-thinning
1.4 x 1.4 m ² (5100 trees/ha)	Moderate selective thinning (300 elite trees/ha)	Self-thinning
2 x 2 m ² (2500 trees/ha)	Heavy selective thinning (300 elite trees/ha)	Self-thinning



FoA Zusmarshausen
Abt. VI 6c Salchgraben
Versuchsfläche Nr. 603

Flächenanlage 24.05.1968



FoA Zusmarshausen
Abt. VI 6c Salchgraben
Versuchsfläche Nr. 603

Flächenanlage 24.05.1968

M 1 : 1000

Plot 2 – 1 x 1 m² - self-thinning



Photo credit: Leonhard Steinacker

Age 54, 1274 trees/ha, Volume 636 m³/ha, Basal Area 49 m²/ha, Diameter 22 cm,
Max. Increment 37 m³/ha/a, Total Volume Prod. 1180 m³/ha

Plot 2 – 1 x 1 m² - self-thinning



Photo credit: Leonhard Steinacker

Age 54, 1274 trees/ha, Volume 636 m³/ha, Basal Area 49 m²/ha, Diameter 22 cm,
Max. Increment 37 m³/ha/a, Total Volume Prod. 1180 m³/ha

Plot 2 – 1 x 1 m² - self-thinning



Photo credit: Leonhard Steinacker

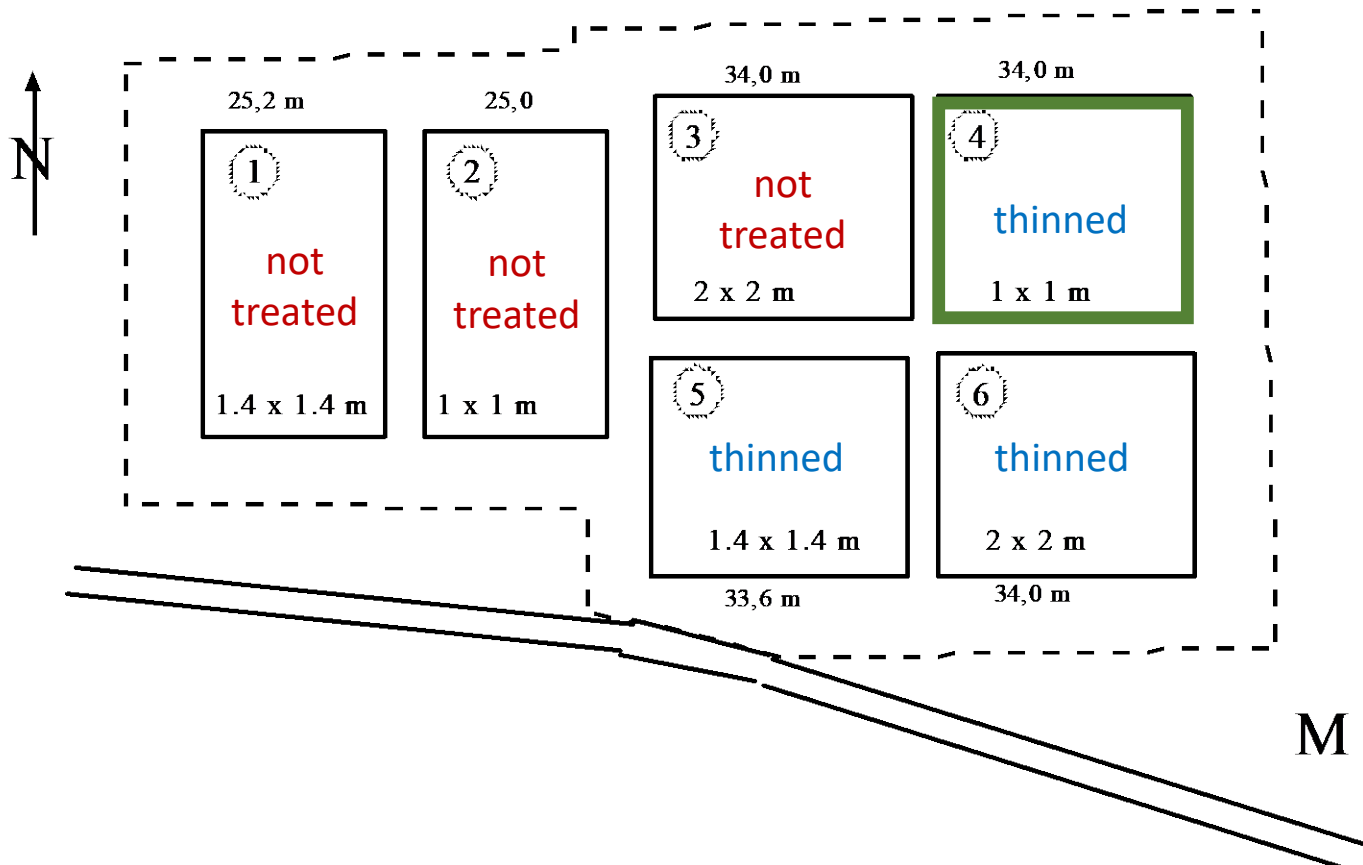
Age 54, 1274 trees/ha, Volume 636 m³/ha, Basal Area 49 m²/ha, Diameter 22 cm,
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Plot 2 – 1 x 1 m² - self-thinning



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FoA Zusmarshausen
Abt. VI 6c Salchgraben
Versuchsfläche Nr. 603

Flächenanlage 24.05.1968

M 1 : 1000

Plot 4 – 1 x 1 m² - thinned



Photo credit: Leonhard Steinacker

Age 54, 971 trees/ha, Volume 638 m³/ha, Basal Area 51 m²/ha, Diameter 26 cm,
Max. Increment 38 m³/ha/a, Total Volume Prod. 1056 m³/ha

Plot 4 – 1 x 1 m² - thinned



Photo credit: Leonhard Steinacker

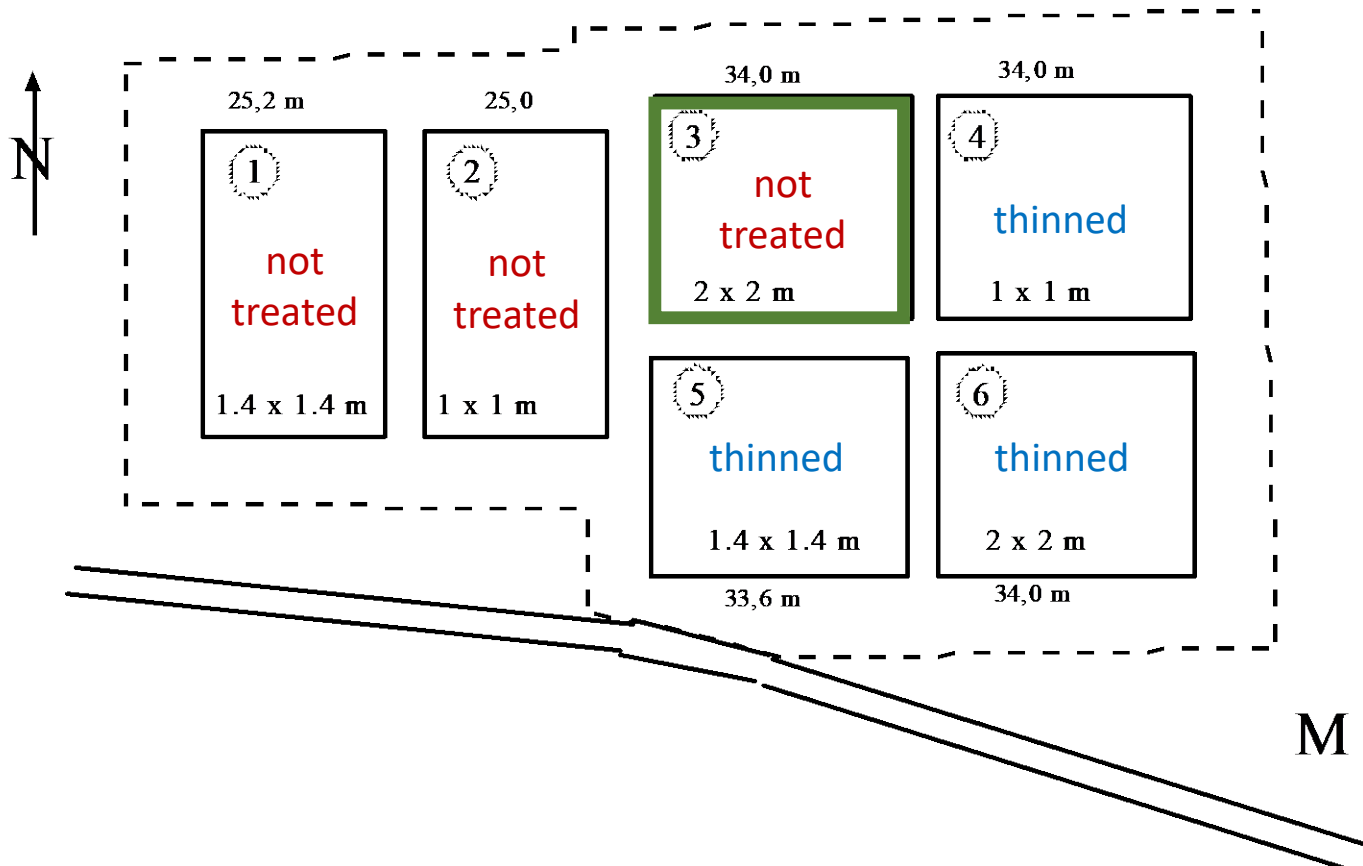
Age 54, 971 trees/ha, Volume 638 m³/ha, Basal Area 51 m²/ha, Diameter 26 cm,
Max. Increment 38 m³/ha/a, Total Volume Prod. 1056 m³/ha

Plot 4 – 1 x 1 m² - thinned



Photo credit: Leonhard Steinacker

Age 54, 971 trees/ha, Volume 638 m³/ha, Basal Area 51 m²/ha, Diameter 26 cm,
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FoA Zusmarshausen
Abt. VI 6c Salchgraben
Versuchsfläche Nr. 603

Flächenanlage 24.05.1968

Plot 3 – 2 x 2 m² - self-thinning



Photo credit: Leonhard Steinacker

Age 54, 1451 trees/ha, Volume 898 m³/ha, Basal Area 68 m²/ha, Diameter 25 cm,
Max. Increment 39 m³/ha/a, Total Volume Prod. 1071 m³/ha

Plot 3 – 2 x 2 m² - self-thinning



Photo credit: Leonhard Steinacker

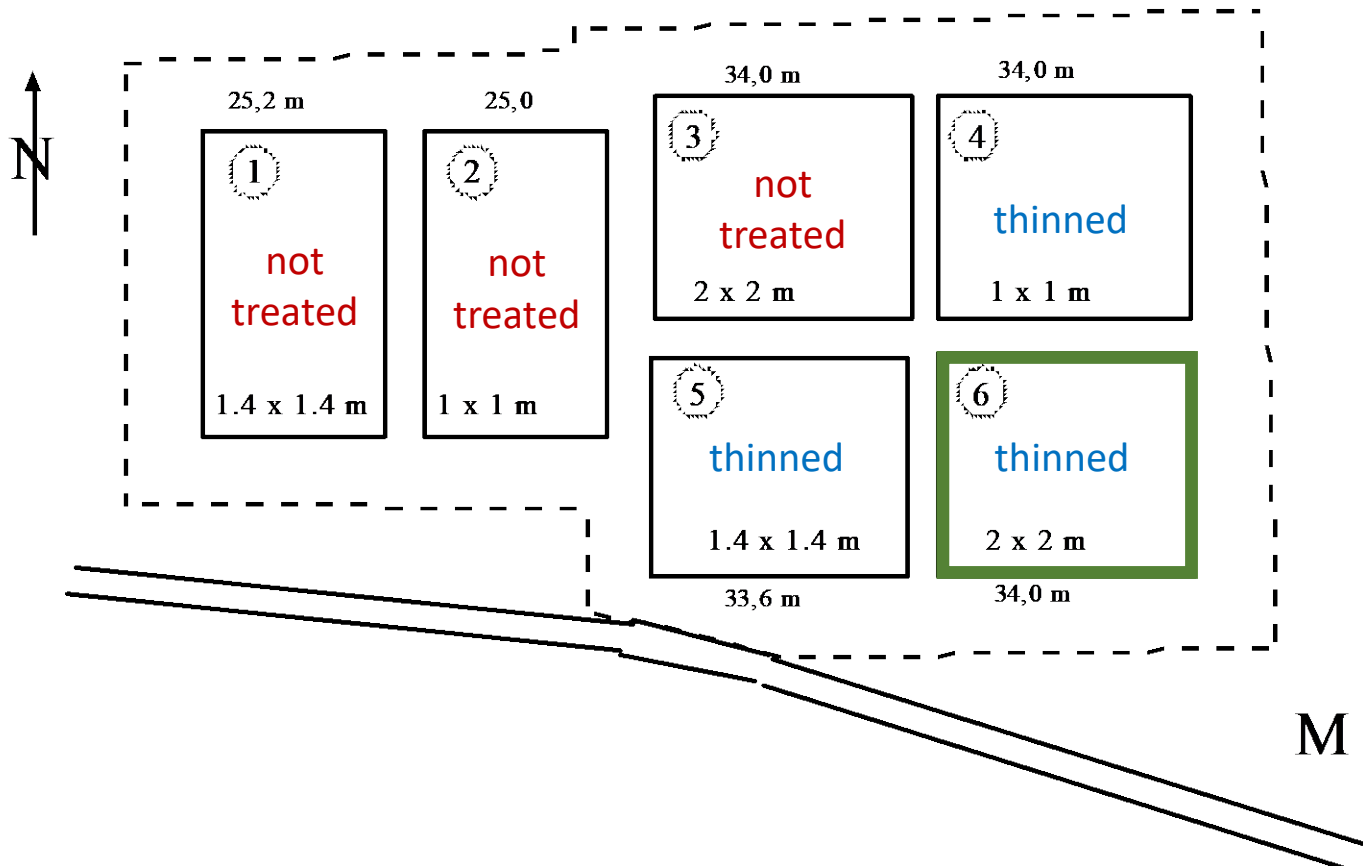
Age 54, 1451 trees/ha, Volume 898 m³/ha, Basal Area 68 m²/ha, Diameter 25 cm,
Max. Increment 39 m³/ha/a, Total Volume Prod. 1071 m³/ha

Plot 3 – 2 x 2 m² - self-thinning



Photo credit: Leonhard Steinacker

Age 54, 1451 trees/ha, Volume 898 m³/ha, Basal Area 68 m²/ha, Diameter 25 cm,
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FoA Zusmarshausen
Abt. VI 6c Salchgraben
Versuchsfläche Nr. 603

Flächenanlage 24.05.1968

M 1 : 1000

Plot 6 – 2 x 2 m² - thinned



Photo credit: Leonhard Steinacker

Age 54, 343 trees/ha, Volume 615 m³/ha, Basal Area 48 m²/ha, Diameter 42 cm,
Max. Increment 32 m³/ha/a, Total Volume Prod. 1086 m³/ha

Plot 6 – 2 x 2 m² - thinned

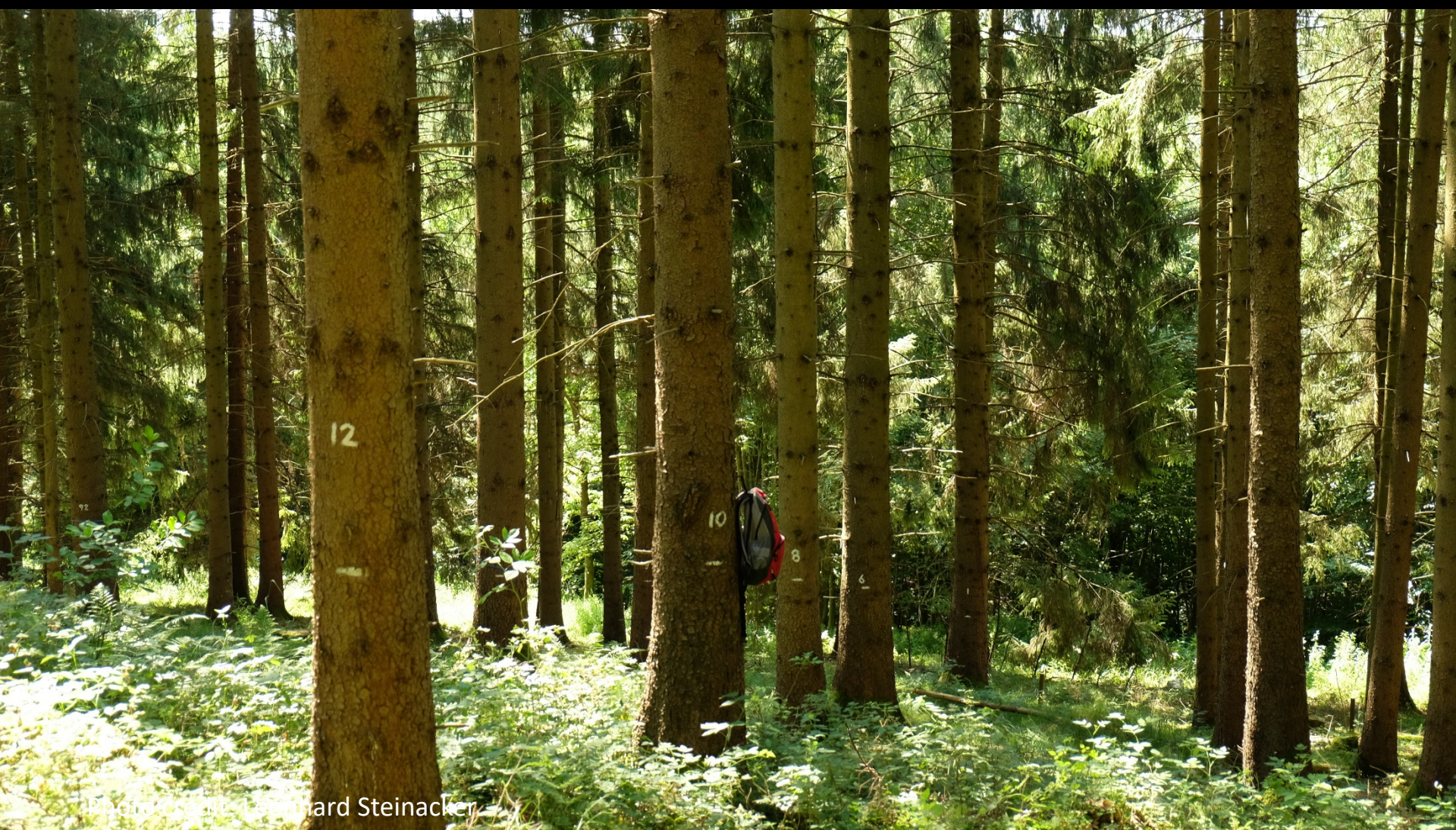


Photo credit: Leonard Steinacker

Age 54, 343 trees/ha, Volume 615 m³/ha, Basal Area 48 m²/ha, Diameter 42 cm,
Max. Increment 32 m³/ha/a, Total Volume Prod. 1086 m³/ha

Plot 6 – 2 x 2 m² - thinned



Photo credit: Leonhard Steinacker

Age 54, 343 trees/ha, Volume 615 m³/ha, Basal Area 48 m²/ha, Diameter 42 cm,
Max. Increment 32 m³/ha/a, Total Volume Prod. 1086 m³/ha

ZUS 603 - ALTERFOR-Summary



ZUS 603 - ALTERFOR-Summary

- Highly productive, low biodiversity
- Wide corridor of thinning strengths leads to the same total wood production (very different standing volume, however)
- Considerable steering potential for individual tree stability
- Overall high bark beetle risk
- Untreated plots give a realistic picture of what would happen after taking large areas out of management

Douglas-fir / European beech Growth series Krumbach 861

ALTERFOR demo site for the forest management
model „multifunctional“

Peter Biber & Leonhard Steinacker

Plot KRU 861/7



Photo credit: Leonhard Steinacker

Growth series KRU 861 – Quick facts

- Rationale: Improve understanding of dynamics and structure of Douglas-fir mixed stands
- Growth series: Different plots at different stage of development under comparable site conditions
- Seven plots cover stand ages of 16 to 129 years
- Established 1999 with three plots, extended to seven plots in 2009
- We focus on the oldest plot KRU 861/7 (three surveys since 2009)

Plot KRU 861/7

- Plot size 1.12 ha, age ~ 130 years (main layer)
- Volume: 806 m³/ha (Douglas fir 426 m³/ha, European beech 193 m³/ha, rest: Norway spruce, European larch)
- Current volume increment: 20.4 m³/ha/a
- Mean height: Douglas fir - 50 m, European beech – 38 m, Norway spruce 41 m
- Mean diameter: Douglas fir – 108 cm, European beech – 49 cm, Norway spruce 60 cm



Photo credit: Leonhard Steinacker



Photo credit: Leonhard Steinacker



Photo credit: Leonhard Steinacker

Plot KRU 861/7 – ALTERFOR-Summary

- High increment even at age 130
- Douglas fir growth profits from mixture with beech
- Douglas fir does not turn out invasive on the site (due to the presence of beech)
- High structural diversity
- High stability
- Target diameter harvesting and keeping rich structure seems possible

