Effect of the size of retention tree groups on biodiversity in forest regeneration (RETREE)

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Location of study sites
Approximately 200 ha of mature *Myrtillus* -type spruce forest was biotope-mapped in the area in 1997.

After GNMDS-analysis, paludified Norway spruce (*Picea abies*) -forest biotopes (‘hot-spots’) were selected as retention tree groups.

Size of the selected biotope patches varied between 0.1 - 0.6 ha.
Methods

- Three seasons: 1998 (pre-treatment year), 1999 (felling year) and 2000 (scarification year) (2001)
- Epixylic vegetation (vascular plants, bryophytes, liverworts, lichens): Visual cover estimation from permanently marked 200 cm² sized plots on logs
- Understorey vegetation visual cover estimation from permanently marked 1 m² sized plots, a gradient through retention tree groups
- Seedling and sapling inventory, a gradient through retention tree groups
- CWD: Estimation of the disturbance caused to permanently marked logs
- Uprootings: Number of new uprootings
Sampling

Edge of the retention tree group

Understorey vegetation and regeneration

Epixylic vegetation sampling on logs

Felling area
Retention tree group
Retention tree group
Epiphyte vegetation sampling
Mean ± SE preservation percentage of CWD in coniferous and in deciduous trees in retention tree groups (in) and in felled area (out) during 1998-2000. Asterisks indicate differences to pre-treatment year: * = P < 0.05; ** = P < 0.01, *** = P < 0.001.

pre = before treatment; fell = after felling; prep = after site preparation
Mean ± SE preservation percentage of CWD in less (1-3) and highly (4-6) decayed CWD in retention tree groups (in) and in felled area (out) during 1998-2000. Asterisks indicate differences to pre-treatment year: * = P < 0.05; ** = P < 0.01, *** = P < 0.001.

pre = before treatment; fell = after felling; prep = after site preparation
The differences in uprooting percentages (%) in the paludified ($n = 11$) and in the upland ($n = 8$) biotopes after the felling (1999-2000).
epiphytic vegetation cover

- Retention tree group
- Felling area


% retention tree group: 40 (P < 0.001)
% felling area: 10 (P < 0.001)

Year 1999:
- Retention tree group: 20 (P < 0.001)
- Felling area: 5

Year 2000:
- Retention tree group: 25
- Felling area: 3

*** (P < 0.001)
Conclusions

- **CWD**
  - fellings + scarification destroy almost 70% of logs
- **Tree uprooting**
  - number of uprootings is much higher in paludified than in the upland biotope
- **Epixylic vegetation**
  - epixylic vegetation seems to survive in the retention patches despite the high number of uprootings
- With **less destructive management**, 60% of logs could be maintained on stand level
- By **planning retention tree group locations** more wind-resistant, amount of uprootings could be reduced
- By **leaving large enough retention tree groups** the epixylic species survival over the forest regeneration phase could be ensured on **stand level**
- By **landscape-ecological planning** the species survival and continuum could be ensured on **landscape level**
Publications

Related publications

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