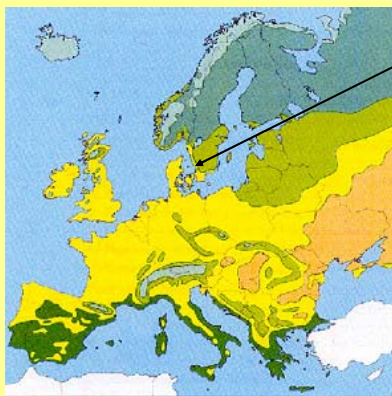


Tree age as a key factor for epiphytes in beech *Fagus sylvatica* forests



Örjan Fritz, University of Agricultural Sciences, Alnarp, Sweden
Mats Niklasson, University of Agricultural Sciences, Alnarp, Sweden
Marcin Churski, Polish Academy of Sciences, Bialowieza, Poland

The location of the study area in Europe



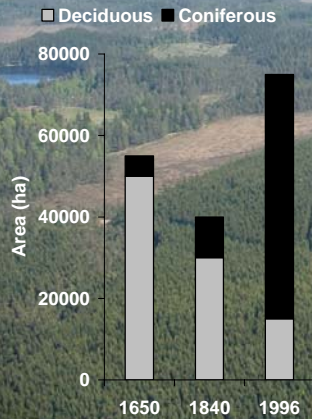
- Province of Halland, SW Sweden
- Nemoral vegetation zone
- Northern border of beech
- Important hardwood tree

(Source: Swedish EPA)

The beech forest today

- Extensive habitat loss since 1650
- Severely fragmented
- Hostile matrix

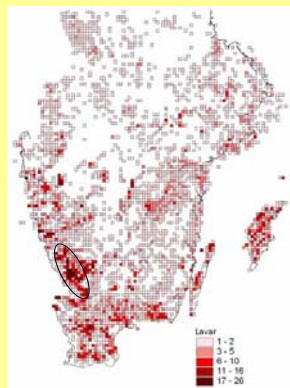
Red-listed species



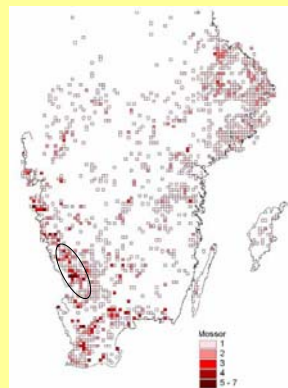
Isolated patches of beech stands

Red-listed epiphyte species on beech: Distribution peaks in Halland

Lichens



Bryophytes



Number of species per 25 km² square (Source: Swedish EPA 2004)

Beech characteristics

- Max age 400 yrs (300 yrs)
- Shade-tolerant and competitive
- Gap-phase dynamics
- Thin bark

65 yrs - smooth



238 yrs - rough



Questions in this study

- Species age ranges?
- Beech mature time for the red-listed species?
- Healthy or "damaged" old beeches?
- Effects of thinning?



"Damaged" tree type –wounded by rot

Material and methods

- 571 beeches studied in 37 plots in 29 stands of various ages and structures
- Cored age-determined beeches
- Ages from 37 to 292 years
- All epiphytes on 0-2 m were surveyed

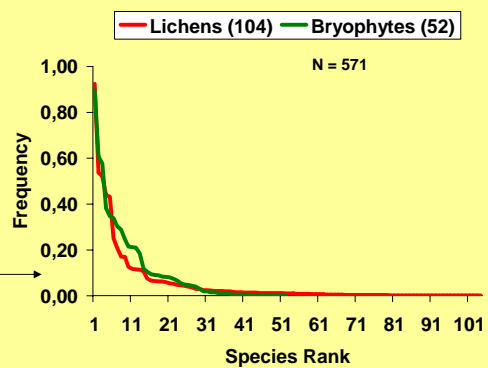


Biskopstorp area – ca 900 ha forthcoming nature reserve

Results

Number of species

- 104 lichens - 17 red-listed
- 52 bryophytes - 5 red-listed
- 1-34 per beech, average 12
- Few dominants and many rare



Important variables

- Tree age
- Topographical position
- Impact from thinning

Bryophytes of conservation concern



Zygodon conoideus



Antitrichia curtipendula



Neckera pumila

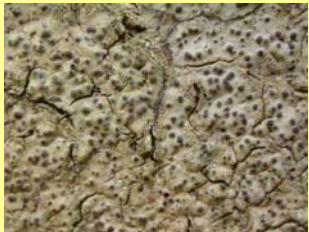


Neckera crispa

Some red-listed lichens in the study



Normandina pulchella

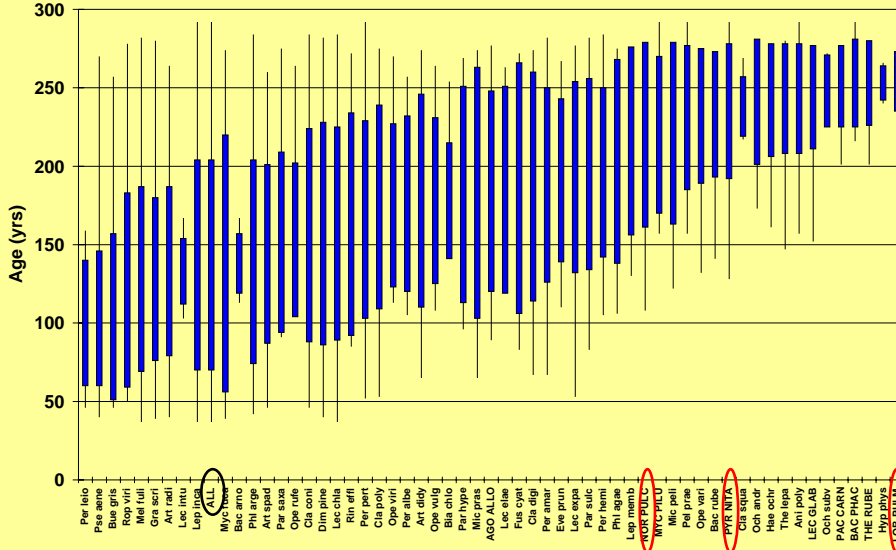


Pyrenula nitida

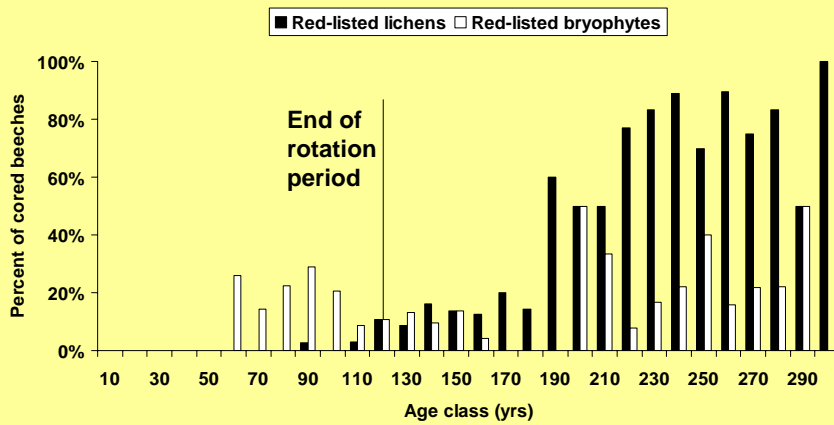


Lobaria pulmonaria

Age ranges for lichens



Red-listed lichens on beeches > 180 yrs

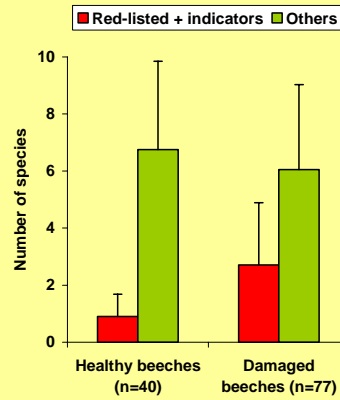


Old trees are not enough...

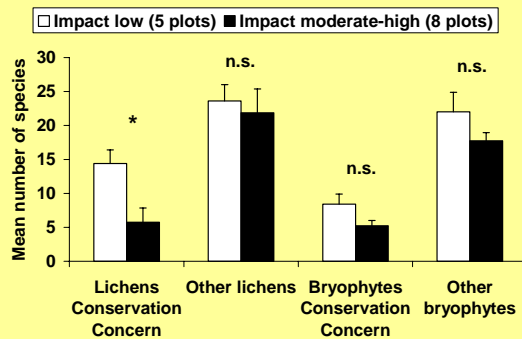


"Damaged" tree type: Late-growing rot infected beeches 280 yrs

More lichens of conservation concern ($p < 0.001$) on damaged beeches but not of other lichens (n.s)



Effects of thinning in old beech forest



High impact plot – a few old beeches remains

Management of production forests

Shelter-wood system

- Single-layered and even-aged
- Rotation period 120 yrs
- Large fluctuation in light climate
- Unsuitable for red-listed lichens
- Retention trees effective?

Single tree/group selection

- Continuous forest cover
- All-aged structure
- Promising but untested



Conclusions

- Tree age, topography and impact important factors
- Red-listed lichens prefer beeches > 180 yrs
- "Damaged" beeches ☹
- Thinning ☹ for red-listed lichens
- Urgent need of new management in production forests



