Successional Divergence of Heathlands and Woodlands in Western Norway

Introduction

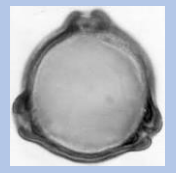
European Heathland is so well established along the Atlantic seaboard of Europe that it was formerly considered as a type of natural vegetation. Now it is understood, that only through artificial management, can heathlands survive and resist the throttle of succession. how has the evolution of such heaths differed from the naturally occurring forests, iconic to the Scandinavian peninsular, since they both emerged from the retreat of the Pleistocene's glaciers?

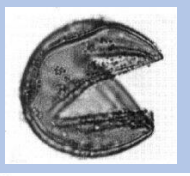
Materials and Methods

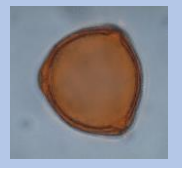
1. Russian Core, sample to 8 metres.
2. Microscopic analysis for pollen count (12 slides)
3. Percentage data used to create pollen graph using "C2".
4. Comparison to woodland pollen graph (Eide et al., 2005).

Research Questions

- What successional patterns are seen in heathlands and woodlands?
- Where does the successional pattern of heathlands and woodlands diverge?







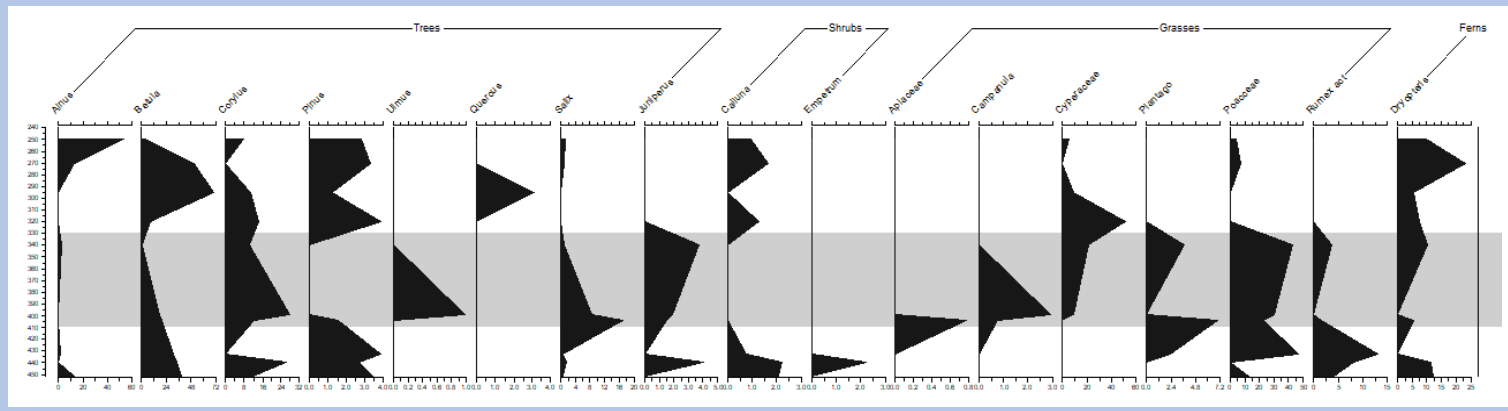


Fig 1., Represents pollen levels from Lygra throughout the Holocene. Three zones were distinguished, highlighted by different shading of horizontal columns. Pollen percentages were taken from depths ranging from 450 – 240 cm.

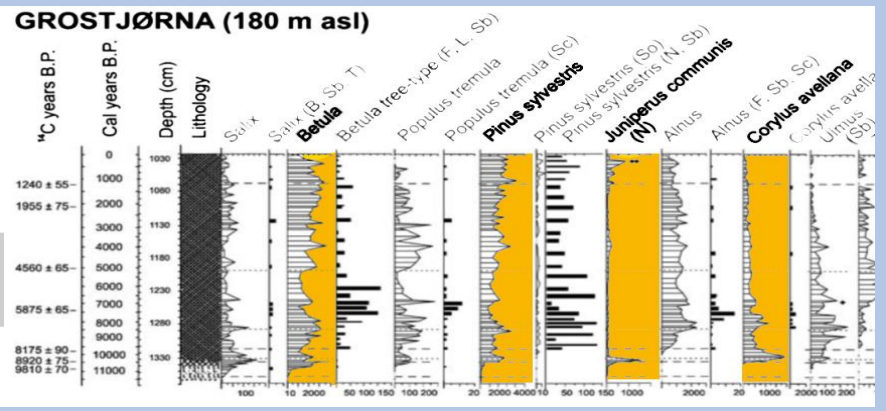


Fig 2., Represents pollen levels from Grostjorna throughout the Holocene (Eide et al., 2005). Three zones were distinguished, highlighted by different shading of horizontal columns. Pollen percentages were taken from depths ranging from 1330 – 1030 cm. This graph was produced by Eide et al., 2005, and not by our group.

Results

Three zones were identified: *Z1 (450-410 cm), Z2 (410-330 cm),* and *Z3 (330-240 cm),* with Z1 being the oldest and Z3 the youngest (Fig. 1.).

Z1: 6 different tree species were found, some grass species with *Poaceaea*, shurbs and ferns, along with a representable amount of *Rumex* sp.

Z2: signified by grass species, dominated by *Plantago* sp. *Corylus*, *Salix,* and *Ulmus* tree species were also found in a significant amount. *Betula* amounts showed a decrease, while *Corylus* increased. *Rumex* showed a steady increase, followed by a sharp decrease in Z2.

Z3: an increase in tree species can be seen. Trees are not homogenous (?). Significant amounts of *Betula* and *Pinus* are found throughout Z1, along with a large increase of *Alnus*. *Calluna* and *Dyropteris* also show an increase during this period.

Discussion and Conclusions

- Similarities found in figs 1 and 2 lead to the conclusion that each were depicting the early Holocene. These two graphs could be compared to each other.
- Five main species that were well-represented in both sites were used for main comparison of the two environments (highlighted in fig 1., 2.).
- Z1species show a well-diversified and homogenous forest (fig 1.). Similar trend was found in fig 2.
- **Differentiation of the two environments is distinguishable in Z2.**
- In **Heathlands** (fig 1.), the arrival of *Plantago sp*. can be seen, which is a proxy to human activity. Salix levels are high during this period. **Woodland** succession shows a different pattern with stable levels of *Pinus* and *Betula* (fig 2.). Due to these dissimilarities, **we conclude that heathlands and forest succession started to differentiate at this point**.
- Z3 shows unrelated trends between heathlands and Woodlands.

References: Eide, W., Birks, H., Bigelow, N., Peglar, S. and Birks, H. (2005). Holocene forest development along the Setesdal valley, southern Norway, reconstructed from macrofossil and pollen evidence. *Vegetation History and Archaeobotany*, 15(2), pp.65-85.