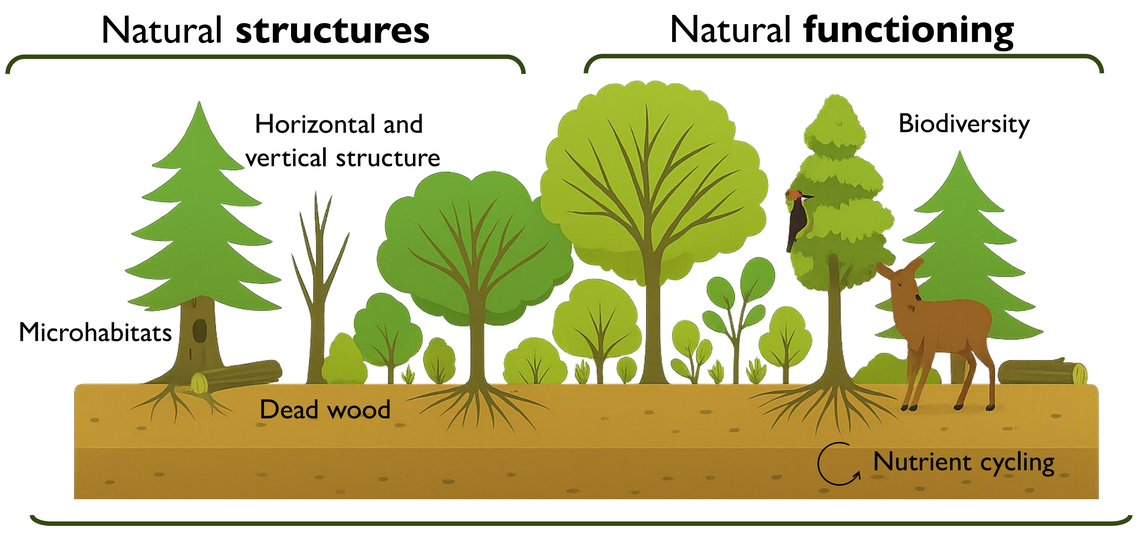
Forest naturalness evaluation through lichens

Fabien Dierckx[1], Yannick Agnan[1]
[1]*ELI-E, Earth and Life Institute, UCLouvain, 1348 Louvain-la-Neuve, Belgium*

Naturalness → Complex to quantify → Bioindication through lichens



Bioindication?

Use of living organisms to monitor the environment

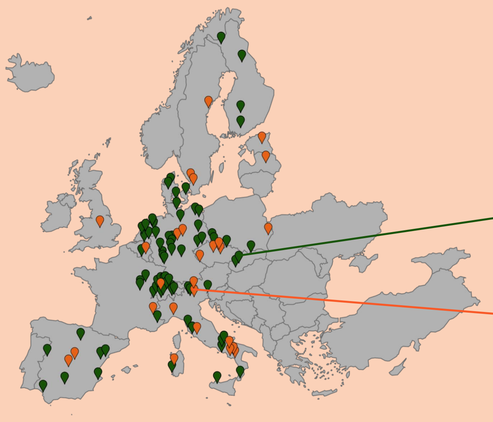
- Integrative
- Quick

Why lichens?

- Sensitive to disturbances
- Representative of ecosystem
- Longevity and limited dispersal
- Easily observable

Naturalness diagnosis → Protection of quality areas / Restauration of damaged areas

1 Evaluation of stand-level influences through a meta-analysis



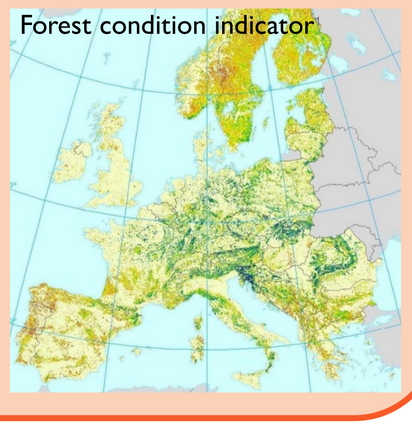
European lichen surveys

- **Projects in collaboration**
- **Scientific & grey litterature**

Ancillary data

Stand-level
Forest management, forest condition, tree cover, climate, atmospheric pollution…

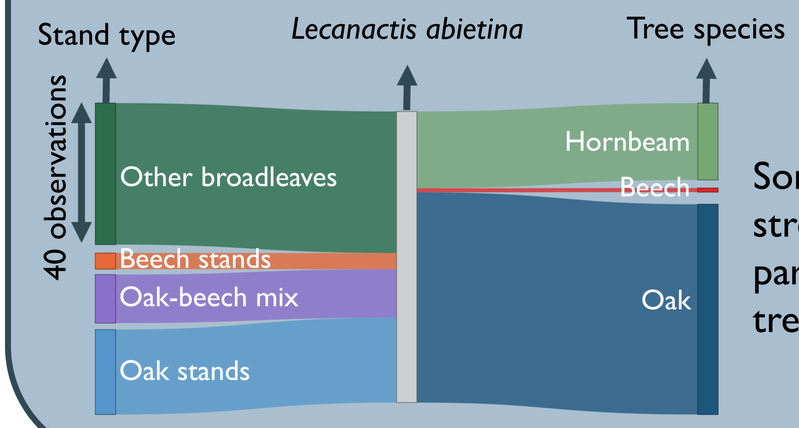
Lichen ecology



2 Evaluation of tree-level influences through additional surveys

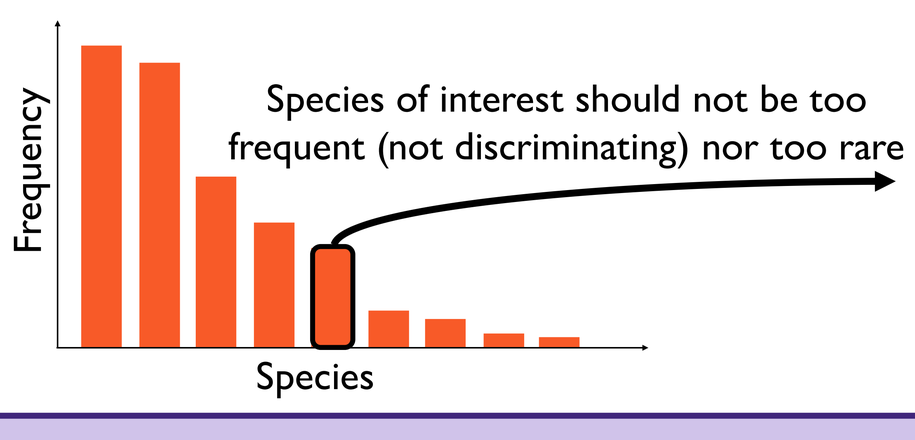
Survey on 120 sites in Wallonia with data on:

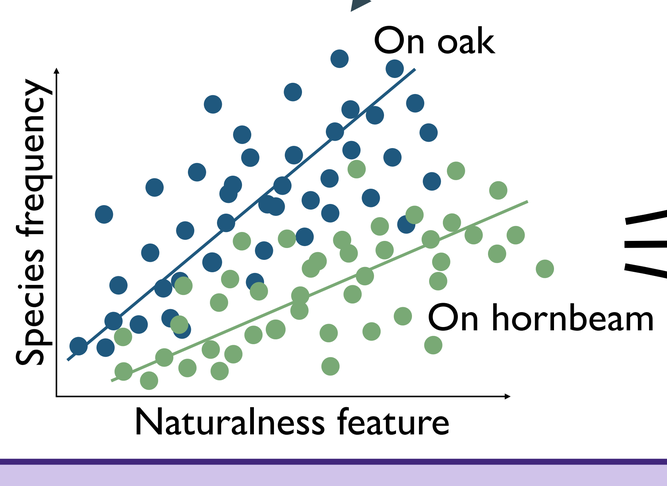
- Other epiphytes
- Microclimate
- Tree and bark characteristics



Some lichen species show strong preferences for particular stand types, tree species or both

Email: fabien.dierckx@uclouvain.be





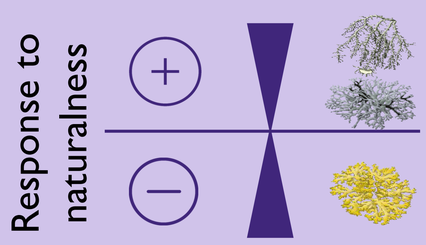
Potential indicator species for each naturalness feature

- For dead wood
- For spatial forest continuity
- For other naturalness features

3 Creation of naturalness indices

For each naturalness feature:

1. Validation of indicator species



2. Choice of score computation method

- (+) Species with a positive response only
- Or
- (+)/(−) Ratio of positive over negative response

× Species frequencies

Combination of all features

3. Naturalness score

- **Monitoring tool for scientists**
- **Simplified decision-making tool for foresters**

References
[1]Scherpenhuijzen, N., West, T. A. P., Debonne, N., Oostdijk, S., Adame, P., Astrup, R., & Verburg, P. H. (2025). Mapping forest management regimes in Europe. *Forest Ecology and Management*, *594*, 122940. https://doi.org/10.1016/j.foreco.2025.122940