

SCHWENDENER Florence (2017) : Response of testate amoebae and vegetation to changes of water table depth in a restored *Sphagnum* peatland

Abstract

Peatlands are threatened by climate change and by anthropogenic exploitation impacting their structure and carbon sink functions. Peatland restoration aims to re-establishing natural biotic communities and functions. Monitoring of restoration success is mainly based on vegetation survey or other faster indicators such as testate amoebae (TA). Thus, TA may be especially useful for rapid assessment of restoration success but only limited data exist to assess this.

We studied a cutover *Sphagnum* peatland, in the Swiss Jura, that was restored in 2008. Sites were selected in formerly drained area, pit mining trench, newly created pools, and unmined but drained forested peatland. We assessed the correlation between either plant or TA communities and water levels, pH, *Sphagnum* carbon and nitrogen contents, at the surface (post-restoration communities) and at depth (pre-restoration). Past water table depths were inferred using existing transfer function models (Swiss Jura, Engadine, Europe).

Restoration increased the TA-inferred water table in all pools and half of the lawns in open habitats, but not in shaded habitats (shrub or forest). *Sphagnum* or peat pH and C/N ratio indicate rather high mineralization rate for all sites, typical for restored or disturbed peatland. TA and vegetation communities showed a difference between sites with high water level (open environment) and those with low water table (shaded environment). In the open sites, communities shifted from a dominance of dry to wetter indicators. In the shaded sites, communities remained dominated by dry indicators but with a shift towards characteristic species of natural wooded peatlands. Although TA and plant communities showed similar patterns the response of TA was clearer.

This study confirmed the usefulness of testate amoebae as restoration indicators as well as the value of using short (even undated) palaeoecological sequence to document recent changes in ecosystem conditions.

Keywords: Peatland, restoration, testate amoebae, vegetation, water table depth, bioindication, palaeoecology, community ecology