

Additional material

Summary

In percolation mires, the water level hardly drops and the peat remains weakly decomposed, with large pores, and elastic. As the related high hydraulic conductivity leads to a substantial water flow through the whole peat body, percolation mires are only found in places where water supply is not only very evenly distributed over the year, but also quite large. Normally these requirements are only met under conditions of groundwater feeding. In Kolkheti lowland ombrogenous (solely fed by rain) percolation mires occur because: 1) the climate is very wet and the precipitation surplus is very evenly distributed over the year, 2) the bog has a convex shape, 3) there are no clear hummocks and hollows, because surface patterning depends on lateral water flow, 4) the vegetation is acid and possibly more nutrient demanding than in 'normal' bogs, because of rheotrophy effects, 5) the peat is hardly decomposed over a large depth. Extremely high mire oscillation with a maximum rise up to 25 cm can occur.

The ombrogenous mires are characterized by uniformity in their surface patterns. This uniformity and lack of diversity at the single landscape level is of importance when looking at wider scale, since Ispani (together with Imnati mire) mire can be regarded as reference point for global peat land diversity. The combination of percolation and ombrogenous (rain fed) types and resulting uniform character of Kolkheti mires constitute the extreme reference case of mire diversity in comparison with polygon patterning mires of the northern hemisphere regions. The uniformity of Ispani II 'explains' the worldwide diversity of peat lands and mire formations, and thus contributes into global diversity of mire landscapes.

Noteworthy flora:

The Kolkheti mires display diverse vegetation with many endemic species and relicts from the glacial period. Ispani II and Ispani I (partly) are dominated by *Sphagnum papillosum*, *S. imbricatu*, and *S. palustre*. The vegetation further compiles amazingly few species, including *Molinia litoralis*, *Rhynchospora alba*, *R. caucasica*, *Rhododendron ponticum*, *R. luteum*, *Vaccinium arctostaphylos*, *Drosera rotundifolia*. This monotony makes Ispani II to a paradigm example of low internal diversity that contributes substantially to global ecosystem biodiversity.

Among the major peat accumulating species *Sphagnum* deserves special attention. Kolkheti is the only subtropical area in the world with *Sphagnum* dominated ombrotrophic mires. *Sphagnum imbricatum* is a main peat forming species in Ispani 2. Communities with *Molinia litoralis* dominates. Relatively small areas are covered by *Carex lasiocarpa*. Small areas are populated with shrubs such as *Rhododendron luteum*, *Rhododendron ponticum*, *Frangula alnus*, *Alnus barbata*, etc. Scrubs with peat mosses are developed on limited areas and on convex surfaces.

During the last Glacial Maximum, Kolkheti constituted an important refuge for the flora of Europe. Because of this, the Ispani currently harbour – next to Tertiary relict species like *Rhododendron ponticum* – many (sub) Mediterranean, temperate, and boreal relict species. Of special interest is the widespread occurrence of boreal mire flora elements in Kolkheti like *Drosera rotundifolia*, *Menyanthes trifoliata*, *Rhynchospora alba*, *Carex lasiocarpa*. Some of the mire species are endemic species of Georgia and Caucasus: *Rhynchospora caucasica*, *Ramphicarpa medvedii*

Along the rivers Togoni and Shavi gele remnants of alder (*Alnus barbata*) forest are still found. Frequent associates of alder are *Pterocarya pterocarpa*, *Carpinus caucasica* (on dry places), *Quercus imeretina*, *Frangula alnus*, *Crataegus microphylla*, *Viburnum opulus*, etc, which are overgrown with natural lianas such as *Smilax excelsa*, *Vitis sylvestris*, *Hedera colchica*, etc.

Current scientific research and facilities:

From the Botanical Institute of the Greifswald University, NGO “Tchaobi”, Kobuleti Protected Areas, Batumi Botanical garden the following research tasks do exist:

- analyses of the vegetation of the Ispani 2 and Ispani 1 peat lands
- analyses of the different degradation and succession stages of the peat lands
- evaluation of the perspectives of *Sphagnum* farming at the buffer zones
- vegetation history of the region by a peat core taken from the Ispani 2 peat land
- Invasive plant species of the Ispani mires
- Main habitats and its suitable flora of Ispani I peat lands

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