Bryophyte Diversity of České Švýcarsko (Bohemian Switzerland) National Park

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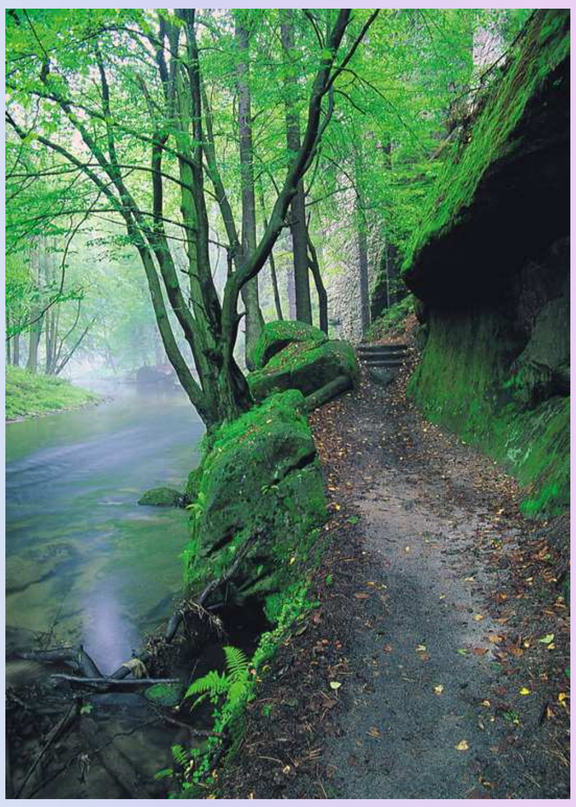
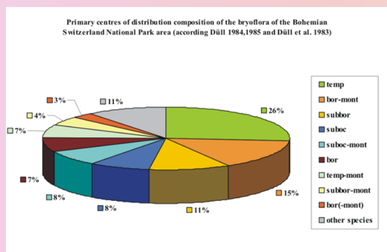
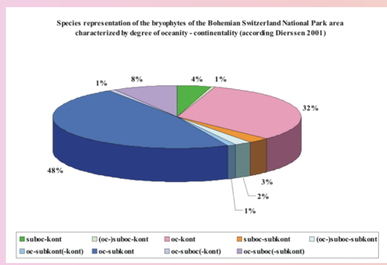


The area pattern of České Švýcarsko (Bohemian Switzerland) conditions two different views of bryophyte species diversity. On the one hand species low rich communities occur there frequently which is related to the occurence of nutrient-poor soils on sandstones. Apart from this there occur species which are connected with unique microhabitats (e.g. rock fissures) related to strong and specific broken topography. Together there are found species the occurence of which is determined by climate of the inversion sites (ravines) and also by generally oceanic-suboceanic pattern of this area. Thanks to these unique climatic conditions this area amounts to the one of the most richest sandstone areas in the Czech Republic as far as bryophyte species are concerned. From the standpoint of phytogeography mostly temperate species are represented (26%), more than one fourth of species is boreal-montane, almost 10% of species is oceanic-suboceanic.





Leucobryum juniperoideum

Bazzania trilobata

Pellia epiphylla

Representatives of the most common communities **Tetraphis pellucida**, **Calypogeia integristipula**, **Lepidozia reptans**, **Dicranella cerviculata**, **Dicranella heteromalla**, **Dicranodontium denudatum**, **Odontoschisma denudatum** and **Leucobryum juniperoideum** are distributed on sandstone rocks generally. With more shaded and moist rocks species as **Mylia taylorii**, **Cephalozia bicuspidata**, **Diplophyllum albicans**, **Scapania nemorea** or **Pellia epiphylla** (which also colonizes humus-rich rock shelves and bases of the rocks) are connected. On the stream banks **Mnium hornum** often occurs, on the stones on the stream banks or directly in the streams **Scapania undulata** and **Chiloscyphus polyanthos** occur abundantly, frequent species is also a hydrophilic moss **Fontinalis antipyretica**. Characteristic representative of the waterlogged spruce forests and edges of the peaty soils is **Bazzania trilobata**. On drier habitats in relict pine forests and spruce stands **Dicranum scoparium**, **Pohlia nutans**, pertinently **Campylopus flexulosus** occur most frequently.

Most of the other species are not too frequevent in the area. These species are dependent on habitats with specific micro-mesoclimate or unique substrate:

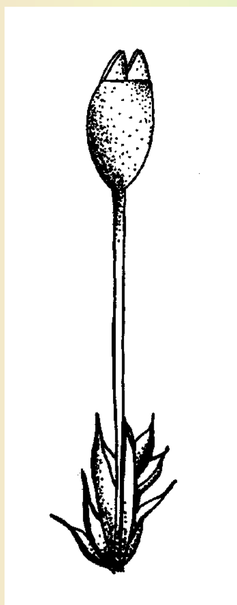
Kurzia sylvatica

Plagiothecium undulatum

Frequent occurence of suboceanic-oceanic bryophytes supports oceanic area pattern, among them e.g. **Kurzia sylvatica**, **Cephalozia connivens**, **Campylopus fragilis**, **Plagiothecium undulatum**, **Rhabdoweisia crispata** or **Rhytidiadelphus loreus**.

Of many species characteristic of the inversion sites of this area in the Czech Republic for instance a very rare liverwort **Lophozia grandiretis** can be mentioned. This subarctic-alpine species colonizes clay and loamy soils on roadsides and streamsides. **Dicranodontium asperulum**, a relatively frequent moss on the rocks, and a hygrophilous species **Hygrohypnum ochraceum** are another subarctic-alpine species. In the inversion sites e.g. subarctic-subalpine mosses **Oligotrichum hercynicum**, **Polytrichum alpinum** and **Tetrodontium repandum**, a subalpine liverwort **Anastrophyllum michauxii** and montane liverworts **Pellia neesiana** and **Tritomaria execta** also occur.

Lophozia grandiretis


Tetrodontium brownianum

Schistostega pennata (protonema)

Relatively often in shaded rock fissures a suboceanic-montane species **Schistostega pennata** occurs. Its persistent protonema „luminesces" yellow-greenly. In vertical rock rifts or under shaded rock ledges **Tetrodontium brownianum** occurs. This suboceanic-montane species has been only found on several localities in České Švýcarsko for last ten years. These localities are the only recent sites in the Czech Republic.

Cephalozia leucantha

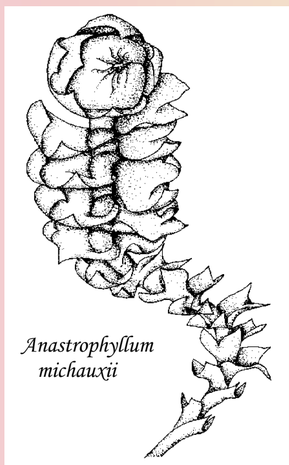
On calcareous sandstones basiphilic bryophytes e.g. **Pedinophyllum interruptum**, **Lophozia bantriensis**, **Fissidens gracilifolius** or **Neckera crispa** occur.
Out of the sandstone area e.g. **Andreaea rupestris** or **Racomitrium lanuginosum** occur on basalt rock outcrops and screes.
On decayed wood (accidentally also on humus layer on sandstone rocks) very rare and endangered species **Cephalozia leucantha**, **Riccardia chamaedryfolia** and **R. latifrons** (the occurence of which has been recorded in the area of national park recently) occur among the other.
Not very frequently epiphytic bryophytes are represented in the area of national park. Important epiphytes are e.g. **Blepharostoma trichophyllum**, **Ptilidium pulcherrimum**, **Dicranoweisia cirrata**, **Dicranum flagellare** or **Orthodicranum montanum**.
On secondary habitats many basiphilic species are found mainly those which broadly wouldn´t occur in the area of national park naturally. Of rare and endangered species mosses **Syntrichia latifolia** and **Didymodon spadiceus** can be mentioned.

Orthodontium lineare

Markedly **Orthodontium lineare** invasion shows in the whole area. This species occurs on acidic barks particularly on bases of trunks, on sandy soil in forest and on the almost perpendicular sandstone rock walls abundantly. On some localities occurence of another invasive species **Campylopus introflexus**, which occurs on drier edges of peat bogs, humus-rich soils in waterlogged spruce as well as pine forests and forest roadsides, has been observed.

Acknowledgement
I thank Ing. Petr Bauer for the loan of the photos of **Bazzania trilobata**, **Plagiothecium undulatum** and **Orthodontium lineare**. I thank RNDr. Zdeněk Patzelt for the loan of the photo of **Schistostega pennata** and Václav Sojka for the loan of the photo of the ravine. I thank RNDr. Zdeněk Soldán, Ph.D. for the lending the figures of **Anastrophyllum michauxii** and **Cephalozia leucantha**.

More than 270 species of bryophytes (30% liverworts, 70% mosses) have been recorded in the area of National Park České Švýcarsko, out of which „Preliminary lists of threatened bryophytes in the Czech Republic" include 34 species, e.g. **Anastrophyllum michauxii**, **Jamesoniella autumnalis**, **Lophozia grandiretis**, **Pedinophyllum interruptum**, **Riccardia chamaedryfolia**, **Riccardia latifrons**, **Atrichum tenellum**, **Campylopus fragilis**, **Didymodon spadiceus**, **Fissidens gracilifolius**, **F. rufulus** , **Rhynchostegium confertum** or **Tetrodontium brownianum**. Some of these threatened species e.g. **Geocalyx graveolens**, **Harpanthus flotowianus**, **H. scutatus**, **Jungermannia caespiticia** or **Nowellia curvifolia** are only historical data, recently their occurence hasn´t been corroborated yet.


Anastrophyllum michauxii

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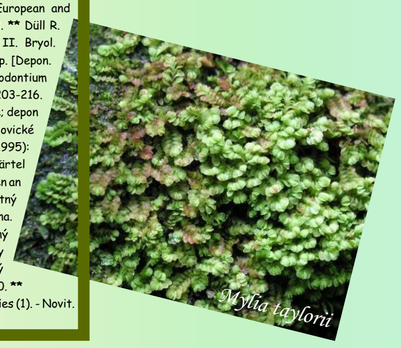
Mylia taylorii