

2.5 Species composition and diversity of bryophytes in biological soil crusts on natural substrata

ZDENĚK SOLDÁN

INTRODUCTION

Bryophytes play a very important role in natural habitats with well-developed biological soil crusts, primarily as pioneer organisms during early stages of succession. Due to their often using the life strategy of colonists, or shuttle-species, they are able to be no less than the dominant part of vegetation within a short period, in these types of substrates. Their role is equally important for the stability of substrates and the resistance of such substrates with the respect on possible water regime as well as wind and water erosions, and the creation of suitable conditions for the subsequent succession of vascular plants.

From the bryological point of view, no special studies of questions connected with bryophytes forming biological soil crusts have yet been published in the Czech Republic. The majority of information is of only floristic character and is usually only included for comprehensiveness. It can be mentioned here that there is very concentrated interest among bryologists on the vegetation of bryophytes in the regions of sandstones, where very well developed communities with dominating bryophytes on bases of rocks (particularly on shaded places) are sometimes very rich, and bryophytes have very dominant role here.

MATERIAL AND METHODS

After field collection bryophytes were microscopically determined in a lab. The nomenclature follows the paper Kučera & Váňa (2004); all specimens have been consecutively deposited in the herbarium of the Faculty of Natural Sciences of the Charles University in Prague (PRC).

In the case of Střezovská rokle, only the bryophytes growing and forming biological soil crusts on the surface of slopes (exposed as well as shaded) were included. No bryophytes are mentioned from wider surroundings of these habitats (e.g., epiphytes, bryophytes growing along a brook, etc.).

However, all bryophytes species have been included from the wider surroundings of study plots in the case of locality Ralsko.

The results of bryological research in pasture locality at Netluky near Prague are attached in this paper as a demonstration of the typical composition of bryophytes in so-called “agrocenoses”. Study of these habitats is usually overlooked

in the Czech Republic; on the other hand, some such papers concerning to this problem have been published in Slovakia in the past (e.g., Kresáňová 2006).

RESULTS AND DISCUSSION

The list of bryophytes collected in the above mentioned localities is submitted in a form of synoptic table.

In total, 31 bryophytes (26 mosses and 5 liverworts) were discovered on the locality Střezovská rokle. The species composition of biological soil crusts is influenced especially by the degree of shading of relevant slope. Species like *Fissidens bryoides* and *Dicranella heteromalla* dominated in shaded places, exposed slopes are typical habitats for other species – *Ceratodon purpureus* or *Polytrichum piliferum*. The most interesting species of this locality is definitely hepatic *Riccardia incurvata*. It is very rare frondose liverwort, evaluated as an vulnerable species in the “Red List of Bryophytes” in the Czech Republic (Kučera & Váňa 2005). It grows mostly in submontane and montane elevations, on acidic as well as on basic substrates (sandstone soil, peat soil, among grasses or among other bryophytes). This species was discovered by O. Peksa here in 2002 (Kučera 2004). The distribution of this species is very tessellated in the Czech Republic (recent data are known from the vicinity of Veselí n. Lužnicí and a record from Jestřebí near Česká Lípa was confirmed recent occurring on the base of an older finding).

In total, 28 species of bryophytes (26 mosses and 2 liverworts) were discovered in the Ralsko locality. They are relatively frequent or common species of bryophytes, with a wide ecological valency. The most surprising findings represent the moss *Oligotrichum hercynicum*, which dominates usually at higher altitudes (mountains near the state border). Its occurrence in such altitudes probably represents its lowest locality in the Czech Republic (Zmrhalová 1992).

18 species of bryophytes (15 mosses, 1 liverwort and 1 hornwort) were collected from the small pasture near Netluky. They represent relatively common species, which are typical for so-called “agrocenoses” or fields or pastures and they are very rare on other types of habitats.

Table 2.5.1 The list of bryophytes collected in the natural localities (Netluky, Ralsko, Střezov). (Used symbols: + = the species present, – = the species absent)

Taxon	Netluky	Ralsko	Střezov
<i>Aneura pinguis</i>	–	–	+
<i>Anthoceros agrestis</i>	+	–	–
<i>Atrichum undulatum</i>	+	–	+
<i>Barbula fallax</i>	–	–	+
<i>Barbula convoluta</i>	–	–	+
<i>Barbula unguiculata</i>	+	+	+
<i>Blasia pusilla</i>	–	+	–
<i>Brachythecium albicans</i>	+	+	–
<i>Brachythecium rutabulum</i>	+	+	+
<i>Brachythecium salebrosum</i>	+	–	+
<i>Bryum argenteum</i>	+	+	+
<i>Bryum bicolor</i>	+	–	+
<i>Bryum caespiticium</i>	–	–	+
<i>Bryum capillare</i>	–	+	+
<i>Bryum rubens</i>	+	–	–
<i>Bryum subapiculatum</i>	+	–	–
<i>Cephalozia bicuspidata</i>	–	–	+
<i>Cephaloziella divaricata</i>	–	+	+
<i>Ceratodon purpureus</i>	+	+	+
<i>Climacium dendroides</i>	–	+	–
<i>Dicranella heteromalla</i>	–	+	+
<i>Dicranella staphylina</i>	+	–	–
<i>Dicranum scoparium</i>	–	+	+
<i>Dicranum polysetum</i>	–	+	–
<i>Ditrichum heteromallum</i>	–	+	–
<i>Eurhynchium hians</i>	+	–	+
<i>Fissidens bryoides</i>	–	–	+
<i>Fissidens taxifolius</i>	–	–	+
<i>Fossombronia wondraczekii</i>	+	–	–
<i>Funaria hygrometrica</i>	+	+	–
<i>Gymnocolea inflata</i>	–	–	+
<i>Hypnum cupressiforme</i>	–	+	+
<i>Oligotrichum hercynicum</i>	–	+	–
<i>Physcomitrium pyriforme</i>	–	–	+
<i>Plagiomnium affine</i>	–	+	–
<i>Plagiomnium cuspidatum</i>	–	+	–
<i>Pleurozium schreberi</i>	–	+	–
<i>Pohlia annotina</i>	–	–	+
<i>Pohlia nutans</i>	–	+	+
<i>Polytrichastrum formosum</i>	–	–	+
<i>Polytrichum juniperinum</i>	–	+	–
<i>Polytrichum piliferum</i>	–	+	+
<i>Pogonatum urnigerum</i>	–	+	–
<i>Riccia glauca</i>	+	–	–
<i>Riccardia incurvata</i>	–	–	+
<i>Rhizomnium punctatum</i>	–	–	+
<i>Rhytidiadelphus squarrosus</i>	–	+	–
<i>Scleropodium purum</i>	–	+	+
<i>Syntrichia ruralis</i>	–	+	+
<i>Tortula acaulon</i>	+	–	+
<i>Tortula muralis</i>	–	+	–
<i>Tortula ruralis</i>	–	+	–
<i>Tortula truncata</i>	+	–	–