

European Committee for Conservation of Bryophytes

Natural History Museum of Montenegro

9<sup>th</sup> CONFERENCE of European Committee  
for Conservation of Bryophytes

**BRYOPHYTE CONSERVATION**

**TOWARDS THE NEW EUROPEAN RED LIST OF BRYOPHYTES**

**BOOK OF ABSTRACTS**

26-29. April 2016.  
BEČIĆI, Montenegro

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Chair of the ECCB

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Supporters:  
NP Skadarsko jezero  
NP Durmitor  
TO Kotor  
TO Podgorica  
TO Budva

Photo on the cover: *Buxbaumia viridis* (Moug. ex Lam. et DC.) Brid. ex Moug. et Nestl.  
Locality: Durmitor Mts., Montenegro  
Author: Anja Vulević

## TIME SCHEDULE

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1<sup>st</sup> day TUESDAY, April 26

10.00 Opening ceremony and welcome cocktail

11.00 Oral presentations

17.00 Poster presentations

2<sup>nd</sup> day WEDNESDAY, April 27

9.00 Oral presentations

12.00 Discussion - New European Red Data Book

14.30-18.30 Boka Kotorska Bay Visit tour

19.00 Meeting of ECCB Board

20.30 Closing ceremony and Gala dinner

3<sup>rd</sup> day THURSDAY, April 28

9.30-20.00 Excursion 1: Skadar Lake National Park

4<sup>th</sup> day FRIDAY, April 29

8.00-20.00 Excursion 2: Durmitor Mountain National Park

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## 9th CONFERENCE of European Committee for Conservation of Bryophytes - detailed programme:

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1<sup>st</sup> day TUESDAY, April 26

8:00 Registration and placement of posters

10:00 OPENING CEREMONY - welcome words from the representatives of Montenegrin  
authorities and from Scientific and Organizing Committee

10:30 Welcome cocktail

ORAL PRESENTATIONS

CHAIR: Tomas Hallingbäck

11:00 Beáta Papp, Peter Erzberger and Snežana Dragičević:  
EXPLORATION OF THE BRYOPHYTE FLORA OF MONTENEGRO IN THE LAST DECADE  
WITH A SPECIAL ATTENTION TO THE SPECIES OF CONSERVATION INTEREST

11:20 Christian Berg:  
HOW USEFUL ARE PHYTOGEOGRAPHICAL INDICATOR VALUES FOR EUROPEAN  
BRYOPHYTES?

11:40 Lars Söderström, Ana Séneca, Laura Forrest, David Long and Kristian Hassel:  
WHAT DO WE DO WITH CRYPTIC SPECIES, CONSERVE OR FORGET?

12:00 Coffee break

ORAL PRESENTATIONS

CHAIR: Lars Söderström

12:30 Miloš Ilić, Marko Rućando, Mirjana Ćuk, Ružica Igić and Dragana Vukov:  
INFLUENCE OF THE CONIFER REFORESTATION ON FOREST FLOOR BRYOPHYTES

12:50 Nele Ingerpuu and Kai Vellak:  
MONITORING METHODS FOR THREATENED BRYOPHYTES

13:10 Stefan Kaufmann:  
THE IMPORTANCE OF SLOVAKIAN PRIMEVAL BEECH FORESTS IN THE WESTERN  
CARPATHIAN MOUNTAINS FOR BRYOPHYTE DIVERSITY IN CONTRAST TO MANAGED  
FORESTS

13: 30 Lunch break

ORAL PRESENTATIONS

CHAIR: Marko Sabovljević

15:30 Steffen Caspari, Michael Sauer, Carsten Schmidt and Gerhard Ludwig:  
THE NEW RED LIST OF BRYOPHYTES OF GERMANY (2016) AND REMARKS TO METH-  
ODS USED IN COMPARISON TO THE IUCN CRITERIA

15:50 Oleg Maslovsky:  
RARE AND THREATENED BRYOPHYTES OF BELARUS AND EASTERN EUROPE, AS CAN-  
DIDATES FOR NEW EUROPEAN RED BOOK

16:10 Snežana Dragičević and Milan Veljić:  
SPHAEROCARPOS TEXANUS AUST., GROWING OR NOT IN MONTENEGRO?

16:30 Coffee break

POSTER SESSION

17:00 - 19:00 POSTER PRESENTATIONS

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2<sup>nd</sup> day **WEDNESDAY**, April 27

ORAL PRESENTATIONS

CHAIR: Nick Hodgetts

9:00 Marko Sabovljević, Beáta Papp, Milorad Vujičić, Erzsébet Szurdoki, Nada Nikolić  
and Aneta Sabovljević:  
EX SITU CONSERVATION OF BRYOPHYTES: RARE SPECIES BIOLOGY KNOWLEDGE AND  
BIOTECHNOLOGICAL SKILL BREAK THROUGH

9:20 Anja Vulević, Snežana Dragičević and Danka Petrović:  
CONTRIBUTION TO KNOWLEDGE OF THE BRYOPHYTE FLORA OF THE TEPAČKE FOR-  
ESTS (DURMITOR MTS., MONTENEGRO)

9:40 Mesut Kirmaci and Hatice Özenoğlu Kiremit:  
THE GENUS RICCIA (HEPATICOPHYTA) IN TURKEY

10:00 Thomas Kiebacher, Christine Keller, Christoph Scheidegger and Ariel Bergamini:  
IGNORED CROWN JEWELS: THE ROLE OF TREE CROWNS IN BRYOPHYTE AND LI-  
CHEN SPECIES RICHNESS IN SYCAMORE MAPLE WOODED MEADOWS

10:20 Coffee break

ORAL PRESENTATIONS

CHAIR: Beáta Papp

11:00 Tomas Hallingbäck:  
USING THE IUCN CRITERIA TO ASSESS THE SPECIES THREAT STATUS

11:20 Antun Alegro and Vedran Šegota:  
DATA QUALITY REGARDING BRYOPHYTE SPECIES IN CROATIA PROPOSED FOR CAN-  
DIDATE LIST FOR RED BOOK OF EUROPEAN BRYOPHYTES

11:40 Nick Hodgetts:  
A NEW BRYOPHYTE RED LIST FOR EUROPE - A CO-OPERATIVE PROJECT WITH IUCN

12:00 DISCUSSION - New European Red Data Book  
13:00 Lunch break  
14:30 - 18:30 tour of the Bokokotorska Bay (Kotor)  
19:00 - 20:00 Meeting of ECCB Board  
20:30 Closing ceremony and Gala dinner

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3<sup>rd</sup> day **THURSDAY**, April 28

9.30-20.00 Excursion 1: Skadar Lake National Park  
9:30 Departure from Bečići (bus)  
10:30 Vranjina: The visitor center Vranjina  
11:00 Vranjina - Rijeka Crnojevića (boat trip)  
12:30 Rijeka Crnojevića: visit the Obod cave (field work)  
16:00 Coffee break in café bar in Rijeka Crnojevića  
17:00 Return to Bečići

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4<sup>th</sup> day **FRIDAY**, April 29

8.00-20.00 Excursion 2: Durmitor Mountain National Park  
8:00 Departure from Bečići (bus)  
9:30 Podgorica: Natural History Museum of Montenegro (exhibition), coffee break  
10:00 Departure from Podgorica  
12:30 NP DURMITOR, visit the Crna poda (field work)  
13:00 Departure from Crna poda  
14:00 Coffee break at "Most na Đurđevića Tari"  
14:30 Žabljak: NP DURMITOR, visit the Crno jezero lake (field work)  
17:00 Lunch in National restaurant  
18:00 Return to Bečići



## POSTER SECTION

### 1. DIVERSITY AND BRYOPHYTIC DISTRIBUTION IN MEDITERRANEAN COASTAL DUNE SYSTEMS

Valeria MURRU<sup>1</sup>, Giorgia FILIPPINO<sup>1</sup>, Michela MARIGNANI<sup>1</sup>, Alicia T. R. ACOSTA<sup>2</sup> and Annalena COGONI<sup>1</sup>

1 Department of Environmental and Life Science-Section Botany and Botanical Garden, University of Cagliari, Viale S. Ignazio 13, 09123 Cagliari, Italy

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Diversity and distribution of bryophytes were surveyed in coastal sand dune environments, taking as case study a coastal dune system within the SIC Porto Campana (ITB042230), in South-West coast of Sardinia (Italy). The selected area, about 20 ha, includes several relevant habitats, like the 2250\* "coastal dunes with *Juniperus* spp." (Council Directive 92/43/EEC 1992). 21 bryophytic species were surveyed, mainly acrocarpous and colonist, for the most part Pottiaceae followed by Bryaceae. Environmental variables influence composition and richness of species: foredune has the lowest presence of bryophytes, among which *Tortella flavovirens* (Bruch) Broth., able to colonize and consolidate the sandy substrate, while in retrodunal environments bryophytic species increase, diversify and the pleurocarpous species *Homalotecium philippeanum* (Spruce) Schimp., *Hypnum jutlandicum* Holmen & E. Warncke and *Rhynchostegium megapolitanum* (Blandow ex F. Weber & Mohr) Schimp. appear together with the liverworts *Fossombronia caespitifformis* De Not. ex Rabenh. and *Frullania dilatata* (L.) Dumort. Halophytic areas host some peculiar species such as *Tortula caucasica* R.H. Zander. In these habitats the diversity of bryophyte component is of primary importance for stabilization and consolidation of sands, starting humification processes and contributing to the development of more complex soils (Birse et al. 1957; Vianello 1979). In this regard, bryophytes are particularly interesting as constituents of biological soil crusts of sand dunes, protecting the soil from erosion, ensuring damp and nutrients to seeds and plants, favoring the start of vegetation succession (Zedda et al. 2010; Belnap et al. 2001; Grunewald & Łabuz 2004). More studies are currently in progress to determine the role of bryophyte component within the biological soil crusts in Mediterranean coastal dune system.

### 2. THE SERRA DE SINTRA AS A CRITICAL SITE FOR CONSERVATION OF THREATENED SPECIES IN CONTINENTAL PORTUGAL

Cecilia CACCIATORI

Camerino University/ Lisbon University, Via Benedetto Croce 38, Ascoli Piceno 63100 Italy

The Serra de Sintra, in central Portugal, hosts 279 bryophyte species (Cacciatori et al., 2015), 30 out of which are threatened at national level (Sergio et al., 2013). Among them are some Macaronesian species which found in the Serra de Sintra their refuge. Example of such species are *Marchesinia mackaii* (Hook.) Gray, *Drepanolejeunea hamatifolia* (Hook.) Schiffn and *Lejeunea mandonii* (Steph.) Mull. Frib, for which the Serra de Sintra represents the only site of occurrence in continental Portugal (Sergio et al., 2013). Another macaronesian species, *Frullania teneriffae*

(F.Weber) Nees, due to the high humidity rate characterizing the Serra, found here a suitable habitat. *Lophocolea fragrans* (Moris & De Not.) Gottsche et al., *Plagiochila bifaria* (Sw.) Lindenb. and *Isothecium algarvicum* W.E Nicholsson & Dixon represent a group of rare species for which the Serra the Sintra is one of the few localities of occurrence in continental Portugal. During surveys on saxicolous bryophytes carried out in 2014-2015 in the Serra de Sintra all of the species above mentioned, with the exception of *Drepanolejeunea hamatifolia*, were recorded on boulders and rocks. All the 3 sampling locations showing the greatest number of threatened species lie all of them on the northern slope of the Serra and are characterized by a high bryophyte and herb cover of the area and a distance of less than 5 meters from paths. The 2 rocks where the highest number of threatened species was recorded are characterized by a relatively small size, very high bryophyte cover and high shading.

### 3. CONSERVATION OF BRYOPHYTES IN THE REPUBLIC OF IRELAND

Neil LOCKHART<sup>1</sup>, Christina CAMPBELL<sup>2</sup>, N.G. HODGETTS<sup>3</sup> and Rory HODD<sup>4</sup>

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Revision of the bryophytes listed for legal protection in the Republic of Ireland was undertaken in 2013–15. The Flora (Protection) Order, 2015 (FPO) lists 65 species (25 liverworts and 40 mosses) that are now afforded strict protection in Ireland, representing 7.9% of the native Irish bryophyte flora. Species were chosen largely on the basis of threat status in Ireland (and Europe), numbers of extant populations and the suitability of their habitats for conservation measures. Species of ephemeral habitats were excluded from consideration. Candidate species were assessed using five criteria: (1) species listed on Annex II of the EU Habitats Directive; (2) species listed on the Flora (Protection) Order, 1999; (3) species CR or EN in Ireland (or RE and recently re-found),  $\leq 5$  populations in Republic of Ireland (1970–2012) and recently seen (1990+); (4) species VU in Ireland,  $\leq 10$  populations in Republic of Ireland (1970–2012), included on European Red List and recently seen (1990+); (5) species re-evaluated (removed from the old FPO or added to new FPO) on best expert judgment. Information on the location, extent of populations and ecological requirements of FPO species is relatively accurate and up to date, following recent surveys in Ireland. Communicating such information is through liaison with local authorities, publication on government websites and through the Irish National Biodiversity Data Centre. Information packs are currently in preparation to allow National Parks and Wildlife staff to keep a watching brief on possible threats and impacts.

### 4. MONITORING OF MOSSES GROWING IN FENS: A CASE STUDY FROM ESTONIA

Tiina SAMSON, Kai VELLAK and Nele INGERPUU

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Estonia is rich in mires and the amount of bryophytes inhabiting in different mire types is high. Almost one third of all Estonian bryophytes are growing in mires, and majority of them are obligatory mire species. The most species-rich are fens, but their area is the lowest in Estonia and fens are the most degraded mire type in

Estonia. Ten species inhabiting mires are under nature protection in Estonia. The state monitoring program was initiated in 1994 and the first moss species growing in mires was taken under monitoring in 1996. At present six species inhabiting mires are monitored. Two species under monitoring - *Hamatocaulis vernicosus* and *Catoscopium nigratum* are candidates for new red list of European bryophytes, four *Sphagnum* species (*S. lindbergii*, *S. inundatum*, *S. quinquefarium* and *S. wulfianum*) are rare in Estonia, but more common in elsewhere. Of them only *S. inundatum* occurs in fens, other are growing in bogs or in paludified forests. *Hamatocaulis vernicosus* is common in Estonia, having 47 recent localities. Some old localities have been vanished due to drainage. This species is monitored at three sites and according to the last monitoring the state of this species has worsened. *Catoscopium nigratum* has 12 recent localities and three unchecked old findings. This species is sporadically distributed in Estonia. The overall state of *C. nigratum* is good in Estonia, despite of small diminishment in cover in 2008.

##### **5. BRYOPHYTE DIASPORE BANK IN “ECOLOGICAL FOCUS AREAS” IN ARABLE FARMING IN SWISS LOWLANDS**

Lisa STUDER<sup>1</sup>, Irene BISANG<sup>2</sup>, Katja JACOT<sup>3</sup> and Ariel BERGAMINI<sup>4</sup>

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Ecological Focus Areas (EFAs) are an important tool of the Swiss agri-environmental schemes to support biodiversity in landscapes dominated by agriculture. EFAs are usually designed to promote bird and vascular plant richness or ecological functions such as pollination. A parallel study revealed a beneficial effect of EFAs also on above-ground bryophyte species richness. Here, we focus on the bryophyte diaspore bank of EFAs and adjacent conventionally managed fields. We hypothesize that the diaspore banks of very young EFAs do hardly differ from those in conventionally managed fields, but that older EFAs show a different and richer diaspore bank, especially EFAs of intermediate age.

We selected 18 study sites in the Swiss lowlands, each consisting of either one flower strip for pollinators and other beneficials (sowed in the same season), one young (1-3 years old) or one old wildflower strip (4-6 years old) as well as the adjacent field. We sampled the diaspore bank at 3 and 15 cm at four randomly chosen points in each strip and the adjacent field (288 soil samples). The soil samples were cultivated in transparent, covered plastic boxes in the greenhouse during 4.5 months. Above-ground bryophyte cover was higher in flower strips and young wildflower strips than in older wildflower strips. We currently analyse species composition and diversity in the diaspore bank. To our surprise, the hornworts *Anthoceros laevis* and the threatened *Phaeoceros carolinianus* emerged abundantly from the diaspore bank although they were not present above-ground.

## 6. TOWARDS THE BRYOPHYTE RED LIST OF SERBIA

Jovana PANTOVIĆ and Marko SABOVLJEVIĆ

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Bryophyte flora of Serbia counts 774 species (133 and 641 liverworts and mosses, respectively). The total number is fluid since many new species continuously appear while some of the previous records are questionable and subject of revision. However, an attempt has been made to estimate the current bryophyte threat status. Based on IUCN criteria, 51% of bryophyte flora fits into some of the threat categories (CR, EN, VU), mainly based on B criterion. Additionally, 8.7% of bryophyte species are in category NT (near threatened). One species, namely *Encalypta serbica* is extinct (EX). Significant number of species - 124 (16.0%) are data deficient (DD). When only hepatics are taken into account 85 species (63.9%) fit into some of the threat categories, 23 (17.3%) are NT and 11 (8.3%) are DD. Among mosses 310 (48.4%) are threatened, 44 (6.9%) are NT, while 113 (17.6%) are DD. In total 187 species of Serbian bryophyte flora seems to be in Least Concern (LC) category (14 liverworts and 173 mosses). We assume that rather high percentage of threatened species is a consequence of under-recording, and that some corrective factors like biological features of species (i.e. genoelement, yield, population fragmentation, spreading vectors, distance dispersal), reproduction capacity/strategy, habitat quality and the presence of strong populations in nearby countries should be taken into account prior to release of the new Bryophyte Red List of Serbia.

## 7. IN VITRO ESTABLISHMENT, PROPAGATION AND CONSERVATION OF *CALLIERGON GIGANTEUM* (SCHIMP.) KINDB. (AMBLYSTEGIACEAE)

Aneta SABOVLJEVIĆ, Milorad VUJIČIĆ and Marko SABOVLJEVIĆ

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*Calliergon giganteum* (giant sparmoss, giant calliergon or simply arctic moss) is a rare and threatened moss in many European countries. It is critically endangered in Hungary, endangered in Spain, the Netherlands and Bulgaria, vulnerable in Austria, Czech Republic, Germany, Luxembourg, Montenegro and Serbia. This species of boreo-arctic belt is nearly threatened in many other countries, found in water beds, wet calcareous fens and flushes, usually with a down part in water. Capsules are rare. The in vitro culturing for propagation and conservation purpose was a real challenge having in mind, that the culture were started from the gametophore material covered with algae and other cohabitants, from herbarium voucher 4 years old. The conventional treatments with surface sterilization did kill the plants as well. Thus, the material was planted without sterilization, on various media in optimal growth conditions (18°C, 16/8 light of cool white fluorescent tubes - 40µmol/m<sup>2</sup>/sec). Vigorous tip growth achieved in some media, allows us to cut the tips and subculture to new ones many times (29) before we get completely axenic material free of bacteria, algae and fungi. The best growth achieved was on Knop media, and sugar free. *C. giganteum* do not need additional carbon sources in form of sugars for example. In media enriched with sugars it forms callus like structure rather than secondary protonema or new buds. At present, acclimation of *C. giganteum* is tested prior to release to wild i.e. reintroduction and enforcement to adequate habitats in Europe.

## 8. DO BRYOPHYTES PROFIT FROM AGRI-ENVIRONMENTAL SCHEMES? A COMPARISON OF DIFFERENT “ECOLOGICAL FOCUS AREA” IN THE SWISS LOWLANDS

Maya VALENTINI<sup>1</sup>, Irene BISANG<sup>2</sup>, Katja JACOT<sup>3</sup> and Ariel BERGAMINI<sup>4</sup>

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Agricultural biodiversity has decreased substantially during the last few decades in Europe and globally. Agri-environmental schemes devised to promote sustainable farming have been a major policy instrument for the past decades to stop this negative trend. In Switzerland, these include Ecological Focus Area Areas (EFA), i.e. habitats subject to specific wildlife-friendly agricultural management. EFA were generally designed to support diversity of vascular plants and animals. In this study we investigate whether bryophyte specialists of arable fields occur in three EFA types, and which factors affect them. In 30 studied EFAs (12 sown wildflower strips, 12 improved field margins, 6 rotational fallows) in Northern Switzerland, we found in total 44 species with an average of 10.9 species per EFA. These included 13 arable specialist species and some nationally threatened species (e.g. *Phaeoceros laevis*). We assessed the effects of EFA type, –quality and –age and selected environmental and vegetation parameters on bryophyte species richness with generalized linear mixed models. We show that bryophyte cover differs among EFA types, is higher in 1-3 year-old compared to older EFAs, and increases with higher percentages of open ground. Arable specialist species richness is highest in rotational fallows, probably due to their young age, and decreases with increasing cover of vascular plants. Bryophyte species composition was similar in the three EFA types. We conclude that the three EFA types are suitable habitats for arable bryophytes including arable specialists. Young EFAs with a high percentage of open ground are most beneficial. Still, threatened species are very rare in EFAs and require targeted conservation actions.

## 9. DISTRIBUTION PATTERN AND HABITATS OF *HAMATOCAULIS VERNICOSUS* IN LITHUANIA

Ilona JUKONIENĖ, Monika SUBKAITĖ and Birutė PARŠONYTĖ

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*Hamatocaulis vernicosus*, Bern convention and EU Habitat Directive species, is protected in 26 Natura 2000 territories of Lithuania. In 2008–2015, field survey was carried in 30 localities of the species to ascertain its habitat characteristics and population status. *Hamatocaulis vernicosus* is quite usual species of spring fens and transitional mires of Lithuania; occasionally it is recorded in calcareous fens. The main localities of *H. vernicosus* are concentrated in the southern and eastern parts of Lithuania, the regions rich in spring fens and quacking mires of the lake shores. In the western part of Lithuania, the species is mostly distributed in transitional mires. In the habitats of *H. vernicosus*, pH varied from 5.85 to 7.55 ( $6.9 \pm 0.338$  SD), mean

conductivity –  $332.7 \pm 202.6$  SD). *H. vernicosus* preferred *Caricetum diandrae* and *Caricetum rostratae* communities, where, besides *Carex diandra* and *C. rostrata*, quite frequent in the herb cover were *Menyanthes trifoliata*, *Epilobium palustre*, *Equisetum fluviatile*, *Caltha palustris*, *Peucedanum palustre* and *Cardamine pratensis*. The main accompanying bryophyte species in the habitats were *Calliergonella cuspidata*, *Marchantia polymorpha*, *Aulacomnium palustre*, *Paludella squarrosa* and *Tomentypnum nitens*. A total of about 120 plant species (about 90 vascular plants and 30 bryophytes) were recorded growing with *H. vernicosus*. The species shares habitats with some redlisted plant species of Lithuania: *Saxifraga hirculus*, *Dactylorhiza longifolia*, *D. traunsteineri*, *Liparis loeselii*, *Eriophorum gracile* and *Sphagnum platyphyllum*.

## 10. MONITORING OF CONSERVATION IMPORTANT BRYOPHYTE SPECIES IN BULGARIA

Rayna NATCHEVA and Anna GANEVA

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Eleven bryophytes species listed in the Red List of Bryophytes in Bulgaria are included in the National Biodiversity Monitoring System, together with other plant and animal species. In 2014 sample plots for all eleven species for long-term observation were set in different parts of the country aiming to cover all or considerable part of species localities known for the present. A methodology was elaborated for each one of the species (according to morphological and biological peculiarities) to estimate population characteristics, as well as habitat status. Some of the parameters are the cover of the mats and tufts, number of sporophytes, population density, area of locality, forest canopy, species composition of the tree layer, cover of shrub and herb layer in percent of the sample plot, threats (fires, draining, water-catchments, forest felling, etc.). The data from this first monitoring were included in the data-base of the National Biodiversity Monitoring System. Further observations will allow also a statistical assessment and outline the trends in population status. Here we present the results of the monitoring of five of the species: *Buxbaumia viridis*, *Dicranum viride*, *Hamatocaulis vernicosus*, *Mannia tranrda* and *Meesia longisetata*, which are included in the Habitat Directive, App. II.

## 11. TEMPORARY WET ECOSYSTEMS: THE ROLE OF BRYOPHYTES IN A HABITAT OF PRIORITY IMPORTANCE FOR CONSERVATION AT EUROPEAN LEVEL

Silvia POPONESSI<sup>1</sup>, Michele ALEFFI<sup>2</sup>, Fabio MANELI<sup>1</sup>, Roberto VENANZONI<sup>1</sup> and Daniela GIGANTE<sup>1</sup>

<sup>1</sup> Department of Chemistry, Biology and Biotechnology, University of Perugia, Italy, silvia.poponessi@hotmail.it

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With the present study, a methodological protocol that allows enhancing the knowledge of bryophytes in the temporary wet ecosystems was developed. From the bryological point of view, these habitats have been seldom investigated, al-

though they host rare taxa whose survival is strictly dependent on the occurrence of precise ecological and hydrogeological conditions. The study area is represented by the Piana di Ferretto in Central Italy, a large flat territory around 300 m a.s.l. west of Trasimeno Lake (Perugia, Umbria). A remarkable richness of vascular and bryophytic species and communities was detected in these systems, also emphasized by the presence of two Habitats from 92/43/EEC Directive's Annex I (3130, 3170\*). Seven vegetation types were identified: *Serapio-Isoëtetum histricis*, *Riccietum canaliculatae*, *Alismo-Gratioletum officinalis*, *Callitricho-Juncetum bulbosi*, *Callitriche stagnalis* & *Nitella capillaris* community, *Junco-Solenopsietum laurentiae*, *Callitricho-Ranunculetum ophioglossifolii*. Fifty permanent sampling areas (40x40 cm<sup>2</sup> plots), were set taking into account the tiny ecological variations that characterize the amphibian systems, with special care for the water persistence and slope. The flora and vegetation occurring inside these plots was repeatedly surveyed during the vegetative season and the relationships between the bryophyte and the vascular components and several environmental factors were analyzed. A remarkable shift in time as concerns the presence and the cover values of the bryophytic species was detected in the different micro-habitats. From the bryophytic point of view, it is necessary to promote the study of these habitats and preserve them from a series of human practices that threaten their conservation.

## 12. EPIPHYTE COMMUNITIES WITH *DICRANUM VIRIDE* (SULL. & LESQ.) LIND. FROM ROMANIA

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*Dicranum viride* is protected by EU Habitat Directive, Anex II, implemented in Romania by Law No 13/ 1993. In the last 5 years, due to numerous environmental projects, its conservation status was reassessed and led to an upgrade chorology of this species and the development of specific management measures integrated into the management plans of Natura 2000 sites where this species has been reported, especially measures for the host habitats. The purpose of this study is to inventory the epiphytic communities that host this species nationwide. In Romania this species was identified in five bryophyte associations: *Leskeelletum nervosae* Jež. et Vondr. 1962, *Platygyretum repentis* Le Blanc 1964, *Pterigynandretum filiformis* Hil. 1925, *Isothecietum myuri* Hil. 1925, *Orthodicrano montani-Hypnetum filiformis* Wisn. 1930. Phytogeographical and ecological structure of these associations, complies with the the ecological preferences of the species. The host habitats are 91E0 \*, 9410, 91V0. The proper development of these communities has been found on beech (habitat 91V0) - it hosts four associations, but most trees that host bryophyte communities with *Dicranum viride* are alder trees (habitat 91E0 \*), which were identified in three associations. Spruce is not a suitable habitat for epiphytic communities, only an association was identified, most specimens were populated only by isolated clumps of *Dicranum viride*.

### 13. *TORTULA MODICA* R.H. ZANDER, NEW BRYOPHYTE RECORDS FROM MONTENEGRO

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More intensive research of bryophytes in Montenegro is partially covered urban areas for which generally do not exist detailed data about bryoflora. During the research of semi-natural habitats within the city area of the Podgorica, from 2011. to 2013. new moss species for Montenegro, *Tortula modica* R.H. Zander was recorded. It was collected in the locality Velje brdo, from soil in planted Pine forest (*Pinus halepensis* and *P. nigra*), with elements of natural vegetation: *Quercus pubescens* and *Q. macedonica*. Population of *Tortula modica* R.H. Zander was represented with several small turfs, distributed on rather small area of 0,3 m<sup>2</sup>. Due to rather strong anthropogenic pressure, frequent fires and illegal dumping, its population in the locality Velje brdo can be considered as threatened. Up to know, the species is reported only for this locality, but due to its ecological preferences it might have wider distribution in Montenegro. Thus, the further researches are recommended.

Descriptions of Montenegrin population of moss *Tortula modica* R.H. Zander as well as ecological characteristics, distribution details and status in SE Europe are given.

### 14. PROJECT FOR A RED LIST AND COUNTRY ASSESSMENT OF ITALIAN BRYOPHYTES

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Italy represents a biodiversity hot spot in the Mediterranean area. To monitor and defend its great "natural patrimony", coherently with the Europe Strategy for Plant Conservation (EPCS, 2002) and the EU Biodiversity Strategy for 2020 (2011), the Italian Ministry of Environment, land and sea protection supported a national project to compile the first Red List of Italian flora (Rossi et al. 2013) according to IUCN criteria (2001), coordinated by the Italian Botanical Society. For Italian bryophytes the first red lists were compiled by Cortini Pedrotti & Aleffi (1992) for mosses and Aleffi & Schumacker (1995) for liverworts and hornworts. To update these lists

the Working Group for Bryology of the Italian Botanical Society joined the National project and compiled a red list of bryophytes: the species taken into account are 61 [43 Policy Species (PS) and 18 Non Policy Species (NPS)]. 34% of the taxa are CR and EN, mainly due to the high number of NPS. Three bryophytes were categorized as Critically Endangered (Possibly Extinct). Several bryophytes were categorized as Data Deficient (DD) because the available data did not permit a reliable assessment (e.g. *Sphagnum* spp.). To fill this gaps, in the last few years researchers started to include information coming from herbaria collected from Italian and European Institutions. Most of the data were made before 1980s and they refer to sites that have been altered drastically and, thus, require new explorations to verify whether these species are still present. The use of bibliographical data and herbarium samples are fundamental to launch new studies to monitor, also in the light of recent discoveries, the current situation of these species.

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## ORAL SECTION

### 1. EXPLORATION OF THE BRYOPHYTE FLORA OF MONTENEGRO IN THE LAST DECADE WITH A SPECIAL ATTENTION TO THE SPECIES OF CONSERVATION INTEREST

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Bryology has for a long time been a neglected research field in Montenegro. From 2003 several bryological field trips were organised in the country due to a cooperation between the Hungarian Natural History Museum and the Natural History Museum of Montenegro. Mainly national parks, protected areas were investigated from the sea shore to the highest mountains, e. g. Kotor bay, Skadar lake, Lovćen Mts, Durmitor Mts, Prokletije Mts, Bjelasica Mts, Komovi Mts, Orjen Mts, Rumija Mts. Owing to this field work the exploration of the bryophyte flora of Montenegro has been accelerated and 121 species (47 liverworts and 74 mosses) were reported for the first time from the country. The bryophyte flora now counts 149 liverworts and 546 mosses. Almost 31% of the whole Montenegrin liverwort flora and 14% of the moss flora were explored during these field trips in the last decade. Many populations of 13 bryophyte species included in the Red data book of European bryophytes and populations of a further 34 species (8 liverworts and 26 mosses) of European conservation interest being on the candidate list of the new Red data book of Euro-

pean bryophytes were found. Besides of these several populations of species rare on the Balkan, especially mosses of wetlands and boreal leafy hepatics, were also discovered. We will give an overview about the species important from conservation point of view in Montenegro.

## **2. HOW USEFUL ARE PHYTOGEOGRAPHICAL INDICATOR VALUES FOR EUROPEAN BRYOPHYTES?**

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Ellenberg's Indicator values (EIV) are a widely used tool in vegetation science and ecology. While the values for moisture, soil reaction, nutrients and light are empirically deduced based on decades of field observation and literary research, Ellenberg based the biogeographical values for temperature (EIV-T) and continentality (EIV-K) on the large scale zonal and altitudinal range and the distribution of species along a global gradient of phytogeographically continentality.

For Bryophytes, scientific knowledge of global distribution ranges is insufficient comparing with vascular plants. Many Bryophytes have huge distribution ranges, and they are closer bond to the microclimate, which hide the indication power of macroclimatic properties. For the Bryophyte flora of Northeast Germany, we compared the size of distribution ranges of 550 Bryophytes with 550 random selected lowland species of the vascular plant flora of Central Europe. In a second approach, we compared the Bryophyte species distribution data with the biogeographical indicator values presented in Ellenberg's list. Many species are overestimated in their value for continentality and temperature, the majority of species should be considered as indifferent.

## **3. WHAT DO WE DO WITH CRYPTIC SPECIES, CONSERVE OR FORGET?**

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With the increasing use of molecular methods, several genetic distinct lineages are detected. For several of the new lineages there are also morphological characters that can be used to separate them. However, in some groups we have not (yet) been able to find any reliable characters, yet they are as distinct genetically as what we use to consider good species on morphological grounds. One such group is the *Aneura pinguis* complex. Unless we include *Aneura mirabilis* in the concept of *A. pinguis* we have to accept that we have at least 10 species in Europe alone. Some of them seem widespread but there are also lineages that seem to be rare. Art. 2 in the CBD say that also genetic diversity within a species should be conserved. This is important as the genetic diversity is needed for evolution to proceed and for possible adaptation to environmental change. But, how can we do it? How can we take care of the genetic diversity within a species complex that is usually seen upon

as a common “thing” but that turns out to be so genetically different that we should separate many new species.

#### 4. EX SITU CONSERVATION OF BRYOPHYTES: RARE SPECIES BIOLOGY KNOWLEDGE AND BIOTECHNOLOGICAL SKILL BREAK THROUGH

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Bryophyte diversity deserves the same conservation interests as some other groups of organisms. As other plants they suffer from rapid environmental changes and often can not react quickly or in appropriate manner to stay alive ie. survive. The passive measure of protection, legislative development often fail to achieve the population survival. Thus, the ex situ conservation is lately recognized as a must in plant conservation. For many biological entities it can be rather late since once we are aware of ex situ conservation need, it is to late due to rather poor knowledge on target species and very few amount of plant biomass left to make biotechnological experimentations. However, we have to struggle and not everything is lost. Yet! The good example of great break trough is a huge bryophyte in vitro collection (Bryophyte Bryophyte Group Belgrade – BBGB collection) of over 140 species of bryophytes from all over the world but mostly European ones. The high percentage of 52% belongs to national, regional and even European threat accession of conservation priority. This is only one step in ex situ achievement which already took place for some of the species like *Entosthodon hungaricus*, *Hennediella heimii* or *Hamatocaulis vernicosus* that were released into wildness in Serbia and Hungary. Many other species are in the steps in between with the same goal: *Sphagnum* spp., *Riella helicophylla* for example. Problems, solutions and break troughs will be presented.

#### 5. INFLUENCE OF THE CONIFER REFORESTATION ON FOREST FLOOR BRYOPHYTES

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This research was conducted during 2013-2015 on Vidlič Mountain in South-eastern Serbia. Study site was on 1015 meters above the sea level. Two permanent plots were set. The first one was situated in the naturally regenerated Balkan beech (*Fagus moesiaca* (K. Maly) Czech) forest, and the second was in the Douglas-fir plantation (*Pseudotsuga menziesii* (Mirb.) Franco). Natural vegetation in this area is *Fagetum moesiacae montanum* Jov. 1953 (non Rudski 1949), but after wildfire, some parts were reforested with alien species-Douglas-fir. The aim of this research was to determine possible effect of stand replacement on ground bryophyte flora. Total number of 48 taxa (6 liverworts, 42 mosses) was found in the beech forest, and 43 taxa (9 liverworts and 34 mosses) in Douglas-fir plantation. In the beech forest stand, one species (*Brachythecium geheebii* Milde 1869) is listed in Red data book of European bryophytes, while one species (*Leptobryum pyriforme* (Hedw.) Wilson 1855) is listed in Red list of Serbia and Montenegro. Furthermore, 58% of total spe-

cies number in beech, and 60% in Douglas-fir stand are part of ground bryophyte flora. Statistical analysis showed no significant difference of liverwort proportions between these two stands. Sørensen's similarity index for these localities has value 0.31. Air temperature, air humidity and soil moisture content were measured, and these two localities were statistically different only in soil moisture content. In addition, variation in species composition, abundance and coverage might be influenced by soil moisture content.

## **6. MONITORING METHODS FOR THREATENED BRYOPHYTES**

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Monitoring has become more and more important since threats to species are rising continuously. The monitoring methods for birds and vascular plants have been elaborated for longer time, those for bryophytes are more recent and vary greatly in different countries. The need of giving evaluations for the state of Habitat Directive species and threatened species of Europe similarly in different countries leads to the necessity of developing adjusted monitoring methods. We have tested several bryophyte monitoring methods in Estonia for a longer time. As a result we describe here three monitoring modes that should suit for bryophyte groups with different habitats, life history and morphology. These three groups are: 1) bryophytes that are long-lived and form large patches on ground or rocks, 2) bryophytes with shorter life duration that inhabit separated substrata units, and 3) bryophytes that are short-lived, inhabit communities with frequent disturbances or are difficult to be identified in the field.

## **7. A NEW BRYOPHYTE RED LIST FOR EUROPE – A CO-OPERATIVE PROJECT WITH IUCN**

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The ECCB produced a first attempt at a bryophyte Red List for Europe in 1995. At the ECCB conference in Budapest in 2012, a document suggesting a way forward for a new Red List was presented. The conference substantially endorsed the proposals, and a Red List Steering Group was set up to move the project forward. Last year EU LIFE funding was obtained by IUCN to fund the Red Listing of several taxonomic groups on a Europe-wide basis. One of the groups the IUCN wanted to cover was bryophytes, so at that stage contact was made between the ECCB and the IUCN, and a three year project was started to produce a new Red List. This will be a collaborative project requiring the ECCB network to work together and with IUCN colleagues. There are three stages in the project: (1) assigning a draft conservation status to all species on the European list; (2) a series of regional workshop meetings to examine the draft statuses and assign a final status; (3) production of a Red List book by IUCN. All species will be assessed according to the IUCN Guidelines. Several ECCB members have been trained by IUCN and designated as assessors, each of whom will work with ECCB members and other bryologists Europe-wide, and co-ordinate, in co-operation with IUCN, the workshop meetings. Nick Hodgetts is project co-ordinator for the ECCB, and Ariel Bergamini is the IUCN Red List authority, providing quality control. The project will be completed in 2019.

## 8. RARE AND THREATENED BRYOPHYTES OF BELARUS AND EASTERN EUROPE, AS A CANDIDATES FOR NEW EUROPEAN RED BOOK

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Not only very rare and endemic species of region, but also quickly regressive, reduced and threatened bryophytes may be present in Red Book. Regressive species occupy 18,4% of Belarus bryoflora. Among 87 regressive bryophytes, some groups were distinguished: relict sub-arctic and arctic-alpine, boreal and boreal-alpine in swamps and forests, nemoral (temperate) in wide-broad forests, regressive stenotype species. There are 2 main directions of geographical regression of bryophytes on the territory of Belarus: to north and west. There have been identified 4 main centers in Belarus, where the locations of these species are grouped together and where the depletion of bryoflora is possible in the near future. Now, 34 bryophytes are included in new edition of the Belarus Red Book (2015). Also 27 European protected species are found in Belarus. Among them, there are 8 species, which may be candidates for new European Red Book: *Cinclidotus danubicus* (1 remaining / existing point in Eastern Europe), *Cephalozia lacinulata*, *Dicranum viride*, *Neckera pennata*, *Meesia hexasticha*, *M. longisetata*, *Bryum neodamense*, *Lophozia ascendens*. Also our analysis of geographical distribution of bryophytes in Eastern Europe on the base of mapping on 390 quadrates (100 km x 100 km) provides possibilities for proposing around 250 species for new European Red Book.

## 9. THE IMPORTANCE OF SLOVAKIAN PRIMEVAL BEECH FORESTS IN THE WESTERN CARPATHIAN MOUNTAINS FOR BRYOPHYTE DIVERSITY IN CONTRAST TO MANAGED FORESTS

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The importance of Slovakian primeval beech forests in the western Carpathian Mountains for bryophyte diversity in contrast to managed forests *Fagus sylvatica* is considered to be the dominant tree species across Europe. However, forest area has been reduced and forests have been exploited for wood and other products since millennia. Due to that, only few small remnants of primeval forests persisted in Europe until today. A substantial amount of virgin beech forests exists in the western Carpathians (Slovakia). In these putative primeval forests, no management activities took place for at least 500 years. The protection of these forests is of particular importance, as they harbour a unique biodiversity and continue to undergo natural ageing and disturbance dynamics. Slovakia's virgin beech forests are also home to highly endangered bryophytes, such as *Buxbaumia viridis* and *Dicranum viride*. Within two years of field work, epiphytic bryophytes were studied in three virgin beech forests in Eastern Slovakia and compared to managed stands. Each 40 circular plots (500 m<sup>2</sup>) were established in the primeval beech forests, Havešová, Kyjov and Stužica. In the managed stands, each ten plots (500 m<sup>2</sup>) were marked. Rarefaction/extrapolation curves showed a significantly higher number of bryophytes in virgin compared to managed forests. The higher species richness and the occur-

rence of rare species in the unmanaged forests are attributable to the availability of suitable substrates and microhabitats, including old and decaying trees as well as habitat continuity. The occurrence of rare and endangered bryophytes highlights the importance of the conservation of old growth forests to prevent a further loss of biodiversity.

## **10. THE NEW RED LIST OF BRYOPHYTES OF GERMANY (2016) AND REMARKS TO METHODS USED IN COMPARISON TO THE IUCN CRITERIA**

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Coordinated by the Federal Agency for Nature Conservation, The Federal Republic of Germany is currently updating its Red Lists of regionally threatened species for many organism groups. The respective publications started in 2009 with the vertebrates; the bryophytes are along with the vascular plants among the last groups to be published. Their analysis and evaluation is now completed and publication is envisaged for 2016.

The current version is considered to be the 2nd complete edition of Red Lists for bryophytes in Germany, not counting two lists with preliminary character that were valid only for western Germany. Methods of evaluation were made significantly more objective from the last to the current version. The red list categories currently used in Germany as well as the criteria leading to them are still similar to but differ quite substantially from the IUCN categories. A comparison is given and the main differences are explained. The new system comprises of four independent assessment criteria evaluated separately: long-term population trend, short-term population trend, current population situation and (presence of) risk factor(s). An evaluation matrix aggregates these four criteria into a final category. The method goes beyond assessing extinction risk as the results allow to determine conservation priorities.

In the current approach the Red List recognizes 1.192 established taxa (1.128 species) of bryophytes for Germany, 1.185 of which are evaluated; the remaining seven being Neobiota. 40 taxa are considered regionally extinct and 47 are critically endangered. 300 taxa are threatened in a broader sense, and with the 113 taxa added classified as “(extremely) rare”, which Germany maintains as a category, 453 taxa (= 38.2 %) are on the “Red List”.

A comparison with the 1996 red list revealed a category change for 442 taxa (= 37.3 %). The vast majority of those was positive (351 taxa), only 91 were negative. In almost all cases (97.5 %) one of the reasons given for positive change is improvement of the knowledge base; actual improvement is indicated only for 18.4 % of positive change cases (up to three reasons could be indicated). The methodical differences caused deterioration of categories in 29.3 % of cases but only 2.5 % of improvement of categories. This can be seen an indicator for the more objective assessment process of the actual version of the Red List compared to the former version.

## **11. IGNORED CROWN JEWELS: THE ROLE OF TREE CROWNS IN BRYOPHYTE AND LICHEN SPECIES RICHNESS IN SYCAMORE MAPLE WOODED MEADOWS**

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Tree crowns typically cover the vast majority of the surface area of trees, but they are rarely considered in diversity surveys of epiphytic bryophytes and lichens, especially in temperate Europe. Usually only stems are sampled. We assessed the number of bryophyte and lichen species on stems and in crowns of 80 sycamore trees at six sites in the Northern Alps. The total number of species detected per tree ranged from 13 to 60 for bryophytes, from 25 to 67 for lichens, and from 42 to 104 for bryophytes and lichens considered together. At the tree level, 29% of bryophyte species and 61% of lichen species were recorded only in the crown. Considering all sampled trees together, only 4% of bryophyte species, compared to 34% of lichen species, were never recorded on the stem. For bryophytes as well as for lichens, the number of additional crown species was negatively related to the number of species recorded on the stem. Five out of 10 red-listed bryophyte species and 29 out of 39 red-listed lichen species were more frequent in crowns. Our findings highlight the importance of tree crowns for species richness and their importance as habitat of red-listed species of epiphytic bryophytes and lichens. Further, our study demonstrates that tree crowns need to be considered in research on these species, especially in biodiversity surveys and in conservation tasks involving lichens.

## **12. USING THE IUCN CRITERIA TO ASSESS THE SPECIES THREAT STATUS**

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ECCB has, since it started in 1990, assessed the threat states of bryophyte species. To our help we established at the ECCB conference at Reading in 1996 guidelines which has helped us to consider threat factors like small population size, small area of distribution, fragmentation etc in a more or less consistent way. IUCN has adopted part of our guidelines, however not all, and has included them in the official "Guidelines for Using the IUCN Red List Categories and Criteria". These official guidelines will soon, probably in 2017, be updated and published.

Still, for bryophytes there are some practical problems how to use them in a consistent way. Biologically there are still much we do not know about extinction risk. How can the length of generation time, a severe fragmentation of populations, a small number of individuals; locations can be important in evaluating extinct risk. These factors are often interpreted in different ways by different assessors. Still, the most forgotten threat to bryophytes is habitat loss and habitat degradation.

I will discuss these issues above and give some suggestions in order to harmonize the use of the threat criteria system in a way that is more practical. Maybe these will also better reflect the extinction risk comparable to how the criteria system is applied to vascular plants, fungi and animals?

### 13. CONTRIBUTION TO KNOWLEDGE OF THE BRYOPHYTE FLORA OF THE TEPAČKE FORESTS (DURMITOR MTS., MONTENEGRO)

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The field studies of the bryoflora of the Tepska forest were conducted during 2014. We collected 132 bryophyte taxa, of which 104 taxa belong to Bryopsida and 28 to Marchantiopsida. The families represented by the highest number of taxa are *Bryaceae*, *Brachytheciaceae*, *Pottiaceae*, *Plagiomniaceae*, *Polytrichaceae*, *Ditrichaceae* and *Hypnaceae*, while the most abundant genera are *Plagiomnium*, *Bryum*, *Orthotrichum* and *Brachythecium*. Analysis of the floristic elements showed that the greatest number of taxa are boreal elements, followed by temperate, atlantic and submediterranean floral elements. The ecological analysis showed the following: relevant in terms of the humidity are mesophilous species, dominating in terms of the light are sciophilous, in regard to substratum pH acidophilous species are dominant and species that prefer soil as a substrate are the most numerous. This paper includes checklist of the bryophyte flora of the forest Tepska šuma, chorological analysis and analysis of ecological parameters (humidity, light, substrate type and substrate pH).

### 14. DATA QUALITY REGARDING BRYOPHYTE SPECIES IN CROATIA PROPOSED FOR CANDIDATE LIST FOR RED BOOK OF EUROPEAN BRYOPHYTES

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Croatia has long tradition of bryological researches, but they were unsystematic, concentrated to certain areas and with long time gaps. In order to summarize all existing knowledge related to bryophyte distribution in Croatia, all accessible published data were compiled, the finding localities geocoded, the nomenclature unified and accorded to actual taxonomy. This Croatian Bryophyte Database was analysed in order to estimate quantity of data related to species proposed for Candidate list for the new Red Data Book of European Bryophytes. In total, the database contains 24,955 species-locality entries, which refer to 756 bryophyte taxa (2 hornworts, 177 hepatics and 577 mosses) – 110 of them (22 hepatics and 88 mosses) are proposed for Candidate list. In total 1,175 (4.7%) species-locality entries refer to candidate species, but when secondary citations are filtered, 516 (2.1%) remain, only 212 (0.85%) of which are published in last 50 years. On species level, there are 18 (16.4%) taxa with the last published record before 1918, while for 46 (41.8%) taxa last records have been published during the last 50 years. In recent period, after 2009, data regarding 23 (20.9%) taxa have been published, which corresponds with 60 species-locality entries. Yet eight species, cited on several checklists, are without any finding place quoted. Although some species (*Buxbaumia viridis*, *Anomodon rostratus*, *Sphagnum* spp.) are studied in detail during the recent period, there is an evident need for systematic survey of species proposed for Red Book in order to access current status of their distribution, populations, habitats and threats.

## 15. THE GENUS *RICCIA* (HEPATICOPHYTA) IN TURKEY

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The genus *Riccia* L. is represented by more than approximately 150 species in the world (Jovet-Ast, 2005). It is widely distributed in Europe (36 taxa: 33 species and 3 varieties), Mediterranean areas (40 taxa: 36 species and 4 varieties) and Southwest Asia (33 taxa: 31 species, 1 variety and 1 subspecies) (Heyn & Herrnstadt, 2004; Frey et al., 2006; Ros et al., 2007; Kürschner & Frey, 2011).

*Riccia* is the largest genus of the Turkish liverwort flora with 25 taxa (24 species and 1 varieties). Of these 6 taxa, *R. trabutiana* Lev., *R. canaliculata* Hoffm., *Riccia ciliifera* Link ex Lindenb., *R. cavernosa* Hoffm., *R. rhenana* Lorb. ex Müll. Frib. and terrestrial and aquatic form of *R. fluitans* L. are known in only one locality. Additionally *R. perennis* Steph. was collected two different localities from western Anatolia. These localities are eastern border of species. *R. beyrichiana* Hampe ex Lehm., *R. cavernosa* and *R. crinita* Taylor. were newly added to the Turkish liverwort flora during the framework of a project between 2012 and 2015 (supported by the Scientific and Technological Research Council of Turkey). While *R. sorocarpa* Bisch. is the most common taxa all around the country, others were generally collected in Mediterranean areas with this project.

In this study, the genus *Riccia* in Turkey will be given with distribution data, habitats and red list categories.

## 16. *SPHAEROCARPOS TEXANUS* AUST., GROWING OR NOT IN MONTENEGRO?

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Liverwort *Sphaerocarpos texanus* Aust. was first time recorded in Montenegro in February 2014. It was found in the capital city Podgorica, in the vicinity of the city center, more precisely in front of the building of the Natural History Museum of Montenegro. The species is recorded as small liverwort, growing on very small grassy surface, on the area less than 10m<sup>2</sup>, surrounded by concrete paths and several trees of *Cypressus sempervirens*. No other bryophyte species were found with mentioned liverwort. Since no spores found in its thalli, the species was identified based on certain morphological characteristics. Having in mind the fact that *Sphaerocarpos texanus* Aust. was found in only one locality, belonging to urbanized city area, it can be assumed that it is exposed to certain risk due to urban development.

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