

Check-list of the bryophytes of Bulgaria with data on their distribution. I. Hepaticae and Anthocerotae

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Résumé – Sur la base des données de la littérature et des herbiers, les auteurs présentent une liste des 173 espèces d'hépatiques et de 2 anthocérotes qui croissent en Bulgarie. Chaque espèce est présentée avec sa distribution selon les régions floristiques. Douze nouvelles espèces sont considérées comme « menacées ». La liste est accompagnée d'un synopsis systématique et d'une liste des synonymes.

Abstract – The present check-list enlists 173 species of hepatics and 2 hornworts that occur in Bulgaria. It is based on literature and herbarium records. The distribution of each species by floristic regions is presented. 12 additional species are considered threatened. The check-list is supplemented by a systematic synopsis and list of synonyms.

Hepaticae / Anthocerotae / check-list / distribution / Bulgaria

The first thorough account of the bryophytes in Bulgaria was published by Petrov (1975). At this time 570 species were listed including general information about their occurrence. After the publication of this first treatment (Petrov, 1975) many new species were added to the Bulgarian bryoflora. Taxonomic changes in some groups added further species to this Bulgarian bryophyte inventory. In 1999, Ganeva & Düll listed 722 species of bryophytes (160 hepatics and 562 mosses) based on literature sources and personal collections. In this report they listed eight species new for Bulgaria. Most recently Söderström *et al.* (2002) cited 172 species of hepatics which occur in Bulgaria. All these accounts highlight the fact that the Bulgarian bryoflora is only partially known. Moreover, the knowledge on the chorology of most species is limited. Some areas of the country have received greater attention than others. Mountainous areas were more intensively studied because a greater species diversity was expected there.

The present check-list of the hepatics includes 173 species. It was compiled after a thorough literature search as well as a full inventory of the materials available in Bulgarian herbaria (mainly SOM). Attempts were made to trace specimens collected by foreign bryologists who visited Bulgaria at different periods, especially for those species reported only once.

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Taxon	Distribution by floristic regions																							Herbarium	Conser- vation status														
	B		D		M		NeB		P		Fb		R		Rh		Sg		Sf		Sl		Sv			The		Ti		V		Wfm		Zn					
	Bsk n	Bsk s	D	M	NeB	P	Fb	R	w	c	e	w	c	e	w	c	e	w	c	e	Sf	Sl	w			c	e	Sv	Sp	w	c	e	The	Ti	V	Wfm	Zn		
<i>Scapania apiculata</i> Spruce																																					SOM	V	
<i>Scapania aspera</i> Bernet et M. Bernet																																					SOM		
<i>Scapania calcicola</i> (Arnell et J. Perss.) Ingham																																					SOM		
<i>Scapania compacta</i> (A. Roth) Dumort.																																					SOM	V	
<i>Scapania crassiretis</i> Bryhn																																							
<i>Scapania curta</i> (Mart.) Dumort.																																							
<i>Scapania helvetica</i> Grüttsche																																							
<i>Scapania irrigua</i> (Nees) Nees																																							
<i>Scapania mucronata</i> H. Buch																																							
<i>Scapania nemorea</i> (L.) Grollé																																							
<i>Scapania pallidicola</i> Loeske et Müll. Frib.																																							
<i>Scapania parvifolia</i> Warnst.																																							
<i>Scapania scandica</i> (Arnell et H. Buch) Macvicar																																							
<i>Scapania subalpina</i> (Nees ex Lindenb.) Dumort.																																							
<i>Scapania umbrosa</i> (Schrad.) Dumort.																																							
<i>Scapania undulata</i> (L.) Dumort.																																							
<i>Scapania verrucosa</i> Heeg																																							
<i>Taraxion hypophylla</i> L.																																							
<i>Trichocolea tomentella</i> (Ehrh.) Dumort.																																							
<i>Tritomania exserta</i> (Schmidel) Loeske																																							
<i>Tritomania exseciformis</i> (Bredl.) Loeske																																							
<i>Tritomania quinqueclanata</i> (Huds.) H. Buch																																							
<i>Tritomania scintila</i> (Taylor) Jäg.																																							

- (1) Reported for Bulgaria without a reference to an exact locality or collection date (Schuster 1980, p. 296), Söderström *et al.* (2002) consider it to be of doubtful occurrence.
- (2) We treat the taxa within the *Marchantia polymorpha* complex at species level since *M. aquatica* and *M. alpestris* are easily morphologically distinguished and are ecologically distinct. The third taxon within the complex, *M. polymorpha* auct. (= *M. polymorpha* subsp. *ruderalis* Bischl. & Boisselier), was not found after a revision of the available herbarium material. So although it was assumed to be present by Söderström *et al.* (2002) we have excluded it from the present list until more data are available.

Since the information on bryophyte distribution within the country is sparse and incomplete, we have tried to extract all available data on the chorology of each species, and provide a base for further more purposeful investigations of the Bulgarian bryoflora. We chose to present the distribution of the species by the floristic regions that are designed for the higher flora, rather than by administrative regions. The floristic region is a natural unit with relatively uniform habitats and a common history of development of its flora. A quick reference to the known distribution of each species, as well as the species diversity within each region is provided. The names of the floristic regions and their boundaries are indicated in Fig. 1.

The nomenclature generally follows Grolle & Long (2000) with a few exceptions which are commented on under the respective species.

Forty three of the species in the present check-list are known from a single region with a single locality, 8 of which have not been collected since 1956. 56 (32.4%) of the hepatic species are included in the preliminary list of threatened bryophytes in Bulgaria (Ganeva, 1998). The chorological data presented here reveal an additional 12 (6.9%) species that deserve attention with respect to conservation (Appendix 1). These species are listed here without the allocation of a threat category, since they will be tested against the new IUCN Red List categories. This assessment will be a part of a Red List Project, which has recently been started in Bulgaria.

The check-list is supplemented by a systematic synopsis of the families and genera (Appendix 2), and a list of the main synonyms (Appendix 3). In the synopsis we have adopted the classification system proposed by Crandall-Stotler & Stotler (2000).

In the list and Fig. 1 the following abbreviations and symbols are used:

B – Belasitsa

Bsk – Black Sea Coast (n – north, s – south)

D – Danubian Plain

Fb – Forebalkan

M – Mesta river valley

NeB v Northeastern Bulgaria

P – Pirin Mt

R – Rila Mt

Rh – Rhodopi Mts (w – western, c – central, e – eastern)

Sf – Sofia region

Sg – Sredna gora Mt

Sl – Slavyanka Mt

Sp – Stara planina Mts (Balkan Range) (w – western, c – central, e – eastern)

Sv – Struma river valley

Sz – Strandzha Mt

The – Toundzha Hilly Country

Tl – Thracian Lowland

V – Vitosha Mt

Wfm – West Frontier Mts

Zn – Znepole region

○ – observations based on literature from before 1956

● – observations based on literature from after 1956 (incl.)

□ – report based on herbarium materials collected before 1956

■ – report based on herbarium materials collected after 1956 (incl.)

() – presence uncertain



Fig. 1. Map of Bulgaria showing the boundaries of the floristic regions. — Abbreviations: 1. Black Sea Coast (n – north, s – south) (Bsk); 2. North-eastern Bulgaria (NeB); 3. Danubian Plain (D); 4. Forebalkan (Fb); 5. Stara planina Mts (Balkan Range) (w – western, c – central, e – eastern) (Sp); 6. Sredna gora Mt (w – western, c – central, e – eastern) (Sg); 7. Sofia region (Sf); 8. Znepole region (Zn); 9. West Frontier Mts (Wfm); 10. Struma river valley (Sv); 11. Belasitsa (B); 12. Slavyanka Mt (Sl); 13. Mesta river valley (M); 14. Pirin Mt (P); 15. Rila Mt (R); 16. Vitosha Mt (V); 17. Rhodopi Mts (w – western, c – central, e – eastern) (Rh); 18. Thracian Lowland (TI); 19. Toundzha Hilly Country (Thc); 20. Strandzha Mt (Sz).

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Appendix 1. List of the additional liverwort species with conservation value in Bulgaria. For the abbreviations of the distribution see Fig. 1.

Calypogeia sphagnicola (Arnell et J. Perss.) Warnst. et Loeske. Distribution: V.
Cephaloziella turneri (Hook.) Müll.Frib. Distribution: Sz.
Gymnomyttron coralloides Nees. Distribution: R.
Jungermannia confertissima Nees. Distribution: V.
Porella obtusata (Taylor) Trevis. Distribution: Sz.
Porella pinnata L. Distribution: R.
Radula lindenbergiana Gottsche ex C.Hartm. Distribution: P.
Ricciocarpos natans (L.) Corda. Distribution: D.
Scapania crassiretis Bryhn. Distribution: R.
Scapania scandica (Arnell et H.Buch) Macvicar. Distribution: P.
Tritomaria exsecta (Schmidel) Loeske. Distribution: P.
Tritomaria scitula (Taylor) Jörg. Distribution: R.

Appendix 2. Systematic synopsis of the taxa of hornworts and liverworts occurring in Bulgaria with number of species (in parentheses)

Phylum (Division): ANTHOCEROTOPHYTA

CLASS: ANTHOCEROTOPSIDA

Order: Anthocerotales

Family: **Anthocerotaceae** - *Anthoceros* L. (1), *Phaeoceros* Prosk. (1);

Phylum (Division): MARCHANTIOPHYTA

CLASS: MARCHANTIOPSIDA

Order: Marchantiales

Family: **Aytoniaceae** - *Reboulia* Raddi (1), *Mannia* Opiz (4), *Asterella* P.Beauv. (1)

Family: **Conocephalaceae** - *Conocephalum* Hill (1)

Family: **Lunulariaceae** - *Lunularia* Adans. (1)

Family: **Marchantiaceae** - *Preissia* Corda (1), *Marchantia* L. (1)

Family: **Cleveaceae** - *Athalamia* Falconer (1)

Family: **Corsiniaceae** - *Corsinia* Raddi (1)

Family: **Targioniaceae** - *Targionia* L. (1)

Order: Ricciales

Family: **Oxymitraceae** - *Oxymitra* Bisch. ex Lindenb. (1)

Family: **Ricciaceae** - *Ricciocarpos* Corda (1), *Riccia* L. (10)

CLASS: JUNGERMANNIOPSIDA

Subclass: Metzgeriidae

Order: Blasiales

Family: **Blasiaceae** - *Blasia* L. (1)

Order: Fossombroniales

Family: **Fossombroniaceae** - *Fossombronia* Raddi (4)

Family: **Pelliaceae** - *Pellia* Raddi (3)

Order: Metzgeriales

Family: **Aneuraceae** - *Aneura* Dumort. (1), *Riccardia* Gray (5)

Family: **Metzgeriaceae** - *Metzgeria* Raddi (3), *Apometzgeria* Kuwah. (1)

Subclass: Jungermanniidae

Order Lepicoleales

Family: **Ptilidiaceae** - *Ptilidium* Nees (2)

- Family: **Trichocoleaceae** - *Trichocolea* Dumort. (1)
 Order: Jungermanniales
 Family: **Pseudolepicoleaceae** - *Blepharostoma* (Dumort.) Dumort. (1)
 Family: **Geocalyceae** - *Lophocolea* (Dumort.) Dumort. (3), *Chiloscyphus* Corda (2), *Harpanthus* Nees (1)
 Family: **Plagiochilaceae** - *Pedinophyllum* (Lindb.) Lindb. (1), *Plagiochila* (Dumort.) Dumort. (2)
 Family: **Calypogeiaceae** - *Calypogeia* Raddi (6)
 Family: **Lepidoziaceae** - *Lepidozia* (Dumort.) Dumort. (2), *Bazzania* Gray (3)
 Family: **Cephaloziaceae** - *Cephalozia* (Dumort.) Dumort. (8), *Nowellia* Mitt. (1), *Odontoschisma* (Dumort.) Dumort. (1)
 Family: **Cephaloziellaceae** - *Cephaloziella* (Spruce) Schiffn. (5)
 Family: **Antheliaceae** - *Anthelia* (Dumort.) Dumort. (1)
 Family: **Jungermanniaceae** - *Barbilophozia* Loeske (6), *Lophozia* (Dumort.) Dumort. (10), *Leiocolea* (Müll.Frib.) H.Buch (3), *Anastrophyllum* (Spruce) Steph. (2), *Tritomaria* Schiffn. ex Loeske (4), *Jamesoniella* (Spruce) F.Lees (1), *Mylia* Gray (1), *Jungermannia* L. (10), *Nardia* Gray (3)
 Family: **Gymnomitriaceae** - *Marsupella* Dumort. (8), *Gymnomitrium* Corda (3), *Eremonotus* Lindb. et Kaal. ex Pearson (1)
 Family: **Scapaniaceae** - *Diplophyllum* (Dumort.) Dumort. (3), *Scapania* (Dumort.) Dumort. (17)
 Order: Porellales
 Family: **Porellaceae** - *Porella* L. (6)
 Family: **Lejeuneaceae** - *Lejeunea* Lib. (1), *Cololejeunea* (Spruce) Schiffn. (2)
 Family: **Radulaceae** - *Radula* Dumort. (2)
 Family: **Jubulaceae** - *Frullania* Raddi (5)

Appendix 3. Main synonyms.

- Anastrophyllum myriocarpum* (Carring.) Schust. ex Váňa = *Eremonotus myriocarpus* (Carring.) Pears.
Anthoceros husnotii Steph. = *Anthoceros punctatus* L.
Anthoceros laevis L. = *Phaeoceros laevis* (L.) Prosk.
Barbilophozia gracilis (Schleich. ex Steph.) K. Müll = *Barbilophozia attenuata* (Mart.) Loeske
Bazzania denudata auct. = *Bazzania flaccida* (Dumort.) Grolle
Calypogeia trichomanis auct. = *Calypogeia azurea* Stotler et Crotz
Cephalozia lammersiana (Huebener) Carring. = *Cephalozia bicuspidata* (L.) Dumort.
Cephalozia media Lindb. = *Cephalozia lunulifolia* (Dumort.) Dumort.
Cephaloziella starkei (Funck ex Nees) Schiffn. = *Cephaloziella divaricata* (Sm.) Schiffn.
Clevea hyalina (Sommerf.) Lindb. = *Athalamia hyalina* (Sommerf.) S.Hatt.
Corsinia reticulata (Gmelin) Dum. = *Corsinia coriandrina* (Spreng.) Lindb.
Fimbriaria lindenbergiana Corda ex Nees = *Asterella lindenbergiana* (Corda ex Nees) Arnell
Grimaldia dichotoma auct. = *Mannia androgyna* (L.) A.Evans
Grimaldia fragrans (Balbis) Corda = *Mannia fragrans* (Balbis) Frye et Clark
Grimaldia pilosa (Hornem.) Lindb. = *Mannia pilosa* (Hornem.) Frye et Clark
Grimaldia rupestris (Nees) Lindenb. = *Mannia triandra* (Scop.) Grolle
Isopaches decolorans (Limpr.) Buch = *Lophozia decolorans* (Limpr.) Steph.
Jungermannia lanceolata auct. = *Jungermannia leiantha* Grolle
Leiocolea bantriensis (Hook.) Jörg. = *Lophozia bantriensis* (Hook.) Steph.

- Leiocolea heterocolpos* (Thed. ex Hartm.) Buch = ***Lophozia heterocolpos*** (Thed. ex Hartman) M. Howe
Leiocolea muelleri (Nees ex Lindenb.) Dumort. = ***Lophozia bantriensis*** (Hook.) Steph.
Lophocolea cuspidata (Nees) Limpr. = ***Lophocolea bidentata*** (L.) Dumort.
Lophozia alpestris auct. = ***Lophozia sudetica*** (Nees ex Huebener) Grolle
Lophozia porphyroleuca (Nees) Schiffn. = ***Lophozia longiflora*** (Nees) Schiffn.
Marsupella badensis Schiffn. = ***Marsupella funckii*** (F. Weber. et D. Mohr) Dumort.
Marsupella ustulata (Huebener) Spruce ex Pears. = ***Marsupella emarginata*** (Ehrh.) Dumort.
Marsupella varians (Lindb.) Müll. Frib. = ***Marsupella brevissima*** (Dumort.) Grolle
Metzgeria pubescens (Schrank) Raddi = ***Apometzgeria pubescens*** (Schrank) Kuwah.
Oxymitra paleacea Bisch. ex Lindenb. = ***Oxymitra incrassata*** (Brot.) Sergio et Sim-Sim
Pellia fabroniana Raddi = ***Pellia endiviifolia*** (Dicks.) Dumort.
Plectocolea hyalina (Lyell) Carr. = ***Jungermannia hyalina*** Lyell
Plectocolea obovata (Nees) Mitt. = ***Jungermannia obovata*** Nees
Porella laevigata (Schrad.) Lindb. var. *thuja* Nees = ***Porella obtusata*** (Taylor) Trevis.
Porella platyphylloidea (Schwein.) Kindb. = ***Porella platyphylla*** (L.) Pfeiff.
Riccardia pinguis (L.) S. Gray = ***Aneura pinguis*** (L.) Dumort.
Riccardia sinuata (Hook.) Trev. = ***Riccardia chamaedryfolia*** (With.) Grolle
Scapania nemorosa Dumort. = ***Scapania nemorea*** (L.) Grolle
Solenostoma caespiticium (Lindenb.) Steph. = ***Jungermannia caespiticia*** Lindenb.
Solenostoma cordifolium (Dumort.) Steph. = ***Jungermannia exsertifolia*** Steph. subsp. ***cordifolia*** (Dumort.) Vána
Solenostoma crenulatum (Sm.) Mitt = ***Jungermannia gracillima*** Sm.
Solenostoma pumilum (With.) Müll. Frib. = ***Jungermannia pumila*** With.
Solenostoma sphaerocarpoideum (De Not.) Paton et Warb. = ***Jungermannia atrovirens*** Dumort.
Solenostoma triste (Nees) Müll. Frib. = ***Jungermannia atrovirens*** Dumort.
Sphenolobus minutus (Schreb.) Berggr. = ***Anastrophyllum minutum*** (Schreb.) R. M. Schust.