



Abh. Ber. Naturkundemus. Görlitz	Band 77 Heft 1	S. 77 – 86	2005
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ISSN 0373-7586

## Noteworthy lichen records for Bulgaria

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### Abstract

66 lichen taxa and one lichenicolous fungus are documented for Bulgaria or for certain floristic regions for the first time. Of these, the following species are new to Bulgaria: *Arthothelium spectabile*, *Bacidia circumspecta*, *Bacidia fraxinea*, *Bryoria nadvornikiana*, *Candelariella reflexa*, *Catillaria nigroclavata*, *Cladonia caespiticia*, *Gyalecta ulmi*, *Hyperphyscia adglutinata*, *Lecanora expallens*, *Lecanora thysanophora*, *Opegrapha viridis*, *Parmelia ernstiae*, *Parmelina pastillifera*, *Peltigera elisabethae*, *Peltigera membranacea*, *Phaeophyscia pusilloides*, *Placynthiella dasaea*, *Pyrenula chlorospila*, *Pyrenula nitidella*, *Trapeliopsis flexuosa* and the lichenicolous fungus *Milospium graphideorum*. In particular in the Strandzha Mountains, many species were found that had not been documented before in that region. Although the lichen flora there is extremely rich and of special interest from a biogeographical point of view, it is still poorly studied.

### Zusammenfassung

**Neue oder bemerkenswerte Flechtenfunde aus Bulgarien** – Es werden 66 Flechtenarten und ein lichenicoler Pilz aufgeführt, die erstmals für Bulgarien oder einzelne seiner floristischen Regionen nachgewiesen werden konnten. Erstfunde für Bulgarien sind *Arthothelium spectabile*, *Bacidia circumspecta*, *Bacidia fraxinea*, *Bryoria nadvornikiana*, *Candelariella reflexa*, *Catillaria nigroclavata*, *Cladonia caespiticia*, *Gyalecta ulmi*, *Hyperphyscia adglutinata*, *Lecanora expallens*, *Lecanora thysanophora*, *Opegrapha viridis*, *Parmelia ernstiae*, *Parmelina pastillifera*, *Peltigera elisabethae*, *Peltigera membranacea*, *Phaeophyscia pusilloides*, *Placynthiella dasaea*, *Pyrenula chlorospila*, *Pyrenula nitidella*, *Trapeliopsis flexuosa* und der lichenicole Pilz *Milospium graphideorum*. Besonders viele Erstnachweise können für das Strandzha-Gebirge erbracht werden, dessen Flechtenflora wenig erforscht, aber reich und vom biogeographischen Standpunkt besonders interessant ist.

### 1. Introduction

MAYRHOFER et al. (2005) published a species list of all lichens and lichenicolous fungi from Bulgaria that had been recorded in herbaria and literature sources up to that year. This enables lichen collectors now to determine which of their own species findings can be considered as new to Bulgaria or certain floristic regions. Accordingly, the objective of this paper is to add new taxa to the list of lichens from Bulgaria based upon the author's observations in 2000 and 2004.

## 2. Materials & methods

In September 2000 and September 2004, lichens were collected at several sites in Bulgaria. The sites were mainly located in the Pirin Mountains, the Balkan (Stara Planina) Mountains, and the Strandzha Mountains as well as in the vicinity of the Poda Nature Conservation Centre on the Black Sea coast near the city of Burgas.

The material collected in 2000 (collecting sites codified below with an »A«) is preserved in the author's own herbarium. The material collected in 2004 (collecting sites codified below with a »B«) is deposited at the Staatliches Museum für Naturkunde Görlitz (GLM), Germany.

The following nomenclature was used:

SCHOLZ (2000), with the exception of *Melanelia fuliginosa*,

HAFELLNER & TÜRK (2001) for species not mentioned in SCHOLZ (2000) and for *Melanelia fuliginosa*,

PURVIS et al. (1994) for species mentioned neither in SCHOLZ (2000) nor in HAFELLNER & TÜRK (2001), and

FEUERER & THELL (2002) for *Parmelia ernstiae*.

Following MAYRHOFER et al. (2005), the floristic regions of the collecting sites are given in square brackets for each record. The regions include the following:

- [1]: Black Sea coast
- [2]: Northeast Bulgaria
- [5]: Balkan (Stara Planina) range
- [14]: Pirin Mts
- [20]: Strandzha Mts

Other collecting data are given in detail using the following codification (see Fig. 1):

A: September 2000; GPS data based on the WGS 84 map datum.

A1a: Pirin Mts: Pirin National Park: between the refuges »Tevno Ezero« and »Pirin«, near the timberline, 1850 m asl, 41°39.55' N – 23°30.39' E

A1b: ditto, 41°39.518' N – 23°30.529' E

A1c: Pirin Mts: Pirin National Park: near the refuge »Pirin«, 1620 m asl, 41°37.9' N – 23°29.8' E

A1d: Pirin Mts: Pirin National Park: above Rozhenski Manastir, light oak forest, 1250 m asl, 41°34.1' N – 23°26.8' E

A1e: ditto, near the chapel / grave of Aleksandrov, light oak forest, approx. 940 m asl, 41°33' N – 23°25.9' E

A1f: foreland of the Pirin Mts: dry stream bed above Melnik [41°31' N – 23°24' E], 550 m asl

A1g: foreland of the Pirin Mts: near Melnik [41°31' N – 23°24' E], 450 m asl

- A2a: Balkan Mts: Central Balkan National Park north of Karlovo: above the refuge »Vasil Levski« (42°42'17.5" N – 24°51'18.8" E), 1280 m asl
- A2b: Balkan Mts: Central Balkan National Park north of Karlovo: below the refuge »Vasil Levski« (42°42'17.5" N – 24°51'18.8" E)
- A2c: Balkan Mts: Central Balkan National Park north of Karlovo: below the refuge »Vasil Levski« (42°42'17.5" N – 24°51'18.8" E), path to the refuge »Balkanski Rozi«
- A3a: Black Sea coast south of Burgas: pasture land near Sozopol, light coppice, 50 m asl, 42°24.67' N – 27°41.14' E
- A3b: Black Sea coast south of Burgas: Strandzha Natural Park: oak forest N Akhtopol [42°06'N – 27°57' E]
- A3c: Black Sea coast south of Burgas: Strandzha Natural Park: between Akhtopol & Sinemorec, oak coppice, 42°4.4' N – 27°57.2' E
- A4a: Strandzha Mts: Strandzha Natural Park: valley of the river Veleka, approx. 42°3.5' N – 27°55.4' E
- A4b: ditto, 42°02.887' N – 27°54.447' E
- A5: Northeast Bulgaria: steppe slopes above Veliko Tarnovo [43°05'09" N – 25°39'20" E], 230 m asl

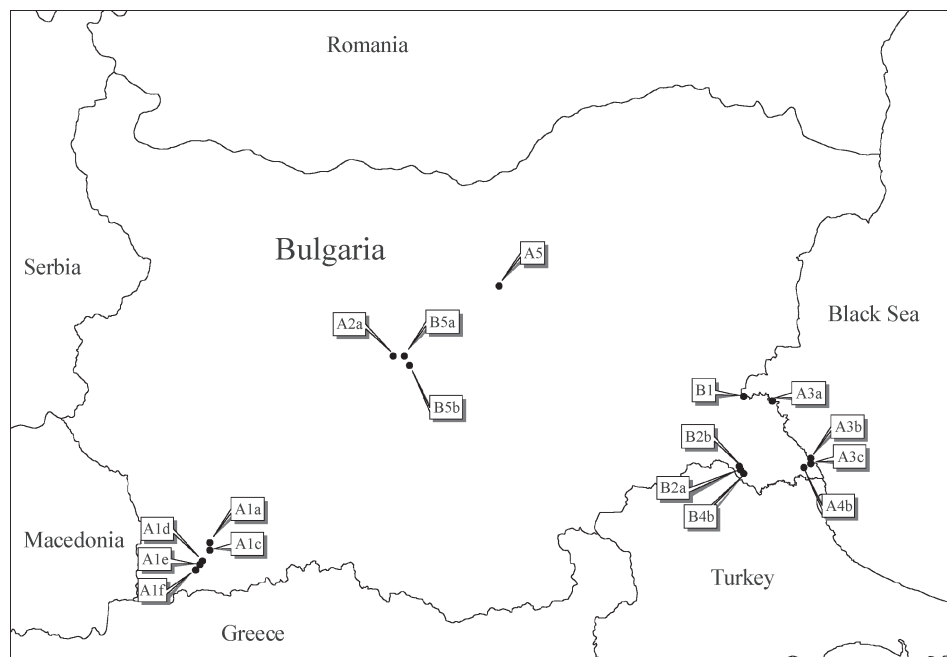


Fig. 1 Position of the main collecting sites (sites not shown are closely adjacent to others).

**B:** September 2004; GPS data based on the Potsdam map datum.

- B1: Black Sea coast south of Burgas: mountain ridge east of the Nature Conservation Station »Poda«, GPS (Station) 42°26'38.8" N – 27°28'11.5" E
- B2a: Strandzha Mts: Strandzha Natural Park: village of Bräshljan, approx. 300 m asl, 42°02'48.8" N – 27°25'39.7" E
- B2b: Strandzha Mts: Strandzha Natural Park: picnic area near the spring »Kobarelova Vodenica« N Bräshljan, 42°04'27.2" N – 27°25'23.2" E
- B3a: Strandzha Mts: Strandzha Natural Park: grazing forest north of Bräshljan (between B2a & B2b)
- B3b: Strandzha Mts: Strandzha Natural Park: stream valley north of Bräshljan (between B2a & B2b)
- B3c: Strandzha Mts: Strandzha Natural Park: pasture land north of Bräshljan (between B2a & B2b)
- B4a: Strandzha Mts: Strandzha Natural Park: forest southeast of Bräshljan (between B2a & B4b)
- B4b: Strandzha Mts: Strandzha Natural Park: Thracian cairn in pasture land southeast of Bräshljan, 42°01'49.1" N – 27°26'55.5" E, 437 m asl
- B4c: Strandzha Mts: Strandzha Natural Park: another Thracian cairn in pasture land southeast of Bräshljan, 42°01'42.4" N – 27°27'15.7" E
- B5a: Balkan Mts: Central Balkan National Park north of Kalofer: near the refuge »Ray« (42°41'47" N – 24°56'2.3" E), approx. 1500 m asl
- B5b: Balkan Mts: Central Balkan National Park north of Kalofer: Kaloferski Manastir, monastery yard, approx. 650 m asl, 42°39'17.9" N – 24°57'41.7" E
- B5c: Balkan Mts: Central Balkan National Park north of Karlovo: below the refuge »Vasil Levski« (42°42'17.5" N – 24°51'18.8" E)

Geographic coordinates were mainly determined with GPS; in some cases [in square brackets], coordinates of populated places close to the collecting sites are given, according to the GEONET NAMES SERVER (2005)

### 3. Results

The following species list presents records of lichens and one lichenicolous fungus that are either new to Bulgaria or to certain floristic regions according to MAYRHOFER et al. (2005). Species that are new to Bulgaria are marked with an asterisk (\*).

List of species

*Acrocordia gemmata* (Ach.) A. Massal.

[20]: B4a: on *Quercus*

*Amandinea punctata* (Hoffm.) Coppins & Scheid.

[20]: B2a: on a wooden table in a garden

*Anisomeridium biforme* (Borrer) R. C. Harris  
[20]: B3b: on *Carpinus betulus*

\**Arthothelium spectabile* Flot. ex A. Massal.  
[20]: B3b: on *Carpinus betulus*

\**Bacidia circumspecta* (Nyl. ex Vain.) Malme  
[20]: B3a: on *Quercus*

\**Bacidia fraxinea* Lönnr.  
[1]: A3b: on *Quercus*; [14]: A1f: on *Ulmus minor*;  
[20]: A4b: on *Fraxinus*; B2b: on old *Fraxinus*; B4a: on *Quercus*

*Bacidia rosella* (Pers.) De Not.  
[20]: B4a, B4b: on *Quercus*

*Bacidia rubella* (Hoffm.) A. Massal.  
[20]: B4a: on *Quercus*

\**Bryoria nadvornikiana* (Gyeln.) Brodo & D. Hawksw.  
[14]: A1c: on dead *Picea*

*Calicium salicinum* Pers.  
[20]: B4a: on *Quercus*

\**Candelariella reflexa* (Nyl.) Lettau  
[1]: A3b

*Candelariella xanthostigma* (Ach.) Lettau  
[5]: B5a: on *Fagus* at the edge of the forest

\**Catillaria nigroclavata* (Nyl.) Schuler  
[20]: B4a: on *Quercus*

*Chrysothrix candelaris* (L.) J. R. Laundon  
[20]: B3b: on *Carpinus betulus*

\**Cladonia caespiticia* (Pers.) Flörke  
[5]: A2a, A2c: on rocks in a beech forest  
This species is not mentioned by MAYRHOFER et al. (2005), but see LITTERSKI & АНТИ (2004).

*Cladonia symphycarpa* (Flörke) Fr.  
[2]: A5; [20]: B3c

*Collema furfuraceum* (Arnold) Du Rietz  
[1]: A3c: edge of an oak forest, on *Fraxinus*

*Collema subflaccidum* Degel.  
[20]: B2b: on old *Fraxinus*

*Evernia prunastri* (L.) Ach.  
[20]: B3b: very common on several trees and shrubs

- Graphis scripta* (L.) Ach.  
[20]: B3b: on *Carpinus betulus*
- \**Gyalecta ulmi* (Sw.) Zahlbr.  
[20]: B4a: on *Quercus*
- \**Hyperphyscia adglutinata* (Flörke) H. Mayrhofer & Poelt  
[1]: A3b, A3c: on *Quercus*
- Lecanora albella* (Pers.) Ach.  
[20]: B4a: on *Carpinus betulus*
- Lecanora argentata* (Ach.) Malme  
[20]: B3b: on *Carpinus betulus*
- \**Lecanora expallens* Ach.  
[1]: B1: on *Ailanthus*; [20]: B4a: on *Quercus*
- Lecanora hagenii* (Ach.) Ach.  
[20]: B2b: on old *Fraxinus*
- \**Lecanora thysanophora* R. C. Harris  
[20]: B3b: on *Carpinus betulus*
- Leprocaulon microscopicum* (Vill.) Gams  
[20]: A4a: S-exposed rocks by the road
- Massalongia carnosa* (J. Dicks.) Körb.  
[14]: A1b: on rock among mosses
- Megalaria laureri* (Hepp ex Th. Fr.) Hafellner  
[20]: B3b: on *Carpinus betulus*
- Melanelia elegantula* (Zahlbr.) Essl.  
[20]: B4b: on *Quercus*  
This species is not mentioned by Mayrhofer et al. (2005), but see Otte et al. (2005).
- Melanelia fuliginosa* (Fr. ex Duby) Essl.  
[20]: A4a: on *Fraxinus*; B4a: on *Carpinus betulus*
- Melanelia glabra* (Schaer.) Essl.  
[20]: B4c: on *Quercus*
- Melanelia subargentifera* (Nyl.) Essl.  
[1]: A3b; [1]: B1: on *Ailanthus*; [5]: A2c: on *Fagus*; [5]: B5b: on *Tilia argentea*;  
[14]: A1f: on *Robinia*; A1g: on *Populus*; [20]: B4a, B4b: on *Quercus*  
This species is not mentioned by MAYRHOFER et al. (2005), but see OTTE et al. (2005).
- Melanelia subaurifera* (Nyl.) Essl.  
[1]: A3a: on *Populus*; A3b, A3c: on *Quercus*; [14]: A1c: on *Fagus*; A1g: on *Populus*
- Opegrapha varia* Pers.  
[14]: A1c: on *Fagus*; [20]: B3a: on *Quercus*

- Opegrapha viridis* (Pers. ex Ach.) Behlen & Desberger  
[20]: B3b: on *Carpinus betulus*
- Parmelia ernstiae* Feuerer & Thell  
[14]: A1c: on *Fagus*
- Parmelina pastillifera* (Harm.) Hale  
[5]: B5a: on *Fagus*
- Peltigera canina* (L.) Willd.  
[1]: A3b: open section in a grazing forest of *Quercus*, *Carpinus betulus* & *C. orientalis*;  
[20]: B3c
- Peltigera elisabethae* Gyeln.  
[20]: B3a: on rock
- Peltigera malacea* (Ach.) Funck  
[14]: A1a: on rock
- Peltigera membranacea* (Ach.) Nyl.  
[14]: A1c: on soil & rock
- Peltigera neckeri* Hepp ex Müll. Arg.  
[1]: A3b: grazing coppice
- Peltigera praetextata* (Flörke ex Sommerf.) Zopf  
[20]: A4a: mossy rocks by the road; near B2a: in the forest on rock
- Pertusaria hemisphaerica* (Flörke) Erichsen  
[20]: B3b: on *Carpinus betulus*; B4a: on *Quercus*
- Phaeophyscia endophoenicea* (Harm.) Moberg  
[5]: A2b: on *Fagus*; B5a: on *Fagus*; [20]: B3a: on *Carpinus orientalis*; B4b: on *Quercus*
- Phaeophyscia orbicularis* (Neck.) Moberg  
[20]: B4a: on *Quercus*
- Phaeophyscia pusilloides* (Zahlbr.) Essl.  
[20]: A4b: on *Fraxinus*
- Phlyctis agelaea* (Ach.) Flot.  
[20]: A4a: on *Fraxinus*; B3a: on *Carpinus orientalis*; B3b: on *Carpinus betulus*; B4a: on *Quercus*, *Carpinus betulus*
- Phlyctis argena* (Spreng.) Flot.  
[1]: A3c: edge of an oak forest; [14]: A1f: on *Robinia*; [20]: B3b: on *Carpinus betulus*
- Physcia aipolia* (Ehrh. ex Humb.) Fűrnr.  
[20]: A4a: on *Fraxinus*; B4a: on *Quercus*
- Physcia biziana* (A. Massal.) Zahlbr.  
[1]: A3a: near the beach on *Populus*; B1: on *Ailanthus*

*Physconia distorta* (With.) J. R. Laundon

[14]: A1f: on *Robinia*

*Physconia enteroxantha* (Nyl.) Poelt

[1]: A3b, A3c: on *Quercus*; [14]: A1f: on *Robinia*; A1g: on *Populus*;

[20]: B4a: on *Quercus*

*Physconia perisidiosa* (Erichsen) Moberg

[1]: A3b, A3c: on *Quercus*; [5]: B5a: on *Acer platanoides*; B5b: on *Tilia argentea*;

[14]: A1d: on *Quercus*; A1e: on *Quercus*; A1f: on *Robinia*; A1g: on *Populus*;

[20]: B3b: on *Carpinus betulus*; B4a: on *Quercus*

\**Placynthiella dasaea* (Stirt.) Tønsberg

[5]: B5a: on *Fagus*

*Pleurosticta acetabulum* (Neck.) Elix & Lumbsch

[20]: B4a: on *Quercus*

\**Pyrenula chlorospila* Arnold

[1]: A3b: in an oak forest near a brook on *Carpinus orientalis*

\**Pyrenula nitidella* (Flörke ex Schaer.) Müll. Arg

[20]: B3b: on *Carpinus betulus*

*Ramalina fastigiata* (Pers.) Ach.

[14]: A1c: on *Fagus*; A1f: on *Populus* & *Robinia*;

[20]: A4a: on *Fraxinus*; B4a: on *Quercus*

*Ramalina fraxinea* (L.) Ach.

[1]: B1: on *Ailanthus* & *Morus*

*Ramalina pollinaria* (Westr.) Ach.

[20]: B4a: on *Quercus*

\**Trapeliopsis flexuosa* (Fr.) Coppins & P. James

[5]: B5c: on *Abies*

*Usnea glabrescens* (Nyl. ex Vain.) Vain.

[14]: A1c: on *Abies* & *Fagus*

*Xanthoria parietina* (L.) Th. Fr.

[20]: B4a: on *Quercus*

lichenicolous fungus:

\**Milospium graphideorum* (Nyl.) D. Hawksw.

[1]: A3b: on *Opegrapha* spec. on *Carpinus orientalis*

#### 4. Discussion

The Balkan Peninsula is one of the floristically richest regions of Europe (BARTHLOTT et al. 1999) and its landscape is very diverse. Therefore, although endemism does not play a role in lichens (as is the case in vascular plants of the region concerned), it is highly



probable that the number of about 900 taxa that is known at present (MAYRHOFER et al. 2005) does not at all represent the existing diversity of lichens in Bulgaria. This conclusion can be backed up by the fact that a relatively high number of species new to Bulgaria was found within only a few days of collecting.

Particularly in the Strandzha Mountains, a considerable number of lichen species was found for the first time in this region or even as new records for Bulgaria. One reason for the magnitude of new findings in this region may be the insufficient knowledge of the lichen flora of this frontier area, which until today has been kept partly closed to the public. Another reason may be that Strandzha is biogeographically outstanding, belonging to the Euxinic floristic province. This province is characterised by relictic *Laurocerasus* vegetation in moist deciduous forests (but does not exclude the occurrence of outposts of Mediterranean elements in dry stands) (HERMANN 1936, MEUSEL et al. 1965). Thus, in Strandzha, Euxinic elements such as *Rhododendron ponticum*, *Ilex colchica* or *Vaccinium arctostaphylos* can be observed at their only localities in Bulgaria (FLORA BULGARICA 2003). Among the lichens recorded above, *Lecanora thysanophora* and *Phaeophyscia pusilloides* should be considered as Euxinic elements from a regional point of view, as they clearly prefer regions with high moisture availability during the warm season in their global distribution (see e. g. BRODO et al. 2001). Eventually, a more intensive lichen inventory, particularly in the Strandzha Mountains, will most probably add further species to the lichen list of Bulgaria.

## 5. Acknowledgements

The author is indebted to the staff at the Poda Nature Conservation Centre and at Strandzha Natural Park for kind support and to Alexa Michel (Berlin) for improving the English of this paper.

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Manuscript accepted: 15 November 2005

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Printed by WinterDruck, Herrnhut, Germany

ISSN 0373-7586