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Addition to the Lichenized Fungi (Ascomycota) of Central Rilski Reserve (Rila Mts.)

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Abstract. Fifty four species are reported from the Central Rilski Reserve. Among them, *Lecidea plana* is a new record for Rila Mts; *Nephromopsis chlorophylla* and *Calicium viride* (indicators of old-growth forest communities) were observed in the vicinity of Soleniya Dol stream and nearby the Musalemska Bistritsa river, while *Bryoria subcana*, *B. capillaris*, *B. fuscescens*, *Chaenotheca chryscephala*, *Hypogymnia tubulosa* and *Vulpicida pinastri* were observed with high frequency. *Cladonia coniocraea*, *C. ecmocyna*, *C. gracilis*, *C. macilenta*, *C. sulphurina*, *Diploschistes scruposus* f. *flavicans*, *Pertusaria albescens*, *Polychidium muscicola*, *Ramalina farinacea*, *Rhizocarpon hochstetterii* and *Rinodina milvina* are among the rarely recorded ones.

Key words: biodiversity, Bulgaria, old forests, Rila Mts.

Introduction

The Central Rilski Reserve (Southwestern Bulgaria, National Park Rila), with a total area of 12393.7 hectares, is the largest national reserve in the Balkan Peninsula. The higher parts of the subalpine belt are occupied mostly by communities of old-aged *Pinus mugo* Turra, *P. peuce* Griseb. and *Picea abies* (L.) H. Karst.

Many lichenized fungi had been recorded from Rila Mts ([SUZA, 1929](#); [SZATALA, 1930](#); [CRETZOIU, 1936](#); [MOTYKA & ZHELEZOVA, 1962](#); [KLOSS, 1962](#); [POPNIKOLOV & ZHELEZOVA, 1964](#); [PIŠÚT, 1969, 2001](#); [SLAVÍKOVÁ-BAYEROVÁ & ORANGE, 2006](#); [SLAVÍKOVÁ-BAYEROVÁ & FEHRER, 2007](#); [ATANASSOVA & MAYRHOFER, 2012](#)); however, studies on the biodiversity of lichens in the region of the reserve dated from the researches of [KAZANDZHIEV \(1900\)](#)

and [PODPĚRA \(1911\)](#), who listed 45 species mainly from Musala peak and Shatur (the former Chadur Tepe) peak. Later [ZHELEZOVA \(1956; 1960; 1962; 1963\)](#) noted 18 species in the reserve area. Prior to the present work 54 species belonging to 27 genera were known (Table 1).

This study is aimed to contribute to the species diversity of lichens, especially focusing on the rarely recorded taxa from the reserve area.

Materials and Methods

Field excursions were conducted in 2004 and 2015, and two regions of the Central Rilski Reserve were investigated, following the linear transects. They are: - Borovets park area (1). along the track from Sarugyol hut-Zhultoezeren Circus, altitudes 1580-2300 m;

(2). along the track from Sitnyakovo lift station - Soleniya Dol stream - Musalenska Bistritsa river, alts 1825-1740 m; (3). slope of Deno peak, 2650 m; - Beli Iskar park area (4). above Beli Iskar dam-lake, alts 2045-2206 m. On the basis of 160 specimens collected in the study regions, 54 lichen taxa growing on wood, rocks and soil have been examined. All new records for the reserve area are marked with an asterisk (*). The nomenclature of the lichen taxa given in Table 1 follows MAYRHOFER *et al.* (2005). The localization of the lichen collections follows the methods, described in STOYKOV (2014). Identifications were made generally after HENNIPMAN & SIPMAN (1978), HODGETTS (1992), DOBSON (2000) and SMITH *et al.* (2009). Microscopic examinations were prepared in distilled water and observed under Boeco BM-180/T/SP LM; lactophenol is used to examine ascus and spore details; oil immersion is added to observe ascospore morphology; spot tests with C, K, lugol (recipies after DOBSON, 2000) and UV light reaction were applied ex

situ. The herbarium specimens are housed at the Mycological Collection, Institute of Biodiversity and Ecosystem Research, Sofia (SOMF).

Results

Thirty five species are reported for the first time from the Central Rilski Reserve. *Lecidea plana* is a new record for Rila Mts. *Nephromopsis chlorophylla* and *Calicium viride* (indicators of old-growth forest communities) were observed in single points, while *Bryoria subcana*, *B. capillaris*, *B. fuscescens*, *Chaenotheca chryscephala*, *Hypogymnia physodes*, *H. tubulosa* and *Vulpicida pinastri* were observed with high frequence. *Baeomyces rufus*, *Cladonia carneola*, *C. coniocraea*, *C. gracilis*, *C. macilenta*, *C. sulphurina*, *Diploschistes scruposus* f. *flavicans*, *H. austrodes*, *Icmadophila ericetorum*, *Pertusaria albescens*, *Platismatia glauca*, *Polychidium muscicola*, *Ramalina farinacea*, *Rhizocarpon badioatrum*, *R. hochstetteri* and *Rinodina milvina* were studied from single localities.

Table 1. Lichenized fungi, known from Central Rilski Reserve.

Taxon	Author
<i>Alectoria ochroleuca</i>	PODPĚRA (1911); ZHELEZOVA (1956; 1960)
<i>Anaptychia ciliaris</i>	PODPĚRA (1911)
<i>Arthrorrhaphis citrinella</i>	PODPĚRA (1911); ZHELEZOVA (1960)
<i>Brodoa intestiniformis</i>	PODPĚRA (1911); ZHELEZOVA (1956)
<i>Cetraria aculeata</i>	KAZANDZHIEV (1900); PODPĚRA (1911)
<i>C. eicetorum</i> , <i>C. islandica</i>	PODPĚRA (1911)
<i>Cladonia arbuscula</i>	PODPĚRA (1911); ZHELEZOVA (1963)
<i>C. carneola</i>	PODPĚRA (1911)
<i>C. confusa</i> f. <i>confusa</i>	ZHELEZOVA (1956)
<i>C. deformis</i> , <i>C. digitata</i> , <i>C. ecmocyna</i>	PODPĚRA (1911)
<i>C. gracilis</i>	PODPĚRA (1911); ZHELEZOVA (1963)
<i>C. pocillum</i> , <i>C. pyxidata</i> , <i>C. rangiferina</i> , <i>C. sulphurina</i> , <i>C. uncialis</i> ssp. <i>uncialis</i>	PODPĚRA (1911)
<i>Cornicularia normoerica</i>	PODPĚRA (1911)
<i>Flavocetraria cucullata</i>	PODPĚRA (1911); ZHELEZOVA (1956)
<i>F. nivalis</i>	ZHELEZOVA (1956; 1960)
<i>Hypogymnia austrodes</i>	ZHELEZOVA (1960)
<i>Ionaspis lacustris</i> ; <i>Lecanora intricata</i> ; <i>L. polytropa</i> ; <i>Lecidea tessellata</i> ; <i>Parmelia omphalodes</i> , <i>P. saxatilis</i>	PODPĚRA (1911)
<i>Peltigera rufescens</i>	PODPĚRA (1911)
<i>P. didactyla</i>	ZHELEZOVA (1960)

<i>Porpidia albocaerulescens</i> , <i>P. flavocaerulescens</i> , <i>P. glaucophaea</i>	PODPĚRA (1911)
<i>Protomicarea limosa</i> ; <i>Protoparmeliopsis muralis</i> ; <i>Pseudephebe pubescens</i>	PODPĚRA (1911)
<i>Ophioparma ventosa</i>	ZHELEZOVA (1956; 1963)
<i>Pycnothelia papillaria</i>	PODPĚRA (1911); ZHELEZOVA (1960)
<i>Protopannaria pezizoides</i>	ZHELEZOVA (1963)
<i>Pseudevernia furfuracea</i>	ZHELEZOVA (1962)
<i>Rhizocarpon alpicola</i> , <i>R. geographicum</i> , <i>R. hochstetteri</i> , <i>R. petraeum</i>	PODPĚRA (1911)
<i>Solorina crocea</i>	PODPĚRA (1911); ZHELEZOVA (1956; 1963)
<i>Thamnolia vermicularis</i> var. <i>vermicularis</i>	PODPĚRA (1911); ZHELEZOVA (1956)
<i>Stereocaulon alpinum</i> , <i>Umbilicaria cylindrica</i> , <i>U. crustulosa</i> , <i>U. deusta</i> , <i>U. spodochroa</i>	PODPĚRA (1911)
<i>U. decussata</i>	ZHELEZOVA (1956)
<i>Vulpicida juniperinus</i>	PODPĚRA (1911)

List of taxa

**Acarospora fuscata* (Schrad.) Th. Fr. (1). N42°12'29.4'', E023°36'57.3'', 2293 m, SOMF 27473; (4). N42°06' 04.8'', E023°32'01.9'', 2068 m, on siliceous rocks, companied by *R. geographicum*, SOMF 30046;

**Alectoria sarmentosa* (Ach.) A. Massal., s.l. (2). N42°14'33.3'', E023°36'37.9'', 1783 m, on twigs of old spruce, SOMF 30050;

**Aspicilia cinerea* (L.) Körb. (2). near Musalenska Bistritsa river, N42°13'59.1'', E023°35'37.3'', 1875 m, on rocks, SOMF 30042;

**Baeomyces rufus* (Huds.) Rebent. (1). along the track to Zhultoezeren Circus, on soil, SOMF 27365; (2). N42°14'24.2'', E023°36'06'', 1745 m, on granite rock;

**Bryoria capillaris* (Ach.) Brodo & D. Hawksw., s.l. (1). N42°13'06.0'', E23°37'32.9'', 1580 m, SOMF 26263, on twigs of spruce; (2). N42°14'30.8'', E023°36'36.2'', 1770 m, on twigs of conifers, spot tests K, KC (+) yellow, C(+) red; N42°14'25.2'', E023°36'26.0'', 1730 m, N42°14'38.2'', E023°36'37.3'', 1824 m, SOMF 30051; N42°14'38.2'', E023°36'37.3'', 1830 m, on twigs of spruce;

**B. fuscescens* (Gyeln.) Brodo & D. Hawksw., s.l. (1). N42°13'06.0'', E023°37'32.9'', 1600 m; (2). N42°14'30.8'', E023°36'36.2'', 1770 m, SOMF 26257,

companied by *P. furfuracea*, on twigs; N42°14'33.3'', E023°36'37.9'', 1783 m, SOMF 30049, on twigs of spruce, companied by *H. physodes*;

**B. subcana* (Nyl. ex Stizenb.) Brodo & D. Hawksw., s.l. (1). N42°13'06.0'', E023°37'32.9'', 1600 m, on old spruce, spot tests (-); (2). N42°14'28.2'', E023°36' 09.5'', 1721 m, SOMF 26262, on bark of spruce, spot tests (-);

**Calicium viride* Pers. (2). N42°14'27.6'', E023°36'08.7'', 1728 m, nearby the Musalenska Bistritsa river, on bark of old-aged *Picea abies* trees (Fig. 1), SOMF 30061, UV(+), rare species;

Cetraria islandica (L.) Ach. (1). N42°13'06.0'', E023°37'32.9'', 1580 m, on soil, among grass; N42°12'39.2'', E023°37'05.7'', 2213 m, on soil, among moss; N42°12'30.9'', E023°37'00.7'', 2252 m, on soil, among mosses, N42°12'25.9'', E023°36'59.1'', 2286 m, on soil, among grasses with *Geum bulgaricum* Pančić, N42°12'29.4'', E023°36'57.3'', 2293 m, abundant on soil, SOMF 29711; (2). N42°14'30.8'', E023°36'36.2'', 1770 m, on grassy soil, among mosses, SOMF 26267; (3). on soil; (4). N42°06'00.6'', E023°31'29.4'', 2204 m, on soil; N42°06' 02.3°, E023°31'24.6'', 2206 m, SOMF 30044;

**Chaenoheca chrysoccephala* (Turner ex Ach.) Th. Fr. (2). N42°14'22.7'', E023°36'8.4'', 1745 m, on bark; N42°14'29.1'',

E023°36'21.3'', 1689 m, on bark; N42°14'23.9'', E023°36'31.6'', 1740 m, on bark of old spruce trees (Fig. 6);

Cladonia carneola (Fr.) Fr., s.l. (1). between 2100-2230 m, on soil, among mosses, SOMF 26260;

**C. coniocraea* (Flörke) Spreng. (1). N42°12'58.6'', E023°37'31.9'', 1990 m, on bark of spruce; (2). N42°14'33.3'', E023°36'37.9'', 1783 m, bark at the base of old spruce; N42°14'24.2'', E023°36'06.1'', 1738 m, idem., SOMF 30059; along the track to Musalenska Bistritsa river, among moss, on soil, SOMF 30052;

C. ecmocyna Leight., s.l. (1). N 42°12'30.9'', E023°37'00.7'', 2252 m, SOMF 30054;

**C. fimbriata* (L.) Fr. (1). N42°12'52.6'', E023°37'23.8'', 2050 m, SOMF 26264; (2). N42°14'30.8'', E023°36'36.2'', 1770 m, SOMF 30049; (4). N42°0'04.8'', E023°32'11.8'', 2045 m, on soil;

**C. furcata* (Huds.) Schrad. (1). N42°12'39.2'', E023°37'05.7'', 2213 m, on soil with mosses, as f. *foliolosa*; (2). N42°14'30.8'', E023°36'36.2'', 1770 m, on soil, SOMF 27217;

C. gracilis (L.) Willd., s.l. (1). N42°12'30.9'', E023°37'00.7'', 2252 m, on soil among mosses, SOMF 26261;

**C. macilenta* Hoffm. (2). N42°14'33.3'', E023°36'37.9'', 1783 m, on decaying bark, SOMF 30043; N42°14'30.8'', E023°36'36.2'', 1769 m, with sparingly branched podetia, on decaying old trunk, SOMF 29638, spot tests C(-), K(+) yellow;

C. pyxidata (L.) Hoffm. (1). N42°12'43.6'', E023°37'11.4'', 2133 m, on soil, SOMF 27344; (3). on soil;

C. rangiferina (L.) F.H. Wigg. (1). N42°12'30.9'', E023°37'00.7'', 2252 m, on soil among moss; growing with podetia of *C. gracilis*, (3). on soil; (4). N42°06'02.3'', E023°31'24.6'', 2206 m, on soil;

C. sulphurina (Michx.) Fr., s.l. (1). N42°12'30.9'', E023°37'00.7'', 2252 m, on soil, among moss, SOMF 30038, podetia up to 4.5 cm, with red apothecia on podetial tips, spores oval, 10-11.5 × 4-5 µm (in tap water), spot tests C(-), K(-), CK (faint yellow), UV(+); white, basal squamules usually large, spot

test K(+) under LM dark purple (some morphotypes of *C. pleurota* (Flörke) Schaer. and *C. carneola* could be distinguished from *C. sulphurina* with the help of t.l.c. analysis only); idem., on decaying trunk, SOMF 27482;

C. uncialis (L.) Weber ex F.H. Wigg. ssp. *uncialis* (1). N42°12' 30.9'', E023°37' 00.7'', 2252 m, on soil among plant debris and mosses, SOMF 30039;

**Diploschistes scruposus* (Schreb.) Norman f. *flavicans* (Moris & De Not.) Zahlbr. (2). N42°14'22.7'', E023°36'28.4'', 1745 m, on big rocks near the track to Soleniya Dol stream, SOMF 30048; N42°13'59.1'', E023°35'37.3'', 1780 m, above Musalenska Bistritsa river, along the road to Musala chalet, SOMF 30053 (Fig. 3);

**Evernia divaricata* (L.) Ach. (1). N42°12'58.6'', E023°37'31.9'', 1990 m; (2). N42°14'25.2'', E023°36'26.0'', 1730 m, spot tests K, CK(-); N42°14'33.3'', E023°36'37.9'', 1783 m, on twigs of spruce, N42°13'59.1'', E023°35'37.3'', 1780 m; above Musalenska Bistritsa river, along the track to Musala chalet, on branches of *Abies alba*, UV (-), spot tests K, KC (-), according to ZHELEZOVA (1963) it is common in mountainous coniferous forests;

Hypogymnia austrodes (Nyl.) Räsänen (1). N42°12'29.4'', E023°36'57.3'', 2293 m, on decorticated twig of *Pinus mugo*;

**H. physodes* (L.) Nyl. (2). N42°14'30.8'', E023°36'36.2'', 1770 m, on twigs, SOMF 30049;

**H. tubulosa* (Schaer.) Hav. (1). N42°12'58.6'', E023°37'31.9'', 1990 m, on twigs, SOMF 30057; (2). N42°14'25.2'', E023°36'26.0'', 1730 m, on bark of conifers;

**Icmadophila ericetorum* (L.) Zahlbr. (1). N42°12'43.6'', E023°37'11.4'', 2133 m, on decaying wood, SOMF 26266;

Lecanora polytropa (Ehrh. ex Hoffm.) Rabenh. (1). N42°12'58.6'', E023°37'31.9'', 1990 m; (4). N42°06'04.8'', E023°32'01.9'', 2070 m, accompanied by *R. geographicum*, on rocks, SOMF 30045;

**Lecidea plana* (J. Lahm) Nyl. (1). N42°12'58.6'', E023°37'31.9'', 1990 m, on siliceous rocks, SOMF 26258;

**Lepraria incana* (L.) Ach., s.l. (1). along the track to Zhultoezeren Circus, on small wooden piece, spot tests C, K, CK(-); (2). N42°14'30.8'', E023°36'36.2'', 1770 m, spot test C, K(-), on decaying trunk; N42°14'22.7'', E023°36'28.4'', 1745 m; N42°14'33.3'', E023°36'37.9'', 1783 m, on bark of old spruce;

**Nephromopsis chlorophylla* (Willd.) Divakar, A. Crespo & Lumbsch (2). N42°14'28.2'', E023°36'09.5'', 1721 m, on twig of coniferous tree (Fig. 5), SOMF 28749, spot tests K, C(-), rare species;

Parmelia saxatilis (L.) Ach. (1). N42°13'06'', E023°37'32.9'', 1600 m, on mossy rock; (2). along the track from Solenia Dol stream to Musalenska Bistrita river, on mossy rock;

**P. sulcata* Taylor (1). N42°13'06'', E023°37'32.9'', 1600 m; (2). N42°14'24.2'', E023°36'06.1'', 1740 m; N42°14'30.8'', E023°36'36.2'', 1770 m, on bark of old spruce; **Peltigera aphthosa* (L.) Willd. (1). N42°12'42.2'', E023°37'08.9'', 2152 m, on peat soil, among moss, UV(+) orange;

**P. canina* (L.) Willd. (2). N42°14'25.1'', E023°36'32.6'', about 1712 m, on soil, among moss, SOMF 26259;

**P. venosa* (L.) Hoffm. (1). N42°12'58.6'', E023°37'31.9'', 1990 m, on soil, SOMF 30041 (Fig. 8);

**Pertusaria albescens* (Huds.) M. Choisy & Werner (2). N42°14'22.7'', E023°36'28.4'', 1745 m, on bark of tree by Soleniya Dol stream;

**P. lactea* (L.) Arnold (2). N42°14'25.1'', E023°36'32.6'', 1712 m; (4). N42°06'02.3'', E023°31'24.6'', 2206 m, on rocks, UV(+);

**Platismatia glauca* (L.) W.L. Culb. & C.F. Culb. (2). N42°14'24.2'', E023°36'06.1'', 1735 m, on bark of old spruce;

**Polychidium muscicola* (Sw.) Gray (1). N42°12'58.6'', E023°37'31.9'', 1990 m, with apothecia, on siliceous rocks, SOMF 30062, rare species (Fig. 4);

Protoparmeliopsis muralis (Schreb.) M. Choisy (1). along the track from N42°12'58.6'', E023°37'31.9'', 1990 m towards N42°12'40.9'', E023°37'07.7'', 2190 m, on rocks;

Pseudevernia furfuracea (L.) Zopf (1). N42°13'06'', E023°37'32.9'', 1600 m,

N42°12'52.6'', E023°37'23.8'', 2050 m, abundant on twigs and bark of *Pinus mugo*; (2). N42°14'22.7'', E023°36'28.4'', 1745 m, on twigs of spruce, common;

**Ramalina farinacea* (L.) Ach. (2). N42°14'22.7'', E023°36'28.4'', 1745 m, on bark of old tree;

**Rhizocarpon badioatrum* (Flörke ex Spreng.) Th. Fr. (1) along the track to Zhultoezeren Circus, between 2000-2300 m, on rocks, SOMF 26255;

R. geographicum (L.) DC., s.l. (1). N42°12'58.6'', E023°37'31.9'', 1990 m; along the banks of the first lake, 2200 m; (2) N42°14'30.8'', E023°36'36.2'', 1769 m; (4). N42°06'04.8'', E023°32'01.9'', 2068 m, on siliceous rocks, UV(+);

R. hochstetteri (Körb.) Vain. (1). N42°12'58.6'', E023°37'31.9'', 1990 m, along the track to Zhultoezeren Circus, on siliceous rocks, SOMF 30055 (Fig. 2);

**Rinodina milvina* (Wahlenb.) Th. Fr. (2). N42°14'30.8'', E023°36'36.2'', 1769 m, on siliceous rocks, SOMF 30056 (Fig. 7);

Thamnolia vermicularis (Sw.) Schaer. var. *vermicularis* (1). N42°12'29.4'', E023°36'57.3'', 2293 m, on soil, SOMF 30060, UV (+) faint orange;

Umbilicaria crustulosa (Ach.) Frey (1). N42°13'06.0'', E023°37'32.9'', 1600 m, on rocks, SOMF 30058, accompanied by *U. deusta*; (4). N42°06'02.8'', E023°31'23.2'', 2205 m, on rock;

U. cylindrica var. *fimbriata* (Ach.) Nyl. (1). N42°12'58.6'', E023°37'31.9'', 1990 m; (4). N42°06'04.8'', E023°32'11.8'', 2045 m, SOMF 30047, on rocks;

U. deusta (L.) Baumg. (1). N42°12'58.6'', E23°37'31.9', 1990 m, along the track to Zhultoezeren Circus, on rocks; (2). N42°13'59.1'', E023°35'37.3'', 1780 m, on large granite rock by the path to Musala chalet; (4). N42°06'00.6'', E023°31'29.4'', 2204 m, on rock;

**Usnea filipendula* Stirt., s.l. (1). N42°12'58.6'', E023°37'31.9'', 1990 m, on twigs; (2). N42°14'33.3'', E023°36'37.9'', 1783 m, on twigs of conifers, SOMF 30059, spot tests C(-), K(+);

**U. florida* (L.) F.H. Wigg., s.l. (1). N42°12'58.6'', E023°37' 31.9'', 1990 m; (2). N42°14'25.1'', E023°36'32.6'', 1712 m, on twigs of spruce, SOMF 30052; (2). N42°14'33.3'', E023°36'37.9'', 1783 m, on twigs of spruce;

**Vulpicida pinastri* (Scop.) J.-E. Mattsson & M.J. Lai (1). N42°12'52.6'', E023°37'23.8'', 2050 m, on twigs of *Pinus mugo*, accompanied by *H. physodes*, *H. tubulosa* and *P. furfuracea*, SOMF 26254; (2). N42°14'29.2'', E023°36'21.6'', 1685 m, N42°14'29.1'', E023°36'21.3'', 1690 m, spot tests C, CK(-), N42°14'23.9'', E023°36'31.6'', N42°14'25.4'', E023°36'07.5'', 1740 m, spot tests (-), N42°14'38.2'', E023°36'37.3'', 1824 m, SOMF 30040, on bark of old spruce trees.

Discussion

As a result of field work and the microscopic examination under LM of the materials, collected from the studied areas in the Central Rilski Reserve (Fig. 9), 54 species of lichenized fungi are reported.

Calicium viride (Fig. 1) was known so far in Bulgaria from Rila (Parangalitsa Reserve, 1600 m, Borovets - ZHELEZOVA (1960) on bark of spruce, and by the road to Ribnite Lakes, 1300 m - ZHELEZOVA (1956) on *Abies alba*), Rhodopi (Jundola resort, at 1300 m - PIŠÚT (2001) on *A. alba*) and Pirin Mts - IVANOV (2010). During the present study it was observed with thalli, grown on bark of old-aged spruce trees near the bank of the Musalenska Bistritsa river. *Diploschistes scruposus* f. *flavicans* was reported on granite rock, at 1700 m, along the road from Borovets resort to Musala peak by ZHELEZOVA (1963). During this excursion it was collected in the reserve area (during the track to Soleniya Dol stream) and by the road to Musala peak, 1780 m (Fig. 3). *Nephromopsis chlorophylla* (Fig. 5), known in Bulgaria under the name of *Cetraria chlorophylla* (Willd.) Vain. - POPNIKOLOV & ZHELEZOVA (1964), recorded for the first time from the area of Central Rilski Reserve, is considered as old-growth forests indicator (ELLIS et al., 2015). It is known as a species of

conservation concern in some parts of Europe (CZARNOTA, 2012; GRAHAM, 2012). *Rinodina milvina* (Fig. 7) was reported by SUZA (1929) on granite rock at 1600-1800 m from Rila Mts (Skakavitsa Reserve). It is registered in a single point from the Central Rilski Reserve, at 1770 m. *Polychidium muscicola* (Fig. 4) is a rare species in Bulgaria, known only with single localities in Rila (SUZA, 1929) and Rhodopi Mts (SZATALA, 1930). It was collected on siliceous rocks above Sarugyol hut at 1990 m. *Icmadophila ericetorum* was known from Rila Mts (Parangalitsa Reserve) at 1900 m on decaying trunk (ZHELEZOVA, 1960) and *Alectoria sarmentosa* was known from the Rilomanastirska Gora Reserve (vicinities of Kirilova Polyana, at 1250 m) on twigs of *Abies alba* (ZHELEZOVA, 1956).

During our field work in the collection sites (Fig. 9) we have observed the following species *Alectoria sarmentosa*, *Calicium viride*, *Chaenotheca chryscephala* (Fig. 6), *Cladonia coniocraea*, *C. macilenta*, *Evernia divaricata*, *Hypogymnia austrodes*, *H. physodes*, *H. tubulosa*, *Icmadophila ericetorum*, *Nephromopsis chlorophylla*, *Parmelia sulcata*, *Pseudevernia furfuracea*, *Platismatia glauca*, *Vulpicida pinastri*, *Pertusaria albescens*, *Ramalina farinacea*, *Lepraria incana* s.l. along with *Bryoria capillaris*, *B. fuscescens*, *B. subcana* and *Usnea filipendula*. *U. florida* (with pendulous thalli) have ecological preferences to old-growth conifers (*Picea abies*, *Pinus mugo*). Some of them are known as lichens, associated with different types of old-growth boreal forests in Northern Europe (MOTIEJŪNAITÉ et al., 2004; LÖHMUS & LÖHMUS, 2011; ANDROSOVA et al., 2018).

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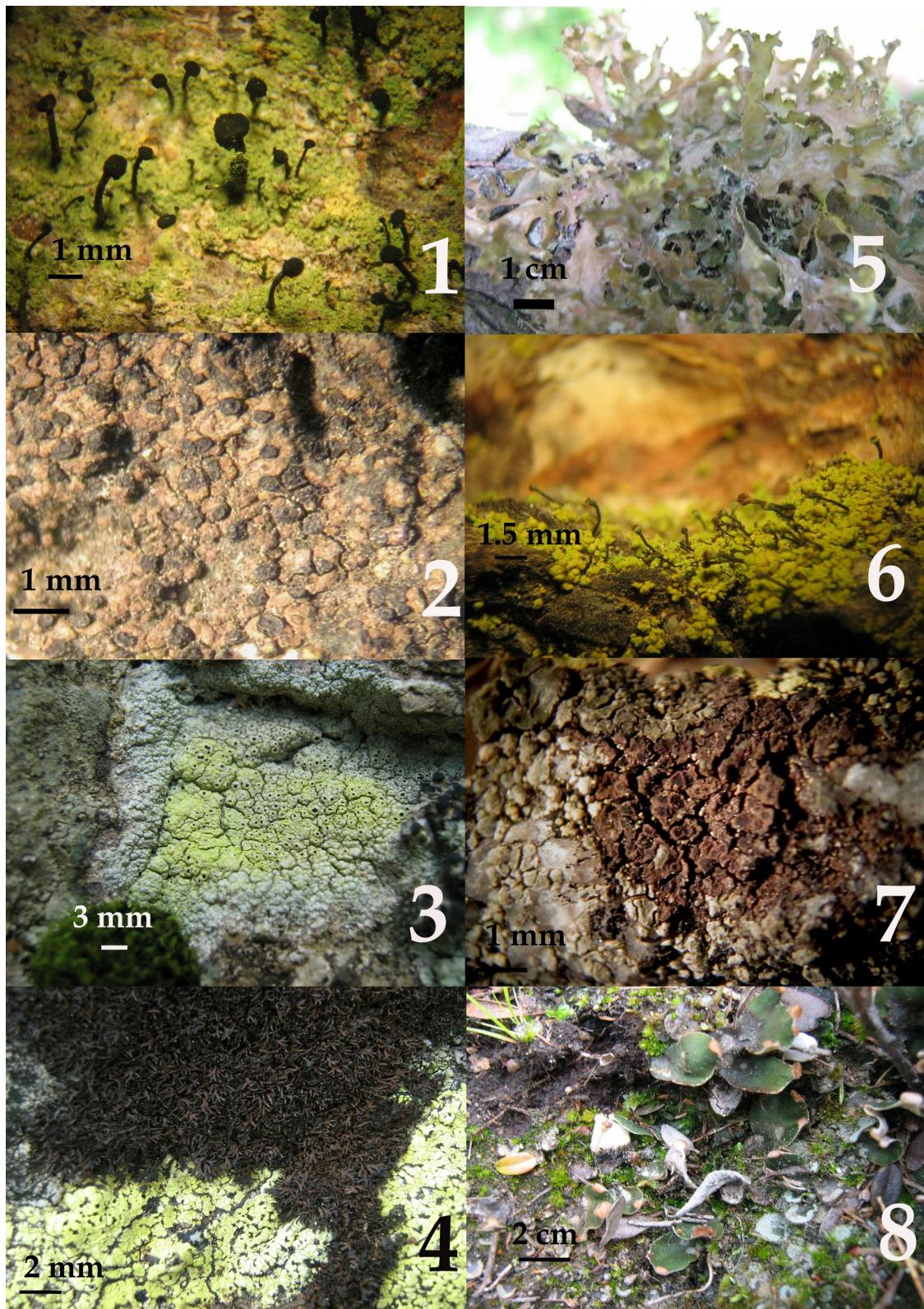


Fig. 1-8. Thalli of: 1. *C. viride* (ex situ); 2. *R. hochstetteri* (ex situ); 3. *D. scruposus* f. *flavicans*; 4. *P. muscicola*; 5. *N. chlorophylla*; 6. *C. chrysocephala* (ex situ); 7. *R. milvina* (ex situ); 8. *P. venosa*.

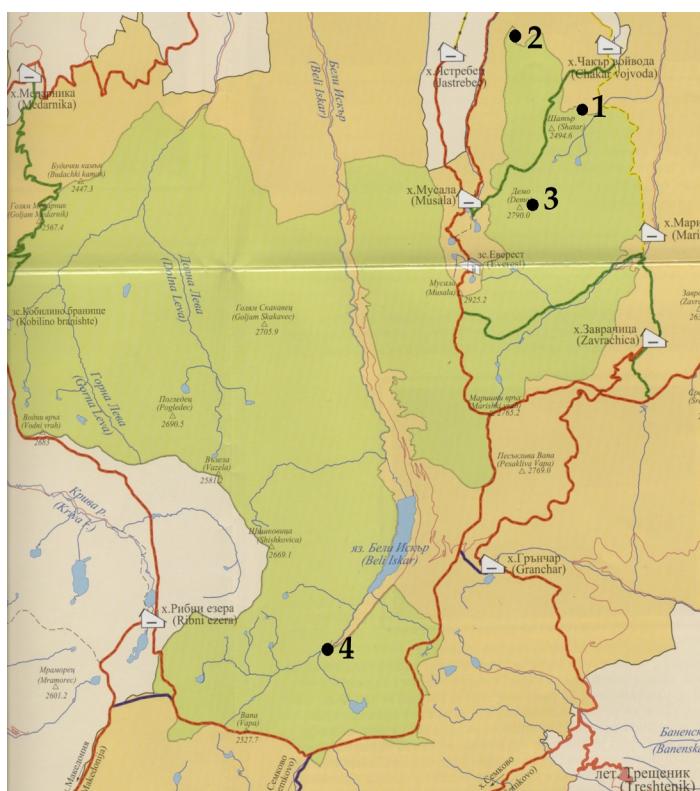


Fig. 9. Indicative map of the collection sites.

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