

GDK 172.9:228.81 Ždrocle:(497.12 Snežnik)

Prispelo / Received: 24. 11. 2000

Sprejeto / Accepted :16. 01. 2001

Izvorni znanstveni članek
Original scientific paper

THE LICHENS OF THE ŽDROCLE FOREST RESERVE

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Abstract:

88 lichenized and 2 lichenicolous fungi are reported from the Ždrocle Forest Reserve. The association *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora* hosts the greatest biodiversity of lichens. One species (*Biatora flavopunctata*) is new for the flora of Slovenia, two species (*Collema furfuraceum* and *Lecanora subintricata*) and one variety (*Cladonia macilenta* ssp. *floerkeana*) are new for the dinaric phytogeographical region.

Key words: Flora of Slovenia, Snežnik, Ždrocle, lichens, lichenicolous fungi, distribution, biodiversity, forest reserve.

LIŠAJI GOZDNEGA REZERVATA ŽDROCLE

Izvleček

88 vrst lišajev ter 2 vrsti liheniziranih gliv je bilo zabeleženih v Gozdnem rezervatu Ždrocle. Največja lišajska diverziteteta je bila opažena znotraj asociacije *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora*. Zabeležena je ena nova vrsta lišaja za Slovenijo (*Biatora flavopunctata*), dve vrsti (*Collema furfuraceum* and *Lecanora subintricata*) sta novi za dinarsko fitogeografsko regijo.

Ključne besede: flora Slovenije, Snežnik, Ždrocle, lišaji, lihenizirane glive, razširjenost, biodiverziteteta, pragozd

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1 INTRODUCTION

UVOD

The biodiversity of lichens has been investigated in several regions of Slovenia in recent years including areas of the Snežnik-Javorniki region (GRUBE / BATIČ / MAYRHOFER 1995, 1998; ARUP et al. 2001), Pohorje (MAYRHOFER / KOCH / BATIČ 1996, MAYRHOFER / MATZER / BELEC 1998), Trnovski gozd (PRÜGGER / MAYRHOFER / BATIČ 2000), Uršlja gora (SUPPAN / MAYRHOFER in press), the area of Zasavje (VIDERGAR-GORJUP / BATIČ / MAYRHOFER in press), and Triglav National Park (BATIČ et al., in prep.). Suppan, Prügger & Mayrhofer (2000) have provided an evaluation of the accessible literature records as another base for further lichenological studies. Thus, they have processed it as a catalogue of taxa with geographical integration of records according to the phyto-geographical division of the country by Wraber (1969). The first records of lichens from the Snežnik region were done by Biasoletto (1846).

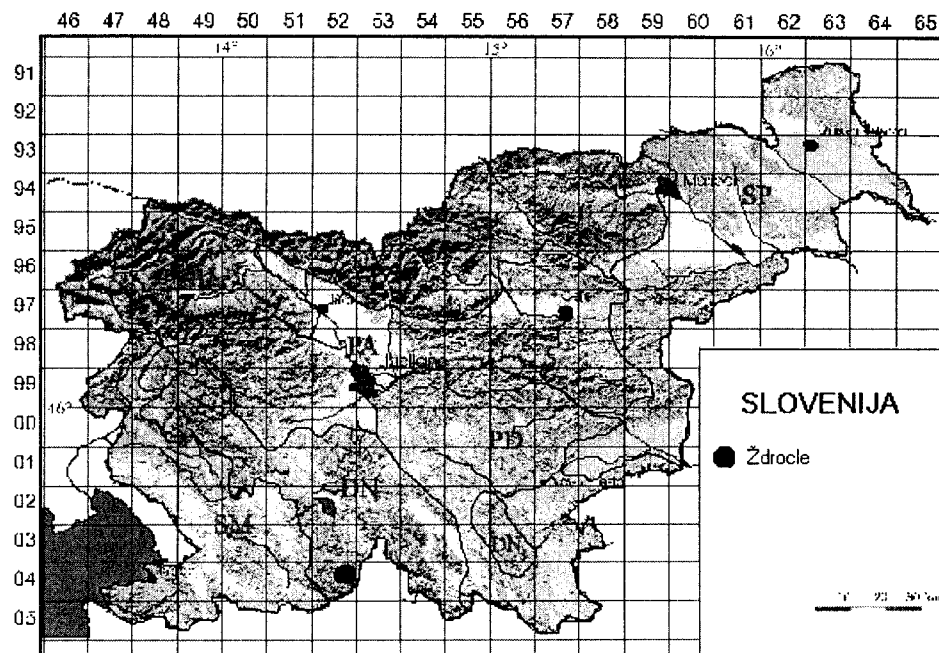
2 GENERAL ECOLOGICAL CONDITIONS

OPIS SPLOŠNIH EKOLOŠKIH RAZMER

The Ždrocle Forest Reserve is located on the south-eastern side of Snežnik (1796 m), the highest peak of a mountainous karst plateau in the south of Slovenia, near the border with Croatia (Fig. 1). It covers an area of 184,26 ha between 1300 m and 1478 m (Fig. 2; Ždrocle at the northern side of the reserve 1478 m, Omance in the southeast 1266 m) (JANEŽIČ 1985). Ždrocle are karst depressions with steep walls that are typical for the area and the forest reserve (ZUPAN-HAJNA 1997). Southwest from the biggest and the only grassy region Andrejev studenec, the area takes its name from the 1478 m high summit called Ždrocle. The same name is in local use for the mentioned steep depressions where snow frequently remains throughout the year.

The diverse climate is due to interference from Mediterranean, Atlantic and Continental influence, which results in a high amount of precipitations (2738 mm – Gomance, 937 m) (B. ZUPANČIČ 1995) and temperatures (6,7 °C year average - Gomance). The summer is short and fresh whereas winter is long but not too cold. Autumn (average 7,7 °C) is

warmer than spring (average 5,5 °C). Temperature and therefore inversion of vegetation especially above 1200 m is clearly visible in depressions. The vegetation period lasts from May until September (MEKINDA-MAJARON 1995).



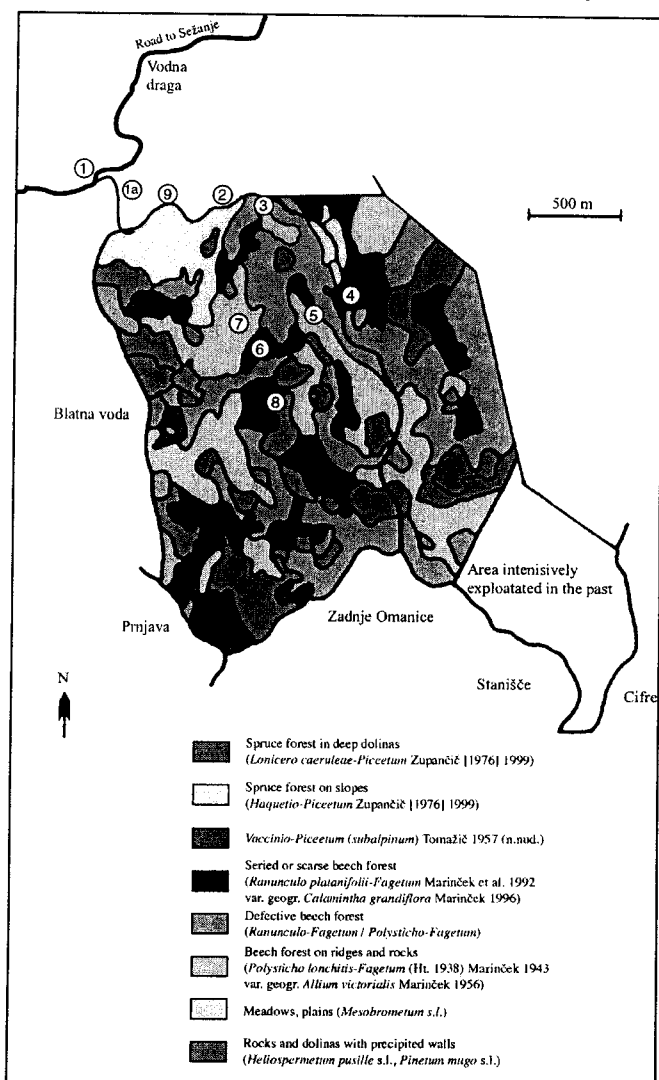
Picture 1: Location of the Ždrocle forest reserve in Slovenia

Slika 1: Lokacija gozdnega rezervata Ždrocle

The bedrock of the Snežnik plateau is built on Jurassic and cretaceous limestone and dolomites and their breccias. During the last glaciation the area of Ždrocle was situated above the perpetual snow line and was covered by permanent ice (ŠIFRER 1959).

In comparison to the northern side of Snežnik, covered with mixed beech and fir forests (*Omphalodo-Fagetum* s.l. dominating) and where large and rounded valleys occur, the southern side and especially the Ždrocle Forest Reserve is characterised by small, deep depressions (Fig. 2) and peaks with precipices where mainly pure beech forests prevail

(*Polysticho lonchitis-Fagetum* var. geogr. *Allium victorialis* on peaks exposed to wind and *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora* mainly on



Picture 2: Vegetation map of the Ždrocľe Forest Reserve and collection sites (according to JANEŽIČ 1985, associations renamed)

Slika 2: Karta vegetacije gozdnega rezervata Ždrocľe z vzorčnimi ploskvami (povzeto po JANEŽIČ 1995, združbe preimenovane)

slopes below the former association; Fig. 7), whereas conifers are restricted generally to small and deep valleys (*Hacquetio-Piceetum*: frequent association in valleys where temperature and vegetation inversion occur (Fig. 6), *Lonicero caeruleae-Piceetum*: in deep valleys also with distinctive inversion of vegetation and *Vaccinio-Piceetum*: in open areas exposed to wind; *Lamio orvalae-Aceretum* s.l. occurs in the reserve only sparsely). From the phyto-geographical point of view the area belongs to the Dinaric phyto-geographical region (WRABER 1969) or Snežnik-Risnjak district (ZUPANČIČ et al. 1987).

The forest is mainly untouched mostly because of the unusual wilderness. Between 1903 and 1969 only the southeastern part called Omance and a smaller part in northwest of the reserve were exploited because of accessibility and larger stands of spruce (JANEŽIČ 1985).



Picture 3: A group of *Acer pseudoplatanus* at the margin of a depression.

Slike 3: Skupina gorskega javorja na robu vrtače

3 METHODS

METODE

During fieldwork mostly epiphytic lichens were collected. Lichen species were determined using classical methods (WIRTH 1995) and some of the mainly leprose thali using TLC. Nomenclature follows Santesson (1993) and Wirth (1995).

3.1 COLLECTION SITES

OPIS VZORČNIH PLOSKEV

- 1 Slovenia, SE Snežnik, SW Vodna draga, ca. 700 m NNW Ždrocle, near the road, *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora*, 1365 m; x=5458550 / y=5048300; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998
- 1a Slovenia, SE Snežnik, SW Vodna draga, ca. 700 m NNW Ždrocle, on the road to the forest reserve, *Hacquetio-Piceetum*, 1360 m; x= 5458600 / y= 5048150; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998
- 2 Slovenia, SE Snežnik, ca. 300 m N Ždrocle, near forest road, *Hacquetio-Piceetum*, 1345 m; x=5458800 / y=5048100; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998
- 3 Slovenia, SE Snežnik, NNE Ždrocle, Andrejev studenec (Andreas-Quelle), *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora* and *Hacquetio-Piceetum*, 1360 m; x=5459125 / y=5048125; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998
- 4 Slovenia, SE Snežnik, eastern slopes of Ždrocle, *Hacquetio-Piceetum*, 1380 m; x=5459250 / y=5047800; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998
- 5 Slovenia, SE Snežnik, eastern slopes of Ždrocle, *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora*, 1385 m; x=5459125 / y=5047750; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998
- 6 Slovenia, SE Snežnik, eastern slopes of Ždrocle; *Polysticho lonchitis-Fagetum* var. geogr. *Allium victorialis*, 1407 m, x=5459000 / y=5047625; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998

- 7 Slovenia, SE Snežnik, summit of Ždrocle, *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora*, 1460 m; x=5458850 / y=5047700; MTB 0452/2; leg.: J. Prügger & B. Surina; 23.10.1998
- 8 Slovenia, SE Snežnik, Forest reserve Ždrocle, base of *Fagus sylvatica*, *Hacquetio-Piceetum*; x=5459000 / y=5047500; MTB 0452/2; leg.: B. Surina; 31.10.1998
- 9 Slovenia, SE Snežnik, Forest reserve Ždrocle, *Hacquetio-Piceetum*; x=5048130 / y=5458670; MTB 0452/2; leg.: B. Surina; 31.10.1998

The abbreviations used for substrata follow Trpin and Vreš (1995):

Acepseu *Acer pseudoplatanus*

Fagsylv *Fagus sylvatica*

Picabie *Picea abies*

4 INVESTIGATION RESULTS REZULTATI RAZISKAVE

4.1 LIST OF TAXA SEZNAM VRST

Species names are followed by locality numbers and substrates.

- Acrocordia gemmata* (Ach.) A. Massal.: 6 (Fagsylv);
- Arthonia radiata* (Pers.) Ach.: 3 (Acepseu); 4 (Fagsylv); 6 (Acepseu, Fagsylv);
- Arthonia vinosa* Leight.: 3 (Acepseu);
- Bacidia circumspecta* (Nyl. ex Vain.) Malme: 7 (Fagsylv);
- Bacidia globulosa* (Flörke) Hafellner & V. Wirth: 1 (Acepseu); 4 (Fagsylv);
- Bacidia rubella* (Hoffm.) A. Massal.: 6 (Fagsylv);
- Bacidia subincompta* (Nyl.) Arnold: 4 (Fagsylv); 6 (Fagsylv);
- Belonia herculina* (Rehm) Keissl.: 4 (Fagsylv);
- Biatora chrysantha* (Zahlbr.) Printzen: 3 (Acepseu);
- Biatora efflorescens* (Hedl.) Räsänen: 4 (trunk and base of Acepseu);
- Biatora flavopunctata* (Tønsberg) Hinteregger & Printzen: 4 (Fagsylv);
- Biatora subduplex* (Nyl.) Printzen: 4 (Fagsylv);
- Biatoridium monasteriense* J. Lahm: 3 (Acepseu);

- Calicium salicinum* Pers.: 5 (wood of *Fagsylv*);
Caloplaca herbidella (Hue) H. Magn.: 1 (*Acepseu*); 3 (*Acepseu*); 6 (*Acepseu*);
Candelariella reflexa (Nyl.) Lettau: 6 (*Acepseu*; trunk and mosses on *Fagsylv*);
Catinaria atropurpurea (Schaer.) Vezda & Poelt: 3 (rotting wood);
Cetrelia cetrarioides (Duby) W.L. Culb. & C.F. Culb.: 4 (*Fagsylv*);
Cladonia coniocraea auct.: 2 (stumps);
Cladonia digitata (L.) Hoffm.: 2 (stumps);
Cladonia macilenta Hoffm. ssp. *macilenta*: 2 (stumps);
Cladonia macilenta Hoffm. ssp. *floerkeana* (Fr.) V. Wirth: 2 (stumps);
Cladonia pyxidata (L.) Hoffm.: 1 (*Acepseu*); 2 (stumps); 3 (mosses on *Acepseu*); 7 (mosses on *Fagsylv*);
Cladonia squamosa (Scop.) Hoffm.: 2 (stumps);
Collema auriforme (With.) Coppins & J.R. Laundon: 4 (mosses above rocks);
Collema flaccidum (Ach.) Ach.: 4 (*Fagsylv*);
Collema furfuraceum (Arnold) Du Rietz: 4 (*Fagsylv*);
Degelia plumbea (Lightf.) P.M. Jørg. & P. James: 4 (*Fagsylv*);
Evernia prunastri (L.) Ach. var. *herinii* (P.A. Duvign.) Maas Geest.: 1 (*Acepseu*);
Fuscidea cyathoides (Ach.) V. Wirth & Vezda var. *corticola* (Fr.) Kalb: 6 (*Fagsylv*);
Graphis scripta (L.) Ach.: 7 (*Fagsylv*);
Gyalecta truncigena (Ach.) Hepp: 4 (*Fagsylv*);
Hypogymnia tubulosa (Schaer.) Hav.: 1 (twigs of *Picabie*);
Hypogymnia physodes (L.) Nyl.: 1 (*Picabie*);
Icmadophila ericetorum (L.) Zahlbr.: 2 (stumps; *Picabie*);
Lecanora allophana Nyl.: 4 (*Fagsylv*);
Lecanora argentata (Ach.) Malme: 1 (*Acepseu*); 3 (*Acepseu*); 6 (*Acepseu*; *Fagsylv*);
Lecanora chlarotera Nyl.: 3 (*Acepseu*); 6 (*Acepseu*; *Fagsylv*);
Lecanora horiza (Ach.) Linds.: 1 (*Acepseu*); 4 (*Fagsylv*); 6 (*Fagsylv*); 8 (*Fagsylv*);
Lecanora saligna (Schrad.) Zahlbr. var. *sarcopis* (Ach.) Hillmann: 6 (*Fagsylv*);
Lecanora subcarpineae Szatala: 1 (*Acepseu*);
Lecanora subintricata (Nyl.) Th. Fr.: 5 (wood of *Fagsylv*);
Lecidella elaeochroma (Ach.) M. Choisy: 1 (*Acepseu*); 4 (*Fagsylv*); 6 (*Acepseu*);
Lepraria eburnea J.R. Laundon: 1 (base of *Acepseu*); 2 (stumps); 3 (trunk and base of *Acepseu*); 4 (base of *Acepseu*, *Fagsylv*); 7 (*Fagsylv*);
Lepraria elobata Tønsberg: 5 (*Fagsylv*);

- Lepraria lobificans* J.R. Laundon: 3 (*Acepseu*);
Lepraria rigidula (de Lesd.) Tønsberg: 7 (mosses on *Fagsylv*);
Leptogium gelatinosum (With.) J.R. Laundon: 4 (mosses above rocks);
Leptogium lichenoides (L.) Zahlbr.: 4 (mosses on *Fagsylv*);
Lobaria pulmonaria (L.) Hoffm.: 1 (*Acepseu*); 3 (*Acepseu*); 4 (*Fagsylv*); 6 (*Acepseu*);
Melanelia fuliginosa (Fr. ex Duby) Essl.: 1 (*Acepseu*); 3 (*Acepseu*); 4 (*Acepseu*); 6 (*Acepseu*, *Fagsylv*);
Micarea denigrata (Fr.) Hedl.: 3 (rotting wood);
Micarea lignaria (Ach.) Hedl.: 2 (stumps);
Micarea prasina Fr.: 2 (stumps);
Mycobilimbia epixanthoides (Nyl.) ined.: 3 (*Acepseu*);
Mycobilimbia microcarpa (Th. Fr.) Brunnb.: 4 (mosses above rocks);
Mycobilimbia sabuletorum (Schreb.) Hafellner: on *Peltigera collina*.
Mycoblastus sanguinarius (L.) Norman: 1 (*Picabie*);
Nephroma resupinatum (L.) Ach.: 3 (*Acepseu*); 4 (*Fagsylv*; mosses on *Fagsylv*);
Normandina pulchella (Borrer) Nyl.: 4 (base of *Acepseu*; mosses on *Fagsylv*); 6 (mosses on *Fagsylv*);
Ochrolechia androgyna (Hoffm.) Arnold: 1 (*Acepseu*); 3 (*Acepseu*); 4 (*Acepseu*, *Fagsylv*); 6 (*Acepseu*, *Fagsylv*);
Ochrolechia subviridis (Høeg) Erichsen: 6 (trunk and mosses on *Fagsylv*);
Ochrolechia szatalaensis Verseghy: 1 (*Acepseu*);
Parmelia saxatilis (L.) Ach.: 1 (*Acepseu*); 3 (*Acepseu*); 4 (*Acepseu*);
Parmelia sulcata Taylor: 1 (*Acepseu*); 3 (*Acepseu*);
Parmeliella triptophylla (Ach.) Müll. Arg.: 1 (mosses on *Acepseu*); 3 (*Acepseu*);
Parmelina pastillifera (Harm.) Hale: 6 (*Acepseu*; *Fagsylv*);
Peltigera canina (L.) Willd.: 5 (mosses above rocks); 8 (base of *Fagsylv*);
Peltigera collina (Ach.) Schrad.: 3 (mossy base of trunks *Acepseu*); 4 (mosses on *Fagsylv*; mossy base of *Fagsylv*);
Peltigera leucophlebia (Nyl.) Gyeln.: 1 (mosses on soil)
Peltigera polydactylon (Neck.) Hoffm.: 4 (base of *Acepseu*);
Peltigera praetextata (Flörke ex Sommerf.) Zopf: 4 (mosses above rocks, mossy base of *Acepseu* and *Fagsylv*); 6 (base of *Acepseu*);
Pertusaria albescens (Huds.) M. Choisy & Werner var. *albescens*: 1 (*Acepseu*); 3 (*Acepseu*); 6 (*Fagsylv*);

- Pertusaria albescens* (Huds.) M. Choisy var. *corallina* auct.: 1 (*Acepseu*); 3 (*Acepseu*); 4 (*Acepseu*, *Fagsylv*, mosses on *Fagsylv*); 6 (*Acepseu*, *Fagsylv*, mosses on *Fagsylv*);
Pertusaria amara (Ach.) Nyl.: 1 (*Picabie*); 4 (*Acepseu*, *Fagsylv*); 6 (*Fagsylv*);
Pertusaria coccodes (Ach.) Nyl.: 1 (*Acepseu*); 6 (*Acepseu*, *Fagsylv*);
Pertusaria coronata (Ach.) Th. Fr.: 1 (*Acepseu*);
Pertusaria hemisphaerica (Flörke) Erichsen: 3 (*Acepseu*); 6 (*Fagsylv*);
Pertusaria leioplaca DC.: 1 (*Acepseu*); 3 (*Acepseu*);
Pertusaria pertusa (Weigel) Tuck.: 1 (*Acepseu*); 3 (*Acepseu*); 4 (*Acepseu*, *Fagsylv*); 5 (*Fagsylv*); 6 (*Fagsylv*); 7 (*Fagsylv*);
Phaeophyscia orbicularis (Neck.) Moberg: 8 (*Fagsylv*);
Phlyctis argena (Spreng.) Flot.: 1 (*Acepseu*); 3 (*Acepseu*); 4 (*Fagsylv*); 5 (*Fagsylv*); 6 (*Acepseu*, *Fagsylv*);
Platismatia glauca (L.) W.L. Culb. & C.F. Culb.: 1 (*Picabie*; twigs of *Picabie*); 3 (*Acepseu*); 4 (twigs of *Fagsylv*); 7 (*Fagsylv*);
Pseudevernia furfuracea (L.) Zopf: 1 (twigs *Picabie*); 4 (*Acepseu*);
Pyrenula nitida (Weigel) Ach.: 4 (trunk and mosses on *Fagsylv*); 7 (*Fagsylv*);
Ramalina farinacea (L.) Ach.: 1 (*Acepseu*);
Scoliciosporum chlorococcum (Graewe ex Stenh.) Vezda: 6 (*Fagsylv*); 1 (twigs of *Picabie*);
Sphaerophorus globosus (Huds.) Vain.: 9 (*Picabie*);

Lichenicolous Fungi

- Plectocarpon lichenum* (Sommerf.) D. Hawksw.: 1 (on *Lobaria pulmonaria*).
Sphinctrina turbinata (Pers.) De Not.: 5 (on *Pertusaria* sp.), 6 (on *Pertusaria pertusa*)

Non Lichenized Fungus

- Pseudotryblidium neesii*: 3 (*Acepseu*);

5 DISCUSSION RAZPRAVA

The forests of the reserve Ždrocľe host several rare and elsewhere endangered lichen species such as *Arthonia vinosa*, *Bacidia circumspecta*, *Biatora chrysantha*, *Biatoridium*

monasteriense, *Catinaria atropurpuea*, *Collema furfuraceum*, *Degelia plumbea*, *Gyalecta truncigena*, *Lobaria pulmonaria*, *Mycoblastus sanguinarius*, *Nephroma resupinatum*, *Ochrolechia szatalaensis*, *Parmeliella triptophylla*, *Parmelina pastillifera*, *Peltigera collina* and *Sphaerophorus globosus* (Fig. 4, 5, 8).

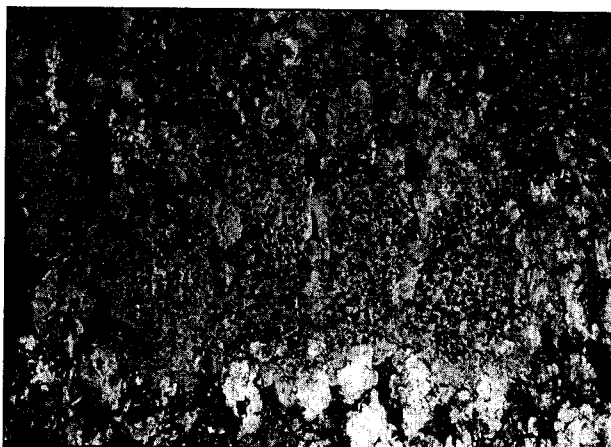


Picture 4: *Lobaria pulmonaria*

Slika 4: *Lobaria pulmonaria*

Biatora flavopunctata is newly recorded for the lichen flora of Slovenia. *Lobaria pulmonaria*, an easy recognizable foliicolous lichen, (Fig. 4), prefers humid places in undisturbed forests. It is very common in the Snežnik-Javorniki area, and in general found on *Acer pseudoplatanus* and sometimes on *Fagus sylvatica*. In many other regions it is endangered by air pollution and activities in forest management. *Sphinctrina turbinata* is a non-lichenized parasitic fungi which usually grows on *Pertusaria pertusa* in mountain regions on old beeches. It is very sensitive to nutrification (WIRTH 1995). With the exception of *Sphaerophorus globosus* (Fig. 8) the rare and elsewhere endangered species

are confined to communities dominated by beech. The absence of pendulous species is remarkable and questionable (compare GRUBE / MAYRHOFER / BATIČ 1998).



Picture 5: *Mycoblastus sanguinarius*

Slika 5: *Mycoblastus sanguinarius*

Old maple trees (*Acer pseudoplatanus*) and decaying wood contribute to a rich and diverse lichen flora. The presence of decaying wood in nature close forests is an important factor for substrate diversity. The different stages of decaying present habitats for numerous highly specialized organisms.

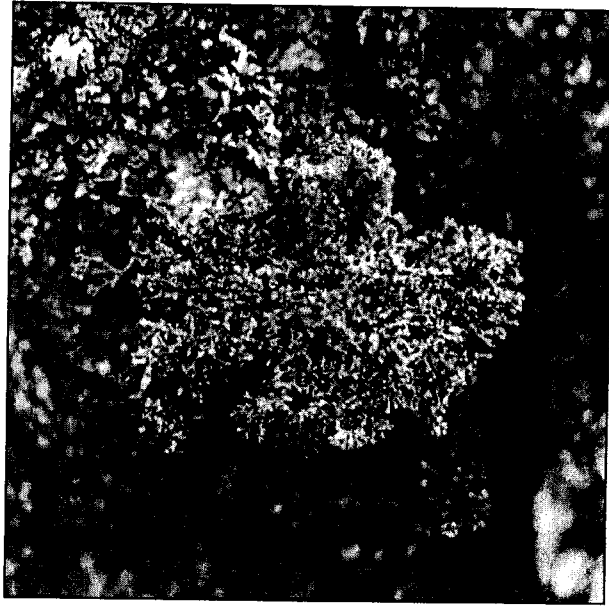
The association *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora* hosts the greatest lichen biodiversity with 65 species followed by *Polysticho lonchitis-Fagetum* var. geogr. *Allium victorialis* with 36 species and the *Haquetio-Piceetum* with only 22 recorded species. On conifers you can find lichens specialized on rather acid bark, but many more species prefer deciduous trees. Further factors for the occurrence of lichens are light, humidity, temperature, nutrification and human influence.



Picture 6: Mixed spruce-beech forest and *Hacquetio-Piceetum* in the background
Slika 6: Mešan gozd smreke in bukve; v ozadju gozd smreke s tevjem (Hacquetio-Piceetum)



Picture 7: *Polysticho lonchitis-Fagetum*
Slika 7: Polysticho lonchitis-Fagetum



Picture 8: *Sphaerophorus globosus*

Slika 8: *Sphaerophorus globosus*

6 CONCLUSIONS ZAKLJUČKI

Classical taxonomic methods accompanied by TLC were used to determine mostly epiphytic lichens collected in the Ždrocle Forest Reserve. 88 lichenized and 2 licenicolous fungi are reported from the forest reserve. *Biatora flavopunctata* is newly recorded for the lichen flora of Slovenia. *Collema furfuraceum*, *Lecanora subintricata* and *Cladonia macilenta* ssp. *florkeana* are new for the dinaric phytogeographical region. The greatest lichen diversity (65 species) hosts the association *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora*, which is due to relatively higher pH value and buffer capacity of bark of deciduous trees. 36 species were recorded in the association *Polysticho lonchitis-Fagetum* var. geogr. *Allium victorialis* and only 22 species in the association *Hacquetio-Piceetum* since many fewer lichens are specialised on rather acidic bark. Comparing with area in the vicinity of the Ždrocle Forest Reserve

we noticed higher lichen diversity of the reserve. Further investigations of the broader area will put much more light on the phenomenon. This is rather due to the presence of higher amounts of decaying wood, better light conditions and presence of plenty of old beech and maple trees as very suitable substrata for lichen colonization. The amount of decaying wood can be used as an indicator for nature close forests.

7 POVZETEK

Prve podatke o lišajih širšega območja Snežnika navaja že Biasoletto (1846).

Relativna ohranjenost gozdov ter nekaj izredno zanimivih najdb redkih in ogroženih lišajskih vrst so, zlasti v zadnjem času, na omenjenem območju vzpodbudile nadaljnje lihenološke raziskave (GRUBE / BATIČ / MAYRHOFER 1995, GRUBE / MAYRHOFER / BATIČ 1998; ARUP et al. in press). V najnovejšem času se proučevanja lišajev na omenjenem območju, pod mentorstvom H. Mayrhofer-ja, loteva J. Prügger.

Gozdni rezervat Ždrocle se nahaja jugovzhodno od Snežnika (1796 m), najvišjega vrha kraške planote na jugozahodu Slovenije, nedaleč od hrvaške meje. Obsega 184,26 ha površine med 1300 in 1478 m nm.v. (JANEŽIČ 1985). Ždrocle predstavljajo globoke kraške vrtače s strmimi in prepadnimi stenami, ki dajejo območju glavno obeležje (ZUPAN-HAJNA 1997). V rezervatu je najvišji vrh Ždrocla, visok 1478 m.

*Pestre klimatske razmere so posledica mešanja mediteranskega, atlantskega in kontinentalnega vpliva, ki se odrazi v zelo visoki količini padavin (2738 mm-Gomance, 937 m n.m.v.) (ZUPANČIČ 1995) ter temperauri (letno povprečje za Gomance znaša 6,7 °C) (MEKINDA-MAJARON 1995). Poletja so hladna in sveža, zime pa dolge in ne premrzle. Jesen (povprečje 7,7 °C) je toplejša kot pomlad (povprečje 5,5 °C). Temperaturni in vegetacijski obrati so v rezervatu in širši okolici dobro izraženi. Geološko podlago planote tvorijo jurski in kredni apnenci ter dolomiti in njihove breče. Med zadnjo poledenitvijo se je območje nahajalo v pasu večnega ledu (ŠIFRER 1959). Vetru izpostavljene grebene porašča asociacija *Polysticho lonchitis-Fagetum* var. geogr. *Allium victorialis*, pobočja pa večinoma asociacija *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora*. Iglavci poraščajo v glavnem vrtače mrzličnega značaja*

(ždrocle) in tvorijo združbe *Hacquetio-Piceetum*, *Lonicero caeruleae-Piceetum* ter *Vaccinio-Piceetum*, posamič pa uspevajo po celotni površini pragozda. Znotraj rezervata se lokalno zelo omejeno pojavlja še asociacija *Lamio orvalae-Aceretum*. Rezervat se nahaja v dinarskem fitogeografskem območju (M. WRABER 1969) oziroma snežniško-risnjaškem distriktu (ZUPANČIČ et al. 1987). Z izjemo manjših predelov na severozahodu ter jugovzhodu je večina gozdnega rezervata z vidika gospodarjenja z gozdom nedotaknjena.

S klasičnimi taksonomskimi metodami ter z metodo tankoplastne kromatografije (TLC) smo zabeležili 88 lišajskih vrst (liheniziranih gliv) ter 2 vrsti, ki uspevata na lišajih (lihenokolni glivi). Vrste *Arthonia vinosa*, *Bacidia circumspecta*, *Biatora chrysantha*, *Biatoridium monasteriense*, *Catinaria atropurpurea*, *Collema furfuraceum*, *Degelia plumbea*, *Gyalecta truncigena*, *Lobaria pulmonaria*, *Mycoblastus sanguinarius*, *Nephroma resupinatum*, *Ochrolechia szatalaensis*, *Parmeliella triptophylla*, *Parmelina pastillifera*, *Peltigera collina* in *Sphaerophorus globosus* (Slike 4, 5 in 8) so splošno redke in tudi drugod ogrožene. *Biatora flavopunctata* predstavlja novo vrsto v lišajski flori Slovenije. Z izjemo vrste *Sphaerophorus globosus* so omenjene redke vrste omejene na bukove asociacije. Odsotnost visečih-grmičastih vrst ostaja nepojasnjena. Največjo pestrost lišajskih vrst (66 vrst) smo zabeležili v asociaciji *Ranunculo platanifolii-Fagetum* var. geogr. *Calamintha grandiflora*, kjer se znotraj asociacije pogosto pojavljajo še starejša drevesa gorskega javorja. Skorja gorskega javorja z relativno visoko vrednostjo pH ter veliko pufrsko kapaciteto predstavlja ugoden substrat za kolonizacijo epifitov. Podobno velja tudi za že izbrazdano skorjo starejših bukev. V asociaciji *Polysticho lonchitis-Fagetum* var. geogr. *Allium victorialis* smo zabeležili 36 vrst, v smrečju *Hacquetio-Piceetum* pa le 22, kar je v skladu s kislejšo kemično reakcijo skorje iglavcev povsem pričakovano, saj je večina epifitskih lišajskih vrst na skorji listavcev. Večjo vrstno pestrost lišajev v bukovju pogojujejo tudi boljši svetlobni pogoji, saj so svetlobne razmere v smrečjih skoraj po pravilu slabše. K vrstni pestrosti lišajev precej prispeva tudi prisotnost ostankov odmrlega drevja v različnih fazah razgradnje. Kot indikator ohranjenosti gozdov bi med drugimi lahko služila ravno količina razpadajočega drevja. V primerjavi s florističnimi raziskavami širšega območja smo ugotovili relativno veliko število lišajskih vrst znotraj rezervata. To je posledica predvsem večje količine odmirajočega drevja v različnih fazah razgradnje, ki predstavlja ugoden substrat za kolonizacijo številnim lišajskim vrstam, ugodnejših svetlobnih razmer.

Relief je namreč v rezervatu precej skalovit in razčlenjen, gozdni sestoji pa so zato precej presvetljeni, ter prisotnosti starejših bukovih in javorjevih dreves.

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9 ACKNOWLEDGMENTS

ZAHVALE

We are grateful for assistance in obtaining information and for other support to: dr. M. Zupančič who has made some suggestions about renaming certain associations; ing. Ivan Česnik (Zavod za gozdove Slovenije, enota Ilirska Bistrica) who helped us during the fieldwork with their forest maps of Ždrocle; A. Mayrhofer for correcting our English.