

FIVE LICHEN SPECIES NEW TO THE CROATIAN FLORA

SINIŠA OZIMEC

Institute of Biology, Faculty of Education,
J. J. Strossmayer University, L. Jägera 9, HR – 31000 Osijek, Croatia

Ozimec, S.: Five lichen species new to the Croatian flora. *Nat. Croat.*, Vol. 9, No. 2. 133–138, 2000, Zagreb.

Five species of epiphytic lichens from Risnjak National Park (*Candelariella reflexa*, *Chaenotheca brunneola*, *Placynthiella icmalea*, *Usnea diplotypus* and *Usnea subfloridana*) are reported for the first time in the Croatian lichen flora. For each species, a short description with notes on ecology and distribution are given.

Key words: biodiversity, lichens, flora, Risnjak, Croatia

Ozimec, S.: Pet novih vrsta lišaja u flori Hrvatske. *Nat. Croat.*, Vol. 9, No. 2., 133–138, 2000, Zagreb.

Pet vrsta epifitskih lišaja (*Candelariella reflexa*, *Chaenotheca brunneola*, *Placynthiella icmalea*, *Usnea diplotypus* i *Usnea subfloridana*) prvi su put zabilježene za floru lišaja Hrvatske u Nacionalnom parku »Risnjak«. Za svaku vrstu dan je kratak opis, uz bilješke o ekologiji i rasprostranjenosti.

Ključne riječi: biološka raznolikost, lišaji, flora, Risnjak, Hrvatska

INTRODUCTION

The knowledge of south European and Mediterranean lichen flora is largely insufficient (NIMIS, 1996). The first records on the Croatian lichen flora date back to the second part of the 19th century. NOÉ (1858) states fifty-six and MATKOVIĆ (1879) states fifty-eight species from the North Adriatic coastal area. In the beginning of the 20th century SCHULER (1902) published a good contribution to the knowledge of the lichen flora of Rijeka and Gorski kotar. In this period ZAHLBRUCKNER (1901) started with a description of the lichen material collected in Dalmatia. SERVIT (1910) also took part in the lichen studies. The main Croatian lichenologist Fran Kušan did extensive research into the lichen flora in Croatia (KUŠAN, 1928; 1930), and summarized the papers on lichens from former Yugoslavia including many references for Croatia (KUŠAN, 1953). Since that compilation there have been only very few publi-

cations referring to lichens from Croatia (CHRISTENSEN, 1987, 1988; CHRISTENSEN & HANSEN, 1994), due to the paucity of field studies in recent decades.

In this paper five species, found during two lichenological surveys within Risnjak National Park in 1997 and 1998 (OZIMEC, 1999) are reported as being new to the lichen flora of Croatia.

MATERIAL AND METHODS

Risnjak National Park (45° 26' N, 14° 39' E) is located in Gorski kotar, a highland region in western Croatia (Fig. 1). It is the most densely forested part of the country, with 60 percent of its area covered by forests. The park has an area of 64 km² and includes the source of the Kupa River and the massifs of Risnjak (1528 m a.s.l.) and Snježnik (1506 m a.s.l.), which belong to the western parts of the Dinaric Mountains. The climate is perhumid, with a maritime precipitation regime (3500 mm average), high air humidity (85%), short vegetation period and thick snow cover; the mean annual temperature is 3.0 °C. Due to the predominant limestone bedrock a typical karst relief with the characteristic morphology has developed.

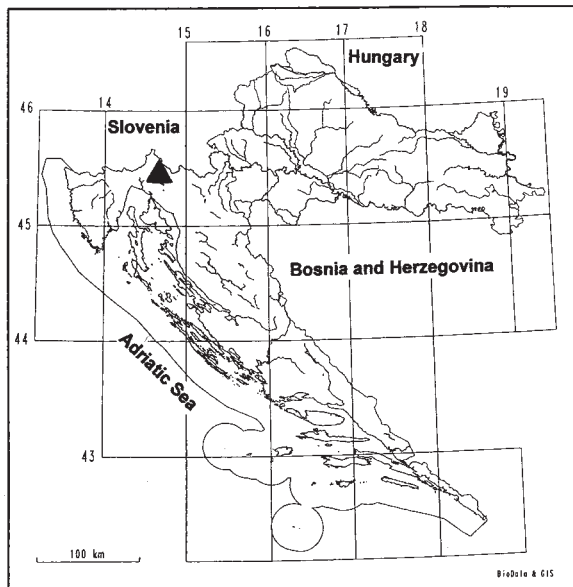


Fig. 1. Map of Croatia with the position of Risnjak National Park

The area is covered by mixed beech and fir forests, subalpine beech forests, spruce forests and mountain pine (*Pinus mugo*) scrubs. Such communities are char-

acteristic of Gorski kotar, other parts of Croatia and neighbouring Slovenia and Bosnia.

The lichen specimens are deposited in the herbarium of Botanical Institute, Faculty of Sciences in Zagreb (ZA). Locality, altitude, substratum, date of collection and MTB coordinates are given for each sample. Small portions of the *Usnea* species thallus were analyzed by thin-layer chromatography (TLC) in accordance with WHITE & JAMES (1985). For each species, a short description with brief comment on ecology and geographic distribution is given.

Nomenclature of species follows NIMIS (1993), but COPPINS & JAMES (1984) for *Placynthiella icmalea*.

THE SPECIES

Candelariella reflexa (Nyl.) Lettau

Markov brlog, by the path to Medvjeda vrata, 940 m a.s.l., in *Abieti-Fagetum dinaricum* Treg., on *Acer pseudoplatanus*, 16. XI. 1997, MTB 0553/4.

Leska valley, by the »Horvatova staza« path to Podi, 740 m a.s.l., in *Abieti-Fagetum dinaricum* Treg., on *Acer pseudoplatanus*, 17. XI. 1997, MTB 0554/3.

Bijela Vodica valley, by the road, 680 m a.s.l., on open standing *Acer pseudoplatanus*, near the entrance sign, 13.VIII. 1998, MTB 0554/3.

A yellow, crustose lichen with a K – thallus of minute squamules. Squamules up to 1 mm diam., rounded, flattened, citrine-yellow; the margins braking down into fine-granular soredia.

This southern-temperate species occurs in areas with high precipitation, on slightly nutrient-enriched habitats (WIRTH, 1995). It is frequent on the mineral-rich, subneutral bark of broad-leaved, often isolated trees. This moderately shade and pollution tolerant lichen is widespread from the Mediterranean region to southern Norway. It was reported from Snežnik (GRUBE *et al.*, 1995) and Trnovski gozd (PRÜGGER *et al.*, 2000) in Slovenia.

Chaenotheca brunneola (Ach.) Müll. Arg.

Cajtnik, by the path ascending to Veliki Risnjak, 1380 m a.s.l., in *Homogyno alpinae-Fagetum* (Horv.) Borh., on a decaying *Fagus* trunk with moss cover, 4. X. 1997, MTB 0553/4.

Thallus crustose, immersed. Apothecia 0.6–1.6 mm tall, stalked. Stalks shiny black, often branched, carrying 2–5 globose dark-brown heads. Thallus Pd + yellow.

This species occurs mostly on bark and lignum of decaying conifers and deciduous trees, in shaded and humid situations of the montane and subalpine belt (WIRTH, 1995).

The species is known from Herzegovina (KUŠAN, 1953; MURATI, 1993), and Slovenia (MAYRHOFER *et al.*, 1996).

Placynthiella icmalea (Ach.) Coppins & P. James

Medvjeda vrata, above path to Vilje, 1300 m a.s.l., in *Calamagrostio-Abietetum* Horv., on *Abies alba*, 4.X. 1997, MTB 0553/4.

Thallus crustose, of isidiate to minutely coralloid green-brown granules. Apothecia 0.2–0.6 mm diameter, scattered, with a distinct, paler, true exciple.

Thallus K–, KC + red, C + red, Pd–. The small specimen was collected on lignum of the trunk of a dead fir tree, together with *Cladonia fimbriata*.

The genus *Placynthiella* was resurrected by COPPINS & JAMES (1984) to accommodate the *Lecidea uliginosa* group. The four species of the genus occur on a wide range of acidic substrata in Europe and North America: on dead bark and lignum of fallen trees and stumps, worked timber, peaty ground and plant debris in heathland and forest clearings.

Placynthiella icmalea is widespread through Europe, except in dry Mediterranean regions.

Usnea diplotypus Vainio

Bijela Vodica valley, by the road, 680 m a.s.l., on open standing *Acer pseudoplatanus*, near the entrance sign, 13.VIII. 1998, MTB 0554/3.

Thallus 2.5 cm tall, subpendulous with anisotomic-dichotomous ramifications, minute tuberculate and richly isidiate soralia. Medulla K + yellow, C/KC + red, Pd + yellow. Chemistry: usnic and alectorialic acid.

The small specimen, associated with *Cladonia fimbriata*, *Evernia prunastri*, *Hypogymnia physodes*, *Lobaria scrobiculata*, *Parmelia acetabulum*, *P. caperata*, *P. pastillifera*, *Pertusaria albescens*, *Pseudevernia furfuracea* and *Ramalina fastigiata*, was collected on an open standing sycamore growing in the valley. According to CLERC (1987), *Usnea diplotypus* has been wrongly considered as being exclusively saxicolous. It is frequent in more or less continental areas of Scandinavia and central Europe, but it is rare in southern and western Europe.

The occurrence of this species on the eruptive rocks in Bulgaria and its central European distribution was noted by MURATI (1993). *Usnea diplotypus* was recently reported from Trnovski gozd in Slovenia by PRÜGGER *et al.* (2000).

Usnea subfloridana Stirton

Leska valley, near the educational trail, 700 m a.s.l., in *Blechno-Abietetum* Horv., on *Abies alba*, 13.VIII. 1998, MTB 0554/3

Thallus 5.3 cm tall, shrubby, slightly tufted, attached by a compact holdfast. Branching isotomic-dichotomous. Surface grey-green, conspicuously blackened at the base with minute transverse cracking without interconnecting longitudinal cracks.

Main branches densely papillose, terminal parts and fibrils smooth with scattered papillae and pseudocypbellae, giving rise to tuberculate, irregularly rounded

soralia with coarsely granular soredia. Medula K + yellow, C/KC + red, Pd + yellow. Chemistry: usnic and thamnolic acid.

MURATI (1993) reported the occurrence of this lichen on the bark of various trees on high mountains in Slovenia and Macedonia. It was recently reported from Snežnik (GRUBE *et al.*, 1995) and Trnovski gozd (PRÜGGER *et al.*, 2000) in Slovenia.

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to Dr B. J. Coppins (Edinburgh), and Professor Dr H. Mayrhofer (Graz), for their help with identification of lichen material and valuable comments. TLC analyses were made using equipment and facilities of the Institute of Botany in Graz (Austria). The manuscript was improved by the comments of two anonymous reviewers.

Received January 26, 2000

REFERENCES

- CHRISTENSEN, S. N., 1987: Contribution to the lichen flora of Yugoslavia. *Acta Bot. Croat.* **46**, 161–172.
- CHRISTENSEN, S. N., 1988: Contribution to the lichen flora of Istria, Yugoslavia. *Acta Bot. Croat.* **47**, 127–134.
- CHRISTENSEN, S. N. & E. S. HANSEN, 1994: Lichens from Croatia. *Acta Bot. Croat.* **53**, 101–113.
- CLERC, P., 1987: *Usnea*. In NIMIS, P. L. & J. POELT: The Lichens and Lichenicolous Fungi of Sardinia (Italy). *Studia Geobot.* **7** (suppl. 1), 479–495.
- COPPINS, B. J. & P. W. JAMES, 1984: New or interesting British lichens V. *Lichenologist* **16**, 241–264.
- GRUBE, M., F. BATIČ & H. MAYRHOFER, 1995: Contributions to the Lichen Flora of Slovenia I. Epiphytic Lichens of the Snežnik area. *Herzogia* **11**, 189–196.
- KUŠAN, F., 1928: Predradnje za floru lišajeva Hrvatske. I. izvještaj. *Acta Bot. Inst. Botan. Univ. Zagreb* **3**, 1–40.
- KUŠAN, F., 1930: Neue Beiträge zur Flechtenflora des kroatischen und dalmatinischen Küstenlandes. *Acta Bot. Inst. Botan. Univ. Zagreb* **5**, 18–47.
- KUŠAN, F., 1953: Prodrómus flore lišaja Jugoslavije. JAZU Zagreb.
- MATKOVIĆ, P., 1879: Sulla flora crittogamica di Fiume. Programma della regia scuola media superiore di stato in Fiume. Pubblicato all fine dell' anno scolastico, 37–42.
- MAYRHOFER, H., M. KOCH & F. BATIČ, 1996: Beiträge zur Flechtenflora von Slowenien II. Die Flechten des Pohorje. *Herzogia* **12**, 111–127.
- MURATI, M., 1993: Flora lišajeva 2. The lichen flora 2. Unija albanske inteligencije u Makedoniji. Skopje.
- NIMIS, P. L., 1993: The lichens of Italy. An annotated catalogue. Monografie XII, Museo Regionale di Scienze Naturali, Torino.
- NIMIS, P. L., 1996: Towards a checklist of Mediterranean lichens. *Bocconea* **6**, 5–17.
- NOÉ, W., 1858: Flora di Fiume e del suo litorale. Almanaco Fiumano per l' anno 1858., 78–79.

- OZIMEC, S., 1999: Flora epifitskih lišaja Nacionalnog parka »Risnjak«. MSc Thesis, University of Zagreb.
- PRÜGGER, J., H. MAYRHOFER & F. BATIĆ, 2000: Beiträge zur Flechtenflora von Slowenien IV. Die Flechten des Trnovski gozd. Herzogia **14**, in press.
- SERVIT, M., 1910: Zur Flechtenflora Nord-Dalmatien. Mag. Bot. Lap. **9**, 164–193.
- ZAHLBRUCKNER, A., 1901: Vorarbeiten zu einer Flechtenflora Dalmatiens I. Öst. Bot. Zeitschr. **51**, 273–285, 336–350.
- WHITE, F. J. & P. W. JAMES, 1985: A new guide to microchemical techniques for the identification of lichen substances. Brit. Lich. Soc. Bull. **57** (suppl.), 1–41.
- WIRTH, V., 1995: Die Flechten Baden-Württembergs 1–2. Verlag Eugen Ulmer, Stuttgart.

SAŽETAK

Pet novih vrsta lišaja u flori Hrvatske

S. Ozimec

Tijekom lihenoloških istraživanja Nacionalnog parka »Risnjak« u razdoblju 1997.–1998. godine, zabilježeno je pet novih vrsta za floru lišaja Hrvatske. Korastim lišajima pripadaju *Candelariella reflexa*, *Chaenotheca brunneola* i *Placynthiella icmalea*, dok *Usnea diplotypus* i *Usnea subfloridana* pripadaju grmastim lišajima.

Talus vrste *Candelariella reflexa* čine sitne ljuskice žućkaste boje, rubova prekrivenih zrnatim soredijsima. Naseljava listopadno drveće blago eutrofiziranih staništa i česta je na stablima uz planinarske staze i prometnice. *Chaenotheca brunneola* dolazi na sjenovitim i vlažnim položajima gorskih i pretplaninskih područja; nađena je na trulom deblu bukve. Apoteciji su sitni štapići (do 1.6 mm visoki), s 2–5 tamnosmeđih glavica na vrhovima. *Placynthiella icmalea* zrnatog je, crveno-smeđeg talusa; raste na kiselim podlogama. Nađena je na kori i drvu osušenog stabla jele u sastojini kod Medvedjih vrata. *Usnea diplotypus*, iz skupine bradolikih lišaja visećeg talusa, pogrešno je smatrana isključivo saksikolnom. Nađena je na solitarnom stablu gorskog javora u uvali Bijela Vodica. *Usnea subfloridana* nađena je na stablu jele uz poučnu stazu u uvali Leska.

Premda su ovi lišaji prilično česti i u susjednim područjima, činjenica da su do sada bili nezabilježeni odražava potrebu daljih istraživanja u svrhu potpunijeg upoznavanja flore lišaja kao sastavnice ukupne biološke raznolikosti Hrvatske.

