

Contributions to the lichen flora of Slovenia X. Lichens from the Slovenian Julian Alps

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Abstract: BATIČ, F., PRIMOŽIČ, K., SURINA, B., TROŠT, T. & MAYRHOFER, H. 2003: Contributions to the lichen flora of Slovenia X. Lichens from the Slovenian Julian Alps. – *Herzogia* 16: 143–154.

The lichen flora of the Slovenian Julian Alps, with special regard to the Triglav National Park, is discussed. 26 species are reported for the first time for Slovenia: *Bacidia incompta*, *Bacidina delicata*, *Biatora amaurospoda*, *Caloplaca bryochryson*, *Candelariella kuusamoensis*, *Cladonia norvegica*, *C. pocillum*, *C. ramulosa*, *Collema multipartitum*, *Diplotomma alboatrum*, *Endocarpon adscendens*, *Farnoldia micropsis*, *Gyalecta ulmi*, *Hyperphyscia adglutinata*, *Lecanora boligera*, *Lecidea betulicola*, *L. plebjea*, *Lempholemma botryosum*, *Micarea cinerea*, *M. misella*, *Naetrocymbe saxicola*, *Peltigera hymenina*, *Thelidium minutulum*, *Thelomma ocellatum*, *Usnea barbata* and *Xanthoria contortuplicata*. The following taxa are new records for the Alpine Phytogeographical Region of Slovenia: *Caloplaca ferruginea*, *C. obscurella*, *Candelariella subdeflexa*, *Cladonia furcata* ssp. *subrangiformis*, *C. rei*, *C. symphycarpa*, *Collema crispum*, *C. furfuraceum*, *C. fuscovirens*, *Gyalecta flotowii*, *Hypogymnia bitteri*, *Lecanora leptyroides*, *L. piniperda*, *Lecidea albofuscescens*, *Leptogium gelatinosum*, *Lobaria scrobiculata*, *Mycobilimbia berengeriana*, *Myxobilimbia sabuletorum*, *Opegrapha atra*, *Pertusaria pustulata*, *Physconia grisea*, *Placidium lachneum*, *Porina borrieri*, *Ramalina roesleri*, *Sagiolechia protuberans*, *Verrucaria elaeomelaena* and *Xanthoria candelaria*. The geography, geology, climate and vegetation of the area are described briefly.

Zusammenfassung: BATIČ, F., PRIMOŽIČ, K., SURINA, B., TROŠT, T. & MAYRHOFER, H. 2003: Beiträge zur Flechtenflora von Slowenien X. Flechten aus den slowenischen Julischen Alpen. – *Herzogia* 16: 143–154.

Ein Beitrag zur Flechtenflora der slowenischen Julischen Alpen mit besonderer Berücksichtigung von Lokalitäten im Triglav Nationalpark wird vorgelegt. 26 Arten stellen Erstnachweise für Slowenien dar: *Bacidia incompta*, *Bacidina delicata*, *Biatora amaurospoda*, *Caloplaca bryochryson*, *Candelariella kuusamoensis*, *Cladonia norvegica*, *C. pocillum*, *C. ramulosa*, *Collema multipartitum*, *Diplotomma alboatrum*, *Endocarpon adscendens*, *Farnoldia micropsis*, *Gyalecta ulmi*, *Hyperphyscia adglutinata*, *Lecanora boligera*, *Lecidea betulicola*, *L. plebjea*, *Lempholemma botryosum*, *Micarea cinerea*, *M. misella*, *Naetrocymbe saxicola*, *Peltigera hymenina*, *Thelidium minutulum*, *Thelomma ocellatum*, *Usnea barbata* und *Xanthoria contortuplicata*. Die folgenden Taxa sind Erstnachweise für die Alpine Phytogeographische Region Sloweniens: *Caloplaca ferruginea*, *C. obscurella*, *Candelariella subdeflexa*, *Cladonia furcata* ssp. *subrangiformis*, *C. rei*, *C. symphycarpa*, *Collema crispum*, *C. furfuraceum*, *C. fuscovirens*, *Gyalecta flotowii*, *Hypogymnia bitteri*, *Lecanora leptyroides*, *L. piniperda*, *Lecidea albofuscescens*, *Leptogium gelatinosum*, *Lobaria scrobiculata*, *Mycobilimbia berengeriana*, *Myxobilimbia sabuletorum*, *Opegrapha atra*, *Pertusaria pustulata*, *Physconia grisea*, *Placidium lachneum*, *Porina borrieri*, *Ramalina roesleri*, *Sagiolechia protuberans*, *Verrucaria elaeomelaena* und *Xanthoria candelaria*. Geographie, Geologie, Klima und Vegetation des Gebietes werden kurz vorgestellt.

Key words: Lichens, Triglav National Park, biodiversity.

Introduction

The Julian Alps belong to the Southern Limestone Alps. The eastern, central and half of the western part occupy north-western Slovenia. The other half of the western part extends into Italy. The Sava Dolinka valley separates them from the Karavanke mountains in the north; the

Jelovica and the Pokljuka plateaux are the boundaries in the east, and the Soča valley, the Škofja Loka mountains and the Trnovski gozd in the southwest. Most of the Julian Alps in Slovenia belong to the Triglav National Park, which covers 83.807 ha. The highest peaks are in the central (Triglav 2864 m, Škrlatica 2738 m) and western part (Mangart 2677 m and Jalovec 2643 m in Slovenia; Iof di Montasio 2793 m and Iof Fuart 2666 m in Italy), whereas peaks from the eastern part are generally of lower altitude. Extensive plateaux occur in the southwestern part (Krn), the central part (Triglav) and in the south eastern part (Pokljuka).

The majority of the Julian Alps are built of Dachstein limestone from the upper Triassic. A minor part, especially in the north and west, is from the lower Triassic; these are dolomites and sandstones. Limestone mixed with sandstone from the Cretaceous has a fragmentary distribution in the eastern (Pokljuka) and south-western parts (Trenta valley) (RAMOVŠ 1985).

The great differences in altitudes between certain parts of the area and the influence of the Adriatic Sea are the reasons for the diverse climate. Towards the Soča valley in the southern part, a mediterranean influence occurs which is clearly discernible in the floristic composition of the vegetation. Other parts have an alpine climate. The southern and western parts receive the highest precipitation (2500–3000 mm/year); the eastern part (Pokljuka plateau) receives 2200mm/year and the northern part only 1500–1600 mm/year (GOMIŠČEK et al. 1997). Snow cover in the lower montane belt (600–1200 m) lasts for 3–5 months and for 5–6 months in the upper montane belt (1200–1800 m).

From the phytogeographical point of view, the Julian Alps belong to the Alpine Phytogeographical Region of Slovenia (WRABER 1969). The climax vegetation in the lower montane belt is the *Anemone trifoliae*-Fagetum Tregubov 1957 which has a fragmentary occurrence in a few other subassociations, whereas in the upper montane belt it is the *Adenostylo glabrae*-Piceetum M.Wraber 1966 (prov.). In the alpine valleys of the northern part *Rhodothamno-Pinetum mugo laricetosum* Tregubov 1957 occurs; smaller areas are covered by *Laburno-Piceetum Zupančič* 1980 and *Piceo-Pinetum* Tregubov 1957. Most of Pokljuka plateau is covered with the *Homogyno sylvestris*-Fagetum Marinček et al. 1993 stad. *Picea abies* Zupančič 1995. Norway spruce (*Picea abies*) dominates on Pokljuka since the 15th century, when large amounts of beech trees were cut for the production of charcoal. Bog and marsh vegetation such as *Sphagno-Pinetum mugo* (Bartsch 1940) R.Koch and *Sphagno-Piceetum* R.Koch 1954 em. Zupančič also occur on Pokljuka plateau. The south-western parts of the Julian Alps are covered with *Luzulo-Fagetum* M.Wraber 1956 p. p., but slopes facing south support *Sesleria autumnalis*-Fagetum (Horvat 1950) M.Wraber (1957) 1960 and *Ostryo-Fagetum* M.Wraber 1960 emend. Marinček, Puncer et Zupančič 1979 (MARINČEK et al. 1983).

The lichenological investigations in the area began with SCOPOLI (1772). In the 19th century Tommasini collected in the southern and central part (GLOWACKI 1874), followed by Glowacki (GLOWACKI & ARNOLD 1870). Collections of Glowacki are often cited in various taxonomic treatments. Servit visited some places in the first half of the 20th century and published his records in numerous papers (SUPPAN et al. 2000). Batič collected at several sites in the 1970s (BATIČ 1976, 1978).

The impact of the local air pollution on the epiphytic lichens is strongest in the north eastern parts of the area due to iron and steel production at the town of Jesenice in the upper Sava valley, and due to the influence of polluted air from the Ljubljana-Kranj region, especially under particular weather conditions (GOMIŠČEK et al. 1997). The western and south-western parts are sparsely populated, almost without any major, local, air pollution sources, but transboundary transport of air pollutants into Slovenia from the west and south-west occurs.

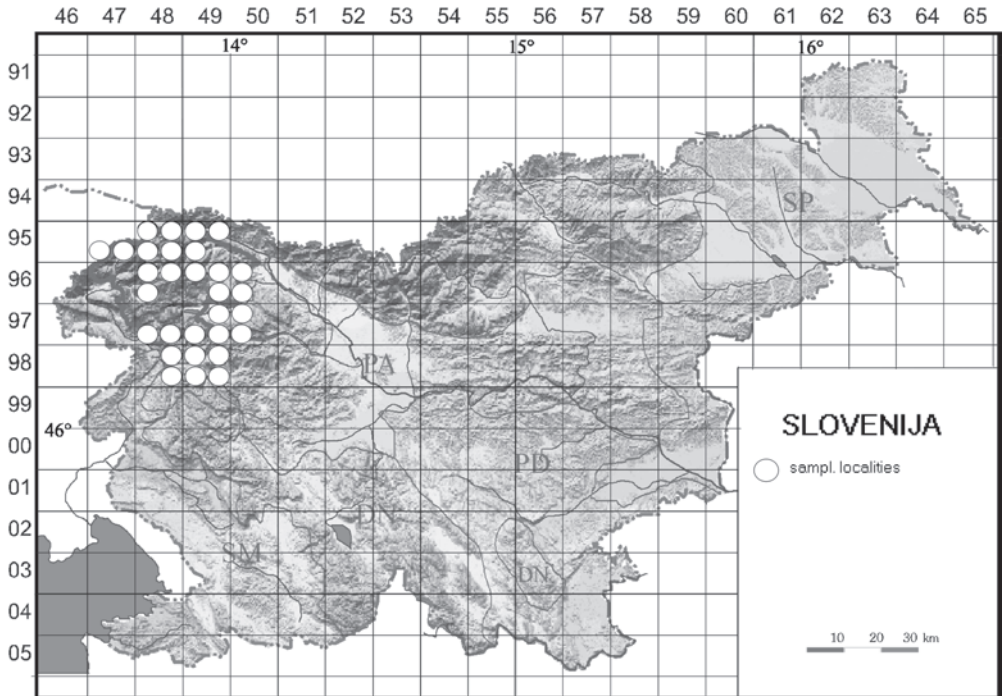


Fig. 1: Sampling areas in Triglav National Park (Julian Alps).

Materials and Methods

The influence of air pollutants on the decline of epiphytic forest lichens was studied in Triglav National Park as graduation theses (TROŠT 1997; PRIMOŽIČ 1998; SURINA 1998) in order to provide a basis for further pollution-monitoring studies following the accounts of GRUBE et al. (1995, 1998), MAYRHOFER et al. (1996, 1998), PRÜGGER et al. (2000, 2001), SUPPAN & MAYRHOFER (2002), and VIDERGAR-GORJUP et al. (2002) from other areas of Slovenia. The investigations were focused on the northern part, where deep valleys extend towards the central part, the eastern part (Pokljuka plateau) and the south western part (Soča valley, Trenta valley) (Fig. 1). Lichen mapping was undertaken mostly within three profiles, located at above the mentioned regions where other studies connected to forest decline have also been carried out [forest decline inventories, measurements of air pollutants, detailed analyses of Norway spruce needles (BATIC et al. 1999)]. The investigated areas do not cover the whole area of the Triglav National Park, and some of them, especially those in the south-western part, extend outside of the Park. The specimens are kept in the lichen collection of the Herbarium of the University of Ljubljana (LJU). Further records from the Pokljuka plateau by Christian Printzen during a field trip in 1993 were included. These specimens are preserved in his private herbarium. Last but not least a small number of samples from the mountain Mangart kept in Graz (GZU) were added.

List of species

Nomenclature mainly follows HAFELLNER & TÜRK (2001). Species names are followed by information to their distribution in form of grid references according to the mapping of the flora of Central Europe. New records for Slovenia are indicated with an asterisk (*), new records for the Alpine Phytogeographical Region with a ring (°), samples from Printzen with (pr) following the grid reference, and specimens from Mangart with (GZU) following the grid reference.

- Acrocordia gemmata* (Ach.) A.Massal.: 9549/1, 9650/1, 9750/3, 9849/1, 9849/2
- Alectoria sarmentosa* (Ach.) Ach.: 9548/2, 9649/1, 9649/2 (pr), 9649/4, 9650/3
- Amandinea punctata* (Hoffm.) Coppins & Scheid.: 9548/1, 9548/2, 9549/3, 9649/2, 9650/3, 9750/3, 9849/3
- Anaptychia ciliaris* (L.) Körb.: 9548/2, 9549/3, 9650/1, 9650/3, 9750/3
- Arthonia didyma* Körb.: 9548/2, 9549/1, 9650/1, 9748/4
- Arthonia radiata* (Pers.) Ach.: 9548/3, 9548/4, 9549/3, 9648/2, 9649/2, 9650/1, 9748/4, 9749/4, 9750/1, 9848/2, 9849/1, 9849/3
- Arthonia stellaris* Kremp.: 9548/2, 9648/2, 9749/3, 9749/4, 9750/3, 9848/2, 9849/1
- Arthonia vinosa* Leight.: 9649/4
- Arthopyrenia salicis* A.Massal.: 9748/4, 9749/4, 9849/1, 9849/2
- Arthothelium ruanum* (A.Massal.) Körb.: 9848/2
- Bacidia circumspecta* (Nyl. ex Vain.) Malme: 9649/2 (pr)
- Bacidia friesiana* (Hepp) Körb.: 9650/1
- Bacidia globulosa* (Flörke) Hafellner & V.Wirth: 9650/1
- **Bacidia incompta* (Borrer ex Hook.) Anzi: 9649/1
- Bacidia rubella* (Hoffm.) A.Massal.: 9548/3, 9650/1
- Bacidia subincompta* (Nyl.) Arnold: 9649/4 (pr)
- Bacidina arnoldiana* (Körb.) V.Wirth & Vězda: 9650/1
- **Bacidina delicata* (Larbal. ex Leight.) V.Wirth & Vězda: 9650/1
- Baeomyces rufus* (Huds.) Rebent.: 9649/1
- **Biatora amaurosoda* Anzi: 9549/4 (pr)
- Biatora efflorescens* (Hedl.) Räsänen: 9548/1, 9548/3, 9649/1 (pr), 9649/2 (pr), 9649/4 (pr)
- Biatora helvola* Körb. ex Hellb.: 9649/2 (pr), 9649/4 (pr)
- Biatora ocelliformis* (Nyl.) Arnold: 9649/4 (pr)
- Biatora rhododendri* (Hepp) Arnold: 9649/1 (pr)
- Biatora sphaeroidiza* (Vain.) Printzen & Holien: 9649/2 (pr)
- Biatora subduplex* (Nyl.) Räsänen ex Printzen: 9649/1 (pr)
- Biatora turgidula* (L.) Fr. (syn. *Lecidea* t.): 9649/4
- Bryoria capillaris* (Ach.) Brodo & D.Hawksw.: 9548/2, 9549/3, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3
- Bryoria fuscescens* (Gyeln.) Brodo & D.Hawksw.: 9548/1, 9548/2, 9549/1, 9549/3, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9648/2, 9748/4, 9750/3, 9848/4
- Bryoria implexa* (Hoffm.) Brodo & D.Hawksw.: 9548/2, 9649/2, 9649/4, 9650/3
- Bryoria nadvornikiana* (Gyeln.) Brodo & D.Hawksw.: 9548/2, 9548/3, 9548/4, 9549/1, 9549/3, 9649/4, 9650/3
- Bryoria pseudofuscescens* (Gyeln.) Brodo & D.Hawksw.: 9548/2
- Bryoria subcana* (Nyl. ex Stizenb.) Brodo & D.Hawksw.: 9649/1, 9649/4, 9650/3
- Buellia disciformis* (Fr.) Mudd: 9548/1, 9548/2, 9549/1, 9549/3, 9648/1, 9648/3, 9650/1, 9748/4, 9750/3, 9849/2, 9848/4, 9849/3
- Buellia griseovirens* (Turner & Borrer ex Sm.) Almb.: 9548/2, 9549/1, 9650/1, 9648/2, 9750/1
- Calicium glaucellum* Ach.: 9649/4
- Calicium trabinellum* (Ach.) Ach.: 9649/4
- Calicium viride* Pers.: 9548/4, 9549/3, 9649/2 (pr), 9649/4, 9650/3, 9750/3
- **Caloplaca bryochryson* Poelt: 9547/4 (GZU)
- Caloplaca cerina* (Ehrh. ex Hedw.) Th.Fr.: 9548/1, 9548/2, 9549/1, 9648/2, 9649/2, 9650/1, 9750/3
- Caloplaca cerinella* (Nyl.) Flagey: 9648/1, 9649/2, 9650/1, 9650/3
- °*Caloplaca ferruginea* (Huds.) Th.Fr.: 9649/4 (pr)
- Caloplaca herbidella* (Hue) H.Magn.: 9548/1, 9548/2, 9648/3, 9650/1, 9748/3, 9748/4, 9749/4, 9750/1, 9750/3, 9848/4, 9849/2
- Caloplaca holocarpa* (Hoffm. ex Ach.) A.E.Wade: 9648/3, 9649/2, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9848/3, 9848/4, 9849/3
- Caloplaca nubigena* (Kremp.) Dalla Torre & Sarnth.: 9547/4 (GZU)
- °*Caloplaca obscurella* (J.Lahm ex Körb.) Th.Fr.: 9750/3, 9849/3
- Caloplaca scrobiculata* H.Magn.: 9547/4 (GZU)
- Caloplaca sinapisperma* (Lam. & DC.) Maheu & Gillet: 9649/1 (pr)

- Candelaria concolor* (Dicks.) Stein: 9548/2, 9548/3, 9648/2, 9748/4, 9749/3, 9749/4, 9848/4, 9849/1, 9849/2, 9849/3, 9849/4
- Candelariella aurella* (Hoffm.) Zahlbr.: 9650/3
- **Candelariella kususamoensis* Räsänen: 9650/1, 9650/3
- Candelariella reflexa* (Nyl.) Lettau: 9548/1, 9548/2, 9548/4, 9549/1, 9549/3, 9648/1, 9650/1, 9650/3, 9748/4, 9749/3, 9749/4, 9750/1, 9750/3, 9848/2, 9848/4, 9849/1, 9849/2, 9849/3
- °*Candelariella subdeflexa* (Nyl.) Lettau: 9650/1
- Candelariella vitellina* (Hoffm.) Müll. Arg.: 9648/1, 9748/4.
- Candelariella xanthostigma* (Ach.) Lettau: 9548/1, 9548/2, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9650/1, 9650/3, 9748/4, 9750/1, 9750/3, 9848/2, 9848/4, 9849/3.
- Catapyrenium cinereum* (Pers.) Körb.: 9649/2
- Catapyrenium daedaleum* (Kremp.) Stein: 9649/2
- Catillaria nigroclavata* (Nyl.) Schuler: 9648/2, 9650/1, 9748/4, 9750/3, 9848/1, 9848/4, 9849/3
- Catinaria atropurpurea* (Schaer.) Vězda & Poelt: 9650/1
- Cetraria islandica* (L.) Ach.: 9548/1, 9649/1, 9649/2, 9649/4
- Cetraria sepincola* (Ehrh.) Ach.: 9649/2
- Cetrelia cetrarioides* (Delise ex Duby) W.L.Culb. & C.F.Culb.: 9548/1, 9648/2, 9750/1, 9848/4, 9849/3
- Cetrelia olivetorum* (Nyl.) W.L.Culb. & C.F.Culb.: 9548/1, 9849/3
- Chaenotheca chrysocephala* (Turner ex Ach.) Th.Fr.: 9548/1, 9649/2, 9650/1, 9650/3
- Chaenotheca ferruginea* (Turner & Borrer) Mig.: 9548/1, 9548/2, 9649/2, 9650/1
- **Chaenotheca subroscida* (Eitner) Zahlbr.: 9649/4
- °*Chaenothecopsis nana* Tibell: 9649/4
- Cladonia arbuscula* (Wallr.) Flot. em. Ruoss: 9649/2
- Cladonia bellidiflora* (Ach.) Schaer.: 9649/2
- Cladonia caespiticia* (Pers.) Flörke: 9548/2
- Cladonia cenotea* (Ach.) Schaer.: 9649/1, 9649/2, 9649/4
- Cladonia coniocraea* auct.: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/4, 9749/3, 9750/1, 9750/3, 9848/4, 9849/3
- Cladonia cornuta* (L.) Hoffm.: 9548/3
- Cladonia deformis* (L.) Hoffm.: 9649/4
- Cladonia digitata* (L.) Hoffm.: 9548/1, 9548/2, 9549/1, 9549/2, 9549/3, 9649/2, 9649/4, 9650/1
- Cladonia fimbriata* (L.) Fr.: 9549/3, 9649/2, 9649/4, 9749/4
- Cladonia furcata* (Huds.) Schrad. ssp. *furcata*: 9548/1, 9548/2, 9548/3, 9549/1, 9549/2, 9549/3, 9649/2, 9649/4, 9650/1, 9748/4, 9749/4, 9848/2
- °*Cladonia furcata* ssp. *subrangiformis* (Sandst.) Abbayes: 9649/2
- Cladonia macilenta* Hoffm.: 9548/2, 9549/1, 9549/2, 9750/3
- **Cladonia norvegica* Tønsberg & Holien: 9548/3, 9649/2, 9649/4
- Cladonia parasitica* (Hoffm.) Hoffm.: 9649/2
- **Cladonia pocillum* (Ach.) Grognot: 9548/1, 9548/3
- Cladonia polydactyla* (Flörke) Spreng.: 9650/1, 9749/4, 9849/3,
- Cladonia pyxidata* (L.) Hoffm. ssp. *pyxidata*: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/4, 9749/3, 9749/4, 9750/3, 9848/4, 9849/2, 9849/3
- Cladonia pyxidata* ssp. *chlorophaea* (Flörke ex Sommerf.) V.Wirth: 9548/3
- **Cladonia ramulosa* (With.) J.R.Laundon: 9650/1
- Cladonia rangiferina* (L.) Weber ex F.H.Wigg.: 9548/1, 9548/2, 9649/4
- Cladonia rangiformis* Hoffm.: 9649/4
- °*Cladonia rei* Schaer.: 9548/3, 9649/4
- Cladonia squamosa* Hoffm.: 9649/1, 9649/2, 9649/4
- Cladonia subulata* (L.) Weber ex F.H.Wigg.: 9649/2, 9650/1, 9650/3
- °*Cladonia symphyocarpa* (Flörke) Fr.: 9649/2
- Clauzadea monticola* (Ach.) Hafellner & Bellem.: 9649/2 (pr)
- Collema auriforme* (With.) Coppins & J.R. Laundon: 9649/2, 9650/1
- °*Collema crispum* (Huds.) Weber ex F.H.Wigg.: 9649/1
- Collema cristatum* (L.) Weber ex F.H.Wigg.: 9649/4 (pr)
- Collema flaccidum* (Ach.) Ach.: 9548/2, 9648/2, 9748/4, 9749/4, 9848/3
- °*Collema furfuraceum* (Arnold) Du Rietz: 9848/4
- °*Collema fuscovirens* (With.) J.R.Laundon: 9649/2
- **Collema multipartitum* Sm.: 9649/2
- Collema nigrescens* (Huds.) DC.: 9848/4
- Collema subflaccidum* Degel.: 9849/2
- Collema tenax* (Sw.) Ach. emend. Degel.: 9649/1, 9649/2, 9750/1
- Cyphelium tigillare* (Ach.) Ach.: 9650/1
- Dermatocarpon miniatum* (L.) W.Mann: 9649/2
- Dimerella pineti* (Schrad. ex Ach.) Vězda: 9548/3, 9549/1, 9649/2 (pr), 9650/3, 9848/4, 9849/4
- Diploschistes muscorum* (Scop.) R.Sant.: 9548/2, 9549/1, 9549/2, 9649/2, 9849/3

- *Diplotomma alboatrum* (Hoffm.) Flot.: 9849/2
Elixia flexella (Ach.) Lumbsch: 9650/1
**Endocarpon adscendens* (Anzi) Müll.Arg.: 9649/1 (pr)
Endocarpon pusillum Hedw.: 9649/2 (pr)
Evernia divaricata (L.) Ach.: 9548/2, 9548/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3
Evernia prunastri (L.) Ach.: 9548/1, 9548/2, 9548/4, 9549/1, 9549/3, 9648/1, 9649/2, 9649/4, 9650/1, 9650/3, 9749/3, 9749/4, 9750/1, 9750/3, 9848/4, 9849/2, 9849/3
Flavoparmelia caperata (L.) Hale: 9648/2, 9749/3, 9749/4, 9750/3, 9848/4, 9849/1, 9849/2, 9849/3
Farnoldia jurana (Schaer.) Hertel: 9649/1 (pr)
**Farnoldia micropsis* (A.Massal.) Hertel: 9649/1 (pr)
Fulgensia pruinosa (Körb.) Poelt: 9547/4 (GZU)
Fuscidea stiriaca (A.Massal.) Hafellner (syn. *F. cyathoides* var. *corticola*, *F. fagicola*): 9548/2, 9548/4, 9549/1, 9549/3, 9649/4 (pr), 9650/1, 9748/4, 9749/4, 9750/1
Graphis scripta (L.) Ach.: 9548/1, 9548/2, 9548/3, 9549/1, 9648/2, 9649/2, 9650/1, 9748/4, 9749/3, 9749/4, 9750/1, 9750/3, 9848/2, 9848/4, 9849/1, 9849/2, 9849/3
°Gyalecta flotowii Körb.: 9650/1
Gyalecta jenensis (Batsch) Zahlbr.: 9649/2 (pr)
Gyalecta truncigena (Ach.) Hepp: 9848/4
**Gyalecta ulmi* (Sw.) Zahlbr.: 9650/1
**Hyperphyscia adglutinata* (Flörke) H.Mayrhofer & Poelt: 9848/4
Hypocnomyce caradocensis (Leight. ex Nyl.) P.James & Gotth.Schneid.: 9749/4
°Hypogymnia bitteri (Lynge) Ahti: 9548/1, 9548/2, 9549/1, 9549/3
Hypogymnia farinacea Zopf: 9548/1, 9548/2, 9648/2, 9649/2, 9649/4,
Hypogymnia physodes (L.) Nyl.: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/4, 9749/3, 9749/4, 9750/1, 9750/3, 9849/1, 9849/2, 9849/3
Hypogymnia tubulosa (Schaer.) Hav.: 9548/2, 9548/3, 9549/1, 9549/2, 9549/3, 9547/2, 9648/1, 9649/2, 9649/4, 9650/1, 9749/3, 9749/4, 9848/2, 9848/4, 9849/1, 9849/2, 9849/3
Icmadophila ericetorum (L.) Zahlbr.: 9548/2, 9649/2, 9649/4, 9650/1
Imshaugia aleurites (Ach.) S.L.F.Meyer: 9548/2
Lecania cyrtella (Ach.) Th.Fr.: 9649/1 (pr), 9650/1
Lecania naegelii (Hepp) Diederich & P.Boom: 9749/4
Lecanora albella (Pers.) Ach.: 9547/1, 9548/2, 9549/3, 9649/2, 9748/4, 9749/4, 9750/1, 9750/3, 9849/1, 9849/3, 9849/4
Lecanora allophana Nyl.: 9548/2, 9647/2, 9648/2, 9650/1, 9650/3, 9748/4, 9749/3, 9749/4, 9750/1, 9750/3, 9848/2, 9848/4, 9849/2, 9849/3
Lecanora argentata (Ach.) Malme: 9548/1, 9548/2, 9548/4, 9549/1, 9549/3, 9648/2, 9649/2, 9650/1, 9650/3, 9748/4, 9749/3, 9749/4, 9750/1, 9750/3, 9848/4, 9849/1, 9849/2, 9849/3, 9849/4
**Lecanora boligera* (Norman ex Th.Fr.) Hedl.: 9649/2, 9650/1
Lecanora cadubriae (A.Massal.) Hedl.: 9649/2
Lecanora carpineae (L.) Vain.: 9548/1, 9548/4, 9648/2, 9649/2, 9650/1, 9650/3, 9749/3, 9749/4, 9848/4, 9849/3
Lecanora chlarotera Nyl.: 9548/1, 9548/2, 9649/2, 9650/1, 9648/2, 9750/1, 9848/4
Lecanora circumborealis Brodo & Vitik.: 9650/1
Lecanora conizaeoides Nyl. ex Crombie: 9548/1, 9548/2, 9548/4, 9549/1, 9549/2
Lecanora epibryon (Ach.) Ach.: 9649/1
Lecanora expallens Ach.: 9548/1, 9548/2, 9549/2, 9549/3
Lecanora glabrata (Ach.) Malme: 9548/2
Lecanora horiza (Ach.) Linds.: 9548/1, 9548/2, 9549/1
Lecanora impudens Degel.: 9649/2
Lecanora intumescens (Rebent.) Rabenh.: 9549/1, 9549/2, 9648/2, 9649/2, 9650/1, 9748/3, 9748/4, 9749/4, 9750/1, 9848/4, 9849/2, 9849/3
°Lecanora leptyroides (Nyl.) Degel.: 9648/2, 9748/4, 9749/4, 9750/3, 9849/1,
°Lecanora piniperda Körb.: 9649/4, 9650/3
Lecanora pulicaris (Pers.) Ach.: 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9649/2, 9650/1, 9749/2, 9749/4, 9750/1, 9750/3, 9848/2, 9849/3
Lecanora saligna (Schrad.) Zahlbr.: 9650/1, 9650/3
Lecanora sambuci (Pers.) Nyl.: 9648/2, 9650/1, 9748/4, 9749/4, 9848/2, 9848/4, 9849/3
Lecanora strobilina (Spren.) Kieff.: 9650/3
Lecanora subcarpineae Szatala: 9548/1, 9548/2, 9548/4, 9549/1, 9549/3, 9649/2, 9650/1
Lecanora symmicta (Ach.) Ach.: 9548/2, 9548/4, 9549/1, 9549/3, 9648/2, 9649/2, 9650/1, 9749/4, 9848/4
Lecanora varia (Hoffm.) Ach.: 9548/1, 9548/2, 9549/1, 9650/1, 9750/3
°Lecidea albofuscescens Nyl.: 9649/2 (pr)
**Lecidea betulicola* (Kullh.) H.Magn.: 9649/2 (pr), 9649/4
**Lecidea plebjea* Nyl.: 9548/1, 9548/2, 9549/3, 9650/1
Lecidea turgidula Fr.: 9649/4

- Lecidella elaeochroma* (Ach.) M.Choisy: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/3, 9648/2, 9649/1 (pr), 9649/2, 9649/4 (pr), 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/1, 9750/3, 9848/4, 9849/1, 9849/2, 9849/3
- Lecidella stigmatea* (Ach.) Hertel & Leuckert: 9649/1 (pr)
- **Lempholemma botryosum* (A.Massal.) Zahlbr.: 9649/2
- Lepraria eburnea* J.R.Laundon: 9548/2, 9650/1
- Lepraria elobata* Tønsberg: 9548/2, 9548/3, 9548/4, 9549/1
- Lepraria incana* (L.) Ach.: 9548/2, 9548/4, 9549/1, 9650/1
- Lepraria lobificans* Nyl.: 9548/2, 9548/3, 9549/1, 9549/2, 9549/3, 9649/2, 9650/1, 9650/3
- Lepraria rigidula* (de Lesd.) Tønsberg: 9548/3, 9549/1, 9549/2, 9649/2, 9650/1, 9750/1
- Leproloma vouauxii* (Hue) J.R.Laundon: 9548/2, 9549/1, 9650/1
- °*Leptogium gelatinosum* (With.) J.R.Laundon: 9649/1, 9649/2, 9650/1
- Leptogium lichenoides* (L.) Zahlbr.: 9649/2, 9749/4, 9848/2,
- Leptogium plicatile* (Ach.) Leight.: 9649/2
- Leptogium saturninum* (Dicks.) Nyl.: 9548/3
- Lobaria pulmonaria* (L.) Hoffm.: 9548/2, 9749/4, 9849/3
- °*Lobaria scrobiculata* (Scop.) DC.: 9849/3
- Loxospora elatina* (Ach.) A.Massal.: 9548/3, 9649/2, 9649/4, 9650/1, 9750/1
- Megalalaria laureri* (Hepp ex Th.Fr.) Hafellner: 9649/2
- Melanelia elegantula* (Zahlbr.) Essl.: 9548/1, 9649/2, 9650/1, 9650/3, 9750/1, 9849/3
- Melanelia exasperata* (De Not.) Essl.: 9648/2, 9650/3, 9749/4, 9849/3
- Melanelia exasperatula* (Nyl.) Essl.: 9548/1, 9548/2, 9548/4, 9549/1, 9549/3, 9648/2, 9649/1, 9650/1, 9650/3, 9749/4, 9750/3, 9848/4, 9849/2, 9849/3
- Melanelia fuliginosa* (Fr. ex Duby) Essl.: 9548/1, 9548/2, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/4, 9749/4, 9750/1, 9750/3, 9848/3, 9848/4, 9849/1, 9849/2, 9849/3
- Melanelia glabra* (Schaer.) Essl.: 9548/1, 9548/2, 9648/2, 9650/1, 9650/3, 9749/4, 9750/3, 9848/4, 9849/2, 9849/3
- Melanelia subargentifera* (Nyl.) Essl.: 9548/1, 9548/2, 9549/1, 9648/2, 9848/2, 9849/3
- Melanelia subaurifera* (Nyl.) Essl.: 9548/2
- Micarea adnata* Coppins: 9649/1, 9650/1
- **Micarea cinerea* (Schaer.) Hedl.: 9650/1
- **Micarea misella* (Nyl.) Hedl.: 9649/2
- Micarea peliocarpa* (Anzi) Coppins & R.Sant.: 9548/2, 9648/1, 9649/2 (pr), 9649/4 (pr), 9650/1
- Micarea prasina* Fr.: 9649/2, 9649/4, 9650/1, 9650/3
- °*Mycobilimbia berengeriana* (A.Massal.) Hafellner & V.Wirth: 9649/1, 9649/2
- Mycobilimbia hypnorum* (Lib.) Kalb & Hafellner: 9649/1 (pr)
- Mycoblastus affinis* (Schaer.) T.Schauer: 9649/2, 9649/4
- Mycoblastus fucatus* (Stirt.) Zahlbr.: 9548/1, 9548/2, 9549/1, 9549/3, 9649/2
- Mycoblastus sanguinarius* (L.) Norman: 9548/1, 9548/2, 9549/3, 9649/2 (pr)
- °*Myxobilimbia sabuletorum* (Schreb.) Hafellner (syn: *Mycobilimbia s.*): 9649/2, 9749/4
- **Naetrocymbe saxicola* (A.Massal.) Coppins: 9649/2
- Nephroma parile* (Ach.) Ach.: 9548/2
- Normandina pulchella* (Borrer) Nyl.: 9548/2, 9648/2, 9748/3, 9748/4, 9749/4, 9750/1, 9848/4, 9849/1, 9849/2, 9849/3
- Ochrolechia alboflavescens* (Wulfen) Zahlbr.: 9548/2, 9548/3, 9649/2, 9650/3
- Ochrolechia androgyna* (Hoffm.) Arnold: 9548/2, 9649/4, 9650/3
- Ochrolechia arborea* (Kreyer) Almb.: 9548/1, 9548/2, 9549/3, 9648/2
- Ochrolechia microstictoides* Räsänen: 9548/2, 9750/1
- Ochrolechia palleescens* (L.) A.Massal.: 9648/2, 9748/4, 9849/2, 9849/3
- Ochrolechia szatalaensis* Verseghy: 9548/1, 9549/1, 9649/1 (pr)
- Ochrolechia turneri* (Sm.) Hasselrot: 9648/2, 9649/2, 9649/4, 9650/1, 9650/3, 9750/1
- Ochrolechia upsaliensis* (L.) A.Massal.: 9547/4 (GZU)
- °*Opegrapha atra* Pers.: 9648/2, 9748/3, 9748/4, 9749/4, 9848/3, 9848/4, 9849/2, 9849/3,
- Opegrapha rufescens* Pers.: 9548/1, 9548/2, 9549/3, 9650/1, 9748/4, 9849/2
- Opegrapha rupestris* Pers.: 9649/2 (pr)
- Opegrapha varia* Pers. var. *varia*: 9548/2, 9549/3, 9650/1, 9748/4, 9750/3, 9848/4
- Opegrapha viridis* (Pers. ex Ach.) Behlen & Desberger: 9650/1, 9748/4
- Opegrapha vulgata* Ach. ssp. *subsiderella* Nyl.: 9649/4, 9650/1

- Parmelia saxatilis* (L.) Ach.: 9548/1, 9548/2, 9548/3, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/1, 9848/4, 9849/2, 9849/3
- Parmelia submontana* Nád. ex Hale: 9549/2, 9648/2, 9649/2, 9649/4, 9748/4, 9749/4, 9750/1, 9848/3, 9849/2, 9849/3
- Parmelia sulcata* Taylor: 9548/1, 9548/2, 9548/3, 9549/1, 9549/2, 9549/3, 9647/2, 9648/2, 9649/2, 9649/4, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/1, 9750/3, 9848/4, 9849/1, 9849/2, 9849/3
- Parmeliella triptophylla* (Ach.) Müll. Arg.: 9549/3
- Parmelina pastillifera* (Harm.) Hale: 9547/1, 9548/2, 9548/4, 9648/2, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/1, 9750/3, 9848/4, 849/4, 9848/4
- Parmelina quercina* (Willd.) Hale: 9648/1, 9648/2, 9650/1, 9650/3, 9749/4, 9849/1, 9848/4, 9849/3
- Parmelina tiliacea* (Hoffm.) Hale: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/3, 9750/3
- Parmeliopsis ambigua* (Wulfen) Nyl.: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/1, 9848/2, 9849/2
- Parmeliopsis hyperopta* (Ach.) Arnold: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9749/4, 9750/1
- Parmotrema chinense* (Osbeck) Hale & Ahti: 9748/4, 9749/1, 9849/1, 9849/3
- Peltigera canina* (L.) Willd.: 9548/2, 9548/4, 9549/3, 9649/2, 9649/4, 9650/1, 9650/3
- Peltigera degenii* Gyeln.: 9549/1, 9649/2, 9649/4, 9650/1
- Peltigera horizontalis* (Huds.) Baumg.: 9548/2, 9549/3, 9649/1, 9849/3
- **Peltigera hymenina* (Ach.) Delise ex Duby: 9549/3, 9649/2
- Peltigera leucophlebia* (Nyl.) Gyeln.: 9548/2, 9649/2
- Peltigera membranacea* (Ach.) Nyl.: 9548/2, 9549/3, 9649/2
- Peltigera polydactyla* (Neck.) Hoffm.: 9649/1, 9649/2, 9749/4
- Peltigera praetextata* (Flörke ex Sommerf.) Zopf: 9548/2, 9548/4, 9549/1, 9549/3, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9648/2
- Pertusaria albescens* (Huds.) M. Choisy & Werner: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/3, 9647/2, 9648/2, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/1, 9848/4, 9849/2, 9849/3
- Pertusaria amara* (Ach.) Nyl.: 9548/1, 9548/2, 9549/1, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9749/4, 9849/3
- Pertusaria coccodes* (Ach.) Nyl.: 9748/4, 9749/4, 9848/4, 9849/3
- Pertusaria coronata* (Ach.) Th. Fr.: 9548/2, 9649/2, 9748/3, 9750/1, 9849/3
- Pertusaria flavida* (DC.) J.R. Laundon: 9548/2, 9648/2, 9748/4, 9749/4, 9750/1, 9750/3, 9848/4, 9849/3
- Pertusaria hemisphaerica* (Flörke) Erichsen: 9549/3, 9648/2, 9748/3, 9748/4, 9749/4, 9750/3, 9848/4, 9849/1, 9849/2, 9849/3
- Pertusaria hymenea* (Ach.) Schaer.: 9748/4
- Pertusaria leioplaca* DC.: 9548/2, 9548/3, 9648/2, 9649/2, 9650/1, 9748/4, 9750/1, 9849/2, 9849/3
- Pertusaria pertusa* auct. non (Weigel) Tuck.: 9548/2, 9549/3, 9648/2, 9748/3, 9748/4, 9749/4, 9849/3
- Pertusaria pupillaris* (Nyl.) Th. Fr.: 9749/4
- °*Pertusaria pustulata* (Ach.) Duby: 9748/4, 9749/4
- Petractis clausa* (Hoffm.) Kremp.: 9649/2 (pr)
- Phaeophyscia endophoenicea* (Harm.) Moberg: 9648/2, 9748/3, 9748/4, 9749/4, 9848/4, 9849/1, 9849/2, 9849/3
- Phaeophyscia nigricans* (Flörke) Moberg: 9749/4
- Phaeophyscia orbicularis* (Neck.) Moberg: 9548/1, 9648/2, 9650/1, 9650/3, 9749/4, 9848/4, 9849/1, 9849/2, 9849/3
- Phaeophyscia sciastra* (Ach.) Moberg: 9650/3
- Phlyctis argena* (Spreng.) Flot.: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/3, 9648/2, 9649/2, 9649/4, 9650/1, 9650/3, 9748/3, 9748/4, 9750/1, 9848/4, 9849/3, 9749/4
- Physcia adscendens* (Fr.) H. Olivier: 9548/1, 9548/2, 9549/1, 9549/3, 9547/1, 9547/2, 9648/2, 9649/2, 9649/4, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/3, 9848/4, 9849/1, 9849/2, 9849/3
- Physcia aipolia* (Ehrh. ex Humb.) Fűrnr.: 9548/2, 9549/1, 9549/3, 9648/2, 9748/4, 9749/4, 9750/3, 9848/2, 9848/4, 9849/3
- Physcia stellaris* (L.) Nyl.: 9548/2, 9549/1, 9549/3, 9648/2, 9649/2, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9848/4
- Physcia tenella* (Scop.) DC.: 9548/2, 9549/1, 9648/2, 9650/1, 9650/3, 9749/4, 9848/4, 9849/1, 9849/2, 9849/3
- Physconia distorta* (With.) J.R. Laundon: 9548/1, 9548/2, 9548/3, 9549/1, 9549/3, 9648/2, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9750/3, 9849/2, 9849/3
- °*Physconia grisea* (Lam.) Poelt: 9748/4
- Physconia perisidiosa* (Erichsen) Moberg: 9548/1, 9549/1, 9650/1, 9650/3
- °*Placidium lachneum* (Ach.) de Lesd.: 9649/1 (pr)
- Placynthiella icmalea* (Ach.) Coppins & P. James: 9548/2, 9650/3

- Placynthium filiforme* (Garov.) M.Choisy: 9649/2
Platismatia glauca (L.) W.L.Culb. & C.F.Culb.: 9548/1, 9548/2, 9548/3, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/4, 9749/4, 9750/1, 9848/4, 9849/2, 9849/3
Porina aenea (Wallr.) Zahlbr.: 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/2, 9749/4, 9750/1, 9848/4, 9849/2, 9849/3
 °*Porina borrieri* (Trevis.) D.Hawksw. & P.James: 9849/1
Protoblastenia incrustans (DC.) J.Steiner: 9649/2 (pr)
Protopannaria pezizoides (Weber) M.Jørg. & Ekman (syn. *Pannaria p.*): 9649/2, 9649/4
Pseudevernia furfuracea (L.) Zopf: 9548/1, 9548/2, 9548/3, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/3, 9748/4, 9750/1, 9749/4, 9750/3, 9848/4, 9849/2, 9849/3
Punctelia subrudecta (Nyl.) Krog: 9548/1, 9548/2, 9549/3, 9748/4, 9749/4, 9848/4, 9849/1, 9849/2, 9849/3
Pyrenula nitida (Weigel) Ach.: 9548/2, 9549/1, 9650/1, 9748/4, 9749/4, 9849/3
Ramalina farinacea (L.) Ach.: 9548/1, 9548/2, 9548/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9749/4, 9750/3, 9848/4, 9849/3
Ramalina fastigiata (Pers.) Ach.: 9548/1, 9548/2, 9549/1, 9648/2, 9650/1, 9650/3, 9749/4, 9750/3, 9848/4, 9849/3
Ramalina fraxinea (L.) Ach.: 9650/3
 °*Ramalina roesleri* (Hochst. ex Schaer.) Hue: 9649/2, 9650/1, 9650/3
Rinodina albana (A.Massal.) A.Massal.: 9650/3
Rinodina archaea (Ach.) Arnold: 9548/4, 9649/4
Rinodina capensis Hampe: 9548/2, 9649/2, 9650/1
Rinodina sophodes (Ach.) A.Massal.: 9548/4, 9549/3, 9648/3, 9649/2, 9748/4, 9848/4, 9849/2
Ropalospora viridis (Tønsberg) Tønsberg: 9548/1, 9548/3, 9750/1
 °*Sagiolechia protuberans* (Ach.) A.Massal.: 9649/2 (pr)
Sarea difformis (Fr.) Fr.: 9548/1, 9949/1
Scoliciosporum chlorococcum (Graewe ex Stenh.) Vězda: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9748/3, 9748/4, 9749/4, 9750/3, 9848/4, 9849/1, 9849/2, 9849/3
Scoliciosporum sarothamni (Vain.) Vězda: 9650/1
Scoliciosporum umbrinum (Ach.) Arnold: 9748/3, 9748/4, 9749/4
Squamarina lamarckii (DC.) Poelt: 9547/4 (GZU)
Tephromela atra (Huds.) Hafellner var. *torulosa* (Flörke) Hafellner: 9548/2, 9650/1, 9849/2
 **Thelidium minutulum* Körb.: 9650/3
 **Thelomma ocellatum* (Körb.) Tibell: 9650/1
Thelotrema lepadinum (Ach.) Ach.: 9548/1, 9548/2, 9549/3
Toninia alutacea (Anzi) Jatta: 9649/1 (pr)
Tromera resiniae (Fr.) Kuntze (syn. *Sarea r.*): 9649/2 (pr)
Tuckermannopsis chlorophylla (Willd.) Hale: 9548/1, 9548/2, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/3, 9749/4, 9848/4, 9849/3
Tuckneraria laureri (Kremp.) Randle & Thell: 9548/1, 9548/2, 9649/1, 9649/4, 9650/3
 **Usnea barbata* (L.) Weber ex F.H.Wigg.: 9649/1, 9649/2
Usnea ceratina Ach.: 9650/1
Usnea diplotypus Vain.: 9649/2, 9649/4, 9650/1
Usnea filipendula Stirt.: 9548/1, 9548/2, 9549/1, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3
Usnea florida (L.) Weber ex F.H.Wigg.: 9548/2, 9548/4, 9549/3, 9648/2, 9649/2, 9649/4, 9748/4, 9749/4
Usnea fulvoreaegens (Räsänen) Räsänen: 9649/2, 9648/2, 9748/4
Usnea glabrata (Ach.) Vain.: 9649/4
Usnea glabrescens (Nyl. ex Vain.) Vain.: 9649/4
Usnea hirta (L.) Weber ex F.H.Wigg.: 9548/2, 9548/3, 9549/1, 9549/3, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3
Usnea rigida (Ach.) Mot.: 9649/2, 9650/3
Usnea subfloridana Stirt.: 9548/1, 9548/2, 9548/4, 9549/1, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/3, 9748/4, 9749/4, 9848/4, 9849/3
 °*Verrucaria elaeomelaena* (A.Massal.) Anzi: 9649/4
Vulpicida pinastri (Scop.) Mattson & M.J.Lai: 9548/1, 9548/2, 9548/3, 9548/4, 9549/1, 9549/2, 9549/3, 9648/2, 9649/1, 9649/2, 9649/4, 9650/1, 9650/3, 9748/4, 9749/4, 9750/1, 9750/3, 9848/4, 9849/3
 °*Xanthoria candelaria* (L.) Th.Fr.: 9650/3, 9648/2, 9748/3, 9748/4, 9749/4, 9849/1
 **Xanthoria contortuplicata* (Ach.) Boistel: 9547/4 (GZU)
Xanthoria parietina (L.) Th.Fr.: 9548/1, 9548/2, 9548/3, 9549/1, 9648/2, 9650/1, 9650/3, 9749/4, 9848/4
Xanthoria polycarpa (Hoffm.) Th.Fr. ex Rieber: 9548/2
Xylographa parallela (Ach.) Behlen & Desberger: 9649/4

Discussion

The Triglav National Park is mostly covered by natural forest (WRABER 1969) but is also subject to various human influences, such as air pollution, eutrophication, deforestation, grazing, tourism and sport activities. Despite that, the area supports many rare and endangered lichen taxa such as *Alectoria sarmentosa*, *Anaptychia ciliaris*, *Arthonia stellaris*, *Bacidia friesiana*, *Biatora ocelliformis*, *Bryoria implexa*, *Chaenotheca subbroscida*, *Cladonia norvegica*, *C. parasitica*, *C. rei*, *C. ramulosa*, *Collema nigrescens*, *C. subflaccidum*, *Endocarpon adscendens*, *Gyalecta flotowii*, *G. ulmi*, *Lecidea betulicola*, *Lobaria pulmonaria*, *L. scrobiculata*, *Megalaria laureri*, *Nephroma parile*, *Parmelia submontana*, *Parmeliella triptophylla*, *Parmelina quercina*, *Parmotrema chinense*, *Peltigera hymenina*, *Pertusaria hymenea*, *P. pustulata*, *Ramalina fraxinea*, *R. roesleri*, *Rinodina capensis*, *Usnea ceratina*, *U. florida*, *U. glabrescens*, *Verrucaria elaeomelaena* and other rare species, with the highest abundance of these found on the Pokljuka plateau and some other high-altitude, sheltered sites. In the valleys, the most sensitive lichens are badly damaged or absent. The main reason is air pollution as well as other environmental factors such as loss of habitats, especially old deciduous trees. Endangered species like *Lobaria pulmonaria*, *L. scrobiculata*, *Nephroma parile* and *Parmeliella triptophylla* occur on one to few sheltered trees.

A strong correlation exists between species diversity and sulphur dioxide concentration (HAWKSWORTH & ROSE 1976). This was proved in a set of transects in Kranjska gora, Pokljuka and Trenta, three quite differently polluted regions of the Park. In Kranjska gora, the transect closest to Jesenice underlined the impact of sulphur compounds. The number of species on conifers (Norway spruce, European larch) increased from 19 in the moderately polluted bottom of the valley (Kranjska gora, 920 m) to 37 at the top of the transect (1554 m). The concentration of sulphur dioxide in the air and the total sulphur content in the needles of Norway spruce confirmed the harmful effects of sulphur compounds (BATIČ et al. 1999, BATIČ 2002). The western sites possess the poorest species diversity in spite of no major local air pollution sources. The lowest diversity is observed at the altitudes from 900 m to 1100 m in the western and south-western part, which are open to polluted air masses from the west. Periodic measurement of air quality and other bioindication studies (Norway spruce needles analyses) showed the effects of eutrophication caused by polluted air from transboundary sources (GOMIŠČEK et al. 1997, BATIČ et al. 1999). According to Wirth (1995), toxitolerant taxa such as *Parmelia* (= *Melanelia*) *fuliginosa*, *P. sulcata* and *Parmelina pastillifera* become more competitive and are predominant. Also *Scoliciosporum chlorococcum*, an indicator of high polluted areas according to WILL-WOLF (1988), is fairly common. In the northern part of the Park where the major air pollution source is ironworks in Jesenice, the most abundant toxitolerant species are found in the valleys close to the town. Because of some refuge sites in remote valleys this area still retains many epiphytic species. Pokljuka, the south eastern part of the Park, hosts the highest diversity within the investigated area. Pokljuka is well-sheltered from the polluted air masses from the west and north as well as rising above the winter fog of the neighbouring basins.

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