

## Distribution of lichens and lichenicolous fungi in the Świętokrzyski National Park

ANNA LUBEK<sup>1</sup> and STANISŁAW CIEŚLIŃSKI<sup>2</sup>

<sup>1</sup>Department of Algology and Mycology, University of Łódź, Banacha 12/16,  
PL-90-237 Łódź, adonica@biol.uni.lodz.pl

<sup>2</sup>Institute of Biology, Świętokrzyska Academy, Świętokrzyska 15  
PL-25-406 Kielce, sciesl@pu.kielce.pl

Lubek A., Cieśliński S.: *Distribution of lichens and lichenicolous fungi in the Świętokrzyski National Park*. Acta Mycol. 39 (2): 173-252, 2004.

This paper presents the distribution of 405 taxa of the lichens and 26 species of lichenicolous fungi in the Świętokrzyski National Park.

**Key words:** lichenized and lichenicolous fungi, distribution, Świętokrzyski National Park, Świętokrzyskie Mts.

### INTRODUCTION

The Świętokrzyski National Park (ŚNP) covers the central area of the Świętokrzyskie Mountains – the oldest and the northernmost and easternmost mountain range in Poland, uplifted during the Caledonian and Variscan orogenic uplift. These mountains stand out because of a characteristic geological structure consisting in, among others, uncovering of layers of rocks from 500 million years ago that form boulder fields (Wróblewski 2000) (Fig. 1). At the same time, the ŚNP is one of the oldest national parks in Poland – founded in 1950. The rich and diversified lichen biota of the Świętokrzyskie Mountains has long been of interest to lichenologists. Lichenological research in this area dates back to the 19<sup>th</sup> century and has continued with varied intensity until the present day. As regards the ŚNP, there have been four periods describing the degree of research of the lichen biota: up to 1960, 1961-1980, 1981-1985, 1999-2002. The first period is characterized by a substantial concentration of research in the area of the highest hills of the Łysogóry Range (Berdau 1876; Błoński 1890; Kobendza and Motyka 1928, 1929; Kobendza 1939). Rich herbarium collections of B. Halicz and S. Kuziel (from 1955-1959) and M. Sroczyński (from 1960) dating from that period, deposited in the Herbarium of Lichens and Lichenicolous Fungi at the University of Łódź (LOD) were published after 1960 (Halicz and Kuziel 1965, 1966). The findings concerning lichens found in the second period of research come from the

selected areas of the Łysogóry and Klonowskie Ranges, the Wilkowska Valley, as well as from the protection zone and may often be considered as complementary (Tobolewski 1962; Halicz and Cieśliński 1967; Bystrek and Cieśliński 1976; Cieśliński and Halicz 1971; Toborowicz 1977; Cieśliński 1975, 1981). Some publications from that period were based on previous herbarium collections (Cieśliński and Bystrek 1982). The third period includes the spatially vastest research. It concerned the whole area of the ŚNP in its borders from before 1996, it did not, however, took the area of the protection zone into consideration (Cieśliński and Toborowicz 1989; Cieśliński 1985, 1991, 2000). The latest research conducted between 1999-2002 covered the whole area of the ŚNP and its protection zone (Łubek 2004).

The lichen biota of the area inside the borders of the national park should be considered as well studied within the Świętokrzyskie Mts. This article presents a distribution of all species of lichens and lichenicolous fungi found in the area of the ŚNP and its protection zone.

## MATERIAL AND METHODS

The research material – lichens and lichenicolous fungi – comes from three sources: published and unpublished literature, herbarium collections deposited in the Herbarium of Lichens and Lichenicolous Fungi at the University of Łódź (LOD) and the Herbarium of Lichens at the Świętokrzyska Academy (KTC), as well as the field studies conducted between 1999-2002 (Łubek 2004).

The research included all habitats, both natural and anthropogenic, within the area of the ŚNP and its protection zone where lichens may be found. Epiphytic lichens (growing on the bark of living trees, bushes and shrubs), epixylic lichens (found on wood in various stages of decay), epilithic lichens (saxicolous) growing on limestone rock and quartzitic sandstone, epigeic lichens (terrestrial) and epibryophytic lichens (growing on bryophytes) have been studied.

The grid square method has been applied. The research area was divided into 88 squares-sites, each side of the square 2 kilometers long. The square grid has been adjusted to the national ATLICHEN grid – acc. to Cieśliński and Fałtynowicz (1993). The studied squares are included in eight ATLICHEN squares: Ee65, Ee66, Ee67, Ee75, Ee76, Ee77, Ee78, Ee87. The spatial arrangement of the squares and their numbering are presented in Fig. 2. Field charting of the lichen and lichenicolous fungi biota was made between 1999-2002. Published, unpublished, and herbarium historical materials, except for those where to exact location of the site was impossible, were charted, too.

The spatial distribution of lichens and lichenicolous fungi is presented in cartograms. Fig. 1 serves to locate the square in which a given taxon is found. A single cartogram (Fig. 2) – a grid of squares, each side of the square 2 kilometers long – is included in a series of cartograms (1-431) and corresponds to one lichen taxon or lichenicolous fungus. A single map contains the following data:

- name of species of a lichen, \*lichenicolous fungus or \*saprobiont [(\*) – an optional saprobiont], which constitutes the title of the map;
- total number of present sites (np) and total number of historical sites (nh);

– information about Protection status in Poland (acc. to the Journal of Laws. – Dz. U. No 168, item 1765): P - species under strict protection, Pp - under partial protection;

– Świętokrzyskie Mts/Poland Red List Categories (acc. to Cieśliński and Łubek 2003; Cieśliński, Czyżewska, Fabiszewski 2003): Re - Regionally Extinct, CR - Critically Endangered, EN - Endangered, VU - Vulnerable, NT - Near Threatened, LC - Least Concern, DD - Data Deficient;

– subsequent time periods when a species was found are marked with the following symbols: ○ – until 1960, ● – 1961-1980, ◐ – 1981-1985, ● – a species found in all time periods: until 1960, 1961-1980, 1981-1985 to 2002, ● – 1999-2002, ? – lack of exact location.

The list of lichens (cartograms 1 to 405), lichenicolous fungi and saprobionts (406-431) has been arranged alphabetically. The nomenclature follows Scholz (2000), Vězda and Liška (1999), and Hawksworth (1983).

## RESULTS

Taking into consideration the existing results of the research in the area of the ŚNP, 405 species, subspecies and varieties of lichens and 26 species of lichenicolous fungi have been found. 382 species of lichens and 18 species of lichenicolous fungi have been determined to exist on the basis of the past of the national park and its protection zone. During present research 261 species of lichens have been found, and 144 species of lichens have not been found. The majority should be assumed as extinct in the territory of the national park, the rest may be still found somewhere, but was overlooked during the research.

The whole lichen biota of the national park consists of 119 genera grouped in 50 families and the genus *Lepraria* not belonging to any family. The most abundant in species are the genera: *Cladonia* (37 species), *Lecanora* (31), *Usnea* (13), *Caloplaca* (13), *Micarea* (12), *Pertusaria* (11) and *Chaenotheca* (10).

Lichenicolous fungi have been classified into 21 genera classified into 11 orders. The most abundant in species are the families *Mycoalicaceae* (4 species) and *Tremelaceae* (3) and the genus *Lichenocodium* (3 species). The most numerous group among lichenicolous fungi are species belonging to *Ascomycetes* – 52%. Participation of species belonging to amorphous fungi (*Hyphomycetes* and *Coelomycetes*) – 32% and to *Basidiomycetes* – 16% is smaller.

The most dominant in the lichens biota are epiphytes – more than 220 species and epixyles – 118, which is connected with the forest character of the ŚNP. The third most numerous group are epilithes – 117 species which are also characterized by the number of exclusive species (86%). Terrestrial lichens – 72 species find habitats specific for them in the national park primarily on the boulder fields where they grow in the soil accumulated among rock blocks. The least number of lichens have been found on bryophytes – only 7 species. A detailed analysis of the lichen biota in the ŚNP and its protection zone shall be included in a separate work.

**Acknowledgements.** We would like to thank Prof. Krystyna Czyżewska (University of Łódź) for the access herbarial material of lichens from the Świętokrzyski National Park, determining or revising the determination of taxa and critical analysis of this article. We would like to thank Dr Lucyna Śliwa (PAN, Kraków) for determining or revising the determination of the species of *Lecanora dispersa* and *L. umbrina* groups, Dr Martin Kukwa (University of Gdańsk) for determining or revising by TLC the determination of the species of *Lepraria*.

The work was partly supported by the Committee for Scientific Research, research project no 6 P04G 077 20 and University of Łódź, grants no 505/451, 505/413.

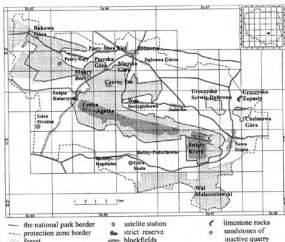


Fig. 1. Świętokrzyski National Park and its protecting zone.

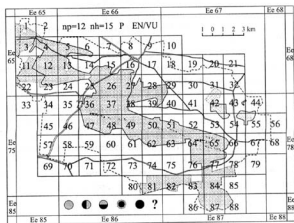
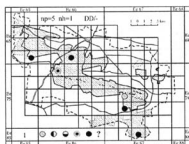
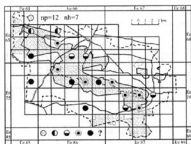
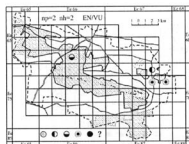
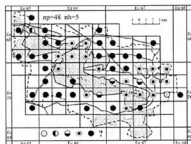
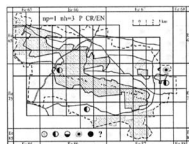
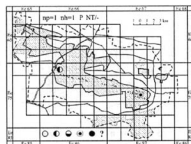
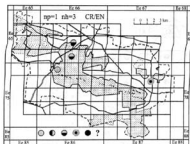
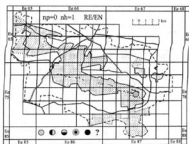
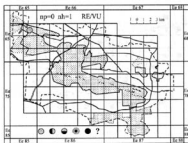
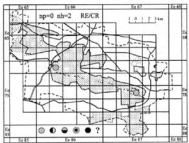
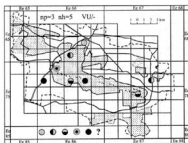
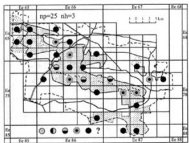
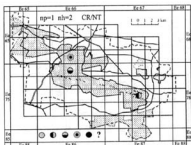
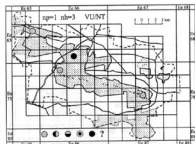
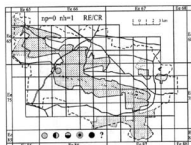
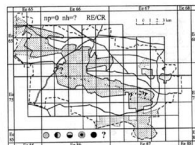
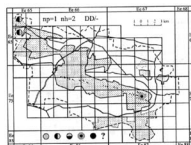
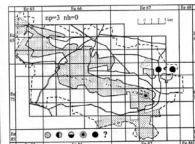


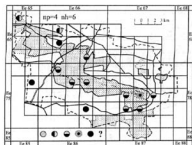
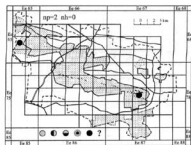
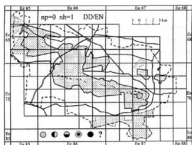
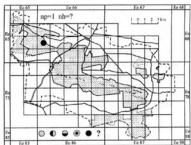
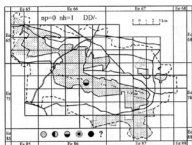
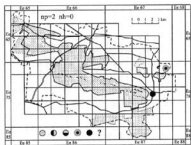
Fig. 2. A single cartogram, and their numbers.

## Distribution of lichens and lichenicolous fungi

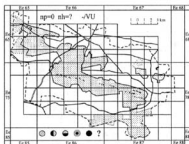
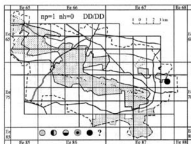
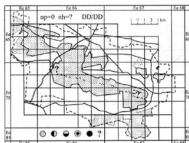
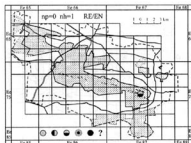
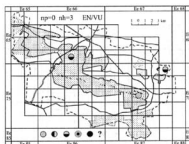
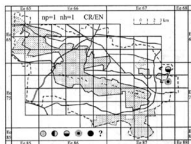
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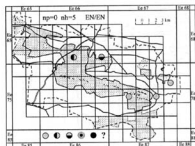
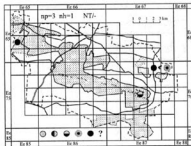
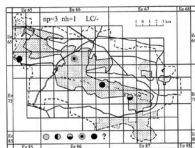
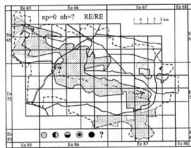
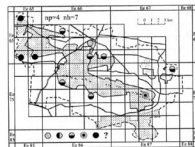
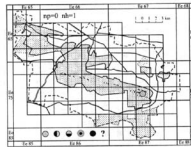
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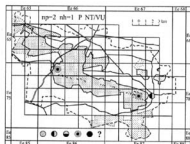
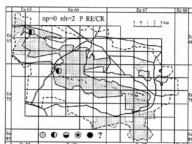
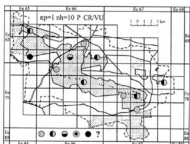
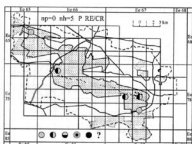
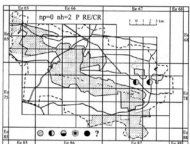
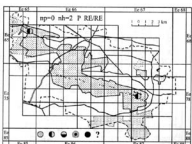
*Arthonia vinosa* Leight.*Arthothelium ruanum* (A. Massal.) Körb.*Arthothelium spectabile* Flot. ex A. Massal.*Arthrosporium populum* A. Massal.*Aspicilia caesiocinerea* (Nyl. ex Malbr.) Arnold*Aspicilia calcarea* (L.) Mudd

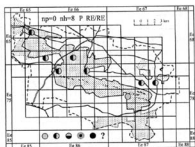
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Jatta



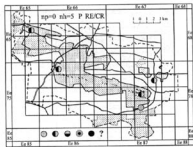
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*Bacidina assulata* Vězda*Bacidina inudata* (Fr.) Vězda*Bacidina phacodes* (Körb.) Vězda*Baeomyces carneus* Flörke*Baeomyces rufus* (Huds.) Rebent.*Bagliettoa parmigera* (J. Steiner) Vězda & Poelt

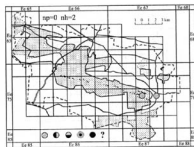
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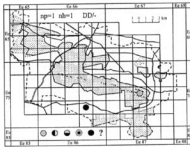
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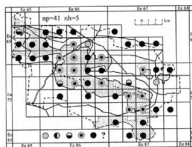
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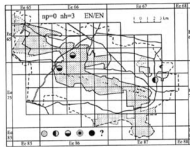
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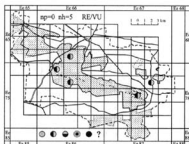
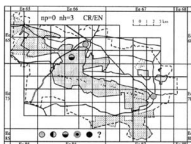
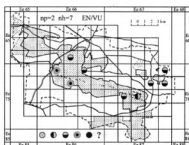
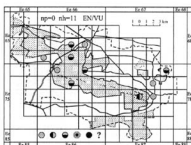
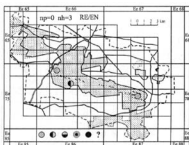
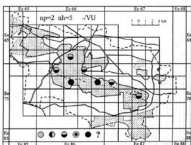
*Buellia aethalea* (Ach.) Th. Fr.

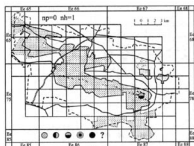
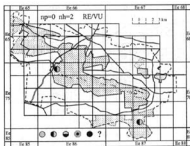
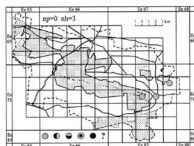
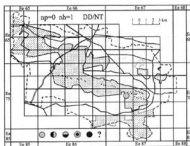
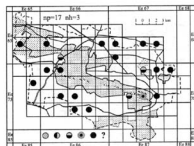
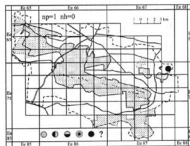


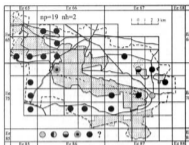
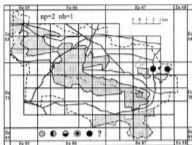
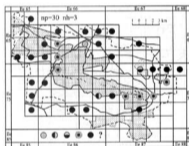
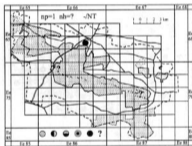
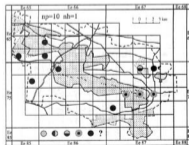
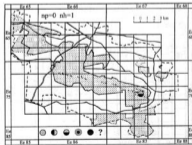
*Buellia griseovirens* (Turner & Borrer ex Sm.)  
Alb.

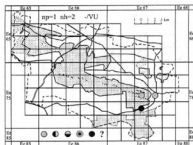


*Buellia schaeereri* De Not.

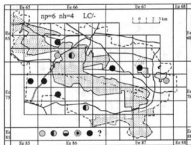
*Calicium abietinum* Pers.*Calicium adspersum* Pers.*Calicium glaucellum* Ach.*Calicium salicinum* Pers.*Calicium trabinellum* (Ach.) Ach.*Calicium viride* Pers.

*Caloplaca arenaria* (Pers.) Müll. Arg.*Caloplaca cerina* (Ehrh. ex Hedw.) Th. Fr.*Caloplaca chalybaea* (Fr.) Müll. Arg.*Caloplaca cirrochroa* (Ach.) Th. Fr.*Caloplaca citrina* (Hoffm.) Th. Fr.*Caloplaca coronata* (Kremp. ex Körb.) J. Steiner

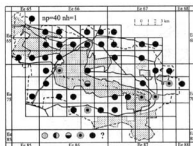
*Caloplaca decipiens* (Arnold) Blomb. & Fossell*Caloplaca dolomiticola* (Hue) Zahlbr.*Caloplaca holocarpha* (Hoffm. ex Ach.) Wade*Caloplaca obscurella* (J. Lahm ex Körb.) Th. Fr.*Caloplaca saxicola* (Hoffm.) Nordin*Caloplaca teicholyta* (Ach.) J. Steiner



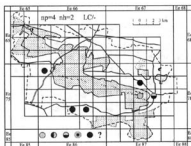
*Caloplaca variabilis* (Pers.) Müll. Arg.



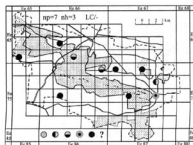
*Candelaria concolor* (J. Dicks.) Stein



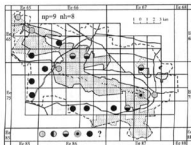
*Candelariella aurella* (Hoffm.) Zahlbr.



*Candelariella coralliza* (Nyl.) H. Magn.

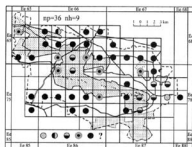
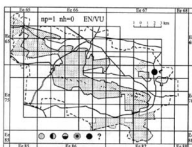
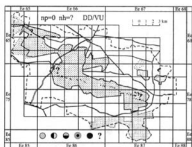
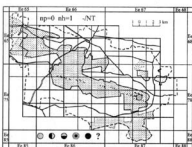
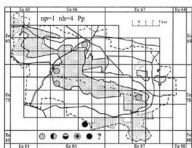
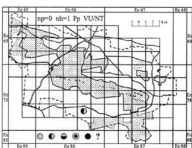


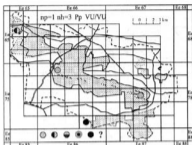
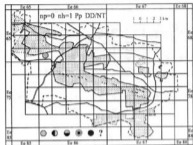
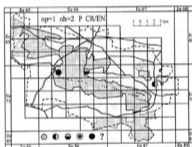
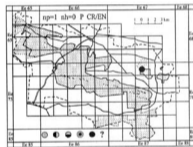
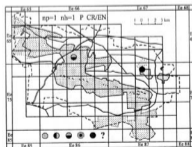
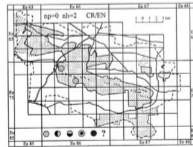
*Candelariella reflexa* (Nyl.) Lettau

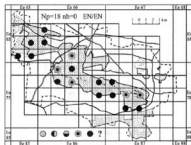
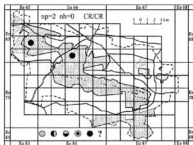
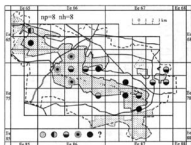
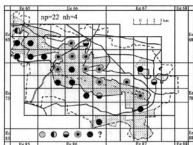
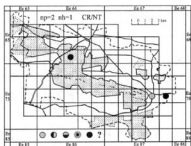
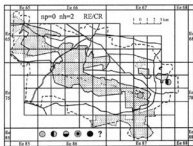


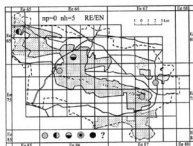
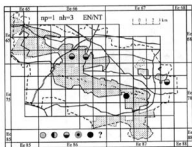
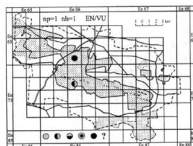
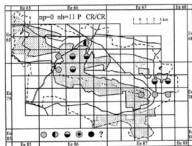
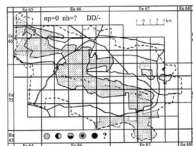
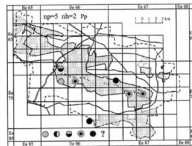
*Candelariella vitellina* (Hoffm.) Müll. Arg.

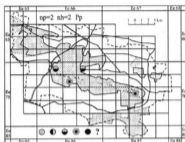


*Candelariella xanthostigma* (Ach.) Lettau*Catapyrenium cinereum* (Pers.) Körb.*Catillaria chalybeia* (Borrer) A. Massal.*Catillaria lenticularis* (Ach.) Th. Fr.*Cetraria aculeata* (Schreb.) Fr.*Cetraria ericetorum* Opiz

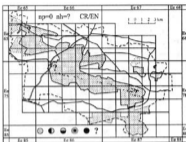
*Cetraria islandica* (L.) Ach.*Cetraria muricata* (Ach.) Eckfeldt*Cetraria sepincola* (Ehrh.) Ach.*Cetraria cetrarioides* (Delise ex Duby) W.L. Culb. & C.F. Culb.*Cetraria olivetorum* (Nyl.) W.L. Culb. & C.F. Culb.*Chaenotheca brachypoda* (Ach.) Tibell

*Chaenotheca brunneoala* (Ach.) Müll. Arg.*Chaenotheca chlorella* (Ach.) Müll. Arg.*Chaenotheca chrysocephala* (Turner ex Ach.)  
Th. Fr.*Chaenotheca ferruginea* (Turner & Borrer) Mig.*Chaenotheca furfuracea* (L.) Tibell*Chaenotheca hispidula* (Ach.) Zahlbr.

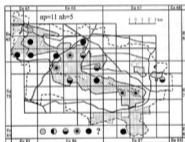
*Chaenotheca phaeocephala* (Turner) Th. Fr.*Chaenotheca trichialis* (Ach.) Th. Fr.*Chaenotheca xyloxena* Nádv.*Chrysothrix candelaris* (L.) J.R. Laundon*Chrysothrix chlorina* (Ach.) J.R. Laundon*Cladonia arbuscula* (Wallr.) Flot. ssp. *arbuscula*



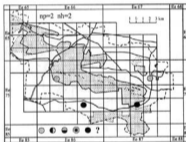
*Cladonia arbuscula* (Waltr.) Flot. ssp. *mitis*  
(Sandst.) Ruoss



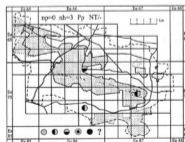
*Cladonia botrytes* (K.G. Hagen) Willd.



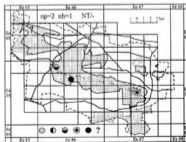
*Cladonia cenotea* (Ach.) Schaer.



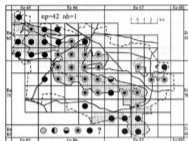
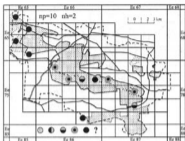
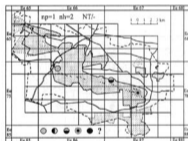
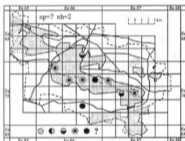
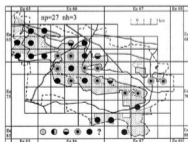
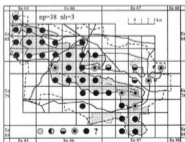
*Cladonia cervicornis* (Ach.) Flot. ssp.  
*verticillata* (Hoffm.) Ahti

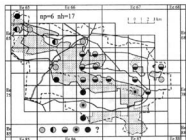
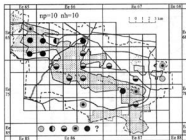
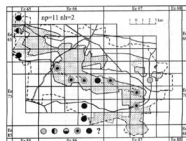
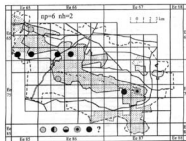
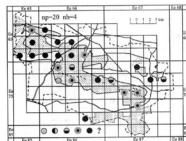
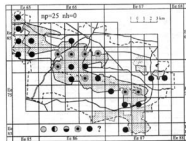


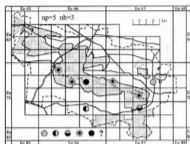
*Cladonia ciliata* Stirt. var. *tenuis* (Flörke) Ahti



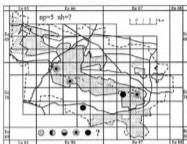
*Cladonia coccifera* (L.) Willd.

*Cladonia coniocraea* auct.*Cladonia cornuta* (L.) Hoffm.*Cladonia crispata* (Ach.) Flot.*Cladonia deformis* (L.) Hoffm.*Cladonia digitata* (L.) Hoffm.*Cladonia fimbriata* (L.) Fr.

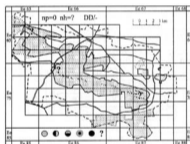
*Cladonia furcata* (Huds.) Schrad.*Cladonia glauca* Flörke*Cladonia gracilis* (L.) Willd.*Cladonia macilenta* Hoffm. ssp. *floerkeana*  
(Fr.) V. Wirth*Cladonia macilenta* Hoffm. ssp. *macilenta**Cladonia ochrochlora* Flörke



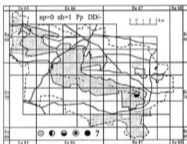
*Cladonia phyllophora* Hoffm.



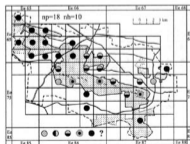
*Cladonia pleurota* (Flörke) Schaer.



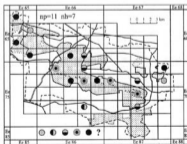
*Cladonia polydactyla* (Flörke) Spreng.



*Cladonia portentosa* (Dufour) Coem.

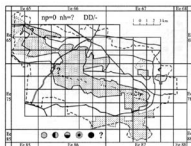


*Cladonia pyxidata* (L.) Hoffm.  
ssp. *chlorophaea* (Sommerf.) V. Wirth s.l.

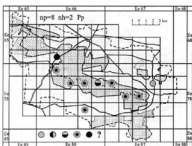


*Cladonia pyxidata* (L.) Hoffm. ssp. *pyxidata*

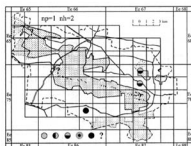




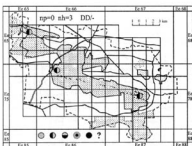
*Cladonia ramulosa* (With.) J.R. Laundon



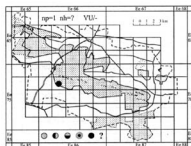
*Cladonia rangiferina* (L.) Weber ex F.H. Wigg.



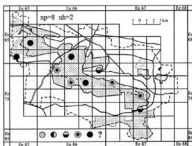
*Cladonia rangiformis* Hoffm.



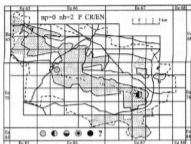
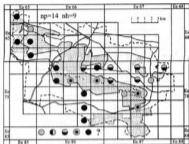
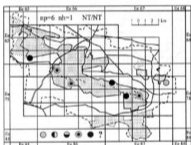
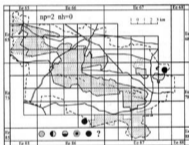
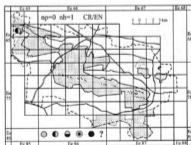
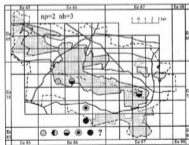
*Cladonia rei* Schaer.

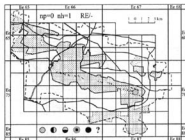


*Cladonia scabriuscula* (Delise) Nyl.

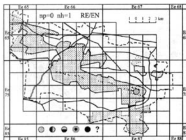


*Cladonia squamosa* (Scop.) Hoffm.  
var. *squamosa*

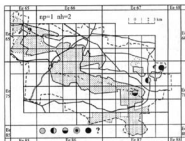
*Cladonia stellaris* (Opiz) Pouzar & Vězda*Cladonia subulata* (L.) Weber ex F.H. Wigg.*Cladonia sulphurina* (Michx.) Fr.*Cladonia symphycarpa* (Flörke) Fr.*Cladonia turgida* Hoffm.*Cladonia uncialis* (L.) Weber ex F.H. Wigg



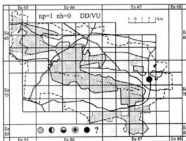
*Collema crispum* (Huds.) Weber ex F.H. Wigg.



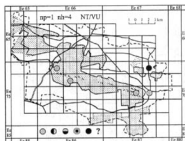
*Collema flaccidum* (Ach.) Ach.



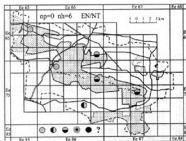
*Collema tenax* (Sw.) Ach. em. Degel.



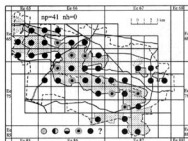
*Cyphelium notarisii* (Tul.) Blomb. & Frossell



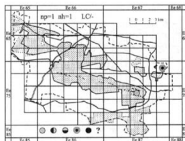
*Dermatocarpon miniatum* (L.) W. Mann



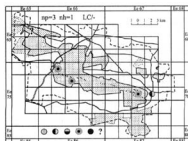
*Dibaeis baeomyces* (L.fil.) Rambold & Hertel



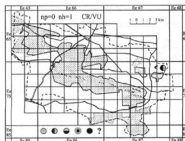
*Dimerella pineti* (Ach.) Vězda



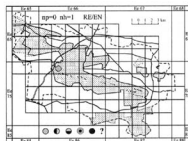
*Diploschistes muscorum* (Scop.) R. Sant.



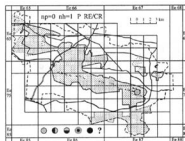
*Diploschistes scruposus* (Schreb.) Norm.



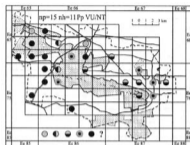
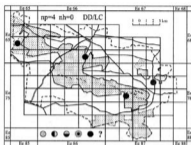
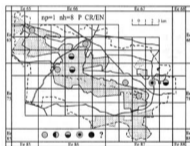
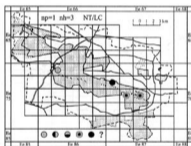
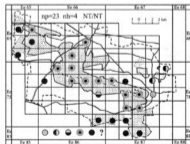
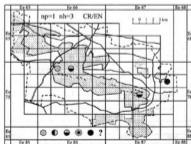
*Endocarpon pusillum* Hedw.

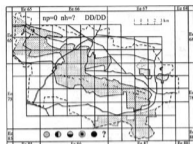


*Epebe lanata* (L.) Vain.

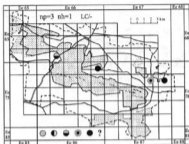


*Evernia divaricata* (L.) Ach.

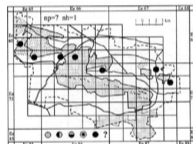
*Evernia prunastri* (L.) Ach.*Felthaneropsis vezdae* (Coppins et P. James)  
Štúr. et Coppins*Flavoparmelia caperata* (L.) Hale*Fuscidea kochiana* (Hepp) V. Wirth & Vězda*Graphis scripta* (L.) Ach.*Gyalecta truncigena* (Ach.) Hepp.



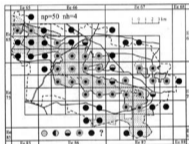
*Haematomma ochroleucum* (Neck.) J.R. Laundon  
var. *ochroleucum*



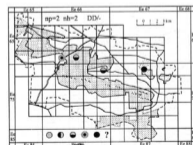
*Hypocenomyce antracophila* (Nyl.) P. James  
& Gotth. Schneid.



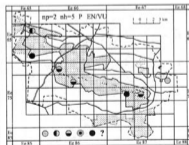
*Hypocenomyce caradocensis* (Leight. ex Nyl.)  
P. James & Gotth. Schneid.



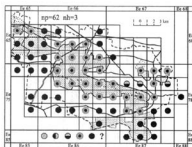
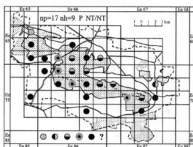
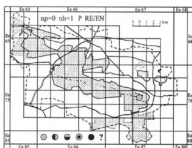
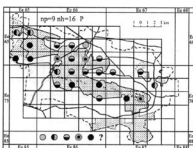
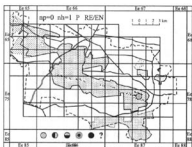
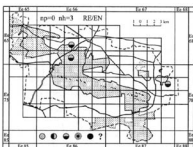
*Hypocenomyce scalaris* (Ach. ex Lilj.) M. Choisy

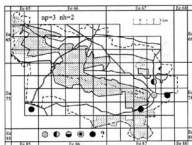
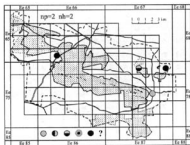
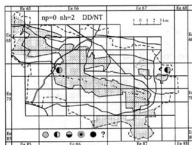
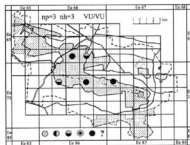
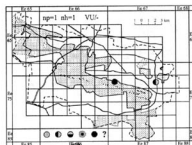
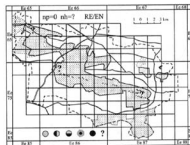


*Hypocenomyce sorophora* (Vain.) P. James  
& Poelt [*Pycnora sorophora* (Vain.) Hafellner]

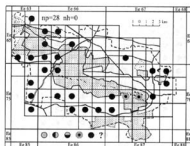
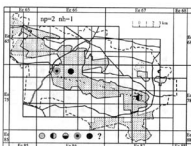
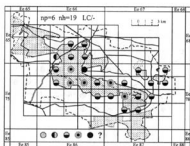
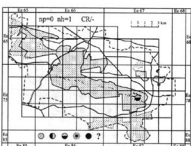
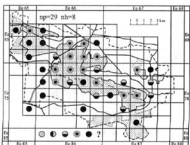
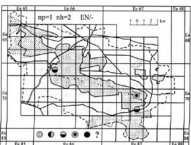


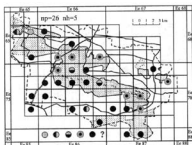
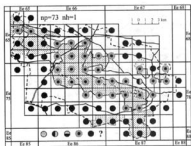
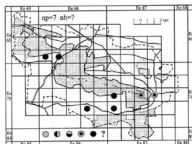
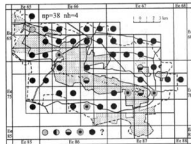
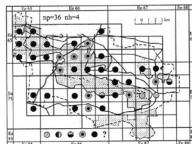
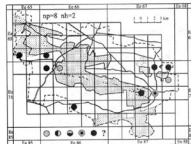
*Hypogymnia farinacea* Zopf

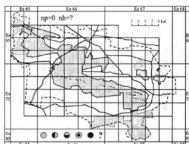
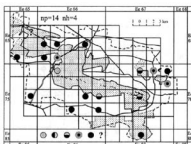
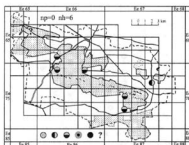
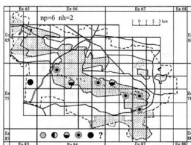
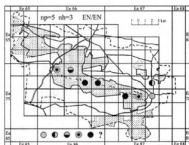
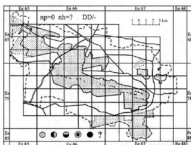
*Hypogymnia physodes* (L.) Nyl.*Hypogymnia tubulosa* (Schaer.) Hav.*Icmadophila ericetorum* (L.) A. Zahlbr.*Imshaugia aleurites* (Ach.) S.L.F. Mey.*Lasallia pustulata* (L.) Mèrat*Lecanatis abietina* (Ach.) Korb.

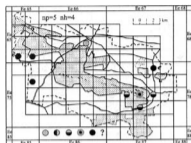
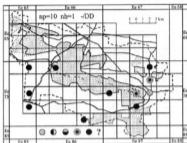
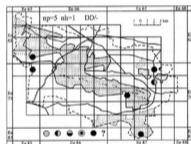
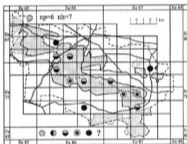
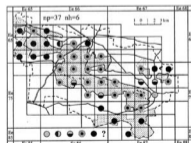
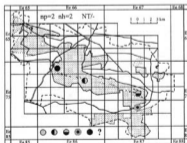
*Lecania cyrtella* (Ach.) Th. Fr.*Lecania erysibe* (Ach.) Mudd*Lecania fuscella* (Schaer.) A. Massal.*Lecania globulosa* (Flörke) P. Boom & Sérus.*Lecania naegeli* (Hepp) Diederich & P. Boom*Lecanora albella* (Pers.) Ach.

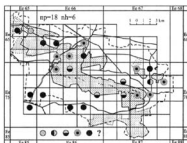
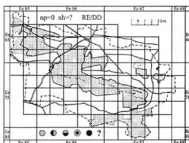
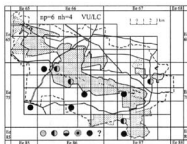
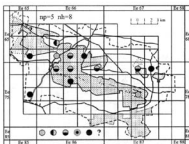
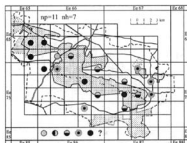
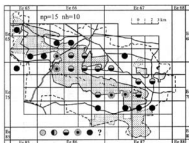


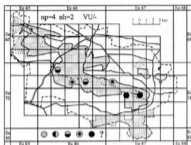
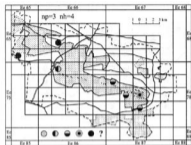
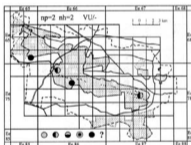
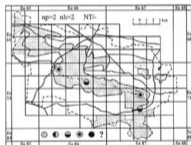
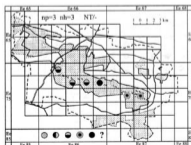
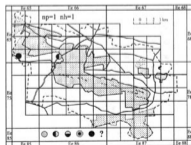
*Lecanora albescens* (Hoffm.) Branth & Rostr.*Lecanora allophana* Nyl.*Lecanora argentata* (Ach.) Malme*Lecanora campestris* (Schaer.) Hue*Lecanora carpinea* (L.) Vain.*Lecanora cenisia* Ach.

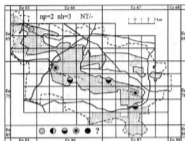
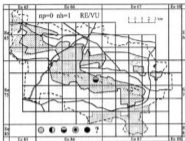
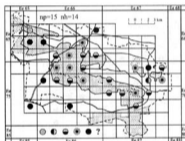
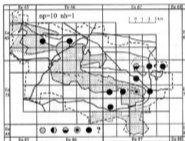
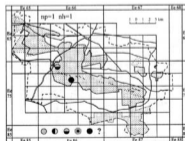
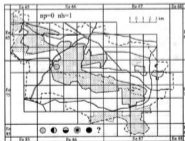
*Lecanora chlarotera* Nyl.*Lecanora conizaeoides* Nyl. ex Crombie*Lecanora crenulata* Hook.*Lecanora dispersa* (Pers.) Sommerf.*Lecanora expallens* Ach.*Lecanora flotowiana* Spreng.

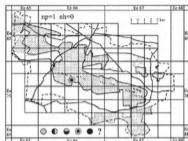
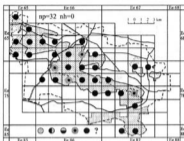
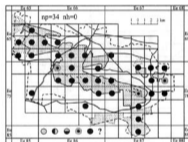
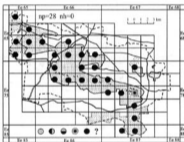
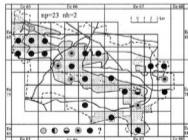
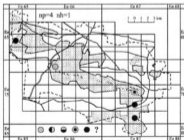
*Lecanora glabrata* (Ach.) Malme*Lecanora hagenii* (Ach.) Ach.*Lecanora impudens* Degel.*Lecanora intricata* (Ach.) Ach.*Lecanora intumescens* (Rebent.) Rebenh.*Lecanora leptyroides* (Nyl.) Degel.

*Lecanora muralis* (Schreb.) Rebenh.*Lecanora persimilis* (Th. Fr.) Nyl.*Lecanora piniperda* Kieb.*Lecanora polytropa* (Ehrh. ex Hoffm.) Rabenh.*Lecanora pulicaris* (Pers.) Ach.*Lecanora rupicola* (L.) Zahlbr.

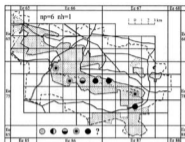
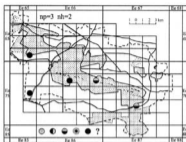
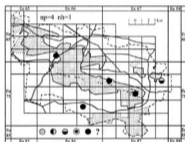
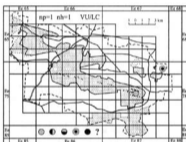
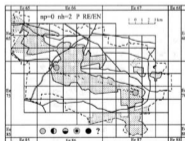
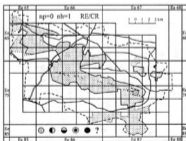
*Lecanora saligna* (Schrad.) Zahlbr.*Lecanora sambuci* (Pers.) Nyl.*Lecanora subrugosa* Nyl.*Lecanora symmicta* (Ach.) Ach.*Lecanora umbrina* (Ach.) A. Massal.*Lecanora varia* (Hoffm.) Ach.

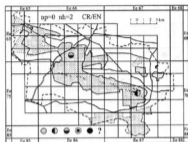
*Lecidea confluens* (Weber) Ach.*Lecidea fuscoatra* (L.) Ach.*Lecidea lapicida* (Ach.) Ach. var. *lapicida**Lecidea lapicida* (Ach.) Ach. var. *pantherina* Ach.*Lecidea lithophila* (Ach.) Ach.*Lecidea nylanderii* (Anzi) Th. Fr.

*Lecidea plana* (J. Lahm) Nyl.*Lecidea turgidula* Fr.*Lecidella elaeochroma* (Ach.) M. Choisy*Lecidella stigmatæa* (Ach.) Hertel & Leuckert*Lepraria borealis* Lohlander & Tuesberg*Lepraria cacuminum* (A. Massal.) Kümmerling & Leuckert

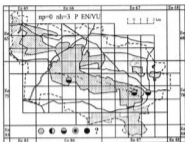
*Lepraria cf. eburnea* J.R. Laundon*Lepraria elobata* Tonsberg*Lepraria incana* (L.) Ach.*Lepraria jackii* Tonsberg*Lepraria lobificans* Nyl.*Lepraria membranacea* (Dicks.) Vain.



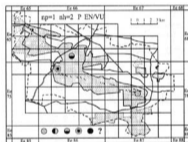
*Lepraria neglecta* (Nyl.) Lettau*Lepraria rigidula* (de Lesd.) Tonsberg*Lepraria vouauxii* (Hue) R.C. Harris*Leptogium lichenoides* (L.) Zahlbr.*Lobaria pulmonaria* (L.) Hoffm.*Lopadium pezizoideum* (Ach.) Körb.



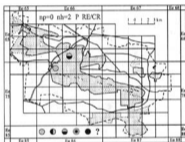
*Loxospora elatina* (Ach.) A. Massal.



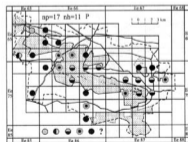
*Melanelia disjuncta* (Erichsen) Essl.



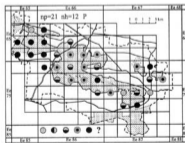
*Melanelia elegantula* (Zahlbr.) Essl.



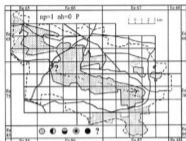
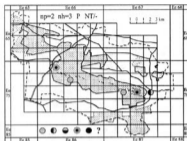
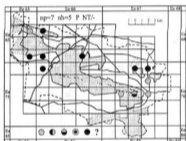
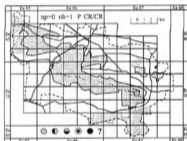
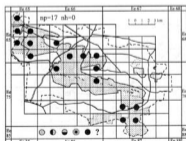
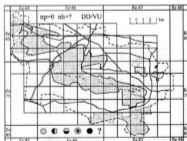
*Melanelia exasperata* (De Not.) Essl.

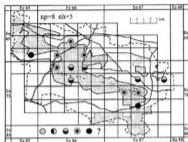


*Melanelia exasperatula* (Nyl.) Essl.

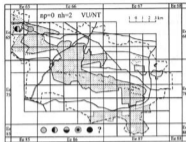


*Melanelia glabrata* (Lamy) Essl.

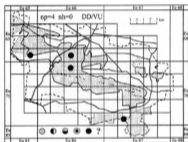
*Melanelia olivacea* (L.) Essl.*Melanelia stygia* (L.) Essl.*Melanelia subaurifera* (Nyl.) Essl.*Menegazzia terebrata* (Hoffm.) A. Massal.*Micarea botryoides* (Nyl.) Coppins*Micarea cinerea* (Schaer.) Hedl.



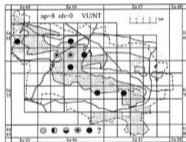
*Micarea denigrata* (Fr.) Hedl.



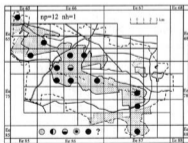
*Micarea erratica* (Körb.) Hertel, Rambold & Pietschm.



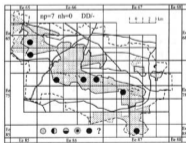
*Micarea hedlundii* Coppins



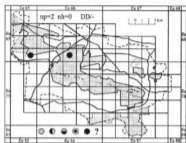
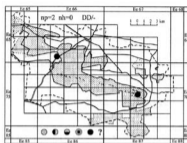
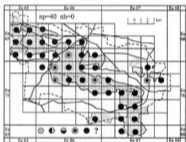
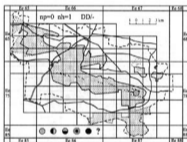
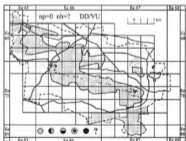
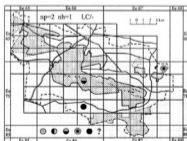
*Micarea melaena* (Nyl.) Hedl.

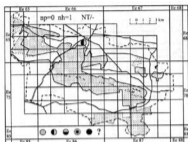


*Micarea misella* (Nyl.) Hedl.

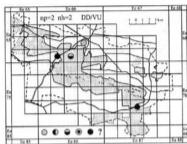


*Micarea nigella* Coppins

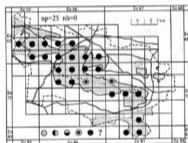
*Micarea nitschkeana* (J. Lahm ex Rabenh.) Harm.*Micarea peliocarpa* (Anzi) Coppins et R. Sant.*Micarea prasina* Fr. s.l.*Micarea sylvicola* (Flot.) Vězda & V. Wirth*Miriquidica leucophaea* (Flörke ex Rabenh.)  
Hertel & Rambold*Mycobilimbia fusca* (A. Massal.) Hafellner  
& V. Wirth



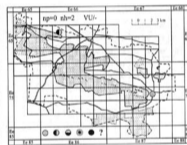
*Mycobilimbia sabuletorum* (Schreb.) Hafellner



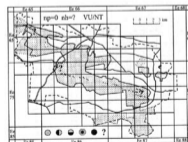
*Mycobilimbia sphaeroides* (J. Dicks.)



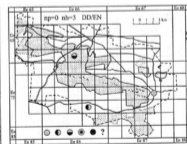
*Mycoblastus fucatus* (Stirt.) Zahlbr.



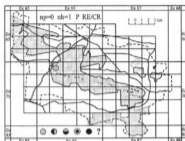
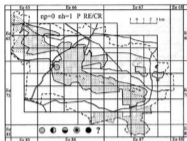
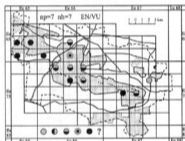
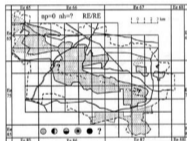
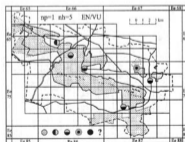
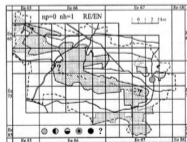
*Neofuscelia loxodes* (Nyl.) Essl.

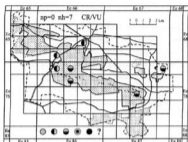
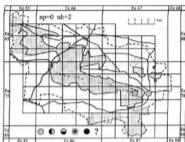
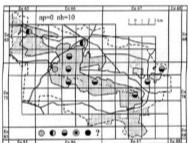
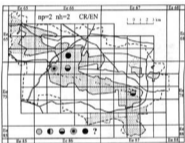
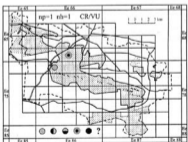
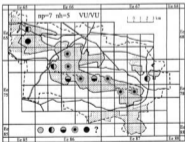


*Neofuscelia pulla* (Ach.) Essl.

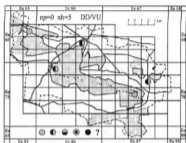
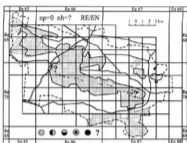
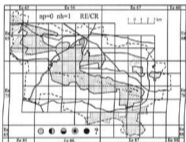
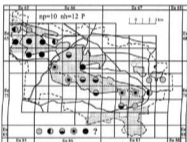
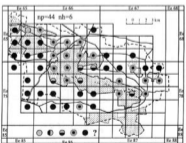
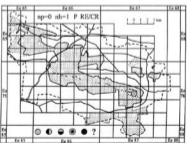


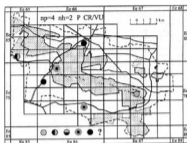
*Neofuscelia verruculifera* (Nyl.) Essl.

*Nephroma laevigatum* Ach.*Nephroma resupinatum* (L.) Ach.*Ochrolechia androgyna* (Hoffm.) Arnold*Ochrolechia parella* (L.) A. Massal.*Ochrolechia subviridis* (Hoeg) Erichsen*Opegrapha atra* Pers.

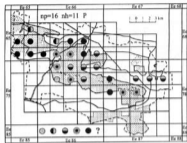
*Opographa rufescens* Pers.*Opographa rupestris* Pers.*Opographa varia* Pers. var. *varia**Opographa vermicellifera* (Kunze) J.R. Laundon*Opographa viridis* (Pers. ex Ach.) Behlen & Desberger*Opographa vulgata* Ach. var. *subsiderella* Nyl.



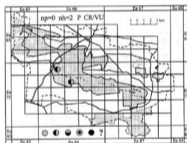
*Opegrapha vulgata* Ach. var. *vulgata**Orphniospora mosigii* (Körb.) Hertel & Rambold*Pannaria pezizoides* (Weber) Trevisan*Parmelia saxatilis* (L.) Ach.*Parmelia sulcata* Taylor*Parmelina quercina* (Willd.) Hale



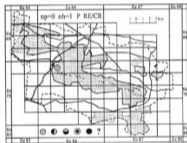
*Parmelina tiliacea* (Hoffm.) Hale



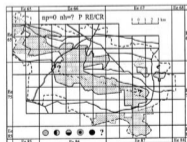
*Parmeliopsis ambigua* (Wulfen) Nyl.



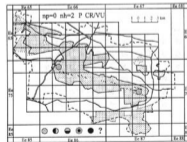
*Parmeliopsis hyperopta* (Ach.) Arnold



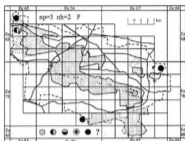
*Parmotrema chinense* (Osbeck) Hale & Ahti



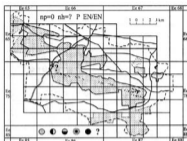
*Peltigera aphthosa* (L.) Willd.



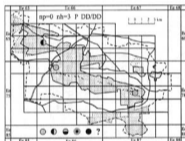
*Peltigera canina* (L.) Willd.



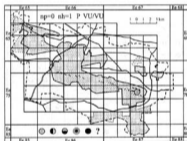
*Peltigera didactyla* (With.) J.R. Laundon  
var. *didactyla*



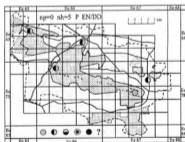
*Peltigera horizontalis* (Huds.) Baumg.



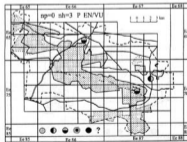
*Peltigera hymenina* (Ach.) Delise



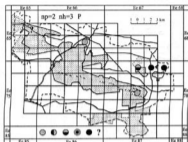
*Peltigera malacea* (Ach.) Funck



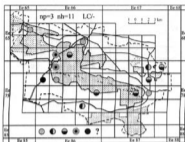
*Peltigera polydactylon* (Neck.) Hoffm.



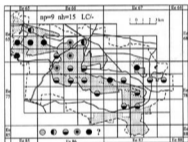
*Peltigera praetextata* (Flörke ex Sommerf.) Zopf



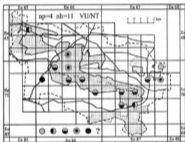
*Pertusaria rufescens* (Weiss) Humb.



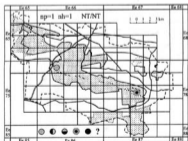
*Pertusaria albescens* (Huds.) M. Choisy & Werner



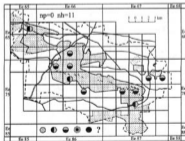
*Pertusaria amara* (Ach.) Nyl.



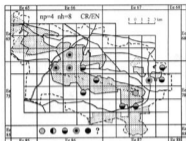
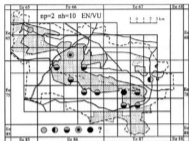
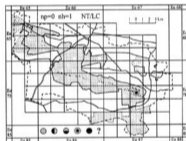
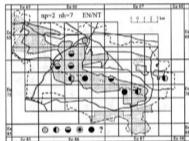
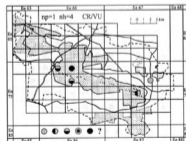
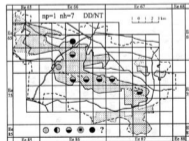
*Pertusaria coccodes* (Ach.) Nyl.

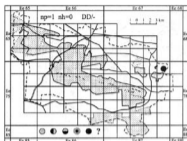
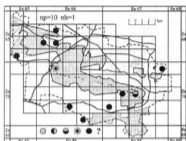
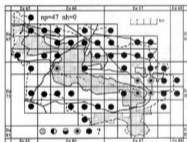
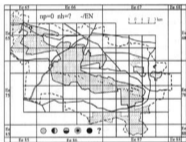
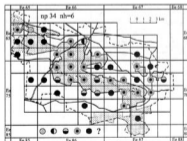
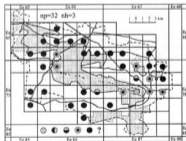


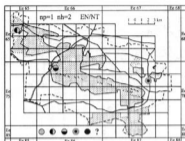
*Pertusaria corallina* (L.) Arnold



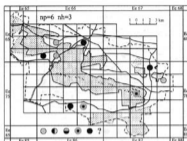
*Pertusaria coronata* (Ach.) Th. Fr.

*Pertusaria flavida* (DC.) J.R. Laundon*Pertusaria hemisphaerica* (Flörke) Erichsen*Pertusaria lactea* (L.) Arnold*Pertusaria leioplaca* DC.*Pertusaria pertusa* (Weigel) Tuck.*Pertusaria pupillaris* (Nyl.) Th. Fr.

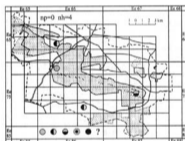
*Phaeophyscia kairamoi* (Vain.) Moberg*Phaeophyscia nigricans* (Flörke) Moberg*Phaeophyscia orbicularis* (Neck.) Moberg*Phlyctis agelaea* (Ach.) Flot.*Phlyctis argena* (Spreng.) Flot.*Physcia adscendens* (Fr.) H. Olivier



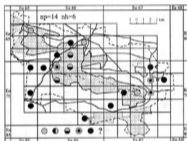
*Physcia aipolia* (Ehrh. ex Humb.) Fűr. r.



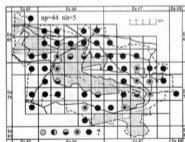
*Physcia caesia* (Hoffm.) Fűr. r.



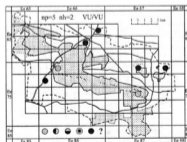
*Physcia dubia* (Hoffm.) Lettau



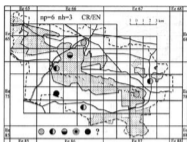
*Physcia stellaris* (L.) Nyl.



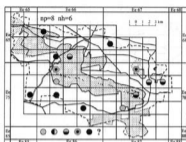
*Physcia tenella* (Scop.) DC.



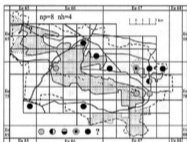
*Physconia detersa* (Nyl.) Poelt



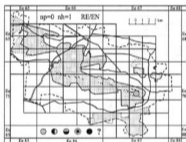
*Physconia distorta* (With.) J.R. Laundon



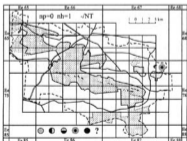
*Physconia enteroxantha* (Nyl.) Poelt



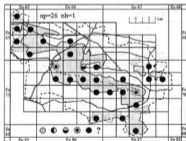
*Physconia grisea* (Lam.) Poelt



*Placidium rufescens* (Ach.) A. Massal.

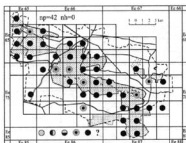


*Placidium squamulosum* (Ach.) Breuss

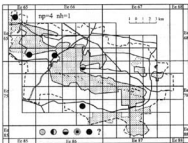


*Placynthiella dasaea* (Stirt.) Tønsberg

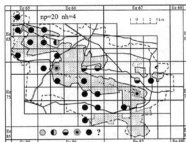




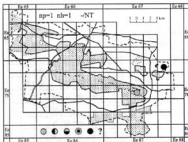
*Placynthiella icmalea* (Ach.) Coppins & P. James



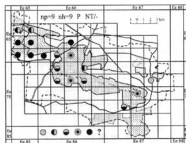
*Placynthiella oligotropa* (J.R. Laundon)  
Coppins & P. James



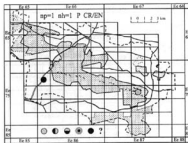
*Placynthiella uliginosa* (Schrad.) Coppins  
& P. James



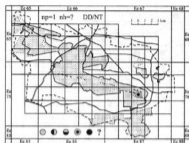
*Placynthium nigrum* (Huds.) S. Gray



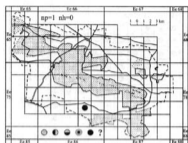
*Platismatia glauca* (L.) W.L. Culb. & C.F. Culb.



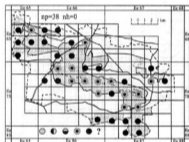
*Pleurosticta acetabulum* (Neck.) Elix  
& Lumbsch



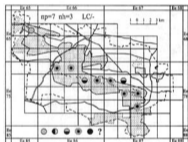
*Polysporina lapponica* (Ach. ex Schaer.) Degel.



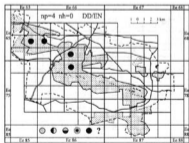
*Polysporina simplex* (Dav.) Vězda



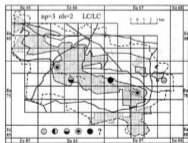
*Porina aenea* (Wallr.) Zahlbr.



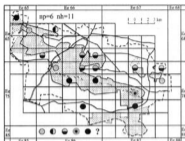
*Porina chlorotica* (Ach.) Müll. Arg.



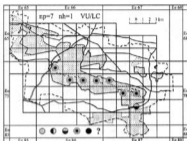
*Porina leptalea* (Durieu & Mont.) A.L. Sm.



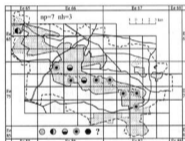
*Porpidia cinereoatra* (Ach.) Hertel & Knoph



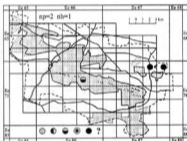
*Porpidia crustulata* (Ach.) Hertel & Knoph



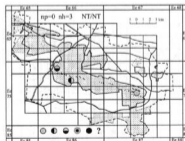
*Porpidia macrocarpa* (DC.) Hertel & A.J. Schwab



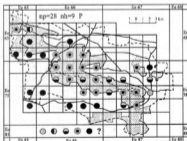
*Porpidia tuberculosa* (Sm.) Hertel & Knoph



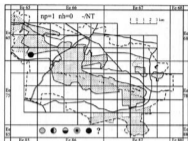
*Protoblastenia rupestris* (Scop.) J. Steiner



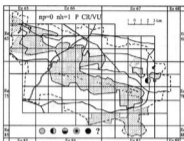
*Protoparmelia badia* (Hoffm.) Hafellner



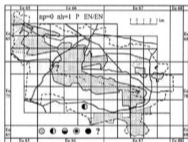
*Pseudevernia furfuracea* (L.) Zopf.



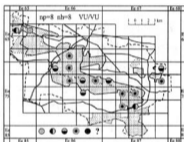
*Psilolechia clavifera* (Nyl.) Coppins



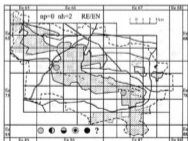
*Punctelia subrudecta* (Nyl.) Krog



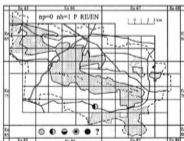
*Pycnothelia papillaria* Dufour



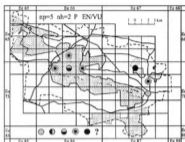
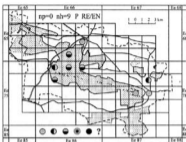
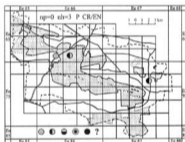
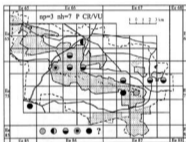
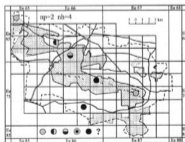
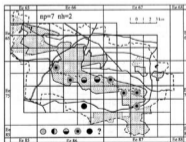
*Pyrenula nitida* (Weigel) Ach.

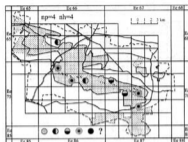
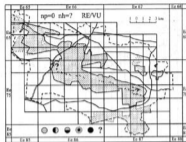
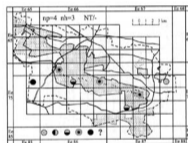
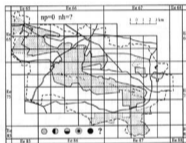
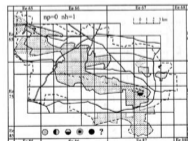
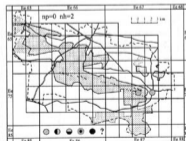


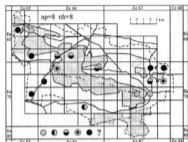
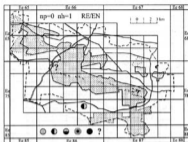
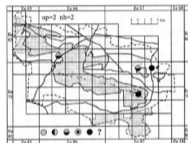
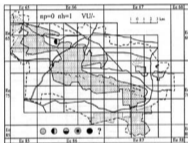
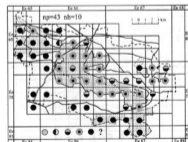
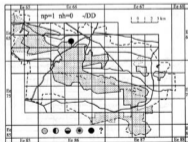
*Pyrenula nitidella* (Flörke ex Schaer.) Müll. Arg.

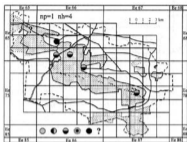
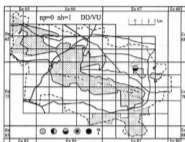
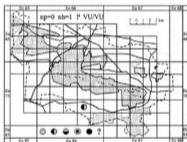
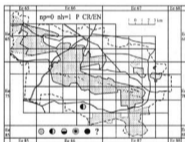
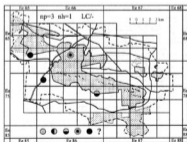
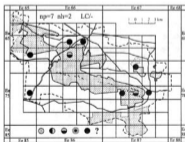


*Ramalina baltica* Lettau

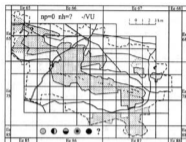
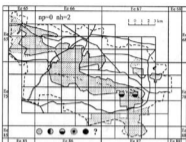
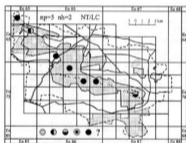
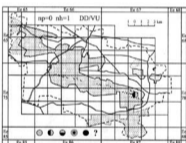
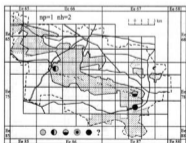
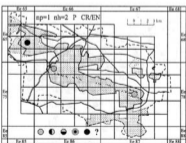
*Ramalina farinacea* (L.) Ach.*Ramalina fastigiata* (Pers.) Ach.*Ramalina fraxinea* (L.) Ach.*Ramalina pollinaria* (Westr.) Ach.*Rhizocarpon distinctum* Th. Fr.*Rhizocarpon geographicum* (L.) DC.

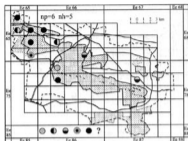
*Rhizocarpon obscuratum* (Ach.) A. Massal.*Rhizocarpon petraeum* (Wulfen) A. Massal.*Rhizocarpon polycarpum* (Hepp) Th. Fr.*Rinodina exigua* (Ach.) S. Gray*Rinodina gennarii* Bagl.*Rinodina immersa* (Körb.) Zahlbr.

*Rinodina pyrina* (Ach.) Arnold*Rinodina sophodes* (Ach.) A. Massal.*Sarcogyne regularis* Körb.*Sarcosagium campestre* (Fr.) Poetsch & Schiederm*Scoliciosporum chlorococcum* (Graewe ex Stenh.) Vězda*Scoliciosporum pruinatum* (P. James) Vězda

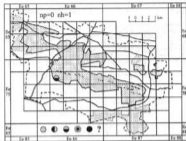
*Scoliciosporum umbrinum* (Ach.) Arnold*Staurothele ambrosiana* (A. Massal.) Zschacke*Stereocaulon condensatum* Hoffm.*Stereocaulon incrustatum* Flörke*Strangospora moriformis* (Ach.) Stein*Strangospora pinicola* (A. Massal.) Körb.



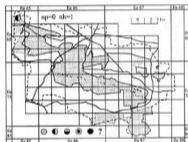
*Strigula stigmatella* (Ach.) R.C. Harris*Tephromela grumosa* (Pers.) Hafellner & Cl. Roux*Thelocarpon epibolum* Nyl.*Thelocarpon intermediellum* Nyl.*Thelocarpon laureri* (Flot.) Nyl.*Thelotrema lepadinum* (Ach.) Ach.



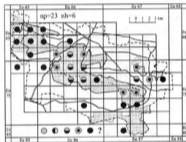
*Trapelia coarctata* (Sm.) M. Choisy



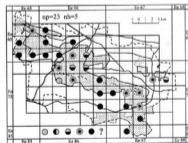
*Trapelia involuta* (Taylor) Hertel



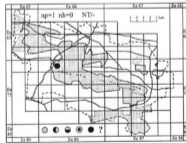
*Trapelia obtegens* (Th. Fr.) Hertel



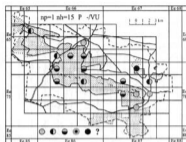
*Trapeliopsis flexuosa* (Fr.) Coppins & P. James



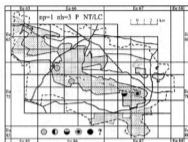
*Trapeliopsis granulosa* (Hoffm.) Lumbsch



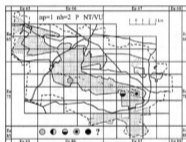
*Trapeliopsis pseudogranulosa* Coppins & P. James



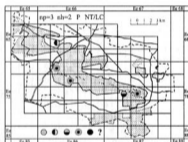
*Tuckermannopsis chlorophylla* (Willd.) Hale  
[*Cetraria chlorophylla* (Willd.) Vain.]



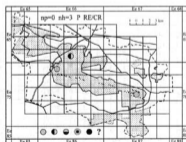
*Umbilicaria deusta* (L.) Baumg.



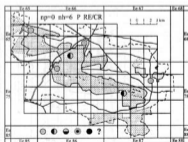
*Umbilicaria hyperborea* (Ach.) Hoffm.



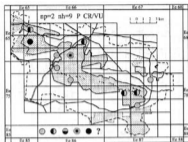
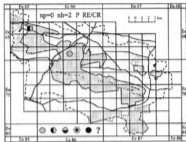
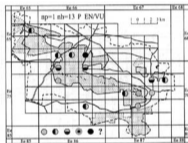
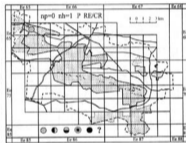
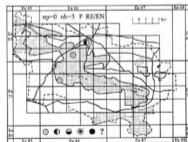
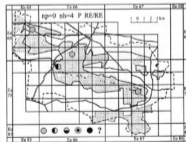
*Umbilicaria polyphylla* (L.) Baumg.

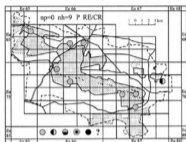
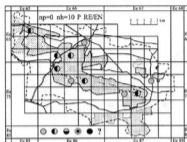
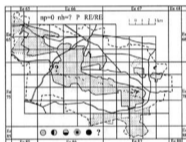
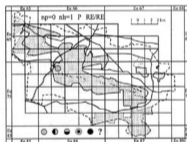
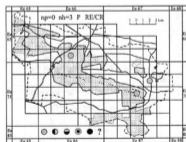
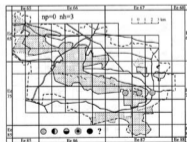


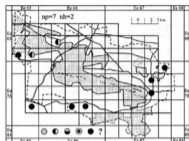
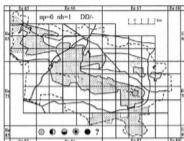
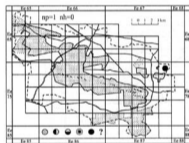
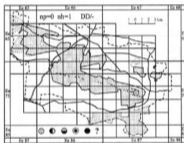
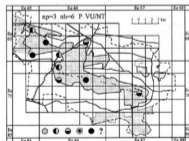
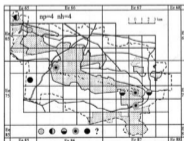
*Usnea ceratina* Ach.

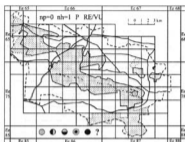


*Usnea faginea* Motyka

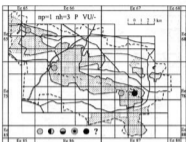
*Usnea filipendula* Stirt.*Usnea fulvorangeans* (Räsänen) Räsänen*Usnea hirta* (L.) Weber F.H. Wigg.*Usnea hirtella* Motyka*Usnea laricina* Vain.*Usnea neglecta* Motyka

*Usnea rigida* (Ach.) Motyka s.l.*Usnea subfloridana* Strit.*Usnea sylvatica* Motyka*Usnea uncinulata* Motyka*Usnea wasmuthii* Räsänen*Verrucaria calciseda* DC.

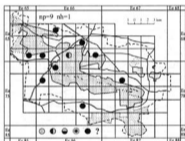
*Verrucaria muralis* Ach.*Verrucaria nigrescens* Pers.*Verrucaria rupestris* Shrad.*Verrucaria velana* (A. Massal.) Zahlbr.*Vulpicidia pinastris* (Scop.) Mattson & M.J. Lai*Xanthoparmelia conspersa* (Ach.) Hale



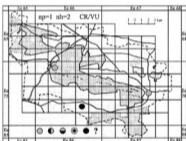
*Xanthoparmelia mougeotii* (Schaer. ex D. Dietz.) Hale



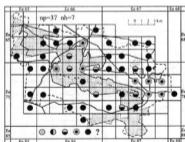
*Xanthoparmelia somloënsis* (Gyeln.) Hale



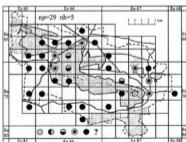
*Xanthoria candelaria* (L.) Th. Fr. s.l.



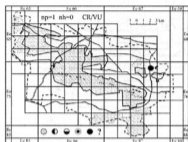
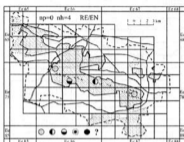
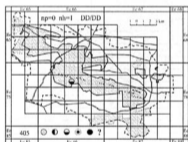
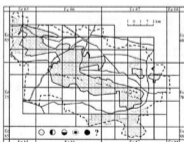
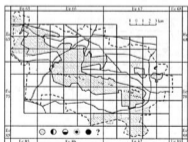
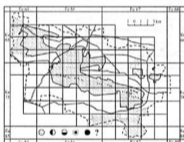
*Xanthoria fallax* (Hepp) Arnold



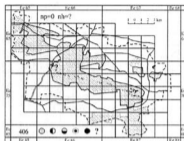
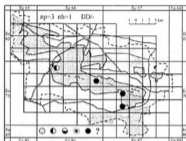
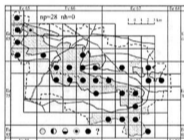
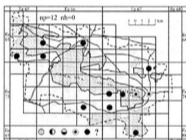
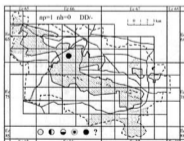
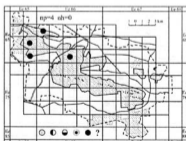
*Xanthoria parietina* (L.) Th. Fr.

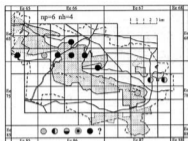


*Xanthoria polycarpa* (Hoffm.) Th. Fr. ex Rieber

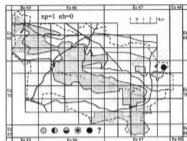
*Xanthoria ulophyllodes* Räsänen*Xylographa parallela* (Ach.: Fr.) Behlen & Desberger*Xylographa vitiligo* (Ach.) J.R. Laundon



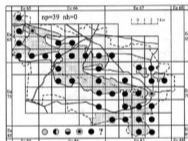
\**Abrothallus parmelliarum* (Sommerf.) Arnold(*Arthopyrenia lapponina* Anzi)\**Athelia arachnoidea* (Berk.) Jülich\**Bispora christiansenii* D. Hawksw.\**Chaenothecopsis nigra* Tibell\**Chaenothecopsis pusilla* (Ach.) A.F.W. Schmidt



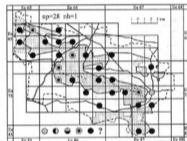
\**Clypeococcum hypocenomyces* D. Hawksw.



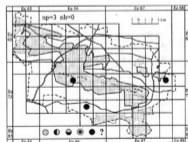
\**Illosporium carneum* Fr.



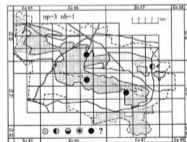
\**Lichenocodium erodens* M.S. Christ.  
& D. Hawksw.



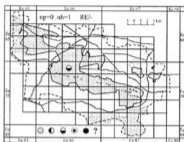
\**Lichenocodium lecanorae* (Jaap) D. Hawksw.



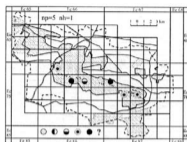
\**Lichenocodium pyxidatae* (Oudem.) Petr. & Syd.



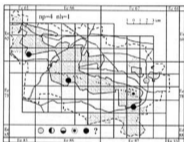
\**Lichenodiplis lecanorae* (Vouaux) Dyko  
& D. Hawksw.



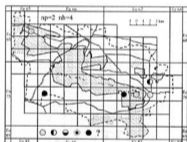
( ) *Melaspilea gibberulosa* (Ach.) Zwackh



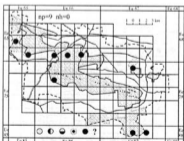
\* *Muellerella lichenicola* (Sommerf.: Fr.)  
D. Hawksw.



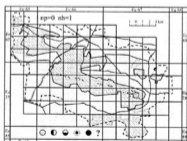
*Mycocalicium subtile* (Pers.) Szatala



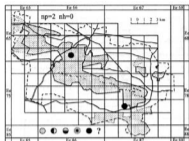
( ) *Peridiothelia fuliguncta* (Norman) D. Hawksw.  
[ ( ) *Mycomicrothelia micula* Kőeb.]



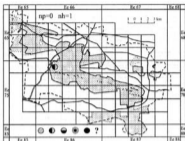
\* *Phoma cytaspora* (Vouaux) D. Hawksw.



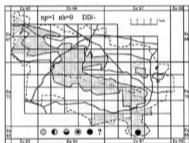
\* *Plectocarpon lichenum* (Sommerf.) D. Hawksw.  
in D. Hawksw. & D.J. Galloway



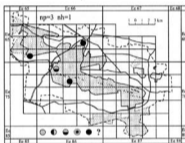
*Stenocybe pullatula* (Ach.) Stein.



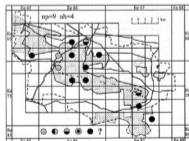
\**Stigmidium congestum* Triebel in Rambold & Triebel



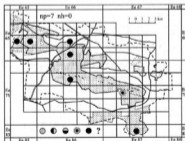
\**Thelocarpon lichenicola* (Fueckel) Poelt & Hafellner



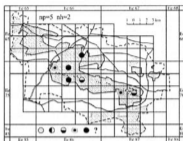
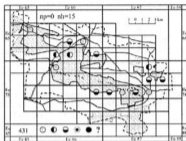
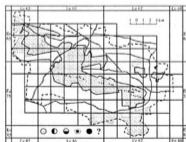
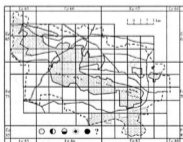
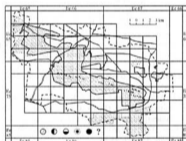
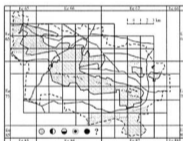
\**Tremella cladoniae* Diederich & M.S. Christ.



\**Tremella hypogymniae* Diederich & M.S. Christ.



\**Tremella lichenicola* Diederich

\**Vouauxiella lichenicola* (Linds.) Petr. & Syd.\**Phlyctis erythrosora* Erichsen

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- Dz.U. Nr 168, poz. 1765, Rozporządzenie Ministra Środowiska z dnia 9 lipca 2004 r. w sprawie gatunków dziko występujących grzybów objętych ochroną.

## Rozmieszczenia porostów i grzybów naporostowych w Świętokrzyskim Parku Narodowym

### Streszczenie

W pracy przedstawiono rozmieszczenie 405 gatunków, podgatunków i odmian porostów oraz 26 gatunków grzybów naporostowych.

Materiały badawcze pochodzą z trzech źródeł: z literatury publikowanej i niepublikowanej, z historycznych zbiorów zielnikowych oraz z własnych badań terenowych przeprowadzonych w latach 1999-2002.

Rozmieszczenie przestrzenne porostów i grzybów naporostowych przedstawiono na kartogramach. Pojedynczy kartogram – sieć kwadratów o bokach 2 km dostosowana do ogólnopolskiej sieci ATLICHEN – wchodzi w skład serii kartogramów i odpowiada jednemu taksonowi porostu lub grzybowi naporostowemu. Kartowaniu poddano również historyczne materiały publikowane, niepublikowane i zielnikowe. Na pojedynczej mapie zawarto następujące dane: nazwa gatunku, obecna i historyczna liczba stanowisk, ochrona ścisła lub częściowa, status zagrożenia w Górach Świętokrzyskich/Polsce, kolejne przedziały czasowe, w których stwierdzony został gatunek, sygnowane różnymi znakami.