

CORSO DI CORSO DI BOTANICA SISTEMATICA

LEZIONE 58

Laboratori di Lichenologia

Pier Luigi Nimis



The Lichens of Italy

An annotated catalogue

Museo Regionale
di Scienze Naturali
Torino

MONOGRAFIA XII
1993



THE LICHENS OF ITALY

A second annotated catalogue

EUT

Pier Luigi Nimis



***Dirina massiliensis* Durieu & Mont.**

in Durieu, Explor. Sc. Algérie: 257, 1847.

Syn.: *Dirina cyclosora* Poelt & Nimis, *Dirina immersa* f. *sorediata* Müll. Arg., *Dirina massiliensis* f. *aponina* (A. Massal.) Tehler, *Dirina massiliensis* f. *sorediata* (Müll. Arg.) Tehler, *Dirina patronii* Bagl., *Dirina repanda* auct. non Fr., *Dirina repanda* var. *pelagosae* J. Steiner & Zahlbr., *Dirina stenhammarii* (Fr.) Poelt & Follmann, *Dirinopsis massiliensis* De Not., *Lecanactis aponina* (A. Massal.) Arnold, *Lecanactis stenhammarii* (Fr.) Arnold, *Pyrenotea aponina* A. Massal.

N - VG, Ven (Lazzarin 2000b, Salvadori & Municchia 2016), TAA, Piem, Emil (Nimis & al. 1996), Lig, C - Tosc (Tretiach & al. 2008b, Salvadori & Municchia 2016), Marc (Nimis & Tretiach 1999), Umb (Panfili 2000b, Favera & al. 2006), Laz (Edwards & al. 1997, 1997b, Bartoli & al. 1998, Roccardi & al. 2005, Roccardi 2011, Zucconi & al. 2012), Abr, Mol (Nimis & Tretiach 1999, Caporale & al. 2008), Sar (Monte 1993, Nöske 2000, Tehler & al. 2013), S - Camp (Alnieri & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), Pugl (Edwards & al. 1997, Nimis & Tretiach 1999, Durini & Medagli 2002, Tehler & al. 2013), Bas (Caneva & al. 2006, Nugari & al. 2009), Cal (Puntillo 1996), Si (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Monte & Ferrari 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b, Genco & al. 2007, Grillo & al. 2009, Gianguzzi & al. 2009, Ottonello & Puntillo 2009, Tehler & al. 2013).

Cr/ Tr/ S, A.s/ Sax/ pH: 3-5, L: 2-3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, Pad: er, SmedH: c, MedH: ec, MedD: rc/ PT: 1/ coast, u/ Note: on steeply inclined or underhanging surfaces of basic siliceous or calcareous rocks, very variable according to the type of substrata (thallus colour depends on the quantity of calcium oxalates, and on the density of epilichenic cyanobacteria); the sexual form seems to be absent along the Adriatic coast north of Abruzzo up to the coast near Trieste (like another ecologically similar species: *Roccella phycopsis*). For further details see Tehler & al. (2013).



ITALIC 5.0

HOME QUERY IDENTIFICATION KEYS GENERAL INFORMATION HOW TO CITE

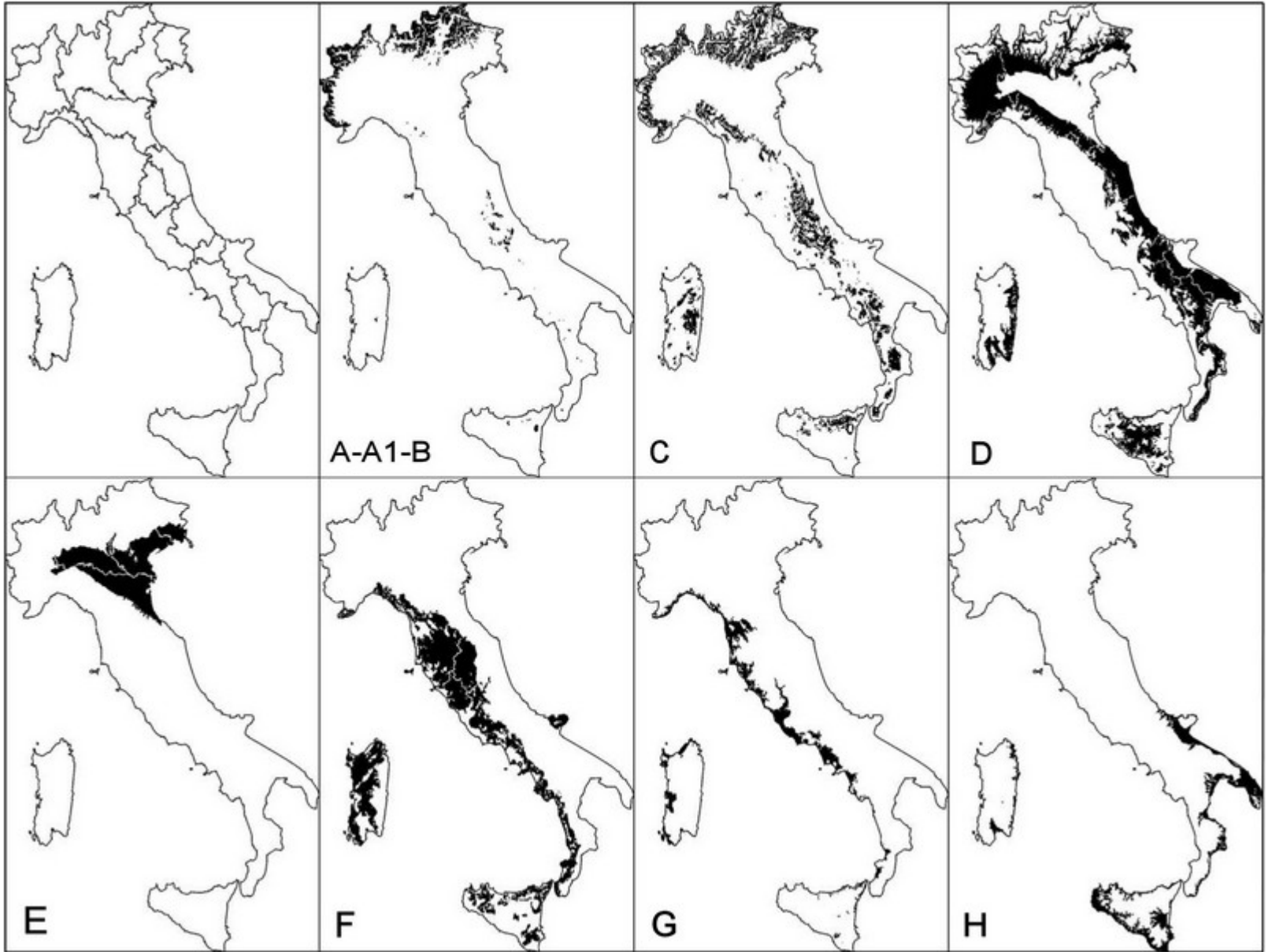
ITALIC 5.0, THE INFORMATION SYSTEM ON ITALIAN LICHENS

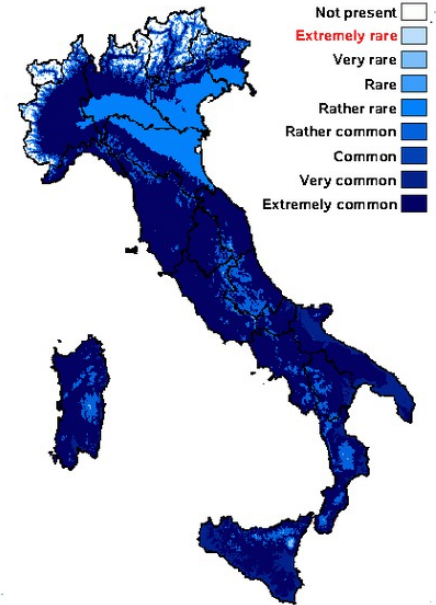
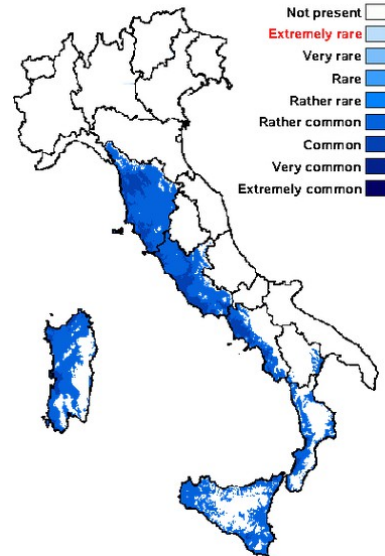
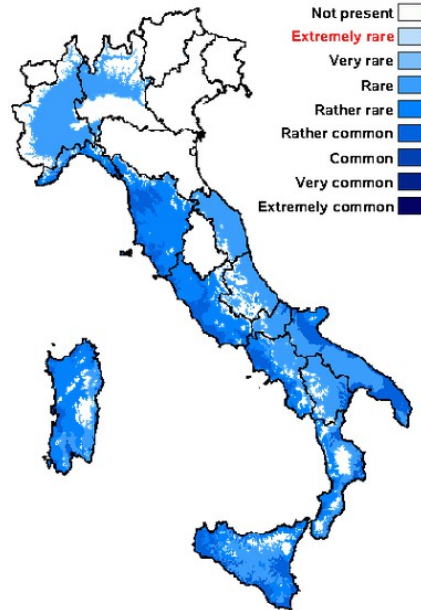
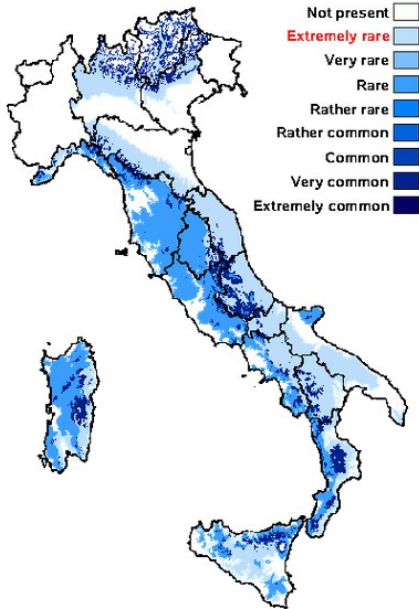
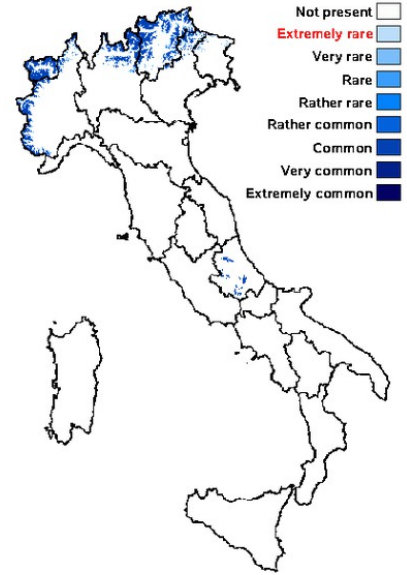
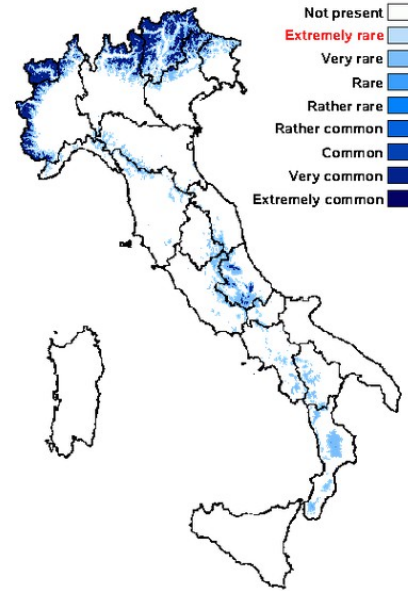
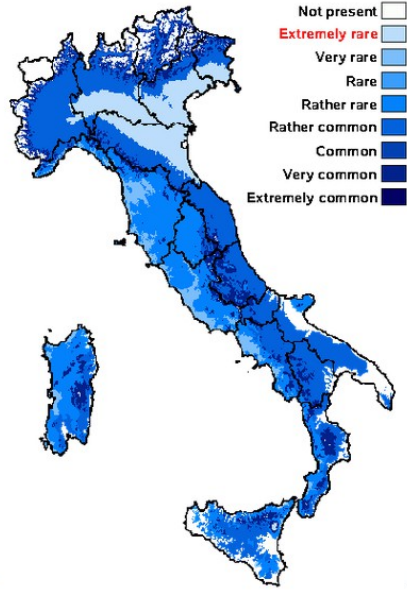
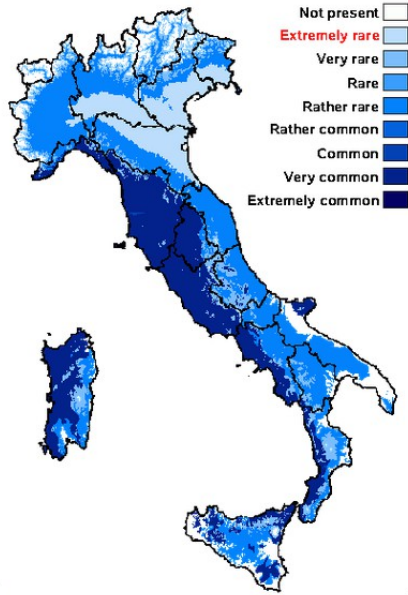
P.L. Nimis & S. Martellos

ITALIC makes available information about the lichens known to occur in Italy. It is maintained and updated by the Research Unit of Prof. Pier Luigi Nimis, at the University of Trieste (NE Italy), Dept. of Life Sciences. The present version incorporates information from the latest Checklist of the Lichens of Italy by Nimis (2016).

The information can be queried through three interfaces (taxonomic, floristic, statistic). Other sections are devoted to the TSB Lichen Herbarium, the image archive, and to regional and national red lists. ITALIC also provides access to useful resources such as digital identification keys, developed in the framework of Project Dryades (<http://dryades.units.it>).

Region	<u>Nimis</u> 1993	<u>Nimis & Martellos</u> 2003	<u>Nimis</u> 2016
Venezia Giulia (VG)	431	459	517
Friuli (Frl)	638	912	1051
Veneto (Ven)	900	1012	1174
Trentino-Alto Adige (TAA)	1272	1301	1582
Lombardia (Lomb)	1055	1095	1296
Piemonte (Piem)	898	1125	1296
Valle d'Aosta (VA)	503	688	800
Emilia-Romagna (Emil)	562	654	775
Liguria (Lig)	790	977	1091
Toscana (Tosc)	921	1005	1208
Marche (Marc)	187	501	542
Umbria (Umb)	47	502	556
Lazio (Laz)	557	650	762
Abruzzo (Abr)	335	603	705
Molise (Mol)	0	354	490
Sardegna (Sar)	1002	1110	1232
Campania (Camp)	501	667	846
Puglia (Pugl)	383	570	630
Basilicata (Bas)	216	468	642
Calabria (Cal)	629	900	979
Sicilia (Si)	726	846	960
<u>Total</u>	2145	2345	2704







LICHALP, THE INFORMATION SYSTEM ON THE LICHENS OF THE ALPS

Nimis PL, Hafellner J, Roux C, Clerc P, Mayrhofer H, Martellos S, Bilovitz PO

This database allows to retrieve information on the lichens hitherto reported from the Alps. It organises data from the latest checklist of the Alps (Nimis et al. 2018), including a thesaurus of synonyms, distribution maps in 46 Operational Geographic Units, and a link to pictures, whenever present, from the archive of ITALIC (<http://dryades.units.it/italic/index.php>), the information system on the lichens of Italy (Martellos 2012). Additional data (growth-form, reproductive strategy, main photobionts) will be made searchable in the near future. The checklist will be updated at variable intervals of time.

References

Martellos S. (2012) From a textual checklist to an information system: The case study of ITALIC, the Information System on Italian Lichens. *Plant Biosystems* 146(4): 764-770.

Nimis P.L., Hafellner J., Roux C., Clerc P., Mayrhofer H., Martellos S., Bilovitz P.O. (2018) The lichens of the Alps - an annotated checklist. *MycKeys* 31: 1-634. <https://doi.org/10.3897/mycokeys.31.23568>

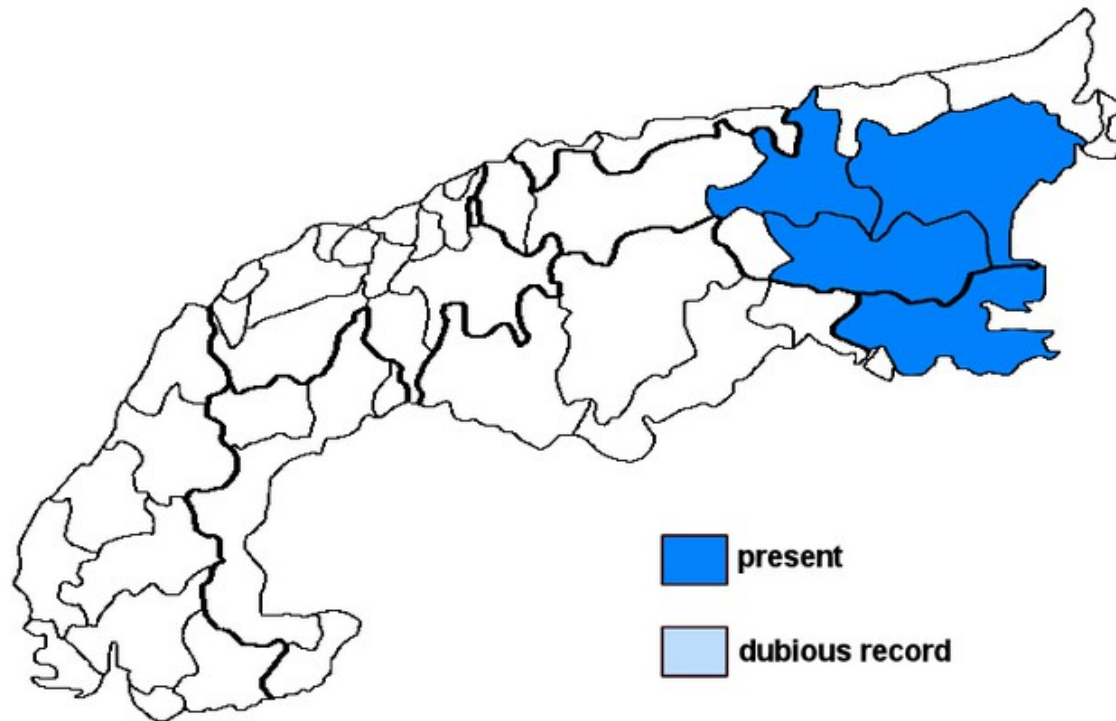
Lecidea polytrichinella Hertel, Obermayer & Poelt

Lichenised.

Substrate: living mosses

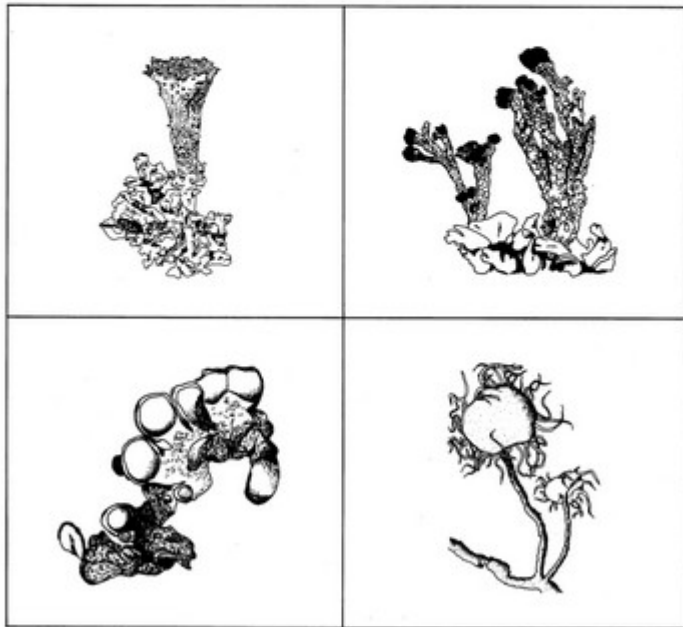
Altitudinal range: from the **subalpine belt** (potential vegetation: open, taiga-like forests dominated by *Larix decidua* and/or *Pinus cembra* and *Rhododendron*) to the **alpine belt** (potential vegetation: treeless Alpine grasslands and tundras, to the lower limit of perennial snow and the equilibrium line of glaciers)

Note: a tiny species of unclear relationships, with a thallus of minute, whitish areoles, small hemispherical, immarginate, brown to blackish apothecia, asci recalling those of *Biatora*, and small ascospores; encrusting leaflets of moribund *Polytrichum*, often together with *Lecanora leptacinella*; overall distribution arctic to temperate-alpine; widespread in the Alps but rarely collected.



P.L. NIMIS

I MACROLICHENI D'ITALIA
CHIAVI ANALITICHE PER LA DETERMINAZIONE



Le guide di Dryades 1 - Serie Licheni 1 (L-I)

**KEYS TO THE LICHENS
OF ITALY**
I. TERRICOLOUS SPECIES

Pier Luigi Nimis & Stefano Martellos



Edizioni Goliardiche

Region: **Venezia Giulia**

Phytoclimatic belt: **All belts**

Substrate: **Saxicolous**

Photosynthetic partner: **All**

Growth form: **Crustose**

Phytoclimatic range: **All**

Special requirements for water: **All**

Only coastal species: **No**

Only parasitic species: **No**

Only pioneer species: **No**

Species of metal-rich substrata: **No**

Reproductive Strategy: **Mainly asexual, by soredia or soredia-like structures, e.g. blastidia**

Select two values for any parameter if you want to search in a range, or the same value in the two columns.

Indicator values for pH from: **1 - Very acid substrata** to **3**

Indicator values for Light from: **1 - In very shaded situations** to **3**

Indicator values for Water from: **1 - Hygrophytic** to **3**

Indicator values for Eutrophication from: **1 - No eutrophication** to **3**

Altitudinal Range from: **1 - Eu-mediterranean belt** to **2**

Poleotolerance from: **All** to **All**

Commonness-rarity status from: **1 - Extremely rare** to **8**

Acrocordia conoidea (Fr.) Körb. var. *conoidea*
Arthonia calcarea (Sm.) Ertz & Diederich
Bagliettoa baldensis (A. Massal.) Vězda
Bagliettoa calciseda (DC.) Gueidan & Cl. Roux
Bagliettoa marmorea (Scop.) Gueidan & Cl. Roux
Bagliettoa parmigera (J. Steiner) Vězda & Poelt
Bagliettoa parmigerella (Zahlbr.) Vězda & Poelt
Bagliettoa steineri (Kušan) Vězda
Botryolepraria lesdainii (Hue) Canals, Hern.-Mar., Gómez-Bolea & Llimona
Caloplaca teicholyta (Ach.) J. Steiner
Candelariella aurella (Hoffm.) Zahlbr.
Catillaria lenticularis (Ach.) Th. Fr.
Circinaria caesiocinerea (Malbr.) A. Nordin, Savić & Tibell
Circinaria hoffmanniana (S. Ekman & Fröberg ex R. Sant.) A. Nordin
Clauzadea chondrodes (A. Massal.) Hafellner & Türk
Clauzadea immersa (Hoffm.) Hafellner & Bellem.
Clauzadea metzleri (Körb.) D. Hawksw.
Clauzadea monticola (Schaer.) Hafellner & Bellem.
Flavoplaca oasis (A. Massal.) Arup, Frödén & Søchting s.str.

Identification

Options

About

Characters available

- genus <taxon>
- family <taxon>
- global occurrence <continent>
- substrate <kind>
- thallus <growth habit>
- thallus <compartmentation>
- [th] upper surface <colour>
- [th upper surface] <pruinosity>
- [th marginal and upper surface] specific structures <presence>
- [th margin] cilia, cilioid structures <presence>
- [th upper surface] isidia, isidioid structures <presence>
- [th upper surface] soredia, soralia, soraliod structures <presence>
- [th] morphol substructures (eg areoles, lobes, branches) width [mm]
- [th] morphol substructures (eg areoles, lobes, branches) upper surface <structure>

Selection criteria



Dryades
project



UNIVERSITÀ
DEGLI STUDI DI TRIESTE
Dipartimento di Scienze della Vita

smats
sistema museale d'ateneo

MENU

[Environment settings](#)

[Characters](#)

[Taxa](#)

[Groups](#)

List groups

Create a new group

Delete a group

Modify a group

Duplicate a group

Split a group

Key of groups

Characters defining a group

Species of a group

[Image archive](#)

[Filters](#)

[Keys](#)

ADMIN SECTION - GROUPS MANAGEMENT SECTION

Groups are subsections of the database, which can be independently managed by different authors, with a specific account. Inside their group, authors can insert and modify characters and species, create and edit keys, etc. Their work eventually becomes part of the whole system.

Here you can create new groups, assign them to authors, and manage existing groups.

Copyright 2011 Stefano Martellos, Department of Life Sciences - University of Trieste.

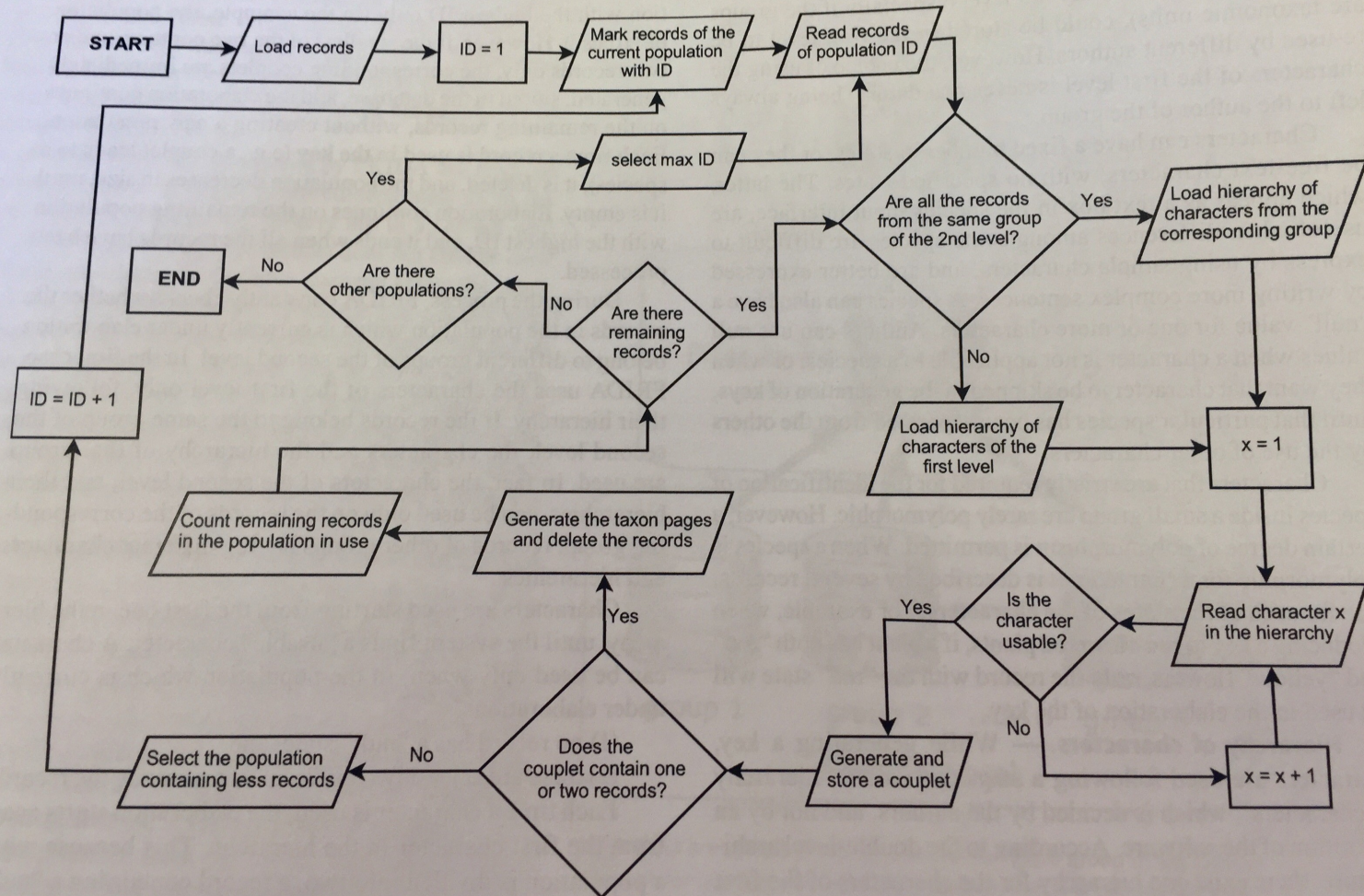


Fig. 2. Process of generation of flat identification key. See text for details.

	Species	1	2	3	4	5	6	7	8	9	10
	Character1	A	A	A	A	A	A	A	A	A	A
	Character2	A	A	A	0	B	B	B	B	B	B
1	Character3	A	A	B	B	B	B	B	B	B	B
	Character4	A	A	A	0	A	B	B	0	0	0
5	Character5	0	0	0	B	A	B	B	A	B	0
8	Character6	0	A	0	0	A	0	0	A	B	B
6	Character7	A	0	A	A	A	A	A	B	B	B
7	Character8	A	0	A	A	A	A	B	B	B	B
4-10	Character9	0	A	A	B	B	B	B	B	A	A
2	Character10	A	B	0	0	0	0	0	0	A	B
3	Character11	A	A	A	A	A	B	B	B	B	B

1 Character 3A.....	2
1 Character 3B.....	3
2 Character10A.....	Species1
2 Character10B.....	Species2
3 Character 11A.....	4
3 Character 11B.....	6
4 Character 9A.....	Species3
4 Character9B.....	5
5 Character 5B.....	Species4
5 Character 5A.....	Species5
6 Character 7A.....	7
6Character 7B.....	8
7 Character 8A.....	Species6
7 Character 8B.....	Species7
8 Character 6A.....	Species8
8 Character 6B.....	9
9 Character 10A.....	Species9
9 Character 10B.....	Species 10



**KeyToNature
2007-2010**



**Siit
2010-2014**

Altogether, c. 6.000.000 Euros



PRODUCT	Nr.Unique Visitors	Source
Keys	1.243.563	Statcounter
Portals	672.705	Statcounter
SiiT Webpage	71.465	Google Analytics
TOTAL	1.987.733	



The lichens of the Classical Karst (NE Italy-SW Slovenia): an interactive guide

Pier Luigi Nimis

Curator of the apparatus of images: Andrea Moro

This is a key to all lichens hitherto known from the Classical Karst Region (604 infrageneric taxa, including a few non- or doubtfully lichenized species traditionally treated by lichenologists). The key, which has been primarily prepared as a tool for lichenology labs at the University of Trieste, could be useful also outside the survey area, as it includes many widespread and common species.

The 'Classical Karst' (Italian: Carso; Slovenian: Kras) is a limestone plateau stretching NW to SE above the Gulf of Trieste, in the northernmost part of the Adriatic Sea, which is c. 40 Km long and up to 13 km wide, covering c. 440 Km². Located part in Italy, part in Slovenia, it is delimited by the Adriatic Sea to the SW, the Friulian plain (river Soca/Isonzo) to the NW, the Vipava/Vipacco valley to the NE and by the Brkini hills (Flysch) and the Reka river valley to the SE, the SE limit being rather arbitrary. Although, strictly speaking, the Karst should be limited to areas with limestone, we have included in the study area the whole Province of Trieste, parts of which have Flysch as the main geological substrate.

Limestones and dolomites of cretaceous and tertiary origin predominate on the Plateau, reaching sea level in the northern part of the Province of Trieste, whereas the flanks of the Plateau are often covered with Flysch, an Eocenic alternation of sandstones and marl. Typical for the Plateau are the high rock solubility and the well-developed secondary porosity. Three main types of soils are present: Terra Rossa, Rendzina and Brown Cambisols. The climate is typically transitional between the Mediterranean type and the Central European type, with hot, rather dry summers and cold, rather rainy winters. Average annual precipitation varies from c. 1000 mm along the coast to c. 1400 mm in the



THE LICHENS OF NORTHERN ITALY - An interactive guide

Pier Luigi Nimis

Apparatus of images: Andrea Moro - Software and databases: Stefano Martellos

Northern Italy, comprising the administrative regions of Piemonte, Valle d' Aosta, Lombardy, Emilia-Romagna, Liguria and the so-called 'Triveneto' (Trentino-Alto Adige, Veneto and Friuli Venezia Giulia), includes the Alps, the great plains of the North, the Karst Region near Trieste, and a part of the Tyrrhenian coast in Liguria.

Northern Italy has been intensively studied since the 'Golden Period' of Italian lichenology by scholars such as e.g. M. Anzi, F. Arnold, F. Baglietto, G. De Notaris, S. Garovaglio, A. Massalongo, and V. Trevisan, and by many other lichenologists in recent times. As a consequence, it is the lichenologically best-explored part of Italy: more than 2200 infrageneric taxa have been reported from Northern Italy.

This key, including 2228 species, was produced with the latest version of software FRIDA, developed at the Department of Life Sciences of the University of Trieste, and is a further step toward the completion of a lichen flora of Italy. Although not yet fully tested and corrected, the key is published online in order to render its testing possible by the lichenological community. Any suggestion for its improvement is welcome: messages should be sent by email to P.L. Nimis - nimis@units.it

How to use the key

Two query interfaces are available:

- 1) **Dichotomous**: this is a classical dichotomous key. The path to identification may be long, as the total number of species is high. At any step, you can obtain a textual key (incl. pictures) of the remaining species.
- 2) **Multi-entry**: This query interface allows you to specify a set of characters which fit those of your specimen: the result will be a dichotomous key including only the species which share these characters. If you already know the genus, you can also obtain a dichotomous key of all species of that genus (or you can combine the genus name with some other character: e.g. a key to all epiphytic species of *Rinodina* reacting K+ yellow).

SOME IMPORTANT SUGGESTIONS:

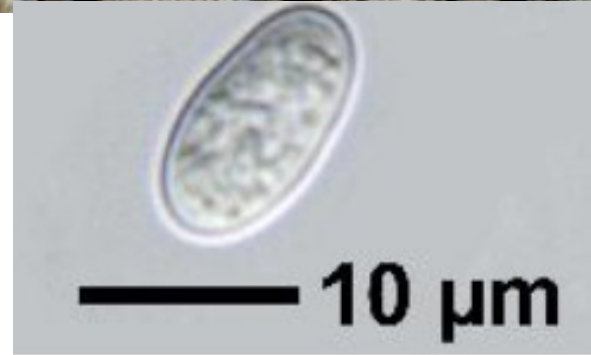
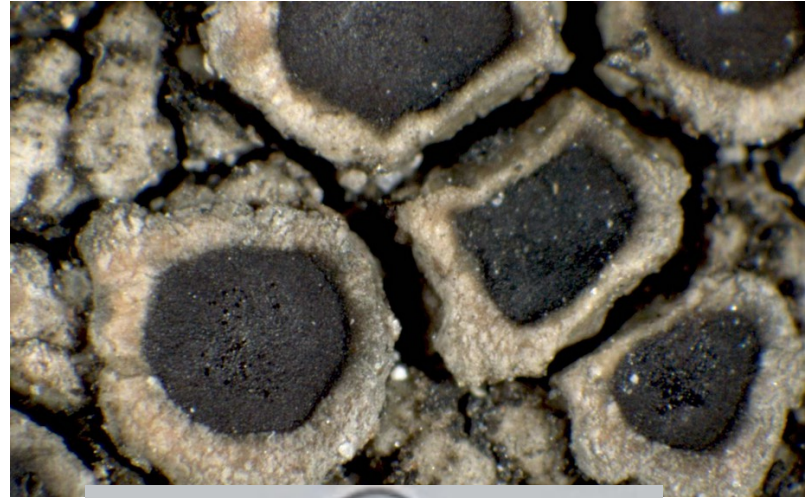
- 1) Never use two different keys at the same time with the same browser: before using the second key, close the browser and start a new session.
- 2) If you want to start again the multi-entry interface, select 'Key home page' and re-launch the key.
- 3) When you use the multi-entry interface, select only characters which you are sure of. If you are in doubt, better leave the field empty.

Projeccy Dryades, Department of Life Sciences, University of Trieste - CC BY-SA 4.0

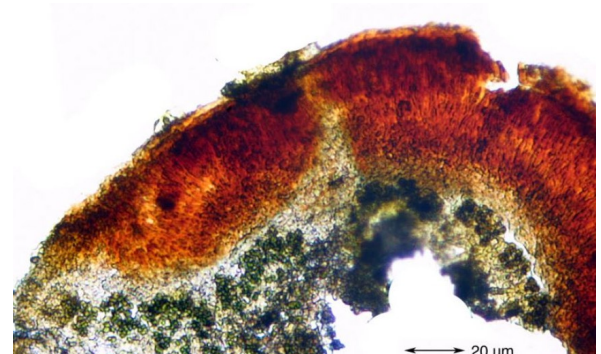
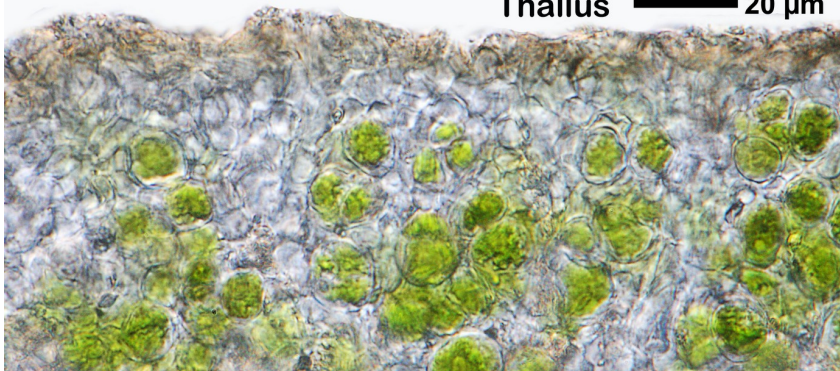
[List of species](#)

[IDENTIFY](#)

1 - Tallo K+ rosso, su roccia, spore 8 per asco



Thallus — 20 µm



THE LICHENS OF NORTH-EASTERN ITALY - An interactive guide

Taxon:

On



bark and wood



rock

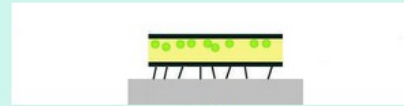


soil, terricolous mosses and plant debris

Thallus



fruticose (only for species with green algae)



foliose

Thallus

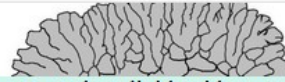


crustose or leprose



squamulose, or (for cyanobacterial lichens only) microfruticose

● Thallus



crustose-placodioid, with marginal lobes



crustose not placodioid

○ Photobiont



cyanobacterial



not cyanobacterial

○ Photobiont

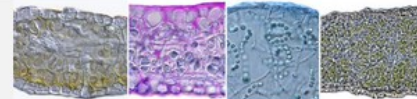


trentepohlioid (more or less orange)



chlorococcoid (bright green), or absent (species not lichenized)

● Thallus



homoiomerous, the photobionts (cyanobacteria) occurring throughout its thickness



heteromerous, the photobionts (green algae or cyanobacteria) occupying a

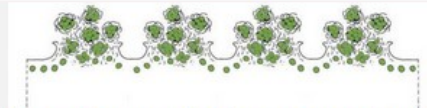
● Thallus



○ and/or apothecia bright yellow, orange, or red-

○ and/or apothecia of other colours

● Thallus

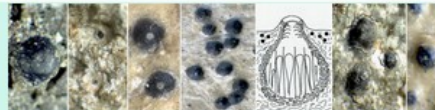


○ with soredia or soredia-like structures (e.g. blastidia)



○ with isidia or schizidia

● Ascocarps



○ perithecioid



○ apothecioid

● Apothecia

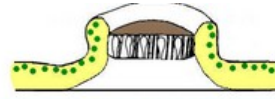


○ elongated (lirelliform), sometimes branched



○ not lirelliform

● Apothecia

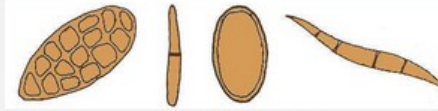


● lecanorine



● not lecanorine

● Ascospores



● pigmented



● hyaline

● Ascospores



● 1-celled



● more than 1-celled



● 2-celled

● Ascospores



● more than 2-celled

● Ascospores

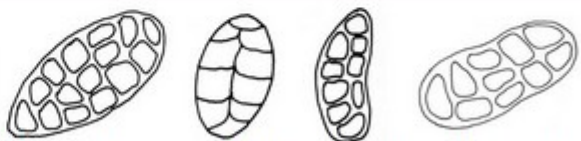


● polarilocular (2 cells united by a thin canal)



● not polarilocular

● Ascospores



● muriform or submuriform (with both longitudinal and transversal septa)



● not muriform/submuriform

Thallus



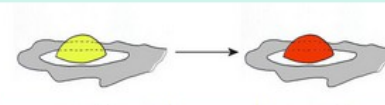
K-



K+ yellow

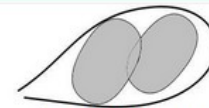


K+ red

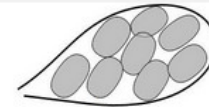


K+ yellow turning to red

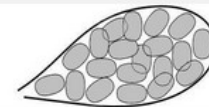
Ascospores



less than 8 per ascus



8 per ascus



more than 8 per ascus

Submit

Dryades project

THE LICHENS OF NORTH-EASTERN ITALY - An interactive guide

[Start again](#)

[Go back](#)

[3 records left](#)

[Textual key to remaining taxa](#)

[Textual key to all taxa](#)

[Key home page](#)



Apothecia immersed, not constricted at the base. Marginal lobes not overlapping, firmly attached. Asci < 50 μ m long. Very common (*Lobothallia radiosa* (Hoffm.) Hafellner)

Apothecia constricted at base. Marginal lobes overlapping, sometimes not very firmly attached. Asci >60 μ m long. Rare species

1 **Apothecia immersed, not constricted at the base. Marginal lobes not overlapping, firmly attached. Asci < 50 µm long. Very common**

[Lobothallia radiosa \(Hoffm.\) Hafellner](#)

Thallus crustose-placodioid, epilithic, forming orbicular rosettes to 6(-8) cm across, tightly adnate throughout, rimose to areolate in the center, lobed at margins, pale to dark grey. Lobes contiguous, 3-7 x 0.4-1(-1.5) mm, c. 0.25 mm thick, sometimes divided and transversely broken by partial cracks, flat to slightly convex, sometimes weakly pruinose at tips. Cortex cellular, of anticlinal hyphae, with abundant fine dark brown granules and hyaline, coarsely granular crystals, both insoluble in K; medulla: white, with crystals. Apothecia frequent, lecanorine-aspicioid, mostly crowded in the center of thallus, long remaining immersed, finally adnate, 0.4-1.7 mm across, often compound or confluent and irregular in outline, with a red-brown to black disc and a thin, scarcely raised thalline margin. Epithemium brown to (rarely) olive-brown; hymenium colourless, K/I+ blue; paraphyses usually simple, tightly compacted, with globose apical cells 2-3 µm wide; hypothecium colourless. Asci 8-spored, oblong-clavate, *Lecanora*-type. Ascospores 1-celled, hyaline, subglobose to broadly ellipsoid, (8-)11-13(-15) x 6-9(-11) µm, Pycnidia appearing as black dots, immersed, colourless in section. Conidia 4-6 x c. 1 µm. Photobiont chlorococcoid. Spot tests: thallus K- or K+ red, C-, KC-, P- or P+ orange. Chemistry: medulla sometimes with norstictic acid, more rarely with stictic acid.



1 **Apothecia constricted at base. Marginal lobes overlapping, sometimes not very firmly attached. Asci >60 µm long. Rare species** **2**

2 **Marginal lobes flat to moderately convex, not easily detached from substrate. Thallus usually some shade of brown when fresh, to 1 mm thick**

[Lobothallia praeradiosa \(Nyl.\) Hafellner](#)

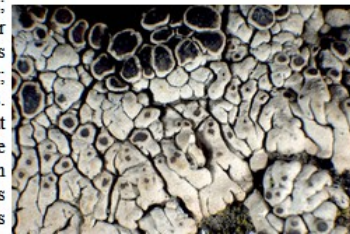
Thallus crustose-placodioid, up to 0.5-1 mm thick centrally, closely attached, areolate in central parts, yellowish white, grey or brownish grey, often grey-pruinose, not changing colour when wet, forming regular to very irregular rosettes. Central areoles 0.5-1 mm wide, flat to convex; marginal lobes contiguous, radiating but often irregularly arranged, flat to slightly convex, up to 3-6 mm long and 0.5-1.3 mm wide. Upper cortex brown, usually interspersed with abundant, small dark granules soluble in K, overlain by a thin epinecral layer; medulla white, rather loose; lower cortex absent or poorly developed. Apothecia lecanorine, 0.5-1.5(-2) mm across, adnate to sessile, with a brown to black, flat to convex, usually epruinose disc, and a 0.1(-0.3) mm wide, entire to flexuose, persistent, thalline margin. Amphithecium corticate, paraplectenchymatous; algal layer extending below the hypothecium; epithecium pale brown, usually interspersed with dark red-brown granules and covered by layer of coarse hyaline granules, N-; hymenium colourless, 70-90 µm tall, I+ blue; paraphyses submoniliform in upper part, the apical cells short-clavate 2-3 µm wide; hypothecium colourless, I+ blue. Asci 8-spored, oblong-ellipsoid, *Lecanora*-type. Ascospores 1-celled, hyaline, broadly ellipsoid to subglobose, (8-)9-13(-15) x 6-10 µm Photobiont chlorococcoid. Spot tests: K+ yellow turning red, C-, KC-, P+ orange, or P-. Chemistry: norstictic and constictic acids.



2 **Marginal lobes strongly convex, easily separated from substrate. Thallus usually some shade of grey when fresh, 2-5(-10) mm thick**

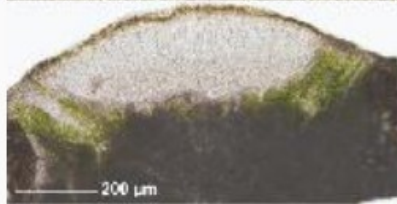
[Lobothallia alphoplaca \(Wahlenb.\) Hafellner](#)

Thallus crustose-placodioid, episubstratic, loosely attached, 0.5-1.5 mm thick, white to cream-colored, more rarely ash grey or greyish brown, turning pink in the herbarium, usually epruinose, forming regular or irregular rosettes, areolate in central parts. Central areoles up to 1 mm in diam., discrete, flat to convex, often mixed with elongated lobes; marginal lobes 3-5(-8) mm long, 0.5-1(-1.3) mm wide, contiguous to overlapping, flat to usually strongly convex or almost cylindrical, incised-lobed. Upper cortex paraplectenchymatous, brownish, interspersed with dark brown granules soluble in K, and with coarse hyaline granules insoluble in K, and overlain by a c. 15 µm thick epinecral layer; medulla white, loose to almost hollow, with hyaline granules insoluble in K; lower cortex paraplectenchymatous. Apothecia lecanorine, usually crowded and deformed in thallus center, 0.4-1.5(-2.5) mm across, sessile or somewhat stalked, with a dark reddish brown to black, plane to convex disc, and an entire, raised, 0.2-0.3 mm wide thalline margin. Amphithecium corticate, 20-40 µm thick; medulla paraplectenchymatous, of thick-walled hyphae, with hyaline, coarse granular crystals insoluble in K; epithecium greenish brown, with superficial hyaline granules insoluble in K; hymenium colourless, 70-80 µm high; paraphyses coherent, c. 2.5 µm wide, the upper 3-4 cells

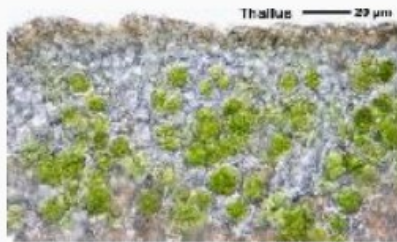


20/02/2017

Italy, Friuli Venezia Giulia, Trieste,



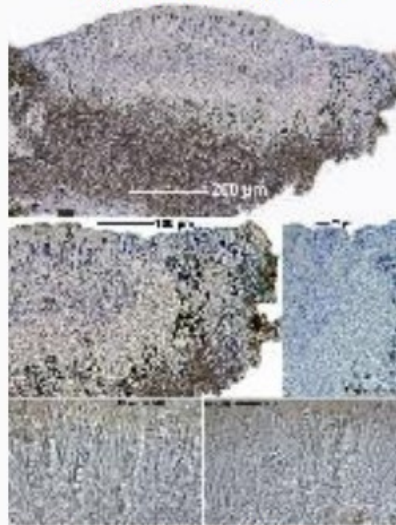
Felix Schumm – CC BY-SA 4.0



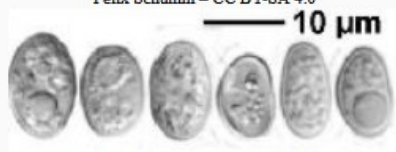
Felix Schumm – CC BY-SA 4.0



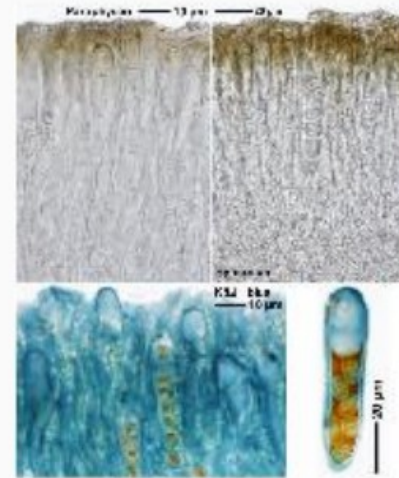
Felix Schumm – CC BY-SA 4.0



Felix Schumm – CC BY-SA 4.0



Felix Schumm – CC BY-SA 4.0



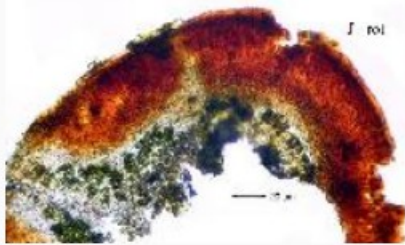
Felix Schumm – CC BY-SA 4.0



Felix Schumm – CC BY-SA 4.0



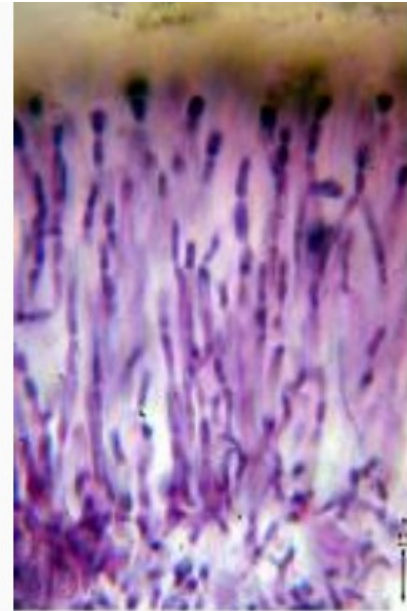
Felix Schumm CC BY-SA 4.0



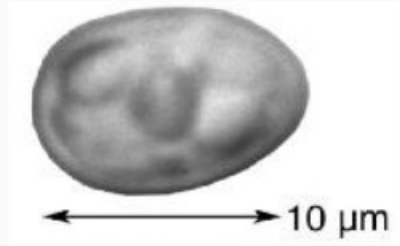
Felix Schumm – CC BY-SA 4.0



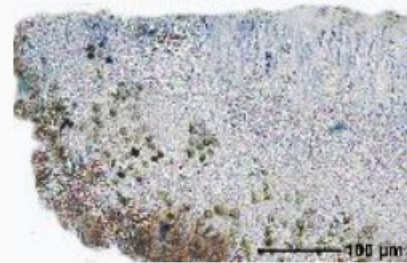
Felix Schumm CC BY-SA 4.0



Felix Schumm – CC BY-SA 4.0



Felix Schumm – CC BY-SA 4.0



Felix Schumm CC BY-SA 4.0

