FRITSCHIANA

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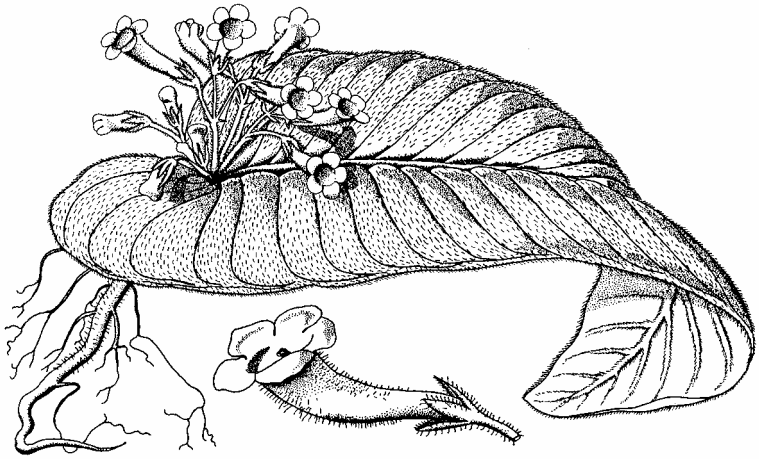

Veröffentlichungen aus dem
Institut für Pflanzenwissenschaften
der Karl-Franzens-Universität Graz

Walter OBERMAYER

Lichenotheca Graecensis, Fasc. 16 (Nos 301–320)

Dupla Graecensia Lichenum (2007, nos 481–580)

Josef HAFELLNER

Lichenicolous Biota (Nos 1–20)

Graz, 20. Dezember 2007

Hofrat Prof. Dr. Karl FRITSCH
(∗ 24.2.1864 in Wien, † 17.1.1934 in Graz)

Karl FRITSCH studierte nach einem Jahr in Innsbruck an der Universität Wien Botanik und wurde dort 1886 zum Dr.phil. promoviert; 1890 habilitierte er sich. Nach Anstellungen in Wien wurde FRITSCH 1900 als Professor für Systematische Botanik an die Universität Graz berufen, wo er aus bescheidenen Anfängen ein Institut aufbaute. 1910 wurde er Direktor des Botanischen Gartens, 1916 wurde das neu errichtete Institutsgebäude bezogen. Aus der sehr breiten wissenschaftlichen Tätigkeit sind vor allem drei Schwerpunkte hervorzuheben: Floristisch-systematische Studien, besonders zur Flora von Österreich, monographische Arbeiten (besonders über *Gesneriaceae*) und Arbeiten zur systematischen Stellung und Gliederung der Monocotylen. An Kryptogamen interessierten ihn besonders Pilze und Myxomyceten.

Nachrufe: KNOLL F. 1934, Ber. Deutsch. Bot. Ges. 51: (157)–(184) (mit Schriftenverzeichnis). - KUBART B. 1935, Mitt. Naturwiss. Ver. Steiermark 71: 5–15 (mit Porträt). - TEPPNER H. 1997, Mitt. Geol. Paläont. Landesmus. Joanneum (Graz) 55: 133–136. - Im übrigen vgl. STAFLEU F.A. & COWAN R.S. 1976, Tax. Lit. 1: 892 und BARNHART J.H. 1965, Biogr. Notes Botanists 2: 12.

Graz, November 1997 H. TEPPNER

Die Serie FRITSCHIANA wurde als Publikationsorgan für die zahlreichen Aktivitäten im Zusammenhang mit der botanischen Sammlung des Institutes für Pflanzenwissenschaften, Bereich Systematische Botanik und Geobotanik (vormals Institut für Botanik), der Karl-Franzens-Universität Graz (GZU) gegründet. Vor allem Schedae-Hefte der von den Mitarbeitern herausgegebenen Exsiccatenwerke sollten hier erscheinen, aber auch Exkursionsberichte sowie Listen und Indices besonders wertvoller Bestände in GZU. Das Spektrum wurde mittlerweile auf floristische und kleinere taxonomische Arbeiten (zwischenzeitlich auch auf das Samentauschverzeichnis des Botanischen Gartens) ausgeweitet. Die Schedae-Hefte des von Prof. Dr. Josef POELT begründeten, inzwischen abgeschlossenen Exsiccatenwerkes Plantae Graecenses sind die Vorläufer dieser Schriftenreihe.

Gesamtredaktion:

Dr. Christian SCHEUER, Mag. Dr. Walter OBERMAYER
Karl-Franzens-Universität Graz, Institut für Pflanzenwissenschaften
Bereich Systematische Botanik und Geobotanik, Holteigasse 6
A-8010 Graz, Österreich/Austria

ISSN 1024-0306
Key title = Abbreviated title: Fritschiana (Graz)

Umschlagsbild: *Carolofritschia diandra* ENGL. (= *Acanthonema strigosum* HOOK.f.); nach einer Zeichnung in HUTCHINSON, J. & HEPPER, F.N. 1963, Flora of West Tropical Africa, Ed. 2, Vol. II: 382.

FRITSCHIANA

Veröffentlichungen aus dem
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Bereich Systematische Botanik und Geobotanik
der Karl-Franzens-Universität Graz

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ISSN 1024-0306
Key title = Abbreviated title: Fritschiana (Graz)

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Date of publication: 20.XII.2007
Printed by: Druckerei Khil Ges.m.b.H., Neutorgasse 26, 8010 Graz, Austria

Lichenotheca Graecensis, Fasc. 16 (Nos 301–320)

Walter OBERMAYER*

OBERMAYER W. 2007: Lichenotheca Graecensis, Fasc. 16 (Nos 301–320). - Fritschiana (Graz) 60: 1–6. - ISSN 1024-0306.

Abstract: Fascicle 16 of Lichenotheca Graecensis comprises 20 collections of lichens from the following countries (and administrative subdivisions): Austria (Carinthia; Salzburg; Styria; Upper Austria), Germany (Baden-Württemberg), Italy (Trentino–Alto-Adige), Portugal (Madeira), Russia (Buryatia Republic), and U.S.A. (Alaska). TLC-analyses were carried out for *Cetrelia cetrarioides* s.str., *Lepraria caesioalba* (chemotype Ia), *Pleopsidium flavum*, and *Rinodina turfacea*.

*Institut für Pflanzenwissenschaften, Karl-Franzens-Universität Graz, Holteigasse 6, A-8010 Graz, AUSTRIA, e-mail: walter.obermayer@uni-graz.at, homepage: http://www.uni-graz.at/walter.obermayer

The exsiccata 'Lichenotheca Graecensis' is distributed on exchange basis to the following 20 herbaria and private collections (herbarium abbreviations follow http://sciweb.nybg.org/science2/IndexHerbariorum.asp): ASU, B, C, CANB, CANL, E, G, GZU, H, HAL, HMAS, LE, M, MAF, MIN, O, TNS, UPS, Dr. Klaus Kalb, Dr. Antonin Vězda. Abbreviations of authors of plant names are taken from http://asaweb.huh.harvard.edu:8080/databases/botanist_index.html. Names of countries and states (or provinces or principial subdivisions) are based upon a list from http://www.ars-grin.gov/cgi-bin/npgs/html/geolist.pl. A text version (including corrections) of Lichenotheca Graecensis can be found under http://www.uni-graz.at/walter.obermayer/li-grz1.htm. The original PDF-file is currently available under http://www.uni-graz.at/walter.obermayer/lichenotheca-graecensis-16.pdf. Label texts originally drafted in a local language have been translated into English by the author. Unless otherwise stated, additional notes were provided by the author.

I wish to thank all lichenologists who have made their lichen material available, particularly Josef HAFELLNER, Roman TÜRK, Gennadi URBANAVICHUS, and Michail ZHURBENKO. I am also indebted to Helmut MAYRHOFER for help with determination.

OBERMAYER W. 2007: **Lichenotheca Graecensis**, Fasc. 16 (Nos 301–320). - Fritschiana 60: 1–6.
Distributed by the *Institut für Pflanzenwissenschaften, Karl-Franzens-Universität,* Graz (GZU)

301. **Arthonia leucopellaea** (Ach.) Almq.

AUSTRIA, Oberösterreich (= Upper Austria), Dachstein-Gebiet, 2.8 km SW of Hallstatt, Echerntal, westernmost part of the valley, 47°32'55"N, 013°37'07"E, MTB 8447/4, 625 m alt., on *Picea abies*.

18.V.2007 leg. & det. R. Türk (41768)

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

ITALIA, Trentino–Alto-Adige, Dolomite Alps, Val di Fassa, Pera, 46°26'30"N, 011°42'00"E, 1330 m alt., left bank of the river Avisio, on *Salix* spec.

29.III.1980 leg. & det. J. Hafellner (41513)

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303. **Cetrelia cetrarioides** (Delise ex Duby) W.L.Culb. & C.F.Culb. s.str.

PORTUGAL, Madeira, Poiso, below the street shortly S of Casa do Poiso, 32°42'30"N, 016°53'W, 1400 m alt., mixed forest, on *Quercus*.

Note: TLC: Atranorin (minor in soralia, traces in cortex), perlatolic acid syndrome [no imbricaric acid]. All specimens have been tested. Specimen in GZU intermixed with *Pseudocyphellaria crocata*.

18.II.1990 leg. & det. J. Hafellner (41617) & A. Hafellner

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304. **Cladonia cenotea** (Ach.) Schaer.

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, 9.6 km E of Obdach, E-facing slopes of Ameringkogel, 3.7 km W of Hirschegger Sattel, SE of the hut Steinmoarhütte, 47°04'10"N, 014°49'25"E, MTB 8954/2, 1620 m alt., forest area with *Picea abies* and *Larix decidua*, on decayed stump.

10.VII.2006 leg. & det. J. Hafellner (66410)

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305. **Dermatocarpon** cf. **rivulorum** (Arnold) Dalla Torre & Sarnth.

UNITED STATES OF AMERICA, Alaska, Brooks Range, Atigun Pass, Mile 247 Dalton Highway, 68°07'42"N, 149°28'W, 1463 m alt., pebble/stone field under a snow bank, in wet situation (between small streams), on small stones (abundant).

Note: Part of the material has already been issued in Lichenotheca Graecensis no 195 (for further notes regarding homogeneity of the material see there).

31.VII.2001 leg. M. Zhurbenko (01188a-2), det. W. Obermayer

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306. **Hyperphyscia adglutinata** (Flörke) H.Mayrhofer & Poelt

GERMANY, Baden-Württemberg, 9 km S of Wertheim, Taubertal, Bronnbach, 49°42' 57"N, 009°32'42"E, 150 m alt., along a main road, on *Acer pseudoplatanus*.

Note: Richly fruiting material.

15.IV.2004 leg. & det. R. Türk (34584)

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307. **Lecanora pulicaris** (Pers.) Ach.

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Grazer Bergland, 11 km NE of Frohnleiten, wooded ridge area at the NE extension of the mountain Rote Wand S of Tyrnauer Alm, along an ancient farm track right S below the chalet 'Tyrnauer Almhütte', 47°20'20"N, 015°25'40"E, MTB 8658/4, 1260 m alt., conifer-rich mixed forest (with clearings), on low hanging twigs of *Larix decidua*.

30.X.2005 leg. & det. J. Hafellner (64688)

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308. **Lecanora varia** (Hoffm.) Ach.

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, 7.9 km ESE of Obdach, Ameringkogel massif, S-facing slopes and ridges of Weißenstein, 0.6 km E of the lodge Weißensteinhütte, N of Melcheben, 47°03'35"N, 014°48'05"E, MTB 8954/2, 1900 m alt., pasture fence immediately above the timber line, on wooden fence bars.

3.IX.2005 leg. & det. J. Hafellner (65157)

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309. **Lepraria caesioalba** (de Lesd.) J.R.Laundon
[chemotype Ia]

AUSTRIA, Steiermark (= Styria), Zentralalpen, Steirisches Randgebirge, Stubalpe E of St.Leonhard, NW of Packsattel, 1 km W of the hut 'Bernsteinhütte', conspicuous group of rocks at the timber line, SE below the ridge with the height notation 1696, 46°59'50"N, 014°54'20"E, MTB 9055/1, 1630 m alt., big boulders of mica slate, on bryophytes.

Note: TLC: Atranorin, fumarprotocetraric acid syndrome, angardianic acid [traces of lecanoric acid come from *Diploschistes* cf. *muscorum*]. All specimens have been examined at least twice. The thalli are partly infected with *Diploschistes* cf. *muscorum* (TLC: lecanoric acid, diploschistesic acid, rangiformic acid), which causes a paler (almost white) colour and finally a disappearance of the soredia. *Lepraria alpina* is rarely intermixed (the thallus in GZU contains atranorin, porphyrilic acid, and rangiformic acid; three other samples where found with angardianic acid instead of rangiformic acid).

10.VIII.2005 leg. J. Hafellner (41634)
det. W. Obermayer

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310. **Melanohalea exasperatula** (Nyl.) O.Blanco & al.

AUSTRIA, Steiermark (= Styria), Oststeirisches Riedelland, 8.2 km E of the centre of Graz, Kainbach area, 'Auf der Ries', near Pfabenpeter, 47°06'05"N, 15°32'15"E, MTB 8859/3, 560 m alt., orchard at a forest edge, on twigs of *Pyrus communis*.

26.III.2005 leg. & det. W. Obermayer (10663)

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311. **Melanohalea septentrionalis** (Lynge) O.Blanco & al.

AUSTRIA, Salzburg, Niedere Tauern, Schladminger Tauern, 25 km NW of Murau, 12 km W of Krakaudorf, Prebersee, 47°11'05"N, 13°51'30"E, MTB 8849/1, 1515 m alt., southeastern area of the lakeshore, on small twigs of *Betula pubescens*.

24.VIII.1993 leg. & det. W. Obermayer (11345)

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312. **Parmeliella triptophylla** (Ach.) Müll.Arg.

AUSTRIA, Salzburg, Tennengau, Golling, Bluntautal, path to Joch-Alm, 47°34'06"N, 013°06'41"E, MTB 8444/3, 550 m alt., on *Fagus sylvatica*.

Note: Partly associated with *Normandina pulchella*.

4.V.2007 leg. & det. R. Türk (41746)

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313. **Pleopsidium** cf. **flavum** (Bellardi) Körb.

RUSSIA, Southern Siberia, Buryatia Republic (near border to Mongolia), Dzhida district, Dzhida Range, SE of Petropavlovka town, 50°34'04.2"N, 105°26'35.8"E, 660-670 m alt., steppe, S-exposed slope, on rock.

Note: TLC: Rhizocarpic acid (maj.), unknown yellow pigment (min.), two fatty acids.

26.VIII.2007 leg. & G. Urbanavichus (s.n.)
det. W. Obermayer

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314. **Protoblastenia szaferi** J.Nowak

AUSTRIA, Steiermark (= Styria), Nördliche Kalkalpen, Ennstaler Alpen, Lugauer, SW of Hieflau, near the cross of the western summit, 47°33'12"N, 014°43'20"E, MTB 8454/1, 2210 m alt., fragments of Caricetum firmae and calcareous cliffs, on NW-exposed steep faces of low cliffs.

3.VII.2005 leg. & det. J. Hafellner (65408)

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315. **Pseudosagedia aenea** (Wallr.) Hafellner & Kalb

AUSTRIA, Steiermark (= Styria), Grazer Bergland (eastern part), 5.6 km NNE of the centre of Graz, 1.3 km NW of Wenisbuch, middle part of the valley Dürrgraben, 47°07'25"N, 015°27'45"E, MTB 8858/4, 500 m alt., forest area on steep N-facing slopes along a gorge, on bark of horizontal stem of *Carpinus betulus*.

13.IV.2006 leg. & det. W. Obermayer (11097)

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316. **Pyrrhospora elabens** (Fr.) Hafellner

AUSTRIA, Salzburg, Lungau, Niedere Tauern, Schladminger Tauern, W of the mountain Preber, path from Preberhalterhütte to Mühlbachtörl, 47°12'08"N, 013°51' 16"E, MTB 8749/3, 1940 m alt., on dead wood of *Pinus cembra*.

5.VII.2006 leg. & det. R. Türk (39749)

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317. **Rinodina turfacea** (Wahlenb.) Körb.

AUSTRIA, Kärnten (= Carinthia), Hohe Tauern, Ankogelgruppe, slopes E of the lodge 'Hannover Haus' towards Grauleitenspitze, 14°02'45"N, 013°13'30"E, MTB 8945/3, 2700-2850 m alt., on alpine soil and earthy crevices.

Note: TLC: Sphaerophorin (maj.), variolaric acid (min./tr.).

29.VII.1989 leg. R. Türk & J. Hafellner (41510), det. H. Mayrhofer

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318. **Umbilicaria decussata** (Vill.) Zahlbr.

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, Größenberg S of Zeltweg, N-ridge towards Eppenstein, NW below Wetterkopf, 47°05'45"N, 014°47' 05"E, MTB 8954/2, 1780 m alt., big gneissic boulders at the edge of a pasture, on steep faces of a big boulder.

15.VIII.2006 leg. & det. J. Hafellner (66474)

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319. **Umbilicaria vellea** (L.) Hoffm.

AUSTRIA, Steiermark (= Styria), Zentralalpen, Steirisches Randgebirge, Gleinalpe, Roßeck SE of Niklasdorf, uppermost SE-facing slopes at the edge of the summit, 47°21'30"N, 015°12'25"E, MTB 8657/1, 1660 m alt., S-exposed gneissic boulders, on stepped overhanging faces.

31.XII.2006 leg. & det. J. Hafellner (67531)

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320. **Xanthoria** cf. **candelaria** (L.) Th.Fr.

AUSTRIA, Steiermark (= Styria), Dachsteingruppe, 4.4 km NNW of Schladming, Ramsau, 0.5 km N of the church of Ramsau-Ort, 47°25'40"N, 013°39'00"E, MTB 8547/4, 1180 m alt., roadside trees in open meadows, on bark of *Acer pseudoplatanus* (E-exposed sides, 0.2-1.5 m height).

19.II.2007 leg. & det. W. Obermayer (11337)

Dupla Graecensia Lichenum (2007, nos 481–580)

Walter OBERMAYER*

OBERMAYER W. 2007: Dupla Graecensia Lichenum (2007, nos 481–580). - Fritschiana (Graz) 60: 7–34. - ISSN 1024-0306.

Abstract: Dupla Graecensia Lichenum (2007, nos 481–580) comprises 100 collections of lichen duplicates from Argentina (Misiones), Armenia (prov. Ararat), Australia (New South Wales; Queensland; Tasmania), Austria (Carinthia; Salzburg; Styria; Tirol; Upper Austria), Brazil (Amazonas; Mato Grosso; Paraná; Rio Grande do Sul; São Paulo), Bulgaria (Blagoevgrad), China (Tibet, prov. Xizang), Guatemala (Petén), Jamaica (Saint Elizabeth), Namibia (Erongo), Réunion, Slovenia, South Africa (Cape Province), Spain (Canary Islands), Switzerland (Bern; Graubünden), U.S.A. (Hawai'i), Uruguay (Artigas; Durazno; Canelones; Maldonado; Rocha; Salto; San José; Tacuarembo), and Zimbabwe. TLC-investigations were carried out for 9 lichenized taxa (*Cetrelia cetrarioides* s.str. [3 different localities]*, C. monachorum* [2 different localities]*, Lecanora* cf. *leuckertiana, Lobaria 'pseudoisidiophora'* ined., *Pertusaria albescens* var. *a., P. albescens* var. *corallina, Pleopsidium gobiense*). *Lobaria 'pseudoisidiophora'* (ined.) is issued as part of the results of the 'Sino-German Joint Expedition to Southeastern and Eastern Tibet 1994'.

*Institut für Pflanzenwissenschaften, Karl-Franzens-Universität Graz, Holteigasse 6, A-8010 Graz, AUSTRIA, e-mail: walter.obermayer@uni-graz.at, homepage: http://www.uni-graz.at/walter.obermayer/index.html

The dwarf exsiccata 'Dupla Graecensia Lichenum' is issued by the herbarium of the Institute for Plant Sciences of the Karl-Franzens-University, Graz, Austria (international abbreviation: GZU). It includes lichens and lichenicolous fungi from all over the world with five to ten duplicates of each collection. Each institution receiving a duplicate is cited (at the bottom line of each individual label) with its international herbarium abbreviation (see http://sciweb.nybg.org/science2/IndexHerbariorum.asp): The herbaria in Canberra (CANB), Graz (GZU), Munich (M), New York (NY), and Uppsala (UPS) are receiving all distributed specimens continuously. To make every single specimen unique, the abbreviation of the herbarium, where the specimen should be housed, is underlined on the labels. Abbreviations of authors of plant names are taken from http://brimsa.huh.harvard.edu/cms-wb/botanist_index.html). Names of countries and states (or provinces or principial subdivisions) can be found under http://www.ars-grin.gov/cgi-bin/npgs/html/geolist.pl. 'Dupla Graecensia Lichenum' is published as text version (with online corrections) under http://www.uni-graz.ac.at/walter.obermayer/dupl-graec.htm. A downloadable PDF-file can currently be found under http://www.uni-graz.at/walter.obermayer/dupla-graecensia-lichenum-2007.pdf. Label texts originally drafted in a local language have been translated into English by the author. Unless otherwise stated, additional notes were provided by the author.

I wish to thank all the collectors and keepers of private herbaria for their contributions, in particular Uwe Becker, Franz Berger, Ursula Brosch, Josef Hafellner, Klaus Kalb, Helmut Mayrhofer, Héctor Osorio, and Roman Türk.

Thanks are also due to several colleagues, who helped with determinations: Philippe CLERC, Andreas FRISCH, Roland MOBERG, John W. SHEARD, Orvo VITIKAINEN. Field works in Tibet (1994) were supported by the 'Austrian Science Fund' (project number P09663-BIO).

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481. **Acarospora sinopica** (Wahlenb.) Körb.

[Syn.: *Polysporinopsis sinopica* (Wahlenb.) Vězda]

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, Ameringkogel massif, E of Obdach, Weißenstein, S-facing ridge above Milcheben (E above Weißensteinhütte), 47°03'35"N, 014°48'05"E, MTB 8954/2, 1900 m alt., on small, iron-rich rocks (in a rock wall). – 3.IX.2005, leg. J. Hafellner (65152) & A. Hafellner, det. J. Hafellner.

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482. **Alectoria nigricans** (Ach.) Nyl.

AUSTRIA, Salzburg/Steiermark (= Styria) (border area), Niedere Tauern, Schladminger Tauern, 24 km NW of Murau, Preber, path from Grazer Hütte to the summit of Preber, ridge area between Bockleiteneck and Roßscharte, 47°12'53"N, 013°52' 03"E, MTB 8749/3, 2450-2530 m alt., alpine pastures with siliceous rocks along a windblown ridge, on ground (moss-lichen heath). – 15.VIII.2006, leg. & det. W. Obermayer (11168).

Note: Partly with intermixed thalli of *Alectoria ochroleuca*. TLC: Alectorialic acid syndrome.

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483. **Anthracothecium goniostomum** Müll.Arg.

URUGUAY, Durazno, 150 km NE of Durazno, near the river Rio Negro, 1 km E of the railstation 'km 329', between Mazamorra and Poblado de los Morales, 32°25'S, 055°25'W, riverside of Rio Negro, on branches of shrubs. – 24.II.1974, leg. & det. H.S. Osorio (7012).

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484. **Anthracothecium papilliferum** (Nyl.) Müll.Arg.

ARGENTINA, Misiones, 40 km ENE of Posadas, between Santa Ana and San Ignacio, 5 km E of the Paraná river Loreto, 27°19'S, 055°32'W, 220 m alt., on bark of indigenous trees. – 5.III.1956, leg. J.E. Montes (10046; ex herb. Osorio 5423), det. H.S. Osorio (1980).

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485. **Arthonia ruana** A.Massal.

[Syn.: *Arthothelium ruanum* (A.Massal.) Körb.]

AUSTRIA, Steiermark (= Styria), Sausal, vicinity of Waldschach, 0.6 km SSE of the castle 'Schloss Waldschach', 46°49'05"N, 015°25'10"E, MTB 9158/4, 320 m alt., mixed forest, on bark of *Fraxinus excelsior*. – 20.VII.2003, leg. & det. J. Hafellner (60778).

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486. **Bilimbia lobulata** (Sommerf.) Hafellner & Coppins

[Syn.: *Mycobilimbia lobulata*; *Myxobilimbia lobulata*]

AUSTRIA, Steiermark (= Styria), Mürzsteger Alpen, Schneealpe, summit area of Windberg, 47°42'12"N, 015°35'38"E, MTB 8359/2, 1903 m alt., wind-exposed ridge with alpine vegetation (over calcareous bedrock), on ground (p.p. covering bryophytes). – 28.VII.2007, leg. & det. W. Obermayer (11403).

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487. **Buellia bahiana** Malme

U.S.A., Hawai'i, Kau, road north of South Point, 365 m alt., windy cattle range, on dead branch. – 28.XII.1976, leg. O. Degener (34187 [ex herb. Otto Degener]) & I. Degener, det. K. Kalb.

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488. **Buellia schaereri** De Not.

AUSTRIA, Kärnten (= Carinthia), Lienzer Dolomiten (border to Gailtaler Alpen), 3 km NNW of St.Lorenzen, 350 m NW of Tuffbad, path to 'Wiesner Alm', 46°43'33"N, 012°45'46"E, MTB 9242/4, 1320 m alt., cattle pasture, on bark of *Picea abies*. – 7.VII. 2005, leg. & det. R. Türk (37622).

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489. **Caloplaca ammiospila** (Wahlenb.) H.Olivier

AUSTRIA, Steiermark (= Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, 11 km NE of Aflenz, Zagerkogel, N-exposed slopes short below the summit, 47°36'40"N, 015°07'26"E, MTB 8356/4, 2240 m alt., low calcareous outcrops in the midst of Caricetum firmae, on bryophytes and plant remnants. – 18.IX.2004, leg. & det. J. Hafellner (63446).

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490. **Caloplaca australis** (Arnold) Zahlbr.

[Syn.: *Fulgensia australis* (Arnold) Poelt]

AUSTRIA, Kärnten (= Carinthia), Karnische Alpen, 10 km SW of Kötschach-Mauthen, 4 km NW of Plöckenpass, 500 m W of 'Obere Valentinalm', 46°37'15"N, 012°53' 55"E, MTB 9343/3, 1650 m alt., alpine pasture with calcareous boulders and outcrops, on strongly inclined faces of limestone boulders (1-2 m above ground). – 18.VII.2007, leg. & det. W. Obermayer (11404).

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491. **Caloplaca erodens** Tretiach, Pinna & Grube

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Grazer Bergland, 6.5 km NE of Mixnitz, Hochlantsch, eastern ridge 0.6 km ENE of the cross of the summit, 47°21'55"N, 015°25'57"E, MTB 8658/2, 1620 m alt., short rock cliff (palaeozoic limestone) protruding to the north, on SW-exposed, inclined rock surfaces. – 15.X.2005, leg. & det. J. Hafellner (64445) & L. Muggia.

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492. **Caloplaca oahuensis** Hafellner

U.S.A., Hawai'i, O'ahu, brink of Kaukonahua Gulch near the University of Hawaii, 213 m alt., on trunk and branches of introduced *Ficus*. – 17.V.1977, leg. O. Degener (34419 [ex herb. Otto Degener]) & I. Degener, det. K. Kalb.

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493. **Canoparmelia texana** (Tuck.) Elix & Hale

URUGUAY, Canelones, ENE of Montevideo, Parque Nacional "F.D.Roosevelt", between Italia Avenue and Rio de la Plata coast, 34°51'S, 56°01'W, 1-5 m alt., on trunk of *Pinus*. – 15.VI.1985, leg. & det. H.S. Osorio (8514).

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494. **Cetrelia cetrarioides** (Delise ex Duby) W.L.Culb. & C.F.Culb. s.str.

AUSTRIA, Steiermark (= Styria), Salzkammergut, Totes Gebirge, 2.7 km N of Altaussee, W-facing slopes of Loser, 0.7 km WNW of the summit, path from Loser-Hütte to Blaa-Alm, 47°39'50"N, 013°45'45"E, MTB 8348/2, 1300 m alt., mixed forest with *Picea abies, Acer pseudoplatanus,* and *Abies alba*, on bark of *Acer pseudoplatanus* (shady conditions). – 31.XII.2006, leg. & det. W. Obermayer (11289).

Note: All specimens tested two or three times by TLC: Perlatolic acid syndrome [no imbricaric acid], atranorin (traces in the thallus, minor in the soralia), no fatty acid.

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495. **Cetrelia cetrarioides** (Delise ex Duby) W.L.Culb. & C.F.Culb. s.str.

SLOVENIA, Southern Alps, Julian Alps, Koritnica valley NE of the village Log pod Mangartom, 46°24'50"N, 013°38'00"E, 700 m alt., mixed forest along the river bed, on *Picea abies*. – 31.VII.2003, leg. H. Mayrhofer (16032a) , M. Jensen & M. Trembley, det. W. Obermayer (2006).

Note: All specimens with apothecia. TLC: Atranorin (traces in the thallus, minor in the soralia), perlatolic acid syndrome [no imbricaric acid].

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496. **Cetrelia cetrarioides** (Delise ex Duby) W.L.Culb. & C.F.Culb. s.str.

SWITZERLAND, Bern [Kanton], Berner Oberland, 11 km SSE von Meiringen, Guttannen, 46°39'N, 008°17'E, 1050 m alt., forest area with *Picea abies*, on *Picea abies* (covered with bryophytes). – 31.VII.1961, leg. K. Schittengruber (1210), det. W. Obermayer (2007).

Note: TLC (performed at least twice per specimen): Atranorin (traces in the thallus, minor in the soralia), perlatolic acid syndrome.

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497. **Cetrelia monachorum** (Zahlbr.) W.L.Culb. & C.F.Culb.

AUSTRIA, Steiermark (= Styria), Niedere Tauern, Seckauer Tauern, Mautern, Hagenbachgraben, 47°22'50"N, 014°45'00"E, MTB 8654/2, 1080 m alt., on *Acer pseudoplatanus* (40-50 cm stem diameter). – 21.X.1962, leg. K.Schittengruber (1390), det. W. Obermayer (2007).

Note: TLC (performed at least four times per specimen): Atranorin (traces in the thallus, minor in the soralia), imbricaric acid syndrome (maj.), perlatolic acid (min.), p.p. with fatty acid 1(-2)/1(-2)/ 1(-2). *Cetrelia cetrarioide*s s.str. is intermixed at least in the samples deposited in CANB and UPS.

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498. **Cetrelia monachorum** (Zahlbr.) W.L.Culb. & C.F.Culb.

AUSTRIA, Steiermark (= Styria), Nordalpen, Nördliche Kalkalpen, Mürzsteger Alpen, Greithgraben N of Turnau, just N of Greith, vicinity of 'Barbarakreuz', 47°37'00"N, 015°20'30"E, MTB 8358/3, 1020 m alt., mixed forest with mainly conifers (near a brook), on bark of *Acer pseudoplatanus*. – 22.X.2006, leg. J. Hafellner (67532) & L. Muggia, det. J. Hafellner.

Note: TLC: Imbricaric acid syndrome (maj.), perlatolic acid (min.), atranorin (traces in the thallus, minor in the soralia), p.p. with fatty acid 1(-2)/1(-2)/1(-2).

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499. **Chaenotheca ferruginea** (Turner & Borrer) Migula

AUSTRIA, Steiermark (= Styria), Oststeirisches Riedelland, 10.8 km NE of the centre of Graz, 2 km SSE of Kumberg, 500 m W of Bachwirt, 47°08'35"N, 015°32'30"E, MTB 8859/3, 450 m alt., *Fraxinus-Carpinus-Picea* stand along a brook, on branches of *Fraxinus excelsior* (lying on ground). – 26.III.2006, leg. & det. W. Obermayer (11317).

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500. **Chapsa alborosella** (Nyl.) A.Frisch

BRAZIL, Amazonas, rainforest along the river Rio Negro, 150 km upstream of Manaus, 02°30'S, 061°10'W, 40 m alt., on bark of a tree. – 16.X.1980, leg. & det. K. Kalb (31731).

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501. **Chapsa leprocarpa** (Nyl.) A.Frisch

BRAZIL, São Paulo, Ilha Comprida, opposite to Cananéia, 25°00'S, 047°50'W, 2 m alt., dry coastal forest not subjected to flooding (restinga), on bark of unknown tree. – 18.III.1979, leg. K. Kalb (31078) & G. Plöbst, det. A. Frisch.

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502. **Cladia retipora** (Labill.) Nyl.

AUSTRALIA, Tasmania, Mt. Field National Park, Tarn Shelf, 42°40'S, 146°34'E, 1200 m alt., glacial debris, on ground. – 17.XI.1978, leg. J.O. Juvik (TAS-5), det. P. Scholz (2006).

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

AUSTRIA, Kärnten (= Carinthia), Steirisches Randgebirge, Stubalpe, Höllgraben E of Reichenfels, N-exposed slopes NW of Jaukenschlößl, 47°01'15"N, 014°47'20"E, MTB 8954/4, 1280 m alt., young forest with old tree stumps, on wood of tree stumps. – 6.VI.2006, leg. & det. J. Hafellner (66269) & L. Muggia.

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504. **Cladonia stygia** (Fr.) Ruoss

SLOVENIA, Pohorje, 26 km WSW of Maribor, 6 km ENE of Mislinja, Lovrenška jezera, 46°29'02"N, 015°18'56"E, 1525 m alt., upland moor with *Pinus mugo* (in wet pits between hillocks), on soil. – 12.VI.2006, leg. & det. H. Mayrhofer (16084) & S. Harutyunyan.

Note (Mayrhofer): New to Slovenia.

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505. **Cladonia sulphurina** (Michx.) Fr.

AUSTRIA, Steiermark (= Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, 13 km NW of Thörl, Buchbergkogel, northern ridge S above the hut Häuselalm, 47°35'15"N, 015°04'35"E, MTB 8456/1, 1620 m alt., loose dwarf pine scrub, on raw humus (amidst *Pinus mugo* stands). – 28.IX.2003, leg. & det. J. Hafellner (62779).

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506. **Cladonia uncialis** (L.) Weber ex F.H.Wigg.

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, SE-facing slopes of Speikkogel, 17 km W of Köflach, 2.2 km SW of Salzstiegelhaus, 47°03'10"N, 14°51'10"E, MTB 8955/1, 1860 m alt., boulder field, on ground. – 5.VIII.2006, leg. & det. W. Obermayer (11166).

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507. **Concamerella fistulata** (Taylor) W.L.Culb. & C.F.Culb.

URUGUAY, Rocha, Sierra de San Miguel, Cerro Picudo, 33°42'S, 053°34'W, 110 m alt., on (above) rocks. – 18.VII.1986, leg. C. Prigioni (s.n.; ex herb. Osorio 9712), det. H.S. Osorio (2004).

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508. **Concamerella pachyderma** (Hue) W.L.Culb. & C.F.Culb.

URUGUAY, Maldonado, 37 km NW of Maldonado city, Cerro Caperuza Grande, 19 km NNW of Cerro de las Animas, 34°46'S, 055°19'W, 150 m alt., on rocks. – 18.IX.1983, leg. & det. J. Femenias (s.n.; ex herb. Osorio 9711).

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509. **Cratiria lauricassiae** (Fée) Marbach

AUSTRALIA, Queensland, Whitsunday Group, Whitsunday Island, along the beach, 20°17'S, 148°40'E, 5 m alt., on *Callistemon* spec. – 21.VIII.2002, leg. & det. K. Kalb (33903).

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510. **Cryptothelium octosporum** (Vain.) Zahlbr.

BRAZIL, Rio Grande do Sul, São Francisco de Paula, Floresta Nacional, I.B.D.F., 29°27'S, 050°35'W, 900 m alt., on trunk of *Ocotea* or *Nectandra* (inside a forest). – 19.IV.1982, leg. H.S. Osorio & M. Fleig (SF/18; ex herb. Osorio 8029), det. H.S. Osorio 1983.

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511. **Dimerella pineti** (Schrad. ex Ach.) Vězda

AUSTRIA, Steiermark (= Styria), Grazer Bergland (eastern part), 5.5 km NNE of the centre of Graz, 0.8 km NW of Wenisbuch, uppermost part of the valley of Dürrgraben, 47°07'15"N, 015°28'05"E, MTB 8858/4, 560 m alt., N-facing slopes (forest area with *Pinus, Larix, Quercus*), on bark at base area of *Larix decidua*. – 13.IV.2006, leg. & det. W. Obermayer (11115).

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512. **Dirinaria applanata** (Fée) D.D.Awasthi

URUGUAY, San José, San José de Mayo, near railroad station, 40-50 m alt., on bark of *Gleditschia triacanthos*. – 9.XII.1975, leg. A. Laguardia (s.n.; ex herb. Osorio 9720), det. H.S. Osorio (2005).

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513. **Evernia prunastri** (L.) Ach.

AUSTRIA, Steiermark (= Styria), Zentralalpen, Gurktaler Alpen, Grebenzen, E-facing slopes, 3.6 km SW of Neumarkt, 1.2 km NE of the church of Pöllau, 47°02'48"N, 14°23'50"E, MTB 8952/3, 1090 m alt., sun-exposed trees (influenced by road dust) along the road to Pöllau, on *Salix* spec. – 27.IV.2007, leg. & det. W. Obermayer (11362).

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514. **Gyalecta ulmi** (Sw.) Zahlbr.

AUSTRIA, Salzburg, 3 km S of St.Gilgen (at the lake Wolfgangsee), E-facing slopes of Zwölferhorn, Steingrabenalm, 47°44'29"N, 013°22'19"E, MTB 8246/3, 900 m alt., wood yard, on *Fraxinus excelsior*. – 4.V.2004, leg. B. Antesberger (1903), det. B. Antesberger, conf. R. Türk.

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515. **Gyrotrema sinuosum** (Sipman) A.Frisch

BRAZIL, Amazonas, rainforest along the river Rio Negro, 150 km upstream of Manaus, 02°30'S, 061°10'W, 40 m alt., on bark of a tree. – 16.X.1980, leg. & det. K. Kalb (34004).

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516. **Halecania subsquamosa** (Müll.Arg.) P.Boom & H.Mayrhofer

AUSTRALIA, New South Wales, Eurobodalla, Cape Dromedary, S of Mystery Bay, S of Narooma, 36°18'S, 150°08'E, on coastal rocks. – 27.VII.1992, leg. H. Mayrhofer (10685) & E. Hierzer, det. H. Mayrhofer (conf. P.P.G. van den Boom).

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517. **Helocarpon pulverulum** (Th.Fr.) Türk & Hafellner

AUSTRIA, Kärnten (= Carinthia), Zentralalpen, Steirisches Randgebirge, Stubalpe, E of St.Leonhard, W-facing slopes NE above 'Görlitzer Alm', Kollmannsöfen, near 'Schieflinger Kreuz', 47°00'25"N, 014°52'55"E, MTB 8955/3, 1745 m alt., outcrops and boulders of mica slate (in dwarf-shrub heath), on bryophytes and plant remnants. – 12.VI.2005, leg. & det. J. Hafellner (65084).

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518. **Hypogymnia tubulosa** (Schaer.) Hav.

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Grazer Bergland (eastern part), Schöckl, 2 km N of St.Radegund, path from the tavern 'Schöcklbartl' to 'Römerweg', 47°11'52"N, 015°29'00"E, MTB 8858/2, 1040 m alt., mixed forest with mainly *Picea abies* and *Larix decidua*, on twigs of *Larix decidua*. – 15.IV.2007, leg. & det. W. Obermayer (11355) & B. Cartellieri.

Note: Partly associated with *Hypogymnia physodes, Pseudevernia furfuracea* var. *ceratea*, and *Parmelia sulcata*.

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519. **Icmadophila ericetorum** (L.) Zahlbr.

SWITZERLAND, Graubünden, Engadiner Alpen, Sesvenna group, 12 km NE of Scuol, San Niclà, shortly SE of the church, 46°51'30"N, 010°25'35"E, 1070 m alt., steep slope exposed to the N, outcrops of calcareous schist in mixed forest with dominant *Picea abies* and *Pinus sylvestris*, on rotting wood. – 22.VIII.2006, leg. & det. W. Obermayer (11228).

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520. **Lecanora** cf. **leuckertiana** Zedda

AUSTRIA, Steiermark (= Styria), Oststeirisches Riedelland, 7.5 km E of the centre of Graz, Kainbach area, 'Auf der Ries', 47°06'00"N, 15°31'40"E, MTB 8859/3, 515 m alt., edge of a wood, on bark of *Quercus petraea* (50 cm trunk-height, SE-exposed). – 26.III.2005, leg. W. Obermayer (10644), det. H. Mayrhofer.

Note: TLC: Usnic acid, zeorin, unknown 1(-2)/1-2/1; specimen in GZU with two mature apothecia.

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521. **Lecidea nylanderi** (Anzi) Th.Fr.

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Joglland, NNE of Birkfeld, Grauer Stein N above Strallegg, at the summit ridge, 47°25'25"N, 015°43'35"E, MTB 8560/3, 1070 m alt., loose mixed forest with conifers and inactive quartzitic boulders (mostly covered with bryophytes and dwarf shrubs), on bark of *Pinus sylvestris*. – 11.X.2003, leg. & det. J. Hafellner (61792).

Note: All specimens show the typical white leprarioid crust with a UV+ white fluorescence.

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522. **Leifidium tenerum** (Laurer) Wedin

AUSTRALIA, Tasmania, Great Western Tiers, Pine Lake, about 5 km N of Breona, on Great Lake Highway, 41°44'S, 146°43'E, 1200 m alt., boulder field, on *Arthrotaxis cupressoides*. – 21.XI.1978, leg. & det. J.O. Juvik (TAS-9).

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523. **Leptogium marginellum** (Sw.) Gray

BRAZIL, Paraná, Guayra, 24°04'S, 54°15'W, damp place, on trunks and twigs of trees. – 14.V.1956, leg. J.E. Montes (10144; ex herb. Osorio 4374), det. H.S. Osorio (1960); conf. W. Dodge (1960).

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524. **Lobaria 'pseudoisidiophora'** ined.

CHINA, Tibet, prov. Xizang, Himalaya Range, 280 km ESE of Lhasa, 45 km SW of Mainling, way down from a mountain pasture hut to the valley of a tributary of the Tsangpo, 29°02-03'N, 93°54-56'E, 3400-3800 m alt., *Abies* forest, on *Salix*. – 14.VIII. 1994, leg. & det. W. Obermayer (10578).

Note: TLC (all specimens tested): Stictic acid (maj.), constictic acid (maj.), gyrophoric acid (maj.), norstictic acid (tr.). All specimens with isidia and apothecia (separated material with a lichenicolous fungus in the apothecia will be distributed later). Shape of thalli and isidia as well as the chemical compounds are similar to those in *L. isidiophora*, but *Lobaria 'pseudosidiophora'* contains cyanobacteria as photobionts.

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

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Joglland, NNE of Birkfeld, Grauer Stein N above Strallegg, at the summit ridge, 47°25'25"N, 015°43'35"E, MTB 8560/3, 1070 m alt., loose mixed forest with conifers and inactive quartzitic boulders (mostly covered with bryophytes and dwarf shrubs), on bark of *Abies alba*. – 11.X.2003, leg. & det. J. Hafellner (61800).

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526. **Melanotrema platystomum** (Mont.) A.Frisch

BRAZIL, São Paulo, Ilha de São Sebastião, 130 km E of São Paulo, western slopes of Morro das Tacas, 23°50'S, 045°20'W, 400 m alt., in a humid and dark rainforest along a rivulet, on bark of unknown tree. – 2.IV.1979, leg. K. Kalb (31134) & G. Plöbst, det. A. Frisch.

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527. **Nephroma parile** (Ach.) Ach.

AUSTRIA, Steiermark (= Styria), Salzkammergut, Totes Gebirge, 2.7 km N of Altaussee, W-facing slopes of Loser, 0.7 km WNW of the summit, path from Loser-Hütte to Blaa-Alm, 47°39'50"N, 013°45'45"E, MTB 8348/2, 1300 m alt., mixed forest with *Picea abies, Acer pseudoplatanus*, and *Abies alba*, on bark of *Acer pseudoplatanus* (shady conditions). – 31.XII.2006, leg. & det. W. Obermayer (11292).

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528. **Ocellularia polydisca** Redinger

BRAZIL, Mato Grosso, 35 km SE of Cuiaba, 15°50'S, 056°00'W, 120 m alt., cerrado with iron bearing rocky outcrops, on old deciduous trees. – 3.-4.VII.1980, leg. K. Kalb (31699) & M. Marcelli, det. A. Frisch.

distributed to: **CANB, GZU, M, NY, UPS, hb.Kalb**

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529. **Opegrapha rufescens** Pers.

AUSTRIA, Steiermark (= Styria), Grazer Bergland (eastern part), 7.2 km NNE of the centre of Graz, 1.2 km ESE of Weinitzen, Annengraben, 47°08'10"N, 015°27'55"E, MTB 8858/4, 440 m alt., steep, S-exposed slopes with *Carpinus-Fagus-Quercus-Pinus*-forest, on stem bark of *Carpinus betulus* (1-3 m height, W-exp.). – 09.IV.2006, leg. & det. W. Obermayer (11083).

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530. **Parmotrema melanothrix** (Nyl.) Hale

BRAZIL, Paraná, 130 km NW of Cascavel, near the Paraná river, Guaíra, 24°04'S, 054°15'W, on trunk and branches of trees. – 12.V.1956, leg. J.E. Montes (10137A; ex herb. Osorio 4348), det. H.S. Osorio (1960).

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531. **Peltigera malacea** (Ach.) Funck

AUSTRIA, Salzburg/Steiermark (= Styria) (border area), Niedere Tauern, Schladminger Tauern, 24 km NW of Murau, Preber, path from Grazer Hütte to the summit of Preber, ridge area between Bockleiteneck and Roßscharte, 47°12'53"N, 013°52' 03"E, MTB 8749/3, 2450-2530 m alt., alpine pastures with siliceous rocks along a windblown ridge, on ground. – 15.VIII.2006, leg. & det. W. Obermayer (11172).

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532. **Peltigera polydactylon** (Neck.) Hoffm.

AUSTRIA, Steiermark (= Styria), Dachsteingruppe, 4.4 km NNW of Schladming, Ramsau, 1 km NNW of the church of Ramsau-Ort, 47°25'55"N, 013°38'55"E, MTB 8547/4, 1280 m alt., mixed forest with *Picea abies* and *Larix decidua*, on vertical surface of a rotten stump. – 19.II.2007, leg. W. Obermayer (11347), det. O. Vitikainen (2007).

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533. **Peltula cylindrica** Wetmore

ZIMBABWE, Inselberg ZW17/30a1=ZW15, Gwangwaza, near Banket, 17°30.7'S, 030°29.7'E, 1390 m alt., rock of 'Glockenberg-type' (70 m high, surrounded by farmland), on granite rocks. – 11.VII.1993, leg. U. Becker (215171), det. U. Becker (2002).

Note: Partly associated with other Peltulas, e.g. *P. marginata* and *P. umbilicata.*

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534. **Peltula marginata** Wetmore

ZIMBABWE, Inselberg ZW17/30a1=ZW15, Gwangwaza, near Banket, 17°30.7'S, 030°29.7'E, 1390 m alt., rock of 'Glockenberg-type' (70 m high, surrounded by farmland), on granite rocks. – 11.VII.1993, leg. U. Becker (215030), det. U. Becker (2002).

Note: Partly associated with other Peltulas, e.g. *P. cylindrica*, *P. umbilicata*, *P.* cf. *congregata*, *P*. cf. *obscurans*, *P*. cf. *boletiformis*.

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

AUSTRIA, Steiermark (= Styria), Dachsteingruppe, 4.4 km NNW of Schladming, Ramsau, 0.5 km N of the church of Ramsau-Ort, 47°25'40"N, 013°39'00"E, MTB 8547/4, 1180 m alt., roadside trees at the edge of a pasture, on bark of *Acer pseudoplatanus* (basal part of the trunk). – 19.II.2007, leg. & det. W. Obermayer (11354).

Note: TLC (all samples have been tested): Three fatty acids (allo-pertusaric acid, dihydropertusaric acid, unknown).

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536. **Pertusaria albescens** (Huds.) M.Choisy & Werner var. *corallina* (Zahlbr.) J.R.Laundon

SLOVENIA, Trnovski gozd, Lokve, pension 'Winkler', 46°00'58"N, 013°47'33"E, 940 m alt., on *Tilia platyphyllos*. – 10.VI.2006, leg. H. Mayrhofer (16602), det. W. Obermayer (2007).

Note: TLC: 3 fatty acids.

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537. **Phaeophyscia chloantha** (Ach.) Moberg

AUSTRIA, Kärnten (= Carinthia), Karnische Alpen, 7.2 km SSW of the railway station of Kötschach-Mauthen, 3.5 km E of 'Plöckenpass', valley of the rivulet 'Angerbach', forestry road to 'Untere Tschintenmuntalm', 46°36'30-35"N, 012° 59'10-20"E, MTB 9343/4, 1360-1400 m alt., mixed forest with *Fagus sylvatica, Picea abies*, and *Abies alba*, on *Fagus sylvatica* (bark covered with mosses; shady conditions). – 31.VIII.2007, leg. W. Obermayer (11435), det. R. Moberg (2007).

Note: Probably due to the growth under very shady conidtions, the material is quite untypical in its appearance. Some strongly divided thalli reach more than 3 cm in length, the upper cortex is rather untypically developed and the shape of soralia strongly resembles those of *Heterodermia speciosa*.

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538. **Phaeophyscia endococcinodes** (Poelt) Moberg

AUSTRALIA, Queensland, Lamington National Park, Beechmont Range, Binna Burra, 28°13'S, 153°11'E, 700 m alt., dry, subtropical rainforest dominated by *Acacia* spec., on bark of unknown tree. – 17.VIII.1988, leg. K. Kalb (21393) & A. Kalb, det. K. Kalb.

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539. **Physcia alba** (Fée) Müll.Arg.

URUGUAY, Tacuarembo, Rincón de Vassoura, 31°22'S, 55°47'W, on trunk of tree. – 29.III.2002, leg. G. Geymonat (s.n.; ex herb. Osorio 9541), det. H.S. Osorio (2002).

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

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Fischbacher Alpen, Eibeggsattel N of 'St.Jakob bei Mixnitz', path to Ederkogel, 47°25'15"N, 015°27'00"E, MTB 8558/4, 1030 m alt., forest with mainly *Picea abies* and *Larix decidua* (with a few deciduous trees), on detritus along the slopes of the path. – 29.IX.1999, leg. & det. J. Hafellner (59610).

Note: Partly intermixed with *Placynthiella icmalea*.

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541. **Pleopsidium gobiense** (H.Magn.) Hafellner

ARMENIA, Ararat province, Vedi, cemetery next to Khor-Virab church, 39°52.996'N, 044°34.691'E, 844 m alt., on basalt. – 21.VII.2006, leg. H. Mayrhofer (16641) & S. Harutyunyan, det. W. Obermayer (2007).

Note (Obermayer): TLC: Rhizocarpic acid (maj.), yellow pigment (min.; 3/3/5, UV-yellow) [no strong fatty acid detected].

Note (Mayrhofer): New to Armenia.

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542. **Protoblastenia szaferi** J.Nowak

AUSTRIA, Steiermark (= Styria), Nordalpen (Nördliche Kalkalpen), Ennstaler Alpen, Gesäuseberge E of Admont, 'Großer Buchstein', northern anticline between the summit and 'Admonter Frauenmauer', 47°36'50"N, 014°35'55"E, MTB 8353/4, 2065 m alt., stands with *Carex firma* and *Dryas octopetala* (with low limestone cliffs), on W-exposed steep rock faces. – 19.VI.2005, leg. & det. J. Hafellner (64388).

distributed to: **BRA, CANB, GZU, M, NY, UPS**

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543. **Protomicarea limosa** (Ach.) Hafellner

AUSTRIA, Tirol, Osttirol, Hohe Tauern, Glocknergruppe, path from the refuge 'Lucknerhaus' to the refuge 'Glorer Hütte', 47°01'41"N, 012°42'36"E, MTB 8942/3, 2540 m alt., on soil (above gneissic rocks). – 1.VII.2007, leg. & det. R. Türk (42574).

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544. **Protoparmelia oleaginea** (Harm.) Coppins

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, Größenberg S of Zeltweg, NW-ridge towards Eppenstein, Pichlmoarkogel, SW-facing slopes between 'Griesmoarhütte' and the summit, 47°06'05"N, 014°46'05"E, MTB 8854/4, 1560 m alt., coniferous forest (with *Picea abies* and *Larix decidua*), on decayed stumps. – 18.VIII.2005, leg. & det. J. Hafellner (65870).

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545. **Protothelenella corrosa** (Körb.) H.Mayrhofer & Poelt

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, SW of Köflach, NW of 'Packsattel', midway between 'Knödelhütte' and 'Bernsteinhütte', Lahnofen just below the hilltop, 46°59'45"N, 014°55'40"E, MTB 9055/2, 1510 m alt., small outcrops and big boulders of mica slate (in open *Picea-Larix*-forest), on W-exposed, inclined faces of boulders. – 28.VIII.2005, leg. & det. J. Hafellner (65815).

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546. **Pseudephebe pubescens** (L.) M.Choisy

AUSTRIA, Salzburg/Steiermark (= Styria) (border area), Niedere Tauern, Schladminger Tauern, 24 km NW of Murau, Preber, path from Grazer Hütte to the summit of Preber, ridge area between Bockleiteneck and Roßscharte, 47°12'53"N, 013°52' 03"E, MTB 8749/3, 2450-2530 m alt., alpine pastures with siliceous rocks along a windblown ridge, on small rocks near ground (horizontal faces). – 15.VIII.2006, leg. & det. W. Obermayer (11170).

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547. **Pseudevernia furfuracea** (L.) Zopf
var. *ceratea* (Ach.) D.Hawksw.

AUSTRIA, Steiermark (= Styria), Grazer Bergland, 3 km NW of St.Radegund, Schöckl, summit plateau, 0.6 km ENE of Stubenberghaus, 47°12'00"N, 15°28'10"E, MTB 8858/2, 1420 m alt., forest area with *Picea abies* and *Larix decidua*, on ground (all thalli fallen down from *Picea abies* and *Larix decidua*). – 11.VI.2005, leg. & det. W. Obermayer (10994).

Note: Each specimen contains several single thalli which have been tested with the spot test. Small thalli or thallus fragments of *Pseudevernia furfuracea* var. *furfuracea* can be intermixed.

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548. **Pseudevernia furfuracea** (L.) Zopf
var. *furfuracea*
[all specimens with apothecia, up to 1 cm in diam.]

AUSTRIA, Steiermark (= Styria), Dachsteingruppe, 6.5 km NW of Schladming, Ramsau, 2.9 km W of Ramsau-Ort, E-facing slopes of Rittisberg, 47°25'15"N, 013°36' 55"E, MTB 8547/4, 1440 m alt., edge of a forest with *Picea abies* and *Larix decidua*, on bark of *Picea abies*. – 19.II.2007, leg. & det. W. Obermayer (11336).

Note: Specimen in GZU also with fertile thalli of *Pseudevernia f.* var. *ceratea.*

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549. **Pseudevernia furfuracea** (L.) Zopf
var. *furfuracea*

AUSTRIA, Steiermark (= Styria), Grazer Bergland, 3 km NW of St.Radegund, Schöckl, summit plateau, 0.6 km ENE of Stubenberghaus, 47°12'00"N, 15°28'10"E, MTB 8858/2, 1420 m alt., forest area with *Picea abies* and *Larix decidua*, on ground (all thalli fallen down from *Picea abies* and *Larix decidua*). – 11.VI.2005, leg. & det. W. Obermayer (10993).

Note: Each specimen contains several single thalli which have been tested with the spot test. Small thalli or thallus fragments of *Pseudevernia furfuracea* var. *ceratea* can be intermixed.

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550. **Pseudosagedia aenea** (Wallr.) Hafellner & Kalb

AUSTRIA, Steiermark (= Styria), Grazer Bergland (eastern part), 5.6 km NNE of the centre of Graz, 1.3 km NW of Wenisbuch, middle part of the valley of Dürrgraben, 47°07'25"N, 015°27'45"E, MTB 8858/4, 500 m alt., forest area on steep N-facing slopes along a gorge, on base of *Fagus sylvatica*. – 13.IV.2006, leg. & det. W. Obermayer (11105).

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551. **Psilolechia lucida** (Ach.) M.Choisy

AUSTRIA, Steiermark (= Styria), Steirisches Randgebirge, Stubalpe, Ameringkogel massif, E of Obdach, valley of the rivulet Schwarzenbach E of the hamlet 'Schwarzenbach am Größing', SW below the hut 'Griesmoarhütte', 47°05'30"N, 014°45'15"E, MTB 8954/2, 1140 m alt., rocky slope of a forestry road, on overhanging faces of platelike siliceous outcrops. – 18.VIII.2005, leg. & det. J. Hafellner (65849).

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552. **Redingeria krempelhuberi** (Redinger) A.Frisch

BRAZIL, São Paulo, Praia de Peruibe near Itanhaém, 24°10'S, 46°50'W, 2 m alt., dense mangrove forest, on *Languncularia racemosa*. – 19.VII.1979, leg. K. Kalb (31409), det. A. Frisch.

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553. **Rhizocarpon lecanorinum** Anders

AUSTRIA, Steiermark (= Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, Polster E of Eisenerz, E-exposed slopes along the path from the hut Leobner Hütte to Hirscheggersattel, 47°32'10"N, 014°58'10"E, MTB 8455/4, 1660 m alt., subalpine pasture lawns and scattered dwarf pine areas, on low rocks (breccia). – 10.IX.2004, leg. & det. J. Hafellner (63256).

Note: All specimens associated with *Rhizocarpon polycarpum*.

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554. **Rinodina maculans** (Kremp.) Müll.Arg.

JAMAICA, [island of the Greater Antilles], Saint Elizabeth, between Crawford and Sandy Ground, 4 km NW of Black River, 18°03'W, 077°52'N, 30 m alt., on roadside tree. – 15.IV.1992, leg. K. & A. Kalb (36400), det. J.W. Sheard (2007).

Note: All specimens associated with *Rinodina colobinoides*. The thallus of *R. maculans* is thin and smooth whereas the thallus of *R. colobinoides* is thicker and partly shows vegetative propagules.

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555. **Rinodina milvina** (Wahlenb.) Th.Fr.

BULGARIA, Blagoevgrad, Pirin Mountains, Pirin National Park, 10 km SE of Bansko, Banderitza valley, along the road to the mountain hut Vihren near Bajkushevata Mura, 41°45.798'N, 023°25.212'E, 1875 m alt., granite boulders between scattered *Pinus peuce*, on granite (horizontal faces). – 10.VII.2007, leg. & det. H. Mayrhofer (16671) & S. Nikolova.

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556. **Schismatomma pericleum** (Ach.) Branth. & Rostr.

AUSTRIA, Tirol, Osttirol, Defereggental, valley of the river Schwarzach, path to the refuge 'Patscher Hütte', 46°55'02"N, 012°14'59"E, MTB 9039/3, 1585 m alt., on bark of *Picea abies*. – 5.VII.2007, leg. & det. R. Türk (42572).

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557. **Sphaerophorus fragilis** (L.) Pers.

AUSTRIA, Salzburg/Steiermark (= Styria) (border area), Niedere Tauern, Schladminger Tauern, 24 km NW of Murau, Preber, path from Grazer Hütte to the summit of Preber, ridge area between Bockleiteneck and Roßscharte, 47°12'53"N, 013°52' 03"E, MTB 8749/3, 2450-2530 m alt., alpine pastures with siliceous rocks along a windblown ridge, on earth within small rock crevices. – 15.VIII.2006, leg. & det. W. Obermayer (11169).

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558. **Stegobolus auberianus** (Mont.) A.Frisch & Kalb

BRAZIL, São Paulo, eastern part of Ilha Comprida, 24°52'S, 047°48'W, 3 m alt., dry and light coastal forest not subjected to flooding (restinga), on bark of unknown tree. – 1.IX.1980, leg. K. Kalb (32259), det. A. Frisch.

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559. **Stegobolus auberianus** (Mont.) A.Frisch & Kalb

BRAZIL, São Paulo, Praia de Peruibe near Itanhaém, 24°10'S, 046°50'W, 5 m alt., dense coastal forest not subjected to flooding (restinga), on bark of unknown tree. – 24.II.1979, leg. K. Kalb (31163) & G. Plöbst, det. A. Frisch.

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560. **Stegobolus radians** (Müll.Arg.) A.Frisch

BRAZIL, São Paulo, Ilha de São Sebastião, 130 km E of São Paulo, western slopes of Morro das Tacas, 23°50'S, 045°20'W, 600 m alt., in a light and very humid rainforest, on bark of unknown tree. – 21.IV.1978, leg. K. Kalb (31758) & G. Plöbst, det. A. Frisch.

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561. **Stegobolus schizostomus** (Tuck.) A.Frisch

GUATEMALA, Petén, surroundings of Tikal, 17°13'N, 089°24'W, 300 m alt., humid and dark primary rainforest, on bark of unknown tree. – 10.I.1979, leg. K. Kalb (31782) & G. Plöbst, det. A. Frisch.

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562. **Stenocybe septata** (Leight.) A.Massal.

SPAIN, Islas Canarias, Tenerife, Macizo de Anaga, NW of Las Carboneras, road to Chinamada, 28°33'N, 016°16'W, 700 m alt., relicts of a laurel forest (vicinity of a resting place), on bark of *Ilex perado* ssp. *platyphylla*. – 27.IV.2005, leg. & det. J. Hafellner (64203).

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563. **Stereocaulon alpinum** Laurer

AUSTRIA, Salzburg/Steiermark (= Styria) (border area), Niedere Tauern, Schladminger Tauern, 24 km NW of Murau, Preber, path from Grazer Hütte to the summit of Preber, ridge area between Bockleiteneck and Roßscharte, 47°12'53"N, 013°52' 03"E, MTB 8749/3, 2450-2530 m alt., alpine pastures with siliceous rocks along a windblown ridge, on ground. – 15.VIII.2006, leg. & det. W. Obermayer (11173).

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564. **Sticta sylvatica** (Huds.) Ach.

AUSTRIA, Steiermark (= Styria), Ennstaler Alpen, Gesäuse National Park, Hartelsgraben, 4 km SW of Hieflau, 47°34'N, 014°42'E, MTB 8454/1, 860-940 m alt., ravine forest, on *Fagus sylvatica*. – 23.VII.1994, leg. H. Mayrhofer (17120) & C. Scheuer, det. W. Obermayer (2007).

Note: The delimitation against *Sticta fuliginosa* seems to be difficult.

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565. **Strigula smaragdula** Fr.

URUGUAY, Artigas, Estancia El Tigre, Colonia Palma, 10 km W of Colonia Palma town, 30°40'S, 057°40'W, 100 m alt., marginal forest of the brook Tigre, on leaves of *Cupania vernalis*. – 5./8.XIII.1975, leg. & det. H.S. Osorio (7242).

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566. **Strigula smaragdula** Fr.

URUGUAY, Salto, Uruguay river, Salto Grande Island, 31°14'S, 057°55'W, on leaves of *Eugenia pungens*. – 4./6.II.1972, leg. & det. H.S. Osorio (6683).

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567. **Teloschistes capensis** (L.f.) Müll.Arg.

NAMIBIA, Erongo, Namib desert, N of Swakopmund, lichen fields, 22°34'S, 014° 31'E, 10 m alt., road along the beach, on ground. – 22.VIII.2006, leg. U. Brosch (herb. Obermayer no.11252), det. W. Obermayer.

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568. **Thelotrema pachysporum** Nyl.

BRAZIL, São Paulo, Praia de Peruibe near Itanhaém, 24°10'S, 046°50'W, 2 m alt., dense mangrove forest, on *Laguncularia racemosa*. – 24.II.1979, leg. K. Kalb (33123), det. A. Frisch.

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569. **Toninia candida** (Weber) Th.Fr.

AUSTRIA, Steiermark (= Styria), Salzkammergut, Totes Gebirge, 1.9 km NNE of Altaussee, S-facing slopes of Loser, 0.7 km W of Loser-Hütte, path from Loser-Hütte to Blaa-Alm, 47°39'25"N, 013°46'30"E, MTB 8348/2, 1420 m alt., ski-slope, on stongly inclined surface of a small limestone boulder. – 31.XII.2006, leg. & det. W. Obermayer (11290).

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570. **Trapelia placodioides** Coppins & P.James

AUSTRIA, Kärnten (= Carinthia), Karnische Alpen, 7 km SSW of Kötschach-Mauthen, 3.1 km E of Plöckenpass, path from the valley of the brook 'Angerbach' to 'Heldenfriedhöfe', 46°36'25"N, 012°59'10"E, MTB 9343/4, 1380 m alt., N-exposed mixed forest, on small schistose boulder (shady conditions, near ground). – 18.VII.2007, leg. & det. W. Obermayer (11437).

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571. **Trapeliopsis aeneofusca** (Flörke ex Flot.) Coppins & P.James

AUSTRIA, Oberösterreich (= Upper Austria), Kobernaußer Wald, 700 m SE of Stelzen, 48°05'23"N, 013°34'13"E, MTB 7846, 700 m alt., on soil (above molasse). – 31.III.1999, leg. F. Berger, G. Neuwirth, F. Priemetzhofer & R. Türk (27043), det. R. Türk.

Note: Specimen in GZU with fruiting bodies (apothecia orange-brownish, with a narrow white margin, hymenium colourless, epihymenium slightly brownish, spores 13x5 µm, thallus and soralia C-).

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572. **Trapeliopsis gelatinosa** (Flörke) Coppins & P.James

AUSTRIA, Salzburg, Flachgau, 5.8 km SSE of 'Neumarkt am Wallersee', Henndorfer Wald, valley of the brook Klausbach, path from Jägerwiese to Hasenkopf, 47°54' 18"N, 013°16'07"E, MTB 8045/4, 755 m alt., on bare soil (above flysch). – 28.IX.2007, leg. & det. R. Türk (42793).

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573. **Trapeliopsis gelatinosa** (Flörke) Coppins & P.James

AUSTRIA, Steiermark (= Styria), Oststeirisches Riedelland, 8.4 km E of the centre of Graz, 2.7 km WNW of Laßnitzhöhe, Äußere Ragnitz, path to 'Doktorbauer', 47°05'00"N, 15°32'50"E, MTB 8959/1, 480 m alt., mixed forest (*Fagus-Acer-Pinus-Picea-Abies*), slope of a forestry road, on shaded soil. – 20.III.2006, leg. & det. W. Obermayer (11007).

Note: Thallus sterile, with typical, pale green (at the beginning separated, but later on strongly confluent) soralia.

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574. **Tuckneraria laureri** (Kremp.) Randlane & Thell

AUSTRIA, Salzburg, Lungau, 9.2 km NE of Tamsweg, Überling-Sonnseite, 47°10' 16"N, 013°54'43"E, MTB 8849/1, 1725 m alt., on *Picea abies* and *Larix decidua*. – 21.VI.2005, leg. & det. G. Brunnauer (ex herb. Türk 37623).

Note: Specimen in GZU with apothecia.

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575. **Usnea intermedia** (A.Massal.) Jatta s.l.

AUSTRIA, Steiermark (= Styria), Zentralalpen, Gurktaler Alpen, Grebenzen, E-facing slopes, 4.4 km SW of Neumarkt, 500 m NE of the church of Pöllau, 47°02'35"N, 14°23'30"E, MTB 8952/3, 1150 m alt., edge of a forest with *Larix decidua* and *Picea abies*, on *Larix decidua*. – 1.IX.2004, leg. W. Obermayer (10515b), det. Ph. Clerc (2006).

Note (Obermayer): 'Type II' (thallus yellowish-green, pendulous).

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576. **Usnea intermedia** (A.Massal.) Jatta s.l.

AUSTRIA, Steiermark (= Styria), Zentralalpen, Gurktaler Alpen, Grebenzen, E-facing slopes, 4.4 km SW of Neumarkt, 500 m NE of the church of Pöllau, 47°02'35"N, 14°23'30"E, MTB 8952/3, 1150 m alt., edge of a wood with *Larix decidua* and *Picea abies*, on *Larix decidua*. – 1.IX.2004, leg. W. Obermayer (10515a), det. Ph. Clerc (2006).

Note (Obermayer): 'Type I' (thallus glaucous-green [→'U. glauca'], rather stout and loose shrubby).

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577. **Usnea rubiginea** (Michx.) A.Massal.

RÉUNION, [overseas département of France, belonging to the Mascarene Islands], [no further, more detailed location data given], 21°10'S, 055°40'E, on twigs of unknown tree. – IV.1989, leg. G. Follmann & I. Follmann-Schrag (s.n.), det. H. Sipman (2006).

distributed to: **CANB, GZU, M, NY, UPS**

OBERMAYER W. 2007: **Dupla Graecensia Lichenum** (2007, nos 481–580). - Fritschiana 60: 7–34.
Distributed by the *Institut für Pflanzenwissenschaften, Karl-Franzens-Universität,* Graz [GZU]

578. **Verrucaria elaeomelaena** (A.Massal.) Anzi non auct.

AUSTRIA, Steiermark (= Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, Aflenzer Staritzen N of Seewiesen, E-exposed cirque close to the Gamssteig, 47°38'00"N, 015°15'20"E, MTB 8357/4, 1500-1600 m alt., stands of *Pinus mugo* at the timber line, on limestone rocks in a wellspring bed. – 16.VIII.2003, leg. & det. J. Hafellner (63716).

distributed to: **CANB, GZU, M, MIN, NY, UPS**

OBERMAYER W. 2007: **Dupla Graecensia Lichenum** (2007, nos 481–580). - Fritschiana 60: 7–34.
Distributed by the *Institut für Pflanzenwissenschaften, Karl-Franzens-Universität,* Graz [GZU]

579. **Xanthodactylon flammeum** (L.f.) C.W.Dodge

SOUTH AFRICA, Cape Province, 80 km SSE of Alexander Bay, Port Noloth, Larus Beach House, 49°16'S, 016°53'E, 10 m alt., beach area along the Atlantic Ocean, on shrubs. – 27.VIII.2006, leg. U. Brosch (herb. Obermayer no 11235), det. W. Obermayer.

distributed to: **CANB, GZU, M, NY, UPS**

OBERMAYER W. 2007: **Dupla Graecensia Lichenum** (2007, nos 481–580). - Fritschiana 60: 7–34.
Distributed by the *Institut für Pflanzenwissenschaften, Karl-Franzens-Universität,* Graz [GZU]

580. **Xanthoria fallax** (Hepp) Arnold

SLOVENIA, 20 km ESE of Koper, 0.2 km SSE of Rakitovec, 45°28'25"N, 013°58' 08"E, 520 m alt., old schoolhouse with rockery, on *Acer campestre*. – 8.VI.2006, leg. H. Mayrhofer (16537) & S.Harutyunyan, det. H. Mayrhofer.

distributed to: **CANB, GZU, M, NY, UPS**

Lichenicolous Biota (Nos 1–20)

Josef HAFELLNER*

HAFELLNER J. 2007: Lichenicolous Biota (Nos 1–20). – Fritschiana (Graz) 60: 35–49. - ISSN 1024-0306.

Abstract: The first fascicle (20 numbers) of the new exsiccata "Lichenicolous Biota" is published. The issue contains material of one lichenized and 18 non-lichenized fungal taxa (14 ascomycetes, 1 basidiomycete, 4 anamorphic fungi), including isotype material (no 9) and paratype material (no 20) of *Taeniolella atricerebrina* Hafellner.

Zusammenfassung: Der erste Faszikel (20 Nummern) eines neuen Exsikkates namens „Lichenicolous Biota" wird veröffentlicht. Die Ausgabe enthält Proben von einem lichenisierten und 18 nicht-lichenisierten Taxa (14 Ascomyceten, 1 Basidiomycet, 4 anamorphe Pilze), einschließlich Isotypen (no. 9) und Dubletten eines Paratypus (no. 20) von *Taeniolella atricerebrina* Hafellner.

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Introduction

Lichenicolous biota, especially fungi, have attracted considerable interest since about 40 years, and a number of scientists devoted much of their efforts to studying such organisms.

One possible way to promote these interests is the distribution of an exsiccata. Prof. Rolf Santesson (Uppsala, Sweden) has been the first and so far only editor of an exsiccata restricted to lichenicolous fungi (starting with SANTESSON, R. 1984. Fungi lichenicoli exsiccati. Fasc. I–II (No 1–50). Publications from the Herbarium, University of Uppsala, 13: 1–20). So far, 350 numbers have been distributed, and we all are very grateful to Prof. Santesson for this initiative. My colleagues and I have found this exsiccata most useful, and some of us are privileged in having easy access to it. For Santesson's exsiccata, at least 10 duplicates were necessary, a number of specimens, which is not always easy to obtain from a single collection. Therefore I accumulated collections of lichenicolous taxa with at least 5 but less than 10 duplicates over the years, and I now decided to distribute this material in a new exsiccata named "Lichenicolous Biota", which is offered to several institutions on exchange basis.

As for all exsiccata, the aims are: to share knowledge about a particular group of organisms with colleagues, to make species concepts available and easier to check on the basis of a real specimen, to distribute the material of

even rather common taxa from various localities in order to facilitate comparative studies among populations, and to deposit rich collections in a useful manner.

Contrary to Santesson's 'Fungi lichenicoli exsiccati', the present exsiccata will cover all lichenicolous biota. One may assume that the majority will still be non-lichenized and lichenized fungi, but the exsiccata is also open to myxomycetes, bacteria, and even animals, whenever they cause a characteristic symptom on their host (e.g., discoloration or galls). Consequently, the exsiccata will contain both highly host-specific and plurivorous species, as long as the individuals clearly grow upon a lichen and the collection is homogeneous, so that identical duplicates can be prepared.

As the exsiccata will mainly contain fungi, I decided to distribute the sets primarily to institutions housing large collections of lichenized and non-lichenized fungi, including a representative stock of lichenicolous taxa. On the other hand, I want to spread out the material geographically. Therefore I decided to send the five complete sets to herbaria of the following regions: Central Europe (Graz [GZU]), Northern Europe (Uppsala [UPS]), Western Europe (Bruxelles [BR]), North America (New York [NY]), Australasia (Canberra [CANB]). Incomplete sets will preferably be distributed to institutions where at least one active researcher interested in lichenicolous fungi is affiliated, e.g., to Barcelona [BCC], Edinburgh [E], Leningrad [LE], Munich [M], and Prague [PRM] (herbarium acronyms sec. HOLMGREN & HOLMGREN 1998, onwards: Index Herbariorum. New York Botanical Garden. http://sciweb.nybg.org/science2/IndexHerbariorum.asp). It is planned to publish at least one fascicle per year, consisting of a variable number of decades.

I would be very grateful to receive material of lichenicolous biota from my colleagues. The collections should be divided up into at least 5 (up to 10) duplicates, preferably already prepared. Unprepared collections should be rich enough to obtain at least 5 duplicates.

For the first issue, I gratefully acknowledge the contribution of one collection by Javier Etayo and one by Walter Obermayer, and the help during fieldwork by Angela Hafellner, Jolanta Miadlikowska, Lucia Muggia, Pier Luigi Nimis, Mauro Tretiach, and Mikhail Zhurbenko. Christian Scheuer, Walter Obermayer, and Helmut Mayrhofer are thanked for critically reading the manuscript.

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

1. ***Biatoropsis usnearum*** Räsänen

in Ann. Soc. Zool. Bot. Fenn. Vanamo 5(9): 8 (1934).

Host: *Usnea articulata* (thallus)

Africa, **Canary Islands**: Gran Canaria, along the road from Moya to Artenara, between Las Fontanales and the lookout point Los Pinos de Galdar, *c*. 1350 m alt., 28°02'20"N / 15°37'W; open pine forest, on branches of *Pinus canariensis*.

Note: The type host of *Biatoropsis usnearum* is *Usnea comosa* (syn. *U*. *subfloridana*). In the protologue three species are mentioned (*U*. *glabrescens*, *U*. *comosa*, *U*. *similis*). Diederich & Christiansen (Lichenologist 26: 49, 1994) have chosen a lectotype, the host of which is named *U*. *comosa*.

21. II. 1994 leg. J. Hafellner (53831) & A. Hafellner, det J. Hafellner

distributed to: BCC, BR, CANB, E, GZU, LE, M, NY, PRM, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

2. ***Catillaria mediterranea*** Hafellner

in Herzogia 6: 293 (1982). – Bas.: *Scutula pleiospora* Vouaux in Pitard & Harmand, Bull. Soc. Bot. France 58, Mem. 22: 72 (1911), non *Catillaria pleiospora* (J.Steiner) J.Steiner (1898).

Host: *Ramalina bourgeana* (thallus)

Africa, **Canary Islands**: Gran Canaria, high above the west coast by the road from San Nicolás to Agaete, Andén Verde, *c*. 530 m alt., 28°01'30"N / 15°46'W; volcanic cliffs, on steep rock faces exposed to the W.

Note: *Ramalina bourgeana* is the type host of the species.

20. II. 1994 leg. J. Hafellner (41056) & A. Hafellner, det. J. Hafellner

distributed to: BCC, BR, CANB, E, GZU, LE, M, NY, PRM, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

3. ***Endococcus macrosporus*** (Hepp ex Arnold) Nyl.

in Lamy, Bull. Soc. Bot. France 25: 504 (1878). – Bas.: *Tichothecium macrosporum* Hepp ex Arnold in Verh. K. K. Zool.-Bot. Ges. Wien 18: 960 (1868).

Host: *Rhizocarpon geographicum* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Niedere Tauern, Triebener Tauern, Griesmoar Kogel SW of the village Wald am Schoberpaß, ridge exposed to the N above the saddle to Himmeleck, 47°25’15’’N / 14°36’10’’E, *c*. 1950 m alt., GF 8553/4; low outcrops of mica schist in alpine vegetation.

Note: The type host of *Endococcus macrosporus* is *Rhizocarpon alpicola*.

20. VIII. 2002 leg. J. Hafellner (58888) & J. Miadlikowksa, det. J. Hafellner

distributed to: BR, CANB, GZU, LE, M, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

4. ***Lichenochora obscuroides*** (Linds.) Triebel & Rambold

in Rambold & Triebel, Biblioth. Lichenol. 48: 168 (1992). – Bas.: *Lecidea obscuroides* Linds. in Trans. Roy. Soc. Edinburgh 22: 112, 247 (1859). – Syn.: *Lichenochora thallina* (Cooke) Hafellner in Nova Hedwigia 48: 363 (1989).

Host: *Phaeophyscia orbicularis* (thallus)

Europe, **Austria**: Styria, Oststeirisches Hügelland, Graz, Ragnitztal E of the town, Dr. Hanisch-Weg, 47°04’35’’N / 15°28’50’’E, *c*. 380 m alt., GF 8958/2; old orchard, on canopy branches of *Juglans regia*.

Note: *Phaeophyscia orbicularis* is the type host of the species. The thalli are partly also infested by *Arthonia phaeophysciae* Grube & Matzer (e.g., the specimen in GZU).

8. IX. 2006 leg. et det. J. Hafellner (67536)

distributed to: BCC, BR, CANB, E, GZU, LE, M, NY, PRM, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

5. ***Nigropuncta rugulosa*** D.Hawksw.

in Bull. Brit. Mus. (Nat. Hist.), Bot. 9(1): 46 (1981).

Host: *Bellemerea cinereorufescens* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Gurktaler Alpen, surroundings of the pass Turracherhöhe, hill N above the lake Turrachsee, ENE above the hotel Seewirt, 46°55’30’’N / 13°52’40’’E, *c*. 1850 m alt., GF 9049/3; open forest with codominant *Picea abies*, *Larix decidua*, and *Pinus cembra*, in overhangs of boulders and outcrops of a Palaeozoic conglomerate.

Note: *Bellemerea cinereorufescens* is the type host of *Nigropuncta rugulosa* (isotype in GZU). However, the host had remained undetermined when the lichenicolous fungus was described, because the infection strongly suppresses the formation of host apothecia.

27. VII. 2002 leg. et det. J. Hafellner (61656)

distributed to: BCC, BR, CANB, GZU, LE, M, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

6. ***Paranectria oropensis*** (Ces.) D.Hawksw. & Piroz.

in Can. J. Bot. 55: 2555 (1977). – Bas.: *Sphaeria oropensis* Ces. in Rabenh., Bot. Zeitung 15: 406 (1857).

Host: sterile corticolous crustose lichen (thallus)

Europe, **Austria**: Styria, Oststeirisches Hügelland, 7 km E of the centre of Graz, 2.9 km SW of Hönigtal, forested area between Ragnitzstraße and Höhenstraße, 47°04’45’’N / 15°31’45’’E, 460–480 m alt., GF 8959/1, mixed lowland forest with *Fagus sylvatica*, *Pinus sylvestris*, and *Picea abies*, on bark of *Carpinus betulus*.

Note: The type host of *Paranectria oropensis* are sterile squamules of a so far undetermined lichen.

25. IX. 2006 leg. W. Obermayer (11358), det. J. Hafellner

distributed to: BCC, BR, CANB, E, GZU, LE, M, NY, PRM, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

7. ***Phacopsis vulpina*** Tul.

in Ann. Sci. Nat., Bot., sér. 3, 17: 126 (1852).

Host: *Letharia vulpina* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Niedere Tauern, Triebener Tauern, Gamskögel SW above the refuge Mödringhütte, on slopes exposed to the N, 47°22’25’’N / 14°33’20’’E, *c*. 1700 m alt., GF 8653/1; subalpine forest with *Larix decidua* and *Picea abies*, on bark of *Larix decidua*.

Note: *Letharia vulpina* is the type host of the species.

1. V. 2006 leg. J. Hafellner (65963), L. Muggia & A. Hafellner, det. J. Hafellner

distributed to: BCC, BR, CANB, GZU, LE, M, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

8. ***Sphaerellothecium minutum*** Hafellner

in Herzogia 9: 760 (1993).

Host: *Sphaerophorus fragilis* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Niedere Tauern, Wölzer Tauern, mountains *c*. 8,5 km WNW of the village Pusterwald, Großhansl, close to the summit, 47°19’10’’N / 14°15’55’’E, *c*. 2300 m alt., GF 8651/4; cliffs of metal-rich siliceous rock on steep slope exposed to the E, on inclined rock faces.

Note: *Sphaerophorus fragilis* is the type host of the species.

25. VIII. 2005 leg. J. Hafellner (68069), L. Muggia & A. Hafellner, det. J. Hafellner

distributed to: BR, CANB, GZU, LE, M, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

9. ***Taeniolella atricerebrina*** Hafellner Isotype

in Biblioth. Lichenol. 96: 115 (2007).

Host: *Tephromela atra* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Niedere Tauern, Triebener Tauern, Griesmoar Kogel SW of the village Wald am Schoberpaß, ridge exposed to the N above the saddle to Himmeleck, 47°25’15’’N / 14°36’10’’E, *c*. 1950 m alt., GF 8553/4; low outcrops of mica schist in alpine vegetation.

Note: The infection of *Tephromela atra* with *Taeniolella atricerebrina* induces the formation of conspicuous galls.

20. VIII. 2002 leg. J. Hafellner (59165) & J. Miadlikowska, det. J. Hafellner

distributed to: BR, CANB, E, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

10. ***Telogalla olivieri*** (Vouaux) Nik.Hoffm. & Hafellner

in Biblioth. Lichenol. 77: 109 (2000). – Bas.: *Laestadia olivieri* Vouaux in Bull. Soc. Mycol. France 28: 216 (1912) nomen novum for *Verrucaria xanthoriae* Wedd. f. *megaspora* H.Olivier in Princ. Paras. Lich. Fr. Suppl. 1: 14 (1907).

Host: *Xanthoria parietina* (thallus)

Europe, Austria: Styria, Eastern Alps, Nördliche Kalkalpen, Hochschwab-Gruppe, Seetal W of the village Seewiesen, *c*. 10 km NE of Aflenz, 47°37’15’’N / 15°15’20’’E, *c*. 930 m alt., GF 8357/4; row of trees along the edge of a meadow, on lower canopy branches of *Fraxinus excelsior*

Note: *Xanthoria parietina* is the type host of the species.

18. XI. 2007 leg. et det. J. Hafellner (69273)

distributed to: BCC, BR, CANB, E, GZU, LE, M, NY, PRM, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

11. ***Arthonia digitatae*** Hafellner

in Linzer Biol. Beitr. 31: 508 (1999).

Host: *Cladonia digitata* (thallus squamules)

Europe, **Austria**: Styria, Eastern Alps, Steirisches Randgebirge, Stubalpe, Größenberg S of Zeltweg, NW ridge towards the village Eppenstein, Pichlmoarkogel, between Griesmoarhütte and the mountain top, on slope exposed to the SW, 47°06’05’’N / 14°46’05’’E, *c*. 1560 m alt., GF 8854/4; montane forest with *Larix decidua* and *Picea abies*, on rotten stumps.

Note: *Cladonia digitata* is the type host of the species.

18. VIII. 2005 leg. et det. J. Hafellner (65869)

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

12. ***Carbonea herteliana*** Hafellner & Matzer

in Hafellner, Linzer Biol. Beitr. 31: 509 (1999).

Host: *Rhizocarpon umbilicatum* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Nördliche Kalkalpen, Ennstaler Alpen, Gesäuseberge SE of Admont, knoll between the mountains Riffel and Kalbling, 47°33’05’’N / 14°31’05’’E, *c*. 2000 m, GF 8453/1; outcrops of Triassic limestone in alpine meadows, on inclined rock faces of outcrops.

Note: *Rhizocarpon umbilicatum* is the type host of the species.

13. IX. 2006 leg. et det. J. Hafellner (67789)

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

13. ***Carbonea intrudens*** (H.Magn.) Hafellner

in Fritschiana 52: 40 (2006). – Bas.: *Lecidea intrudens* H.Magn. in Ark. Bot. 33A(1): 53 (1946).

Host: *Rhizocarpon geographicum* (thallus)

Europe, **Italy**: Piemonte, Cuneo, Western Alps, Alpi Cozie, crest SW above Colle dell' Agnello, 44°40’55’’N / 06°58’35’’E, *c*. 2830 m; outcrops of calcareous schist on steep slope exposed to the SE, on banks of schist partly rich in calcium.

Note: *Rhizocarpon geographicum* is the type host of the species.

25. VII. 2000 leg. et det. J. Hafellner (60264)
(together with M. Tretiach and P. L. Nimis)

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

14. ***Cercidospora crozalsiana*** (H.Olivier) Nav.-Ros., Cl.Roux & Casares

in Cryptogamie, Bryol.-Lichénol. 16: 100 (1995). – Bas.: *Sphaeria crozalsiana* H.Olivier in Bull. Acad. Int. Géogr. Bot. 17: 168 (1907).

Host: *Squamarina cartilaginea* (thallus)

Europe, **Spain**: Aragón, Zaragoza, La Retverta, Pina de Ebro *c*. 35 km SE of Zaragoza, UTM 30TYL29-97, c. 200 m alt., on gypsum soil.

Note: The type host of the species is *Squamarina lentigera*.

11. III. 1991 leg. et det. J. Etayo

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

15. ***Illosporiopsis christiansenii*** (B.L.Brady & D.Hawksw.) D.Hawksw.

in Sikaroodi et al., Mycol. Res. 105: 457 (2001). – Bas.: *Hobsonia christiansenii* B.L.Brady & D.Hawksw. in Lowen et al., Mycologia 78: 842 (1986).

Host: *Physcia adscendens* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Steirisches Randgebirge, Fischbacher Alpen, on the saddle between the mountains Ederkogel and Aibel, NE of the village St. Jakob bei Mixnitz, 47°25’00’’N / 15°27’50’’E, *c*. 1100 m alt., GF 8558/4; row of trees along the edge of a pasture, on bark of *Fraxinus excelsior*.

Note: The type host of the species is *Candelaria concolor*.

29. IX. 1999 leg. et det. J. Hafellner (59545)

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

16. ***Lichenoconium lecanorae*** (Jaap) D.Hawksw.

in Bull. Brit. Mus. (Nat. Hist.), Bot. 6(3): 270 (1979). – Bas.: *Coniosporium lecanorae* Jaap in Lindau, Verh. Bot. Vereins Prov. Brandenburg 47: 71 (1906).

Host: *Lecanora saligna* (hymenia)

Europe, **Austria**: Styria, Eastern Alps, Nördliche Kalkalpen, Hochschwab group, massif of Meßnerin *c*. 25 km NW of the town Kapfenberg, Rabenstein S above the inn Bodenbauer, 47°34’15’’N / 15°06’35’’E, *c*. 1480 m alt., GF 8456/2; forest with *Picea abies* and *Larix decidua*, on slope exposed to the E, on wood of snags.

Note: The type host of the species is *Lecanora chlarotera*.

4. VII. 2004 leg. et det. J. Hafellner (63723)

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

17. ***Skyttea nitschkei*** (Körb.) Sherwood, D.Hawksw. & Coppins

in Trans. Brit. Mycol. Soc. 75: 488 (1981, "1980"). – Bas.: *Nesolechia nitschkei* Körb. in Parerga Lichenol.: 462 (1865).

Host: *Thelotrema lepadinum* (thallus, apothecial margins)

Europe, **Austria**: Styria, Eastern Alps, Ennstaler Alpen, Gesäuse, in the valley Hartelsgraben *c*. 3 km W of the village Hieflau, somewhat before the second bridge over the creek, 47°35'15''N / 14°42'25''E, *c*. 660 m alt., GF 8454/1; montane forest with *Fagus sylvatica*, *Abies alba*, and *Picea abies*, on bark of *Fagus sylvatica*.

Note: *Thelotrema lepadinum* is the type host of the species.

26. VIII. 2002 leg. J. Hafellner (60630) & J. Miadlikowska, det. J. Hafellner

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

18. ***Stigmidium congestum*** (Körb.) Triebel

in Triebel et al., Mycotaxon 42: 290 (1991). – Bas.: *Pharcidia congesta* Körb. in Parerga Lichenologica: 470 (1865).

Host: *Lecanora chlarotera* (hymenia)

Europe, **Austria**: Styria, Eastern Alps, Steirisches Randgebirge, Stubalpe, Teigitsch-Graben NW of the village Hirschegg, *c*. 1 km NW of the inn Spengerwirt, 47°02'40''N / 14°55'20''E, *c*. 990 m alt., GF 8955/4; row of trees along the brook side, on bark of *Alnus incana*.

Note: *Lecanora chlarotera* (f. *rugosella*) is the type host of the species.

29. X. 2006 leg. et det. J. Hafellner (66896)

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

19. ***Stigmidium pumilum*** (Lettau) Matzer & Hafellner

in Biblioth. Lichenol. 37: 115 (1990). – Bas.: *Rosellinia pumila* Lettau, Repert. Spec. Nov. Regni Veg. 61(2): 150 (1958).

Host: *Physcia caesia* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Steirisches Randgebirge, Stubalpe W of the town Köflach, SW ridge of the Rappoldkogel N above the pass Hirschegger Sattel, 47°04’35’’N / 14°52’40’’E, *c*. 1660 m alt., GF 8955/1, low outcrops of marble in a pasture field surrounded by subalpine *Picea abies* forest, on inclined rock faces, partly over saxicolous bryophytes.

Note: *Physcia caesia* is the type host of the species.

18. VIII. 2006 leg. et det. J. Hafellner (66699)

distributed to: BR, CANB, GZU, NY, UPS

Hafellner J. 2007: Lichenicolous Biota (Nos 1–20). - Fritschiana 60: 35–49.

20. ***Taeniolella atricerebrina*** Hafellner Paratype material

in Biblioth. Lichenol. 96: 115 (2007).

Host: *Tephromela atra* (thallus)

Europe, **Austria**: Styria, Eastern Alps, Niedere Tauern, Seckauer Tauern, Hämmerkogel N of the village Seckau, above the small lake Goldlacke, on slopes exposed to the S, *c*. 2100 m alt.; 47°20’30’’N / 14°45’05’’E; GF 8654/4; low outcrops of siliceous rocks in alpine meadows, on inclined rock faces.

Note: *Tephromela atra* is the type host of the species. Isotypes of *Taeniolella atricerebrina* have been distributed as “Lichenicolous Biota no. 9”.

20. X. 2001 leg. et det. J. Hafellner (64099)

distributed to: BR, CANB, GZU, NY, UPS

Taxon Synopsis:

Taxon **Exs. no.**

Ascomycota

Lecanoromycetes (incl. Ostropales)

Carbonea herteliana 12
Carbonea intrudens 13
Catillaria mediterranea 2
Phacopsis vulpina 7
Skyttea nitschkei 17

Arthoniomycetes

Arthonia digitatae 11

Leotiomycetes

Sordariomycetes (incl. Hypocreales, Sordariales)

Lichenochora obscuroides 4
Paranectria oropensis 6

Eurotiomycetes (incl. Verrucariales)

Endococcus macrosporus 3
Telogalla olivieri 10

Dothideomycetes

Cercidospora crozalsiana 14
Sphaerellothecium minutum 8
Stigmidium congestum 18
Stigmidium pumilum 19

Anamorphic Fungi

Hyphomycetes

Illosporiopsis christiansenii 15
Taeniolella atricerebrina 9, 20

Coelomycetes

Lichenoconium lecanorae 16
Nigropuncta rugulosa 5

Basidiomycota

Homobasidiomycetes

Heterobasidiomycetes

Biatoropsis usnearum 1

Host Index:

Host taxon	Lichenicolous taxon	Exs. no.
Bellemerea cinereorufescens	*Nigropuncta rugulosa*	5
Cladonia digitata	*Arthonia digitatae*	11
Lecanora chlarotera	*Stigmidium congestum*	18
Lecanora saligna	*Lichenoconium lecanorae*	16
Letharia vulpina	*Phacopsis vulpina*	7
Phaeophyscia orbicularis	*Lichenochora obscuroides*	4
Physcia adscendens	*Illosporiopsis christiansenii*	15
Physcia caesia	*Stigmidium pumilum*	19
Ramalina bourgeana	*Catillaria mediterranea*	2
Rhizocarpon geographicum	*Carbonea intrudens*	13
Rhizocarpon geographicum	*Endococcus macrosporus*	3
Rhizocarpon umbilicatum	*Carbonea herteliana*	12
Sphaerophorus fragilis	*Sphaerellothecium minutum*	8
Squamarina cartilaginea	*Cercidospora crozalsiana*	14
Tephromela atra	*Taeniolella atricerebrina*	9, 20
Thelotrema lepadinum	*Skyttea nitschkei*	17
Usnea articulata	*Biatoropsis usnearum*	1
Xanthoria parietina	*Telogalla olivieri*	10
sterile crustose lichen	*Paranectria oropensis*	6

Geographic Index:

BIOGEOGRAPHIC UNITS*

Country (or Archipelago) — **Lichenicolous taxon** — **Exs. no.**

1. EUROPE

Austria

Arthonia digitatae 11
Carbonea herteliana 12
Endococcus macrosporus 3
Illosporiopsis christiansenii 15
Lichenochora obscuroides 4
Lichenoconium lecanorae 16
Nigropuncta rugulosa 5
Paranectria oropensis 6
Phacopsis vulpina 7
Skyttea nitschkei 17
Sphaerellothecium minutum 8
Stigmidium congestum 18
Stigmidium pumilum 19
Taeniolella atricerebrina 9, 20
Telogalla olivieri 10

Italy

Carbonea intrudens 13

Spain (see also Africa, Canary Islands)

Cercidospora crozalsiana 14

2. AFRICA

Canary Islands

Biatoropsis usnearum 1
Catillaria mediterranea 2

3. ASIA TEMPERATE

4. ASIA TROPICAL

5. AUSTRALASIA

6. PACIFIC

7. NORTHERN AMERICA

8. SOUTHERN AMERICA

9. ANTARCTIC

* The nomenclature of the biogeographic units follows BRUMMITT, R.K. 2001: World Geographical Scheme for Recording Plant Distributions. Edition 2. - Pittsburg: Hunt Institute for Botanical Documentation Carnegie Mellon University.

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ISSN 1024-0306