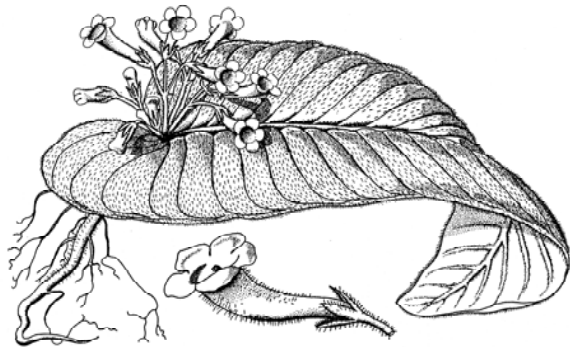


FRITSCHIANA

49



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

Walter OBERMAYER

Lichenotheca Graecensis, Fasc. 14 (Nos 260–280)

Dupla Graecensia Lichenum (2004)

Josef HAFELLNER

Notes on *Scoliciosporum intrusum*

Graz, 31. Dezember 2004

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 Exsiccataerwerke 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 sowie das Samentauschverzeichnis des Botanischen Gartens ausgeweitet. Die Schedae-Hefte des von Prof. Dr. Josef POELT begründeten, inzwischen abgeschlossenen Exsiccataerwerkes *Plantae Graecenses* sind die Vorläufer dieser Schriftenreihe.

Gesamtredaktion:

Dr. Christian SCHEUER, Mag. Dr. Walter OBERMAYER
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FRITSCHIANA

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

49

Walter OBERMAYER

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Lichenotheca Graecensis, Fasc. 14 (Nos 261–280)

Walter OBERMAYER*

OBERMAYER W. 2004: Lichenotheca Graecensis, Fasc. 14 (Nos 261–280). - Fritschiana (Graz) 49: 1–7. - ISSN 1024-0306.

Abstract: Fascicle 14 of Lichenotheca Graecensis comprises 20 collections of lichens from the following countries (and administrative subdivisions): Argentina (Misiones), Austria (Salzburg; Styria; Upper Austria), Germany (Bavaria; Saxony-Anhalt), Greece (Macedonia), Italy (Calabria), Russia (Komi Republik), Spain (Canary Islands), and Uruguay (Maldonado). TLC-analyses were carried out for *Cetrelia monachorum*, *Lecanora thysanophora*, and *Lepraria eburnea*.

*Walter OBERMAYER, 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 series '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://www.huh.harvard.edu/databases/cms/botanist_index.html. Names of countries and states (or provinces or principal subdivisions) are based upon a list from <http://www.ars-grin.gov/cgi-bin/npgs/html/geolist.pl>. A text version of Lichenotheca Graecensis can be found under <http://www-ang.kfunigraz.ac.at/~oberma/li-grz1.htm>. Label texts originally drafted in a local language have been translated into English by the author.

I wish to thank all persons who have made their lichen material available, particularly Franz Berger, Josef Hafellner, Helmut Mayrhofer, Hector S. Osorio, Regine Stordeur, Roman Türk, and Mikhail Zhurbenko. Peter Kosnik kindly assisted with TLC investigations. Thanks are also due to Brian Coppins and Teuvo Ahti for the revision of previously distributed specimens.

OBERMAYER W. 2004: **Lichenotheca Graecensis**, Fasc. 14 (Nos 261–280). - Fritschiana 49: 1–7. Distributed by the *Institut für Pflanzenwissenschaften, Karl-Franzens-Universität, Graz (GZU)*

261. *Acarospora peliscypha* Th.Fr.

GERMANY, Sachsen-Anhalt (=Saxony-Anhalt), Zirkelschachthalde N of Eisleben, S of Thondorf, MTB 4435/1, on copper schist.

12.XI.2003

leg. R. Stordeur (s.n.) & M. Beckmann, det. R. Stordeur

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262. *Acrocordia gemmata* (Ach.) A.Massal.

AUSTRIA, Salzburg, Flachgau, 8.7 km E of Seekirchen, Henndorfer Wald, 4 km E of Henndorf am Wallersee, valley of the brook Aubach, E of the inn Kienberg, 47°54'23"N / 013°14'45"E, MTB 8045/3, 630 m alt., on bark of old *Fraxinus excelsior* (80 cm in diam.).

1.V.2004

leg. & det. R. Türk (34601)

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

GERMANY, Bayern (=Bavaria), Allgäu, 11 km ENE of Füssen, Ammergauer Alpen (Ammergebirge), 3.3 km SE of Buching, 1 km S of the confluence of the rivulets Halblech and Lobentalbach, 47°35'50"N / 10°50'30"E, 950-1000 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus*, *Picea abies*, and *Fagus sylvatica*, on bark of *Abies alba*.

6.IX.2004

leg. & det. W. Obermayer (10472)

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264. *Aspicilia fruticulosa* (Eversm.) Flagey

GREECE, Macedonia, Pieria, Óros Ólimbos (Mt Olympos), between refuge "S.E.O." and refuge "C", E of Mt Stefani, 40°05'N / 22°21'E, 2670 m alt., meadows with calcareous pebbles, on the ground (vagrant).

Note: Specimen in GZU with apothecia.

19.IX.1989

leg. & det. H. Mayrhofer (15811)

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265. *Bacidina arnoldiana* (Körb.) V. Wirth & Vězda

AUSTRIA, Steiermark (=Styria), Steirisches Randgebirge, Fischbacher Alpen, S-facing slopes of Rennfeld massif, 'Am Eibegg' N of St. Jakob-Breitenau, entrance to the vale which heads for the grange Knoll, 47°24'35"N / 15°26'20"E, MTB 8558/4, 700 m alt., remnants of a ravine forest close to the brook at the base of a W-facing slope (with rocky outcrops), on bark of *Fraxinus excelsior*.

17.XI.2002 leg. J. Hafellner (59329) & M. Zhurbenko, det. J. Hafellner

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266. *Buellia megapotamica* Malme

[Syn.: *Fluctua megapotamica* (Malme) Marbach

URUGUAY, Maldonado, Rio de la Plata, 19 km SSW of San Carlos, south side of Isla Gorriti, 34°57'S / 54°58'W, 0-10 m alt., on cone scales of *Pinus*.

18.III.1984 leg. & det. H.S. Osorio (8362)

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267. *Caloplaca pyracea* (Ach.) Th.Fr.

AUSTRIA, Steiermark (=Styria), Sausal, surrounding area of Waldschach, eastern shore of a fishpond, S below the castle 'Schloß Waldschach', 46°49'10"N / 15°25'05"E, MTB 9158/4, 305 m alt., grove strip between the pond and the road, on *Populus* cult. (canopy branches).

20.VII.2003 leg. & det. J. Hafellner (60836)

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

AUSTRIA, Oberösterreich (=Upper Austria), Totes Gebirge, 23 km SSE of Gmunden, at the south shore of the lake Almsee, E of the hut Seehaus, 47°44'35"N / 013°57'26"E, MTB 8249/4, 590 m alt., on bark of *Salix* spec.

Note: TLC: Imbricatic acid (maj.), perlatic acid (min./tr.), atranorin (maj./min./tr.-). Many of the issued specimens have well developed apothecia. Sterile lobes show a brownish lower surface, that of fertile ones is totally white.

27.IV.2004 leg. R. Türk (34594), det. W. Obermayer

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269. *Chaenotheca brunneola* (Ach.) Müll.Arg.

ITALY, Calabria, Reggio di Calabria, Aspromonte, Montalto, 38°10'N/15°55'E, 1870 m alt., on lignum of *Abies alba*.

20.VIII.1989 leg. & det. D. Puntillo (s.n.1)

OBERMAYER W. 2004: *Lichenotheca Graecensis*, Fasc. 14 (Nos 261–280). - Fritschiana 49: 1–7.
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270. *Dimerella pineti* (Schrad. ex Ach.) Vězda

AUSTRIA, Steiermark (=Styria), Sausal, surrounding area of Waldschach, 0.6 km SSE of the castle 'Schloß Waldschach', 46°49'05"N / 15°25'10"E, MTB 9158/4, 320 m alt., mixed forest, on base region of *Picea abies*.

20.VII.2003 leg. & det. J. Hafellner (60777)

OBERMAYER W. 2004: *Lichenotheca Graecensis*, Fasc. 14 (Nos 261–280). - Fritschiana 49: 1–7.
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271. *Lasallia pustulata* (L.) Mérat

AUSTRIA, Steiermark (=Styria), Steirisches Randgebirge, Stubalpe, 6 km SW of Köflach, Teigtschgraben 1.2 km W of Edelschrott, 47°01'15"N / 15°02'10"E, MTB 8956/3, 800 m alt., on S-exposed steep rocks above the rivulet Teigtsch.

19.IX.2003 leg. & det. H. Mayrhofer (14587) & M. Lambauer

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272. *Lecanactis abietina* (Ach.) Körb.

GERMANY, Bayern (=Bavaria), Allgäu, 11 km ENE of Füssen, Ammergauer Alpen (Ammergebirge), 3.3 km SE of Buching, 1 km S of the confluence of the rivulets Halblech and Lobentalbach, 47°35'50"N / 10°50'30"E, 950-1000 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus*, *Picea abies*, and *Fagus sylvatica*, on bark of *Abies alba*.

6.IX.2004 leg. & det. W. Obermayer (10470)

OBERMAYER W. 2004: *Lichenotheca Graecensis*, Fasc. 14 (Nos 261–280). - Fritschiana 49: 1–7.
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273. *Lecanora thysanophora* R.C.Harris

AUSTRIA, Oberösterreich (=Upper Austria), Totes Gebirge, 23 km SSE of Gmunden, at the south shore of the lake Almsee, E of the hut Seehaus, 47°44'35"N / 013°57'26"E, MTB 8249/4, 590 m alt., on bark of dead *Alnus incana*.

Note: TLC: Atranorin, usnic acid, [no zeorin! - untypical for *L. thysanophora*], triterpenoids, fatty acids.

27.IV.2004

leg. R. Türk (34596), det. W. Obermayer

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274. *Lepraria eburnea* J.R.Laundon s.l. chemotype I

AUSTRIA, Steiermark (=Styria), Steirisches Randgebirge, Koralpe, 8.8 km W of Deutschlandsberg, 2 km E of Parfußwirt, 46°49'40"N/15°06'00"E, MTB 9156/4, 1000 m alt., shadowed brookside in a *Picea abies* forest, on bark of *Acer pseudoplatanus*.

Note: TLC: Aleoctorialic acid (maj.), barbatolic acid (min.) protocetraric acid (min.), 'pinkish unknown 1' (5/2-3/(4-)5, major or traces), 'pinkish unknown 2' (5-6/3/5, major or traces). The pinkish unknowns are dark-violet under UV366, and (especially unknown 1) strongly pinkish in daylight after treatment with sulphuric acid..

14.VIII.2002

leg. & det. W. Obermayer (09335)

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275. *Normandina pulchella* (Borrer) Nyl.

GERMANY, Bayern (=Bavaria), Nordalpen, Ammergauer Alpen (Ammergebirge), Tegelberg, path from Tegelberghaus via Tegelbergkopf to Marienbrücke, 47°33'35"N / 010°46'05'-20"E, 1500-1600 m alt., calcareous outcrops in forest with *Picea abies*, on bark of *Acer pseudoplatanus*.

4.IX.2004

leg. & det. W. Obermayer (10479)

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

RUSSIA, Komi Republic, Northern Ural, Pechora-Ilych state reserve, upper stream of Pechora River, 165 km ESE of Troitsko-Pechorsk, Yanyupuner Range, between mountains "981" and "894", 62°06'N / 59°07'E, 700 m alt., rocks among low-alpine heath, on rock walls (locally abundant).

3.VII.1997

leg. & det. M. Zhurbenko (97141)

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277. *Polychidium muscicola* (Sw.) Gray

SPAIN, Islas Canarias, Gran Canaria, rocky ridge W above the hydroelectric dam Presa de los Hornos, 3 km above Ayacata, 15°36'W / 27°58'N, 1560 m alt., volcanite outcrop, on bryophytes above rocks (N-exposed).

19.II.1994

leg. & det. J. Hafellner (61039)

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278. *Ramalina capitata* (Ach.) Nyl. s.lat.

AUSTRIA, Oberösterreich (=Upper Austria), 14.5 km E of Schärding, 2.4 km W of Kopfing, Leithen 8, 48°26'18"N / 13°37'35"E, MTB 7547, 410 m alt., on ridging tiles of a removed barn shed for hay.

1.IX.2004

leg. F. Berger (19350), det. W. Obermayer

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279. *Ramalina celastri* (Spreng.) Krog & Swinscow

ARGENTINIA, Misiones, SE of Ciudad del Este, Iguazú (Extremo E), 25°34'S / 54°34'W, 310 m alt., on branches of trees.

5.IV.1950

leg. J.E. Montes (10113E; ex herb. Osorio no. 4281),
det. H. Kashiwadani (1990)

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280. *Thelotrema lepadinum* (Ach.) Ach.

GERMANY, Bayern (=Bavaria), Ammergauer Alpen (Ammergebirge), 15 km ESE of Füssen, uppermost valley of the rivulet Linder, Neualmgrieß, 47°32'20"N / 010°54'00"E, 1050-1100 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus*, *Fagus sylvatica* and *Picea abies*, on *Acer pseudoplatanus*.

5.IX.2004

leg. & det. W. Obermayer (10466)

Corrections

OBERMAYER W. 2003: *Lichenotheca Graecensis* Fasc. 12 & 13 (Nos 221-260). - Fritschiana 43: 1-12.
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231. Cladonia macroceras (Delise) Hav. [originally distributed as *Cladonia gracilis* (L.) Willd.]

AUSTRIA, Steiermark (=Styria), Seetaler Alpen, 10 km WNW of Obdach, road from Schmelz to Winterleitenhütte, 47°05'45"N / 14°34'40"E, MTB 8953/1, 1680 m alt., slopes of a forest road in a high montane *Picea-abies/Pinus-cembra* forest, on ground.

Note: TLC: Fumarprotocetraric acid, protocetraric acid.

28.V.2003

leg. & det. W. Obermayer (10183)
rev. Teuvo Ahti (February 2004)

OBERMAYER W. 2003: *Lichenotheca Graecensis* Fasc. 12 & 13 (Nos 221-260). - Fritschiana 43: 1-12.
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243. Leptogium gelatinosum (With.) J.R.Laundon [originally distributed as *Leptogium lichenoides* (L.) Zahlbr.]

GERMANY, Bayern (=Bavaria), Randersacker SE of Würzburg, Kartoffelstein, 49°45'00"N / 9°59'35"E, MTB 6225, 306 m alt., on bryophytes (over limestone; shadowed by a tree).

Note: Richly fruiting material.

2.XI.2002

leg. R. Türk (32892-2), O.L. & R. Lange & D. Zimmermann
det. R. Türk (conf. A. Guttova)
rev. Brian Coppins (November 2003)

Dupla Graecensia Lichenum (2004)

Walter OBERMAYER*

OBERMAYER W. 2004: Dupla Graecensia Lichenum (2004). - Fritschiana (Graz) 49: 9–27. – ISSN 1024-0306.

Abstract: Dupla Graecensia Lichenum (2004) comprises 70 collections of lichen duplicates (including the lichenicolous fungus *Plectocarpon lichenum*) from Argentina (Neuquen), Australia (Victoria), Austria (Styria; Tirol; Upper Austria), China (Tibet, prov. Xizang; prov. Sichuan), Costa Rica (Puntarenas), Germany (Bavaria), Greece (Aegean Islands), Italy (Trentino-Alto Adige), New Zealand (South Islands), Russia (Eastern Siberia), Slovenia (Notranjsko Kraška), and Uruguay (Canelones; Montevideo; Rocha; Treinta y Tres). TLC-investigations were carried out for 24 lichenized taxa. Paratypes of *Amandinea deminuta* Hafellner are distributed. *Caloplaca flavorubescens* is issued as part of the results of the 'Sino-Austrian Joint Expedition to the SE-Tibetan Fringe Mountains (=Hengduan Shan), Sichuan Province, China (July/August 2000)'. *Allocetraria flavonigrescens* is presented as part of the results of the 'Sino-German Joint Expedition to Southeastern and Eastern Tibet 1994'.

*Walter OBERMAYER, 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 dwarf-exsiccata 'Dupla Graecensia Lichenum (2004)' are 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 species 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 principal subdivisions) can be found under <http://www.ars-grin.gov/cgi-bin/npgs/html/geolist.pl>. Dupla Graecensia Lichenum is published as text version under <http://www-ang.kfunigraz.ac.at/~oberma/dupl-graec.htm>. Label texts originally drafted in a local language have been translated into English by the author.

I wish to thank all the collectors and keepers of private herbaria for their contributions, in particular Josef Hafellner, Michaela Lambauer, Helmut Mayrhofer, Héctor S. Osorio, and Mikhail Zhurbenko. Thanks are also due to several colleagues, who helped with determinations (P. Clerc, J.E. Elix, J. Hafellner, H. Kashiwadani, M. Kukwa, H. Mayrhofer, and T. Randlane). Peter Kosnik kindly assisted with TLC-analyses. Field works in Tibet (1994 and 2000) were supported by the 'Austrian Science Fund' (project numbers P09663-BIO and P13676-BIO).

OBERMAYER W. 2004: **Dupla Graecensia Lichenum** (2004). - Fritschiana 49: 9–27
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331. *Alectoria ochroleuca* Nyl.

AUSTRIA, Steiermark (=Styria), Seetaler Alpen, 10.5 km W of Obdach, path from Großer Winterleitensee via Ochsenboden to Kreiskogel, 47°05'05"N / 14°33'35"E, MTB 8953/1, 1970 m alt., alpine meadows with boulders, on the ground. – 16.V.2002, leg. & det. W. Obermayer (10184).

Note: TLC: Usnic acid (maj.), diffractaic acid (maj.).

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332. *Allocetraria flavonigrescens* A.Thell & Randlane

CHINA, Tibet, prov. Xizang, 120 km SSW of Quamdo (=Changtu), 10 km S of Bamda, 30°09'N / 97°17'E, 4500 - 4600 m alt., *Rhododendron* shrubs, on bark of *Rhododendron* and soil. – 5.VII.1994, leg. W. Obermayer (03870a), det. T. Randlane (1999).

Note: All specimens with fruiting bodies.

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333. *Allocetraria stracheyi* (Bab.) Kurok. & M.J. Lai

CHINA, SW Tibet, prov. Xizang, West Himalaya, Upper Karnali, Burang, 30°08'N / 81°20'E, 4680 m alt., 15 NNE, upper slope on moraine, upper limit of *Kobresia nepalensis* (Veg.Rec.No. 1004), on ground. – 31.VIII.1993, leg. G. & S. Miehe (9621/04-1), det. T. Randlane (2001).

Note: TLC (all specimens tested): Usnic acid, fatty acids (allo-protolichesterinic acid, lichesterinic acid).

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334. *Amandinea deminuta* Hafellner

- paratype - [on *Caloplaca felipponei* Zahlbr. - toptype-material]

URUGUAY, Rio de la Plata, Isla de Flores, northern shore of the island next to the pier, 34°56'S / 55°55'W, hygrohaline zone, on rocks. – 31.X.2000, leg. H.S. Osorio (9404), det. J. Hafellner.

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335. *Anzina carneonivea* (Anzi) Scheid.

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Schladminger Tauern, WSW of Schladming, footpath from Gasselhöhehütte to the lake Mittersee, 47°21'25"N / 13°35'45"E, MTB 8647/2, 1760 m alt., mixed forest with *Picea abies*, *Larix decidua* and *Pinus cembra*, on stumps. – 24.VIII.2001, leg. & det. J. Hafellner (56758).

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336. *Arthonia cinnabarina* (DC.) Wallr. agg.

COSTA RICA, Puntarenas, close to the pacific coast, Carara Biological Reservation S of the Río Táreoles, just in front of the park entrance, 84°35'W / 09°47'N, 100 m alt., abandoned trees, on bark of *Cecropia* spec. – 18.VIII.1991, leg. & det. M. Grube (s.n.2).

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337. *Arthrorhaphis citrinella* (Ach.) Poelt

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Seckauer Tauern, Rosenkogel N of Pöls, path from Sommertörl to Loretokapelle, 47°17'25"N / 14°33'10"E, MTB 8753/1, 1680 m alt., subalpine *Picea abies* forest, on soil (slopes of a forestry road). – 14.IX.2002, leg. & det. J. Hafellner (59116).

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338. *Buellia griseovirens* (Turner & Borrer ex Sm.) Almb.

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Schladminger Tauern, Obertal S of Schladming, valley of Giglachbach, on the path to Lackneralm, 47°18'50"N / 13°41'10"E, MTB 8648/3, 1100 m alt., *Picea abies* forest with *Alnus incana* (wet bottom of a slope), on bark of *Alnus incana*. – 25.VIII.2001, leg. & det. J. Hafellner (56815).

Note: All specimens with apothecia.

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339. *Calicium viride* Pers.

AUSTRIA, Steiermark (=Styria), Steirisches Randgebirge, Gleinalpe, Hochalpe SE of Leoben, path to the summit, S of Trasattel, 47°20'50"N / 15°12'35"E, MTB 8657/3, 1360 m alt., montane forest with *Picea abies*, on wood of a snag. – 12.VIII.2001, leg. & det. J. Hafellner (56241).

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340. *Caloplaca arnoldii* (Wedd.) Zahlbr. ex Ginzb.

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Wölzer Tauern, N-facing base of Rettlkirchspitz NW of Oberwölz, 1 km W of Neunkirchner Hütte, 47°16'15"N / 14°08'00"E, MTB 8750/2, 1720 m alt., subalpine pastures with marble outcrops, on steep faces of marble. – 24.VIII.2002, leg. J. Hafellner (60712) & J. Miadlikowska, det. J. Hafellner.

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341. *Caloplaca flavorubescens* (Huds.) Laundon

CHINA, Sichuan Province, SE-Tibetan fringe mountains (=Hengduan Shan), 60 km WSW of Ya'an, road from Tianquan to the Erlang Shan-tunnel, W of Xing Gou, 29°54'06"N / 102°22'23"E, 1530 m alt., on bark of *Paulownia*. – 26.VII.2000, leg. & det. W. Obermayer (07970).

Note: All characters agree well with those of European material: Thallus continuous, smooth, yellowish to grey-white, orange apothecia with an exciple reaching 55 µm thickness at the base, lower part of the hymenium and hypothecium filled with oil droplets, asci containing eight two-celled spores, 13-16 x 8-9 µm, septum 5-7 µm wide. The specimens are partly intermixed with another, blastidiate, orange *Caloplaca* species. The specimen in GZU additionally contains *Caloplaca triloculans*.

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

AUSTRIA, Steiermark (=Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, about 6.7 km E of Hieflau, Schwabeltal, close to the confluence of the brook Schwabelbach with a tributary brook, at the W-facing foot of the mountain Mitterkogel, 47°36'40"N / 14°50'20"E, MTB 8355/3, 730 m alt., mixed forest above limestone boulders, on bark of *Acer pseudoplatanus*. – 16.VIII.2004, leg. & det. W. Obermayer (10410a).

Note: TLC (all specimens tested twice on different areas): Perlatolic acid (maj.), imbricatic acid (tr.), atranorin (major to traces or even not detected), 4-O-methylolivetic acid (min.), anziaic acid (tr.); *Cetrelia monachorum* (imbricatic acid as major substance) has been separated but may still be present as admixture.

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343. *Chaenothecopsis debilis* (Turner & Borrer ex Sm.) Tibell

AUSTRIA, Tirol, Ammergauer Alpen (Ammergebirge), 8.5 km E of Reutte, path from Plansee ("Am Plansee") along the Altenbergweg to Kuhklause, WSW-facing foot of Altenbergkopf, 47°30'00"N / 010°49'15"E, MTB 8530/2, 1150 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus* and *Picea abies*, on wood of dead *Acer pseudoplatanus* (light exposed, overhanging surfaces). – 5.IX.2004, leg. & det. W. Obermayer (10478).

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344. *Chrysothrix candelaris* (L.) J.R.Laundon [chemical race with pinastric acid]

GERMANY, Bayern (=Bavaria), Ammergauer Alpen (Ammergebirge), 15 km ESE of Füssen, uppermost valley of the rivulet Linder, Neualmgrieß, 47°32'20"N / 010°54'00"E, 1050-1100 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus*, *Fagus sylvatica*, and *Picea abies*, on bark of *Picea abies*. – 5.IX.2004, leg. & det. W. Obermayer (10473).

Note: TLC: Pinastric acid (maj.), unknown 4-5/2/4 (min./tr.); all specimens tested twice.

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345. *Chrysothrix candelaris* (L.) J.R.Laundon [chemical race with pinastric acid]

GERMANY, Bayern (=Bavaria), Ammergauer Alpen (Ammergebirge), 15 km ESE of Füssen, uppermost valley of the rivulet Linder, Neualmgrieß, 47°32'20"N / 010°54'00"E, 1050-1100 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus*, and *Fagus sylvatica*, on bark of a snag of *Abies alba*. – 5.IX.2004, leg. & det. W. Obermayer (10481).

Note: TLC: Pinastric acid (maj.); *Chaenotheca trichialis* and *C. chrysocephala* can be intermixed.

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346. *Cladonia crispatula* (Nyl.) Ahti

URUGUAY, Rocha, 59 km NE of Rocha, 6 km N of Palmar de Castillos, Cerro de los Rochas, 34°09'S / 53°51'W, 80 m alt., N-facing slope of a hill, on soil. – 25.IV.2003, leg. H.S. Osorio (9659) & G. Geymonat, det. H.S. Osorio.

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347. *Cladonia macilenta* Hoffm. s.l.

[sorediate chemotype with barbatic acid = *Cladonia bacillaris*]

AUSTRIA, Steiermark (=Styria), Eisenerzer Alpen, S-exposed base of Zeiritzkampel, N of Kalwang, just NE of the hunting lodge Don, path to Achner Alm, 47°28'N / 14°45'E, MTB 8554/1, 1250 m alt., stands of *Alnus incana* near a brook, on decayed wood. – 11.V.1997, leg. J. Miadlikowska & J. Hafellner (40599), det. J. Hafellner.

Note: TLC: Barbatic acid (maj.), rhodocladonic acid (in apothecia).

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348. *Cladonia norvegica* Toensberg & Holien

GERMANY, Bayern (=Bavaria), Allgäu, 11 km ENE of Füssen, Ammergauer Alpen (Ammergebirge), 3.3 km SE of Buching, 1 km S of the confluence of the rivulets Halblech and Lobentalbach, 47°35'50"N / 10°50'30"E, 950-1000 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus*, *Picea abies*, and *Fagus sylvatica*, on strongly decayed wood (vertical faces). – 6.IX.2004, leg. & det. W. Obermayer (10474).

Note: TLC: Barbatic acid (maj.), 4-O-demethylbarbatic acid (min.), rhodocladonic acid (min.); red pigmented areas (caused by mite? infestation) on squamules and podetia are very well developed.

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349. *Cladonia substellata* Vain.

URUGUAY, Rocha, Highway 16, Sierra la Blaqueada, Estancia La Blaqueada, 33° 59'S / 53°40'W, 100-150 m alt., on the ground among rocks in a meadow (locally abundant). – 10.VI.1989, leg. & det. H.S. Osorio (9006) conf. T. Ahti (1989).

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

AUSTRIA, Steiermark (=Styria), Steirisches Randgebirge, Stubalpe, 17.5 km W of Köflach, 2 km SW of Salzstiegelhaus (Hirscheeggensattel), near the cross on the lower peak 0.5 km SE of the mountain Speikkogel, 47°03'20-25"N / 14°51'05-10"E, MTB 8955/1, 1940-1960 m alt., alpine meadows with amphibolitic (and gneissic) boulders, on ground. – 24.X.2004, leg. & det. W. Obermayer (10502).

Note: TLC (all samples tested): Usnic acid, [no squamatic acid], fatty acid 4(-5)/5(-6)/5(-6) running heights like those of nephrosteranic acid.

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351. *Dibaeis baemyces* (L.fil.) Rambold & Hertel

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Seckauer Tauern, Speikbichl N of Knittelfed, S-facing slopes towards Feistrizgraben, above Schwaigerhütte, 47°20' 55"N / 14°49'05"E, MTB 8654/4, 1540 m alt., forest road in a wood with *Picea abies* and *Larix decidua*, on soil. – 22.VI.2000, leg. J. Hafellner (51743) & A. Hafellner, det. J. Hafellner.

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352. *Dimealena oreina* (Ach.) Norman

[chemotype I]

AUSTRIA, Tirol, Osttirol, 32 km NW of Lienz, Defereggental, Lasörling Gruppe, 2.3 km E of St. Jakob, Äußere Tögisch, 46°55'09"N / 12°21'39"E, 1600 m alt., S-exposed rocks in steep meadow, on gneiss. – 11.VIII.2004, leg. & det. H. Mayrhofer (15814).

Note: TLC (Kosnik & Mayrhofer): Fumarprotocetraric acid (maj.), protocetraric acid (tr.), usnic acid (maj.).

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354. *Dimelaena oreina* (Ach.) Norman chemotype Va

AUSTRIA, Steiermark (=Styria), Seetaler Alpen, Zirbitzkogel, SW of Moaralm above Tonnerhütte, 47°03'12"N / 14°33'E, MTB 8953/1, 1780 m alt., siliceous outcrops, on shadowed, S-exposed, steep rocks. – 13.VIII.2002, leg. & det. H. Mayrhofer (15299).

Note: TLC: Usnic acid (maj.), stictic acid (maj.), norstictic acid (tr.), menegazziac acid (tr.), cryptostictic acid (tr.), constictic acid (tr.).

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353. *Dimelaena oreina* (Ach.) Norman [chemotype IV]

AUSTRIA, Tirol, Osttirol, 31 km WNW of Lienz, Defereggental, Deferegger Alpe, 2.3 km E of St. Jakob, Mooser Alm, NW of Ochsenlacke, 46°53'33"N / 12°22'09"E, 2360 m alt., W-exposed steep rocks, on gneiss. – 10.VIII.2004, leg. & det. H. Mayrhofer (15812).

Note: TLC (Kosnik & Mayrhofer): Usnic acid (maj.), gyrophoric acid (maj.), fumarprotocetraric acid (maj.), protocetraric acid (tr.); results confirmed for all specimens by applying the 'single-areole-method'.

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355. *Diploschistes scruposus* (Schreb.) Norm.

AUSTRALIA, Victoria, Bogong High Plains, Mt Cope, 36°56'S / 147°17'E, 1800-1837 m alt., on granite. – 25.II.1985, leg. H. Mayrhofer (15361), H. Hertel & R. Filson, det. H.T. Lumbsch (2003).

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356. *Diplotomma lutosum* A.Massal.

AUSTRIA, Steiermark (=Styria), Steirisches Randgebirge, Fischbacher Alpen, Ebenschlag NE of St. Jakob bei Mixnitz, ridge area SE of the cross on the summit, 47°25'00"N / 15°29'30"E, MTB 8558/4, 1520 m alt., pasture with small calcareous outcrops, on limestone (S-exposed faces and near the ground). – 29.IX.1999, leg. & det. J. Hafellner (59628).

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

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Schladminger Tauern, Untertal SE of Schladming, lowermost N-exposed slopes of Mandlspitze, southern shore of Riesachsee, 47°19'45"N / 13°46'35"E, MTB 8648/4, 1340 m alt., mossy boulder field with *Larix decidua* and *Pinus mugo*, on bryophytes covering the boulders. – 28.VIII.2001, leg. & det. J. Hafellner (56577).

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358. *Hypocenomyce leucococca* R.Sant.

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Schladminger Tauern, Obertal S of Schladming, valley of Giglachbach, on the path to Lackneralm, 47°18'50"N / 13°41'10"E, MTB 8648/3, 1100 m alt., *Picea abies* forest with *Alnus incana* (wet bottom of a slope), on bark of *Alnus incana*. – 25.VIII.2001, leg. & det. J. Hafellner (56814).

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359. *Hypotrachyna dactylifera* (Vain.) Hale

URUGUAY, Canelones, ENE of Montevideo, Parque Nacional "F.D. Roosevelt", 34°51'S / 56°02'W, 10 m alt., plantation with *Eucalyptus* and *Pinus*, on a trunk of *Pinus*. – 3.III.2002, leg. & det. H.S. Osorio (9518).

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360. *Imshaugia aleurites* (Ach.) S.L.F.Meyer

GERMANY, Bayern (=Bavaria), Nordalpen, Ammergauer Alpen (Ammergebirge), Tegelberg, path from Tegelberghaus via Tegelbergkopf to Marienbrücke, 47°33'35"N / 010°46'05'-20"E, 1500-1600 m alt., calcareous outcrops in forest with *Picea abies*, on bark of dead *Picea abies*. – 4.IX.2004, leg. & det. W. Obermayer (10471).

Note: TLC: Thamnic acid.

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361. *Lasallia pustulata* (L.) Mérat

AUSTRIA, Tirol, Osttirol, 32 km NW of Lienz, Defereggental, Lasörling Gruppe, 2.3 km E of St. Jakob, Äußere Tölgisch, 46°55'09"N / 12°21'39"E, 1600 m alt., S-exposed rocks in a steep meadow, on gneiss. – 11.VIII.2004, leg. & det. H. Mayrhofer (15810).

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362. *Lecanora intumescens* (Rebent.) Rabenh.

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Triebener Tauern, Vordertriebental SSE of Trieben, 1 km SE of the tavern Brodjäger, N-facing base of Tierkogel, 47°26'30"N / 14°31'25"E, MTB 8553/3, 1050 m alt., waterside grove, on bark of *Alnus incana*. – 26.VIII.2002, leg. J. Hafellner (58970) & J. Miadlikowska, det. J. Hafellner.

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363. *Lecanora subrugosa* Nyl.

AUSTRIA, Steiermark (=Styria), Sausal, 5 km W of Leibnitz, SE-facing base of Demmerkogel, NW of Heimschuh, lower part of Stumpfgraben, 46°46'15"N / 15°28'45"E, MTB 9258/2, 300 m alt., mixed forest, on bark of *Fraxinus excelsior*. – 25.III.2000, leg. & det. J. Hafellner (51103).

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364. *Lecanora thysanophora* R.C.Harris

AUSTRIA, Tirol, Ammergauer Alpen (Ammergebirge), 8.5 km E of Reutte, path from Plansee ("Am Plansee") along the Altenbergweg to Kuhklause, 47°29'35'-50"N / 010°49'35'-55"E, MTB 8530/2, 1050-1130 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus* and *Picea abies*, on bark of *Fagus sylvatica* (1.5-2 m stem height). – 5.IX.2004, leg. & det. W. Obermayer (10469).

Note: TLC: Atranorin, usnic acid, zeorin.

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365. *Lepraria lobificans* Nyl.

AUSTRIA, Steiermark (=Styria), Oststeirisches Riedelland, 8.7 km E of the centre of Graz, 2.2 km WNW of Laßnitzhöhe, Äußere Ragnitz, 47°04'42"N / 15°32'21"E, MTB 8959/1, 440 m alt., mixed forest (*Fagus-Acer-Pinus-Picea*) near a brook, on *Fagus sylvatica*. – 19.X.2003, leg. W. Obermayer (10188), det. Martin Kukwa (2002).

Note: TLC (each bark-fragment tested): Atranorin, zeorin, stictic acid, constictic acid.

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366. *Lepraria nivalis* J.R.Laundon [chemotype 6 with atranorin and psoromic acid]

AUSTRIA, Steiermark (=Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, about 5 km ENE of Hieflau, Schwabetal, shortly NE of the confluence of the brooks Schwabelbach and Seebach, surrounding area of the waterfall, 47°37'20"N / 14°48'25"E, MTB 8354/4, 660 m alt., mixed forest with calcareous outcrops as well as deciduous trees along the brook, on limestone rock. – 16.VIII.2004, leg. & det. W. Obermayer (10446).

Note: TLC: Atranorin, psoromic acid, 2'-O-demethylpsoromic acid (tr.).

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367. *Lepraria nivalis* J.R.Laundon [chemotype III with atranorin and fumarprotocetraric acid]

GREECE, East Aegean Islands, Nomos Dodekanisou, Kos Island, Kefalos peninsula, 6 km S of Kefalos, Agios Mammas chapel near S-tip, 36°40.7'N / 26°58.0'E, 200 m alt., *Phrygana* dwarfshrub vegetation with siliceous rock outcrops on hilltop near the coast, on soil of a steep bank. – 23./24.IX.2000, leg. H. Sipman (47127) & Th. Raas, det. H. Sipman.

Note: TLC: Atranorin, fumarprotocetraric acid.

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368. *Leprocaulon microscopicum* (Vill.) Gams

ITALY, Trentino-Alto Adige, prov. Bolzano (=Südtirol), Val Venosta (=Vinschgau), slopes just W above Laudes (=Laatsch), 46°40'40"N / 10°31'45"E, 1000-1050 m alt., steppe-like vegetation in E-exposed slopes with outcrops and steep rugged rocks of siliceous schist, on soil and bryophytes. – 3.IX.2002, leg. & det. W. Obermayer (10483).

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369. *Leproloma vouauxii* (Hue) J.R.Laundon

GERMANY, Bayern (=Bavaria), Nordalpen, Ammergauer Alpen (Ammergebirge), eastern outskirts of Hohenschwangau, N-facing foot of the hill of the castle Neuschwanstein, 47°33'30"N / 010°45'00"E, 820 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus* and *Picea abies*, on bark of *Acer pseudoplatanus*. – 4.IX.2004, leg. & det. W. Obermayer (10480).

Note: TLC: Pannaric-acid-6-methylester (maj.), 4-oxypannaric-acid-2-methylester (min., tr.); further detected substances are obviously from different intermixed Leprarias, e.g. *L. lobificans* (atranorin, stictic acid, zeorin) and *L. eburnea/frigidia* (allectorialic acid).

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370. *Lobarina scrobiculata* (Vain.) Nyl. ex Cromb.

SLOVENIA, Notranjsko-Kraška, Snežnik-Javorniki, SW Kozarišče, 2.5 km W of Babno Polje, SW of Maslovec, 45°39'00"N / 14°30'55"E, MTB 0353/3, 720 m alt., mixed deciduous forest, on bark of *Acer pseudoplatanus*. – 3.X.1997, leg. J. Prügger (SN061.84/1), U. Suppan, H. Mayrhofer & F. Batič, det. J. Prügger.

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371. *Micarea lignaria* (Ach.) Hedl.

AUSTRIA, Tirol, Ammergauer Alpen (Ammergebirge), 8.5 km E of Reutte, path from Plansee ("Am Plansee") along the Altenbergweg to Kuhklause, WSW-facing foot of Altenbergkopf, 47°30'00"N / 010°49'15"E, MTB 8530/2, 1150 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus*, *Fagus sylvatica*, and *Picea abies*, on bark of *Fagus sylvatica*. – 5.IX.2004, leg. & det. W. Obermayer (10467).

Note: The hymenium (but not the epithecium) partly shows small violaceous granules along the paraphyses, which turn to bright blue with KOH; TLC: Argopsin (tr.), no further substances.

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372. *Multiclavula mucida* (Pers.) R.H.Petersen

GERMANY, Bayern (=Bavaria), Ammergauer Alpen (Ammergebirge), 15 km ESE of Füssen, uppermost valley of the rivulet Linder, Neualmgrieß, 47°32'20"N/010°54'00"E, 1050-1100 m alt., mixed forest (*Abies alba*, *Acer pseudoplatanus*, *Fagus sylvatica*, *Picea abies*), on strongly decayed wood. – 5.IX.2004, leg. & det. W. Obermayer (10475).

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373. *Normandina pulchella* (Borrer) Nyl.

AUSTRIA, Steiermark (=Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, about 7.5 km E of Hieflau, lowermost NW-facing slopes of the mountain Kaltmauer, north of the valley Wurmgraben, 47°36'30"N / 14°51'00"E, MTB 8355/3, 850 m alt., mixed forest above limestone boulders, on bark of *Fagus sylvatica*. – 16.VIII.2004, leg. & det. W. Obermayer (10409).

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374. *Parmotrema xanthinum* (Müll.Arg.) Hale

URUGUAY, Rocha, 63 km NE of Rocha City, 14 km N of Palmar de Castillos, route 16, road kilometer 18, 34°05'41"S / 53°51'04"W, 50 m alt., on trunk of *Butia capitata*. – 24.IV.2003, leg. H.S. Osorio (9651) & G. Geymonat, det. J.A. Elix (2004).

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375. *Peltigera collina* (Ach.) Schrad

AUSTRIA, Steiermark (=Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, about 7.5 km E of Hieflau, lowermost NW-facing slopes of the mountain Kaltmauer, north of the valley Wurmgraben, 47°36'30"N / 14°51'00"E, MTB 8355/3, 850 m alt., mixed forest above limestone boulders, on bark of *Acer pseudoplatanus*. – 16.VIII.2004, leg. & det. W. Obermayer (10407).

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376. *Peltigera leucophlebia* (Nyl.) Gyeln.

AUSTRIA, Steiermark (=Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, about 7.5 km E of Hieflau, lowermost NW-facing slopes of the mountain Kaltmauer, north of the valley Wurmgraben, 47°36'30"N / 14°51'00"E, MTB 8355/3, 850 m alt., mixed forest above limestone boulders, on bryophytes above limestone rock. – 16.VIII.2004, leg. & det. W. Obermayer (10408).

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377. *Peltigera praetextata* (Flörke ex Sommerf.) Zopf

AUSTRIA, Steiermark (=Styria), Steirisches Randgebirge, Gleinalpe, Niklasdorfgraben N of the mountain Mugel, at the hunting lodge Karner, 47°22'25"N / 15°11'35"E, MTB 8657/1, 1000 m alt., grove area along the brook, on bryophytes covering a siliceous rock. – 6.X.2001, leg. & det. J. Hafellner (57221).

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378. *Peltula euploca* (Ach.) Poelt

ITALY, Trentino-Alto Adige, prov. Bolzano (=Südtirol), Val Venosta (=Vinschgau), slopes just W above Laudes (=Laatsch), 46°40'40"N / 10°31'45"E, 1000-1050 m alt., steppe-like vegetation in E-exposed slopes with outcrops and steep rugged rocks of siliceous schist, on wet, vertical rock faces. – 3.IX.2002, leg. & det. W. Obermayer (10484).

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379. *Pertusaria glomerata* (Ach.) Schaer.

GERMANY, Bayern (=Bavaria), Ammergebirge, 6.5 km SE of Füssen, SE of Hohen Schwangau, near Bleckenau, 47°32'20"N / 10°46'30"E, 1370 m alt., above the artificial timber line, on bryophytes covering a solitary *Acer pseudoplatanus*. – 28.VIII.1968, leg. A. Schröppel (s.n.2), det. Obermayer (2004).

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

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Schladminger Tauern, WSW of Schladming, footpath from Gasselhöhehütte to the lake Mittersee, 47°21'25"N / 13°35'45"E, MTB 8647/2, 1760 m alt., mixed forest with *Picea abies*, *Larix decidua* and *Pinus cembra*, on wood of a bole. – 24.VIII.2001, leg. & det. J. Hafellner (56762).

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381. Plectocarpon lichenum (Sommerf.) D.Hawksw.
[lichenicolous fungus on *Lobaria pulmonaria*]

AUSTRIA, Steiermark (=Styria), Ennstaler alpen, Tamischbachgraben SW of Großreifling, 47°38'07"N / 14°41'45"E, MTB 8354/3, 710 m alt., mixed forest with *Fagus sylvatica*, *Acer pseudoplatanus* and *Picea abies*, on bark of *Acer pseudoplatanus*. – 30.VI.2004, leg. & det. H. Mayrhofer (15784) & C. Scheuer.

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382. Porpidia contraponenda (Arnold) Knoph & Hertel

GERMANY, Bayern (=Bavaria), Allgäuer Alpen, NE of Sonthofen, Grünten, SW-running ridge shortly S of Grüntenhaus, 47°33'00"N / 10°18'55"E, 1600 m alt., sun-exposed sandstone outcrops in a subalpine forest with *Picea abies*, on sandstone (horizontal faces, 15 cm above the ground). – 7.IX.2004, leg. & det. W. Obermayer (10468).

Note: TLC: Methyl-2'-O-methylmicrophyllinate (maj.), 2'-O-methylmicrophyllinic acid (tr.).

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383. Protousnea fibrillatae Calvelo, Stocker-Wörgötter,
Liberatore & Elix

ARGENTINIA, Neuquen, Lago Nahuel Huapi, Isla Victoria, Puerto Piedras Blancas, 40°56'S / 71°33'W, on *Austrocedrus chilensis*. – VII.1970, leg. & det. J.R. Contreras (s.n.; ex herb. Osorio no 9673).

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384. Pseudocyphellaria aurata (Ach.) Vain.

URUGUAY, Treinta y Tres, Quebrada de los Cuervos, 32°54'S / 54°25'W, Eucalyptus plantation (1 km E of the ravine), on a trunk of *Eucalyptus*. – 10.II.2003, leg. F. Scarabino (s.n.; ex herb. Osorio no 9619), det. H.S. Osorio (2003).

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385. Pycnora praestabilis (Nyl.) Hafellner

AUSTRIA, Steiermark (=Styria), Nördliche Kalkalpen, Hochschwab-Gruppe, along the road from Thörl to Bodenbauer, 2 km NW of Innerzwain, Festlau SW of Karlschütt, 47°34'20"N / 15°08'33"E, MTB 8456/2, 870 m alt., conifer forest with *Picea abies* and *Pinus sylvestris*, on wood of snags. – 9.VI.2004, leg. & det. J. Hafellner (63091).

Note: Richly fruiting material.

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386. Ramalina celastri (Spreng.) Krog & Swinscow

URUGUAY, Montevideo, near Santiago Vásquez, Melilla, 4 km ENE of the bridge of 'Highway Number One' across the Río Santa Lucía, 34°48'S / 56°22'W, 0-10 m alt., marginal forest, on bark of *Acacia caven*. – 5.XII.1982, leg. & det. H.S. Osorio (8132).

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387. Ramalina farinacea (L.) Ach.

[chemical strain with protocetraric acid; all specimens with apothecia]

AUSTRIA, Tirol, Ammergauer Alpen (Ammergebirge), 8.5 km E of Reutte, path from Plansee ("Am Plansee") along the Altenbergweg to Kuhklause, WSW-facing foot of Altenbergkopf, 47°30'00"N / 010°49'15"E, MTB 8530/2, 1150 m alt., mixed forest with *Abies alba*, *Acer pseudoplatanus* and *Picea abies*, on bark of *Acer pseudoplatanus*. – 5.IX.2004, leg. & det. W. Obermayer (10476).

Note: TLC: Protocetraric acid (all specimens tested twice).

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388. Ramalina laevigata Fr.

URUGUAY, Treinta y Tres, Quebrada de los Cuervos, along the Yerbal Chico brook, 32°54'S / 54°25'W, on rocks (occasionally inundated). – 22./28.III.1970, leg. H.S. Osorio (5960), det. H. Kashiwadani (1989).

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389. *Ramalina laevigata* Fr.

URUGUAY, Rocha, Cabo Polonio, Cerro Buena Vista, 34°24'S / 53°46'W, oceanic coast, hygrohaline zone, on rocks. – 16.II.1980, leg. M. Meneghel & F. Achaval (s.n.; ex herb. Osorio no 9617), det. H.S. Osorio (1992).

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390. *Ramalina sprengelii* Krog & Swinscow

URUGUAY, Treinta y Tres, Quebrada de los Cuervos, 32°54'S / 54°25'W, *Eucalyptus* plantation (1 km E of the ravine), on a trunk of *Eucalyptus*. – 10.II.2003, leg. F. Scarabino (s.n.; ex herb. Osorio no 9618), det. H.S. Osorio (2003).

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391. *Rinodina bischoffii* (Hepp) A.Massal.

NEW ZEALAND, South Island, Canterbury, close to Motunau Beach Road near Coringa, 43°01'58"S / 173°01'55"E, 83 m alt., pasture across the river, on low limestone rocks. – 3.XI.2003, leg. M. Lambauer (0137) & C. Meurk, det. M. Lambauer.

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392. *Rinodina oleae* Bagl.

NEW ZEALAND, South Island, Nelson, N End of Boulder Bank, 41°12'13"S / 173°18'23"E, 1-5 m alt., close to the sea, on pebbles. – 19.XI.2003, leg. M. Lambauer (0194) & B. Malcolm, det. M. Lambauer.

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393. *Rinodina oleae* Bagl.

NEW ZEALAND, South Island, Canterbury, Banks Peninsula, Tumbledown Bay, 43°51'16"S / 172°46'17"E, 0-2 m alt., spray zone at the beach, on basaltic rocks (W-exposed). – 4.XI.2003, leg. & det. M. Lambauer (0153).

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

RUSSIA, Eastern Siberia, Yakutiya, Lena River delta, right bank of Olenek channel, 18 km WNW of Krest-Tumsa Cape at the north-western extremity of Primorskii Range, Kurungnaakh-Sise Island, Buor-Khaya urochishche, 72°20'N / 126°18'E, 40 m alt., moist lichen-moss tundra, on bryophytes in continuous lichen-moss mat (locally common). – 1.VIII.1998, leg. M. Zhurbenko (98215b), det. H. Mayrhofer (2004).

Note: TLC (Mayrhofer, Kosnik, Bilovic): Sphaerophorin, variolaric acid.

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

AUSTRIA, Steiermark (=Styria), Niedere Tauern, Schladminger Tauern, Kleinsölktal, Sacherseealm, lowermost slopes of Kesselspitze, 47°19'42"N / 13°53'47"E, MTB 8649, 1090 m alt., on N-exposed, strongly shadowed steep faces of a gneissic rock. – 27.IX.2003, leg. & det. H. Mayrhofer (14588).

Note: TLC: Sphaerophorin (maj.), hypothamnolic acid (maj.), squamatic acid (tr.); the thalli are very well developed, richly branched and show an unusual grey colour.

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OBERMAYER W. 2004: **Dupla Graecensia Lichenum** (2004). - Fritschiana 49: 9–27
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396. *Teloschistes flavicans* (Sw.) Norman

URUGUAY, Treinta y Tres, Quebrada de los Cuervos, 32°54'S / 54°25'W, *Eucalyptus* plantation (1 km E of the ravine), on a trunk of *Eucalyptus*. – 10.II.2003, leg. F. Scarabino (s.n.; ex herb. Osorio no 9620), det. H.S. Osorio (2003).

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OBERMAYER W. 2004: **Dupla Graecensia Lichenum** (2004). - Fritschiana 49: 9–27
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397. *Teloschistes flavicans* (Sw.) Norman

URUGUAY, Rocha, 63 km NE of Rocha City, 14 km N of Palmar de Castillos, route 16, road kilometer 18, 34°05'41"S / 53°51'04"W, 50 m alt., on shrubs (in a palm grove of *Butia capitata*, locally very abundant). – 24.IV.2003, leg. H.S. Osorio (9641) & G. Geymonat, det. H.S. Osorio.

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OBERMAYER W. 2004: **Dupla Graecensia Lichenum** (2004). - Fritschiana 49: 9–27
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398. *Trapelia coarctata* (Sm.) M.Choisy

ITALY, Trentino-Alto Adige, prov. Trento, Passo di Rolle N of San Martino di Castrozza, gentle slopes S of the pass, 46°17'40"N / 11°47'10"E, 2010 m alt., low outcrops of siliceous rocks in subalpine pastures, on stones (near the ground) along a road. – 1.IX.2002, leg. & det. W. Obermayer (10485).

Note: TLC (apothecia): Gyrophoric acid (asci with spores show a C+ red reaction); TLC (thallus): Gyrophoric acid.

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OBERMAYER W. 2004: **Dupla Graecensia Lichenum** (2004). - Fritschiana 49: 9–27
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399. *Usnea ceratina* Ach.

AUSTRIA, Oberösterreich (=Upper Austria), Totes Gebirge, 23 km SSE of Gmunden, at the south shore of the lake Almsee, E of the hut Seehaus, 47°44'36"N / 013°57'32"E, MTB 8249/4, 600 m alt., on *Salix* spec. – 27.IV.2004, leg. & det. R. Türk (34598).

Note: TLC: Diffractaic acid (maj.), usnic acid (min./tr.), barbatolic acid (tr./-).

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

OBERMAYER W. 2004: **Dupla Graecensia Lichenum** (2004). - Fritschiana 49: 9–27
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400. *Usnea intermedia* (A.Massal.) Jatta s.lat.

AUSTRIA, Steiermark (=Styria), Zentralalpen, Gurktaler Alpen, Grebenzen, 2.6 km ESE of St. Lambrecht, Maria Schönanger, 47°03'58"N / 14°20'03"E, MTB 8952/3, 1330 m alt., forest with *Picea abies* and *Larix decidua*, on *Larix decidua*. – 2.VIII.2004, leg. W. Obermayer (10229), det. Ph. Clerc (2004).

Note: TLC: Salacinic acid (maj.), usnic acid (maj./min.). All specimens tested once (including apothecia) and some of them tested twice (with and without apothecia). Samples with apothecia show a higher concentration of usnic acid.

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

Notes on *Scoliciosporum intrusum*

Josef HAFELLNER*

HAFELLNER J. 2004: Notes on *Scoliciosporum intrusum*. – Fritschiana (Graz) 49: 29–41. - ISSN 1024-0306.

Abstract: The lichen species commonly called *Carbonea intrusa* (Th.Fr.) Rambold & Triebel in modern floras, is recognized as belonging to *Scoliciosporum* A.Massal. Information on the species is compiled and the new combination *Scoliciosporum intrusum* (Th.Fr.) Hafellner is introduced. *Carbonea halacsyi* sensu Hafellner & Sancho is not a synonym of *Scoliciosporum intrusum*, but a different species with superficially similar appearance.

Zusammenfassung: Die Flechtenart, die in modernen Florenwerken als *Carbonea intrusa* (Th.Fr.) Rambold & Triebel aufscheint, wird als zu *Scoliciosporum* A.Massal. gehörig erkannt. Informationen über die Art werden zusammengestellt und die neue Kombination *Scoliciosporum intrusum* (Th.Fr.) Hafellner wird vorgeschlagen. *Carbonea halacsyi* sensu Hafellner & Sancho ist kein Synonym von *Scoliciosporum intrusum* sondern eine andere Art mit oberflächlich ähnlichem Aussehen.

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1. Introduction

The lichen genus *Scoliciosporum* A.Massal. was described in the middle of the 19th century, when better light microscopes became available (MASSALONGO 1852). Although accepted by the more critical lichenologists (e.g. Arnold, Th. Fries, Körber), it was more often reduced to the synonymy of *Bacidia* De Not. *Scoliciosporum* was resurrected by VĚZDA (1978), who accepted the genus because of constant differences in exciple texture, peculiarities of the paraphyses, and the shape of ascocata. He compares it with *Micarea* Fr. rather than *Bacidia* and supposes a closer relationship with that genus (VĚZDA 1978: 412). Although this relationship to *Micarea* could not be proven (e.g., HAFELLNER 1984, ANDERSEN & EKMAN 2004), the genus *Scoliciosporum* is now generally accepted.

Usually hyaline, transseptate, elongated ascospores are associated with the genus *Scoliciosporum*. For instance, when VĚZDA (1978) resurrected the genus, he included only phragmosporous taxa with more or less worm- to needle-shaped ascospores, which are mostly +/- coiled in the ascus. In *Scoliciosporum*, such spores are typical for the type species, *S. holomelaenum* (= *S. umbrinum*), and some other species.

In the course of extensive determination work on crustose lichens from Europe, it became evident that the species commonly named *Carbonea intrusa* (Th.Fr.) Rambold & Triebel does not belong to *Carbonea* but is a species of *Scoliciosporum* with unusual spore characters.

2. Material and Methods

The present study is based on the dried herbarium specimens cited below. External morphology was studied with a dissecting microscope (WILD M3, 6,4x–40x), anatomical studies of the thallus and the ascocata were carried out under a light microscope (LEICA DMRE, 100x–1000x). Sectioning was performed with a freezing microtome (LEITZ, sections of 12–15 mm) but squash preparations were also used, especially for ascus analysis. Preparations were mounted in water. When necessary, contrasting was performed by a pretreatment with lactic acid-cotton blue (MERCK 13741). Amyloid reactions in hymenia were observed after treatment with Lugol's reagent (= IKI; MERCK 9261). Sections and squash preparations were not pretreated with KOH, unless otherwise stated. Measurements refer to dimensions in tap water. So far, no crystalline lichen compounds have been detected in the genus. Hymenial pigments are classified following MEYER & PRINTZEN (2000). Abbreviations for institutional herbaria follow HOLMGREN et al. (1990). Abbreviations of taxonomic authorities are taken from BRUMMITT & POWELL (1992).

The following material has been used for comparison:

Scoliciosporum umbrinum (Ach.) Arnold: **AUSTRIA, Steiermark**, Niedere Tauern, Wölzer Tauern, Planneralpe [NE oberhalb von Donnersbach], am Steig vom Plannerknot zum Rotbühel, Plannereck, ca. 1900 m, [47°24'35"N / 14°13'10"E], GF 8551/3, N-exponierte Gneisschrofen, 20. VII. 1988, leg. J. Hafellner 20459 (GZU). - Steirisches Randgebirge, Gleinalpe, [nördliche] Abhänge der Mugel gegen Niklasdorf, ca. 5 km E von Leoben, Niklasdorfgraben unter dem Ghf Loser, [47°22'55"N / 15°10'50"E], ca. 700 m, GF 8657/1; W-exponierte, niedere Silikatausbisse an der Wegböschung; 11. IV. 1977, leg. J. Hafellner 2172 (GZU). - [Gleinalpe], Murtal, Kirchkogel über Kirchdorf bei Pernegg, ca. 700 m, GF 8657, SE-exponierte Serpentinfelsrippe, 15. VI. 1990, leg. H. Mayrhofer 9197 (GZU). - **Kärnten**, Karnische Alpen, Maglern W von Arnoldstein, Geländerücken E des Ortes, ca. 640 m, GF 9447/4; S-exponiert auf bodennahen, metamorphen Silikatschrofen; 6. V. 1992, leg. J. Hafellner 29410 (GZU).

Carbonea atronivea (Arnold) Hertel: **AUSTRIA, Tirol**, Nordtirol, Nördliche Kalkalpen, Lechtaler Alpen, S-exponierte Schrofenhänge N und W der Augsburger Hütte über Grins, NW Landeck, ca. 2200–2400 m; Kalk und Mergelkalk, 9. VII. 1982, leg. J. Hafellner 9967 (herb. Hafellner). - Osttirol, Hohe Tauern, Granatspitzgruppe, E-seitige Hänge und Rücken des Nussing-Kogel, 2200–2530 m, GF 8941, Kalkschieferschrofen, 30. VIII. 1988, leg. J. Poelt (GZU). - **Kärnten**, Nationalpark Hohe Tauern, Glockner-Gruppe, NW-Grat des Großen Magrötzen Kopfs W ober dem Hochtor, knapp SW unter dem Grat, ca. 2620 m, GF 8943/1; Granatglimmerschiefer, auf SW-exponierten Schrofen und Blöcken, 30. VIII. 1996, leg. J. Hafellner 40055 (herb. Hafellner). - Nationalpark Nockberge, kleine Anhöhe ca. 600 m NW vom Mallnock, ca. 1980–2020 m, GF 9148/2, verkieselte Dolomitblöcke, 11. VII. 1990, leg. J. Poelt, W. Obermayer & W. Petutschnig (GZU). - **SPAIN, Prov. Girona**, Pyrenäen, Nuria N von Ribas de Freser, NW-Hänge SE oberhalb des Klosters, ca. 2300 m, NW-exponierte Abbrüche aus Kieselkalk und Kalkschiefer, 27. V. 1983, leg. J. Poelt (GZU).

Carbonea halacsyi sensu Hafellner & Sancho: **AUSTRIA, Steiermark**, Steirisches Randgebirge, Koralpe, Kleiner Speikkogel, N-Hänge kurz NW unter dem Gipfel, 46°47'05"N / 14°58'40"E, ca. 2080 m, GF 9255/2, Glimmerschieferschrofen in alpinen Rasen, auf N-exponierten Neigungsflächen, auf *Rhizocarpon geographicum*, 29. X. 2000, leg. J. Hafellner 53177 & A. Hafellner (GZU).

3. Results

Scoliciosporum intrusum (Th.Fr.) Hafellner comb. nov.

Bas.: *Lecidea intrusa* Th.Fr., Bot. Notiser 1867: 152 (?1868).

≡ *Carbonea intrusa* (Th.Fr.) Rambold & Triebel [in Aptroot et. al.], Biblioth. Lichenol. 64: 47 (1997). - *Catillaria intrusa* (Th.Fr.) Th.Fr., Lichenographia Scandinavica, vol 1, pars 2: 579 (1874). - *Micarea intrusa* (Th.Fr.) Coppins & H.Kiliias, in Coppins, Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 11(2): 138 (1983). - *Lecideopsis intrusa* (Th.Fr.) Zopf, Hedwigia 35: 338 (1896). - *Conida intrusa* (Th.Fr.) Sacc. & D.Sacc., Syll. Fung. 18: 187 (1906). - *Lecidea contrusa* Vain., Medd. Soc. Fauna Flora Fenn. 10: 29 (1883). Nom. illegit., superfluous name (ICBN Art. 63).

Typus: Finland, Tavastia australis, Mustiala, on *Amygdalaria panaeola*, 1867, leg. A. Kullhem (UPS-holotype, fide COPPINS 1983: 138). Not seen.

= *Lecidea aphanoides* Nyl., Flora, Regensburg 51: 476 (1868). (fide COPPINS 1983: 138 and SANTESSON et al. 2004: 75).

Typus: Scotland: Braemar, "supra saxa calcarea", leg. Crombie (cited from protologue, specimen not seen).

= *Lecidea melaphana* Nyl., Flora, Regensburg 52: 83 (1869). (fide COPPINS 1983: 138 and SANTESSON et al. 2004: 75).

Typus: Scotland: "socio *Lecanorae fuscatae* f. *sinopicae*, ad saxa granitosa", leg. Crombie (cited from protologue, specimen not seen).

For supposed further synonyms see below!

Icon: Fig. 1 (ascus, paraphyses, ascospores)

Exs.: ---

Description: **Thallus** black but often with brownish tinge, areolate, areolae developing between areolae of other lichens (see below) or laterally affixed to alien areolae, with uneven to granular surface, consisting of several to many dense thallus particles, bearing apothecia or not. **Photobiont** a coccal green alga, algal cells mostly 10–18 µm in diam., only autospores may be smaller; reactions: thallus K-, C-, Pd-, medulla not tested. **Apothecia** blackish, often somewhat glossy, one to several per areole, adnate, convex from the beginning, with indistinct margin or later margin excluded and apothecia virtually immarginate. **Exciple** in longitudinal section pale to brownish, darker towards the outer edge, composed of radiating hyphae; excipular hyphae branched and anastomosing, the lumina c. 1–2 µm wide. **Hypothecium** up to 200 µm high, hyaline to slightly olivaceous, in the upper part often some scattered hyphal cells with orange content, which reacts K+ purple (Intrusa-yellow). **Hymenium** hyaline, not interspersed, ca. 40–50 µm high, the upper part (epihymenium) olive to aeruginose to bluish; K+ green intensifying, N+ red to purplish to pale violet, hymenial gel IKI- but gel and outer layer of empty ascal walls IKI+ blue which may provoke the impression that the entire hymenium gives such a reaction. **Paraphyses** numerous, branched and anastomosing, c. 1,5 µm wide, with only slightly enlarged tips, with "Pigmenthauben" (sec. KILIAS 1981) which are embedded in the hymenial gel. **Asci** clavate to broadly cylindrical, mature asci 35–45 x 14–18 µm, 8-spored, ascal wall lecanoralean, strongly thickened at the apex and forming a tholus, with a broad ocular chamber (possibly indiscernible in mature asci); ascal gel: IKI+ blue, only slightly diffusing into the hymenium, outermost layer of the ascal wall: IKI+ blue, tholus IKI+ blue, with a non-reactive, broad, +/- cylindrical axial body; ascus dehiscence rostrate (Lecanora-type); apported asci and ascospores sometimes containing the substance Intrusa-yellow. **Ascospores** ellipsoid to fusiform, at least a few per preparation slightly

asymmetric to somewhat curved, simple at first, later frequently with one septum, 12–17(–19) x 4–5,5(–6) µm, old spores sometimes with up to 3 transsepta and brownish walls. **Pycnidia** not observed. **Chemistry:** For Intrusa-yellow see below.

Biology and ecology: *Scoliciosporum intrusum* grows in close associations with other crustose lichens, either on these lichens or directly on siliceous rocks but always in close contact with other species. COPPINS (1983: 138, fig. 55) has observed, that the algal cells in the *S. intrusum* thallus are penetrated by haustoria of the mycobiont which underlines the parasitic capability of the species. According to WIRTH (1995: 250), the species grows preferably in the Pertusario-Ophioparmetum.

Host spectrum: mostly on and between *Rhizocarpon geographicum*, *Lecidea lapicida* coll., *Lecidea spec.*; other hosts given in the lichenological literature include *Calvitimela melaleuca*, *Amygdalaria panaeola* (SANTESSON et al. 2004: 75); *Schaereria fuscocinerea* (MAGNUSSON 1945: 314); *Lecidea atrobrunnea* (RAMBOLD & TRIEBEL 1992: 103); *Aspicilia cinerea*, *Calvitimela aglaea* (DEGELIUS 1982: 59); *Rhizocarpon lecanorinum* (HITCH 1996: 43); *Euopsis cf. granatina* (APTROOT et al. 1997: 48); *Pertusaria lactea* (BERGER 2000: 70).

Distribution: Europe (Austria, Finland, France, Germany, Norway [incl. Svalbard], Sweden, United Kingdom); Asia (New Guinea); North America (U.S.A. [Maine, Arizona]).

Earlier records (published under various names, mostly the nomenclatural synonyms *Lecidea intrusa*, *Catillaria i.*, or *Carbonea i.*): APTROOT et al. 1997: 47–48 (New Guinea); BOOM et al. 1996: 640 (Austria); COPPINS 1983: 138–140 (southern Scandinavia, Norway, Scotland); COPPINS 1992: 384 (Scotland); DEGELIUS 1956: 357 (Norway); DEGELIUS 1982: 59 (Norway); ELVEBAKK & HERTEL 1997: 296 (Svalbard); FRIES 1868: 152–153 (Finland); FRIES 1874: 579 (Norway, Sweden, Finland); HAFELLNER 1997: 10 (Austria); HAFELLNER 2002a: 97 (Austria); HARMAND 1899: 97 (France); HERTEL 1991: 300 (Svalbard); HINDS et al. 2002: 138–139 (U.S.A.: Maine); HITCH 1996: 43 (United Kingdom: Scotland); KILIAS 1981: 392 (Finland); KNOPH et al. 2004: 54 (U.S.A.: Arizona); KULLHEM 1871: 275 (Finland); MAGNUSSON 1945: 314 (Sweden); MAGNUSSON 1952: 140 (Sweden); POELT & TÜRK 1984: 433 (Austria); SANTESSON et al. 2004: 75–76 (Sweden, Norway, Finland); TRIEBEL 1989: 227–228 (Finland); VAINIO 1883: 29, sub *Lecidea contrusa* (Finland); VAINIO 1934: 454–455 (Finland); VOUAUX 1914: 156–157 (Norway, Sweden, Finland); WIRTH 1973: 186–187 (Germany, France); WIRTH 1974: 373 (France); WIRTH 1975: 475 (Germany); WIRTH 1989: 612 (Germany); WIRTH 1995: 248–250 (Germany).

The species is also listed for Italy in NIMIS & MARTELLOS (2003), but the only Italian record is one of the supposed synonym *Carbonea halacsyi* sensu Hafellner & Sancho (see also remark below) from Northern Italy (TRETIACH & HAFELLNER 2000). This record refers to a different taxon, a true *Carbonea*, and *Scoliciosporum intrusum* has evidently not been found in Italy so far. Furthermore, the species has been reported from Iceland, growing on *Pertusaria lactea* (BERGER 2000: 70). Because also a true *Carbonea* species is known from this host, the record will remain uncertain as long as the specimen has not been re-examined.

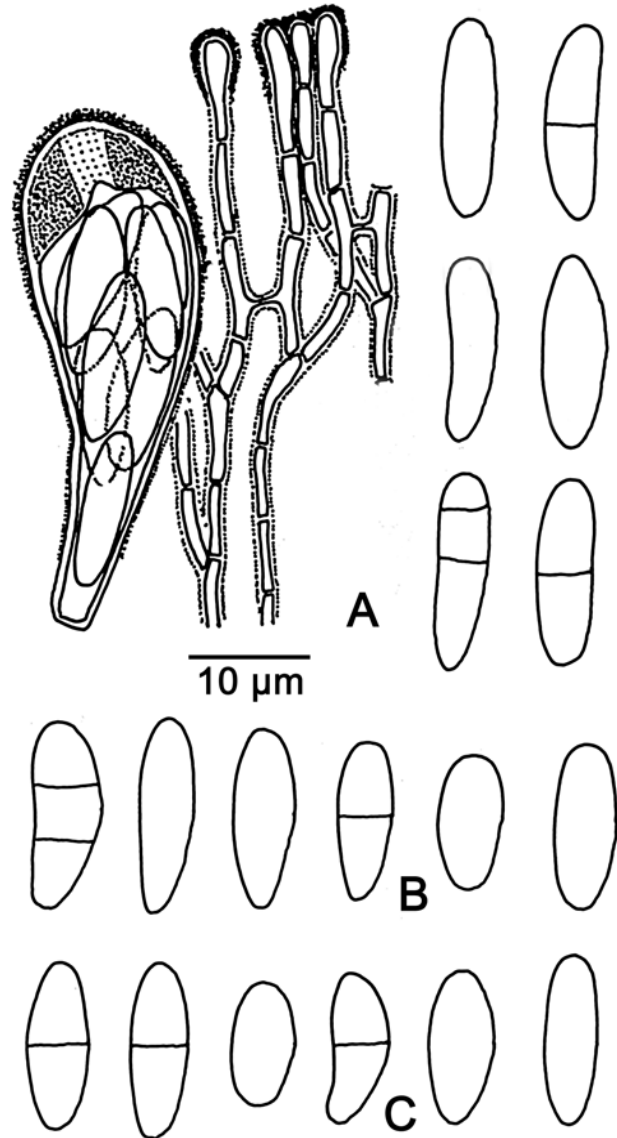


Fig. 1. *Scoliciosporum intrusum*. A: Ascus (after treatment with IKI), paraphyses and ascospores (Poelt 12419). B: Ascospores (Poelt Sc 92/478). C: Ascospores (Magnusson 22230).

Remarks: SANTESSON et al. (2004: 75) give the year of publication of the journal "Botaniska Notiser för år 1867", in which the species *Lecidea intrusa* was published, as 1868. The title page of this volume bears the year 1867. The entire volume was not available for us, therefore it remains unclear if the volume was either delayed or published in issues.

The placement of the species in several not closely related genera (*Catillaria*, *Micarea*, *Carbonea*) within a relatively short period of time shows impressively the helplessness in finding the correct genus for this species. Only COPPINS (1983), when combining the species into *Micarea*, expressed his hesitation in doing so, mainly because of its unusual habitat for a *Micarea* and the non-micareoid photobiont cells he had observed. COPPINS (l.c.) also pointed out that the species is very similar to *Scoliciosporum umbrinum* in its external appearance and that "*Micarea intrusa*" should be included in any future revision of *Scoliciosporum*. COPPINS (1992) even indicated that "*Micarea intrusa*" is often mistaken for *Scoliciosporum umbrinum*. Recently also HINDS et al. (2003) emphasised the similar shape and colour of apothecia of *C. intrusa* and *S. umbrinum*, but these authors did not comment on that in more detail.

MAGNUSSON (1952: 140) already pointed to a characteristic feature of *Scoliciosporum intrusum*, i.e., the presence of both non-septate and one-septate ascospores, obviously one of the reasons why it was so difficult to accommodate the species in an appropriate genus.

Several modern, relatively complete generic descriptions of *Scoliciosporum* have been published (e.g. VÉZDA 1978, PURVIS 1992, EKMAN & TØNSBERG 2004). The transfer of *Scoliciosporum intrusum* makes it necessary to amend this description in the way that the ascospores may now be non-septate to phragmosporous with up to 7 transsepta, and their shape can be fusiform to ovate, or lunulate, or bacilliform to acicular. The ascus features of *Scoliciosporum* have first been depicted by HAFELLNER (1984). A good description of the ascus features is given by EKMAN & TØNSBERG (2004). Asci of *Scoliciosporum* and its supposed relative *Strangospora* are broadly clavate to cylindrical, 8-spored to multispored, have a thick ascial wall with the typical lecanoralean layering. The asci are apically provided with an amyloid tholus with a distinct non-amyloid central body. A conical ocular chamber is best developed as long as the ascospores are immature. Ascus dehiscence is rostrate.

The pigment colouring the epihymenium is, according to the terminology of MEYER & PRINTZEN (2000), Cinereorufa-green, which is the same as "Lecidea-Grün" (BACHMANN 1890) or pigment A (COPPINS 1983). However, MEYER & PRINTZEN (2000) omitted *Scoliciosporum intrusum* from the list of taxa, which should have this pigment, although it is mentioned by COPPINS (1983: 87). On the other hand, MEYER & PRINTZEN (2000: 575, 582) describe another insoluble apothecial pigment in "*Carbonea intrusa*", called Intrusa-yellow. According to these authors, it is identical with Pigment H characterized by COPPINS (1983). Intrusa-yellow is not a cell wall pigment nor is it deposited in the hymenial gel. It is located inside mycobiont cells, i.e., in the cytoplasm of scattered (possibly damaged) ascogenous hyphae, asci, and ascospores. This fact was not mentioned by MEYER & PRINTZEN (l.c.) but explicitly annotated by COPPINS (l.c.). This yellow to orange pigment evidently is a chinoid substance, as it reacts K+ purple and N-. It remains unclear whether it has any taxonomic importance.

Both RAMBOLD & TRIEBEL (1992: 103) and SANTESSON et al. (2004: 75) list also *Carbonea halacsyi* (J.Steiner) Hafellner & Sancho among the synonyms of *Carbonea intrusa*. However, we always applied this name to a lichenicolous discomycete entirely different from *S. intrusum* and confined to yellow *Rhizocarpon* species (e.g. HAFELLNER & SANCHO 1990, see also below). In the early 1990s, some of the specimens of *Carbonea halacsyi* sensu Hafellner & Sancho preserved in GZU have been revised by

Knoph et al. as *Carbonea intrusa*, which is definitely wrong. Knoph, Rambold & Triebel are announced as authors of a still unpublished *Carbonea* monograph ever since (cf. HERTEL 1991). Evidently these authors could not distinguish true *Scoliciosporum intrusum* and the lichenicolous *Carbonea* when one of these fungi inhabited a yellow *Rhizocarpon*. Perhaps this confusion is the reason why *Lecidea intrusa* Th.Fr. was transferred to *Carbonea* by RAMBOLD & TRIEBEL (in APTROOT & al. 1992). Unfortunately also some more recent descriptions (e.g., in KNOPH et al. 2004) are rather useless due to these mixtures of *Scoliciosporum* and *Carbonea* characters. See also the note on *Lecidea intrudens* H.Magn. and chapter 4.3. below.

SANTESSON et al. (2004: 75) also mention *Lecidea intrudens* H.Magn. (MAGNUSSON 1946: 53) as a synonym of "*Carbonea intrusa*". HERTEL (1970: 424) has restudied the type but not commented on the possible identity of *Lecidea intrudens* and *Scoliciosporum intrusum*. The characters mentioned in the protologue "apothecia...pauca congesta, hypothecium fuscum" (MAGNUSSON, l.c.) and in the emended description by Hertel "Befallsherde sind geschwärzte Zonen von bis 3 mm Durchmesser, Apothecium kohlig schwarz und dicht gedrängt, Hypothecium dunkelbraun, Excipulum kohlig, Paraphysen selten verzweigt" (HERTEL, l.c. [word order re-arranged by the author]) do not fit with *Scoliciosporum intrusum*, for which larger infections, non-agglomerated apothecia, a pale hypothecium, a non-carbonized exciple, and frequently branched and anastomosing paraphyses are characteristic. Magnusson compared his new species with "*Catillaria intrusa*" and regarded the hypothecium and ascospore characters as diagnostic. HERTEL (1970: 408) has also published a drawing of a longitudinal section of the apothecium, which looks perfectly like a drawing of *Carbonea halacsyi* sensu Hafellner & Sancho, thus the identity of or a close relationship between *Lecidea intrudens* and *Carbonea halacsyi* sensu Hafellner & Sancho is possible. As *Carbonea* is outside the scope of this study the problem is not addressed here in further detail.

It is worth mentioning that Magnusson has described both a *Lecidea intrudens* (see above) and a *Lecanora intrudens*. The two original names refer to two different taxa. When describing *Lecanora intrudens* H.Magn. (MAGNUSSON 1942), now *Miriquidica intrudens* (H.Magn.) Hertel et Rambold, the author compares that species in its external aspect and biological behaviour with *Scoliciosporum intrusum*, *Rimularia furvella*, and *Scoliciosporum umbrinum*. Similar observations have been published by POELT (1958: 304).

RAMBOLD & TRIEBEL (1992: 103, 140 sub *Carbonea intrusa*) give further synonyms and mention additional hosts, including *Aspicilia candida* and *Pertusaria lactea*. The specimens where these data refer to need further comparative investigation.

In the synoptic revisions of lichenicolous fungi by VOUAUX (1914) and KEISSLER (1930) the species was thought to be arthonialean and placed in *Conida*. The proposal to do so dates back to SACCARDO & SACCARDO (1906) but turned out to be completely wrong.

Specimens investigated:

AUSTRIA, Kärnten, Hohe Tauern, Kreuzeck-Gruppe, Grakofel, Südseite, ca. 2500 m, auf Diorit-Gestein, auf *Lecidea* spec., 13. VII. 1987, leg. W. Petutschnig (GZU). - Nationalpark Hohe Tauern, Schober-Gruppe, Graden Tal W von Döllach-Putschall, Außer Kretschitz S des Fleckenkopfs, ca. 1950 m, 9042/2, Gneisblöcke, teilweise Fe-hältig, auf *Rhizocarpon geographicum*, 22. IV. 1988, leg. J. Hafellner 20612 & M. Walther (herb. Hafellner). - **Salzburg**, Lungau, Schladminger Tauern, Lessachtal, Weg von der Lasshofer Hütte zum Landschitzsee, 9. IX. 1981, leg. J. Poelt (GZU). - Niedere Tauern, Schladminger Tauern, W-facing base of Kampspitze, path from Ursprungalm to Preneggsattel, 400 m SE above Ursprungalm, 47°17'40"N /

13°37'40"E, c. 1700 m, MTB 8747/2; subalpine *Picea-Larix* forest over siliceous rocks, on schist with Quartz veins, on and between *Rhizocarpon geographicum*; 27. VIII. 2001, leg. R. Türk, W. Mayer & O. E. Lange (GZU). - **Steiermark**, Niedere Tauern, [Seckauer Tauern], Rücken N des Geierkogel über Hohentauern, N-seitige Abbrüche bei 1900 - 1950 m, auf *Lecidea* spec., VIII. 1975, leg. J. Poelt (GZU). - Zentralalpen, Murberge, Gstoder ca. 14 km WNW von Murau, im oberen Teil des E-Rückens W ober der Gstoderhütte, 47°08'40"N / 13°59'45"E, ca. 2050 m, GF 8849/4; Blockwerk und niedere Schrofen in Blockwerk und Schrofen in Windheiden, auf N-exponierten Schräglflächen, auf *Rhizocarpon geographicum*, 26. VIII. 2000, leg. J. Hafellner 53568 (herb. Hafellner). - Gurktaler Alpen, Frauenalm S von Murau, S-exponierte Abbrüche zwischen Oberberg und Frauenalm, ca. 1830 m, auf *Rhizocarpon* spec., 18. VI. 1978, leg. H. Mayrhofer (GZU). - [Steirisches Randgebirge], Koralpe, freistehende Felsen auf der Handalpe N über der Weineben, 1750 - 1850 m, zwischen *Rhizocarpon geographicum*, 13. VI. 1972, leg. J. Poelt (GZU). - Koralpe, freie Felsgruppe auf dem Kamm ESE der Glitzfelsen, N über der Glitzalm bei Schwanberg, 1750 - 1760 m, auf *Rhizocarpon geographicum*, 16. X. 1977, leg. J. Poelt & J. Wetz (GZU). - Stubalpe, Rücken zwischen Speikkogel und Weißenstein, 2020–2030 m, Gneisfelsen und Blöcke, auf und zwischen *Rhizocarpon geographicum*, 26. V. 1985, leg. K. Kalb & J. Poelt (GZU). - **FINLAND**, Schärenhof von Turku, Korppo, Lohm, VIII. 1965, leg. J. Poelt (GZU). - **FRANCE**, Elsaß, Vogesen, Hohneck, Granitfelsen der Spitzköpfe, ca. 1250–1300 m, auf *Rhizocarpon geographicum*, VII. 1969, leg. V. Wirth 1865 (GZU). - **SLOVAKIA**, Vysoké Tatry (Hohe Tatra), Bielovodske dolina, 900–1300 m, auf Granitfelsen, auf *Rhizocarpon geographicum*, 4. VII. 1993, leg. I. Pisút & J. Poelt 93-551 (GZU). - **SWEDEN**, Torne Lappmark, Umgebung von Abisko, kurz über dem Torneträsk, unterhalb der Naturvitensk. Station Abisko, ca. 360 m, erzhaltiger Schieferblock, on *Rhizocarpon geographicum*, 19. VII. 1967, leg. J. Poelt (GZU), as accompanying species on specimen of *Miriquidica nigroleprosa*). - **Bohuslän**, Norum, St. Askerön, N of Danestan, on and between *Aspicilia* spec., together with *Scoliciosporum umbrinum* var. *compactum* (!), 12. VIII. 1950, leg. A. H. Magnusson 22230 (GZU). - **UNITED KINGDOM**, **Scotland**, Westernness (V.C. 97), Ariundle Wood National Nature Reserve, ca. 7 km NE of Strontian, disused mine NW of Ariundle Wood, 240–260 m, on *Rhizocarpon geographicum*, 18. VI. 1992, leg. B. Coppins, P. W. James & J. Poelt Sc92/478 (GZU).

4. Discussion

4.1. Which characters indicate that *Lecidea intrusa* Th.Fr. belongs to *Scoliciosporum*?

As already mentioned by COPPINS (1983) and HINDS et al. (2002), the habit of *Scoliciosporum intrusum* apothecia is exactly like in other *Scoliciosporum* species. Also the anatomical features of the apothecia fit perfectly with *Scoliciosporum*, i.e., the poorly developed, not carbonized exciple composed of intricate hyphae, the hyaline to weakly pigmented hypothecium, the richly branched and anastomosing paraphyses, the shape of the asci, and the construction of the ascal wall. Unusual are the unicellular ascospores which may become one-septate with age. A certain tendency of the ascospores to be asymmetric indicates that the ascospores can be regarded as an extreme within the intrageneric continuum of *Scoliciosporum*.

When SÉRUSIAUX (1993) discovered and described *S. curvatum* Sérus., it became evident that *Scoliciosporum* species do not necessarily have bacilliform to acicular ascospores, as demanded in the generic descriptions by MASSALONGO (1852) or VÉZDA (1978). The ascospores may also be fusiform to lunulate, and non- or one-

septate. Therefore the ascospore characters of *S. intrusum* are definitely within the intrageneric range.

4.2. Which characters indicate that *Lecidea intrusa* Th.Fr. does not belong to *Carbonea*?

The genus *Carbonea* (Hertel) Hertel is typified with *Carbonea atronivea* (Arnold) Hertel. According to the description given by HERTEL (1983), the diagnostic features of the genus are black, marginate apothecia, an intensely pigmented exciple lacking algal cells, *Lecanora*-type asci with non-septate ascospores, unbranched conglutinated paraphyses, and filiform pycnospores. The generic concept applied by Knoph et al. (2004) seems much wider. However, it is difficult to decide which of the generic characters have been broadened, mainly because of the inclusion of the alien *Scoliciosporum intrusum* in *Carbonea*.

If we apply the generic concept of HERTEL (1983) and also consider the characters of other *Carbonea* species, it is clear that *Lecidea intrusa* Th.Fr. does not fit into *Carbonea*, especially because of its non-carbonised exciple composed of intricate hyphae, the hardly pigmented hypothecium, and the ramified and anastomosing paraphyses.

4.3. How can *Scoliciosporum intrusum* be distinguished from *Carbonea halacsyi* sensu Hafellner & Sancho?

As the holotype of *Lecidea halacsyi* Steiner has not been available for study, it is not sure if the species called *Carbonea halacsyi* by HAFELLNER & SANCHO (1990) and the taxon represented by the type are identical. Nevertheless it is evident that *Carbonea halacsyi* sensu Hafellner & Sancho is not conspecific with *Scoliciosporum intrusum* but a different lichenicolous fungus, which definitely belongs to *Carbonea*.

The protologue of *Lecidea halacsyi* J.Steiner (STEINER 1894) does not allow a clear decision to which taxon it refers. Some of the characters mentioned in the protologue of *Lecidea halacsyi* do not agree with *Scoliciosporum intrusum* but with a lichenicolous *Carbonea*, which is not rare in Central Europe (and a third similar lichenicolous discomycete which regularly attacks *Rhizocarpon geographicum* is not known so far). Therefore we saw a good chance that the species we had found in the Alps and in the mountains of central Spain is identical with Steiner's species (HAFELLNER & SANCHO 1990). However, Steiner (l.c.) compared *Lecidea halacsyi* with *Lecidea supersparsa* (now *Carbonea supersparsa*), a species with +/- flat apothecia growing on *Lecanora* species. The species we used to call *Carbonea halacsyi* is closer to *Carbonea aggregantula*, a species not mentioned by Steiner in his discussion.

Carbonea halacsyi sensu Hafellner & Sancho has a much narrower host spectrum than *Scoliciosporum intrusum*. Until now it is confined to yellow *Rhizocarpon* species. Although it is most frequently found on the polymorphic *Rhizocarpon geographicum*, also other yellow *Rhizocarpon* species are attacked, e.g., *Rhizocarpon alpicola*. For the host spectrum of *Scoliciosporum intrusum* see above. The infections of *Carbonea halacsyi* sensu Hafellner & Sancho remain dot-like and therefore always smaller than those of *Scoliciosporum intrusum*. In *Carbonea halacsyi* sensu Hafellner & Sancho a lichenized thallus is not discernible, usually the thallus is only visible as a prothallus line between host and parasite. Already at a very early stage, entirely black, strongly convex apothecia are developed in the infected areas. Other than in *Scoliciosporum intrusum*, sterile thalli are unknown, at least they are not discernible on the host thallus, which has a well developed black prothallus itself.

4.4. Lichenicolous growth in *Scoliciosporum*

So far, only two obligatorily lichenicolous *Scoliciosporum* species are known, *S. vouauxii* (de Lesd.) Hafellner (HAFELLNER 2002b) and *S. intrusum*. While *S. intrusum* grows on a range of saxicolous crustose lichens inhabiting siliceous rocks, *S. vouauxii* has so far been found only on *Ramalina*.

Beside these obligatorily lichenicolous *Scoliciosporum* species, the genus comprises also two facultative inhabitants of other lichen thalli. The type species, *S. umbrinum*, commonly grows on other substrates, but it is occasionally found on other lichens in different ecological niches, including saxicolous crusts (*Aspicilia caesiocinerea*, *A. cinerea*, *Lecanora rupicola*, *Lecanora sulphurea*, *Orphniospora mosigii*, *Pertusaria lactea*, *Pertusaria monogona*, *Rinodina badiella*), as well as both corticolous (*Evernia prunastri*) and terricolous (*Peltigera aphthosa*) macrolichens (e.g. BERGER 2000, CLAUZADE & RONDON 1960, HAFELLNER 2002b, POELT 1958, RAMBOLD & TRIEBEL 1992, TRETJACH & HAFELLNER 2000). Another species which is rarely found growing on lichens is *S. chlorococcum*. It has been reported on *Platismatia glauca* (HAFELLNER 2002b).

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