Annotated List of Macromycetes

Found in the Greenhouses of the Botanic Garden

of the Institute of Botany in Graz (Austria), 1998 - 2001

Helmut PIDLICH-aigner¹, Anton HAUSKNECHT² & Christian SCHEUER³

Summary: PIDLICH-aigner H., HAUSKNECHT A. & SCHEUER Ch. (2002): Annotated list of macromycetes found in the greenhouses of the Botanic Garden of the Institute of Botany in Graz (Austria), 1998 - 2001. – Fritschi (Graz) 32: 49 - 61. – ISSN 1024-0306

The present compilation is a short version of the paper by PIDLICH-aigner & HAUSKNECHT (2001, Österr. Z. Pilzk. 10: 43-73 + colour illustr. IV-XI) on macromycetes found in the greenhouses of the Botanic Garden of the University of Graz (Austria). It contains an additional note on Gymnopus luxurians, including some figures. Nearly all other annotations are free, shortened translations from the annotations in the original paper, except for the additional general information on the occurrence of some native species in the natural environment.

Over a period of three years, 37 taxa were found altogether (33 Agaricales, 4 Aphyllophorales s.l.). The most remarkable taxa were treated in detail by PIDLICH-aigner & HAUSKNECHT (l.c.): Conocybe crispella, Conocybe spec., Coprinus plagioporus, Gymnopus luxurians, Gymnopus spec., Lepiota elaiophylla, Leucocoprinus cepistipes var. rorulentus, Leucocoprinus denudatus, Melanoleuca rasilis var. leucophyloides, Melanotus flavolivens, Mycena spec., Psathyrella pseudocorrugis, Rigidopus lineatus.

Some of the species are mainly known from the tropics or from North America. Melanotus flavolivens was a new record for Europe.


Innerhalb von etwa drei Jahren wurden 37 Arten gefunden (33 Agaricales, 4 Aphyllophorales s.l.). Die bemerkenswertesten Taxa wurden von PIDLICH-aigner & HAUSKNECHT (l.c.) detailliert behandelt: Conocybe crispella, Conocybe spec., Coprinus plagioporus, Gymnopus luxurians, Gymnopus spec., Lepiota elaiophylla, Leucocoprinus cepistipes var. rorulentus, Leucocoprinus denudatus, Melanoleuca rasilis var. leucophyloides, Melanotus flavolivens, Mycena spec., Psathyrella pseudocorrugis, Rigidopus lineatus.

Einige der Taxa sind hauptsächlich aus den Tropen oder aus Nordamerika bekannt. Melanotus flavolivens war ein Neufund für Europa.

¹) Helmut PIDLICH-aigner, Horschweg 8, A-8046 Graz (e-mail: h.p.a.myk@aon.at)
²) Dkm. Anton HAUSKNECHT, Sonnendorferstraße 22, A-3712 Maissau
³) Dr. Christian SCHEUER, Institut für Botanik, Holleigasse 6, A-8010 Graz (e-mail: christian.scheuer@uni-graz.at)
Recently, Pidlitch-Aigner & Hausknecht (2001) have published an annotated list of macromycetes found in the greenhouses of the Botanic Garden in Graz, including descriptions, illustrations, and discussions of remarkable taxa. The fungi were recorded over a period of three years, and the following species were treated in detail: Conocybe crispella, Conocybe spec., Coprinus plagioporus, Gymnopus luxurians, Gymnopus spec., Lepiota elaiophylla, Leucocoprinos cepistipes var. rorulentus, Leucocoprinos denudatus, Melanoleuca rasilis var. leucophyloides, Melanotus flavolivens, Mycena spec., Psathyrella pseudocorrugis, Rigidoorus lineatus.

Nearly all annotations in the present paper are free, shortened translations from the original paper by the third author, except for additional general information on the occurrence of some native species in the natural environment. Unless stated otherwise, the latter is mostly based on the flora by Moser (1983).

It is not surprising that this work yielded an interesting mixture of taxa from the biogeographical and ecological point of view. A number of the native species found in the greenhouses usually occur in ± natural types of woodland, other species (usually also regarded as 'native') are mainly or exclusively encountered in man-made environments and situations, and others are better known from the tropics or from North America and obviously introduced.

With very few exceptions, herbarium specimens are deposited in the private herbarium of H. Pidlitch-Aigner and in the public herbarium of the Institute of Botany of the University of Vienna (WU).

Thanks are due to Univ.-Prof. Dr. Herwig Teppner for giving his permission to photograph and collect in the greenhouses, to the staff of the Botanic Garden for keeping contact with the first author and providing prompt information about newly grown fruitbodies, and to Dr. Walter Obermayer for help with the illustrations of the present paper.

Annotated list

Explanation of abbreviations: TROP. = tropical greenhouse; TEMP. = temperate greenhouse, including the sections 'Succulents I' and 'Succulents II' (the latter including the cycads); COOL = cool greenhouse.

The tropical, temperate and cool sections also include the corresponding parts of the nursery. The show case in the section 'Succulents I' has a tropical microclimate and serves for the presentation of flowering tropical plants to the visitors. For a plan of the greenhouses, see Fig. 6, p. 59.

**Armillaria mellea** (Vahl: Fr.) Kummer

TROP.: on basal part of a tree trunk serving as a phorophyte for epiphytic plants, 7 Dec. 1998 (Pidlich-Aigner 974); 18 Nov. 1999 (WU 20217).

Native, a common and dangerous pathogen of trees and shrubs.

**Coniophora puteana** (Schum.: Fr.) P. Karst.


Tree trunks and spruce logs served as barriers for the various sections in the temperate greenhouse until 1999. They have been removed in order to prevent damage by this rather aggressive wood decay fungus from the large wooden flower pots.

Native, also frequently found in cool, damp indoor environments, as indicated by the German vernacular name 'Kellerschwamm' (= 'cellar fungus').
**Conocybe crispella** (Murrill) Singer  
TEMP.: on soil in a flower pot with *Ptychosperma microcarpum* (Ericaceae) in the nursery, 14 June 1999 (Pidlich-Aigner 1072, WU 19467).  
This species, close to our fairly common *C. albipes* (OTTH) Hauskn., syn. *C. lactea* (Lange) Métrod, was described from North America and first recorded for Europe a few years ago (Hausknecht 1997), only from indoor environments. It is widespread in the tropics in grassy places.

**Conocybe** spec.  
The same species was also found in a greenhouse in Berlin in 1989 (Hausknecht S2602, and herb. E. Ludwig). It is apparently undescribed, but none of the existing collections is rich enough to serve as a satisfactory holotype.  
In side view, the basidiospores of this fungus are somewhat hexagonal in outline. These spores and the caulocystidia with some lecythiform elements point towards sect. Pilosellae. Similar taxa were treated by Watling (1994).

**Coprinus disseminatus** (Pers.: Fr.) S.F. Gray  
TROP.: apparently on bare soil but most probably on buried pieces of wood, 28 Sep. 1999 (Pidlich-Aigner 1265); on a palm fruit in the nursery, 16 Dec. 2000 (Pidlich-Aigner 1640).  
Native and quite common, often extremely abundant on decaying tree stumps in ± damp places.

**Coprinus domesticus** (Bolt.: Fr.) S.F. Gray  
TEMP.: two fruitbodies, apparently on bare soil but, again, most probably on buried pieces of wood, 16 May 1998 (Pidlich-Aigner 632).  
Native, on decaying logs and branches, often also in cool, damp indoor environments like cellars (as indicated by the specific epithet), but also recorded in mines. Usually accompanied by a conspicuous and rather shaggy rusty-brown superficial mycelium, the so-called *Ozonium*.

**Coprinus plagioporus** Romagn.  
Outdoors this species seems to be extremely rare in eastern Austria, only one collection is known from Lower Austria, on plant litter beside a vineyard (WU 9898).  
*C. plagioporus* may be confused with *C. fallax* M. Lange & A.H. Smith and *C. subpurpureus* A.H. Smith (see also Uljé & Bas 1991).

**Gymnopus dryophilus** (Bull.: Fr.) Murrill  
A common native species occurring in all sorts of woodland, from the lowlands up to the alpine zone.

**Gymnopus luxurians** (Peck) Murrill  
(Figures 1 - 4)  
From 1996 until 1998, this species was sometimes very abundant and fruiting nearly everywhere in the tropical greenhouse, especially in 1998, but finally it was found only on a single spot in 1999.
**G. luxurians** was originally described from North America. Only in recent years it was found in Europe, mainly in greenhouses, but also in ruderal places in parks. It is also known from Benin (West Africa) and the Hawaiian Islands. The present records from the greenhouses in Graz were the first ones in Austria (cf. **HAUSKNECHT & KRISAI-GREILHUBER** 2000). **ANTONIN & HERINK** (1999) examined further specimens from Germany, Italy, the Netherlands, and the Czech Republic, **BON & MASSART** (1996) reported three collections from France. For references to illustrations and additional records see **ANTONIN & HERINK** (1999). The robust basidiocarps with their brown, later pallescent caps and stout, often twisted stipes grow in fascicles (Fig. 2, 4). Most collections from our tropical greenhouse were sterile, especially those found during the winter months, the lamellae bearing only basidioles. This sterility may apparently be correlated with fewer lamellae and anomalous 'double' gill edges which occur quite frequently in this species. **ANTONIN & HERINK** (1999) described and illustrated *G. luxurians* in detail and discussed its variability with special reference to the structure of those gill edges. While such 'anomalous' fruitbodies are still young, the gill edges are connected to each other, completely closing off the interlamellar space (Fig. 1a). Later they crack apart (Fig. 1b), and the remnants of this connecting plectenchyma form two downy white fringes along every single gill edge, which are well visible with a hand lens (Fig. 1c, 3). In old fruitbodies, the two fringes converge (Fig. 1d), finally often becoming attached to each other and coalescing to form a simple gill edge. However, it must be noted that **ANTONIN & HERINK** (1999) have studied 20 specimens from outdoor and greenhouse habitats and found a continuous transition between basidiocarps with well-developed lamellar connections and basidiocarps without them, concluding that this anomalous gill development may be caused by certain environmental conditions (high humidity?).

**Figure 1. Gymnopus luxurians**: Schematic drawing of gill development in cross section: (a) young stage, interlamellar space completely closed off by neighbouring gill edges connected by a plectenchyma; (b) gill edges cracking apart; (c) typical appearance of the gill edge with its two fringes in mature fruitbodies [cf. Fig. 3]; (d) parallel to convergent fringes in old fruitbodies; (re-drawn from **ANTONIN & HERINK** 1999).

**Figures 2–3. Gymnopus luxurians**: (2) three fascicles of fruitbodies (grid unit 1 cm²). (3) pileus from below, showing the anomalous 'double' gill edges of a mature fruitbody; every single gill edge with two downy white fringes along a smooth, slightly darker middle line [cf. Fig. 1c]; (phot. H. Pidlich-Aigner).
Fig. 2: Gymnopus luxurians

Fig. 3: Gymnopus luxurians
Fig. 4: *Gymnopus luxurians*

Fig. 5: *Rigidoporus lineatus*
**Gymnopus** spec.
TROP.: in a flower pot with *Oncidium apliatum* in the nursery from 28 Dec. 2000 (Pidlich-Aignr 1642, WU 21007) until 12 Feb. 2001 (WU 21143), either directly on small pieces of conifer wood or bark, or connected with them by rhizomorphs. According to ANTONIN & NOORDELOOS (1997), the intense odour of this fungus points towards sect. Vestipedes subsect. Impudicae, although coralloid and diverticulate terminal cells are only sparsely developed in the pileocutis. Its affinities are with *G. herinkii* ANTONIN & NOORDEL., but our taxon is apparently undescribed.

**Hemimycena cucullata** (PERS.: FR.) SINGER

Native, usually found on plant litter and on tree stumps.

**Hohenbuehelia mastrucata** (FR.: FR.) SINGER

This species is native and usually found on wood of deciduous trees. However, *Hohenbuehelia* species are generally uncommon in Central Europe. They are characterized by laterally attached ('pleurotoid') fruitbodies, a gelatinized layer in the pileocutis, and in most species also by metuloid cystidia in the hymenium.

**Hohenbuehelia petalodes** (BULL.: FR.) SCHULZ.

Native, on the ground in grassy places in woodland, parks and gardens; keyed out under the name *H. geogenia* (DC. ex FR.) SING. by MOSER (1983), but see the recent treatment by S. ELBORNE (in BAS & al. 1995).

**Hypholoma fasciculare** (HUDS.: FR.) KUMMER

A common native species on rotting stumps and logs, both on conifers and deciduous woody plants.

**Lepiota aspera** (PERS.: FR.) QUÉL.

The individual fruitbodies showed high variability in basidiospore dimensions, sometimes it was difficult to separate our finds from *L. perplexa* KNUDSEN.
Native and rather common; sometimes found together with *L. cristata* and *L. clypeolaria* (BULL.: FR.) KUMMER in semi-ruderal situations in and around Graz.

**Lepiota cristata** (BOLT.: FR.) KUMMER

This is one of the common and well-known native *Lepiota* species, with very typical 'bullet-shaped' basidiospores.

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**Lepiota elaiophylla** VELLINGA & HUIJSE

TROP.: 3 Aug. 1998 (Pidlich-Aigner 713, WU 18988), on a different spot 16 Aug.–20 Oct. 1999; the often somewhat bulbous stipe bases were connected with small pieces of wood or bark by rhizomorphs.

This *Lepiota* species with yellow gills, which is usually found in greenhouses or flower pots, was formerly included in *L. xanthophylla* ORTON. Only recently, *L. elaiophylla* was recognized and described as a distinct species (VELLINGA & HUIJSE 1997). Due to the former confusion with *L. xanthophylla*, there exists only one additional reliable record from Austria so far (greenhouse in the Botanical Garden in Vienna, WU 20257).

**Leucoagaricus americanus** (PECK) VELLINGA

Syn. *L. bresadolae* (SCHULZER) BON (see VELLINGA 2000)


Very similar to *Macrolepiota* species in habit, usually recorded in man-made situations (e.g., on sawdust heaps, bark chips, and compost).

**Leucoagaricus leucothites** (VITT.) VASSER


This species was found quite frequently in the open in summer 2000, in garden meadows, but also in plant beds covered with bark mulch.

**Leucocoprinus birnbaumii** (CORDA) SINGER

TROP., TEMP., COOL: very abundant in 1998 and 1999, especially in the tropical greenhouse (13 Feb. 1998; Pidlich-Aigner 576, WU 19161), just like *Gymnopus luxurians*. In the meantime, it has become rather rare, and in 2001 *L. birnbaumii* was only found on a single spot in the cool greenhouse.

Although *L. birnbaumii* is a tropical species, which does not occur in our natural environment, this is probably one of the best-known agarics in Europe, due to its frequent occurrence in flower pots and its intense lemon- or sulphur-yellow colour.

**Leucocoprinus cepistipes** (SOW.: FR.) var. *rorulentus* (PANIZZI) BABOS


According to Migliozzi & Perrone (1992), var. *rorulentus* differs from var. *cepistipes*, e.g., by the presence of guttation droplets on all parts of the fruitbody, and by the greyish colour of the lamellae in older and dried fruitbodies. This was probably the first record of this fungus in Austria.

**Leucocoprinus denudatus** (RABENH.) SINGER

COOL: only one collection, with three mature and several young basidiocarps in fascicles, attached to small pieces of wood or bark buried in the sandy substrate by rhizomorphs, 17 Aug. 1998 (Pidlich-Aigner 728, WU 18965).

A widespread species, but in Europe it is only known from gardens, parks, greenhouses, and flower pots (VASSER 1979, CANDUSSO & LANZONI 1990, BON 1996).
**Limacella glioderma (FR.) MAIRE**
TROP.: 10 Nov. 1998 (Pidlich-Aigner 969) until July 1999, sparsely also 2000. —
A native species, especially of deciduous woodland; easily recognizable by the slimy, reddish-brown caps of the young fruitbodies.

**Lyophyllum fumosum (PERS.: FR.) ORTON**
A native species of woodland and grazed land, where the fruitbodies are often grouped in fairy rings.

**Melanoleuca rasilis (FR.) SINGER var. leucophylloides BON**
A native species of grassy places in woodland. This fruitbody was hidden in a dark corner behind a large flower pot and probably therefore the cap was ± grey, not as dark as in typical specimens (cf. BON 1995).

**Melanophyllum haematospermum (BULL.: FR.) KREISEL**
Syn. *M. echinatum* (ROTH: FR.) SING.
In most collections, the caps measured up to 35 mm in diameter, only the collection of 4 May 1998, from an area of about 1 square meter in the tropical greenhouse, differed considerably by minute fruitbodies with caps only 10 mm in size. However, this was apparently a dwarf 'modification' rather than the forma *gracilis* mentioned by BON (1996), which should have much more pallid gills.
A native species of moist woodland, often under tall herbs like *Petasites* and *Adenostyles*, also in burnt places with the moss *Funaria* (Moser 1983).

**Melanotus flavolivens** (BERK. & CURT.) SINGER
This find agrees well with the description in the monographic treatment by Horak (1977). So far, *M. flavolivens* was known from islands in the Pacific Ocean, New Caledonia, the Solomon Islands, and the Bonin Islands. This was the first record for Europe.
In spite of the differences in habit, *Melanotus* is very close to *Psilocybe* and has already been reduced to subgeneric rank by M.E. NoordeLoos (in Bas & al. 1999).

**Mycena leptcephala** (PERS.: FR.) GILLET
The fruitbodies from the show case had no clamp connections, and basidia with only two sterigmata beside normal basidium. However, Maas Geesteranus (1992) has included a North American collection with these characters in *M. leptcephala*. 
M. leptoccephala is native and usually found on plant litter in woodland, mainly on buried small pieces of wood or dead roots (e.g., Breitenbach & Kränzlin 1991).

**Mycena sanguinolenta** (ALB. & SCHWEINITZ: FR.) Kummer


— COOL: numerous fruitbodies on a metal basket 2 m above ground, filled with bark chips, Sphagnum and peat, serving as a substrate for orchids, 7 Apr. 1998 (Pidlích-Aigner 582, WU 19160); this basket was transferred into the garden in the middle of May where the fungus continued to produce fruitbodies until the end of July.

A native species usually found on needle litter in conifer woods. If the stipe base breaks, it oozes out a brownish-red juice, but more watery and much less copious than in the more robust, wood-inhabiting *M. haematopus* (Pers.: Fr.) Kummer.

**Mycena** spec.

TROP.: about 20 fruitbodies on thick pieces of wood from the stem base of *Vitis vinifera* (therefore very irregular in shape and with numerous cavities), 13 July 1998 (Pidlích-Aigner 685, WU 20867).

G. Robich (Venezia, in litt.) has kindly examined our collection and noted that this is apparently a tropical species, which may finally be identifiable from living material. He has also provided detailed microscopic data which were included in the description in the original paper.

**Psathyrella candolleana** (FR.: FR.) MAIRE


A common native species in Europe, usually fasciculate or gregarious on or around decaying stumps.

**Psathyrella pseudocorrugis** (ROMAGN.) BON


According to Kits Van Waveren (1985), *P. pseudocorrugis* is a rare terrestrial species, but in Middle Europe it is quite frequently found in floodplain forests and in Robinia pseudacacia stands.

**Psathyrella spadiceogrisea** (SCHAEFF.) MAIRE


Like *P. candolleana*, this is one of the most common native *Psathyrella* species, usually also found on or around decaying stumps.

**Rigidiporus lineatus** (PERS.) RYV.

(Fig. 5, p. 55)

TROP.: in the nursery, on the outside of a very moist flower pot with substrate and the seedling of a date palm species, 19 Apr. 1999 (Pidlích-Aigner 1033, WU 19474).

According to Ryvarden & Gilbertson (1994), this is a common polypore in the tropics, but apparently only the third record from Europe. In Budapest it was found in a greenhouse, in former Czechoslovakia in a mine 450 m deep.

**Schizophyllum commune** FR.: FR.

TROP.: on discs from soft-wooded tree trunks serving as ‘stepping stones’ on the ground, throughout the years; 16 Mar. 2000 (Pidlích-Aigner 1353, WU 20223).

A common native decomposer of wood on rather dry, ± undecayed logs and stumps.
**Steccherinum ochraceum** (PERS.: FR.) S.F. GRAY
TROP.: numerous pileate fruitbodies on a tree trunk in the show case, 12 May 2000 (Pidlich-Aigner 1358, WU 20946).
A native wood-decay fungus; basidiocarps resupinate to pileate, with hydnoid hymeniophore.

**Tubaria conspersa** (PERS.: FR.) FAYOD
Outdoors this native fungus is usually found on moist soil, often associated with small pieces of wood.

In the final part, the fungus species are arranged by the different greenhouses where they were found (cf. Fig. 6). Technical data and the various substrates are summarized in the original paper by PIDLICH-AIGNER & HAUSKNICHT (2001). For details see the references given under 'KARL-FRANZENS-UNIVERSITÄT GRAZ, BOTANISCHER GARTEN (1994)' and 'KARL-FRANZENS-UNIVERSITÄT GRAZ & STIRISCHE LANDESREGIERUNG, LANDESBAUDIREKTION (1995)'.

Fig. 6. Plan of the greenhouses of the Institute of Botany of the University of Graz.
Tropical greenhouse, incl. the corresponding section in the nursery and the show case:

- **Armillaria mellea**
- **Conocybe spec. [nursery]**
- **Coprinus disseminatus**
- **Gymnopus luxurians**
- **Gymnopus spec. [nursery]**
- **Hohenbuehelia mastrucata [show case]**
- **Hohenbuehelia petalodes**
- **Hypholoma fasciculare**
- **Lepiota aspera**
- **Lepiota cristata**
- **Lepiota elaiophylla**
- **Leucoagaricus americanus**
- **Leucocorinus birnbaumii**
- **Leucocorinus cepistipes** var. **rorulentus**
- **Limacella glioderma**
- **Melanophyllum haematospermum**
- **Melanotus flavolivens [nursery]**
- **Mycena spec.**
- **Psathyrella candolleana**
- **Rigidiporus lineatus [nursery]**
- **Schizophyllum commune**
- **Steccherinum ochraceum [show case]**

Temperate greenhouse (excl. succulents section), incl. the corresponding section in the nursery:

- **Coniophora puteana**
- **Conocybe crispella [nursery]**
- **Coprinus domesticus**
- **Coprinus plagioporus**
- **Leucocorinlus birnbaumii** var. **rorulentus**
- **Limacella glioderma**
- **Lyophyllum fumosum**
- **Melanoleuca rasilis**
- **Melanophyllum haematospermum**
- **Mycena sanguinolenta**
- **Psathyrella candolleana**
- **Psathyrella pseudocorrigis**
- **Psathyrella spadiceogrisea**
- **Tubaria conspersa**

Cool greenhouse, incl. the corresponding section in the nursery:

- **Gymnopus dryophilus**
- **Hemimycena cucullata**
- **Leucoagaricus americanus**
- **Leucoagaricus leucothites**
- **Leucoagaricus birnbaumii** var. **rorulentus**
- **Lyophyllum fumosum**
- **Leucocorinlus denudatus**
- **Limanella glioderma**
- **Lymenella fumosum**
- **Mycena leptocephala**
- **[also in the nursery]**
- **Mycena sanguinolenta**

Temperate greenhouse (Succulents I):

- **Lepiota cristata**
- **Leucocorinlus cepistipes var. rorulentus**

Temperate greenhouse (Succulents II, incl. the cycads): no collections

References

