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THE LEOTIOMYCETES (ASCOMYCOTA) IN WESTERN EUROPE KEY TO THE SPECIES.

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Abb.: max./min. = maximum/minimum; BE/F = Belgium/Flanders; BE/W = Belgium/Wallonia; CRB = cresylblue 0.3-1 %, IKI = jodkaliumjodide, MLZ = Melzer's reagent; KOH = potassiumhydroxide 1-5%; LB = lipid body (oily guttule); OCI = oil content index of the spores: 0 = without lipid content, 5 = maximal possible lipid content, VB = vacuolar body.

Used marks:

- = present in Belgium
- = present in Belgium and available in the herbarium of the author
- (●) = non Belgian collection(s) available in the herbarium of the author

Lit.: Ekanayaka et al. 2019: 310, Haelewaters et al. 2021: 1323.

Class **LEOTIOMYCETES**

- Order **Chaetomellales** Crous et al. 2017
- Order **Erysiphales** Gwynne-Vaughan 1922
- Flagellospora** clade
- Order "**Helicogoniales**"
- Hamatocanthoscypha - Hyphodiscus** clade
- Order **Helotiales** Nannf. 1932
- Order **Lahmiales** O.E. Erikss. 1986
- Leptodontidiaceae** clade
- Order **Lauriomycetales** Hern.-Restr., R.F. Castañeda & Guarro 2017
- Order **Leotiales** Carpenter 1988
- Order **Marthamycetales** P.R. Johnst. & Baral 2019
- Order **Medeolariales** Korf 1982
- Order **Phacidiales** Bessey 1907
- Order **Rhytismatales** M.E. Barr ex Minter 1986
- Order "**Sclerotiniales**"
- Order **Thelebolales** P.F. Cannon 2001
- Trizodia - Calloriopsis** clade

Leotiomycetes, familia incertae sedis:

- Bloxamiaceae Locq. 2017
- Hamatocanthoscyphaceae Ekanayaka & K.D. Hyde 2019
- Hyphodiscaceae Ekanayaka & K.D. Hyde 2019
- Myxotrichaceae Locq. ex Currah 1985
- Pseudeurotiaceae Malloch & Cain 1970

Leotiomycetes, genera incertae sedis: c. 15 genera

Key to the orders

- 1 Ascomata mostly absent. Asci cilindro-clavate, inamyloid, with or without crozies. Ascospores frequently budding conidia, Anamorph Hyphomycetous or pycnidial. Parasitic in hymenia of fungi, mainly discomycetes "**Helicogoniales**"
- 1' Ascomata always present 2
- 2 Ascomata with prominent stroma 3
- 2' Stroma absent or inconspicuous 5
- 3 Ascomata apothecial, sessile to long-stalked, opening in an early phase, arising from a stroma or sclerotium, or from stromatised host tissue. Paraphyses mostly with elongate vacuolar bodies. Asci mostly with amyloid ring of *Sclerotinia*-type, with or without croziers. Ascospores uniseptate, sometimes combined with several nuclei, overmature ascospores

- may become multiseptate and form microconidia. Anamorph hyphomycetus, rarely pycnidial. Parasitic or parasitic/saprobic. "Sclerotinales" p.p.
- 3' Ascomata apothecial, developing within a stroma, opening in a late phase 4
- 4 Stromata with one or more hymenial areas eventually rupturing only after the hymenium is mature (either by one or more longitudinal slits or in a stellate manner). Asci mostly clavate, 1-. Ascospores usually aseptate, often with gelatinous sheath **Rhytismataceae (Rhytismales)**
- 4' Parasitic on *Nothofagus* **Cyttariaceae (Helotiales)**
- 5 Ascomata chasmothecial, sitting on a superficial mycelium. Hamathecium absent. Asci mostly few, broadly clavate, 2-8-spored. Ascospores subglobose to ovoid, aseptate, hyaline or almost so. Anamorph conspicuous, Hyphomycetous. Conidia terminal, single or catenate, aseptate, hyaline. Biotrophic on leaves and stems **Erysiphales**
- 5' Ascomata not chasmothecial 6
- 6 Ascomata minute, apothecial or cleistothecial, glabrous or with tapering hairs. Paraphyses straight to slightly curved. Asci clavate or subglobose, opening by an irregular slit, 1-, often multispored; with or without croziers. Ascospores glued together inside the ascus, ellipsoid to fusoid, eguttulate. Mainly on dung. **Thelebolales**
- 6' Ascospores not glued together inside the ascus 7
- 7 Ascomata circular, superficial, discoid, or immersed and becoming erumpent, opening by irregular tears in upper layer. Asci clavate, unitunicate with or without apical dehiscence ring. Ascospores ellipsoid to subcylindrical or irregularly so, straight to curved, aseptate, hyaline or brown, without sheath. Paraphyses branched or simple, septate, hyaline, anastomosing, invested in mucilage. Conidiomata uni- to multilocular, single to aggregated. Conidiophores hyaline, smooth, branched, or reduced to conidiogenous cells. Conidiogenous cells phialidic, at times proliferating percurrently, invested in mucilage. Conidia subcylindrical, ellipsoid-oblong or subreniform, aseptate, with or without appendages. Saprobiic or plant pathogenic. **Phacidiales**
- 7' Ascomata either with naked hymenium from the beginning or at least more or less spherical opening by a pore to expose the hymenium long before the formation of mature asci and ascospores 8
- 8 Ascomata with elongate fertile part and a stipe. Paraphyses without vacuolar bodies. Asci mostly with amyloid apical ring. Ascospores ellipsoid to elongate, septate or not, smooth, hyaline or brown, OCI high **Leotiales**
- 8' Ascomata without elongate fertile part 9
- 9 Ascomata mostly apothecial, rarely cleistothecial, perithecial or mazaedial, sessile to long-stalked, non- to strongly gelatinous. Asci with rounded or conical apex, with or without amyloid ring, exceptionally entire ascus wall amyloid. Ascospores globose to filiform, 0- to multiseptated, hyaline, rarely brown, smooth, rarely ornamented, with or without sheath, lipid content low to high, often easily germinable. Anamorph present or absent. **Helotiales**
- 9' Ascomata apothecial, immersed to erumpent, sessile to substipitate; hymenium plane to convex, whitish, exterior ochraceous to red-brown, hairless or with scattered, long brown setae. Setae absent (*Pilidium*) or present (*Chaetomella*), dark brown, thick-walled, septate, smooth, apically subclavate, straight or curled at apex. Paraphyses simple, apically branched. Asci 8-spored, cylindrical-clavate, with rounded, thick-walled, inamyloid apex. Ascospores ellipsoid-fusoid, aseptate, hyaline,. Anamorph, if known, dimorphic. Pycnidial morph sessile, dark brown to black, usually opening by fissures. Sporodochial morph sessile to long-stalked; conidiomata with or without brown setae. Conidiogenous cells phialidic. Conidia straight to falcate with pointed ends, 0-1-septate. Habitat: Parasitic or saprobic on leaves, herbaceous stems and fruits of dicots. **Chaetomellales**

CHAETOMELLALES Crous et al. 2017

Lit.Crous et al. 2017: 423, :Ekanayaka et al. 2019: 310.

Families belonging to this order:

Chaetomellaceae Baral, P.R. Johnst. & Rossman

Marthamycetaceae Baral, Lantz, Hustad et al.

Key to the families:

- 1 Apothecia sessile to substipitate, erumpent initially develop beneath epidermis, with or without hairs **Chaetomellaceae**
- 1' Apothecia rounded to elongated, semi-immersed, opening by irregular splits in epihymenium or median longitudinal split with adhering host tissue **Marthamycetaceae**

CHAETOMELLACEAE Baral, P.R. Johnst. & Rossman

Lit.: Pärtel & Baral 2016, Ekanayaka et al. 2019: 322..

Genera belonging to this family:

- 1.
2. *Chaetomella* Fuckel
3. *Corniculariella* P. Karst.
4. *Hainesia* Ellis & Sacc.
5. *Pilidium* Kunze
6. *Sphaerographium* Sacc.
7. *Synchaetomella* Decock & Seifert
8. *Xeropilidium* Baral & Pärtel

Key to the genera treated here:

- 1 With synnematal synanamorph *Synchaetomella*
- 1' With sporodochial synanamorph 2
- 2 Apothecia setose *Chaetomella*
- 2' Apothecia erumpent, non-setose; anamorph pycnidial; spores non-septate, 9-11 µm long *Pilidium*

Chaetomella Fuckel

Syn.: *Zoellneria* Velen.

Type species: *Chaetomella oblonga* Fuckel

Lit.: Dennis 1981: 10 (sub *Zoellneria rosarum*),

- 1 Apothecia cup-shaped on a small base, disc flat, about 0.5 mm diam., yellowish, receptacle bearing stiff brown hairs; asci 75x6 µm, I-; spores narrowly clavate, 6-9x2.5 µm; hairs up to 200x6-8 µm, dark brown, apex paler, with simple or forked base; saprobic on leaves of *Rosa* spp. under wild rose bushes; phen.: VIII-XII ***Chaetomella oblonga*** Fuckel (1870)
 Ill.: Dennis 1981: fig. 33P.

Pilidium Kunze

Syn.: *Discohainesia* Nannf., *Hainesia* Ellis & Sacc.

Type species: *Pilidium acericum* (Alb. & Schwein.) Kunze

Lit.: Seaver 1951: 211 (sub *Mollisia oenotherae*), Rossman et al. 2004 (*Pilidium acerinum*), Wang & al. 2006: .

- 1 Sexual morph: Apothecia 0.5-1 mm diam., substipitate, hymenium whitish; asci 55-70x7-8 µm; spores 8x2 µm. Asexual morph: Conidiomata pycnidial or hemispheric sporodochial, amphigenous. Conidia ellipsoid-fusoid, 6.8-8.2x1.4-2 µm, aseptate, smooth, hyaline; conidial mass orange when dry. Parasitic on leaves of *Castanea sativa*, *Bergenia*, *Calluna vulgaris*, *Fallopia*, *Lysimachia*, *Lythrum*, *Rosa*, leaves and fruits of *Fragaria vesca*, *Olea*. Phen.: (II)VI-X (BE/F, DE, FR) ***Pilidium lythri*** (Desm.) Rossman (2014)
- 1' Sexual morph: Apothecia about 0.5 mm diam., sessile, hymenium whitish, outside reddish brown; asci 92-102x7.5-8.5 µm, IKI-, with croziers; spores (8.5)10-14(16)x(2.5)3.5-4.5(5.5) µm. Asexual state: Pycnidia (in company of teleomorph) with hyaline, slightly curved fusiform conidia 15-16x2.5-3 µm. Pathogen on leaves of *Acer opalus subsp. granatense*, *A. pseudoplatanus*, *Betula pendula*; phen.: IX-XI (ES) ***Pilidium acerinum*** (Alb. & Schwein.) Kunze (1824)

Xeropilidium Baral & Pärtel

Type species: *Xeropilidium dennisii* Baral, Pärtel & G. Marson

Lit.: Pärtel & Baral 2016.

- 1 Apothecia erumpent, cupulate, finally flat, disc bright grey to dark grey, shiny, 1-2(3) mm diam., resembling a *Mollisia*, single or in groups of 3 to 4; ectal excipulum greyish to dark brown, covered by white pruina; asci *42-85 x4.5-6 µm, IKI-, with croziers; spores narrowly cylindrical, sometimes ellipsoid, *4.5-8(10)x(1.2)1.4-1.7 µm; hyaline crystals on flanks and margin; paraphyses interspersed with hyaline to pale yellowish, cloddy-amorphous granules; with sporodochial and pycnidial synanamorphs; saprobic on still attached twigs of *Cornus sanguinea*, *Crataegus* sp., *Prunus spinosa*, *Rosa* spp. and *Salix* spp.; phen.: X-VI (BE/W, ES, FR, LU, DE, GB, SE)

..... **Xeropilidium dennisii** Baral, Pärtel & G. Marson (2016)
III.: Pärtel & Baral 2016: fig. 11.

MARTHAMYCETACEAE Baral, Lantz, Hustad & Minter 2015

Lit.: Baral 2015 (unpublished key), . Ekanayaka et al. 2019: 322.

Genera belonging to this family:

1. *Cyclaneusma* DiCosmo, Peredo & Minter
2. *Marthamyces* Minter
3. *Mellitiosporiella* Höhn.
4. *Mellitiosporium* Corda
5. *Naemacyclus* Fuckel
6. *Phragmiticola* Sherwood
7. *Propolina* Sacc.
8. *Propolis* (Fr.) Corda

Key to the genera:

- | | | |
|----|---|--------------------------|
| 1 | Spores filiform | 2 |
| 1' | Spores not filiform | 4 |
| 2 | Apothecia circular to angular, immersed, with little or no lower and side wall and a poorly-defined upper wall with a consisting covering layer which often contains crystalline material, greyish hymenium; asci cylindrical, 8-spored, 1-; spores filiform, smooth, transversely septate, hyaline; saprobic on leaves and similar substrates | <i>Marthamyces</i> |
| 2 | On needles and cones of <i>Pinus</i> | 3 |
| 3 | Apothecia deeply embedded, clypeate, opening by short radial splits; hair-like cells produced from the upper wall and lining of the split; spores septate; saprobic on dead attached needles or cones of <i>Pinus</i> spp. | <i>Naemacyclus</i> |
| 3' | Apothecia not clypeate, opening by a pair of flaps; without hair-like cells; spores septate; saprobic on needles of <i>Pinus</i> spp. | <i>Cyclaneusma</i> |
| 4 | Spores septate | 5 |
| 4' | Spores consistently non-septate, even when apothecia overmature, lipid content ± high; dead asci apically thin-walled, subapically thick-walled (especially when immature); paraphyses apically often with short to long, contorted branches..... | 7 |
| 5 | Apothecia immersed-erumpent,; hymenium entirely blue in IKI, turning red-brown at higher concentration. Asci thick-walled, 1-8-spored; spores with longitudinal as well as transverse septa | <i>Mellitiosporium</i> |
| 5' | Spores predominantly 1-3 or up to 7-13-septate when mature, lipid content low to high; asci 8-spored; dead asci usually with apical thickening (especially when immature), sometimes enclosing an amyloid ring, rarely thin-walled; paraphyses not or only sparsely branched at the uppermost apex | 6 |
| 6 | Paraphyses with a coarse, densely adhering covering layer of warts, paraphyses forming hair-like projections, likewise warted; asci with amyloid ring; ascospores (1-)3-septate, 13-23 µm long; disc ± orange-rose to greyish-brownish | <i>Phragmiticola</i> |
| 6' | Paraphyses loosely covered by granular exudate, paraphyses not projecting; asci with or rarely without amyloid ring; spores 1-13-septate, 11-70 µm long; disc whitish, cream, greyish, bluegreen | <i>Mellitiosporiella</i> |
| 7 | Apothecia circular to angular, immersed, with little or no lower, side and upper wall, without a covering layer or with one which is soon lost, hymenium whitish to coloured; asci saccate, generally 8-spored and 1-; spores ellipsoid to reniform, smooth, aseptate or sometimes transversely septate, hyaline or slightly pigmented; saprobic on wood, bark, fallen conifer cones and similar substrates | <i>Propolis</i> |
| 7' | Asci multispored | <i>Propolina</i> |

***Cyclaneusma* DiCosmo, Peredo & Minter**

Type species: *Cyclaneusma minus* (Butin) DiCosmo, Peredo & Minter

Lit.: DiCosmo & al. 1983: 208.

- 1 Apothecia erumpent, opening by a longitudinal slit in the epidermis, forming a pair of bend back flaps, about 0.5 mm long, hymenium ochraceous orange; spores cylindrical, slightly curved, rounded ends, 70-85x2-3 µm, with one or two septa near the middle, guttulate; saprobic on fallen needles of *Pinus radiata* and *Pinus sylvestris*; phen.: XI-V

- • **Cyclaneusma minus** (Butin) DiCosmo, Peredo & Minter (1983)
 1' Similar to *C. minus*; hymenium whitish; spores 90-120x2-2.5 µm, aseptate; saprobic on needles of *Pinus sylvestris*
 **Cyclaneusma niveum** (Pers.) DiCosmo, Peredo & Minter (1983)

Marthamyces Minter

Type species: *Marthamyces emarginatus* (Cooke & Masee) Minter

Lit.: Saccardo 1889: 746 (sub *Coccomyces ursinus* and *C. albidus*), Johnston 1986: 115 (sub *Propolis*), Minter 2003: 50, Rubio & al. 2010: 333.

- 1 Asci 110-120x11-16-3 µm; spores 60-80x1-2 µm; on leaves of *Arctostaphylos uva-ursi* and *Vaccinium*; phen.: VI ...
 **Marthamyces phacidioides** (Fr.) Minter (2003)
 Ill.: Rubio & al. 2010: p. 333.

Mellitiosporiella Höhn.

Type species: *Mellitiosporiella puOClhella* Höhn.

Lit.: Baral 2015 (unpublished key).

- 1 Spores predominantly with more than 3 septa, lipid content low to high 2
 1' Spores predominantly 3-septate or less, lipid content low; asci always inamyloid and apically thick-walled 4
- 2 Asci inamyloid; spores *27-40x9-12.5 µm, 7-septate, with small and medium large LBs (lipid content medium); on wood of *Laurus*, Canary islands (E. Beltran) **Mellitiosporiella canariensis** Baral nom. prov.
 2' Asci with amyloid apical ring 3
- 3 Mature ascospores consistently with 7 transversal septa, *(27)30-37(42)x8.3-10.6 µm, with one large and several small LBs in each cell; on wood of *Olea*, Dalmatia **Mellitiosporiella octomera** Baral nom. prov.
 3' Mature spores with 4-5 transversal and a few longitudinal septa, *(33)35-39(40)x(9.2)9.5-10.5(11) µm, containing many small but no large LBs; on bark of *Salix*, Poland **Mellitiosporiella polonica** nom. prov.
- 4 Spores *13-21.5x3.5-5.5(6) µm, (1-2)3-septate (in living 8-spored asci), with few small LBs near septa, or 1-2 LBs 0.5-1.8 µm and several small ones, lipid content low to medium 5
- 5 Spores slightly to medium allantoid, *(11)13-19(21.5)x(3.5)4-5.5(6.2), (1)3-septate, lipid content low to medium; asci *40-85x10-15 µm (†40-76x7-10.5); disc deep slate-grey (exudate blue-green); on wood (also bark) of various dicots (especially Rosaceae, Fagaceae, Salicaceae) and conifers (*Pinus*, *Picea*, *Abies* etc.), mediterranean (S-Europe), semi-deserts (SW-USA) **Mellitiosporiella puOClhella** Höhn. (1919)
 Ref.: Dennis (1981: 17), Ellis & Ellis (1985: 9), Höhnel (1918: 211).
- 5' Spores *(16-)17-20(-21.5)x(3-)3.4-4(-4.7) µm, 3-septate; hymenium greyish-white; asci *53-57x19-20 µm (†-39-52 up to 70-75 x 11-15 µm); bark of *Salix caprea*, *S. cinerea*, temperate Europe, NW-Europe, W-Siberia and Altay
 **"Propolis" angulosa** P. Karst.

Mellitiosporium Corda

Type species: *Mellitiosporium versicolor* Corda.

Lit.: Saccardo 1889: 704, Rehm 1896: 172, Dennis 1981: 37, Minter: Fungi of Ukraine, Senn-Irlet 2014: 151.

- 1 Apothecia elongate urceolate, immersed-erumpent, 0.5-1 mm diam., hymenium dark red-brown to black; asci 30-40x8-10 µm, I-, 1-spored; spore 24-37x(7)8-9 µm, with 7-16 traverse septa, few segments with 1-2 longitudinal septa, brown; paraphyses with brown enlarged tip; saprobic on bleached spots on decorticated branches of *Picea*, *Pinus*, *Salix*; phen.: III, VII-X (•) **Mellitiosporium propolidoides** (Rehm) Rehm (1888)
 Ill.: Dennis 1981: fig. 34D, Senn-Irlet 2014: pl. 1-2.
- 1' Apothecia circular to elongate, hymenium pale brown; asci 8-spored; spores 28-44x5-9 µm, 6-7-traverse septa, few segments with 1-2 longitudinal septa; saprobic on petioles of *Pteridium aquila*
 **Mellitiosporium pteridinum** (W. Phillips & Buckn.) Sacc. (1889)

Naemacyclus Fuckel

Syn.: *Lasiostictis*

Typus: *Naemacyclus pinastri* (Lacroix) Fuckel = *Naemacyclus fimbriata* (Shwein.) DiCosmo, Peredo & Minter

Lit.: Sherwood 1974: 41 (sub *Lasiostictis fimbriata*), Ellis & Ellis 1985: 441 (*N. caulium*), Minter, Fungi of Ukraine.

- 1 Spores up to 60 µm long 2

- 1' Spores more than 60 µm long 3
- 2 Apothecia with black clypeus, erumpent, about 0.5 mm diam., disc whitish with white minutely downy margin; spores narrow clavate, 50-60x1.5-2.5 µm, 5-7-septate, guttulate, with mucous coating; on branches, cone scales and needles of *Pinus nigra*, *P. sylvestris*, *P. halepensis*; phen.: II-IX
 (●) **Naemacyclus fimbriatus** (Shwein.) DiCosmo, Peredo & Minter (1983)
- 2' Apothecia immersed, up to 1 mm diam., grey disc becoming exposed after host tissue splits into 4 lobes; spores 40-50x1.5 µm, mostly 7-septate, hyaline; saprobic on stem base of *Urtica*; phen.: IV
 **Naemacyclus caulium** Höhn.(1906)

Phragmiticola Sherwood

Type species: *Phragmiticola rhopalospermum* (Kirschst.) Sherwood.

Lit.: Sherwood 1987: 168, Baral 2015 (unpublished key).

- 1 Spores *(4)5–6(7) µm wide; marginal hairs ± 30–50 µm long; on wood of various angiosperm trees and shrubs (*Acer*, *Arctostaphylos*, *Corylus*, *Quercus*, *Pistacia* etc.), semi-arid (e.g. mediterranean), Europe, USA
 **Phragmiticola desertorum** Baral nom. prov.
- 1 Ascumata immersed, orbicular to elongate in outline, pustulate but not erumpent, 0.3-1x0.3-0.6 mm, brown to black, splitting open to expose an pink-orange hymenium; asci 40-60x7-9 µm, I+; spores cylindrical-clavate, 15-22x(3.5)4-4.5 µm, 3-septate, hyaline, with mucous sheath; marginal hairs 10-20 µm long; saprobic on culms of *Phragmites australis*; phen.: IV-VI
 ● **Phragmiticola phragmitis** (Dearn. & House) Magnés (1997)

Propolidium Sacc.

Type species: *Propolidium glaucum* (Ellis) Sacc.

Lit.: Saccardo 1899: 808.

- 1 Ascumata 0.2-0.3 mm diam., disk ochraceous brown with paler margin; asci 50-55x6-7 µm; spores fusiform, 13-17x2.5-3 µm, becoming 3-septate, hyaline; saprobic on bark of deciduous and coniferous trees; phen.: V,XI
 **Propolidium ambiguum** Starbäck (1895)

Propolis (Fr.) Corda (1836) non *r* Fr. (1849)

Type species: *Propolis farinosa* (Pers.) Fr.

Syn.: *Propolomyces* Sherwood

Lit.: Dennis 1982: 218, Hansen & Knudsen 2000: 214, Minter 2003: 44.

- 1 Spores cylindric-ellipsoidal(-clavate), l:w ratio 2-3.5, predominantly straight, a few very slightly (rarely medium) allantoid, *10-31 µm long; disc white, cream, reddish, or blue-green(-grey) 2
- 1' Spores cylindrical (always homopolar), l:w ratio 3–5, slightly to medium allantoid, *16-30 or up to 55 µm long; disc white or cream (blue-green colours consistently absent, even when growing sun-exposed) 6
- 2 Mature living spores multiguttulate, LBs 0.7-1.5(2) µm diam., scattered to abundant, surrounded by smaller ones; apothecia often roundish but also very elongate, hymenium chalky-white or pale greyish-cream 3
- 3' Mature living spores 1-2(3)guttulate (large LBs 2–3 to 4–6.5 µm diam., surrounded by few to many small ones) .. 4
- 3 Spores *22-27(28.5)x(10)12-14(15) µm, wall *0.8-1 µm thick (†1.2-2); asci *230x18-19.5 µm; on bark of trunks of old standing living *Pinus pinaster* (also *P. sylvestris*?), atlantic France **Propolis leonis** (Tul.) Rehm
- 3' Spores *(13)15-18.5(21)x(6)7-8(9.7) or (18)20-26(28.5)x(7)8.5-10.5(11.5) µm, wall *~0.2–0.4 µm thick (†~0.5–1); asci *(110)130-200(223)x14.5-17(18) µm; on cones of *Pinus uncinata*, wood of *Pinus cembra*, Vosges, Alps, 630–1800 m
 **Propolis rhodoleuca** (Sommerf.) Fr. (1849)
- 4 Apothecia fully pale to deep blue-green(-grey), sometimes hymenium whitish-cream and only lobes pale blue-green, rarely blue-green pigment completely absent (esp. if growing in dark cavities); spores partly heteropolar (clavate), *14-21(26)x 6.5-8.5 µm (immature *12–18x4.8-6.5 µm, LBs 2-3 µm), with two large LBs 3-4.7 µm diam. and a few to many minute ones,; asci *75-103x12.5-18 µm (†80-115x11-14.3 µm); on wood or cones of various conifers and dicots (*Calicotome villosa*, *Phyllyrea media*, *Pinus halepensis*), mediterranean (S-Europe), 0–1500 m
 **Propolis viridis** L.M. Dufour
 Ill.: Rubio & al. 2010: p. 254.
- 4' Asci †120-228 µm long; spores *19–31 µm long, large LBs 4–7 µm diam. 5
- 5 Disc whitish to reddish-cream, finally strongly convex; spores with 1(2) large LBs, *19-27(31)x9-10.5(11.8) µm; asci †155-178(220)x18.5-23 µm; on wood of *Quercus*, Luxembourg **Propolis quercina** nom. prov.

- 5' Disc whitish to greyish, lobes hyaline (USA, Utah) or light blue-green (Madeira); spores with 2(3) large LBs, *22-31x 9-12 µm; asci †120-228x14.5-16.5(19?) µm; on decorticated twig of *Arctostaphylos* (Utah) or ?*Erica* (Madeira) (G. Marson) **Propolis subviridis** nom. prov.
- 6 Spores predominantly > 30 µm long and > 9 µm wide; living and dead asci both > 19 µm wide 7
- 6' Spores predominantly < 30 µm long and < 9 µm wide; living and dead asci both < 19 µm wide 8
- 7 Spores *(28)32-42(50)x9-12.5(13.5) µm, with 1-2 large LBs 4-8.5 µm diam. in each half and many ± small ones, spore wall †0.3 µm thick; asci *180-193x24-26 µm (†140-150x20-22); on wood of *Quercus* (temperate), branches of *Pinus* (bark and wood), submediterranean, S-France-Alps, 1000–1400 m a.s.l. **Propolis (versicolor var.) betulae** (Fuckel) Rehm (1871)
- 7' Spores *(26)30-45(55)x(11)12-14(16) µm, with many small LBs c. 1-2 µm diam. and many minute ones, spore wall †1-1.5 µm thick (†0.7-0.8 µm); asci *160-255x29-34 µm (†155-180x25-37 µm); on branches of *Picea*, *Juniperus* (bark or wood), montane-subalpine (700–1540 m) (DE, FR, AT,NO) **Propolis hillmanniana** Kirschst. (1935)
- 8 Spores *(20)22–29(33)x(6)6.5–8(10) µm, large LBs 3–4.7 µm diam.; asci *137–187x14–18.3 µm; on coniferous and deciduous wood and bark (*Ceratonia siliqua*, *Populusxcanadensis*, *Populus tremula*, *Rosa* sp., *Salix*), also on coniferous cones; phen.: II-III; temperate and mediterranean, worldwide ● **Propolis farinosa** (Pers.) Fr. (1849)
Spore size varies somewhat in this common species, and the limits to var. *betulae* are not very clear. For descriptions see Bellemère (1968: 428, 1977: 249), Beaton (1976: 450), Dennis (1978: 218), Breitenbach & Kränzlin (1981: 289), Huhtinen (1985: 492), Johnston (1991) and Chlebicka (2013), and about nomenclature Sherwood (1977b), Dennis (1982), Minter (2003) and Chlebicka (2013).
- 8' Spores rarely >6.5 µm wide..... 9
- 9 Spores *16-25.5x5-6.5 µm, 2 large LBs 2.7-4.5 µm diam.; asci?; on wood and bark of *Olea*, *Prunus*, etc.; mediterranean **Propolis ?farinosa** (Pers.) Fr. (1849)
- 9' Hymenium mostly pale reddish. Spores *(20)22-30(34)x5-6.5 µm, large LBs 1.5-3.5 µm diam.; asci *101-137x15.5-18.3 µm; on bark of *Salix*; phen.: XI (DE) **Propolis rubella** Fuckel (1870)

ERYSIPHALES Gwynne-Vaughan 1922

Lit.: Bolay 2005: 1, Braun & Cook 2012: 1, Jaklisch et al. 2016: 157, Ekanataka et al. 2018: 342.

Families belonging to this order:

1. Amorphothecaceae Parbery
2. Erysiphaceae Tul. & C. Tul.

Key to the families:

- 1 Ascomata cleistothecial, rarely apothecial. Cleistothecia globose, with apical outgrowths. Peridium composed of thick-walled brown hyphae with appendages. Asci 8-spored, arising from croziers and sometimes evanescent. Ascospores smooth or striate, hyaline. Apothecia cupulate-turbinate, sessile, with hairy flanks and margin. . Paraphyses are filiform and branched at the apices. Asci are 8-spored, cylindrical-clavate and amyloid. Ascospores are hyaline, ellipsoid to fusoid and 1–3-septate. Saprobiic on wood. **Amorphothecaceae**
- 1' Ascomata chasmothecial, often with appendages, sitting on a superficial subiculum. Hamathecium absent. Asci 2-8-spored. Ascospores subglobose to ovoid, aseptate, hyaline or almost so. Biotrophic on leaves and stems. **Erysiphaceae**

AMORPHOTHECACEAE Parbery

Syn.: Myxotrichaceae Locq. ex Currah

Lit.: Ekanayaka et al. 2019: 342.

Genera belonging to this family:

1. *Amorphotheca* Parbery
2. *Brefeldochium* Verkley 2005
3. *Byssosascus* Arx
4. *Myxotrichum* Kunze
5. *Oidiodendron* Robak
6. *Polydesmia* Oud.

Key to the genera with sexual morph treated here:

- 1 Ascomata globose, peridium a network of branched, thick-walled hyphae, with usually brown radiating hyphae which either form spines or grow on into appendages, often with incurved or circinate tips; asci 8-spored ; hyphomycetous *Oidiodendron* anamorph producing chains of arthroconidia..... *Myxotrichum*
- 1' Ectal excipulum of glassy-walled *textura angularis*; hairs delicate, coiled or crisped; spores 1-3-septate at maturity; paraphyses propoloid *Polydesmia*

Myxotrichum Kunze

Type species: *Myxotrichum chartarum* Kunze

Lit.: Ellis & Ellis 1988: 130 & 163, Welt & Heine 2007: 238.

- 1 Peridial appendages with branched in upper part, up to 200x1.5-3 µm, side branches deflexed, up or down, apices often hyaline; ascomata 0.1-0.4 mm diam. including appendages; peridial hyphae dark brown, smooth; spores lenticular, 4-5.5x2.5-3 µm, delicately striate, pale yellowish orange in mass; on damp paper, rotting canvas, etc. **Myxotrichum deflexum** Berk. (1838)
- 1' Peridial appendages with upper part not branched 2
- 2 Peridial appendages uncinat 3
- 2' Peridial appendages straight 4
- 3 Ascomata globose, up to 1 mm diam., greyish green to blackish brown; periderm a network of thick-walled, dark brown hyphae with radiating spine-like branches; appendages dark brown, smooth, uncinat, thickened at their tips; asci oval, 8-spored; spores ovoid, 4-5x2-3 µm, finely striate, becoming pale orange-brown; conidia 3-8x1.5-3.5 µm; on damp paper and cardboard, rotting canvas and leather or on dung ○ **Myxotrichum chartarum** Kunze (1823)
- 3' Appendages not thickened at their tips, tapered; spores oval or ellipsoid-fusiform, 3.5-5x1.5-3 µm, hyaline or pale; on damp cardboard **Myxotrichum aeruginosum** Mont. (1836)

- 4 Peridial hyphae asperulate, brown, from which arise brown, smooth, spine-like appendages 50-350x3-5 µm; spores ellipsoid, 3-4x1-2 µm, hyaline; on damp paper **Myxotrichum cancellatum** W. Phillips (1884)
- 4' Peridial hyphae smooth 5
- 5 Ascomata up to 0.5 mm diam., excluding appendages, brown; appendages 90-1700x5 µm, tapered, branches arising from base only and turning upwards; spores 3.5-5x1.5-3 µm, hyaline or pale yellow, orange-yellow in mass; on damp corrugated cardboard **Myxotrichum ochraceum** Berk. & Broome (1875)
- 5' Appendages up to 200x4 µm, branched in lower part, grey brown, spine-like; asci 8-spored, globose, 7-9 µm diam., with 5-8 µm long stalk; spores narrowly ellipsoid, 4-7x2-2.5 µm, hyaline to pale yellowish **Myxotrichum stipitatum** (Lindf.) Orr & Kuehn (1963)
 Ill.: Welt & Heine 2007: Abb. 21-22.

Oidiiodendron Robak

Type species: *Oidiiodendron fuscum* Robak

Lit.: Rice & Currah 2005: 83.

Polydesmia Boud.

Type species: *Polydesmia pruinosa* (Jerd. Ex Berk. & Broome) Boud.

Lit.: Korf 1978: 457, Raitviir & Galan 1995: 447, Huhtinen & Santesson 1997: 205, Verkley 2005: 503 (*Brefeldochium pruinorum*), Puolasmaa & al. 2012: 27 (*P. lichenis*).

- 1 Apothecia pale yellow to pale brown 2
- 1' Apothecia pure white to dirty white, cupulate to patellate 3
- 2 Apothecia yellowish, turbinate; asci 70-80x9-13 µm; spores 18-24x2.5-4 µm, 3-septate at maturity; on fallen stromatized fruit-capsules of *Eucalyptus globulus*; phen.: XI **Polydesmia turbinata** Raitv. & R. Galán (1995)
- 2' Apothecia light yellow to light brown, with paler margin, pruinose, sessile, 0.16-0.24 mm diam.; asci 83-120x9-13 µm, MLZ+, with croziers; spores 10-25x3-5 µm, 0-3-septate, sometimes with greenish guttules; ectal excipulum of *textura angularis*; hairs thin, undulating; on thalli of *Peltigera* spp.; phen.: (VI)VIII-XII (SE) **Polydesmia lichenis** Huhtinen & R. Sant. (1997)
 Ill.: Huhtinen & Santesson 1997: fig. 1, Puolasmaa & al. 2012: fig. 26.
- 3 Apothecia white; asci 80-110x8-11 µm, MLZ+, with croziers; spores 14-22x3.7-5.1 µm, 3-septate at maturity; paraphyses strongly branched; anamorph *Brefeldochium pruinorum* (in vitro) with hyaline, 3-5-septate, faOClate hyaloconidia 18-45x4-6 µm, mainly on old *Xylariales* (*Biscogniauxia nummeralia*, *Diatrype decorticata*, *D. bullata*, *D. stigma*, *Diatrypella favacea*, *Diatrypella quercina*, *Eutypella prunastri*, *Hypoxylon fragiforme*, *H. fuscum*, *H. howeanum*, *H. multiforme*, *H. rubiginosum*, *Nemania serpens*, *Rosellinia* sp.), sometimes on other ascomycetes (*Camaropella lutea*, *Catinella olivacea*, *Melanomma pulvis-pyrius*, *Valsa*); phen.: I-V(VI-VIII)IX-XII (BE/F, BE/W, DE, FR, NL, UK) • **Polydesmia pruinosa** (Jerd. Ex Berk. & Broome) Boud. (1885)
 Ill.: Huhtinen & Santesson 1997: fig. 2.
- 3' Apothecia 0.2-1 mm diam.; asci 43-61x4.5-6 µm, 1+; spores 6-12(17)x1.5-2.5 µm, 1-septate at maturity; paraphyses apically sparsely branched; on forest debris (fruit-capsules of *Eucalyptus globulus*, fallen pods and peduncles of *Mimosa* spp, acorns mummified by *Sclerotinia pseudotuberosa*, stromatized leaves of *Rosa* sp., bark of *Salix* sp.); phen.: X-IV (BE/F) • **Polydesmia fruticola** Korf (1978)

ERYSIPHACEAE Tul. & C.Tul. 1861

Lit.: Ekanayaka et al. 2019: 322.

Genera belonging to this family:

1. *Arthrocladiella* Vassilkov
2. *Blumeria* Golovin ex Speer
3. *Brasiliomyces* Viégas
4. *Caespitotheca* S. Takam. & U. Braun
5. *Cystotheca* Berk. & Curtis
6. *Erysiphe* DC. (incl. *Bulbomicrosphaera* A.Q. Wang)
7. *Golovinomyces* (U. Braun) V.P. Heluta
8. *Levellula* G. Arnaud
9. *Microsphaera* Lév.
10. *Neoerysiphe* U. Braun
11. *Oidiopsis* Scalia
12. *Oidium* Link
13. *Ovulariopsis* Pat. & Har.
14. *Parauncinula* S. Takam. & U. Braun
15. *Phyllactinia* Lév.
16. *Pleochaeta* Sacc. & Speg.
17. *Podosphaera* Kunze
18. *Pseudoidium*
19. *Queirozia* Viégas & Cardoso
20. *Sawadaea* Miyabe
21. *Takamatsuella* U. Braun & A. Shi
22. *Typhulochaeta* Ito & Hara

Key to the genera treated here:

- | | |
|---|------------------------|
| 1 Mycelium developed internally and on the surface of the substrate; endo- and ectoparasitic genera | 2 |
| 1' Mycelium developed on the surface of the substrate; ectoparasitic genera | 3 |
| | |
| 2. Appendages awl-like, ampulliform at the base, arranged like the spokes of a wheel; conidiophores of <i>Ovulariopsis</i> -type | <i>Phyllactinia</i> |
| 2' Appendages simple, mycelium-like, poorly or not branches; conidiophores of <i>Oidiopsis</i> -type | <i>Levellula</i> |
| | |
| 3 Ascomata with only one ascus | 4 |
| 3' Ascomata with several asci | 5 |
| | |
| 4 Wall of the ascoma simple, layers firmly connected, appendages mycelioid or stiff, setiform and terminally dichotomously branched; anamorph without special aerial hyphae; outline of the conidial chains crenate | <i>Podosphaera</i> |
| 4' Wall of the ascoma differentiated, composed of two layers, which are easily separated from each other, appendages almost absent or mycelioid; anamorph with mycelium bearing special pigmented aerial hyphae, faOClate to filiform; outline of the conidial chains sinuate; on living leaves of Fagaceae (<i>Quercus</i> , <i>Fagus</i>) | <i>Cystotheca</i> |
| | |
| 5 Conidiophores of <i>Pseudoidium</i> -type; conidia isolated; appressoria lobbed | <i>Erysiphe</i> |
| 5' Conidiophores of <i>Euoidium</i> -type; conidia in chains | 6 |
| | |
| 6 Conidia with fimbrosine particles; appendages ending with one or more crooks | <i>Sawadaea</i> |
| 6' Conidia without fimbrosine particles | 7 |
| | |
| 7 Basal cell of the conidiophores bulbous; haustoria within the epidermal cells fingered; on Poaceae | <i>Blumeria</i> |
| 7' Basal cell of the conidiophores not bulbous; haustoria globose | 8 |
| | |
| 8 Appendages with dichotomous ends; on <i>Lycium</i> | <i>Arthrocladiella</i> |
| 8' Appendages simple, mycelium-like with sometimes irregular branches | 9 |
| | |
| 9 Appressoria lobbed; external wall of the conidia striate (scanning microscope, SEM) | <i>Neoerysiphe</i> |
| 9' Appressoria hilly or indistinct; external wall of the conidia reticulate (SEM) | <i>Golovinomyces</i> |

Arthrocladiella Vassilkov

Type species: *Arthrocladiella lycii* (Lasch) Vassilkov

Lit.: Bolay 2005: 33.

- 1 Parasitic on *Lycium barbatum*, *Lycium chinense*; ◦ **Arthrocladiella mougeotii** (Lév.) Vassilkov (1963)

Blumeria Golovin ex Speer

Type species: *Blumeria graminis* (DC.) Speer

Lit.: Bolay 2005: 33.

- 1 Parasitic on Poaceae (*Aegilops*, *Agropyron*, *Anthoxantum*, *Arrhenaterum*, *Avena*, *Brachypodium*, *Bromus*, *Dactylis*, *Deschampsia*, *Festuca*, *Glyceria*, *Hordeum*, *Koeleria*, *Lolium*, *Milium*, *Molinia*, *Poa*, *Secale*, *Trisetum*, *Triticum*).
Phen.: • **Blumeria graminis** (DC.) Speer (1975) [1973-1974]

Cystotheca Berk. & M. A. Curtis

Type species: *Cystotheca wrightii* Berk. & M.A. Curtis

Lit.: Hanlin 1998: 68.

- 1 On living leaves of *Quercus* **Cystotheca wrightii** Berk. & M.A. Curtis (1860)
Ill.: Hanlin 1998: 69.

Erysiphe DC.

Type species: *Erysiphe polygoni* DC. = *Erysiphe betae* (Vařha) Weltzien.

Syn.: *Microsphaera* Lév., *Uncinula* Lév.

Lit.: Huhtinen 2001:31 (sub *M. paOCizewskii*), Bolay 2005: 34.

- 1 FuOClrum ends with dichostomic divisions or with one or more crooks 2
1' Appendages simples, mycelium-like, sometimes branched (*Erysiphe* sect. *Erysiphe*) 3
2 FuOClrum ends with dichostomic divisions (*Erysiphe* sect. *Microsphaera*) 9
2' FuOClrum ends with one or more crooks (*Erysiphe* sect. *Uncinula*) 27

Section *Erysiphe*.

- 3 Ascomata with more than 10% branched appendages 4
3' Ascomata with less than 10% branched appendages 6

- 4 Appendages coralliiform; on *Paeonia* **Erysiphe paeoniae** R.Y. Zheng & G.Q. Chen (1981)
4' Appendages mycelium-like 5

- 5 On Apiaceae • **Erysiphe heraclei** DC.(1815)
5 On Asteraceae (*Cirsium*) • **Erysiphe mayorii** var. *mayorii* S. Blumer (1933)
5 On Caricaceae (*Carica*); phen.: XI **Erysiphe caricae** U. Braun & Bolay (2005)
5 On Chenopodiaceae (*Beta*, *Dysphania*) • **Erysiphe betae** (Vařha) Weltzien (1963)
5 On Convolvulaceae (*Calystegia*, *Convolvulus* and *Ipomoea*); phen.: VIII • **Erysiphe convolvuli** DC. (1805)
5 On Fabaceae (*Lathyrus* and *Ononis*) **Erysiphe pisi** var. *cruchetiana* (S. Blumer) U. Braun (1981)
5 On Plombaginaceae (*Limonium*) ◦ **Erysiphe limonii** L. Junell (1967)
5 On Polygonaceae (*Polygonum* and *Rumex*) **Erysiphe polygoni** DC. (1821)
5 On Rosaceae (*Filipendula*) ◦ **Erysiphe ulmariae** Pers. ex Desm. (1846)

- 6 Appendages longer than two times the ascoma diameter 7
6' Appendages less than two times the ascoma diameter long 8

- 7 On Brassicaceae (*Alliaria*, *Sisymbrium*), Capparidaceaea, Limnanthaceaea, Fumariaceae and Papaveraceae
..... • **Erysiphe cruciferarum** Opiz ex L. Junell (1967)
7 On Crassulaceaea **Erysiphe sedi** U. Braun (1981)
7 On Dipsacaceae ◦ **Erysiphe knautiae** Duby (1830)
7 On Lythraceae (*Lythrum*) **Erysiphe lythri** L. Junell (1967)
7 On Onagraceae (*Circaea*) • **Erysiphe circaeae** L. Junell (1967)
7 On Onagraceae (*Oenantha* and *Zauschneria*) ◦ **Erysiphe howeana** Duby (1830)
7 On Renunculaceae (*Aconitum*, *Anemone*, *Aquilegia*, *Caltha*, *Clematis*, *Delphinium*, *Ranunculus*, *Thalictrum*, *Trollius*),
sometimes on Gentianaceae (*Swertia*) and Magnoliaceae (*Magnolia*) ◦ **Erysiphe aquilegiae** DC. (1815)
7 On Santalaceae (*Thesium*) **Erysiphe thesii** L. Junell (1967)

8 On Bignoniaceae (<i>Incarvillea</i>)	Erysiphe scholzii U. Braun & Bolay (2005)	
8 On Boraginaceae (<i>Anchusa</i>)	○ Erysiphe lycopsidis R.Y. Zheng & G.Q. Chen (1981)	
8 On Caryophyllaceae (<i>Silene</i>)	○ Erysiphe buhrii U. Braun (1978)	
8 On Geraniaceae (<i>Geranium</i>)	Erysiphe geraniacearum U. Braun & Simonyan (1984)	
8 On Fabaceae	○ Erysiphe pisi var. pisi DC. (1821)	
8 On Urticaceae (<i>Urtica</i>)	○ Erysiphe urticae (Wallr.) S. Blumer (1933)	
9 Appendages flexuous, length more than three times the ascoma diameter		10
9' Appendages rigid, length less than three times the ascoma diameter		17
10 Ascoma with less than 20% of the appendages ending on dichotomic divisions		11
10' Ascoma with more than 50% of the appendages ending on dichotomic divisions		12
11 On Cornaceae (<i>Cornus</i>)	● Erysiphe tortilis (Wallr.) Link (1824)	
11 On Fabaceae (<i>Astragalus</i> and <i>Oxytropis</i>)	Erysiphe astragali DC. (1815)	
11 On Fabaceae (<i>Vicia</i>)	○ Erysiphe baeumleri (Magnus) U. Braun & S. Takam. (2000)	
11 On Fabaceae, other genera (<i>Melilotus</i> , <i>Trifolium</i> , ...).....	○ Erysiphe trifoliorum (Wallr.) U. Braun (2010)	
11 On Hypericaceae (<i>Hypericum</i>); phen.: IX	○ Erysiphe hyperici (Wallr.) S. Blumer (1933)	
11 On Oxalidaceae (<i>Oxalis</i>)	Erysiphe russelii (Clinton) U. Braun & S. Takam. (2000)	
12 On Celastraceae (<i>Euonymus</i>)		13
12 On other families		14
13 Ascomata superficial, 85-115 µm diam.; appendages with 3-4(5) dichotomic divisions		
.....	○ Erysiphe euonymi DC. (1815)	
13' Ascomata immersed in a whitish-yellowish stroma, dense, 100-145 µm diam.; appendages with 1-3 dichotomic divisions	Erysiphe euonymi-japonici (Vienn.-Bourg.) U. Braun & S. Takam. (2000)	
14 On Fabaceae		15
14' On other families		16
15 On <i>Laburnum</i> and <i>Chamaecytisus</i>	Erysiphe guarinonii (Briosi & Cavara) U. Braun & S. Takam. (2000)	
15' On <i>Spartium</i> and <i>Baptisia</i>	Erysiphe rayssiae (Mayor) U. Braun & S. Takam. (2000)	
16 On Bignoniaceae (<i>Catalpa</i>)	Erysiphe elevata (Burrill) U. Braun & S. Takam. (2000)	
16' On Caprifoliaceae (<i>Lonicera</i>)	Erysiphe magnusii (S. Blumer) U. Braun & S. Takam. (2000)	
16" On Rhamnaceae (<i>Frangula</i>); phen.: X-XI	● Erysiphe divaricata (Wallr.) Schltdl. (1824)	
17 Dichostomic fuOClrum divisions with spatulate or straight ends, not curved		18
17' Dichostomic fuOClrum divisions with curved to spiral ends		20
18 Conidia 30-60 µm long; appendages with 1-3, rarely 4 septa; on <i>Begonia</i> ; phen.: VIII-X.....		
.....	Erysiphe begoniicola U. Braun & S. Takam. (2000)	
18' Conidia 20-38 µm long		19
19 On Berberidaceae (<i>Berberis</i> , <i>Mahonia</i>). Phen.: VI.....	● Erysiphe berberidis DC. (1805)	
19 On Caprifoliaceae (<i>Lonicera</i>)	○ Erysiphe lonicerae DC. (1815)	
19 On Caprifoliaceae (<i>Sambucus nigra</i> , <i>S. racemosa</i>)	● Erysiphe vanbruntiana (W.R. Gerard) U. Braun & S. Takam. (2000) var. sambuci-racemosae	
19 On Caprifoliaceae (<i>Symphoricarpos</i>)	Erysiphe symphoricarpi (Howe) U. Braun & S. Takam. (2000)	
19 On Fabaceae (<i>Caragana</i>)	Erysiphe paOClzewskii (Jacz.) U. Braun & S. Takam. (2000)	
19 On Grossulariaceae (<i>Ribes</i>)	○ Erysiphe grossulariae (Wallr.) de Bary (1870)	
20 On Betulaceae		21
20' On other families		22
21 On <i>Alnus</i>	● Erysiphe penecillata (Wallr.) Link (1824)	
21' On <i>Betula</i> ; Appendages 1-1.5 times the ascoma diam.	○ Erysiphe ornata (U. Braun) U. Braun & S. Takam. var. ornata (2000)	
21" On <i>Betula</i> . Appendages 4-10, 0.5-1 times the ascoma diam.	● Erysiphe ornata var. europaea (U. Braun) U. Braun & S. Takam. (2000)	
22 On Caprifoliaceae (<i>Viburnum</i>)		23
22' On other families		24

23 Conidia 35-37x15-17 µm; ascomata 75-125 µm diam.	Erysiphe viburni Duby (1830)
23' Conidia 25-35x15-20 µm; ascomata 62-95 µm diam. (BE/F) •	Erysiphe hedwigii (Lév.) U. Braun & S. Takam. (2000)
24 On Fagaceae	25
24' On other families	26
25 Conidia numerous, ellipso-ovoid, doliiform, 20-40x10-25 µm; on Fagaceae (<i>Quercus</i> , <i>Fagus</i> , <i>Castanea</i>), sometimes on Anacardiaceae (<i>Cotinus</i>) •	Erysiphe alphitoïdes (Griffon & Maubl.) U. Braun & S. Takam. (2000)
25' Conidia rare, cylindro-ellipsoid, 25-28(60)x10-21 µm; on Fagaceae (<i>Quercus</i>), sometimes on Paeoniaceae (<i>Paeonia lutea</i>)	Erysiphe hypophylla (Nevod.) U. Braun & Cunningt. (2003)
26 On Ericaceae (<i>Calluna</i> , <i>Erica</i> , <i>Rhododendron</i>)	Erysiphe azaleae (U. Braun) U. Braun & S. Takam. (2000)
26 On Hydrangeaceae (<i>Deutzia</i>); phen.: IX-X	Erysiphe deutzia (Bunkina) U. Braun & S. Takam. (2000)
26 On Oleaceae (<i>Ligustrum</i> and <i>Syringa</i>)	○ Erysiphe syringae Schwein. (1834)
26 On Platanaceae (<i>Platanus</i>)	• Erysiphe platani (Howe) U. Braun & S. Takam. (2000)
26 On Rhamnaceae (<i>Rhamnus</i>)	Erysiphe friesii (Lév.) U. Braun & S. Takam. (2000)
27 Ascomata with long (>100 µm) and short (<50 µm) appendages (former genus <i>Uncinuliella</i>)	28
27' Ascomata with only long appendages (former genus <i>Uncinula</i>)	29
28' On Hippocastanaceae (<i>Aesculus</i>). Phen.: X-XI	• Erysiphe flexuosa (Peck) U. Braun & S. Takam. (2000)
29 Basal cell of the conidiophores flexuous or twisted; on Vitaceae	○ Erysiphe necator Schwein. (1834)
29' Basal cell of the conidiophores straight, sometimes flexuous, never twisted	30
30 On Rosaceae (<i>Prunus</i>)	• Erysiphe prunastri DC. (1815)
30' On Salicaceae (<i>Populus</i> and <i>Salix</i>)	• Erysiphe adunca (Wallr.) Fr. var. adunca (1829)
30" On Ulmaceae (<i>Ulmus</i>)	• Erysiphe clandestina Biv. (1815)

Golovinomyces (U. Braun) V.P. Heluta

Type species: *Golovinomyces cichoracearum* (DC.) V.P. Heluta

Lit.: Bolay 2005: 84, [Braun & Cook 2012: 294](#).

1 Conidiophores very long, foot-cells about 80-250 µm with increasing width from base to top, or foot-cell 40-80 µm long with first following cell as long as the foot-cell ; conidia mostly >20 µm wide, germination of the <i>longitubus</i> pattern within the <i>Euoidium</i> type (<i>Golovinomyces</i> sect. <i>Depressi</i>)	2
1' Conidiophores shorter, with cylindrical foot-cell about 40-140 µm; conidia usually 13-22 µm wide, germination of the <i>Euoidium</i> type (<i>Golovinomyces</i> sect. <i>Golovinomyces</i>).....	4
2 Foot-cell of the conidiophore 40-100(150)x10-20 µm; on <i>Echinops</i> ; phen.: IX	Golovinomyces echinopsis (U. Braun) V.P. Heluta (1988)
2' Foot-cell very long, width increasing from base to top	3
3 Foot-cells (50)80-160 µm, width increasing from 8-9 µm at the base to 10-18 µm in the upper half, followed by 1-3 short cells; saprobic on <i>Verbascum</i> ; phen.: VIII	• Golovinomyces verbasci (Jacz.) V.P. Heluta (1988)
3' Foot-cell straight, 80-190x10-15 µm; on <i>Arctium</i> , <i>Centaurea</i> , <i>Onopordum</i> and <i>Stemmacantha</i>	○ Golovinomyces depressus (Wallr.) V.P. Heluta (1988)
4 Presence in the same individual of 5 different basal cell types: cylindrical (type A), basally constricted (type B), bent at the base (type C), gradually widening from bottom to top (type D) and sudden widening (type E)	5
4' One or more of the five basal cell types missing or very rare	7
5 On Asteraceae	6
5' On many hosts belonging to about twenty other families ..	○ Golovinomyces orontii (Castagne) V.P. Heluta (1988)
6 On <i>Artemisia</i>	○ Golovinomyces artemisiae (U. Braun) V.P. Heluta (1988)
6' On <i>Eupatorium</i> ; phen.: VIII-XI (CH, DE, FR, IT, UK)	Golovinomyces circumfusus (Schltdl.) U. Braun (2012)
6" On Asteraceae subfam. Cichorioideae (<i>Cichorium</i> , <i>Hieracium</i> , <i>Lactuca</i> , <i>Picris</i> , <i>Scorzonera</i>)	○ Golovinomyces cichoracearum (DC.) V.P. Heluta (1988)
7 Basal cells in general bent at the base	8
7' Basal cells in general not bent at the base	10

- 8 Basal cells mostly bent at the base, cylindrical, rarely straight; on Plantaginaceae (*Plantago*); phen.: VIII-X
 • **Golovinomyces sordidus** (L. Junell) V.P. Heluta (1988)
- 8' Basal cells a minority bent at the base 9
- 9 Appendages of mature ascomata usually distinctly verrucose; foot-cells of the conidiophores curved; on
 Valerianaceae (*Valeriana*, *Centranthus*) ○ **Golovinomyces valerianae** (Jacz.) V.P. Heluta (1988)
- 9' Basal cells bent or cylindrical; on *Galium* (Rubiaceae) **Golovinomyces riedlianus** (Speer) V.P. Heluta (1988)
- 10 Basal cell cylindrical; conidia 15-27 µm wide; on *Helanthus*; phen.: VIII-IX (DE)
 **Golovinomyces latisporus** (U. Braun) P.-L. Qiu & S.-Y. Liu (2020)
- 10 Conidia narrower 11
- 11 Basal cells never constricted 12
- 11' Basal cells mostly constricted 13
- 12 Basal cells sometimes cylindrical, never constricted; on Boraginaceae (*Symphytum*, *Pulmonaria*, *Cynoglossum*);
 phen.: VIII-X..... • **Golovinomyces cynoglossi** (Wallr.) V.P. Heluta (1988)
- 12' Basal cells cylindrical, 30-80×9-15 µm, followed by 1–3 shorter cells, forming catenescence conidia 25–40×14–
 20(24) µm; asci 2(3)-spored; spores 15-25(28)×10-15(18) µm; on Asteraceae, Fabaceae, Malvaceae,
 Polygonaceae, Solanaceae and Verbenaceae; phen.: VIII-XI **Golovinomyces ambrosiae** (Schwein.) U. Braun & R.T.A. Cook
- 13 Basal cells mainly cylindrical, frequently constricted or gradually widening from bottom to top; on *Phlox* and
Polemonium (Polemoniaceae); phen.: VIII
 • **Golovinomyces magnicellulatus** (U. Braun) V.P. Heluta (1988) var. **magnicellulatus**
- 13' Basal cells frequently cylindrical and constricted; on Laminaceae (*Ajuga*, *Glechoma*, *Melissa*, *Origanum*, *Salvia*)
 ○ **Golovinomyces biocellatus** (Ehrenb.) V.P. Heluta (1988)

Leveillula G. Arnaud

Type species: *Leveillula taurica* (Lév.) G. Arnaud

Lit.: Bolay 2005: 98, Braun & Cook 2012: 180..

- 1 Primary conidia cylindrical to cylindro-ovoid and, if not cylindrical, the greatest width is located between the middle
 and the apex of the conidium; on *Picris hieracioides* (Asteraceae); phen.: VIII-X
 **Leveillula picridis** (Castagne) Durrieu & Rostam (1985) [1984]
- 1' Primary conidia lanceolate to ovoid-lanceolate, the greatest width is located between the base and the middle of the
 conidium; on a great number of hosts belonging to four families (*Asclepias*, *Cynara*, *Gazania*, *Notothlaspi*,
Helianthemum, *Muehlenbeckia*); phen.: (IV)VIII-XI ○ **Leveillula taurica** (Lév.) G. Arnaud (1921)
- 1" Conidia formed singly, +/- clavate, 45-65×4-18 µm; asci very numerous, 50-65×20-30 µm, 2-spored; spores 18-26×
 11-14 µm, hyaline; on leaves of *Euphorbia pucherrima*. Phen.: II (ES) **Leveillula clavata** Nour (1957)

Neoerysiphe U. Braun

Type species: *Neoerysiphe galeopsidis* (DC.) U. Braun.

Lit.: Bolay 2005: 100.

- 1 Asci with (2)3-6(8) spores; on Acanthaceae (*Acanthus*), Bignoniaceae (*Catalpa*) and Lamiaceae (*Ajuga*, *Ballota*,
Calamintha, *Galeopsis*, *Glechoma*, *Lamium*, *Melissa*, *Melittis*, *Origanum*, *Salvia*, *Sideritis*, *Stachys*). Phen.: III-VI.....
 • **Neoerysiphe galeopsidis** (DC.) U. Braun (1999)
- 1' Asci with 2-4 spores, in general 2; on Rubiaceae (*Asperula*, *Cruciata*, *Galium*, *Rubia*); phen.: VII-X.....
 ○ **Neoerysiphe galii** (S. Blumer) U. Braun (1999)

Phyllactinia Lév.

Type species: *Phyllactinia suffulta* (Rebent.) Sacc.

Lit.: Bolay 2005: 110, Rubio & al. 2010: 202.

- 1 Asci with mostly 2 spores 2
- 1' Asci with 2-4 spores, mostly with 3 spores; on leaves of *Fraxinus* and *Syringa* (Oleaceae) phen.: IX-X
 ○ **Phyllactinia fraxini** (DC.) Fuss (1878)
- 2 Ascomata more than 250 µm diam. 3
- 2' Ascomata less than 250 µm diam. 4

- 3 Ascomata 250-350 µm diam.; on *Quercus* (Fagaceae); phen.: IX-XI **Phyllactinia roboris** (Gachet) S. Blumer (1933)
- 3' Ascomata 250-275 µm diam.; on *Hippophaë* (Elaeagnaceae); phen.: X **Phyllactinia hippophaës** Thüm. ex S. Blumer (1933)
- 4 On leaves of lignicolous Rosaceae (*Amelanchier*, *Crataegus monogyna*, *Malus*, *Mespilus*, *Oemleria*, *Prunus*, *Pyracantha*, *Pyrus*); phen.: X **Phyllactinia mali** (Duby) U. Braun (1978) [1977] Ill.: Rubio & al. 2010: p. 202.
- 4' On leaves of hosts belonging to other families 5
- 5 On leaves of Betulaceae (*Alnus*, *Betula*, but mainly on *Corylus*); phen.: X-XI **Phyllactinia guttata** (Wallr.) Lév. (1851)
- 5' On leaves of *Fagus*. Phen.: X-XI (BE/F) **Phyllactinia orbicularis** (Ehrenb.) U. Braun (2012)

Podosphaera Kunze

Type.: *Podosphaera myrtilina* Kunze

Lit.: Bolay 2005: 115, [Braun & Cook 2012: 97](#).

- 1 Ascomata with appendages ending on dichotomic divisions sect. *Podosphaera*
- 1' Ascomata with simple appendages, mycelium-like, rarely branched sect. *Sphaerotheca*

Section *Podosphaera*

- 1 Insertion of the appendages in +/- equatorial position (subsect. *Podosphara*) 2
- 1' Insertion of the appendages on top of the upper face of the ascoma (subsect. *Tridactyla*) 6
- 2 Appendages long, 1.5-10 times the ascomatal diameter; on *Vaccinium* (Ericaceae) 3
- 2' Appendages shorter, 0.5-4.5 times the ascomatal diameter; on Rosaceae 4
- 3 Appendages about 1.5-6 times the ascomatal diameter, rather stiff; parasitic on *Vaccinium*; phen.: IX **Podosphaera myrtilina** var. **myrtilina** Kunze (1823)
- 3' Appendages longer and flexuous, mostly 5-10 times the diameter of the ascoma; parasitic on leaves and twigs of *Vaccinium uliginosum*; phen.: VIII-IX **Podosphaera myrtilina** var. **major** Juel (1895) Ill.: Schmid & Schmid 1991: nr. 92.
- 4 Appendages few, usually 2-6, 1-3 times as long as the ascomatal diameter, 2-7-septate; on *Sorbus aucuparia* **Podosphaera aucupariae** Erikss. (1886)
- 4' Appendages numerous, usually 5-20 5
- 5 Appendages 5-15, usually 1-2 times as long as the ascomatal diameter; on *Crataegus*, *Cydonia*, *Mespilus* and *Pyrus* (Rosaceae); phen.: **Podosphaera clandestina** (Wallr.) Lév. 136 (1851)
- 5' Appendages up to about 35 per ascoma, 1-3 times as long as the ascomatal diameter, occasionally with elongated primary branches, deeply cleft or even branched near the base; mature asci usually thin-walled, 1-2 µm wide; on *Amelanchier*; phen.: VII-X **Podosphaera amelanchieris** Maurizio (1927)
- 6 Appendages few, (1)2-6(8), rigid, erect, ending on 4-5 dichotomic divisions; asci (4)6-8-spored; on *Prunus* (Rosaceae); phen.: VIII-IX **Podosphaera tridactyla** (Wallr.) de Bary (1870)
- 6' Appendages numerous, ending on (0)1-2 dichostomic divisions 7
- 7 Appendages 6-12 times the ascomatal diameter; on *Salix* (Salicaceae); phen.: X **Podosphaera schlechtendalii** Lév. (1851)
- 7' Appendages about 1-6 times the ascomatal diameter, usually simple, aseptate, but apex sometimes 1-2(3) times dichotomously branched; on *Malus*, *Pyrus* and *Cydonia* (Rosaceae); phen.: V(a), XII **Podosphaera leucotricha** (Ellis & Everh.) E.S. Salmon (1900)

Section *Sphaerotheca*

- 1 Peridial cells of the ascoma indistinct, 6-25 µm diam.; subsect. *Sphaerotheca* 2
- 1' Peridial cells large, conspicuous, 15-55 µm diam., less than 12 peridial cells visible per ascoma face: subsect. *Magnicellulatae* 15
- 2 Appendages rare, short, sometimes missing; on *Dryas* (Rosaceae); phen.: (IV)VIII-X **Podosphaera volkartii** (S. Blumer) U. Braun & S. Takam. (2000)

2'	Appendages normally developed	3
3	Secondary mycelium abundant, first grey-yellowish, becoming brown-blackish; ascomata immersed in a stroma .	4
3'	Secondary mycelium missing or inconspicuous	8
4	Appendages numerous, long, 1-5 times the diameter of the ascoma	5
4'	Appendages few, short, length equal to or shorter than the diameter of the ascoma	6
5	On <i>Geranium</i> (Geraniaceae) ○ Podosphaera fugax (Penz. & Sacc.) U. Braun & S. Takam. (2000)	
5'	On <i>Humulus</i> and <i>Cannabis</i> (Moraceae); phen.: IX	
	..... ○ Podosphaera macularis (Wallr.) U. Braun & S. Takam. (2000)	
6	Hyphes of secondary mycelium narrow, 3-5 µm wide; conidia cylindrical, slender, 12-17 µm wide; on <i>Euphorbia</i> (Euphorbiaceae) ● Podosphaera euphorbiae (Castagne) U. Braun & S. Takam. (2000)	
6'	Hyphes of secondary mycelium 3-9.5 µm; conidia not cylindrical; on other hosts	7
7	On <i>Prunus</i> (<i>P. laurocerasus</i>) and <i>Rosa</i> (Rosaceae); sometimes on <i>Forsythia</i> (Oleaceae); phen.: V	
	..... ● Podosphaera pannosa (Wallr.) de Bary (1870)	
7'	On leaves and fruits of <i>Ribes uva-crispa</i> (Grossulariaceae); phen.: VI	
	..... ○ Podosphaera mors-uvae (Schwein.) U. Braun & S. Takam. (2000)	
8	Appendages inserted in +/- equatorial or upper face position of the ascoma	9
8'	Appendages inserted solely on the lower face of the ascoma	10
9	Mycelium causing deformations of the infected organs; on <i>Filipendula</i> and <i>Spiraea</i> (Rosaceae)	
	..... ○ Podosphaera spiraeae (Sawada) U. Braun & S. Takam. (2000)	
9'	Mycelium causing no deformations of the infected organs; on <i>Arunacus</i> and <i>Sanguisorba</i> (Rosaceae)	
	..... ○ Podosphaera ferruginea (Schltld.) U. Braun & S. Takam. (2000)	
9"	On <i>Polemonium</i> Podosphaera polemonii (L. Junell) U. Braun & S. Takam. (2000)	
10	Appendages irregular, bent, sometimes branched, 0.5-2.5 times the ascoma diameter; on <i>Erodium</i> and <i>Bibersteinia</i> (Geraniaceae); phen.: (III)VIII-X	
	..... Podosphaera erodii (Durieu & Mont.) U. Braun & S. Takam. (2000)	
10'	Appendages straight, not bent nor branched, 0.5-4(5) times the ascoma diameter	11
11	Ascoma 50-60 µm diam.; on <i>Sorbus</i> (Rosaceae) Podosphaera niesslii (Thüm.) U. Braun & S. Takam. (2000)	
11'	Ascoma 60-110(160) µm diam.	12
12	Ascoma 60-105 µm diam.	13
12'	Ascoma 75-110(160)	14
13	On <i>Epilobium</i> (Onagraceae) ○ Podosphaera epilobii (Wallr.) de Bary (1870)	
13'	On herbaceous Rosaceae (<i>AOCIhemilla</i> , <i>Aphanes</i> , <i>Aremonia</i> , <i>Fragaria</i> , <i>Geum</i> , <i>Potentilla</i> , <i>Rubus</i> , <i>Sibbaldia</i>)	
	..... ● Podosphaera aphanis (Wallr.) U. Braun & S. Takam. (2000)	
14	On <i>Dipsacus</i> , <i>Knautia</i> (Dipsacaceae); phen.: (VI) VIII-IX	
	..... ○ Podosphaera dipsacacearum (Tul. & C. Tul.) U. Braun & S. Takam. (2000)	
14'	On <i>Parietaria</i> (Urticaceae) Podosphaera parietariae (Schwarzman) U. Braun & S. Takam. (2000)	
15	Polyphagous species (<i>Adenostyles</i> , <i>Arnica</i> , <i>Aster</i> , <i>Crepis</i> , <i>Doronicum</i> , <i>Hieracium</i> , <i>Lapsana</i> , <i>Leontodon</i> , <i>Pulicaria</i> , <i>Sanvitalia</i> , <i>Senecio</i> , <i>Serratula</i> , <i>Sanchus Tanacetum</i> , <i>Taraxacum</i> , <i>Tephroses</i> , <i>Citrullus</i> , <i>Cucumis</i> , <i>Cucurbita</i> , <i>Lagenaria</i> , <i>Bartsia</i> , <i>Euphrasia</i> , <i>Melampyrum</i> , <i>Odontites</i> , <i>Pedicularis</i> , <i>Rhinanthus</i> , <i>Scrophularia</i> , <i>Physalis</i>); phen.: IX .	
	..... ○ Podosphaera fusca (Fr.) U. Braun & Shishkoff (2000)	
15'	Species parasitic on one or more hosts of the same family	16
16	Appendages 0.5-4(6) times the ascoma diameter	17
16'	Appendages 0.5-1 times the ascoma diameter	21
17	On <i>Impatiens</i> (Balsamiaceae) ● Podosphaera balsaminae (Wallr.) U. Braun & S. Takam. (2000)	
17'	Hosts belonging to other families	18
18	On <i>Arabis</i> and <i>Draba</i> (Brassicaceae) Podosphaera drabae (Juel) U. Braun & S. Takam. (2000)	
18'	Hosts belonging to other families	19
19	On <i>Helianthemum</i> (Cistaceae) Podosphaera helianthemii (L. Junell) U. Braun & S. Takam. (2000)	

19' Hosts belonging to other families 20

20 On *Plantago* (Plantaginaceae) ; phen.: XI● **Podosphaera plantaginis** (Castagne) U. Braun & S. Takam. (2000)

20' On *Thalictrum* (Ranunculaceae) **Podosphaera thalictri** (L. Junell) U. Braun & S. Takam. (2000)

21 On *Saxifraga*, *Heuchera*, *Tiarella* and *Tolmiea* (Saxifragaceae); phen.: X
 **Podosphaera alpina** (S. Blumer) U. Braun & S. Takam. (2000)

21' Hosts belonging to other families 22

22 On *Veronica* (Scrophulariaceae) **Podosphaera fuliginea** (Schltld.) U. Braun & S. Takam. (2000)

22' On *Verbena* (Verbenaceae) **Podosphaeria xanthii** (Castagne) U. Braun & Shishkoff (2000)

Sawadaea Miyabe

Type species: *Sawadaea aceris* (DC.) Miyabe = *Sawadaea bicornis* (Wallr.) Homma

Lit: Bolay 2005: 138.

- 1 Foliicolous mycelium amphigenous (developing undifferentiated on both sides of the leaf), diffuse, or as whitish ill-defined spots; ascomata with more than 50% of the appendages ending by 2(8) crooks; parasitic on leaves of *Acer*; phen.: X ● **Sawadaea bicornis** (Wallr.) Homma (1937)
- 1' Mycelium first epiphyllous, as small well-defined whitish spots becoming finally confluent and covering both sides of the leaf; ascomata with more than 50% of the appendages ending by one single crook; on *Acer*
 ○ **Sawadaea tuslanei** (Fuckel) Homma (1937)

HELOTIALES Nannf. 1932

Syn.: Cytariales Luttr. ex Gamundí, *Erysiphales* Warm.

Lit.: Dennis 1978: 92, Hansen & Knudsen 2000: 131, Gernandt & al. 2001: 915, Korf & Lizon 2001: 255, Wang & al. 2006: 295, Baral & al. 2015 (poster), Jaklisch et al. 2016: 159, Ekanayaka et al. 2019: 348, Haelewaters et al. 2021: 1323.

Families belonging to this order:

Amicodiscaceae Ekanayaka & K.D. Hyde 2019
 Arachnopezizaceae Hosoya, J.G. Han & Baral 2015
 Bryoglossaceae Ekanayaka & K.D. Hyde 2019
 Calloriaceae Marchand
 Cenangiaceae Rehm
 Chlorospleniaceae Ekanayaka & K.D. Hyde 2019
 Chrysodiscaceae Baral & Haelew. 2019
 Cordieritidaceae (Sacc.) Sacc.
 Cytariaceae Speg. 1888
 Discinellaceae Ekanayaka & K.D. Hyde
 Deltopyxidaceae Ekanayaka & K.D. Hyde
 Drepanopezizaceae Baral
 Gelatinodiscaceae S.E. Carp.
 Godroniaceae Baral
 Helotiaceae Rehm 1886
 Hederosphaeriaceae Rehm
 Hyaloscyphaceae Nannf. 1932
 Hydrocinaceae Ekanayaka & K.D. Hyde
 Hysteropezizella lineage
 Lachnaceae Raitv. 2004
 Mitrulaceae Rchb. 1828
 Mollisiaceae Rehm
 Pezizellaceae Velen.
 Ploettnerulaceae Kirschst.
 Roesleriaceae Y.J. Yao & Spooner
 Solenopezaceae Ekanayaka & K.D. Hyde
 Vibrisseaceae Korf 1991

Families with unclear position:

Ascocorticiaceae J. Schröt. 1893
 Ascodichaenaceae D. Hawksw. & Sherwood 1982
 Hamatocanthoscyphaceae Ekanayaka & K.D. Hyde
 Hyphodiscaceae Ekanayaka & K.D. Hyde
 Stannaria lineage

Key to the families:

- 1 Ascomata a very thin, whitish mat, a few mm in diam.; usually on (often inner side) of conifer bark *Ascocorticiaceae*
- 1' Ascomata having a more distinct shape, variously shaped, not immersed in gel, although gelatinized tissues may be present; spores without appendages 4
- 4 Apothecia plane to pulvinate, sessile to long-stalked, usually brightly coloured, superficial. Ectal excipulum of iso-diametric cells. Paraphyses with elongate VBs. Asci cylindrical, elongated, with conspicuously thickened apex. Asco-spores filiform, breaking into part-spores, 1-2.5 µm diam., hyaline. Saprobic on aquatic plant material *Vibrisseaceae*
- 4' Spores if very long then not fragmenting or more than 3 µm diam. 5
- 5 Apothecia not with the above combination of characters 8
- 8 Apothecia mostly hairy 9
- 8' Apothecial margin without real hairs 13
- 9 Apothecia 0.2–4 mm in diam.; hymenium plane, white to yellow-orange, also black; margin with short to long hairs; sessile, with ± conspicuous subiculum of partly warted and thick-walled hyphae. Ectal excipulum of hyaline or rarely

- brown textura angularis, towards margin textura prismatica, with partly thick-walled, glassy wall. Hairs cylindrical or tapering, also apically swollen, usually multiseptate, thin- or thick-walled, hyaline to yellowish, smooth or warted, crystals absent. Paraphyses cylindrical, hyaline, apically sometimes flexuous, without refractive vacuolar bodies. Asci 8-spored, with amyloid apical ring, with croziers. Ascospores 0–7-septate, with or without sheath or appendages. Anamorph unknown or dwayaangam-like (conidia staurosporous). Saprobian, lignicolous, herbicolous, also on living bryophytes, desiccation-sensitive. *Arachnopezizaceae*
- 9' Apothecia without conspicuous subiculum 10
- 10 Ascomata resembling Hyaloscyphaceae and Lachnaceae in having warted hairs, and Dermateaceae and Cordieritidaceae in the ionomidotic reaction of these hairs *Chrysodiscaceae*
- 10' Hairs without ionomidotic reaction 11
- 11 Apothecia 0.1-2 mm diam, hymenium plane to urn-shaped, rarely perithecial (*Unguicularia*), margin densely or loosely covered by minute or conspicuous hyaline to yellow, reddish or dark brown hairs, sessile to short-stipitate. Asci with apical ring of *Calycina*-type. Paraphyses cylindrical, without VB's. Anamorphs hyphomycetous. Saprobian on ligneous or herbaceous substrate (**phylogenetically still heterogenous**) *Hyaloscyphaceae*
- 11' Apothecia 0.2-8 mm diam., hymenium mostly plane, whitish, yellow, orange or brownish; margin densely covered by mostly long, conspicuous hairs, sessile to long-stipitate. Ectal excipulum of textura angularis, textura prismatica or textura oblita; medullary excipulum. Hairs densely warted or partly to entirely smooth and with irregular deosits, straight near the margin, hyaline, yellow, reddish or dark brown; crystals partly present. Paraphyses lanceolate, rarely cylindrical. Hairs and paraphyses with or without globose, hyaline or yellow vacuolar bodies, Asci with apical ring of *Calycina*-type. Anamorphs, if present, pycnidial, conidiogenesis phialidic without collarete; conidia globose, aseptate. Saprobian, rarely parasitic, on ligneous or herbaceous substrate *Lachnaceae*
- 11" Ascomata apothecial, cupulate, sessile or sub-stipitate, margins covered by hairs. Ectal excipulum textura angularis or textura prismatica cells, Medullary excipulum loosely arranged hyphae. Paraphyses filiform, cylindrical, septate, simple. Asci 8-spored, apical ring of *Calycina*-type, amyloid, sometimes arising from croziers. Ascospores ellipsoid to fusoid, aseptate, guttulate, lemon-yellow pigmented. *Amicodiscaceae*
- 13 Apothecia disc-shaped, sessile to short-stipitate, margin smooth or torn; outer tissue soft-fleshed and at least near the base composed of mostly brown to pale yellow-brown angular to subglobose cells (if outer tissue pale then apothecia at least partly immersed or spores muriform); spores hyaline or sometimes brown, aseptate to several septate, rarely muriform, smooth or rarely with granulate wall *Dermateaceae*
- 13' Apothecia usually disc-shaped, almost always glabrous or downy; outer tissue usually composed of hyphae, pale, sometimes gelatinized *Helotiaceae*
- 13" Ascomata long-stipitate, hymenium plane to convex or capitate. Ectal excipulum of textura porrecta, partly immersed in gel. Paraphyses without VB's. Asci with amyloid or non-amyloid ring, with croziers. Ascospores cylindro-fusoid, one-celled. Parasitic on bryophytes. *Bryoglossaceae*

AMICODISCACEAE Ekanayaka & K.D. Hyde 2019

Lit.: Ekanayaka et al. 2019:

Sexual morph: Ascomata apothecial, cupulate, sessile or sub-stipitate, margins covered by hairs. Ectal excipulum textura angularis or textura prismatica cells, Medullary excipulum loosely arranged hyphae. Paraphyses filiform, cylindrical, septate, simple. Asci 8-spored, apical ring of *Calycina*-type, amyloid, sometimes arising from croziers. Ascospores ellipsoid to fusoid, aseptate, guttulate, lemon-yellow pigmented.

Genera belonging to this family:

1. *Amicodisca* Svrček
2. *Dematioscypha* Svrček

Key to the genera:

- 1 Ectal excipulum with olivaceous brown or brown textura prismatica 2
- 2 Apothecia sessile, with greyish hymenium and long hairs. Hairs thin-walled and multiseptate, with thin olivaceous yellow walls, sometimes bearing concolorous incrustations. On water-soaked wood..... *Amicodisca*
- 2' Ectal excipulum with brown texture prismatica. Hairs glabrous or almost so. Associated with *Haplographium* anamorph *Dematioscypha*

Amicodisca Svrček

Type species: *Amicodisca brdensis* (Velen.) Svrček = *Amicodisca virella* (P. Karst.) Huhtinen

Lit.: Svrček 1987a: 16, Haines 1989: 350, Huhtinen 1994: 5, Huhtinen & Laessle 2001: 43, Han & al. 2011: 89.

- 1 Disc pale greenish-olivaceous when fresh, becoming dark green when dry; asci longer than 80 µm ***Amicodisca groenlandica*** Raitv.
- 1' Disc greyish when fresh and dry; asci shorter than 80 µm 2
- 2 Apothecia 0.2-0.6 mm diam., hymenium watery-grey, marginal hairs yellow-green; asci IKI redbrown, without croziers; spores oblong-cylindrical, obtuse-ended, (13)16-22(25)x(3)3.5-6 µm, guttulate, guttules with lemon-yellow dissolving in KOH; hairs tapering, 40-130x(1.5)2-4 µm, hyaline to pale yellow-green, sometimes bearing amorphous olive-brown pigment; on decorticated hardwood and bark of *Alnus*, *Salix cinerea*, partly immersed in water, in swamps; phen.: VI-X (BE/F) ○ ***Amicodisca virella*** (P. Karst.) Huhtinen (1994) Ill.: Huhtinen 1994: fig. 1.
- 2' Apothecia similar to *Amicodisca virella*; asci IKI red brown, without croziers; spores 8-14(17)x2.7-3.5 µm, 0(1)-septate, OCI 2-3; on wood and bark of *Betula*, *Quercus*, *Sambucus*; phen.: VI-XI ● ***Amicodisca svrčekii*** Raitviir & Huhtinen (2001)

Dematioscypha Svrček

Syn.: *Haplographium* Berk. & Broome

Type species: *Dematioscypha dematiicola* (Berk. & Broome) Svrček = *Dematioscypha delicata* (Berk. & Broome) Hosoya

Lit.: Svrček 1977: 193, Dennis 1978: 17 (sub *Hyaloscypha dematiicola*), Breitenbach & Kränzlin 1981: 202, Huhtinen 1987b: 19, Hansen & Knudsen 2000: 189, Raitviir 2001: 289.

- 1 Sexual morph: Apothecia urceolate, sessile, 0.2-0.4 mm diam., hymenium grey, receptacle dark brown, margin densely covered with whitish, conical hairs; asci *45-55x7-7.5 µm, IKI-, with croziers; spores narrowly ellipsoid, 5.5-9x2-2.5 µm, 0-1-septate smooth, hyaline; hairs thick-walled except the apex, smooth, aseptate, hyaline. Asexual morph: *Haplo-graphium delicatum* with growing between black setose conidiophores; conidia obong, hyaline. Saprobic on wet decayed wood of *Alnus*, *Betula*, *Carpinus*, *Corylus*, *Fagus*, *Fraxinus*, *Quercus*, *Rhododendron*; phen.: III-XII ● ***Dematioscypha delicata*** (Berk. & Broome) Hosoya (2014) Ill.: Breitenbach & Kr. 1981: pl. 239, Huhtinen 1987b: fig. 11-14.
- 1' Hairs with exudates 2
- 2 Asci IKI- 3
- 2' Asci IKI+ 4
- 3 Apothecia sessile to shortly stipitate, 0.3-1 mm diam., hymenium greyish; outside dark brown to black, with brown hairs, growing between black setose conidiophores of its *Haplographium catenatum* anamorph; apothecia lacking the prominent red tinge when dried; asci IKI-, without croziers; spores ellipsoid to subfusiform, *5-9x2-2.5 µm, 0(1)-

- septate, OCI 1-2; hairs 3-septate, with gold yellow to greenish exudates; saprobic on deciduous wood (*Alnus*, *Betula*, *Carpinus*, *Populus*, *Quercus*, *Salix*); phen.: I-XII
 • **Dematioscypha richonis var. olivacea** (Velen.) Huhtinen (1987)
 III.: Huhtinen 1987b: fig. 5-7, Ascofrance.
- 3' Apothecia sessile to shortly stipitate, up to 0.5 mm when dried, disc and flanks black when dried but overall colour of apothecia brown to prominently red due to the resinous exudates; asci 30-42x4-6 µm, IKI-, with croziers; spores ellipsoid to subfusiform, *5-8(10)x2-3 µm, 0(1)-septate; hairs cylindrical to slightly tapering with blunt apex, up to 80x2-3 µm, septate, covered with amorphous exudates; saprobic on deciduous wood (*Acer*, *Corylus*, *Populus*, *Quercus*) and stems of *Rubus*; phen.: VI-XII **Dematioscypha richonis var. richonis** (Boud.) Huhtinen (1987)
 III.: Huhtinen 1987b: fig. 8-10.
- 4 Apothecia 0,1-0,2 mm diam., shortly stalked, greyish-white, receptacle cup-shaped to soucer-shaped, dark grey to almost black with black stipe when dry, covered by conical, mostly smooth, septate hairs up to 50x3-4 µm; asci 30-50x3-4 µm, IKI+, with croziers; spores 5-7x1 µm, biguttulate; on fallen leaves of *Betula*; phen.: X
 **Dematioscypha dematiicola var. fuscostipitata** (Graddon) Raitv. (2001)
 III.: Graddon 1974: fig. 3 (sub *Betulina fuscostipitata*).
- 4' Apothecia sessile to very shortly stipitate, 0.1-0.2 mm diam., pale greyish; receptacle cupshaped, dark brown with white marginal fringe when dry; hairs septate, of two types: tapering hairs 60-90x3-4 µm with dark brown exudate and cylindrical hairs 35-60x4-5 µm with same incrustation; asci 50-60x7-9 µm, MLZ+, with croziers; spores ellipsoid to cylindrical-ellipsoid, 10-15x2-3 µm, with 2-4 lipid guttules; on fallen decorticated branch of *Pinus*; phen.: III (ES) **Dematioscypha galanii** Raitv. (2001)
 III.: Raitviir 2001: fig. 1-4.

Dematioscypha castaneae (J.G. Han, Hosoya & H.D. Shin) Baral

ARACHNOPEZIZACEAE Hosoya, J.G. Han & Baral 2015

Lit.: Jaklisch et al. 2016: 177, Kosonen et al. 2021: 26.

Sexual morph: Apothecia 0.2–4 mm in diam.; hymenium plane, white to yellow-orange, also black; margin with short to long hairs (*Arachnopeziza sphagniseda* without hairs); sessile, with ± conspicuous subiculum of partly warted and thick-walled hyphae. Ectal excipulum of hyaline or rarely brown textura angularis, towards margin textura prismatica, with partly thick-walled, glassy wall. Hairs cylindrical or tapering, also apically swollen, usually multiseptate, thin- or thick-walled, hyaline to yellowish, smooth or warted, crystals absent. Paraphyses cylindrical, hyaline, apically sometimes flexuous, without vacuolar bodies. Asci with amyloid apical ring, with croziers. Ascospores 8 per ascus, 0–7-septate, with or without sheath or appendages.

Asexual morph unknown or dwayaangam-like (conidia staurosporous).

Habitat: Saprobic, lignicolous, herbicolous, also on living bryophytes, desiccation-sensitive.

Included genera:

1. *Arachnopeziza* Fuckel
2. *Eriopezia* (Sacc.) Rehm
3. ?*Durella*

Probably not belonging here:

- Arachnoscypha* Boud.
Austropezia Spooner
Parachnopeziza Korf.

Key to the genera:

- 1 Apothecia black or red, sessile, margin sometimes toothed; paraphyses with VB's, imbedded in an olivaceous epithecium; lignicolous *Durella*
- 1' Apothecia with true hairs 2
- 2 Apothecia sessile; ectal excipulum dark brown; hairs tapering, hyaline; spores mostly aseptate *Eriopezia*
- 2' Ascospores multiseptate *Arachnopeziza*
- 2' Hairs with glassy walls, coiled or crisped, smooth; apothecia subsessile, *Parachnopeziza*

Arachnopeziza Fuckel

Type species: *Arachnopeziza aurata* Fuckel.

Syn.: *Polynema* Lév. emend. Fuckel, *Arachnopezizella* Kirschst.

Lit.: Korf 1951: 153, Huhtinen 1987b: 12, Baral 1989: 122 (*A. floriphila*), Engel 1993: 129 (*A. engelii*), Huhtinen 1993: 188, Hansen & Knudsen 2000: 186, . Kosonen et al. 2021: 38.

- 1 Spores up to 7-septate at maturity 2
- 1' Spores 1-5-septate at maturity 3
- 2 Apothecia 0.2-1 mm diam., white to yellow or pale orange; subiculum concolorous; asci 78-115x8-10 µm, I+, with croziers; spores filiform with pointed ends, straight to curved, 50-78x1.4-2.7 µm, Q>20, 6-7-septate at maturity, in one parallel bundle; hairs cylindric, 60-125x1.5-4 µm, base and sometimes apex slightly widened, thin- to thick-walled with hyaline to yellow or orange walls, smooth or with external roughenings; saprobic on decaying deciduous hardwood (*Alnus*, *Betula*, *Carpinus*, *Castanea*, *Corylus*, *Eucalyptus*, *Fagus*, *Platanus*, *Quercus*, *Tilia*); phen.: III-XII (BE/F, BE/W, DE, DK) • **Arachnopeziza aurata** Fuckel (1870) [1869-70] Ill.: Korf 1951: fig.3; Schmid I. & H. 1990: nr. 17.
- 2' Apothecia 0.2-1 mm diam., whitish; asci 79-95x9-10 µm, I+; spores 30-61(63) x 2.4-3.8(4) µm, Q<20, 3-5(7)-septate, fasci-culate or multiseriate; hairs tapering, 50-130x9 µm, apex enlarged to 3.5-7.5 µm, fairly thin-walled, often with external particles; saprobic on decaying wood (*Betula*, *Populus*, *Quercus*, *Pinus*); phen.: VI-IX (DE) **Arachnopeziza delicatula** Fuckel (1870) [1869-70] Ill.: Korf 1951: fig.4, Huhtinen 1993: fig. 1a-e.
- 2' Apothecia several mm across, sessile; outside white; asci ca. 100x9.5 µm, I+; spores 3.4-4.8 µm wide, arranged in two bundles, one above the other; saprobic on wood; phen.: ? **Arachnopeziza araneosa** (Sacc.) Korf (1952) Ill.: Korf 1951: fig.5.
- 3 Apothecia up to 1 mm diam.; hairs agglutinated, forming narrow teeth up to 200 µm long; asci 63-75x7-9 µm, I+; spores 13.5-22.5x2.5-5 µm (1)3-septate at maturity; saprobic on rotten wood; phen.: V **Arachnopeziza fitzpatrickii** Korf (1952) Ill.: Korf 1951: fig.12.
- 3' Hairs not agglutinated, not forming teeth, or into short blunt ones ... 4

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- 4 Species lacking a prominent subiculum 7
 4' Species with prominent subiculum 8
- 7 Apothecia 0.3-0.4(0.6) mm diam., translucent white; outside with straight setae; asci *100-130x10-11 µm, MLZ and IKI+; spores *14-18(23)x3.8-4.5 µm, on both ends with a 4-4 µm long lanceolate part and an up to 10 µm long cilium, later on 3-septate and without appendages; saprobic on male blossoms of *Fagus sylvatica*; phen.: IV
 **Arachnopeziza floripila** Baral (1989)
 Ill.: Baral 1989: Taf. 2.
- 7' Apothecia 0.25-0.35 mm diam., pale pinkish; marginal hairs 10-15 µm long, echinulate; asci 70x7-8 µm, I+; spores 20-24x3.5-4 µm, overmature spores 3-4-septate; saprobic on branch of *Tilia*; phen.: XI
 **Arachnopeziza engelii** Svrček (1993) [1990-1991]
- 8 Apothecia up to 4 mm diam., outside orange 9
 8' Apothecia up to 2 mm diam., outside never orange 10
- 9 Apothecia 0.5-4 mm diam.; hymenium white to yellow or pale orange; outside pallid, with long, orange hairs; subiculum white to orange; asci 65-87x7.5-9 µm, I+; spores fusiform to cylindrical, 12-17x2.5-4 µm, (1)3-septate; hairs 100-500 x 3-4 µm, tapering towards the tip, mostly yellowish; saprobic especially on involucre (*Quercus*), but also on wood (*Quercus*, *Fagus*), fruits and leaves (*Quercus*); phen.: III-X
 • **Arachnopeziza aurelia** (Pers.) Fuckel (1870) [1869-70]
 Ill.: Korf 1951: fig.7, Ellis & Ellis 1985:fig. 1, Rubio & al. 2010: p. 204.
- 10 Spores mostly less than 10 µm long; hairs delicate 11
 10' Spores mostly more than 10 µ long; hairs robust 12
- 12 Apothecia 0.5-3.5 mm diam.; hymenium whitish; outside appearing orange from hairs; with yellow resin between hairs and excipular cells, subiculum whitish; asci 70-85x7-9 µm, MLZ-; spores 11-18x2.5-3.5 µm, (0)1-3-septate; hairs 50-150(250)x2-4 µm, thin- to thick-walled, multiseptate, hyaline to yellow orange. Saprobic on decayed hardwood trunks (*Populus*, *Betula*, *Quercus*) or on very coarse debris. Phen.: III-XI (AT, FI, SE, SK)
 **Arachnopeziza leonina** (Schwein.) Dennis (1963)
 Ill.: Korf 1951: fig.6 (sub *A. candidofulva*).
- 12' Apothecia 0.3-1.2 mm diam., yellowish to orange, with whitish marginal hairs covered by abundant resin; practically non-existent subiculum; asci 60-78x7-7.5 µm, MLZ-; spores narrow ellipsoid to fusiform, (8)11-13.5(16.5)x(2)2.5-3.5(5) µm, 1-3-septate at maturity; hairs flexuous, up to 85(125)x3-3.5 µm, slightly roughened over the length, multiseptate; saprobic on decorticated wood (*Betula*, *Carpinus*, *Castanea*, *Corylus*, *Fagus*); phen.: III-XI (AT)
 **Arachnopeziza trabinelloides** (Rehm) Korf (1952)
 Ill.: Korf 1951: fig.10.
- 12' Hairs smooth or only roughened at the apex 13
- 13 Asci average more than 80 µm long 14
 13' Asci average less than 80 µm long; apothecia less than 0.5 mm diam. 15
- 14 Apothecia mostly 1-2 mm diam.; asci 85-100x7.5-9 µm; spores 12-22x3.5-5 µm, 1-3 septate; hairs up to 40 µm, enlarged at the apex up to 6 µm, rather thin-walled, smooth or with external particles; saprobic on rotten wood; phen.: V **Arachnopeziza major** (Ellis & Everhart) Korf (1952)
 Ill.: Korf 1951: fig.11.
- 15 Apothecia 0.15-0.3 mm diam., hymenium whitish; outside pallid to fleshy-yellow; subiculum concolorous, rather copious; asci 57-68x7.5-9 µm; spores subfusiform to subcylindrical, 9-14(17.5)x2-3 µm, 1-3-septate at maturity; hairs slightly tapering, 75-120x4-7 µm, often constricted at the septa, rather thick-walled, smooth or with external apical roughenings; saprobic on decaying decorticated wood (*Castanea*, *Quercus*); phen.: IV-X
 **Arachnopeziza cornuta** (Ellis) Korf (1951)
 Ill.: Korf 1951: fig.8.
- 15' Apothecia 0.2-0.3 mm diam., sessile, white; asci 62-73x7.5-10 µm, I+; spores 16-30 x 2.7-3.4 µm, 3(4) septate OCI=4; hairs tapering, up to 120x4-5 µm, apex slightly swollen to 3.5-4 µm diam., fairly thin-walled, smooth or with external particles; saprobic on rotten wood of *Larix*, *Quercus*, *Pinus*, *Tilia*; phen.: XI-III
 • **Arachnopeziza obtusipila** Grelet (1951)
 Ill.: Korf 1951: fig.9.

Arachnoscypha Boud.

Type species: *Peziza aranea* Boud.

Lit.: Kosonen et al. 2021: 46.

- 1 Sexual morph: Apothecia urceolate to turbinate, up to 0.5 mm diam., whitish; asci 40-60x6.5-7 µm, I+; spores 6-10x2-2.5 µm, OCI 0.5, aseptate; hairs flexuous, 35-40(70)x2-3.5 µm, fairly thick-walled, mostly 1-septate. Asexual morph: Conidia filiform, arising from swollen phialides; saprobic on involucre of *Castanea*; phen.: VIII-XI(I) (BE/F, FI, SE) • **Arachnoscypha aranea** (De Not.) Boud. Px Dennis (1949) Ill.: Korf 1951: fig.13.
- 1' Apothecia 0.5-1.5 mm diam., drying patelliform; disc yellowish to grey; outside whitish; asci 40-50x4-5.5 µm, I+; spores 6-11(13)x1.5-2(2.5) µm, 1-septate at maturity; hairs flexuous, tapering to a ca. 1 µm wide tip, up to 70x1.5-2 µm, smooth or with external particles; saprobic on wood, hickory (*Carya*), nuts, etc.; phen.: IX-X • **Arachnopeziza eriobasis** (Berkeley) Korf (1952) Probably a synonym of *Arachnoscypha aranea*. Ill.: Korf 1951: fig.14.

Durella Tul. & C. Tul.

Type species: *Durella stictica* (Fr.) Nannf.

Syn.: *Globuligera* (Sacc.) Höhn.

Lit.: Baral (unpublished key), Kutorga & Hawksworth 1997: 39 (*Globuligera*), Hansen & Knudsen 2000: 147, Medardi 2004: 29.

- 1 Apothecia superficial to slightly immersed, up to 0.5 mm diam., grey, drying black; asci inamyloid, with croziers; spores fusiform with rounded ends, 24-45x4-6 µm, 3-7(10)-septate; paraphyses with green vacuoles, yellowish in KOH; saprobic on decorticated wood and woody stems; phen.: I-XII **Durella connivens** (Fr.) Rehm (1881)
- 1' Spores up to 32 µm long, mostly 0-3-septate 2
- 2 Spores up to 12 µm long, 0-1-septate 3
- 2' Spores in majority >12 µm long, mostly 3-septate 5
- 3 Apothecia superficial, 0.1-0.5 mm diam., hymenium pale, outside black; asci amyloid; asci 45-50x7-8 µm, I+; spores ellipsoid to fusiform, 6-9x2.5-3 µm, aseptate, OCI 0; saprobic on cones of *Pinus*; phen.: I-XII **Durella suecica** (Starbäck) Nannf. (1932)
- 3' Asci IKI- 4
- 4 Apothecia superficial, about 0.5 mm broad, hymenium convex and black, surrounded by a low rim; asci 45-55x6 µm, inamyloid, with croziers; spores ellipsoid to subclavate, 6.5-12x2-3.5 µm, 0(1)-septate, OCI 1; saprobic on decorticated wood (*Fagus*), mostly *Quercus*; phen.: IX-III **Durella commutata** Fuckel (1870) [1869-70]
- 4' Apothecia superficial, turbinate, 0,05 mm diam.; redbrown to blackish; asci 52-52x6-9 µm, IKI-, with croziers; spores 6-10x2.5-3 µm, 1-septate, hyaline; paraphyses apically branched and hooked; saprobic on *Alnus*; phen.: XII **Durella uncinata** Baral sp.nov.
- 5 Apothecia superficial with slightly immersed base, up to 0.6 mm broad; disc plane, surrounded by a low rim, hymenium yellowish to olivaceous, outside black; asci 60-90x8-10, I+, with croziers; spores 12-15x5.5-7 µm, 3-septate, OCI 2-4, with ascoconidia forming phialides; saprobic on decorticated wood; phen.: I-XII **Durella melanochlora** (Sommerf.) Rehm (1882)
- 5' Spores narrower 6
- 6 Apothecia semi-immersed, first hysterooid, 0.5 mm long; spores oblong-cylindrical, 12-18x4-5 µm, 3-septate, hyaline; saprobic on *Populus tremula* **Durella stictica** (Fr.) Nannf. (1932)
- 6' Apothecia round to elongate, 0.2-0.6x0.2-0.4 mm, hymenium ochraceous orange, outside black, rim more or less toothed; asci 56-85x9.5-11 µm, with croziers; spores (11)13-18(19.5)x4.5-5 µm, 3-5(7)-septate, seldomly with a longitudinal septum, OCI 0-1; saprobic on *Cercis siliquastrum*; phen.: VIII **Durella compressa** (Pers.) Tul. & C. Tul. (1865)
- 6'' Spores with OCI 3-5 7
- 7 Apothecia ellipsoid, immersed, erumpent, about 1 mm long, black, rim often toothed, often surrounded by a bluish or blue-grey stain; asci 120-180x15-18 µm, I-, with croziers; spores cylindrical, 18-25x4-5 µm, 3(5)-septate, OCI 5; *Plasia* anamorph with verruculose septate conidia; saprobic on decorticated wood of *Betula alba*, *Tilia*, *Ulmus scabra* and woody herbaceous stems (*Citrus*); phen.: XII-IV • **Durella atrocyanea** (Fr.) Höhn. (1919)
- 7' Apothecia up to 1 mm diam., black, rim more or less toothed; asci 75-100x10.3-10.8 µm, I-, with croziers; spores 15-32x3.5-4 µm, 3-septate, OCI 3; paraphyses with brown-olivaceous exudate, KOH-; saprobic on wood (*Fagus*, *Platanus*, *Pyrus malus*, *Quercus*); phen.: XII-III ◦ **Durella macrospora** Fuckel (1870) Ill.: Breitenbach & Kränzlin 1981: Pl. 207

Eriopezia (Sacc.) Rehm

Type species: *Eriopezia caesia* (Pers.) Rehm.

Lit.: Korf 1951: 140, Korf 1978: 464, Baral & Krieglsteiner 1985: 69, Hansen & Knudsen 2000: 190.

- 1 Apothecia cupulate, 0.2-0.5 mm diam., sessile to substipitate; hymenium bluish grey to greenish grey; outside olivaceous to dark brown, with white hairs, specially near margin; subiculum white, copious; asci 30-47x4-5.5 μ m, I+; spores subfusiform, 4-6x1.5-2 μ m, aseptate, hyaline; hairs tapering to a blunt or pointed apex, 30-40x2-3 μ m, hyaline; saprobic on deciduous wood, mainly on *Quercus*; phen.: (VII)IX-I(IV)
 • ***Eriopezia caesia*** (Pers.) Rehm (1892) [1896]
 III.: Korf 1951: fig. 1; Schmid I. & H. 1990: nr. 19.

Parachnopeziza Korf

Type species: *Parachnopeziza miniopsis* (Ellis) Korf

Lit.: Korf 1978: 468, Raschle 1978: 667 (sub *Calycellina triseptata*).

- 1 Apothecia up to 1 mm diam., hyaline with brownish base, sessile; asci 64-68x9-10.5 μ m, I+; spores 19-23x3-3.5 μ m, 3-septate; saprobic on leaves of *Athyrium alpestre*; phen.: IX
 ***Parachnopeziza triseptata*** (Raschle) Korf & W.Y. Zhuang (1985)
 III.: Raschle 1978: Abb. 2e-g.

ASCOCORTICIACEAE J. Schröt. 1893

Lit.: Julich & de Vries 1982: 407, Jaklitsch et al. 2016: 163.

Sexual morph: Ascomata apothecial, effuse, irregular in shape, whitish-greyish or ochraceous, pruinose film. Excipulum strongly reduced. Paraphyses simple, unbranched. Asci 4–16-spored, cylindrical-clavate, inamyloid, with or without croziers. Ascospores cylindrical-ellipsoid or vermiform, 0–11-septate, hyaline, eguttulate.

Asexual morph hyphomycetous. Conidiophores brown, with hyaline, bristle-like fertile part; conidiogenesis sympodial. Conidia subglobose, hyaline, small, arranged in a spike. Saprobiic on bark and wood of mainly conifers, or parasitic on leaves (*Ascosorus*), desiccation-sensitive.

Included genera:

- 1 *Ascocorticium* Bref.
- 2 *Ascocorticiellum* Jülich & B. de Vries
3. *Ascosorus* Henn. & Ruhland

Key to the genera:

- 1 Ascocarp resupinate, forming white patches on the substrate. Ascospores cylindrical-ellipsoid, aseptate..... *Ascocorticium*
- 1' Ascocarp resupinate, small, ochraceous. Subiculum thin, with hyaline, cylindrical hyphae. Margin not differentiated. Asci hyaline, clavate, smooth, somewhat thick-walled, with 4-8 spores. Paraphyses rare, hyaline, cylindrical. Ascospores vermiform, multiseptate, somewhat thickwalled, smooth, hyaline. On living leaves of angiosperms. *Ascocorticiellum*

Ascocorticium Bref.

Syn.: *Laricina* Velen.

Type species: *Ascocorticium anomalum* (Ellis & Harkn.) Earle.

Lit.: Hansen & Knudsen 2000: 133.

- 1 Sexual morph: Ascomata resupinate, waxy, appearing as up to 5 mm diam. rounded greyish white patches, mostly confluent. Asci cylindrical or narrowly clavate, often with a short lateral outgrowth at the base, with thickened wall toward the apex, 18-22x5-6 µm, 1-. Ascospores ellipsoid, 3.5-5x1.5-2 µm, aseptate, often biguttulate. Asexual morph: Aerial hyphae yellowish to brownish, 1-2.5 /µm wide, thin-walled, smooth. Conidiophores scattered, subulate with a denticulaterachis, up to 50 µm long, pale brown near the base, becoming hyaline towards the apex. Conidia hyaline, broadly ellipsoid, thin-walled, smooth or finely verrucose, not septate, 3.5-5x3-3.5 µm. Saprobiic on bark of gymno-sperms (*Pinus*, *Picea*, *Juniperus*, *Larix*) and angiosperms (*Betula*, *Calluna*, *Hippophae*); phen.: VIII-XI(I-V) (BE/F, DE, DK, NL, SE) • **Ascocorticium anomalum** (Ellis & Harkn.) Earle (1894) III.: Breitenbach & Kränzlin 1981: pl. 130.

Ascocorticiellum Jülich & B. de Vries

Type species: *Ascocorticiellum vermisporum* (Hauerslev) Jülich & B. de Vries

Lit.: Julich & de Vries 1982: 407.

- 1 Ascocarp forming resupinate, rounded patches up to a few millimeters in diameter, very thin, hardly visible, pruinose, whitish or light greyish. Subiculum very thin, arachnoid, producing fascicles of asci . Asci broadly clavate, 20-40x15-18 µm, 16-spored. Ascospores 20-30x1.2-1.5 µm, thin-walled, 3-septate. Saprobiic on wood and bark of *Pinus*. Phen.: VIII, XI (DK NL) **Ascocorticiellum vermisporum** (Hauerslev) Jülich & B. de Vries (1982)

Ascosorus Henn. & Ruhland

Type species: *Ascosorus floridanus* (Ellis & Martin) P. Henn. & Ruhland

No Western European species known.

ASCODICHAENACEAE D. Hawksw. & Sherwood

Lit.: Jaklitsch et al. 2016: 163.

Genera belonging to this family:

1. *Ascodichaena* Butin
2. *Delpinoia* Kuntze
3. *?Dichaenopsis* Paoli

Key to the genera treated here:

- 1 On living or dead bark of the Fagaceae, often causing extensive black stromatic crusts, often looking like a lichen; ascomata rarely observed; asci saccate, opening with a large apical tear; spores ellipsoid, without a mucous sheath [Ascodichaena](#)

Ascodichaena Butin

Type species: *Ascodichaena rugosa* Butin

Lit.: Butin 1977: 249, Minter, Fungi of Ukraine

- 1 Sexual morph: Apothecia erumpent, then superficial, densely crowded, round to elongated hysterioid, 0.3-0.45 mm long by 0.25-0.3 mm wide, opening by a simple or stellate fissure, blackish brown; asci (4-6)8-spored, 85-110x25-35 µm, I-; spores ovoid, 18-24x13-16 µm, aseptate, without mucous sheath; on living and dead twigs and bark of *Fagus sylvatica*, *Quercus petraea*, *Quercus pubescens* and *Quercus robur*. Asexual morph: *Polymorphum quercinum* forming extensive black crusts on the trunks of living *Fagus* and *Quercus*. Phen: teleomorph V-VII, anamorph I-XII ● **Ascodichaena rugosa** Butin (1977)
 Ill.: Butin 1977: fig. 1-5.

Delpinoia Kuntze

Syn.: *Henriquesia* Pass. & Thüm., anamorph *Macroallantina* Speer

Type species: *Delpinoia lusitanica* (Pass. & Thüm.) Kuntze

Lit.: Arnaud 1914: 355, Speer 1987: 9.

- 1 Ascomata erumpent, black, single or grouped, about 0.5 mm diam., splitting in two or more teeth; asci cylindrical to subclavate, 110-130x13-15 µm; spores fusiform, with rounded ends, slightly curved, 28-36x6 µm, hyaline, overmature spores 1-septate; *Macroallantina* anamorph with hyaline, allantoid conidia 45-50x5-6 µm; parasitic/saprobic on corticated branches and trunks of *Quercus ilex*, *Q. coccifera* and *Q. suber*; phen.: IV-XI **"Henriquesia" coccifera** (Castagne) G. Arnaud (1914)

BRYOGLOSSACEAE Ekanayaka & K.D. Hyde 2019

Lit.: Jaklitsch et al. 2016: 178.

Genera belonging to this family:

- 1 *Bryoclavicus* L. Ludw. P.R. Johnst. & Steel
- 2 *Bryoglossum* Redhead

Bryoglossum Redhead

Type species: *Bryoglossum gracile* (P. Karst.) Redhead

Lit.: Eckblad 1963: 150, Hansen & Knudsen 2000: 178.

- 1 Apothecia egg-shaped to cylindric, 2-7x2-5 mm, pale yellow, margin normally not free from stem; stem 10-30 mm high; spores 9-13x2.5-3 µm; on mosses in coniferous forests; phen.: summer and autumn
..... **Bryoglossum rehmi** (Bres.) Ohenoja, in Knudsen & Hansen, *Nordic J Bot.* **16**(2): 211 (1996)
- 1' Apothecia cylindric to campanulate, 5-8x4 mm, yellow to orange yellow, margin free; stem 3-5 mm high; spores 11-13x3-3.5 µm; on mosses in rich *Paludella* fens; phen.: VII-IX
..... **Bryoglossum gracile** (P. Karst.) Redhead, *Can. J. Bot.* **55**(3): 323 (1977)

CALLORIACEAE Marchand

Lit.: Jaklitsch et al. 2016: 171, Ekanayaka et al. 2019: 419.

Sexual morph: Apothecia roundish to very elongate, 0.1-1(3) mm in diam., sessile, immersed to erumpent or seemingly superficial; Hymenium +/- plane, whitish, yellowish, orange, brownish or blackish; margin whitish to bluish, indistinct, partly protruding, often covered by host remnants, opening slit-like or by lobes, closing on drying. Ectal excipulum of +- hyaline textura angularis, towards margin mostly of textura prismatica or textura porrecta; exterior smooth, rarely with 0-septate, +/- tapering solid glassy hairs with KOH-soluble matrix (*Hyalacrotetes*, *Iridinea*). Paraphyses apically i+/- inflated or not, straight or flexuous to hooked, without or sometimes with globose VBs (multiguttulate), smooth, rarely with a brown, granular coat (*Naeviella*) or tipped by glassy caps. Asci with rounded to conical apex, inamyloid or with hemi- or euamyloid apical ring (*Calycina*-, *Pezicula*- or *Ploettnera*-type), with or sometimes without croziers. Ascospores (2-4)8 per ascus, ellipsoid to oblong, subclavate or filiform-clavate, usually 0-septate when mature, sometimes turning 1-3-septate with age, or brown with lateral germ pore (*Naeviella*), lipid content low to high.

Asexual morph: hyphomycetous or sporodochial; conidiogenous cells, conidia 0-septate, globose to ellipsoid or cylindrical.

Habitat: Saprobic, foliicolous, caulicolous, rarely lignicolous.

Genera belonging to this family:

1. *Aivenia* Svrček
2. *Belonioscyphella*
3. *Calloria* Fr.
4. *Chaetonaevia* Arx
5. *Cistella*
6. *Dactylaria*
7. *Diplonaevia* Sacc.
8. *Duebenia* Fr.
9. *Eupropolella* Höhn.
10. *Hyalacrotetes* (Korf & Kohn) Raitv.
11. *Iridinea* Velen.
12. *Laetinaevia* Nannf.
13. *Leohumicola*
14. *Loricella* Velen.
15. *Micropodia* Boud.
16. *Mycoarthritis*
17. *Naeviella* (Rehm) Clem.
18. *Naeviopsis* B. Hein
19. *Ploettnera* Henn.
20. *Polyphilus*
21. *Psilachnum*
22. *Stamnaria*
23. *Rodwayella*
24. *Roseodiscus*
25. *Rommelaarsia*
26. *Tetracladium*
27. *Urceolella*
28. *Vandijckella*

Key to the genera:

- 1 Outer excipulum lacking dark-walled textura angularis in marginal and lateral excipulum; margin thick, extending markedly above and overarching the hymenium, apothecia as a result apparently opening by a pore; periphysis-like elements often present; apothecia at maturity usually less than 0.4 mm diam. *Diplonaevia*
- 1' Apothecia without protruding, thick margin 2
- 2 Apothecia bearing distinct marginal setae; setae hyaline, with lumen to apex, non-septate; excipulum a pale yellowish textura angularis; asci 4- or 8-spored, pore l- *Chaetonaevia*
- 2' Apothecia without setae; asci (2-4)8-spored, l+ or l- 3
- 3 Apothecia developed beneath a covering layer of host/fungus tissue, disc exposed by splitting of this layer as teeth or upraised epidermis, later partly erumpent 4

- 3' Apothecia without a covering layer, erumpent in early state or superficial 6
- 4 Paraphyses apically enlarged or capitate and often with coloured contents; spores becoming 1-3-septate; anamorph lacking *Ploettnera*
- 4' Paraphyses not or slightly enlarged apically, lacking coloured contents; spores 0(1)-septate; anamorphs present or lacking *Naeviopsis*
- 6 Asci 2-6-spored, spores not septate; on Fabaceae *Duebenia*
- 6' Asci 8-spored, spores 0-3-septate; on other hosts 7
- 7 Apothecia 0.15-0.3 mm diam.; lateral excipulum absent; asci broadly clavate; spores 1-3-septate, 12-20 µm long; paraphyses without VB's, apex embedded in gel *Eupropelella*
- 7' Ectal excipulum present 8
- 8 Apothecia superficial, disciform, broadly sessile, small (0.1-0.3 mm diam.); ectal excipulum subhyaline, of textura angularis to sub-globulosa with thin-walled cells; spore 0-1-septate, hyaline *Aivenia*
- 8' Apothecia erumpent 9
- 9 Asci I+ or I-; anamorph *Trichosporiella* or lacking *Laetinaevia*
- 9' Asci I-; anamorph *Cylindrocolla* or lacking *Calloria*
Naeviella

Aivenia Svrček

Type species: *Aivenia tantula* Svrček

Lit.: Svrček 1977: 132, Svrček 1989: 215.

- 1 Apothecia 0.2-0.3 m diam., broadly sessile, convex to hemispherical, without margin, white, drying yellowish; asci 50-55x10-14 µm, IKI-, with croziers; spores cylindrical to elongate ovoid, 10-14x3-3.5 µm, 1-septate, OCI 0, hyaline; saprobic on leaves of *Caltha palustris*; phen.: V **Aivenia calthae** Svrček (1989)
Ill.: Svrček 1977: fig. 1/3.
- 1' Asci amyloid 2
- 2 Apothecia disciform, 0.1-0.15(0.2) mm diam., broadly sessile, fully pale ochraceous yellow; basal excipulum of irregular textura globulosa; margin with cylindrical to cylindrical-clavate end cell 8-15x3-4 µm; asci 25-35x4-7 µm, IKI blue, with croziers; spores inequilateral clavate, 6-7x1.3-1.5 µm, unicellular, eguttulate, hyaline; saprobic on leaves of *Comarum palustre*; phen.: IV-V **Aivenia tantula** Svrček (1977)
Ill.: Svrček 1977: fig. 1/1.
- 2' Apothecia 0.1-0.15 mm diam., broadly sessile, disk convex, without margin, pale ochraceous yellow; ectal excipulum composed of oblong-ellipsoid cells 4-9x3-5 µm; asci 30-40x5-7 µm, IKI blue; spores subclavate, 7-11x2-2.5 µm, OCI 2, hyaline; paraphyses 1.5-2 µm diam.; saprobic on stems of *Aconitum firmum*; phen.: IX **Aivenia aconiti** Svrček (1989)
Ill.: Svrček 1977: fig. 1/1.
- 2'' Apothecia 0.2-0.3 mm diam., broadly sessile, plano-convex, without margin, fully pale ochraceous yellow; excipulum with rust-colored encrusted marginal cells; asci 45-60x9-11 µm, IKI blue; spores oblong-ellipsoid, 10-14x3-3.5 µm, OCI 0-1, 0(1)-septate, hyaline; saprobic on leaves of *Aconitum firmum*; phen.: IX **Aivenia foliicola** Svrček (1989)
Ill.: Svrček 1977: fig. 1/2.

Calloria Fr.

Type species: *Calloria fusarioides* (Berk.) Fr. = *Calloria tremelloides* (Grev.) L. Lombard

Lit.: Hein 1976: 52, Nauta & Spooner 1999a: 66,

- 1 Apothecia up to 0.5 mm diam.; asci <50 µm long; spores 7-9x1.5-2.5 µm; saprobic on *Galium*; phen.: ? **Calloria galiorum** Dennis (1990)
- 1' Spores longer 2
- 2 Asci IKI red, with croziers; spores ellipsoid, 11-15.5x4.5-6 µm, 0(1)-septate, OCI 2; with glassy excipular hairs, glass KOH-soluble; saprobic on stems and leaves of *Veratrum album*, montane; phen.: VI **Calloria gentiana** Grelet & Croz. (1928)
- 2' Spores average up to 4.5 µm 3

- 3 Sexual morph: Apothecia up to 1 mm diam.; asci 60-80x7-8(10) μm , I-, with croziers; spores 10-15x3.5-5 μm , 1-3-septate, OCI 2. Asexual morph sporodochial, conidia; saprobic on stems of *Urtica*; phen.: III-VI(IX) (BE/F, BE/W, CH, DE, FR) • **Calloria tremelloides** (Grev.) L. Lombard (2021)
- 3' Apothecia circular to elongated, 0.2-0.4 mm wide; asci 45-65x7-8.5 μm , I-; spores 10-13(14)x3-4 μm , 0(1-3)-septate; saprobic on *Galeopsis tetrahit*; phen.: VIII **Calloria galeopsidis** J. Schröt. (1893)

Chaetonaevia Arx

Type species: *Chaetonaevia nannfeldtii* Arx.

Lit.: Arx 1951: 86, Svrček 1976: 8 (*C. petasitis*), Svrček 1982: 146, Nauta & Spooner 1999a: 66.

- 1 Asci 4-spored, pore I-, 50-65x15-22 μm ; spores 43-54x7-10 μm ; on *Arctostaphylos alpina*; phen.: ? **Chaetonaevia nannfeldtii** Arx (1951)
- 1' Asci 8-spored; spores up to 20 μm long 2
- 2 Apothecia semi-immersed, cup-shaped, 0.1-0.3 mm diam., margin with glassy brittle hairs; asci I-; spores cylindrical, 11.5-18(20)x3-4(4.5) μm , 1-septate, hyaline; saprobic on mostly upper side of leaves of *Petasitidis officinales*; phen.: V **Chaetonaevia petasitis** Svrček (1976)
III.: Svrček 1976: fig. 1.
- 2' Apothecia superficial, 0.15-0.2 mm diam., pale yellow, margin with glassy brittle hairs; asci I-; spores fusiform, 10-14x2-2.5 μm , aseptate, hyaline; saprobic on leaves of *Ulmus* spores; phen.: V **Chaetonaevia ulmicola** Svrček (1982)

Diplonaevia Sacc.

Type species: *Diplonaevia caricum* (Auersw.) Sacc.

Syn.: *Merostictis* Clem.

Lit.: Défago 1967: 40 (sub *Merostictis*), Hein 1983b: 78, Hein & Scheuer 1985: 125, Scheuer 1991b: 634 (*D. paulula*), Nauta & Spooner 2000a: 25.

- 1 Margin in median cut composed of textura prismatica and textura angularis to globulosa 2
- 1' Margin in median cut only composed of textura prismatica 8
- 2 Hyphal end cells on the inner side of the margin arranged roofing tile wise 3
- 2' Hyphal end cells on the inner margin side palisade-like arranged and mostly having a papillate end 5
- 3 Free hyphal ends on the inner side of the margin about 20 μm long, partially septate; asci I+; spores fusiform to subclavate, (6)10-13(16)x1.5-2(2.5) μm , 0(1)-septate; saprobic on leaves of *Luzula pilosa*, *Luzula silvatica*; phen.: VI-VII ○ **Diplonaevia luzulina** (P. Karst.) B. Hein (1983)
III.: Hein 1983: Abb.4 e-f.
- 3' Free hyphal ends up to 15 μm long and mostly unicellular; on *Juncus* (and *Carex*?) 4
- 4 Apothecia 0.25-0.4 mm diam., ochraceous rosa to ochraceous brown, black crenulate margin; asci *55-74x6-8 μm , J+, with croziers; spores narrowly clavate, *11-19x 2-3.2 μm , 0(1)-septate, with minute polar guttules; paraphyses guttulate; saprobic on culms of *Juncus conglomeratus*, *Juncus effusus*, *Juncus filiformis* and *Luzula silvatica*; phen.: VI-IX **Diplonaevia emergens** (P. Karst.) B. Hein (1983)
III.: Hein 1983: Abb.1 d.
- 4' Apothecia dark brown; spores 13-18x2-3 μm ; saprobic on *Juncus arctius*; phen.: VIII **Diplonaevia glacialis** (Rehm) Sacc. (1889)
III.: Hein 1983: Abb.2 d.
- 5 Asci I+; spores 7-8x1.5-2 μm ; saprobic on *Nardus stricta*; phen.: VII-IX **Diplonaevia perpusilla** (Rehm) B. Hein (1983)
III.: Hein 1983: Abb.5 a.
- 5' Spores average more than 8 μm long 6
- 6 Apothecia up to 0.4 mm diam., pale orange brown; asci 40-45x5 μm , I+; spores 10-13x1.5-2.5 μm ; periphyses 10-20x4-5 μm , with pointed end; on *Carex sempervirens*; phen.: VII . **Diplonaevia immersa** B. Hein & Scheuer (1985)
III.: Hein 1983: Abb.1 d.
- 6' Spores more than 2.5 μm wide 7
- 7 Apothecia 0.3 mm diam.; asci 35-50x5-6 μm , I+; spores 7-12x2.5-3 μm , guttulate; periphyses with pointed 8x4 μm end cell; paraphyses embedded in gel; saprobic on *Carex hirta*, *Carex longifolia*, *Carex montana*, *Carex sempervirens*, *Carex verna* and grasses (*Avena parlatorei*, *Calamagrostis epigeios*, *Sesleria varia*); phen.: V-VII

		8
7'	Spores more than 12 µm long Diplonaevia seriata (Lib.) B. Hein (1983) III.: Hein 1983: Abb.1 a-b.	8
8	Asci +; spores 12-16(19)x2.5-3.5µm; saprobic on <i>Nardus stricta</i> ; phen.: VII Diplonaevia salassorum (Défago) B. Hein (1983) III.: Hein 1983: Abb.1 c.	9
8'	Apothecia 0.1-0.2 mm diam.; asci (52)66-72x13-16 µm, IKI+; spores clavate, 12-16.5x(4)4.5-5.5 µm, biguttulate, with an easily dissolving mucous coating; parasitic on bleached culms of <i>Juncus maritimus</i> , along the margin of black spots; phen.: III Diplonaevia paulula (Rob. Ex Desm.) Scheuer (1991) III.: Scheuer 1991b: fig. 1.	10
9	Hyphal ends or lateral cell protrudings on inner side of the margin 10	10
9'	Hyphal ends on the inner side of the margin without conspicuous protrudings 16	16
10	Spores more than 3 µm wide; on monocotyls 11	11
10'	Spores up to 2.5 µm wide; on dicotyls 14	14
11	Asci mostly 4-spored, I+; spores 20-28x5-7 µm, aseptate, in the ascus with mucous coating; on <i>Scirpus cespitosus</i> ; phen.: I-VII Diplonaevia trichophori (Petr.) B. Hein (1983) III.: Hein 1983: Abb.2 a; Schmid I. & H. 1990: nr. 7.	12
11'	Asci 8-spored 12	12
12	Apothecia 0.1 mm diam.; spores 28-32x4.4.5 µm, (0)1-septate; on <i>Luzula alpino-pilosa</i> ; alpine; phen.: VII..... Diplonaevia septospora B. Hein & Scheuer (1985) III.: Hein & Scheuer 1985: Taf.1: Abb.1.	13
12'	Spores up to 25 µm long 13	13
13	Asci I+; spores 15-20(25)x4-5 µm; on <i>Juncus anceps</i> var. <i>atricapillus</i> , <i>Juncus subnodulus</i> , <i>Scirpus</i> ; phen.: VII Diplonaevia exigua (Desm.) B. Hein (1983) III.: Hein 1983: Abb.2 b, Ellis & Ellis 1985: fig. 2029.	14
13'	Apothecia 0.2-0.35 mm diam.; asci I+; spores 19-25x3.5-4 µm; on <i>Luzula alpino-pilosa</i> ; alpine; phen.: VII Diplonaevia muellerii B. Hein & Scheuer (1985) III.: Hein & Scheuer 1985: Taf.1: Abb.3.	15
14	Apothecia 0.25 mm diam., yellow-rosa; asci I+; spores (8)10-12(15)x2-2.5(3) µm, 0(1)-septate; on <i>Urtica dioica</i> ; phen.: V-VII • Diplonaevia bresadolae (Rehm) B. Hein (1983) III.: Hein 1983: Abb.3.	16
14'	Apothecia middle brown to dark brown 15	15
15	Apothecia up to 0.4 mm diam., dark brown; asci I+; spores 9-11.5x1.5-2 µm; on <i>Euphorbia austriaca</i> , <i>Euphorbia</i> <i>duOClis</i> , <i>E. hyberna</i> , <i>E. palustris</i> ; phen.: (III)V-VII Diplonaevia mollisioides (Sacc. & Briard) B. Hein (1983) III.: Hein 1983: Abb.4 a-d, Rubio & al. 2010: p. 218.	17
15'	Apothecia up to 0.2 mm diam., middle brown; asci I+; spores 10-12x2 µm; on <i>Carex davalliana</i> ; phen.: VI Diplonaevia davaliana B. Hein & Scheuer (1985) III.: Hein & Scheuer 1985: Taf.1: Abb.5.	17
15	Apothecia pale, visible outer side translucent pale yellowish to pale reddish or with silvery epidermis 17	17
15'	Apothecia dark to blackish brown; on monocotyls 19	19
17	Apothecia up to 1x0.2-0.4 mm, pale ochraceous; asci IKI violet red; spores 21-26x4-5 µm, 1-septate; saprobic on culms of <i>Calamagrostis villosa</i> ; phen.: VI "Merostictis" hypopyrrha (Rehm) Défago (1968) [1967] III.: Défago 1967: fig.23.	18
17'	Spores shorter 18	18
18	Asci I+; spores (5)6-8x1.5-2.5 µm; on <i>Caulophyllum thalictroides</i> ; phen.: V (USA, Canada)..... Diplonaevia caulophylli (Ellis & Everh.) B. Hein (1983) III.: Hein 1983: Abb.5 b.	19
18'	Asci I+; spores 10-14x1.8-2.5 µm; on <i>Heracleum lanatum</i> ; phen.: ? (USA)..... Diplonaevia stenospora (Sacc.) B. Hein (1983) III.: Hein 1983: Abb.5 c.	20
19	Asci 4-6(8)-spored, I-!; spores filiform, 17-28x1.5-2.5 µm, fasciculate; on <i>Carex pyrenaica</i> ; phen.: VIII Diplonaevia caricis (Petr.) B. Hein (1983)	21

- III.: Hein 1983: Abb.2 c.
- 19' Spores not filiform 20
- 20 Asci mostly 4-spored, I+; spores 8-12x3-4 µm; on *Juncus acutiflorus*; phen.: VI
 **Diplonaevia circinata** (Lib.) B. Hein (1983)
 III.: Hein 1983: Abb.2 e.
- 20' Asci 8-spored, I+; spores 14-20x3-4 µm, with large guttules; on *Elyna myosuroides*; artic-alpine; phen.: VII-VIII
 **Diplonaevia elyanae** (Défago) B. Hein (1983)
 III.: Hein 1983: Abb.2 f.
- Apothecia 0.1-0.3 mm diam., erumpent, yellowish; spores 8-10x1.5-2 µm, aseptate, eguttulate, hyaline; saprobic on
 culms of *Bromus inermis*; phen.: VII **"Merostictis" Iundellii** Svrček (1990)

Duebenia Fr.

Type species: *Duebenia rubra* Fr. = *Duebenia compta* (Sacc.) B. Hein.

Syn.: *Briardia* Sacc.

Lit.: Hein 1976: 104, Nauta & Spooner 1999b: 67.

- 1 Apothecia circular, 0.5 mm diam., hymenium translucent; asci 8-spored, 55-70x8-9 µm, I-; spores 8-10x4-5 µm, aseptate; saprobic on stems of *Astragalus norvegicus*; phen.: VIII **Duebenia blyttiana** (Rostr.) B. Hein (1976)
 III.: Hein 1976: Abb.36d-f.
- 1' Apothecia elongated 2
- 2 Apothecia erumpent, elongated, about 0.5x0.4 mm, hymenium orange to brown; asci 42-62x6-7.5 µm, IKI-, 4-8-spored, faintly I+, with croziers; spores oblong, 6-12x3-3.5 µm, aseptate, OCI 2, hyaline; paraphyses apically lanceolate, forming a pseudoepithecium; saprobic on stems of *Artemisia*; phen.: V-VI (LU, IT)
 • **Duebenia compta** (Sacc.) Nannf. ex B. Hein (1976)
 III.: Hein 1976: Abb.36a-c.
- 2' Apothecia about 0.6x0.25 mm, hymenium yellow to orange; asci 35-45x3.5-5 µm, 4-8-spored, I-, with croziers; spores clavate-fusoid, 6-10x2.3-3.2 µm, aseptate, OCI 2; paraphyses subclavate; saprobic on Fabaceae (*Lathyrus sylvestris*, *Lotus corniculatus*, *Melilotus alba*, *Melilotus officinalis*, *Medicago sativa*, *Vicia cracca*) sp.; phen.: V-VI (VIII) (LU, IT)..... **Duebenia subcompta** Ekanayaka & K.D. Hyde (2018)

Eupropelella Höhn.

Type species: *Eupropelella vaccinii* (Rehm) Höhn.

Lit.: Dennis 1978 : 221, Nauta & Spooner 2000a: 27, Baral 2000 (key).

- 1 Spores curved, 14-18x3-5 µm, becoming 1-3-septate; paraphyses apically brown and clavate; saprobic on underside of leaves of Ericaceae (*Andromeda*, *Arctostaphylos*, *Vaccinium oxycoccus*, *V. vitis-idaea*); phen.: IX
 **Eupropelella vaccinii** (Rehm) Höhn. (1917)
- 1' Paraphyses apically hyaline and only slightly enlarged 2
- 2 Basal excipulum (hypotheecium) hyaline or deep olive-brown, with bright fox-ochre host tissue below, disc light to dull cream-ochre-grey; spores oblong, *13-23x4.8-6.6 µm, aseptate, hyaline, completely filled by some large and many small LBs with irregular pattern (OCI 5), overmature 1-septate, remaining hyaline; apothecia with (2)3(4) epidermal lobes; gregarious on both sides of dry, decayed leaves of *Hedera helix*, usually in close association with *Trochila craterium*; phen.: V-XII (BE/F) • **Eupropelella "hederae"** Baral nom. prov.
 (?= *E. britannica*)
- 2' Spores 1-3-septate 3
- 3 Basal excipulum dark brown, disc blackish-grey; asci J+; spores 9-18x4.2-7 µm becoming 1-3-septate and pale brownish; saprobic on both sides of leaves of *Prunus laurocerasus*; phen.: (I)IV-VII (BE/F).....
 ○ **Eupropelella britannica** Greenh. & Morgan-Jones (1972)
 III.: Dennis 1978: fig. 31M, Ellis & Ellis 1985: fig. 865.
- 3' Spores 12-20x3-5 µm, becoming 3-septate, hyaline; asci IKI blue; paraphyses flexuose; saprobic on stems of *Arundinaria*, *Phragmites*; phen.: I-III ○ **Eupropelella arundinaria** (E.K. Cash) Dennis (1975)
 III.: Dennis 1975: fig. 9A.

Hyalacrotetes (Korf & Kohn) Raitv.

Type species: *Hyalacrotetes hamulata* (Rehm) Raitv.

Lit.: Huhtinen 1985a: 508 (sub *Urceolella hamulata*).

- 1 Apothecia discoid, 0.3-1 mm diam., light ochraceous when fresh; asci 60-85x9-13 µm, IKI-, IKI blue after KOH pretreatment; spores 12-16x3-4 µm, 0(1)-septate, OCI ?3; saprobic on stems of *Aconitum*, *Cirsium*, *Epilobium angustifolium*, *Heracleum maximum*, *Senecio*, *Rumex*. Phen.: VIII-IX (arctic-alpine, CH,SE)
 **Hyalacrotus hamulata** (Rehm) Raitv. (1991)
 Ill.: Müller 1968: Abb. 3, Huhtinen 1985a: fig. 58.

Iridinea Velen.

Syn. ?*Unguiculariella* K.S. Thind & R. Sharma
 Type species: ?

Laetinaevia Nannf.

Type species: *Laetinaevia lapponica* (Nannf.) Nannf. = *Laetinaevia adonis* (Fuckel) Nannf. ex Hein.
 Lit.: Hein 1976: 28, Svrček 1976: 11 (*L. fagicola*), Graddon 1977: 268 (*L. pustulata*), Kirk & Spooner 1984: 568 (*L. marina*), Nauta & Spooner 1999b: 67.

- 1 Spores more than 15 µm long 2
 1' Spores up to 15 µm long 3
- 2 Apothecia up to 0.4 mm diam.; asci I-; spores (14)15-17(19)x5-6(7) µm, 0-1-septate, with two large LB's; saprobic on herbaceous leaves and stems (*Aconitum napellum*, *Adonis vernalis*, *Trollius europaeus*); phen.: IV-VIII
 **Laetinaevia adonis** (Fuckel) Nannf. ex Hein (1976)
- 2' Asci up to 85x15 µm, I-; spores 30-33x4 µm; on leaves of *Luzula*; phen.: VII .. **Laetinaevia luzulae** Spooner (1981)
 Ill.: Spooner 1981: fig. 21.
- 3 Apothecia erumpent, 0.1-0.15 mm diam., disc subhyaline to pale yellowish; asci 45-50x7-8 µm, I-; spores 6-8x3-3.5 µm, eguttulate, hyaline; saprobic on pale brownish spots on inner side of leaves of *Fagus sylvatica*; phen.: V
 **Laetinaevia fagicola** Svrček (1976)
 Ill.: Svrček 1976: fig. 1.
- 3' Spores more than 8 µm long 4
- 4 Asci 30-60x10-13 µm, I+ violaceous, IKI rr, with croziers; spores 10-15x3-4 µm, 0-1-septate; saprobic on herbaceous stems, mainly *Urtica*; phen.: IV-IX ●**Laetinaevia carneo-flavida** (Rehm) Nannf. ex B. Hein (1976)
- 4' Asci IKI blue 5
- 5 Apothecia erumpent, 0.25-0.45 mm diam., disc pale orange; asci 50-65x6-7 µm, I+; spores 9-11(13)x2.5-3.5 µm, 0(1)-septate, hyaline; on marine brown algae (*Ascophyllum*, *Fucus*); phen.: IV-IX
 **Laetinaevia marina** (Boyd) Spooner (1984)
 Ill.: Kirk & Spooner 1984: fig.10.
- 5' Apothecia 0.3 mm diam., disc pale yellow; asci up to 75x6 µm, I+ blue; spores 11.5-13x3-4 µm; saprobic on lower side of leaves of *Quercus*; phen.: XII **Laetinaevia pustulata** Graddon (1977)
 Ill.: Graddon 1977: fig.21.

Laetinaevia erythrostroma (Rehm) B. Hein (1976)

Micropodia Boud.

Type species: *Micropodia pteridina* (Nyl.) Boud.
 Lit.:

- 1 Apothecia 0.2-0.4 mm diam., downy, with short marginal teeth, white; asci †30-47x5-5.5 µm, IKI+, with croziers; spores †7-10x1.5-2 µm; saprobic on blackened base of fronds of *Pteridium aquilinum*; phen.: V
 ○ (●) **Micropodia pteridina** (Nyl.) Boud. (1904)

Naeviopsis B. Hein

Type species: *Naeviopsis epilobii* (P. Karst.) B. Hein.
 Lit.: Hein 1976: 60, Nauta & Spooner 1999b: 68.

- 1 Apothecia 0.3-0.5 mm diam., disc ochre-yellow to -red; asci 60-80x11-14 µm, I+; spores 11-13.5x5.5-7.5 µm; saprobic on herbaceous stems (*Euphorbia*, seldomly on *Solidago*); phen.: V-VI
 **Naeviopsis tithymalina** (Kunze) B. Hein (1976)
 Ill.: Hein 1976: Abb. 16a & 17.
- 1' Spores different; not on *Euphorbia* 2

2	Spore longer than 13 µm	3
2'	Spore up to 13 µm long	9
3	Apothecia 0.3 mm diam., disc yellowish; asci 90-120x26-32 µm, I-; spores 22-27x10-12 µm, guttulate; saprobic on stems and leaves of <i>Rhodiola rosea</i> , <i>Trollius europaeus</i> ; phen.: VI-VIII Naeviopsis rhodiolae B. Hein (1976) Ill.: Hein 1976: Abb. 16f, 18 & 19.	4
3'	Spores narrower	4
4	Spores with L/W<4	5
4'	Spores with L/W≥4	7
5	Apothecia 0.1-0.3 mm diam., disc yellowish; asci 50-70x11-14 µm, I-; spores (11)14-16(18)x5-6 µm, aseptate, guttulate; saprobic on leaves and stems of <i>AOCIhemilla alpina</i> , <i>Geum reptans</i> , <i>Potentilla crantzii</i> , <i>Potentilla fragiformis</i> , <i>Potentilla hypartica</i> , <i>Potentilla nivea</i> ; phen.: VI-VIII Naeviopsis arctica (Allesch.) B. Hein (1976) Ill.: Hein 1976: Abb. 2a-b, 16k & 20.	6
5'	Spores 6-8 µm wide; apothecia larger	6
6	Apothecia erumpent; asci 70-100x14-19 µm, I+; spores 13-17x6-8 µm, aseptate; saprobic on stems of <i>Chamerion angustifolium</i> ; phen.: VI-VIII Naeviopsis epilobii (P. Karst.) B. Hein (1976) Ill.: Hein 1976: Abb. 2c, 16b & 21.	6
6'	Apothecia cf. <i>N. epilobii</i> but disc pruinose; paraphyses broader; saprobic on <i>Astrantia minor</i> , <i>Eryngium spina-alba</i> , <i>Laserpitium gallicum</i> , <i>Laserpitium latifolium</i> , <i>Pimpinella sp.</i> , <i>Seseli libanotis</i> ; phen.: V-VII Naeviopsis jenensis (Kuntze) B. Hein (1976) Ill. Hein 1976: Abb. 16c.	6
7	Apothecia erumpent, flesh-coloured; spores fusiform, 30-41x3.5-4 µm, aseptate; saprobic on culms of <i>Juncus filiformis</i> ; phen.: VII Naeviopsis carneola B. Hein & Nannf. 12 (1992)	8
7'	Spores shorter	8
8	Apothecia 0.2-0.5 mm diam., disc rosa; asci 70-90x14-18 µm, I-; spores 25-32x5-6 µm, 1-septate; saprobic on leaves of <i>Primula glutinosa</i> ; phen.: VIII Naeviopsis primulae (Rehm) B. Hein (1976) Ill. Hein 1976: Abb. 16d & 22c.	8
8'	Apothecia 0.2 mm diam, yellowish; asci 60-85x12-15 µm, I+ blue; spores 22-26x4.5-5(5.5) µm, 1-septate; saprobic on leaves of <i>Salix reticulata</i> ; phen.: VIII Naeviopsis salicis B. Hein (1976) Ill. Hein 1976: Abb. 16e, 22a-b.	8
9	Asci I-	10
9'	Asci I+	11
10	Apothecia 0,08-0.15 mm diam.; asci 40-50x8-10 µm; spores 9-11x3-4 µm, aseptate; saprobic on upper side of leaves of <i>Ribes glabellum</i> , <i>Rubus chamaemorus</i> ; phen.: VII-VIII Naeviopsis tornensis B. Hein (1976) Ill. Hein 1976: Abb. 16j, 23.	10
10'	Apothecia 0.1-0.3 mm diam., yellowish; asci 50-70x9-11 µm; spores 9-13x4-5 µm, aseptate; saprobic on stems of <i>Gentiana purpurea</i> ; phen.: VII Naeviopsis montana B. Hein (1976) Ill. Hein 1976: Abb. 1c, 16l, 24.	10
11	Apothecia 0.1-0.2 mm diam., whitish; asci 35-50x6-9 µm, I+; spores (6)7-10x2.5-3.5(4) µm, aseptate; saprobic on lying leaves of <i>Fagus sylvatica</i> , <i>Populus tremula</i> , <i>Ulmus sp.</i> ; phen.: V-VII Naeviopsis carneopallida (Rob. ex Desm.) B. Hein (1976)	11
11'	Spores 3.5 µm wide or more	12
12	Apothecia 0.1-0.2 mm diam., pale yellowish; asci 45-65x9-12 µm, I+ violet; spores 9-13x4-5 µm, aseptate; saprobic on stems of <i>Chamerion angustifolium</i> , <i>Lythrum salicaria</i> ; phen.: VII-VIII Naeviopsis simulans B. Hein (1976)	12
12'	Apothecia 0.2-0.5 mm diam.; asci 60-75x9-11 µm, I+ blue; spores 9-11x4-5 µm, aseptate; saprobic on leaves of <i>Cornus sanguinea</i> ; phen.: IV Naeviopsis pusilla (Speg.) B. Hein (1976)	12

Ploettnera P. Henn.

Type species: *Ploettnera coeruleoviridis* (Rehm) Henn. = *Ploettnera exigua* (Niessl) Höhn.

Lit.: Hein 1976 : 94, Dennis 1978 : 219, Beyer 1987 : 443 (*P. solidaginis*), Nauta & Spooner 1999b: 68.

- 1 Substratum with blue-green stain; asci 8-spored, up to 60x10 µm, I-; paraphyses tips swollen, with blue-green pigment; spores 12-15x5-8 µm, 0(1)-septate, with two large and many small guttules, OCI 5; saprobic on rods of *Rubus*; phen.: XI-XII • **Ploettnera exigua** (Niessl) Höhn. (1918)
 Ill.: Dennis 1978: pl. XXVIK, Dougoud 2011: p. 23.
- 1' Substratum without blue-green stain; asci 4-8-spored, apical pore I+; paraphyses tips swollen or not, lacking blue-green pigment; on other hosts 2
- 2 Asci 4(6)-spored, 100-135x10-12 µm, I-; spores ellipsoid to reniform, 13-18x7-7.5 µm; paraphyses apically flexuous, not subcapitate, virtually hyaline; saprobic on *Compositae* (*Aster*, *Hieracium*, *Solidago*); phen.: VII-VIII.....
 **Ploettnera solidaginis** (De Not.) B. Hein (1976)
 Ill.: Hein 1976: Abb.32a & 33.
- 2' Asci 8-spored 3
- 3 Asci 8-spored; spores 15-20(22)x4-5 µm, guttulate; paraphyses often subcapitate, with yellow-brown pigment; saprobic on *Atropa belladonna*, *Chaerophyllum aromaticum*, *Phytolacca sp.*; phen.: VIII
 **Ploettnera belladonae** (Rehm) B. Hein (1976)
 Ill.: Hein 1976: Abb.32b & 34.
- 3' Asci 8-spored; spores 11-15(17)x5-7(8) µm, guttulate; paraphyses apically often subcapitate, with yellow-brown pigment; saprobic on *Hypericum hirsutum*, *Hypericum maculatum*, *Hypericum perforatum*, *Sibbaldia procumbens*; phen.: VI-VII..... **Ploettnera hyperici** (Vestergr.) B. Hein (1976)
 Ill.: Hein 1976: Abb.32c & 35.

CHLOROSPENIACEAE Ekanayaka & K.D. Hyde 2019

Lit.:

Chlorosplenium Fr.

Type species: *Chlorosplenium chlora* (Schwein.) M.A. Curtis

Lit.: Dennis 1978: 148, Svrček, 1992: 34.

- 1 Apothecia 0.8-1.5 mm diam., shortly stalked, deep green; asci 50-60x6-8 µm, I-; spores oblong, inequilateral, 8-10x2.5-3 µm, with a minute guttule at both poles, aseptate; saprobic on stems of *Hypericum maculatum*; phen.: X ..
 **Chlorosplenium hyperici-maculati** Svrček (1992)
 III.: Svrček 1992: p. 38, 2.
- 1' Apothecia shortly stalked, hymenium pale greyish, outer surface yellowish green; asci IKI+; spores oblong, (7.5)8-10.5x2-2.8 µm, with a minute guttule at both poles, aseptate; paraphyses with a cylindrical vacuole; saprobic on wood of *Quercus rubra*; phen.: XI **Chlorosplenium chlora** (Schwein.) M.A. Curtis

CHRYSODISCACEAE Baral & Haelew.

Lit.: Baral & Polhorsky 2019: 79.

One single genus belongs to this family:

Chrysodisca Baral, Polhorský & G. Marson

Type: *Chrysodisca peziculoides* Baral, Polhorský & G. Marson

- 1 Apothecia 0.13–0.6 mm diam., non-gelatinous, soft, sessile, erumpent, gymnohymenial, disc flat, margin not or slightly protruding, overall covered by a whitish- or mostly yellow pruina, pubescent by protruding paraphyses and hairs. Asci *75-155×13.7-22 μm, †64–107×11.3–16 μm, 8-spored, inamyloid, short-stalked, arising from simple septa. Ascospores *16-27×5-7.5 μm, †13-20×4.2–5.8 μm, cylindric-ellipsoid-oblong, ends rounded to almost subacute, straight to medium curved, non-septate, hyaline, smooth; containing one or sometimes more nuclei, groups of minute LBs and vacuoles, and two large glycogen bodies; overmature 0–1(–3)-septate, germination not observed. Paraphyses apically cylindrical to slightly clavate, *2–5 μm wide, protruding beyond subturgescence. Medullary excipulum of slightly gelatinised textura intricata-prismatica. Ectal excipulum of slightly gelatinised t. prismatica-angularis, small-celled, hyaline to greyish olive-brown. Hairs *15–50×3.2–5.5 μm, cylindrical, 0–1-septate, firm-walled, hyaline to light brown, minutely warted. Exudate on protruding part of paraphyses and on hairs sulphur-yellow, granular to cloddy, ionomidotic (exudate dissolved in KOH (2%) by giving a golden stain), turning olivaceous with age. VBs absent. Asexual morph unknown. On xeric, often resinous bark of corticated coniferous branches and trunks in an initial state of decay. Phen.: III-XI (CH, DE, FE, LU)
 **Chrysodisca peziculoides** Baral, Polhorský & G. Marson (2019)

CORDIERITIDACEAE (Sacc.) Sacc.

Lit.: Jaklitsch & al. 2016: 165, Pärtel & Baral 2016, Ekanayaka et al. 2019: 322.

Sexual morph: Apothecia 0.1-50 mm in diam., plane or cup-, funnel- to ear-shaped, opening in the mesohymenial phase; hymenium cream, olive-green, brown or black; exterior often pustulate, margin with or without hairs; immersed-erumpent or superficial, sessile or stipitate, stipes often branched or arising from a common base, sometimes with a dark stroma. Ectal excipulum of textura globulosa-angularis or vertically oriented textura prismatica-intricata, immersed in gel or dark-coloured exudate, outer layers partly splitting into pustules, tissue rarely containing crystals (*Encoelia fimbriata* Spooner & Trigaux); exudate in KOH often releasing a deep yellow or mostly red-brown pigment. Hairs (if present) septate or not, straight or tapered and hooked, hyaline or brownish, smooth, sometimes thick-walled or solid. Paraphyses cylindrical or clavate, sometimes lanceolate and projecting, without VBs. Asci inamyloid, often with apical thickening, with croziers. Ascospores 8 per ascus, ellipsoid to fusoid or rod-shaped, straight or sometimes curved, hyaline, 0(3)-septate, without sheath, lipid content medium to high (bi- to multiguttulate).

Asexual morph: rarely known, coelomycetous, unilocular, phialidic, conidia triangular, hyaline (*Unguiculariopsis*).

Habitat: Temperate-boreal to tropical, lignicolous or fungicolous, parasitic on bamboo [*Encoelia helvola* (Jungh.) Overeem], mainly desiccation-tolerant.

Genera belonging to this family:

1. *Ameghiniella* Speg.
2. *Austrocenangium*
3. *Cordierites* Mont.
4. *Diplocarpa* Masee
5. *Diplolaeviopsis* Girakt & D. Hawksw.
6. *Gelatinopsis* Rambold & Triebel
7. *Ionomidotis* E.J. Durand ex Thaxt.
8. *Limoniella* Hafellner & Nav.-Ros.
9. *Macroskytea*
10. *Midotiopsis* Henn.
11. *Phaeangella* (Sacc.) Masee
12. *Rhizocladosporium*
13. *Rhymbocarpus* Zopf
14. *Sabahriopsis*
15. *Skyttea* Sherwood, D. Hawksw. & Coppins
16. *Skyttella* D. Hawksw. & R. Sant.
17. *Thamnogalla* D. Hawksw.
18. *Unguiculariopsis* Rehm
19. *Unguiculella* Höhn.

Key to the genera:

- | | |
|---|-------------------------|
| 1 Genera with ionomidotic reaction (extrusion of KOH-soluble yellow to red- brown pigment) | 2 |
| 1' Genera without ionomidotic reaction | 3 |
| 2 Apothecia about 20 mm diam., shortly stipitate, irregularly lobate, black, often growing as rosettes; ectal excipulum composed of thick-walled, protruding round-celled or hyphoid elements perpendicular to the surface, with orange-brown ionomidotic reaction; paraphyses obtuse; asci I-; spores aseptate | <i>Ameghiniella</i> |
| 2' Apothecia stipitate, tomentose; Outer excipulum a well-developed textura angularis or textura globulosa to the margin; paraphyses with fusiform swollen septate apex | <i>Diplocarpa</i> |
| 3 Ectal excipulum of brown textura globulosa to textura angularis, covered by uncinat hairs; asci I- . | <i>Unguiculariopsis</i> |
| 3' Lichenicolous | 4 |
| 4 | <i>Rhymbocarpus</i> |
| 4' Ascomata first perithecioid; erumpent, urceolate, excipulum composed of small-celled pseudoparenchyma, dark brown or olive green, margin with hyaline to brown thin-walled hairs ; asci thick-walled, lacking an apical apparatus, I-; spores 0-3-septate, hyaline; lichenicolous | <i>Skyttea</i> |
| 7' Apothecia discoid to ear- or funnel-shaped; outside covered by brown hyphal protrusions; non-ionomidotic | <i>Cordierites</i> |

Ameghiniella Speg.

Type species: *Ameghiniella australis* Speg.

Lit.: Hansen & Knudsen 2000: 157, Běťák & al. 2012: 72, Pärtel & Baral 2016.

- 1 Apothecia erumpent, solitary or fasciculate, sessile to short stipitate, 1.5-5(10) mm diam., hymenium olivaceous brown to almost black, outside mostly reddish brown; excipulum of textura prismatica-globulosa covered by brown exudates; asci, l-, arising from croziers; spores ellipsoid to allantoid, 5-8x1.5-2 µm, OCI 2; saprobic on deciduous branches (*Betula*, *Fraxinus*, *Prunus padus*, *Salix* sp.); phen.: (VIII)XII-IV
 • **“Ionomidotis” fulvotingens** (Berk. & M.A. Curtis) E.K. Cash (1939)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 202, Rubio & al. 2010: p. 230.
- 1' Apothecia solitary to fasciculate, short stipitate, first discoid, soon ear-shaped or irregularly lobed, (10-)15-30 mm diam., hymenium dark purplish black, outer surface blackish with a pustulate to powdery olive-brown coating, flesh leathery gelatinous, tissue yielding purplish pigment on 5% NaOH; asci ca. 70x7 µm, IKI-; spores narrowly ellipsoid, 7-9x2.8-3.5 µm, with two large and several small guttules; paraphyses lanceolate; saprobic on *Fagus* trunk; phen.: IX-X (CZ, ES)..... **“Ionomidotis” irregularis** (Schwein.) E.J. Durand (1923)
 Ill.: Běťák & al. 2012: fig. 1-4.

Diplocarpa Masee

Type species: *Diplocarpa curreyana* Masee = *Diplocarpa bloxamii* (Berk.) Seaver.

Lit.: Nauta & Spooner 2000a: 24.

- 1 Apothecia stalked, hymenium olivaceous, outside dark brown tomentose; asci 68-75x6-7 µm, l-; spores 6-9x3 µm; paraphyses lanceolate, overtopping the asci; hairs up to 150 µm long; on rotten trunks of *Carpinus*, *Fagus*, *Quercus*, in company of *Amellaria* strings; phen.: VI-VII(X) **Diplocarpa bloxamii** (Berk. ex W. Phillips) Seaver (1937)

Gelatinopsis Rambold & Triebel

Type species: *Gelatinopsis geoglossi* (Ellis & Everh.) Rambold & Triebel

Syn.: *Micropyxis* Seeler.

Lit.: Rambold & Triebel 1990: 375, Aptroot & al. 1997: 155, Baral & Marson 2001: 23 (monograph), Ertz & Diederich 2006: 515 (pdf).

- 1 Lichenicolous 2
- 1' On non-lichenized fungi 5
- 2 Apothecia immersed, crowded, roundish to elongate, plane, up to 0.45 mm diam., black-brown, excipulum and epihymenium immersed in olivaceous gel; asci (35)40-50(55)x7-11 µm, MLZ-; spores cylindrical, †10-14(18)x (2.5)3-4(4.5) µm; lichenicolous (*Baeomyces roseus*, *Dibaeis*); phen.: IX-X
 **Gelatinopsis ericetorum** (Körber) Rambold & Triebel (1990)
 Ill.: Baral & Marson 2001: fig. 2.
- 2' Excipulum and epihymenium orange-brown 3
- 3 Ascomata 180-360(440) µm diam.; spores 10.5-13(13.5)x(4)4.5-5.5 µm, uniguttulate; on thalli of *Heppia despreauxii*; phen.: VI **Gelatinopsis heppiae** Nav.-Ros., Hladun & Llimona (2008)
- 3' Spores shorter 3
- 4 Ascomata 70-120 µm diam.; spores 8-10.5(12)x3-4(5); on *Roccella phycopsis*, granite;
 **Gelatinopsis roccellae** Etayo, Paz-Berm. & Diederich (2001)
- 4' Ascomata 150-400 µm diam.; spores (6)7-8(9)x(4)4.5-5.5(6) µm; on *Leptogium byssinum*; phen.: II
 ○ **Gelatinopsis leptogii** Ertz & Diederich (2006)
- 5 Spores clavate-dacryoid, slightly to strongly heteropolar; apothecia (nearly) superficial 6
- 5' Spores globose, ellipsoid to narrowly cylindrical, homopolar or slightly heteropolar; apothecia more or less erumpent to completely immersed; asci arising from croziers (unknown *G. septata*) 7
- 6 Apothecia semiglobose to pulvinate, 0.1-0.2 mm diam., slightly translucent, shiny, medium- to chocolate-brown; medullary excipulum of brown textura angularis; asci †31-55x5-7.5 µm, IKI-, without croziers (but often with a subbasal protuberance), apical dome immature †0.7-1.5 µm thick; hypothecium pale ochraceous; spores lacrymiform, twisted-contorted, †(6.5)8-11.5(13.5)x(2.5)2.8-3.5(4) µm, overmature spores aseptate, with two large roundish glycogen depots (redbrown in IKI or MLZ), hyaline; parasitic on *Geoglossum* sp., *Trichoglossum* sp.; phen.: VIII **Gelatinopsis geoglossi** (Ellis & Everh.) Rambold & Triebel (1990)
 Ill.: Baral & Marson 2001: fig. 7-11.
- 6' Asci †40-82 µm long, arising from croziers, apical dome †1-3 µm thick; hypothecium pale to deep olivaceous-brown; spores †(5.5)7-12(15)x2.2-3 µm, without conspicuous glycogen depots, overmature spores 1(2)-septate;

- apothecia 0.1-0.6 mm diam. when rehydrated, bright grey to whitish; on the pores of *Trametes versicolor*; phen.: VII-XI (AT, BE/F, DE, FR) • **Gelatinopsis fungicola** (Kirschst.) Baral (2001)
 Ill.: Baral & Marson 2001: fig. 4-6.
- 7 Spores broadly ellipsoid to globose, aseptate, not budding to form conidia 8
 7' Spores becoming 1- to 3-septate, budding off conidia directly on both ends (and middle cells) 9
- 8 Apothecia erumpent, rarely completely immersed, macroscopically well visible, apical dome of dead immature asci 3-5 µm thick; spores ellipsoid, *8-13x4.5-7 µm, OCI 1-2, with 1-2 glycogen depots; on *Exidia recisa* on *Salix caprea*; phen.: IX-XII **Gelatinopsis exidiophila** Baral & G. Marson (2001)
 Ill.: Baral & Marson 2001: fig. 3.
- 8' Apothecia always entirely immersed, macroscopically completely invisible; apical dome of dead immature asci up to 2 µm thick; spores globose to ovoid, *4-7x3.6-5 µm, OCI 4, without glycogen; in apothecia of *Hysteropatella elliptica* on bark of dead *Salix*; phen.: IV-VI(IX) **Gelatinopsis hysteropatellae** Baral & G. Marson (2001)
 Ill.: Baral & Marson 2001: fig. 12-13.
- 9 Hypothecium hyaline; apothecia rehydrated 0.15-0.35 mm diam., pale to deep yellowish-brownish, living submature asci with (4-)8 consistently 1(2)-septate spores*6.5-9.6x2.2-3.8 µm, these forming numerous ellipsoid ascoconidia grouped in (4)8 balls within the living asci; on *Hyphodontia* and *Trechispora*; on *Salix*; phen.: X **Gelatinopsis polycondiata** Baral & G. Marson (2001)
 Ill.: Baral & Marson 2001: fig. 14-15.
- 9' Hypothecium dark brown; apothecia rehydrated 0,05-0.2 mm diam., dark chocolate-brown; spores †9-18x3-4(5) µm, forming conidia only within dead asci or after discharge 10
- 10 Apothecia semiglobose to pulvinate, 0,05-0.1 mm diam., slightly translucent, shiny, dark brown; asci 40-60x6-8 µm, IKI-; spores (†?)9-11(15)x3-4(5) µm, 0-1-septate; conidia short-ellipsoid?; on *Merulius* sp.; phen.: : X, I **Gelatinopsis septata** Aptroot, Candoussau & Verkley (1997)
- 10' Apothecia superficial, 0.1-0.2 mm diam., dark brown; spores †13-18 µm long, 1(3)-septate; conidia +/- allantoid, †5-8x1.2 µm; on *Skeletocutis papyracea*; phen.: VIII..... **Gelatinopsis aff. septata**
 Ill.: Baral & Marson 2001: fig. 16.

Rhymbocarpus Zopf

Type: *Rhymbocarpus punctiformis* Zopf

Lit.: Sherwood & al. 1980: 484 (sub *Skyttea cruciate*), Etayo & Diederich 1998: 108 (sub *Llimoniella pubescens*), [Diederich & Etayo 2000](#):

- 1 Ascomata apothecia, first immersed, erumpent, opening by a pore, 0,1-0,25 mm diam., black, covered by black hairs; asci 35-52x5,5-6,5 µm, I-; spores ellipsoid, 5,5-9x2,5-3,2 µm, 1-septate, hyaline; on Fagus, on *Lepraria lobificans*; phen.: IV-VII, XI **Rhymbocarpus pubescens** (Etayo & Diederich) Diederich & Etayo (2000)
 Ill.: Etayo & Diederich 1998: fig. 2.
- 1' Ascomata regularly divided in 3-4 cruciately arranged fissures; spores 7-8.5(9.5)x3-3.5 µ; on *Diplocia canescens* ...
 **Rhymbocarpus cruciatus** (Sherwood, D. Hawksw. & Coppins) Etayo & Diederich (2000)

Skyttea Sherwood, D. Hawksw. & Coppins

Type species: *Skyttea nitschkei* (Körb.) Sherwood, D. Hawksw. & Coppins

Lit.: Sherwood & al. 1980: 479, Etayo & Diederich 1998: 113 (S. megalosporae), [Diederich & Etayo 2000](#): ., Zhurbenko 2007: 4.

- 1 Spores narrowly ellipsoid, L/W>2, more than 10 µm long, becoming septate 2
 1' Spores oval to fusiform, less than 10 µm long, non-septate 4
- 2 Spores (8)10-13x2-3(4) µm, 0-1-septate; on *Thelotrema lepadinum* **Skyttea nitschkei** (Körb.) Sherwood, D. Hawksw. & Coppins (1981) [1980]
 Ill.: Sherwood & al. 1980: fig. 1F & 7.
- 2' Spores longer 3
- 3 Spores 20-28(?-38)x2-3 µm, 0-3-septate; on *Ochrolechia rosella* and possibly also *Haematoma*; phen.: VII **Skyttea fusispora** Sherw., D. Hawksw. & Coppins (1980)
 Fig.: Sherwood & al. 1980: fig. 1D & 5.
- 3' Ascomata immersed to erumpent, first closed, opening by a pore, 70-120 µm diam., black; asci 45-55x5-6 µm; spores faOClate to sigmoid, with acute ends, 22-46x2,5-3 µm, 0(1)-septate; on *Megalospora tuberculosa*; phen.: VII

- **Skyttea megalosporae** Etayo & Diederich
(1998) Ill.: Etayo & Diederich 1998: fig. 5.
- 4 Ascocarps regularly divided in 3-4 cruciately arranged fissures; spores 7-8,5(9,5)x3-3,5 µm; on *Dipliocia canescens*; phen.: V-VIII **Skyttea cruciata** Sherwood, D. Hawksw. & Coppins (1981) Ill.: Sherwood & al. 1980: fig. 1B & 3
- 4' Ascocarp margins entire, or marked with fine radial striations 5
- 5 Spores 5-7x2.5-3.5 µm; on *Buellia punctata* **Skyttea buelliae** Sherwood, D. Hawksw. & Coppins (1981) [1980] Ill.: Sherwood & al. 1980: fig. 1A & 2.
- 5' Spores 7-10(11) µm long 6
- 6 Ascoma margin olive green; hairs short and blunt, 15-20x3-3.5(4) µm; spores 7-8.5x3-3.5 µm; on *Mycoblastus sterilus* **Skyttea gregaria** Sherwood, D. Hawksw. & Coppins (1981) [1980] Ill.: Sherwood & al. 1980: fig. 1E & 6.
- 6' Ascocarp margin brown or black, without olivaceous tints; hairs longer and more slender . 7
- 7 Ascomata 100-200 diam., remaining immersed, margin brown, hairs longer and slender; spores 7-8x3.5 µm; on ?*Lecidea* sp. **Skyttea elachistophora** (Nyl.) Sherwood & D. Hawksw. (1981) [1980] Ill.: Sherwood & al. 1980: fig. 1C & 4.
- 7' Ascocarps 200-400 µm diam. 8
- 8 Ascocarps becoming almost superficial; spores 7-8,5(9)x(2)2,5-3,5 µm; on *Lecanora chalotera* s. lat. **Skyttea thallophila** (P. Karst.) Sherwood, D. Hawksw. & Coppins (1981)
- 8' Ascocarps reaming urceolate, blackish with whitsh striate rim; spores fusiform, (7)7,5-10(11), guttulate; on thalli of *Decampia hookeri*; phen.: VIII **Skyttea dacampiae** Zhurb. (2007) Ill.: Zhurbenko 2007: fig. 3.
- Unguiculariopsis** Rehm
Type species: *Unguiculariopsis ilicincola* (Berk. & Broome) Rehm.
Lit.: Graddon 1986: 333 (sub *Unguicularia hamatopilosa*), Zhuang 1988: 1 (monograph), Zhuang & Korf 1989: 648 (sub *Skyttea lesdainii*), Rambold & Triebel 1990: 386 (*U. refractiva*, *U. lettaui*), Coste & Rey 1995: 106 (sub *Pithyella hamata*), Hairaud 2014: 109 (*U. ravenelii* subsp. *hamata*), Stöckli 2017: 255 (*U. godroniicola*).
- 1 Spores spherical to subspherical 2
- 1' Spores ellipsoid 7
- 2 Asci subfusoid; paraphyses shorter than asci; on *Cucurbitaria berberidis*; phen.: ? **Unguiculariopsis rehmi** W.Y. Zhuang & Korf (1988) Ill.: Zhuang & Korf 1988: 56, fig.21.
- 2' Asci cylindrical; paraphyses not shorter than asci; on other substrates 3
- 3 Apothecium cupulate to discoid, broadly stipitate, hymenium brownish to greyish, stipe covered with whitish hyphae; asci 30-63x5-7 µm, with croziers, IKI-; spores 2.9-3.3 µm diam., guttulate, smooth; on apothecia of *Godronia ribis*, *G. confertus*.; mountain; phen.: V-VIII (AT, CH, FR) **Unguiculariopsis godroniicola** W.Y. Zhuang (1988) Ill.: Zhuang & Korf 1988: fig.11, Stöckli 2017: pl. 1-2.
- 3' Apothecia sessile or substipitate; on other substrates 4
- 4 Asci 31-35x4.5-5.3 µm; hairs relatively thin-walled; on ?*Karstenula* sp.; phen.: IX **Unguiculariopsis livida** (Bacc.) W.Y. Zhuang (1988)
- 4' Asci longer 5
- 5 Asci 50-70x4.7-6.6 µm, IKI-; spores subspherical to spherical, 3.4-5.3(6) µm diam; or 3.9-4.5(6)x3.7-4.3 µm; on *Myrangium* sp., *Cytisus scoparia*; phen.: XI-I (FR) **Unguiculariopsis ilicincola** (Berk. & Broome) Rehm (1909) Ill.: Zhuang & Korf 1988: 39, fig.14.
- 5' Species associated with *Rhytidhysteron*, on *Buxus* 6
- 6 Apothecia densely crowded, 0.5-2 mm diam., hymenium rose orange, outside whitish to very pale brown; asci 40-55x5-7 µm, IKI rb; spores 4 µm diam.; saprophytic, in the cracks of bark of *Buxus sempervirens*, associated to *Rhytidhysteron rufulum*; phen.: III (USA) **Unguiculariopsis ravenelii** (Berk. & M.A. Curtis) W.Y. Zhuang & Korf subsp. **ravenelii** (1987)

- 6' Apothecia up to 2 mm diam.; asci 55-65x5.5-7 µm, IKI-; spores 4-5.2 µm diam.; saprobic on bark of *Buxus sempervirens* associated to *Rhytidhysteron hysterinum*; phen.: II-III (FR) **Unguiculariopsis ravenelii** subsp. *hamata* (Chenant.) W.Y. Zhuang (1988) III.: Hairaud 2014: pl. 1-2.
- 7 Apothecia on thalli of lichens. 8
- 7' Apothecia on other substrates 11
- 8 Hair-like processes with a solid apex, mostly not curved, refractive, c. 3.5-4.5(5) µm thick, up to 60 µm long; spores 7-9x2.5-3.5 µm; on *Mycobilimbia* sp. **Unguiculariopsis refractiva** (Coppins) Coppins (1990)
- 8' Hairlike processes with lumen at apex, hooked, ca. 2-3 µm thick, up to 35 µm long 9
- 9 Apothecia urceolate to cupulate, submerged, dark brown, 0.1-0.2 mm when dry; ectal excipulum of brown textura angularis; asci I-; spores ellipsoid, 5-7.5x1.8-2.2 µm, biguttulate; on thalli of *Lecanora effusa*; phen.: IX **Unguiculariopsis lesdainii** (Vouaux) Etayo & Diederich (1998) III.: Zhuang & Korf 1989: 649, fig.1.
- 9' Spores more than 2.2 µm wide 10
- 10 Ascomata 0.2-0.4 mm diam., becoming almost superficial; asci 32-42x5.7-7.7 µm; spores ellipsoid, (6)7.5-9x(2.3) 2.8-3.4(3.7) µm, biguttulate; on corticolous *Lecanora* (e.g. *Lecanora carpinea*); phen.: I-XII **Unguiculariopsis thallophila** (P. Karst.) W.Y. Zhuang (1988) III.: Zhuang & Korf 1988: 63, fig.24.
- 10' Spores 6-7.5(8)x2.5-3.5 µm; on *Evernia prunastri*; phen.: I **Unguiculariopsis lettai** (Grumann) Coppins (1990)
- 11 Pycnidial anamorph *Deltosperma caespitosum*, with subtriangular conidia; apothecia discoid, broadly stipitate; spores ovate, 6-8x3-4 µm, biguttulate; on *Eutypa lata* on branch of *Acer* sp.; phen.: IV, autumn **Unguiculariopsis caespitosum** (Fuckel) W.Y. Zhuang (2014) III.: Zhuang & Korf 1988: 47, fig.18 (sub *U. parasitica*); Ascofrance (anamorph).
- 11' Anamorph unknown; hairs with a solid apex 12
- 12 Medullary excipulum of textura angularis to textura intricata, with cell walls brown; marginal hairs with coiled, solid apex, 22-30x4 µm; asci 2- or 4-spored, 30x5 µm, I-; spores 5-8x2.5-3 µm, with two polar guttules; on ascocarps of *Didymosphaeria ?oblitescens*, on stem of *Rubus fruticosus*, on pyrenomycete on *Ulex*; phen.: XII-III **Unguiculariopsis hamatopilosa** (Graddon) W.Y. Zhuang (1988) III.: Zhuang & Korf 1988: 35, fig.12.
- 12' Medullary excipulum of textura intricata, with cell walls subhyaline; marginal hairs with a curved apex 13
- 13 Spores 6.3-10.2x2.2-3 µm; hairs 22-45 µm long; associated with *Septoriella*-like coelomycete on *Rosa* sp.; phen.: IV **Unguiculariopsis robergei** subsp. *coelomyceticola* W.Y. Zhuang (1988) III.: Zhuang & Korf 1988: 60, fig.23.
- 13' Spores up to 7.5 µm long 14
- 14 Spores 4.4-7x2.7-3.5 µm; hairs 44-65 µm long; associated with *Amphisphaerella xylosti* on *Lonicera* sp.; phen.: ? ... **Unguiculariopsis robergei** subsp. *robergei* (Desm.) Korf & W.Y. Zhuang (1988) III.: Zhuang & Korf 1988: 58, fig.22.
- 14' Apothecia (0.3)0.7-1.5 mm diam.; asci with croziers, IKI-; spores 5.5-7.4x2.6-3.3 µm, biguttulate; on pyrenomycetes on *Crataegus*; phen.: II **Unguiculariopsis marsonii** Baral nom. prov.

Unguiculella Höhn.

Type species: *Unguiculella falcipila* Höhn.

Lit.: Baral (unpublished key), Holm & Nannfeldt 1992b: 15 (*U. nectriiphila*), Hansen & Knudsen 2000: 210, Huhtinen & Spooner 2003: 749.

- 1 Apothecia 0.3-0.8 mm diam., grey brown, outer surface red brown; spores oblong, 6.5-9.5x1.5-2 µm, biguttulate; saprobic on branches of *Salix caprea*, mostly associated with *Nectria coryli*; phen.: III **Unguiculella nectriiphila** Svrček (1992)
- 1' Ectal excipulum yellowish to hyaline 2
- 2 Asci IKI (medium) strong bb 3
- 2' Asci IKI- 6
- 3 Spores 14.5-18.5(21)x5-6.2 µm **Unguiculella "Arnegg"** Baral nom. prov.
- 3' Spores less than 3.5 µm wide 4

- 4 Apothecia 0.1-0.2 mm diam., sessile to shortly stalked, white; asci †25-34x5-6 µm, IKI+, with croziers; spores oblong-ellipsoid, *9-12x2.5-3 µm, aseptate, OCI 0-1; hairs composed of a swollen venter 8-10x3-3.8 with VB and a curved hook 7-15x0.7-1 µm. On leaves of *Alnus*, *Betula*, *Salix*. Phen.: X (UK, DE)
 **Unguiculella foliicola** (Graddon) Spooner & P.M. Kirk (1989)
 Ill.: Huhtinen 1990: fig.225-227. 5
- 4' Herbicolous species; spores with OCI>2 5
- 5 Spores 7.4-13x2.7-3.3 µm, 0(1)-septate, OCI 4; asci 55-65x8-9 µm, with croziers; saprobic on herbaceous stems (*Cirsium oleraceum*); phen.:VII- IX **Unguiculella incarnatina** (Quél.) Baral (2020)
 Ill.: Boudier 1904-1910: pl. 531.
- 5' Spores 7-11.5x2-2.8 µm; saprobic on *Angelica sylvestris*, *Cirsium*; phen.: V-VIII
 • **Unguiculella "subhamulata"** Baral nom. prov.
- 6 Apothecia 0.1-0.2 mm diam., white; asci IKI-; spores 8-11x2-2.5 µm, OCI 2-3; ectal excipulum hyaline; hairs 1.5-2.5 µm wide; caulicolous, mostly between *Leptosphaeria acuta* on *Urtica*; phen.: V-VII
 • **Unguiculella hamulata** (Feltgen) Höhn. (1906)
- 6' Spores up to 8 µm long 7
- 7 Apothecia 0.2-1 mm diam., cupulate to narrow sessile, greyish-white; asci *45-70 x 8.5-10 µm, with croziers; spores ellipsoid, thick-walled, *6-7.7x3.6-4.2 µm, †4.6-7.6x2.8-3.2 µm, OCI 0 when dry; paraphyses of two types: cylindrical ones equalling or shorter than the asci and protruding ones similar to hairs with refractive walls; hairs narrowly conical to lageniform, undulating-straight to apically curved, smooth, aseptate; saprobic on cow and rabbit dung, on or in association of pyrenomycetes (*Schizothecium aloides*, *Schizothecium conicum*, *Schizothecium squamulosum* and *Schizothecium tetrasporum*); phen.: III-XII ○ **Unguiculella tityrii** (Velen.) Huhtinen & Spooner (2003)
 Ill.: Huhtinen & Spooner 2003: fig. 1-10.
- 7' Apothecia 0.1-0.5 mm diam.; spores 5.5-8x2-3.4 µm, OCI 4-4.5; hairs 2.5-3.5 µm wide; ectal excipulum frequently with yellowish intercellular pigment 8
- 8 Apothecia subsessile to short stipitate, 0.2-0.3 m diam., pale yellow; asci 30-43x6-7 µm, IKI-, with croziers; spores ovoid to fusiform, 5-8x2-3.2 µm; hairs 30-45x3-4 µm, with 1 µm wide, hooked apices, thin-walled, aseptate, hyaline; paraphyses with hooked apices exceeding the asci; saprobic on herbaceous stems (*Rubus fruticosus* agg., *Melilotus albus*, *Cirsium*, *Solidago Canadensis*, *Ulex europaeus*, *Urtica dioica*) and wood (*Hedera helix*) phen.: (VI)X-III • **Unguiculella eurotioides** (P. Karst.) Nannf. (1936)
 Ill.: Dennis 1978: fig.XXIVc.
- 8' Spores 2.8-3.4 µm wide; caulicolous (different?) **Unguiculella ?robergei** (Desm.) Dennis (1955)

CYTTARIACEAE Speg. 1887

Lit.: Ekanayaka et al. 2019: 339; Haelewaters et al. 2021: 1323.

Sexual morph: Ascomata are pitted apothecia immersed in a sterile fleshy-gelatinous stroma. Apothecia are characterised by simple filiform paraphyses, 8-spored, inoperculate and amyloid asci and uninucleate, subglobose to ovoid, smooth to rugulose ascospores, which are hyaline to yellowish at first, but later becoming pigmented (Mengoni 1986, Peterson et al. 2010).

Asexual morphs: pycnidial, immersed, conidiogenous cells are monoblastic and conidia are small, hyaline and aseptate

Habitat: Obligate pathogens on *Nothofagus* spp.

Monotypic family:

Cyttaria Berk.

Type species: *Cyttaria darwinii* Berk.

Lit.:

No Western European species known.

DERMATEACEAE Fr. 1849

Lit.: Nauta & Spooner 1999-2000, Jaklitsch et al. 2016: 165, Chen et al. 2016: 1291.

Sexual morph: Apothecia 0.3-2.5 mm in diam., often aggregated and erumpent, opening in the pro- or rarely (*Ocellaria*) mesohymenial phase; hymenium ochraceous-orange or whitish-greyish to black, plane to convex, i rough; exterior i concolorous, hairless; sessile or short-stipitate, sometimes on a thick stroma. Ectal excipulum of textura angularis, with yellow to brown exudate, partly with KOH-soluble yellow or red-brown pigment (ionomidotic); with or without crystals. Medullary excipulum of paler angular cells. Paraphyses apically uninflated to clavate, with yellowish to brown exudate. Asci apically rounded to conical, with an eu- or often hemiamyloid apical ring (*Pezicula*- or *Ploettneria*-type), arising from croziers. Ascospores (4)8 per ascus, hyaline, ellipsoid-oblong, medium- to large-sized, aseptate, with a delicate sheath (episporium) staining lilac in Cresyl Blue, lipid content high (multiguttulate); overmature septate to muriform, often budding microconidia.

Asexual morph: pycnidial (eu-stromatic, partly multilocular) or acervular (*Cryptosporiopsis*), phialides without collarette, sometimes proliferating percurrently; microconidia rod-shaped, eguttulate; macroconidia large, hyaline, multiguttulate, either ellipsoid-oblong and 0-septate, overmature septate to muriform (*Cryptosporiopsis*), or fusoid, slightly to strongly falcate, 0 -1-septate (*Foveostroma*).

Habitat: More or less parasitic endophytes fruiting on bark, rarely wood or cones of gymno- and angiosperms, often host-specific, desiccation-tolerant.

Genera belonging to this family:

1. *Coleophoma* Höhn.
2. *Dermea* Fr.
3. *Neofabraea* H.S. Jacks.
4. *Parafabraea* Chen, Verkley & Crous
5. *Pezicula* Tul. & C. Tul
6. *Phlyctema* Desm.
7. *Schizothyrioma* Höhn.
8. *Verkleyomyces* Y. Marín & Crous

Key to the genera of Dermateaceae:

- 1 Sexual morph unknown Asexual morph: Conidiomata eustromatic, convuluted, pulvinate to sporodochial; conidiophores branched, hyaline; conidiogenous cells phialidic giving rise to hyaline, aseptate, fusiform, straight to curved conidia *Phlyctema*
- 1' Sexual morph known 2
- 2 Sexual morph: Apothecia mostly caespitose on a common base, leathery, thick-fleshed; paraphyses filiform, with brown contents, forming a (pseudo-)epithecium. Asexual morph pycnidial, mostly present with the teleomorph. Host specific weak parasites on wood, erumpent through bark *Dermea*
- 2' Apothecia not leathery 3
- 3 Sexual morph: Ascomata: apothecial, sessile to subsessile. Asci clavate to cylindrical-clavate, hyaline to pale brown, 8-spored. Ascospores inequilateral, fusoid to ellipsoid, aseptate, hyaline, guttulate. Paraphyses numerous, cylindrical, slender, septate, hyaline to pale brown. Asexual morph: Conidiomata pycnidial, ostiolate. Paraphyses hyaline, septate at the base. Conidiophores pale brown at the base, hyaline above, branched, septate. Conidiogenous cells phialidic. Conidia hyaline, aseptate, cylindrical. Saprobes, pathogens, endophytes *Coleophoma*
- 3' Ascospores aseptate 4
- 4 Ascospores (0)1-septate 5
- 4' Ascospores becoming multiseptate to muriform 6
- 5 Apothecia partly immersed, erumpent, sessile, solitary to gregarious; medullary excipulum weakly developed, composed of hyaline textura prismatica; ectal excipulum composed of brown to olivaceous brown textura prismatica at the base, and pale brown textura intricata towards the margin. Paraphyses slender, septate, apex rounded, hyaline, flexuous, numerous. Asci clavate to cylindrical clavate, short pedicellate, with an apical apparatus stained blue or purplish blue in Melzer's reagent, 8-spored. Ascospores fusoid to ellipsoid, hyaline, ends rounded or somewhat pointed, straight or slightly curved, thin-walled, guttulate or eguttulate, initially aseptate, or later becoming 1-septate. Conidiomata acervular or cupulate, semi-immersed, dark, separate, formed of olivaceous brown textura intricata, dehiscence by irregular fissures, sometimes by a central ostiole. Conidiophores simple, hyaline, smooth, thin-walled, septate at the base, unbranched, discrete, or rarely integrated beneath the aged conidiogenous cell. Conidiogenous cells enteroblastic, phialidic, cylindrical, hyaline, smooth, thin-walled, sometimes with proliferation, periclinal thickening present. Conidia cylindrical, straight, apex obtuse, base abruptly tapered to a distinct scar, hyaline, smooth, thin-walled, aseptate, eguttulate to biguttulate.

- 5' Apothecia subcuticular; asci 2-8-spored; spores 1-septate; anamorph unknown *Schizothyrioma*
- 6 Sexual morph: Apothecia erumpent or immersed, mostly brightly coloured or whitish, disc often pruinose; ectal excipulum pale; spores mostly broadly ellipsoid, commonly septate, sometimes muriform, large, commonly over 18x6 µm; asci thick-walled, IKI red. Asexual morph *Cryptosporiopsis* acervular; mostly lignicolous *Pezicula*
- 6' Sexual morph: Apothecia erumpent from a basal stroma, disc initially concave to plane, then convex, pruinose or smooth, pale grey or buff, pale reddish or brown, 0.2-2 mm diam., receptacle absent or weakly to well-developed, dark brown; asci with croziers; spores elongated ellipsoid to fusiform, aseptate, becoming multiseptate to muriform. Asexual morph: conidiomata acervular to pulvinate, macroconidia cylindrical-fusiform to ellipsoid, septate; corticolous *Neofabraea*

Coleophoma Höhn.

Type species: *Coleophoma crateriformis* (Dur. & Mont.) Höhn.

Lit.: Duan et al. 2007: 187.

- 1 Conidia 3-5.5 µm wide 2
- 1' Conidia up to 3 µm wide 3
- 2 Conidia cylindrical, 4.5-5.5 µm wide. On living leaves of *Prunus lusitanica*. Phen.: VII (UK) **Coleophoma prunicola** J.X. Duan, W.P. Wu & Xing Z. Liu (2007) Ill.: Duan et al. 2007: fig. 1-12.
- 2' Conidia fusiform, 3-4.5 µm wide. Causing leaf lesions of *Rhododendron ponticum* (UK) **Coleophoma fusiformis** W.P. Wu, B. Sutton & Gange (1996)
- 3 Conidia 1.5-2 µm wide **Coleophoma aesculi** (Petr.) Nag Raj (1978)
- 3' Conidia 2-3 µm wide 4
- 4 Conidia 11-20 µm long, with small guttules. **Coleophoma crateriformis** (Dur. & Mont.) Höhn. (
- 4' Conidia cylindrical, 11-20x2-3 µm long, with a few small guttules. On living and dead leaves of many different plants (*Prunus laurocerasus*, *P. lusitanica*). Phen.: I-VIII (UK) .. **Coleophoma cylindrospora** (Desm.) Höhn. (1919) Ill.: Duan et al. 2007: fig. 13-18 (syn. *Coleophoma empetri*).

Dermea Fr.

Type species: *Dermea cerasi* (Pers.) Fr.

Syn.: *Dermatea* Fr., *Foveostroma* (anamorph)

Lit.: Velenovsky 1934: 65, Groves 1946: 351, Baral & Krieglsteiner 1985 : 32, Nauta & Spooner 2000a: 24.

Probably highly host-specific according to Baral. Revision needed based on neotypes.

- 1 Asci 8-14 µm wide, IKI- or ±bb; on Rosaceae..... 2
- 1' Not on Rosaceae 5
- 2 Apothecia erumpent, 0.5-1 mm diam., blackish brown; asci 70-90x8-10 µm; spores 12-22x3-5 µm. Asexual morph: conidia 15-20x2-4 µm. Saprobic on *Sorbus aucupariae*; phen.: XII-V (BE/F) **Dermea ariae** (Pers.) Tul. & C. Tul. ex P. Karst. (1871) Ill.: Ellis & Ellis 1985: fig. 1151.
- 2' Asci 10-14 µm wide; spores 5-7 µm wide; conidia longer than 20 µm; on *Prunus* spp. 3
- 3 Apothecia 1-3 mm diam.; asci mostly IKI-, seldomly bb; spores 15-25x5-7 µm, 0-3-septate; conidia ±sigmoid, 45-57x2.5-3.2 µm, 1-septate; saprobic on corticated branches of *Prunus avium*, *P. cerasus* and *P. serotina*; phen.:XII-V(IX) (BE/F, BE/W, ES, GB) **Dermea cerasi** (Pers.) Fr. (1825) Ill.: Rubio & al. 2010: p. 217.
- 3' Apothecia 0.5-1 mm diam., conidia 16-35 µm long 4
- 4 Conidia 20-30x5-7 µm; asci 90-115x12-14 µm; spores 15-25x5-7 µm, 0-3-septate; pycnidia caespitose, beaked; saprobic on branches of *Prunus spinosa*; phen.: II-IV(VII) **Dermea prunastri** (Pers.) Fr. (1849)
- 4' Conidia ±sickle-shaped, 16-25x2.5-3.2 µm, aseptate; asci 85-100x10-13 µm, strongly IKI (r)b, few asci weakly or negative, with croziers; spores 15-20x5-7 µm, 0-1(3)-septate; pycnidia mostly solitary, not beaked; conidia 3.5-5 µm wide; saprobic on branches of *Prunus domestica*, *P. padus*; phen.: VII **Dermea padi** (Alb. & Schwein.) Fr. (1849)
- 5 Asci 75-115x15-18 µm, IKI- ; spores 15-21x5.5-8.5 µm, 0-3-septate; conidia 25-40x6-8 µm ; saprobic on bark of *Fraxinus* ; phen.: IV **Dermea tulasnei** J.W. Groves (1946)

- 5' Coniferous species 6
- 6 Asci 80-100x15 µm; spores 18-24 µm long, 2-3-septate; saprobic on bark of conifers (*Abies*) ; phen.: ?
 "**Dermetea**" **abietina** Velen. (1934)
- 6' Apothecia erumpent, about 1 mm diam., black. Ascospores 19-24x4-5 µm. Conidia sigmoid, up to 95x3 µm, 3-septate, hyaline. Saprobiic o branches of *Pseudotsuga menziesii*. Phen.: X-XI (GB)
 **Dermea balsamea** (Peck) Seaver (1932)
 Ill.: Ellis & Ellis 1985: fig. 878.
- Saprophytic on *Salix triandrae* **Dermea triandrae** Rimp.
 Saprophytic on *Populus nigra* **Dermea populum** (Desm.) Höhn.
 Saprophytic on *Ribes alpinum* **Dermea variabilis** E. Müll. et al.

Neofabraea H.S. Jacks.

Type species: *Neofabraea malicorticis* H.S. Jacks.

Lit.: Verkley 1999: 125, Johnston & al. 2014: 102, Chen et al. 2016: 1304.

- 1 Sexual morph unknown. Microconidia, 9-13x1.2-1.6 µm. On twigs of *Chamaecyparis* (FR)
 **Neofabraea inaequalis** (M. Morelet) Chen, Verkley & Crous (2016)
- 1' Sexual morph known 2
- 2 Apothecia developing from acervuloid stromata, disc up to 1 mm diam., slightly convex and pale grey or buff; asci 125-150x13-24 µm, J+; spores elongated ellipsoid to fusoid, 20-30x7-10 µm, becoming 3-5(6)-septate, hyaline; macroconidia cylindrical to fusiform-allantoid, curved, 14-30x2-4 µm, aseptate; macroconidia not observed; on dead bark of *Malus domestica*, also on *Euonymus*, *Olea europaea*, *Rubus*, *Sambucus*, *Aconitum* and *Erigeron*; phen.: III-V (AT, BE, DK, GB, IT, NL) • **Neofabraea vagabunda** (Desm.) P.R. Johnst. (2014)
 Ill.: Sutton 1980: fig. 353 (anamorph).
- 2' Asci narrower; spores shorter 3
- 3 Apothecia erumpent from acervular stromata, disc circular, 0.5-1 mm diam. but often merging, greyish, pale flesh or brownish; receptacle covered by surrounding older stroma; asci 75-150x10-20 µm, IKI+ or I; spores inequilateral elongated ellipsoid, 12.5-26x5-9 µm, becoming 1-3(5)-septate and pale brown, forming ascoconidia. Asexual state: macroconidia weakly to strongly curved, 15-35x3-6 µm, becoming 1-2-septate, hyaline; microconidia 5-6x1-1.5 µm. Causing anthracnose cancer on branches and twigs of *Malus domestica*, also on *Amelanchier*, *Crataegus*, *Pyrus*, *Prunus persica*, *Prunus armeniaca*, *Sorbus*; phen.: X-XI (DK, NL, PT)
 **Neofabraea malicorticis** H.S. Jacks. (1913)
- 3' Apothecia as in *N. malicorticis*, but asci 86-170x8-14 µm and spores 11.5-22.5x4-8.5 µm; paraphyses with apical cells swollen up to 7 µm. Asexual state: macroconidia straight to weakly curved, 12-25x3-6 µm, becoming 1-2-septate, hyaline. Causing perennial cancer on the same hosts as *N. malicorticis*
 **Neofabraea perennans** Kienholz (1939)
 Ill.: Verkley 1999: fig. 40.

Pezicula Tul. & C. Tul.

Type species: *Pezicula carpinea* (Pers.) Tul. & C. Tul. ex Fuckel.

Syn.: *Ocellaria* (Tul. & C. Tul.) P. Karst.

Lit.: Korf 1978: 489 (*Pezicula linda*), Verkley 1999:1 (monograph).

- 1 Apothecia sessile, never stalked 2
- 1' Apothecia subsessile or (short-)stalked 3
- 2 Disc orange or orange-brown, rarely paler, margin white; asci widest in the lower half; spores broadly ellipsoid (average L/W 2.1-2.7), often with fairly thick hyaline walls (up to 1 µm) when still aseptate; on recently dead bark of *Populus* and *Salix*, also on *Hippophaë* and *Rhamnus*; phen.: I-XII • **Pezicula ocellata** (Pers.) Seaver (1951)
 Ill.: Verkley 1999: fig. 28-29, Rubio & al. 2010: p. 246.
- 2' Disc ochraceous, fulvous, sometimes olivaceous or brownish, margin brighter but never white; asci widest in upper half; spores ellipsoid (average L/W 2.5-2.7), thin-walled when aseptate; on recently dead bark of *Alnus viridis*; phen.: VIII **Pezicula aurantiaca** (Rehm) Rehm (1912)
 Ill.: Verkley 1999: fig. 9.
- 3 Asci consistently 4-spored, occasionally some asci with 4 additional hypotrophied (much smaller) spores 4
- 3' Asci mostly 8-spored (a minority may have 4 or intermediate number of spores) 6

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- 4 Apothecia yellowish to cinnamon when fresh, drying dark orange-brown; medullary excipulum colourless to dark orange-brown; normally developed (not hypotrophied) spores elongated ellipsoid, fusoid or broadly falcate (average L/W > 3.5); saprobic on bark and cone scales of conifers (*Abies*, *Larix*, *Picea*, *Pinus*); phen.: (V)VIII-XI (I) • ***Pezicula eucrita*** P. Karst. (1871)
..... III.: Boudier 1910: pl. 559, Verkley 1999: fig. 18.
- 4' Apothecia pale greyish or olivaceous when fresh, drying dull grey-brown to olivaceous-black; spores with average L/W < 3.0; saprobic on *Frangula*, *Rhamnus* 5
- 5 Medullary excipulum black on cut surface; asci 65-105x11-14 µm; on recently dead bark of *Frangula alnus*; phen.: (III)V-X(XII) • ***Pezicula frangulae*** subsp. ***frangulae*** (Pers.) Fuckel (1870) [1869-70]
..... III.: Verkley 1999: fig. 19-20.
- 5' Medullary excipulum more brightly coloured; asci 87-131x15-17.5 µm; on *Rhamnus* sp. (USA)
..... ***Pezicula frangulae*** subsp. ***americana*** Verkley (1999)
- 6 Asci mostly 150-190 (NT), 200-260 µm long; spores broadly ellipsoid or ellipsoid, 18.5-39.5x9-14.5 (average L/W 2.1-2.4), tardily becoming 1-3-septate; saprobic on *Carpinus* and more rarely on *Fagus*; phen.: VII-III
..... • ***Pezicula carpinea*** (Pers.) Tul. ex Fuckel (1870) [1869-70]
..... III.: Verkley 1999: fig. 10-11.
- 6' Above characters not combined 7
- 7 Extensive basal stroma present, bearing more than 6 apothecia 8
- 7' Only smaller stromata formed, bearing up to 6 apothecia 12
- 8 Spores on average more than 26 µm long 9
- 8' Spores on average shorter 10
- 9 Apothecial margin persistent; disc plane to slightly convex at maturity; spores elongated ellipsoid or allantoid-fusoid (average L/W 3.6-4.4), frequently with a bluntly hooked end; macroconidia (18)25-39(42)x9-10.5(11) µm; saprobic on *Acer*, *Aesculus*, *Corylus* or *Fraxinus*; phen.: VIII-III • ***Pezicula aesculea*** Kirschst. (1944)
..... III.: Verkley 1999: fig. 7.
- 9' Apothecial margin disappearing; disc finally strongly convex; spores elongated ellipsoid or fusoid (average L/W 3.2-3.5), never with a bluntly hooked end; saprobic on *Acer*, *Cornus*, *Rhododendron* or *Quercus*; phen.: IX-XI
..... • ***Pezicula acericola*** (Peck) Sacc. (1885)
..... III.: Verkley 1999: fig. 5-6.
- 10 Apothecia distinctly stalked; receptacle pruinose to pulverulent; usually accompanied by subglobose to claviform conidiomata with cylindrical, strongly curved macroconidia; in linear rows breaking through the bark of *Vitis* spp. (North America) ***Pezicula puberula*** (E.J. Durand) Verkley (1999)
- 10' Apothecia rarely distinctly stalked, on other substrata 11
- 11 Asci on average less than 14.5 µm wide (NT); spores mostly 13-23.5x4-7.5 µm (average 17.7x5.2 µm), average L/W around 3.4; saprobic on *Crataegus* or *Quercus*; phen.: X-XII ○ ***Pezicula amoena*** Tul. & C. Tul. (1865)
..... III.: Verkley 1999: fig. 8.
- 11' Asci on average wider than 14.5 µm; spores on average longer than 18 µm and wider than 6.5 µm, average L/W 2.7-3.2(3.6) 16
- 12 Spores with average L/W 4-5.1 ***Pezicula eucrita*** P. Karst. (1871)
..... (rare 8-spored form)
- 12' Spores with average L/W < 4 13
- 13 Surface of the basal stroma and lower receptacle of the apothecia covered by a distinct greyish or white pruina due to numerous amorphous crystals; spores ellipsoid or elongated ellipsoid (average L/W 3.1-3.3), normally accompanied by beaked conidiomata of the anamorph; saprobic on *Amelanchier* (North America)
..... ***Pezicula pruinosa*** Farl. (1922)
- 13' Above characters not combined 14
- 14 Spores elongated ellipsoid (average L/W > 3.2), often with pointed ends, non-septate or tardily becoming 1-3(4)-septate, not producing conidia directly 15
- 14' Spores ellipsoid or broadly ellipsoid (average L/W < 3.2), ends rounded or more rarely somewhat pointed, non-septate or becoming (1)3-5(7)-septate; if average L/W > 3.2, then small conidia produced 16
- 15 Disc pale yellowish brown or greyish brown when moist, drying dark purplish brown, with whitish pruina; basal stroma pale to dark brown with cell walls thickened up to 2 µm; spores 17-24.5x 4.7-6 µm, OCI 5; anamorph unknown; on recently killed branches and twigs of *Vaccinium myrtillus*, *V. uliginosum*, *Rhododendron ferrugineum*; phen.: VI-X (BE/F) • ***Pezicula myrtillina*** P. Karst. (1871)

- III.: Verkley 1999: fig. 27, Rubio & al. 2010: p. 249.
- 15' Disk pale luteous to warm orange-brown when moist, drying warm red-orange to dark orange-brown, with sulphur-yellow pruina; basal stroma hyaline to yellow, with cell walls thickened up to 1 µm; spores on average 5.6-7.6 µm wide, usually accompanied by the anamorph with elongated, claviform or fusoid macroconidia which are typically pointed at the apices; saprobic on *Rubus* and *Rosa*; phen.: VI-XII(II) • ***Pezicula rubi*** (Lib.) Niessl (1876)
 III.: Verkley 1999: fig. 32-33.
- 16 Spores broadly ellipsoid, average L/W 2.5 or less; apothecia whitish 17
- 16' Spores ellipsoid to elongated ellipsoid, average L/W 2.6 or more; apothecia whitish or darker 22
- 17 Apothecial margin prominent and mostly persistent; upper receptacle pulverulent, beset with masses of either isodiametric cells or intricate thick-walled hyphae; spores with walls thickened up to 0.4 µm before septa are formed, average L/W 2-2.2(2.7) 18
- 17' Apothecial margin only slightly raised but soon disappearing or hidden; upper receptacle smooth or pruinose from protruding clavate cells, not pulverulent; spores with thin walls (< 0.1 µm), not thickened before traverse septa are formed, average L/W 2.3-2.6 19
- 18 Asci 15-23(26) µm wide (NT); spore range of averages 21.5-29.8x9.8-11.8 µm. Asexual state: macroconidia elongated ellipsoid, 20-32.5x7.5-11.5 µm. Asexual morph On recently killed bark of woody Rosaceae (*Crataegus*, *Malus*, *Prunus*, *Pyrus*); phen.: II(a), XI-IV(VI) (BE/F) • ***Pezicula sepium*** (Desm.) Dennis (1964)
 III.: Verkley 1999: fig. 34.
- 18' Asci 28-35 µm wide; spores on average 31.6-14.5 µm; saprobic on *Crataegus* (North America)
 ***Pezicula crataegicola*** (Durieu) J.W. Groves (1946)
- 19 Surface of basal stroma and lower part of receptacle black; saprobic on recently dead bark of *Cornus* (North America); ***Pezicula cornina*** (Peck) P.R. Johnst. (2013)
 III.: Verkley 1999: fig. 14.
- 19' Surface of stroma and receptacle brighter coloured, white to orange brown 20
- 20 Disc drying dark reddish brown; apical cells of paraphyses not exceeding 6 µm in width; saprobic on *Acer pennsylvanicum* (North America) ***Pezicula subcarnea*** J.W. Groves (1941)
 III.: Verkley 1999: fig. 37.
- 20' Disc yellowish or olivaceous-brown when dry; apical cell of paraphyses exceeding 6 µm in width 21
- 21 Basal stroma orange-brown; disc drying a vivid yellowish brown; asci 22-30 µm wide; paraphyses 2-3 µm wide (below); saprobic on *Hamamelis* (North America) ***Pezicula hamamelidis*** J.W. Groves & Seaver (1939)
- 21' Basal stroma hyaline; disc yellowish brown or pale olivaceous-brown when dry; asci 18-25 µm wide; paraphyses 1-2 µm wide (below); saprobic on *Rhododendron canadense* (Canada) ***Pezicula grovesii*** Wehm. (1940)
- 22 Apothecia only weakly protruding from the bark when moist, sessile, but the base and disc about equal diameter; ectal excipulum well-developed (25-100 µm thick) only at the prominent and persistent margin, where it is composed of isodiametric cells; receptacle with a pruinose to pulverulent surface due to protruding groups of globose cells; spores average L/W 2.5-2.7; saprobic on *Alnus viridis*; phen.: VIII ***Pezicula aurantiaca*** (Rehm) Rehm (1912)
- 22' Apothecia also protruding from the bark when dry, sessile or short-stalked, diameter of the base smaller than the disc, margin mostly soon disappearing 23
- 23 Apothecia often accompanied by anamorph in separate, strongly erumpent, cylindrical to conical, black conidiomata, and/or its remnants present as dark, thick-walled angular cells at the base of the receptacle; ectal excipulum throughout of slender hyphae ending in appressed or free, narrowly clavate cells; spores with L/W around 2.9, tardily forming 1(3) traverse septa; saprobic on *Corylus* (North America) ***Pezicula corylina*** J.W. Groves (1938)
 III.: Verkley 1999: fig. 16.
- 23' No such anamorph present; ectal excipulum mostly of isodiametric cells or only at the margin composed of hyphal cells; spores more rapidly forming transverse and/or oblique septa 24
- 24 Apothecia white; basal stroma usually weakly developed; asci 85-120x15.5-20 µm; spores on average 24.7x7.8 µm; excipulum cells strongly gelatinized; anamorphs unknown; on unidentified, bare hardwood (Tenerife); phen.: I
 ***Pezicula linda*** Korf (1978)
 III.: Verkley 1999: fig. 25.
- 24' Apothecia pale buff, pale luteous, luteous or cinnamon when fresh, drying darker; basal stroma usually well-developed and anamorph usually also present 25
- 25 Surface of the basal stroma almost black; hand sections of the excipulum showing a deep brown ectal tissue contrasting with the almost hyaline medullary tissue; spores 13-26.5x5.5-9 µm; paraphyses 2.5-4 µm wide, with apical cell rather abruptly swollen up to 10 µm; often accompanied by barely erumpent eustromatic conidiomata forming macroconidia (12)14-18(20)x5-7.5 µm; on *Alnus* (Canada) ***Pezicula heterochroma*** Verkley (1999)

- 25' Above characters not combined 26
- 26 Asci (4-6)8-spores; spores on average 23.3-25.3 μm long, average L/W 3-3.6, forming 3-5(7) traverse septa and ascoconidia mostly 3.5-6 μm long; on twigs of *Quercus robur*; phen.: X-XI **Pezicula sporulosa** Verkley (1999)
 Ill.: Verkley 1999: fig. 35-36.
- 26' Asci usually 8-spored; spores on average shorter than 24 μm ; conidial production varying 27
- 27 Apothecia only known in association with bark necrosis of Rosaceae, usually preceded by an acervular anamorph; spores mostly 15.5-25.7x7-8.5 μm , on average 22.3x7.6 μm , average L/W 2.7-2.9, forming up to 3 transverse septa and 4-6 μm long ascoconidia from minute openings in the spore wall. Asexual state: On *Malus* and *Pyrus*; phen.: ?

 **Pezicula corticola** (C.A. Jørg.) Nannf.(1932)
 Ill.: Verkley 1999: fig. 15.
- 27' Spores 15-31x5-12 μm , range of averages 18-24.3x6.5-8.9 μm , average L/W 2.7-3.2(3.4), forming 3-5(7) transverse septa and several oblique or longitudinal septa, and 6.4-8x1-1.65 μm ascoconidia from minute openings or discrete or integrated phialides. Asexual state: eustromatic, usually preceding the sexual state, conidia oblong, 15.5-36x5.5-12 μm , first hyaline, becoming septate and yellowish brown. On recently dead bark of conifers (*Abies*, *Juniperus*, *Larix*, *Picea*, *Pinus*) and angiosperms (*Acer*, *Alnus*, *Betula*, *Carpinus*, *Castanea*, *Cornus*, *Corylus*, *Cytisus*, *Fagus*, *Fraxinus*, *Ilex*, *Prunus*, *Quercus*, *Salix*, *Tilia*, *Viburnum*); phen.: (VI)VIII-XI(XII)
 • **Pezicula cinnamomea** (DC.) Sacc. (1889)
 Ill.: Verkley 1999: fig. 12-13.

Phlyctema Desm.

Type: *Phlyctema vagabunda* Desm. = *Neofabraea alba* ?
 Lit.: Quaedvl. et al. 2013: 384.

- 1 Conidiomata immersed, separate, eustromatic, unilocular, convoluted, acervular to sporodochial, up to 450 μm diam; wall of 3-6 layers of brown textura angularis; outer surface covered in brown, warty hyphae. Conidiophores hyaline, smooth, subcylindrical, branched, 1-4-septate, 15-50x4-5 μm . Conidiogenous cells phialidic, hyaline, smooth, subcylindrical to cymbiform or doliiform, with apical periclinal thickening and minute, non-flaring collarete, 7-18x3.5-5 μm . Conidia hyaline, smooth, guttulate, aseptate, fusiform, curved, tapering to subobtuse apex and truncate base, (27)33-37(40)x3(3.5) μm . Forming leaf spots on *Vincetoxicum officinale*. Phen.: IX (CZ)
 **Phlyctema vincetoxici** Quaedvl. et al. (2013)

Schizothyrioma Höhn.

Type species: *Schizothyrioma ptarmicae* (Desm.) Höhn.
 Lit.: Müller & Arx 1962 : 564, Holm & Nannfeldt 1992a: 18.

- 1 Apothecia erumpent, terete to elongate, 0.2-0.5(1) mm wide; asci 40-50x6-8 μm , mostly 2-spored, I-; spores 12-15x5-6 μm , 1-septate, hyaline; parasitic on *Achillea ptarmica* **Schizothyrioma ptarmicae** (Desm.) Höhn. (1917)
 Ill.: Müller & Arx 1962: Abb. 224.
- 1' Similar to *S. ptarmicae* but asci 6-8-spored, I+, and spores 8-12x2-2.5 μm , 1-septate, hyaline; parasitic on leaves of *Achillea ptarmica*; phen.: VIII-IX ◦ **Schizothyrioma aterrimum** (P. Karst.) L. Holm (1971)

Verkleyomyces Y. Marín & Crous

Type species: *Verkleyomyces illicii* (X. Sun et al.) Y. Marín & Crous
 Lit.: Marín-Felix et al. 2017: 167.

No Western European species known.

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Lit.: Jaklitsch et al. 2016: 168, Johnston et a. 2019: 15 & 17.

Sexual morph: Apothecia 0.5-20 mm in diam., hymenium concave to plane, white to brownish or lilaceous-grey, margin smooth or with long teeth; slightly gelatinous; sessile to short-stalked. Ectal excipulum of textura prismatica, usually covered by a +/- thick, strongly gelatinous external layer of narrow hyphae, margin and teeth of textura porrecta; medullary excipulum of textura intricata-prismatica; without crystals. Paraphyses filiform, apically often branched and/ or i flexuous, without VBs. Asci with rounded to conical apex with eu- or often hemiamyloid ring of Pezicula- or sometimes *Ploettneria*-type, also inamyloid, with croziers. Ascospores 8 per ascus, ellipsoid, 0-septate, hyaline, without sheath, lipid content low to high.

Asexual morph: hyphomycetous, holoblastic; conidia filiform or staurosporous

Habitat: Saprobic on leaves, rootlets, herbaceous stems, liverworts, Sphagnum etc., in bogs or on mossy soi, desiccation-senstive.

Genera belonging to this family:

1. *Cladochasiella* Marvanová 1997
2. *Discinella* Boud.
3. *Fontanospora* Dyko 1978
4. ?*Hydrocina* Scheuer
5. *Margaritispota* Ingold
6. *Naevata* B. Hein
7. *Pezoloma* Clem. s.str.
8. *Pseudopezicula* Korf
9. *Tetrachaetum* Ingold

Key to the genera:

- 1 Apothecia cupulate, substipitate, yellowish to brown; ectal excipulum of a thin-walled textura prismatica-porrecta, with thin covering layer of textura porrecta embedded in gel; asci with croziers, IKI-red (*Pezicula*-type); paraphyses without refractive vacuoles, showing a tendency to being apically irregularly bent and branched; spores aseptate ... *Discinella*
- 1' Apothecia discoid, sessile, margin strongly denticulate or not; ectal excipulum with gelatinous covering layer; medullary excipulum without gel; asci with a refractive globulus beyond the pars sporifera, apical annulus amyloid or hemiamyloid; paraphyses eguttulate *Pezoloma*
- 1' Apothecia developed beneath a covering layer of host/fungus tissue, disc exposed by splitting of this layer as teeth or upraised epidermis, later partly erumpent; Paraphyses not or slightly enlarged apically, lacking coloured contents; spores 0(1)-septate; anamorphs present or lacking Marginal excipulum brown *Naevata*

Discinella Boud. (non P. Karst.)

Syn.: *Pachydisca* Boud., *Geocoryne* Korf

Type species: *Discinella boudieri* (Quél.) Boud.

Lit.: Nawashin S. 1888 : 306 (sub *Helotium schimperi*), Dennis 1978: 149, Ellis & Ellis 1988: 67, Hansen & Knudsen 2000: 146, Medardi 2007: 6 (*D. boudieri*), Wieschollek & al. 2011: 167 (*D. menzierii*).

- 1 Apothecia purplish 2
- 1' Apothecia paler 4
- 2 Apothecia narrow sessile to substipitate, plane or irregular, 5-15 mm diam., soft-fleshed, purplish brown; asci *92-116x10-11 µm, IKI weakly red, with croziers; spores ellipsoid, *10-15x4-5 µm, OCI 5, hyaline; saprobic on sandy and clayey soil; phen.: IX-X ○(●) **Discinella boudieri** (Quél.) Boud. (1907)
Ill.: Boudier 1904-1910: pl. 445, Dennis 1978: XIXm, Medardi 2007: fig. 1c-d.
- 2 Apothecia purple 3
- 3 Apothecia gregarious, orbiscular, 4-5 mm diam., margin raised, incurved, wit short stem, lurid purple: spores broadly elipsoid, 17x10 µm, biguttulate; on sandy soil and charcoal; phen.: ? **Discinella exidiiformis** (Berk. & Broome) Boud. (1907)
- 3' Apothecia deep cup-shaped then expanded, tapered towards the base, 10-20 mm diam., sessile, livid purple; spores narrow ellipsoid to broadly fusiform, 20-22x7-8 µm; on soil; phen.: IX-X **Discinella purpurascens** (Pers.) Boud. (1907) (1907)

- 4 Apothecia turbinate, translucent, white to pink, to 0.5 mm wide; asci 90-100x10-13 µm, always with 4 large spores with VBs and 4 smaller spores without VB, IKI blue; large spores*16-19 x 5.3-5.7 µm, fusoid, containing very elongate 1-2 refractive large VBs; parasitic on *Sphagnum squarrosum*; phen.: ?
 **Discinella schimperii** (Navashin) Redhead & K.W. Spicer (1981)
- 4' Spores up to 5 µm wide 5
- 5 Apothecia 1-4 mm diam., white to cream-coloured; spores cylindrical-ellipsoid, 9-14x3-5 µm; on soil under conifers; phen.: V-IX **Discinella margarita** W.D. Buckley (1920)
- 5' Apothecia 5-10(15) mm diam., cupulate to scutellate, shortly stalked, margin crenulated, pale yellowish brown; brown ectal excipulum covered by thin layer of textura porrecta in gel; asci IKI red; spores narrow ellipsoid, 15-17x4-5 µm, with 2-3 large and many small guttules, OCl 5; on soil; phen.: XII
 **Discinella menziesii** (Boud.) Boud. ex A.L. Sm. & Ramsb. (1914)
 Ill.: Wieschollek & al. 2011: Abb. 5-6.

Naevala B. Hein

Type species: *Naevala mlinutissima* (Auersw.) B. Hein = *Naevala perexigua* (Rob. Ex Desm.) K. Holm & Holm.
 Lit.: Hein 1976: 83, Ellis & Ellis 1985: 206, Nauta & Spooner 1999b: 68.

- 1 Apothecia strongly elongated, 0.3-1.5x0.3-0.5 mm, hymenium yellow-red; asci 80-95x17-25 µm, l-; spores 21-26x7-8.5 µm, aseptate; saprobic on *Epilobium fleischeri*; phen.: IX
 **Naevala hysteropezizoides** (Rehm) B. Hein (1976)
 Ill.: Hein 1976: Abb. 26a & 27.
- 1' Apothecia circular; on other substrates 2
- 2 Apothecia 0.1-0.2 mm diam.; asci 2-spored, 60-80x11-13 µm, l-; spores 15-18x8-11 µm, aseptate; saprobic on leaves of *Salix nigricans*; phen.: V **Naevala vleugellii** (Rehm) B. Hein (1976)
 Ill.: Hein 1976: Abb. 26b & 29b-c.
- 2' Asci 8-spored, l+ 3
- 3 Apothecia immersed, 0.1-0.25 mm diam., hymenium becoming exposed by splitting of the dark brown covering layer by 4 to 5 lobes; asci hemiamyloid; spores 7-9x3.5-4.5 µm; saprobic on lower side of leaves of *Quercus robur*, *Quercus rubra*, *Quercus petraea*, *Quercus coccinea*, *Populus tremula*; phen.: V-VI(VIII)
 • **Naevala perexigua** (Rob. ex Desm.) K. Holm & Holm (1978)
 Ill.: Hein 1976: Abb. 2d, 26e, 28 & 29a, Rubio & al. 2010: p. 243.
- 3' Spores more than 4.5 µm wide 4
- 4 Apothecia 0.2 mm diam., hymenium yellowish to orange; asci 60-90x13-17 µm, l+; spores 17-20x6-7 µm; saprobic on stem and leaves of *Solidago virgaurea*; phen.: VIII **Naevala marginata** B. Hein (1976)
 Ill.: Hein 1976: Abb. 26c & 30.
- 4' Apothecia 0.1-0.2 mm diam., yellowish; asci 60-70(80)x11-14 µm, l+; spores 11-13.5x5-6 µm; saprobic on leaves of *Ribes glabellum*; phen.: VII **Naevala ribis** B. Hein (1976)
 Ill.: Hein 1976: Abb. 26d & 31.

Naeviella (Rehm) Clem.

Type species: *Naeviella paradoxa* (Rehm) Clem.
 Lit.: Défago 1967: 67 (sub *Eupropelella*), Suková 2004: 74.

- 1 Asci 42.5-55x7.5-9.5 µm, l-; spores 10-12x3.5-4.5 µm, biguttulate and several minute ones; saprobic on *Juncus monanthos*, *Juncus filiformis*, *Juncus trifidus*; phen.: VI-IX **Naeviella paradoxa** (Rehm) Clem. (1909)
 Ill. Défago 1967: fig. 26e-f & 28.
- 1' Spores ellipsoid, 7-9x3-4 µm; saprobic on stems and leaves of *Carex curvula*, *Eriophorum callitrix*, *Luzula lutea*, *Luzula sylvatica*; phen.: VI-VIII **Naeviella volkartiana** (Rehm) Nannf. (1982)
 Ill. Défago 1967: fig. 26a-c & 27.

Pezoloma Clem.

Syn.: anam. *Articulospora* Ingold, ?*Gyoerffyella* Kol
 Type species: *Pezoloma griseum* Clem.
 Syn.: *Rhizoscyphus* W. Y. Zhuang & Korf.

Lit.: Read 1974: 381 (sub *Pezizella ericae*), Benkert 1981: 35, Engel & Hanff 1987: 65 (*P. ciliifera*), Engel & Hanff 1989: 23, Lizon & al. 1998: 75 (*P. iodopedis*), Currah & al. 1999: 65, (*Scytalidium vaccinii*), Hambleton & al. 1999: 1391 (sub *Hymenoscyphus ericae*), Garcia & Van Vooren 2005: 115 (key), Baral & Krieglsteiner 2006: 16.

- 1 Apothecia without marginal teeth 2
- 1' Apothecia with toothed margin; asci IKI+ reddish 3

- 2 Apothecia superficial, up to 1 mm diam., concave, sessile, translucent to white; asci 50-80x5-6 µm, I+ slightly blue; spores ellipsoid, 5-12x3-4 µm, 0(1)-septate, hyaline; anamorph *Scytalidium vaccinii* with about 10 µm long arthroconidia; mycorrhizal endophyte directly on rootlets or on soil near rootlets of *Calluna vulgaris*, *Rhododendron sp.*; phen.: VII
..... **Pezoloma ericae** (D. J. Read) Baral (2006)
Ill.: Read 1974: fig. 1.
- 2' Apothecia beige to yellowish-reddish brown; asci 70-93(103)x4-13 µm, I+, with croziers; spores 7.7-12.3x3.1-5.4 µm; on wet wood: phen.: I **Pezoloma iodopedis** Korf, Lizoň & Iturr.(1998)
- 3 Apothecia subturbinate up to 1 mm diam., white, with thin marginal teeth; ascus porus IKI+ reddish, with croziers; spores ovoid, 7-9x4-4.5 µm, Q=1.6-2, OCI 2; on living *Marchantia polymorpha* thalli and rhizoids; phen.: V-VIII
..... ○ (●) **Pezoloma marchantiae** (Sommerf.) Benkert (1981)
- 3' Spores more than 9 µm long 4

- 4 Apothecia 0.5-1.5 mm diam., white, with thin marginal teeth; ascus porus IKI+ reddish, with croziers; spores 10-13x4-5.5 µm, 0(1)-septate, OCI 3-4; saprobic on leaf debris laying in mud and *Sphagnum*; phen.: IV-IX
..... ○ **Pezoloma ciliifera** (P. Karst.) Korf (1971)
Ill.: Garcia & Van Vooren 2005: fig. 1 + photo I-II.
- 4 Apothecia discoid, 0.7-1.4 mm diam., sessile, with erect marginal teeth, translucent white; asci 105-145x14-19 µm, IKI red, with croziers; spores narrow ellipsoid, 20.5-26(32.5)x7-9(10) µm, (0)1(4)-septate, guttulate, hyaline; saprobic on *Sphagnum squarrosum*; phen.: VI **Pezoloma scanicum** Laukka (2010)
Ill.: Huhtinen & al. 2010: fig. 6.

Pezoloma iodocyanescens (Dennis & Korf) Korf, *Phytologia* 21(4): 205 (1971)

DELTOPYXIDACEAE Ekanayaka & K.D. Hyde 2019

Lit.: Ekanayaka et al. 2019: 340.

Sexual morph: Ascomata apothecial cupulate to discoid, sessile to substipitate. Margins more or less distinct or crenulate, pustulate. Ectal excipulum composed of cells of textura prismatica globulosa-angularis. Medullary excipulum composed of slightly gelatinized cells of textura globulosa-angularis-prismatica. Paraphyses filiform, clavate-capitate, sometimes apically slightly swollen and covered with gell sheath, septate, branched or unbranched. Asci 8–64 spored, clavate or sub-cylindrical, non-amyloid, opening by a large slit-like pore, arising from croziers. Ascospores ellipsoid to ovoid or slightly to strongly triangular, guttulate, budding to form cylindrical to ellipsoid phialoconidia.

Asexual morphs: Conidiomata pycnidial, peridium composed of light brown cells of textura globulosa. Conidiophores subglobose to obpyriform, with a short to long neck. Conidiogenesis phialidic. Conidia rod-shaped, straight to slightly curved, eguttulate.

Habitat: Saprobic on dead plant material or lichenicolous.

Genera belonging to this family:

1. *Deltopyxis* Baral & G. Marson
2. *Phaeopyxis* Rambold & Triebel

Key to the genera:

- 1 Apothecia small, roundish, sessile, black-brown; asci with 3 µm thick apex, I+ or I-; spores ellipsoid to ovoid, aseptate, smooth, hyaline; lichenicolous or (?) algicolous *Phaeopyxis*
- 1' Apothecia small, roundish, (sub)sessile, cream to blackish brown; asci polysporous, apex IKI-; spores triangular
..... *Deltopyxis*

Deltopyxis Baral & G. Marson

Type species: *Deltopyxis triangulispora* Baral & G. Marson

Lit.: Baral & Marson 2012: 175.

- 1 Apothecia rehydrated 0.07-0.35 mm diam., 60-160 µm thick, scattered to gregarious, singly or crowded, (sub-)sessile, superficial, round, hymenium flat, light cream to dark brownish-grey or blackish, margin dark brown to black, crenulate-pustulate, protruding (0)5-20 µm beyond hymenium, exterior on flanks ± glabrous. Asci *30-50×8-13 µm, †(23)35-45×7-10 µm (spores alive), , ellipsoid to clavate-fusoid, 64-spored; apex of mature asci broadly hemi-sphaerical, with apical chamber opening by a large slit-like pore, IKI-, arising from croziers. Ascospores triangular in profile view, medium flattened and ± deltoid to ovoid in dorsal view, *(2.5)2.8-3.5(4)×(2)2.2-2.8(3) µm, †2.3-3×1.8-2.3 µm, *1.8-2.3 µm wide in dorsal view (†1.7-1.9 µm); with 1-4 LBs 0.5-1.2 µm diam, OCI 2-3; budding ascospores form cylindric(-ellipsoid) phialoconidia *2-3×1-1.2 µm. Paraphyses straight, unbranched, slightly to distinctly clavate-capitate, 2-4 µm longer than living asci, 4-9 µm longer than dead asci; middle part agglutinated with asci by a gel. Medullary excipulum 5-30 µm thick, of hyaline, textura globulosa-angularis-prismatica. Ectal excipulum at base and lower flanks of textura (prismatica-)globulosa-angularis, (10-)30-95 µm thick {4}, light brown, at mid flanks and margin 15-30 µm thick, of textura prismatica-globulosa with Inter-cellular gel. Anamorph: Conidiomata 0.12-0.25(-3.5) mm diam, round, densely gregarious, partly confluent and then reaching 0.8 mm diam, sessile, with a bright ochre- to red-brown peridium composed of globose, light brown cells; at first globose, black, apically opening by a transversal slit, margin indistinctly crenulate, producing a whitish slimy conidial mass. Conidiophores subglobose to obpyriform, *4.5-8×(2.5)3-3.3 µm, conidiogenesis phialidic with minute collarette. Phialoconidia *(2.7-)3.2-4.5×1.5 µm, straight to slightly curved. On still attached, mostly corticated, branches of shrubs of the genera *Corylus*, *Crataegus*, *Ilex*, *Prunus*, and *Salix*, of advanced age or dead, often on decayed *Vuilleminia* spp.. Phen.: I-XII (FR, LU) **Deltopyxis triangulispora** Baral & G. Marson (2012)

Phaeopyxis Rambold & Triebel

Type species: *Phaeopyxis punctum* (Massal.) Rambold, Triebel & Coppins

Lit.: Rambold & Triebel 1990: 380.

- 1 Apothecia roundish, 0.1-0.3 mm diam., disk plane, sessile, black-brown; asci (30)35-50×7.5-8.5 µm, I+; spores ellipsoid, (7)8.5-10.5(12)×2.5-3.5(4) µm; on *Cladonia* spp.; phen.: II-IX
..... **Phaeopyxis punctum** (A. Massal.) Rambold, Triebel & Coppins (1990)
- 1' Apothecia crowded, 0.2-0.35 mm diam., disk plano-convex, sessile, black-brown, partly confluent; asci (25)30-40×5-8 µm, I-; spores ellipsoid, (6)8-9.5(10.5)×(2.5)3-4(5) µm; on *Trapeliopsis gelatinosa*; phen.: IV-VIII
..... **Phaeopyxis varia** Coppins, Rambold & Triebel (1990)

DREPANOPEZIZACEAE Bat. & H. Maia

Lit.: Jaklitsch et al. 2016: 172, Johnston et al. 2019: 16.

Sexual morph: Apothecia sessile, immersed to erumpent, rarely superficial, often on stromatic tissue, hymenium greyish to brownish, margin often protruding, with or without lobes. Ectal excipule textura angularis. Paraphyses usually without vacuolar bodies. Asci with obtuse to conical apex, with or without amyloid apical ring. Ascospores ellipsoid to fusoid or often \pm broadly ovoid-clavate, 0–1(–2)-septate, septum \pm eccentric, lipid content low to medium.

Asexual morph: hyphomycetous, acervulus. Conidiogenesis is holoblastic. Conidia are sometimes two types, macroconidia are ellipsoid to fusoid and slight curved and microconidia are sometimes present and ellipsoid to bacilliform.

Habitat: Parasitic on leaves of various dicotyledons, causing leaf-spot diseases, rarely on herbaceous stems (*Spilopodia*); desiccation-tolerant.

Genera belonging to this family:

- 1 *Blumeriella* Arx
- 2 *Diploncarpon* F.A. Wolf
- 3 *Drepanopeziza* (Kleb.) Höhn.
10. *Felisbertia* Viégas
11. *Leptotrochila* P. Karst.
12. *Pseudopeziza* Fuckel
13. *Spilopodia* Boud.
14. *Spilopodiella* E. Müll.
15. *Thegonia* B. Sutton

Key to the genera of *Drepanopezizaceae*:

- 1 Only asexual morph known *Thegonia*
- 1' Sexual morph known 2

- 2 Apothecia arising from stromatized vascular bundles which form rhizomorph-like strands 3
- 2' Apothecia not arising from stromatized vascular bundles; stroma on living or overwintered leaves 4

- 3 Apothecia with stromatized base; asci J+; spores unicellular *Spilopodia*
- 3' Apothecia with conical stalk linked to the stromatized bundles; asci J- *Spilopodiella*

- 4 Excipulum lacking or scarcely developed; anamorph unknown; asci J- *Pseudopeziza*
- 4' Excipulum present, mostly well-developed 5

- 5 Apothecia erumpent from beneath the epidermis; asci 4-8-spored; spores 0-1-septate; anamorph *Diplosporonema*, *Entomosporium*, *Marssonina*, *Sporonema* or unknown 6
- 6 Apothecia developed on living leaves 7
- 6' Apothecia developed on overwintered leaves 9

- 7 Anamorph with staurosporous conidia *Entomosporium*
- 7' Conidia otherwise 8

- 8 Anamorph *Sporonema*; asci J+; spores 0-1-septate, not constricted at the septum *Leptotrochila*
- 8' Lateral excipulum poorly developed; asci I+; on leaves of Salicaceae or *Ribes*; anamorph *Gloeosporidiella*, developed on living leaves *Drepanopeziza*

- 9 Anamorph *Marssonina*; spores 1-septate, constricted at the septum *Diplocarpon*
- 9' Apothecia remaining immersed; anamorphs *Phloeosporella*; spores 0-3-septate, mostly longer; parasitic on leaves; apothecia developed on overwintered leaves *Blumeriella*

Blumeriella Arx

Syn.: *Higginsia* Nannf., *Microgloeum* Petr., anam. *Phloeosporella*

Type species: *Blumeriella jaapii* (Rehm) Arx.

Lit.: Baral & Kriegelsteiner 1985: 31, Ellis & Ellis 1985: 194, Williamson & Bernard 1988: 2048, Nauta & Spooner 2000a:

- 1 Apothecia hypophyllous, 0.15-0.3 mm diam.; asci I+, 70-95x11-14 µm; spores 33-50x3.5-5.5 µm; anamorph *Phloeosporrella padi* forms angular brown spots, finally dropping out of the leaf giving a "shot-hole" appearance, with 1-septate conidia 48-62x2-3 µm on the lower leaf side; parasitic on leaves of *Cerasus vulgaris*, *Prunus avium*, *P. domestica*, *P. padi*; phen.: V, anamorph: VIII-IX ● **Blumeriella jaapii** (Rehm) Arx (1961)
 III.: Ellis & Ellis 1985: fig. 861.
- 1' Apothecia epiphyllous, 0.1-0.3 mm diam., disk translucent whitish; asci 38-88x6-24 µm; spores 14-35x3-5 µm, 0(1)-septate; anamorph *Phloeosporrella filipendulae* forms pale ochre yellow spots and 1-septate conidia 30-65x2-5 µm; on leaves of *Spiraea filipendula*, *Spiraea x vanhouttei*; phen.: IV, anamorph: late autumn
 ● **Blumeriella haddenii** Williamson & Bernard (1988)
 III.: Williamson & Bernard 1988: fig. 1-7.

Diplocarpon F.A. Wolf

Syn.: *Marssonina*, *Botrichonema*

Type species: *Diplocarpon rosae* F.A. Wolf.

Lit.: Sutton 1980: 300 (*Marssonina fragariae* & *M. rosea*), Nauta & Spooner 2000a: 25, Lee et al. 2011: 200, Shaerer et al. 2018.

- 1 On Rosaceae 2
- 1' On other substrates 5
- 2 Asexual morph *Entomosporium mespili*: Acervuli predominantly epiphyllous, subcuticulate, up to 0.2 mm diam. Conidia 4- or 5-celled, consisting of a larger basal cell, a globose upper cell, and 2 or more lateral cells 4-7 µm long that form a cross pattern, 15-26x5.5-9.5 µm overall, hyaline. Apical and lateral cells each with a single, flexuous appendage 7-15.5 µm long. On mostly young living leaves of *Amelanchier*, *Crataegus* and *Cydonia* producing first dark red spots late becoming asg grey with purplish margin Sexual morph rare, saprotic on overwintering leaves.. Phen.: anamorph: VII-IX (BE/F, DE, FR, IT) ○ **Diplocarpon mespili** (Sorauer) B. Sutton (1980)
 III.: Ellis & Ellis 1985: fig. 488, Nag Raj 1993: fig. 9.1.
- 2' With *Marssonina*-type conidia 3
- 3 Sexual morph: Spores 18-28x4-6 µm. Asexual morph causing dark purplish to brown spots 2-3 mm, acervuli blackish with conidia curved, truncate base and acute apex, 1-septate, 16.5-29x5.5-8 µm, hyaline; on *Fragaria* sp., *Potentilla anserina*, *Rubus caesius*; phen.: V-VIII (BE/F, BE/W) ..○ **Diplocarpon fragariae** (Sacc.) Rossman (2014)
 III.: Sutton 1980: fig. 167, Ellis & Ellis 1985: fig. 1501.
- 3' Conidia
- 4 Sexual morph: Spores 20-25x5-6 µm. Asexual morph causig purplish-brown spots, conidia slightly curved, base truncate, apex obtuse, 18-25x5-7 µm, 1-septate, with two 2-3 µm diam. guttules per cell; on living leaves of *Rosa* spp., *Sorbus*, forming dark purplish brown spots, frequently with radiating pattern; phen.: I-XII (BE/F).....
 ● **Diplocarpon rosae** F.A. Wolf (1912)
 III.: Ellis & Ellis 1985: fig. 1034.
- 4' Sexual morph: Apothecia rare, mostly epiphyllous. Spores 23-33x5-6 µm. Asexual morph forming epiphyllous green to blackish spots, sometimes turning into star-like lesions, black small acervuli (0.08-0.4 mm) and premature defoliation: Conidia obovoid, 20-24x6.5-8.5 µm, constricted 1-septate, guttulate, hyaline. On living (anamorph) leaves of *Malus* spp.; teleomorph formed on fallen leaves. Phen.: anamorph: VI-XI, teleomorph: XII-IV (BE/F, CH, DE, IT) ● **Diplocarpon coronariae** (Ellis & Davis) Wöhner & Rossman (2020)
 III.: Lee et al. 2011: fig. 1 (sub *Diplocarpon mali*)*.
- 5 Spores 17-20x4.5-5.5 µm; saprobic on leaves of Caryophyllaceae (*Dianthus plumarius*, *Saponaria officinalis*) ; phen.: IV ● **Diplocarpon saponariae** (Ces.) Nannf. (1936)
- 5' Asexual morph: Colonies hypophyllous, white. Conidiophores emerging through stomata in groups of 3 to 8, 80-160x2-7 µm, spirally twisted, hyaline. Conidia on small pegs, 20-33x13-16 µm, smooth to verruculose, becoming 1-septate, hyaline. Parasitic, causin dark reddish brown, round or angular spots up to 3 mm diam. on leaves of *Polygonum viviparum* (CH, NO, UK) (●) **Diplocarpon polygoni** E. Müll. (1977)

Drepanopeziza (Kleb.) Höhn.

Syn.: anam. *Gloeosporidiella*

Type species: *Drepanopeziza populorum* (Desm.) Höhn.

Lit.: Rimpau 1962: 257, Défago 1967: 71 (*D. paraxoïdes*), Dennis 1978: 213, Sutton 1980 : 299 (*Marssonina*), Ellis & Ellis 1985: 244, Baral 1994a: 211, Nauta & Spooner 2000a: 26.

- 1 On monocotyls 2
- 1' On dicotyls 3

- 2 Apothecia erumpent, 0.1-0.2 mm diam., hymenium pale ochraceous yellow; asci 80-100x10-11 µm; spores 10-14x5 µm; saprobic on *Luzula alpino-pilosa*, *Luzula glabrata*, *Luzula lutea*, *Luzula spadicea*; phen.: VII-IX **Drepanopeziza paraxoïdes** (Rehm) Défago (1967)
- 2' Apothecia erumpent, 0.3-0.6(0.8) mm diam., sessile to shortly stalked, hymenium bright rose; asci *130-230x24-28(37) µm, amyloid, with croziers; spores ellipsoid-subfusiform, *19-23x8-11 µm, aseptate, with foveate ornamentation (warts that do not protrude outside the outer wall layer), with two large polar guttules, with mucous coating; saprobic on *Deschampsia caespitosa*, alpine; phen.: IX **Drepanopeziza verrucispora** H.O. Baral (1992)
Ill.: Baral 1994a: fig.1-23.
- 3 Anamorph *Gloeosporidiella*; on *Ribes* species 4
- 3' Anamorph *Marssonina* or *Monostichella*; mostly on Salicaceae 5
- 4 Apothecia erumpent, 0.3 mm diam., dark brown; asci up to 70x15 µm; spores ellipsoid, 10-14x5-6 µm, with two polar guttules. Asexual morph *Gloeosporidiella ribis* with falcate conidia 17-26x6-7 µm. Saprobic on leaves of *Ribes grossularia*, *R. rubrum*, *R. nigrum*. Phen.: III-V, anamorph: VII-IX **Drepanopeziza ribis** (Rehm ex Kleb.) Höhn. (1915)
Ill.: Rimpau 1962: Abb.1a-b.
- 4' Apothecia 0.15-0.2 mm diam.; asci 80-100x16-20 µm; spores 13-18x6-7.5 µm. Asexual morph *Gloeosporidiella variabile* with falcate conidia. Teleomorph saprobic on lower side of leaves of *Ribes alpinum*; phen.: teleomorph: VI, anamorph: VII-IX **Drepanopeziza variabilis** E. Müll., Hütter & Schüepp (1959)
Ill.: Rimpau 1962: Abb.1c.
- 5 Conidia 17-22x(5)8-10 µm, 0-1-septate, hyaline; common foliar pathogen on *Betula*, causing characteristic leaf spots as well as lesions on young shoots and stem cracks. Sexual morph unknown. Phen.: infects leaves and young shoots in spring and summer (BE/W) "**Marssonina**" **betulae** (Lib.) Magnus (1906)
- 5' On Salicaceae 6
- 6 On *Populus* 7
- 6' On *Salix* 9
- 7 Apothecia 0.1-0.2 mm diam.; spores 14-16x5-7 µm; *Marssonina castagnei* state with obovoid to pyriform 1-septate macroconidia 16.5-20.5x5.5-8 µm; on leaves of *Populus alba*, *P. canadensis*; phen.: V, anamorph: VII-XI **Drepanopeziza castagnei** (Desm. & Mont.) Rossman & W.C. Allen (2017)
Ill.: Pirozynski - Fungi Canadensis n°.14.
- 7' Anamorph with macroconidia either larger or smaller 8
- 8 Apothecia 0.2-0.35 mm diam.; spores 12-16x5-9 µm; *Marssonina populi* state with obovoid to pyriform, 1-septate macroconidia 17-25x6-11 µm; saprobic on leaves of *Populus balsamifera*, *Populus nigra* group; phen.: IV-V, anamorph: VII-XI **Drepanopeziza populorum** (Desm.) Höhn. (1917)
Ill.: Pirozynski - Fungi Canadensis n°.15.
- 8' Apothecia about 0.2 mm diam.; asci 50-60x8-12 µm; spores 8-9x1.8-2 µm, aseptate, hyaline; *Marssonina brunnea* state forming up to 1 mm diam. brown spots and narrowly ellipsoid, 1-septate macroconidia 13-19x4-6 µm; saprobic on leaves of *Populusxcanadensis*, *Populus tremula*, seldomly on *Populus alba*; phen.: IV-V(X), anamorph: VIII-X **Drepanopeziza tremulae** Rimpau (1962)
Ill.: Rimpau 1962: Abb. 7f, Pirozynski - Fungi Canadensis n°.13.
Drepanopeziza punctiformis Gremmen is most probably a synonym.
- 9 Apothecia erumpent, 0.2-0.5 mm diam., blackish brown with grey discs; spores 10-16x6-7 µm; *Monostichella salicis* anamorph with slightly curved, hyaline, aseptate, biguttulate conidia 14-17x4.5-8.5 µm, parasitic; teleomorph saprobic on leaves of *Salix alba*, *S. amygdalina*, *S. caprea*, *S. cinerea*, *S. fragilis*, *S. triandra* and *S. viminalis*; phen.: teleomorph: III-V, anamorph: VIII-IX **Drepanopeziza salicis** (Tul. & Tul.) Höhn. (1920)
Ill.: Rimpau 1962: Abb. 11a & d, Ellis & Ellis 1985: fig. 1106.
- 9' Macroconidia 1-septate 10
- 10 Apothecia 0.2-0.25 mm diam.; asci 65-80x12-14 µm; spores 10-13x5-6.5 µm; *Marssonina kriegeriana* state with narrowly ellipsoid conidia 13-17x3.5-6 µm; on *Salix triandrae*; phen.: teleomorph: IV-V, anamorph: VI-IX **Drepanopeziza triandrae** Rimpau (1962)
Ill.: Rimpau 1962: Abb. 11c & f.
- 10' Sexual morph: Apothecia 0.2-0.3 mm diam.; asci *75-110x16-23 µm, IKI+, with croziers; spores *13-22x7-11 µm, biguttulate, OCI 2-3; hyaline. Asexual morph *Marssonina salicicola* with obovoid to pyriform, 1-septate conidia 15-

17x5-7 µm; parasitic on leaves and small twigs of *Salix caprea*, more seldomly on *Salix alba* var. *vitellina* x *babylonia* and *S. aurita*; teleomorph saprobic; phen.: III(t), VI-XI (a) (BE/F) **Drepanopeziza sphaerioides** (Pers.) Höhn. (1917) III.: Rimpau 1962: Abb. 11b & e, Ellis & Ellis 1985: fig. 1107.

Entomosporium Lév.

Type species: *Entomosporium mespili* (DC.) Sacc.
Lit.: Stowell & Backus 1966: 949.

- 1 Sexual morph: apothecia on overwintering leaves. Spores 16-24x6-10 µm, 1-septate. Asexual morph: causing red-brown spots on young living leaves and fruit. Acervuli epiphyllous, subcircular, up to 0,5 mm diam. Macroconidia staurosporous, 5-celled, all cells subglobose to broadly ellipsoid, composed of an upper cell (the largest one) and a lower cell with 2-3 lateral cells, 15-26x6-9 µm, upper cell and lateral cells with a 7-15.5 µm long flexuous appendage, guttulate, hyaline. Causing reddish spots on living leaves of Rosaceae (*Amelanchier*, *Crataegus*, *Cydonia*, *Mespilus*, *Pyrus*). Phen.: VII(a)-IX(a) (●) **Entomosporium mespili** (DC.) Sacc.(1880) III.: Ellis & Ellis 1985: fig. 488.

Leptotrochila P. Karst.

Syn.: *Ephelina* Sacc., *Fabraea* Sacc., anam. *Sporonema* Desm.

Type species: *Leptotrochila radians* (Desm.) P. Karst. = *Leptotrochila campanulae* (DC.) Rossman

Lit.: Schüepp 1959: 233, Baral & Krieglsteiner 1985: 33, Holm & Nannfeldt 1990a: 8 (*L. bartsiae*), Johnston & al. 2014: 101, Boerema et al. 1996: 165.

- 0 Asexual morph: Pycnidia at first globose and closed, later opening and splitting irregularly and becoming cupulate, mostly 150-200 µm diam.; wall rather thin, consisting of brown-black cells. Conidiophores inconspicuous, cylindrical, usually (4)10(15) x1.5 µm, little different from the conidia. Conidia short-cylindrical with truncate ends, mostly (5)6(7)x2-2.5 µm. On leaves of *Convallaria majalis*, *Quercus robur*. **Sporonema hiemale** Desm. (1851)
- 0' Sexual morph known 1
- 1 Ectal excipulum clearly differentiated 2
- 1' Ectal excipulum of poorly differentiated, with externally hardly darkened cells, against the substrate clearly demarcated; hypothecium not or poorly formed; marginal protrudings more or less clearly present; apothecia superficial; parasitic (*Leptotrochila astantiae* group) 3
- 2 Ectal excipulum composed of an external dark and internal pale thin-walled layer, completely surrounding the apothecium and demarcated against the pseudostroma; hypothecium and marginal protrudings clearly present; apothecia superficial or immersed; parasitic or saprobic (*Leptotrochila repanda* group) 5
- 2' Ectal excipulum only laterally composed of an external dark and internal pale thin-walled layer, continuing within substrate or stroma; hypothecium well formed; margin not differentiated or with marginal protrudings 6
- 3 Apothecia 0.1-0.9 mm diam., erumpent, pale brown; with basally and in center strongly enlarged layers, ectal excipulum with short, hyaline, marginal protrudings; asci 45-60x7-9 µm, I+; spores slightly clavate, narrowly ellipsoid to fusiform, 8-13x2.4-4 µm, with two medium size LBs and several minute ones, OCI 3-3.5, overmature spores 1-septate; parasitic on leaves of *Cerastrium* spp.; phen.: IV-IX (BE/F, DE, FR, NL).....
..... ● **Leptotrochila cerastiorum** (Wallr.) Schüepp (1959)
- 3' Ectal excipulum basally and laterally equal in thickness 4
- 4 Apothecia 0.1-0.4 mm diam., erumpent from bleached spots, marginal protrudings numerous; asci 50-65x9-11.5 µm, I+; spores ovoid to broadly ellipsoid, 7.5-9.5x3.5-4.5 µm, 0-1-septate; parasitic on lower side of leaves of *Sanguisobra officinalis*; phen.: IX **Leptotrochila sanguisorbae** (Jaap) Schüepp (1959) III.: Schüepp 1959: Abb. 11
- 4' Apothecia 0.1-0.5 mm diam., erumpent from brownish black spots, without marginal protrudings; asci 50-70x10-13 µm, 2-4(8)-spored; spores fusiform, clavate to narrowly ellipsoid, 11-20x3.5-5.5 µm, 0-1-septate; parasitic on lower side of leaves of *Astrantia major*, *Astrantia minor*; phen.: VI-X **Leptotrochila astantiae** (Ces.) Schüepp (1959)
- 5 Apothecia 0.3-1 mm diam., excipulum margin with paraphyse-like protrudings; asci 45-92x6-10 µm, I+; spores elongated clavate.7-13x3-4.5 µm, aseptate; *Sporonema* anamorph; parasitic and saprobic on leaves and stems of Rubiaceae (*Galium mollugo*, *Galium boreale*, *Galium silvestre*, *Galium spp.*, *Asperula brachyantha*, *Rubia tinctorum*, *Sherardia arvensis*); phen.: (II)V-XI (BE/F) ● **Leptotrochila verrucosa** (Wallr.) Schüepp (1959)
- 5' Apothecia 0.3-1 mm diam., excipulum margin with short protrudings; asci 50-70x6-8 µm, I+; spores fusiform or elongated clavate, 12-19x2.5-3.5 µm, 0-1-septate; parasitic and saprobic on stems and leaves of *Potentilla norvegica*; phen.: VI-VII **Leptotrochila repanda** (Fr.) P. Karst. (1871) III.: Schüepp 1959: Abb. 10.

- 6 Apothecia occurring on living leaves; marginal cells slightly elongated (*Leptotrochila ranunculi* group) 7
 6' Apothecia occurring on stromatised previous-year stems; outer excipulum layer and margin crumbling
 (*Leptotrochila radians* group) 9
- 7 Apothecia 0.1-0.8 mm diam., erumpent from brown spots, excipulum poorly formed, with few marginal protrudings;
 asci 60-82x9-11.5 µm, I-; spores fusiform to ovoid, 9.5-12.5x3.5-4.5 µm, aseptate; *Sporonema* anamorph; parasitic
 on *Trifolium arvense*; phen.: VIII-X **Leptotrochila trifolii-arvensis** Schüepp (1959)
 7' Excipulum well formed, mostly with slightly elongated marginal cells 8
- 8 Apothecia 0.2-0.7 mm diam., erumpent from pale brown spots; asci 55-75x7-10 µm, I-; spores broadly clavate or
 ovoid, aseptate, 7.5-10x3-5 µm. Asexual morph: *Sporonema phacidioides* Desm. Parasitic on both sides of leaves
 of *Medicago sativa*; phen.: VI-IX **Leptotrochila medicaginis** (Fuckel) Schüepp (1959)
 8' Apothecia 0.1-0.7 mm diam., erumpent from brown spots; asci 65-92x11.5-14 µm, I+; spores elongated ovoid to
 clavate, 0-1-septate, 13-16x5-6.5 µm. Asexual morph: unknown. Parasitic on lower side of withering leaves of
Ranunculus cassubicus, *Ranunculus repens*; phen.: (VI)IX-X(I) • **Leptotrochila ranunculi** (Fr.) Schüepp (1959)
 Ill.: Schüepp 1959: Abb. 9
- 9 On Campanulaceae 10
 9' On Scrophulariaceae 12
- 10 Apothecia 0.3-1 mm diam., erumpent from brownish black stromata; asci 50-60x7-8 µm, I+; spores cylindrical to
 fusiform, 8-12.5x2.5-3 µm, aseptate; *Sporonema* anamorph with conidia 3-5x1-1.5 µm; on *Campanula allium*, *C.*
rapunculus, *C. romboidalis*, *C. scheuchzeri*, *C. trachelium*; phen.: V-X
 **Leptotrochila campanulae** (DC.) Rossman (2014)
 Ill.: Schüepp 1959: Abb. 8
 10' Apothecia 0.2-0.5 mm diam., erumpent from a stroma; asci 44-60x6-8 µm; spores narrow ellipsoid, 9-14x2.5-3.5
 µm; anamorph unknown; on *Jasione montana*, *Jasione perennis*; phen.: (V)IX-X
 **Leptotrochila jasionis** (Romell) Schüepp (1959)
 10'' Apothecia 0.5-1 mm diam., erumpent from stroma; asci 50-65x7-9 µm; spores cylindrical to fusiform, 9-13x2.5-3.5
 µm; *Sporonema* anamorph with conidia 5-7x2-3 µm; on *Phyteuma* spp.; phen.: III-VIII
 **Leptotrochila phyteumatis** (Fuckel) Schüepp (1959)
- 12 Apothecia 0.2-0.5 mm diam., with strongly developed excipulum, erumpent from 10-30 mm long stromata; asci 55-
 75x7-10 µm; spores ovoid to clavate, 8-11x3-6 µm; anamorph unknown; on *Rhinanthus* spp.; phen.: V-VIII
 **Leptotrochila lugubris** (de Not.) Schüepp (1959)
 12' With parasitic anamorph *Sporonema* 13
- 13 Apothecia 0.7-1 mm diam., erumpent from up to 10 mm long stromata; asci 65-85x6-9 µm, I+; spores elongate
 clavate or ellipsoid, 9-14x3-4 µm; *Sporonema* anamorph with conidia 6-9.5x2-2.5 µm; on *Pedicularis foliosa*, *P.*
gyroflexa, *P. incarnate*, *P. rostrato-spicata*, *P. tuberosa*; phen.: VII-VIII
 **Leptotrochila pedicularis** (E. Müll. & Schüepp) Schüepp (1959)
 13' Apothecia up to 1.5 mm diam., erumpent from 1-10 mm long stromata; asci 55-75x7-10 µm; spores fusiform or
 narrow clavate, 9-10x4-5 µm; *Sporonema* anamorph with conidia 3.5-6x1-1.5 µm; saprobic on stems and leaves of
Bartsia alpina; phen.: VII-VIII **Leptotrochila bartsiae** Schüepp (1959)
Leptotrochila porri Arx & Boerema (1963)

Pseudopeziza Fuckel

Type: *Pseudopeziza trifolii* (Biv.) Fuckel.

Lit.: Schüepp 1959: 223, Hein 1976 : 115 (*P. morthierii*), Dennis 1978 : 213.

- 1 Asci broadly clavate, 55-70x13-19 µm, I-; spores ellipsoid to reniform, 14-19x4-5.5 µm, (0)1-septate; hypothecium
 at ascus base composed of isodiametric cells 6-10 µm diam., surrounded by 2-5 µm large cells; paraphyses not
 branched; parasitic on pale spots on both sides of leaves of *Caltha palustris*; phen.: VI-X
 ○ **Pseudopeziza calthae** (W. Phillips) Masee (1895)
 Ill.: Schüepp 19+59: Abb.2c & 5.
 1' Hypothecium composed of uniform thin-walled cells, surrounded by darker stromatic cells; asci narrowly clavate;
 paraphyses slightly branched 2
- 2 Apothecia 0.2-0.7 mm diam., pale reddish brown; asci 50-95x10-14 µm, J-; spores ovoid, *11.5-17.2x5.3-6.3 µm,
 Q= 2-2.7, aseptate, OCI 2-3; parasitic on *Mellilotus albus*, *Trifolium repens*; phen.: V-XI
 • **Pseudopeziza trifolii** (Biv.) Fuckel (1870) [1869-70]
 Ill.: Schüepp 19+59: Abb.2a & 4, Rubio & al. 2010: p. 254.

- 2' Cf. *P. trifolii*; spores ovoid, *10.5-14x5-6 µm, Q=1.8-2.5, aseptate, OCI 2-3; parasitic on leaves of *Medicago arabica*, *Medicago hispida*, *Medicago lupulina*, *Medicago sativa*, *Vicia*; phen.: (II)VI-XI
 ○ **Pseudopeziza medicaginis** (Lib.) Sacc. (1887)

Spilopodia Boud.

Syn.: *Holmiodiscus* Svrček, anam. *Melanodiscus* Höhn.

Type: *Spilopodia nervisequia* (Pers.) Boud.

Lit. : Rehm 1896: 626 (sub *Pyrenopeziza*), Hansen & Knudsen 2000: 152 (sub *Holmiodiscus filipendulae*),

Declercq 2001: 71, Baral (unpublished key).

- 1 Apothecia erumpent, 0.3-0.6 mm diam., disc grey, margin and outer surface black; asci 68-84x9.5-10(12) µm, with strongly hemiamyloid ring, with croziers; spores †11-13x3.5-4 µm, 0(1)-septate, OCI 3-4; saprobic on blackened veins of leaves of *Plantago lanceolata*; phen.: III-V (BE/F) ○ **Spilopodia nervisequa** (Pers.) Boud. (1907)
- 1' Asci IKI-; spores mostly distinctly clavate to pyriform(-ovoid)..... 2
- 2 Spores 4-5.5 wide 3
- 2' Spores *3.3-4 µm wide (†2.7-3.8 µm), oblong to clavate, without glycogen 4
- 3 Apothecia 0.5-1(1.5) mm diam., disc grey; asci 59-87x8-9 µm, IKI-, with croziers; spores *9-12x4.5-5.5 µm, 0(1)-septate usually with 1-2 glycogen bodies; paraphyses with clavate apex; saprobic on stems of *Clinopodium vulgare*, *Galeopsis tetrahit*, *Galium mollugo*, *Filipendula*, *Lycopus europaeus*; phen.: V-VI
 • **Spilopodia simulata** (Berk. & Broome) Baral comb. nov. ined.
- 3' Apothecia erumpent, 1.5-2 mm broad, narrowly sessile, opening by an elongate slit, hymenium sordid orange, outside blackish; asci 60-80x7-8 µm, non-amyloid; spores ellipsoid, ovoid to broadly fusiform, 8-10x4-4.5 µm, hyaline; saprobic on stems of *Filipendula ulmaria*; phen.: IV **Holmiodiscus filipendulae** Svrček (1992)
- 4 Asci 50-65 µm long, IKI-; spores ovoid, †7.5-12x2.5-4 µm; marginal protrusions up to 15 µm long saprobic on stems of *Allium*, *Apocynum*, *Aruncus*, *Hypochaeris radiculata*, *Melampyrum pratense*, *Vincetoxicum*; phen.: ?
 ○ **Spilopodia moutonii** (Rehm) Declercq (2001)
- 4' Terminal cell of paraphyses †42-48x3-3.8 µm, medium clavate, thin-walled, all spores distinctly heteropolar, †8-10x3-3.8 µm, anchoring hyphae mostly rough-walled, pale to light brown, thick-walled, cells 13-20x3-3.5 µm, on stems of *Mercurialis perennis* **Spilopodia melanogramma** Boud. (1885)
- 4'' Terminal cell of paraphyses †12-60x3-5 µm, medium to strongly clavate, apically partly thick-walled (glassy, *, in KOH thicker); spores homopolar to distinctly heteropolar, *8-10x3.3-3.7 µm (†6.8-9x2.7-3.2); anchoring hyphae dark brown, 3-5 µm wide, ?emerging from a dark brown net of isodiametrical cells 8-12 µm wide; on herbaceous stem of indet. plant, 1200 m (Alps) **Spilopodia sp.**
 = *S. moutonii*?

Spilopodiella E. Müll.

Type : *Spilopodiella arxii* E. Müll.

Lit. : Müller 1989 : 219.

- 1 Apothecia erumpent, with immersed conical stalk, 0.6-0.9 mm diam., with hyphal stroma within the substrate; ectal excipulum of brown textura angularis, margin of textura peismatica ; asci 115-130x11-13 µm, I- ; spores clavate, 20-24x5.5-6.5, 1(3)-celled, hyaline to grey; saprobic on leaves of *Carex sempervirens* ; phen. : VIII
 **Spilopodiella arxii** E. Müll. (1989)
 III.: Müller 1989: Abb. 1.

Thedongia B. Sutton

Type species: *Thedongia ligustrina* (Boerema) B. Sutton

Lit.: Ellis & Ellis 1985: 159, Braun & al. 2013: 281, Kruse & Braun 2021: 160.

- 1 Conidiophores hyaline; conidia cylindrical, truncate at ends, 25-65x4-5.5 µm, 1- or 2-septate, in chains, hyaline; on living leaves of *Ligustrum ovalifolium*, causing zonate brown spots with grey centres and purplish-brown raised borders phen.: II (BE/F,NL) ○ **Thedongia ligustrina** (Boerema) B. Sutton (1973)
 III.: Ellis & Ellis 1985: fig. 699.
- 1' Caespituli amphigenous, mainly epiphyllous, whitish. Conidiophores arising from stromata, often hardly separable from conidia, densely arranged in groups or fascicles, 23-115x5-6 µm, sometimes up to 150 µm long, straight to curved, subcylindrical, septate, hyaline. Conidia in long chains, cylindrical, 17-55x5-6 µm, hyaline, pluriseptate. On living, basal leaves of *Verbascum* spp. forming several circular to subcircular or irregular leaf spots, sometimes

coalescent, at first light brown, later dark brown and papery, with a conspicuous violet purplish margin ; phen.:
(X)III-VI (BE/F, DE, FR, IT, UK) ◦ **Thegonia bellocensis** (C. Massal. & Sacc.) U. Braun (1992)
Ill.: Kruse & Braun 2021: fig. 1-2.

GELATINODISCACEAE S.E. Carp.

Syn.: Ombrophilaceae Boud. nom. inval.

Lit.: Jaklitsch et al. 2016: 168.

Sexual morph: Apothecia 0.3-15(50) mm in diam., hymenium plane to convex, rarely cerebriform, whitish-greyish to purple-lilac or yellow, margin and exterior smooth; slightly to often strongly gelatinous; sessile to long-stalked, superficial. Ectal excipulum of textura prismatica to textura globulosa, not rarely with an external gelatinous layer; medullary excipulum not or mostly strongly gelatinous; often with crystals. Paraphyses cylindrical to capitate, partly with low- to high-refractive, hyaline, globose to elongate VBs. Asci with rounded to conical apex, amyloid ring of *Calycina*/*Pezicula*/*Sclerotinia*/*Hymenoscyphus*-type, also *Hymenoscyphus*-type, rarely inamyloid, mostly with croziers. Ascospores 8 per ascus, ellipsoid to fusoid, homopolar, rarely curved, small- to large-sized, hyaline, rarely brown (*Skyathea*), smooth, rarely striate (*Ascotremella*), often with sheath, lipid content low to high, overmature 1-5-septate, partly budding conidia.

Asexual morph: hyphomycetous or forming gelatinous synnemata; or slimy sporodochia; phialidic (*Ascocoryne*, *Chloroscypha*, *Neobulgana*), rarely monoblastic (*Xerombrophila*), con1d1a small, 0 septate.

Habitat: Saprobic, endophytic, lignicolous, also on cones or leaves of conifers and Ericaceae, or monocots, desiccation-sensitive, rarely -tolerant. Worldwide, boreal to subtropical.

Genera belonging to this family:

- | | | |
|----|-------------------------------------|---|
| 1. | scocoryne J.W. Groves & D.E. Wilson | A |
| 2. | scotremella Seaver | A |
| 3. | Chloroscypha Seaver | |
| 4. | Neobulgaria Petr. | |
| 5. | Ombrophila Fr. | |
| 6. | Phaeangellina Dennis | |
| 7. | ?Skyathea Spooner & Dennis | |
| 8. | Xerombrophila Baral | |

Key to the genera of Gelatinodiscaceae:

- | | | |
|----|---|----------------------|
| 1 | Apothecia sessile to stipitate, up to 5 mm diam., yellowish green to blackish when dry; ectal excipulum composed of textura porrecta embedded in a gel matrix and curved outwards at a high angle to the surface, outermost cells brown with yellow ionomidotic exudate; spores fusiform, more than 20 µm long; paraphyses embedded in a greenish matrix; saprobic or parasitic on leaves of conifers | <i>Chloroscypha</i> |
| 1' | Ectal excipulum without ionomidotic exudates | 2 |
| 2 | Spores brown | <i>Skyathea</i> |
| 2' | Spores hyaline | 3 |
| 3 | Apothecia cerebriform; asci originating from simple septa; spores striate | <i>Ascotremella</i> |
| 3' | Spores smooth | 4 |
| 4 | Apothecia up to 2.5 mm diam., sessile to shortly stalked; ectal excipulum with gelatinized covering layer; medullary excipulum strongly gelatinized; asci with euamyloid apical ring of <i>Calycina</i> -type; on branches of <i>Salix</i> ; anamorph monoblastic; desiccation-tolerant | <i>Xerombrophila</i> |
| 4' | Anamorph otherwise; apothecia desiccation-sensitive | 5 |
| 5 | Apothecia discoid to turbinate, purplish | <i>Ascocoryne</i> |
| 5 | Apothecia discoid, sessile, turbinate or stalked; ectal excipulum mostly a textura prismatica oriented parallel to the surface; medullary excipulum gelatinous; asci with croziers, apical ring of <i>Hymenoscyphus</i> type; spores sometimes slightly rough | <i>Ombrophila</i> |
| 5 | Apothecia erumpent, turbinate, purplish-brown; asci l-; spores ellipsoid, becoming septate | <i>Phaeangellina</i> |

Ascocoryne J.W. Groves & D.E. Wilson

Type species: *Ascocoryne sarcoides* (Jacq.) J.W. Groves & D.E. Wilson

Lit.: Hansen & Knudsen 2000: 136, Stasinska & Sotek 2004: 61 (*A. turficola*).

- 1 Apothecia 5-40(50) mm diam., sessile or with tapering base, with convex, olivaceous brown disc, outside purplish; asci I+; spores ellipsoid, 12-14(-18)x4.5-5(-6.5) µm, aseptate; in *Sphagnum* on cyperaceous stems; phen.: VI-X
● **Ascocoryne turficola** (Boud.) Korf (1971)
 Ill.: Boud.: pl. 451, Stasinska & Sotek 2004: fig. 1-2.
- 1' On wood 2
- 2 Apothecia discoid to turbinate, 6-30 mm diam., purplish lila; asci IKI+, with croziers; spores 22-35x4.5-6.5 µm, filled with small LBs, OCI 5, overmature spores 3-5(6)-septate and budding subspherical ascoconidia 2.5-3(4)x2-2.5 µm; paraphyses multiguttulate, with slightly clavate apex. Asexual morph: unknown. Saprobic on decaying wood (*Alnus*, *Betula*, *Fagus*, *Populus*, *Quercus*, *Sambucus*, *Tilia*); phen.: IX-I.....
● **Ascocoryne cylichnium** (Tul.) Korf (1971)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 166.
- 2' Spores up to 25 µm long; with *Coryne* anamorph 3
- 3 Sexual morph: Apothecia turbinate, purplish lila to pale lilaceous brown; asci (140)160-180(230)x11-14 µm, IKI+ deep blue, with croziers; margin with moniliform end cells; spores fusiform, (17.5)20-25(27)x4.5-5.5(7) µm, with 1(2) large LBs per hemispore and many small ones, OCI 5, overmature spores 3-septate and budding spherical ascoconidia in chains; paraphyses with strongly capitate apex. Asexual morph: discoid, with allantoid conidia 4-5x1 µm. Saprobic on decaying wood of *Alnus*, *Carpinus*, *Fagus*, *Fraxinus*, *Populus*; phen.: IX-XII
● **Ascocoryne inflata** D.E. Wilson
- 3' Spores up to 20 µm long; paraphyses not strongly capitate 4
- 4 Sexual morph: Apothecia turbinate, solitary or fasciculate, 4-10 mm diam., purplish; asci IKI+ first blue then dirty violet red, 130-190x9.5-11 µm, with croziers; spores *(12)14-21(24) x4-5.5 µm, 0(1-3)-septate, with a large LB per hemispore and several small ones, OCI 5, budding ellipsoid ascoconidia in chains; paraphyses tips not or slightly clavate; mostly in company of anamorph. Asexual morph *Coryne dubia* with narrow clavate conidiophores and allantoid conidia 3-4.5x1-1.3 µm; saprobic on mainly deciduous wood (*Alnus*, *Betula*, *Corylus*, *Fagus*, *Picea*, *Pinus*, *Populus xcanadensis*, *Prunus*, *Quercus rubra*, *Salix*, *Sorbus*); phen.: (VII)IX-II
● **Ascocoryne sarcoides** (Jacq.) J.W. Groves & D.E. Wilson (1967)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 167.
- 4' Sexual morph: Apothecia turbinate, with brownish hymenium; asci with croziers; spores *(11)12-17(20)x4-4.5 µm, 0(1)-septate, with two large and many small LBs, OCI 5. Asexual morph *Coryne albida* with globose stipitate conidio-phores and slightly allantoid conidia 3-3.8x1-1.3 µm; saprobic on wood of *Fagus*, *Sorbus*; phen.: VIII-XI
● **Ascocoryne albida** (Berk.) Seifert (2014)

Ascotremella Seaver

Type species: *Ascotremella faginea* (Peck) Seaver
 Lit.: Hansen & Knudsen 2000: 136.

- 1 Apothecia cerebriform, purplish brown; asci simple-septate, apical ring I+; ectal excipulum of vertically oriented broadly terminating hyphae; spores ellipsoid, 6-10x3.5-4.5 µm, finely longitudinally striate ornamented; anamorph habitat similar, conidia obconical with truncate base and 6.5-9.5x3-5 µm, conidiophores 15-35x5 µm; lignicolous (*Alnus*, *Carpinus*, *Corylus*, *Fagus*, *Sambucus*); phen.: (VI)IX-XII
● **Ascotremella faginea** (Peck) Seaver (1930)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 165, Ellis & Ellis 1985: fig. 2.

Chloroscypha Seaver

Type: *Chloroscypha seaveri* Rehm ex Seaver.

Lit. : Seaver 1951: 100 (sub *Kriegeria*), Gremmen 1954: 9 (sub *C. cryptomeriae*), Dennis 1964b: 34 (*C. alutipes*), Petrini 1982: 206 (key), Baral & Krieglsteiner 1985: 106, Engel & Hanff 1988: 35.

Apothecia sessile to stipitate, up to 5 mm diam., mostly yellowish green, blackish when dry; spores fusiform, more than 20 µm long; paraphyses embedded in a greenish matrix; parasitic/saprobic on leaves of conifers.

- 1 Apothecia 0.3-0.4 mm diam., stipitate, brown; asci 133-152x19-27 µm, I-; spores 27-30x7.5-11.5 µm, aseptate, hyaline; ?parasitic on leaves of *Thuja*, *Chamaecyparis obtusa* and *Cryptomeria japonica*; phen. : II-IV (BE/F, NL)
○ **Chloroscypha seaveri** Rehm ex Seaver (1931)
- 1' Apothecia olivaceous ; on needles and twigs of *Juniperus* 2
- 2 Apothecia up to 1-2 mm diam., stipitate, yellow olive to black-olive; asci 100-135x16.5-20 µm, I+, IKI first blue-grey then red-violet, with croziers; spores naviculate, 23.5-29x6.5-8.5 µm, with 2(4) large and many small guttules, OCI 5, hyaline; paraphyses tips with 2-3 short cells, 2-3 µm diam., embedded in a yellowish gel; saprobic on still attached needles and twigs of *Juniperus sabina*; phen.: IX-XI(I) (BE/F)
○ **Chloroscypha alutipes** (W. Phillips) Dennis (1964)

Ill. : Dennis 1964b: fig. 5.

- 2' Apothecia 0.3-0.5 mm diam., shortly stalked, yellow olive to black-olive; asci 90-160x14-20 µm, IKI- or only upper porus part slightly blue, with croziers; spores ellipsoid to ovoid, mostly with rounded ends, 20-26x9-10(11) µm, with many small guttules, OCI 5, hyaline; saprobic on still attached needles and twigs of *Juniperus communis*, *J. nanus* and *J. sabina*; phen.: VIII-IV (NL) **Chloroscypha sabinae** (Fuckel) Dennis (1954)
 Ill.: Dennis 1978: fig. 18A.

Neobulgaria Petr.

Type species: *Neobulgaria pura* (Pers.) Petr.

Lit.: Medardi 2006 : CXXXIV (key).

- 1 Ascomata as a larger collective fruitbody, pale lilac; spores 6.5-9x3.5-4.5 µm; saprobic on decaying wood of *Fagus*;

 • **Neobulgaria pura var. foliacea** (Bres.) Dennis & Gamundí
 According to a type study, *Neobulgaria pura var. foliacea* is partly *N. pura*, partly *A. faginea* (Baral, ined.).

Neobulgaria premnophila Roll-Hansen & H. Roll-Hansen

Neobulgaria undata (W.G. Sm.) Spooner & Y.J. Yao (1995)

Ombrophila Fr.

Typus: *Ombrophila violacea* (Hedw.) Fr.

Lit.: Martin-Sans 1933: 134 (sub *Coryne janthina*), Baral 1999: 50 (*O. hemiamyloidea*), Baral (unpublished key),

Dougoud 2006: 90.

Asci mostly with amyloid apex (*Hymenoscyphus*-type), with croziers; spores sometimes slightly roughened; ectal excipulum mostly a textura prismatica oriented parallel to the surface; medullary excipulum of textura intricata, with or without gel.

- 1 Spores more than 18 µm long 2
 1' Spores up to 18 µm long 5
- 2 Spores (14)19-30(33)x3.3-4.2 µm, straight, naviculiform, multiguttulate (mainly low-refractive VBs!), 0(1)-septate; apical ring large, except for a_s deep blue in IKI; apothecia with short to long stalk; graminicolous, cypericolous (*Eriophorum*, *Carex*), *Typha*; phen.: IX-X **Ombrophila pileata** (P. Karst.) P. Karst. (1870)
 2' Spores more than 4.5 µm diam. 3
- 3 Asci hemiamyloid; apothecia white, 3-4 mm diam.; spores (19.5)20.5-25(28.5)x(4.5)5-6(7.5) µm, 3-septate; paraphyses with clavate apex; medulla with many crystals; on soaked wood of *Carpinus*, *Fagus* and *Fraxinus*; phen.: X-XII **Ombrophila hemiamyloidea** Baral & Gminder (1999)
 3' Asci amyloid 4
- 4 Spores ellipsoid, 12-15x5-6 µm, aseptate, with a few minute guttules; asci 100-110x10-12 µm; apothecia 5-8 mm diam.; saprobic on decaying needles of *Larix decidua*; phen.: ? **Ombrophila morthieriana** Rehm var. **morthieriana**
 4' Spores ellipsoid-fusoid, (16)18-23.5(25.5)x5-6(6.5) µm, eguttulate, overmature spores 1-2(3)-septate and forming short stipelets budding terminally microconidia 2-2.5 µm diam.; asci 15-175x12-15 µm; apothecia 2-8.5 mm, stipitate; saprobic on decaying needles of *Larix decidua*; phen.: VIII-X **Ombrophila morthieriana** Rehm var. **megalospora** Bres. (1920)
 Ill.: Dougoud 2006: 92, Pl. 1 & 2.
- 5 Spores up to 3 (3.5) µm broad 6
 5' Spores min. 3.5 µm broad 11
- 6 Spores mostly over 9 µm long, 2-3µm broad; apothecia pale grey (violet), often long-stalked; graminicolous 7
 6' Spores up to 9 µm long, 2.6-3 µm broad; apothecia distinctly violet; lignicolous, conicolous..... 8
- 7 Spores straight to slightly curved, dimorphic: 9.5-13.5x2.2-2.7 µm and with OCI 4, or only 6.5-11x2-2.3 µm with OCI 0-2 (in same apothecium, in different asci); saprobic on Graminaea (*Glyceria*, *Phalaris*, *Phragmites*) in mud; phen.: VI-VII(XI) • **Ombrophila**
 7' Spores strongly sickle-shaped curved, 13-18x2-2.5 µm; saprobic on monocotyls (*Carex*, *Typha*); phen.: IX-XI
 **Ombrophila lacustris** Velen. (1934)
- 8 Spores oblong, 7-8(9)x2.6-3 µm; medulla without gel, (text. intricata with few intercellular space, hyphae 5-7 µm broad); asci nearly IKI-; apothecia short-stalked; conicolous (*Pinus*); phen.: V-VII, XI-XII (BE/F)
 • "**Cudoniella**" **rubicunda** (Rehm) Dennis (1964)
- 8' Spores ellipsoid, 5-7x2.7-3.5 µm 9

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- 9 Medulla very gelatinous (extremely much intercellular space, hyphae 1-3 µm broad); spores (4.5)5-6.5(7.5)x2.7-3.2 µm; apothecia often longstalked; conicolous (*Picea*); phen.: VI-IX ● **Ombrophila janthina** P. Karst. (1869)
 Ill.: Breitenbach & Kränzlin 1981: pl. 160.
- 9' Medulla little gelatinous, basally with abundant crystal nests; spores c. 6-7x3-4 µm; apothecia subsessile; conicolous, corticolous, lignicolous (*Alnus*, *Fagus*, *Populus*, *Salix*); phen.: VI-IX (BE, CH) ● **Ombrophila ?janthina** P. Karst. (1869)
- 11 Spores 7-9(11) µm long 12
- 11' Spores 9-18 µm long 16
- 12 Medulla without gel; apothecia always without crystals, subsessile, max. 1.5 mm large, violet or white 13
- 12' Medulla very gelatinous, apothecia violet 14
- 13 Apothecia white, completely free of gel; spores 7-10x3.5- 4.3 µm, with 2 medium large LBs; ascus apex distinctly blue in IKI; conicolous (*Picea*); phen.: VI ● **Ombrophila tetracladia** (Abdullah, Descals & J. Webster) Baral (1985)
- 13' Apothecia with violet/lila tint, much gel in ectal excipulum (innermost zone & covering layer, and in "subiculum"), 0.5-2 mm diam.; spores 7-10(12)x3-5(5.5) µm, often slightly warted, with 2 large and mostly several small LBs; ascus apex faintly blue or negative in IKI; with anamorph forming small whitish hills, conidia 4.5-5x1.4 µm, bean-shaped, few minute LBs near each end; saprobic on very rotten wood of *Acer*, *Alnus*, *Betula*, *Fagus*, *Picea*, *Pinus*, *Salix*; phen.: IX-XII (BE/F, BE/W) ● **Ombrop**
 Ill.: Raitviir & Huhtinen 2002: fig. 9.
- 14 Apothecia 10-27 mm broad and tall, sessile; spores 7.5-9.5x4.5-5 µm, with 2 large (ca. 2 µm) LBs, wall in CRB not staining; ascus apex in IKI strongly blue except for apex; saprobic on decayed wood and bark; phen.: VII-XII
 ● **Ombrophila pura** (Pers.) Qué. (1886)
 Ill.: Breitenbach & Kränzlin 1981: pl. 163.
- 14' Apothecia less than 10 mm diam.; spore wall deep violet in CRB 15
- 15 Apothecia 0.7-7 mm broad, strongly convex, subsessile; spores *6.5-9x3.5-4.5 µm, with 2 medium large (ca. 1-1.5 µm) and several small LBs, surface deep violet in CRB; asci 90-110x7.5-8.5 µm, apex in IKI medium strongly blue (only the a_i); saprobic on strongly decayed wood (*Fraxinus*) in wet places; phen.: X ● **Ombrophila convexa** Baral nom. prov.
- 15' Apothecia 1-8 mm diam., slightly convex, subsessile to long stalked; spores *7.5-10(11)x4-4.5 µm, † 7-9x3.5-4 µm, with 2 medium large (ca. 1-1.5 µm) and several small LBs, surface deep violet in CRB; asci 75-92(105)x8-10 µm, apex in IKI medium strongly blue (only the a_i); lignicolous (*Alnus viridis*), foliicolous, conicolous (*Picea*, *Pinus*); phen.: VI-X
 ● **Ombrophila violacea** (Hedw.) Fr. (1849)
 Ill.: Breitenbach & Kränzlin 1981: pl. 161.
- 16 Medulla very gelatinous (hyphae only 1-5 µm broad) 17
- 16' Medulla not to faintly gelatinous (±well cuttable, hyphae 2-10-20 µm broad, apothecia very faintly pigmented) 22
- 17 Ascus apex in IKI a_i strongly blue, a_m faintly, a_s neg. 18
- 17' Ascus apex fully strongly blue in IKI 21
- 18 Apothecia (sub)sessile, lila, Pezizales like; spores 10.5-16(17.5)x4-6 µm, with several minute ones LBs per half, with inconspicuous mucous coating; in wet places on soil or plant debris; phen.: VI-XI
 ● **Ombrophila cf. limosella** (P. Karst.) Rehm (1881)
- 18' Apothecia distinctly stalked, habitus of a typical Ombrophila 19
- 19 Spores 9.5-12.5(14)x3.8-4.5(5) µm, with several minute to medium large LBs, stipe base with "gel shoe"; conicolous (DE) .
 ● **Ombrophila "Eigenried"** Baral nom. prov.
- 19' Spores 9.5-12(14)x4.3-5.2(5.5) µm, with some minute LBs, stipe base ?without "gelshoe"; detritus of Cyperaceae, etc.; phen.: VIII ● **Ombrophila "cypericola"** Baral nom. prov.
- 19 Apothecia 2.5-8 mm diam., sessile, translucent white to pale greyish, base wrapped in a gelatinous gangue; asci 105-115(125)x9-10.5, IKI -; spores ellipsoid-ovoid, 9.5-11.5(13)x4.5-5 µm, with many small LBs at both poles OCI 3-4; saprobic on *Betula* leaves in peat-bogs; phen.: VI (BE/W, FR)
 ● **Ombrophila obstricta** (P. Karst.) P. Karst. (1871)
- 21 Spores 12-14x3.7-5.2 µm, with several minute LBs, germinating with lageniform conidiophores, which form phialidic ±globose microconidia; apothecia with crenulate margin ● **Ombrophila "cicerbitae"** Baral nom. prov.
- 21' Spores 10.5-13.5x4-5 µm, with several small and medium large LBs, not germinating; lignicolous, cupulicolous (*Fagus*); phen.: VIII-XI ● **Ombrophila "fagiseda"** Baral nom. prov.
- 22 Apothecia very pale flesh-rose, 1-8 mm large; spores dimorph: 15-18.5x4.2-4.8 µm, OCI 4-5, guttules large, or 12-16x3.5-4.2 µm, OCI 2, 0(1)-septate, forming short stipelets (without conidiophore) budding terminally microconidia; abundantly yellowish oxalate druses in medulla; lignicolous (*Salix*), caulicolous (*Polygonum*), on petiole of *Salix* sp.; phen.: V-VII (Velen.: soil) ● **Ombrophila cf. rivulorum** Velen. (1934)
 Ill.: Rubio & al. 2010: p. 248.

22' Apothecia white, 0.3-2(3.5) mm diam., stalked; spores 12-16(18)x4.5-5.5 µm, with some small LBs at both poles (OCI 2); on water-soaked leaves foliicolous (*Fagus*, *Quercus*, *Picea*), water-soaked stem of *Rubus fruticosus* agg. ; phen.: IX-XI (BE/F) ● **Ombrophila translucens** (W.L. White) Baral (1985)

Phaeangellina Dennis

Type species: *Phaeangellina empetri* (W. Phillips) Dennis
 Lit.: Dennis 1978: 128.

1 Apothecia erumpent, turbinate, up to 0.5 mm diam., hymenium dark olive, receptacle dark purplish-brown and sometimes vertically ridged; asci up to 160x20 µm, I-; spores ellipsoid, 17-21x9-12 µm, guttulate, overmature spores dark brown and 1-septate; saprobic on leaves of *Empetrum* still attached to the plant; phen.: VIII-IX
 ● **Phaeangellina empetri** (W. Phillips) Dennis (1955)
 Ill.: Dennis 1978: fig. XIXJ.

Xerombrophila Baral

Type species: *Xerombrophila crystalliferum* Baral, G. Marson & Unter.
 Lit.: Baral & al. 2012: ?.

1 Apothecia cyathiform, densely crowded, disc concave to plane, 1-2 mm diam., pale ochraceous yellow, outer surface whitish pruinose (crystals), shortly stalked; asci 100-110x9 µm, arising from croziers, IKI bb; spores fusiform, inequilateral, (0)1(2)-septate, 12-19x3.7-4.5 µm, with many small refractive guttules, OCI = 4 (guttulation disappearing when becoming septate); erumpent from bark of *Salix caprea* branches still attached to the tree; phen.: I-VII(X) (BE/W, DE) ● **Xerombrophila crystalliferum** Baral, G. Marson & Unter. (2012)

GODRONIACEAE Baral

Lit.: Jaklitsch et al. 2016: 166.

Sexual morph: Apothecia 0.3-3.5 mm in diam., urceolate to saucer-shaped; hymenium pale to dark grey or cream, opening in the mesohymenial phase; margin strongly protruding, partly hairy, exterior often furfuraceous-tomentose or ribbed, rusty- to greenish- or blackish-brown; sessile or with short stalk, partly arising from a common base (stromatic), erumpent. Ectal excipulum at least near margin of hyaline to yellow-ochre textura oblita or dark brown t. prismatica, at base and flanks also textura angularis; medullary excipulum of reddish- to dark olive-brown textura prismatica-porrecta, subhymenium hyaline; without crystals, exudate in KOH often releasing a yellow-brown, rarely bluish-green pigment. Paraphyses filiform, apically often slightly inflated, without VBs, partly granular-encrusted by ochraceous, pinkish, or bluish exudate. Asci with hemispherical to conical apex with amyloid apical ring (*Calycina*-type) or inamyloid, with croziers. Ascospores 8 per ascus, ellipsoid to fusiform or clavate to vermiform or filiform, 0-7-septate, without sheath, lipid content low to rather high.

Asexual morph: coelomycetous, stromatic, yellowish to blackish-brown, roundish to conical or discoid, uni- or multi-locular; conidiogenesis phialidic; conidia ellipsoid to fusoid or vermiform, straight or falcate or helicoid, 0-7-septate.

Habitat: Parasitic on bark of woody gymno- and angiosperm plants, rarely monocots, desiccation-tolerant. Northern Hemisphere, temperate to subarctic-alpine.

Genera belonging to this family:

1. *Ascocalyx* Naumov
2. *Atropellis* Zeller & Goodd.
3. *Godronia* Moug. & Lév.
4. *Gremmeniella* M. Morelet
5. *Grovesiella* M. Morelet

Key to the genera:

- 1 Apothecia erumpent, cup-shaped to urnulate, outside mostly dark brown to black, mostly with basal stroma; ectal excipulum of textura oblita; asci I+; spores fusiform, clavate or filiform, 1-7-septate; angiosperm-inhabiting, +/- parasitic *Godronia*
- 1 Species conifericolous, pathogens causing brach cankers and dieback of young shoots 2
- 2 Apothecia with a stroma; asci I-; ascospores narrowly ellipsoid to fusiform, hyaline; conifericolous. Asexual morph: Conidiomata pycnidial to apothecioid. Conidia hyaline, lunate to falcate or cylindrical, with obtuse apex and truncate base, septate, smooth-walled *Ascocalyx*
- 2' *Gremmeniella*
- 2" Apothecia superficial on an erumpent stroma; ascospores filiform, multiseptate, hyaline; parasitic on twigs of *Abies* *Grovesiella*

Ascocalyx Naumov

Type species: *Ascocalyx abietis* Naumov

Lit.: Schläpfer-Bernhard 1969.

- 1 Stroma poorly developed; apothecia 0.5-0.7 mm diam., sessile to shortly stalked; asci 70-110x8.5-10.5 µm, J-; spores 14-23x4-4.5 µm, 0(3)-septate. Asexual morph: Conidia falcate, 3-septate, hyaline. Saprobitic on twigs of *Abies*. Phen.: VI-IX (ES, CH, SE) **Ascocalyx abietis** Naumov (1925)

Godronia Moug. & Lév.

Type species: *Godronia muehlenbeckii* Moug. & Lév.

Lit.: Groves 1965: 1195, Hansen & Knudsen 2000: 148.

- 1 Most spores >60 µm long 2
- 1' Most spores <60 µm long 5
- 2 On *Ribes* 3
- 2' On other hosts 4

- 3 Apothecia erumpent solitary or in clusters from a common stroma, shortly stipitate, cupulate, 0.5-1.5 mm diam., dark olive brown; asci 100-165x7.5-9.5 µm; spores 60-84x2-3 µm, 3-7-septate; anamorph *Topospora* forming pycnidia with 3-septate conidia 17-22x3-3.5 µm; saprobic on twigs of *Ribes nigrum*, *R. rubrum*; phen.: IV-VII **Godronia uberiformis** J.W. Groves (1965)
- 4 Apothecia erumpent solitary or in clusters from a common stroma, sessile to shortly stipitate, cupulate, 0.5 mm diam. by 1 mm high, hymenium grey, outside black with rusty tinge; asci 120-145x8-9 µm; spores 53-91x2-3.5 µm, becoming 7-septate; saprobic on twigs of *Salix aurita*, *Salix caprea*; phen.: V-VIII • **Godronia fuliginosa** (Pers.) Seaver (1945)
- 4 Apothecia erumpent solitary or in clusters from a well developed stroma, cupulate to urceolate, 0.5-1 mm diam., hymenium whitish to grey, outside reddish brown to olive brown; asci 86-122x7-9 µm; spores 54-80x1.5-2.5 µm; saprobic on various twigs, preferably of Ericaceae (*Calluna*, *Vaccinium*); phen.: IV-VI **Godronia cassandrae** Peck (1887) [1886]
- 4' Apothecia erumpent solitary or in clusters, becoming cupulate, 0.5-1.5 mm broad and high, dark greenish olive to olivaceous brown; asci 90-130x6-8 µm; spores 50-75x1.5 µm, multiseptate; saprobic on *Betula* and *Alnus*; phen.: IV-VII • **Godronia urceolus** (Alb. & Schwein.) P. Karst. (1885)
- 5 On *Ribes* or *Viburnum* 6
- 5' On Ericaceae 7
- 6 Apothecia erumpent from a common stroma, becoming cupulate, 0.5-2 mm diam., 1-3 mm high, hymenium yellowish to greyish Brown, outside very dark brown to black; asci 110-166x7-9 µm, IKI b; spores clavate, 23-42x3-5 µm, 3-5-septate; saprobic on twigs of *Ribes spp.*; phen.: I-XII • **Godronia ribis** (Fr.) Seaver (1945)
- III.: Dennis 1978: XXIIa, Breitenbach & Kränzlin 1981: Pl. 205.
- 6' Apothecia erumpent from a common stroma, becoming cupulate, 0.4-0.6 mm diam., 0.7-1 mm high, outside very dark brown to black; asci 93-120x7.5-10 µm; spores 47-60x2-3 µm, 3-7-septate; saprobic on dry twigs of *Viburnum*; phen.: VIII-IX **Godronia viburni** (Fuckel) Rehm (1891)
- 7 On *Vaccinium* 8
- 7' On *Andromeda*, *Calluna* or *Empetrum* 9
- 8 Apothecia 0.5-1 mm diam., 0.3-0.4 mm high, outside reddish brown to blackish brown; asci 83-91x7-8 µm; spores 14-21x3-4 µm, 0-3-septate; saprobic on leaves and twigs of *Vaccinium vitis-idaea*; phen.: ? **Godronia foliicola** Schläpf.-Bernh. (1969)
- 8' Apothecia becoming cupulate, shortly stipitate, up to 1 mm broad and high, hymenium grey, outside blackish, striate; asci to 80x8 µm; spores 28-44x1.5-2.5 µm, 3-septate; saprobic on fruits and twigs of *Vaccinium myrtillus*, *Vaccinium uliginosum*; phen.: VI-VII **Godronia urceoliformis** (P. Karst.) P. Karst. (1885)
- 9 Apothecia cupulate, sessile to substipitate, about 0.4 mm broad and high, hymenium grey, outside dark brown to blackish; medullary excipulum not reaching the substratum; asci 80-90x8-11 µm; spores 48-63x2 µm, 3-7-septate; saprobic on twigs of *Empetrum nigrum*; phen.: ? **Godronia empetri** B. Erikss. (1970)
- 9' Medullary excipulum reaching the substratum in the central parts; on twigs of *Adromeda* and *Calluna* 10
- 10 Apothecia short stipitate, 0.4-0.8 mm broad and high, hymenium grey, outside olivaceous to dark brown with black stripes; asci 75-110x6-10 µm; spores 44-55x2.5-4 µm, becoming 5-septate; saprobic on twigs of *Adromeda polifolia*; phen.: V **Godronia adromedae** P. Henn. (1901)
- 10' Apothecia pyriform, erumpent solitary or rarely in small clusters from a common stroma, opening by a pore to become deeply cupulate, 0.5-0.7 mm diam., about 0.5 mm high, hymenium greyish to whitish, outside reddish brown to blackish; asci 90-108x7-9 µm; spores slightly curved, 32-62x2-3 µm; saprobic on twigs of *Calluna vulgaris*; phen.: X, III **Godronia callunigera** (P. Karst.) P. Karst. (1970)
- Apothecia urceolate; spores narrow ellipsoid, 11-15x2.5-3.5 µm, 0(1)-septate; phen.: VI **Godronia rosae** Schläpf.-Bernh. (1969)
- III.: Ascofrance.

Gremmeniella M. Morelet

Type species: *Gremmeniella abietina* (Lagerb.) M. Morelet.

Syn.: *Lagerbergia* J. Reid, anam. *Brunchorstia* Erikss.

Lit.: Groves 1969: 1324 (sub *Encoeliopsis laricina*), Dennis 1971: 350 (sub *Lagerbergia abietina*), Hansen & Knudsen 2000: 150.

- 1 Apothecia cupulate, 0.5-1 mm diam., single or caespitose erumpent, sessile or very shortly stipitate, brownish black; asci 80-125x7.5-10.5 µm; spores ellipsoid to subclavate, 14-20x3.5-5 µm, 2-3-septate; anamorph

Brunchorstia pinea; parasitic on seedlings, young trees of *Pinus* sp. and branches of *Pinus austriaca*, *P. contorta*, *P. sylvestris*; phen.: I-X **Gremmeniella abietina** (Lagerb.) M. Morelet (1969)
 Ill. : Dennis 1971 : fig. 15.

1' Apothecia mostly scattered, cupulate to discoid, almost sessile, about 1 mm diam., hymenium greyish; outside cinnamon brown, later dark brown; asci 70-100x9-10 µm; spores clavate, 18-20x4 µm, 3-septate; saprobic on needles of *Juniperus*; phen.: ? **Gremmeniella juniperina** K. Holm & L. Holm (1977)

1" Apothecia erumpent, single or in clusters, 0.5-1 mm diam., dark reddish brown to black, hymenium plano-concave and greyish; asci (70)85-115x7.5-10 µm, I-; spores fusoid, (10)12-18(23)x(3.5)4-5 µm, 1-septate, hyaline; accompanied by anamorph with fusoid conidia 0-1(3)-septate and (12)14-20(21)x3.5-4.5 µm; on *Larix*; phen.: VII-VIII
 **Gremmeniella laricina** (Ettl.) Petrini, L.E. Petrini, Lafl. & Ouell. (1989)
 Ill.: Groves 1969: fig. 22 & 24.

Grovesiella M. Morelet

Type species: *Grovesiella abieticola* (Zeller & Goodd.) M. Morelet & Gremmen

Lit.: Seaver 1951: 332 (sub *Godronia abieticola*).

1 Apothecia sessile on an erumpent stroma, cupulate to expanded, 0.5-1.2 mm diam., nearly black, with a membranaceous margin; asci 110x10 µm, IKI-; spores hyaline, 40-61x2.5-3.2 µm, mostly 7-septate; ectal excipulum consisting of dark brown, mostly globose cells; parasitic on cankers on living branches and twigs of *Abies alba*; phen.: IV-V **Grovesiella abieticola** (Zeller & Goodd.) M. Morelet & Gremmen (1969)

HAMATOCANTHOSCYPHACEAE Ekanayaka & K.D. Hyde 2019

Lit.: Ekanayaka et al. 2019: 322.

Saprobic or parasitic.

Sexual morphs: Ascomata apothecial, cupulate or discoid, sessile, rarely stipitate, erumpent. Ectal excipulum reduced or composed of cells of textura intricata or textura prismatica. Medullary excipulum composed of cells of textura intricata or textura prismatica, paraphyses, filiform, slightly swollen at the apices. Asci 8-spored, non-amyloid, cylindrical-clavate, sometimes arising from croziers. Ascospores ellipsoid to fusoid, hyaline, 0–1-septate.

Asexual morphs: Conidiomata hyphomycetous, sporodochial. Conidiogenesis phialidic, proliferating sympodially. Conidia hyaline, ellipsoid, fusoid to cylindrical, mostly 0–1-septate.

Genera belonging to this family:

1. *Brachyalara* Réblová & W. Gams
2. *Chalara* (Corda) Rabenh.
3. *Ciliolarina* Svrček
4. *Curviclavula* G. Delgado, F.A. Fernández & A.N. Mill.
5. *Gremmenia* Korf
6. *Hamatocanthoscypha* Svrček
7. *Hyalodendriella* Crous
8. *Infundichalara* Réblová & W. Gams
9. *Microscypha* Syd. & P. Syd.
10. *Pseudohelotium* Fuckel
11. *Xenochalara* M.J. Wingf. & Crous
12. *Xenopolyscytalum* Crous

Key to the genera in this family:

- | | |
|--|---------------------------|
| 1 Hairs short, strongly curved | <i>Hamatocanthoscypha</i> |
| 1' Hairs otherwise or none | 2 |
| | |
| 2 Ectal excipulum reduced; apothecia erumpent, apothecial roof bursting teeth-like; causing snow-blight on conifers; foliicolous | <i>Gremmenia</i> |
| 2' Ectal excipulum of textura prismatica pale to dark brown | 3 |
| | |
| 3 Apothecia sessile to stalked ; white | <i>Pseudohelotium</i> |
| 3' Ectal excipulum pale to dark brown | 4 |
| | |
| 4 Hairs mainly cylindrical | <i>Microscypha</i> |
| 4' Hairs cylindrical to clavate, tips loosely roughened in MLZ | <i>Ciliolarina</i> |

Key to the asexual genera of this family:

- | | |
|--|--------------------|
| 1 Conidiomata hyphomycetous | 2 |
| | |
| 2 Conidiomata pale brown, septate, simple, seldom branched at the base on the host, with frequent sympodial proliferation in vitro. Conidiogenous cells phialides, subhyaline to pale brown, ampulliform, gradually tapering towards the collarete. Conidia hyaline, smooth-walled or finely verruculose, ellipsoidal to obovoidal, truncate at the base, in long chains. Chlamyospores absent. | <i>Brachyalara</i> |
| 2' Conidiomata pale brown, septate or not. Colonies white when mature (due to the conidia). Conidiogenous cells phialides, mostly pale brown, ampulliform, with a cylindrical collarete. Conidia mostly cylindrical, catenate, hyaline, smooth-walled | <i>Chalara</i> |

Chalara (Corda) Rabenh.

Type species: *Chalara fusidioides* (Corda) Rabenh.

Lit.: McKenzie et al. 2002: 129 (*Chalara* key)

- | | |
|--|--|
| 1 Conidia one-celled | 2 |
| 1' At least some conidia septate | 8 |
| | |
| 2 Colonies effuse, hairy, inconspicuous. Conidiophores micronematous or absent. Conidiogenous cells ampulliform, smooth, pale brown, composed of a subglobose venter 3.5-5 µm diam. and a cylindrical collarete 5.5-8 µm long , 1.4-1.6 µm diam. Conidia catenate, cylindrical, 4-6x0.8-1.2 µm, smooth, hyaline, <u>formation holoblastic</u> . On cones of <i>Pinus</i> . Phen.: V (UK) | Chalara dennisii P.M. Kirk (1986) |
| 2' Conidiophores rarely consisting of more than a single stalk cell and/or a phialide | 3 |

2"	Conidiophores mostly consisting of more than one stalk cell and phialide	6
3	Sexual morph unknown. Asexual morph: Layer of sterile filaments, rarely visible. Phialides brown, erect, widened at the base, 1-septate, 35-40x5-6 µm; conidia acrogenous, cylindrical, with both ends clearly truncate, 10-12x2 µm, aseptate, hyaline. On needles of <i>Pinus nigra subsp. austriaca</i> . Phen.: ? (FR)	
	Chalara austriaca (Fautrey & Lamb.) Nag Raj & W. B. Kendr. (1975)	
3'	Conidia endogenous	4
4	Phialides lageniform, formed directly on the vegetative hyphae, light brown, smooth, gradually tapering towards the collarete, (11)13-19.5(23) µm long; venter subcylindrical to subconical, 11-16.5 µm long and 2.5-3.5 µm wide; collarete cylindrical, light brown, 3.5-6.5 µm long and 1.5-2 µm wide, transition from venter to collarete abrupt. Proliferation was not observed. Conidia mostly clavate with obtuse ends, 4-5.5x1-2 µm, 1-septate, hyaline. Synanamorph with fusiform conidia, produced in chains directly from the vegetative hyphae, thin-walled, hyaline, 0-3-septate, (10) 14-26(36)x(1.5)2-3 µm. In green needles still attached to wind-fallen trees of <i>Picea abies</i> . Phen.: VI (CZ)	
	Chalara holubovae Koukol (2011)	
4'	Conidia longer	5
5	Colonies effuse, pale yellowish. Conidiophores mostly without stalk cells, Phialides 12-25 µm long, with 4-8 µm wide base and 1.5-3 µm wide neck. Conidia catenate, cylindrical, 5-8x1;5-2.5 µm; aseptate, hyaline. On dead leaves of <i>Pinus nigra var. maritima</i> and <i>Pinus sylvestris</i> . Phen.: ? (UK)	
	Chalara fusidioides (Corda) Rabenh. (1844) Ill.: Ellis & Ellis 1985: fig. 769.	
5'	Conidiophores with 0-2 stalk cells, light greenish gray, smooth, (25)28.5-39(48) µm long and 3.5-5 µm wide. Phialides lageniform, straight or slightly bent, light brown, smooth, gradually tapering towards the collarete, (14.5)18.5-30(33) µm long and 3.5-5 µm wide. Venter cylindrical, (14.5)17-24.5(27.5)x3-5 µm, collarete 7.5-10x2-2.5 µm wide, its first two-thirds are cylindrical and light greenish-gray, and the last third is hyaline with slight tapering. Proliferation was not observed. Transition from venter to collarete abrupt. Conidia catenate, cylindrical with rounded ends, rarely clavate, one-celled, hyaline, 4.5-7.5(9.5)x1.5-2.5 µm. Conidia sometimes connected with connectives 0.5-1 µm long. On needles of <i>Picea abies</i> . Phen.: X (CZ, DE)	
	Chalara hyalocuspica Koukol (2011)	
5"	Colonies effuse, hairy, inconspicuous. Conidiophores pale brown, with cylindro-ellipsoid venter 10-16x6-8 µm and a cylindrical neck 16-22x2.5-3 µm. Conidia catenate, cylindrical with truncate ends, one-celled, hyaline, 7-11x2-2.5 µm. On <i>Hydnum</i> , dead leaves of <i>Laurus</i> , <i>Quercus</i> , <i>Rhododendron ponticum</i> , dead wood of <i>Fagus</i> . Phen.: XI-XII (BE/F, IT)	
	• Chalara fungorum (Sacc.) Sacc. (1877)	
6	Colonies effuse, creamy. Conidiophores 30-80 µm long, mostly only 50 µm long, composed of a short stalk cell and a phialide, pale brown. Phialides with 6-7 µm wide venter and 2-2.5 wide neck. Conidia catenate, 6-18x1.5-2.5 µm (Sacc.: 10-12x2 µm), aseptate, smooth, hyaline. Common on leaf litter of <i>Aesculus</i> , <i>Alnus</i> , <i>Fagus</i> (incl. cupules), <i>Pinus</i> and <i>Quercus</i> (incl. cupules). Phen.: X-VII. (BE/F, UK)	
	Chalara affinis Sacc. & Berl. (1885) Ill.: Ellis & Ellis 1985: fig. 545.	
6'	Colonies blackish brown, hairy. Conidiophore stipes up to 135x4-6 µm. Phialides lageniform, 22-40 µm long, with 6-7 µm wide base and 2-3 µm wide cylindrical neck. Conidia cylindrical, 4-11x1-1.7 µm, aseptate, hyaline. On dead wood, cupules of <i>Fagus</i> , <i>Picea</i> and <i>Pinus</i> . Phen.: X-II (CZ, UK)	
	Chalara cylindrosperma (Corda) S. Hughes (1958) Ill.: Ellis 1971: fig. 364D, Ellis & Ellis 1985: fig. 546.	
8	Conidia 2-celled	9
8'	Conidia multicelled	16
9	Conidiophores never consisting of more than a single stalk cell and/or a phialide	10
9'	Conidiophores mostly consisting of one or more stalk cells and phialide	12
10	Conidia 0-1-septate	11
10'	Conidia 1-septate	14
11	Conidia up to 2 µm diam.	12
11'	Conidia wider	13
12	Colonies orange yellow. Conidiophore stipes up to 25x5-6 µm. Phialides lageniform, 35-75 µm long, swollen base 6-7 µm wide, cylindrical neck 3 µm thick. Conidia 12-16x2 µm, 0-1-septate, hyaline. On wood of fallen branches, fruits of <i>Aesculus</i> , dead leaves of <i>Quercus suber</i> . Phen.: VII (CZ, IT, UK)	
	Chalara aurea (Corda) S. Hughes (1958) Ill.: Ellis 1971: fig. 364A.	
12'	Colonies dark brown, hairy. Conidiophore stipe up to 65x4 µm, brown. Conidia catenate, 3-6x1 µm, 0-1-septate, hyaline. On <i>Castanea</i> , <i>Picea</i> (also on dry scales) and <i>Taxus</i> leaves. Phen.: I (BE/F, UK)	
	○ Chalara cylindrica P. Karst. (1887) Ill.: Ellis & Ellis 1985: fig. 731.	
13	Colony superficial, effuse, brown, hairy. Conidiophores scattered or in small clusters. simple. erect or variously bent, cylindrical, multiseptate, brown to dark brown or reddish brown in the basal part. becoming paler above, 78-230 µm long	

- and 4.5-8 µm wide at the slightly swollen base. terminating in a phialide. Phialides 70-100 µm long, pale brown, composed of a venter narrow at the base and 8-13 µm wide at its apex, abruptly merging into a cylindrical collarette which is 3-6 µm wide. Phialoconidia catenate, cylindrical with both ends rounded or basal end alone flattened, 1-septate, hyaline. smooth. 10.5-18x2.5-4 µm. On dead stems of *Centaurea*, *Epilobium hirsutum*, *Eupatorium*, *Filipendula*, *Heracleum*, *Rumex* and *Urtica*. Phen.: IV, IX (BE/F) ○ **Chalara urceolata** Nag Raj & W. B. Kendr. (1974)
 III.: Ellis & Ellis 1985: 1276.
- 14 Colonies effuse, brown, hairy. Conidiophores often reduced to a phialide, brown, up to 60x10, with neck about 5 µm wide. Conidia catenate, 8-12x3-4 µm, 1-septate, hyaline. On fallen leaves of *Quercus borealis*. Phen.: XII
 **Chalara kendrickii** Nag Raj (1975)
 III.: Ellis & Ellis 1985: fig. 927.
- 14' Conidia up to 3 µm wide 15
- 15 Colonies effuse velvety, pale yellow or creamy. Conidiophores twisted, up to 130 µm long including a phialide with venter 6-8 µm wide and neck 2.5-4.5 µm wide, pale brown. Conidia 15-25x3 µm, 1-septate, hyaline. Uncommon, on fallen cupules of *Fagus*. Phen.: XI (BE/F) ● **Chalara spiralis** Nag Raj & W.B. Kendr. (1975)
 III.: Ellis & Ellis 1985: fig. 547.
- 15' Colony effuse, brown, hairy, covered with white masses of conidia. Conidiophores solitary or loosely aggregated, composed of phialides sessile and borne directly on mycelium or on a few-celled stalk which is 33-54 µm long and 4.5-5.5 µm wide at the base, pale brown to brown. Phialides lageniform, 25.5-48(60) µm long, composed of an ellipsoidal venter 10-16.5x5.5-7.5 µm and a cylindrical collarette 19-29.5x2-3 µm, wall smooth. Phialoconidia cylindrical, with obtuse ends, 1-septate, hyaline, smooth-walled, 12-17x2-2.5 µm; seen singly or in easily dispersible chains. On wood of *Betula*, *Viburnum*, leaves of *Quercus ilex*. Phen.: X (BE/F, UK) ● **Chalara hughesii** Nag Raj & W. B. Kendr. (1974)
 III.: Ellis & Ellis 1985: fig. 926.
- 16 Colonies widely effused, brown, thinly hairy. Conidiophore stipes up to 80x5-8 µm, brown. Phialides terminal, lageniform, 50-70x8-9 µm with neck 3-4 µm wide, subhyaline. Conidia 9-17x2-3 µm, 1-3-septate, hyaline. On dead petioles of *Pteridium aquilina*. Phen.: IV-XI (BE/F, UK) ● **Chalara pteridina** Syd. & P. Syd. (1912)
 III. Ellis & Ellis 1985: fig. 2118.
- 16' Colonies effuse, brown, hairy or velvety. Conidiophores up to 250 µm long, stalk 10-12 µm wide. Phialides 80-150 µm long, composed of a pale brown venter 12-19 µm wide and dark brown neck 8-10 µm wide. Conidia catenate, 25-48x5-7 µm, 3-7-septate, smooth, hyaline, On the inner side of bark of *Alnus*, *Corylus*. **Chalara inflatipes** (Preuss) Sacc.
 III.: Nag Rej & Kendrick 1971 : fig.2*, Ellis & Ellis 1985: fig. 486.
- Paraphyletic species! On green needles attached to wind-fallen *Picea abies*. Pen.: V-VI, XI-XII (AT, CZ, DE, FR, UK)
 **Chalara longipes** (Preuss) Cooke (1881)
- Phialides proliferating only rarely percurrently; conidia cylindrical, forming long chains. On needles of *Pinus*
 **Chalara microspora** (Corda) S. Hughes (1958)

Ciliolarina Svrček

Type species: *Ciliolarina laricina* Svrček

Lit.: Svrček 1977c: 198, Dennis 1978: 175 (sub *Cistella piceae* var. *laricinum*), Svrček 1982: 152 (*C. ligniseda*), Baral: N14, Huhtinen 1993: 93, Raitviir & Huhtinen 2002: 14.

- 1 Spores up to 7 µm long 2
- 1' Spores longer 4
- 2 Apothecia up to 1 mm diam., mostly reddening, sessile; asci 20-45x5-7.5 µm; spores 4-6.5(7)x(1.5)2-3 µm, biguttulate; saprobic on wood of *Larix decidua*, *Picea abies*; phen.: I,IV,IX
 **Ciliolarina ligniseda** (Velen.) Svrček (1982)
- 2' Apothecia stipitate, up to 0.4 mm diam. 3
- 3 Apothecia white, reddening, stipitate; asci 30-42x5.5-6.3 µm, MLZ-, arising from croziers; spores 5-6.5x1.8-2.6 µm; saprobic on *Pinus sylvestris* and *Picea abies*; phen.: IX-X **Ciliolarina laetifica** Huhtinen (1993)
 III.: Raitviir & Huhtinen 2002: fig. 1-3.
- 3' Apothecia 0,05-0.3 mm diam., stipitate; asci MLZ+, arising from croziers; spores 4-5.5x1.2-1.8 µm; hairs cylindric to clavate, tip naked or granular; saprobic on naked wood, cortex and cones of *Pinus sylvestris* and *Picea abies*; phen.: IX-X **Ciliolarina neglecta** Huhtinen (1993)
 III.: Raitviir & Huhtinen 2002: fig. 4-7.
- 4 Apothecia 0.2-0.4 mm diam., greyish white, without margin, receptacle pale brown, subsessile; asci 50-60x8-10 µm, IKI+ reddish brown; spores 8.5-11x3.5-4.5 µm, 0-1-septate, OCI 1, hyaline; ectal excipulum of pale brown textura prismatica, covered by hyaline *Cistella*-like hairs; saprobic on wood and bark of fallen branches of *Larix decidua*, *Pinus sylvestris* and *Picea abies*; phen.: IX-XII(III)..... ● **Ciliolarina laricina** (Raitv.) Svrček (1977)

Ill.: Svrček 1977c: fig. 1.6.

4' Apothecia 0.2-0.5 mm diam., sessile to subsessile, whitish to pale grey, receptacle pale brown; asci 55-85x9-12 μm , IKI-, without croziers; spores 8.5-13(15)x3.5-5(6.5) μm , 0(1-3)-septate; saprobic on bark of *Pinus sylvestris*; phen.: VIII-I • **Ciliolarina pinicola** (Henn. & Plöttner) Huhtinen (1993)

on cut branches of *Salix* sp.; phen.: XI "**Carneopezizella**" **salicicola** Svrček (1987)

Gremmenia Korf

Type species: *Gremmenia gigaspora* (Gremmen) Korf = *Gremmenia pini-cembrae* (Rehm) Crous

Lit.: Gremmen 1953: (sub *Phragmonaevia gigaspora*), Crous & al. 2014: 182.

1 Causing snow-blight of *Abies* spp. and *Pseudotsuga menziesii* **Gremmenia abietis** (Dearn.) Crous (2014)

1' Apothecia subepidermal, circular, hymenium orange; asci 70-160x14-22 μm , I+; spores 15-26x5-9.5 μm , smooth, hyaline; parasitic on needles of *Pinus cembra*, *Pinus contorta*, *Pinus sylvestris*, *Juniperus communis*; alpine-boreal; phen.: VII-IX **Gremmenia infestans** (P. Karst.) Crous (2014)

Ill.: Terrier 1942: fig. 1a-b, Crous & al. 2014: fig. 4.

1" Apothecia erumpent, 0.3 mm diam., hymenium orange-red; asci 1-4-spored, 90-100x11 μm , I-; spores 27-46x7.7-11.5 μm , 1-3(4)-septate, hyaline; saprobic on needles of *Pinus cembra*; phen.: IX-X (AT) **Gremmenia pini-cembrae** (Rehm) Crous (2014)

Hamatocanthoscypha Svrček

Type species: *Hamatocanthoscypha laricionis* (Velen.) Svrček

Lit.: Böhler 1974: 89 (sub *Hyaloscypha dryopteridis*), Huhtinen 1990: 181, Huhtinen 2001: 6.

1 Apothecia bright yellow, brown or greyish brown when fresh, alike or blackish when dry; excipular walls hyaline to clearly pigmented, brown colour not restricted to the very base of stipe 2

1' Apothecia whitish when fresh, light coloured when dry, lacking bright yellow or dark brown colours; excipular walls hyaline except for stipe base; hairs up to 30(65)x2-4 μm , uncinatate to strongly curved, 0-2-septate 5

2 Apothecia bright yellow when fresh and dry; hairs and paraphyses with prominent yellow pigment when fresh in water 3

2' Apothecia with brown to blackish colours on flanks or stipe basally prominently blackish 4

3 Asci 28-38x4-5 μm , MLZ+, with croziers; spores 4-7.2(8)x1.4-2.2 μm , guttulae inconspicuous; saprobic on cone scales and wood of *Picea abies*, lying in moist conditions; phen.: VIII-X (BE/W) **Hamatocanthoscypha unci-pila** (Le Gal) Huhtinen (1990)

Ill.: Huhtinen 2001: fig. 7-9.

3' Asci 35-47x4.8-6 μm , MLZ-; spores *8-11.5x2.3-3 μm , 0(1)-septate; saprobic on wood of *Betula*; phen.: X **Hamatocanthoscypha straminella** (P. Karst.) Huhtinen (2001)

Ill.: Huhtinen 1990: fig. 212-214 (sub *U. unci-pila*).

4 Apothecia blackish when dry; asci 29-45x4-5 μm , MLZ+, with croziers; spores cuneiform-subfusiform, 5-8.4(9.8)x1.3-2(2.5) μm ; hairs 20-42x2.8-3.2 μm , showing one-sided thickenings, brown to hyaline; saprobic on needles of *Juniperus* and *Pinus*; phen.: VIII **Hamatocanthoscypha uncinata** var. **uncinata** (W. Phillips) Huhtinen (1990) [1989]

4' Apothecia blackish to brown to cream-coloured when dry; asci 26-41x4.2-5(5.7) μm , MLZ+, with croziers; spores 5.4-11.7(13.6)x1.2-2.5(2.8) μm , 0(1)-septate; hair walls of uniform thickness; saprobic on needles of *Juniperus*; phen.: IV-XI **Hamatocanthoscypha uncinata** var. **phaeotricha** (K. Holm & L. Holm) Huhtinen (1990) [1989]

5 Ascomata 0.1-0.3 mm diam., white to yellow white, margin hairy; asci 28-39(45)x3.4-4.5(5.8) μm , MLZ+, with croziers; spores narrow ellipsoid, 5.6-6.4x2.2-3 μm , biguttulate; saprobic on softwood (*Picea*, *Pinus*, *Pseudotsuga*); phen.: IX-III (ES, NL) **Hamatocanthoscypha ocellata** Huhtinen (1990) [1989]

5' Spores up to 3 μm wide 6

6 Asci 16-24x2.6-3.3 μm , MLZ+, without croziers; spores 3.3-5.2x1-1.6 μm ; saprobic on needles of *Pinus*; phen.: VI, XI **Hamatocanthoscypha laricionis** var. **minutissima** (Velen.) Huhtinen (1990) [1989]

6' Asci with croziers 7

7 Apothecia cupulate, stipitate, up to 0.3 mm diam., white; asci 29-34x4 μm , J-, with croziers; spores ellipsoid to subglobose, 3.2-3.6x2.2-3 μm , eguttulate; hairs uncinatate, 2(3)-septate, 25-65x2.5-4 μm ; saprobic on leaves of *Cupressus*, *Juniperus*; phen.: XII-I **Hamaocanthoscypha rotundispora** Raitv. & Galán (2004)

- 7' Asci J+ 8
- 8 Apothecia cupulate, up to 0.3 mm diam., shortly stalked, white; asci 27-41x4.2-6(6.2) μm , J+, with croziers; spores 6.5-9.5(10.5)x1.8-2.2 μm ; saprobic on *Dryopteris dilatata*, *Dryopteris filix-mas*; phen.: V-X
 **Hamatocanthoscypha laricionis var. dryopteridis** (H.C. Böhler) Huhtinen (1990) [1989]
- 8' Apothecia up to 0.55 mm, sessile to shortly stalked, white; asci 23-36(41)x4-5.1(6.3) μm , MLZ+, with croziers; spores 4.8-7(7.5)x1-2(2.3) μm , with few minute guttules; saprobic on litter of various conifers (*Abies*, *Cryptomeria*, *Juniperus*, *Larix*, *Picea*, *Pinus*); phen.: (IV)VI-XII (BE/F)
 • **Hamatocanthoscypha laricionis var. laricionis** (Velen.) Svrček (1977)

Infudichalara Réblová & W. Gams

Type species: *Infudichalara microchona* (W. Gams) Réblová & W. Gams

Lit.: Réblová & al. 2011: 78.

- 1 Conidiophores brown, often arising from dark fascicles of vegetative hyphae, either as simple phialides or with additional septa. Phialides often proliferate sympodially on ageing, with funnel-shaped collarette and shallow-seated conidiogenous locus. Conidia clavate with truncate base, 3.5-5x1.3-2.5 μm . Teleomorph unknown; on decayed coniferous wood (*Pinus*) and basidiomata of members of the *Polyporales*; phen.: II,VII
 *Chalara microchona* W. Gams = **Infudichalara microchona** (W. Gams) Réblová & W. Gams (2011)
 III.: Réblová & al. 2011: fig. 42-48.

Microscypha Syd. & P. Syd.

Type : *Microscypha grisella* (Rehm) Syd. & P. Syd.

Lit. : Graddon 1967 : 9 (*M. enrhizus*), Graddon 1972 : 158 (sub *Actinoscypha muelleri*), Böhler 1974 : 93 (sub *M. grisella*), Svrček 1976 : 11 (*M. monticola*), Ellis & Ellis 1985 : 567 (sub *M. grisella*), Huhtinen & al. 2010 : 419 (*M. cajaniensis*).

- 1 Apothecia up to 0.15 mm diam. when dry, sessile ; asci 30-45x5-8.5 μm , IKI red, with croziers ; spores (4.5)5.5-9x(1.5)2-3 μm , 0-1-septate, guttulate, hyaline ; bryobiotic (?saprobic) on *Polytrichastrum* spp. ; phen. : VI
 **Microscypha cajaniensis** Huhtinen (2010)
 III. :Huhtinen & al. 2010 : fig. 3.
- 1' Asci amyloid 2
- 2 Spores up to 10 μm long 3
- 2' Spores longer 5
- 3 Apothecia cupulate, narrowly sessile, 0.5-0.8 mm diam., white, basallt brown, with hairy margin; asci 50-60x6 μm ; spores 8-10x1.5-2.5 μm ; hairs 50-60x3-4 μm , apically widened; on fallen leaves of *Salix cinerea*, *Alnus*
 **Microscypha cejpui** (Velen.) Svrček (1985)
- 3' Asci less than 50 μm long 4
- 4 Apothecia cupulate, 0.2-0.3 mm diam., short stipitate, hymenium pale grey, outside brownish and downy, margin greyish white and hairy; asci 24-33x5-8 μm , IKI+; spores fusoid to clavate, 6.5-9.5x1.5-2 μm ; hairs conical, up to 50x3-5 μm , non-septate, hyaline; on dead leaves of *Pteridium*, rarely on *Matteucia*; phen.: spring and summer
 (1919)
 III.: Dennis 1978: pl.. XXIVg.
- 4' Apothecia erumpent, 0.5 mm diam., shortly stalked, yellowish, with up to 60 μm long hyaline hairs, with globose, hyaline immersed pseudostroma; asci 40-45x4-5 μm , I+; spores fusiform, 6-9x2 μm ; saprobic on leaves of *Ilex aquila*; phen.: I **Microscypha enrhizus** Graddon (1967)
- 5 Apothecia cupulate, 0.2-0.4 mm diam., shortly stalked, pale yellowish, with up to 60 μm long hyaline marginal hairs; asci 45-60x5-6 μm , I+; spores 9-14x2-3 μm , straight to slightly curved, eguttulate, hyaline; ectal excipulum with large brownish globose cells; saprobic on leaves of *Salix caprea* and *Salix reticulata*; phen.: IV-VII
 **Microscypha monticola** Svrček (1976)
 Belonging to *Pyrenopeziza*?
- 5' Apothecia cupulate, 0.3 mm diam., pale yellowish grey; asci 100-170x16-20 μm , I+; spores 20-30x5-6 μm , 1-3(5)-septate, guttulate; saprobic on leaves of *Carex flacca*, stems of *Eriophorum angustifolium*; phen.: V
 **Microscypha muelleri** (Graddon) Spooner ined. (2012)

Pseudohelotium Fuckel

Type species: *Pseudohelotium pineti* (Batsch) Fuckel.

Lit.: Dennis 1956: 63, Graddon 1972: 149 (*P. alaunae*), Baral & Krieglsteiner 1985: 147, Svrček 1987: 93 (*P. vernale*), Huhtinen 1994: 6 (*P. sordidulum*), Beyer 1995: 3.

- 1 Apothecia 0.5 mm diam., sessile, whitish, ochraceous when dry; asci clavate, up to 70x12 µm, IKI+, with croziers; spores 30-38x3 µm, 3-7-septate, hyaline; saprobic on *Deschampsia caespitosa*; phen.: IV
○ **Pseudohelotium alaunae** Graddon (1972)
 Ill.: Graddon 1972: fig. 2.
- 1' Coniferous species 2
- 2 Apothecia up to 1 mm diam., shortly stalked, whitish; asci 80-87x7-9 µm, I+; spores 20-37x1.7-2.7 µm, OCI 0.5-2, 1(3)-septate; ectal excipulum of brown textura prismatica, base with isodiametrical cells; saprobic on needles and old cones of *Pinus sylvestris*; phen.: III-IV(IX)..... ○ **Pseudohelotium pineti** (Batsch) Fuckel (1870)
- 2' Apothecia up to 0.5 mm diam., sessile, grey to grey-brown; asci 50-87x10-12 µm, I+; spores fusiform, 17-25x2.5-3 µm, 1(3-7)-septate, guttulate when young; saprobic on needles and branches of *Pinus sylvestris* and *Picea abies*, on cone of *Pinus nigra*; phen.: III-IV(V-IX)..... **Pseudohelotium sordidulum** (P. Karst.) Huhtinen (1994)
 Ill.: Huhtinen 1994: fig. 2.

HELOTIACEAE Rehm

Lit.: Hansen & Knudsen 2000: 133, [Jaklitsch et al. 2016: 169](#).

Sexual morph: Apothecia 0.3-7(15) mm in diam., non-gelatinous or cartilaginous; hymenium plane, sometimes concave

or convex, white to yellow, lilaceous, or greyish-brownish, rarely black, hysterothecial (*Mytilodiscus*); margin smooth, rarely with brown setae; erumpent or superficial, sessile to long-stalked. Ectal excipulum of hyaline, rarely brown textura prismatica, textura globulosa, or textura oblita, sometimes with external crystals (*Cyathicula*); medullary excipulum of textura intricata; in *Dicephalospora* with a yellow exudate releasing in KOH a reddish or yellowish pigment. Paraphyses cylindrical, often with low- to high-refractive, hyaline to yellowish, globose (multiguttulate) or sometimes elongate VBs. Asci with rounded to conical apex, mostly euamyloid ring of *Hymenoscyphus*-type, sometimes approaching *Calycina*-type (*Cyathicula*) or inamyloid, with or without croziers. Ascospores (4—)8 per ascus, ellipsoid, fusoid, or clavate (scutuloid), small- to large-sized, partly with sheath, lipid content low to high, overmature 1-3-septate, rarely budding conidia.

Asexual morph: hyphomycetous, sporodochial or synnematal; macroconidia holoblastic: hyaline, filiform or stauro-sporous (anguillospora-, tricladium-like), dark brown, in chains or bulbils (Bispora, Glarea); thallic, hyaline, 3-5-septate (*Symphyosirella*); microconidia phialidic (chalara-like, *Endoconidium*).

Habitat: Saprobic, on wood and bark, leaves, herbaceous stems, fruits, mosses and liverworts, often endophytic, some parasitic, desiccation-sensitive, rarely -tolerant.

Genera belonging to this family:

1. *Bisporella* Sacc.
2. *Brackelia* Zhurb.
3. *Bryoscyphus* Spooner
4. ?*Chaetoscypha* Syd.
5. *Cudoniella* Sacc.
6. *Cyathicula* De Not.
7. *Dicephalospora* Spooner
8. *Gloeotinia* M. Wilson, Noble & E.G. Gray
9. *Graddonia* Dennis
10. *Hymenoscyphus* Gray
11. *Hymenotorrendiella* P.R. Johnst., Baral & R. Galán
12. ?*Muscicola* Velen.
13. *Mytilodiscus* Kropp & S.E. Carp.
14. *Phaeohelotium* Kanouse
15. ?*Pithyella* Boud.
16. *Pseudoniptera* Velen.
17. *Symphyosirinia* E.A. Ellis
18. ?*Tatraea* Svrček
19. ?*Tricladium* Ingold

Key to the genera:

- | | |
|--|-----------------------|
| 0 Conidiomata hyphomycetous. Conidiophores erect, hyaline. Conidia branched, axial part fusiform, multiseptate, with lateral parts with different orientation, hyaline Colonies mostly on submersed leaves | Tricladium |
| 0' Sexual morph present | 1 |
| | |
| 1 Apothecia with ionomidotic reaction (yellow or red); asci thick-walled, apical ring of Hymenoscyphus-type; spores with polar gel cap; ectal excipulum of non-gelatinized textura prismatica | <i>Dicephalospora</i> |
| 1' Apothecia without ionomidotic reaction | 2 |
| | |
| 2 Ectal excipulum of textura oblita; asci with (mostly) amyloid apical ring | 3 |
| 2' Ectal excipulum otherwise | 5 |
| | |
| 3 Apothecia black, extremely laterally compressed (hysteroid), stalked; ectal excipulum of textura oblita, covered by a brown cuticula; foliicolous | <i>Mytilodiscus</i> |
| 3' Apothecia without brown cuticula; paraphyses cylindrical, with vacuolar bodies | 4 |
| | |
| 4 Apothecia sessile to substipitate, mostly white; ascus ring of <i>Hymenoscyphus</i> -type; paraphyses multiguttulate; mostly lignicolous, fungicolous | <i>Bisporella</i> |

4'	Apothecia with even, crenulate to dentate margin; ascus ring of <i>Hymenoscyphus</i> -type; herbicolous, graminicolous, cypericolous	6 9
5	Ectal excipulum of textura prismatica to porrecta	6
5'	Ectal excipulum at least basally of textura globulosa-angularis	9
6	Apothecia with short, cylindrical to clavate, smooth hairs; paraphyses cylindrical, guttulate; spores spherical, ornamented; ectal excipulum with hyaline textura prismatica	6
6'	Asci with truncate apex, apical annulus with only inner part amyloid (= <i>Hymenoscyphus</i> -type); spores not spherical	7
7	Apothecia discoid, sessile to stalked; paraphyses with strongly refractive guttules; anamorph with cylindrical, mostly 5-septate conidia; seminicolous	8
7'	Anamorph otherwise or missing	8
8	Apothecia discoid, sessile to stalked, whitish to yellowish; paraphyses with strongly to weakly refractive guttules; ectal excipulum of texture prismatica; lignicolous, foliicolous, herbicolous or graminicolous	8
8'	Like <i>Hymenoscyphus</i> , hymenium strongly convex	8
8''	Like <i>Hymenoscyphus</i> but musicolous	8
9	Asci I-	10
9'	Asci I+	11
10	Asci with obtuse apex, I-; paraphyses multiguttulate; apothecia sessile	10
10'	Apothecia with plane disc, dark brown to black; paraphyses with slightly clavate apex; asci I-; ascospores hyaline, ellipsoid to very narrowly obovate, 0(-1)-septate, guttulate, wall smooth; lichenicolous	10
11	Ectal excipulum at least basally of textura globulosa-angularis; apothecia discoid, whitish, yellowish or brown, reddening when hurt or not; ascus with apical ring of <i>Hymenoscyphus</i> -type; paraphyses multiguttulate; lignicolous, foliicolous	11
'	Apothecia stalked, whitish to pale grey or pinkish, without stroma; asci with cylindrical apical ring fully amyloid extended with amyloid zones (<i>Tatraea</i> -type); subhymenium with brownish textura intricata; medullary excipulum with a thick textura porrecta, ectal excipulum with light brownish textura globulosa-angularis; lignicolous	11

Bisporella Sacc.

Type species: *Bisporella monilifera* (Fuckel) Sacc.

Lit.: Korf & Carpenter 1974: 51, Baral (unpublished key), Holm & Nannfeldt 1990a: 6 (*B. nannfeldtii*), Galan & Raitvir 1992: 229 (*B. calycellinoides*), Hansen & Knudsen 2000: 137.

1	Asci hemiamyloid	2
1'	Asci not hemiamyloid	3
2	Apothecia 0.5-1 mm diam.; asci IKI+ red to red brown; spores ellipsoid, 6-7.5x2.8-3 µm, biguttulate, OCl=4; lignicolous; phen.: IX	2
2'	Apothecia 0.8-1.2 mm diam., golden yellow, fasciculate, sessile; asci 35-45x4-5 µm, apex dextrinoid; spores 5-7x 1.2-1.5 µm, cylindrical to subballantoid, eguttulate, hyaline; on remnants of stromata on dead branches of <i>Prunus padus</i> : phen.: VIII	3
3	Ectal excipulum with blackish brown exudates; apothecia crowded, 1-2.5 mm diam., sessile to stalked; asci IKI-, often without croziers; spores 7.5-8x2-2.3 µm, aseptate, OCl=2; saprobic on stump of <i>Quercus</i> ; phen.: XII-I	3
3'	Asci. IKI weakly to strongly blued	4
4	Paraphyses with cylindrical vacuoles (sometimes mixed: <i>B. Grosplane</i> , <i>drosodes</i> , <i>prunicola</i>); spores with OCl=3-5	5
4'	Paraphyses purely multiguttulate	7
5	Asci ?without croziers; outer medulla (and ectal excipulum p.p.) with brown extracellular pigment; spores 19.5-24.5x6.5-7 µm, multiguttulate; saprobic on wood of <i>Prunus avium</i> ; phen.: I	5
5'	Apothecia pale, outmost with dark pigment in the stalk base	6
6	Apothecia 0.4-1 mm diam.; asci with croziers; spores 22-24.5x5-5.5 µm, aseptate, multiguttulate, OCl=5	6

- **Bisporella "Grosplane"** Baral spec. prov.
- 7 Apothecia crowded, whitish, drying yellow, sessile or shortly stipitate, 0.5-1.5 mm diam.; asci weakly amyloid (+/- *Hymenoscyphus* type); spores ellipsoid to fusiform, 9-13x3.5-4.5 µm, 1-septate, with a medium size guttule per cell, OCI=3-4; mostly in company of its anamorph *Bispora antennata*; saprobic on stumps of deciduous wood (*Fagus*); phen.: (V)VIII-I **Bisporella pallescens** (Pers.) S.E. Carp. & Korf (1974)
 Ill.: Breitenbach & Kränzlin 1981: pl. 176.
- 7' Spores with OCI 0-1.5; apothecia ochraceous yellow to yellow 8
- 8 Spores 8-16x3.5-4.2 µm, overmature spores septate, OCI 1.5; apothecial base IKI-
 **Bisporella rubescens** (Saut.) S.E. Carp. (1981)
- 8' Spores aseptate 9
- 9 Apothecia crowded, yellowish, sessile, 0.5-1.5 mm diam.; asci weakly amyloid (+/- *Hymenoscyphus* type, with croziers); spores ellipsoid to ovoid, 5-9x2.5-3 µm, overmature spores ?aseptate, OCI 0-1; apothecial base blued in IKI; on deciduous wood (*Acer*, *Alnus*, *Corylus*, *Carpinus*, *Fagus*, *Fraxinus*, *Quercus*, *Salix*); phen.: X-V
 • **Bisporella subpallida** (Rehm) Dennis (1978)
 Ill.: Ellis & Ellis 1985: fig. 4.
- 9' Apothecia gregarious, bright yellow when fresh up to 0.5 mm diam., sessile, downy receptacle; asci weakly amyloid, arising from croziers; spores fusiform, 9-12x2.5-3 µm, aseptate, with polar guttules; saprobic on leaves of *Rosa* sp.; phen.: X **Bisporella calycellinoides** R. Sharma & Korf (1982)

Brackelia Zhurb.

Type species: *Brackelia lunkei* Zhurb.
 Lit.: Zhurbenko & Pino-Bodas 2017: 197.

- 1 Apothecia, dark brown to almost black, glossy, superficial with somewhat immersed base, 50–200 µm in diameter; disc more or less plane, concolorous or slightly paler than margin; margin raised or at the disc level, sometimes lacerate. Exciple composed of cells with rounded or tangentially elongated lumina. Paraphyses hyaline, light to medium brown or brownish orange, pigmentation usually gradually fading from the apex to the base, 1.2–2.5(3.5) µm in diameter, apices sometimes slightly clavate. Asci narrowly clavate, apical structures not observed, (31)32-41 (45)x5–6(7) µm, IKI–, 8-spored. Ascospores hyaline, ellipsoid to narrowly obovate, (5.3)6-9(11)x(1.5)1.7–2.0(3.2) µm, 0(1)-septate, guttulate, smooth. Anamorph not found. Parasitic on *Cladonia gracilis*, C. sp. Phen.: IX (BE/F)
 • **Brackelia lunkei** Zhurb. (2017)

Bryoscyphus Spooner

Typus : *Bryoscyphus conocephali* (Boyd) Spooner

Lit.: Dennis 1956: 109 (sub *Helotium marchantiae* & *H. phascoïdes*), Svrček 1978: 17 (sub *Hymenoscyphus rhytidadelphii*), Dennis 1981: 140, Benkert 1981: 34 (sub *Hymenoscyphus*), Kirk & Spooner 1984: 557, De Meulder 1992: 79 (sub *Helotium fulvum*), **Verkley & al. 1997:** , Hansen & Knudsen 2000: 137, Dougoud 2003: 7 (*B. atromarginatus*).

Apothecia parasitic on mosses and liverworts, whitish to ochraceous, reddening when damaged, sessile to shortly stipitate. Asci with apical apparatus of *Hymenoscyphus*-type. Excipulum at least basally with isodiametrical cells, mostly with hair-like processes.

- 1 Ascoporus IKI- 2
- 1' Ascoporus IKI+ 3
- 2 Apothecia scutellate, 1-1.5 mm diam., shortly stalked; asci 160-180x11.5-13 µm, IKI-, arising from croziers; spores broadly fusiform, with narrowly rounded ends, 16-24x6-9 µm, 0(1-3)-septate, with several minute guttules, OCI 3; on *Ceratodon purpureus*, *Paraleucobryum longifolium* and *Didymodon fallax*; phen.: (VIII) X-II
 • **Bryoscyphus dicrani** (Ade & Höhnelt) Spooner (1984)
 Ill.: Kirk & Spooner 1984: fig. 7A, Capoen 2013: 45.
- 2' Apothecia 0.5-1.5 mm diam. and high, stalked, reddish brown to dark brown; asci 140-180(200)x12.5-18 µm, IKI-, arising from?; spores oblong-ellipsoid, with broadly rounded ends, 15.5-23x6-9 µm, with several large and small guttules, OCI 4-4.5; parasitic on *Dicranella cerviculata*; phen.: II
 ○ **Bryoscyphus fulvus** (Boud.) Declercq comb. nov. inedit.
 Basionym: *Helotium fulvum* Boud., *Bull. Soc. mycol. Fr.* 13: 16 (1897)
 Ill.: De Meulder 1991: 80.
- 3 Spores up to 15 µm long 4
- 3' Spores longer 6

- 4 Apothecia scutellate, 1-5 mm diam., ochraceous to brown, shortly stalked; asci 140-160x6-10 µm, apical porus IKI+, arising from croziers; spores ovate-ellipsoid to rhomboidal, 0(1)-septate, 12-15.5x6-7 µm, OCI 2; parasitic on *Reboulia hemisphaerica* and *Conocephalum conicum*; phen.: III-VII **Bryoscyphus marchantiae** (Berk.) Spooner (1984)
..... III.: Kirk & Spooner 1984: fig. 6B.
- 4' Spores less than 6 µm broad 5
- 5 Apothecia 0.8-1 mm diam., stalked, white; asci 95-110x7.5-8.5 µm, apical ring IKI+, arising from croziers; spores broadly fusiform, 9-15x4-5.5 µm, 0(1)-septate, OCI 3-4; ?parasitic on *Rhytidiadelphus squarrosus*, *R. loreus* and *Pseudoscleropodium purum*; phen.: X-V • **Bryoscyphus phascoides** (Fr.) Baral (2020)
..... III.: Rubio & al. 2010: p. 227.
- 5' Apothecia scutellate, (0.5)1-3(3.5) mm, hymenium ochraceous, outer surface slightly darker with brown margin which becomes dark violet bleu when hurt, shortly stalked; asci (90)115-140x7.5-9 µm, arising from croziers; spores narrow ellipsoid to shoe-shaped, 0(1)-septate, (9.5)10.5-13(14.5)x3.5-4.5 µm, OCI 4-5; parasitic on *Lunularia*, *Marchantia polymorpha*; phen.: VI-XI (BE/F, CH, NL) • **Bryoscyphus atromarginatus** Verkley, Aa & G. De Cock (1984)
..... III.: Dougoud 2003: p.9-10.
- 6 Apothecia scutellate, 0.5 mm diam., hymenium pale brown, sessile to shortly stalked; asci 95-102x11-12 µm, apical ring of calycina-type and IKI+, arising from ?croziers; spores narrow fusiform, aseptate, 16-22x3.5-4 µm; ?parasitic on *Dicranum scoparium*, *Polytrichastrum formosum* and *Hypnum cupressiforme*; phen.: autumn (BE/W) ..
..... • **"Bryoscyphus" turbinatus** (Fuckel) Spooner (1984)
..... III.: Kirk & Spooner 1984: fig. 7B & 8.
- 6' Spores more than 4 µm wide 7
- 7 Apothecia scutellate, 0.5-1.5 mm diam., ochraceous to brown, reddening when damaged, sessile to shortly stalked.; asci 110-130x9-11 µm, arising from ?croziers; spores shoe-shaped, 0(1)-septate, 21-24x4.5-6 µm, eguttulate, OCI 0; ?parasitic on *Conocephalum conicum*. Phen.: X-IV
..... • **Bryoscyphus conocephali** (Boyd) Spooner (1984)
..... III.: Kirk & Spooner 1984: fig. 6A.
- 7' Apothecia 0.25-1 mm diam., shortly stalked, whitish; asci (90)117-168x(8)10-12(13.5) µm, apical ring IKI+, arising from croziers; spores fusoid to ellipsoid, (13)15-16(20)x5-7 µm, OCI 4; parasitic on *Rhytidiadelphus squarrosus*, *R. triquetrus*, *Pseudoscleropodium purum* and *Thuidium tamariscinum*; phen.: VIII, XII
..... • **Bryoscyphus rhytidiadelphi** (Svrček) Baral (2020)
..... III.: Capoen 2013: 43.

Chaetoscypha Syd.

Type species: *Chaetoscypha nidulans* Syd.

Lit.:

Cudoniella Sacc. (1889)

Typus : *Cudoniella acicularis* (Bull.: Fr.) Schröt.

Lit.: Huhtinen 1992: 61 (*C. viridula*).

Remark - Differences with *Hymenoscyphus* ss. str. and *Phaeohelotium* are unclear.

- 1 Apothecia turbinate with undulating margin, up to 20 mm diam., ivory to pale greyish yellow and becoming reddish-brown when old, with very stout short stalk; asci 90-110x8 µm, arising from croziers; spores ciboroid, 0(1)-septate, 10-16x4.5-5 µm, OCI = 0-2; on woody debris and leaf-litter in wet places; phen.: IV-VIII
..... • **Cudoniella tenuispora** (Cooke & Masee) Dennis (1974)
- 1' Apothecia not turbinate, with a short to long stalk 2
- 2 Apothecia not reddening 3
- 2' Apothecia reddening; paraphyses with refractive guttules 4
- 3 Apothecia up to 0.3 mm diam. strongly convex, first white, then greenish, with a 0.2-0.5 mm long stalk; asci 16-23x3.2-4 µm, MLZ+, with croziers; spores cuneiform, 4-6.2x1.2-1.8 µm, biguttulate; on cortex of *Pinus*; phen.: XI-I
..... **Cudoniella viridula** Grelet (1947)
..... III.: Huhtinen 1992: 61.
- 3' Apothecia up to 10 mm diam., ivory, mostly strongly convex, with short to long stalk; asci 96x10 µm, porus IKI-, arising from croziers; spores ciboroid, 0(1)septate, 8.5-11x4 µm or 10-15(17)x(3.5)4-5 µm, OCI = 1; paraphyses with refractive guttules; saprobic on dead wood (*Salix*) and herbaceous stems (*Phragmites*) in wet places, frequently in running water; phen.: III-VII • **Cudoniella clavus** (Alb. & Schw.: Fr.) Dennis (1964)

- 4 Apothecia scutellate with strongly convex disc, 2-6 mm diam., ochraceous ivory, becoming reddish-brown when touched, with an up to 10 mm long stalk; asci 80-110x8-10 µm, porus IKI-, arising from croziers; spores ciboroid to clavate, 0(1)septate, 8-14(16)x4-5 µm, OCI=0; on water-soaked stems of *Juncus effusus*; phen.: V-VI • **Cudoniella junciseda** (Velen.) Dennis (1968)
- 4' Apothecia strongly convex, up to 5 mm diam., ivory, blackening when hurt, with long stalk; asci 110-125x12-13 µm, arising from croziers; spores fusiform, 0(1.3)septate, 15-26x5-6 µm, eguttulate, OCI = 0; on trunks of *Quercus* and *Castanea*; phen.: (V)VIII-XII • **Cudoniella acicularis** (Bull.: Fr.) Schröt. (1893)

Cyathicula De Not.

Type species: *Cyathicula coronata* (Bull.) De Not.

Lit.: Graddon 1977: (*C. furva*), Carpenter 1981 (monograph).

- 1 Spores longer than 14 µm in average 2
 1' Spores shorter than 14 µm in average 15
- 2 Asci longer than 85 µm in average 3
 2' Asci shorter 9
- 3' Asci J+ 4
 3' Asci J- 8
- 4 Margin of the apothecia covered by long teeth; spores 0(-1)-septate 5
 4' Margin otherwise; spores pluriseptate 6
- 5 Apothecia deep-cupulate, 2-5 mm diam., long-stipitate, margin with 15-40 teeth, pale yellow with pink tinge; asci 70-110x(4)6-8(9) µm, J+, with croziers; spores (13)15-18(20)x(3)3.5-4(5) µm, 0(1)-septate, OCI 4.5-5, hyaline; saprobic on herbaceous stems (*Achillea*, *Aconitum*, *Adenostyles*, *Artemisia*, *Aruncus*, *Aster*, *Atropa*, *Beta*, *Carduus*, *Chaerophyllum*, *Cirsium*, *Clematis*, *Erigeron*, *Eupatorium*, *Heracleum*, *Ledum*, *Lilium*, *Lupinus*, *Lysimachia*, *Malva*, *Mentha*, *Nepeta*, *Physalis*, *Polygonum*, *Ranunculaceae*, *Rubus*, *Rudbeckia*, *Rumex*, *Sambucue ebulus*, *Sedum*, *Senecia*, *Solidago*, *Sonchus*, *Struthiopteris*, *Umbelliferae*, *Urtica*, *Vinca*) and Poaceae; phen.: (IV)VIII-XII • **Cyathicula coronata** (Bull.) Rehm (1893)
- 5' Apothecia 2-3 mm diam., long-stipitate, with dentate margin, outer surface with crystals; asci *110-125x8.5-9 µm, J+, with croziers; spores *12-18x3-3,8 µm, †10-14x2,5-3,5 µm, 0(1)-septate, OCI 2-3, hyaline; saprobic on herbaceous stems (*Aconitum*, *Adenostyles*, *Cirsium*, *Clematis*, *Rumex*, *Senecia*) and petioles of *Fraxinus*; phen.: (V)VII-XI • **Cyathicula pallida** Velen. (1934)
 Ill.: Breitenbach & Kränzlin 1981: pl. 193.
- 6 Apothecia stipitate-cupulate, 0.5 mm diam., hymenium dull white; asci 100-110x10-13 µm, J+; spores 25-30x4-5 µm, 7-septate, OCI 0, hyaline; saprobic on culms of *Stipa eriocaulis*; alpine; phen.: VII "Crociareas" **alpinum** (Stadelmann) S.E. Carp. 1980
 Ill.: Carpenter 1981: fig. 2.
- 6' Spores 3-septate 7
- 7 Apothecia stipitate-cupulate, margin denticulate, 0.5-1.5 mm diam., very pale yellowish-white to pinkish white; asci 120-140x12-14 µm, J+, with croziers; spores 21-35x3.5-4.5 µm, 3-septate in the ascus, hyaline, with a mucous coating; saprobic on herbaceous stems and culms (*Agropyron*, *Agrostis*, *Aira*, *Andropogon*, *Arrhenantherum*, *Artemisia*, *Aena*, *Brachypodium*, *Calamagrostis*, *Caryophyllea*, *Dactylis*, *Deschampsia*, *Elymus*, *Festuca*, *Glyceria*, *Molinia*, *Phalaris*, *Phragmites*, *Poa*, *Rumex*, *Saraothamnus*, *Schoenus*, *Scirpus*, *Secale*, *Senecio*, *Stipa*); phen.: (IV)VI-X • **Cyathicula culmicola** (Desm.) S.E. Carp. & Dumont (1978)
- 7' Apothecia stipitate-hysteriform, 0.75-1 mm wide, receptacle blackish brown, stipe golden-brown; asci 110-125x13-15 µm, J+; spores clavate-ellipsoid, (20)23-27(30)x5-6 µm, 3-septate, OCI 0, overmature spores dark golden-brown, with mucous coating; saprobic on stems of *Anemone*, *Arnica*, *Bromus*, *Elymus*, *Juncus*, *Lupinus*, *Luzula*, *Nardus*, *Penstemon*, *Poa*, *Sitanion*; artic-alpine; phen.: VII-IX **Cyathicula melanosporum** (Rehm) M. Chleb. & Chleb. (2005)
- 8 Apothecia cupulate, stipitate, 1-2 mm diam.; asci 100-115x10-11 µm, J-, without croziers; spores (24)30-35x6-7 µm, aseptate, OCI 4, hyaline; saprobic on *Carex* sp.; phen.: VII-X .. **Cyathicula megalospora** (Rea) Dennis (1978)
- 8' Apothecia cupulate, stipitate, 0.5-0.7 mm diam.; asci (78)85-90(100)x8-9(11) µm, J-, without croziers; spores (14)15-18(19)x3.5-4 µm, OCI 4, hyaline; saprobic on leaves of *Deschampsia caespitosa*; phen.: VII-IX • **Cyathicula airae** (Velen.) Baral (1993)
- 9 Asci J+ 10
 9' Asci J- 14

- 10 Apothecia cupulate, stipitate, margin denticulate, white to pale ochraceous; asci 76-83x7-7.5 µm, J+, with croziers; spores (13.5)16-18(19)x2.5-3µm, 0(1)-septate, OCI 1, hyaline; saprobic on petioles of *Fraxinus*; phen.: X-XI.....
..... • **Cyathicula fraxinophila** (Svrček) Baral (1993)
- 10' Asci shorter 11
- 11 Spores 1-septate 12
- 11' Spores aseptate 13
- 12 Apothecia cupulate, stipitate, margin with short narrow teeth, yellow; asci *62-73x6-6,5 µm, J+, without croziers; spores 15-18x2,5-3 µm, 1-septate within the asci, OCI 1, hyaline; saprobic on *Graminaea* (*Agropyron*, *Phalaris*, *Triticum*, *Zea*); phen.: VIII-XII • **Cyathicula dolosella** (P. Karst.) Dennis (1956)
- 12' Apothecia cupulate-stipitate, 0.3-0.5 mm diam, pale yellow; asci 48-56x4-5 µm, J+; spores scutuloid, (13)15-18(1)x1.5-2 µm, 1-septate, OCI 0, hyaline; saprobic on leaves of *Carex ampullacea*; phen.: IX
..... "**Crocicreas**" **nivellum** (P. Karst.) S.E. Carp. (1980)
- 13 Apothecia with stipe immersed in the substrate, 0.5-1 mm diam.; asci 45-70x4-6 µm, J+; spores fusiform, (13)15-20(21)x2-2.5 µm, hyaline; saprobic on stems and leaves of *Carex davalliana*, *Carex elongata* and *Carex rotundata* x *Carex vesicaria*; phen.: VIII-IX **Cyathicula dispersella** (P. Karst.) E. Müll. (1977)
..... Ill. Graddon 1977: fig. 16.
- 13' Apothecia distinctly stipitate, margin with protruding brown tomentum hyphae; asci 63-70x5-6 µm, J+; spores slightly curved, (12)15-18(20)x1.5-2 µm, OCI 4, hyaline; saprobic on culms of *Agropyron repens*; phen.: VIII
..... **Cyathicula furva** Graddon (1977)
..... Ill. Graddon 1977: fig. 3.
- 13" Apothecia deeply concave, 0.5-0.8 mm diam.; stipitate; asci *59-72x6-6.5 µm, IKI bb, with croziers; spores (16-)18-20x1.7-1.8 µm, OCI 2; saprobic on stem of *Sambucus racemosa*; phen.: IV **Cyathicula "filispora"** Baral nom. prov.
- 14 Apothecia cupulate, 0.3-1 mm diam., stipitate, hysteriform when dry; asci 55-70x(5)6-7 µm, J-; spores (12)15-18§(20)x(2.5)3-3.5 µm, hyaline; paraphyses 3 µm wide at the apex; medullary excipulum composed of two layers; saprobic on stems of *Aconitum*, *Arnica*, *Gentiana*, *Oxyria* and *Xerophyllum*; alpine; phen.: VI-IX (CH)
..... **Cyathicula hysterioides** (Rehm) E. Müll. (1977)
- 14' Apothecia cupulate, short-stipitate, margin denticulate, 0.5-1 mm diam., hymenium light yellow, receptacle dark yellow-brown; asci 55-67x5-6 µm, J-; spores (12)15-18(20)x2-2.5 µm, hyaline; paraphyses 2 µm wide at the apex; medullary excipulum composed of one layer; saprobic on stems of *Lotus corniculatus*; phen.: VII
..... "**Crocicreas**" **bicolor** (Starbäck) S.E. Carp. (1980)
- 15 Apothecia deep-cupulate, very short-stipitate or stipe immersed, 0.5-1 mm diam., hymenium pale yellow, receptacle yellow-brown; asci 53-70x(4)5-6 µm, J-, with croziers; spores (8)10-11(12)x2-2.5 µm, 0(1)-septate, OCI 0, hyaline; saprobic on wood (*Pinus* sp., *Prunus spinosa*, *Salix caprea*, *Seringa josikaea*); phen.: II-VI, XI
..... **Cyathicula complicata** (P. Karst.) Dennis (1975)
- 15' Asci J+ 16
- 16 Apothecia stipitate, up to 1 mm diam., stipitate; asci 55-70x5-6 µm, I+, with croziers; spores obpyriform, (7)9-12(14)x3.5-4 µm, OCI 0; saprobic on aments of *Salix caprea* and *Populus tremula*; phen.: II-IV(VII)
..... • **Cyathicula amenti** (Batsch) Baral & R. Galán (2013)
- 16' Spores not obpyriform 17
- 17 Apothecia stipitate, 0.8-1.5 mm diam., hymenium grey, margin and/or receptacle with long, brown tomentum hyphae; asci 58-60x4 µm, J+; spores 8-10(12)x2-2.5 µm, OCI 1; saprobic on roots and stem base of Poaceae (*Molinia*); phen.: VII-X **Cyathicula tomentosa** Dennis (1975)
..... Ill.: Dennis 1975: fig. 2A.
- 17' Margin and/or receptacle of the apothecia without long, brown tomentum hyphae 18
- 18 Apothecia about 0.5 mm diam., stipitate-cupulate, brown to dark brown, margin with freely protruding tapered hyphae; medullary excipulum hyaline; asci 38-50x(4)5-6(7) µm, J+; spores (5)6-9(10)x1.5-2 µm, OCI 0; saprobic on culms and leaves of Poaceae (*Anthoxanthum*, *Calamagrostis*, *Deschampsia*, *Elymus*, *Festuca*, *Nardus*, *Poa*), *Juncus* sp. and stems of *Rumex alpinus*; phen.: (V-VI)VII-IX **Cyathicula spicarum** (Rehm) E. Müll. (1977)
- 18' Apothecia white, pale yellow or tan 19
- 19 Apothecia with immersed stipe; asci 40-50x4-5 µm, J+; spores 13-15x2 µm, 0(1)-septate, hyaline; graminicolous (*Triticum repens*); phen.: II **Cyathicula straminea** (Berk. & Br.) E. Müll. (1977)
- 19' Apothecia distinctly stipitate 20
- 20 Asci with croziers 21
- 20' Asci without croziers 27

- 21 Apothecia stipitate, when dry the margin appearing as a white pulverulent collarette; asci 36-48x4-5.5 µm, J+, with croziers; spores (6) 7-8(10)x1.5-2.5 µm, OCI 1; paraphyses clavate to sublanceolate; saprobic on stems of Apiaceae, *Bambusa*, *Equisetum fluviale*, but mainly on Ranunculaceae (*Caltha palustris*, *Ranunculus acinifolius*, *R. acris*, *R. auricomus*, *R. fallax*, *R. pteranthemus*, *R. repens*, *R. villarsii*); phen.: (I)IV-VII
 **Cyathicula starbaekii** (Rehm) S.E. Carp ex Tholl, Baral, Schultheis, G. Marson & Diederich (2000)
 Ill.: Schmid I. & H. 1990: nr. 13, Rubio & al. 2010: p. 216.
- 21' Apothecia without collarette 22
- 22 Apothecia cupulate, stipitate, 1.2-3 mm diam., hymenium cream; asci 72-85x6-7.5 µm, slightly IKI blue, with croziers; spores 9-11(12)x2.5-3 µm, OCI 2, smooth to finely warted, hyaline; saprobic on cupules of *Castanea sativa*; phen.: X **Cyathicula** "Castanea-cupules" sp.
- 22' Spores always smooth; on other substrates 23
- 23 Spores in average up to 2,5 µm long 24
- 23' Spores more than 2.5 µm wide 25
- 24 Apothecia 0.5-1.5 mm diam., white to pale yellow; asci 40-60x4-5(7) µm, J+, with croziers; spores (5)6-12(15)x1.5-2.5(3) µm, OCI 1-2, hyaline; saprobic, mostly herbicolous (*Angelica*, *Centaurea*, *Cirsium*, *Epilobium*, *Eupatorium*, *Heracleum*, *Teucrium*, *Urtica dioica*), also graminicolous and pteridicolous (*Pteridium*); phen.: III-XI
 • **Cyathicula cyathoidea** (Bull.) Thüm. (1874)
 Ill.: Boudier 1905-1910: pl. 494.
- 24' Apothecia 0,5-1,3 mm diam; stipitate; asci 50-65x5,5-6,5 µm, IKI+, with croziers; spores subclavate, 5.5-8x2-2.5(-3) µm, OCI 2-3 µm; saprobic on spikes of *Typha*; phen.: VII-IX **Cyathicula typhae** Baral sp. nov.
- 25 Apothecia 1-3.5 mm diam., pale rust to salmon-pink; asci 55-70(90)x(5)6-7 µm, J+, with croziers; spores *7-10x3-3.5 µm, OCI 1, hyaline; saprobic on calathia of *Carlina acaulis*, *Cirsium* sp., *Saussurea alpina*; phen.: VIII-IX
 **Cyathicula calathicola** (Rehm) Baral (2020)
- 25' Apothecia cupulate, short-stipitate, 0.5-1.5 mm diam., hymenium pale yellow, receptacle brown; asci 62-70x5.5-6.5 µm, J+, with croziers; spores (5)9-14(17)x2.5-3.5 µm, OCI 1, hyaline; saprobic on herbaceous stems (*Aconitum*, *Arnica*, *Aster*, *Beta maritima*, *Cirsium*, *Clematis*, *Epilobium*, *Geum*, *Lappa*, *Lathyrus*, *Lycopodium*, *Ononis*, *Ptleum*, *Rumex*, *Salvia*, *Sambucus*, *Scrophularia*, *Senecio*, *Silene*, *Solanum*, *Trifolium*, *Ulex*, *Urtica*, *Vincetoxicum*, *Vitis*) and grass culms (*Calamagrostis*, *Elymus*, *Poa*), on branch of ?*Salix*; phen.: V-IX
 • **Cyathicula cacaliae** (Pers.) Dennis (1975)
- 27 Apothecia cupulate, stipitate, with a very small collarette forming a small opening, 0.25-0.5 mm diam., pale yellow to pale tan; asci 45-65x(5)6-8(8.5) µm, J+, without croziers; spores (9)12-14(15)x(2)3-3.5 µm, 1-septate, OCI 3, hyaline; saprobic on leaves and culms of Poaceae (*Calamagrostis*, *Poa*, *Sesleria*); phen.: VII-IX
 "**Crocicreas**" **nivale** (Rehm) S.E. Carp. (1980)
- 27' Apothecia with long stalk; asci IKI+, without croziers; spores 10-15x2,3-3,1 µm, OCI 5; herbicolous
 • **Cyathicula paludosa** (Velen.) Baral comb. nov; ined.

Dicephalospora Spooner 1987

Type species: *Dicephalospora calochroa* (Syd.) Spooner

Lit.: Spooner 1987, Verkley 2004: 348.

No Western European species known.

Gloeotinia M. Wilson, Noble & E.G. Gray

Type species: *Gloeotinia temulenta* (Prill. & Delacr.) M. Wilson, Noble & E.G. Gray

Lit.: Svrček 1979: 200, Engel & Hanff 1987: 60 (*G. juncorum*), Beyer 1998: 181 (*G. granigena*), Hansen & Knudsen 2000: 148.

- 1 Apothecia 1-2.5 mm broad, light pinkish brown to deep brown; stem 1-8x0.3-0.5 mm diam.; asci 60-120x3.5-7 µm; spores thick-walled, 8-12x3-6 µm, biguttulate; macroconidial state produced in a copious pink slime on surface in summer, macroconidia 11-21 x 2.5-6 µm; microconidial state produced in pink pulvinate structures, microconidia 2.3-6 x 1.8-3.0 µm, ovoid, colourless, unicellular; on fallen caryopses of grasses (*Bromus*, *Elymus*, *Festuca*, *Lolium*, *Secale*); phen.: spring (VII-IX)..... **Gloeotinia granigena** (Quél.) T. Schumach. (1979)
- 1' Apothecia 1-3 mm broad, light brown to reddish brown, stem 1-12x0.2-0.5 mm; asci 120-155x7-10 µm; spores 8-13.5x4-5.5 µm; on stromatized fruits of *Carex*; phen.: spring
 • **Gloeotinia aschersoniana** (Henn. & Plötn.) Baral (1985)

- 1" Apothecia up to 1.5 mm diam., yellowish, stipitate; asci 108-145x6.5-10.5 μm , I-; spores lemon-shaped, 10-15x5-6.5 μm ; saprobic on seeds of *Juncus effusus*; phen.: VI **Gloeotinia juncorum** (Velen.) Baral (1985)
 Ill.: Engel & Hanff 1987: p. 60.

Graddonia Dennis

Type species: *Graddonia coracina* (Bres.) Dennis.
 Lit.: Baral & Krieglsteiner 1985: 33, Gminder 1993: 104.

- 1 Apothecia 0.8-1.6 mm diam., greyish brown; asci IKI-; paraphyses with small LB's; spores ovoid to broadly fusiform, *(14)16-22x8-10.5 μm , OCl=5; on partly submerged wood of *Alnus*, *Carpinus*, *Fagus*, *Fraxinus*, *Quercus*, *Salix*, *Sambucus racemosa* in uncontaminated brooks; phen.: VI-IX • **Graddonia coracina** (Bres.) Dennis (1955)
 Ill.: Gminder 1993: 107, fig. 1-3.

Hymenoscyphus Gray

Typus : *Hymenoscyphus fructigenus* (Bull.) Fr.
 Syn.: *Lambertellinia* Korf & Lizon, ? *Poculopsis* Kirschst.
 Lit.: Hengstmengel 1985: 489, Hengstmengel 1996: 191, Declercq (preliminary key), Queloz & al. 2010: , Dougoud 2011: 27 (*H. ombrophilaeformis*), Van Vooren 2012: .

Apothecia discoid, with glabrous margin and short to long stalk. Excipulum of hyaline textura prismatica-porrecta. Spores scutuloid, subellipsoid, clavate, cylindrical or fusiform.

- 1 Spores scutuloid Key A – Section *Scutuloideae*
 1' Spores subellipsoid, clavate, cylindrical or fusiform Key B – Section *Repandoideae*

Key A - Section Scutuloideae.

Key AA - Apothecia reddening when bruised or older; paraphyses with strongly refractive guttules.

- 1 Asci arising from simple septa 2
 1' Asci arising from croziers 31
- 2 Spores 10-22 μm long 3
 2' Spores longer 16
- 3 Asci up to 100 μm long 4
 3' Asci longer 5
- 4 Apothecia 0.5-4 mm diam., pale ivory to cream, short stalk with blackish base; asci 80-100x 9-11 μm ; spores 13-20x(3)4-5 μm , with 1-3 medium and many small guttules per side, OCl 5, without setulaae; saprobic on blackened petioles of *Fraxinus*; phen.: (VI)VII-XI • **Hymenoscyphus albidus** (Gillet) W. Phillips (1887)
- 4' Apothecia scattered, 0.5–2.3 mm diam., arising from superficial black pseudosclerotium; disc white or cream-white, slightly concave to flat, exterior concolorous; asci 70-92x7.5-9 μm ; spores slightly scutuloid, 11-17x3-5 μm , with two large, 2–2.2 μm diam., and some smaller oil drops, without setulae, germinating spores often form single septa and turn slightly olive-brown. Asexual morph chalara-like. Saprobc on petioles and leaf veins of *Fraxinus pennsylvanica*; phen.: VIII-IX (PL) **Hymenoscyphus pusillus** Kowalski & Bilański (2018)
 Ill.: Kowalski & Bilanski 2018: fig. 1*.
- 4" Apothecia up to 1 mm diam., ochraceous yellow, reddening, sessile or with a very short stalk; asci 65-90x 10-12 μm ; spores 0(1)-septate, (15)18-22x3.5-4.5(6) μm , with 2-3 up to 2.5 μm diam. guttules and many small ones per side, OCl 5, sometimes with 1 μm long cilia at both ends; saprobic on *Humulus lupulus*; phen.: (VIII)X-XI
 • **Hymenoscyphus humuli** (Lasch) Dennis (1964)
- 5 Spores 3-4 μm wide 6
 5' Spores 3.5-5 μm wide 7
- 6 Spores 0(1)-septate, 10-18(20)x3-4 μm , OCl 5, without cilia; saprobic on nuts of *Corylus*; phen.: VIII-IX
 • **Hymenoscyphus fructigenus** var. **coryli** (Feuilleaub.) Hengstm. (1985)
- 6' Spores 0(1)-septate, 12-21(23)x3-4 μm , OCl 4-4.5, with an up to 1 μm long cilium at one or both ends; saprobic on fruits of *Carpinus*; phen.: IX-X • **Hymenoscyphus carpini** (Batsch) Gminder (2016)
- 7 Spores without cilia 8
 7' Spores at least some with cilia 9

- 8 Apothecia 1-2(3) mm diam., pale ivory to ochraceous yellow, reddening, stalked; asci 90-120x11-12 µm; spores 18-22(25)x3-4.5(5) µm, OCI 4-5, without cilia; saprobic on wood and bark (*Fagus*, *Quercus*, *Picea*) and cones of *Alnus glutinosa*; phen.: X-XII (BE/F) ○ **Hymenoscyphus virgultorum** (Vahl) W. Phillips (1887)
- 8' Apothecia 0.5-3 mm diam., white, reddening, stalked; asci (90)100-110x7.5-8.5 µm; spores slightly scutuloid, 13-20x(3)3.5-4 µm, with many small guttules at both sides, OCI 4, without cilia; saprobic on grass culms (*Phragmites*, *Phalaris*); phen.: IX-XI (DE, FR) ● **Hymenoscyphus phalaridis** Baral (2019)
- 9 Apothecia 1-4(5) mm diam., pale ivory, pale to ochraceous yellow, reddening, with long stalk; asci 110-140x8-10 µm. Spores (0)1(3)-septate, 14-24x3.5-5 µm, slightly constricted at the septum, with many up to 2 µm diam. guttules, OCI 4-5, with 1-4 about 1 µm long cilia at both ends; on fallen cupules and fruits of *Acer pseudoplatanus*, *Aesculus hippocastanum*, *Fagus sylvatica*, *Juglans*, *Quercus robur*, *Tilia*, twigs of *Quercus robur*; phen.: VIII-X(I) ● **Hymenoscyphus fructigenus** var. **fructigenus** (Bull.) Gray (1821)
- 9' Apothecia scutellate, 0.5-1.5(2.5) mm diam., pale ivory to pale yellowish, stalked; asci 95-115x8.5-11 µm; spores scutuloid, without hooked apical end, 17-24x4-4.5(5) µm, without cilia or only a few spores with up to 3 µm long cilia at both ends, (1)2-3 up to 3 µm diam. guttules and several minute ones per hemispore, OCI 5; saprobic on herbaceous stems of *Fallopia japonica*, *Filipendula ulmaria*, *Polygonum*, *Rubus fruticosus*, *Solanum dulcamara*, *Thalictrum flavum*, petioles of *Filipendula* and *Fraxinus*; phen.: (VII)IX-X(XII) (BE/F) ● **Hymenoscyphus vitellinus** (Rehm) O. Kuntze (1898)
(One collection, exs. 98086, on old stems of *Polygonum mite*, differs by spores with only minute guttules)
- 16 On woody substrates 17
- 16' Not on woody substrates 20
- 17 Apothecia yellowish 18
- 17' Apothecia purplish 19
- 18 Apothecia scutellate, 0.5-3.5 mm diam., whitish to yellowish, reddening, shortly stipitate; asci 120-170x13-17 µm; spores slightly scutuloid or inequilateral-fusiform, 0(1.3)-septate, finally becoming pale brown, (20)25-30(32)x5-7(8.5) µm, with 2-3 up to 4.5 µm diam. guttules per side and many minute ones when fresh, OCI 5, mostly with 1-2(5) up to 1 µm long cilia at both ends; saprobic on twigs and branches of *Salix* mostly still attached to the tree, sometimes on *Alnus* and *Populus*; phen.: (V)VIII-XI ● **Hymenoscyphus salicellus** (Fr.) Dennis (1964)
- 18' Apothecia scutellate, 1-4 mm diam., yellow to ochraceous yellow, reddening, stalked; asci 140-200x13-15 µm; spores scutuloid, 29-35(40)x(4.5)6-7(7.5) µm, filled with medium and small guttules, OCI 5, with 2-3 up to 2(4) µm long cilia at both ends; saprobic on wood of *Carpinus*; phen.: XII-I ○ **Hymenoscyphus lepismoides** Baral & Bemann (2013)
- 19 Apothecia scutellate, 0.5-1.5 mm diam., pale purplish, stalked; asci 90-135x10-12 µm; spores slightly scutuloid to subcylindrical, (0)1-septate, 18-28(30)x(4)5-6(7)µm, with an up to 1.5 µm diam. guttule at each pole and several minute ones, OCI 3-4; saprobic on leaves of *Fagus* in humid places; phen.: X-XI ● **Hymenoscyphus syringicolor** Svrček (1975)
- 19' Apothecia 0.7-2.5 mm diam., pale bluish to greyish violet, shortly stipitate; asci (120)165-190x10-11(12) µm, arising from simple septa; spores 0(1)-septate, 20-25x6-7 µm, without cilia; saprobic on trunks, twigs and branches of *Acer* and *Fagus* in wet habitats; phen.: IX-X ● **Hymenoscyphus ombrophilaeformis** Svrček (1977)
Ill.: Dugoud 2011: Pl. 1-2.
- 20 Spores 4-5 µm wide 21
- 20' Spores wider 23
- 21 Apothecia 0.7-1.5(2) mm diam., disc pale to bright yellow, with long whitish stalk with brownish base; asci *120-160x10.5-14 µm; spores scutuloid, slightly curved, becoming lately 1-septate, *29-38x3.5-4.8 µm, with mostly one centred 5-7(9) long cilium at both ends, seldomly several smaller cilia per end, with several medium and small lipid guttules, OCI 5; saprobic on stems of *Fallopia sachalinensis*, *F. japonica*; phen.: V-VIII(XII) (AT, CH, DE, FR, LU, SE) (●) **Hymenoscyphus reynoutriaae** Baral (2019)
Ill.: Baral 2019: fig. 1-9.
- 21' Spores up to 30 µm long 22
- 22 Apothecia. scutellate, up to 3 mm diam., whitish to ochraceous yellow, reddening, stalked; asci 110-155x9.5-12 µm; spores 0(1)-septate, 19-27(32)x4-5(5.5) µm, with 1(2) up to 6 µm long cili(um)(a) at both ends, with 2-4 up to 3 µm diam. guttules and many small ones per side OCI 5; paraphyses filled with refractive guttules; saprobic on herbaceous stems (*Artemisia vulgaris*, *Aster* sp., *Eupatorium cannabinum*, *Lycopus europaeus*, *Solidago canadensis*, *Tanacetum vulgare*, *Urtica dioica*) and twig of *Alnus*; phen.: VIII-XI ● **Hymenoscyphus scutula** var. **scutula** (Pers.) W. Phillips (1887)
- 22' Apothecia scutellate, up to 2 mm diam., whitish to ochraceous yellow, reddening, stalked; asci 90-145x9-12 µm; spores 0(1)-septate, 19-28(30)x(3)4-5 µm, with 2-3 up to 2.5 µm diam. guttules and many small ones per side, OCI 5, with a thin coating; saprobic on decaying leaves of *Aesculus*, *Alnus* and *Salix*, petioles of *Castanea* and *Fraxinus*,

- twigs of *Alnus*, trunks of *Fagus*, stems of *Athyrium*, *Hypericum perforatum*, *Pteridium aquila*, *Rubus fruticosus*, *Rubus idaeus*, *Teucrium scorodonia*; phen.: IX-XI (BE/F)
 • **Hymenoscyphus scutula** (Pers.: Fr.) W. Phillips var. **pteridis** (Feltgen) Declercq stat. nov. ined.
 ?= *Hymenoscyphus nubilipes* (Boud.) Gamundi (1979) = *Helotium nubilipes* Boud. (1907)
 ?= *Hymenoscyphus cejpi* (Velen.) Dennis (1964) = *Helotium cejpi* Velen. (1934)
 Basionym: *Hymenoscyphus scutula* (Pers.: Fr.) W. Phillips f. *pteridis* Feltgen,
- 23 Apothecia scutellate, 0.5-3(4) mm diam., whitish to ochraceous yellow, reddening, with long stalk; asci 125-185x12-13 µm; spores with or without cilium at both ends, (15)18-28(39)x(4)5-6(7) µm, 0(1.3)-septate, with (2)3(4) up to 4.5 µm diam. guttules and many small ones per side, OCI 5; saprobic on Gramineae, Cyperaceae and herbaceous stems; phen.: X-XI (XII) • **Hymenoscyphus suspectus** (Nyl.) Hengstm. (1985)
- 23' Spores without cilia 24
- 24 Apothecia up to 1 mm diam., whitish to ochraceous yellow, reddening, with up to 1(2) mm long stalk; asci 90-120(140)x13-15 µm. Spores 20-24x(4.5)5-6(6.5) µm, mostly slightly constricted at the middle, with (1)2(3) medium guttules and many minute ones per side, OCI = 5; saprobic on leaves and stems of *Iris pseudacorus* in humid places; phen.: VIII-IX • **Hymenoscyphus iridicolens** Declercq (2012)
- 24' Apothecia up to 1 mm diam., ochraceous yellow, substipitate; asci 120-160x13-15 µm; spores slightly scutuloid, 21-5(31)x5-6(7.5) µm, with (1)2(3) medium guttules and many minute ones per side, OCI = 5, becoming 1(2)-septate and brownish when overmature; paraphyses with large chloraceous yellow to redbrown guttules; saprobic on petioles of *Dryopteris dilatata*, *D. felix-mas*; phen.: X • **Hymenoscyphus chloroscyphus** Baral sp. nov. ined.
- 31 Spores with only minute guttules 32
- 31' Spores with medium and small guttules 33
- 32 Apothecia up to 10(12) mm diam., shortly stipitate, hymenium bright yellow; asci 110-160(170)x8.5-11µm, arising from croziers; spores slightly scutuloid to fusiform with rounded ends, 0(1)-septate, 12-16(17)x3.5-4.5(5) µm, with a cluster of small guttules at each pole, OCI 2-3; on dead branches and wood of *Populus* and *Salix*; phen.: IX-XII(I) ...
 • **Hymenoscyphus conscriptus** (P. Karst.) Korf (1967)
 =? **H. salicinus**
- 32' Apothecia scutellate, 1-2 mm diam., whitish to pale yellowish, stalked; marginal ectal excipulum of guttulate textura porrecta; asci 95-115x9-12 µm, arising from croziers; spores slightly constricted, 0(1-3)-septate, 16-21(37)x3-6 µm, with a cluster of minute guttules at both sides, OCI 4; paraphyses with refractive guttules which tend to become cylindrical; saprobic on petioles and decaying leaves of *Populusxcanadensis*; phen.: X-XI
 • **Hymenoscyphus caudatoides** Declercq spec. nov. ined.
- 33 Excipulum of textura prismatica-porrecta; apothecia 1-3 mm diam., creamy white, with short to long stalk; asci 90-120x10-10.5 µm, arising from croziers; spores subclavate, 10-16x4-5 µm, 0(1)-septate, with many large and small guttules, OCI 4-5; saprobic on cupules of *Fagus*; phen.: VIII-X (BE/F)
 • **Hymenoscyphus rokebyensis** (Svrček) Matheis (1979)
- 33' Spores in average longer than 15 µm 34
- 34 Spores in average up to 20 µm long 35
- 34' Spores longer 41
- 35 Spores mostly ciliate 36
- 35' Spores mostly not ciliate 38
- 36 Apothecia up to 7(10) mm diam., orange yellow hymenium, stalked; asci 150-185x11-13 µm; spores subscutuloid to fusiform, 0(1)-septate, 18-22x4.5-5.5 µm, with many medium to small guttules, OCI 5; saprobic on branches of *Alnus viridis*, *Alnus alnubetula*; phen.: VIII-IX • **Hymenoscyphus trichosporus** Dougloud (2001)
- 36' Spores smaller; asci shorter 37
- 37 Apothecia up to 2 mm diam., whitish to ivory, with up to 10 mm long stalk; asci 120-135x9-10.5 µm; spores scutuloid, 0(1)-septate, mostly with a 3-4 µm long cilium at both ends, 16-20.5x4-4.5 µm, with several medium and small guttules, OCI 4; saprobic on seeds of *Alnus glutinosa* in wet places; phen.: IX
 • **Hymenoscyphus seminis-alni** Baral, Grauwinkel & Eckel (1996)
- 37' Apothecia scutellate, 0.6-1.2 mm diam., pale ochraceous yellow, stalk up to 1 mm long; asci 90-110x9-10 µm, arising from croziers; spores strongly scutuloid to scutuloid, mostly with 1-2 up to 1 µm long cilia at one or both ends, 15-20(21)x3.5-4.5 µm, with up to 2(3) medium and many small guttules per side, OCI 5; paraphyses with refractive vacuoles; saprobic on veins of decaying leaves of *Myrica gale*, *Fagus sylvatica*, *Quercus robur*, *Quercus rubra*, *Salix sp.*; phen.: VII-X • **Hymenoscyphus calyculoides** Declercq sp. nov. ined.

- 38 Apothecia 3-7 mm diam., bright ochraceous yellow, stalked; asci 150-160x10-11 μm , J+, arising from croziers; spores subscutuloid to fusiform, 14-18x5-6 μm , with many small guttules, OCI 5; saprobic on wood of *Fagus sylvatica*, *Prunus*, *Ribes alpina*, *Salix*; phen.: X-XII **Hymenoscyphus subferrugineus** (Nyl.) Dennis (1964)
- 38' Spores subscutuloid; paraphyses with strongly refractive LB's 39
- 39 Apothecia 1-3.5(5) mm diam., whitish, stalked; asci arising from croziers; spores (15)16-20(24)x(4)4.5-5(5.5) μm ; saprobic on blackened petioles of *Fraxinus*; phen.: V-VII(VIII).....
- • **Hymenoscyphus fraxineus** (T. Kowalski) Baral, Queloz, Hosoya (2014)
- 39' Spores shorter 40
- 40 Apothecia up to 2 mm diam., yellow, stalked; asci length very variable (?), arising from croziers; spores subscutuloid to fusiform, 0(1)-septate, 15-18x(3)4-5 μm , mostly with 4 up to 3 μm diam. guttules and many minute ones, OCI 5; saprobic on twigs of *Alnus*, *Fagus*, *Rosa*, *Rubus*, *Salix*, stem of *Fallopia*; phen.: IX-X
- • **Hymenoscyphus calyculus** (Fr.) W. Phillips (1887)
- 40' Apothecia 0.5-1.5 mm diam., white to pale yellow, reddening, with a long stalk; asci 85-110x9-12 μm , arising from croziers; spores subscutuloid to fusiform, (12)16-18(21)x3.5-4.5 μm , sometimes with (1)2 about 1 μm long cilia at one or both ends, 0(1)-septate, with 1-2(3) large guttules and many small ones per side, OCI 5; saprobic on herbaceous stems of *Fallopia japonica*, *Galeopsis tetrahit*, *Hypericum perforatum*, *Lysimachia vulgaris*, *Polygonum mite*. Phen.: VI-XI
- • **Hymenoscyphus macroguttatis** Baral, Declercq & Hengstm. (2006)
- 41 Spores average up to 25 μm long 42
- 41' Spores longer 44
- 42 Apothecia scutellate, 0.5-1.5 mm diam., pale yellowish, reddening, stalked; asci 95-115x9-11 μm , arising from croziers; spores 21-26x4-4.5 μm , sometimes slightly constricted at the middle, mostly with 1-3 up to 3 μm long cilia at both ends and sometimes a few lateral cilia, with 2-3 up to 3 μm diam. guttules and several minute ones per side, OCI 5; saprobic on herbaceous stems such as *Filipendula ulmaria*, (*Lysimachia vulgaris*, *Rubus fruticosus*, *Scrophularia nodosa*), petioles of *Filipendula ulmaria*; phen.: VIII-IX • **Hymenoscyphus scutuloides** Hengstm. (1996)
- 42' Follicolous species 43
- 43 Apothecia up to 2.5 mm diam., ochraceous yellow, stalked; asci 100-115x8-10 μm ; spores slightly scutuloid, 0(1)-septate, 18-23x(3)5-6 μm , OCI ? ; saprobic on petioles of *Polypodium*; phen.: X-XI
- • **Hymenoscyphus polypodii** Declercq sp. prov.
- 43' Apothecia up to 1 mm diam., white, stalked; asci (75)85-105x9-10 μm ; spores scutuloid, 0(1)-septate, 17-23x(3.5)4-5 μm , with 2(3) large and several small guttules per side, OCI 4-4.5 , sometimes with 1-3 about 1 μm long cilia at both ends; paraphyses with refractive guttules which tend to form a cylindrical vacuole; saprobic on petioles and decaying leaves of *Populusxcanadensis*, *Populus tremula*, *Quercus robur*, *Quercus rubra*; phen.: VIII-IX
- • **Hymenoscyphus "Sophienphlege"** Baral sp. prov.
- 44 Apothecia scutellate, 0.5-5 mm diam., bright yellow with whitish margin, with up to 10 mm long stalk; asci 110-135x8-10 μm ; spores strongly curved, 0(1)-septate, 18-30x3-4 μm , OCI 4; saprobic on branches of *Fagus*; phen.: IX-XI(XII)
- • **Hymenoscyphus serotinus** (Pers.) W. Phillips (1887)
Ill.: Rubio & al. 2010: p. 228.
- 44' Not lignicolous 45
- 45 Apothecia up to 3 mm diam., whitish to bright yellow, reddening when damaged, with long stalk; asci 115-135 x14-15 μm ; spores 1(3)-septate when ripe, 22-36x4.5-6.5 μm , OCI 5, with 2-3 up to 2 μm long cilia; saprobic on herbaceous stems; phen.: VII-IX **Hymenoscyphus fucatus**. var. **fucatus** (W. Phillips) Baral & Hengstm. (1996)
- 46' (Description of rehydrated exsiccatum according Hengst.) Apothecia up to 0.9 mm, light yellow, stalked; asci 83-101x9-10 μm , arising from croziers, porus medium blue in IKI; spores 25-31x4-5 μm , mostly with 1-3 tiny setulae at both ends, with 2-3 large guttules per side, OCI 5; paraphyses with refractive guttules; saprobic on leaf of ?*Carex*; phen.: X
- • **Hymenoscyphus fucatus** (W. Phillips) Baral & Hengstm. var. **badensis** Hengstm. (1996)

Key AB - Apothecia mostly not reddening. Paraphyses with low refractive vacuoles. Follicolous species.

- 1 Apothecia scutellate, up to 2.5 mm diam., whitish to ochraceous yellow, blackening when injured, stalked; asci 70-100x8-9 μm , arising from simple septa. Spores with sharply pointed basal end, 0(1)-septate, (15)16-22(24)x3.5-4.5(5.5) μm , with 2-3 medium guttules and several small ones per side, OCI 4.5-5; saprobic on leaf veins and petioles of *Aesculus*, sometimes on *Fagus* and *Quercus*; phen.: VIII-IX
- • **Hymenoscyphus aesculi** (Velen.) Baral & E. Rubio (2014)
Ill.: Baral & Bemmann 2014: fig. 13-19.
- 1' Apothecia not blackening 2

- 2 Apothecia 0.5-1.5(2) mm diam., whitish to yellowish, reddening, stalked; asci 60-95x8-10 µm, arising from simple septa; spores 13-17(20)x3-4.5 µm, guttulate OCI 4-5; saprobic on leaf veins of *Betula*, *Fagus*, *Populus*, *Quercus*; phen.: VII-IX (BE/F, BE/W)..... • **Hymenoscyphus albopunctus** (Peck) O. Kuntze (1979)
- 2' Spores and asci longer 4
- 4 Spores up to 20 (22) µm long 5
- 4' Spores longer 7
- 5 Apothecia 0.5-2 mm diam., white, stalked.; asci with long slender stalk, 120-156x11-12(13) µm, arising from simple septa; spores with rounded apical and obtuse basal end, slightly constricted in the middle, 0(1)-septate, (14)15-20(21)x5-6.5 µm, with one medium guttule and several small ones at each pole, OCI 4-4.5; saprobic on petioles of *Aesculus*, *Populus* and sometimes on twigs; phen.: X-XI • **Hymenoscyphus vitigenus** (de Not.) Dennis (1964)
- 5' Asci up to 120 µm long; spores with OCI = 4-5 6
- 6 Apothecia scutellate, 0.7-1.2 mm diam., stipitate, white; asci 85-120x10-12 µm, arising from simple septa; spores slightly scutuloid, obtuse to rounded basal end when mature, with easily loosening hyaline epiporus, 0(1)-septate, slightly constricted at the middle, (13)14-20x(4)4.5-5.5(6) µm, with 1-3 about 1.5-2 µm diam. guttules and many small guttules per side, OCI 4.5-5; paraphyses with low refractive guttules; saprobic on leaves of *Acer pseudoplatanus*, *Aesculus hippocastanum*, *Alnus glutinosa*, *Betula pubescens*, ?*Myrica gale*, *Fallopia japonica*, *Populus canadensis*, *Salix alba*; phen.: VIII-XI • **Hymenoscyphus caudatus** var. **constrictus** Declercq var. nov. inedit.
- 6' Apothecia scutellate, 0.5-2 mm diam., whitish, reddening, with 0.5-2(4) mm long stalk; asci ?80-120x11-12.5 µm, arising from simple septa; spores scutuloid, pointed basal end, 0(1)-septate, (14)16-22x3.5-4.5 µm, with 1-3 about 1.5-2 µm diam. guttules and many small guttules per side, OCI 4-5, both ends mostly ornamented with the remainings of a thin hyaline sheath; paraphyses with slightly refractive guttules; saprobic on decaying leaves of *Acer*, *Aesculus*, *Alnus*, *Betula*, *Castanea sativa*, *Carpinus betulus*, *Corylus avellana*, *Crataegus*, *Fagus sylvatica*, *Fraxinus excelsior*, *Pinus*, *Platanus*, *Populus*, *Prunus*, *Quercus*, *Robinia*, *Salix*, *Tilia*, *Ulmus*, sometimes on other substrates; phen.: (VI)IX-XI • **Hymenoscyphus caudatus** var. **caudatus** (P. Karst.) Dennis (1964)
- 7 Apothecia scutellate, 1-2.5 mm diam., pale yellowish, stalked; asci 130-160x13-14 µm, arising from simple septa; spores scutuloid, 26-35x4.5-6 µm, 0(1-2)-septate, first hyaline but finally becoming pale brown, basal end strongly pointed, filled with medium and small guttules, OCI 4-4.5; paraphyses with medium low refractive guttules; saprobic on petioles of *Fraxinus*; phen.: XI • **Hymenoscyphus fucatoides** Baral spec. prov.
- 7' Asci up to 120 µm long 8
- 8 Apothecia scutellate, up to 1 mm diam., whitish, stalk up to 1 mm long; asci 95-120x11-13(15) µm, arising from simple septa; spores 18-26x5.5-6.5, basal end strongly pointed, filled with a cluster of few medium and many minute guttules at both sides, OCI 4; paraphyses with large low refractive guttules. On decaying leaves of *Acer pseudo-platanus* and *Quercus robur*; phen.: X-XI • **Hymenoscyphus "acutisporus"** Declercq nom. prov.
- 8' Apothecia scutellate, 1-1.6 mm diam., pale ivory, stalk 1-1.5 mm long and with blackish base; asci 100-115x10-11 µm, arising from simple septa; spores aseptate, 19-27(29)x4.5-6 µm, filled with up to 1.5 µm diam. guttules, OCI 5; paraphyses with low refractive guttules; saprobic on decaying leaves of *Acer pseudoplatanus*; phen.: IX-X • **Hymenoscyphus vacini** (Velen.) Baral & E. Weber (1992)
Ill.: Kirk & Spooner 1984: fig. 11.

Key B - Section Repandoideae.

Key BA - Apothecia reddening when damaged. Paraphyses with strongly refractive vacuolar bodies.

- 1 Asci arising from simple septa 2
- 1' Asci arising from croziers 8
- 2 Spores with OCI 1-2 3
- 2' Spores with OCI 3-5 4
- 3 Apothecia up to 2(3) mm diam., very pale yellow to ochraceous yellow, stalked; asci 55-85x7-8 µm; spores narrowly ellipsoid to cylindrical, 0(1)-septate, 8-14(18)x2.5-3(3.5) µm, with a few small guttules at both ends, OCI 1-2; saprobic on herbaceous stems, sometimes on other substrates; phen.: (IV)V-X (BE/F, CH)..... • **Hymenoscyphus repandus** (W. Phillips) Dennis (1964)
 ? = *Hymenoscyphus populneus* (Velen.) Svr.
- 3' Apothecia up to 2.5 mm diam., flesh-coloured to orange, with long stalk; asci 90-120 µm long, arising from simple septa?; spores ellipsoid-cylindrical to slightly clavate, 9-14x2.5-4.5 µm, with a few guttules per side, OCI 1.5; saprobic on *Cladium*, *Phragmites*, *Scirpus* and *Typha*; phen.: V-VIII • **Hymenoscyphus robustior** (P. Karst.) Dennis (1964)
- 4 Apothecia 0.5-2 mm diam., whitish, shortly stalked.; asci 105-120x10-11 µm; spores shoe-shaped, with a thin coating, 0(1)-septate, 13-18x4.5-5.5 µm, with several small guttules at each pole, OCI 3; paraphyses with refractive

- vacuolar bodies at the upper 15-25 µm of the tip; ectal excipulum of textura porrecta; saprobic on leaves of *Castanea*, *Fagus* and *Quercus*; phen.: IX-XI ● **Hymenoscyphus sparsus** (Boud.) Baral (1985)
 Ill.: Boudier 1905-1910: pl. 495.
- 4' Spores with OCI 4 -5 5
- 5 Apothecia up to 1.5 mm diam. and 1.5 µm high, whitish, shortly stalked; asci 85-120x10-12 µm; spores cylindrical-fusiform, 0(1)-septate, (12)14-16(17)x4.5-5.5(6) µm, multiguttulate, OCI 4-4.5; paraphyses few in amount, with refractive, globose vacuolar bodies or cylindrical body; saprobic on leaves of *Betula pendula*, *Betula pubescens*; phen.: VIII-XI ● **Hymenoscyphus betulae** Declercq sp. nov. inedit.
- 5' Apothecia up to 2 mm diam., bright to ochraceous yellow, stalk mostly with a swollen whitish downy base; asci 80-130x7.5-9 µm, IKI+; spores with rounded ends, 12-23(27.5)x3-5 µm, mostly hyaline, aseptate, with many small guttules, OCI 5, overmature spores 1(3)-septate and pale brown; saprobic on herbaceous stems, occasionally on other substrates such as on the midveins of leaves of *Fagus*; phen.: (V)VI-VIII(X) ● **Hymenoscyphus menthae** (W. Phillips) Baral (1985)
- 8 Apothecia turbinate, 1-3(4) mm diam., yellowish, sessile to shortly stalked, fleshy; asci 100-125x11-15 µm, **porus IKI-**, arising from ???; spores pale brown and roughened when ripe, 1(3)-septate, 14-16(20)x5.5-7 µm, with several guttules, OCI ?; saprobic on wet rotten wood and twigs of ?*Quercus*; phen.: VIII ● **Hymenoscyphus latisporus** Declercq sp. nov. ined.
 A *Phaeohelotium*?
- 8' Ascoporus weakly to strongly blued in IKI 9
- 9 Apothecia white, scutellate, 0.5-1.5 mm diam., with up to 10 mm long slender stalk; asci 45-80x6-7 µm, arising from croziers; spores fusiform, aseptate, 7-11x2.5-3 µm, almost eguttulate; saprobic on fallen bud scales of *Fagus*; phen.: IV-V ● **Hymenoscyphus fagi** (Jaap) Baral comb. nov. ined.
- 9' Spores longer 10
- 10 Spores up to 15 µm long 11
- 10' Spores longer 12
- 11 Apothecia pale ochraceous yellow, reddening when damaged, up to 2 mm diam. and 1.5 mm high, stalked; asci 76-87x7-8 µm, porus medium blued in IKI., arising from croziers; spores fusiform to subcylindrical, aseptate, 10-14(16)x3-4 µm, OCI 1-2; saprobic on deciduous wood and bark on boggy ground; phen.: V-VI ● **Hymenoscyphus peruni** (Velen.) Svrček (1986)
- 11' Apothecia up to 2 mm diam., ochraceous yellow, shortly stalked; asci 90-110x10 µm, arising from croziers; spores 10-13x4-4.5µm, with one up to 1.5 µm diam. guttule and several smaller ones per side, OCI ?; paraphyses ?; saprobic on wood and bark; phen.: V ● **Hymenoscyphus "enamii"** Declercq sp. prov.
- 12 Apothecia up to 2.5 mm diam., white to pale yellowish, with long stalk; asci 85-120x10-12 µm; spores fusiform with rounded ends, becoming (1)3-septate within the asci, 16-22(24)x5-6.5(7) µm, with many small guttules, OCI 4-4.5; on fallen leaves of *Populus canadensis*, petioles of *Fraxinus* in muddy places, exceptionally on dead stems of *Rubus fruticosus*; phen.: (VII)VIII-X(XI) ● **Hymenoscyphus triseptatus** Declercq sp. nov. ined.
 Differs from *H. strangulatus* (Velen.) Svrček described by Velen. as 1-septate, only Svrček saw 3-septate (?overmature) spores.
- 12' Apothecia 1-2.5 mm diam., stalked; asci 140-160(210)x(10)12-13.5 µm; spores fusiform with rounded ends, 0(1)-septate, (17)19-25(27)x5-7(8) µm, with several large guttules, OCI 4.5; saprobic on water-soaked wood and branches of *Fagus* and *Quercus*; phen.: VII-XII ● **Hymenoscyphus laetus** (Boud.) Dennis (1964)
 Ill.: Van Vooren 2012: p .111 & fig. 3.

Key BB - Apothecia not reddening when damaged. Paraphyses with low refractive or without vacuolar bodies.

- 1 Asci arising from simple septa 2
- 1' Asci arising from croziers 3
- 2 Apothecia 0.3-1.2 mm diam., translucent white, with short to long stalk; asci 65-95x9-10 µm, without croziers; spores 12-16(17)x3.5-4.5(6) µm, OCI 1-2; saprobic on leaves of *Populus*; phen.: X-XI ● **Hymenoscyphus phyllogenus** (Rehm) O. Kuntze (1898)
- 2' Apothecia 0.4-0.6 mm diam., milky white, stipe 0.4-0.8x0.15-0.2 mm; asci 60-80x6-7.5 µm, weakly IKI+, without croziers; spores naviculiform, (10.5)12-16(18)x4-4.5 µm, with 1-3 large and many small guttules per hemispore, OCI 4-4.5; saprobic on leaves of *Crataegus monogyna*; phen.: IX ● **Hymenoscyphus crataegi** Baral & R. Galán, in Baral & al. (2006)
- 2 Apothecia up to 15 mm diam., disc pale ochraceous to orange, shortly stalked; asci 125-145x15-16.5 µm; spores naviculate, 1(3)-septate when old, 18-25x5.5-6 µm, with many medium and small guttules, OCI 4-4.5; saprophytic on twigs and wood of *Laburnum anagyroides*, *Laburnum alpinum*; phen.: IV-VIII ● **Hymenoscyphus infarciens** (Ces.) Dennis (1964)

Hymenoscyphus saccicola Svrček in Holm & Nannfeldt, *Thunbergia* 10: 17 (1990)

May belong here:

- 1 Apothecia epiphyllous, stipitate, disc 0.3-0.5 mm diam., yellow when young, darkening with age, subgelatinous when wet; asci 120-130x15 µm, I+; spores ellipsoid, 20-25x8-12 µm, with 12 guttules, first hyaline and aseptate, overmature spores dark brown and 1-septate, sometimes with germ pore; paraphyses cylindrical, apically branched, enlarged at the tips to 3 µm; saprobic on *Lycopodium annotinum* and *L. clavatum*; phen.: VIII
 **Poculopsis ogrensis** Kirschst. (1935)

Hymenotorrendiella P.R. Johnst., Baral & R. Galán

Type species: *Hymenotorrendiella eucalypti* (Berk.) P.R. Johnst., Baral & R. Galán

Lit.: Johnston et al. 2014a: 7.

- 1' Apothecia saucer-shaped, 1-2 mm diam., long-stipitate, yellow to olive when fresh; asci 95-115x8-9.5 µm, I+; spores 12-17x3-5 µm; hairs up to 350x11 µm, dark brown; saprobic on *Acacia melanoxylon* phyllode; phen.: IX
 **Hymenotorrendiella eucalypti** (Berk.) P.R. Johnst., Baral & R. Galán (2014)
 Ill.: Dennis 1978: fig. 7A.

Mytilodiscus Kropp & S.E. Carp.

Typus: *Mytilodiscus alnicola* Kropp & S.E. Carp.

Lit.: Baral: N17, Schmid I. & H. 1990: nr. 25.

- 1 Apothecia hysteriform, stalked, up to 0.8 mm high by up to 0.9 mm wide, black, hymenium in damp condition ellipsoid and pale cream; asci I+; spores ellipsoid, 9.5-11.5x3.5-4.5 µm, smooth, eguttulate, hyaline; paraphyses apices verruculose; ectal excipulum of textura oblita covered by a brown cuticula; saprobic on leaves of *Alnus viridis*; phen.: VI-V **Mytilodiscus alnicola** Kropp & S.E. Carp. (1984)
 Ill.: Schmid I. & H. 1990: nr. 25.

Phaeohelotium Kanouse, Pap. Mich. Acad. Sci. 20: 75 (1935).

Typus: *Phaeohelotium monticola* (Berk.) Dennis = *P. flavum* Kanouse

Lit.: Galán & Baral 1997: 57 (sub *Hymenoscyphus tamaricis*), Van Vooren & Cheype 2008: 139 (sub *Hymenoscyphus sulphuratus*), Van Vooren 2012: 109 (*Hymenoscyphus eichleri*), Baral & al. 2013: 386.

Apothecia pale to ochraceous yellow or brown, sessile to shortly stipitate. Excipulum at least basally with isodiametrical cells.

- 1 Apothecia reddening when damaged; paraphyses with strongly refractive vacuoles; spores ciboroid, cylindrical to fusiform **Key A**
 1' Apothecia not reddening when damaged; paraphyses with low refractive vacuoles or eguttulate; spores ciboroid, cylindrical to fusiform **Key B**

Key A – Apothecia reddening

- 1 Asci arising from simple septa 2
 1' Asci arising from croziers (*H. rarus* to be checked) 10
- 2 Spores up to 15 µm long 3
 2' Spores longer 6
- 3' Asci 8-spored 4
- 4 Asci 140-150x10 µm; spores ciboroid, hyaline, 1-septate, 13-15x4-5 µm, with many minute LB's at both ends, OCI ?3; paraphyses with refractive guttules. On water-soaked cones of *Picea*
 ? **Phaeohelotium umbilicatum** (Le Gal) Dennis (1971)
 Identical with "Hymenoscyphus" sazavae ss. Baral in Weber in table 7?
- 4' Asci up to 90 µm long. Spores with OCI > 2 5
- 5 Apothecia scutellate, up to 2 mm diam., whitish to pale ochraceous yellow, subsessile; asci 45-90x7.5-8.5 µm; spores ciboroid to ovoid, aseptate, 7-10x3-4.5 µm, with one or a few polar guttules per side, OCI 1-2; ectal excipulum of hyaline textura angularis up to the margin; saprobic on old water-soaked cones and wood of *Picea abies*, on water-soaked deciduous wood; phen.: IV-V • **Phaeohelotium rufescens** (Velen.) **Declerco** comb. nov. ined.
 Basionym: *Pezizella rufescens* Velen., Mon. Disc. Bohemiae: 164 (1934)
- 5' Apothecia scutellate, whitish, up to 6(11) mm diam., short to long stalk, base rugulose and sometimes blackish; asci 75-90x7-8 µm; spores cylindrical-subballantoid to subfusiform, 0(1)-septate, 8-13(15)x(2.5)3-3.5(4) µm, with 5-

- 10 small guttules per side, OCI 1-2; lateral ectal excipulum of textura prismatica; saprobic on twigs and branches of *Alnus* and *Salix* in wet places; phen.: (II)IV-VI(XI) • **Phaeohelotium vernum** (Boud.) Declercq (2014)
- 6 Apothecia turbinate, 0.5-2 mm diam., disc bluish grey, outer surface brown to dark brown; asci 97-121x10-12 µm, IKI-; spores fusiform with narrowly rounded to acute ends, straight or slightly curved, 15-23x4-5.5 µm, 0(-1)-septate, OCI 4, smooth, hyaline; saprobic on cupules of *Quercus robur* laying in mud; phen.: X • **Phaeohelotium cf. fulvidulum** (Boudier) Baral & Declercq (2013)
- 6' Asci IKI+ 5
- 5 Apothecia turbinate, 0.5-5 mm diam., ochraceous to brown, reddening when damaged, stalk basally dark brown; asci 110-160x10-12 µm, IKI+; spores fusiform with narrowly rounded ends, 17-25x4.5-5.5 µm, with several medium and small guttules, OCI 4-4.5; on moist plant debris such as twigs of *Carpinus*, *Fagus* and *Quercus*, cupules and leaves of *Fagus*, cones of *Picea*; phen.: VIII-X • **Phaeohelotium fulvidulum** (Boudier) Baral & Declercq (2013)
Ill.: Boudier 1904-1910: pl. 439.
- 5' Apothecia 1-2 mm diam., shortly stalked, pale ochraceous grey; asci 97-126x11-12 µm, IKI+; spores fusiform, 15-19x3.5-4.5 µm, 0(1)-septate, with two 1.5-2 µm diam. VBs and many minute ones, OCI 4-4.5, with a conspicuous mucous coating; saprobic on leaves and twigs of *Salix atrocinerea* lying on moist soil; phen.: IX • **Phaeohelotium brittanicum** Declercq, Capoen & Hairaud sp. nov. inedit.
(M. Hairaud organises sequencing in order to check if different from *Ph. fulvidulum*)
- 5 Apothecia 3 mm diam., shortly stalked, pale yellowish; asci IKI+; spores elongated ellipsoid to subclavate, 15-18.8x5-6 µm, filled with vacuolar and lipid bodies (content 5, but OCI 2-3 in 5% KOH), with loosening mucous coating; on cones of *Pinus sylvestris*. Phen.: IX • **Phaeohelotium parasulphuratus** Baral & Marson nom. prov.
- 8 Spores average shorter than 10 µm 9
- 8' Spores longer 10
- 9 Apothecia turbinate to scutellate, disc slightly concave to plane, ivory grey, up to 2 mm diam., shortly stipitate; asci 65-80x7-9 µm, slightly I+, arising from ; spores ovoid, 6.5-10x2.5-3(3.5) µm, eguttulate, OCI 0; paraphyses with refractive guttules; saprobic on bud-scales of *Picea abies*, *Cedar*; phen.: IV-V "Hymenoscyphus" **ravus** Svrček (1989)
- 9' Apothecia turbinate, disc plano-convex, whitish, 1-2 mm diam., sessile to shortly stalked; asci 60-75x8-9 µm, IKI+, arising from large croziers; spores ovoid to inequilateral, 8-10x3.5 µm, with a 1.5 µm diam. guttule and a few minute ones per side, OCI 2-3; ectal excipulum of textura angularis, marginal zone of textura prismatica-porrecta; on wood of *Quercus robur*, in dry habitat; phen.: VI-XI • **Phaeohelotium flexuosum** (Crossl.) Dennis (1971)
Ill.: Ellis & Ellis 1985: fig. 54.
- 10 Spores up to 15 µm long 11
- 10' Spores average longer than 15 µm 16
- 11 Asci average shorter than 90 µm 12
- 11' Asci average longer than 90 µm 14
- 12 Apothecia 0.3-0.7 mm diam., sessile, greyish white, becoming pinkish; asci porus fully IKI+ red (not *Hymenoscyphus*-type!); spores 11-12(15)x3 µm, 0(1-3)-septate, with a few larger and minute polar guttules; ectal excipulum of hyaline textura globulosa up to the margin; saprobic on decaying wood of conifers; phen.: XII "Phaeohelotium" **subcarneum** (Schumach.) Dennis (1971)
- 12' Asci with amyloid apical ring 13
- 13 Apothecia turbinate to scutellate, disc plano-convex, whitish to pale ochraceous yellow, 1-2(4) mm diam., shortly stipitate; asci 60-95x7-9 µm, arising from croziers; spores ovoid, aseptate, sometimes 1-septate before germinating, 8-13(16)x3-4.5(5) µm, with a few minute guttules at both poles, OCI (0)1-2; paraphyses with strongly refractive guttules; ectal excipulum basally pale brown; saprobic on fallen twigs, branches, cones and woody debris in wet places; phen.: (III)V-XI(XII) • **Phaeohelotium imberbe** (Bull.: Fr.) Svrček (1985) [1984]
- 13' Apothecia scutellate, disc yellow, reddening, shortly stalked; asci †85-90x7-7.5 µm; spores slightly shoe-shaped, †12-15x3.5-4 µm, OCI 3-4; on cones of *Pinus sylvestris*; phen.: VII-IX ○ **Phaeohelotium lutescens** (Hedw.: Fr.) Declercq comb. nov. inedit.
Basionym: *Octospora lutescens* Hedw., Descr. micr.-anal. musc. frond. 2: 31, tab. 9C, figs. 1-7 (1789)
= *Hymenoscyphus lutescens* (Hedw.: Fr.) W. Phillips
= *Hymenoscyphus sazavae* (Vel.) Svr.
- 14 Apothecia 1-2(3) mm diam., pale ochraceous yellow to yellow disc, short paler stalk.; asci 80-130x9-10(11) µm, porus faintly blued in IKI; spores (11)12-13(15)x4-4.5 µm, with thin hyaline covering sheath, mostly with one medium size polar guttule and several small ones per side, OCI=2-3, sometimes forming spherical ascoconidia at one end; on the ground between mosses; phen.: (III)IX-X • **Phaeohelotium epigaeum** (P. Karst.) Baral & Friebes (2020)
- 14' Spores not forming ascoconidia 15

- 15 Apothecia turbinate, margin tending to become lobbed, sometimes fasciculate, whitish to pale ochraceous yellow; asci 85-110x8-10 μm , arising from croziers; spores ciborioid, with thin gelatinous coating, 0(1)-septate, 8-15x3-5.5 μm , with several up to 2 μm diam. guttules per side, OCl 3-4; paraphyses with minute refractive guttules; saprobic on twigs and branches in wet places; phen.: (IV)V-XI • **Phaeohelotium kathiae** (Korf) Baral (2005)
- 15' Apothecia turbinate, 2-4.5(6) mm diam., about 2 mm high, hymenium egg yellow to lemon yellow with paler margin, outer surface pale yellowish; asci 115-130(160)x7-9(10) μm , arising from croziers, porus IKI-; spores fusiform-clavate, inequilateral, 10-15(17)x5-5.5(6) μm , filled with minute guttules, OCl= 4; on needles of *Abies* and *Picea abies*; phen.: IX-X "**Hymenoscyphus**" **sulphuratus** (Fr.) Van Vooren & Cheypte (2008)
Ill.: Van Vooren 2014: fig. 2.
- 16 Ascoporus IKI- 17
16' Ascoporus IKI+ 18
- 17 Apothecia turbinate, 3-8 mm diam., bright yellow; asci 110-145x8-10 μm , porus IKI- or faintly blued, arising from croziers; spores fusiform, inequilateral, 0(1)septate, 13-19x3.5-4.5 μm , with 1(2) medium and several small guttules per side, OCl 4; paraphyses guttulate; ectal excipulum dextrinoid; saprobic on buried rotten woody and herbaceous debris; phen.: IX-X **Phaeohelotium sabranskyana** (Bäumler) Declercq comb.nov. ined.
Basionym: *Humaria sabranskyana* Bäumler, Beitr. z. Crypt. Fl. d. Presb. Com., Heft III: 162 (1897)
= *Helotium sabranskyana* (Bäumler) Bänh.
= *Calycella citrina* var. *terrestris* Boud. = *Calycella terrestris* (Boud.) Le Gal = *Phaeohelotium terrestris* (Vel.) Svřček
- 17' Apothecia turbinate, up to 7 mm diam., bright yellow, reddening; asci 110-150x10-12 μm , porus IKI-, arising from ?croziers; spores shoe-shaped, 0(1)-septate, 12-21x3.5-5.5 μm , with 1(2) medium and several small guttules per side, OCl 4; s aphytic on twig of ?*Populus*; phen.: X • **Hymenoscyphus "Paul"** Baral spec. prov.
Different from *P. sabranskyana*?
Has the coll. H. "Paul" a *textura angularis*????
- 18 Apothecia turbinate with concave to plano-convex disc, fleshy, 0.5-3(7) mm diam., pale yellowish to yellow, reddening when damaged, sessile to shortly stipitate; asci 90-135x9-11 μm ; spores asymmetrical fusiform, inequilateral, 0(1)-septate, (9)11-20(24)x(3)4-5.5 μm , with 1(2) up to 3 μm diam. guttules and many small ones at each side, OCl 4-4.5 resolving in KOH, overmature spores 2(?3)-septate and pale greyish brown; paraphyses, subhymenium and excipulum with strongly refractive guttules; on plant debris, such as cones and needles of *Pinus*, catkins of *Betula*, cupules of *Quercus* and *Fagus*, but mainly on leaf litter of *Alnus*, *Betula*, *Carpinus*, *Quercus*; phen.: (VII)IX-XI • **Phaeohelotium epiphyllum** (Pers.) Hengstm. (2009)
- 18' Overmature spores budding microconidia 19
- 19 Apothecia scutellate, disc pale ochraceous yellow, reddish brown when dry, with a short white stalk; asci 140-170x10-12 μm , arising from croziers; spores cylindrical-ellipsoid, *(11)14.5-16.5(17)x(4.5)5-6.5(7) μm , aseptate, with one large LB and several small ones per half, OCl=4-4.5, frequently becoming 1-septate, pale ochraceous and budding off microconidia; saprobic on decayed wood and bark of *Tamarix africana*, *Tamarix gallica* in coastal marshes and river banks; phen.: X-XII "**Hymenoscyphus**" **tamaricis** Galán & Baral (1997)
- 19' Apothecia asci 114-125 x 8-10 μm , porus IKI blued, with croziers; spores fusoid, often slightly curved or inequilateral, (15.5)16-19x3.5-4(4.2) μm , hyaline, OCl 3, sometimes with one septum in overmature spores, forming microconidia on very short germ tubes; on needles of *Pinus sylvestris*; phen.: VIII
..... **Phaeohelotium epiphyllum** var. **acarium** (P. Karst.) Hengstm. (2009)
Ill.: Van Vooren 2014: fig. 1 (holotype).

Key B – Apothecia not reddening.

- 1 Asci arising from simple septa 2
1' Asci arising from croziers 5
- 2 Apothecia turbinate, up to 6 mm diam., white, with short stout stalk; asci 120-170x11-12 μm , arising from simple septa; spores fusiform, sometimes with hooked apical end, 0(1)-septate, 23-40x4.5-6 μm , with several small guttules, OCl = 3. On cupules, fruit scales and branches of *Quercus*, stem of *Filipendula ulmaria*. Phen.: IX-XI
..... • **Phaeohelotium geogenum** (Cooke) Svřček & Matheis (1979)
- 2' Spores shorter 3
- 3 Apothecia turbinate, 1-5 mm diam., bright yellow, sessile; asci 170-190x10-12 μm , IKI blue; spores broadly fusiform, 0(1)septate, 11-19x4.5-6(7) μm , with several medium and small guttules, OCl = 4, with a gelatinous coating, forming stalked ascoconidia; paraphyses with bright yellow guttules close to the septa; saprobic on rotten wood of *Picea abies*, *Pinus mugo*, *Pinus sylvestris*; phen.: VIII-I ... "**Hymenoscyphus**" **eichleri** (Bres.) Baral (2000)
Ill.: Van Vooren 2012: 111 & fig. 2.
- 3' Apothecia scutellate, 1-2.5 mm diam., ivory to pale yellowish, shortly stalked. Asci 110-160x9-10(11) μm . Spores 0(1)-septate, 12-17x4-5 μm , with a large cluster of minute guttules at both sides, OCl = 3-4. Paraphyses eguttulate.

- Excipulum marginal of textura prismatica, lateral with more isodiametrical cells and a few covering hyphae, stalk of textura prismatica. On leaf litter and other debris of *Picea abies*. Phen.: IX-X
 • **"Hymenoscyphus" sazavae** (Velen.) Svrček ss. ?Baral in Weber(1992: 120)
 = *Helotium eichleri* Bres. ss. Velen. (1934:197)
- 5 Apothecia with plano-convex disc, up to 3 mm diam., pale yellowish, shortly stalked; asci 90-115x8-10 µm, arising from croziers; spores ciborioid, 9-16x3.5-4.5 µm, binucleate, OCI 1; excipulum lateral with shortly prismatical to almost isodiametrical cells; saprobic on leaves of *Populus*, *Quercus*; phen.: X-XI
 • **Phaeohelotium binucleatum** Declercq sp. prov. 6
- 5' Spores not binucleate 6
- 6 Spores up to 15 µm long 7
- 6' Spores longer 8
- 7 Apothecia turbinate, with flat to convex disc, 1-3 mm diam., white to greyish blue, drying pale reddish brown, sessile or with short stout stalk, fleshy, base with brownish ring; asci 70-95x9-9.5 µm; spores 8-13(16)x4-5(6) µm, OCI = 0-1; paraphyses with a low refractive cylindrical body; excipulum of textura globulosa-angularis; on cupules of *Fagus*; phen.: IX-XI (BE/F, NL) • **Phaeohelotium fagineum** (Pers.) Hengstm. (2009)
- 7' Apothecia turbinate to scutellate, up to 2(3) mm diam., whitish to pale yellow, shortly stipitate; asci 80-130x9-10 µm; spores slightly clavate to rhombic, frequently inequilateral, (9)10-14(16)x4-5 µm, with a few small guttules at both poles, OCI = 1-2; saprobic on leaves of *Fagus*, *Platanus*, *Populus*, *Quercus*, *Salix* and petioles of *Aesculus*; phen.: (VI) IX-XI • **Phaeohelotium immutabile** (Fuckel) **Declercq** comb. nov.
 = *Hymenoscyphus immutabilis* (Fuckel) Dennis
 Basionym: *Helotium immutabile* Fuckel, Symb. Mycol., Nachtr. 1: 50 (1871)
- 8 Apothecia 0.7-1, 5 mm diam., white to yellowish, sessile; asci 85-110(125)x10-12µm, porus reddish in IKI, arising from croziers; spores subcylindrical, 0(1)-septate, 12-20x4-5(5.5) µm, OCI = 2-4; on leaves of *Carpinus*, *Fagus*, *Quercus*, *Vaccinium*; phen.: IX-XI **"Hymenoscyphus" carpinicola** (Rehm) Arenholz (1979)
- 8' Ascoporus blued in IKI 9
- 9 Apothecia turbinate, densely crowded, 0.6-1 mm diam., white, shortly stalked; asci 82-103x11 µm, arising from croziers; spores fusiform, 0(1)septate, 12-18x4-5 µm, with two polar guttules and several smaller ones, OCI = 2-3, forming cylindrical ascoconidia; saprobic on cupules and twigs of *Quercus robur*; phen.: VIII-X.....
 • **Phaeohelotium quercicolum** Declercq sp. nov. ined.
- 9' Apothecia turbinate, 1-4 mm diam., bright yellow, subsessile to shortly stalked, fleshy; asci 95-140x9-11 µm, IKI+, arising from croziers; spores fusiform, inequilateral, with rounded ends at both sides, 0(1)-septate, 12-19x(3)4-5 µm, with 1(2) medium guttules and several smaller ones per side, OCI = 4.5, pale brown when overmature; paraphyses and excipulum with low refractive vacuoles; on wet rotten wood, cupules of *Quercus*; phen.: VII-XI
 • **Phaeohelotium monticola** (Berk.) Dennis (1964)

Phaeohelotium lilacinum (Bres.) Dennis, *British Ascomycetes*: 118 (1968)

Phaeohelotium baileyianum Baral & R. Galan (2013)

Pithyella Boud.

Type species: *Pithyella hypnina* (Quél.) Boud.

Lit.: Korf & Zhuang 1987: 1, Priou 2008: 50 (*P. frullaniae*), Priou 2019: 75.

- 1 Apothecia whitish to cream, up to 0.6 mm diam., sessile to stipitate, with downy outer surface; hairs up to 25x4.5 µm; asci 30-45x6-7 µm, arising from croziers, IKI-; spores spherical to subspherical, 3-3.5x2.8-3 µm, poorly verrucose; ectal excipulum of textura prismatica; saprobic on leaves of *Frullania dilatata*; phen.: II-VI(X-XI) (BE/F, FR, UK).....
 ○ **Pithyella chalaudii** Priou (2019)
 Photo: Priou 2008: Pl.V – III.: Priou 2008: fig.5.
- 1 Spores spiniculate 2
- 1 Apothecia ca. 0.5 mm diam., shortly stalked, dark yellow, glabrous. Ectal excipulum consisting of hyphae laying at a small angle to the surface, 2-2.5 µm diam., with gelatinized walls, ending in inflated tips 4-7 µm broad; asci ca. 60x6 µm; spores subglobose, 4-5 µm diam.; on mosses (*Rhacomitrium suOClatum*)
 **Pithyella apicalis** (Berk. & Broome) Korf & Zhuang (1987)
- 1' Apothecia 0.5-1 mm diam., turbinate, hymenium ochraceous yellow, receptacle whitish downy; asci 60-65x9-10 µm; spores 3-4 µm diam., spiniculate; saprobic on moss (*Hylocomium oakesii*); phen.: II
 **Pithyella hypnina** (Quél.) Boud. 125 (1907)
 Ill.: Boudier 1905-1910: pl. 519.

Symphosirinia E.A. Ellis

Type species: *Symphysirinia galii* E.A. Ellis

Lit.: Ellis 1956: 1, Svrček 1989: 221 (*S. chaerophylli*), Engel & Hanff 1992: 112 (*S. angelicae*), Baral 1994a: 211, Garcia & al. 2002: 43 (*S. angelicae*).

- 1 Apothecia short and relatively thick stipitate, stipe 0.8-1.3(3.5)x0.5-1 mm; upper medulla and subhymenium with glassy cells; spores 12-16.5x(4)4.6-5.3 µm, 0(1-2)-septate, with an early loosening coating; saprobic on seeds of *Clematis vitalba*; phen.: II-IV (anamorph), IX-XII (teleomorph and anamorph) • **Symphysirinia clematidis** H.O. Baral (1992)
..... III.: Baral 1994a: fig.24-52.
- 1' Apothecia with long thin stipe 3-6.5x0.3-1 mm; medulla and subhymenium without glassy cells 2
- 2 Spores †10-15x3-4 µm; apothecia 1-1.5 mm diam.; saprobic on seeds of *Galium palustre* in fens; phen.: V-VI (anamorph), X (teleomorph and anamorph) **Symphysirinia galii** E.A. Ellis (1956)
- 2' Spores min. 4-4.7 mm wide; apothecia 1-3(5) mm diam. (following species of uncertain taxonomical value) 3
- 3 Spores apically +/- pointed, †12-21x4-5.7 µm, 0(1)-septate; asci 130-150x8.5-11.5 µm, I+, with croziers; saprobic on seeds of *Angelica sylvestris*, *Heracleum sphondylium*, *Peucedanum palustre*; phen.: IX-X **Symphysirinia angelicae** E.A. Ellis11 (1956)
..... III.: Baral 1994a: fig.53-71, Garcia & al. 2002: fig. 1-2.
- 3' Spores apically hardly pointed, †11.5-14x4-4.8 µm; asci amyloid, with croziers; saprobic on seeds of *Chaerophyllum hirsutum*; phen.: IX **Symphysirinia chaerophylli** Svrček (1989)
..... III.: Baral 1994a: fig.72-77.

Tatraea Svrček

Type species: *Tatraea dumbirensis* (Velen.) Svrček.

Lit.: Svrček 1984: 143 (sub *Helotium dumbirensis*), Spooner 1988: 91 (sub *Ciboria dumbirensis*), Svrček 1993: 161, Baral & al 1999: 71 (key), Rubio & al. 2010: 264.

- 1 Apothecia flat cupulate, (1)2-6(8) mm diam., shortly stalked, pale greyish to pale flesh-coloured when fresh, drying ochraceous to dark brown; asci *(150)180-208x(9.5-)12.5-15.8 µm, apical ring IKI+ with extended amyloid zones, with croziers; spores oblong-ellipsoid to reniform, strongly inequilateral to curved, *(14)17-23(28)x5.5-7.5(8.5) µm, 0(1-2)-septate, smooth, hyaline, guttulate; saprobic on rotten wood of *Fagus* (rarely on *Abies*, *Betula*, *Fraxinus*, *Sorbus*) immersed in water; phen.: (VII)VIII-X(XI) **Tatraea dumberensis** (Velen.) Svrček (1993)
..... III.: Spooner 1988: fig. 1, Baral & al. 1999: fig. 1-10 + photos, Rubio & al. 2010: p. 264.

Tricladium Ingold

Type species: *Tricladium splendens* Ingold

Lit.: Ellis & Ellis 1985: 107.

- 1 Asexual morph: Colonies effuse, thin cobwebby, white. Conidiophores hyaline, 15-35x3-5 µm. Conidia branched, main axis 80-130x3-3.5 µm, lateral branches 50 µm long, multiseptated, hyaline. On rotting cupules of *Castanea* and *Quercus* **Tricladium castaneicola** B. Sutton (1975)
..... III.: Ellis & Ellis 1985: fig. 452.
- 1' Asexual morph: Conidiophores straight, slightly branched hyaline. Conidia terminal, composed of an axial fusiform part 60-100x6-7 µm, 3-6-sptate, and two lateral, tapering parts, 30-80 x6-7 µm, hyaline. On submerged decaying leaves of *Acer*, *Alnus*, *Quercus*, on cupules of *Fagus*. Phen.: II(t) (UK) **Tricladium splendens** Ingold (1942)

HETEROSPHAERACEAE Rehm

Lit: Jaklitsch & al. 2016: 171.

Sexual morph: Apothecia black, with concave hymenium, gelatinous, 0.3-2 mm in diam., sessile, erumpent; margin strongly protruding, even or dentate, completely closing when dry. Ectal excipulum thin, of dark brown, thin-walled textura angularis, protruding margin with or without periphysoids; medullary excipulum hyaline, strongly gelatinous. Paraphyses with inflated, clavate to lanceolate, smooth apex which contains many globose, medium-refractive VBs. Asci with conical apex with hemiamyloid ring (Calycina- to Pezicula-type), arising from croziers. Ascospores 8 per ascus, 0-septate when mature, ovoid to elongate, without gel sheath, lipid content low to medium.

Asexual morph: Conidiomata apothecioid-perithecioid; sympoduloconidia faOClate, septate.

Habitat: Saprobic on herbaceous stems, +/- host-specific, desiccation-tolerant. European, esp. mountainous-boreal to alpine.

Genus belonging to this family:

Heterosphaeria Grev.

Type species: *Heterosphaeria patella* (Tode) Grev.

Lit.: Dennis 1956: 10, Baral :N15, Breitenbach & Kränzlin 1981: 182 (*Heterosphaeria patella*), Hansen & Knudsen 2000: 151.

- | | | |
|------|--|--|
| 1 | Spores up to 3.5 µm wide | 2 |
| 1' | Spores wider | 4 |
| 2 | Spores slender, 7-22x1.6-2 µm; saprobic on <i>Clematis</i> | Heterosphaeria intermedia Höhn. (1918) |
| 2' | Spores more than 2 µm wide | 3 |
| 3 | Apothecia deep urceolate, 1-1.5 mm diam.; hymenium pale cream; outside grey brown, striate; spores cylindrical, *(11)13-17(19)x3-3.5 µm, 0(1)-septate; saprobic on stem of <i>Adenostyles</i> ; phen.: VI | Heterosphaeria lojkae (Rehm ex G. Winter) J. Schröt. (1893) |
| 3' | Apothecia erumpent, globose when young, finally cyathiform with a fimbriate to denticulate margin, 0.5-1.5 mm diam.; hymenium whitish to pale greyish; outside brown-black; spores narrow ellipsoid to cylindrical, 9-13x2-3 µm, 0(1)-septate, hyaline; saprobic on stems of <i>Compositae</i> , mostly on <i>Adenostyles alliariae</i> ; phen.: VII | Heterosphaeria compositarum (Rehm) Höhn. (1918)
Ill.: Schmid I. & H. 1990: nr. 14. |
| 4 | Spores ovoid, *11-14(16)x6-7(8) µm, 0(1)-septate; saprobic on stems of Apiaceae; phen.: VII | Heterosphaeria ovispora Leuchtm. (1987) |
| 4' | Spores not ovoid | 5 |
| 5 | Apothecia erumpent, globose when young, finally cyathiform with a fimbriate to denticulate margin, 0.5-1.5 mm diam.; hymenium whitish to pale greyish; outside purplish brown to brown-black; asci arising from croziers; spores cylindrical, 12-18x4-5 µm, 0(1)-septate, OCI 2-3, hyaline; <i>Heteropatella</i> anamorph with hyaline, slightly curved conidia 20-25x3 µm, 1-2-septate, with filiform appendages; saprobic on stems of Apiaceae (<i>Angelica sylvestris</i> , <i>Anthriscus</i> , <i>Daucus</i> , <i>Foeniculum</i> , <i>Heracleum</i> , <i>Pastinaca sativa</i>); phen.: V-VII • | Heterosphaeria patella (Tode) Grev. (1824)
Ill.: Breitenbach & Kränzlin 1981: Pl. 208. |
| 5' | Apothecia 0.5-1.2 mm diam.; hymenium grey; outside dark brown to black; spores 8-17x3-5 µm, 0(1)-septate, OCI 2-3; <i>Heteropatella</i> anamorph with conidia without filiform appendages; saprobic on stems of <i>Angelica</i> ; phen.: VII | Heterosphaeria alpestris (Fr.) Höhn. (1918) |
| 5'' | Apothecia 1.2-1.5 mm diam.; grey, receptacle black and radially striate; asci IKI+ red; spores 11-18.5x3.5-4.5 µm (Rubio & al. 2010: 20-25x5.5-6 µm) , with minute polar guttules, 0(1)-septate; saprobic on stems of <i>Veratrum album</i> ; phen.: VI | Heterosphaeria sublineolata (Thüm.) Leuchtm. (2014)
Ill.: Rubio & al. 2010: p. 225. |
| 5''' | Apothecia smaller; spores 9-14x3-4 µm; saprobic on stems of <i>Linaria vulgaris</i> ; phen.: VII | Heterosphaeria linariae (Rabenh.) Rehm (1888) [1896] |

HYALOSCYPHACEAE Nannf. 1932

Lit.: Korf & Kohn 1980: 503, [Jaklitsch & al. 2016: 179](#), .Kosonen et al. 2021: 26.

Sexual morph: Apothecia 0.1-2 mm in diam., hymenium urn-shaped to plane, white to yellowish or brownish, soft, rarely perithecial (*Unguicularia*); margin densely or loosely covered by minute or conspicuous hyaline to yellow, reddish or dark brown hairs; sessile or short-stipitate. Ectal excipulum of textura angularis or usually textura prismatica, rarely textura oblita (*Unguicularia*). Hairs smooth or densely warted or encrusted, straight to flexuous or hooked, not rarely glassy-walled or solid, cylindrical to capitate, or tapering to a fine bristle, rarely tipped by crystals (*Graddonidiscus*). Paraphyses cylindrical or sometimes lanceolate, without VBs. Asci with conical apex with euamyloid apical ring of *Calycina*-type, sometimes hemiamyloid or inamyloid, with or without croziers. Ascospores (4-)8 per ascus, small to medium-sized, globose to mostly elongate, rarely 1-3-septate, lipid content low to high.

Asexual morph: hyphomycetous (*Catenulifera*, phialophora-like), conidiogenesis phialidic, conidia small, 0-septate, hyaline; or sporodochial, holoblastic, conidia +/- brown, branched, muriform or in chains (*Cheiromycella*, monodictys-like, *Pseudaegerita*); or sterile (*Meliniomyces*).

Habitat: Saprobies on ligneous or herbaceous substrate, desiccation-sensitive, sometimes -tolerant.

Genera belonging to this family:

1. ?*Ambrodiscus* Carpenter
2. *Asperopilum* Spooner
3. *Cistella* Quél.
4. *Dematioscypha*
5. *Dimorphotricha* Spooner
6. *Echinula* Graddon
7. ?*Endoscypha* Syd.
8. *Eupezizella* Höhn.
9. *Graddonidiscus* Raitv. & R. Galán
10. *Grahamiella* Spooner
11. *Hegermila* Raitv.
12. *Hyaloscypha* Boud.
13. *Incrupila* Raitv.
14. *Luteodiscus* Baral gen. ined.
15. *Mimicoscypha* T. Kosonen, Huhtinen & K. Hansen 2021
16. *Olla* Velen.
17. *Polaroscyphus* Huhtinen
18. *Proprioscypha* Spooner
19. *Protounguicularia* Raitv. & R. Galán
20. *Psilocistella* Svrček
21. *Resinoscypha*
22. *Thindiomyces* Arendh. & R. Sharma
23. *Unguicularia* Höhn.
24. *Urceolella* Boud.

Key to the genera treated here:

- | | |
|--|-------|
| 1 Hair tip and protrudings glassy or thick glassy walls | Key A |
| 1' Hairs not glassy, exceptionally with thin glassy walls | 2 |
| 2 Hairs predominantly conical | Key B |
| 2' Hairs at least partially cylindrical, straight, bended or flexuous..... | 3 |
| 3 Hairs cylindrical to slightly conical or clavate, rounded tip, smooth or almost so | Key C |
| 3' Hairs ornamented | 4 |
| 4 Hairs cylindrical to slightly conical or clavate, rounded tip, spiniculate | Key D |
| 4' Hairs cylindrical tot slightly conical or clavate, predominantly incrustated | Key E |

Key A – Genera with fully or partially glassy hairs

- | | |
|--|-------------|
| 1 Hairs with long glassy upper part without lumen, without protrudings, mostly aseptate; apothecia urn-shaped to discoid | <i>Olla</i> |
| 1' Hairs with a lumen | 2 |

- 2 Hairs with narrow or reduced lumen 3
- 2' Hairs with a wide lumen 5

- 3 Hairs with mostly aseptate lumen, glassy substance dissolving in KOH 5%; asci I+ or I- *Urceolella*
- 3' Hairs with mostly septate lumen, glassy substance not dissolving in KOH 5%; sometimes with thin-walled flexuous marginal hairs (hair dimorphism); asci I+ or I- 4

- 4 Paraphyses cylindrical, smooth *Hyalopeziza*
- 5' Hairs straight, with thin glassy walls, strongly incrustated *Incupila*

Key B - Genera with conical hairs

- 1 Ectal excipulum hyaline; hairs smooth or almost so; paraphyses cylindrical, with non refractive content; mostly with overall dextrinoid reactions *Hyaloscypha*
- 1' Resinous exudates abundant; hairs predominantly blunt and aseptate; overall dextrinoid reactions lacking; almost exclusively known from softwoods *Eupezizella*

Key C – Genera with (almost) smooth cylindrical to clavate hairs

- 1 Ectal excipulum cells covered by yellow exudate..... *Luteodiscus*
- 1' Ectal excipulum hyaline 2

- 2 Hyphal hairs fasciculate, forming long tentacles; spores ellipsoid *Echinula*
- 2' Hairs not fasciculate, cylindrical, smooth, septate; paraphyses cylindrical, without refractive body, as long as the asci; apothecia sessile *Psilocistella*

Key D - Genera with spiniculate cylindrical to clavate hairs

- 1 Hairs intermixed with almost black aseptate setae *Venturiocistella*
- 1' No setae present 2

- 2 Ectal excipulum of hyaline textura prismatica; hairs cylindrical to clavate, bearing sharp cyanophilous spines 3
- 3 Asci with rounded apex, I-; spores filiform, multiseptate, disarticulating within the ascus *Polaroscyphus*
- 3' Asci with conical apex, I+; spores not filiform, aseptate; hairs sometimes smooth *Cistella*

Key E – Genera with incrustated cylindrical to clavate hairs

- 1 Ectal excipulum hyaline; hairs 0(1)-septate, smooth, bearing spherical crystal caps or upper part incrustated by irregular crystals; paraphyses cylindrical with subclavate apex *Graddonidiscus*
- 1' Ectal excipulum with brownish textura prismatica to angularis; hairs cylindrical, straight, thin-walled, granulate, fuscous, multiseptate; asci I+; paraphyses cylindrical *Fuscolachnum*

Cistella Quéf.

Syn.: *Clavidisculum* Kirschst., *Discocistella* Svrček.

Type species: *Cistella dentata* (Pers.) Quéf.

Lit.: Graddon 1974: (sub *Psilachnum rubrotinctum*), Graddon 1977: 261 (sub *Clavidisculum microsporium*), Raschle 1978: 658, Baral & Krieglsteiner 1985: 61, Baral (unpublished key), Galán 1986: 334 (sub *Lachnum deflexum*), Baral 1989: 123 (*C. helvetica*), Raitviir 1990: 306 (*C. sacconi*), Huhtinen & Süderholm 1997: 1 (*C. spicicola*), Hansen & Knudsen 2000: 187, Quijada et al. 2015: 131.

- 1 Spores 19-26x4-4.5 µm, 3-septate when overmature; asci 105-115x10 µm, IKI bb, with croziers; apothecia 0.8-2.5 mm; lignicolous (*Populus*), caulicolous (*Anthriscus*), *Scirpus sylvaticus*, leaves of *Alnus viridis*; phen.: VIII-XII(IV) (CH, DE, ES) **Cistella tenu**
Ill.: Raschle 1978: Abb. 2a-b, Huhtinen 1993: fig. 2.
- 1' Spores max. 15-20 µm long, max. 1-septate when overmature; asci max. 50-80 µm long 2

- 2 Asci IKI-, with croziers ("lotharina" still to test) 3
- 2' Asci not IKI- 8

- 3 Hairs with curved apex, hairs and paraphyses with many low refractive vacuoles, lateral hairs with brown pigment; spores 7.5-10x2-2.5 µm, OCI 3; corticolous (*Juniperus*) "**Unciniella**" **unciniata** (W. Phillips) K. Holm & L. Holm (1977)
- 3' Hairs ±straight 4

- 4 Apothecia 0.15-0.2 mm diam.; asci 20-27x5-7 µm, IKI-; spores 6-7x1.5-2 µm, OCI 2; hairs 13-20 µm long, apex covered by a yellowish amorphous cap (MLZ brownish); saprobic on stems and leaves of *Schoenoplectus lacustris*, *Carex* sp.; phen.: X **Cistella calyptrata** (Svrček) Raitv. (2004)
 Ill.: Svrček 1988a: fig. 4
- 4' Hairs without amorphous cap 5
- 5 Spores 7.5-10x1.8-3 µm, OCI 3; apothecia hyaline; lignicolous **Cistella "lotharina"** Baral nom. prov.
- 5' Spores OCI 0.5-2; apothecia brownish yellow; corticolous 6
- 6 Apothecia up to 0.5 mm diam., white, sessile; asci 28x6 µm, I+; spores ellipsoid, 3-4x1.5-2 µm, eguttulate; hairs clavate, 0-1-septate, up to 30x3 µm; saprobic on bark of *Betula*; phen.: II "**Clavdisculum**" **microsporum** Graddon (1977)
 Ill.: Graddon 1977: fig. 11.
- 6' Spores more than 5 µm long 7
- 7 Apothecia sessile, 0.2-0.5(0.8) mm diam., grey-white; asci *38-45x7-8.5 µm, IKI-, with croziers; spores cylindrical, *5.5-7.5 x2-2.5 µm, OCI1-2; hairs verruculose or smooth; saprobic on branches of *Crataegus*, *Salix*, *Ulmus*; phen.: XI-I
 • **Cistella chlorosticta** (E.P. Fr. ex Cooke) Nannf. (1941)
- 7' Apothecia subsessile, 0.2-0.5(0.6) mm, white; asci 45-51x7-8.5 µm, IKI-, with croziers; spores ± cylindrical, 8.5-10x2.8-3.2 µm, OCI 0.5-2; saprobic on bark of *Pyrus malus*; phen.: XII-II (ES, UK) **Cistella mali** (Rehm) Nannf. (1932)
- 8 Asci IKI rr/rb 9
- 8' Asci bb 15
- 9 Asci without croziers 10
- 9' Asci with croziers 11
- 10 Apothecia 0.15 mm diam., with blackish stalk base; asci 33-40x5-6 µm, IKI rb; spores 5.5-7x2.8-3.7 µm, without croziers; resinicolous "**Bisporella**" **resinicola** (Baranyay & A. Funk) S.E. Carp. & Seifert (1987)
- 10' Apothecia 0.15-0.7 mm; hairs 20-40 µm long; asci *45-55x4-5 µm, IKI r(b), without croziers; spores *5-7.5x1.9-2.4 µm, OCI 0-1; associated with *Chalara*; foliicolous (*Acer*, *Fagus*, *Quercus*); phen.: IX-XII
 **Cistella grumosa** Baral, Senn-Irlt & Aeberhardt (2004)
- 11 Paraphyses and hairs with yellow vacuolar pigment, NH₄OH- (?); apothecia 0.4-1(1.5) mm diam., very pale yellow, shortly stalked; hairs cylindrical, 25-50x5-9 µm, apical cell yellow; asci 38-42x5.5-7 µm, IKI rb, with croziers; spores 5.5-7(8)x2-2.5 µm, OCI 1; lignicolous (*Picea abies*, *Larix*); phen.: XI-II, VI • **Cistella improvisa** (P. Karst.) Baral (2020)
- 11' Paraphyses and hairs hyaline 12
- 12 Apothecia 0.15-0.25 mm diam., sessile on a small base, white; asci *44-60x9-10.5 µm, IKI blue then reddish, arising from croziers; spores 7-11.5x2.8-4.3 µm, OCI 3-4; hairs 20-100x5-8 µm, 0-1-septate, ±cylindrical, pteridicolous (*Athyrium filix-femina*); phen.: III-VI **Cistella helvetica** Baral (1989)
- 12' Spores average less than 3 µm wide 13
- 13 Apothecia 0.2-0.4 mm diam., sessile on a small base; asci 29-45x5-6.5 µm, IKI dirty red, with croziers; spores ellipsoid to ovoid, 3.4-5.3x1.8-2.3 µm, biguttulate (OCI 3); lignicolous (*Quercus*, *Tilia*), fungicolous (*Nemania*); phen.: X-XII
 • **Cistella gelmuydenii** Nannf. (1932)
- 13' Spores 5.3-9.5x2.3-3.6 µm; asci 6.5-8.5 µm wide 14
- 14 Asci IKI red; spores OCI 1-2 (biguttulate), 5.3-8.5x2.3-3.6 µm, 1-celled; lignicolous (*Fraxinus*, *Laurus*)
 **Cistella "fraxini"** Baral nom. prov.
- 14' Spores OCI 4 (multiguttulate), 6.5-9.5x2.5-2.9 µm, 1-2-celled; caulicolous **Cistella "arunci"** Baral nom. prov.
- 15 Spores 5-11x1.5-2.5 µm, OCI 1-4; asci 23-35x5.5-7.5 µm, IKI bb, without croziers; cypericolous
 **Cistella "subfugiens"** nom. prov.
- 15' Asci with croziers 16
- 16 Paraphyses protruding the asci 17
- 16' Paraphyses cylindrical, sometimes slightly lanceolate, not or hardly protruding the asci 18
- 17 Paraphyses p.p. broadly lanceolate, p.p. filiform, 20 µm protruding, hyaline; hairs 40-55x6-8.5 µm, strongly capitate; asci 35-45x5.5-6 µm, IKI blue, with croziers; spores narrowly clavate, 6.5-10x1.9-2 µm, OCI 1; graminicolous (*Phragmites*), cypericolous; phen.: IV-VI **Cistella graminicola** (Raitv.) Raitv. (1978)
- 17' Paraphyses narrowly lanceolate, 5-7 µm protruding; hairs almost whip-like, 30-80x4-6 µm, 4-5-celled, tip 2-2.5 µm wide, ±cork screw like, basal cell yellow; apothecia 0.5 mm diam., urceolate-scutellate, subsessile, pale yellow, becoming brick

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- red in NH₃ vapour; asci 35-40x5-6 µm, IKI blue; spores 6-7x1.5-2 µm (Rubio & al. 2010: 7-8.8x1.9-2.3 µm); saprobic on stems of *Filipendula ulmaria*, *Valeriana pyrenaica*; phen.: V-VI "**Psilachnum**" **rubrotinctum** Graddon (1974)
 Ill.: Graddon 1974: fig. 4, Beyer 1998: Abb. 73, Rubio & al. 2010: p. 256.
- 18 Spores min. 2.5 mm wide 19
 18' Spores up to 2.5 µm wide 24
- 19 Spores 5.5-8.5x2.5-3 µm, OCI 0; asci 55-60x5-5.5 µm ; hairs 12x3-3.8 µm; fructicolous
 **Cistella "parazalewski"** Baral nom. prov.
 19 Spores OCI 2-5 20
- 20 Apothecia 0.2-0.8(1) mm diam., sessile, grey-white, reddening, with white dentate margin; asci 55-80x7-9 µm, IKI+, with croziers; spores 9-12x2.5-3.6 µm, OCI 2-4; hairs 30-70 µm, ±straight, marginal ones forming teeth; on hardwood (*Acer*, *Fagus*, *Quercus*, *Populus*, *Tilia*); phen.: XI-II(IV) (DE, ES, NO, SE, UK) • **Cistella dentata** (Pers.) Quéf. (1886)
 Ill. : Boudier 1905-1910 : pl. 523.
 20' Apothecia not dentate 21
- 21 Apothecia pulvinate, 0,2-0,6 mm diam., gregarious, immarginate; asci 64-79x9-11 µm, IKI+, with croziers; spores (9-)10-15(-16)x2.8-3.8 µm, 1-septate, with several large guttules, OCI 4; cortical cells cylindrical-subclavate, up to 25x5 µm, smooth; saprobic on rotten inner face of *Populus* bark; phen.: XII
 **Cistella ascophanoides** (Boud.) Baral comb. prov.
 Ill.: Boudier 1905-1910: pl. 438.
 21' Spores only with small guttules 22
- 22 Apothecia 0.3-1 mm diam., subsessile, reddening; asci 55-62x6.6-7 µm, IKI blue, with croziers; spores *9-14(15)x3-4(4.5) µm, 0(1)-septate, with several minute LB's (OCI 2-3); hairs 30-40x3-3.5 µm; saprobic on *Puya raimundii*; phen.: X
 **Cistella puyae** Baral nom. prov.
 22' Spores OCI 4-5 23
- 23 Spores 8-18(20)x2.5-3.3 µm, 0(1-3)-septate, with many minute guttules (OCI 4); asci with croziers; graminicolous (*Glyceria aquatica*), basal dead leaves of standing living stems of Cyperaceae (*Scirpus silvaticus*, *Carex* sp.), *Juncus effusus*; phen.: IV-VIII • **Cistella albidolutea** (Feltgen) Baral (1985)
 Ill.: Svrček 1979: fig. 2.1.
 - Attention: maybe 2 species (OCI 1.5-4.5), hairs sometimes smooth, spores with ?ascoconidia)
 23' Spores 10-13.5x2.5-3 µm, aseptate, with many small guttules, OCI 4-5; asci *60-65(70)x8 µm, IKI+, with croziers; hairs 45-60 µm long, flexuous; saprobic on herbaceous stems (*Angelica*, *Mentha longifolia*, *Chenopodium binus-henricus*, *Urtica*, *Valeriana pyrenaica*); phen.: III-VIII • **Cistella aconiti** (Rehm) Raitv. & Järv. (1997)
 Ill.: Rubio & al. 2010: p. 214.
- 24 Spores OCI 3-5 25
 24' Spores OCI 0.5-3 26
- 25 Apothecia 0.1-0.4 mm diam.; asci 25-32x5-6 µm, IKI weakly blue, with croziers; spores 8-11(13)x1.5-2 µm, OCI 3; hairs 12-27 µm long; saprobic on *Typha latifolia*, *Juncus effusus*; phen.: V-VI **Cistella typhae** (Svrček) Raitv. (2004)
 Ill.: Svrček 1988a: fig. 3.
 25' Apothecia up to 0.5 mm diam., substipitate, hymenium pale grey to pale ochraceous; hairs pale ochraceous to yellow-brown, granulate except the base, 0(1)-septate, 38-63x7-10 µm; asci 34-40x8-10 µm; IKI+, with croziers; spores 8-11x2-2.2 µm, OCI 3-4; saprobic on *Lycopus europaeus*, *Rumex hydrolapathum*; phen.: VI-VIII
 • **Cistella cf. crassipila** (Raitv.) Raitv.
- 26 Spores 1-1.5 µm wide 27
 26 Spores wider 28
- 27 Apothecia up to 0.2 mm diam., sessile, disc beige, margin white, blackish below; asci 15-28x4-5 µm, IKI+, with croziers; spores 3.8-6x1-1.5 µm, OCI 0; saprobic on sporophylls of *Diphasiustrum complanatum*; phen.: VII
 **Cistella spicicola** Huhtinen & Söderh. (1997)
 Ill.: Huhtinen & Söderholm 1997: fig. 1.
 27' Apothecia 0.1-0.2 mm diam.; asci 18-30x5-6.5 µm, IKI bb, with croziers; spores 5-8x1-1.5 µm, OCI 1.5-2; hairs 8-27 µm long; saprobic on leaves of Gramineae (*Glyceria*, *Phragmites*, *Triticum*), Cyperaceae (*Eriophorum vaginatum*, *Carex* spp.), *Juncus*; phen.: IV-VIII(X) • **Cistella fugiens** (W. Phillips) Matheis (1977) [1976]
- 28 Apothecia stalked, 0.2-0.6 mm diam., white; asci *27-45x5-5.5 µm, IKI rb to bb, with croziers; spores 4.5-7(8)x1.5-2(2.5) µm, with pointed ends, OCI 1-2 (biguttulate); hairs up to 45 µm long; saprobic on needles of *Picea*, *Pinus*, *Abies*, *Tsuga*, *Juniperus*; phen.: (VI)VIII-II • **Cistella acuum** (Alb. & Schwein.) Svrček (1959)

- III.: Breitenbach & Kränzlin 1981: Pl. 211.
- 28' Apothecia sessile to subsessile 29
- 29 Hairs 18-40x3-4 µm, 1-3-celled, cylindrical; asci 52-65x6.5-7.5 µm, IKI+, with croziers; spores 5-6.3x2.1-2.5 µm, OCI 2-3; lignicolous (*Tilia*); phen.: II ?**Psilocistella "tiliae"** Baral nom. prov.
- 29' Hairs ±tortuous; not lignicolous 30
- 30 Spores up to 8 µm long 31
- 30' Spores longer 32
- 31 Apothecia up to 0.25 mm diam., sessile, white; hairs 28-80 µm long, straight or curved, granulate up to the base; asci 27-50x5-7.7 µm, IKI slightly blued, with croziers; spores 5-7.5(8)x2-3(3.4) µm, OCI 0.5-1, aseptate; saprobic on leaves of *Acer*, *Populus*, *Ulmus*; phen.: X-XI • **Cistella deflexa** (Graddon) Raitv. (1978)
= *Cistella attenuipilus* Graddon fide Raitviir (pers. comm.)
- 31' Apothecia white to pale ochraceous; asci 28-42x3.5-5 µm; spores 6-8x1.3-2 µm, OCI 1; hairs 18-36 µm long; saprobic on herbaceous stems (*Galium*, *Pteridium*); phen.: V • **Cistella hungarica** (Rehm) Raitv. (1978)
- 31" Apothecia brownish white; asci 30-40x5-7 µm, IKI+, with croziers; spores clavate, 6-7.5x1.5-1.8 µm, OCI?; saprobic on stem of Apiaceae; phen.: V (UK) **Cistella granulosa** (P. Karst.) Nannf. (1932)
- 32 Spores 1-septate 33
- 32' Spores aseptate 34
- 33 Apothecia dark grayish or brownish, surrounded by white marginal hairs, 0.5-1.2 mm diam.; asci 50-65x4-6 µm, I+; spores (10.5)12-14(15)x2-3 µm, 1-septate; paraphyses sublanceolate, 1.5-2.5 µm wide; hairs 1-septate, 50-90x3-5 µm; saprobic on herbaceous stems; phen.: VIII-IX; alpine **Cistella sacconii** Raitv. (1991) [1990]
- 33' Apothecia up to 0.75 mm diam., disc ochraceous; hairs up to 30x5 µm, finely incrustated; asci 40-58x7-8 µm, IKI+, with croziers; spores 9-12x2-2.5 µm, 1-septate, OCI 2; paraphyses cylindrical; saprobic on petioles of *Pteridium aquila*; phen.: (VIII)X-XII (BE/F,NL) • **"Dasyscyphus" pteridialis** Graddon (1977)
- 34 Apothecia white to pale ochraceous; asci 43-56x4.5-7 µm, IKI strongly blued, with croziers; spores fusiform, 6-10.5x1.3-2.5 µm, aseptate, OCI 1.5-2.5; hairs 14-50x2,5-5 µm, 1-2-celled; saprobic on herbaceous stems (*Adenostyles*, *Cirsium*, *Galium*, *Heracleum*, *Melissa*, *Rumex*, *Peucedanum*, *Pleuropterus*); phen.: (IV)V-VII(VIII) • **Cistella grevillei** (Berk.) Raitv. (1978)
III.: Boudier 1904-1910: pl. 536 (sub *Trichopeziza galii*), Schmid I. & H. 1990: nr. 18.
- 34' Asci 40-50x5-8.5 µm; spores 8-13x2.5 µm, OCI 2; hairs up to 25x6,5 µm; saprobic on leaves of *Carex*; phen.: IV ...
..... **Cistella caricis** (Raitv.) Raitv. (1978)

Echinula Graddon

Type species: *Echinula asteriadiformis* Graddon

Lit.: Graddon 1977: 255, Dougoud 2011: 22.

- 1 Apothecia up to 0.2 mm diam., sessile, hyaline, with fasciculate marginal hyphae forming up to 350 µm long tentacles; asci 60-75x12-13 µm, I+, with croziers; spores *10-12x5-6.5 µm, biguttulate; saprobic on leaves of *Rubus fruticosus* agg.; phen.: V-IX • **Echinula asteriadiformis** Graddon (1977)
III.: Graddon 1977: fig. 1, Dougoud 2011: p. 22.

Eupezizella Höhn.

Type species. *Eupezizella candida* (Starbäck) Höhn.

Lit.: Kosonen et al. 2021: 48.

- 5 Without overall dextrinoid reactions; hairs blunt, with yellowish, brownish, reddish or hyaline resin usually dissolving in CB, MLZ 6
- 1 Hairs frequently bearing hyaline resin; asci 36-48x4-5 µm, MLZ+, without croziers; spores 5.5-8x1.8-2.2 µm, OCI ?2-3; saprobic on *Betula*; phen.: VIII **Eupezizella candida** (Starbäck) Höhn. (1926)
III.: Huhtinen 1990: fig. 76-77.
- 1' Spores longer 2
- 2 Sexual morph: Apothecia up to 1.5 mm diam., narrowly sessile to shortly stalked, white to yellowish, hairs bearing yellowish brown to brown resin; asci 35-63x5-8.5 µm, MLZ+, with croziers; spores 6.5-10x2-3 µm, aseptate; OCI ?0-2; excipulum and hairs often with amyloid nodules. Asexual morph *Cheiromycella microscopica* has usually branched, cheiroid, golden-brown conidia 8-23 µm long, each branch 1-5-septate and 3-7 µm thick; saprobic on decorticated softwood (*Abies*, *Juniperus*, *Larix*, *Picea*, *Pinus*, *Pseudotsuga*, *Taxus*); phen.: IV-V, IX-XII 2

- • **Eupezizella aureliella** (Nyl.) T. Kosonen, Huhtinen & K. Hansen (2021)
 Ill.: Huhtinen 1990: fig. 32, 62-65.
- 2' Spores with OCI 2-4 3
- 3 Hairs frequently with lumps of yellowish brown to brown resin; asci 42-58x5-7.5(9) µm, MLZ+, with croziers; spores 7-12.5x2-3 µm, 0(1)-septate, OCI2-3; saprobic on decayed wood (*Larix*, *Picea*); phen.: I-XII
 **Eupezizella britannica** (Huhtinen) T. Kosonen, Huhtinen & K. Hansen (2021)
 Ill.: Huhtinen 1990: fig. 68-71.
- 3' Hairs frequently bearing lumps of resin which are rosy red under hand lens in fresh condition; asci 46-64x6-8 µm, MLZ-, with croziers; spores 8-11.5(14)x3-3.5 µm, OCI ?3-4, 0(1)-septate; saprobic on wood; phen.: VIII
 **Eupezizella roseoguttata** (Huhtinen) T. Kosonen, Huhtinen & K. Hansen (2021)
 Ill.: Huhtinen 1990: fig. 74.

Eupezizella nipponica (Huhtinen) T. Kosonen, Huhtinen & K. Hansen (2011)

Grahamiella Spooner

Type species: *Grahamiella dryadis* (Nannf. ex L. Holm) Spooner

Lit.: Carpenter 1981: 96 (sub *Crocicreas dryadis*), Spooner 1981: 281, Ellis & Ellis 1985: 118.

- 1 Apothecia subsessile, 0.15-0.2 mm diam., olive-brown, margin fringed; asci 35-40x5-6 µm, I+; spores subcylindrical, 10-12x2 µm, 1(3)-septate; saprobic on leaf hairs of *Dryas octopetala*; phen.: VI
 **Grahamiella dryadis** (Nannf. ex L. Holm) Spooner (1981)
 Ill.: Spooner 1981: fig. 17.

Graddonidiscus Raitv. & R. Galán

Type species: *Graddonidiscus coruscatus* (Graddon) Raitv. & Galán

Lit.: Graddon 1977: 260 (sub *Dasyscyphus coruscatus*), Beyer 1989: 186 (sub *Dasyscyphus coruscatus*), Galan & Raitviir 1992: 34.

- 1 Spores 4-6x1.5-2 µm; asci without croziers; ectal excipulum and hairs hyaline; saprobic on leaves of *Castanea vesca*, *Quercus robur*, *Q. rubra*, stems of *Rubus*; phen.: X-XII.....
 ○ **Graddonidiscus coruscatus** (Graddon) Raitv. & Galán (1992)
 Ill.: Graddon 1977: fig. 9.
- 1' Spores 6.3-7.5x2-3 µm; asci 27-33x5-6.5 µm, I+, without croziers; ectal excipulum and hairs pale smoky brown; saprobic on leaves of *Quercus ilex* subsp. *ballota*; phen.: X **Graddonidiscus hispanica** Raitv. & Galán (1992)
 Ill.: Raitv. & Galán 1992: fig. 20-27.

Hyaloscypha Boud.

Syn.: *Chrysothallus* Velen., *Ciliosculum* Kirschst., *Fuscocypha* Svrček, *Parorbiliopsis* Spooner & Dennis, *Rhizoscyphus* W.Y. Zhuang & Korf; anam. *Cheiromyrella* Höhn., *Meliniomyces* Hambl. & Sigler, *Pseudaegerita* J.L. Crane & Schokn.

Type species: *Hyaloscypha vitreola* (P. Karst.) Boud.

Lit.: Dennis 1971: 353 (sub *Phaeohelotium extumescens*), Svrek 1986 (*Fuscocypha*), Huhtinen 1990: 1, Huhtinen 2001: 10 (*H. priapi*), Huhtinen 2002: 405, Baral & al. 2009: 1.

- 1 Biotrophic parasites on mosses; asci *43-108x6.5-11.3 µm (†47-86x5-8.8 µm), arising from simple septa, apical dome †0.9-2 µm thick; spores *5.5-12.5x2.8-4 µm, (†5.5-9x2.3-3.5 µm) with a low to high OCI; hairs in H₂O smooth, without exudate, apices 1-1.5(-2.5) µm wide; apothecia entirely white, sessile or stipitate, or grey-brown with a dark brown stipe, pigment unchanged in KOH; ectal excipulum on flanks 30-80 µm thick 2
- 1' Not on mosses 3
- 2 Apothecia grey-brown with dark stipe, excipular cells on lower flanks *4-19x3.5-9 µm; asci often with a basal protuberance; parasitic on *Cephaloziella*, *Lophozia* and *Ptilidium*; phen.: XII-VI(X)
 **Hyaloscypha hepaticola** (Grelet & Croz.) Baral, Huhtinen & De Sloover (2009)
 Ill.: Baral & al. 2009: fig.2-5.
- 2' Apothecia entirely hyaline, often sessile, excipular cells on lower flanks *7-23 x 6-15 µm; asci never with a basal protuberance; parasitic on *Calypogeia*, *Cephalozia* and *Tetraphis*; phen.: XI-V.....
 **Hyaloscypha albocarpa** Baral (2009)
 Ill.: Baral & al. 2009: fig.6.
- 3 Saprophytes on decaying leaves and fruits; asci *28-50x5.5-6(-7?) µm (†28-42.5x5-6.3 µm), arising from croziers, apical dome †0.2-1 µm thick, ascospores *5-8x1.6-2.3 µm (†5-9x1.5-1.9 µm), with a very low OCI, hairs

- fresh in H₂O smooth or finely rough, partly covered by hyaline to yellowish-brownish MLZ-soluble granules or lumps, apices 0.5–1.2 µm wide, apothecia greybrown, with a dark brown stipe, pigment turning olivaceous in KOH, ectal excipulum on flanks 10–12 µm thick 4
- 3' On other substrates. With or without overall dextrinoid reactions; hairs pointed, rarely blunt, smooth or warted, not bearing abundant resin in water mounts (but may show inconspicuous lumps at hair apices) 9
- 4 Ectal excipulum on flanks of *textura prismatica* with 1–1.5 µm thick common walls; ascus apical dome †0.2 µm thick; spores 5-7x1.5-2 µm, OCI 0; saprobic on needles of *Pinus*; phen.: VIII
 ***Hyaloscypha acicularum*** (Velen.) Baral & Huhtinen (2009)
 Ill.: Svrcek 1986: fig. 1(2), Baral & al. 2009: fig.7.
- 4' Apothecia c. 0.2 mm diam., greyish white stipitate; ectal excipulum on flanks of *textura prismatica-angularis* with 0.2–0.3 µm thick common walls, ascus apical dome †0.4–1 µm thick, saprobic on lower face of leaves of *Betula*, *Carpinus*, *Rubus*, involucre of *Castanea*; phen.: IX-X
 ***Hyaloscypha fuscostipitata*** (Graddon) Baral & Huhtinen (2009)
 Ill.: Graddon 1974: fig. 3B, Baral & al. 2009: fig.8-10.
- 9 Spores mean length over 9.5 µm 10
- 9' Spores mean length 4.5-8.5 µm, rarely over 10 µm long 17
- 10 Spores almost cylindrical, up to 2 µm wide 11
- 10' Spores over 2 µm wide 12
- 11 Asci 39-47 µm long, with croziers; hairs narrowly conical ***Hyaloscypha secalina* var. *Secalina*** Velen. (1934)
- 11' Asci 23-36 µm long, without croziers; hairs lageniform
 ***Hyaloscypha secalina* var. *paludicola*** Huhtinen (1990) [1989]
- 12 Asci 42-83(93)x7.2-9.8(10.8) µm, IKI-, without croziers; spores 7.9-12.5(14.7)x2.5-4.3(4.9) µm, 0(1)-septate; hairs short, mostly smooth, often with apical solidifications, MLZ+; saprobic on hardwood (*Carpinus*, *Salix*); phen.: (I)VIII-XI ***Hyaloscypha intacta*** Svrček (1986)
 Ill.: Huhtinen 1990: fig. 117-119.
- 12' Asci IKI rb or bb 13
- 13 Hairs predominantly smooth in MLZ (rarely apically sparsely warted) 14
- 13' Hairs minutely to clearly rough in MLZ, rarely smooth 15
- 14 Asci without croziers, 39-55(56)x6-8.4(8.6) µm, MLZ+; spores oblong or oblong ellipsoid, 9.5-17.5(19)x2.1-3.1(3.2) µm, 0(1)-septate; hairs 18-40 µm long, smooth to minutely warted in CB and MLZ; on bulky wood (*Thuja*), arboreal litter and herbaceous stems; phen.: III-XII • ***Hyaloscypha herbarum*** Velen. (1934)
 Ill.: Huhtinen 1990: fig. 108-114, Rubio & al. 2010: p. 226.
- 14' Asci with croziers, 40-75(84)x7.3-10.5(12.8) µm, MLZ+; spores oblong-ellipsoid to phaseoliform, *8.5-15(20)x2.9-3.7(4.2) µm, 0(1)-septate; hairs with long, narrow apices of equal width and uniformly thickened wall, no apical solidifications; on bulky hardwood (*Acer*, *Alnus*, *Betula*, *Fagus*, *Populus*, *Prunus*, *Ulmus*); phen.: III-XI
 • ***Hyaloscypha vitreola*** (P. Karst.) Boud. (1885)
 Ill.: Huhtinen 1990: fig. 173-176.
- 15 Asci 34-74x6-9(10.5) µm, MLZ+, with croziers; spores ellipsoid to oblong-ellipsoid, 8.5-14.5(15.5)x2.5-4 µm, (0)1-septate, OCI 3; excipulum and hairs frequently with dextrinoid reaction; saprobic on wood and bark of *Alnus*, *Betula*, *Corylus*, *Crataegus*, *Pinus*, *Populus tremula*, *Prunus spinosa*, *Quercus*, *Salix*, *Tilia*; phen.: I-XII
 • ***Hyaloscypha albohyalina* var. *albohyalina*** (P. Karst.) Boud. (1907)
 Ill.: Huhtinen 1990: fig. 36-43.
- 15' Asci without croziers 16
- 16 Hairs with tapering to broad and blunt apices, warted to smooth in CB and MLZ, mostly MLZ+; asci 31-59x5.5-9 µm, MLZ+; spores ellipsoid to oblong-ellipsoid, 7.5-13x2-3.4 µm, aseptate; saprobic on bulky wood (*Alnus*, *Betula*, *Fagus*, *Carpinus*, *Corylus*, *Crataegus*, *Fagus*, *Fraxinus*, *Larix*, *Picea*, *Pinus*, *Populus tremula*, *Prunus avium*, *Quercus*, *Sambucus*, *Ulex*), rarely on litter (cupules of *Aesculus* and *Castanea*, cones of *Picea*, leaves), stems of *Rubus*; phen.: I-XII • ***Hyaloscypha spiralis*** (Velen.) J.G. Han, Hosoya, H.D. Shin (2014)
 Ill.: Huhtinen 1990: fig. 46-54.
- 16' Hairs with low, platelike crust, apically cincinnate, MLZ-; asci 53-88x7-9(10) µm, MLZ+; spores phaseoliform to broadly ellipsoid to oblong-ellipsoid, 9-13.5(15)x3-4 µm, OCI 3; saprobic on softwood (*Pinus sylvestris*); phen.:
 ***Hyaloscypha albohyalina* var. *tigillar*** (P. Karst.) Huhtinen (1990) [1989]
 Ill.: Huhtinen 1990: fig. 57-59.

- 17 Asci with conical apices, 31-55(57)x5.6-7.5(8.5) μm , MLZ-, without croziers; spores *7-11.2(12.5)x2-3 μm wide; hairs short, smooth to clearly warted, apical solidifications frequent, MLZ- or MLZ+; excipulum MLZ-; saprobic on hardwood (*Betula*, *Corylus*, *Crataegus*, *Fagus*, *Populus*, *Prunus*, *Quercus*) and bark; phen.: (III)VII-X
 • **Hyaloscypha quercicola** (Velen.) Huhtinen (1990) [1989]
 Ill.: Huhtinen 1990: fig. 150-153.
- 17' Asci MLZ+ 18
- 18 Hairs predominantly uncinately or apically hooked or forked, apices frequently solidified; asci 35-55x4.5-6 μm , MLZ+, without croziers; spores 5.6-8.2x1.8-2.8 μm , guttulate; excipulum with thickened walls; on pore surface of annual polypores (*Amylocystis*); phen.: VII-VIII **Hyaloscypha epiporia** Huhtinen (1990) [1989]
 Ill.: Huhtinen 1990: fig. 90-92.
- 18' Hairs straight, slightly bent or undulating to apically cincinnate; asci with or without croziers 19
- 19 Spores narrowly cylindrical, mean width 1.4 μm or ellipsoid with mean length <6 μm ; fruiting on herbaceous litter or cone scales 20
- 19' Spores mean width over 1.6 μm and mean length over 6 μm ; fruiting on various substrates 22
- 20 Asci 28-44x3.8-5.2 μm , MLZ+, with croziers; spore 4.2-6.6x1.6-2.2 μm ; on cone scales of *Pinus pinea*; phen.: X-XI..
 **Hyaloscypha strobilicola var. strobilicola** Huhtinen (1990) [1989]
 Ill.: Huhtinen 1990: fig. 160-162.
- 20' On herbaceous litter 21
- 21 Asci 39-47x4.4-4.8 μm , MLZ+, with croziers; spores 7-10.3x1-2 μm , aseptate; hairs narrowly conical; saprobic on culms of *Secale cereale*; phen.: VIII **Hyaloscypha secalina var. secalina** Velen. (1934)
 Ill.: Huhtinen 1990: fig. 156.
- 21' Asci 23-36x3.3-4.9(5.6) μm , MLZ+, without croziers; spores 5.5-10.4(11)x1.1-1.7(2) μm , 0(1)-septate; hairs lageniform; saprobic on herbaceous litter (*Potentilla palustris*, *Eriophorum vaginatum*) in paludified sites; phen.: VII-VIII **Hyaloscypha secalina var. paludicola** Huhtinen (1990) [1989]
 Ill.: Huhtinen 1990: fig. 157-158.
- 22 Hairs often +/- cylindrical, intermixed with conical hairs, prominently warted, often apically cincinnate, MLZ- or fragmentarily MLZ+; spore mean width 1.7 μm ; saprobic on wood of (*Betula*, *Carpinus*, *Quercus*); phen.: VIII-XI.....
 **Hyaloscypha priapi** Velen. (1934)
 Ill.: Huhtinen 2001: fig. 14 & 16.
- 22' Hairs lageniform to narrowly conical, relatively clearly tapering towards the apex, mostly MLZ+ 23
- 23 Asci 34-53(64)x4.8-6.5 μm , MLZ+, with croziers; spores mostly cuneiform, 5-9(10)x1.8-3(3.8) μm , OCI 0-1; hairs narrowly conical to slightly lageniform, predominantly smooth; apothecia occasionally yellowish to naked eye; saprobic on wood of *Quercus*; phen.: (II)VI-X(XII) • **Hyaloscypha daedaleae** Velen. (1934)
 Ill.: Boudier 1905-1910: pl.525, Huhtinen 1990: fig. 80-83.
- 23' Spores ellipsoid, oblong-ellipsoid or elongated, rarely subfusoid 24
- 24 Hairs up to 90 μm long, with thin walls, smooth to warted, apices widened or not, solidified or not 26
- 24' Hairs up to 200 μm long, with uniformly thickened, refractive wall, smooth, apices not widened nor solidified, occasionally cincinnate 25
- 25 Asci without croziers, 22-50x4.5-6.8 μm , MLZ+; spores 5.5-10x1.7-2.8(3) μm , guttulate; hairs rarely with constrictions, frequently corkscrew-like; saprobic on wood (*Alnus*, *Betula*, *Calluna*, *Fagus*, *Pinus*, *Quercus*, *Taxus*), woody litter (*Betula* catkin, *Larix* cone, *Fagus* cupule, twig of *Pinus*) and bark; phen.: VI-XI
 • **Hyaloscypha leuconica var. leuconica** (Cooke) Nannf. (1936)
 Ill.: Huhtinen 1990: fig. 125-127.
- 25' Asci with croziers, 34-51x5.3-6.7(7.2) μm , MLZ+; spores 7-11.3x2-2.8(3.2) μm , 0(1)-septate; hairs often irregularly constricted below; saprobic on wood, woody litter and bark; phen.: IV-XI
 • **Hyaloscypha leuconica var. bulbopilosa** (Feltgen) Huhtinen (1990) [1989]
 Ill.: Huhtinen 1990: fig. 130-133.
- 26 Hairs 20-50 μm long, warted to smooth in CB and MLZ, tapering to a fine point or apically 1-2 μm wide; spores 7-13x2-3 μm , rarely to frequently septate 27
- 26' Hairs 30-60(90) μm long, smooth or bearing loose encrustations when fresh in water, smooth in CB and MLZ, tapering to a fine point; spore mean size 7-8x2 μm , rarely over 2.5 μm wide or over 10 μm long, mostly aseptate 28
- 27 Asci with croziers; spores ellipsoid to oblong-ellipsoid, often septate, guttulate; excipulum and hairs frequently with dextrinoid reaction • **Hyaloscypha albohyalina var. albohyalina** (P. Karst.) Boud. (1907)

- 27' Asci without croziers, 31-59x5.5-9 µm, MLZ+; spores ellipsoid to oblong-ellipsoid, 7.5-13x2-3.4 µm, aseptate; hairs with tapering to broad and blunt apices, warty to smooth in CB and MLZ, mostly MLZ+; saprobic on bulky wood, rarely on litter; phen.: I-XII **Hyaloscypha albohyalina var. spiralis** (Velen.) Huhtinen (1990) [1989]
- 28 Asci 25-44(47)x4.6-6.5(7) µm, MLZ+, with croziers; spores 5.6-8.5x1.9-2.3 µm, 0(1)-septate; saprobic on wood and bark of *Abies*, *Alnus*, *Betula*, *Carpinus*, *Corylus*, *Fagus*, *Malus*, *Larix*, *Picea*, *Populus*, *Prunus*, *Quercus*, *Salix*, *Tilia*, *Viburnum*, rarely on monocotyledonous litter (*Juncus*, *Molinia*, *Typha*) or pyrenomycetes; phen.: (I)IV-XII
..... • **Hyaloscypha fuckelii var. fuckelii** Nannf. (1932)
..... Ill.: Huhtinen 1990: fig. 95-99.
- 28' Asci 26-54(61)x5.1-7.7 without croziers; spores 6.1-10(12)x2-2.9(3.2) µm, 0(1)-septate; ecology as for type variety; phen.: IV-XI • **Hyaloscypha fuckelii var. alniseda** (Velen.) Huhtinen (1990) [1989]
..... Ill.: Huhtinen 1990: fig. 102-105.

Still to recombine:

1. Apothecia 0.2-0.3 mm diam., sessile, white; asci 55-66x8-9.5 µm, I-; spores 10-12.5x3-4 µm, aseptate, biguttulate; paraphyses 2.5-3 µm diam., sometimes branched; saprobic on the underside of decaying trunk of *Betula*, *Fagus*, *Quercus*, on *Hysterobrevium* on *Rosa canina*; phen.: X-XII **Parorbiliopsis minuta** Spooner & Dennis (1986)
- 1' Apothecia cup-shaped, 0.3-0.5 mm diam., cream; asci 40-50x6-8 µm, ?I-; spores 8-11x2.5-3 µm, biguttulate; on *Eutypa* on *Fagus*; phen.: X-XI (BE/F) • **Parorbiliopsis extumescens** (P. Karst.) Spooner & Dennis (1986)
- Parorbiliopsis salicis** Svrček, *Česká Mykol.* **45**(4): 135 (1992)
- Parorbiliopsis samarae** (Velen.) Svrček, *Česká Mykol.* **45**(4): 138 (1992)
- Parorbiliopsis luzulae-silvaticae** Svrček, *Česká Mykol.* **46**(3-4): 157 (1993)

Hyphopeziza J.G. Han, Hosoya & H.D. Shin (2014)

Type species: *Trichopeziza pygmaea* Mouton ≡ *Hyphopeziza pygmaea* (Mouton) J.G. Han, Hosoya & H.D. Shin
Lit.: Svrček 1985: 217 (sub *Unguicularia pygmaea*), Huhtinen 1987b: 279 (*H. pygmaea*), Han & al. 2014: 161.

- 1 Apothecia superficial, broadly sessile, becoming discoid, 0.5-1 mm diam., externally covered with white to grayish hairs, disc flat to slightly convex, somewhat pruinose, gray when fresh becoming white when dry; asci 25-33x3.5-5 µm, IKI+ weakly, with croziers; spores 5-6x2-2.4 µm, eguttulate; hairs tapering, entirely solid or thick-walled with lumen, upper mostly covered by up to 1 µm diam. large incrustations; paraphyses cylindrical with clavate or lanceolate apex, commonly aseptate, less frequently 1-septate near the base, apical parts turning coarsely warty; foliicolous (*Carpinus*, *Laurus nobilis*, *Prunus serotina*, *Quercus*) and sometimes lignicolous (*Pinus* cones, *Rosa*); phen.: VIII-IX
..... **Hyphopeziza pygmaea** (Mouton) J.G. Han, Hosoya, H.D. Shin (2014)
..... Ill.: Huhtinen 1987b: fig.4-5, Huhtinen 2001: fig. 15 & 17.

Incrupila Raitv.

Type species: *Incrupila aspidii* (Lib.) Raitv.

Lit.: Müller 1968: 143 (sub *Dasyscyphus dennisii*), Bøhler 1974: 92 (*I. aspidii*), Dennis 1978: 176 (*I. melatheja*), Baral & Kriegelsteiner 1985: 73, Schmid I. & H. 1990: nr. 22, Raitviir 2000: 457.

- 1 Apothecia deeply cup-shaped, shortly stalked, 0,1-0,3 mm diam., white; ectal excipulum thin-walled, hairs apically slightly tapering and pointed, 60-150 µm long, chalk-white; asci 40-45x4-5.5 µm, MLZ+, with croziers; spores narrowly ellipsoid to clavate, 5.5-8x1.5-1.8 µm, with two oil drops, hyaline; on decaying deciduous wood
..... **Incrupila lignicola** Raitv. (1998)
- 1' Hairs up to 60 µm long 2
- 2 Apothecia cyathiform, sessile, 0.1-0.3 mm diam., white, outer surface and margin covered with white hairs; asci 22-33x5-5.5, I+, with croziers; spores fusiform to clavate, 5-8x1-1.5 µm, aseptate, OCI 0-1, hyaline; hairs thick-walled, strongly incrustated; saprobic on stems and leaves of ferns (*Aspidium*, *Dryopteris*, *Polystichum*); phen.: III-VI
..... **Incrupila aspidii** (Lib.) Raitv. (1970)
..... Ill.: Bøhler 1974: fig. 8, Schmid I. & H. 1990: nr. 22.
- 2' Spores up to 6 µm long 3
- 3 Apothecia cyathiform, sessile, disk flat, black, 0.5 mm diam. outside covered with downy sulphur yellow hairs; asci 25-35x4-5 µm; spores 4-6x1 µm; saprobic on vegetable debris (wood of *Pinus*) in damp places; phen.: III
..... **Incrupila melatheja** (Fr.) Dennis (1978)
- 3' Apothecia cyathiform, shortly stalked, 0.15-0.2 mm diam., white; asci 21-25x4.5-5 µm, J+; spores clavate, 5-6x1.5-2 µm, aseptate, hyaline; paraphyses filiform; saprobic on needles of *Abies*, *Picea*, *Pinus* in high mountains; phen.: IX (FR,CH,AN) **Incrupila dennisii** (E. Müll.) E. Müll. (1977)

Luteodiscus Baral gen. ined.

Type species: ?

Lit.: (none)

- 1 Apothecia discoid, 0.2-1.5 mm diam., sessile to shortly stalked, yellow to egg-yellow, rose in H₂O and KOH 5%. Asci 60x8 µm, IKI blue, with croziers. Spores fusiform, 11-17x3-4 µm, 0(-1)-septate, OCI 3, hyaline. On mosses (*Lophozia*, *Polytrichum*) on acid rocks. Phen.: XI-IV (CH, CZ, DE, ES, FR) **Luteodiscus bryophilus** Baral sp. ined.
- 1' Apothecia similar. Asci clavate, 74-95x11-12 µm, strongly IKI blue, with croziers. Ascospores fusiform, straight to slightly curved, 19-24x2.5-3 µm, 1(-3)-septate, constricted at the middle septum, OCI 0-1, smooth, hyaline. On wood and cupules of *Fagus sylvatica*. Phen.: XI **Luteodiscus fagi** Declercq sp. ined.

Mimicoscypha T. Kosonen, Huhtinen & K. Hansen

Type species: *Mimicoscypha lacrimiformis* (Hosoya) T. Kosonen, Huhtinen & K. Hansen.

Lit.: Dennis 1962: 325, Kosonen et al. 2021: 49.

- 1 Apothecia sessile, about 1 mm diam., whitish. Hairs tapering, 40-115 µm, basally 3-4 µm. Asci clavate, 50-85x6-7 µm, 8-spores, apical pore MLZ+, arising from croziers. Ascospores oblong-fusoid, 9-11(15)x2-2.5 µm, 1-septate, hyaline. On Cyperaceae, *Juncus*. Phen.: IV-VII (BE/F, UK)
.....○ **Mimicoscypha mimica** T. Kosonen, Huhtinen & K. Hansen (2021)
Ill.: Dennis 1962: fig. 10.
- 1' Apothecia 0.2–0.4 mm diam, shortly stipitate to sessile, ochraceous yellow when dry, hair cover white. Ectal excipulum of textura prismatica-angularis, lacking MLZ+ nodules. Hairs 60-130x2-3.5 µm, cylindrical, tapering to a blunt apex, thin-walled, ranging from aseptate to more often 1–3(5)-septate, basally widened up to 5–6 µm, in water often tightly glued together, hyaline resin sometimes present. Asci cylindrical, 40–60x4–6 µm, 8-spored, apical pore MLZ+, arising from simple septa. Ascospores ellipsoid to oblong-ellipsoid, (6.8)7.7-9.7(10.0)x1.9-2.2 µm, Qm= 4.1, 0(1)-septate, eguttulate to guttulate. Paraphyses mainly cylindrical, 1-2 µm wide, sometimes moniliform and sub-capitate. Phen.: VIII-X (CZ, FI, UK) **Mimicoscypha paludosa** (Velen.) T. Kosonen, Huhtinen & K. Hansen (2021)

Olla Velen.

Syn.: *Protoungicularia* Raitv. & Galán, *Ungicularia* ss. auct.

Type species: *Olla ulmariae* Velen.

Lit.: Böhler 1975: 94 (sub *Ungicularia aspera*), Dennis 1975: 352 (*O. ulmariae*), Dennis 1978: 180, Svrček 1985: 216 (sub *Hyaloscypha barbata*), Huhtinen 1987a: 457 (sub *Protoungicularia*), Baral 1993: 8, Baral (unpublished key), Hansen & Knudsen 2000: 209 (sub *Ungicularia*).

- 1 Apothecia urceolate, 0.2-0.5 mm, hymenium grey, outside brown, pubescent; asci 42-58x6-8 µm, I+; spores clavate to fusoid, 10-13x3-4 µm; hairs cylindrical to conical with rounded apex, 40-50x3-4 µm, purplish in MLZ; saprobic on petioles of *Osmunda regalis*; phen.: VI (●) "**Ungicularia**" **aspera** (Fr.) Nannf. (1932)
Ill.: Böhler 1975: fig. 10.
- 1' Spores up to 3 µm wide 2
- 2 Hairs up to 40 µm long 3
- 2' Hairs longer 8
- 3 Apothecia urceolate, about 0.15 mm diam., white; asci 20x4 µm, I+; spores clavate, 4-5x1 µm; hairs cylindrical, 12-25x4-5 µm, red-brown in MLZ, arranged in vertical bands on the receptacle; saprobic on stems of *Filipendula ulmaria*; phen.: V-IX **Olla ulmariae** Velen. (1934)
- 3' Spores wider 4
- 4 Apothecia urceolate, (0.1)0.2-0.6 mm diam.; asci IKI B, without croziers; spores fusoid, 8-10(13)x2-2.5 µm, OCI 4; hairs without lumen, up to 40 µm long; ectal excipulum brownish; saprobic on *Juncus effusus*, *J. inflexus*; phen.: IV-VI ● **Olla costata** (Boud) Svrček (1986)
- 4' Spores with OCI 0-2 5
- 5 Apothecia cupulate; hairs with glassy tip, mostly warted 6
- 5' Apothecia urceolate; hairs +/- fully glassy, smooth 7
- 6 Apothecia cupulate, sessile, 0.1-0.2 mm diam.; asci *24-34x5.5-6.5 µm, IKI blue, without croziers; spores 5-7.5x1.5-2 µm, OCI 2; hairs 10-15x4 µm with glassy tip, sometimes warted; saprobic on leaves of *Calamagrostis*, *Carex*; phen.: V-VII, XI "**Cistella**" **lagenipilus** Spooner (1984)
Ill.: Kirk & Spooner 1984: fig. 9C.

- 6' Apothecia 0.2 mm diam.; asci 35-65x6.5 µm, J+, with croziers; spores 7.5-9x1.9-2.2 µm, OCI 1; hairs 13-25x3.5-6.5 µm, with glassy tip, warty; saprobic on *Luzula glabrata*; phen.: VI-IX **"Cistella" luzulina** (W. Phillips) Matheis (1977) [1976]
 Ill.: Müller 1968: Abb. 2.
- 7 Apothecia urceolate, 0.1-0.3 mm diam., whitish; asci IKI blue, without croziers; spores clavate to fusoid, 5-8x1.2-2.0 µm, OCI 0.5-1.5; hairs cylindrical, without lumen, KOH-, purplish in MLZ; saprobic on herbaceous stems (*Epilobium*, *Eupatorium*, *Reynoutria*, *Rubus idaeus*, *Sambucus ebulus*, *Senecio fuchsii*, *Valeriana*); phen.: V-VII(IX)
 • **Olla millepunctata** (Lib.) Svrček (1986)
 Ill.: Rubio & al. 2010: p. 247.
- 7' Apothecia urceolate, whitish; asci 30-40x5.5-7 µm, IKI blue, with basal protruding; spores 6-9.5x1.6-2.8 µm, OCI 1-2; saprobic on wood of *Alnus*, *Fagus*, *Prunus spinosa*; phen.: II-IV • **Olla scrupulosa** (P. Karst.) Svrček (1986)
- 8 Apothecia cupulate, sessile to subsessile, 0.2-0.5 mm diam., white, brownish to blackish due to the abundant exudates covering the hairs, hairs white to rarely brown, often glued together forming irregular teeth; hairs slightly tapering, up to 110x2-4(6) µm, smooth or rarely with small golden brown exudates, with solid, glassy and I+ apex, septate; asci 30-43x5-7 µm, I+, arising from simple septa or with downward hook at the base; spores *6-10x2.5-3 µm, OCI 1(2), aseptate; saprobic on wood (*Alnus*, *Fagus*, *Populus*, *Quercus*, *Salix caprea*, *Sorbus*, *Tilia*, *Ulmus*); phen.: IX-IV
 • **Olla transiens** (Höhn.) Baral (1993)
 Ill.: Dennis 1975: fig. 4B, Huhtinen 1987a: fig. 1-5.
- 8' Asci I- 9
- 9 Apothecia c. 0.6 mm diam., subsessile, disc almost black; asci 30x4 µm, ?I-; spores 5-7x1-1.5 µm; hairs with ellipsoid base and long solid tip, up to 70x8 µm; saprobic on stems of *Epilobium hirsutum*; phen.: IV
 • **"Unguicularia" dilatopilosa** Graddon (1974)
 Ill.: Graddon 1974: fig. 3.
- 9' Apothecia erumpent, up to 0.2(0.3) mm diam., disc faintly yellowish with white margin; asci 37-74x8-9 µm, with croziers; spores fusoid-subfusoid, 8.5-16(17.5)x2.5-3.2 µm, guttulate; saprobic on *Nephroma* spp.(NO, SE, UK)
 **"Protounguicularia" nephromatis** (Zhurb. & Zavarzin) Huhtinen & al. (2008)
 Ill.: Huhtinen & al. 2008: fig. 1.

Polaroscyphus Huhtinen

Type species: *Polaroscyphus spetsbergianus* Huhtinen.

Lit.: Huhtinen 1987: 132.

- 1 Apothecia cyathiform, up to 0.1 mm wide, subsessile, with white hairy margin, base pale brown; asci 4-spored, with rounded apex, I-, I+ after KOH pretreatment; spores filiform, 50-62x1.8-2 µm, multiseptate, disarticulating while still in the ascus, hyaline; paraphyses 1 µm diam.; hairs up to 45x7 µm, spinulose, base rarely smooth; saprobic on leaves of *Salix polaris*; phen.: VII **Polaroscyphus spetsbergianus** Huhtinen (1987)
 Ill. Huhtinen 1987: fig. 5 a-e.

Psilocistella Svrček

Type species: *Psilocistella obsoleta* (Velen.) Svrček.

Lit.: Svrček 1977: 196, Svrček 1979: 204, Huhtinen 1987: 134, Huhtinen 1993: 102, Quijada & al. 2014: 143 (key).

- 1 Mean spore length up to 5.5 µm 2
- 1' Mean spore length more than 5.5 µm 3
- 2 Apothecia up to 0.1 mm diam., disc flat, pale yellow, margin densely clothed by short white hairs; asci 20-22x3.5-5 µm, I+; spores 2.5-4x1-1.5 µm, biguttulate, hyaline; hairs cylindrical, 25-40x2-2.5 µm, obtuse, septate; saprobic on rotten wood of *Fagus sylvatica*; phen.: X (CZ) **Psilocistella obsoleta** (Velen.) Svrček (1977)
- 2' Apothecia 0.3-0.5 mm diam., disc flat, pale brown, margin densely clothed by short white hairs; asci 25-30x4.5-5 µm, I+; spores 4-6x1.3-1.8 µm, eguttulate, hyaline; saprobic on very rotten damp wood of *Pinus sylvestris*, *Picea abies*; phen.: VII (CZ) **Psilocistella lignatilis** (Velen.) Svrček (1977)
- 3 Ascus porus inamyloid 4
- 3' Ascus porus amyloid 6
- 4 Apothecia 0.8-1 mm diam., disc flat, substipitate, margin minutely hairy, pure white; asci I-; spores inequilateral tear-shaped, 5-8x2.5-3 µm, smooth, hyaline; saprobic on fallen cones of *Pinus sylvestris*, *Thuja plicata*, in the cavity of a stump of *Picea abies*; phen.: I-V (CZ) **Psilocistella conicola** (Velen.) Svrček (1979)
- 4' Spores more than 8 µm long 5
- 5 Spores 8-12x3-4 µm; asci narrower than 8 µm; on dead branches of *Jasminum fruticans* (ES)

- **Psilocistella jasmini** Raitv. & R. Galán(2004)
- 5' Spores wider than 4 µm, asci wider than 8 µm; on dead stems and leaves of *Alchemilla glomerulans* (Greenland) ...
..... **Psilocistella alhemillae** Raitv. (2003)
- 6 Mean width of spores < 2.5 µm, and mean length of asci < 45 µm 7
- 6' Mean width of spores > 2.5 µm, mean length of asci >45 µm 9
- 7 Mean length of asci >36 µm; on dead leaves of *Fagus* (CZ) **Psilocistella parca** Svrček (1992)
- 7' On stems or wood 8
- 8 Apothecia 0.3-1 mm diam., margin densely clothed by short white hairs; asci 8-spored, *41-61x5.5-7 µm, †25-48x4-6 µm, 1+, with croziers; spores *5.5-9.5x2-3.2 µm, †5-84-7x1.6-2.2 µm, OCI 2-3; hairs 30-85x2.5-4 µm, septate; ectal excipulum and hairs 1+; saprobic on wood and bark of *Fagus*, *Laurus*, *Quercus* in moist forests; phen.: II-V (CZ, DE, FR, SP) **Psilocistella quercina** (Velen.) Svrček (1977)
..... Ill.: Quuada et al. 2014: fig. 1-2.
- 8' Asci usually 4-spored (rarely 8-spored); spores 7-12x1.5-2 µm; on stems of *Typha latifolia* (CZ)
..... **Psilocistella fonticola** Svrček (1983)
- 9 Spores narrower than 4 µm 10
- 9' Spores broader than 4 µm; on dead stems and leaves of *Epilobium latifolium* (Greenland)
..... **Psilocistella macrospora** Raitv. (2003)
- 10 Spores up to †9x2.5-3 µm; asci †60-70x7.5-10 µm; on rotten wood of *Alnus glutinosa*. Phen.: V (CZ)
..... **Psilocistella vernalis** (Velen.) Svrček (1985)
- 10' Spores larger than 9 µm; on leaf veins of *Iris pseudacorus*. Phen.: IX (CZ)
..... **Psilocistella nymphaeum** (Velen.) Svrček (1985)

Resinoscypha T. Kosonen, Huhtinen & K. Hansen

Type species: *Resinoscypha variepilosa* (R. Galán & Raitv.) T. Kosonen, Huhtinen & K. Hansen.

Lit.: Kosonen et al. 2021: 58.

- 1 Apothecia cupulate, broadly sessile, up to 0.5 mm diam. when dried; hymenium white; margin with white hairs, outside brown when dried; asci 26-33x4-6 µm, MLZ+; spores ellipsoid to subfusiform 4-7x1.8-2 µm, 0(1)-septate, OCI 1-2; hairs cylindrical, up to 100x2-4 µm, hyaline, with brownish resinous exudates; saprobic on deciduous and coniferous wood (*Abies*); phen.: VIII-XI (DK, ES, SK)
..... **Resinoscypha variepilosa** (R. Galán & Raitv.) T. Kosonen, Huhtinen & K. Hansen
..... Ill.: Huhtinen 1987b: fig.1-2, Huhtinen 1993: fig. 1f-j.
- 1' Apothecia 0.3-1 m diam.; hymenium white; outside whitish, basally brownish; without true subiculum; asci 42-56x5-7 µm, 1+; spores cylindrical to ellipsoid, 8.5-16x2-3 µm, 1-septate at maturity, OCI 0-2; hairs cylindrical, 30-150x2-5 µm, thin-walled, hyaline to brownish, with brownish exudates; saprobic on coniferous wood (*Abies*); phen.: IV-VIII (ES, FI, NO) **Resinoscypha monoseptata** (R. Galán & Raitv.) T. Kosonen, Huhtinen & K. Hansen
..... Ill.: Huhtinen 1987b: fig.3-4, Huhtinen 1993: fig. 3i-l.

Unguicularia Höhn.

Type species: *Unguicularia unguiculata* Höhn.

Lit.: Höhn 1905, Raschle 1977: 220.

- 1 Apothecia sessile, spherical-urceolate, 0,2-0,4 mm diam., hairy, translucent white; hairs tapering, upper 2/3-3/4 without lumen, base swollen, 40-95x6-9 µm, brown to black in IKI; asci IKI-, without croziers; spores fusiform, *10-12x2.5-2.8 µm, smooth, hyaline; saprobic on needles of *Abies*; phen.: III-IV(VII-VIII)
..... **Unguicularia unguiculata** Höhn. (1905)
..... Ill.: Raschle 1977: fig. 12a-c.

Urceolella Boud.

Type species: *Urceolella crispula* (P. Karst.) Boud.

Syn.: *Betulina* Velen.

Lit.: Müller 1968: 151 (*U. tetraspora*), Böhler 1974: 95 (sub *Unguiculella xylemicola*, *U. carestiana*), Raschle 1977: 204, Raschle 1977: 215 (sub *U. salicicola*), Graddon 1977: 262 (sub *Hyalotricha salicicola*), Huhtinen 1985b: 17, Svrček 1985: 214 (sub *Hyalopeziza pani*), Huhtinen 1987: 277 (sub *U. conspucua*), Huhtinen 1988: 8, Hansen & Knudsen 2000: 210, Huhtinen 2001: 1, Baral & al. 2009: 1, Rubio & al. 2010: 210 (sub *Calloria gentianae*), Holm & Nannfeldt 1990a: 11 (sub *Mollisia arenula*).

1 On pteridophytes	2
1' Follicolous, herbicolous, lignicolous species or seated on sclerotia	5
2 Apothecia cupulate, up to 0.25 mm diam.; asci 4-spored, 30-50x5-7 µm, I+; spores 13-22x2-3.5 µm, overmature spores 1-3-septate; hairs up to 60x6 µm, glassy content dissolving in 5%KOH; saprobic on petioles of <i>Athyrium filix-femina</i> , <i>Athyrium alpestre</i> ; phen.: IV-VII (CH)	6
Urceolella tetraspora (Rehm) E. Müll. (1968)	
Ill.: Müller 1968: Abb. 6.	
2' Asci 8-spored	3
3 Apothecia cup-shaped, up to 0.4 mm diam., shortly stipitate; hymenium white; outside white with brownish base, pubescent; asci 33-37x4-5 µm, I+; spores 6.5-8x1.5-2 µm; hairs typically with numerous branches, up to 48 µm long, solid with basal lumen, unchanged in iodine, glassiness dissolving in 5% KOH; saprobic on stems of <i>Equisetum sylvaticum</i> ; phen.: V-X	4
Urceolella equiseti (Huhtinen) Huhtinen (1987)	
Ill.: Huhtinen 1985b: fig.1-5.	
3 Hairs unbranched; on ferns or <i>Lycopodium</i>	4
4 Apothecia urn-shaped, 0.1-0.3 mm diam., sessile to substipitate, white to cream or pale yellowish brown; outside pubescent; asci 30-58x4.5-7 µm, IKI+; spores cylindric to clavate or fusoid, 6-14x1.5-2.5 µm, 0-1-septate; hairs with thick glassy walls, dissolving in 5% KOH, unchanged in 2% KOH and iodine, mostly with narrow lumen widening at apex; saprobic on petioles of <i>Athyrium filix-femina</i> , <i>Athyrium alpestre</i> , <i>Dryopteris filix-mas</i> and <i>Matteuccia</i> ; phen.: (III)V-VI(VIII) (BE/F, BE/W)	4
● Urceolella carestiana (Rabenh.) Dennis (1963)	
Ill.: Böhler 1974: fig. 13-14, Raschle 1977: Abb.1.	
4' Apothecia cup-shaped, 0.1-0.2 mm diam., sessile to substipitate, white to cream or pale orange; outside pubescent; asci 33-50x5-8 µm, I+ or I-; spores ellipsoid to fusoid, 9-13x1.5-3 µm, 0(1)-septate, OCI 1-2; hairs up to 25x2-5 µm, solid or luminal, the solidifying substance dissolved or loosing refractiveness in 10% KOH; saprobic on petioles of <i>Dryopteris dilatata</i> , <i>Dryopteris filix-mas</i> and on <i>Lycopodium clavatum</i> , <i>L. complanatum</i> ; phen.: VII-XI	4
Urceolella pani (Velen.) Huhtinen (1988) [1987]	
Ill.: Böhler 1974: fig. 11, Huhtinen 1988: fig.: 1-3.	
4" Apothecia 0.2-0.5 mm diam., urceolate, pale grey, with up to 70 µm long hyaline to pale brown, thin-walled, tapering hairs; asci 30-55x7-8 µm, I+, with croziers; spores *8-12(-14)x(1.8)2-2.8 µm, hyaline, OCI 1; saprobic on underside of fronds of <i>Pteridium aquilinum</i> and <i>Matteuccia struthiopteris</i> ; phen.: (III)V-VII	4
○ "Micropodia" arenula (Alb. & Schwein.) Boud. (1907)	
Ill. Boud. 1905-1910: pl. 528.	
5 On sclerotia	6
5' Follicolous, herbicolous or lignicolous species	7
6 Apothecia cup-shaped, 0.2 mm diam., short stipitate, white to cream; asci 30-36x4-5 µm, I+, arising from croziers; spores fusoid, 6-8x1-1.5 µm, aseptate; hairs up to 90x2.5 µm, with very thick glassy walls, loosing refractiveness in 7% KOH, with narrow lumen widened at apex, multiseptate; on sclerotia in leaves of <i>Carex vesicaria</i> ; phen.: IX	6
Urceolella curvipila (P. Karst.) Raschle (1977) [1976-77]	
Ill.: Huhtinen 1988: fig.5.	
6' Apothecia up to 0.5 mm diam., sessile to shortly stalked, disc yellow; asci 45x5 µm, I-; spores 6-8x1.5 µm; hairs up to 100x3-4 µm; on sclerotia (<i>Typhula</i> sp.?); phen.: ?	6
Urceolella seminis (Cooke & W. Phillips) Dennis (1963)	
7 Herbicolous species	8
7' Follicolous and lignicolous species	12
8 Spores up to 9 µm long	9
8' Spores longer	10
9 Apothecia sessile, subglobose, 0.1-0.3 mm diam., white to cream with hairy margin; asci 28-40x3.5-5.5 µm, I+, with croziers; spores clavate to fusoid, 4.5-9x1-2 µm, aseptate, OCI 2-3; hairs cylindric, 50-170x3.5-6 µm, sharply bent basally, with very thick glassy walls dissolving in 5% KOH, unchanged in 2% KOH, lumen narrow and often widened at apex; saprobic on herbaceous stems (<i>Aconitum napellus</i> , <i>Aconitum vulparia</i> , <i>Adenostyles</i> , <i>Anthriscus sylvestris</i> , <i>Chamerion</i> , <i>Chenopodium bonus-henricus</i> , <i>Cirsium spinosissimum</i> , <i>Geranium sylvaticum</i> , <i>Heracleum</i> , <i>Onobrychis viciifolia</i> , <i>Polygonum cuspidatum</i> , <i>Rumex alpestris</i> , <i>Thalictrum aquiligifolium</i> , <i>Veratrum album</i>); phen.: IV-VII(IX) (BE/F, BE/W)	9
● Urceolella crispula (P. Karst.) Boud. (1907)	
Ill.: Dennis 1978: XXIV D, Raschle 1977: Abb.2, Huhtinen 1985b: fig.60, Rubio & al. 2010: 269.	
9' Similar to <i>U. crispula</i> but apothecia up to 0.5 mm diam., orange; hairs up to 250 µm long; saprobic on <i>Urtica</i> ; phen.: V	9
Urceolella aasii S. Olsen & J.H. Haines (1993)	
10 Apothecia about 0.5 mm diam., yellowish white; asci 50-55x6.5-7 µm, I+; spores 10-12x2.5-3 µm; hairs wavy, up to 300x6.5 µm, with narrow lumen; saprobic on <i>Adenostyles alliariae</i> ; phen.: VIII	10

- **Urceolella tuberculiformis** (Ellis & Everh.) Dennis (1963)
 Ill.: Raschle 1977: Abb. 10d-f.
- 10' Asci I- 11
- 11 Apothecia cup-shaped, 1 mm diam., whitish to pale yellowish; asci IKI red, with croziers; spores 14-19x4.5-6 µm, 1(2)-septate, OCI 4; hairs attenuate, without lumen, glassy content dissolving in KOH; saprobic on stems of *Veratrum album* and *Gentiana*; phen.: VI "**Calloria**" **gentianae** Grelet & Croz. (1928)
 Ill.: Rubio & al 2010: p. 210.
- 11' Apothecia about 0.25 mm diam., yellowish white, shortly stalked; asci c. 50x9 µm, I-; spores 10-13(16)x2.5-3 µm; hairs up to 63x3-5 µm, glassy walls dissolving in 5%KOH; saprobic on leaves of *Saxifraga aizoon*; phen.: VII
 **Urceolella saxifragae** Svrček (1967).
- 12 Spores less than 10 µm long 13
- 12' Spores more than 10 µm long 14
- 13 Apothecia 1-1.5 mm diam., substipitate; outside with dense long hairs; asci 27-34x4-4.5 µm, IKI bb, arising from croziers; spores ellipsoid-fusiform, 4.5-5.5x1.5-2 µm, OCI 0-1; hairs cylindrical, flexuous, up to 1000x2-3 µm, aseptate; saprobic on wet leaves of *Betula*, *Populus*, *Quercus* and *Salix caprea*; phen.: X-XI
 **Urceolella hirta** (Velen.) Svrček, De Sloover & Baral (2009)
 Ill.: Graddon 1977: 13, Raschle 1977: Abb.11 a-c.
- 13' Apothecia cupulate, shortly to prominent stipitate, up to 0.2 m when dried, flank brownish when dried but densely covered by appressed white hairs; asci 30-42x3.5-6 µm, I+, arising from croziers; spores ellipsoid to subfusiform, 6-10x2-2.5 µm, aseptate, OCI 2; hairs cylindric, flexuous, with blunt apex, up to 130x2.5-3.5 µm, aseptate to multiseptate; saprobic on leaf remnants; phen.: III **Urceolella appressipila** Graddon (1986)
 Ill.: Graddon 1986: fig. 9, Huhtinen 1988: fig.4.
- 14 Apothecia cup-shaped, up to 0.5 mm diam., short stipitate, whitish, with hairy margin; asci 65-90x8-10 µm, I-; spores 10-20x3-5 µm, 0-1-septate; hairs cylindric or tapering toward a blunt apex, to 330x3-6 µm, with very thick glassy walls losing refractiveness in 5% KOH, with thin septa; saprobic on needles and twigs of *Juniperus*, leaves of *Populus*; phen.: X **Urceolella juniperi** (Velen.) Huhtinen (2001)
 Ill.: Huhtinen 1987: fig.3, Huhtinen 2001: fig. 1-2.
- 14' Apothecia up to 0.5 mm diam. when dry, broadly sessile, densely covered by whitish hairs; asci 55-74x8.5-10.2 µm, IKI+, with croziers; spores 11-15.8x4-4.6 µm, 0(1)-septate, guttulate; hairs undulating to curved, with widened base and narrow, apical part with inconspicuous lumen, up to 35x5 µm; saprobic on twigs of *Cotoneaster*; phen.: IX
 **Urceolella pallida** (Velen.) Huhtinen (2001)

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Lit.: Ekanayaka et al. 2019: 345.

Sexual morphs: Ascomata apothecial, cupulate or discoid, sessile or short stalked, sometimes gelatinized. Margins covered with hairs. Hairs white or brownish, cylindrical, granulate, sometimes septate. Ectal excipulum composed cells of textura angularis, intricata or prismatica. Medullary excipulum composed of cells of textura intricata to angularis. Para-physes hyaline, filiform, septate, slightly enlarged at the apices. Asci 8-spored, cylindric-clavate, amyloid or non-amyloid, sometimes arising from croziers. Ascospores hyaline, 0–3-septate, ellipsoid.

Asexual morphs: Conidiomata hyphomycetous. Conidiophores borne on single or fasciculate hyphae. Conidiogenous cells phialidic. Conidia solitary, aseptate, subcylindrical to narrowly obovate, globose to turbinate or napiform, straight or slightly curved, hyaline.

Habitat: Saprobic on dead plant material.

Genera belonging to this family:

1. *Fuscolachnum* J.H. Haines
2. *Hyalopeziza* Fuckel
3. *Hyphodiscus* Kirschst.
4. *Soosiella* Hujšlová & M. Kolařík
5. *Scolecolachnum* Guatim., R.W. Barreto & Crous
6. *Venturiocistella* Raitv.

- | | | |
|----|--|-------------------------|
| 1 | Hairs glassy, with reduced, mostly septate lumen, glassy substance not dissolving in KOH 5%; sometimes with thin-walled flexuous marginal hairs (hair dimorphism); asci I+ or I- | <i>Hyalopeziza</i> |
| 1' | Hairs not glassy | 2 |
| 2 | Hairs cylindrical, intermixed with almost black aseptate setae | <i>Venturiocistella</i> |
| 2' | Apothecia not setose | 3 |
| 3 | Ectal excipulum with brownish textura prismatica to angularis; hairs cylindrical, straight, thin-walled, granulate, fuscous, multiseptate; asci I+; paraphyses cylindrical | <i>Fuscolachnum</i> |
| 3' | Ectal excipulum of textura prismatica-obliqua, strongly gelatinized; hairs KOH- and with greenish, yellow or red exudate | <i>Hyphodiscus</i> |

Fuscolachnum J.H. Haines

Type species: *Fuscolachnum pteridis* (Alb. & Schwein.) J.H. Haines.

Lit.: Haines 1989: 315, Hansen & Knudsen 2000: 190, Huhtinen & al. 2010: 415 (*F. necator*), Dougoud 2011: 24 (key).

- | | | |
|----|---|--|
| 1 | On seed plants | 2 |
| 1' | On cryptogams | 5 |
| 2 | Spores more than 10 µm long ; on <i>Ledum</i> | Fuscolachnum labradoricum (Huhtinen) Haines (1989) |
| 2' | Spores up to 10 µm long | 3 |
| 3 | On leaves of <i>Dryas grandis</i> | Fuscolachnum hainesii Chleb. & Sukova (2005) |
| 3' | On needles or leaves of other plants | 4 |
| 4 | Spores 7-9x2 µm; on green needles of <i>Juniperus communis</i> ; phen.: VIII | Fuscolachnum borealis (K. Holm & L. Holm) J.H. Haines (1989) |
| 4' | Paraphyses cylindrical, 1.5-2 µm diam.; asci IKI+, arising from croziers; hairs brownish grey; spores clavate, (4) 4.5-6(7)x1.5-2(2.5) µm; saprobic on leaves of <i>Rubus fruticosus</i> , <i>Acer rubrum</i> , <i>Acer sacharum</i> ; phen.: (IV)V-X(XII) ...
..... • Fuscolachnum misellum (Rob. ex Desm.) J.H. Haines (1989)
Ill.: Rubio & al. 2010: p. 221, Dougoud 2011: p. 20. | |
| 5 | Apothecia 0.3 mm when dry, stipitate; asci 72-83x6-11 µm, IKI-, without croziers; spores elongated fusiform, 24-30x2-3.5 µm, 0-3-septate, guttulate; on <i>Polytrichum juniperinum</i> ; phen.: IX | Fuscolachnum necator Huhtinen & Dobbeler (2010)
Ill. : Huhtinen & al. 2010 : fig. 1. |
| 5' | Spores up to 10 µm long; on pteridophytes | 6 |
| 6 | Apothecia about 0.3 mm diam., olivaceous grey, stipitate; spores ellipsoid, (5.6)6-9.5(10.5)x(1.6)2.1-3(3.2) µm, biguttulate; saprobic on stems and microphylls (leaves) of <i>Lycopodium</i> spp.; phen.: IV-IX | |

- **Fuscolachnum inopinatum** (Kirschst.) J.H. Haines (1989)
- 6' Spores clavate 7
- 7 Apothecia up to 0.5 mm diam., sessile to substipitate, pale greyish brown; asci 40-65x4.5-6(-7) µm, IKI+, with croziers; spores clavate, (5.8)6.2-8.2(9.9)x(1.4)1.5-2(2.3) µm, OCI 2-2.5; paraphyses with refractive, globose VBs; hairs cylindrical, incrustated; saprobic on ferns (*Pteridium aquila*, *Osmunda regalis*); phen.: V-VI (FR)
..... **Fuscolachnum pteridis** var. **pteridis** (Alb. & Schwein.) J.H. Haines (1989)
..... Ill. : Hairaud 2015 : p. 38-39.
- 7' Hairs clavate, constricted at the septa **Fuscolachnum pteridis** var. **tumidipila** Haines (1989)

Hyalopeziza Fuckel

Type species: *Hyalopeziza patula* (Pers.) Fuckel.

Lit.: Graddon 1974: 475 (sub *Hyalotricha niveocincta*), Graddon 1977: 262 (*H. spinicola*), Raschle 1977: 193, Holm & Holm 1981: 62 (*H. rubefaciens*), Baral & Krieglsteiner 1985: 70, Baral (unpublished key), Huhtinen 1988: 12 (*H. rari-pila*), Beyer 1991: 156 (*H. niveocincta*), Raitviir & Huhtinen 1997: 445, Baral & Galán 1999: 133 (*H. niveocincta*).

- 1 Hairs dimorphic, hyaline: setae originating from the lower cortex thinwalled, aseptate and up to 250 µm long, hair of the upper cortex cylindrical, obtuse, 0(1)-septate, up to 50 µm long; apothecia 0.3 mm diam., shortly stipitate, olive brown base; asci 40x5 µm, I+; spores 5x2 µm; saprobic on spines of *Castanea vesca*; phen.: XI
..... **Hyalopeziza spinicola** Graddon (1977)
..... Ill.: Graddon 1977: fig.12.
- 1' Hairs 60-155(270) µm long, with continuous lumen 2
- 1" Hairs max. 78 µm long 9
- 2 Hairs only apically glassy (solid), 0(2)-septate; asci without croziers; spores 11.5-21x3.7-4.8 µm; mainly on bark of *Juniperus* **Hyalopeziza "junipericola"** Baral nom. prov.
- 2' Hairs also basally thick-walled and glassy 3
- 3 Apothecia 0.1-0.25 mm diam., white; outside hairy; asci 23-40x5-5.5 µm, IKI+, without croziers; spores 3.5-5.5x2 µm, aseptate, OCI 0; hairs dimorphic: hairs on flanks straight, up to 250x4.5-6.5 µm wide, 7-11-septate, unchanged in 5% KOH and Melzer's reagent, marginal hairs apically bended or branched; saprobic on leaves of *Acer campestre*, *Acer pseudoplatanus*, *Acer platanoides*, *Carpinus betulus*, *Quercus* and cupules of *Castanea*; phen.: (IX)X
..... (●) **Hyalopeziza ciliata** Fuckel (1870) [1869-70]
..... Ill.: Dennis 1978: fig.4 K.
- 3' Apothecia pale to dark brown 4
- 4 Hairs unchanged in Melzer's reagent 5
- 4' Hairs dextrinoid (brownish red to purplish in J) 6
- 5 Apothecia 0.2-0.25, sessile, dark brown, outside with straight hairs; asci 35-50x6-8 µm, I-; spores 6.5-10x2-2.5 µm; hairs up to 240x4 µm, with thin lumen, septate, unchanged in 5% KOH and Melzer' reagent; saprobic on wood of *Alnus viridis*, *Hippophae rhamnoides*, *Populus tremula*; phen.: IX **Hyalopeziza valesiaca** Raschle (1977) [1976-77]
..... Ill.: Raschle 1977: Abb.6 e-g.
- 5' Apothecia up to 0.5 mm diam., shortly stipitate; asci 33-37x3.5-4 µm, IKI -, arising from croziers; spores 4.5-7x1.5 µm, with OCI 3.5; hairs straight, entirely thick-walled, up to 240x4.5 µm, aseptate; saprobic on needles of *Pinus sylvestris*; phen.: V,X ○(●) **Hyalopeziza trichodea** (W. Phillips & Plowr.) Raitv. (1970)
- 6 Apothecia 0.1-0.3 mm, broadly sessile, olive green to olive black, outside with white hairs; asci *40-50(65)x8-9(10) µm, †33-54x5-7 µm, IKI-, without croziers; spores *8-9.8x3-3.3 µm, †4.5-7(8.5)x2.5-3.5 µm, 0(1)-septate, OCI 2; hairs 50-90x2.5-3.5 µm, dextrinoid, walls glassy but thickness very variable, septate; saprobic on twigs and wood of *Alnus viridis*, *Calluna*, *Rhododendron ferrugineum*, *Salix*; drought-tolerant; phen.: VI-IX (AD, AT, CH, ES)
..... **Hyalopeziza nectrioidea** (Rehm) Raschle (1977) [1976-77]
..... Ill.: Raschle 1977: Abb.7 d-f.
- 6' Asci I+; hairs with evenly thick glassy walls 7
- 7 Apothecia up to 0.3 mm diam.; outside brownish, with straight hyaline hairs; asci 40-54x4.5-6.5 µm, I+, with croziers; spores 6-13x1.5-2.5 µm, 0(1)-septate, OCI 2-3.5; hairs dimorphic: lateral hairs straight, up to 270x4.5 µm, with thin lumen, septate, unchanged in 5% KOH, dextrinoid, marginal hairs 10-20 µm long; saprobic on wood and bark of *Alnus viridis*; phen.: V-IX (CH,IT) **Hyalopeziza alni** E. Müll. (1968) [1967]
..... Ill.: Müller 1968: Abb. 5, Raschle 1977: Abb.6 a-d, Breitenbach & Kränzlin 1981: pl. 242, Schmid I. & H. 1990: nr. 20.
- 7' Spores shorter 8

- 8 Apothecia 0.3 mm diam., shortly stipitate, olive brown base; asci 40x5 µm, I+; spores 5x2 µm; hairs dimorphic and hyaline: setae originating from the lower cortex thin-walled, aseptate and up to 250 µm long, hairs of the upper cortex cylindrical, obtuse, 0(1)-septate, up to 50 µm long; saprobic on spines of *Castanea vesca*; phen.: XI
 **Hyalopeziza spinicola** Graddon (1977)
 III.: Graddon 1977: fig.12.
- 8' Apothecia 0.2 mm diam., shortly stipitate, brownish, with white hairs; asci *28-35x3.54 µm, IKI+, without croziers; spores *6-9.5x1.5-2 µm, aseptate; hairs up to 140x3.5 µm, 2-4-septate, dextrinoid; saprobic on leaves and branches of *Myrica gale*; phen.: V-IX • **Hyalopeziza corticicola** (Dennis) Raitv. (1970)
 III.: Raschle 1977: Abb.7 a-c, Dennis 1978: pl. XXIV J.
- 9 Hairs ± lanceolate, with continuous lumen, glass low refractive, granulate, dissolving in KOH; asci 43-55x8.5-10.5 µm, IKI-, with croziers; spores 9.8-13.5x2.6-3.2 µm; saprobic on leaves of *Castanea vesca*; phen.: I
 **Hyalopeziza "castanea"** Baral nom. prov.
- 9' Hairs tapering 10
- 10 Apothecia discoid, 0.1-0.2(0.3) mm diam., reddish when moist, ochraceous when dry; asci 15-20x4 µm; spores 4-6x1.5 µm; hairs tapering, thick-walled with lumen, 20-40x4 µm; saprobic on stems of *Lycopodium* spp.; phen.: (IV)VI-X **Hyalopeziza rubefaciens** L. Holm & K. Holm (1981)
- 10' Spores more than 6 µm long 11
- 11 Apothecia 0.2-0.6 mm diam., sessile, whitish to pale yellowish; asci (40)55-110(130)x8-12(16) µm, MLZ-, with croziers; spores ellipsooid to elongate, 10-14(18)x3.5-5(6) µm, 0(1)-septate, OCI 0-2; hairs 26-52x4-7 µm, smooth; saprobic on stems of *Cirsium spinosissimum*, *Angelica archangelica*; phen.: VI-VIII **Hyalopeziza latispora** Raitv. (1981)
 III.: Raitviir & Huhtinen 1997: fig. 7-12.
- 11' Spores up to 3.5 µm wide 12
- 12 Apothecia 0.2-0.5 mm diam., shortly stipitate, outside with short white hairs; asci 34-45(55)x7-9 µm, IKI-, with croziers; spores 9-14.5x2-2.5 µm; hairs slightly bended, up to 60x3 µm, aseptate, unchanged in J and 5% KOH; saprobic on herbaceous stems (*Euphorbia amygdaloides*, *Chamerion angustifolium*) and on non-skeletonized leaves (*Castanea sativa*, *Cistus ladanifer*, *C. laurifolius*, *Rosa*, *Rubus fruticosus*); phen.: (VIII) XI-IV
 **Hyalopeziza niveocincta** (Graddon) Raschle (1977) [1976-77]
 III.: Graddon 1974: fig. 2, Raschle 1977: Abb.8 a-c, Baral & Galán 1999: fig.1-14.
- 12' Apothecia sessile, 0.1-0.25 mm diam., pale; asci 40-55(65)x6-8 µm, IKI rr or IKI-, with croziers; spores *(11.5)12.5-18.5 (21)x2.5-3.5 µm, (Huhtinen: †9-12x2-3 µm), OCI 3, with mucous coating; hairs up to 35x3-5 µm, tapering, solid or inconspicuous luminal, glassy, unchanged in KOH, smooth; saprobic on herbaceous stems (*Cosmos*, *Geranium pratense*, *Rheum rhabarbarum*, *Petasites petioles*); phen.: (I)V-VII (BE/F)
 • **Hyalopeziza raripila** (Höhn.) Huhtinen (1988) [1987]
 III.: Huhtinen 1988: fig.6 .

Hyphodiscus Kirschst.

Syn.: anam. *Catenuifera* Hosoya, *Cistellina* Raitv., *Incrupilella* Svrček.

Type species: *Hyphodiscus gregarius* Kirschst. = *Hyphodiscus theiodeus* (Cooke & Ellis) W.Y. Zhuang

Lit.: Graddon 1974: 475 (sub *Incrupila viridipilosa*), Baral 1993: 6, Baral 1994: 121, Hansen & Knudsen 2000: 195 (sub *Incrupila viridipilosa*), Huhtinen & al. 2010: 417 (*H. delitescens*), Bogale & al. 2010: 396 (*Catenuifera*), Hosoya & al. 2010, Pärtel & Pöldmaa 2011: 11.

- 1 Apothecia gregarious, 0.25-0.6 mm diam., sessile, disc plano-convex and dark greenish brown, margin and outer surface greyish downy; asci 45-58x(4.5)6-6.5 µm, hemiamyloid (IKI RB), with croziers; spores spherical, 2.6-3.3 µm diam., mostly with an eccentrical LB; fungicolous on corticioid basidiomycetes (*Peniophora*) on branches of *Sarothamnus scoparius*, *Salix* sp.; phen.: VIII-V • **Hyphodiscus theiodeus** (Cooke & Ellis) W.Y. Zhuang (1988)
 III.: Dennis 1963: fig. 68 (sub *Lachnellula theiodea*), Zhuang 1988: fig. 1-2.
- 1' Spores not spherical 2
- 2 Spores up to 2.5 µm wide 3
- 2' Spores wider 6
- 3 Apothecia 0.06-0.15 mm diam., sessile to short-stipitate, white; asci 4- to 8-spored, 19-28x4-5.5 µm, IKI+, with croziers; spores 4-6x1.5-2 µm, often with two guttules; bryosymbiotic on *Bazzania trilobata*; phen.: VIII-IX
 **Hyphodiscus delitescens** Huhtinen & Döbbeler (2010)
 III.: Huhtinen & al. 2010: fig. 2.
- 3' Asci 8-spored; no bryosymbiont 4
- 4' Sexual morph: Apothecia 0.2-0.7 mm diam., substipitate, pale ochraceous to white; asci 30-43x5-6 µm, IKI red-grey, with croziers; spores 3.4-5.3x1.8-2.3 µm, biguttulate; hairs 16-23x4-6 µm, minutely granulate. Asexual morph:

Catenulifera with globose to turbinate, catenate conidia 1.5-2 µm diam. Saprobic on deciduous wood (*Fagus*) and on stem of *Fallopia japonica*; phen.: II, VII, XII **Hyphodiscus hyaloscyphoides** Hosoya, J.G. Han & G.H. Sung (2011) Ill.: Hosoya et al. 2010: fig. 1-5.

- 4' Spores shorter 5
- 5 Apothecia 0.2-0.35 mm diam., cup-shaped to saucer-shaped, substipitate, margin and receptacle covered by bluish green, 37x3 µm, verrucose hairs, disc ochraceous, base brownish; asci 23-30x5-6 µm, with croziers; ascospores ellipsoid, 2,6-3,2x1,6-2 µm, biguttulate; saprobic on wood (*Corylus*). Phen.: II (ES) **Hyphodiscus smaragdinus**
- 5' Apothecia 0.1-0.3 mm diam., substipitate, green fading to ochraceous, with hairy margin, base brown; asci c. 35x5 µm, I+, with croziers; spores ellipsoid, 3-4(4.5)x1.5-2 µm, biguttulate; hairs 25-45x2.5-3 µm, with greenish to yellowish brown granules; saprobic on deciduous wood (*Acer*, *Fagus*, *Salix caprea*, *Salix cinerea*); phen.: (VIII)XI-IV **Hyphodiscus viridipilosus** (Graddon) Baral (1993) Ill.: Graddon 1974: fig. 1.
- 6 Apothecia 0.3-0.7 mm diam., substipitate, disc ochraceous grey then red-brown; asci 50-80x6-7 µm, hemiamyloid, with croziers; spores (5.5)6-6.5(7)x2.5-3 µm, biguttulate, hyaline; anamorph *Catenulifera rhodogena*; on resupinate *Poriales* (*Peniophora*, *Piptoporus*, *Trametes*), sometimes on bark (*Picea*) and red areas on wood (*Fagus*, *Rhamnus*, *Tilia*); phen.: XI-V • **Hyphodiscus hymeniophilus** (P. Karst.) Baral (1993) Ill.: Boudier 1905-1910: pl. 526, Helfer 1991: Abb.5, Rubio & al. 2010: 229.
- 6' Apothecia sessile to shortly stipitate, 0.3-0.6 mm diam., olivaceous. Receptacle cup-shaped to saucer-shaped, margin with numerous greenish-white hairs. Ectal excipulum composed of gelatinous, more or less parallel, slightly interwoven, bluish-green pigmented cells terminating above the surface into cylindrical hairs 10-19x2-2.2 µm. Medullary excipulum brownish-orange, of textura intricata. Hairs greyish green, mostly straight, cylindrical, slightly pointed, thinwalled, 0-3-septate, 31-62x2-2.8 µm, IKI-; wall (except the base) covered with loose irregular-tuberculate greyish green warts. Pigment in excipulum and hair walls dissolving in KOH, apothecia extracting pale yellow hue into KOH solution. Asci cylindrical-clavate, 37-47x5-6 µm, arising from croziers, 8-spored, apical pore IKI-. Ascospores ellipsoid with obtuse apices, 7.6-11.5x2.6-4 µm, biguttulate, aseptate, smooth, hyaline. Paraphyses filiform, with 2-3 septa, 1.5-2 µm in diameter, filled with fine green vacuolar bodies, simple or branched only at the base, gradually slightly tapering towards the apex. On *Stereum* spp. Phen.: XII (ES) **Hyphodiscus stereicola** Raitv., Pärtel & K. Pöldmaa (2011) Ill.: Pärtel & Pöldmaa 2011: pl. 1.

Venturiocistella Raitv.

Type species: *Venturiocistella venturioides* (Sacc. & Rom. In Sacc.) Raitv. = *V. gaylussaciae* Baral

Lit.: Graddon 1974: 484 (sub *Trichodiscus heterotrichus*), Graddon 1977: 267 (sub *Trichodiscus diversipilus*), Graddon 1980: 268 (sub *Trichodiscus*), Baral 1993: 10.

- 1 Only one hair type: ± cylindric, smooth, dark brown, 1-4-septate; asci IKI-; saprobic on bark of conifers ? **Venturiocistella**
- 1' Hairs dimorphic: dark brown, ± lanceolate setae and warted cylindric, pale brown hairs 2
- 2 Dark brown setae ca. 3-5-septate; pale hairs about as long as setae (up to 160 µm), with helicoid ends; apothecia 0.5 mm diam., sessile; asci 100x16 µm, I+; spores 19-24x6 µm, olive brown and 3-septate when overmature, OCI high; saprobic on *Deschampsia caespitosa*; phen.: IX-II **Venturiocistella heterotricha** (Graddon) Baral (1993) Ill. : Graddon 1974 : fig. 7, Ellis & Ellis 1985 : fig.1869.
- 2' Dark brown setae aseptate; pale hairs up to half the length of the setae (up to 65 µm), straight, ± cylindric; spores up to 3µm wide, OCI mostly low 3
- 3 Apothecia 0.15 mm diam.; spores mostly slightly sigmoid, 14-22x2 µm 0-3-septate; saprobic on bark of *Ulex europaeus*; phen.: XI **Venturiocistella ulicicola** (Graddon) Baral (1993) Ill.: Ellis & Ellis 1985: fig.1186.
- 3' Spores max. 18 µm long, mostly straight, aseptate 4
- 4 Setae max. 100(120) µm long; spores 7-18x1.5-3 µm 5
- 4' Setae often 100-200(260) µm long; spores 5-11x1.5-2.5 µm 7
- 5 Apothecia 0.15 mm diam.; asci 30-40x7.5-9.5 µm, with 2-3 µm wide apical ring, IKI red, wall weakly red; spores (9)10-14(18)x1.7-2.5 µm, OCI 1-2, walls weakly violet in CRB ; saprobic on resin, bark and cones of *Pinus*; phen.: X-IV (BE/F) ○ **Venturiocistella pini** (Höhn.) Baral (1993) Ill.: Ellis & Ellis 1985: fig.817, Baral 1993: Tafel 3.
- 5' Asci with 1 µm wide apical ring, IKI ?blue, walls IKI- 6

- 6 Asci 40-60x6-8 μm ; spores 12-17x2-3 μm ; saprobic on leaves and twigs of *Vaccinium uliginosum*; phen.:
 **Venturiocistella** sp.
- 6' Asci 26-33x6-8 μm ; spores 8-13x1.8-2.1 μm ; saprobic on leaves of *Gaylussacia* (North America); phen.: ?
 **Venturiocistella gaylussaciae** Baral (1993)
- 7 Apothecia 0.15 mm diam.; asci *20-28x5.5-7.5 μm , †17-23x4.5-6 μm , apical ring weakly IKI+, walls IKI weakly red;
 spores * 6-8.5(9)x1.5-2(2.5) μm , OCI 1, wall CRB-; setae ca. 9-20 per apothecium, basally swollen, wall 0.5-1(1.5)
 μm thick; pale hairs only marginal; saprobic on leaves of *Betula* and *Quercus*; phen.: X-XI (BE/F, NL)
 ○ **Venturiocistella diversipila** (Graddon) Baral (1993)
 Ill.: Graddon 1977: fig.20, Ellis & Ellis 1985: fig.915, Baral 1993: Tafel 2.
- 7' Asci †26-46x4.5-6 μm , apical ring IKI blue, walls IKI-; setae ca. 80-120 per apothecium, basally hardly swollen, wall
 1-3 μm thick, setae and hairs mixed all over the outside; saprobic on leaves of *Vaccinium uliginosum*; phen.: VI
 **Venturiocistella venturioides** (Sacc. & Rom. In Sacc.) Baral (1993)
 Ill.: Baral 1993: Tafel 1.

HYSTEROPEZIZELLA lineage

Lit.: Jaklitsch et al. 2016: 171.

Sexual morph: Apothecia immersed to erumpent, rarely with epidermal lid, sessile, 0.1-0.7 mm in diam.; hymenium plane, whitish-grey to black-brown, also yellow often pruinose; exterior smooth or hairy. Ectal excipulum of hyaline or brown textura angularis, towards margin textura prismatica. Hairs absent to distinct, warted and hyaline, rarely smooth and dark brown (*Cejpia*). Paraphyses with a subclavate to lanceolate, often warted upper part which mostly contains globose, i refractive VBs (multiguttulate). Asci with conical apex with hemiamyloid apical ring (*Pezicula*-type), rarely inamyloid, with or without croziers. Ascospores 8 per ascus, medium- to large-sized, ellipsoid to fusoid or cylindrical-clavate, often with gel sheath, lipid content medium to high (bi- to multiguttulate).

Asexual morph: Anamorphs not known with certainty.

Habitat: Saprobic on monocots, esp. in bogs, desiccation-sensitive. Temperate to montan.

Genera belonging to this lineage:

1. *Cejpia* Velen.
2. ?*Coleosperma* Ingold
3. *Coronellaria* P. Karst.
4. *Hysteronaevia* Nannf.
5. *Hysteropezizella* Höhn.
6. ?*Involucroscypha* Raitv.

Key to the genera:

- | | |
|--|-------------------------|
| 1 Paraphyses with granulate wall | 2 |
| 1' Paraphyses smooth-walled | 3 |
| | |
| 2 Asci broad, apex rounded, apically not strongly blueing in I (sometimes not blueing); spores ellipsoid-cylindrical, often yellowish, becoming septate; paraphyses lanceolate, with globose VB's content, wall granular (obs. In water); outer excipulum bearing dark brown, thick-walled hairs, separated by a thick brown septum from the thinner-walled excipulum elements, on monocotyledonous plants | <i>Cejpia</i> |
| 2' Hairs on excipulum with granular walls, hyaline; asci IKI strongly rr; paraphyses with granulate walls (observed in water!) | <i>Coronellaria</i> |
| 2'' Hairs on excipulum smooth, glued together; asci I+ or I-; paraphyses with granulate walls (observed in water!) | <i>Hysteropezizella</i> |
| | |
| 3 Paraphyses lanceolate, exceeding the asci; asci amyloid; spores aseptate; ectal excipulum of yellowish textura globulosa; hairs clavate, with brown to dark brown slightly thickened wall, covered with a hyaline, strongly refracting, warty crust | <i>Involucroscypha</i> |
| 3' Asci broadly clavate, I-, relatively thick-walled; paraphyses irregularly enlarged at the apex, not acuminate | <i>Hysteronaevia</i> |

Cejpia Velen.

Type species: *Cejpia coerulea* Velen. = *Cejpia amoena* (Boud.) Svrček

Syn.: *Belonium* Sacc. sensu Sacc.

Lit.: Velenovsky 1934: 125 (sub *C. coerulea*), Svrček 1976: 14, Dennis 1981: 203 (sub *Belonium hystrix*), Baral 1994: 116, Nauta & Spooner 2000a: 23.

- | | |
|--|--|
| 1 Apothecia superficial, up to 0.5 mm diam., with dark brown cylindrical marginal hairs; asci without croziers; spores 12-18x4-5 µm, 0(1-3)-septate; paraphyses with granular incrustations; saprobic on <i>Molinia coerulea</i> ; phen.: VI-IX(X) | |
| • <i>Cejpia hystrix</i> (De Not.) Baral (1994) | |
| 1' Apothecia 0.5-1mm diam., sessile, with blackish brown marginal hairs; asci 100-130x12 µm; spores 15-20 µm long, aseptate; saprobic on leaves of <i>Scirpus sylvaticus</i> ; phen.: ? | <i>Cejpia amoena</i> (Boud.) Svrček (1976)
Ill.: Velenovsky 1934: Taf. XVII 45-50. |

Coleosperma Ingold

Type species: *Coleosperma lacustre* Ingold.

Lit.: Nauta & Spooner 1999a: 66.

- 1 Apothecia erumpent, white; asci I-; spores with mucous coating, guttulate, hyaline; paraphyses forming an epithecium; saprobic on submerged stems of *Schoenoplectus*; phen.: ? **Coleosperma lacustre** Ingold (1954)

Coronellaria P. Karst.

Type species: *Coronellaria delitschiana* (Auersw.) P. Karst.

Lit.: Svrček 1978: 12 (*C. benkertii*), Baral 1985: 31, Raitviir & Leenurm 2001: 64 (*C. pulicaris*), Richter & Baral 2008: 45.

- 1 Spores fusiform, 25-40x6-7 µm; saprobic on *Schoenoplectus lacustris*; phen.: ? **Coronellaria delitschiana** (Auersw.) P. Karst. (1870)
- 1' Spores shorter 2
- 2 Asci J weakly blue; spores 22-24 x 5.5-7 µm; saprobic on *Acorus calamus*; phen.: ? **Coronellaria acori** Höhn. (1918)
- 2' Spores up to 5.5 µm wide 3
- 3 Apothecia with grey brown outside, basally black, margin with white hairs; ectal excipulum grey olive brown, †thin-walled, without exudate; asci † 70-102x9-12(14) µm, with croziers; spores * (16)18-23(27) x 4-5.5 µm, with 2-8 large and many small guttules; paraphyses lanceolate; marginal hairs 40-120 µm long, with warts; saprobic on *Schoenoplectus lacustris*; phen.: VII-XI **Coronellaria pulicaris** (P. Karst.) Sacc. (1889)
Ill.: Raitviir & Leeburn 2001: fig. 4-6.
- 3' Asci without croziers 4
- 4 Apothecia with pale ochraceous grey outside, sometimes olive brown to black; ectal excipulum hyaline to dark olive brown, †thick-walled p.p., without or with ochraceous brown exudate; asci †65-94x(10)11-13(15) µm, IKI red, without croziers; spores *15-25x(3.7)4-5(5.5) µm, with 2-4 large and many small guttules; paraphyses lanceolate; marginal hairs 25-60(85) µm long; saprobic on *Schoenoplectus lacustris*; phen.: IX **Coronellaria** sp.
Ill.: Richter & Baral 2008: Abb.3.
- 4' Ectal excipulum with olive brown coating hyphae; asci IKI red; spores *16-26x4-5.3 µm, with two medium guttules and several small ones; hairs 14-40 µm long, paraphyses and hairs often without refractive vacuoles; saprobic on *Carex rostrata* and *Eriophorum*; phen.: VI-VII **Coronellaria benkertii** Svrček (1978) ss. Baral
Ill.: Beyer 1994: fig. 6.
- 4" Asci IKI rr, with or without croziers (> aggregate?); spores *12-20x3.8-4.5 µm, OCI 4-5; hairs 30-100 µm long, paraphyses and hairs strictly refractive multiguttulate; saprobic on *Carex elata*, *Carex rostrata* and *Trichophorum caespitosum*; phen.: V-VII (BE/F) • **Coronellaria caricinella** (P. Karst.) P. Karst. (1870)
Ill.: Rubio & al. 2010: p. 215.

Hysteronaevia Nannf.

Type species: *Hysteronaevia holoschoeni* (De Not.) Nannf.

Lit.: Défago 1967: 17 (sub *Hysteropezizella olivacea*), Graddon 1977: 511 (sub *Hysteropezizella hebridensis*), Nannfeldt 1984a: 225, Scheuer 1988: 75.

- 1 Apothecia by drying sinking back in the substrate 5
- 1' Apothecia not sinking back in the substrate 2
- 2 Apothecia erumpent, 0.1-0.2 mm diam.; spores elongate fusiform, 30-36(40)x2-3 µm, early 1-septate; saprobic on *Eriophorum angustifolium*, *E. vaginatum*; phen.: VII **Hysteronaevia advena** (P. Karst.) Nannf. (1984)
- 2' Spores up to 30 µm long 3
- 3 Spores 20-30 µm long, commonly aseptate 4
- 3' Spores < 20 µm long; commonly 1-septate 5
- 4 Paraphyses and inner hyphal ends at the margin with pale, loosely granulated apex, below glued together by brown, densely granulated mucus; perihymenial excipulum coated by a brown, granulated mucous crust; apothecia up to 0.3 mm diam.; spores fusiform, 22-28x3-4 µm; saprobic on *Trichophorum caespitosum*; phen.: VIII **Hysteronaevia cincturata** Nannf. (1984)
- 4' Paraphyses without mucous coating; apothecia 0.2-0.5 mm diam.; margin when young with rows of cells with rather thick refractive walls, later on with hair-like free, septate, densely granulate hyphal ends except the smooth end cell; saprobic on *Trichophorum caespitosum*; phen.: VIII-IX **Hysteronaevia scirpina** (Peck) Nannf. (1984)
- 5 Apothecia early erumpent, 0,08-0.12 mm diam., dark brown; paraphyse tips abruptly clavate, with brown mucous cap forming a crust; spores bacilliform, 13-22x1.5-2.5 µm; saprobic on *Trichosporum caespitosum*; phen.: VII-IX

- **Hysteronaevia stenospora** Nannf. (1984)
- 5' Apothecia stick by a thick base within the substrate, 0.1-0.2 mm diam.; paraphyse tips often curly, without distinct mucous cap; spores fusiform, 15-21(23)x2-2.5(3) µm; saprobic on *Juncus jacquinii*, *J. gerardii*, *J. hostii*, *J. monanthos*, *J. trifidus*; phen.: VII-VIII **Hysteronaevia minutissima** (Rehm) Nannf. (1984)
Ill.: Sudová 2004: fig.3.
- 6 Apothecia erumpent, cup-shaped, 0.15-0.3 mm diam., brown; asci I-, 4-8-spored; spores oblong to fusiform, 17-26 (28)x3-5(6) µm, overmature spores yellow-brown and up to 5-septate; paraphyses clavate, paraphyses and marginal hyphae glued together by a brown mucus; apothecium base of isodiametrical cells; saprobic on stems and leaves of several *Carex* sp., *Elyna myosuroides*, *Eriophorum angustifolium*, *Luzula* sp.; phen.: VI-VIII.....
..... **Hysteronaevia olivacea** (Mouton) Nannf. (1984)
- 6' Apotheca erumpent, 0.1-0.2 mm diam.; paraphyses without distinct mucous caps; spores 22-32(34)x2.5-4 µm, aseptate, hyaline; saprobic on *Juncus jacquinii*; phen.: VII-VIII **Hysteronaevia clavulifera** Nannf. (1984)

Hysteropezizella Höhn.

Type species: *Hysteropezizella subvelata* (Rehm) Höhn.

Lit.: Défago 1967: 1, Défago 1967: 37 (sub *Hysterostegiella hydrophila*), Spooner 1981: 283, Scheuer 1988: 81; Holm & Nannfeldt 1990b: 7.

- 1 Margin composed of isodiametric cells, not arranged into filaments; apothecia erumpent, 0.3-0.8 mm diam., hemispherical, dark brown; asci I+; spores elongate ellipsoid, 17-20x5-7 µm, aseptate, hyaline; saprobic on stems and leaves of *Carex* sp.; phen.: V **Hysteropezizella fuscella** (P. Karst.) Nannf. (1932)
- 1' Margin composed of elongated cells arranged into filaments 2
- 2 Asci IKI+ 3
- 2' Asci IKI- 11
- 3 Asci commonly with 2 or 4 spores 4
- 3' Asci commonly (6)8-spored 5
- 4 Apothecia 0.15 mm diam.; asci 4-spored; spores elongated ellipsoid, 20-24x5-6 µm, aseptate; saprobic on stems and leaves of *Trichophorum caespitosum*; phen.: IX **Hysteropezizella tetraspora** (Rehm) Défago(1967)
- 4' Apothecia erumpent, 0.2-0.5 mm diam., with brown margin and paler hymenium; asci mostly 2-spored; spores fusiform, commonly 48-57x5-7 µm and 3-septate, sometimes smaller without or with fewer septa; saprobic on stems and leaves of several *Carex* sp.; phen.: VIII-IX **Hysteropezizella macrospora** (P. Karst.) Nannf. 119 (1932)
- 5 Paraphyses lanceolate 6
- 5' Paraphyses different 7
- 6 Apothecia erumpent, 0.15-0.3 mm diam., olive- to red-brown; asci IKI red; spores ellipsoid, 11-18(22)x3-5 µm; saprobic on leaves and stems of *Avena scheuzerii*, several *Carex* species, *Eriophorum*, *Festuca rubra*, *Juncus articus*, *J. trifidus*, *Luzula*, *Sesleri cerulea*, *Poa* and other grasses (arctic); phen.: V-XI
..... **Hysteropezizella diminuens** (P. Karst.) Nannf. (1932)
Ill.: Spooner 1981: fig. 19, Sudová 2004: fig. 4.
- 6' Apothecia erumpent, up to 0.5 mm diam., dark brown, with margin extending above the hymenium; asci hemi-amyloid, without croziers; spores elongated ellipsoid, 16-20.5x4-5 µm, 0-1-septate, guttulate, hyaline; paraphyses lanceolate, abruptly pointed and extending above the asci; saprobic on stems of *Schoenoplectus lacustris*; phen.: VII
.....
..... **Hysteropezizella hydrophila** (Bomm., Rouss. & Sacc.) Nannf. (1932)
- 7 Margin extending markedly above the hymenium 8
- 7' Margin not extending above the hymenium 9
- 8 Apothecia erumpent, 0.15-0.25 mm diam., dark brown with white margin; asci I+; spores cuneiform or elongate ellipsoid, 10-13x2.5-4 µm, overmature spores brown and septate; on halms of *Juncus balticus*, *J. conglomeratus*, *J. effusus*, *J. filiformis*, *J. hostii* and *Elyna myosuroides*; phen.: (V)VII-VIII(X)
..... **Hysteropezizella pusilla** (Lib.) Nannf. (1932)
Ill.: Défago 1967: fig. ..., Ellis & Ellis 1985: fig. 2030.
- 8' Apothecia erumpent, 0.2-0.3 mm diam., dark brown; asci I+; spores fusiform, 14-19x3-4 µm, guttulate, hyaline; saprobic on *Trichophorum alpina*, *T. caespitosum*; phen.: VI-IX.....
..... **Hysteropezizella subsessilis** (Rehm) Nannf.(1932)
- 9 Apothecia 0.2-0.3 mm diam., pale brown; asci I+; spores cylindrical-fusiform, 36-40x(3)4-4.5 µm, aseptate, guttulate, hyaline; saprobic on leaves of *Carex vesicaria*; phen.: VII **Hysteropezizella holmii** Svrček (1990)

- 9' Spores smaller 10
- 10 Apothecia erumpent, 0.1-0.2 mm diam., black; asci I+; spores elongate ellipsoid, 12-14x3 µm, hyaline; saprobic on *Luzula lutea*, *L. spadicæ*; phen.: VII-VIII **Hysteropezizella valesiaca** Défago (1967)
- 10' Apothecia slightly erumpent, ellipsoid, 0.1-0.3x0.15-0.4 mm diam., ochraceous brown; asci I+; spores cuneiform to elongate ellipsoid, 16-22x4-5 µm, hyaline; saprobic on dry stems and leaves of *Phragmites australis* and several *Carex* sp.; phen.: VII-IX **Hysteropezizella phragmitina** (P. Karst. & Starbäck) Nannf. (1932)
- 11 Paraphyses with brownish clavate apex; overmature spores brown and 1(5)-septate **Hysteropezizella olivacea** (Mouton) Nannf. (1932)
- 11' Paraphyses otherwise 12
- 12 Apothecia 0.15-0.25 mm diam., hymenium brown-yellow; asci I-; spores 19-22x4-5 µm, aseptate, hyaline; basal conical part of the apothecia composed of elongated cells more or less arranged in filaments; saprobic on stems and leaves of *Arctagrostis latifolia*, *Carex alpina*, *C. sp.* and *Poa flexuosa*; phen.: VIII **Hysteropezizella lyngei** (Lind) Nannf. (1932)
- 12' Apothecia erumpent, 0.1-0.2 mm diam., black; spores elongate ellipsoid, 12-14x3 µm, hyaline; basal conical part composed of isodiametric cells; saprobic on *Luzula alpino-pilosa*; phen.: VII-VIII **Hysteropezizella cf. valesiaca** Défago (1968)[1967]
- Spores 18-25x5-6 µm; **Hysteropezizella rehmi** (Jaap) Nannf. (1932)
III.: Ellis & Ellis 1985: fig. 2031.

Involucroscypha Raitv.

Type species: *Involucroscypha involucrata* (B. Erikss.) Raitv.
 Lit.: Raitviir 2002: 45.

- 1 Apothecia superficial, shortly stipitate, 0.3-0.6 mm diam., often involucrate, a new apothecium proliferating from the centre of an old apothecium shell, hymenium whitish to greyish, externally hairy and medium brown; asci 40-55x5-7 µm, MLZ+, with croziers; spores ellipsoid-fusiform, 7-12x2-3 µm, with two big polar LB's; paraphyses lanceolate, up to 15 µm longer than the asci; saprobic on stems of Ericaceae; phen.: VIII-IX **Involucroscypha involucrata** (B. Erikss.) Raitv. (2002)

LACHNACEAE Raitv. 2004

Lit.: Raitviir 2004, Jaklitsch et al. 2016: 178.

Sexual morph: Apothecia 0.2-8 mm in diam., soft or cartilaginous; hymenium plane, rarely urn-shaped (*Solenopezia*), whitish, yellow, orange or brownish; margin densely covered by mostly long, conspicuous hairs; +/- superficial, sessile to long-stipitate. Ectal excipulum of textura angularis, textura prismatica or textura oblita; medullary excipulum of textura intricata, sometimes textura oblita. Hairs densely warted or partly to entirely smooth and with irregular wall deposits, +/- straight near the margin, sometimes undulating at flanks, hyaline, yellow, reddish or dark brown; crystals partly present. Paraphyses lanceolate, rarely cylindrical. Hairs and paraphyses with or without globose, hyaline or yellow VBs. Asci with conical to sometimes hemispherical apex with eu- or hemiamyloid apical ring of *Calycina*-type, sometimes inamyloid, with or without croziers. Ascospores 8 per ascus, small to large, globose to filiform or allantoid, partly phragmosporous, lipid content low to high.

Asexual morph: Anamorphs known only in *Lachnellula* and *Proliferodiscus*, pycnidial; phialides hyaline, without collarette; conidia small, globose, 0-septate.

Habitat: Saprobic, rarely parasitic on ligneous or herbaceous substrate incl. leaves, desiccation-sensitive, some genera -tolerant. Worldwide, alpine-boreal to temperate or tropical.

Genera belonging to this family:

1. *Albotricha* Raitv.
2. *Belonidium* Mont. & Dur.
3. *Brunnipila* Baral
4. *Capitotricha* (Raitv.) Baral
5. *Dasyscyphella* Tranzschel
6. *Erioscyphella* Kirschst.
7. *Incrucipulum* Baral
8. *Lachnellula* P. Karst.
9. *Lachnum* Retz.
10. *Lasiobelonium* Ellis & Everh.
11. *Neodasyscypha* Suková & Spooner
12. *Perrotia* Boud.
13. *Proliferodiscus* J.H. Haines & Dumont
14. *Solenopezia* Sacc.
15. *Trichopeziza* Fuckel
16. *Trichopezizella* Dennis ex Raitv.

Key to the genera of Lachnaceae:

- | | |
|---|------------------------|
| 1 Hairs conical; paraphyses lanceolate | <i>Albotricha</i> |
| 1' Hairs cylindrical to clavate | 2 |
| 2 Hairs smooth; ectal excipulum with brown textura globulosa-angularis | 3 |
| 2' Hairs incrustated | 4 |
| 3 Hairs at least basally brown | <i>Trichopeziza</i> |
| 3' Hairs with thick (> 0.5 µm) reddish brown walls, upper part paler; paraphyses lanceolate | <i>Trichopezizella</i> |
| 4 Hymenium yellow-orange; hairs mostly white; asci hemi- or inamyloid; strictly conifericolous | <i>Lachnellula</i> |
| 4' Combination of characters otherwise | 5 |
| 5 Ectal excipulum hyaline | 6 |
| 5' Ectal excipulum pigmented | 7 |
| 6 Hairs evenly granulate, with crystals, hyaline | 5 |
| 6' Hairs without crystals | 6 |
| 5 Hairs with moderate thick hyaline walls, partially covered with crystals; paraphyses lanceolate, basally with orange content | <i>Capitotricha</i> |
| 5' Hairs multiseptate, finely warted, bearing crystal caps; paraphyses lanceolate | <i>Incrucipulum</i> |
| 6 Hairs granulate, apical part glabrous, mostly with OCI secretion; paraphyses cylindrical to lanceolate, ectal excipulum of textura prismatica | <i>Dasyscyphella</i> |
| 6' Hairs evenly granulate; paraphyses lanceolate | <i>Lachnum</i> |

- 7 Hairs apices covered with crystals or short (-30 µm long) and verrucose (hair dimorphism), apically densely septate, pale brown; paraphyses lanceolate *Brunnipila*
- 7' Hairs without crystals 8
- 8 Ectal excipulum of medium gelatinized textura prismatica, with pigment, mostly with violet KOH reaction; asci I-; hairs with tuberculate warts, hyaline *Proliferodiscus*
- 8' Ectal excipulum with textura globulosa-angularis 9
- 9 Medullary excipulum consisting of a compactly packed parallel hyphae; hairs mainly cork screw curled, thick-walled
..... *Lasiobelonium*
- 9' Medullary excipulum otherwise 10
- 10 Apothecia cup-shaped, stipitate; hairs granulate, yellowish; asci I+ *Neodasyscypha*
- 10' Apothecia sessile to subsessile 11
- 11 Apothecia urceolate, sessile; hairs granulate; asci I+ *Solenopezia*
- 11' Apothecia cup-shaped, sessile; hairs with loosely attached granules, pigment dissolving in KOH; asci I- ... *Perrotia*
- 11" Hairs cylindrical, hyaline; spores 3-4x1.5 µm; paraphyses filiform; apothecia chestnut-brown; parasitic on *Stictis* spp.
..... see *Dasyscyphus castaneus*

Albotricha Raitv.

Type species: *Albotricha acutipila* (P. Karst.) Raitv.

Lit.: Müller 1968: 144 (sub *Dasyscyphus washingtonensis*), Raitviir 1970: 40, Bøhler 1974: 88 (sub *Dasyscyphus washingtonensis*), Huhtinen 1985b: 19, Svrček 1987: 17 (*A. lupini*), Beyer 1998: 171 (*A. lupini*), Hansen & Knudsen 2000: 186.

- 1 Apothecia 0.1-0.2 mm diam., yellowish white, often with green tinge, with distinctly hairy margin; asci 27-35x4-6 µm; spores clavate to fusiform, 6-8x1-1.5 µm; paraphyses 4-5 µm diam., up to 20 µm exceeding the asci; saprobic on *Dryopteris dilatata*, *Pteridium aquila*; phen.: (IV)V-VI(VIII) . **Albotricha washingtonensis** (Dennis) Raitv. (1970)
Ill.: Bøhler 1974: fig. 5.
- 1' On phanerogams 2
- 2 On monocotyls 3
- 2' On dicotyls 4
- 3 Apothecia 0.5-1(1.3) mm diam., shortly stipitate, rose, with reddish brown lateral and white marginal hairs; asci 65-75x5.5-6 µm, without croziers; spores fusiform, 7-12(15)x1.5-2 µm, OCI 2-3; paraphyses lanceolate, 5-6 µm diam., 15-30 µm exceeding the asci; hairs conical, 140- 225x3-5 µm, hyaline to reddish brown incrustated; saprobic on grasses (*Phalaris arundinacea*); phen.: IV-VI • **Albotricha albotestacea** (Desm.) Raitv. (1970)
- 3' Apothecia 0.3-0.5(1) mm diam., whitish to ivory, sometimes with reddish hymenium, margin hairy; asci 45-65x4-6.5 µm, without croziers, IKI+; spores narrowly fusiform, (10)12-17(19)x1.5-2 µm, OCI 2; paraphyses 3.5-6 µm diam., 20-30 µm exceeding the asci; marginal hairs 115-150x3-4 µm, hyaline; saprobic on grasses (*Glyceria*, *Phragmites*) and *Juncus*; phen.: IV-VII • **Albotricha acutipila** (P. Karst.) Raitv. (1970)
Ill.: Boudier 1905-1910: pl. 511, Schmid I. & H. 1990: nr. 16.
- 4 Apothecia shortly stipitate, 0.5-1 mm diam., disc yellowish, outside with white straight hairs; asci 37-50x4-5 µm, I+; spores subfusiform to fusiform, 8.5-15(20)x1.5-2 µm; paraphyses 4-5 µm diam., 20-40 µm exceeding the asci; marginal hairs tapering, 110-150x4-5 µm, often with exudations; saprobic on *Rubus idaeus*; phen.: IV-VII
..... **Albotricha laetior** (P. Karst.) Raitv. (1970)
Ill.: Huhtinen 1985b: fig.6-12.
- 4' Apothecia up to 0.8 mm diam., sessile, white; asci 32-45x4-5 µm, I-; spores 8-13x1.5-2 µm, guttulate; paraphyses 3-4 µm diam., 5-12 µm exceeding the asci; marginal hairs up to 50µm long; saprobic on stems of *Lupinus polyphyllus*; phen.: V-VII **Albotricha lupini** Svrček (1987)
Ill.: Svrček 1987: fig. 2.
- 4" lignicolous **Albotricha minuta** Raitv. (1973)

Brunnipila Baral

Type species: *Brunnipila clandestina* (Bull.) Baral.

Lit.: Baral & Kriegsteiner 1985: 49; Baral (unpublished key).

- 1 Asci with croziers; foliicolous, ramicolous or fructicolous on woody plants 2
 1' Asci without croziers; foliicolous or caulicolous on herbs or grasses 6
- 2 Hairs 60-150 µm long, 6-8-celled 3
 2' Hairs 105-240(330) µm long, 8-10-celled 4
- 3 Spores 6-10.5x1.2-1.8 µm, OCI 0; asci IKI+; marginal hairs 60-150 µm long; saprobic on leaves of *Carpinus*, *Fagus*, *Quercus*, *Acer*, cupules of *Fagus*, cones of *Alnus*; phen.: IV-VI(IX) ● **Brunnipila fuscescens** (Pers.) Baral (1985)
 III.: Boudier 1904-1910: pl. 507, Breitenbach & Kränzlin 1981: Pl. 220.
- 3' Spores 5.5-9.5x1.7-2.7 µm, OCI 0; asci IKI+; marginal hairs 60-90 µm long; saprobic on leaves of *Quercus robur*; phen.: V-VI "Lachnella" **brunneola** (Desm.) W. Phillips (1887)
 Distinct from *B. fuscescens*?
- 4 Spores 6-8x2 µm (mature?); asci IKI+; hairs rather violet in KOH
 ● **Brunnipila ?calyculiformis** (Schumach.) Baral (1985)
- 4' Hairs IKI- 5
- 5 Spores 7-12.5x2.4-3.5 µm, OCI 1; asci 57-65x8-7.5 µm, IKI+; paraphyses 10 µm protruding; hairs KOH -; saprobic on wood of *Erica*, *Rhododendron hirsutum*, *R. ferrugineum*; alpine; phen.: VI-VIII
 (●) "**Lachnum**" **latebricola** (Rehm) R. Galán & Raitv. (1997)
 III.: Rubio & al. 2010: p. 233.
- 5' Spores 7.5-12x1.8-2.5 µm, 0(1)-septate, OCI 0; asci 60-70x5-6 µm, IKI+; paraphyses 20 µm protruding; hairs KOH -; saprobic on twigs of *Acer*, *Alnus incana*, *Alnus viridis*, *Corylus avellana*, *Fagus* cupules; montane to subalpine; phen.: (III)V-VIII (CH, CZ, ES) (●) **Brunnipila calyculiformis** (Schumach.) Baral (1985)
 III.: Rubio & al 2010: p. 209.
- 6 Asci 62-65x5-6 µm, IKI rb or IKI rr, without croziers; spores 11-17x2-3 µm, OCI 3; hairs and ectal excipulum covered with violet pigment (especially on stipe) ; saprobic on culms of *Juncus filiformis*, *Juncus trifidus*; phen.: V-VII, not rare
 **Brunnipila calycioides** (Rehm) Baral (1985)
 III.: Breitenbach & Kränzlin 1981: Pl. 216, Suková 2004: fig. 2, Rubio & al 2010: p. 208.
- 6' Asci IKI BB/rB; spores OCI 0-1 7
- 7 Spores 6-10.5 µm long 8
- 7' Spores 9-18x2-2.5 µm, eguttulate (sometimes only 9-12 µm?); saprobic on stems of *Triticum aestivum*; phen.: V-VI
 (●) **Brunnipila palearum** (Desm.) Baral (1985)
- 8 Paraphyses lanceolate, 2-3 µm diam.; asci IKI+, arising from simple septa; spores cylindric-clavate, 4-6x1.2-1.7 µm; hairs golden-brown; saprobic on leaves of *Rubus fruticosus* and *Ledum groenlandicum*; phen.: X.....
 "**Fuscolachnum**" **dumorum** (Roberge ex Desm.) J.H. Haines (1989)
- 8' Hairs apically slightly inflated, usually tipped by crystals, ?5-7-septate 9
- 9 Spores 6-10x1.2-1.8 µm; hairs ±deep brown, never with violet pigment; asci 40-57x4.5-5 µm; saprobic on stems of *Rubus idaeus*, *Epilobium*, *Arctium*, *Cirsium*, sometimes on Poaceae; phen.: V-VII(IX)
 ● **Brunnipila clandestina** (Bull.) Baral (1985)
 III.: Breitenbach & Kränzlin 1981: Pl. 218, Rubio & al 2010: p. 209.
- 9' Spores 7-10.5x1.6-2.2 µm; hairs more light brown; violet pigment on ectal excipulum and hairs may occur; asci 50-60x5-6 µm; saprobic on stems of *Aruncus dioicus*; phen.: VI **Brunnipila "aruncicola"** Baral nom. prov.

Capitotricha (Raitv.) Baral

Type species: *Capitotricha bicolor* (Bull.) Baral.

Lit.: Baral & Krieglsteiner 1985: 60, Hairaud 2009: 16.

- 1 Asci up to 60 µm long; spores up to 2 µm wide 2
 1' Asci more than 60 µm long; spores larger 3
- 2 Spores 6-9.5x1.5-2µm; asci 45-60x5.5 µm, I+; saprobic on stems of *Rubus idaeus*; phen.: VI-VIII(IX)
 ● **Capitotricha rubi** (Bres.) Baral (1985)
- 2' Apothecia 0.5-1 mm diam., stipitate, hymenium yellow; spores 8-10x2 µm, eguttulate; asci 41-42x5.5-6 µm, with croziers; saprobic on leaves of *Quercus*; phen.: V,X
 ● **Capitotricha patulus** (Pers.) Baral & Järv. comb. nov. ined.
 Foto: Hairaud 2009: p. 17.

- 3 Spores fusoid with obtuse ends, *(15)18–25(29.5)×(3.7)4–5(5.4) μm, †15–21×3.5–4.3 μm, hyaline, smooth, at maturity (inside living asci) with mostly 3, rarely (1–)2 or 4(–6) transversal septa, slightly constricted at septa (living state), cells uninucleate, eguttulate or with a few minute LBs. Saprobic on
- 3 Spores 7-12x1.7-2.3 μm, eguttulate; asci 60-70x6-7 μm, I+, without croziers; saprobic on branches of *Quercus*, *Crataegus*, *Betula*, *Alnus*; phen.: III-VIII • **Capitotricha bicolor** (Bull.) Baral (1985)
Foto: Hairaud 2009: p. 17.
- 3' Spores 9-18x2-3μm, 0(1)-septate; asci 60-85x5.5-7.5 μm, I+; saprobic on cupules and twigs of *Fagus*; phen.: (III)IV-V(VI) • **Capitotricha scabrovillosa** (W. Phillips) Baral & Järv. (2020)

Dasyscyphella Tranzschel

Type species: *Dasyscyphella cassandrae* Tranzschel.

Lit.: Raitviir 1977: 29, Baral & Kriegelsteiner 1985: 63, Baral 1993: 5, Raitviir 2002a: 227.

- 1 Calcium oxalate crystals absent on the hairs 2
1' Calcium oxalate crystals present on the hairs 14
- 2 Spores over 20 μm long 3
2' Spores up to 20 μm long 5
- 3 Spores up to 30 μm long, more or less cylindrical or fusoid 4
3' Spores vermiform, 37-56x1.8-2.7 μm, aseptate, hyaline; asci without croziers; saprobic on stems of *Chamaedaphne calyculata*, *Ledum palustre* and *Vaccinium* sp.; phen.: ?
..... **Dasyscyphella cassandrae** Tranzschel (1898) var. **cassandrae**
- 4 Spores 20-25x3.5-4 μm, 1-septate, guttulate, hyaline; asci without croziers; on decaying wood of *Fagus sylvatica*; phen.: ? **Dasyscyphella calongei** R. Galán & G. Moreno (1984)
4' Spores 23-28x2-2.5 μm, aseptate, with several LB's, hyaline; asci with croziers; on dead culms of *Scirpus holoschoenus*; phen.: IX **Dasyscyphella scirpicola** Raitv. (2002)
- 5 Apothecia vivid sulphur-yellow when fresh 6
5' Apothecia whitish to pale sulphur-yellow 7
- 6 Apothecia turning dark brown when dry; asci without croziers; spores 6.5-11.5x2-2.8 μm, aseptate, hyaline; saprobic on hardwood **Dasyscyphella sulphuricola** (Peck) J.H. Haines (1989)
6' Apothecia orange-ochraceous when dry; spores 8.5-11x2-3 μm, aseptate, OCI 1; asci with croziers; on fallen needles of *Pinus cembra*, *Pinus mugo*; phen.: VIII-X **Dasyscyphella mughoncola** (Svrček) Raitv. & Arendh. (1988)
- 7 Hair apical cell ca 1/3 of total length of the hair, hymenium deep orange; asci 4-spored, with croziers; spores 8-13x2-3.2 μm, aseptate, guttulate; on fallen leaves of *Quercus faginea*; phen.: ?
..... **Dasyscyphella patuloides** Raitv. & R. Galán (1994)
7' Hair apical cell not or only slightly longer than other cells 8
- 8 Croziers present 9
8' Croziers absent 12
- 9 Spores 7-9x1.6-2 μm, aseptate, with two large LB's; on decaying wood of *Quercus* sp., on fallen twig of *Salix caprea*; phen.: VIII **Dasyscyphella pilosissima** Raitv. (2002)
9' Spores eguttulate or nearly so ; on woody substrates 11
- 11 Hair tips usually subclavate; asci with croziers; spores (5)7-7.8(9)x1.8-2.2 μm, aseptate; on decaying wood of *Corylus avellana*, *Picea* spp., *Quercus robur*, *Salix* spp.; phen.: ? **Dasyscyphella montana** Raitv. (1977)
11' Hair tips usually slightly tapering; asci with croziers; spores 7.3-9x2.2-2.8 μm, aseptate; saprobic on decaying wood of *Acer* spp., *Larix dahurica*, *Parrotia persica*, *Picea* spp., *Pinus* spp.; phen.: ?
..... • **Dasyscyphella angustipila** Raitv. (1977)
- 12 Asci 40-50 μm long; spores 12-15x1.5-2 μm, aseptate; saprobic on leaves of *Carex* sp.; phen.: VIII
..... **Dasyscyphella norvegica** Raitv. (2002)
12' On woody substrates 13
- 13 Asci 63-85x5.5-6 μm, IKI blue; spores 7-13.5x2-3.2 μm, 0(1)-septate, OCI 0; on decaying wood of *Fraxinus*, *Picea abies*, *Populus* sp.; phen.: V-VII **Dasyscyphella dryina** (P. Karst.) Raitv. (1970)
13' Asci 30-40 μm long; spores 6-10x1.5-2.5 μm, aseptate; on fallen cones of *Pinus sylvestris*, *Picea abies*; phen.: V-VIII(IX) **Dasyscyphella conicola** (Rehm) Raitv. & Arendh. (1988)

III.: Suková 2005: fig. 8.

- 14 Hair apical cell ca 1/3 of total length of the hair..... 15
 14' Hair apical cell not or only slightly longer than other cells 17
- 15 Apothecia 0.25-0.4 mm diam., stalked, whitish; asci 40-55x4.5-5.5 µm, I+, with croziers; spores 8-11x1.5-2.5 µm, aseptate; paraphyses 2-3.7 µm wide, exceeding the asci up to 10(18) µm; hairs up to 140 µm long; saprobic on spines of *Castanea sativa* involucre; phen.: X-XII **Dasyscyphella castaneicola** (Graddon) Raitv. (2002) III.: Graddon 1977: fig. 7.
 15' Croziers absent 16
- 16 Spores 5.6-7.2x1.3-1.8 µm, aseptate; on dead culms of grasses; phen.: ? **Dasyscyphella graminicola** Raitv. & H. Järv. (1997)
- 16' Spores 8.5-13x1.3-2 µm, aseptate; on fallen leaves of *Quercus faginea*, *Quercus rotundifolia*; phen.: ? **Dasyscyphella tamajonica** (Raitv. & R. Galán) Raitv. (2002)
- 17 Croziers present 18
 17' Croziers absent 19
- 18 Spores (5)6-7.5(9)x1.7-2.3 µm, aseptate; on decaying wood of *Carpinus* spp., *Betula* spp., *Fagus* spp., *Populus* spp., *Pyrus communis*, *Quercus rubra*, *Salix* spp., but mainly on *Quercus robur*, ; phen.: (VII)IX-IV(VI) **Dasyscyphella nivea** (R. Hedw.) Raitv. (1970) III.: Suková 2005: fig. 10.
- 18' Spores 8.5-12.5x1.5-2 µm; on fallen leaves of *Quercus canariensis*, *Quercus robur*, *Quercus rotundifolia*, *Quercus rubra*; phen.: (VIII)IX-XII **Dasyscyphella claviculata** (Velen.) Baral & Svrček (1985)
- 19 Yellow resinous matter absent on the hairs; asci shorter than 50 µm 20
 19' Yellow resinous matter present on the hairs; asci longer than 50 µm 21
- 20 Asci 38-43 µm long; spores 7.2-9.6x1.3-1.6µm, with two minute polar guttules, aseptate; on dead stems of *Chamerion angustifolium*; phen.: ? **Dasyscyphella epilobii** Raitv. & H. Järv. (1997)
- 20' Apothecia 0.3-0.8 mm diam. stalked, first white, becoming yellowish; asci 42-45x4.5-5.5 µm, IKI blue, without croziers; spores 8-13.5x1.3-1.9 µm, OCI 1; saprobic on leaves of *Vaccinium*; phen.: VI-VII **Dasyscyphella albocitrina** (Cooke) Baral (1993)
- 21 Asci 56-70x4.5-5.5 µm, IKI blue, without croziers; spores 9-13x1.7-2.3 µm, aseptate; on strongly decayed wood of *Castanea sativa*, *Quercus robur*; phen.: IV-VII(XI) **Dasyscyphella crystallina** (Fuckel) Raitv. (1970) III.: Suková 2005: fig. 9.
- 21' Asci 5-56 µm long; on dead canes of *Rubus idaeus*; phen.: VII-VIII **Dasyscyphella rubi** Raitv. (2002)

Erioscyphella Kirschst.

Type species: *Erioscyphella longispora* (P. Karst.) Kirschst. = *E. abnormis* (Mont.) Baral, Šandová & B. Perić
 Lit.: Tello & Baral 2016: 157.

- 1 Apothecia 0,2-0.7 mm diam., stipitate, Hymenium bright egg-yellow, receptacle and stipe covered by white hairs. Asci *(79-)83-97(-101)x(6-)6.5-8(-8.3) µm, †62-80x(4.5-) 5-5.5(-6.2) µm, with slightly hemiamyloid apical ring (IKI blue then dirty reddish-grey) of *Calycina* type, without croziers. Spores *(12.5-)14-16.5(-17.8)x(2.5-)2.7-3.6(-4) µm, †(5.5-)9-14x2.2-3 µm [direct distance from end to end], curved like a boomerang, gradually tapering at both ends, smooth, hyaline, non-septate, containing a few small oil droplets. Paraphyses cylindrical to slightly lanceolate. On fallen needles of *Pinus nigra*. Phen.: II-V (ES) **Erioscyphella lunata** (W.Y. Zhuang & Spooner) Perić & Baral (2015) III.: Tello & Baral 2016: fig. 1-4.
- 1' Apothecia with hymenium creamish-white to light yellow-orange. Asci *42-53x4-6 µm, †35-42x4-5 µm. Spores *7.5-11.5 x 2-2.6 µm, †6-9 x 1.5-2 µm. On fallen needles of *Pinus nigra* and *P. sylvestris*. Phen.:

Incrucipulum Baral

Type species: *Incrucipulum ciliare* (Schrad.) Baral
 Lit.: Haines 1989: 341 (sub *Lachnum sulphurellum*), Baral & Krieglsteiner 1985: 71, Baral (unpublished key).

- 1 Spores 5-12x0.8-1.7 µm, OCI 0; paraphyses 12-20 µm protruding, 3-5 µm wide; hairs 4.5-6 µm wide, max. 100 µm long 2
 1' Spores OCI 4-5; paraphyses 0-10 µm protruding, 1.5-3.5µm wide; hairs 5.5-9 µm wide, 75-135(200) µm long 3

- 2 Apothecia not yellowing, sessile; hairs 2-5-celled; asci 33-45x4.5-5 µm, IKI blue; spores 5-8x0.8-1µm, OCI 0; paraphyses without plasmaguttules; saprobic on leaves of *Quercus petraea*, *Quercus robur*; phen.: (III)VI-VIII(IX) (BE/F)....
..... • **Incrucipulum capitatum** (Peck) Baral (1985)
- 2' Apothecia yellowing, with 0.2-0.35 long stalk; hairs 50-80(120)x5-7 µm, 8-11-celled, often capped with tetrahedral crystals; asci *40-44x3-4 µm, arising from simple septa; spores fusiform (6)7-12x1.2-1.8(2) µm, OCI 0; paraphyses 3-5.5 µm diam., up to 30 µm longer than the asci, with 1-2 large refractive plasmaguttules; saprobic on twigs of *Myrica gale* which retain bark and leaves; phen.: (IV)V-VIII(X) • **Incrucipulum sulphurellum** (Peck) Baral (1985)
- 3 Hairs up to 135 µm long, wall 0.5-1µm thick; asci IKI rb; spores 18-24(27)x2.7-3 µm, OCI 4-5; paraphyses 0-10µm protruding, 1.5-3.5µm wide, with a few LBs close to the apex; saprobic on leaves of *Castanea sativa*, *Fagus*, *Quercus petraea*, *Quercus robur*; phen.: (VI)IX-X(XI) (BE/F) • **Incrucipulum ciliare** (Schrad.) Baral (1985)
- 3' Hairs up to 200(300) µm long, wall 0.5-2.5 µm thick; asci IKI rr; spores 15-18.5(19.5)x2.8-3.5 µm, OCI 4; paraphyses 0-10µm protruding, 1.5-3.5µm wide, with many refractive ?LBs close to the apex; saprobic on leaves of *Vaccinium myrtillus*, *Vaccinium uliginosum*; phen.: X **Incrucipulum vitembergense** (Matheis) Baral (1985)

Lachnellula P. Karst.

Syn.: *Trichoscyphella* Nannf.

Type species: *Lachnellula suecica* (de Bary) Nannf.

Lit.: Baral 1984: 143.

- 1 Hairs and ectal excipulum without pigment; outside of apothecia white 2
- 1' Hairs and ectal excipulum with brown to olive pigment; outside of apothecia coloured 17
- 2 Spores filiform, 73-97x1.5-2 µm; saprobic on *Pinus maritima*; phen.: ?
..... **Lachnellula pseudofarinacea** (P. Crouan & H. Crouan) Dennis (1962)
- 2' Spores not filiform 3
- 3 Spores spherical to oval, up to 7 µm long; asci with croziers 4
- 3' Spores oval, ellipsoid to fusiform; when oval, then min. 7-9 µm long 6
- 4 Spores oval, 2.5-3.7(4?)x2-2.8 µm; asci IKI-; apothecium stalk hemiamyloid like in *Perrotia*; saprobic on resin of *Picea abies*, sometimes on *Abies alba*, *Larix decidua*; phen.: II (BE/W)
..... • **Lachnellula resinaria** (Cooke & W. Phillips) Rehm (1893)
- 4' Spores 4-5(6) µm long; asci IKI (medium)strongly rr/rb 5
- 5 Spores subspherical, 6-7x5-6 µm; ectal excipulum of thin-walled textura globulosa; asci IKI r(b); saprobic on corticated branches of *Pinus mugo*; subalpine; phen.: V **Lachnellula suecica** (de Bary ex Fuckel) Nannf. (1953)
- 5' Spores ±oval, 4.5-5.5(6)x4.5-5 µm; ectal excipulum thick-walled textura porrecta; asci IKI rr; conicolous (*Pinus montana*); subalpine; phen.: V-VI(XI) **Lachnellula ?hyalina** Dharme (1965)
- 6 Spores max. 3.5 µm wide 7
- 6' Spores min. 3.5-4.5 µm wide 9
- 7 Spores narrow fusiform, 4.5-7.5x1 µm; ectal excipulum textura globulosa; saprobic on branches of *Larix decidua*; phen.: ? **Lachnellula**..... 8
- 7' Spores more than 2 µm wide 8
- 8 Asci IKI medium rb, without croziers, but seldomly with basal protruding; spores fusiform, (5)6-9x2-2.5(2.8) µm, OCI 0; saprobic on *Abies alba*, *Cedrus*, *Picea abies*, *Pinus sylvestris*; phen.: XII-V(VI)
..... • **Lachnellula subtilissima** (Cooke) Dennis (1962)
- 8' Asci IKI-, without croziers; spores ellipsoid to ovoid, 5-6.2(6.6)x2.3-3(3.2) µm, OCI 2 (biguttulate); saprobic on corticated twigs, branches and stems of *Abies alba*, *Picea abies*, *Pinus mugo*, *Pinus silvestris*; phen.: (I)IV-VIII(XII)
..... • **Lachnellula calyciformis** (Wlld.) Dharme (1965)
Ill.: Huhtinen 1993: fig. 3e-h.
- 9 Spores max. 15 µm long 10
- 9' Spores ellipsoid to fusiform, min. 15 µm long; asci without or with "open" croziers 13
- 10 Spores ovoid, clearly wider than half the length; asci IKI-, with croziers 11
- 10' Spore width about half the length, ends rounded 12
- 11 Spores (7)8-9.5(11)x5.5-6 µm, with minute guttules (OCI 2); saprobic on corticated branches of *Abies alba*, *Picea abies*; phen.: (III)IV-V(VI) **Lachnellula gallica** (P. Karst. & Har.) Dennis (1962)

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- 11' Spores (11.5)12-13.5(14.5)x8.5-9.5(11) μm , with several small and mostly one large guttule (OCI 4); saprobic on corticated branches of *Abies alba*; phen.: (II)III-V **Lachnellula robusta** Baral & Matheis (1984)
- 12 Spores 6-9.2x3.5-4.7 μm ; asci IKI?, croziers? **Lachnellula "subgallica"** Baral nom. prov.
- 12' Spores (11)12-13.5x5.5-6.5 μm , ends rounded: asci IKI-, with "open" croziers (basal septate hook-like protruding) **Lachnellula fuckelii** (Bres. Ex Rehm) Dharne (1965)
- 13 Asci with broadly hemisphaerical apex; spores fusiform, mostly with pointed ends; hair apices mostly lanceolate and smooth 14
- 13' Asci with slightly conical apex; spores ellipsoid-cylindric, with \pm rounded ends; hairs fully granulate, blunt 16
- 14 Spores with minute LBs (OCI 2), (20)23-29(35)x(5.5)6-6.5 μm , overmature spores septate, ends without protrudings; asci without basal protruding; paraphyses p.p. with protrudings, blunt **Lachnellula splendens** (J. Schröt.) Baral & Matheis (2000)
- 14' Spores up to 20 μm long 15
- 15 Spores with 2 large and 2 or more small LBs (OCI 4), 15-18.5(20)x4(4.5) μm , septate or not, ends sometimes extended; asci with "open" croziers; paraphyses without apical protrudings, \pm pointed **Lachnellula abietis** (P. Karst.) Dennis (1962)
- 15' Spores similar, but with small LBs; saprobic on needles of *Abies* **Lachnellula** spec.
- 16 Spores (13)18-20(24)x(5)7.5-8.5 μm , with minute LBs and 1-3 empty spaces, overmature spores septate,; asci IKI strongly rr or IKI- (in same apothecium!); paraphyses with apex to 4-5 μm , moniliform and sometimes with apical protrudings; saprobic on corticated branches of *Larix decidua*; phen.: • **Lachnellula occidentalis** (G.G. Hahn & Ayers) Dharne (1965)
- 16' Spores (20)21-24(26.5)x9-10(10.5) μm , with minute LBs and 2-3 empty spaces; asci IKI-; paraphyses with apex 3-3.5 μm wide, poorly septate, seldomly protruding; parasitic on cancer tumors on branches of *Larix decidua*; phen.: III-VI (•) **Lachnellula willkommii** (Hartig) Dennis (1962)
- 17 Apothecia sessile, 0.5-1 mm diam., yellowish; hairs cylindric, fairly thick-walled, 50-70x3-4 μm , hyaline, often with lumps of resin; asci 30-42x3-4.5 μm , arising from croziers; spores 4-5x1 μm , aseptate; saprobic on needles of *Pinus sylvestris*; phen.: V (BE/F, BE/W) • **Lachnellula pulverulenta** (Lib.) Sasagawa & Hosoya (2010)
- 17' Spores (7.5)8-9.5(10)x4.5-5.5 μm , OCI 0; hairs dark brown, basally 5-8 μm wide; asci without croziers; saprotytic on branches of *Larix* sp.; subalpine; phen.: IV-VII (DE, FR) **Lachnellula arida** (W. Phillips) Dennis (1962)
III.: Minter 2005.
- 17" Spores longer; hairs pale brown, only 3.5-5 μm wide 18
- 18 Spores 18-21x5-7 μm ; parasitic on twigs and needles of small *Pinus* spp.; phen.: V **Lachnellula pini** (Brunch.) Dennis (1962)
- 18' Spores up to 17 μm long 19
- 19 Spores 12-16x3.5-5.5 μm , OCI 1; ectal excipulum of textura globulosa with covering layer of textura oblita; hairs ochraceous brown, 3.5-5 μm wide; asci with "closed" (seldomly "open") croziers; parasitic on branches of *Pinus mugo* and *Pinus cembra*; phen.: VI-VIII **Lachnellula fuscanguinea** (Rehm) Dennis (1962)
- 19' Spores 7-13x4-5 μm ; ectal excipulum of textura prismatica-oblita; saprobic on *Larix decidua*, *Pinus cembra*, *Pinus silvestris* and *Picea abies*; phen.: VI-IX **Lachnellula flavovirens** (Bres.) Dennis (1962)

Lachnum Retz.

Type species: *Lachnum agaricinum* Retz.

Syn.: *Dasyscyphus* Nees.

Lit.: Raitviir 1970: 84 (sub *Dasyscyphus*), Haines & Dumont 1984: 1, Galán 1986: 334 (*L. castaneicola*), Krieglsteiner 1987: 453 (sub *L. albidoroseum*), Scheuer 1988: 89, Haines 1989: 332 (*L. luteodiscum*, *L. clavisorum*), Galán & Raitviir 1992: 32 (*L. trapeziforme*), Holm & Nannfeldt 1992b: 4, Soková 2005: 183.

Key mainly according H.O. Baral:

Hairs with oxalate crystals	Paraphyses and hairs with strongly refractive vacuoles	Asci with croziers	
+	+	+	No species known
+	+	-	No species known
+	-	+	Key A (paraphyses always broadly lanceolate, strongly

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			protruding)
+	-	-	Key B (spores OCI 0-1, hairs 3-4celled)
-	+	+	Key C
-	+	-	Key D
-	-	+	Key E (spores 6-13x1.2-3µm)
-	-	-	Key F

Key A (+ - +):

- 1 Crystals adherent on hair tips 2
- 1' Apothecia 0.2-0.8 mm diam., stalked, hymenium pale yellow; hair crystals (often globose) are washed away in the water preparation easily; asci 30-45x4.2-4.7 µm, IKI bb; spores 4-8x1.3-1.5 µm, OCI 0-1; saprobic on leaves of *Acer pseudoplatanus*, *Fagus*, *Quercus petraea*, *Quercus robur*; phen.: IV-VII
 • **Lachnum aceriphilum** nom. prov. Marketa Sandova
 Ill.: Breitenbach & Kränzlin 1981: Pl. 225.
- 2 Apothecia pale pinkish, (0.2)0.5-1 mm diam., shortly stalked; spores 10-16(18.5)x2-2.5 µm, OCI 3; hairs 100-140x4-6 µm, apically with conspicuously large crystals; asci 50-60x5 µm, IKI bb, with croziers; paraphyses up to 20 µm protruding; saprobic on grasses and *Carex ferruginea*, *Juncus trifidus*, *Nardus stricta*, *Trichiporum cespitosum*; alpine; phen.: V-VIII.....**Lachnum roseum** (Rehm) Rehm (1891)
- 2' Apothecia white; spores OCI 0-1 3
- 3 Apothecia 0.8-1 mm diam., stalk 0.3-0.5 mm long; asci 40-50 µm long; spores 6-11x1.2-1.5 µm, OCI 1; paraphyses 20-30 µm exceeding the asci; saprobic on stems of *Filipendula ulmaria*, *Senecio fuchsii*; phen.: VI-VIII
 **Lachnum morthieri** (Cooke) Rehm (1891)
- 3' Apothecia 0.7-2.2 mm diam., stalk 1-2.5 mm long; asci 65-80 µm long, IKI bb; spores 9-15x1.7-2.3 µm, OCI 0; paraphyses 25-35 µm exceeding the asci; saprobic on stems of large herbs such as *Chamerion angustifolium*, but mainly on *Filipendula ulmaria*; phen.: (IV)VI-VIII..... • **Lachnum nudipes** (Fuckel) Nannf. (1928)

Key B (+ - -):

- 1 Apothecia 0.2-0.7 mm diam.; asci 50-66x6.5-9 µm, IKI bb; spores 7-12x2.7-4 µm, OCI 0-1; paraphyses 2.5 µm diam., 0-10 µm protruding the asci; crystals agglutinated by globules of amorphous matter, washed away in the water preparation easily; saprobic on leaves of *Carpinus*, *Quercus faginea*; phen.: IX-X(XII)
 • **Lachnum trapeziforme** Velen.(1934)
 Ill.: Galán 1992: fig. 1-11.
- 1' Spores max. 6-9x1.6-2.1 µm; asci 4-6 µm wide; paraphyses min. 8-15 µm protruding 2
- 2 Apothecia 0.7-1.2 mm diam., (sub)sessile, reddening although without vacuoles; asci 55x5 µm, IKI bb; spores 5-8x1.4-1.7 µm, OCI 1; saprobic on *Polygonatum verticillatum*, *Polygonatum multiflorum*; phen.: V-VI
 ○ **Lachnum eburneum** Kirschst. (1938)
- 2' Apothecia stalked, stalk 0.3-0.6 mm long, not reddening 3
- 3 Apothecia amid populations of *L. nudipes*; asci 45-55x4-4.5 µm, IKI-; spores 4.5-8x1-1.5 µm, OCI 2 (biguttulate); hair crystals adherent; saprobic on stems of *Filipendula ulmaria*; phen.: VI-VIII **Lachnum subnudipes** Baral (1985)
- 3' Asci IKI bb; spores OCI 0-0.5 4
- 4 Apothecia 0.4-1.3 mm diam., stalked; asci 39-45x4.5-6 µm, IKI bb; spores 6-10.5x1.5-2.1 µm, OCI 0; hair crystals adherent; saprobic on *Adenostylus*, *Arctium*, *Aruncus dioicus*, *Epilobium*, *Filipendula*, *Senecio alpinus*, *Senecio fuchsii*; phen.: VI-VII • **Lachnum clavigerum** (Svrček) Raitv. (1985)
 Ill.: Rubio & al. 2010: p. 231.
- 4' **Lachnum rhytmatis** (W. Phillips) Nannf. (1939)
- 4'' Apothecia 0.2-0.6 mm diam.; asci 33-41x4.2-5 µm, IKI bb, without croziers; spores 4-6x1.2-1.5 µm, OCI 0; hair crystals easily washed away; saprobic on leaves of *Vaccinium myrtillus*, *Vaccinium vitis-idaea*; phen.: V-VI
 **Lachnum microsporium** Velen. (1934)
 Ill.: Van Vooren 2004: fig. 2.1; Rubio & al. 2010: p. 233.

Key C (- + +)

- 1 Hairs apically slightly capitate; spores max. 12 µm long; lignicolous 10
- 1' Hairs mostly not enlarged at the tip; mostly graminicolous 2
- 2 Paraphyses up to 15 µm protruding 3
- 2' Paraphyses more protruding 7

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- 3 Spores up to 11 µm long 4
 3' Spores longer 6
- 4 Apothecia 0.2 mm diam., shortly stipitate, white with reddish margin; asci 21-28x(3)4-5(6) µm, I+; spores narrow ellipsoid, 4-6.5x1.5-2 µm, OCI 0-1; hairs 20-45x5-6(7.5) µm, 0(1)septate, hyaline to pale orange, coarsely granulate; saprobic on needles of *Picea abies*; phen.: VIII **Lachnum rubropunctatum** Raitv. & Arendh. (1988)
 4' Spores longer 5
- 5 Apothecia 0.1-0.2 mm diam., stalked; asci 32-40x3.5-4 µm; spores 7-9x1.5-1.8 µm, OCI 0-1; paraphyses 3-4.5µm wide, 13-17 µm protruding; hairs mostly 3-septate, 40-65x4-4.5(5) µm; saprobic on *Nardus stricta*; phen.: VI
 • **Lachnum nardi** Rehm (1891)
- 5' Apothecia about 1 mm diam., stalked; asci 45-68x4-5.5(6.5) µm; spores 7.7-11.4x1.6-2.2(2.9) µm; paraphyses 3-4.5 µm wide, up to 15(20) µm protruding; hairs 25-65 µm long, 3(6)-septate; saprobic on *Calamagrostis epigeios*, *Calamagrostis* sp.; phen.: VI-VII **Lachnum agropyri** Velen. (1934)
- 6 Apothecia 0.8 mm diam.; asci 70-80 µm long; spores 10-19x2.2.5 µm, OCI 2; paraphyses 5-15 µm protruding, 4-5µm wide; hairs 50-8 5 µm long, apically not enlarged, 1-3-celled, fully guttulate; saprobic on *Eriophorum vaginatum*, *Trichophorum*; phen.: VI **Lachnum "trichophoricola"** Baral nom. prov.
- 6' Apothecia 0.5-1.8 mm diam., stalked; asci 50-85x5.5 µm, IKI bb; spores 9-18x1.5-2.3 µm, OCI 0-1; paraphyses 5-15µm protruding, 3.5-6 µm wide; hairs 60-105 µm long, apically partially slightly capitate, 1-5-celled, only basally guttulate; saprobic on Gramineae (*Molinia coerulea*); phen.: VI • **Lachnum "riffwili"** Baral nom. prov.
- 7 Paraphyses up to 5 µm wide 8
 7' Paraphyses 5-6 µm wide 9
- 8 Apothecia 0.5-0.6 mm diam., stalk 0.6-0.85 mm long; asci 34-47x3.5-4.5 µm; spores 7-11.7x1.3-1.8 µm; paraphyses 2.8-4.9 µm diam., 12.5-23(27) µm protruding; saprobic on *Calamagrostis epigeios*, *Calamagrostis* sp.; phen.: VI-VII
 ○ **Lachnum pseudocontroversum** Suková nom. prov.
- 8' Apothecia 0.2-0.3 mm diam., pure white, stalked; asci 28-38x3-4 µm, I+; spores 7-9x1.2-1.8 µm, aseptate, OCI 0; paraphyses 25-30 µm exceeding, 2.5-4 µm wide, I+; hairs cylindrical-conical, 160-240x4-6 µm, occasionally with a few encrusting crystals; saprobic on leaves of *Quercus faginea*; phen.: XI
 **Lachnum cyanoparaphysatum** Raitv. & R. Galán (1992)
 III.: Raitviir & Galán 1992: fig. 1-15.
- 9 Apothecia 0.3-0.9 mm diam., stalked; asci 42-57x4.5 µm; spores 7-15x1.1-1.5 µm, OCI 0.5; paraphyses 15-25 µm protruding, 5-6 µm wide; hairs 60-95 µm long, apically not enlarged, 1-4-celled; saprobic on Gramineae (*Agrostis*, *Brachypodium*, *Calamagrostis*, *Milium*, *Molinia*, *Phalaris*, *Phragmites*), *Carex*, *Juncus*; phen.: (V) VI-VIII
 • **Lachnum tenuipilosum** Svrček (1988)
- 9' Apothecia 0.5-1.3 mm diam., shortly stalked; asci 55-65x6-6.5 µm, IKI bb; spores 9-16.5x1.7-2.3 µm, OCI 1-2; paraphyses 20-25 µm protruding, 5-6 µm wide; hairs 40-115 µm long, apically not enlarged, 1-6-celled; saprobic on leaves of Poaceae (*Agrostis* sp., *Brachypodium pinnatum*, *Calamagrostis arundinacea*, *C. epigeios*, *Milium effusum*, *Molinia coerulea*), *Carex elata*, *Eriophorum vaginatum*, *Juncus* sp.; phen.: (V)V-VIII(X)
 • **Lachnum elongatisporum** Baral nom. prov.
- 10 Apothecia 0.6-3 mm, stalked; asci 35-50x3-4 µm, IKI bb; spores 4.5-7.5x1-1.5 µm; paraphyses 0-12 µm protruding, 3-4 µm wide, up to ?10 µm protruding, vacuoles yellowish; hairs 50-80µm long, 1-3-celled; saprobic on cones of *Pinus*, *Picea* and *Larix*, bark and branches of *Juniperus*, *Picea* and *Abies*; phen.: III-XI
 **Lachnum papyraceum** P. Karst. (1871)
 III.: Ellis & Ellis 1985: fig. 16.
- 10' Asci 42-54x3.5-5.5 µm, IKI bb, with croziers; spores 6.2-9.4x1.6-2.2 µm; paraphyses 2.4-4.2 µm wide, with vacuoles, 5-20 µm protruding; hairs 45-85x3-5.5 µm; saprobic on wood of *Alnus*, branches of *Crataegus* sp.; phen.: IV-IX
 • **Lachnum fasciculare** Velen. (1934)
 ?= *Lachnum crataegi* Velen.
 III.: Ellis & Ellis 1985: fig. 15, Suková 2005: fig. 4.

Key D (- + -):

- 1 Spores OCI »1, max. 8-15 µm long 2
 1' Spores OCI 4-5, min. 9-17 µm long 10
- 2 Hairs apically conspicuously capitate; spores up to 2 µm wide 3
 2' Hairs apically ± not enlarged 5

- 3 Spores 5-9x1.5-2 µm, OCI 1; paraphyses 0-15 µm protruding, 4-5 µm wide, vacuoles yellow; lignicolous (separate species?); saprobic on leaves of *Fagus*; phen.: VI..... **Lachnum "flavotinctum"** Baral sp. nov.
- 3' Paraphyses predominantly with hyaline vacuoles 4
- 4 Asci 30-45x4.5-5 µm, IKI bb; spores 6-11x1.2-1.7 µm, OCI 1; paraphyses 15-30 µm protruding, 4-6µm wide, vacuoles hyaline, seldomly yellow; graminicolous or seldomly caulicolous; phen.: V-IX • **Lachnum pudicellum** (Qué.) J. Schröt. (1908)
- 4' Apothecia 1-2 mm diam., stalked; asci 43-56x4.5-5 µm, IKI bb; spores 7-11x1.5-2 µm, OCI 0; hairs 50-85 µm long, 1-5-celled; paraphyses 15-30 µm protruding, 4.5-7 µm wide; saprobic on corticated branches of *Alnus*, *Fraxinus*, *Salix caprea*, *Prunus*; phen.: (IV)V-VII **Lachnum pudibundum** (Qué.) J. Schröt. (1893)
III.: Suková 2005: fig. 7.
- 5 Asci 50-76x5-6 µm, IKI bb; spores 6-12.5x2-3 µm, OCI 1; paraphyses 0-9 µm protruding, 3-6 µm wide, vacuoles hyaline; hairs apically not enlarged to slightly capitate; saprobic on rotten wood (*Alnus*, *Carpinus*, *Corylus*, *Fagus*, *Fraxinus*, *Populus*, *Robinia*); phen.: (IX)X-III(IV) • **Lachnum brevopilosum** Baral (1985)
III.: Suková 2005: fig. 1-2.
(Collections on *Salix*-branches during summer with paraphyses 0-15 µm protruding, asci mostly with basal protruding eventually a separate taxon)
- 5' Paraphyses (3)10-24 µm protruding; graminicolous 6
- 6 Marginal hairs up to 60 µm long 7
- 6' Marginal hairs 40-80 µm long; paraphyses completely filled with vacuoles 8
- 7 Apothecia 1-2 mm diam., with 2-6 mm long stalk; asci (60)64-75(83)x4.2-6.2 µm; spores 8-13x1.7-2.4 µm; paraphyses 2-5 µm wide, 13-22 µm protruding; hairs 20-50(60)x3.5-6 µm, (1)2-4-celled; saprobic on *Gramineae* (dead roots of *Brachypodium pinnatum*, *Bromus erectus*, *Koeleria glauca*, sheaths of *Sesleria caOClorea*); phen.: VII **Lachnum rhizophilum** (Fuckel) Velen. (1934)
- 7' Apothecia 0.2-0.6 mm diam.; asci 35-50x4.5-5.5 µm,; spores 7-14x1.3-2 µm, OCI 1-2; marginal hairs 35-60 µm long, 2-4-celled; paraphyses mostly with few vacuoles; spores ±fusiform, 7-14x1.3-2 µm; saprobic on *Carex* and *Juncus*; phen.: V-IX • **Lachnum caricis** (Desm.) Höhn. (1917)
/=*Dasyscyphus sydowii*Dennis
- 8 Apothecia 0.3-0.8 mm diam., stalk 0.1-0.2 mm; asci 45-60x5.5-6.8 µm, IKI bb; spores 7.5-15x1.9-2.7 µm, OCI 1; hairs and paraphyses with yellow or white vacuoles; saprobic on stems of *Phragmites australis*; phen.: IV-VIII **Lachnum winteri** (Cooke) Velen. (1934)
- 8' Apothecia larger; spores up to 10 µm long 9
- 9 Apothecia 0.6-1.5 mm diam., stalked; asci 40-52x4-5.5 µm, IKI bb; spores 5-9.5x1.2-2.1 µm, OCI 0.5-1; paraphyses 0-15 µm protruding, 3-6 µm wide; hairs 40-90 µm long, apically not enlarged, ?1-celled; saprobic on Poaceae (*Ammophila*, *Bromus*, *Molinia*); phen.: IX ○ **Lachnum carneolum** (Sacc.) Rehm (1891)
- 9' Apothecia 0.8-2 mm diam., stalk 0.2-1 mm, whitish to pink, often reddening; asci 45-55x5.5-6.5 µm, IKI bb; spores 6-10x1.8-2.2 µm, OCI 1; paraphyses 3-15 µm protruding; hairs 60-80 µm long; hairs and paraphyses with hyaline vacuoles; saprobic on large grasses, especially *Phragmites australis*; phen.: V-IX • **Lachnum controversum** (Cooke) Rehm (1889)
- 10 Apothecia 0.3-1 mm diam., shortly stalked; asci 65-93x8.5-9.5 µm, IKI bb; spores 35-49x1.5 µm, OCI 5; paraphyses 10-30 µm protruding, 5-6 µm wide; saprobic on *Juncus*; phen.: III-IX • **Lachnum apalum** (Berk. & Broome) Nannf. (1936)
III.: Boudier 1904-1910: pl. 512, Breitenbach & Kränzlin 1981: Pl. 212.
- 10' Spores 9-21 µm long 12
- 12 Apothecia sessile (stalk hidden in substrate), hymenium yellowish orange; asci 55-70(105)x6-8 µm, IKI bb; spores fusiform, 16-21x3.3-4 µm, 0(1)-septate, OCI 4-5; paraphyses 2-3.5 µm diam., 13-24 µm protruding; hairs up to 70x3-4 µm long, hyaline to slightly rose; saprobic on overwintered flower stalks of *Scirpus lacustris*; phen.: VI-X ○ **Lachnum luteodiscum** (Peck) Haines (1989)
III.: Krieglsteiner 1987: p. 455 ; Haines 1989: 333, fig. 12 & 13.
- 12' Spores max. 2.5-3.2 µm wide; apothecia shortly stalked 13
- 13 Apothecia 0.75-1 mm diam., shortly stalked; asci 70-103x8-9.5µm, IKI bb; spores 13-21x2.5-3.2 µm, OCI 4.5-5; hairs 40-70 µm long, 1-3-celled (= *Lachnum imbecille* ss. Ba.&Kr.); saprobic on *Cladium mariscus*, *Eriophorum vaginatum*, *Juncus* sp.; phen.: IV-VII **Lachnum juncinum** Spooner (1987)
- 13' Spores max. 2.1-2.3 µm wide; asci 5.5-7 µm wide 14
- 14 Asci 60-73 µm long; spores 11-17x2.1-2.3 µm, OCI 3.5-4.5; hairs 40-65 µm long, 3-4-celled; paraphyses 30 µm protruding; saprobic on *Juncus effusus*; phen.: VI **Lachnum "subdiminutum"** Baral nom. prov.

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14' Apothecia 0.3-1 mm diam., sessile to shortly stalked, white with yellowish disk; asci 45-68x5.5-7 µm, IKI bb; spores 9-21x1.5-2 µm, OCI 4; hairs 30-45 µm long, 1-2-celled; paraphyses 10-18 µm protruding; hairs 30-40 µm long; saprobic on *Juncus effusus*, *J. filiformis*, *J. inflexus*; phen.: (IV)V-VII(X)
 • **Lachnum diminutum** (Roberge ex Desm.) Rehm (1896)

Key E (- - +):

- 1 Apothecia 0.5-3.2 mm diam., with 1-6mm long stalk; asci 40-53x4-5 µm, IKI bb; spores 6-9.2x1.2-1.8 µm, OCI 3.5-4.5; paraphyses 5-10 protruding, 2-3.3 µm diam.; saprobic on lower part of stems of *Lythrum salicaria*; phen.: (VI)VII-VIII
 • **Lachnum salicariae** (Rehm) Nannf. (1992)
- 1' Spores OCI 0-1(2) 2
- 2 Marginal hairs up to 70 µm long 3
- 2' Marginal hairs 70-110 µm long 4
- 3 Apothecia 2-10 mm diam., stalked, hymenium ±yellow; asci 50-83x4-5(6) µm, IKI bb; spores 7-11(?13)x2-2.5(?3) µm, OCI 0-1; hairs 35-45(70?) µm long; paraphyses (0-10?)20-30 µm protruding, 3-4µm wide; saprobic on rotten wood (*Quercus*, *Ulex*), herbs and grasses; phen.: (IV)V-VII(X) • **Lachnum pygmaeum** (Fr.) Bres. (1903)
 Ill.: Suková 2005: fig. 8-9.
- 3' Asci 40-63x4-5.5 µm, IKI bb; spores 5-9x1.5-2.3 µm, OCI 0.5-1; marginal hairs 40-60 µm, lateral hairs 50-90 µm long; paraphyses 6-12 µm protruding, 2.5-3.5 µm wide; hymenium white, ochraceous when old; saprobic on rotten wood of *Alnus*, *Fagus*, *Fraxinus*, *Populus*, *Quercus*, *Robinia*, *Salix*; phen.: IX-V • **Lachnum impudicum** Baral (1985)
 Ill.: Suková 2005: fig. 5.
- 3" Marginal hairs 55-70µm long; spores 5-11x1.5 µm, OCI 1.5; paraphyses 10 µm protruding, ?5 µm wide; saprobic on *Carex acutiformis*; phen.: VII **Lachnum "Schweigbrühl"** Baral nom. prov.
- 4 Apothecia 0.7-2.3 mm diam., shortly stalked; asci 65-79x6.3-7.2 µm, IKI bb; spores 7-12x2.4-3 µm, OCI 0; paraphyses 0-10 µm protruding, 3-4.5 µm wide; hairs 90 µm long, strongly capitate; saprobic on branch of *Salix*; phen.: X
 **Lachnum "salicis"** Baral nom. Prov.
- 4' Paraphyses 15-30 µm protruding, 5-7µm wide; spores 1.5-2.2 µm wide 5
- 5 Hairs cylindrical, apex not enlarged; marginal hairs 90-135(160)x3.5-4.5 µm; asci 45-95x4.5-6 µm, IKI bb; spores 6-12x1.7-2 µm, OCI 0; hairs and paraphyses typically filled with slightly refractive vacuoles; saprobic on twigs and branches of *Calluna vulgaris*, *Carpinus*, *Crataegus*, *Fagus*, *Populus tremula*, *Quercus*, *Rubus fruticosus*, *Rubus idaeus*, cupules of *Fagus sylvatica*, cones of *Abies*, *Alnus*, *Larix*, *Picea*, *Pinus*, leaves of *Fagus*, *Quercus*, stems of *Pleuropteris* and *Athyrium filix-femina*; phen.: III-VI(X) • **Lachnum virgineum** (Batsch) P. Karst. (1871)
 Ill.: Suková 2005: fig. 11.
- 5' Hairs conspicuously capitate, lateral hairs 70-110x(4.5)5-6 µm; asci 50-65x6 µm, IKI bb; spores 7-13x1.7-2.2 µm, OCI 1, sometimes only 6-9x1.5-2 µm, OCI 0; paraphyses & hairs with same slightly refractive plasmaguttules; saprobic on plant debris: cupules of *Fagus*, corticated branches of *Alnus*, *Carpinus*, *Crataegus*, *Fagus*, *Fraxinus*, *Lonicera*, *Picea*, *Quercus*, *Rubus fruticosus*, *Rubus idaeus*, *Salix*, stems of *Pleuropteris*; phen.: V-VII(XI)
 • **Lachnum subvirgineum** Baral (1985)
 Ill.: Suková 2005: fig. 10.

Key F (- - -):

- 1 Spores min. 14.5-20 µm long, OCI 2(3) 2
- 1' Spores max. 9-18 µm long, OCI 0-1 5
- 2 Apothecia to 0.5 mm diam., white to apricot; asci 62-83x6.5-7.5 µm, IKI bb; spores 14.5-26x2.3-2.7 µm, 0-1-septate, OCI 2.5-3; paraphyses 15-25 µm protruding, 4.5-6 µm wide, with slightly orange vacuoles and several LBs; hairs 3-7-celled, narrowing close to apex, apex not enlarged; saprobic on leaves of *Eriophorum angustifolium*, *E. vaginatum*; phen.: IV-X **Lachnum imbecille** P. Karst. (1870)
 Ill.: Rubio & al. 2010: p. 231.
- 2' Spores 1.6-2.3 µm wide, OCI 2; paraphyses 5-15 µm protruding, 3-6 µm wide; hairs 3-5-celled, apex slightly capitate; apothecia not reddening 3
- 3 Apothecia 0.3-0.8 mm diam., stalk 0.1-0.2 mm long; asci 55-75x5.5-6.7 µm, IKI bb; spores 12-27x1.6-2.3 µm, OCI 2; marginal hairs 45-80µm long, 3-celled; saprobic on *Schoenoplectus lacustris*; phen.: VII
 **Lachnum schoenoplecti** Raitv. (1988)
- 3' Apothecia 0.3-1.4 mm diam., stalk 0.2-0.8 mm long; asci 60-82x6-7.8 µm, IKI bb; spores 17-32.5x1.9-2.2 µm, OCI 2; marginal hairs 55-92 µm long, 4-5-celled; saprobic on *Carex rostrata*, *Juncus effusus*, *Molinia coerulea*; phen.: VI
 • **Lachnum "paraimbecille"** Baral nom. prov.

- 5 Spores 4.5-7.3x1.3-1.7 µm, OCI 0; asci 43-48x4.3-4.5 µm; apothecia sessile; saprobic on *Aruncus dioicus*, *Reynoutria japonica*; phen.: VI-VII **Lachnum "reynoutriae"** Baral nom. prov.
- 5' Spores min. 6-12 µm long 6
- 6 Spores 1-1.5 µm wide; paraphyses 15-30µm protruding, 4-7.5 µm wide; asci 40-55 µm long 7
- 6' Spores 1.2-2(2.3) µm wide; asci 45-60(75) µm long 8
- 7 Spores 6-11x1,5 µm; marginal hairs 50-75 µm, lateral hairs 30-55 µm long, hairs strongly capitate; saprobic on Poaceae (*Arrhenaterum*, *Brachypodium*, *Bromius*, *Calamagrostis*, *Lolium*, *Milium*, *Molinia*, *Phragmites*, *Triticum*), seldomly on Cyperaceae (*Carex acutiformis*) and Juncaceae (*Juncus*); phen.: (V)VI-VIII(IX) **Lachnum pudicellum** (Quél.) J. Schröt. (1893)
- 7' Spores 7-12 µm long; marginal hairs 30-55 µm, lateral hairs 20-48 µm long, hairs slightly capitate **Lachnum "subpudicellum"** Baral nom. prov.
- 7'' Asci 40-55x4.5-5 µm, IKI bb; spores 7-15x1-1.3 µm, OCI 0; marginal hairs 70-90 µm, lateral hairs 45-90 µm long; saprobic on leaves of *Carex* and *Juncus*; phen.: V-VIII(X) **Lachnum tenue** Kirschst. (1906)
- 8 Paraphyses 0-15 µm protruding, 2-4 µm wide; asci 45-60x4.5-6 µm, IKI bb; spores 9-18x1.2-2 µm, OCI 0; saprobic on leaves of *Molinia coerulea*, *Sesleria caOClicola*; phen.: VI-VIII **Lachnum sesleriae** (Svrček) Baral (1985)
- 8' Paraphyses 10-25 µm protruding, 4-6.5 µm wide; spores 6-15 µm long; asci 50-75 µm long 9
- 9 Apothecia 0.7-0.9 mm diam., stalk 0.4-0.6 mm; asci 58-67x5.5-6 µm, IKI bb; spores 6-12x2.1-2.3 µm, OCI 1; lignicolous; phen.: XI **Lachnum "subreynoutriae"** Baral nom. Prov.
- 9' Apothecia 0.3-1.8 mm diam., stalk 1-3 mm; asci 50-75x5-6 µm; spores 7-15x1.5-2.2 µm, OCI 1-1.5; saprobic on grasses; phen.: IV-VIII **Lachnum elatius** P. Karst. (1870)

Other species probably belonging here:

- * Apothecia 0.2-0.5 mm diam., shortly stalked; hairs up to 100 µm long; asci 60-80x8-10 µm; spores clavate, 15-20x4-5 µm; paraphyses 1.5-2 µm wide; saprobic on grasses (*Agrostis*, *Molinia*) and rushes (*Juncus conglomeratus*); phen.:? **Lachnum clavisorum** (Mouton) Haines (1989)
- * in the withering leaf apices of living *Eriophorum angustifolium*; phen.: VIII **Lachnum eriophoricola** Nannf. (1992)
- * Apothecia 0.15-0.25 mm diam., stipitate, white, remaining white when dry; asci arising from simple septa; spores fusiform, 9-12x1.2-1.8 µm, aseptate, eguttulate; paraphyses 3-4 µm diam., exceeding the asci 10-15 µm; hairs conical, 80-120x3.5-4.5 µm; saprobic on fallen leaves of *Carex elata*; phen.: VII **Lachnum gracillimum** Raitviir (1992)
- * Saprobiic on stems of *Chelidonium majus*; phen.: VI-IX **Lachnum grevillei** (Berk.) Nannf. (1992) **var. sporis longis**
- * Apothecia 0.2-0.3 mm diam., shortly stalked, not reddening; hairs 50-90 µm long, narrowing close to the apex, without crystals; asci 35-48x5-5.5 µm; spores 15-18(-20)x1.5-2 µm, OCI 4; paraphyses 10-15 µm protruding; saprobic on *Carex ericetorum*, *Carex sempervirens*; phen.: VI-VII **Lachnum callimorphum** P. Karst. (1871)
Ill.: Scheuer 1988: Taf. 11.
- * Apothecia 0.3-0.5 m diam., stalked; asci 48-56x5 µm, with croziers; spores 8-12x1.8 µm, 0(1)-septate; paraphyses 2.5 µm diam., 5-6 µm protruding; hairs slightly tapering, up to 130 µm long; saprobic on leaves of *Quercus*; phen.: (VII)X-XII • **Lachnum soppittii** (Masse) Raitv. (1986)
- * Apothecia 0.6 mm diam., sessile, chestnut-brown, with fringed margin; marginal hairs cylindrical, hyaline; asci 35x4.5 µm, with croziers, IKI-; spores 4-5x1.5-2 µm, biguttulate, OCI 2; paraphyses filiform. Parasitic on *Stictis* spp. on *Epilobium*, *Rumex*. Phen.: VIII-XI (BE/W, UK) • **Dasyscyphus castaneus** Graddon (1977)
Ill.: Graddon 1977: fig. 8.

Lasiobelonium Ellis & Everh.

Type species: *Lasiobelonium subflavidum* Ellis & Everh.

Syn.: *Erioscypha* Kirschst.

Lit.: Raitviir 1980: 104 (key), Baral & Krieglsteiner 1985: 69 (sub *Dasyscyphus variegatus*).

- 1 Apothecia slightly urceolate, 0.5-0.8 mm diam.; asci 55-58x5.5-6 µm, IKI+, with croziers; spores fusoid, (8)8.5-11.5x 1.8-2.2 µm, OCI 1-2; paraphyses lanceolate, over 25 µm exceeding the asci; herbicolous (*Epilobium*); phen.: IV-VI • **Lasiobelonium lanceolatum** Raitv. (1980)
- 1' Paraphyses cylindrical to narrowly lanceolate up to 20 µm exceeding the asci 2
- 2 Spores up to 13 µm long 3
- 2' Spores over 15 µm long 4

- 3 Sexual morph: Apothecia subsessile to shortly stipitate, 0.5-1 mm diam., hymenium pale, receptacle light brown; asci 60-73x6-7.5 µm, IKI bb, with croziers; spores 9-15x2.5-3.5 µm, 1-septate, OCI 1. Asexual morph with similar hairs; conidia cylindrical, 5-7x1-1.5 µm. Saprobic on wood and bark of *Acer*, *Fagus*, *Fraxinus*, *Populus*, *Robinia*, *Salix*. Phen.: (VIII)IX-II (BE/F, ES, FR, UK) ● **Lasiobelonium variegatum** (Fuckel) Raitv. (1980)
 Ill.: Boudier 1904-1910: pl. 517 (sub *Lachnella corticalis*!), Ellis & Ellis 1985: fig. 14.
- 3' Asci 50-60x5-6.5 µm, with croziers; spores 9-10.5x2-3 µm, 2-septate; on dead wood (*Arbutus*, *Lonicera*, *Ribes* sp.) and bark; phen.: IV-IX (CH, ES, FR) (●) **Lasiobelonium loniceræ** (Alb. & Schwein.) Raitv. (1980)
 Ill.: Rubio & al. 2010: p. 235.
- 4 Apothecia sessile to subsessile on a brown subiculum, 0.4-1 mm diam., hymenium pale, receptacle light brown; asci 96-111x7-8.5 µm, porus IKI blue, with croziers; spores 20-27x3-3.5 µm, 3-septate at maturity; hair tips abruptly rounded; saprobic on wood (*Acer*, *Betula*, *Salix*); phen.: I,VI-VIII
 **Lasiobelonium belanense** (Svrček) Raitv. (1980)
 Ill.: Huhtinen 1993: fig. 3a-d, Rubio & al. 2010: p. 234.
- 4' Apothecia subsessile to substipitate, 0.5-1.5 mm diam., hymenium pale, receptacle light brown or grayish-brown; asci 83-102x7.5-9 µm, porus IKI blue, with croziers; spores clavate, slightly curved, 18-24x3.5-4 µm, tardively 1-septate; on dead wood and bark (*Fraxinus*), or on dead bark of living deciduous trees, particularly *Populus*; phen.: IV-V
 **Lasiobelonium corticale** (Pers.) Raitv. (1980)
 Ill.: Breitenbach & Kränzlin 1981:pl. 219.

Lasiobelonium pseudocorticale (Svrček) Baral (2020)

Saprobic on trunks of *Populus* sp. **Lasiobelonium populi** nom. prov.

Neodasyscypha Suková & Spooner

Type species: *Neodasyscypha cerina* (Pers.) Spooner.

Syn. *Dasyscyphus* Fuckel (non *Dasyscyphus* Nees).

Lit.: Baral (unpublished key), Hansen & Knudsen 2000: 204, Suková 2005: 163.

- 1 Apothecia cup-shaped, up to 1 mm diam., +/- stipitate, hymenium brownish, outside with yellow-brown hairs; hairs yielding a purplish dye in KOH; ascus pore blue in IKI, arising from simple septa; spores 4.5-8.5x2-3 µm, aseptate, hyaline; ectal excipulum with textura angularis; saprobic on deciduous wood (*Betula*, *Carpinus betulus*, *Corylus avellana*, *Crataegus*, *Fagus sylvatica*, *Fraxinus excelsior*, *Prunus spinosa*, *Quercus robur*, *Rosa* sp., *Salix caprea*); phen.: (VIII)X-IV(VII) ● **Neodasyscypha cerina** (Pers.) Spooner (2005)
 Ill.: Ellis & Ellis 1985: fig. 13, Suková 2005: fig.11.

Perrotia Boud.

Type species: *Perrotia flammea* (Alb. & Schwein.) Boud.

Lit.: Krieglsteiner & Enderle 1987: 29 (*P. flammea*), Haines 1989: 328 (*P. distincta*), Hansen & Knudsen 2000: 205.

- 1 Apothecia up to 1.5 mm diam., sessile, hymenium pink to orange-vermillion; ectal excipulum of dark red-brown textura globulose to epidermoidea; marginal hairs cylindrical, thick-walled, golden brown with sometimes hyaline tip, covered by some resinous lumps, up to 150 µm long; asci 80-100x10 µm, IKI-, arising from croziers; spores ellipsoid-fusiform, (16)18-22(25)x2-3 µm, 1-septate, hyaline; saprobic on stems of *Phragmites australis*; phen.: IX-XI
 ● **Perrotia distincta** (Peck) J.H. Haines (1989)
 Ill.: Spooner 1981: fig. 28
- 1' Apothecia 1-2.5 mm diam., hymenium reddish brown, outside covered with bright orange to deep red hairs; hairs yielding a purplish dye in KOH; aci IKI-; spores 10-15x2-3 µm, aseptate, hyaline; saprobic on deciduous wood (*Ligustrum vulgare*, *Malus*, *Pyrus*, *Quercus*, *Salix*); phen.: XII-V
 (●) **Perrotia flammea** (Alb. & Schwein.) Boud. (1901)

Proliferodiscus J.H. Haines & Dumont

Syn.: *Farinodiscus* Svrček.

Type species: *Proliferoiscus inspersus* (Berk. & M.A. Curtis) J.H. Haines & Dumont.

Lit.: Baral (unpublished key), Hansen & Knudsen 2000: 207, Hoften & al. 2009: 33.

- 1 Apothecia subsessile, 0.8-2.5 mm diam., disc cream-coloured to ochre, hairs whitish-brownish with a faint to distinct greyish-bluish-violaceous shade, disc when dry closed by incurved hairs; asci *90-100x(7)7.5-8.5(9.5) µm, apex ± conical, IKI BB sometimes IKI rB or IKI-; spores narrowly ellipsoid-fusoid, *†(9)10-13.5(15)x2.7-3.3(3.5) µm, with several medium-sized LBs or multiguttulate, 0(1)-septate; paraphyses *2-2.5(3) µm wide, eguttulate, septate, unbranched in upper part, exceeding the asci by 5-15 µm; hairs 100-200(250)x(2.5)3-3.5(4) µm, hyaline to

very pale brownish, straight to slightly flexuous, densely septate, thin-walled, with ± rough to sparsely warted-tuberculate surface, on flanks near insertion (3)4-5(6) µm wide; ectal excipulum gelatinized, pale cream textura prismatica oriented at an oblique angle to the surface; medullary excipulum of non-gelatinized, hyaline textura intricata; blackish-violet granules minute, scattered to abundant in and on ectal excipulum and on base of hairs; excipulum and hairs KOH-; ectal and medullary excipulum hemiamyloid (IKI reddish, KOH+IKI lilaceous); saprobic on stems of old *Quercus* trees; phen.: III-IX • **Proliferodiscus tricolor** (Sowerby: Fr.) Baral (2009) III.: Hoften & al. 2009: 33, fig 1-7.

- 1' Asci up to 60 µm long; spores up to 8 µm long 2
- 2 Apothecia subsessile to shortly stipitate, 0.3-0.5(1) mm diam., disc pale orange, outside blackish, covered by greyish hairs; asci 35-60x4-5.5 µm, IKI+, with croziers; spores narrowly ellipsoid, 5-8x1.5-2 µm, aseptate, hyaline; marginal hairs 90-120x2.5-3 µm, septate, with fine olive grey pigments, becoming smooth in 5% KOH or Melzer's reagent; paraphyses filiform, 0-10 µm exceeding the asci; ectal excipulum violet in 5% KOH; saprobic on deciduous wood (*Corylus*, *Populus*, *Prunus laurocerasus*, *Prunus spinosa*, *Salix*); phen.: IV-I • **Proliferodiscus pulveraceus** (Alb. & Schwein.: Fr.) Baral (1985) III.: Ellis & Ellis 1985: fig. 17.
- 2' Apothecia 0.5-1.2 mm diam., disc egg-yellow, hairs white; asci 40-50x5 µm, IKI+, with basal protruding; spores *(4)5-7x1.4-1.5 µm, aseptate, OCI 1, hyaline; saprobic on decorticated rotten branch of *Castanea*; phen.: III • **Proliferodiscus inspersus** (Berk. & M.A. Curtis) J.H. Haines & Dumont (1983)

Solenopezia Sacc.

Type species: *Solenopezia solenia* (Peck) Sacc.

Lit.: Dougoud 2011: 31.

- 1 Apothecia urceolate, gregarious, 0.25-0.4 mm diam., superficial, sessile, hymenium yellowish grey, receptacle covered by brown to reddish brown hairs, protruding margin whitish; asci 75-80(100)x6-6.5 µm, IKI blue, without croziers; spores (11)12-15.5(17)x2.4-2.7 µm, 0(1)-septate, with a few minute guttules; ectal excipulum of brown textura globulosa; saprobic on stems of *Aconitum*, *Adenostyles*, *Chamerion angustifolium*, *Cirsium*, *Delphinium*, *Peucedanum*, *Rumex*, *Veratrum*; alpine; phen.: VI • **Solenopezia leucostoma** (Rehm) Raitv., J.H. Haines & E. Müll. (1991)
- 1' in French Alps **Solepezia lamoureaana** Raitv. (1995)

Trichopeziza Fuckel

Type species: *Trichopeziza sulphurea* (Pers.) Fuckel.

Lit.: Sacc. 1889: 405 (*T. Elegantula*), Rehm 1896: 891 (sub *Lachnum sulfureum* sensu Rehm), Dennis 1962: 171, Svrček 1988: 76 (sub *Belonidium subsulphureum*), Svrček 1988b: 139 (sub *Belonidium lizonii*), Baral 1993: 9 (*T. subsulphurea*), Hansen & Knudsen 2000: 208.

- 1 Spores OCI 4-4.5 2
- 1' Spores OCI 0-2.5, up to 26 µm long 4
- 2 Spores 11-22.5x1.8-2.5 µm, aseptate; asci †56-68x4.5-6.5 µm, IKI red brown, with croziers; saprobic on stem of *Artemisia vulgaris*, *Astragalus*; phen.: VI-X (CZ) • **Trichopeziza lizonii** (Svrček) Baral & E. Weber (1992) III.: Svrček 1988b: 138, fig. 4-5.
- 2' Spores septate 3
- 3 Spores 33-38x2.5-3.5 µm, 1-3(4)-septate, OCI 3.5-4; asci †83-96x6-8.5 µm, IKI red brown, without croziers; saprobic on herbaceous stems (*Anthriscus*, *Arctium lappa*, *Chelidonium majus*, *Cirsium arvense*, *C. oleraceum*, *Dryopteris filix-mas*, *Epilobium hirsutum*, *Eupatorium cannabinum*, *Filipendula ulmaria*, *Galeopsis tetrahit*, *Heracleum sphondylium*, *Iris pseudo-corus*, *Parietaria officinalis*, *Polygonum cuspidatum*, *Tanacetum vulgare*, *Zea mays*), but mainly on *Urtica dioica*; phen.: I-XII (BE/F) • **Trichopeziza sulphurea** (Pers.) Fuckel (1870) [1869-70]
- 3' Spores 55-75x2-3 µm, up to 16-septate; asci IKI blue, with croziers; saprobic on herbaceous stems (*Urtica dioica*); phen.: I-X (BE/W) • **Trichopeziza discolor** (Mouton) Raitv. (1987)
- 4 Lignicolous species 5
- 4' Herbicolous or foliicolous species; spores aseptate 7
- 5 Apothecia 0.5-1.5 mm diam., sessile, hymenium rosaceous brown; hairs yellowish brown, inner ones whitish; asci *110-134x9.5-10.5 µm, IKI-, without croziers; spores 12-17x2.8-3.5 µm, 0(1)-septate, OCI 1; paraphyses lanceolate, up to 7 µm diam.; lignicolous (*Alnus*, *Quercus ilex*, *Salix*); phen.: (XI)I-V; (AT, DE, ES, LI) • **Trichopeziza perrotioides** Baral nom. prov.
- 5' Asci IKI red 6

- 6 Apothecia 2-4 mm diam., sessile; marginal hairs sulphur-yellow; asci 55-60x5.5-6 µm; spores 7.5-11.5(13)x2.5-3 µm, 0(1)-septate, OCI 0-1; asci IKI weakly red brown, with croziers; paraphyses lanceolate, 1.5-2 µm diam., up to 10 µm longer than asci; lignicolous (*Fagus sylvatica*, *Populus tremula*); phen.: X-II (BE/F)
 o **Trichopeziza subsulphurea** (Svrček) Baral (1993)
 III.: Svrček 1988a: 78, fig. 2.
- 6' Apothecia shortly stalked, 0.5-1 mm diam., hymenium ochraceous grey; hairs dark purplish brown, with purplish incrustations; asci 78-86x6-7.5 µm, IKI red; spores slightly allantoid, 12-15x2.5-3 µm, 1-septate; paraphyses lanceolate; saprobic on wood of *Populus* sp.; phen.: II
 **Trichopeziza flavofulginea** (Alb. & Schwein.) Sacc. (1889)
 III.: Albertini & Schweinitz 1805: tab.XI/7.
- 7 Hairs turning violaceous and dissolving in KOH 8
- 7' Hairs KOH(?) 9
- 8 Spores fusiform, 8-12x1.5-2 µm, with a minute guttule at both poles ; asci IKI blue; paraphyses lanceolate, 2.5-4 µm wide, 8-10 µm exceeding the asci; saprobic on herbaceous stems; phen.: ?
 **"Belonidium" violascens** Raitv. (1970)
- 8' Spores fusiform-clavate, 8-12(17)x1.5-2 µm; asci IKI blue; paraphyses lanceolate, 2-3 µm wide, not exceeding the asci; hairs turning violaceous and dissolving in KOH; saprobic on leaves of *Populus tremula*; phen.: ?
 **Trichopeziza radians** (P. Karst.) Sacc.
- 9 Spores 12-26x2-2.6 µm, eguttulate; asci IKI red brown, with croziers; hairs with brown resin turning red brown and dissolving in KOH; saprobic on herbaceous stems (*Chamerion angustifolium*, *Melandrium album*, *Solidago virgaurea*); phen.: V-VIII **Trichopeziza elegantula** (P. Karst.) Sacc. (1889)
- 9' Spores shorter, hairs without such resin 10
- 10 Apothecia 1-2 mm diam. gregarious, sessile, hymenium ochraceous rose, hairs yellow; asci 70-80x7-9 µm, IKI-, without croziers; ascospores allantoid, 12.5-14x2.5-3.3 µm, OCI 1, hyaline; paraphyses lanceolate. Saprophytic on stems of *Urtica*; phen.: XII (FR) **Trichopeziza urticae** Baral nom. prov.
- 10' Ascospores fusiform, 9-20x1.6-2.4 µm, OCI 0.5-1 11
- 11 Apothecia with whitish hymenium, hairs yellowish to white; asci IKI+, with croziers; spores ; saprobic on herbaceous stems, mainly of Apiaceae (*Angelica sylvestris*) **Trichopeziza mollisima** (Lasch) Fuckel (1870)
- 11' Apothecia with yellowish hairs; asci hemi-amyloid 12
- 12 Asci IKI red-brown, with croziers; hairs yellowish; saprobic on herbaceous stems (*Aconitum napellus*, *Chenopodium hircinum*, *Filipendula ulmaria*, *Helianthus annuus*, *Heracleum sphondylium*, *Hypericum perforatum*, *Mentha piperita*, *Pimpinella major*, *Polygonatum multiflorum*, *Ranunculus aconitifolius*, *Sambucus ebulus*, *Tanacetum vulgare*, *Urtica dioica*, *Veratrum album*) phen.: II-X • **Trichopeziza limonipilosa** Baral nom. prov.
 = *Trichopeziza mollisima* ss. auct.
 III.: Rubio & al. 2010: p. 266.
- 12' Asci IKI red brown, without croziers; hairs pale yellow; saprobic on herbaceous stems (*Bunias orientalis*, *Chaerophyllum témulum*, *Cirsium* sp., *Galium mollugo*, *Heracleum sphondylium*, *H. mantegazzianum*, *Mentha longifolia*, *Pastinaca sativa*, *Salvia glutinosa*) phen.: V-IX **Trichopeziza sulphureopilosa** Baral sp. prov.

May not belong here:

Apothecia 0.25-0,5 mm diam., sessile, hymenium ochraceous yellow, outer surface pruinose, ochraceous to ochraceous brown; asci 35-40x 4-4,5 µm, IKI+, ?croziers; spores fusiform, 4,5-8x1-1,5 µm, OCI?; saprobic on stems of *Fallopia japonica*; phen.: II-IV (BE/F) • **Trichopeziza effugiens** (Roberge ex Desm.) Le Gal (1939)

Trichopezizella Dennis ex Raitv.

Type species: *Trichopezizella nidulus* (Schmidt & Kunze) Raitv.

Lit.: Haines 1974: 213, Baral (unpublished key), Moyne 2014: 135.

- 1 Paraphyses apically with granular covering; hairs 200-350(400) µm long, without roots 2
- 1' Paraphyses smooth; hairs 60-170 µm long, rooting (maybe except for *T. nazarovae*?); asci IKI bb 4
- 2 Apothecia 0.5-0.7 mm diam., shortly stalked, ectal excipulum of square cells; hairs in cylindric part 4-6 µm wide, straight; asci 64x7 µm, IKI rb, with croziers; spores 10-16x2.3-3 µm, aseptate, OCI 0-1; caulicolous (*Aconitum napellus*, *Adenostyles allariae*, *Chamerion angustifolium*, *Epilobium*, *Senecio*, etc.), subalpine; phen.: V-VII(VIII) (CH, FR).....
 (●)**Trichopezizella relicina** var. **relicina** (Fr.) Raitv. (1970)
 III.: Boudier 1905-1910: pl. 505, Rubio & al. 2010: p. 268.
- 2' Spores longer 3

- 3 Apothecia 1-2 mm diam., sessile, ectal excipulum of textura globulosa; hairs in cylindric part 3.3-3.8 μm wide, \pm flexuous; asci IKI rb; spores 14-20x3.5-4 μm , 1-septate; lignicolous, mainly *Lonicera xylosteum*; phen.: (II)IV-VIII • **Trichopezizella barbata** (Kunze) Raitv. (1970)
..... III.: Schmid I. & H. 1990: nr. 23.
- 3' Apothecia up to 1.5 mm diam., stipitate, ectal excipulum of square cells; asci 120-147x9-11 μm , ?I+, with croziers; spores 11.5-27(33)x2.5-5 μm , 1-3-septate; herbicolous **Trichopezizella relicina var. macrospora** (Raitv.) J.H. Haines (1974)
- 4 Paraphyses exceeding the asci by 0-6 μm , 2.5 μm wide; hairs in cylindric part 3.2-4 μm wide, ?without roots, ectal excipulum of textura prismatica, spores 8-13.3x2-2.2 μm , OCI = 3 **Trichopezizella ?nazarovae**
- 4' Paraphyses exceeding the asci by 15-30 μm , 5-5.5 μm wide; hairs in cylindric part 5.5-6 μm wide, deeply rooting, ectal excipulum of textura globulosa; spores OCI = 0 5
- 5 Asci 49-63x5-8 μm , I+, with croziers; spores (9)10-14(15)x2-3 μm ; saprobic on *Carex acuta*; phen.: IX **Trichopezizella nidulus var. hystricula** (P. Karst.) J.H. Haines (1974)
- 5' Spores up to 2 μm wide 6
- 6 Asci 50-58x5-6 μm , I+, without croziers; spores 6-12x1.5-2.1 μm , OCI 0; saprobic on stems of *Polygonatum multiflorum*, *P. verticillatum*; phen.: V-VII(VIII) • **Trichopezizella nidulus var. nidulus** (Schmidt & Kunze) Raitv. (1970)
..... III.: Boudier 1905-1910: pl. 516, Rubio & al. 2010: p. 267.
- 6' Asci with croziers 7
- 7 Asci 65-75x5.5 μm , I+, with croziers; spores 7-15x1.2-2 μm , OCI 0; swollen hair tip with reddish brown incrustation; saprobic on *Aconitum variegatum*, *Filipendula ulmaria*, *Melandrium rubrum*, *Rumex hydrolapathum*, *Sambucus ebulus*, *Urtica dioica*; phen.: V-VII(IX) • **Trichopezizella rubroguttata** (Svrček) Moyne (2014)
..... III.: Svrček 1967: fig, Moyne 2014: fig. 1-3.
- 7' Apothecia 0.4-0.8 mm diam., sessile; asci 45-55x4.5-5.5 μm , I+, with croziers; spores narrow fusiform, 9-14x1.5(2) μm , 0(1)-septate, hyaline; saprobic on leaves of *Carex* and *Triticum vulgare*; phen.: IV-VIII **Trichopezizella horridula** (Desm.) Raitv. (1970)
..... III.: Schmid I. & H. 1990: nr. 24.

MOLLISIACEAE Rehm

Syn.: LORAMYCETACEAE Dennis ex Digby & Goos

Lit.: Jaklitsch et al. 2016: 175, Tanney & Seifert 2020: 293.

Sexual morph: Apothecia saucer-shaped to plane, 0.2-2(7) mm in diam.; hymenium light to dark (bluish-)grey, also whitish, yellowish, orange or brown; margin not or only slightly protruding, smooth or hairy; externally light or dark, hairs (if present) hyaline to brown, thin-walled; sessile, superficial, rarely erumpent, sometimes developing beneath a scutum. Ectal excipulum of globose to angular, usually brown, thin-walled cells, sometimes embedded in an external gel; medullary excipulum hyaline, non-gelatinous; sometimes with crystals. Paraphyses cylindrical or somewhat clavate or lanceolate, smooth, containing large, elongate VBs that partly react yellow in KOH. Anchoring hyphae sparse to abundant, mostly brown, sometimes forming an extensive subiculum. Asci with conical apex with amyloid ring (*Calycina*-type), rarely more hemispherical and inamyloid, with or sometimes without croziers. Ascospores 8 per ascus, 0-7-septate, ellipsoid to long-filiform, rarely with gel sheath, lipid content low to high.

Asexual morph: Anamorphs hyphomycetous (cadophora-like), anguillospora like (*Loramyces*) or penicillate to synnematal or sporodochial (*Cystodendron*, *Trimmatostroma*, phialocephala-like); conidiophores hyaline to brown, phialidic, with conspicuous collarete; conidia unicellular, ellipsoid, hyaline; also arthric, conidia phragmosporous, brown, in chains (*Trimmatostroma*).

Habitat: Saprobic on woody and herbaceous plant substrate or on aquatic monocots, partly host-specific, some taxa endosymbiotic, plant pathogenic, or mycorrhizal, mostly desiccation-sensitive.

Genera belonging to this order:

1. *Bulbomollisia* Graddon
2. *Cheirospora* Moug. & Fr.
3. ?*Discocurtisia* Nannf.
4. *Loramyces* W. Weston
5. *Mollisia* (Fr.) P. Karst.
6. *Neopyrenopeziza* Ekanayaka & K.D. Hyde
7. *Neotapesia* E. Müll. & Hütter
8. *Niptera* Fr.
9. *Nipterella* Starb. ex Dennis
10. *Obtectodiscus* E. Müll., Petrini & Samuels
11. *Phialocephala* W.B. Kendr.
12. ?*Pseudonaevia* Dennis & Spooner
13. *Pulvinata* Ekanayaka & K.D. Hyde
14. ?*Sarconiptera* Raitv.
15. *Scutobelonium* Graddon
16. *Scutomollisia* Nannf.
17. *Trimmatostroma* Corda

Key to the sexual genera of Mollisiaceae treated here:

- | | |
|---|------------------------|
| 1 Apothecia perithecioid | 2 |
| 1' Apothecia otherwise | 3 |
| 2 Ascospores ellipsoid, with a long basal appendage | <i>Loramyces</i> |
| 2' Ascospores filiform | <i>Obtectodiscus</i> |
| 3 Ascomata pulvinate | 4 |
| 3' Ascomata saucer-shaped to plane | 5 |
| 4 Apothecia whitish to brownish; paraphyses with slightly swollen apices, hyaline; asci amyloid; ascospores aseptate, without appendages | <i>Pulvinata</i> |
| 4' Apothecia black; paraphyses enlarged and pigmented towards the apex; asci amyloid; ascospores regularly 5-septate | <i>Neopyrenopeziza</i> |
| 5 Medullary excipulum not gelatinised; hairs, if present, smooth, varying from pale brown to dark brown; paraphyses with long refractive vacuole; apothecia with or without subiculum | <i>Mollisia</i> |
| 5' Asci long and with with narrow and elongated apical pore; ascospores fusiform, 0-1(3)-septate; with frequently well-developed and melanized subicula; preferring wet habitats | <i>Niptera</i> |
| 5'' Perihymenial and medullary excipulum not or at most slightly gelatinised; margin thin; elements of margin lacking thick, refractive walls, but sometimes slightly thickened; spore length various | 6 |
| 6 Basal and marginal excipulum pale yellowish, elements somewhat thick-walled; shield soon evanescent and difficult to observe; outer excipulum lacking dark striae | <i>Pseudonaevia</i> |

- 6' Basal and often marginal excipulum dark brown, elements thin-walled; shield hyphae usually observable on apothecia; outer excipulum with or without striae 7
- 7 Outer excipulum lacking dark striae *Scutomollisia*
- 7' Outer excipulum with locally superficially dark brown-walled elements, forming lateral "striae" *Scutobelonium*

Key to the asexual genera of Mollisiaceae:

- 1 Sporodochia pulvinate, dark blackish brown to black, originating from erumpent stroma. Conidia formed in branches, basipetal chains, schizogenous, dry, simple, branched, forked or lobed, straight or flexuous, very variable in shape, cylindrical rounded at the apex, ellipsoid, clavate, pyriform, subspherical, etc., pale to dark brown or olivaceous brown, smooth or verruculose, with transverse and often longitudinal or oblique septa *Trimmatostroma*
- 1' Conidiomata acervular. Conidia form a globose mass of cells, surrounded by a persistent gelatinous sheath *Cheirospora*

Cheirospora Moug. & Fr.

Type species: *Cheirospora botryospora* (Mont.) Fr.

Lit.: Sutton 1980: 203, Ellis & Ellis 1985: 145, Crous et al. 2015b: 92.

- 1 Acervuli erumpent, corticolous, densely crowded, unilocular, lense-shaped with flattened base, opening via irregularly rupture; wall consisting of a few layers of brown textura angularis. Conidiogenous cells cylindrical, septate, long-stalked, end cell enlarged and apically flattened, hyaline, evanescent. Conidia black in mass, with a cylindrical to botryoidal base and 3 central cells, both central end cells flattened, dark olivaceous, guttulate, forming acropetal branches that form a globose mass of cells 5 µm diam., surrounded by a persistent gelatinous sheath, 27-49x20-27 µm (resembling bunches of grapes). Synasexual morph on OA. Mycelium consisting of pale brown, septate, branched, 2–3 µm diam. hyphae, frequently with mucoid sheath. Hyphae forming clusters of *Cheirospora* conidia, but also giving rise to a *Phialophora* synasexual morph. Conidiophores erect, brown, cylindrical, 1–2-septate, 15–30 × 2 µm, giving rise to 1–4 conidiogenous cells. Conidiogenous cells pale brown, smooth, cylindrical, straight to curved, 8–12 × 2 µm, with prominent apical cylindrical collarettes, 2–3.5 µm long. Conidia forming in slimy masses, hyaline, smooth, globose to clavate with truncate hilum, 0.5–1 µm diam., 2–3 × 2 µm Saprophytic on corticated branches of *Carpinus*, *Cornus*, *Fagus*, *Quercus* and *Hedera helix*, frequently in company of *Nectria* spp., common. Phen.: III–XI (BE/F, UK) • **Cheirospora botryospora** (Mont.) Fr. (1849)
 Ill.: Sutton 1980: fig. 108, Ellis & Ellis 1985: fig.634, Crous et al. 2016b: fig. 4.

Loramyces W. Weston

Type species: *Loramyces juncicola* W. Weston

Lit.: Ingold & Chapman 1952: 268, Müller & Arx 1962: 581, Holm & Ryman 2000: 1.

- 1 Ascomata perithecium-like, 0.3-0.5 mm diam., dark brown; asci 120-152x8-11 µm, J-; spores elongate ellipsoid, 17-22x4-6 µm, 1-septate, constricted, with up to 65 µm long basal appendage, hyaline; saprobic on culms and leaves of Cyperaceae (*Eleocharis palustris*, *Scirpus lacustris*) and Juncaceae (*Juncus articulatus*) laying in water; phen.: VI–IX..... **Loramyces juncicola** W. Weston (1929)
 Ill.: Ingold & Chapman 1952: fig. 1D-F & 2A, Müller & Arx 1962: Abb. 230.
- 1' Ascomata smaller; spores 22-30x7-8 µm, 1-septate, with up to 140 µm long basal appendage, hyaline; saprobic on *Equisetum* sp., laying in water; phen.: VIII **Loramyces macrosporus** Ingold & B. Chapm. (1952)
 Ill.: Ingold & Chapman 1952: fig. 1A-C & 2B.

Mollisia (Fr.) P. Karst.

Type species: *Mollisia cinerea* (Batsch) P. Karst.

Syn.: ?*Atrocybe* Velen., *Belonopsis* (Sacc.) Sacc., *Crustula* Velen., ?*Dibeloniella* Nannf., *Haglundia* Nannf., *Nimbo-mollisia* Nannf., *Pheomollisia* T.N. Sieber & Grünig, *Tapesia* (Pers.) Fuckel; anam. *Acephala* Münzenb. & Bubner, *Cystodendron* Bubák, *Phialocephala* W.B. Kendr., *Variocladium* Descals & Marvanová

Lit.: Engel & Svrček 1988: 54 (*M. urnicola*), Beyer 1989 (*Belonopsis guestphalicum*), Dougoud 1992: 136 (sub *Haglundia perelegans*), Webster & al. 1993 (*M. casaresiae*), Coste & Rey 1997: 110 (sub *Trichobelonium obscurum*), Gminder (unpublished key), Gminder 2006: 125, Gminder 2012: 105, Tanney & al. 2016: 225.

- 1 On wood, bark Key A
- 1 On remnants of herbs (incl. *Rubus*) and ferns Key B
- 1 On monocotyls Key C
- 1 On leaves of trees or shrubs Key D
- 1 On mosses Key E

1 On remnants of fungi	Key F
<i>Key A – On wood and bark</i>	
1 Ascus plug IKI rb, marginal cells conspicuous, 35-100 µm, hyaline, KOH negative; spores 8-14x2.8-3.5 µm; saprobic underneath rotten <i>Quercus</i> logs; phen.: XII-III	Mollisia elegantiior (Graddon) Baral (2008)
1 Ascus plug otherwise in IKI	2
2 Ascus plug IKI rr	3
2 Ascus plug otherwise in IKI	4
3 Spores 7-10x2.5-3.2 µm, growing ± submersed, marginal cells inconspicuous.....	Mollisia "dextrinoidea" Gminder nom. prov.
3' Spores 9-12x2.2-3 µm, not submersed	Mollisia „Malaval“ Gminder nom. prov.
3" Apothecia greyish blue to deep blue, with frequently paler margin, up to 2.5 mm diam.; asci (49-)58-76x(4-)4.5-6(-7) µm, with croziers; spores ellipsoid-fusiform to oblong, (8)9-11.5(17)x(2.5-)3-3.5(4) µm, OCI 2; synnematosus asexual state; on decomposing wood (<i>Acer</i> , <i>Betula</i> , <i>Ulmus</i>).....	“Phialocephala” oblonga (C.J.K. Wang & B. Sutton) J.B. Tanney, Seifert & B. Douglas (2016)
4 Ascus plug IKI bb	5
4' Ascus plug IKI-	45
5 Subhymenium of brown text. intricata (at least in mature apothecia, needs sometimes several preparations), spores 6-13x2.5-3.3 µm, OCI 0(+), KOH-; saprobic on <i>Calluna vulgaris</i> , <i>Fagus</i> , <i>Quercus</i> ; phen.: II-XI	• Mollisia lividofusca _(Fr.) Gillet (1879)
5' Subhymenium hyaline	7
7 Marginal cells very conspicuous, evidently more than 50 µm long, blackish brown, mostly encrusted and KOH-reaction always strongly lemon-yellow	8
7' Marginal cells less conspicuous, KOH-reaction yellow or negative	10
8 Spores 6-9x2-2.8 µm, OCI 2(+); asci without croziers; saprobic on branches of <i>Rosa rugosa</i> , <i>Rubus idaeus</i> ; phen.: (I-III)VI-VIII (BE/W)	• Mollisia rosae (Pers.) P. Karst. (1871) III.: Rubio & al. 2010: 241.
8' Spores average more than 8 µm long; asci with croziers	9
9 Spores 9-14x2.2-3 µm, OCI 3-4; asci with croziers; saprobic on <i>Prunus spinosa</i> ; phen.: IV	• Mollisia prunicola _ (Fuckel) Gminder, Baral & E. Weber (1996)
9' Spores 6-12.5x1.8-2.5 µm, OCI 0; asci weakly I+, with croziers; apothecia up to 7 mm diam.; marginal hairs 3.5-5 µm wide; semihypogaeic on rotten <i>Quercus</i> trunks, rarely on <i>Betula</i> (often together with <i>Hymenochaete rubiginosa</i> , <i>Dasyscyphella nivea</i>); phen.: IV-X	• Mollisia olivascens (Feltgen) Le Gal & F. Mangenot (1958)
10 KOH-reaction ± clearly yellow	12
10' KOH-reaction negative	21
LE GAL: KOH unknown, spores (8)10-23.5x1.5-2.5 µm, OCI unknown, probably approx. 2; medulla built of parallel, densely woven hyphae	Mollisia caesia (Fuckel) Sacc. (1889)
12 Lipid content 2-3(4)	13
12' Lipid content 0-2	15
13 Apothecia with bleuish grey hymenium and hyaline margin, with hyaline, hairy protrudings; spores 13-18(20)x3.5-4.2 µm, outside the ascus with 1-3 septa (exs.); on decorticated branch of <i>Ulex</i> ; phen.: IX-I (FR, GB).....	Mollisia ulicis Feltgen (1903) (ss. PRIOU)
13' Spores narrower and shorter, even when mature with max. 1 septum	14
14 Spores 8-11.5x2.1-2.8 µm, OCI 3; asci 65-96x7-8,5 µm, IKI+, with croziers; synnematosus diplococcium-like asexual state; saprobic on wood	“Phialocephala” oblonga (C.K.J. Wang & B. Sutton) J.B. Tanney, Seifert & B. Douglas (2015)
14' Spores (9)10-15(18)x2.2-3.2 µm, Q>4 (in average), OCI 2; apothecia ± patellate, cup-shaped, generally bluish-grey, ectal excipulum with clavate end cells, subicular hyphae up to 6 µm broad; saprobic on branches of <i>Alnus glutinosa</i> ; phen.: V-VIII	• Mollisia fusca (Pers.) P. Karst. (1871)
15 Lipid content either 1 (many very tiny droplets) combined with asci IKI bb 3 or 1.5-2 (several bigger drops) and asci IKI bb 1-2, apothecia shortly (blackish) stipitate	Mollisia perparvula P. Karst. (1871) Two specimens in H (PAK 2922, 2930) are identical according to HUHTINEN, but seem to be clearly distinct to me.
15' Apothecia not shortly stipitate	16

- 16 Spores *10-15x2.5-3 µm, †7-12x1.8-2.5 µm, but OCI 1-2; marginal cells grey brown and quite conspicuous; on *Fagus*-cupules (sometimes on small twigs), often together with *Brunnipila fuscescens*, *Capitotricha fagiseda* and *Lachnum virgineum*; phen.: IV-VII **Mollisia faginea** Velen. (1947)
 SVR: Spores 10-15x3.5-4.5 µm, OCI 1-2: small drops accumulated in the polar ends of the spore, marginal cells long, KOH perhaps positive *M. sericeomarginata*
- 16' Spores with OCI 0-1 17
- 17 Spores 2-3 µm broad 18
- 17' Spores > 3 µm broad 20
- 18 Spores 7-10x1.5-2.2 µm, OCI ca. 1, hymenium bluish-grey, with conspicuous blackish margin, marginal cells conspicuous; on cones of *Pinus sylvestris* **Mollisia „neffii“** Gminder nom. prov.
- 18' Spores in average more than 2 µm wide 19
- 19 Asci 63-73x5.5-6 µm, IKI+, with croziers; spores clavate, 8-12.5x2.2-3 µm, OCI 0.5-1.5; hymenium and margin white, very moistened slightly greyish; on *Alnus*, *Prunus spinosa* and *Crataegus*; phen.: VI (ES)
 **Phialocephala piceae** (T.N. Sieber & Grünig) Rossman (2014)
- 19' Apothecia 0.3-0.7 mm diam., disc medium grey, whitish rim, outer surface brown, on dark brown subiculum; asci 43-60(70)x4-5.5 µm, IKI+, with croziers; spores mainly ovoid, 6-8(9)x2-2.8 µm, OCI 0; saprobic saprobic on rotten wood (*Castanea*, *Prunus*, *Quercus*); phen.: I, IV-VI (BE/F, DE) • **Mollisia "pyrenopezizoides"** Gminder nom. prov.
 On *Rubus idaeus*, without croziers → compare *M. alcalireagens* Svrček
- 19" Spores 7.5-10x2.2-2.8 µm, OCI 1; apothecia small, watery greyish, ash-grey, without clearly visible margin, textura ± angularis (to be checked!), excipulum not up to margin brownish; saprobic on *Picea*, *Larix*-cones (also on non-coniferous hosts?) **Mollisia "conifericola"** Gminder nom. prov.
 Identical seems to be PAK 4398: *M. leucostigma* (with „?“), but spores 11-13x2-2.2 µm (already germinating) and margin more conspicuous. FUCKELS *N. leucostigma* has totally different spores and a darker margin!
- 20 Apothecia mostly cushion-like, 1.5-4 mm diam., chalk-white to pale grey, without subiculum; asci 95-120x6.5-7 µm, IKI deeply blue; spores 7-12x(2.5)-3.5 µm, with rounded ends, eguttulate; apothecia always submersed on wood (*Fagus*); phen.: III-VII *Mollisia uda* (non ss. orig.?) ≡ • **Mollisia pulviniformis** Gminder nov. spec. ined.
 The original diagnosis of *M. uda* by Persoon is obviously quite different from this species. According to M. NAUTA (in litt.) no authentic material is left in L.
- 20' Spores 8-14x3.3-4.2 µm, amyloid-ring (porus) T-shaped; ectal excipulum very thick (fide Baral)
 **Mollisia sericeomarginata** Svrček (1986)
 SVR: KOH-reaction yellow ???, spores 10-15x3.5-4.5 µm, OCI 1 (and more?), apothecia not submers *M. sericeomarginata*
- 21 Spores septate 22
- 21' Spores without septa (or rarely septate when overmature, before germinating) 25
- 22 Spores in the ascus 1-3-septate, 10-16x3.2-4.5 µm, OCI 0, in IKI with weakly red sheath (?), on thick blackish subiculum **Mollisia "karkanoszeae"** Gminder nom. prov.
 Further collections by H. O. BARAL from Spain and Thüringen are very likely identical.
- 22' Apothecia without subiculum; spores in the ascus 1-septate 23
- 23 Spores 10-16x3-3.5 µm, 1-septate, OCI 0.5-1; saprobic on wood of *Fagus*; phen.: III
 ○ **Mollisia „septispora“** Gminder nom. prov.
- 23' Apothecia with greyish to cream yellow hymenium and brown outer surface except a thin whitish margin; asci 52-58 x5-6 µm; spores 7-10 x2-3 µm, OCI 0; saprobic on wood of *Betula*, *Eucalyptus*, *Frangula*, *Quercus*, *Salix*; phen.: VII-XI (UK) • **Mollisia atlantica** Gminder ad interim
 = *Niptera ramincola* Rehm sensu Ellis & Ellis 1985.
 III.: Ellis & Ellis 1985: fig. 36.
- 23' Spores with OCI > 2 24
- 24 Apothecia 2 mm diam., hymenium pale grey, sessile on a brown subiculum; asci 82-92x9-12 µm, IKI+, with croziers; spores 33-56x2.5-4 µm, 3(7)-septate, OCI=2-3, hymenium opalescent bluish; on *Calluna* roots at the base of dying plants, often nearly in the earth; phen.: IV-IX **Mollisia obscura** (Rehm) Baral & Gminder (2008)
 III.: Raitviir & Leenurm 2001: fig. 1-3, Rubio & al. 2010: p. 206.
- 24' Spores 11-18x2.5-3.5, 0-3-septate, OCI=4-5, hymenium olive-greenish, drying yellowish (like mustard), growing only in very wet places, sometimes submers • **Mollisia ventosa** P. Karst. (1871)
- 25 OCI 0(+) 26
- 25' OCI 1- 2(3) 33
- 25" OCI >3 40
 LE GAL: OCI unknown, probably 2, spores (8)10-23.5x1.5-2.5 µm, medulla built of parallel, dense hyphae, KOH unknown *M. caesia*
 LE GAL: OCI unknown, probably <1, spores 6-10(11)x1-1.7 µm *M. cinere-olivascens*

- 26 Apothecia 1-1.6 mm diam., disc dirty white to beige, excipulum only slightly darker; subhymenium gelatinous; asci 75-95 x 6-7.5 μm , weakly J+; spores (7)9-12x2.5-3 μm , 0-1-septate, OCI 0; anamorph: aquatic hyphomycete *Casaresia sphagnorum*; saprobic on submersed wood of *Alnus*, *Betula*, *Quercus*; phen.: V **Mollisia casaresiae** J. Webster, Shearer & Spooner (1993)
SVR: spores 8.5-12x1.8-2.5(3) μm [dead?], OCI <1: tiny guttules in both ends, apothecia greyish-white, thick, submersed in mountain rivulets, on *Fagus* **Mollisia rivularis**
Collections by Baral and Gminder showed blue-greyish apothecia. 27
- 26' Not on submersed wood 27
- 27 Spores usually not exceeding 10 μm , at least in average 28
- 27' Spores usually exceeding 10 μm , at least in average; ectal excipulum brown up to the margin..... 32
- 28 Apothecia amber-coloured, singly growing, only basal ectal excipulum brownish; spores 8.5-11x2-2.5, OCI 0; IKI bb 1(2); on *Rubus idaeus* • **Mollisia "amberina"** Gminder nom. prov.
28' Spores 5-9(10)x1.5-2.5 μm ; ectal excipulum ochraceous, often some coloured cells up to the margin: saprobic on cones of *Alnus glutinosa*, *Alnus incana*; phen.: I-XII • **Mollisia amenticola** (Sacc.) Rehm (1891) [1896]
28" Ectal excipulum brown up to the margin 29
- 29 Apothecia 0.8-1.5 mm diam., hymenium cream white, then dark grey, sessile on a blackish subiculum; spores 6-14x2-3.2 μm , OCI 0; subhymenium always hyaline; on cones of conifers (*Larix*, *Pinus*, *Pseudotsuga*); phen.: II-VII .
..... • **Mollisia fallax** (Desm.) Gillet (1882)
III.: Le Gal & Mangenot 1960; Breitenbach & Kränzlin 1981: Abb. 270, Van Vooren 2004: fig. 2.4.
Doubtful species according to Gminder! All collections labelled *M. strobilicola* have been found to be identical with *M. lividofusca* because of the coloured subhymenium.
29' Host otherwise 30
- 30 Apothecia 0.3-0.6 mm diam., disc medium grey, ectal excipulum brownish up to the margin, turning olivaceous greenish in KOH; asci 48-55x4.5-5 μm ; spore narrowly ellipsoid, 7-9x2.5-3 μm , OCI 1; saprobic on wood of *Betula*, *Quercus*; phen.: V **Mollisia dimorpha** (Velen.) Gminder (2012)
III.: Gminder 2012: fig. 8.
30' Ectal excipulum brownish-grey in KOH; apothecia larger 31
- 31 Asci 55-65x5-6 to 70-80x6-6.5 μm , IKI+; spores 7-12x2.5-3 μm , OCI 0-1; marginal cells not conspicuous; saprobic on branches and wood of *Betula*, *Calluna vulgaris*, *Populus tremula*, *Quercus*, *Salix caprea*; phen.: V-VIII
..... • **Mollisia cinerea** (Batsch) P. Karst. (1871)
III.: Breitenbach & Kränzlin 1981: Pl. 274.
- 31' Apothecia with ochraceous grey hymenium and whitish fimbriate margin; spores clavate, 7.5-12x1.8-2.8 μm , OCI 0-1; marginal cells long and conspicuous, with clavate last cell; paraphyses sublanceolate; saprobic on *Rubus canes*; phen.: III-VI • **Mollisia clavata** Gremmen (1954)
GAL: spores 6-8.7-10(12)x1.5-2 μm (exs. in BWB). KOH unknown *Mollisia cinerella* Sacc.
GAL: spores (5)6-8-10(11)x1.7-2.2 μm (exs. in BWB). KOH unknown *Mollisia undulato-depressula* Le Gal & Mangenot
- 32 Spores 9-14x2.5-3 μm , hymenium bluish-grey, with strong blackish subiculum; saprobic on *Picea abies*, phen.: ?.... (BE/F) **Mollisia "subcinerella"** Gminder nom. prov.
Several collections made by LAGERSTRÖM in H sub *M. melaleuroides* could be identical. Spores 8.5-12x2-3 μm , OCI 0-0.5(1), marginal cells hyaline at the margin and very long (up to 60 μm), below the margo vesicular, brownish. *M. melaleuroides* ss. KARSTEN is *M. lividofusca*.
32' Spores 12-16(20)x2.5-3 μm , OCI 0-0.5; margin delicately ciliate with marginal hairs up to 70 μm long and claviform; KOH reduced +; on wood of *Betula*, *Corylus*, *Alnus alnobetula*; phen.: VIII (ES, FR)
..... **Mollisia villosa** (Aebi) Gminder comb. nov. ined.
Fund JPP 9852 (PRIOU) keys out here, but has a different structure (medullary exc. lacking) and reminds at a „*Haglundia*“.
SVR: On decorticated coniferous wood, spores 7-12(15)x3-3.5 μm [dead], OCI 0 or with one small droplet in each end, with blackish granulae in the hymenium when mounted in Melzer's reagens *M. ponticulorum*
- 33 Apothecia with a conspicuous subiculum 34
- 33' Apothecia without conspicuous subiculum 36
- 34 Apothecia 1-2.5 mm diam., seated on a subiculum; margin with long, brown to hyaline cells 26-35(40)x5-7 μm ; asci 60x4 μm , IKI+; spores with pointed ends, 7-10.5x1.8-2.2 μm , OCI 0; saprobic on twig of *Salix*; phen.: VIII
..... **Mollisia ladae** (Velen.) Gminder (2006)
III.: Gminder 2006: fig.8a-b.
34' Spores longer 35
- 35 Apothecia 0.8-3 mm diam., sitting on a brown subiculum; spores 12-16x2-2.5(3) μm , 0(1)-septate, OCI 1-2; KOH-; saprobic on wood of *Quercus*; phen.: VII-VIII **Mollisia velenovskyi** Gminder (2006)

- Ill.: Gminder 2006: fig.4.
- 35' Spores 12-15x3 µm, OCI 3, germinating by conidia, with ± rich subiculum (fide Baral); saprobic on wood; phen.: IX (BE/W) ● **"Tapesia" cinerella** Rehm
- 36 Hymenium light ochraceous, never (?) grey or blackish; spores 9-16(19)x2.5-3.2 µm, Qa>4, with two big polar drops (+ sometimes few more smaller drops); corticolous; phen.: X (BE/F) ● **Mollisia discolor** (Mont.) W. Phillips (1887) Ill.: Breitenbach & Kränzlin 1981: Pl. 275.
- 36' Spores with Qa up to 4 37
- 37 Apothecia with whitish, at most pale creme-coloured hymenium; outer surface dark brown up to the margin; spores 8-12x2.8-3.5 µm, OCI 2, with several not too big drops; phen.: IV-V ● **Mollisia melaleuca** (Fr.) Sacc. (1889) Different from *M. discolor*?
- 37' Ectal excipulum with paler margin 38
- 38 Apothecia watery-grey, only basal ectal excipulum brownish; asci 48-62(69)x5-7 µm, with croziers; spores 8-12(14.5) x2-3.5 µm, seldomly 1-septate, OCI 2-3; saprobic on bark of branches of *Alnus incana*, *Carpinus*, *Populus tremula*, *Salix sp.*, *Sorbus aucuparia*; phen.: VII-XII ● **Mollisia benesuada** (Tul.) W. Phillips (1887) Ill.: Breitenbach & Kränzlin 1981: Pl. 273, Rubio & al. 2010: 239.
- 38 Saprobic on wood 39
- 39 Sexual morph: Apothecia greyish blue to deep blue, with paler margin, 1.5-2.5 mm diam. Asci *65-95x6-9 µm, IKI+, with croziers; spores *(9)10-13(17)x(2.5)3-3.5(4) µm, Qa<4, OCI 2(3); Asexual morph: synnematosus, diplococcium-like. Saprobic on decomposing wood (DE) ● **"Phialocephala" oblonga** (C.K.J. Wang & B. Sutton) J.B. Tanney, Seifert & B. Douglas (2016) SVR: Spores 5.5-10x2 µm [NH₄OH], OCI 0, excipulum with olivegreenish colour (at least in NH₄OH) *Mollisia olivaceocinerea* s; Gminder
- 39' Sexual morph: Apothecia orange greyish brown, with paler ochraceous orange margin, up to 2 mm diam. Asci (49)51.5-62(65)x6 5-6.5 µm, IKI red, with croziers. Ascospores ellipsoidal-fusiform to oblong, apices rounded, (7)8-10.5(12)x(2)2.5-3(4) µm, aseptate, OCI 2(3). Asexual morph: microsclerotial. Saprobic on wood (Canada) ● **"Phialocephala" nodosa** J.B. Tanney & B. Douglas (2016)
- 40 Spores 12-15x2.3-2.8 µm, OCI 4, hymenium blueish-grey; on *Vaccinium uliginosum* (fide Baral) ● **Mollisia vaccinii** Rehm
- 40' Spores 20-28x2.5-3.2 µm, OCI 5, hymenium ochraceous, with crystals in the medulla, subhymenium generally with ochraceous hyphae; excipulum margin with textura prismatica; saprobic on branches of *Betula pubescens*; phen.: VIII ● **"Mollisia" ramealis** P. Karst. (1871) Ill.: Rubio & al. 2010: 240. To be excluded from *Mollisia*.
- 40" Spores 11-18x2.5-3.5 µm, OCI 4-5, mature (overmature?) often with 1(3) septa; hymenium olivaceous-greenish, drying ochre-yellowish (like mustard). Phen.: IV-X ● **Mollisia ventosa** P. Karst. (1871)
- 45 Spores 35-49x2.2-3 µm, up to 8-celled, on *Erica arborea* ● **Mollisia ericae** Rolland (1891)
- 45' Spores shorter and without septa 46
- 46 Spores up to 8 µm, less than 2 µm wide 47
- 46' Spores larger 48
- 47 Apothecia fasciculate, only basal ectal excipulum brownish; asci 26-45x4-4.5 µm, IKI-; spores (4)5-6.8x1.2-1.8 µm, OCI 1; on wood of *Castanea*, *Fagus*, *Salix*, *Sorbus*; phen.: (VI)XI-XII (BE/F)..... ● **Mollisia caespiticia** (P. Karst.) P. Karst. (1871)
- 47' Apothecia not fasciculate; spores 3.5-5.5x1.2-1.8 µm (PAK 4406: 5-7.5x1.8-2.2, if identical?); , ectal excipulum brown, marginal cells ± conspicuous, subhyaline, KOH -; on wood of *Acer*, *Alnus*, *Populus*, *Prunus*, *Salix*; phen.: XI-XII (BE/F) ● **Mollisia sublividula** (Nyl.) P. Karst. (1871)
- 48 Marginal cells subhyaline, end cells nearly cylindrical, apothecia fasciculate; spores (7)8-10(12)x2.2-3 µm, OCI 1(2) ● **Mollisia depressula** Nyl. Concept is based on *M. depressula/inexula* (PAK 4373). Uncertain which name is to be used. SVR: Spores 7-9x2.5-3 µm [living], generally septate, OCI ca. 1 (biguttulate), globose cells yellow coloured and this pigment soluble, apothecia olive (yellowish-)greenish ● **Mollisia viridula** Svrček (1993) Perhaps only an overmature collection of ... ???
- 48' Marginal cells dark (reddish) brown, 2-4-celled, end cell ± clavate; apothecia drought-resistant, not fasciculate; spores 6-10x1.8-2.8 µm, OCI 1(+); saprobic on *Fagus*, *Myricaria germanica*, *Populus*, *Quercus*, *Salix*, *Tamarix*, *Ulmus*; phen.: X-IV(VI-VIII) (BE/F) ● **Mollisia ligni** (Desm.) P. Karst. (1871)

Key B – On herbs and ferns

- 1 Lipid content >2 2
 1' Lipid content 0-1 6
- 2 Spores 11-13x1.5-2 µm, OCI 2-3, consisting of small droplets; herbicolous (*Eupatorium cannabinum*, *Senecio fuchsii*); phen.: IV-XI (BE/F) • **Mollisia coerulans** Qué. (1879)
 2 Spores broader than 2 µm and/or shorter than 11 µm 3
- 3 KOH-reaction clearly yellow, spores 8-11x1.8-2.5 (exs.), OCI 2-3, apothecia without crystals; on *Polygonum*
 **Mollisia polygوني** (Lasch) Gillet (1879)
 3' KOH-reaction negative 4
- 4 Spores 8-11x1.8-2.2 (exs.), OCI 2-3, consisting of small droplets; on *Polygonum*
 **Mollisia polygوني** (Lasch) Gillet (1879)
 Fund WU 8580: Spores 7-10x1.8-2.2 (exs.), OCI 3+, consisting of few bigger, confluent drops.
 4' Spores more than 14 µm long 5
- 5 Spores 14-19x2.5(3) µm, OCI 2-3, consisting of small and bigger drops; saprobic on *Solidago virgaurea*
 **Mollisia "solidaginis"** P. Karst. (18??) ss. Gminder
 5' Spores 17-23x3-4 µm (exs.!), OCI 2-3, consisting of small droplets; saprobic on *Petasites*
 **Mollisia solidaginis** P. Karst. ss. Br/Kr
- 6 Marginal cells inconspicuous, without remarkable features 7
 6' Marginal cells somehow remarkable, conspicuous 10
- 7 Apothecia up to 1.5 mm diam., originating from a globose stroma; asci 40-52x5-6 µm, I+; spores clavate, 7-9.5x
 1.5-2 µm; saprobic on stems of *Rubus fruticosus* agg.; phen.: XII **Mollisia stromatica** Graddon (1972)
 7' Apothecia without such stroma 8
- 8 Apothecia 0.5-1 mm diam., pale to dark grey; reaction with NH₄OH and KOH strongly yellow; asci 45-50x5 µm, IKI
 bb; spores 6-9x1.5-2 µm, OCI 1-2, tiny droplets in one end (also in both?), spore ends rounded; saprobic on stems
 of *Rubus fruticosus*; phen.: V-VI ○ **Mollisia alcalireagens** Svrček (1986)
 Ill.: Svrček 1986: fig. 5.
- 8' KOH reaction inconspicuous or KOH- 9
- 9 Spores 6-11x1.5-2.2 µm, OCI 1-2, few small droplets in one or both ends; asci 40-50x5 µm, J+; apothecia KOH
 negative or indistinctly (+ dissolving very quickly); saprobic on stems of *Artemisia*, *Epilobium*, *Filipendula ulmaria*,
Lysimachia vulgaris, *Rubus idaeus*; phen.: (I)IV-IX (BE/F) • **Mollisia revincta** (P. Karst.) Rehm (1869)
M. solani Kutorga & Raitv., on *Solanum duOClamara*, may differ by the presence of yellow brown encrustations on the outermost ectal
 excipulum layer?
 9' Apothecia 0.3-0.5 mm diam., disc pale grey; asci 34-48x4-5.5 µm; spores 6.8-9.5x1.3-1.5 µm; saprobic on
Lycopodium clavatum; phen.: VII **Mollisia lycopodii** Lebreton & Malbr. (1884)
 9'' Spores fusiform to needle-shaped, with one end rounded and the other tapering, 7-8.5x1.8-2 µm, OCI 0; on
 herbaceous stem; phen.: VII **Mollisia lentiformis** (Velen.) Gminder (2012)
 Ill.: Gminder 2012: fig. 9.
- 10 Spores 8.5-11x2-2.5 µm, OCI 0 (?), apothecia up to 3 mm diam., marginal cells often utriform (constant feature?),
 KOH - **Mollisia adenostylidis** Rehm ss. Breitenbach & Kränzlin
 10' Spores up to 9 µm long 11
- 11 Spores 7.5-9x1.8-2 µm; marginal cells long and conspicuous, with clavate last cell, paraphyses sublanceolate; on
Rubus-cains (exclusively?) (BE/F) • **Mollisia clavata** Gremmen (1954)
 SVR: Spores 5-8x1.3-1.5 µm, OCI ca. 1, biguttulate, KOH ?, marginal cells hyaline, conspicuously long, 1-2-celled *M. potentillae-erectae*
 Most probably a *Pyrenopeziza* spec.!
 SVR: NH₄OH-reaction yellow, spores 5-7x1.8 [dead?], apothecia yellow when bruising, margin ciliate, marginal cells conspicuous and
 partly granulate (?), upper part of the hymenium with amyloid granula *Mollisia flavescens*
- 11' Spores clavate, 7-8.5x1.5-2.5 µm, OCI 1; margin with multiseptate brown to hyaline hairs up to 60x3.5-5 µm; on
 blackened areas near the base of standing petioles of *Pteridium*; phen.: V-VII (BE/F, BE/W)
 ○ **Mollisia pteridis** (Alb. & Schwein.) Gillet (1879)
 saprobic on stems of *Bunias orientalis*; phen.: VI
 **Mollisia buniadis** (Nannf. ex Gremmen) Nannf. in Holm & Nannf., *Thunbergia* 11: 13 (1990)
 Spores 5-6x1 µm; saprobic on stems of *Teucrium*; phen.: ? **Mollisia teucrii** (Fuckel) W. Phillips (1887)

Key C – On monocotyls

- 1 Hymenium and medulla with lilac reaction when adding KOH, spores 6-9x1.2-1.8 µm, hymenium fresh orange, on *Zea mais* **Mollisia „aurantioviolascens“** Gminder nom. prov.
Only french collections. Same reaction as in *Scutomollisia russea* and *purpurea*, but no scutum and much smaller spores.
- 1' No lilac reaction when adding KOH 2
- 2 Apothecia with big masses of crystals in the ectal excipulum and the medulla 3
- 2' Apothecia without crystals 7
- 3 Spores (2)4-celled, †26-31x3-4 µm; on *Phragmites* **Mollisia mediella** (P. Karst.) Baral (2008)
- 3' Spores 1(2) celled, shorter and narrower 4
- 4 Medulla with crystals, KOH strong yellow; asci IKI-; spores 14-17x2.8-3 µm (2nd collection 19-24x2.5-3.2 µm); on *Phalaris arundinacea*; phen.: IV-VII (BE/F) • **Mollisia phalaridis** (Lib. ex P. Karst.) Rehm (1896)
- 4' Asci IKI bb 5
- 5 Apothecia ± pulvinate, up to 6 mm diam., hymenium yellow(ish), drying orange-ochraceous, thick, KOH-reaction yellow (always? not in exs. ?); spores 15-24(29)x2.5-3.2 µm, OCI 3(+); saprobic on culms of *Phragmites australis*; phen.: VI (BE/F) • **Mollisia retincola** (Rabenh.) P. Karst. (1871)
- 5' Apothecia ± flat, patelliform, hymenium grey, blackish-grey, KOH-reaction only in fresh collections short but distinctly yellow, in overmature or dried collections normally not longer visible, marginal cells vesicular, inconspicuous; spores inequilateral clavate to scutuloid, 8-12(15)x2.2-3.2 µm, OCI 1-2, on *Phragmites australis*, *Scirpus sylvaticus*, *Juncus spp.*, *Carex spp.*; phen.: IV-IX (BE/F) • **Mollisia hydrophila** (P. Karst.) Sacc. (1889)
Also collections without any trace of subicular hyphae and/or crystals and/or slightly smaller and narrower spores (transition vs. *M. palustris*). Identical is *M. epithypha* Karst.
SVR: NH₄OH +, spores 6.5-10x1.5-1.8 µm [dead], slightly scutuloid, OCI 0 *M. citrinopigmentosa*
SVR: Spores 6-7.5x1.5-2 [dead], OCI 0, with amyloid granula in the hymenium (probably KOH -) *M. amyloidea*
SVR: Spores 6.5-10.5x2 [living], OCI 0 (probably KOH -) *M. epityphicola*
- 7 Spores septate in living asci 8
- 7' Spores not septate in living asci, sometimes septate before germinating 20
- 8 IKI rr 9
- 8' IKI bb 11
- 9 Spores *30-42x4.3-5.2 µm, in asci 3-5-septate; saprobic on stems of *Phragmites*; phen.: VII-VIII (BE/F, CH)
..... • **Mollisia pulla** (W. Phillips & Keith) Baral (2008)
Exs. JAKLITSCH: spores 27-34x4.5-5.2 µm
- 9' Spores 1-3 -celled In mature, turgescens asci, less than 4.2 µm broad 10
- 10 Spores (25)30-40x3-4 µm, (2)4-celled, constricted at the septa; asci up to 160 µm long; ectal excipulum dark brown; saprobic on *Carex*; phen.: V (BE/F) • **Mollisia pilosa** (Crossland) Baral & T. Richter (2008)
- 10' Spores 36-46x2.5-3.5 µm, 4-celled, not constricted at the septa; asci up to 80-90 µm, IKI red; ectal excipulum ochraceous; saprobic on culms of Poaceae (*Brachypodium*); phen.: V-VIII(X) (BE/F).....
..... • **Mollisia filispora** (Cooke) Baral (2008)
Ill.: Rubio & al. 2010: p. 205.
- 11 Asci without croziers, spores 47-53x3.5-4 µm, OCI 4.5-5; KOH negative; saprobic on *Carex*; phen.: IV-VI (BE/F)
..... • **Mollisia asteroma** (Fuckel) Baral (2008)
- 11' Asci with croziers and/or spores smaller; KOH negative..... 12
- 12 Apothecia 0.2-0.5 mm, with dark brown hymenium and black, hairless margin; spores 12-15(18)x2.5-3.3 µm; paraphyses subapically with olive brown exudate; subiculum hyphes rare; saprobic on *Carex*, *Eriophorum*, *Juncus* and *Trichophorum*; phen.: • **Mollisia submelaena** (Rehm) Declercq (2001)
Ill.: Graddon 1976: fig. 2.
- 12' Spores average more than 15 µm long 13
- 13 Spores up to 35 µm long 14
- 13' Spores longer 17
- 14 Apothecia about 0.5 mm diam., greenish grey hymenium with whitish rim, receptacle blackish; asci 55-80x6-8(10) µm; spores 18-23.5x2 µm, 1(3)-septate; saprobic on *Juncus*, *Phragmites*; phen.: IV, VIII
..... **Mollisia junciseda** P. Karst. (1871)
Ill. Le Gal & Mangenot 1966: fig. 1.
- 14' Spores wider 15

- 15 Apothecia up to 1 mm diam., disc grey, receptacle blackish brown, with brown subiculum; asci 110-120x7-9 µm, IKI+; spores 17-34x2.8-3.5 µm, 1-5-septate; saprobic on leaves of *Carex rostrata*; phen.: VI "Belonopsis" **guestphalicum** (Rehm) Aebi (1972)
..... Ill.: Beyer 1989: fig. IV.
- 15 Overmature spores 1-septate 16
- 16 Apothecia 0.5-1(1.5) mm diam., with pale grey to dark grey hymenium, outside dark grey to dark brown with olive tinge and paler fimbriate margin, filty base; asci 60-75x7-8.5 µm, IKI+ blue, arising from croziers; spores *(12)14-21(27) x (2.2)2.5-3(3.2) µm, 1-septate, OCI 3-4; saprobic on *Carex acutiformis*, *C. flacca*, *C. elata*, *C. paniculata*, *C. pendula*, *C. rostrata*, *Cladium mariscus*, *Scirpus sylvaticus* and *Sparganium* spec.; phen.: I-VII(IX) (BE/F) • **Mollisia luctuosa** Boud. (1907)
..... Ill.: Boudier 1904-1910: pl. 543, Baral & Richter 2008: Abb.5 & 6..
- 16' Apothecia 0.5 mm diam., disk pale, receptacle brown; asci 80-95x12-16 µm, IKI blue; spores 15-23x4-5 µm, 1-septate; saprobic on *Carex binervis*, *C. echinata*, *C. lasiocarpa*, *Nardus stricta*, *Trichoporon caespitosum*, *Juncus* sp.; phen.: VII-X **Mollisia phaea** Rehm (1884)
..... Ill.: Spooner 1981: fig. 26.
- 17 Apothecia 0.5-0.7 mm diam., disk ochraceous to whitish to grey; asci 90-130x14-15 µm, IKI+ blue, arising from croziers; spores *54-80x3.5-4.5 µm, 9-13-septate, multiguttulate; paraphyses clavate; saprobic on *Phragmites australis*, *Juncus effusus*; phen.: X-V (BE/F) • **Mollisia excelsior** P. Karst. (1871)
- 17' Apothecia 1-5 mm diam.; asci 120-185x7-8 µm, IKI blue, arising from croziers; spores with 44-65x2.5-3 µm, one end acutely pointed the other narrowly cylindrical, 3(5)-septate; saprobic on culms of *Juncus*, *Scirpus*, leaves of *Typha*; phen.: VI-VII (BE/F) ○ (•) **Mollisia iridis** (P. Crouan & H. Crouan) Le Gal (1953)
..... Ill.: Sutton & al. 1961: fig. 13b, Beyer 1994: fig. 3.
- 19 Ascus pore red in IKI 20
- 19' Ascus pore blue in IKI 21
- 20 Apothecia 0.5-1 mm diam., hymenium bluish grey; asci 50-70x4.5-5.5 µm, IKI red, with croziers; spores 8-13.5x2-2.8 µm, OCI 3; on Poaceae and *Typha*; phen.: VI-VII (DE) **Mollisia lothariana** Gminder (2006)
- 21 Spores longer than 10 µm 22
- 21' Spores smaller 25
- 22 Apothecia subsessile, 0.25-0.5 mm diam., hymenium yellow-orange; asci 55-87x7.5-8.5 µm, IKI+, with croziers; spores (11)12-15.5x2.8-3.2 µm, OCI 1.5; paraphyses with strongly refractive yellow-orange VB; ectal excipulum blackish brown up to the margin; saprobic on *Nardus stricta*; phen.: VII **Mollisia russea** (Schmid-Heckel) Baral (2008)
- 22' Hymenium greyish 24
- 24 Apothecia grey; asci 90-100x7-8 µm, with croziers; spores 15-21x3-3.5 µm, OCI 2-3; cypericolour; phen.: IV-VI (BE/F) • **Mollisia palustris** (Rob. ex Desm.) P. Karst. ss. Baral
- 24' Apothecia up to 1 mm diam., hymenium bluish grey with paler margin; asci 54x7 µm, IKI+, with croziers; spores fusiform with pointed ends, slightly curved, 10-14.5x2-2.5 µm, OCI 2; saprobic on leaves of *Carex riparia*; phen.: VI **Mollisia pseudochionea** nom. prov. T. Richter & I. Wagner
- 25 Spores curved, 4-8x1-1.3 µm, paraphyses slightly broader than the asci, KOH +; saprobic on *Carex*; phen.: VII-XII.. • **Mollisia caricina** Fautrey (1891)
- 25' Paraphyses narrower than the asci or spores otherwise 26
- 26 Apothecia urn-shaped, 0.5-1 mm diam., with conspicuous whitish margin; ectal excipulum light brown, with clavate, subhyaline cells 20-25x4.5-6 µm; asci 19-27x2.2-3 µm, IKI+, with croziers; spores with pointed ends, 5.5-6x1-1.2 µm, OCI 0; saprobic on stem of *Phalaris*; phen.: IX **Mollisia urnigera** (Velen.) Gminder (2012)
..... Ill.: Gminder 2012: fig. 12.
- 26' Apothecia not urn-shaped 27
- 27 Spores with OCI 0-2 28
- 27 Spores with OCI 2-3 30
- 28 Apothecia up to 1 mm diam., pale grey disk, marginal cells subhyaline, up to ca. 10x8 µm; asci *40x5 µm, †31-35(41)x5-5.7 µm, IKI+; spores mostly tapered towards base, 6.3-9x1.8-2.2 µm, OCI 0-1 (few tiny droplets); saprobic on *Carex riparia*, *Juncus* and grasses (*Deschampsia*, *Glyceria*, *Molinia*, *Phalaris*, *Phragmites*); phen.: VI-X (BE/F, DE) • **Mollisia palustris** (Rob. ex Desm.) P. Karst. (1871)
SVR: Spores 6.5-10.5x2 [living], slightly scutuloid, OCI 0 *M. epityphicola*

- SVR: Spores 5-12x2-2.5 µm [dead], OCI 0, with a covering of amyloid granula over the hymenium *M. variabilispora*
 SVR: Spores 6-7.5x1.5-2 [dead], OCI 0, with amyloid granula in the upper part of the hymenium *M. amyloidea*
 The problems within this complex are big: on the one hand the types are quite distinct, on the other hand recent findings of these „species“ are not too rare and the hiatus between the types disappears. Until now I have seen only one or two recent collection which corresponds to the type of *M. evilescens* appr. 100%, but many collections which have to be located between *M. evilescens* and *M. palustris*.
 LE GAL & MANGENOT describe a (lecto-)type of *M. palustris*, which probably belongs better to *M. evilescens* (small spores, marginal cells). May be not distinct on species level!
- 28' Spores up to 1.5 µm wide 29
- 29 Apothecia 1-4 mm diam., disc grey, margin white; marginal cells subclavate, 10-15x5.5-6(7) µm, hyaline; asci 20-43x3-3.5-4.5 µm, IKI+, with croziers; spores needle-shaped, (4)4.5-6(7)x0.8-1.2 µm, OCI 0-1; in KOH some paraphyses orange-yellow discolorating (= KOH+?); saprobic on *Deschampsia*, *Phragmites*; phen.: III,VI,IX-X
 • **Mollisia phragmitis** (Velen.) Gminder (2006)
- 29' Spores 6.5-8.5x(1)1.2-1.5 µm, OCI 0.5-1, consisting of 1 small and a few very tiny droplets, scattered through the whole spore (exsiccate, living too?); marginal cells conspicuous, big, brownish up to the margin, end cells claviform, 15-22x5-8 µm; phen.: V **Mollisia evilescens** P. Karst. (1871)
 Identical is *M. simillima* P. Karst.
- 30 Apothecia 0,2-0,4 mm diam., pale grey, with dark brown margin; spores 7-10x2-2,5 µm, OCI 2-3; saprobic on *Ammophila*, *Molinia*, *Poa*; phen.: XI-II • **Mollisia poaeoides** Rehm (1891)
 III.: Ellis & Ellis 1985: fig. 1755.
- 30' Apothecia with paler margin 31
- 31 Apothecia 0.4-0.6 mm diam., ochraceous to pale brown, hyaline marginal cells cylindrical and sometimes protruding; asci 39-69x6-7 µm; spores subclavate, 9-12(14)x2-2.8 µm, OCI 2-3; on *Juncus*, *Phalaris*; phen.: V-VI (BE/F)
 • **Mollisia juncina** (Pers.) Rehm (1891)
 III.: Breitenbach & Kränzlin 1981: Pl. 276.
- 31' Apothecia 0,3-1,3 mm diam., greyish blue with whitish pruinose margin, outer surface dark brown, margin with hyaline, clavate end cells; spores 7-11x2-3 µm, OCI 3; saprobic on leaves and stem of *Typha latifolia*; phen.: VII (BE/F) • **Mollisia typha** (Cooke) W. Phillips (1887)
- Saprobic on *Calamagrostis arundinacea*, *C. canescens*; phen.: VI-VII **Mollisia culmina** (Sacc.) Rehm (1914)
- Key D – On leaves**
- 1 Spores up to 8 µm long 2
 1' Spores longer 3
- 2 Apothecia 0.2-0.5 mm diam., disc greyish yellow, outside reddish brown, marginal cells 2-celled, roundish to pear-shaped, not agglutinated; asci *30-47x5-6(6.5) µm; spores *5.5-8x1.7-2.2 µm, OCI 0; saprobic on leaves of *Fagus*, *Quercus petraea*, *Q. robur*, *Q. rubra* and *Castanea sativa*; phen.: V-VIII(X)
 • **Mollisia nervicola** (Desm.) Gillet (1882)
- 2' Spores 5-7 x 1.2-1.5(1.8) µm, marginal cells small, conspicuous, brownish, agglutinated to triangular teeth
 **Mollisia lithocarpis** E.K. Cash (1959)
- 3 Spores up to 12 µm long 4
 3' Spores longer 6
- 4 Spores 6-12x1.7-2 µm, OCI 1; saprobic on petioles of *Aesculus*; phen.: VI
 **Mollisia petiolicola** (Feltgen) Velen. (1934) ss. Feltgen (1903)
- 4' Spores 9-12x-1.5-2.5 µm, mature often 1-septate; marginal cells nearly cylindrical, sometimes agglutinated; saprobic on leaves of *Quercus ilex*; (sub-)mediterranean to atlantic areas; phen.: V
 **Mollisia muelleri-argovensis** (Rehm) Gminder in prep.
- 4" Apothecia 0.2-0.5 mm diam., disc pale greyish to pale brown with white margin; spores 10-12 x 3-3.5 µm, eguttulate; marginal cells club-shaped, not agglutinated; saprobic on inner side of leaves of *Rubus idaeus*; phen.: V
 **Mollisia gabretae** Svrček (1976)
- 6 Apothecia up to 3 mm diam., disc bluish white with a smooth dark margin; asci up to 105x11 µm, apical ring of *Hymenoscyphus*-type, I-; spores 11-15x4-5 µm, with polar guttules, OCI 2; saprobic on leaves of *Fagus*, *Quercus*; phen.: VIII-XI • **"Mollisia" spectabilis** Kirschst. (1906)
 III.: Graddon 1979: fig. 2.
 Probably to transfer to *Cudoniella*.
- 6' Apothecia 1-2 mm diam., disc sulphur green, outside pale brown; spores 9-16x1.5-2.3 µm, eguttulate, non-septate; saprobic on needles of *Pinus mugho*; phen.: VI **Mollisia lacunarum** Svrček (1978)

Key E – On mosses and liverworts

- 1 Spores 13-16x2.5-3.5 µm, septate (in the ascus?), KOH-reaction unknown, marginal cells subglobose and with brownish incrustations; asci IKI bb; on living mosses **Mollisia polytrichicola** Svrček (1988)
- 1' Apothecia up to 0.5 mm diam., blackish; asci 50–60x6.5-7 µm, I+; spores 10-12.5x2-2.5 µm, 1-septate; parasitic on spore capsules of *Polytrichum commune*; phen.: VII **Mollisia urnicola** (Mouton & Sacc.) H. Engel & Svrček (1988)

Key F – On remnants of fungi

- 1 On remnants of pyrenomycetes (?*Diaporthe strumella*) on branches of *Ribes nigrum*; phen.: VIII **Mollisia caespiticia** (P. Karst.) P. Karst. (1871)

saprobic on canes of *Rubus idaeus*; phen.: VI "**Tapesia**" **tenebrosa** (P. Karst.) Nannf. (1932)

saprobic on basal, mostly buried, branches of *Myrica gale*; phen.: VII "**Tapesia**" **undulata** E. Bommer, M. Rousseau & Sacc.

Apothecia cupulate, c. 0.5 mm diam., disc pale brown, receptacle striate; asci 35-40x4.5-5.5 µm, I+; spores 7-8x1-1.5 µm; on stems of *Filipendula ulmaria*; phen.: V-VII **Mollisia fuscostriata** Graddon (1974)

May belong here:

- 1 Apothecia 0.15-0.25 mm diam., stipitate, outer surface brown; asci up to 130x6.5-7 µm, MLZ+, with croziers; spores ellipsoid-inequilateral, 9-12 x4-5 µm, with one large LB, hyaline; on inner bark of *Betula* **Aleuriella personata** (P. Karst.) P. Karst. (1871)
- 1' Apothecia gregarious, discoid, 0.5-2 mm diam., sessile, disc first flat then undulating, hymenium yellowish to weakly flesh-coloured, outer surface brown and smooth; asci I+; spores narrow fusiform, slightly curved, 18-25x2.5-3 µm, 1-septate, hyaline; saprobic on deciduous wood (*Alnus viridis*, *Quercus*); phen.: VIII **Dibeloniella citronella** (Rehm) E. Müll. & Défago (1968) [1966] Ill.: Schmid I. & H. 1990: nr. 6. Ill.: Huhtinen 1994: fig. 3.
- 1 Apothecia light brown, composed of textura globulosa, up to 0.8 mm in diam. and 0.4 mm high, sessile on a subiculum of darkly pigmented 2–3 µm wide, sometimes incrustated hyphae, marginal hyphae often with swollen terminal cells that measure 7-20x6-8 µm; asci 8-spored, 35–45x5.5–8 µm, I+; paraphyses septate, 2-2.5 mm wide with rounded tips; ascospores irregularly biseriate, one-celled, hyaline, 8.5-10.5x 2-2.5 µm when young, becoming two-celled, light brown, constricted at the septum, 8.5-15x3.5-4.5 µm when old; synanamorphs *Cadophora*- or *Phialocephala*-like. On needles; twigs and stumps of *Picea abies* and stems of *Betula pendula*; phen.: (CH,SE) **Phialocephala piceae** (T.N. Sieber & C.R. Grünig) Rossman (2014) Ill.: Grünig & al. 2009: fig. 4-5.

Mollisia velebitica (Matočec, I. Kušan, Jadan, Tkalčec & Mešić) Baral

Neopyrenopeziza Ekanayaka & K.D. Hyde

Type species: *Neopyrenopeziza nigripigmentata* Ekanayaka & K.D. Hyde

Lit.: Ekanayaka et al. 2019: 351.

- 1 Apothecia about 900x800 µm, arising singly or in small groups, sessile, erumpent, pulvinate, black when fresh. Receptacle convex, black when fresh. Ectal excipulum black to dark brown pigmented cells of textura angularis to prismatica, globose, granulate and pigmented apical cells form vertically striate structures. Medullary excipulum of textura prismatica. Hymenium hyaline. Paraphyses 1–2 µm wide, filiform, obtuse, enlarged and pigmented towards the apex, branched, septate. Asci 120–160x9–14 µm, 8-spored, cylindric-clavate, amyloid, short stipitate, arising from croziers. Ascospores ellipsoid to fusoid, 24.5–42x5–6 µm, hyaline, smooth walled, regularly five septate, distinctly more tapered towards the distal end. Asexual morph: Undetermined. On dead aerial branches of *Crataegus* sp. Phen.: V (IT) **Neopyrenopeziza nigripigmentata** Ekanayaka & K.D. Hyde (2019) Ill.: Ekanayaka et al. 2019: fig. 9*.

Niptera Fr.

Syn.: *Nimbomollisia* Nannf.

Type species: *Niptera lacustris* (Fr.) Fr.

Lit.: Ellis & Ellis 1985: 548 (*N. melatephra*) & 558 (sub *Mollisia fuscoparaphysata*).

- 1 Apothecia erumpent, 0.2-0.6(1) mm diam.; asci 2(8)-spored, 70-90x10-12 µm, IKI blued, with croziers; spores (30)35-55x5-8.5 µm, 3-septate, guttulate; saprobic on *Carex* spp., *Eriophorum angustifolium*; phen.: VIII "**Nimbomollisia**" **macrospora** (P. Karst.) Nannf. (1983) Ill.: Scheuer 1988: Taf.7j & 32°, Schmidt & Schmidt 1991: Bild 2/61.

- 1' Asci 8-spored; spores shorter 2
- 2 Apothecia erumpent, cup-shaped, 0.2-0.6 mm diam., pallid disk, outside dark grey; spores fusoid-scutuloid, 12-20x2-2.5 µm, becoming 1-septate when mature, OCI 0; saprobic on *Juncus conglomeratus*, *Juncus effusus*, *Juncus inflexus*, *Juncus subnodulosus*, *Scirpus lacustris*; phen.: VI-IX • **Niptera melatephra** (Lasch) Rehm (1891)
 Ill.: Ellis & Ellis 1985: fig. 2035.
 Probably to exclude from *Niptera*.
- 2' Spores more than 3 µm wide 3
- 3 Paraphyses filiform 4
- 3' Paraphyses with abruptly swollen apex 5
- 4 Apothecia sessile, 0.25-0.8(1) mm diam., disk grey, outside black; in KOH strongly yellow; asci 103-115x14.5-16 µm, IKI blue, with croziers; spores 15-21x5-6 µm, 1(3)-septate, with IKI spore wall red, without mucous coating; paraphyses filiform, apex filled with a cylindrical VB; saprobic on leaves of *Carex* sp.; phen.: VI-VII.....
 **Niptera lacustris** (Fr.) Fr. (1849)
 Ill.: Rubio & al. 2010: p. 245.
- 4' Apothecia sessile, 0.25-0.35 mm diam., disk ochraceous; asci 60-100x10-16 µm, IKI bb; spores long ellipsoid, 18-22 x 5-6(7.5) µm (Rubio & al. 2010: 21.5-29x7.3-8.5 µm, 1(3)-septate), with 1 thick septum already in living ascus, OCI 3, with mucous coating; paraphyses filiform and +/- forked, apex filled with VBs; saprobic on *Eriophorum angustifolium*, *Juncus effusus*, *Juncus filiformis*, *Juncus trifidus*; phen.: V-IX
 • **Niptera eriophori** (L.A. Kirchn.) Rehm (1914)
 Ill.: Scheuer 1988: Taf. 7k, Rubio & al. 2010: p. 244.
- 5 Apothecia sessile, 0.25-0.5(0.7) mm diam., disk dark olivaceous, outside blackish; asci 80-110x13-20 µm, IKI blue, with croziers; spores narrow ellipsoid, 13-18x4-6 µm, 1-septate, filled with minute VBs, OCI 4; paraphyse apices swollen and covered by olivaceous brown exudate; saprobic on *Carex limosa*, *Trichophorum caespitosum*; phen.: VI " **Mollisia**" **fuscoparaphysata** Graddon (1977)
- 5' Apothecia 0.3-0.5 mm diam., with concave yellowish disc; asci 95-122x23-25 µm; spores narrow ellipsoid, 18-22x4-6 µm, 1(3)-septate, with ellipsoid mucous coating; paraphyses forked, with abruptly enlarged tips up to 3-8 µm, with gel cap; saprobic on leaves of *Molinia coerulea*, culms of *Juncus* sp.; phen.: (IV)VI-VIII
 " **Nimbomollisia**" **melatephroides** (Rehm) Nannf. (1983)
 Ill.: Dennis 1964a: fig. 7.

Obtectodiscus E. Müll., Petrini & Samuels

Type species: *Obtectodiscus aquaticus* E. Müll., Petrini & Samuels
 Lit.:

Pulvinata Ekanayaka & K.D. Hyde

Type species: *Pulvinata tomentosa* Ekanayaka & K.D. Hyde
 Lit.: Ekanayaka et al. 2019: 350.

- 1 Sexual morph: Apothecia 700–800x300–350 µm, arising singly, sessile, slightly erumpent. Receptacle pulvinate. Margins raised, whitish to brownish, tomentose. Disc convex. Ectal excipulum 15–20 µm in upper flanks, composed of thin-walled, light brown to hyaline cells of textura angularis. Medullary excipulum 13–18 µm in upper flanks, composed of thin-walled, hyaline cells of textura intricata. Hymenium hyaline. Paraphyses 2–3 µm wide, numerous, filiform, obtuse and slightly swollen at the apex, aseptate, not exceeding the asci in length, smooth, aguttulate. Asci 65–80x4–5.5 µm, 8-spored, unitunicate, cylindrical-clavate, conical at the apex, amyloid ring present at the ascus apex, stipitate base, arising from croziers. Ascospores ellipsoid to fusoid, 8–12x2–3 µm, 1–2-seriate, aseptate, hyaline, guttulate. Asexual morph: Undetermined. Saprobiic on dead stems.
 **Pulvinata tomentosa** Ekanayaka & K.D. Hyde
 Ill.: Ekanayaka et al. 2019: fig. 8*.

Scutomollisia Nannf.

Type species: *Scutomollisia punctum* (Rehm) Nannf.

Lit. : Graddon 1980: 266, Graddon 1984: 379, Spooner 1981: 295 (*S. operculata*), Hein & Scheuer 1985: 129, Scheuer 1988: 167, Beyer 1998: 198.

- 1 Spores average shorter than 9 µm 2
- 1 Spores average longer than 9 µm 4

- 2 Apothecia 0.4-0.6 mm diam., ochraceous, outside dark red-brown with pale fimbriate margin; scutum 0.1 mm diam., brown; asci 35-40x5-6 µm, I+; spores narrow ellipsoid, 8-9.5x2 µm, OCI 2; paraphyses 5 µm longer than asci, apex olive green; saprobic on leaves of *Calamagrostis villosa*; phen.: VII **Scutomollisia clavata** B. Hein & Kores (1986) [1985]
 III.: Hein & Scheuer 1985: Taf.2: Abb.7. 3
- 2' Spores up to 8 µm long 3
- 3 Apothecia 0.2-0.4 mm diam., hymenium pale grey, outside concolorous but basally brown; scutum 0.1-0.2 mm diam., blackish brown; asci 35-45x5 µm, I+; spores 6.5-8.5x2 µm, OCI ?0; saprobic on *Deschampsia caespitosa*; phen.: XI **Scutomollisia microspora** B. Hein & Scheuer (1986)[1985]
 III.: Hein & Scheuer 1985: Taf.2: Abb.9.
- 3' Apothecia up to 0.6 mm diam., sessile, fully white; scutum up to 0.15 mm diam.; asci 45x4 µm, I+; spores 6.5-8x2 µm; saprobic on *Deschampsia flexuosa*; phen.: VII **Scutomollisia contraria** Graddon (1984)
 III.: Graddon 1984: fig. 4.
- 4 Spores up to 11 µm long 5
- 4' Spores longer 7
- 5 Apothecia 0.3-0.5 mm diam.; scutum 0.1-0.15 m diam., brown; asci 35-45x5-5.5 µm; spores fusiform-clavate, 9-11x2 µm, (0)1-septate, OCI 3; paraphyse apices blunt lanceolate, 3-4 µm diam.; saprobic on *Carex fusca*, *Carex panicea*, *Carex nigra* and grasses on peat bog soil ; phen.: VI **Scutomollisia lanceolata** B. Hein & Scheuer (1986)[1985]
 III.: Hein & Scheuer 1985: Taf.2: Abb.6, Scheuer 1988: Taf.7 d.
- 5' Paraphyses non-lanceolate, narrower 6
- 6 Apothecia up to 0.25 mm diam.; black scutum operculate splitting; asci up to 40x5-6 µm, I+; spores ellipso-cylindrical, 8-11x2-2.5 µm, nonseptate; paraphyses slender, about 1 µm thick; saprobic on *Carex binervis*, *Eleocharis multicaulis*; phen.: VI **Scutomollisia operculata** Nannf. (1976)
 III.: Spooner 1981: fig. 31.
- 6' Apothecia up to 0.2 mm diam., ochraceous, receptacle blackish brown; scutum up to 0.1 mm diam., non-operculate splitting; asci 30-45x5-6 µm, I+; spores subclavate, 8-11x2-2.5 µm; paraphyses filiform, apex up to 2.5 µm diam.; saprobic on culms of grass; phen.: IV **Scutomollisia morvernensis** Graddon (1984)
 III.: Graddon 1984: fig. 5.
- 7 Apothecia up to 1 mm diam., brown grey, margin fimbriate; scutum ca. 150 µm diam.; asci up to 60x7 µm, I+; spores 11-12x2-2.5 µm, aseptate; saprobic on culms of *Brachypodium pinnatum*; phen.: IV-VI **Scutomollisia fimbriomarginata** Graddon (1980)
 III.: Graddon 1980: fig. 5.
- 7' Spores longer 8
- 8 Spores up to 18 µm long 9
- 8' Spores longer 10
- 9 Apothecia up to 1 mm diam., disc translucent with smooth white margin, first covered by a 150 µm diam. scutum; asci up to 70x8 µm, I+; spores 12-16x2-2.5 µm, 1-septate; saprobic on culms of *Brachypodium pinnatum*; phen.: IV-VI **Scutomollisia integromarginata** Graddon (1980)
 III.: Graddon 1980: fig. 6.
- 9' Apothecia 0.15-0.2 mm diam., disc grey-yellow; asci 65-75x10-12 µm, I-; spores 15-18x3-4 µm, 0(1)-septate; saprobic on stems of *Typha latifolia*; phen.: VIII **Scutomollisia punctum** (Rehm) Nannf. (1976)
 III.: Beyer 1998: Abb. 75.
- 10 Apothecia 0.25-0.5 mm diam.; scutum opaque black; asci 50-80x6-7 µm, I+; spores fusiform, 16-22x2-3 µm, aseptate; paraphyse apices up to 2 µm diam.; saprobic on *Carex echinata*, culm of *Eriophorum sp.*; phen.: VII-VIII .
 **Scutomollisia stenospora** Nannf. (1976)
 III.: Scheuer 1988: Taf.7 a-b.
- 10 Apothecia up to 1 mm diam, disc pale, receptacle black; scutum ca 0.1 mm diam., red-brown; asci up to 80x11 µm, I+; spores fusiform 22-30x3.5-4 µm, becoming 3-septate; paraphyses with up to 5 µm diam. apex; saprobic on culms of grass; phen.: VIII **Scutomollisia pallido-ochracea** Graddon (1984)
 III.: Graddon 1984: fig. 6.

Trimmatostroma Corda

Type species: *Trimmatostroma salicis* Corda

Lit.: Ellis 1971: 41, Ellis & Ellis 1985: 100 (*T. betulinum*) & 253 (*T. salicis*), Diederich et al. 2010 : .

- 1 Colonies effuse, loose to dense, fumose black, macroscopically appearing as relatively short, prostrate, irregularly formed and branched, often agglomerated conidial chains. Stroma lacking. Conidiophores usually immersed, occasionally somewhat erumpent, micronematous, c. 5–40x2–6 µm, hyphal filaments gradually developing into fertile threads by becoming somewhat wider and darker, with slightly thicker wall, but differentiation between hyphae and conidiophores very difficult. Conidiogenous cells integrated, terminal, monoblastic, c. 5-10x3-4 µm, conidio-genous loci undifferentiated, subtruncate. Conidia in simple or rarely branched, irregular, occasionally disarticulating, basipetal chains, shape and size very variable, globose or subglobose, 0-1(2)-septate, 4–9 µm diam., or ellipsoid ovoid, subcylindrical, oblong, 1–4(5)-septate, transversely septate to dictyosporous, c. 6–30x5–15 µm, sometimes forming irregular aggregations, medium to dark brown, olivaceous-brown in KOH, wall thick, up to 2 µm, occasionally distinctly two-layered, i.e., with a distinct, paler inner layer (but not distoseptate), wall rugose-rimulose to irregularly verrucose, ends more or less rounded. Over bark of *Quercus*, frequently overgrowing and probably parasitizing degenerate crustose lichen thalli or corticolous algae. Phen.: V. (BE/F, BE/W, LU)
 • **Trimmatostroma quercicola** Diederich, U. Braun & Heuchert (2010)
 III.: Diederich et al. 2010: fig. 4-5.
- 1 Pulvinate species 2
- 2 Sporodochia pulvinate, black, shining. Conidiophores up to 30x1-4 µm, brown. Conidia in chains which fragment readily, 10-30x8-25, many-celled, lobed, brown. On dead branches of *Laburnum*. (UK)
 • **Trimmatostroma scutellare** (Berk. & Broome) M.B. Ellis (1976)
- 2' Conidial chains rarely disarticulating 3
- 3 Coniomata pulvinate, sometimes confluent, blackish; conidia in branched chains, very variable in shape and septation, 5-20x5-14 µm, smooth to verruculose, brown; on attached and fallen twigs and branches of *Betula*, *Ribes* and *Salix*, also on *Pinus* litter; phen.: II-VI (BE/F) • **Trimmatostroma betulinum** (Corda) Hughes (1953)
 III.: Ellis & Ellis 1985: fig. 406.
- 3' Conidiomata pulvinate, powdery, black; conidia curved or bent, often vorked, 12-38x4-10 µm, with up to 13 transverse and occasionally 1 or a few longitudinal septa, smooth or verruculose, olivaceous brown: on twigs and branches of *Salix*. Phen.: XI-IV (BE/F, UK) • **Trimmatostroma salicis** Corda (1837)
 III.: Ellis & Ellis 1985: fig. 1140.

PEZIZELLACEAE Velen.

Lit.: Jaklitsch et al. 2016: 181.

Sexual morph: Apothecia 0.1-6 mm in diam., soft to cartilaginous; hymenium saucer-shaped to plane, white to yellow, also brownish; margin smooth or with short, rarely long, smooth hairs; superficial, sessile to short- or sometimes long-stipitate, stipe white or rarely black (*Antinoa*). Ectal excipulum of textura angularis or usually textura prismatica to textura oblita. Hairs short, hyaline, smooth, sometimes incrustated or warted, also with finger-like outgrowths (*Mollisina*), some-times tapered into a straight or uncinatate bristle; rarely multiseptate, brown, flexuous (*Velutaria*); crystals absent. Para-physes filiform, sometimes lanceolate. Paraphyses and mostly also hairs with a globose or elongate, hyaline or yellow vital body. Asci with conical apex with eu- or hemiamyloid apical ring of *Calycina*- or *Pezicula*-type, sometimes inamyloid, with or without croziers. Ascospores (4-)8 per ascus, small to large, cylindric-ellipsoid to allantoid or clavate, 0-3-septate, partly with thin gel sheath stained in Cresyl Blue, lipid content low to high.

Asexual morph: Anamorphs frequently present, hyphomycetous (*Chaetochalam*, *Chalara*), also sporodochial (*Bloxamia*, *Xiambola*); phialides hyaline or often brown, with mostly long-cylindrical collarette; conidia 0-1-septate, cylindrical, partly with minute marginal frill.

Habitat: Saprobic on ligneous or herbaceous substrate or leaves, mostly desiccation-sensitive. Worldwide, alpine-boreal to temperate or subtropical.

Genera belonging to this family:

1. *Allophylaria* (P. Karst.) P. Karst.
2. *Antinoa* Velen.
3. *Calycellina* Höhn.
4. *Calycina* Nees ex Gray
5. *Hamatocanthoscypha* Svrček
6. *Micropeziza* Fuckel
7. *Mollisina* Höhn. ex Weese
8. *Mollisinopsis* Arendh. & R. Sharma
9. *Moserella* Pöder & Scheuer
10. *Phaeoscypha* Spooner
11. ?*Poculinia* Spooner
12. *Psilachnum* Höhn.
13. *Rodwayella* Spooner
14. *Scleropezicula* Verkley
15. *Velutaria* Fuckel
16. *Xiambola* Minter & Hol.-Jech.

Key to the genera of Pezizellaceae:

- | | |
|--|---------------------|
| 1 Apothecia cyathiform, shortly stalked, smooth margin; ascus annulus mostly dextrinoid; paraphyses with apical short cylindrical lipid body; ectal excipulum hyphae parallel to the outer surface; herbicolous, cypericolous or on ferns | <i>Allophylaria</i> |
| 1 Apothecia not cyathiform | 2 |
| 2 Apothecia with blackish stalk; ectal excipulum of textura oblita;; asci IKI+ | <i>Antinoa</i> |
| 2' Apothecia without blackish stalk | 3 |
| 3 Apothecia discoid, sessile, superficially developed beneath a shield of radial hyphae, sometimes soon evanescent; perihymenial and medullary excipulum strongly gelatinised; margin thick; elements of margin (= perihymenial excipulum) with thick, refractive walls; paraphyses, with VB in the apical part, forming a pseudoepithecium; outer surface with abundant exudate; spores <20 µm long | <i>Micropeziza</i> |
| 3' Apothecia not developed beneath a shield of radial hyphae | 4 |
| 4 Ectal excipulum of hyaline textura angularis, covered by hyphoid hairs | <i>Rodwayella</i> |
| 4' Ectal excipulum of textura prismatica | 5 |
| 5 Ectal excipulum with brown textura prismatica; hairs with brown walls, glabrous, tip curved; associated with <i>chalara</i> -like anamorph | <i>Phaeoscypha</i> |
| 5' Ectal excipulum not brown | 6 |
| 6 Paraphyses lanceolate; ectal excipulum of hyaline textura prismatica | <i>Psilachnum</i> |
| 6' Paraphyses not lanceolate | 7 |

- 7 Parphyses mostly with elongated vacuolar bodies 8
 7' Paraphyses not so 9
- 8 Apothecia sessile to shortly stalked, with dark basal ring, white to yellowish; hairs prominent to minute, smooth; paraphyses cylindrical, with a cylindrical, refractive, vacuolar body; ectal excipulum of textura prismatica *Calycellina*
- 8' Hairs cylindrical to clavate, short, rarely incrustated; asci with apical ring of *Calycina*-type; ectal excipulum slightly gelatinized, near the base of the receptacle and in the stipe the cells may be strongly gelatinized; paraphyses mostly with elongated VBs; *Chalara* anamorph with phialidic conidiogenous cell and cylindrical conidia..... *Calycina*
- 9 Apothecia stipitate to sessile, up to 0.5 mm diam., mostly whitish; ectal excipulum of textura prismatica; hairs short, uncinata *Hamatocanthoscypha*

Allophylaria (P. Karst.) P. Karst.

Type species: *Allophylaria subliciformis* P. Karst.

Lit.: Graddon 1977: 258 (*A. basalifusca*), Graddon 1980: 265 (*A. crystallifera*), Carpenter 1981: 17, Beyer 1998: 172 (*A. basalifusca*), Hansen & Knudsen 2000 : 135.

- 1 Asci amyloid 2
 1' Asci not amyloid 3
- 2 Apothecia up to 0.4 mm diam., shortly stalked, hymenium and receptacle greyish, stipe base blackish; asci 80-100 x10 µm, I+; spores 15-20x2.5-3.5 µm, OCI 2-3; paraphyse tips with refractive content, purplish red in MLZ; sapro-phytic on the underside of leaves of *Alnus*, *Quercus*, *Salix* sp.; phen.: VIII-XI (CH, UK)
 • **Allophylaria basalifusca** Graddon (1977)
 Ill.: Graddon 1977: fig. 4, Beyer 1998: Abb. 16.
- 2' Apothecia 0.2-0.35 mm diam.; asci up to 125x13 µm, amyloid, without croziers; spores navicular, 18-27x(5.5)6-6.5 µm, OCI 5; saprobic on stems of *Chamerion angustifolium*, *E. hirsutum* and twigs of *Fraxinus*, *Ulex europaeus*; phen.: V, IX-X • **Allophylaria macrospora** (Kirschst.) Nannf. (1932)
 Ill.: Graddon 1979: fig. 1.
- 2" Apothecia up to 0.5 mm diam., greyish white, shortly stalked; asci 80x8 µm, I+; spores 12-16x3-3.5 µm, 0(1)-septate; saprobic on naked wood of *Acer campestre*; phen.: II **Allophylaria crystallifera** Graddon (1980)
- 3 Asci IKI- 4
 3' Asci hemiamyloid 5
- 4 Apothecia without crystals; asci with croziers, IKI-; spores 11.5-15x2.5-3.5µm, OCI 5, with mucous coating; saprobic on petioles of *Athyrium filix-femina*, *Dryopteris canthusiana*, *D. dilatata*, *D. filix-mas*, *Pteridium aquila*; phen.: VIII-XII
 • **Allophylaria campanuliformis** (Fuckel) Svrček (1989)
 Ill.: Böhler 1974: fig. 4.
- 4 Apothecia with crystals; asci without croziers; spores elongated ellipsoid, 12.5-16x4-5 µm; saprobic on leaves of *Acer pseudoplatanus*; phen.: X • **Allophylaria "inamyloidea"** Baral sp. prov.
- 5 Spores up to 12 µm 6
 5' Spores longer 7
- 6 Spores 7-10x2-2.3 µm, 0-1-septate, OCI 2; ectal excipulum of textura oblita; saprobic on leaves of *Carex* sp.; phen.: IX
 **Allophylaria "Vaseneés"** Baral sp. prov.
- 6' Spores 9-11x4.5-6 µm, aseptate, OCI 2; ectal excipulum of textura prismatica; saprobic on leaves of *Quercus petraea*; phen.: XI **Allophylaria "parvispora"** Baral sp. prov.
- 7 Spores 12-20x3-4.7 µm, OCI 2-3, 1-septate; asci 70-83x10.5-11 µm, IKI red; saprobic on petioles of *Dryopteris filix-mas*, *Pteridium aquila*; phen.: XII-I **Allophylaria "pteridiphila"** Baral sp. prov.
- 7' Spores in mature asci one-celled 8
- 8 Asci with croziers; spores 17-27.5x4-7 µm, 1-3-septate in age, sometimes forming chalara-like phialides on the spores ; saprobic on herbaceous stems (*Artemisia*, *Mellilotus*, *Oenothera*, *Solidago*); phen.: X-I (BE/F, ES, DE)
 • **Allophylaria subliciformis** P. Karst. (1870)
 Ill.: Martinez-Gil & Baral 2018: fig. 1-
- 8' Spores up to 22 µm long 9

- 9 Spores with OCI 1-3; foliicolous 10
 9' Spores with OCI 4.5-5; caulicolous, culmicolous 13
- 10 Spores with OCI 1-1.5; asci with croziers; ectal excipulum of textura oblita; foliicolous..... 11
 10' Spores with OCI 2-3; asci without croziers (still to check for *A. zenobiae*); ectal excipulum of textura prismatica 12
- 11 Spores with pointed ends, 14-21x4-5 µm, with and easily losing coating; apothecia 0.3-1.5 mm; saprobic on leaves of *Acer platanoides*, *Acer pseudoplatanus*, *Aesculus hippocastanum*, *Fraxinus excelsior*, *Sorbus aria*; phen.: IX-XII
 • **Allophylaria subhyalina** (Rehm) Baral (1985)
- 11' Spores with +/- blunt ends, 11.5-16.5x4-5.5 µm; apothecia 0.2-0.6 mm; saprobic on leaves of *Acer campestre*, *Acer pseudoplatanus*, *Aesculus hippocastanum*, *Alnus incana*, *Carpinus betulus*, *Fraxinus excelsior*, *Populus canadensis*, *Populus tremula*, *Quercus* sp.; phen.: X-XII • **Allophylaria nericola** (Velen.) Baral (1992)
 Ill.: Breitenbach & Kränzlin 1981: pl. 187 (sub *Hymenoscyphus immutabilis*)
- 12 Spores 13-22x5.3-7 µm; saprobic on leaves of *Salix caprea*; phen.: X **Allophylaria "Salix"** Baral sp. prov.
 12' Spores 14.5-20x4-5 µm, OCI 2; saprobic on *Alnus incana*; phen.: X-XII **Allophylaria zenobiae**
- 13 Ectal excipulum of textura prismatica; spores 15.5-18.5x4.5-5.5 µm, 1-septate in age; saprobic on stem of *Athyrium filix-femina*; phen.: IX **Allophylaria "Grosplane"** Baral sp. prov.
 13' Ectal excipulum of textura oblita; spores 13.5-22x3-5 µm, 1-septate in age, OCI 3-4, with inconspicuous mucous coating; asci with croziers; saprobic on stems of *Angelica*, *Carex acutiformis*, *Eupatorium cannabinum*, *Fallopia*, *Filipendula*, *Lycopus*, *Mentha*, *Schoenoplectus lacustris*, *Scirpus sylvaticus*, *Solidago*; phen.: IX-XI (BE/F, CH)
 • **Allophylaria byssacea** P. Karst. (1885)
 On *Filipendula*; phen.: IX **Allophylaria clavuliformis** (P. Karst.) P. Karst. (1870)

Antinoia Velen.

Type species: *Antinoia acuum* Velen. = *Pezizella puOCIhella* Fuckel

Lit.: Velenovsky 1934: 214, Dennis 1956 (sub *Phialea advenula* & *P. strobilina*), Baral (unpublished key), Engel & Hanff 1986: 23.

- 1 Spores aseptate; asci up to 40 µm long 2
 1' Spores 1(2)-septate; asci more than 60 µm long 6
- 2 Spores up to 4.5 µm long 3
 2' Spores longer 4
- 3 Apothecia white, with long slender black stalk; asci 15-21x2.5-3.6 µm, I+, without croziers; spores 3-4.7x0.5-1 µm, OCI 0; saprobic on needles of *Abies*, *Picea abies*, *Juniperus communis*; phen.: (X)I-III.....
 **Antinoia juniperinella** (P. Karst.) Velen. (1934)
- 3' Apothecia 0.5-1 mm diam., strongly convex, chalky white including slender stalk; asci and spores as in *A. juniperinella*, but asci with croziers; saprobic on needles of *Picea abies*; phen.: I **Antinoia albipes** Baral nom. prov.
- 4 Apothecia 0.3 mm diam., stalked, fully white; asci IKI+, with croziers; spores narrowly ellipsoid, 7-10x3-4 µm, biguttulate; saprobic on needles of *Larix*; phen.: V-VI **"Phialea" advenula** (W. Phillips) Sacc (1889)
 Ill.: Dennis 1956: fig. 96.
- 4' Spores not ellipsoid 5
- 5 Apothecia 0.5-1 mm diam., disk flat to strongly convex, white, stalk mostly basally with yellow-brown pigment; asci 26-38 x4.3-4.8 µm, I+, without croziers; spores fusiform, 5-8.5x1.4-1.6 µm, OCI 1; paraphyses with slightly refractive vacuoles; saprobic on needles of *Picea abies*, *Pinus*; phen.: IX-XI **"Phialea" puOCIhella** (Fuckel) Sacc. (1889)
- 5' Apothecia 0.2-0.9 mm diam., strongly convex, hymenium cream to olivaceous blue, stipe cream; asci 20-30 x4-5 µm, IKI+, with croziers; spores clavate, 4.5-7x1.7-2(2.5) µm, OCI 2-3; hymenial gel hemiamyloid; saprobic on rotten wood and bark of *Abies alba*, *Picea*; phen.: I-III **Antinoia buissonii** (Grelet) Baral comb. nov.
 Ill.: Tanchaud 2015: 7.
- 6 Apothecia 1 mm diam., grey, with blackish stalk; asci 60-120x6-7 µm, IKI blue, with croziers; spores 12-17x2-3(-3.5) µm, 1-septate, OCI 0; ectal excipulum of textura oblita. Asexual morph *Chalara strobilina* with conidiophores up to 130 µm, 3-10-septate; phialides usually with 5-12 µm long and (3.5)4(4.5) µm wide venter and sharp delimitation of the collarette, total length 18-35 µm; conidia catenate, cylindrical, 3-5x1.0-1.5 µm. Conicolous (*Picea*); phen.: X-XII(II-V) (DE, FR, GB, IT) **Antinoia strobilina** (Fr.) Velen. (1934)
 Ill.: Dennis 1956: fig. 29 (sub *Phialea strobilina*), Gams & Philippi 1992: fig. 1*.
 May be an *Allophylaria* according to Baral (in litt.).

6' Apothecia 0.2-0.5 mm diam., cupulate, with short blackish stipe; asci 90-120x8.5-9.5 µm, IKI blue, with croziers; spores 23.5-26.5x2.3-2.6 µm, OCI 2.5, 1(3)-septate; ectal excipulum of textura oblita; anamorph *Mirambola mirabilis* discoid, with long teeth; saprobic on needles and branches of *Pinus sylvestris*; phen.: IX-X
 "**Phialea**" **fumosella** (Cooke & Ellis) Sacc. (1889)

Calycellina Höhn.

Type species: *Calycellina punctiformis* (Grev.) Höhn.

Syn.: *Molisiella* Boud., *Phialina* Höhn., *Phialoscypha* Svrček, *Scutoscypha* Graddon, *Setoscypha* Velen..

Lit.: Baral (CD-key), Graddon 1980: 268 (sub *Scutoscypha fagi*), Engel & Hanff 1987 : 53 (*C. spiraea*), Baral 1989: 209, Holm & Nannfeldt 1992b: 12 (*Phialina puberula* var. *epilobii*), Baral 1993: 3, Beyer 1995: 8 (*C. ochracea*), Galán & Raitviir 1995 : 33 (sub *Phialina carpinea*), Huhtinen & Scheuer 1995 : 1 (sub *Phialina separabilis*).

- 1 Asci mainly 4-spored, whereby 4 spores degenerated (their mucous sheath remains present in living asci); spores aseptate, 11.5-21 µm long; hairs with whip-like apex 2
- 1 Asci 8-spored 7

- 2 Spores with OCI low (1-1.5); apothecia white or yellow; foliicolous 3
- 2' Spores with very high OCI (5); apothecia always ±yellow 4

- 3 Apothecia 0.1-0.5 mm diam., white to yellowish; asci 35-45x7-8 µm, with croziers; spores ±scutuloid, *15-19x(2.5)3-3.2(3.5) µm, overmature spores sometimes 1-septate, with a few minute guttules; foliicolous (*Acer*, *Alnus*, *Betula*, *Fagus*, *Populus*, *Quercus*, *Salix* and *Tilia*); phen.: VIII-XII (BE/F) • **Calycellina lachnobrachya** (Desm.) Baral (1985)
 Ill. Baral 1989: Taf. 4 A-F.
- 3' Apothecia 0.2-0.5 mm diam., bright yellow when fresh; asci 32-38x5.8-6.5 µm, with croziers; spores ±scutuloid, *13.5-18(18.5)x2-2.5(3) µm, with a few minute guttules; foliicolous (*Alnus viridis*, *Betula*); phen.: VIII-XII (BE/F)
 • **Calycellina araneocincta** (W. Phillips) Baral & Blank (1989)
 Ill. Baral 1989: Taf. 4 G-L, 5 F.

- 4 Spores more than 2.5 µm wide 5
- 4' Spores 2-2.5 µm wide, slightly fusiform 6

- 5 Asci 45-69x9.5-11.5µm; spores ±cylindric, *13.5-16(17)x4-4.8µm, OCI 5; hairs inconspicuous; foliicolous (*Rhododendron ferruginosum*, *Rhododendron hirsutum*); subalpine; phen.: VIII-IX
 **Calycellina lutea** (Raschle) Baral & Blank (1989)
 Ill. Baral 1989: Taf. 3 A-F.
- 5' Apothecia yellow; asci 30-40x6.3-6.8µm, IKI+, with croziers; spores fusiform, *11.5-15.5(16)x2.5-3 µm, OCI 5; hairs conspicuous; saprobic on ferns (*Pteridium aquila*, *Dryopteris dilatata*); phen.: V-XI
 • **Calycellina flaveola** (Cooke) Baral & Blank (1989)
 Ill. Böhler 1974: fig. 7, Baral 1989: Taf. 3 G-L.

- 6 Apothecia sulphur yellow, subsessile, ectal excipulum of textura oblita; spores ±scutuloid, *12-15x2-2.5 µm, OCI 5; hairs 18.5-45x3-5 µm, 1-2-septate; caulicolous (*Filipendula*); phen.: IV-X • **Calycellina ulmariae** (Lasch) Korf (1982)
 Ill. Baral 1989: Taf. 1 & 2.
- 6' Apothecia pale ochraceous yellow, conspicuously stipitate, 0.2-0.3(0.5) mm diam.; ectal excipulum of textura prismatica; spores *14-18(20)x2-2.2 µm, OCI 5; hairs 40-80 µm long; foliicolous (*Vaccinium uliginosum*); phen.: VIII-IX (CH,FR)
 **Calycellina "vaccinii"** Baral nom. prov.

- 7 Asci 8-spored with 4 spores constantly smaller; larger spores 6.8-8.8x2.7-3.4 µm, aseptate; hairs incrustated, 7-15x3 µm
 "**Pezizella**" **junipericola** Svrček (1985) [1984]
- 7' Asci 8-spored, spores ± equally large, but lowest spores mostly longer 8

- 8 Spores septate 9
- 8' Spores mainly aseptate in turgescens asci 13

- 9 Apothecia pale ochraceous white, subsessile, 0.4-1.3 mm diam.; asci 80-108x9-10 µm, IKI blue, with croziers; spores 18-29x2.3-3 µm, 1(3)-septate, OCI 1; ectal excipulum of textura angularis; saprobic on cupules of *Aesculus hippocastanum*; phen.: X • **Calycellina "aesculi"** Baral nom. prov.
- 9' Spores max. 13-20 µm long 10

- 10 Spores 7-15x2.4-3.2 µm long, 1-septate, OCI 1-2; asci 65-80x7-8 µm, IKI blue, with croziers; paraphyse vacuoles strongly refractive; ectal excipulum of textura ±angularis; foliicolous (*Castanea*, *Fagus*, *Quercus robur*, *Q. rubra*, *Q. petraea*); phen.: VI-X • **Calycellina "septispora"** Baral nom. prov.
 ?= **C. rivelinensis** Dennis
- 10' Spores longer, OCI 2-5 11

- 11 Apothecia up to 0.8 mm diam., shortly stalked, yellow; asci 80-100x9-10 µm, I+; spores 15-20(22)x2.5-3 µm, overmature spores 3-septate, OCI 3; saprobic on twigs in very damp places (*Populus*, *Vaccinium uliginosum*); phen.: I-VIII
 ○ **Calycellina ochracea** (Grelet & Croz.) Dennis (1962)
 Ill.: Ellis & Ellis 1985: fig. 6, Beyer 1995: Abb. II/8.
- 11' Spores wider 12
- 12 Spores 12.5-17x4.3-5.8 µm, OCI 5; asci IKI strongly bb, with croziers, with conspicuous periascus; hymenium pale yellow; apothecia sessile; corticolous (conifers) **Calycellina "Breitenbach"** Baral nom. prov.
- 12' Spores 13-20x3.3-4.5 µm, 1-septate, OCI 3.5-4.5, forming many conidia when old; asci without croziers, IKI strongly r(b); apothecia white, shortly stalked; lignicolous (*Salix*); phen.: X (●) **Calycellina "subparilis"** Baral nom. prov.
- 12" Apothecia 0.,3-0.5 mm diam., whitish, sessile, margin with *Phialina*-type hairs; asci IKI+, with croziers; spores 17-24x3.5-4,5 µm, 3-septate, OCI 4-5; vacuoles in paraphyses and ectal excipulum coloring intensely in crezyl blue; lignicolous/foliicolous (*Quercus ilex*); phen.: I (ES,FR) .. **Calycellina albida** (Grelet & Croz) R. Galan & Moreno (1985)
- 13 Asci without croziers 14
- 13 Asci with croziers ("viridis", dilutelloides, angustispora, galbula & fagiseda still to check) 15
- 14 Apothecia up to 90 µm diam.; asci 35x8 µm, I+, without croziers; spores 4-6.5x2 µm; saprobic on leaves of *Quercus*; phen.: XII **Calycellina myriadea** (Mouton) Huhtinen (1990) [1989]
 Ill.: Graddon 1979: fig. 3 (sub *Phialina parenchymatosa*).
- 14' Asci 45-47x6 µm, without croziers; spores 7.5-9.5x2-2.5 µm, aseptate, OCI 0; hairs slightly tapered; phen.: XI
 see *Mollisia "deuncinata"*
- 15 Hairs granulate 16
- 15' Hairs smooth or absent 19
- 16 Apothecia 0.2-0.4(0.8) mm diam., narrowly sessile; hairs flexuous, 30-100x3-4 µm, 1-3-septate; asci 42-72x6.5-7 µm, IKI blue, with croziers; spores 14-19x2.3-2.6 µm, OCI 3; foliicolous (*Alnus glutinosa*, *Carpinus betulus*); phen.: (VIII)IX-XI
 "**Phialina**" **carpinacea** (Velen.) Raitv. & Galán (1992)
 Ill.: Huhtinen 1993: fig. 6.
- 16' Hairs cylindrical-clavate.12-22 µm long 17
- 17 Apothecia 0.1-0.25 mm; asci 25-32x4.5µm; spores 3-4x1.5-2 µm, OCI 1; lignicolous "**Phialea**" **galbula** P. Karst. (1889)
- 17' Spores OCI 4-5 18
- 18 Apothecia 0.5 mm diam., shortly stalked, whitish, reddening; asci 45-60x6-7 µm, IKI blue; spores 8-10.5x2.5-4 µm, ?biguttulate with minute ones; paraphyses with partially granulate apex; lignicolous (*Abies alba*); phen.: VIII (vgl. "*Hymenoscyphus*" *resinae-piceae* in Svrček); phen.: X..... "**Cystopezizella**" **sanguinea** (Velen.) Svrček (1985) [1984]
- 18'. Apothecia with ?long stalk; spores 6.4-8x3-3.4 µm, OCI 4-5; saprobic on bud scales
 **Calycellina "subgemmarum"** Baral nom. prov.
- 19 Spores slender, scutuloid-like (frequently with small head and neck), OCI 2-4, 11-22 µm long; paraphyse apices with strongly refractive vacuoles 20
- 19' Spores not scutuloid-like 23
- 20 Spores more than 2.5 µm wide 21
- 20' Spores 1.8-2.4 µm wide; ectal excipulum of textura prismatica 22
- 21 Apothecia 0.4 mm diam., white to yellowish, base with a brown ring; asci 45-61x7-8.5 µm, I+; spores 8-11x2.5-4 µm; ectal excipulum of textura prismatica with slightly thickened walls; foliicolous (*Betula pendula*); phen.: IX
 **Calycellina dennisii** Raschle (1979) [1978]
 Ill.: Raschle 1978: Abb.4.
- 21' Apothecia 0.2-0.5 mm diam., white to yellowish; outside hairless; spores 13-15x2.5-3 µm, OCI (0)1(2); ectal excipulum of textura prismatica with strongly thickened walls; saprobic on lower side of skeletonised leaves (*Betula*, *Quercus*); phen.: (VII)IX-X (BE/F, BE/W) ● **Calycellina leucella** (P. Karst.) Dennis ex E. Müll. (1977)
- 22 Apothecia whitish, 0.15-0.35 mm diam., with circular brown scutum remaining laterally attached; covering cells and often paraphyse apices with 1-3 protrudings (like in *Mollisia*); spores 12-17x1.7-2.4 µm, OCI 4, 0(1)-septate; saprobic on unskeletonised leaves (*Acer*, *Fagus*, *Quercus*); phen.: VIII-X (BE/F, BE/W)
 ● **Calycellina fagina** (Ant. Schmidt & Arendh.) Baral (1985)
 Ill.: Graddon 1980: fig.7, Engel & Hanff 1987: p. 69.
- 22' Apothecia conspicuously bright yellow, 0.3-1 mm diam., outside with cylindric hairs; asci 56-69x6.5-9 µm, IKI blue; spores 14-18x1.5-2 µm, OCI 1-2; saprobic on leaves (*Fagus*, *Quercus petraea*, *Quercus robur*); phen.: VIII-X(XI)
 ● **Calycellina punctata** (Fr.) Lowen & Dumont (1984)

23 Spores OCI >2	24
23' Spores OCI max. 2	30
24 Spores more than 11 µm long	25
24' Spores max. 11 µm long, OCI min. 3; paraphyses with strongly refractive vacuoles	26
25 Apothecia 0.2-0.5 mm diam.; spores ±cylindric, 14-18x2.5-3.5 µm, OCI >2; paraphyses with slightly refractive vacuoles; foliicolous (<i>Betula</i> , <i>Quercus robur</i> , <i>Quercus rubra</i>); phen.: IX-XI ... • Calycellina rubescens (Mouton) Van Vooren (2005)	
25' Apothecia mostly in swarms, 1-1.2 mm diam., disc white to pale orange-yellow, shortly stalked, receptacle minutely downy, reddening when touched; asci 68-105x7.3-10.5 µm, IKI+, with croziers; spores 12-16.5x2.5-3.7(4) µm, 0(1)-septate, OCI 2-3; saprobic on canes of <i>Rubus idaeus</i> , seldomly on <i>R. fruticosus</i> ; phen.: VII-IX (BE/F, BE/W)	26
..... • Calycellina separabilis (P. Karst.) Baral (2020)	
..... Ill.: Huhtinen & Scheuer 1995: fig. 1-5.	
26 Asci min. (8)9-11 µm wide; spores CRB ??	27
26' Asci 7-8.5 µm wide; spores CRB violet, OCI 3-4	29
27 Apothecia up to 0.3 mm diam., hyaline; asci 34-50x9-11 µm, I+; spores ellipsoid, 7.3-9x3.9-4.2 µm, OCI 4.5; saprobic on leaves (lower side) of <i>Filipendula</i> ; phen.: V-VI	28
..... Calycellina spiraeae (Roberge ex Desm.) Dennis (1964)	
..... Ill.: Engel & Hanff 1987: p. 53.	
27' Spores more than 9 µm long	28
28 Apothecia bright green; asci 13-14µm wide, spores dumbbell-shaped, 11-12x4 µm, OCI 4.5; acicolous	
..... Calycellina "viridis" Baral nom. prov.	
28' Apothecia 0.2-0.4 mm, (sub)sessile, white; asci 50-88x7.5-9.5 µm, IKI bb, with croziers; spores 9-14x3-4 µm, 0(1)-septate, OCI 3; marginal hairs tapering, 15-34(60)x2-3 µm; saprobic on leaves of <i>Acer</i> , <i>Betula</i> , <i>Castanea</i> , <i>Fagus</i> , <i>Quercus</i> , <i>Rubus fruticosus</i> ; phen.: IX-XI(II) (BE/F)	29
..... • Calycellina pseudopuberula (Graddon) Baral 1993	
29 Apothecia 0.3-0.6 mm diam., subsessile; spores 8.5-11x3.5-4.5 µm, wall violet in CRB; saprobic on cupule of <i>Castanea sativa</i> ; phen.: ?	30
..... Calycina "castaneicola" Baral nom. prov.	
..... = ? Calycellina castanea (Sacc.&Ellis) Dennis (1964)	
29' Apothecia 0.7-1.5 mm wide, shortly stipitate; asci 60-85x7-8.5 µm, IKI bb, with croziers; spores 9-13.2x2.5-4 µm, wall violet in CRB, OCI 3; hairs cylindrical; saprobic on cones of <i>Alnus</i> ; phen.: (IX-I)II-IV(V) (BE/F)	31
..... • Calycellinaalniella (Nyl.) Baral (1993)	
..... Ill.: Boudier 1904-1910: pl. 437, Breitenbach & Kränzlin 19881: Pl. 194.	
30 Spores min. 3 µm wide; asci IKI bb (<i>P. epithallina</i> to check)	31
30' Spores max. 2.5-3 µm wide; asci IKI bb, seldomly (r)b.....	34
31 Paraphyses with cylindrical vacuoles; ectal excipulum a textura oblita (<i>C. dilutelloides</i> to check)	32
31' Ectal excipulum otherwise	33
32 Hairs 30-40x5-7 µm, apex slightly narrower, basally with gel coating; apothecia 0.2-0.4 mm diam.; asci 80-105x8-9 µm, IKI+, with croziers; spores 11-14x3.2-3.8 µm, OCI 2, aseptate; saprobic on leaves of <i>Salix caprea</i> ; phen.: X	32
..... Calycellina "haarig" Baral nom. prov.	
32' Hairs ?much shorter; spores 12x3.5 µm, OCI 0, aseptate; on leaves of <i>Robinia pseudoacacia</i> ; phen.: VIII-IX	33
..... "Pezizella" dilutelloides Rehm (1891)	
33 Apothecia 0.3-0.6 mm diam.; hairs 12-14x7-9 µm, capitate-clavate; ectal excipulum of textura prismatica; spores ±ovoid, 9-12x3.3-4.7 µm, OCI 1, aseptate; paraphyses with guttulate vacuoles; saprobic on leaves of <i>Alnus viridis</i> ; phen.: IX	33
..... Calycellina "alni-viridis" Baral nom. prov.	
33' Apothecia 0.2-0.4 mm diam., very pale to dark orange; ectal excipulum a textura globulosa-angularis; asci 63-105x10-15 µm; spores elongate ellipsoid, 10-14x4-7 µm, 0(1)-septate; on thalli of <i>Peltigera</i> spp.; phen.: X	34
..... "Pezizella" epithallina (W. Phillips & Plowr.) Sacc.	
34 Apothecia substipitate, 0.5 mm diam., pale; asci 25-35x4 µm, I+; spores elongated clavate, 4-7x1 µm; saprobic on decaying leaves of <i>Carex elata</i> , <i>Carex riparia</i> ; phen.: VIII-XI	34
..... Calycellina caricina Dennis (1971)	
..... Ill.: Dennis 1971: fig. 21.	
34' Apothecia sessile; paraphyse vacuoles median to strongly refractive	35
35 Apothecia 0.2-0.4 mm diam., white; marginal end cells clavate, 10-20x5 µm; asci 26-37x6-7 µm, IKI+, with croziers; spores cylindrical, 7-8(10)x2 µm, OCI ?1. On lower surface of fallen leaves of <i>Salix caprea</i> . Phen.: III (BE/F)	35
..... • Calycellina indumenticola Graddon (1974)	
..... Ill.: Graddon 1974: fig. 5.	

35' Marginal end cells otherwise	37
37 Apothecia 0.1-0.2 mm diam., sessile, whitish-cream; spores 7-9x2 µm, OCI 0; paraphyse vacuoles as one guttule in apex; foliicolous (<i>Salix</i>); phen.: V-VI	"Phialina" rosae Raitv.(1969)
37' Paraphyse vacuoles lower; apothecia 0.2-1 mm diam.	38
38 Apothecia translucent white to greenish; asci 35-55x4-5 µm, IKI+, with croziers; spores cylindrical-allantoid, 4.5-9x0.8-1.4 µm; ectal excipulum of textura oblita; saprobic on on dead stems of <i>Melissa officinalis</i> , <i>Polygonum sachalinense</i> , <i>Reynautria japonica</i> , <i>Sambucus ebulus</i> , <i>Teucrium scorodonia</i> ; phen.: IX-XI (BE/F) .....	..... • Calycellina chlorinella (Ces.) Dennis (1975)
38' Ectal excipulum basally of textura angularis	39
39 Apothecia 0.2-0.6 mm diam., white, reddening, sessile; asci 35-42x4.5-5.5 µm, IKI+, with croziers; spores 4.5-7x2-2.8 µm, OCI 1; ectal excipulum of textura angularis; conicolous; phen.: II .....	..... • "Mollisia" conigena (Pers.) Boud. (1907) III.: Boudier 1905-1910: pl. 545.
39' Apothecia cupulate, 0.2-0.3 mm diam., translucent greyish, sessile; asci 20-27x4.5-5 µm, I+, spores narrowly clavate, 5-6.5x1.2-1.7 µm, eguttulate; saprobic on needles of <i>Juniperus communis</i> ; phen.: V .....	..... Calycellina juniperina (K. Holm & L. Holm) Spooner (1984) III.: Kirk & Spooner 1984: fig. 3A.
asci 8-spored, 40-50x5-6.5 µm; saprobic on stems of <i>Chamerion angustifolium</i> ; phen.: IX .....	..... "Phialina" puberula (Lasch) Dennis var. epilobii Raitv. (1992)

Calycina Nees ex Gray

Syn.: *Carneopezizella* Svrček, *Gemmina* Raitv., ?*Malotium* Velen., *Parthenope* Velen., *Pezizella* Fuckel, *Septopezizella* Svrček, ?*Weinmannioscyphus* Svrček

Type species: *Calycina herbarum* (Pers.) Gray

Lit.: Ellis M. 1971: 507 (*Chalara*), Baral & Kriegjsteiner 1985: 55, Holm & Nannfeldt 1990a: 7 (*Carneopezizella salicicola*), Baral (unpublished key), **Van Vooren 2005: ? (*C. turgidula*)**, Koukol 2011: Baral & al. (2013): ?(*C. citrina*, etc.)

Key to the sexual morphs:

1 Spores septate	2
1' Spores mostly aseptate	18
2 Asci IKI rr/rb or IKI-	3
2 Asci IKI bb.....	10
3 Asci IKI rr/rb	4
3' Asci IKI-	7
4 Spores building conidia	5
4' Spores never building conidia	6
5 Apothecia 0.7-3.5 mm diam.; asci IKI rb, with croziers; spores 10-18x2.4-3.3 µm, 1-septate, OCI 2-4, LBs medium large: 0.5-1.8(2.1) µm, building conidia 4.5-7x1.3-1.7 µm; herbicolous; phen.: VII-XI Calycina "subherbarum" Baral nom. prov.	
5' Apothecia 0.4-1.2 mm diam.; asci IKI rb, without croziers; spores 13-18x2.5-3.5 µm, 1-septate, OCI 4-5, LBs 1.5-2.5 µm, bilding ascoconidia; herbicolous; phen.: VIII-I (BE/F) .....	..... • Calycina herbarum (Pers.) Gray (1821)
6 Apothecia 0.3-0.8 mm diam., white; asci IKI reddish; spores slightly curved, *17-26x4-4.5 µm.1-3-septate, with large guttules, OCI 4; hairs clavate, 18x6 µm; saprobic on wood of <i>Aesculus</i> , <i>Quercus</i> , <i>Salix</i> , <i>Tilia</i> ; phen.: XI-II (DE, FR) .....	..... Calycina lactea (Sacc.) Baral, R. Galán & G. Platas (2013)
6' Apothecia 0.3-0.6(1) mm diam., shortly stipitate, white; asci IKI rb; spores 15-21x3.5-4.5 µm, 3-septate, OCI 2-3(4), with small polar appendages; up to 30 µm long tapering marginal hairs intermixed with paraphyses; associated with <i>Chalara</i> anamorph at apothecium base; saprobic on leaves of <i>Fagus</i> , <i>Quercus ilex</i> , <i>Buxus sempervirens</i> ; phen.: IX, II .....	..... Calycina sp.
7 Asci with croziers; apothecia white	8
7' Asci without croziers; apothecia yellow	9
8 Apothecia white, 0.3-0.5 mm diam.; asci IKI-, with croziers; spores 13-16.5x3.5-4µm, aseptate, OCI 4; with <i>Chalara</i> anamorph; saprobic on stems of <i>Meum anthamanticum</i> , <i>Sambucus ebulus</i> ; phen.: VI-X .....	..... Calycina drosodes (Rehm) Baral & Declercq (2013)

- 8' Apothecia 0.5-1 mm diam.; asci 65-95x7-8.5 µm, IKI-, with croziers; spores 10.5-16.5x2.8-3.7 µm, (0)1-septate, OCI 1.5-3; saprobic on leaves of *Alnus glutibosa*, *Castanea sativa*, *Fagus sylvestris*, *Platanus*, *Populusxcanadensis*, *Quercus robur*; phen.: (VII)IX-XI • **Calycina phyllophila** (Desm.) Baral (1985)
- 9 Apothecia sessile, 0.3-0.8 mm diam., sulphur yellow; asci 85-105x6-7 µm, IKI-, without croziers; spores 10.5-15.7x2.8-3.5 µm, 3-septate, multiguttulate, OCI 4; graminicolous (*Phalaris*, *Phragmites*); phen.: VI-XII • **Calycina scolochloae** (De Not.) Baral (2013)
- 9' Apothecia sessile, 0.5-1.5 mm diam., sulphur yellow; asci 75-95x5-7 µm, IKI-, without croziers; spores 7-12.5x2.4-3.2 µm, 1-septate, tetraguttulate, OCI 3; with *Chalara* anamorph; lignicolous, associated with old pyrenomycetes; phen.: I-XII • **Calycina claro** III.: Ellis & Ellis 1985: fig. 5.
- 10 Apothecia bright yellow (mainly due to carotinoid LBs in the subhymenium), 0.3-4 mm diam., stalk base frequently internally with blackish brown extracellular pigment 11
- 10' Apothecium colour otherwise 12
- 11 Asci 140-160x9.5-10.5 µm, IKI+, with croziers; spores 9-14x4-4.7 µm, OCI 3-4.5, 0(1)-septate, sometimes with ascoconidia; lignicolous (*Fagus*, *Tilia*); phen.: V,VIII-I • **Calycina citrina** (Hedw.) Gray (1821) III.: Ellis & Ellis 1985: fig. 3.
- 11' Asci 180-185x8.5-9 µm, with croziers; spores 12.5-18(22.5)x4.2-6.5 µm, overmature spores 1(2-3)-septate, ?always forming ascoconidia; lignicolous (*Alnus*, *Betula*); phen.: VIII-I • **"Bisporella" confluens** (Sacc.) Korf & Bujak. (1985)
- 12 Apothecia 0.5-1.3 mm diam.; asci 85-100x6.5-7 µm, IKI bb, with croziers; spores 6-10x2.4-2.7 µm, OCI 0.5, (0)1-septate, with many conidia when old; lignicolous **Calycina "Evi"** Baral nom. prov.
- 12' Spores never building conidia 14
- 14 Asci up to 80 µm long 15
- 14' Asci 80-120 µm long 16
- 15 Apothecia sessile; asci 57-64x6.5-6.9 µm, IKI bb, with croziers; spores 9-11.5x2.2-2.5 µm, 1-septate, OCI 2-4 ; lateral hairs cylindric, 22x2-3 µm, brown-walled; ectal excipulum of textura prismatica; graminicolous **Calycina "phalaricola"** Baral nom. prov.
- 15' Apothecia sessile to subsessile, 0.3-0.6 mm diam., white, strongly reddening; asci 70-80x6-7.5 µm, IKI bb, with croziers; spores fusiform, 8-13x2.5-3 µm, 1-septate, OCI 2; saprobic on canes of *Rubus fruticosus*, stems of *Chamerion angustifolium*, twig of *Fagus*, wood of *Quercus*; phen.: VII-XI • **Calycina heterospora** Baral nom. prov.
- 16 Apothecia sessile to substipitate, 0.3-1 mm diam., white; asci 80-120x5.5-7.2 µm, IKI bb, with croziers; spores 8-15x2-3.2 µm, 1-septate, OCI 1-2; paraphyse vacuoles slightly refractive, extracellular OCI between paraphyses; *Chalara* anamorph with small, aseptate conidia; saprobic on twigs of *Quercus robur* and *Carpinus*; phen.: VIII-I • **Calycina italica** (Sacc.) Baral (2005)
- 16' Apothecia stipitate 17
- 17 Apothecia stipitate, white; asci 80-112x6.2-6.5 µm, IKI (r)b, with croziers; spores straight to slightly curved, 7-15(17)x2.5-3.5 µm, 1-septate, OCI 1-4; paraphyse vacuoles medium refractive; *Chalara* anamorph with conidia 5.5-15x2-3 µm; lignicolous (*Citrus*); phen.: IX-I • **Calycina parilis** (P. Karst.) Kuntze (1898)
- 17' Apothecia 0.5-1.3 mm diam., long stipitate, outside hyaline; asci 78-105x8-9 µm, IKI bb, ?croziers; spores 10-18x3-3.5 µm long, 1-septate, OCI 2-5; foliicolous (*Fagus*); phen.: IX **Calycina "pseudophyllophila"** Baral nom. prov.
- 18 Asci IKI bb or IKI- 19
- 18' Asci IKI rr/rb 24
- 19 Asci 27-48 µm long 20
- 19' Asci 45-75 µm long 21
- 20 Apothecia gregarious, sessile, 0.15-0.3 mm diam., translucent white; asci 27-44x5.5-6.5 µm, IKI+, with croziers; spores 7.7-11.3x1.7-2.3 µm, 0(1)-septate, OCI 1; paraphyses with refractive VB's; saprobic on *Calamagrostis*, *Dactylis glomerata*; phen.: VI, X **Calycina turgidella** (P. Karst.) Van Vooren (2006)
- 20' Apothecia 0.5-1.7 mm diam. shortly stalked, white; asci 38-48x4.7-6.5 µm, IKI-, with croziers; spores slightly allantoid, 5-9x1.2-1.7 µm, OCI 1; paraphyse vacuoles weakly refractive; lignicolous (*Betula*, *Salix*, Rosaceae); phen.: X-I • **Calycina vulgaris** (Fr.) Baral (1989)
- 21 Apothecia stalked, hymenium yellowish; asci 52-70x4-6 µm, IKI+, with croziers; spores 6-9x1.4-1.6(2) µm, OCI 1; foliicolous (*Populus*, *Quercus*); phen.: IX-XI **Calycina subcitrina** (Velen.) Baral (2013)
- 21' Apothecia fully white 22

- 22 Apothecia 1 mm diam., about 1 mm high, stalked, white; asci 45-60x4-5 µm, I+, with croziers; spores 5-8x1-1.5 µm; paraphyses with no refractive vacuoles; ectal excipulum with hyaline exudates; saprobic on needles of *Picea abies*, *Pinus*; phen.: IX-XII(I-III) • **Calycina subtilis** (Fr.) Baral (1985)
 Ill.: Dennis 1956: fig. 52
- 22' Spores wider 23
- 23 Asci 55-65x4.5-5 µm, IKI+, with croziers; spores 5-8x1.5-2 µm, OCI 1.5; paraphyse vacuoles slightly refractive; caulicolous (*Filipendula*, *Rubus fruticosus*); phen.: X-XII • **Calycina "pseudodiscreta"** Baral nom. prov.
- 23' Apothecia whitish, sessile; ectal excipulum of textura prismatica; asci 50-80x7-12 µm, IKI+, with croziers; spores 9-12x2.5-3 µm, 0(1)-septate, OCI 1-2; foliicolous (*Acer pseudoplatanus*, *Betula*, *Populus nigra*, *P. tremula*, *Quercus*, *Salix caprea*, *Tilia*); phen.: VIII-X • **Calycina populina** (Fuckel) Kuntze (1898)
- 24 Apothecia subsessile; asci IKI rb, without croziers; spores 12.7-15.3x3.4-3.9 µm, OCI 4-4.5, aseptate;
 • **Calycina "separabiloides"** Baral nom. prov.
- 24' Spores up to 13 µm, OCI lower 25
- 25 Spores OCI 0(1) 26
- 25' Spores OCI >1 28
- 26 Apothecia 0.25-0.65 mm diam., pulvinate, translucent, light to bright yellowish-orange-ochraceous or pale to dark greyish-brownish-alutaceous. Asci *(50-)58-87(-96)x(6.5-)7-8.5(-9.7) µm, †(38-)43-60(-76)x(5.5-)6-7.5(-8) µm, (4-)8-spored, IKI hemiamyloid, arising from simple septa. Spores subcylindrical to subfusoid or ellipsoid, *(7-)8-13(-15)x(2.8-)3.3-4 (-4.5) µm, exceptionally *4-5.5 µm wide, †(5.5-)7-11(-12.5)x(2.5-)2.8-3.3 µm, OCI 0.5-1, 0(-1)-septate, hyaline. Paraphyses apically clavate and covered by gel, containing large globose VBs. Saprophytic on seaweed (*Fucales*). Phen.: I-XII (GB,NO) (•) **Calycina marina** (Boyd) Rämä & Baral (2015)
- 27 Apothecia 0.3-0.8 mm, subsessile; asci 50-64x5.2-5.4 µm, IKI red, without croziers; spores 5-8.5x1.9-2.4 µm, aseptate, OCI ?0; paraphyse vacuoles not refractive; saprobic on needles (*Pinus sylvestris*); phen.: IX-X
 ○ **"Pezizella" pulvinata** (P. Karst.) Kuntze (1891)
- 27' Apothecia 0.4-1 mm, reddening, sessile; asci 45-55x5.5-6 µm, IKI rr, with croziers; spores slightly fusiform, 6-9x1.5-2.5 µm, OCI 0; saprobic on cones of *Pinus sylvestris*; phen.: XI, II-V • **Calycina conorum** (Rehm) Baral (1985)
- 28 Apothecia 0.2-1 mm, subsessile to stipitate, not reddening; asci 45-60x4.5-5.5 µm, IKI red, with croziers; spores 6-13x1.2-2 µm, cylindric-allantoid, OCI 1.5-2; saprobic on stems of Gramineae (*Zea*), Cyperaceae (*Carex* spp., *Scirpus sylvaticus*, *Scirpus lacustris*), *Juncus*; phen.: IX-XI • **Calycina cruentata** (P. Karst.) Kuntze (1898)
- 28' Asci without croziers 29
- 29 Apothecia stipitate; asci 37-48x4.5-5 µm, IKI red, without croziers; spores 5-8.5x1.4-1.8 µm, aseptate, OCI 1.5-2; paraphyse vacuoles slightly refractive; caulicolous (*Alisma plantago*, *Fallopia japonica*, *Rubus idaeus*); phen.: IX-XII
 • **Calycina discreta** (P. Karst.) Kuntze (1891)
- 29' Apothecia shortly stalked, 0.5-1.2 mm diam.; asci 68-95x5.3-5.7 µm, IKI red, without croziers; spores elongated ellipsoid, 5.5-10.5x2-2.5 µm, aseptate, OCI 2-3.5 (biguttulate); lignicolous (*Acer*, *Alnus viridis*, *Betula*, *Fagus*); phen.: IX-XI **Calycina languida** (F)
- May belong here:
- 1 Apothecia 0.3-1 mm, white; asci 45-75x5.5-7 µm, 4-8-spored, IKI blue, with croziers; spores 6-9x2-2.8 µm, OCI 1; hairs clavate, 10-20x3-5 µm, 0-2-septate, coarsely granulate; saprobic on bud scales of *Populus x canadensis*, *Populus nigra*; phen.: (IX) X-IV(VI) (BE/F) • **Gemmina gemmarum** (Boud.) Raitv. (2004)
 Ill.: Rubio & al. 2010: p. 229.

Micropeziza Fuckel

Type species: *Micropeziza poae* Fuckel.

Syn.: *Actinoscypha* P. Karst, *Calloriella* Höhn., *Crustomollisia* Svrček, *Niesslella* Hohn.,

Lit.: Dennis 1978: 208 (sub *Mollisia cornea*), Svrček 1986: 204 (sub *Allophylaria soederholmii*), Beyer 1987: 186 & 187 (sub *Pezizella roburnea*), Engel 1988: 73 (sub *Allophylaria soederholmii*), Nauta & Spooner 1999b: 67 (sub *Crustomollisia roburnea*), Hansen & Knudsen 2000: 136 (sub *Allophylaria soederholmii*), Helleman & al. 2013: 129, Lindemann & al. 2014: 113.

- 1 Apothecia 0.4-0.8 mm diam., subsessile, brown to greenish brown; asci *85-110x9-10.5 µm, IKI-, without croziers; spores *12-16x3.5-4 µm, 0(1)-septate, hyaline; paraphyses with clavate to capitate apex; saprobic on stems of *Aster*, *Artemisia vulgaris*, *Aruncus silvestris*, *Hieracium umbellatum*, *Mentha Solidago canadensis*; phen.: IX-XI (BE/F, CH, NL).....
 • **Micropeziza umbrinella** (Desm.) Baral, Helleman & U. Lindemann (2013)
 Ill.: Svrček 1986: fig. 2 (sub *Allophylaria soederholmii*), Engel 1988: p. 83.
- 1' Asci with euamyloid ring, with croziers 2
- 2 Spores with OCI 1-3 3

- 2' Spores with OCI 4-5 4
- 3 Apothecia erumpent, hymenium brown, outer excipulum of pale brown textura angularis at the base covered by a yellow-brown to red-brown amorphous crust; asci 45-55x8-9 µm, I+, with croziers; spores ellipsoid, *(10)11-15(17)x3.3-4.3(4.8) µm, †10-13x2.5-3 µm, 0(1)-septate, OCI 1-2; paraphyses with brown contents; saprobic on leaves of *Quercus robur*, *Q. rubra*, *Q. ilex*; phen.: IX-X (GB)
 ○ **Micropeziza mollisioides** (Höhn.) Baral, Helleman & U. Lindemann (2013)
- 3' Apothecia up to 0.4 mm diam., sessile, hymenium orange brown with darker margin; asci up to 65x11 µm; spores 13.5-19x4-5 µm, 0(1)-septate, OCI 2-3; saprobic on leaves of *Quercus ilex*; phen.: V
 ● **Micropeziza castanea** (Sacc. & Ellis) Baral & Guy Garcia (2013)
- 4 Apothecia 0.1-0.4(0.5) mm diam., hymenium greyish brown with darker margin, with scutum; asci *57-80(90)x11-14 (16) µm, IKI bb; spores *12.5-15.5(16.5)x4.5-6 µm; on leaves of *Rhododendron tomentosum*; phen.: VII (FI).....
 **Micropeziza fenniae** U. Lindemann, Helleman & Pennanen (2014)
 III.: Lindemann & al. 2014: pl. 6-7.
- 4' Spores up to 4 µm diam. 5
- 5 Spores up to 12.5 µm long 6
- 5' Spores longer 7
- 6 Apothecia discoid, erumpent, 0.15-0.3 mm diam., hymenium yellowish-brown with darker margin; asci *(40)50-60x8.5-10 µm, IKI blue; spores ellipsoid-fusoid with obtuse ends, *(10)10.5-12.5x(2.7)3-3.5 µm, hyaline, smooth, non-septate, OCI 4; saprobic on basal part of fern rachis (*Athyrium filix-femina*, *Dryopteris dilatata*); phen.: IX-X
 **Micropeziza filicina** Helleman, U. Lindemann & Yeates (2013)
 III.: Helleman & al. 2013: pl.1-2.
- 6' Apothecia up to 0.2 mm diam., sessile, hymenium light brown with darker margin; asci *39-50x9.5-11 µm; spores *11-12.5x3-3.5 µm, OCI 4; saprobic on leaves of *Comarum palustre*; phen.: VI-VIII (DE,BE)
 **Micropeziza zottoi** Helleman, U. Lindemann, L.G. Krieglst., L. Bailly (2014)
 III.: Lindemann & al. 2014: pl. 8-9.
- 7 Apothecia up to 0.5 mm diam., sessile, with minutely dentate margin, hymenium and receptacle yellowish-brown, drying black; asci up to 85x7 µm; spores fusiform, 12-18x3-3.5 µm, 1-septate, with 4 guttules, OCI 4-5; saprobic on stems of *Carex paniculata*; phen.: II-III **Micropeziza cornea** (Berk. & Broome) Nannf. (1976)
- 7' Apothecia up to 0.4 mm diam., sessile, hymenium orange brown with darker smooth margin; asci *65-93x7.5-8.5 µm; spores fusiform, 10-19x2.5-3.5 µm, 0(1)-septate, OCI 4-5; saprobic on culms of *Calamagrostis canescens*, *Phalaris arundinacea*, mainly on the nodes; phen.: VI-VII(X) ● **Micropeziza karstenii** Nannf. (1976)
 Maybe not different from *M. cornea* according to Baral in Helleman & al. 2013.

Mollisina Höhn. ex Weese

Type species: *Mollisina rubi* (Rehm) Höhn.

Syn.: *Dendrotrichoscypha* Svrček

Lit.: Dennis 1949: 85; Arendholz 1979: 1, Baral (unpublished key).

- 1 Hairs simple, slightly narrowing, »30x2 µm, undulating; apothecia with brown basal ring; spores aseptate; asci without croziers **Calycellina "deuncinata"** Baral nom. prov.
- 1' Hairs branched/tree-like 2
- 2 Spores septate 3
- 2' Spores aseptate, max. 9 µm long; apothecia with max. 0.1 mm long stalk; ectal excipulum textura prismatica (?always) . 4
- 3 Apothecia 0.3-0.7 mm diam., with 0.25-0.4 mm long stalk, white, ectal excipulum textura oblita; asci 37-69x6-7 µm, IKI red, without croziers; spores 9-11x2.5-2.7 µm, 1-septate, OCI 3-4; saprobic on leaves of *Carex*, *Scirpus sylvaticus*; phen.: IX
 **Mollisina panici** Baral nom. prov.
- 3' Apothecia 0.15-0.35 mm diam., shortly stalked; asci 70-85x11-12 µm, IKI red, with croziers; spores 13-15x4-4.5 µm, 3-septate, OCI 3; saprobic on leaves of *Athyrium filix-femina*; phen.: IX **Mollisina "triseptata"** Baral nom. prov.
- 4 Asci with croziers; spores 9x2-2.5 µm, OCI 3.5 **Mollisina "uncinata"** Baral nom. prov.
- 4' Asci without croziers 5
- 5 Apothecia 0.1-0.3 mm diam., sessile, grey-white; ectal excipulum of textura globulosa; asci 35-45x4-6 µm, I+, without croziers; spores 4-6x2-2.5 µm, OCI 0; saprobic on leaves of *Aesculus hippocastanum*, *Quercus robur*; phen.: IX-XI
 **Mollisina globulosa** Arendh. (1979)
- 5' Asci not amyloid..... 6

- 6 Asci IKI- 7
 6' Asci IKI rr/rb; spores OCI 0-1 8
- 7 Asci 37-45x5.5-7 µm, IKI-, without croziers; spores 7.5x2.3-2.8 µm, OCI 0-1, 5; foliicolous (*Alnus*); phen.: VI.....
 **Mollisia "alni"** Baral nom. prov.
- 7' Apothecia 0.1-0.15 mm diam., shortly stalked; asci 30-41x6-6.5 µm, IKI-, without croziers; spores 5.5-8x1.5-2 µm, OCI 2-4; saprobic on leaves of *Phalaris arundinacea*, *Carex acutiformis*, *Carex gracilis*, *Juncus alopinio-articulatus*; phen.: VI-X
 **Mollisia echinulifera** Scheuer & Baral (1988)
 Ill.: Scheuer 1988: Taf.10.
- 8 Apothecia 0.3-0.5 mm diam., yellowish, with 0.03-0.1 mm long stalk; paraphyses with intense yellow vacuoles; asci 25-35x3.5-5 µm, without croziers; spores 4.2-6.8x1.4-2.1 µm; foliicolous (*Populus tremula*, *Populus nigra*); phen.: IX-X
 **Mollisia flava** Arendh. (1979)
- 8' Paraphyses hyaline; spores min. 2 µm wide 9
- 9 Apothecia 0.1-0.4 mm, sessile, white; asci 40-50x7-7.5 µm, IKI red, without croziers; spores 5.5-7.5x2.5-3.6 µm, OCI 0; foliicolous (*Acer pseudoplatanus*, *Corylus*, *Fagus sylvatica*, *Populus canadensis*, *Quercus*); phen.: IX-XI
 • **Mollisia acerina** (Mouton) Höhn. (1926)
- 9' Apothecia 0.2-0.4 mm diam., shortly stalked, grey-white; ectal excipulum of textura prismatica; asci 36-62x6-7.5, IKI red, without croziers; spores 5-6.5x2-3 µm, OCI 0-1; saprobic on stems of *Chamerion angustifolium*, *Rubus fruticosus*, leaves of *Rubus fruticosus*, *Filipendula ulmaria*; phen.: V-VI, XII • **Mollisia rubi** (Rehm) Höhn. (1926)
 Ill.: Dougoud 2011: p. 21.

Mollisia oedema (Desm.) Dennis, *Persoonia* 3(2): 355 (1964)

Phaeoscypha Spooner

Type species: *Phaeoscypha cladii* (Nag Raj & W.B. Kendr.) Spooner

Lit.: Graddon 1974: 481 (sub *Uncinia scintillans*), Kirk & Spooner 1984: 574.

- 1 Apothecia cup-shaped, up to 0.4 mm diam., disc ochraceous, sessile, receptacle covered by brown hairs; asci 50-70x11-15 µm, I+; spores 15-19x3-5.5 µm, 1-septate, becoming pale brown; hairs 45-90x3-4.5 µm, septate, with curved tip; saprobic on leaves of *Carex pendula*, *Cladium mariscus*; phen.: XII-I(V)
 **Phaeoscypha cladii** (Nag Raj & W.B. Kendr.) Spooner (1984)

Psilachnum Höhn.

Type species: *Psilachnum lateritioalbum* (P. Karst.) Höhn.

Lit.: Müller 1968: 147 (*P. alpestre*), Dennis 1971: 358 (sub *Microscypha ellisii*), Graddon 1977: 264 (*P. pteridigenum*), Baral & Krieglsteiner 1985: 86, Baral (unpublished key), Beyer 1991: 157 (*P. micaceum*), Hansen & Knudsen 2000: 207.

- 1 Paraphyses lanceolate, mostly strongly protruding (10-20 µm); hairs 30-90 µm long, 1-7-septate; spores 6-12 µm long ... 2
 1' Paraphyses cylindric to sublanceolate, not or slightly protruding; hairs 0-50 µm long, 0(?-2)-septate 7
- 2 Hairs 60-90 µm long, ±lanceolate, 4-9-septate; asci with croziers
 "**Albotricha**" **washingtonensis** (Dennis) Raitv. (1970) var. **schoenoplecti**
- 2' Hairs 30-70 µm long, 1-6-septate 3
- 3 Apothecia 0.1-0.2 mm diam., substipitate, white to cream; asci 32-40x4-5 µm; spores cylindric to clavate, 6-8x1.5-2 µm; paraphyses bluntly lanceolate, 3-5 µm wide, 5-20 µm exceeding the asci; hairs 40-60x2-3 µm, 1-2-septate; saprobic on leaves of Cyperaceae (*Carex paniculata*); phen.: VII **Psilachnum lateritioalbum** (P. Karst.) Höhn. (1926)
- 3' Spores longer (*P. auranticolor* to check) 4
- 4 Asci without croziers; spores 7-11x1.5-4 µm, OCI 0-1; hairs at the apex strongly narrowed, 2-6-septate; saprobic on *Luzula*; phen.: VI..... **Psilachnum "Hohneck"** Baral nom. prov.
- 4' Asci with croziers 5
- 5 Apothecia 0.1-0.2 mm diam., subsessile, whitish; asci 50-55x8 µm; spores ellipsoid to cylindric, 10-15x3-4 µm; paraphyses 4-5 µm wide, up to 10 µm exceeding the asci; hairs to 50x3-4 µm, 1-2-septate; saprobic on leaves of *Carex*; phen.: V-VII..... **Psilachnum asemum** (W. Phillips) Dennis (1963)
- 5' Spores up to 12 µm long 6

- 6 Apothecia up to 0.5 mm wide, sessile, white; asci 42x6µm, IKI b, ?croziers; spores fusiform, 8-12x2-2.5 µm, OCI 3; hairs 35x5 µm; saprobic on petioles of *Pteridium aquilinum*; phen.: VI-IX **Psilachnum pteridigenum** Graddon (1977)
 Ill.: Graddon 1977: fig.: 16.
- 6' Asci 33-47x4.5-6.5 µm; spores 7.5-12x1.7-2.5 µm, OCI 1-3; hairs sublanceolate, 1-3-septate; saprobic on Cyperaceae (*Carex acutiformis*) and Gramineae (*Glyceria*, *Molinia coeruleans*, *Phalaris*, *Poa*); phen.:IV-VIII
 • **Psilachnum acutum** (Velen.) Raitv. (1968)
 Ill.: Huhtinen 1993: fig. 4.
- 6" Asci 4-8-spored, IKI b, with croziers; spores 6-10x1.3-2.4 µm, OCI 3; saprobic on *Valeriana pyrenaica*; phen.: V
 **Psilachnum lanceolatoparaphysatum** (Rehm) Höhn. (1926)
 Ill.: Rubio & al. 2010: p. 255.
- 6''' Apothecia up to 0.6 mm diam., substipitate, pale golden yellow; asci 50x7 µm, J+; spores fusiform, 8-10x2-2.5 µm; hairs up to 60x3-5 µm, 3-5-septate, hyaline; paraphyses lanceolate; hairs cylindrical, up to 60x3-5 µm, 3-5-septate; saprobic on wood of *Castanea vesca*; phen.: II **Psilachnum auranticolor** Graddon (1977)
 Ill.: Graddon 1977: fig.: 15.
- 7 Spores 9-17 µm long 8
- 7' Apothecia max. 1 mm diam.; spores max. 6-10.5 µm long 9
- 8 Apothecia 0.3-1.6 mm diam., strongly reddening; asci with croziers; spores 9-17x1.5-3.2 µm, OCI 2-3; saprobic on *Carex*; phen.: IV-VII • **Psilachnum phymatodes** (W. Phillips) Declercq (2005)
- 8' Apothecia about 0.5 mm diam., stipitate, white; asci 40-45x6-7 µm; spores 10-13x2.5-3 µm; paraphyses cylindrical; hairs 20-40x3 µm, 1-2-septate; saprobic on *Carex riparia*; phen.: IV **Psilachnum ellisii** (Dennis) E. Weber & Baral (1992)
 Ill.: Dennis 1971: fig.22.
- 9 Hairs more than 30 µm long, septate 10
- 9' Hairs ?15-30 µm long, aseptate; apothecia 0.1-0.9 mm 11
- 10 Apothecia 0.5-0.7 mm diam., substipitate, whitish to pale yellowish; asci 35-55x5-6 µm; spores cylindric to clavate, 6-9x1.5-2 µm; paraphyses 2-3 µm wide, 5-10 µm exceeding the asci; hairs 30-70x2-3 µm, 1-2-septate; saprobic on *Equisetum sylvaticum*; phen.: IV-X • **Psilachnum inquilinum** (P. Karst.) Dennis (1962)
- 10' Apothecia 0.15-0.3 mm diam.; asci with "Psilachnum-guttule", with croziers; spores 6-10.5x1.5-2.5 µm, OCI 0-2; hairs 30-50 µm long, ?1-2-septate; saprobic on Cyperaceae (*Scirpus*), Juncaceae (*Juncus articulatus*) but mainly on Gramineae (*Agrostis*, *Arrhenatherum elatius*, *Poa chaixii*, *Triticum aestivum*); phen.: IV-VIII
 • **Psilachnum eburneum** (Roberge) Baral (1985)
- 11 Spores KB deeply violet, 5-8(9)x2-3 µm, biguttulate (OCI 2-3); hairs p.p. uncinata; corticolous (*Abies alba*, *Picea abies*); phen.: VIII-II **Psilachnum "coniferarum"** Baral nom. prov.
- 11' Spores KB- (?) 12
- 12 Apothecia about 0.5 mm diam., subsessile, yellow to orange when fresh, drying pinkish; spores 6-8x1.5 µm (or 10-12x2-2.5 µm fide Beyer 1991); paraphyses 1.5-3 µm wide; saprobic on *Anthriscus sylvestris*, *Cirsium spinosissimum*; phen.: V-VIII **Psilachnum micaceum** (Pers.) Dennis (1964)
 Ill.: Dennis 1964b: fig.52.
- 12' Apothecia first yellowish, reddening when drying; pteridicolous..... 13
- 13 Apothecia 0.2-0.3 mm diam., stalked, yellow; asci 35-42x5-6 µm, J+; spores fusiform, 7.5-10.5x1-1.5 µm, aseptate, hyaline; paraphyses lanceolate; hairs clavate, aseptate; saprobic on petioles of *Arthyrium alpestris*; phen.: VIII
 **Psilachnum alpestre** E. Müll. (1968)
 Ill.: Müller 1968: Abb. 4.
- 13' Paraphyses and paraphyse vacuole cylindrical 14
- 14 Spores fusiform to clavate, 5-9x1-2 µm, OCI 0-2; asci with croziers; paraphyses and paraphyse vacuole cylindrical; saprobic on petioles of *Athyrium filix-femina*, *Pteridium aquilinum*, *Blechnum spicant*; phen.: I-XII
 • **Psilachnum chrysostigma** (Fr.) Raitv. (1970)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 196.
- 14' Spores 5-8x2 µm, OCI 2-3, ±biguttulate; paraphyses and paraphyse vacuole cylindrical; phen.: I-V
 **Psilachnum chrysostigma** var. **versicolor** (Quél.) Krieglst. (1987)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 198, Krieglsteiner & Enderle 1987: p. 33.
- 14" Spores OCI 2-2.5; paraphyses with guttulate vacuoles, sublanceolate? **Psilachnum alpestre** E. Müll.
- 14 Asci without croziers; saprobic on blackened bases of *Pteridium aquilinum*; **Psilachnum** sp.
- Asci IKI+, with croziers; saprobic on lower side of leaves of *Helleborus*. Phen.: X, III (ES, FR, IT, LU).....
 **Psilachnum rubicundum** (Sacc. & Speg.) Baral (2020)

Rodwayella Spooner

Type : *Rodwayella sessilis* (Rodway) Spooner

Lit. : Baral (unpublished key).

- 1 Apothecia 0.5-1 mm diam., ochraceous yellow, sessile on a scanty subiculum; asci 100-130x11-12.5 µm, IKI blue; spores 12-15.5x6-6.5 µm, 1-septate, constricted, with thick mucous coating, OCI 5; saprobic on wood (twig of *Salix*) and herbs; phen.: IX-XI • **Rodwayella sessilis** (Rodway) Spooner (1987)
- 1' Spores up to 4 µm wide 2
- 2 Apothecium outside with subiculum-like hyaline hairs up to margin; spores 1-3-celled, 13-16.5x3-3.8µm, asci ?with croziers **Rodwayella "zeae"** Baral nom. prov.
- 2' Apothecia yellow, sessile, outside ±hairy up to margin; asci with croziers; spores 7.5-12x2.4-2.8 µm, 0-1-septate, constricted, OCI 5; saprobic on wood and herbs (*Veratrum album*), *Carex*, *Typha*; phen.: V-VII.....
..... **Rodwayella citrinula** (P. Karst.) Spooner (1986) [1985]
..... Ill.: Rubio & al. 2010: p. 263.

Scleropezicula Verkley

Type species: *Scleropezicula alnicola* (J.W. Groves) Verkley

Lit.: Verkley 1999: 132.

Velutaria Fuckel

Syn.: *Tapesina* Lambotte, anam. chalara-like.

Type species: *Velutaria griseovitellina* (Fuckel) Fuckel

Lit.: Dennis 1949: 90; Korf 1951: 150, Baral 2002: 117..

- 1 Apothecia sessile, 0.5-1.5(2) mm diam., drying patellate; hymenium yellow; outside tan, hairy; asci †100-140x10.5-13.5(15.5) µm, IKI+, arising from croziers; spores subfusiform, †13.5-24.5x3.5-7(7.5) µm, 3-septate at maturity, hyaline; hairs cylindric, loosely undulate to helicoid, 35-90x2 µm, upper part smooth and hyaline, lower part ochraceous brown and encrusted or warted to tuberculate; with *Chalara rubi* anamorph; saprobic on stems of *Rubus idaeus*; phen.: II-IV **Velutaria griseovitellina** (Fuckel) Fuckel (1870)
..... Ill.: Korf 1951: fig.2, Baral 2002: fig.1-19.

PLOETTNERULACEAE Kirschst.

Lit.: Jaklitsch et al. 2016: 174, Johnston et al. 2019: 13

Sexual morph: Apothecia urn-shaped to plane, 0.1-2(4) mm in diam., sessile, mostly erumpent; hymenium light to dark grey, rarely whitish; margin smooth or hairy, often protruding; externally light or dark, hairs hyaline to dark brown, thin- to thick-walled. Ectal excipulum of globose to angular, usually brown, thin- or sometimes thick-walled cells; medullary excipulum hyaline, non- or rarely gelatinous, never with crystals. Paraphyses cylindrical or somewhat lanceolate, smooth, usually containing a few globose, low-refractive SCBs, without VBs and KOH-reaction. Anchoring hyphae sparse, sometimes abundant, hyaline to brown. Asci with conical apex with amyloid ring (*Calycina*-type), rarely more hemispherical and inamyloid, with or rarely without croziers. Ascospores (4-)8 per ascus, 0(3)-septate, ellipsoid to long-filiform, without gel sheath, lipid content low to high.

Asexual morph: Anamorphs hyphomycetous (*Cadophora*) or coelomycetous (*Cylindrosporium*); conidiophores hyaline to brown, phialidic, with or without collarette; conidia small, unicellular, ellipsoid to rod-shaped; rarely with sympodial (syn)anamorph: conidia septate, filiform (*Helgardia*) or staurosporous (*Ypsilina*).

Habitat: Saprobic or plant pathogenic, caulicolous or foliicolous, also lignicolous, often host-specific and endosymbiotic, also plurivorous, desiccation-sensitive, rarely not. Widespread.

Genera belonging to this family:

1. *Cadophora* Lagerb. & Merlin
2. *Collembolispora* Marvanová & Pascoal 2003
3. *Dennisiodiscus* Svrček
4. *Helgardiomycetes* Crous 2020
5. *Lasiomollisia* Raitv. & Vesterh.
6. *Mollisiopsis* Rehm
7. *Mastigosporium* Riess
8. *Nothophaacidium* J. Reid & Cain
9. *Oculimacula* Crous & W. Gams 2003
10. *Pirottaea* Sacc.
11. *Pyrenopeziza* Fuckel
12. *Rhexocercosporidium* U. Braun
13. *Rhynchobrunnera* B.A. McDonald, U. Braun & Crous 2020
14. *Rhynchosporium* Heinsen ex A.B. Frank
15. *Ypsilina* J. Webster, Descals & Marvanova

Key to the sexual genera:

- 1 Outer excipulum with long thin-walled or slightly thick-walled hairs which are encrusted, reddish brown; apothecia with subiculum; on grasses and *Carex* *Dennisiodiscus* 2
- 1' Hairs or hairlike protrudings smooth-walled 2
- 2 Paraphyses filiform, without yellow contents, smooth-walled; asci narrow, apex conical, apical pore blueing or not in l; spores mostly narrowly cylindrical or fusiform, hyaline; outer surface with dark brown, thick-walled non to several septate hairs, usually also with grana; on dicotyledonous plants *Pirottaea*
- 2' Outer surface without grana 3
- 3 Medullary excipulum gelatinised; hairs smooth and hyaline; paraphyses without long vacuole *Lasiomollisia*
- 3' Medullary excipulum not gelatinised 4
- 4 Apothecia superficial, sessile or shortly stipitate, smooth or minutely downy; paraphyses projecting, lanceolate or irregularly enlarged at the apex, not septate at the apex, with refractive vacuoles; ectal excipulum of brown textura globulosa-angularis *Mollisiopsis*
- 4' Apothecia erumpent or remaining partially immersed; outer excipulum a brown-walled textura angularis reaching almost to the margin; margin usually with paler hair-like protrudings, only partly overarching the hymenium and not thickened; periphysis-like elements lacking; apothecia at maturity usually at least 0.4 mm diam.; paraphyses lacking long vacuole; lignicolous, herbicolous, graminicolous and foliicolous *Pyrenopeziza*

Key to the asexual genera:

- 1 Conidiomata causing brownish black spots, with small whitish heaps of conidia in the centre. Conidiophores anneliic. Conidia ellipsoid to cylindrical, septate, hyaline. Grass parasites *Mastigosporium*
- 1 No sexual morph known. Vegetative hyphae pigmented; phialides pale to hyaline *Cadophora*
- 1 Mycelium consisting of hyaline, smooth, septate, branched hyphae. Conidiophores mostly solitary to aggregated, rarely branched, hyaline, smooth, with terminal conidiogenous cells that have apical

sympodial proliferation, and inconspicuous scars. Conidia long, flexuous, subcylindrical, hyaline, smooth, multiseptate, apex subobtusate, base truncate, hila unthickened *Helgardiomycetes*

Belonium Sacc. sensu Graddon

Type species: *Belonium graminis* (Desm.) Sacc. non sensu Sacc.

Lit.: Graddon 1972: 157 (*B. nigromaculatum*), Graddon 1980: 265, Baral 1994: 113, Nauta & Spooner 2000a: 21.

According to Baral (1994: 115), mentioned species may belong to *Pyrenopeziza* or *Pirotaea*.

- 1 Apothecia cupulate, semi-immersed, up to 0.75 mm diam., hymenium pale grey; excipulum of brown textura globulosa, covered by clusters of dark globose cells; spores (12)17-22x2-2.5 µm, 0(1)-septate, OCI 2; on grass; phen.: IV **Belonium incurvatum** Graddon (1980)
Ill.: Graddon 1980: fig.2
- 1' Spores <12 µm long; apothecia smaller 2
- 2 Apothecia up to 0.4 mm diam.; asci 40-45x5-6 µm, I+; spores 8-12x2 µm; saprobic on leaves *Iris pseudacorus*; phen.: VI **Belonium nigromaculatum** Graddon (1972)
Ill.: Graddon 1972: fig.8
- 2' Spores up to 8 µm long 3
- 3 Outer excipulum with clusters of dark- and thick-walled elements; spores 6.5-8x2 µm; host genus unknown ("straw") **Belonium graddonii** D. Hawksw. (1980)
- 3' Apothecia up to 0.55 mm diam., disc dark honey, receptacle vertically dark brown striate; asci 40-45x5 µm, I+; spores 6-8x2 µm; saprobic on *Ammophila arenosa*; phen.: VI-VIII ... **Belonium psammicola** (Rostr.) Nannf. (1932)

Cadophora Lagerb. & Melin

Type species: *Cadophora fastigiata* Lagerb. & Melin

Lit.: Harrington & Mcnew 2003: 1.

- 1 On blue-stained pine wood (SE) **Cadophora fastigiata** Lagerb. & Melin (1927)

Dennisiodiscus Svrček

Type species: *Dennisiodiscus prasinus* (Quél.) Svrček.

Lit.: Müller & al. 1959: 427, Svrček 1976: 9, Nauta & Spooner 2000a: 23.

- 1 Asci 4(-8)-spored 2
- 1' Asci 8-spored 3
- 2 Apothecia saucer-shaped, up to 2 mm diam., hymenium dark olive, exterior covered by reddish-brown hairs; asci 4 (-8)-spored, *55-75x6-7 µm, arising from croziers, IKI+ red-brown; spores fusiform, slightly curved, 11-20x2.5-3 µm, 0(1-3)-septate, OCI 0; saprobic on *Carex acuta*, *Carex pseudocyperus*, *Carex riparia*, *Glyceria maxima*, *Iris*, *Phalaris*; phen.: V-VIII(IX) • **Dennisiodiscus prasinus** (Quél.) Svrček (1976)
- 2' Apothecia 0.5-1 mm diam., hymenium bluish grey, margin with hyaline hairs; asci 4-spored, *98-103x10-11.5 µm, arising from croziers, IKI+ reddish brown; spores 35-46x4-5 µm, 3-septate, hyaline; saprobic on leaf bases of *Carex riparia*; phen.: IV-VII • **Dennisiodiscus ripariae** Baral nom. prov. syn. *Mollisia "Gotmadingen"* (fide Baral, pers. comm.)
- 3 Apothecia 0.25-0.35 mm diam. ; asci 65-75x5-6 µm, I+; spores 10-14x1.5-2 µm; saprobic on stems of on *Sedum roseum*; phen.: VI **Dennisiodiscus sedi** (E. Müll.) Svrček (1976)
- 3' Apothecia up to 3 mm diam., hymenium pale grey; asci 120-170x10-12 µm, arising from croziers, IKI+ slightly reddish brown; spores 13.5-17.5x5-5.5 µm, aseptate, OCI (0)1, hyaline; saprobic on leaves of *Carex acutiformis*, *Sparanium erectum*; phen.: V-VI • **"Mollisia" sparganii** nom. prov. Baral

Helgardiomycetes Crous

Type species: *Helgardiomycetes anguioides* (Nirenberg) Crous

Lit.: Crous et al. 2020: 83.

- 1 On culm base of *Triticum aestivum* (DE) **Helgardiomycetes anguioides** (Nirenberg) Crous (2020)

Lasiomollisia Raitv. & Vesterh.

Type species: *Lasiomollisia phalaridis* Raitv. & Vesterh.

Lit.: Baral, Hainaud & Lechat 2006: 33.

- 1 Apothecia 0.4-1.8 mm diam., with light grey disc and dense white marginal hairs; spores filiform-subfusoid, *(32) 37-50(52.5)x2.4-2.8 µm, straight to curved, 1(3-5)-septate, OCI 3-4, hyaline; saprobic on culms of *Phalaris arundinacea* in marsh areas with deciduous trees; phen.: V-VI ... **Lasiomollisia phalaridis** Raitv. & Vesterh. (2006)

Mastigosporium Riess

Type species: *Mastigosporium album* Riess

Lit.: Ellis & Ellis 1985, Mayrhofer et al 1991: 73.

- 1 Conidia 50-55(70)x15(16) µm, 4-5-septate, hyaline, with 3 slender appendages. Causing black spots, covered in the centre by white heaps of conidia, on living leaves of *Alopecurus pratensis*, *Bromus hordeaceus*. Phen.: IV-VIII (AT, BE/F, BE/W, CH, DE, DK, FR, NL, NO, SE, UK) **Mastigosporium album** Riess.(1852)
 Ill.: Ellis & Ellis 1985: fig. 1823, Mayrhofer et al. 1991: Abb. 1A & 2-3.
- 1 Conidia without filiform appendages 2
- 2 Conidia solitary or in little white heaps on the surface, 40-85x15-30 µm, 5-7-septate, hyaline. Causing purplish brown spots on living leaves of *Deschampsia caespitosa*. Phen.: VI-XI (AT, IT)..... **Mastigosporium deschampsiae** Jørstad (1947)
 Ill.: Ellis & Ellis 1985: fig. 1875, . Mayrhofer et al. 1991: Abb. 4C & 6C.
- 2' Conidia mostly 3-septate, seldomly 4-septate 3
- 3 Conidia cylindrical, 22-39x8-14 µm, (2)3-septate. On living leaves of *Phleum pratense*, *P. alpinum*. Phen.: IV-X (AT, DE, NO, SE, UK) **Mastigosporium kitzebergense** U. Schlöss. (1970)
 Ill.: Mayrhofer et al. 1991: Abb. 4D.
- 3' Conidia 35-52 µ long. On other substrates 4
- 4 Conidia solitary or in little white heaps on the surface, ellipsoid, 35-50x11-15 µm, 3-septate, apical cell elongated, with a projecting frill around the hilum. Causing purplish spots with grey centre on living leaves of *Agrostis spp.* and *Calamagrostis spp.*. Phen.: VI-X (AT, BE/F, UK) ... **Mastigosporium rubricosum** (Dearn. & Barth.) Nannf. (1939)
 Ill.: Ellis & Ellis 1985: fig. 1822, Mayrhofer et al. 1991: Abb. 7D & 10C-D.
- 4 Conidia ellipsoid to cylindrical, end cell not elongated. 40-52x11-16 µm, 3(4-5)-septate, poorly projecting frill around the hilum. On living leaves of *Dactylis glomerata*, *Briza media*. Phen.: V-VIII (AT, FR, UK) **Mastigosporium muticum** (Sacc.) Gunnerb.(1971)
 Ill.: Mayrhofer et al. 1991: Abb. 7A-C & 8C.

Mollisiopsis Rehm

Type species: *Mollisiopsis subcinerea* Rehm

Lit.: Graddon 1972: 153 (*M. dennisii*), Svrček 1987: 89 (*M. lobkovicensis*), Kirk & Spooner 1989: 340 (*M. quercina*).

- 1 Spores up to 10 µm long 2
- 1' Spores longer than 10 µm 5
- 2 Asci up to 40 µm long 3
- 2' Asci longer 4
- 3 Apothecia discoid, 0.3-0.5 mm diam., disk whitish to pale gray, margin fimbriate ; asci 26-36x4-5 µm, IKI bb, with croziers ; spores subclavate, *5.5-7(8)x1.5-1.8 µm, OCI 0-1; paraphyses lanceolate, exceeding the asci by 5-10 µm, upper cell filled with an elongate refractive VB; foliicolous (*Quercus robur*, *Q. rubra*) ; phen.: V-VIII (BE/F) **Mollisiopsis quercina** (Sacc.) Spooner & P.M. Kirk (1989)
 Ill.: Kirk & Spooner 1989: fig.
- 3' Apothecia up to 1 mm diam., white to pale brown, with white fimbriate margin, outside striate and fawn; asci 35x5 µm, IKI bb; spores subclavate, 6.5-8x2 µm, OCI 2; paraphyses lanceolate, exceeding the asci by up to 20 µm; saprobic on branches and spines of *Ulex europaeus*; phen.: VII-XI (**●**) **Mollisiopsis dennisii** Graddon (1972)
 Ill. : Graddon 1972 : fig. 6, Ellis & Ellis 1985 : fig. 1184.
- 4 Apothecia 0.4-1 mm diam., pale brown to greyish brown, with whitish fimbriate margin; asci 30-50x5-6 µm, IKI bb, with croziers; spores clavate, 7-11x2 µm, OCI 2; graminicolous (*Calamagrostis arundinacea*, *Dactylis glomerata*) ; phen. : VI..... **Mollisiopsis lobkovicensis** Svrček (1987)
 Ill.: Svrček 1987: fig. 4

- 4' Apothecia up to 0.5 mm diam., grey or buff with white margin; asci 40-70x5-5.5 µm, IKI bb, with croziers; spores clavate, 6.5-10x1.5-2 µm, OCI 1(2); paraphyses lanceolate, up to 15 µm longer than the asci; marginal protrudings up to 40 µm long; caulicolous (*Angelica sylvestris*, *Cirsium* sp., *Filipendula ulmaria*, *Lycopus europaeus*, *Rubus*); phen.: IV-VIII • **Mollisiopsis lanceolata** (Gremmen) D. Hawksw. (1975)
 Ill. : Ellis & Ellis 1985: fig. 1488.
- 5 Spores 11-13.5x2.5-3.5 µm, OCI 0.5; caulicolous **Mollisiopsis "loniceræ"** Baral sp. prov.
 non *Pyrenopeziza loniceræ* Nannf. (1932)
- 5' Spores 11-13.5x2.5, OCI 1-1.5, caulicolous (*Heracleum sphondylium*)
 **Mollisiopsis "sublanceolata"** Baral sp. prov.

Oculimacula Crous & W. Gams

Syn.: *Helgardia* Crous & W. Gams

Type species: *Oculimacula yallundae* (Wallwork & Spooner) Crous & W. Gams

Lit.: Crous et al. 2021 :

- 1 On culm base of *Secale cereale* (DE) **Oculimacula aciformis** (Nirenberg) Y. Marín & Crous (2018)

Pirottaea Sacc.

Type species: *Pirottaea veneta* Sacc. & Speg.

Lit. : Nannfeldt 1985: 1, Raitviir & Leenurm 2001: 64, Dougoud & al. 2012: 119 (*P. trichostoma*).

Apothecia erumpent. Ectal excipulum of textura angularis, covered with a few to many blackish brown setae which are evenly dispersed or concentrated to discrete bundles making the apothecia look striate. Growing on dicotyledonous herbs. Up to now only known only from Europe.

- 1 Spores average more than 20 µm long 2
 1' Spores average less than 20 µm long 8
- 2 Spores clavate, (18)20-28(30)x3-4 µm, 0(1)-septate, OCI 3; excipulum multi-layered, without grana; setae flaccid, 50-60(100) µm long, 3-5-septate, setae sometimes very few or lacking; saprobic on stems of *Cirsium palustre*; phen.: V-VI (ES) **Pirottaea caesiella** (Bres.) Nannf. (1932)
- 2' Spores narrowly fusiform to subacicular; excipulum few-layered, dark grana mostly present; setae stiff 3
- 3 Setae long (up to 260 µm), bristle-like, not breakable, with 3-9 thin septa; on *Compositae* 4
 3' Setae shorter, non-septate or septate with top-cell mostly large relative to the short basal cell(s); septa thick and setae easily breaking at them 5
- 4 Spores obtusely fusiform, (18)21-28(32)x3-3.5 µm; asci (2)4-8-spored, I+; setae (80)130-150(170) µm long; saprobic on stems *Artemisia absinthium*; phen.: IV-IX **Pirottaea absinthicola** Nannf. (1985)
- 4' Spores subacicular to faoclolate, (30)36-44(51)x1.5-2 µm; asci 4-8-spored, I+; setae 100-150 µm long; saprobic on stems of *Centaurea* sp.; phen.: VI **Pirottaea intercedens** Nannf. (1985)
- 4" Spores narrowly fusiform to subacicular, from 28x4 µm to 53x1.5-2 µm; asci 4-8-spored, I-or I+; setae 130-200(260) µm; saprobic on stems of *Achillea clavennae*, *A. macrophylla*, *A. millefolium*, *A. ptarmica*; phen.: VI-VIII
 **Pirottaea strigosa** (P. Karst.) P. Karst. (1885)
- 5 Setae mostly 30-60 µm long 6
 5' Setae mostly 12-20 µm long 7
- 6 Spores 27-32x2-2.5 µm, 1-septate, OCI=1-2; asci I+; setae 40-60x4-5 µm, mostly with 2-4 barrel-shaped to subglobose basal cells; saprobic on stems of *Symphytum officinale*; phen.: IV-V
 • **Pirottaea symphyti** Nannf. (1985)
- 6' Spores 16-29x2-2.5 µm, 0(1)-septate, OCI 0-1; asci 70-100 µm long; marginal protrudings up to 60 µm long; saprobic on stems of *Lychnis chaocledonica*, *Melandrium album*, *Melandrium dioicum* and *Melandrium rubrum*; phen.: IV-VI
 • **Pirottaea lychnidis** (Desm.) Suková
- 6" Spores 28-36x3.5-4 µm, 1(3)septate, OCI=3-4 ; asci 8-spored, I+ or I-; setae 30-50x5-6 µm, non-septate or with 1-2 short basal cells; saprobic on stems of *Centaurea jacea*, *C. nigra*, *C. spp.*, *Leuzea rhapontica* and *Serratula tinctoria*; phen.: IV-VIII **Pirottaea brevipila** (Roberge ex Desm.) Boud. (1907)
- 7 Spores (24)28-40x1.5-2 µm, often 1-3-septate; asci 8-spored, I+; setae mostly 12-20x4-6 µm, with rounded tip, but some up to 60 µm long and apically tapering; saprobic on stems of *Knautia arvensis*; phen.: V-X
 **Pirottaea trichostoma** (Kirschst.) E. Müll. & Arx (1955)

- Ill.: Dougoud & al. 2012: pl. 1-4 & fig. 1.
- 7' Spores (19)22-30(32)x(2)2.5-4 μm , (0)1(2)septate, with large non refractive guttules and sometimes a few small refractive ones, OCI=0-1; asci 4-8-spored, I+; setae 15-20(40)x3-4 μm , with rounded or slightly capitate tip; saprobic on *Geranium sanguineum*, *G. silvaticum*; phen.: VI **Pirottaea geraniicola** Nannf. (1932)
- 8 Setae about 100 μm long, 4-8-septate, unbreakable 9
- 8' Setae shorter and stouter, non-septate or septate with the top cell large relatively to the short basal cell(s), with most septa thick and breakable at them 10
- 9 Spores 8-12(13)x1.5-2 μm ; asci 8-spored, I+; setae stiff and straight, slightly tapering, septa relatively thin and not constricted; saprobic on stems of *Lamium maculatum*; phen.: V **Pirottaea saxonica** Nannf. (1985)
- 9' Setae numerous, soft and undulating, hardly tapering; septa thick, very dark, cupulate, giving the setae a linked, chain-like aspect; apothecia deeply cupulate, 0.2-0.3 mm diam., hymenium pale grey; asci 45-70x5-7 μm , MLZ+, with croziers; spores 13-16x2-2.5 μm ; saprobic on *Geranium silvaticum*, *Veronica longifolia*; phen.: V-VII **Pirottaea pilosissima** Nannf. (1985)
 Ill.: Raitviir & Leenurm 2001: fig. 15-18.
- 10 Setae cylindrical, mostly with clavulate, subglobose or pyriform head; marginal setae very short (5-15 μm long) forming a continuous or interrupted fringe; lateral setae longer, forming longitudinal streaks 11
- 10' Setae not swollen apically 12
- 11 Apothecia deeply cupulate, 0.2-0.5 mm diam., hymenium pale grey; asci 40-50x4-6 μm , MLZ+, without croziers; spores 8-11(12)x2(2.5) μm , occasionally 1-septate; saprobic on *Anthriscus*, *Angelica*, *Glechoma*, *Heracleum sphondylium*; phen.: III-VIII **Pirottaea nigrostriata** Graddon (1967)
 Ill.: Raitviir & Leenurm 2001: fig. 11-14.
- 11' Spores 6-8.5x(1)1.5-2 μm , non-septate; saprobic on *Cirsium oleraceum* (similar fungi on *Cynanchum*, *Helleborus* and *Valeriana*); phen.: II-VI **Pirottaea imbricata** Nannf. (1985)
- 12 Marginal setae plump, flaccid and often flexuous; grana almost nil; asci with relatively broad stainable plug; spores 16-21x1.5-2.5 μm , clavulate, non-septate; saprobic on *Centaurea* **Pirottaea inopinata** Nannf. (1985)
- 12' Setae stiff; asci with minute stainable plug (or in *P. lamii* mostly I-); spores mostly much smaller 13
- 13 Margin of apothecium partially covered by a fringe of very short, stout and mostly obtuse, 1-2-septate setae, 5-25x4-5 μm , sometimes almost nil; saprobic on *Geranium*; phen.: VI-VIII **Pirottaea paupercula** Nannf. (1985)
- 13' At least part of the setae much longer and mostly tapering 14
- 14 Lateral setae numerous, not rarely borne on simple grana and thus provided with enlarged bulbous base 15
- 14' Lateral setae scarce or nil 17
- 15 Apothecia erumpent, shallow cupulate, 0.15-0.3 mm diam., dark grey; asci 25-40x4-6 μm , MLZ+, with croziers; spores 6-9x1-1.5 μm , OCI 0-2; saprobic on *Astragalus penduliflorus*, *Filipendula ulmaria*; phen.: V-VI **Pirottaea astragali** Nannf. (1985)
 Ill.: Raitviir & Leenurm 2001: fig. 7-10.
- 15' Spores longer 16
- 16 Spores (14)16-21(23)x2-2.5 μm , eventually 1(3)-septate; saprobic on ?*Labiatae*; phen.: IV **Pirottaea exilispora** Graddon (1977)
 Ill.: Graddon 1977: fig.: 18.
- 16' Spores (13)14-18(21)x(1.5)2-2.5 μm , non-septate; saprobic on stems of *Lamium album*; phen.: (III)IV-V **Pirottaea lamii** Nannf. (1985)
- 17 Exipulum with one or more lateral tufts of often very long, filiform, pale- and thin-walled, sparsely septate, hypha-like "lateral hairs" (up to 170x2-3 μm); saprobic on *Compositae* 18
- 17' No such excipular hairs 20
- 18 Spores 7-9 μm long, non-septate; asci 30-35x5-6 μm ; setae mostly 30-45 μm long; saprobic on *Cichorium* (similar fungi on *Cicerbita* and *Picris*); phen.: VIII-IX **Pirottaea gallica** Sacc. (1877)
- 18' Average spore-length >10 μm ; asci 40-65 μm long 19
- 19 Spores (9)12-14(15)x1.5-2 μm , non-septate, OCI 3; asci 40-60x6-7 μm ; setae mostly 40-75 μm long, sometimes with a tendency to become furcate, anter-like; saprobic on *Adenostyles alliariae* (similar fungus on *Anthemis*); phen.: VI-VIII **Pirottaea adenostylidis** Nannf. (1985)
 Ill.: Schmid I. & H. 1990 : nr. 9.
- 19' Spores 7-12x2-3 μm , 0(1)-septate, with a few minute guttules at both poles, OCI 2; setae 25-60 μm long; saprobic on stems of *Senecio silvaticus*, *S. viscosus*, *Cirsium spinosissimum*; phen.: IV-VIII (BE/W, CH).....

- (●) **Pirottaea senecionis** (Cooke & W. Phillips) Nannf. (1932)
- 20 Grana cells very variable in size and pigmentation: from small, dark- and thick-walled to much larger and almost as thin- and pale-walled as the cells of the exiple proper; spores (7)9-13(15)x1.5-2 µm, non-septate; saprobic on *Malva*; phen.: (IV)VIII-IX **Pirottaea malvae** (Fautrey) Nannf. (1932)
- 20' Grana cells uniformly thick- and dark-walled; spores 6-9(12)x1-1.5 µm, non-septate 21
- 21 Most setae 40-50x4-5 µm, 1-2-septate; grana abundant, often forming large compact clumps; Spores OCI3, with basal mucous cap; saprobic on stems of *Helleborus viridis*; phen.: IV-VI (ES, IT) **Pirottaea veneta** Sacc. & Spieg. (1878) III.: Rubio & al. 2010: p. 252.
- 21' A considerable part of the marginal setae short (16-20 µm long), non-septate; grana less numerous, mostly simple; saprobic on *Aconitum*; phen.: VI-IX..... **Pirottaea aconiti** Petr. (1940)

Pyrenopeziza Fuckel

Syn.: *Cylindrosporium* Grev., *Hysteropeziza* Rabenh., anam. *Cadophora* Lagerb. & Merlin, *Mycochaetophora* Hara & Ogawa, *Rhexocercosporidium* U. Braun.

Type species: *Pyrenopeziza chailletii* (Pers.) Fuckel.

Lit.: Hein & Scheuer 1985: 133 (sub *Hysteropeziza*), Baral (unpublished key), Declercq (unpublished key).

- 1 On wood of deciduous trees 2
- 1' On leaves of deciduous trees 4
- 1" On herbaceous stems or petioles 11
- 1''' On monocotyls 46

Lignicolous species

- 2 Spores 7-9(11)x2-2.5 µm, 0(1)-septate, OCI 0-1; asci 40-60x5.5-7.5 µm, IKI-, without croziers; marginal protrudings hyaline; saprobic on branch of *Cornus*; phen.: VI ● **"Mollisia" cf. myricariae** Rehm III.: Rehm 1896: fig.: 506.
- 2' Asci IKI bb 3
- 3 Apothecia 0.2-0.3 mm diam.; asci 50-60x5 µm, IKI bb, ?with croziers; spores 12-15x2.5 µm, 1-septate, OCI ?1; saprobic on corticated branch of *Salix caprea*; phen.: V **Pyrenopeziza salicis** (Feltgen) Nannf. (1932)
- 3' Apothecia 0.25-0.45 mm diam.; asci 35-43x5.5-6.5 µm, IKI bb, without croziers; spores 4.5-9.2x1.8-2.2 µm, OCI 1; saprobic on decorticated branch of *Ulex europaeus*; phen.: II ● **Pyrenopeziza "deuncinata"** Baral nom. prov.
- 3" Apothecia 0.5-0.8 mm diam., bluish grey; asci 40-50x6-7 µm, IKI+, with croziers, with "Psilachnum drop" beyond the spore part; spores 4-6x2 µm, OCI 1-2; on wood (*Castanea*); phen.: XII-V(IX) (DE, GB)..... ○ **Pyrenopeziza aquosa** (Berk. & Broome) Baral (2020) III.: Ellis & Ellis 1985: fig. 28.

Foliicolous species

- 4 Apothecia cupulate, 0.2-0.25 mm diam.; ectal excipulum pale ochraceous with reddish brown incrustated tufts; spores clavate, 7-9x2-2.5 µm, OCI 0; asci 45-60 µm long; marginal protrudings hyaline and up to 40 µm long; saprobic on leaves of *Rubus*; phen.: V-VI ● **Pyrenopeziza maculata** Graddon (1986)
- 4' Apothecia becoming scutellate, larger 5
- 5 Ectal excipulum almost hyaline; spores cylindrical, 10-15x2.5-3 µm, OCI=0; saprobic on leaves on *Betula*; phen.: VI-VIII ● **Pyrenopeziza betulicola** Fuckel (1870) [1869-70] III.: Hein 1976: Abb.37.
- 5' Ectal excipulum greyish brown 6
- 6 Spores 11.5-18x3.2-4 µm, aseptate, OCI 4; asci 57-88x9 µm, IKI bb, with croziers; saprobic on leaves of *Betula*; phen.: IV-V **Pyrenopeziza betulina** (Alb. & Schwein.) Rauschert (1988) III.: Alb. & Schwein. 1805: Tab. VII 5.
- 6' Spores OCI 0-1 7
- 7 Asci up to 70 µm long 8
- 7' Asci up to 50 µm long 9
- 8 Apothecia immersed and elongate when young; spores 6.5-11.5x2-2.5 µm, OCI 0; asci (40)60-70 µm long; marginal protrudings unicellular, up to 30 µm long; saprobic on petioles of *Acer*, seldomly on petioles of other trees (*Alnus*, *Fraxinus*, *Tilia*); phen.: (III)IV-VII (X) ● **Pyrenopeziza petiolaris** (Alb. & Schw.) Nannf. (1932)

8' Asci 55-60x7-8 µm, IKI bb, with croziers; spores 9-13x2.2-3 µm, OCI 0; marginal protrudings up to 60 µm long; saprobic on leaves of *Salix caprea* and *Salix reticulata*; phen.: IV-VI "**Microscypha**" **monticola** Svrček (1976)

9 Spores clavate, 6.5-9x2-2.2 µm, OCI 0; asci 35-50 µm long; marginal protrudings up to 60 µm long; saprobic on leaves of *Alnus glutinosa*; phen.: V-VI • **Pyrenopeziza foliicola** (P. Karst.) Sacc. (1877)

9' Apothecia up to 0.4 mm diam. Spores 8-10(12)x2-2.5(3) µm, OCI 0; asci 35-60x9 µm long; marginal protrudings up to 20 µm long; saprobic on leaves of *Salix caprea*; phen.: V • **Pyrenopeziza fuckelii** Nannf. (1931)
Ill.: Rubio & al. 2010: p. 258.

Caulicolous species

11 Asci without croziers 12
11' Asci with croziers 13

12 Apothecia 0.2-0.4 mm diam., hymenium pale gray, with white margin; asci 35-60x6-8 µm, IKI bb, without croziers; spores 8-10x1.9-2.35 µm, OCI 2.5; saprobic on stems of *Geum urbarum*; phen.: V **Pyrenopeziza "geum"** Baral nom. prov.

12' Apothecia 0.5-1 mm diam.; asci 52-68x6-7 µm, IKI BB, without croziers; spores 12-13.5x2.5-3.5 µm, 1-septate, OCI 2; with up to 100 µm long lateral hyphal protrudings; saprobic on stems of *Ranunculus mollis*, *Ranunculus repens*; phen.: V-VI **Pyrenopeziza ranunculi** (Graddon) Baral comb. nov. ined.

13 Marginal protrudings average longer than 50 (60) µm 14
13' Marginal protrudings in average shorter or almost absent 17

14 Spores 17-21x2 µm, OCI 0-2; asci 80 µm long; marginal protrudings up to 80 µm long (*Mercurialis*); phen.: IV **Pyrenopeziza mercurialisidis** Graddon (1986)

14' Lipid content 3-4.5 15

15 Ectal excipulum almost hyaline; spores 11-15(18)x2-2.5 µm, 0(1)septate, with several small guttules, OCI 3; asci 55-80 µm long, with croziers; marginal protrudings hyaline and up to 90 µm long (*Rubus fruticosus*, *Rubus idaeus*); phen.: V • **Pyrenopeziza cookei** Baral (2020)

15' Ectal excipulum not so 16

16 Spores 0(1.3)-septate, 18-32x3.5-4(6) µm, OCI 4.5; asci 55-100 µm long; marginal protrudings 40-90 µm long (*Thalictrum*). Phen.: IV-VII • **Pyrenopeziza thalictri** (Peck) Sacc. (1889)

16' Spores clavate, with easily loosening episporus, 0(1)septate, 9-12x2.5-3 µm, with two medium polar guttules and a few small ones, OCI 3, forming subglobose ascoconidia; asci 45-55 µm long; marginal protrudings 40-90 µm long (*Rubus fruticosus*, *Rubus idaeus*, *Rosa*); phen.: (IV)V-IX • **Pyrenopeziza rubi** (Fr.) Rehm (1878)

17 Spores septate 18
17' Spores predominantly aseptate 20

18 Spores 3-septate 19

18' Spores 1-septate, 12-27x2-3 µm, OCI ?; asci 45-60 µm long; marginal protrudings up to 50 µm long (*Artemisia vulgaris*); phen.: VI **Pyrenopeziza leucostoma** (P. Karst.) Nannf. (1932)

19 Spores 29-42x3-3.5 µm, OCI 0-1; asci 80-100 µm long; marginal protrudings up to 30 µm long (*Arctium*); phen.: IV-VI • **Pyrenopeziza arctii** (W. Phillips ex Buchnall) Nannf. (1932)

19' Spores clavate, 20-35x3-4 µm, OCI 3; asci (60)75-90 µm long; marginal protrudings up to 20 µm long; saprobic on stems of *Euphrasia*, *Odontitis serotina*, *Rhinanthus*; phen.: V **Pyrenopeziza euphrasiae** (Fuckel) J. Kunze (1892) [1896]

20 Apothecia cupulate 21
20' Apothecia scutellate 23

21 Spores 13.5-22x3.5-4 µm, OCI 4; paraphyses and marginal protrudings covered by gel; saprobic on *Filipendula ulmaria*; phen.: (IV)V-VI(XI) • **Pyrenopeziza millegrana** Boud. (1907)

21' Spores OCI 0-1.5 22

22 Spores 6-11.5x2-2.5 µm, OCI 1.5; asci 25-55 µm long, IKI bb, with croziers; marginal protrudings up to 50 µm long; saprobic on stems of *Cirsium*, *Epilobium*, *Eupatorium*, but mainly on *Filipendula ulmaria*; phen.: (I)IV-VII(XI) • **Pyrenopeziza pulveracea** (Fuckel) Hütter (1958)

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- 22' Spores clavate, 7-9x2-2.5 µm, OCI 0; apothecia 0.25 mm diam., outer surface dark brown striate; asci 45-60 µm long; marginal protrudings up to 40 µm long; saprobic on stems of *Rubus*; phen.: V-VI • **Pyrenopeziza maculata** Graddon (1986)
Compare *P. escharodes*
- 23 Spores longer than 15 µm 24
23' Spores shorter 28
- 24 Asci longer than 60 µm 25
24' Asci shorter 27
- 25 Apothecia with grey hymenium and whitish margin; asci 60-85x8-9 µm; spores 11-19x2-3.5 µm, OCI 2.5-3.5; with marginal protrudings (*Heracleum, Polygonatum*); phen.: IV-V
..... ○ **Pyrenopeziza chailletii** (Pers.) Fuckel (1870) [1869-70]
..... Ill.: Rubio & al. 2010: p. 256.
- 25' Spores in average more than 20 µm long 26
- 26 Apothecia 0.5-1.2 mm diam., hymenium grey, margin white; asci 82-90x9.5-12 µm, IKI bb; spores 20-23x3-4 µm, OCI 3; with marginal protrudings; saprobic on petioles of *Petasites*, stems of *Chaerophyllum aureum*; phen.: V-VI ..
..... **Pyrenopeziza baraliana** Gminder (2006)
- 26' Spores fusiform-clavate, 15-26x2.5-3 µm, OCI 3; asci 55-75x5-6 µm, becoming 1-3-septate; with short marginal protrudings (*Arctium, Cirsium*); phen.: II-V (IX-X) (BE/V, BE/W) • **Pyrenopeziza inornata** Graddon (1972)
..... Ill.: Graddon 1972: fig. 7.
- 27 Spores 15-24x2-3 µm, OCI 3; asci 40-65 µm long; marginal protrudings up to 20 µm long; saprobic on stems of *Galium boreale*, *G. verum*, *G. mollugo*; phen.: V-VII **Pyrenopeziza galii-veri** (P. Karst.) Sacc. (1889)
..... Ill.: Raitviir & Leenurm 2001: fig. 19-20.
- 27' Spores 15-20x2-3 µm, 0(1)-septate, OCI 2-4; asci *45-75x8-9 µm; with conspicuous marginal protrudings; saprobic on stems of *Artemisia vulgaris*, *Cirsium arvense*, *Cirsium palustre* and *Eupatorium cannabinum*; phen.: (III)IV-VI(IX)
..... • **Pyrenopeziza carduorum** Rehm (1872)
- 28 Spores 6-9(12)x1.5-2(3) µm, with polar guttules, OCI 2-3; asci 30-50x6-8 µm; ectal excipulum reddish brown with up to 20 µm long marginal protrudings (*Polygonum, Rumex*); phen.: (IV)V-XI
..... • **Pyrenopeziza polygoni** (Lasch) Gremmen (1958)
- 28' Ectal excipulum greyish brown to blackish brown 30
- 30 Spores minimum 3 µm wide 31
30' Spores less than 3 µm wide 34
- 31 Spore OCI 2-3 32
31' Spore OCI ? 33
- 32 Apothecia up to 0.5 mm diam.; spores 0(1)-septate, 11-15x3-3.5 µm, OCI 2; asci 45-55 µm long; marginal protrudings up to 30 µm long (*Lotus, Ononis, Trifolium*); phen.: V-VII **Pyrenopeziza compressula** Rehm (1892) [1896]
- 32' Spores 10-17(21)x2.5-3(4) µm, with two polar guttules and several small ones, OCI 3, rarely 1-septate; asci 45-50x7-8 µm, 4- or 8-spored, I+ or IKI-, with croziers (Rubio & al. 2010: asci IKI b, spores 11.8-16.8x3.2-4.1 µm); saprobic on leaves of *Plantago lanceolata*; phen.: III-V, VIII-IX • **Pyrenopeziza plantaginis** Fuckel (1870) [1869-70]
..... Ill.: Rubio & al. 2010: p. 262.
- 33 Spores 7-15x3-3.5 µm, OCI 0; asci 40-50 µm long; marginal protrudings up to 30 µm long; saprobic on stems of *Aconitum, Laserpitium, Oenanthe, Peucedanum, Veratrum*; phen.: V-VIII
..... **Pyrenopeziza subplicata** Rehm (1892) [1896]
- 33' Spores 11.5-13.5x3.5 µm, OCI ?; asci up to 50 µm long; marginal protrudings up to 20 µm long; saprobic on stems of *Solidago*; phen.: ? **Pyrenopeziza solidaginis** (P. Karst.) Schröter (1893) [1908]
- 34 Spores (7)10-15 µm long 35
34' Spores up to 10 µm long 39
- 35 Spore OCI 2-3 36
35' Spore OCI 0-1(1.5) 37
- 36 Spores 0(1)septate, 9.5-14x2-2.5 µm, with several small guttules at each end, OCI 3; asci 35-65x7-8 µm, IKI bb, without croziers; paraphyses sublanceolate; marginal protrudings up to 50 µm long; saprobic on stems of *Mercurialis*; phen.: IV-VI • **Pyrenopeziza mercurialis** (Fuckel) Boud. (1907)
..... Ill.: Rubio & al. 2010: p. 260.

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- 36' Apothecia up to 3 mm diam.; spores 10.5-13x2-2.5 µm, with two polar guttules, OCI 2; asci 75-115 µm long; marginal protrudings ?; saprobic on stems of *Leucopus europaeus*; phen.: IV **Pyrenopeziza lycopincola** (Rehm) Boud.(1907)
- 37 Spores 0(1)septate, 11-15(18)x2-2.5 µm, OCI 1; asci 35-65 µm long; marginal protrudings up to 25 µm long; saprobic on leaves of *Iris pseudacorus*; phen.: IV-V(VII) • **Pyrenopeziza inapiculata** Declercq (2002)
- 37' Spores shorter 38
- 38 Apothecia erumpent, up to 0.7x0.5 mm, almost black when dry, with inconspicuous marginal protrudings; spores 8-12x2 µm, OCI ?0; saprobic on stems of *Angelica sylvestris*, especially around the nodes; phen.: V-XI **Pyrenopeziza plicata** (Rehm) Rehm (1892)
 Ill.: Ellis & Ellis 1985: fig. 1352.
- 38' Apothecia up to 0.8 mm diam.; spores clavate, 9-12.5x2-2.5 µm, OCI 1; asci up to 60 µm long; marginal protrudings 40-50 µm long (*Arctium*, *Cirsium*); phen.: IV-IX • **Pyrenopeziza depressuloides** (Gremmen) Gremmen (1958)
 Ill.: Gremmen 1955, pl. II G.
- 39 Marginal protrudings 40-60 µm long 40
- 39' Marginal protrudings shorter 42
- 40 Spores 6-9x1.5-2 µm, OCI 0-1; asci 40-60 µm long; marginal protrudings up to 60 µm long (*Urtica dioica*, *Lamium galeobdolon*??); phen.: IV-VII(IX) • **Pyrenopeziza urticicola** (W. Phillips) Boud. (1907)
- 40' Spores larger 41
- 41 Spores 6-10.5x2-2.5 µm, OCI 0-1.5; asci 30-65x5-6 µm; apothecia 0.3-1 mm diam., outer surface striate, hymenium ochraceous; marginal protrudings 40-60 µm long (*Angelica*, *Arctium*, *Artemisia*, *Centaurea*, *Chamerion*, *Cirsium*, *Galeopsis*, *Heracleum*, *Impatiens*, *Rubus*, *Symphytum*); phen.: IV-VII(VIII-XII) • **Pyrenopeziza escharodes** (Berk. & Br.) Rehm (1892) [1896]
- 41' Spores 8-13(23)x2-2.5(3) µm, OCI 1; asci 8-spored, 50-70 µm long, mostly not all spores becoming mature; marginal protrudings up to 50 µm long (*Sambucus ebulus*); phen.: V-VII ... • **Pyrenopeziza ebuli** (Fr.) Sacc. (1889)
- 42 Spores 8-10x1.5-2 µm, OCI 3, asci 50-65x5 µm; marginal protrudings up to 20 µm long (*Artemisia vulgaris*); phen.: IV-V(IX). • **Pyrenopeziza artemisiae** (Lasch) Rehm (1871)
- 42' Spores OCI 0-2 43
- 43 Apothecia 0.5-1.2 mm diam.; asci 50-64x6.5-7.5 µm, IKI bb or sometimes IKI-, with croziers; spores 4.5-6x2.5-3 µm, verruculose, biguttulate; saprobic on corticated branches of *Ulex europaeus*; phen.: II-III **Pyrenopeziza "ulicis"** Baral nom. prov.
- 43' Spores smooth 44
- 44 Spores 6-11x2-2.5 µm; asci 30-40 µm long; marginal protrudings up to 40 µm long; saprobic on stems of *Gentiana asclepiadea*; phen.: VIII **Pyrenopeziza gentianae-asclepiadeae** Nannf. (1932)
 Ill. : Schmid I. & H. 1990 : nr. 11.
- 44' Spores 7.9-10.2x1.8-2.4 µm, OCI 1; asci 55x6 µm, IKI bb, with croziers; saprobic on stems of *Asparagus*, *Angelica sylvestris*, *Arctium lappa*, *Cirsium arvense*; phen.: IV-V • **Pyrenopeziza atrata** (Pers.) Fuckel (1870)
- 44" Spores up to 2 µm wide..... 45
- 45 Spores 6-8x1.5-2 µm, OCI 1; asci 25-50 µm long; marginal protrudings up to 30 µm long; saprobic on stems of *Digitalis purpurea*; phen.: V-VII(X) • **Pyrenopeziza digitalina** (W. Phillips) Sacc. (1889)
 Ill.: Rubio & al. 2010: p. 257.
- 45' Spores 6.5-10(12.5)x1.7-2 µm, OCI 0-1; asci 25-45x4-4.5 µm, IKI+, with croziers; marginal protrudings up to 30 µm long; saprobic on stems of *Cirsium palustre*, *Chamerion angustifolium*, *Epilobium hirsutum*, *Symphytum officinale*; phen.: V-IX(X) • **Pyrenopeziza chamaenerii** Nannf. (1928)

Species on monocotyls

- 46 Ectal excipulum hyaline 47
- 46' Ectal excipulum pigmented 48
- 47 Apothecia 0,09-0.15 mm diam., almost hyaline, pale orange to slightly brownish whn dry, margin without conspicuous hairlike protrudings; asci 25-30x5-6 µm, J+; spores 7-9x1.5-2 µm, aseptate, hyaline; saprobic on leaves of *Carex brizoides*; phen.: V **Pyrenopeziza perminuta** Scheuer (1999)
- 47' Ectal excipulum with cylindrical to clavate protrudings up to 30 µm long; asci 45-58x5-7 µm, IKI bb, with croziers; spores 7-11x2-2.2 µm, OCI 1 (*Glyceria maxima*); phen.: V • **Pyrenopeziza sp. 2**

- 48 Apothecia up to 0.7 mm diam., brownish, margin with up to 70 µm long protrudings sticking together to form teeth; asci 45-55x6-6.5 µm, J+; spores 10-11x2.5-3 µm, aseptate, hyaline; saprobic on leaves of *Carex panicea*; phen.: VIII **Pyrenopeziza pubescens** (Hein & Scheuer) Scheuer (1999)
- 48' Apothecia without toothed margin 49
- 49 Asci IKI+, with croziers; spores 6.8-9.3x2.3-2.7 µm; on *Typha*; phen.: VI **Pyrenopeziza typhicola**
- 49' Spores longer 50
- 50 Apothecia 0.1-0.3 mm diam., urceolate, hymenium pale grey; ectal excipulum covered by red-brown granular exudate; asci 40-60x5-7 µm, IKI bb/(r)b, with croziers; spores 8-15x2.5-3 µm, 0(1)-septate, OCI 3; saprobic on grasses (*Brachypodium*, *Calamagrostis*, *Deschampsia*, *Phalaris*, *Poa*), *Carex*, *Scirpus*; phen.: VI-VIII • **Pyrenopeziza karstenii** Sacc. (1889)
 Ill.: Rubio & al. 2010: p. 259.
- 50' Asci 70-80x12 µm; spores clavate, 0(1)-septate, 17-18x3-3.5 µm, saprobic on leaves of *Carex*, *Eriophorum*; phen.: VI-VIII **Pyrenopeziza fuscescens** (Rehm) Défago (1968) [1967]
 Ill.: Spooner 1981: fig. 30.
 syn.: ?*Mollisia upsaliensis* Svrček

Lacking characteristics:

- saprobic on stems of *Laserpitium latifolium*; phen.: VI **Pyrenopeziza nannfeldtii** Petr., *Ann. Mycol.* **38**: 368 (1940)
- saprobic on inflorescences of *Sibbaldia procumbens*; phen.: VIII
 **Pyrenopeziza potentillae** (Rostr.) Nannf., *Sv. Bot. Tidskr.* **22**: 136 (1928)
- saprobic on stems of *Knautia arvensis*; phen.: VI
 **Pyrenopeziza scabiosicola** (Petr.) Hütter, *Phytopath. Zeitschr.* **33**: 30 (1958)

Rhynchobrunnera B.A. McDonald, U. Braun & Crous 2020

Type species: *Rhynchobrunnera lolii* (K.M. King et al.) B.A. McDonald, U. Braun & Crous

Lit.: Crous et al. 2020:

Rhynchosporium Heinsen ex A.B. Frank

Type species: *Rhynchosporium graminicola* Heinsen ex A.B. Frank

Lit.: Crous et al. 2020: 86.

1

Ypsilina J. Webster et al.

Type species: *Ypsilina graminea* (Ingold et al.) Descals et al.

Lit.: Crous et al. 2020: 94.

- 1 On grass leaves and roots of *Triticum aestivum* and *Holcus lanatus*. Phen.: XI (DE, UK)
 **Ypsilina graminea** (Ingold et al.) Descals et al. (1998)

STAMNARIA lineage

Lit.: Jaklitsch et al. 2016: 167.

Sexual morph: Apothecia 0.3-1 mm in diam., developing beneath epidermis, erumpent opening in the ?mesohymenial phase, sessile or stipitate; hymenium yellow-orange, margin whitish, often forming teeth or a collar; exterior hairless. Ectal excipulum of orange textura prismatica, covered by a thick, hyaline, gelatinous layer of textura porrecta; without crystals. Paraphyses apically clavate, without VBs. Asci with conical apex with or without euamyloid apical ring (*Pezicula*-type), arising from croziers. Ascospores 8 per ascus, hyaline, ellipsoid-oblong, medium- to large-sized, aseptate, lipid content medium to high (multiguttulate) with delicate sheath.

Asexual morph: Anamorphs developing beneath epidermis, acervular, sympodial; conidia filiform, 1-3-septate, connected near the base.

Habitat: Parasitic on *Equisetum*, host-specific, desiccation-sensitive. Northern Hemisphere, temperate.

Only genus belonging to this family::

Stamnaria Fuckel

Syn.: anam. *Titaeospora* Bubák.

Type species: *Stamnaria persoonii* (Moug.) Fuckel

Lit.: Dennis 1956: 64, Künkele & al. 2005: 3

- 1 Apothecia stalked, cyathiform, dark orange, with pale translucent crenate margin; asci IKI+, arising from croziers; spores narrow ellipsoid, (17)19-21x6.5-8 µm, smooth, hyaline, minutely guttulate except the poles; parasitic on *Equisetum arvense*, *E. palustre*, sometimes on *E. hyemale*; phen.: IV-VI
 ○ **Stamnaria persoonii** (Moug.) Fuckel (1870) [1869-70]
- 1' Apothecia erumpent in small groups, sessile, up to 1 mm diam., dark orange with smooth translucent margin; asci IKI-, arising from croziers; spores fusiform with rounded ends, (22)24-28(34)x(6)6.5-7.5(8.5) µm, smooth, hyaline, minutely guttulate except the poles; parasitic on *Equisetum hyemale*; phen.: (X)XI-XII
 **Stamnaria americana** Masee & Morgan (1902)
- 1 Asci 195-250x12-17 µm, J+; spores uniseriate, 18-23x8-10 µm, filled with minute guttules; on *Equisetum variegatum*; phen.: VIII **Stamnaria austriaca** sp. nov. ined.

VIBRISSEACEAE Korf 1991

Lit.: Jaklitsch et al. 2016: 176, Ekanayaka et al. 2019: .

Genera belonging to this family:

- 1 ?*Chlorovibrissea* L.M. Kohn
- 2 *Gorgoniceps* P. Karst.
- 3 *Leucovibrissea* (A. Sánchez) Korf
- 4 *Strossmayeria* Schulzer
- 5 *Vibrissea* Fr.

Key to the genera:

- 1 Ascospores filiform, breaking into part-spores 2
- 1' Ascospores not fragmenting 3

- 2 Apothecia stipitate-capitate, olivaceous to blackish green; asci elongate, I+; spores filiform *Chlorovibrissea*
- 2' Apothecia discoid, sessile or stipitate; asci I- or I+; paraphyses with elongate VB's, exceeding the asci; ascospores filiform, multiseptate, hyaline; saprobic on water-soaked wood and *Phragmites* culms *Vibrissea*
- 2'' Apothecia discoid, whitish to pale brown, shortly stalked; stalk composed of a core of vertically elongated cells and a cortex of isodiametric cells *Leucovibrissea*

- 3 Apothecia discoid to turbinate, sessile. Paraphyses with VB's reacting yellow in KOH. Ectal excipulum with textura porrecta or oblita, amyloid. Asexual morph *Pseudospiropes* hyphomycetous, with brown, distoseptate conidia *Strossmayeria*
- 3' Apothecia sessile to substipitate, hymenium pallid to greenish, base brown. Ectal excipulum of textura porrecta. Paraphyses with VB's, not reacting in KOH. Asci with apical ring of *Calycina*-type. Ascospores filiform, septate *Gorgoniceps*

Chlorovibrissea L.M. Kohn

Type species: *Chlorovibrissea melanochlora* (G.W. Beaton & Weste) L.M. Kohn

Lit.: Kohn 1989: 112.

No Western European species known.

Gorgoniceps P. Karst.

Type species: *Gorgoniceps aridula* (P. Karst.) P. Karst.

Lit.: Dennis 1971: 347, Dennis 1978: 127, Graddon 1980: 266, Spooner 1981: 280 (*G. micrometra*), Svrček 1984: 197 (*G. hypothallosa*), Huhtinen 1987a: 189, Spooner 1981: 280 (*G. micrometra*), Hansen & Knudsen 2000: 150, Raitviir & Huhtinen 2002: 17.

- 1 Apothecia cupulate, up to 0.5 mm diam., with short stout stalk, white; asci 2-4-spored, 72-110x14-16 µm, with croziers; spores 60-90x4 µm, becoming 2-septate; saprobic on *Equisetum fluviatile*; phen.: IV-V **Gorgoniceps boltonii** (W. Phillips) Dennis (1971)
Ill.: Dennis 1971: fig. 12.
- 1' Asci 8-spored, with croziers 2

- 2 Spores up to 45 µm long 3
- 2' Spores longer 5

- 3 Apothecia gregarious, cupulate, disk flat, 0.5-1 mm diam., narrowly sessile to substipitate, sienna to burnt sienna, stipe blackish, forming a dark brown basal hypothallus; asci 90-135x8.5-10 µm, MLZ+ (faint blue); spores slightly curved, 22-32x2.8-3.6 µm, 3(4-6)-septate, multiguttulate; saprobic on underside and resinous exudations of bark of *Picea abies*, fungicolous, on wood of *Pinus sylvestris*; phen.: IX-X **Gorgoniceps hypothallosa** Svrček (1984)
Ill.: Raitviir & Huhtinen 2002: fig. 8.
- 3' Apothecia up to 0.5 mm diam., sessile, white; asci up to 70x7 µm, I-; spores 40-45x1.5 µm, 7-septate; saprobic on leaves of *Quercus* and involucres of *Castanea*; phen.: III **Gorgoniceps charnwoodensis** Graddon (1980)
Ill.: Graddon 1980: fig. 4.

- 5 Spores up to 75 µm long 5
- 5 Spores longer 6

- 5 Apothecia gregarious to confluent, cupulate-turbinate, disc greenish (more bluish when dried), outside brownish (blackish when dried), with pale fimbriate margin, up to 0.5 mm diam. and 0.3 mm high and more when dried, arising from blackened areas of the substrate; asci 102-136(165)x9.5-12 µm, I+, with croziers; spores filiform, apically blunt, basally tapered, 48-75(-90)x1.8-2.7 µm, 7(-10)-septate, OCI 2.5; ectal excipulum of textura porrecta; saprobic on blackened areas on both sides of bark of *Pinus sylvestris*; phen.: X **Gorgoniceps viridula** Huhtinen (1987) Ill.: Huhtinen 1987a: fig.1-2.
- 5' Apothecia cupulate, 0.2-0.45 mm diam., sessile to shortly stalked, hymenium pale grey, outside olivaceous blackish; asci 100-110x9-10 µm, IKI-; spores clavate, 59-73x2.5-3.5 µm, 7-11-septate; marginal cells elongated, thick-walled, olivaceous brown; saprobic on *Ammophila arenaria*; phen.: VIII-XI **Gorgoniceps "clavispora"** Baral nom. prov.
- 6 Apothecia discoid to cushion-shaped, 0.3-1 mm diam., sessile to shortly stalked, hymenium plano-convex and greyish to whitish, outside brownish blackish; asci 130-140x14-17 µm, porus of *Calycina*-type, IKI+ blue, with croziers; spores 60-95x2-3 µm, (5-7)-septate, OCI 3-4.5; ectal excipulum of textura porrecta; saprobic on bark and cones of *Picea*, *Pinus*; phen.: (VIII)IX-I • **Gorgoniceps aridula** (P. Karst.) P. Karst. (1871)
- 6' Apothecia scattered to gregarious, turbinate, sessile, disc concave and dark, 0.1-0.15 mm diam.; outside blackish, adpressed hairs giving a striate appearance to the margin; asci 80-95x9-11 µm, I-; spore about 80x2 µm, ?13-septate; hairs obtuse, thick-walled, about 50x2-3 µm, dark brown; saprobic on leaves of *Juncus*; phen.: IV **Gorgoniceps micrometra** (Berk. & Broome) Sacc. (1889) Ill.: Spooner 1981: fig. 16.

Leucovibrisea (A. Sánchez) Korf

Type species: *Leucovibrisea obconica* (Kanouse) Korf

Lit.: Baral-CD.

- 1 Apothecia thick discoid, 0.4-0.8 mm diam., disc slightly convex, shortly stalked, flesh gelatinous, hymenium whitish to pale greyish, stalk light to dark greyish brown; asci IKI+, with croziers; spores 125-160x1 µm, OCI 1, hyaline; saprobic on culms of Poaceae; phen.: V **Leucovibrisea obconica** (Kanouse) Korf (1990)

Strossmayeria Schulzer

Syn.: ?*Cornutum* Velen., *Leptobelonium* Höhn., anam. *Pseudospiropes* M.B. Ellis.

Type species: *Strossmayeria basitricha* (Sacc.) Dennis

Lit.: Dennis 1978: 128, Iturriaga 1984: 169, Iturriaga & Korf 1990: 83 (monograph), Castaneda Ruiz & al. 2001: 3.

- 1 Teleomorph unknown 2
- 1' Teleomorph known 5
- 2 Conidia mostly 3-distoseptate 3
- 2' Conidia with more distosepta in average 4
- 3 Colonies effuse, dark blackish brown to black, velvety to hairy; conidiophores up to 170x4-6 µm, dark brown; conidia 12-18x4.5-6 µm, mostly 3-septate, smooth, mid to dark brown; on dead wood of *Fagus* and *Fraxinus* **Pseudospiropes hughesii** M.B. Ellis (1976) Ill.: Ellis & Ellis 1985: fig. 588.
- 3' Colonies dark blackish brown to black; conidiophores subulate, up to 500x7-10 µm, closely septate, dark brown; conidia 12-29x3.5-5.5 µm, (1-3)(-6)-septate, (sub)hyaline; on dead wood and bark of *Acer*, *Carpinus*, *Crataegus*, *Fagus*, *Fraxinus*, *Salix* and *Sorbus* **Pseudospiropes subuliferus** (Corda) M.B. Ellis (1976) Ill.: Ellis & Ellis 1985: 242.
- 4 Colonies olivaceous brown to blackish brown; conidiophores olivaceous brown or dark brown; conidia 16-38x3.5-4.5 µm, 3-10-distoseptate, pale to mid olivaceous brown, smooth or verruculose; on fallen branches of *Betula*, *Castanea*, *Corylus*, *Fagus*, *Hedera*, *Pinus*, *Quercus* and *Sambucus*; phen.: IX-XII • **Pseudospiropes obclavatus** M.B. Ellis (1976) Ill.: Ellis & Ellis 1985: fig. 240.
- 4' Colonies effuse, dark blackish brown to black, thin, hairy; conidiophores up to 300x6-9 µm, dark brown, paler near the apex where there are a number of small dark scars; conidia 20-37x5-8 µm, 3-7-distoseptate, smooth, hyaline to subhyaline; on dead stems of *Anthriscus*, *Arctium*, *Cirsium*, *Dipsacus*, *Epilobium*, *Paeonia officinalis*, occasionally on wood and bark of deciduous trees including *Fagus* **Pseudospiropes rousseleanus** (Mont.) M.B. Ellis (1976) Ill.: Ellis & Ellis 1985: fig. 1303.

- 5 Sexual morph: Apothecial receptacle brown to black when rehydrated, turbinate, 0.5-1 mm diam.; spores †(26)29-37x(3.7)4.4-7.3 µm, usually 4-5-septate. Asexual morph *Pseudospiropes nodosus* with tortuous conidiophores and fusiform conidia (28)33-42x(10)11-13(18) µm, (3)7(8)-distoseptate, basal scar 4.5-6 µm, brown; saprobic on decorticated wood of *Acer*, *Betula*, *Corylus*, *Fagus*, *Fraxinus*, *Hedera*, *Populus*, *Rubus* and *Salix*. phen.: VIII (AT, BE, W, DE) • **Strossmayeria atriseda** (Saut.) Iturr. (1990)
 Ill.: Iturriaga & Korf 1990: fig. 10, Ellis & Ellis 1985: fig. 239.
- 5' Apothecial receptacle white, cream-colored, yellowish, pale brown or light grey when rehydrated 6
- 6 Apothecia discoid at maturity; spores †(32)35-55x3.5-5(6.5) µm, 6-7-septate, gel sheath 1-1.5 µm wide. Asexual morph *Pseudospiropes josserandii* conidia with a torus around each septal pore, basal cell dark and apical beak usually present; saprobic on decorticated wood of *Carpinus*; phen.: IX-X (FR)
 **Strossmayeria josserandii** (Grelet) Bertault (1970)
 Ill.: Iturriaga & Korf 1990: fig. 21.
- 6' Apothecia turbinate when mature; conidia without those characters 7
- 7 Asci predominantly saccate, 86-108 µm long; spores †(31)37-47(50)x3.7(4.4) µm, 6-7-septate. Asexual morph: conidia fusiform, (28)30-37(40)x(9)11-12 µm, 5-8-distoseptate, all cells brown, with narrow basal scar (1.5)2-3(3.5) µm; conidiophores with scars that do not protrude grossly; saprobic on decayed trunk of *Alnus*; phen.: VIII (CZ)
 **Strossmayeria alnicola** (Velen.) Iturr. (1990)
 Ill.: Iturriaga & Korf 1990: fig. 9.
- 7' Asci predominantly clavate 8
- 8 Spores cylindrical-clavate, †32-43(52)x3-4.4(5.8) µm, (6)7(8)-septate, gel sheath 1.5-2(3) µm thick and verrucose; saprobic on decomposed wood; phen.: I **Strossmayeria confluens** (Seaver & Waterston) Iturr. & Korf (1990)
 Ill.: Iturriaga & Korf 1990: fig. 16.
- 8' Spore gel sheath smooth or verrucose, less than 1.5 µm thick 6
- 6 Spores †(30)37-49(64) µm long. Asexual morph: *Pseudospiropes* sp.. On decayed wood (*Crataegus*, *Sambucus racemosa*). Phen: VIII-IX (CZ, ES)..... **Strossmayeria bakeriana** (Henn.) Iturr. (1990)
 Ill.: Iturriaga & Korf 1990: fig. 11-12 .
- 6' Spores †26-43(48) long 7
- 7 Asci 80-115x11-19 µm. Asexual morph: conidia fusiform, 30-39x(10)11-15(17) µm, 6-7(8)-septate; saprobic on decorticated wood of *Corylus*; phen.: XI (FR)..... **Strossmayeria alba** (P. Crouan & H. Crouan) Iturr. & Korf (1990)
 Ill.: Iturriaga & Korf 1990: fig. 8.
- 7' Asci 100-140x11-16(19) µm, IKI-, with croziers; spores fusiform, *33-50x4.5-5 µm, OCI 2, †26-40(48)x3-5 µm, 6-7-distoseptate. Asexual morph: *Pseudospiropsis simplex* with conidia 29-41(71)x7-15 µm, 5-11-septate, basal scar (1.5)2-3.5 µm. Saprobian on decayed wood and bark of *Acer*, *Alnus*, *Betula*, *Carpinus*, *Castanea*, *Fagus*, *Fraxinus*, *Malus*, *Platanus*, *Populus*, *Quercus*, *Salix*, *Sorbus*. Phen.: (VI)VII-XI(II) (BE/F, CZ, FR, IT)
 • **Strossmayeria basitricha** (Sacc.) Dennis (1960)
 Ill.: Iturriaga & Korf 1990: fig. 13-14, Ellis & Ellis 1985: fig. 241.

Vibrissea Fr.

Type species: *Vibrissea truncorum* (Alb. & Schwein.) Fr.

Syn.: *Apostemidium* P. Karst., *Pocillum* De Not., anam. *Anavirga* B. Sutton.

Lit.: Graddon 1964: 639, Baral (unpublished key), Hansen & Knudsen 2000: 183, Baral et al. 2019: 111.

- 1 Spores min. 200 µm long (unstretched in case of sigmoid) 2
- 1' Spores up to 180 µm long (unstretched in case of sigmoid) 4
- 2 Apothecia sessile, hymenium greyish, outside and margin brown; spores 210-315 µm; paraphyses branched
 **Vibrissea filisporia f. boudieri** A. Sánchez & Korf (1967)
- 2' Asci IKI weakly but conspicuously ±bb 3
- 3 Apothecia with 1.5-12mm long dark brown, hairy stalk, hymenium orange to yellow; spores 200-250x1 µm.16-celled; saprobic on submerged branches (*Ulex*) in a stream; phen.: V-VI
 • **Vibrissea truncorum** (Alb. & Schwein.) Fr. (1822)
 Ill.: Rubio & al. 2010: p. 271.
- 3' Apothecia ±sessile, 0.5-2.5(4) mm diam., hymenium yellowish grey, outside and margin blackish; spores 250-350x1-2 µm, 22-24-celled; (= *V. leptospora* ss. auct.); on water-soaked deciduous wood (*Carpinus*, *Prunus spinosa*); phen.: III-V (BE/F, CH) • **Vibrissea decolorans** (Saut.) A. Sánchez & Korf (1967)
 Ill.: Breitenbach & Kränzlin 1981: pl. 301.

- 4 Spores straight 5
 4' Spores sigmoid (straight too?), not disarticulating 12
- 5 Asci IKI+ 6
 5 Asci IKI- 8
- 6 Apothecia 0.3-0.4 mm diam., hymenium bluish grey, outside and margin dark brown; asci 75-100x12 µm, I+, with croziers; spores 85-95x3.5-4.5 µm, 7-8-septate; saprobic on *Phragmites* in lakes
 **Vibrissea norvegica** (Gremmen) A. Sanchez (1967)
- 6' Spores longer 7
- 7 Apothecia 0.8-1.3 mm diam., with 2-4 mm long stalk, hymenium yellowish, stalk whitish, stalk base greyish brown; asci 244-276x10-11 µm, IKI+, with croziers; spores 128-157x1.5-2.1 µm, 7-septate; saprobic on water-soaked decorticated conifer branch; phen.: VIII **Vibrissea gracilis** I. Kušan & N. Matočec sp. nov.
- 7' Apothecia 0.5-1.4 mm diam., turbinate, partly fasciculate, whitish to translucent greyish, short stalk pale grey, flesh not gelatinous; asci 230-265x(7)8-8.5 µm, IKI+, with croziers; spores 150-160x1.3-1.5 µm, (7)9(13)-septate, OCl 2; medulla strongly blue in I; saprobic on stem of *Filipendula ulmaria* on wet ground; phen.: VII
 **Vibrissea filipendulae** Baral nom. prov.
- 8 Apothecia shortly stalked 9
 8' Apothecia sessile 10
- 9 Apothecia 2.5-3.5 mm diam., with short stout stalk, hymenium ochraceous yellow, outside and stalk dark brown; asci IKI-, with croziers; spores 160-180x1.5 µm, always 16-celled, mostly decomposing in four 4-celled part-spores; saprobic on wood (*Carpinus*, *Fagus*, *Fraxinus*, *Salix*); phen.: IV-VI • **Vibrissea flavovirens** (Pers.) Korf & J.R. Dixon (1974)
- 9' Apothecia 0.5-1 mm diam., outside brown-striate, very short brown stalk; asci *180-200x8.5-9.5 µm, IKI-, with croziers.; spores *85-127x1.6-1.7(-1.9) µm, eguttulate, straight, 7-septate, terminal cells longer than towards centre; paraphyse apex strongly clavate, sometimes branched, with refractive VBs; ectal excipulum with brown cortical hyphae; perihymenial zone IKI very pale blue; saprobic on leaves of *Quercus robur*, *Quercus ilex*, *Q. pubescens*; phen.: V
 **Vibrissea cesatii** (Mont.) Baral (2019)
 Ill.: Rubio & al. 2010: 252.
- 10 Apothecia sessile, disc plano-convex, 0.4-0.8(1.2) mm diam., hymenium greyish, outside finely dotted blackish brown; asci 140-215x(6)9-10 µm, IKI-, with croziers; spores 42-61x2-3(3.4) µm, 3-septate, OCl 2; paraphyses apex mostly branched, with refractive VBs; medulla with glassy elements; saprobic on submerged deciduous wood (*Alnus*, *Carpinus*, *Fagus*); phen.: IV-V (DE, ES) **Vibrissea catarhyta** (Kirchst.) Baral (1999)
 Ill.: Baral 2019: pl. 1-2.
- 10' Spores longer 11
- 11 Apothecia sessile, 0.5-1.2 mm diam., hymenium greyish, outside and margin brown; asci IKI-; spores 100-210x1-2 µm, 15-septate, disarticulating in two part; paraphyses branched, apical cells with VB's; saprobic on water-soaked wood (*Salix*) and *Phragmites* culms; phen.: V-VII • **Vibrissia filisporia f. filisporia** (Bonord.) Korf & A. Sanchez (1967)
- 11' Idem; paraphyses simple; phen.: VII **Vibrissea filisporia f. fiscella** (P. Karst.) A. Sánchez (1967)
- 12 Apothecia with long stalk, head yellow; spores ?straight **Vibrissea "piceicola"** Baral nom. prov.
- 12' Apothecia sessile, 0.5-2(2.5) mm diam., hymenium ivory, outside striate and brownish; asci IKI+, with croziers; spores sigmoid, 140x1.4-1.7 µm, 7-11(13)-septate, OCl 1-2; saprobic on stems of *Rubus idaeus*; phen.: IX
 **Vibrissea "rubicola"** Baral nom. prov.

HELOTIALES, genera of unclear position

Lit.: Jaklisch et al. 2016: 182.

1. *Aeruginoscyphus* Dougoud
2. *Amylocarpus* Curr.
3. *Angelina* Fr.
4. *Ascluella* Di Como et al.
5. *Ascoclavulina* Otani
6. *Acoconidium* Seaver
7. *Asterocalyx* Höhn.
8. *Aquadiscula* Shearer & J.L. Crane
9. *Austrocenangium* Gamundi
10. *Banksiamyces* G. Beaton
11. *Belonioscyphella* Höhn.
12. *Benguetia* Syd. & P. Syd.
13. *Bioscypha* Syd.
14. *Bulgariella* P. Karst.
15. *Bulgariopsis* Henn.
16. *Calycellinopsis* W.Y. Zhuang
17. *Callipiles* R. Sant.
18. *Capricola* Velen.
19. *Cashiella* Petr.
20. *Cenangiumella* J. Fröhl. & K.D. Hyde
21. *Chlorospleniella* P. Karst.
22. *Chondroderris* Maire
23. *Ciliella* Sacc. & P. Syd.
24. *Colipila* Baral & Guy Garcia
25. *Corticifraga* D. Hawksw. & R. Sant.
26. *Crocicreas* Fr.
27. *Crumenella* P. Karst.
28. ?*Cryptocline* Petr.
29. *Cryptohymenium* Samuels & L.M. Kohn
30. *Dactylaria* Sacc.
31. *Dawsonicola* Döbbeler
32. *Dermateopsis* Nannf.
33. *Dictyonia* Syd.
34. *Didonia* Velen.
35. *Echinodiscus* Etayo & Diederich
36. *Encoeliopsis* Nannf.
37. *Episclerotium* L.M. Kohn & Nagas.
38. *Erikssonopsis* M. Morelet
39. *Gloeopeziza* Zokal
40. *Godroniopsis* Diehl & E.K. Cash
41. *Grimmicola* Döbbeler & Hertel
42. *Grovesia* Dennis
43. *Hemiglossum* Pat.
44. *Hymenobolus* Durieu & Mont.
45. *Hyphoscypha* Bres.
46. *Jacobsonia* Boedijn
47. *Lasseria* Dennis
48. ?*Lemalis* Fr.
49. *Leptodontidium* de Hoog
50. *Livia* Velen.
51. *Masseea* Sacc.
52. *Melanopeziza* Velen.
53. *Mitrulinia* Spooner
54. *Mycosphaerangium* Verkley
55. *Obconicum* Velen.
56. *Obscurodiscus* Raitv.
57. *Orbiliopsis* (Sacc.) Syd.
58. *Parencoelia* Petr.
59. *Patellariopsis* Dennis
60. *Patinella* Sacc.

61. *Patinellaria* P. Karst.
62. *Peltigeromyces* A. Möller
63. *Pestalopezia* Seaver
64. *Pezolepis* Syd.
65. *Pezomela* Syd.
66. *Phacidiella* P. Karst.
67. *Phaeofabraea* Rehm
68. *Phragmonaevira* Rehm
69. *Pleoscutula* Vouaux
70. *Podophaacidium* Niessl
71. *Potridiscus* Döbbeler & Triebel
72. *Pseudolachnum* Velen.
73. *Pseudopeltis* L. Holm & K. Holm
74. *Pseudotryblidium* Rehm
75. *Psilophana* Syd.
76. *Pubigera* Baral, Gminder & Svrček
77. *Rhizocalyx* Petr.
78. *Rommelaarsia* Baral & Haelew.
79. *Roseodiscus* Baral
80. *Sambucina* Velen.
81. *Sclerocrana* Samuels & L.M. Kohn
82. *Scytalidium* Pesante 1957
83. *Sinofavus* W.Y. Zhuang
84. *Sorokina* Sacc.
85. *Sorokinella* J. Frödl. & K.D. Hyde
86. *Stilbopeziza* Speg.
87. *Tetracladium* DeWild.
88. *Tovariella* Syd.
89. *Trichohelotium* Killerm.
90. *Triposporium* Corda
91. *Waltonia* Saho
92. *Woodiella* Sacc. P. Syd.
93. *Xeromedulla* Korf & W.Y. Zhuang
94. *Zugazaea* Korf, Iturr. & Lizon

Key to the genera treated here:

- | | |
|--|-----------------------|
| 1 Only asexual morphs known | 2 |
| 1' Sexual morphs known | 6 |
| | |
| 2 Coniomata hyphomycetous | 3 |
| 2' Coniomata pycnidial | 5 |
| | |
| 3 Conidiophores micronematous, hyaline. Conidia arthrocatenate, fragmenting, one-celled, smooth, hyaline or brown | <i>Scytalidium</i> |
| 3' No arthroconidia formed | 4 |
| | |
| 4 Conidiophores hyaline, little-differentiated. Conidia hyaline, clavate, obclavate or filiform, formed on conspicuous, usually scattered, hyaline denticles which arise at acute angles | <i>Dactylaria</i> |
| 4' Conidiophores brown | 5 |
| | |
| 5 Conidiophores brown, often arising from dark fascicles of vegetative hyphae, either as simple phialides or with additional septa. Phialides pigmented mainly in the lower part, subhyaline towards the apex, often sympodially proliferating, tapered slightly below the collarete, collarete funnel-shaped. Conidia hyaline, smooth-walled, clavate, with a truncate base, rounded apically, cohering in long chains. Chlamydospores absent. | <i>Infundichalara</i> |
| 5' Colonies effuse, black, hairy. Conidiophores macronematous, cylindrical, unbranched. Conidia solitary, compose of 3(4) tapering, septate arms joined by their dark brown bases, subhyaline at the tips | <i>Triposporium</i> |
| | |
| 6' Not lichenicolous | 7 |
| | |
| 7 Apothecia scutellate; on ferns | <i>Pseudopeltis</i> |
| 7' Apothecia not scutellate | 8 |
| | |
| 8 Apothecia cupulate to applanate; excipulum of short-celled textura porrecta or textura epidermoidea; spore ellipsoid, aseptate, hyaline; arising 1-3(7) from mummified fruits; phen.: spring | <i>Gloeotinia</i> |

8'	Species without stroma	9
9	Apothecia on soil; margin dentate	<i>Podophaecidium</i>
9'	Margin not dentate	10
10	Ectal excipulum of brown textura globulosa-angularis	11
10'	Ectal excipulum otherwise	12
11'	Apothecia sessile on a subiculum; ectal excipulum of brown thick-walled textura globulosa, pustulate; margin with hyphal hairs; asci I-; spores septate; paraphyses capitate	<i>Encoeliopsis</i>
11	Excipulum with cortical hyphae covered by greenish-yellow exudate; paraphyses cylindrical to narrowly lanceolate; asexual state forms sporodochia with large, multiguttulate, holoblastic phragmoconidia	<i>Rommelaarsia</i>
12	Ectal excipulum of whitish textura globulosa-angularis	13
12	Ectal excipulum of textura prismatica to porrecta	14
14	Ectal excipulum of hyaline or greenish textura prismatica; hairs thick-walled, refractive, septate, smooth or covered by blue-green amorphous material; paraphyses cylindrical to clavate, with obtuse tip; substrate colouring green	<i>Aeruginoscyphus</i>
14'	Ectal excipulum not green; substrate not colouring green	15
15	Medullary excipulum gelatinous; spores brown	<i>Bulgariella</i>
15'	Spores hyaline	16
16	Ectal excipulum of textura prismatica-porrecta, with reddish brown exudate; apothecia stipitate, cyathiform; asci I+; paraphyses branched, embedded in gel; hairs cylindrical, straight to flexuous, irregularly incrustated	<i>Pubigera</i>
13	Apothecia superficial, cyathiform, stipitate, white, receptacle covered by white, spindle-shaped to subulate hairs; asci with pore of <i>Calycina</i> -type, arising from croziers; paraphyses dimorphic that resemble the hairs in both shape and septation; presence of partly distinctly curved hairs on stipe and lower flanks of the apothecia ; lignicolous	<i>Colipila</i>
13'	Spores large and clavate, 1-5-septate, hyaline; paraphyses sometimes forming a brown 'pseudo-epithecium'; on rotten wood	<i>Patellariopsis</i>
13	Asci I+; spores ellipsoid to fusiform, aseptate; on sclerotia of other fungi	<i>Episclerotium</i>
13	Paraphyses mostly lanceolate, without vacuolar bodies	<i>Crocicreas</i>
35	Apothecia similar to <i>Hymenoscyphus</i> , hymenium rose; asci with truncate apex, apical ring of <i>Calycina</i> -type; in bogs and swamps, parasitic to saprobic on <i>Bryophyta</i> and <i>Equisetum</i>	<i>Roseodiscus</i>

Pragmonaevia, Peltigeromyces, Lemalis, Belioscyphella, Patinellaria

Aeruginoscyphus Dougloud

Type species: *Aeruginoscyphus sericeus* (Alb. & Schein.) Dougloud.

Lit.: Rubio & al. 2010: 212 (sub *Chlorosplenium sericeus*), Dougloud 2012: 1-4.

- 1 Apothecia cupulate, (0.6)1-2.5(3) mm diam, hairy, shortly stalked, hymenium pale greyish to blue-green, receptacle pale to dark blue-green; asci 110-135(150)x13-14.5(15) μ m, I+, without croziers; spores (38.5)43-57(61.5)x3.8-4(4.3) μ m, becoming 3-septate, filled with small guttules, OCI 5, hyaline or sometimes blue-green; saprobic on rotten wood of *Corylus avellana*, *Quercus*; phen.: III-VII \circ **Aeruginoscyphus sericeus** (Alb. & Schein.) Dougloud (2012) III.: Rubio & al. 2010: p. 212, Dougloud 2012: photo & pl. 1-2.

Belonioscyphella Höhn.

Type species: *Belonioscyphella hypnorum* (Syd. & P. Syd.) Höhn.

Lit.: Carpenter 1981: 223 (B. hypnorum), Huhtinen & al. 2010: 413 (B. pluriseptata), Egertova & al. 2016: 91.

- 1 Apothecia turbinate, short-stipitate, less than 0.5 mm diam., pinkish; asci 180-190x15-18 μ m, J+, thick-walled; spores clavate, 30-33x5-6 μ m, 3-septate, hyaline; necrotrophic bryoparasite on mosses (*Anomodon attenuatus*, *A. viticulosus*, *A. rugelii*, *Brachythecium velutinum*, *Ctenidium molluscum*, *Fissidens cristatus*, *Hypnum cupressiforme*, *Plagiochila asplenioides*, *Pterigynandrum filiforme* and *Tortella tortuosa*); phen.: I-II
- **Belonioscyphella hypnorum** (Syd. & P. Syd.) Höhn. (1918)

- 1' Apothecia similar; asci 161-215x14-26 µm, J+, thick-walled, with croziers; spores fusiform, 33-55x6.5-9 µm, (3)7-septate, guttulate, hyaline; bryosymbiotic on *Dicranum polysetum*; phen.: X
 **Belonioscyphella pluriseptata** Döbbeler & Laukka (2010)
 Ill.: Huhtinen & al. 2010: fig. 5.

Brachyalaria Réblová & W. Gams

Type species: *Brachyalaria straminea* Réblová & W. Gams

Lit.: Réblová & al. 2011: 67.

- 1 Colonies felty to powdery, effuse, straw-yellow, ochraceous to pale brown. Conidiophores 30–40(50)x3.5-4.5 µm, upright to slightly decumbent, mid-brown, 2–4-septate, usually limited to few supporting cells bearing a conidiogenous cell, unbranched or rarely branching at the base. Conidiogenous cells 25-32(39)x5.5–6.5 µm (mean ± s.e. = 29.9±1.2x5.9±0.1 µm), tapering to 1.5--2 µm just below the collarette, terminal, integrated, monopodialic, ampulliform, venter pale brown, subhyaline towards the apex, part between collarette and phialide pale brown; collarette 2–3 µm deep, widening to 2–3 µm diam, pigmented in the lower part. Conidia (5)6.5-8x4–4.5 µm (mean ± s.e. = 7.1±0.2x4.3±0.07 µm), hyaline, strawyellow to ochraceous in mass, 1-celled, ellipsoidal to obovoidal, truncate at the basal end, rounded and truncate at the apical end, finely verruculose, in basipetal chains adhering end-to-end. Teleomorph unknown; growing on the surface of decayed ascوماتа of *Bulgaria inquinans*; phen.: X-XII (BE/W,DE)
 ○ **Brachyalaria straminea** Réblová & W. Gams (2011)
 Ill.: Réblová & al. 2011: fig. 3-16.

Bulgariella P. Karst.

Type species: *Bulgariella pulla* (Fr.) P. Karst.

Lit.: Ellis & Ellis 1985: 95 (*B. pulla*), Hansen & Knudsen 2000: 138.

- 1 Apothecia superficial, 0.5-2.5 mm diam., mostly crowded, sessile, blackish; asci 160-185x10-11 µm, IKI-, arising from croziers; spores broadly ellipsoid, 10.5-14(17)x(6.5)7.5-9(9.5) µm, guttulate, dark brown; ectal excipulum of textura porrecta; saprobic on decaying wood of *Betula* and *Fagus*; phen.: VI
 **Bulgariella pulla** (Fr.) P. Karst. (1885)
 Ill.: Ellis & Ellis 1985: fig. 380.

Capillipes R. Sant.

Type species: *Capillipes cavorum* R. Sant.

Lit. : Hansen & Knudsen 2000 : 139.

- 1 Apothecia globose, 0.3-0.65 mm, waxy, pale greyish brown; stalk 11-18x0,05-0,08 mm, abruptly bent, blackish base; asci I-; spores ellipsoid, 8-10x2-3 µm; paraphyses with abruptly swollen tip to 6-8 µm, with thick, pale brown, verrucose wall ; saprobic on plant debris in lemming burrows ; phen. : VIII
 **Capillipes cavorum** R. Sant. (1956)

Crocicreas Fr.

Type species: *Crocicreas gramineum* (Fr.) Fr.

Lit.: Carpenter 1980: 1.

- 1 Apothecia stipitate, when dry the margin appearing as a white pulverulent collarette; asci 36-48x3-4 µm; spores (6) 7-8(10)x1.5-2 µm, OCI 1; paraphyses clavate to sublanceolate; saprobic on stems of Apiaceae, *Bambusa*, *Equisetum fluviale*, but mainly on Ranunculaceae (*Caltha palustris*, *Ranunculus acinatifolius*, *R. acris*, *R. auricomus*, *R. fallax*, *R. plectranthemus*, *R. repens*, *R. villarsii*); phen.: (I)IV-VII
 **Crocicreas starbaeckii** (Rehm) S.E. Carp. (1980)
 Ill.: Schmid I. & H. 1990: nr. 13, Rubio & al. 2010: p. 216.
- 1' Apothecia without collarette; paraphyses of two types: cylindrical and lanceolate 2
- 2 Asci 40-58x5-6(7) µm; spores (6)7-10(11)x(2)2.5-3 µm; saprobic on leaves of Poaceae (*Poa arctica*, *P. nemoralis*); phen.: (I)V-IX **Crocicreas gramineum var. gramineum** (Fr.) Fr. (1849)
- 2' Asci 30-38x4-6 µm, I+; spores (4)5-6(7)x1.5-2 µm, OCI 0; saprobic on leaves of Poaceae (*Avena versicolor*, *Calamagrostis varia*, *Deschampsia caespitosa*, *Koeleria ciliata*, *K. cristata*, *Poa alpigena*, *P. arctica*, *P. cookei*, *Sesleria caOClaria*, *Trisetum spicatum* spp. *pilosiglume*); phen.: VI-XI(I)
 **Crocicreas gramineum** (Fr.) Fr. var. **incertellum** (Rehm) S.E. Carp.(1980)

Colipila Baral & G. Garcia

Type species: *Colipila masduguana* Baral & G. Garcia

Lit.: Baral & al. 2011.

- 1 Asci *56-72x6.7-7.5 µm (†42-58x5.3-6 µm), apical ring hemiamyloid (rB/RB); spores *6.5-14x2.4-3.5 µm (†5.8-13x2-3.3 µm), OCI 0.5-1.5, hairs at margin 40-90 µm long, apothecia often >0.8-1 mm diam; saprobic on wood of Fagaceae (*Castanea* and *Quercus*); phen.: XII-III, sub-Mediterranean and temperate Europe
 • **Colipila masduguana** Baral & G. Garcia (2011)
 Ill.: Baral & al. 2011: fig.1-3.
- 1' Asci *50-63x5.5-6 µm (†40-48x4.5-5.3 µm), apical ring euamyloid (BB), spores *9-12x2-2.3 µm (†6-10.8x1.5-2 µm), lipid content 0-0.5, hairs at margin 60-150 µm long; apothecia <1 mm diam.; on unidentified wood (?Rosaceae); phen.: VI, montaneous Central Europe **Colipila pilatensis** Baral (2011)

Cryptocline Petr.

Type species: *Cryptocline effusa* Petr.

Lit.: Morgan-Jones 1973: 309.

Genus in need of revision. Some species are presumed conidial states of *Trochila* spp. (see over there).

- 1 Acervuli sparse, 200-370 µm diam. Conidiophores phialidic, cylindrical, 12-33x3-4 µm, hyaline, smooth-walled, guttulate, with one or more slightly flaring collarettes, frequently proliferating percurrently. Conidia ellipsoidal, 4.5-6.5 x3.5-5 µm, with obtuse apical end and truncate basal end, unicellular, hyaline, smooth-walled, guttulate. On cone scales of *Picea abies*. Phen.: ? (BE/W) **Cryptocline conigena** (Sacc. & Roum.) Arx (1957)
- 1' Conidia more than 7 µm long 2
- 2 Conidia up to 16 µm long 3
- 2' Conidia longer 4
- 3 Acervuli abundant, 100-150 µm diam., amphigenous, appearing as small, white to very pale orange pustules. Conidiophores phialidic, hyaline, smooth-walled, 17-28x3-5 µm. Conidia oblong to ellipsoidal, 12-16x4-6 µm, unicellular, with truncate base, hyaline, smooth-walled, guttulate. On leaves and stems of *Cyclamen* sp. Phen.: XI (NL)
 **Cryptocline cyclaminis** (Sibilia) Arx (1963)
 Ill.: Morgan-Jones 1973: fig. 4.
- 3' Acervuli abundant, 200-400 µm diam. Conidiophores phialidic, 13-24x 3.5-5 µm, hyaline, smooth-walled, proliferating percurrently. Conidia formed in succession from phialides, short, long-ellipsoidal or slightly ovate, 10-16x5-7 µm, unicellular, hyaline, guttulate, smooth-walled, with obtuse apical and truncate basal end. Parasitic on leaves of *Taxus baccata*. Phen.: (BE/F, CZ,DE,PL)
 **Cryptocline taxicola** (Allesch.) Petr. (1925)
 Ill.: Morgan-Jones 1973: fig. 10.
- 4 Acervuli abundant, 100-180 µm diam., hypophyllous, dark brown. Conidiophores phialidic, 10-25x3.5-5 µm. Conidia ellipsoidal to clavate, 10-27x4-8 µm, unicellular, hyaline to pale brown, smooth-walled, guttulate, with truncate base. Saprobic on leaves of *Quercus* spp. Phen.: (VI)IX-X (DE, GB, NL)(●) **Cryptocline cinerescens** (Bubák) Arx (19)
 Ill.: Morgan-Jones 1973: fig. 3, Ellis & Ellis 1985: 936.
- 4' Acervuli abundant, 150-280 µm diam., hypophyllous, appearing as light orange pustules. Conidiophores phialidic, 10-25x3.5-5 µm, hyaline. Conidia ellipsoidal to narrowly obovate, 15-28x8-12 µm, unicellular, with obtuse apical and truncate basal end, hyaline, smooth-walled, guttulate. Microconidia formed from phialides, hyaline, unicellular, oblong, 5-10x2.5-3 µm. On leaves of *Populus tremula*. Phen.: IX (CZ) **Cryptocline dubia** (Bauml.) Arx (1957)
 Ill.: Morgan-Jones 1973: fig. 5.

Encoeliopsis Nannf.

Type species: *Encoeliopsis rhododendri* (Ces. ex Rabenh.) Nannf.

Lit. : Nannfeldt 1932 : 306, Groves 1969: 1319, Dennis 1978: 150, Heimler 1979: 244, Holm & Nannfeldt 1990a: 11.

- 1 Asci exceeding 130 µm in length, I+; ascospores exceeding 6 µm in width
 **Encoeliopsis johnstonii** (Berk.) Dennis (1956)
- 1' Ascus pore not blueing in iodine 2
- 2 Apothecia discoid to cupulate, up to 1 mm diam., dark brown, sessile on a brown subiculum; asci 55-75x6-8 µm, I-; spores 13.5-18x3.5-5 µm, 1-septate, hyaline; tips of paraphyses swollen to 4-7 µm saprobic on cupules of *Rhododendron ferrugineum*, on capsules of *Cassiope hypnoides*; phen. : VI-X (AT, CH)
 (●) **Encoeliopsis rhododendri** (Ces. ex Rabenh.) Nannf. (1932)
 Ill.: Groves 1969: fig. 17.
- 2' Tips of paraphyses swollen to 3-4 µm; asci mostly less than 10 µm in diameter 3

- 3 Apothecia remaining closed for a long time, subglobose to urceolate, opening at first pore-like, finally becoming expanded; spores fusoid, (12)14-18(20)x3-5 µm, 1(3)-septate, hyaline; ectal excipulum with an outer layer of *textura oblita*; on *Ribes* (USA) **Encoeliopsis oricostata** (Cash) J.W. Groves (1969)
 Ill.: Groves 1969: fig. 21.
- 3' Apothecia erumpent, 0.5-1 mm diam.; asci (70)75-100(110)x(7.5)8-10(11) µm, I-; spores fusoid to fusoid-clavate, (10)13-18(20)x(3)4-4.5(5.5) µm, (0)1-septate, hyaline; conidial state not evident and unknown; on leaves and twigs of *Rhododendron ferrugineum*; phen.: VII-VIII **Encoeliopsis bresadolae** (Rehm) J.W. Groves (1969)
 Ill.: Groves 1969: fig. 18.

Episclerotium L.M. Kohn & Nagas.

Type : *Episclerotium sclerotiorum* (Rostr.) L.M. Kohn

Lit. : Nannfeldt 1942: 53, Eckblad 1963: 153, Dennis 1978 : 98 (sub *Mitrula sclerotipus*). Benkert 1983 : 151 (sub *Heyderia*), Beyer & al. 1985: 54 (sub *Heyderia*).

- 1 Fertile part globose to elongated, 0.5-2 mm diam., pale yellowish, stipe up to 6x0.8 mm, white to pale brown; asci 35-55x3.5-5 µm, I+; spores 5-8x2-2.5 µm, aseptate, hyaline; parasitic on sclerotia of *Sclerotinia trifoliorum*; phen.: X-XI **Episclerotium sclerotiorum** (Rostr.) L.M. Kohn (1984)
- 1' Fertile part +/- cylindrical, up to 6x2 mm, yellow, stipe up to 16x1 mm ; asci 35-62x5-6 µm, I+; spores (6-)7-9(11)x1.5-2(3) µm, aseptate, hyaline; parasitic on sclerotia of *Typhula erythropus*, *T. sp.* ; phen. : X-XI **Episclerotium sclerotipus** (Boud.) L.M. Kohn (1984)

Erikssonopsis M. Morelet

Type species: *Erikssonopsis ericae* (Fr.) M. Morelet

Syn.: *Grovesiella* B. Erikss. non M. Morelet

Lit. : Groves 1969 : 1321 (sub *Encoeliopsis ericae*), Eriksson 1970, Heimler 1979 : 248, Hansen & Knudsen 2000: 147.

- 1 Apothecia hemispherical, subsessile, about 1 mm broad, coriaceous, very dark brown to black, solitary; asi (70)85-100(115)x(6)7-9(10) µm, I+ blue; spores fusoid with pointed ends, 15-20x3-4 µm, 1-septate, hyaline; saprobic on still attached twigs of living *Calluna vulgaris*; phen.: VI-IX **Erikssonopsis ericae** (Fr.) M. Morelet (1971)
 Ill.: Groves 1969: fig. 19.

Dactylaria Sacc.

Syn.: *Pleurophragmium* Cost.

Type species: *Dactylaria purpurella* (Sacc.) Sacc.

Lit.: Ellis & Ellis 1985: 294 (sub *P. parvisporum*); De Hoog 1985: 1.

- 1 Conidiophores average more than 120 µm long 2
- 1' Conidiophores up to 120 µm long 3
- 2 Colonies thinly hairy, blackish brown. Conidiophores erect, 100-300x4-6 µm, up to 10-septate, thick-walled, dark brown, with scattered, pimple-shaped, hyaline denticles near the apex. Conidia fusiform to obovoidal, base slightly acuminate, 10-20x3,5-5,5 µm, (1-)3(-4)-septate, smooth or verruculose, subhyaline. Saprophytic on stems of *Urtica dioica*, also on *Arctium*, *Conium*, *Epilobium*, *Filipendula*, *Heracleum*, *Sisymbrium*, etc. Phen.: I-XII (BE/F)
 o **Dactylaria parvispora** (Preuss) de Hoog & Arx (1973)
 Ill.: Ellis & Ellis 1985: fig. 1302, de Hoog 1985: fig. 38.
- 2' Colonies effuse, shortly hairy, white to pale brown. Conidiophores up to 500x2-4 µm, pale brown near the base, otherwise hyaline. Conidia on pegs, 18-25x3-4 µm, mostly 3-septate, hyaline. On rotten wood (*Quercus*)
 **Dactylaria purpurella** (Sacc.) Sacc. (18
 Ill.: Ellis & Ellis 1985:fig. 984.
- 3 Conidiophores up to 30 µm long 4
- 3' Conidiophores longer 5
- 4 Conidiophores flexuous, 20-30x5-5 µm, with many denticles, hyaline to pale brown. Conidia cylindrical, 25-35x2 µm, 1-septate, very thick-walled at each truncate end, hyaline. On fallen dead leaves of *Picea abies*
 **Dactylaria lepida** Minter (1980)
 Ill.: Ellis & Ellis 1985:fig. 732.
- 4' Colonies effuse, inconspicuous. Conidiophores up to 15x4.5 µm, hyaline. Conidia narrowly obtriangular, 20-35x2-3 µm, 1-setate, hyaline. On dead leaves of *Laurus*. **Dactylaria obtriangularia** Matsush. (1975)
 Ill.: Ellis & Ellis 1985:fig. 691.

- 5 Colonies effuse, yellowish brown. Conidiophores up to 120x3-5 µm. Conidia born on pegs, 18-26x3-4 µm, 1-septate, hyaline or yellowish. On rotten wood (*Quercus*). **Dactylaria chrysosperma** (Sacc.) Bhatt & Kendrick (19 III.: Ellis & Ellis 1985:fig. 983.
- 5' Colonies effuse, thin, pale greyish brown, inconspicuous, Conidiophores up to 120x3-5 µm, brown. Conidia 15-30x4-5 µm, 1-septate, hyaline to pale brown. On dead leaves of *Juncus effusus*. . **Dactylaria junci** M.B. Ellis (1976) III.: Ellis & Ellis 1985:fig. 2052.

Lemalis Fr.

Type species: *Lemalis alismatis* (Pers.) Fr.

Lit.: Saccardo 1884: 672, Saccardo 1889: 327 (sub *Mollisia alismatis*), Grove 1937: 125 & 133.

- 1 Conidiomata urn-shaped with a spreading rim, very fragile, about 1 mm high and broad, excipulum shining lemon-yellow, margin coarsely dentate with groups of hairs ; conidiophores long, cylindrical, branched, about 0.75 µm wide, each producing a whorl of four branches at the apex ; conidia globose, hyaline, yellow, 1.5-2 µm diam., concatenate, involved in mucus ; on cones and wood of *Pinus silvestris* (when dry resembles *Calloria chrysocoma*) ; phen.: III
 o **Lemalis aurea** (Lév.) Sacc. (1884)
- 1' Conidiomata cup-shaped, sessile, purplish grey; on stem of *Alisma plantago-aquatica*
 **Lemalis alismatis** (Pers.) Fr. (1849)

Leptodontidium de Hoog

Type species: *Leptodontidium elatius* (F. Mangenot) de Hoog = *Leptodontidium trabinellum* (P. Karst.) Baral, Platas & R. Galán

Lit.: Dennis 1956: 194 (sub *Helotium trabinellum*).

- 1 Apothecia 0.5 mm diam., pale yellow to translucent; asci 90-102x10-12 µm, IKI bb, with croziers; spores 10-14x3-4 µm, 0(1)-septate, OCI 4 (two large and many small LB's), sometimes with ascoconidia; paraphyses with long VB in upper cell and densely septate at the base; lignicolous (*Betula*); phen.: X-XII (ES)
 **Leptodontidium trabinellum** (P. Karst.) Baral, Platas & R. Galán (2015)
 III.: Dennis 1956: fig. 177.

Mastigosporium Riess

Type species: *Mastigosporium album* Riess

Lit.: Mayerhofer et al. 1991: 73 (key), Crous & al. 2014: 155.

- 1 *Leaf spots* amphigenous, pale brown, subcircular, up to 5 mm diam, containing creamy sporodochia. *Conidiophores* smooth, hyaline, subcylindrical, 1-3-septate, mostly unbranched, flexuous, arising from a brown stroma, 20-70x5-7 µm. *Conidiogenous cells* terminal, integrated, cylindrical, smooth, hyaline, proliferating sympodially and percurrently at apex, 15-25x5-7 µm. *Conidia* solitary, obclavate to fusoid-ellipsoid, hyaline, guttulate, 3-5-septate, constricted at septa, hyaline but appearing olivaceous with age, widest in second cell from base, hilum truncate, 3-7 µm diam, with minute marginal frill, (48)55-65(70)x(10)12-15(17) µm. Conidia containing several cellular appendages that are hyaline, smooth, subcylindrical, branched or not, septate. Apical appendage arising from terminal end, 20-120x2-3 µm, with 1-3 lateral branches, or branching dichotomously, flexuous, or apex giving rise to two appendages; apical appendage bluntly rounded, rarely with clavate apex. Lateral appendages (1-2) arising from apical cell or second or even third cell from apex, 40-100 µm long, 0-3-septate. Parasitic on leaves of *Alopecurus pratensis*; phen.: III-V (AT, BE/F, CZ, NL, DE, DK, SE, UK) **Mastigosporium album** Riess
 III.: Ellis & Ellis 1985: fig. 1823, Crous & al. 2014: fig. 8.
- 1' Conidia without filiform appendages 2
- 2 Conidia with 3-8-septate, mostly 6-septate, 40-85x14-30 µm. On *Deschampsia caespitosa*.
 **Mastigosporium deschampsiae** Jørst. (1947)
 III.: Ellis & Ellis 1985: fig. 1875.
- 2' Conidia with 3(4) septa 3
- 3 Conidia 22-39 µm long. On *Phleum* spp. (DE) **Mastigosporium kitzebergense** U. Schlöss. (1970)
- 3' Conidia 35-52 µm long. On other hosts 4
- 4 Hilum with wulstförmigem Kragen, end cell elongated. On *Agrostis* spp. and *Calamagrostis* spp.
 **Mastigosporium rubricosum** (Dearn. & Barthol.) Nannf. (1939)
 III.: Ellis & Ellis 1985: fig. 1822.

- 4' Hilum with poorly developed Kragen, end cell not elongated. On *Dactylis* spp. (FR)
 **Mastigosporium muticum** (Sacc.) Gunnerb. (1971)
 Ill.: Ellis & Ellis 1985: fig. 1864.

Obscurodiscus Raitv.

Type species: *Obscurodiscus myricae* (P. Karst.) Raitv.
 Lit.: Raitviir 2002: 49.

- 1 Apothecia superficial, sessile, 0.2-0.4 mm diam., cupulate, opaque black, externally furfuraceous; ectal excipulum of textura globulosa, cells with dark smoky brown walls; asci 25-30x4-5 µm, apical pore deeply blue in MLZ, without croziers; spores clavate-fusiform, 6-8x1.5 µm, eguttulate; paraphyses lanceolate; saprobic on twigs of *Myrica gale*; phen.: VII **Obscurodiscus myricae** (P. Karst.) Raitv. (2002)

Parencoelia Petr.

Type species: *Parencoelia andina* Petr.
 Lit.: Zhuang 1988: 85.

No Western European species known.

Parthenope Velen.

Type species: *Parthenope parasitica* Velen.
 Lit.: Velenovski 1934: 228, Baral (unpublished key).

- 1 Apothecia 4-16 mm diam., *Mollisia*-like, olivaceous brown; hymenium with gel; asci 47-64x4-4.5 µm, IKI blue, without croziers; spores 2-4x1.4-1.8 µm, biguttulate; saprobic on bark and wood of *Betula*, *Fagus*; phen.: VIII
 • **Parthenope pilatii** Velen. (1939)
- 1' Apothecia cupulate, stipe rugose-foveolate, 1-2 mm diam., 2 mm high, hymenium yellowish, outside pale yellowish; asci 80-90x5-7 µm; spores ellipsoid, 10-12 µm long, aseptate, biguttulate; parasitic on *Lenzites abietina*; phen.: VIII
 **Parthenope parasitica** Velen. (1934)

Patellariopsis Dennis

Type species: *Patellariopsis clavispora* (Berk. & Broome) Dennis.
 Lit.: Dennis 1978: 197.

- 1 Sexual state: Apothecia sessile, up to 1 mm diam., disc black with purplish brown margin; asci 65-90(-101)x11-13 µm J+; spores 20-30x3-4.5 µm, 3-septate, multiguttulate, OCI 5, hyaline. Asexual state with brown, thick-walled, globose conidia 5 µm diam. forming loose clusters. Saprophytic on decorticated wood (*Cornus*, *Corylus*); phen.: XI-V (BE/F)..... • **Patellariopsis atrovinosa** (A. Bloxam ex Curr.) Dennis (1974)
 Ill.: Breitenbach & Kränzlin 1981: pl. 263.
- 1' Spores longer 2
- 2 Apothecia sessile, up to 2 mm diam., disc convex when moist and black,; receptacle composed of hyaline radiating hyphae which pass into an outer tissue of subglobose, dark brown encrusted cells; spores 27-38x4.5 µm, 3-5-septate; saprobic on wood and bark of *Acer*, *Crataegus*, *Fagus*, *Ligustrum*, *Quercus*; phen.: X-XII
 **Patellariopsis clavispora** (Berk. & Broome) Dennis (1964)
- 2' Spores 35-42x6-8 µm, 4-6-septate; saprobic on *Arbus unedo*; phen.: ?
 **Patellariopsis dennisii** (E. Müll. & Hütter) Schläpf.-Bernh. (1969)

Patinella Sacc.

Type species: *Patinella hyalophaea* Sacc.
 Lit.: Baral & Carter 2013: 91.

- 1 Apothecia superficial, sessile or with short stout stipe, lens-shaped, rehydrated 0.25-1.2 mm diam., black; asci †(40) 42-53(65)x (4-)4.5-5(-5.5) µm, 8-spored, IKI-, arising from croziers; spores ellipsoid to slightly ovoid, *4.8-5.7x2.5-2.7 µm, †3.5-5x2.2-2.6 µm, hyaline, aseptate, smooth, containing 1(-2) inconspicuous oil drops 0.3-0.8 µm diam in each half; paraphyses filiform, hyaline, with a slightly to strongly swollen, globose or clavate apex, upper part of apex with a 0.5-3(4) µm thick, bright olive-brown wall; on decayed wood of *Fagus sylvatica*; phen.: IV,X

- • **Patinella hyalophaea** Sacc. (1875)
 Ill.: Baral & Carter 2013: fig1-6.

Patinellaria H. Karst.

Type species: *Patinellaria sanguinea* (Pers.) P. Karst.
 Lit.: Schmid I. & H. 1990: nr. 15.

- 1 Apothecia gregarious, on a web-like reddish to ochraceous subiculum, disciform, 0.2-0.4 mm diam., disc concave to flat, first translucent grey, then red-brown, finally black, with slightly exceeding red-brown to blackish margin; asci I+; spores clavate, 8-10x3-3.5 µm, aseptate, hyaline; saprobic on wood (*Abies*, *Corylus*, *Quercus*, *Salix*); phen.: IV-VIII
 • **Patinellaria sanguinea** (Pers.) P. Karst. (1885)
 Ill.: Schmid I. & H. 1990: nr. 15.

Peltigeromyces Möller

Type species: *Peltigeromyces microsporus* Möller
 Lit.: Baral (Ascofrance).

- 1 Hymenium whitish; asci (†) 33x3 µm, with markedly truncate apices, inamyloid (MLZ); spores subglobose, †1.5-2x1 µm, ?eguttulate; lower layer of medullary excipulum strongly gelatinized; ectal excipulum 40-50 µm thick, KOH-; subtropical South America (Bolivia) **Peltigeromyces microsporus** Möller ss. Dennis
 1' Hymenium not whitish; asci (†) with slightly truncate to hemispherical-subconical apices 2
 2 Hymenium (orange-)yellow (dry dark yellow-reddish to black); asci (†) 40-50x3.5-4 µm, amyloid or inamyloid; spores ovoid to narrowly ellipsoid(-fusoid); ectal excipulum 80-150 µm thick 3
 2' Hymenium (greenish-)bluish-grey (dry ??); spores almost globose to ellipsoid(-fusoid); ectal excipulum KOH-; asci amyloid 4
 4 Asci (†) 60x4 µm; spores ovoid to almost globose, ca. †1.5-2x1.5 µm, ?eguttulate; lower layer of medullary excipulum strongly gelatinized; subtropical South America (South Brasilia)
 **Peltigeromyces microsporus** Möller (1901)
 4' Apothecia 4-16 mm diam., *Mollisia*-like, olivaceous brown; asci (†) 40-58x(3-)3.5-4 µm, IKI+; spores ellipsoid to fusoid, rarely ovoid, †(1.8-)2-3(-3.5)x1.3-1.6 µm, with (1-)2(-3) LBs; lower layer of medullary excipulum ?slightly gelatinized; on wood of *Acer*, *Alnus*, *Betula*, *Fagus*, *Salix*; temperate Europe; phen.: VIII
 • **Peltigeromyces mollisioides** Baral nom. prov.
 = **Parthenope pilatii** Velen. ss. Baral?

Phragmonaevia Rehm

Type species: *Phragmonaevia libertiana* (Sacc. & Roum.) Rehm.
 Lit.: Rehm 1896: 160, Gremmen 1953: 141, Hein 1976: 10.

- 1 Apothecia erumpent, 0.3 mm diam., hymenium orange; asci 1-4-spored, I-; spores 38-46x9.5-11.5 µm, becoming 1-3-septate, hyaline; on needles of *Pinus cembra*; phen.: X **Phragmonaevia gigaspora** Gremmen (1953)
 Ill.: Sherwood 1987: fig. 14.

Podophaacidium Niessl

Type species: *Podophaacidium terrestre* Niessl = *Podophaacidium xanthomelum* (Pers.) Schröt.
 Lit.: Hansen & Knudsen 2000: 213.

- 1 Apothecia turbinate to irregularly discoid, 2-5 mm diam.; hymenium bright yellow; margin prominent, crenate, brown; outside dark brown to black, furfuraceous; asci I+; paraphyses branched above; spores ellipsoid to fusoid, 10-13x5-6 µm, non-septate, with two large guttules, hyaline; saprobic on soil and plant debris in coniferous woods; phen.: VII-X
 **Podophaacidium xanthomelum** (Pers.) Schröt. (1893)
 Ill.: Boudier 1904-1910: pl. 449, Breitenbach & Kränzlin 1981: Pl. 286, Schmid I. & H. 1990: nr. 10.

Pseudopeltis L. Holm & K. Holm

Type species: *Pseudopeltis fillicum* L. Holm & K. Holm
 Lit.: Holm & Holm 1978: 102, Holm & Holm 1981: 62 (*P. perminuta*).

- 1 Apothecia discoid, 0.1-0.3 mm diam., scutellate, excipulum almost absent; asci c. 40x10 µm, I+ after KOH pretreatment; spores 10-12x3.5-4 µm, 1-septate, hyaline, guttulate; saprobic on leaves of *Athyrium filix-femina*, *Dryopteris filix-mas*, *Dryopteris spinulosa*; phen.: III-VI **Pseudopeltis filicum** L. Holm & K. Holm (1978)
- 1' Apothecia 50-100x40-60 µm, scutellate, excipulum almost absent; asci saccate, 15-27x6-8 µm, I+ after KOH pretreatment; spores 7-9x2 µm, aseptate; saprobic on *Lycopodium* sp.; phen.: VI-VIII
..... **Pseudopeltis perminuta** L. Holm & K. Holm (1981)
..... III.: Holm & Holm 1981: fig. 1j & 7.

Pubigera Baral, Gminder & Svrček

Type species: *Pubigera subvillosula* (Rehm) Baral, Gminder & Svrček.

Lit.: Baral, Gminder & Svrček 1995: 47.

- 1 Apothecia cyathiform, stipitate, 0.5-1.8 mm diam., stipe up to 10 mm long, hymenium greyish brown to dark grey, outside and stipe concolorous to darker and hairy, with teeth-like tufts of white marginal hairs; ectal excipulum of *textura prismatica-porrecta*; spores *18-21x4-4.5 µm, finely striate, aseptate, hyaline; hairs flexuous, thick-walled, up to 200 µm long, hyaline with ochraceous base; saprobic on fallen needles of *Picea abies*, sometimes on needles of *Abies alba* and *Pinus sylvestris*; phen.: (I)II-IV
..... **Pubigera subvillosula** (Rehm) Baral, Gminder & Svrček (1995)
..... III.: Baral & al. 1995: fig. 1-21.

Rommelaarsia Baral & Haelew.

Type species: *Rommelaarsia flavovirens* Baral, Tanchaud & Romm.

Lit.: Baral & Haelewaters 2015: 321.

- 1 Apothecia 0.4-0.8(-1.1) mm diam., pale cream to yellowish olivaceous, slightly concave to flat, margin hairy toothed, sessile to shortly stipitate; asci *58-75x7.7-9 µm, apical ring IKI+ and *Calycina*-type, with croziers; spores subcylindrical to fusoid or often clavate-cuneate, *(8.5-)9.5-12(-14)x(2-)2.5-3.5(-4) µm, lipid content 0.5-1; paraphyses cylindrical or mostly narrowly lanceolate, without VBs; ectal excipulum light greenish yellow, of thin-walled, horizontally oriented *textura prismatica* from base to margin, covered by a network of cortical hyphae 5-8 µm wide, incrustated by a rough, bright greenish yellow exudate; asexual state forming whitish sporodochia with hyaline, fusiform, multiguttulate conidia *(83)87-105(118)x(14)14.5-16(18.5) µm and (7)8-11(12)-septate; on previous year's stems of *Equisetum arvense*, *E. fluviatile*; phen.: V-VII(a).....
..... ◦ **Rommelaarsia flavovirens** Baral, Tanchaud & Room. (2015)
..... III.: Baral & Haelewaters 2015; fig. 1-4.

Roseodiscus Baral

Type species: *Roseodiscus rhodoleucus* (Fr.: Fr.) Baral

Lit.: Dennis 1978: 138 (sub *Hymenoscyphus equisetinus*), Baral & Krieglsteiner 2006: 11, Wieschollek & al. 2011: 161 (*R. formosus*).

- 1 On mosses 2
- 1' On *Equisetum* 3
- 2 Apothecia up to 1.5 mm diam., cup-shaped with short stalk, whitish with pale pink tint; asci *52-66x6.5-7.5 µm, IKI+ deep blue; spores clavate or pyriform, *(5.2)6-8.5(10)x(1.8)2-2.6(3) µm, smooth, hyaline, with a few minute LBs in each spore half; parasitic on *Cephalozia catenulate*; phen.: VI **Roseodiscus subcarneus** (Sacc.) Baral (2006)
..... III.: Baral & Krieglsteiner 2006: fig. 1-3.
- 2' Apothecia (1)1.5-4(5) mm diam., flesh-coloured to pink, stipe 1-6 mm long and whitish; asci *(89)100-133(140)x9-11(12) µm, (63)70-95(106)x(6.5)7-8(9) µm, IKI red, with croziers; spores narrow ellipsoid to subclavate, *(9.5)12-18(23)x(3)3.5-4.2(5) µm, 0(1)-septate, with several small guttules at both poles, OCI 2-3; ?parasitic on *Ceratodon purpureus* in coast dunes, heaths, abandoned fields and waste dumps with moss vegetation; phen.: (I) II-III(IV)
..... • **Roseodiscus formosus** Wieschollek, Helleman, Baral & T. Richt. (2011)
..... III.: Wieschollek & al. 2011: Abb. 1-4.
- 3 Apothecia up to 2 mm diam., pale pink, sessile to stipitate; asci 90-115x9-10 µm; spores shoe-shaped, 0(1)septate, 10-16x3-4.5 µm, with a cluster of low refractive guttules at both poles, OCI 2; saprobic on stems of *Equisetum*; phen.: V • **Roseodiscus rhodoleucus** (Fr.) Baral, in Baral & Krieglsteiner (2006)
- 3' Apothecia 1-1.5 mm diam., shortly stalked, pale pink throughout; asci 70x6 µm, I+ blue; spores narrowly ellipsoid, 8-13x2.5-3 µm, becoming 1-septate, eguttulate; saprobic on *Equisetum fluviatile*, *Equisetum variegatum*; phen.: ?
..... **Roseodiscus equisetinus** (Velen.) Baral, in Baral & Krieglsteiner (2006)

Scytalidium Pesante

Type species: *Scytalidium lignicola* Pesante.

Lit.: Ellis & Ellis 1971: 28.

- 1 Colonies effuse, dark blackish brown. Conidiogenous cells Intercalary, cells determinate, fragmenting and forming arthroconidia. Conidia of two kind: (1) hyaline arthroconidia catenate, cylindrical, truncate at each end, 6-10x1-3 µm, aseptate, (2) dark brown conidia, thick-walled, oblong, doliform or broadly ellipsoidal. On wood of *Pinus*, *Platanus*, roots of *Vitis*, from soil. Phen.: I (BE/F, DE, UK) • **Scytalidium lignicola** Pesante (1957)

Triposporium Corda

Type species: *Triposporium elegans* Corda

Lit.: Ellis 1971: 136.

- 1 Conidiophores up to 230x5-7 µm, 12-30 µm at the base. Conidia solitary, composed of 3(4) tapering arms with common base, each 20-40(70) µm long, 3-9-septate, dark brown, paler towards the tip. Common on dead wood (*Alnus*, *Fagus*, *Ilex*, *Rhododendron*) and herbaceous stems (*Epilobium*, *Cladium*). Phen.: XI
..... ○ **Triposporium elegans** Corda (1837)Ill.:

“HELICOGONIALES”

Lit.: Ekanayaka et al. 2019: 314.

Family belonging to this order:

HELICOGONIACEAE Baral

Lit.: Jaklitsch et al. 2016: 190, Ekanayaka et al. 2019:

Genera belonging to this family:

1. *Calloriopsis* Syd. & P. Syd.
2. *Eleutheromycella* Höhn.
3. *Eleutheromyces* Fuckel
4. *Gelatinipulvinella* Hosoya & T. Otani
5. *Geltingia* Alstrup & D. Hawksw.
6. *Helicogonium* W.L. White
7. *Humicolopsis* Cabral & S. Marchand

Key to the genera treated here:

- 1 Sexual morph not known. Asexual morph: *Conidiomata* pycnidial, conical to cornute, gelatinous, translucent yellowish or yellowish brown to dark brown, unilocular, glabrous, ostiolate, wall of *textura angularis*; ostiole central, circular. *Conidiophores* arising all around the cavity of the conidioma, cylindrical, branched mostly at the base, septate, hyaline, smooth, invested in mucus. *Conidiogenous cells* integrated with the conidiogenous loci immediately below the septa, hyaline, smooth-walled, with visible periclinal thickening at apex. *Conidia* aseptate, lenticular to fusiform, hyaline, smooth-walled; apical and basal appendages cellular, delimited from the conidium body by septa; basal appendage developing before the conidium body *Eleutheromyces*
- 1' Sexual morph known 2
- 2 Forming only ascogenous hyphae and asci. Asexual morph: phialidic hyphomycetous *Helicogonium*
- 2' Apothecia with excipulum 3
- 3 Apothecia gelatinized in all parts, <1 mm diam., globose to pulvinate, immarginate; ectal excipulum with hyphoid to prismatic-angular cells embedded in gel; asci inamyloid, mostly with croziers; parasitic or perthophytic on various fungi (inclusive lichens) 4
- 4 Ectal excipulum from base (60 µm thick) to margin (20 µm) of strictly parallel rows of hyphoid or strongly inflated cells immersed in abundant hyaline gel, oriented at a high angle to the surface; medullary excipulum sharply delimited, 10-15 µm thick, of a horizontal, small-celled, little gelatinized *textura prismatica*; apothecia superficial, hyaline *Calloriopsis*
- 4' Ectal excipulum overall 10-30 µm thick, gel less abundant, cells at base and flanks prismatic to angular, orientation irregular or parallel under a low angle; medullary excipulum absent or of irregularly oriented hyphoid to angular cells; hypothecium of similar texture, sometimes conspicuously pigmented; apothecia superficial or immersed, hyaline or pigmented 5
- 5 Ectal excipulum up to margin of angular cells, irregularly oriented at a high angle; apothecia superficial *Gelatinipulvinella* (only known species: *G. astraicola*, on *Astraeus*)
- 5 Apothecia erumpent, small, roundish to elongate, with distinct margin, black; asci cylindrical, inner wall with porelike structure; paraphyses non-conglutinate; spores globose to broadly ovoid, more or less verruculose, hyaline; lichenicolous *Geltingia*

Calloriopsis Syd. & P. Syd.

Type species: *Calloriopsis gelatinosa* (Sacc.) Syd.

Lit.: Saccardo 1886: 590, Baral (in litt.)

- 1 Apothecia subsessile, 0.4-0.9 mm diam., translucent white; asci 27-40x7-9 µm, IKI-, without croziers; spores fusiform, 9-11.5x2.6-3.3 µm, 1-septate, guttulate; paraphyses capitate. Asexual morph: “*Isaria*” *friesii* Mont. *Conidiomata* 0.8-1.5x0.1-0.2 mm, fasciculate, cylindrical and pointed, sometimes branched like antlers, pale yellow and sometimes appearing slightly felty, erumpent, composed of an inner core of interwoven hyphae 1.5-2 µm diam. within a gelatinous matrix and an outer layer of vertically arranged hyphae with swollen tips. *Conidiophores* not clearly distinguished. *Conidiogenous cells* 18-28 x 3-4 µm at the base, ± cylindrical but irregular and usually slightly tapering, fairly thick-walled, apiculate, occasionally branched, proliferating sympodially with very prominent

denticles. and hyaline, 1-septate conidia 6.5-9.5 x 3-3.5 µm, cylindrical to clavate, the apex rounded and the base acute and often attenuated; on still attached of fallen twigs and branches (*Acer*, *Rosa*) or herbicolous stalks (*Reynoutria*, *Sambucus ebulus*); phen.: VIII-XII (BE/F, FR, NL) ○ **Calloriopsis reynoutriae** Baral sp. nov.

Eleutheromyces Fuckel

Type species: *Eleutheromyces subulatus* (Tode) Fuckel

Lit.: Crous & al. 2014: 152.

- 1 Fungicolous. *Conidiomata* pycnidial, scattered to densely gregarious, seemingly superficial but innate erumpent, oval, long conical or cornute, 100–250 µm diam, 150–500 µm high, unilocular, glabrous, gelatinous, translucent, yellowish brown when dry, paler coloured when moist; wall up to 45 µm thick, of *textura angularis*, cells thick-walled, pale brown to pale yellow; ostiole central, circular. *Conidiophores* lining the cavity of the conidioma, cylindrical, branched mostly at the base, septate, often variously curved, hyaline, smooth, to 60 µm long, invested in mucus. *Conidiogenous cells* cylindrical, integrated, hyaline, smooth, 5.5–13 x 2.5–4 µm. *Conidia* ellipsoidal or lenticular, aseptate, hyaline, 4.5–7x2–4 µm (av. 6x2 µm), one appendage at each end delimited by a septum; appendages tubular, attenuated; apical appendage 2–5 µm long; basal appendage 1–3 µm long; on decaying agarics; phen.: IX-X (FR,GB,SV) **Eleutheromyces subulatus** (Tode) Fuckel (1870)
 Ill.: Crous & al. 2014: fig. 6.

Geltingia Alstrup & D.Hawksw.

Type species: *Geltingia associata* (Th. Fr.) Alstrup & D. Hawksw.

Lit.: Rambold & Triebel 1990: 378.

- 1 Apothecia erumpent, crowded, roundish to elongate, sessile, 0,25-0,4 mm diam., black; asci (45)50-60(75)x7-9(11) µm; spores broadly ovoid to globose, (6,5)8-9(9,5)x(5)5,5-6(7) µm, verruculose; on *Ochrolechia* spp., *Thamnia* *vermicularis*; phen.: VII-VIII **Geltingia associata** (Th. Fr.) Alstrup & D. Hawksw. (1990)

Helicogonium W.L. White

Type species: *Helicogonium jacksonii* W.L. White

Lit.: Baral 1999: 1, Baral & Kutorga 2010: 331 (*H. fusisporum*).

- 1 Living mature asci with 8 ascospores which do not produce ascospores (in some species ascospores producing some conidia after discharge or within dead asci) 2
- 1' Living mature asci with 8 ascospores and c. 20-60 ascospores 8
- 2 Ascospores filiform, *22–39 x 1.2–1.5 µm, sickle-shaped to helicoidal, 0–3-septate, asci stalked, arising from croziers; in *Durella connivens* **Helicogonium conniventis**
- 2' Ascospores ellipsoid to clavate or fusiform, max. †13 µm long, asci often more or less sessile 3
- 3 Ascospores fusoid to fusiform, †(7.5-)9-11(-12)x2-2.5 µm, with several large and small guttules; mycoparasite in the hymenium of *Orbilia eucalypti* growing on old ascomata of *Colpoma quercinum*; phen.: IX **Helicogonium fusisporum**
 Ill.: Baral & Kutorga 2010: fig. 1-2.
- 3' Ascospores up to 7 µm long 4
- 4 Ascospores without LBs (?), †4.5–6 x 1.2–1.7 µm, slightly clavate, asci †18–25 x 5–7 µm; in *Dacryobolus sudans* .. **Helicogonium odontiae**
- 4' Ascospores with two large LBs (the upper LB often larger than the lower), †4.5–7 x 1.7–2.3 µm (or larger); in *Leotiales* 4
- 4 Ascospores *6–9.3x3–3.8 µm, mainly homopolar, with two large and some smaller LBs; conidia †2.2–3x1.4–1.6 µm; asci arising from croziers; apical dome immature †1–1.5 µm thick; in *Olla transiens* **Helicogonium transeuntis**
- 4' Ascospores *2.5–3.1 µm wide, mainly heteropolar (clavate), with two large and some minute LBs; apical dome immature †1.8–2.2 µm thick 5
- 5 Ascospores strongly clavate; conidia abundantly produced on the wider end of the ascospores see *H. psilachni*
- 5' Ascospores mostly slightly clavate; conidia few or absent 6
- 6 Asci arising from croziers, †23–46 µm long; in *Pyrenopeziza* and *Pirotaea* **Helicogonium trabinelloides**

6'	Asci arising from simple septa (but sometimes with a subbasal protuberance)	7
7	Asci †19-34 µm long; in <i>Olla scrupulosa</i> and <i>O. millepunctata</i>	Helicogonium scrupulosae
7'	Asci †45-57 µm long; in <i>Parachnopeziza phalaridis</i>	Helicogonium phalaridis
9	Ascospores oblong-fusoid-clavate, 1-septate already at the beginning of conidial formation, eguttulate; conidia produced on both spore ends; ascus base bifurcate with often curled branches, without croziers; in Corticiaceae (<i>Ceraceomyces sublaevis</i>)	Helicogonium jacksonii
9'	Ascospores permanently non-septate; conidia produced at one spore end only (very exceptionally in a few spores at both ends); in <i>Leotiales</i>	10
10	Ascospores globose to broadly ovoid, only some broadly ellipsoid or pyriform, l/w-ratio 1–1.4(–1.7), lipid content low (with one LB 0.3–1 µm diam. and few minute LBs)	11
	(if lipid content of ascospore relatively high, with two large LBs 1–1.8 µm diam. and some small LBs	see <i>H. prunicolae</i> and <i>H. transeuntis</i>)
10'	Ascospores ellipsoid, oblong or clavate, l/w-ratio mostly 1.8–2.5	12
11	Ascospores *3–5(–6)x2.8–3.5(–4) µm, ascoconidia ovoid, *1.8–3x1.4–2 µm, ascus apex (†) slightly to strongly thickened (thin only in centre), with or without croziers; in <i>Orbilia</i> , <i>Calloria</i> , <i>Cyathicula</i> , <i>Parorbiliopsis</i>	Helicogonium orbiliarum
11'	Ascospores *3.3-4 x 3-3.8 µm, ascoconidia slightly to medium allantoid, *2.2-2.9 x 1.1-1.2 µm, whole ascus apex (†) extremely thin-walled, lateral wall distinctly thickened, arising from croziers; in <i>Clausenomyces</i>	Helicogonium claussi
12	Ascoconidia cylindrical, majority medium to strongly allantoid (to helicoidal)	13
12'	Ascoconidia cylindrical, ellipsoid or ovoid, majority straight to slightly curved, only exceptionally allantoid	15
13	Asci with apical dome †4–7 µm thick, arising from croziers; ascospores †6x2.5 µm, oblong-clavate; ascoconidia †4 x 1–1.5 µm; in <i>Mollisia</i> aff. <i>cinerea</i>	Helicogonium sp.
13'	Asci with apical dome 1.3–3.5(–4.5) µm thick	14
14	Ascospores *3.5–6.5 x 2.7–3.1 (–3.5) µm, broadly ellipsoid to pyriform; ascoconidia produced at the narrower end (or indifferent); asci arising from croziers, base sometimes bifurcate; in <i>Hyphodiscus</i>	Helicogonium hyphodisci
14'	Ascospores c. *4.5–7.5 x 2.2–3.2 µm, oblong-clavate; ascoconidial formation not observed; asci arising from one (rarely two) simple septa; in <i>Hyaloscypha</i>	Helicogonium hyaloscypharum
15	Asci without apical dome, arising from a bifurcate base with simple septa; ascospores †4.2–6.5x2–2.8 µm, ellipsoid to oblong-pyriform, with few small LBs; ascoconidia produced predominantly at the narrower end, †2.2–3.6x1.2–1.5 µm, with mostly two medium-sized LBs; in <i>Crocicreas helios</i> var. <i>parahelios</i>	Helicogonium gemmisporum
15'	Asci with distinct apical dome	16
16	Asci arising from simple septa, sometimes with a subbasal aseptate protuberance, ascospores mostly distinctly clavate	17
16'	Asci arising from croziers	18
17	Asci †40–80 x 5.5–9.5 µm, without protuberances near the base; ascospores †5–9 x 1.8–3 µm, LBs small or large; in <i>Mollisia</i>	Helicogonium mollisiophilum
17'	Asci †27–41 x 5.5–6.5 µm, often with a subbasal protuberance; ascospores †4.2–7.8 x 1.8–2.4 µm, with two large LBs prior to conidial formation; in <i>Psilachnum</i> aff. <i>chrysostigmum</i>	Helicogonium psilachni
18	Asci *27-44 x 8-9.5 µm, stalk absent or very short, dome thick but often concave, ascospores *5-8.8x2.2-3.3 µm, cylindric-clavate-ovoid, (1-)2-guttulate (lower LB smaller or lacking, upper LB 1.3-2 µm), Ölm.3-3.5, ascoconidia produced at upper end, *2.5-3.2x1.3-1.7 µm, in <i>Pirottaea</i> aff. <i>Imbricata</i> (on <i>Reynoutria</i>), VI-VII, xerotolerant, Luxembourg	Helicogonium „imbricatae“
18'	Asci *min. 40 µm long, with a more or less distinct stalk	19
19	Ascospores †2.6–3.3(–3.8) µm wide	20
19'	Ascospores †1.8–2.8(–3) µm wide	23
20	Ascospores with two large (1.4–1.8 µm) and some smaller LBs (high lipid content), broadly ellipsoid-oblong(-ciborioid), †2.8–3.8 µm wide	see <i>Helicogonium transeuntis</i>
20'	Ascospores with low to medium lipid content (LBs max. c. 1 µm diam.)	21

- 21 Asci *7.5–9(-11) µm wide, ascoconidia mostly *2-3.3x1.2-1.8 µm see *Helicogonium parorbiliopsis* and *H. vogesiacum*
- 21' Asci *9.5–11.5 µm wide, ascoconidia *(3–)4–5(-6) x 1.5–2 µm 22
- 22 Asci often with a large subbasal protuberance, croziers not forming arches, ascospores *4.7–6.5x3.5–3.8 µm; ascoconidia produced at the narrower end (or indifferent); in *Durella melanochlora* **Helicogonium melanochlorae**
- 22 Ascus base bifurcate, croziers forming distinct arches; ascospores †4–7 x 2.6–3.3 µm (*3–3.8 µm wide), ascoconidia produced at the wider end (or indifferent); in *Mollisia prunicola*; phen.: VII (BE/W) • **Helicogonium prunicolae**
- 23 Ascoconidia at least partly produced at the narrower end of ascospores 24
- 23' Ascoconidia produced at the wider end (or indifferent) 25
- 24 Ascoconidia *2–3x1.2–1.7 µm; croziers without arches; in *Parorbiliopsis minuta* **Helicogonium parorbiliopsis**
- 24' Ascoconidia †3–4.8x0.9–1.3 µm; croziers forming arches; in *Cyathicula* cf. *cacaliae* **Helicogonium cyathiculae**
- 25 Ascospores often homopolar, ascoconidia produced at the wider end (often indifferent), with often large LBs 0.4–1(–1.5) µm diam.; in *Hyaloscypha* and *Mollisia* **Helicogonium vogesiacum**
- 25' Ascospores mostly heteropolar; ascoconidia always produced at the wider end, with small LBs (0.2–0.3 µm); in *Pyrenopeziza petiolaridis* (on *Acer*-petioles, IV) and „*Niptera*“ *dilutella* (on *Rubus idaeus*-stems, VIII-XII), S-Germany, Estonia **Helicogonium petiolaridis**

HAMATOCANTHOSCYPHA - HYPHODISCUS CLADE

Lit.: Ekanayaka et al. 2019:

- 5 Hairs short, strongly curved *Hamatocanthoscypha*
- 4 Ectal excipulum of textura prismatica-oblita, strongly gelatinized, KOH-, with greenish, yellow or red exudate; hairs bearing blunt acyanophilic tuberculate warts, KOH- *Hyphodiscus*

LEOTIALES Carpenter 1988

Syn.: *Lichinodiales* M. Prieto, M. Schultz, Olariaga & Wedin

Lit.: Ekanayaka et al. 2019: 411.

Accepted families:

1. Cochlearomycetaceae Crous
2. Leotiaceae Corda 1842
3. Mniaeciaceae Baral 2019
4. Tympanidaceae Baral & L. Quijada

Key to the families treated here:

- | | | |
|----|---|----------------------|
| 1 | Apothecia sessile discoid; parasitic on liverworts | Mniaeciaceae |
| 1 | Not parasitic on liverworts | 2 |
| 2 | Apothecia convex and lobed, clavate, hemispheric or globose, or disc-shaped to cup-shaped, sessile to stipitate, margin smooth or delicately dentate; gelatinous tissue present | Leotiaceae |
| 2' | Apothecia | Tympanidaceae |

LEOTIACEAE Corda 1842

Lit.: Wang & al. (2005): fig. 4 (*Leotia* & *Microglossum*), Baral & al. 2015 (poster).

Sexual morph: Apothecial, clavate, turbinate to applanate, sessile to long stipitate with subglobose to ellipsoid to fusoid fertile part, sometimes gelatinous Ectal excipulum textura intricata or textura porrecta cells, medullary excipulum textura intricata cells Filiform, hyaline, sometimes apically slightly swollen and/or branched, straight to slightly curved, aseptate 8-spored, mostly amyloid, arising from croziers Ellipsoid to fusoid, rarely vermiform, guttulate, aseptate, hyaline

Genera belonging to this family:

1. *Geocoryne* Korf
2. *Leotia* Pers.
3. *Microglossum* Gillet

Key to the genera treated here:

- 1 Apothecia with strongly convex head, yellowish ochre to blue-green, and several cm long stalk; asci IKI-, without croziers *Leotia*
- 1' Apothecia clavate, pale brown to reddish brown or olivaceous; asci I+; spores cylindrical-oblong, hyaline *Microglossum*

Leotia Pers.

Type species: *Leotia lubrica* (Scop.) Pers.

Lit.: Dennis 1978: 96, Baral & Kriegelsteiner 1985: 142, Hansen & Knudsen 2000: 157.

- 1 Apothecia stipitate; head hemispheric, lobed, gelatinous, yellow green to olivaceous (sometimes blue-green due to some parasitic fungus), 5-20 mm broad; stem cylindrical, 10-30 mm long, yellow or ochraceous, with green granules; asci I-; spores fusoid, 20-25x5-6 µm, 5-7-septate, hyaline; saprobic on soil between mosses and ferns, in damp habitats; phen.: VIII-X(XII) • **Leotia lubrica** (Scop.) Pers. (1797)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 136.

Microglossum Gillet

Type species: *Microglossum viride* (Schrad.) Gillet

Lit. : Boudier 1917: 16 (*M. nudipes*), Nannfeldt 1942: 9 & 46, Baral (unpublished key), Benkert 1983: 155 (*M. olivaceum*, *M. viride*), Boudier 1917: 16 (*M. nudipes*), Hansen & Knudsen 2000 : 181, Moingeon S. & J.M. 2004: 25, Hustad & al. 2013: 111 (sub *Thuemenidium atropurpureum*), Kučera & al. 2014: 282, Kučera et al. 2017: 1.

Amended key of Kučera et al. 2017:

- 1 Stipe covered with scales, ascocarp green, yellowish-green, grayish-green, apex of paraphyses with a "cap" of pigment 2
- 1' Stipe naked, green, pinkish-green, olive-green, blue-green, apex of paraphyses lacking a "cap" of pigment 5
- 2 Ascocarp <1.5 cm tall, asci <80 µm (65–75x9–10 µm) long, ascospores 10–14x4–5 µm (known only from Brasilia) **Microglossum rickii** S. Imai (1942)
- 2' Ascocarps <8 cm tall, asci >80 µm long 3
- 3 Ascocarp yellow-green, growing in wet places, often with liverworts, asci 106-134x9.5-12 µm, ascospores 18-22x 5-7 µm; thickened paraphyse tips; on slightly acidic to acidic stands under *Alnus sp.*, *Betula*, *Populus tremula*, *Picea*; phen.: (VIII)IX-XII (BE/F, CZ,FR) • **Microglossum viride** (Schrad.) Gillet (1879)
- 3' Ascocarp gray-green, growing on soil in the forest, asci 105-139x8-10 µm, ascospores 16-20x4-5 µm; on the ground of neutral to slightly acidic forests (not among liverworts), on margins of old forest roads under *Quercus sp.* and *Fagus sylvatica*; phen.: IX-X (CZ,ES,GB,NO,SK) **Microglossum griseoviride** V. Kučera, Lizoň & M. Tomšovský (2014)
- 5 Stipe constituting 1/2–3/4 of the mature ascocarp, hymenium dominantly buff, pink, olive, stipe is light brown usually mixed with other colors; ascospores 13-15x4 µm **Microglossum rufescens** (Grélet) Bon (1970)
- 5' Stipe equal to or shorter in length than hymenium, ascocarps without pink and olive 6
- 6 Ascospores ≤16 µm long, growing in open areas on calcareous bedrock 7
- 6' Ascospores >16 µm long, growing in *Microglossum pratense* V. Kučera, Tomšovský & Lizoň or forests 8

- 7 Ascocarps white-green, when old with violaceous color; asci 66–79x6 µm; ascospores 11-14x3-4 µm, Qa 3.5 **Microglossum parvisporum** V. Kučera, Lizoň & Tomšovský (2014)
- 7' Ascocarps dark green, when old dark green with dark violet tint, asci 80-95x7.5-8.5 µm long, IKI+; ascospores (10-) 12-15.5(-20) x(3-3.7-4.5(-5.5) µm, Qa 3.4; on soil in forest clearings, meadows and pastures; phen.: X (ES,FR,DE)..... **Microglossum tenebrosum** V. Kučera, Tomšovský, Lizoň & F. Hampe (2017) Ill.: V. Kučera et al. 2017 : fig. 3e-f.
- 8 Asci >105 µm long, growing in the forests 9
- 8 Asci <105 µm long, growing on mesophilous meadows, pastures 10
- 9 Ascocarp green, hymenium with brownish tint, stipe blue-green, paraphyses branched also in upper 1/3 and in the middle 11
- 9' Ascocarp with brown color present also on the stipe, paraphyses tips swollen <5 µm, branched in basal 1/3 **Microglossum nudipes** aff.
- 10 Hymenium green to gray-green (without brown tint), sterile concolorous; asci 78-91.5x7-8.5 µm, IKI+; ascospores 13.5-16.5x4-5 µm, Qa 3.7; meadows and pastures, on soil among grasses; most common species with naked stipe; phen.: X (NO,SE,SK) **Microglossum pratense** V. Kučera, Tomšovský & Lizoň (2017) Ill.: V. Kučera et al. 2017 : fig. 3c-d.
- 10' Hymenium usually brownish-green or brown, stipe blue-green ; asci 85-98x8-9 µm, IKI+; ascospores 15-18x4-5 µm, Qa 3.8; phen.: XI (FR,ES, SK) **Microglossum truncatum** V. Kučera, Tomšovský & Lizoň (2017) Ill.: V. Kučera et al. 2017 : fig. 3a-b.
- 11 Ascocarp flattened, hymenium club-shaped, usually longer than the stipe, paraphyses branched at the base and in the middle; asci 96.5-118x8-10 µm, IKI+; ascospores 15.5-20.5x4.5-5.5 µm, Qa 3.8; phen.: XII (ES) **Microglossum clavatum** V. Kučera, Lizoň & Tomšovský (2017)
- 11' Hymenium mace-shaped, as long as stipe, paraphyses branched both at basal and apical part; asci 91-110x7-8.5 µm, IKI+; ascospores (12-)16.5-20.5(-23)x(4-)4.2-5.2 µm, Qa=3.9; growing among mosses under *Buxus* sp.; phen.: XII (FR) **Microglossum nudipes** Boud. (1917)

Alternative key:

- 1 Ascomata black; asci IKI-; spores 12-14x4 µm, fasciculate **Microglossum** sp.
- 1' Asci with apical rings deep blue in IKI 2
- 2 Ascomata clavate, black to purplish brown, up to 60 mm high, stipe squamulose; asci 100-120x10-12 µm, I+; paraphyses agglutinated at the apices into a vinaceous brown epithecium; spores cylindric, tapering ends, 20-35x5-6 µm, aseptate, hyaline; in meadows and grassy forests; phen.: (VIII)IX-XI (BE/F) **Microglossum atropurpureum** (Batsch: Fr.) P. Karst. (1885)°
- 2' Ascomata paler, without purplish tinge 3
- 3 Ascomata blue-green to olivaceous (at least the stipe), without reddish component; asci †8.5-12(?14) µm wide; spores * or † (?3.5)4.7-6(?7) µm wide 4
- 3' Apothecia pale to dark red-brown, sometimes with olivaceous component; asci †7-8.2 µm wide, arising from croziers; spores * or † 3.6-4.5 µm wide 7
- 4 Ascomata with blue olivaceous-green hymenium; stipe blue(-olivaceous), smooth; asci *93-111(127)x9.5-11.5 µm, †75-106 µm, apical thickening fully amyloid, arising from croziers; spores *12.5-16(18)x(3.5)4.7-5.3 µm, hyaline; paraphyses without enlarged apex; in sunny, dry, calcareous grassland or bushes; phen.: IX-XII **Microglossum olivaceum** (Pers.) Gillet (1879) Ill.: Rubio & al. 2010: p. 237.
- 4' Asci without croziers 5
- 5 Ascomata with olivaceous dark brown or greyish-ochraceous-brown hymenium; stipe smooth; asci *98-135x(8.2)9-10 µm, arising from simple septa, apical thickening amyloid; spores *(9)11-14(15.3)x(3.8)4.3-4.6(4.8) µm, guttulate, hyaline; phen.: XI **Microglossum "deuncinatum"** Baral nom. prov.
- 5' Spores longer 6
- 6 Ascomata solitary or in small groups, with yellow green, pea green or olivaceous hymenium; stipe blue-green, floccose, entire ascoma dark green when dry; asci †106-160x(9.5)10-11.5(12) µm, only inner ½-2/3 of apical thickening amyloid, arising from simple septa; spores †(14)15-21(24)x(4.3)5-5.7(6) µm; paraphyses with enlarged apex, often with greenish "cap" ; among liverworts in shady, moist forests, along brooks, etc., on slightly acidic to acidic stands under *Alnus* sp., *Betula*, *Populus tremula*, *Picea*; phen.: (VIII)IX-XI (BE/F,CZ,FR) **Microglossum viride** (Schrad.) Gillet (1879)

- 6' Ascomata with olive green to greyish green hymenium, fertile part concolorous or paler and partly squamulose, ascoma with similar color when dry; asci *137-170(200)x(10.5)11-12.5(14) μm , †(90)105–130(140)x 8–10 mm, apical ring amyloid, arising from simple septa; spores *(13)15-21(22.5)x5.2-5.8(6) μm , †(13)15–20(21)x4.5–5.3 mm; on the ground of neutral to slightly acidic forests (not among liverworts), on margins of old forest roads under *Quercus* sp. and *Fagus sylvatica*; phen.: IX-X (CZ,ES,GB,NO,SK).....
 **Microglossum griseoviride** V. Kučera, Lizoň & M. Tomšovský (2014)
- 7 Ascomata with light brownish-rose hymenium, some with olivaceous tint; base?; asci arising from croziers, apical annulus dumpbell-shaped when young, fully amyloid; spores *13-18(20)x3.6-4.5 μm ; phen.: IX-I
 **Microglossum fuscorubens** Boud. (1907)
- 7' Ascomata with deep purpuraceous-carneous-redbrown; stipe dark grey-brown, sometimes olivaceous or whitish; apical annulus only over lower 1/2-2/3 amyloid, never dump-shaped **Microglossum ?fuscorubens** Boud. (1907)
- Ascomata with greenish or brownish hymenium; stipe blue-green, smooth; asci 150-160x10-12 μm ; spores fusiform, 17-30x5-7 μm , guttulate, hyaline; paraphyses without or slightly enlarged apex ; phen.: XII (FR)
 **Microglossum nudipes** Boud. (1917)
- Question : asci with croziers ?

MNIAECIACEAE Baral 2019

Lit.: Johnston et al. 2019: 16.

Sexual morph: Apothecia gymnohymenial, sessile, superficial, non-gelatinous, white or blue-green, with smooth, non-protruding margin, hairless; ectal excipule textura prismatica-globulosa, without crystals. Paraphyses simple, without vacuolar bodies. Asci with ± conical, inamyloid, thick-walled apex. Ascospores hyaline, broadly ellipsoid, non-septate, without sheath, with high lipid content (multiguttulate).

Asexual morph: unknown.

Habitat: Parasitic on liverworts on soil, desiccation-intolerant.

Genus included:

Mniaecia Boud.

Syn.: *Epiglia* Boud.

Type species: *Mniaecia jungermanniae* (Fr.) Boud.

Lit.: Grelet 19???: 356 (sub *Epiglia gloeocapsae*), De Meulder 1992: 83 (*M. jungermanniae*), Hardtke 1994: 199, Raspé & De Sloover 1998: 251, De Sloover 2001: 1, Ayel & Van Vooren 2005: 19 (*M. gloeocapsae*).

- 1 Apothecia pulvinate, subturbinate, 0.25-0.5 mm diam., whitish to greyish; asci 100-110x10-12 µm; spores 12-16x5-6 µm, aseptate; paraphyses with curved apex; on small hepatics (*Jungermannia*) covered by gelatinous algae; phen.: (XII)IV-V **Mniaecia gloeocapsae** (Boud.) Van Vooren (2005)
- 1' Spores longer 2

- 2 Apothecia pulvinate, sessile, 0.5-1.5 mm diam., dark bluish green; asci 117-185x(12)15-18(23.5) µm, I-; spores ellipsoid, 15-24x9-14 µm, with several large and small LB's; paraphyses with clavate tip; in association with small hepatics (*Calypogeia muelleriana*, *Cephalozia biscupidata*, *Diplophyllum albidans*, *Nardia scalaris*, *Jungermannia gracillima*, *Lophocolea bidentata* and *Lophozia ventricosa*); phen.: II-V ○ **Mniaecia jungermanniae** (Fr.) Boud. (1907)
 III.: De Sloover 2001: fig. 4.
- 2' Apothecia pulvinate, sessile, 0.5-0.6 mm diam., ivory white; asci 106-138x12.5-16 µm, I-; spores ellipsoid to claviform, 16-20x7.5-10 µm, 0(1)-septate, with many up to 2 µm diam. LB's; paraphyses filiform; in association with small hepatics (*Calypogeia arguta*, *Calypogeia muelleriana*, *Jungermannia albicans*); phen.: III-V.....
 **Mniaecia nivea** (P. Crouan & H. Crouan) Boud. (1907)
 III.: De Sloover 2001: fig. 1-3.

TYMPANIDACEAE Baral & L. Quijada

Lit.: Jaklitsch & al. 2016: 187, Ekanayaka et al. 2019: 411.

Sexual morph: Ascomata are apothecial, discoid, turbinate or pulvinate receptacle, rarely aggregated into central stroma, often slightly gelatinous, sessile or stipitate and erumpent or superficial. The ectal excipulum is composed of cells of textura globulosa to textura oblita, textura prismatica or textura intricata and medullary excipulum is composed of cells of textura intricata. Paraphyses are filiform, cylindrical to capitate, straight, unbranched, densely septate and rarely curved or helicoid. Asci are 4–8-spored or multi-spored, cylindric-clavate, mostly non-amyloid and arising from croziers. Ascospores are globose, ellipsoid, fusiform or sub-cylindrical, sometimes slightly curved, hyaline, 0–21-septate, guttulate, smooth, hyaline and sometimes producing ascoconidia by budding.

Asexual morphs are pycnidial or hyphomycetous. Pycnidia are uni- or multilocular and hyphomycetes are synnematal. Conidiogenesis is phialidic and conidia are hyaline, ellipsoid, filiform, cylindric or allantoid, sometimes curved and 0–3-septate.

Habitat: Saprobiic on dead plant material.

Genera belonging to this family:

1. *Aotearoamyces* P.R. Johnst., J.A. Cooper & Quijada
2. *Claussenomyces* Kirschst.
3. *Collophorina* Damm & Crous 2017
4. *Durandiella* Seaver
5. *Gelatinosporium* Peck
6. *Holwaya* Sacc.
7. ?*Micraspis* Darker
8. *Myriodiscus* Boedijn
9. *Pragmopora* A. Massal.
10. *Tympanis* Fr.
11. *Vexillomyces* S. Bien, C. Kraus & Damm 2019

Key to the genera:

- | | |
|---|-----------------------|
| 1 Apothecia 3-11 mm diam., with black disc; spores filiform, hyaline; anamorph synnematal; on <i>Tilia</i> | <i>Holwaya</i> |
| 1' Apothecia up to 3 mm diam.; spores not filiform | 2 |
| 2 Apothecia greenish, gelatinous, without crystals, sessile; asci with croziers; ascospores without ascoconidia; anamorph synnematal (<i>Dendrostilbella</i>) | <i>Claussenomyces</i> |
| 2' Ascospores with ascoconidia; anamorph <i>Collophorina</i> -like | <i>Vexillomyces</i> |
| 2'' Anamorphs otherwise | 3 |
| 3 Anamorph hyphomycetous; ascospores ?producing ascoconidia | <i>Myriodiscus</i> |
| 3' Anamorphs pycnidial | 4 |
| 4 Conidia large, falcate, (1-)3-septate | <i>Durandiella</i> |
| 4' Conidia minute, aseptate, ellipsoid, cylindric or allantoid | 5 |
| 5 No sexual morph known | <i>Collophora</i> |
| 5' Ascomata with sexual morph | 6 |
| 6 Apothecia without stroma | 7 |
| 7 Apothecia ±sessile, black to greenish-black, gelatinous, with crystals; ascospores subglobose, non-septate, forming a short germ tube inside the living asci, mostly producing ascoconidia | <i>Tympanis</i> |
| 7' Apothecia erumpent | 8 |
| 8 Apothecia with black lobed margin; ascospores septate, budding; macroconidia septate; foliicolous, lignicolous | <i>Micraspis</i> |
| 8' Apothecia scutellate, sessile, black, glabrous, cartilaginous; medullary excipulum of textura epidermoidea; ectal excipulum of textura oblita; spores elongate; typical hyaline resinous guttules between the paraphyses <i>Pragmopora</i> | |

Claussenomyces Kirschst.

Syn.: anamorph *Dendrostilbella* Höhn.

Type species: *Claussenomyces jahnianus* Kirschst.

Lit. : Iturriaga 1991: 327, Hansen & Knudsen 2000 : 141, Baral & Marson 2002 (unpublished key), Medardi 2007: 101.

Species of *Claussenomyces* grow on wood, bark or resin of broad-leaved or coniferous trees. Some grow on substrate fallen on the moist ground ("hygro"), others are xerotolerant and fruit on hanging branches ("xero").

Species without true ascoconidia may form very similar conidia on their ascospores, but in a much lower quantity. This happens never within the living asci, but either on discharged spores or within dead asci.

Asci are always with croziers (?exception: *Cl. sp.* on *Genista*).

- 1 Apothecia ionomidotic (adding KOH dissolves (olivaceous-)brown pigment to a deep red-brown, **not distinctly staining the medium**); spores $* > 40 \mu\text{m}$ long 2
- 1' Apothecia not ionomidotic (adding KOH usually dissolves greenish pigment, no transient stain to the medium); spores $* < 38 \mu\text{m}$ long, rarely $-53 \mu\text{m}$ 3
- 2 Apothecia 2-4 mm diam., strongly erumpent from bark; spores $* 150-180 \times 3.6-4.1 \mu\text{m}$ ($+150-155 \times 3.3-3.5 \mu\text{m}$), multiguttulate, 7-septate, with long-tapering ends; with extracellular "oil" in whole hymenium, rhomboid crystals present in medulla; saprobic on mostly still attached branches of *Quercus* (type of *Claussenomyces*, not congeneric with all following species. Very rare (DE, FR) **Claussenomyces jahnianus** Kirschst. (1923)
- 2' Apothecia 0.2-0.3 mm, superficial (?turbinate), no extracellular "oil", no crystals; spores $+38-78 \mu\text{m}$ long, up to 15-septate (USA) **Claussenomyces tympanoides** (Ellis & Everh.) Iturr. & Korf (1991)
- 3 Apical wall of dead asci distinctly thinner than lateral wall, or of equal thickness, surface cells of paraphyses and ectal excipulum surrounded by strongly refractive, pale olivaceous-ochraceous(-golden), small granules (like sand), OCI 1-2(-3), apothecia 0.1-0.5 mm diam, lacking anamorph, resinicolous on Pinaceae 4
- 3' Wall equally rather thin, no sandy exudate, ascospores $+17.3-23.7 \times 5.5-7.3 \mu\text{m}$, multiguttulate, finally 3-septate (?overmature), apothecia 0.5-2 mm, on thick distinct stipe, dark yellowish green-grey, on wood of *Nothofagus* **Claussenomyces simplex** Gamundi (1998)
Resembles an *Ascocoryne* in many aspects but has inamyloid asci.
- 3" Apical wall of dead asci forming a thick dome, lateral wall distinctly thinner, exudate \pm homogeneous, cloddy or **?granular** 5
- 4 Ascospores $*(21-24-37(-47) \times (3.5-4-4.8(-5.5) \mu\text{m})$, 7(-11)-septate, strongly inflating during germination, apothecia light blue-green-grey, on wounds on branches of *Picea*, *Pinus*, rarely *Larix*, Europe (very common, xero) **Claussenomyces kirschsteinianus** (Kirschst.) G. Marson & Baral (1992)
- 4' Ascospores $*(13-15-20(-25) \times (4.2-5-6(-6.5) \mu\text{m})$, (1)3-6(7)-septate, apothecia grey with faintly greenish tint, on wounds on branches of *Picea*, *Pinus*, Europe, USA (quite rare, xerotolerant) **Claussenomyces "griseus"**
The USA find is a bit between *C. kirschsteinianus* and *C. griseus*, having spores $14.7-22 \times 4.2-5 \mu\text{m}$, 3-6-septate, apothecia light bluish-greenish-grey.
- 5 Apothecia lacking anamorph; spores $* 27-35 \mu\text{m}$ long or $* 6-9 \mu\text{m}$ wide; resinicolous on Pinaceae..... 6
- 5' Apothecia with or without anamorph; spores mostly shorter or narrower (max. $5.6 \mu\text{m}$); on broad-leaved trees 7
- 6 Spores $* 27-53 \times 2.8-3.8 \mu\text{m}$, \pm cylindric, 3-7-septate, no longisepta, apothecia 0.2-0.6 mm, hymenium whitish, translucent, inconspicuous among black yeasts; on branch of *Picea*, Switzerland (rare) **Claussenomyces "hyalinus"**
- 6' Spores $*(14-17-21(-24) \times (6-6.5-7.5(-9) \mu\text{m})$, oblong to subclavate, (2-)3(-4-5)-septate, sometimes with one oblique septum, with some small LBs (OCI 1-2); apothecia 0.2-0.5 mm, bright bluish-green(-olivaceous), substipitate; on branches (wood) of *Pinus mugo* (xerotolerant, rare) **Claussenomyces sp.**
- 7 Spores predominantly 7-septate or 3-7-septate at \pm equal frequency 8
- 7' Spores predominantly 3-septate, **?rarely more?** 11
- 8 Anamorph long-stalked (synnemata of *Dendrostilbella*-type), apothecia 0.6-1.4 mm, ???green, teleomorph without globose cells? in ectal excipulum, anamorph up to 2 mm tall, spores $13-21 \mu\text{m}$ long (rare, ?hygro) **Claussenomyces "maas-geesterani"**
- 8' Anamorph short-stalked or sessile (sporodochia or synnemata of *Coryne*-type); spores with OCI 4-5, multiguttulate with medium sized and small LBs 9
- 9 Apothecia cream-greyish to very pale blue-green, 0.6-1.8 mm, distinctly stalked, spores $* 13.5-22(-26) \times 3.5-4.3 \mu\text{m}$, (3-)7-septate; asci $* 11.2-13 \mu\text{m}$ wide; anamorph whitish or pale blue-green, conidiogenous cells $* 11-13 \times 1.5 \mu\text{m}$, conidia $* 2.3-3 \times 1.1-1.3 \mu\text{m}$; on lower face and in cavities of very rotten trunks and branches (*Alnus*, *Fagus*), Central Europe (rare, hygro) **Claussenomyces "Waldhaff"**
- 9' Apothecia light to dark (blue-)green (xerotolerant) 10

- 10 Apothecia ochre-grey with dark blue-green to black margin, 0.5-1.8 mm; spores *22-30(-36) x (3.8)4.4-5-5.6 µm, 7-septate, asci *14.5-16.3 µm wide, anamorph turquoise-blue o black, 0.4-1 mm, globose to obpyriform, fasciculate, conidiogenous cells 5.7-9 x 1.5-2.1 µm, conidia *3.2-4.5x1.2-1.4 µm, on bark of *Salix caprea*, Central Europe (rare, xerotolerant) **Claussenomyces "caeruleomarginatus"** G. Marson
Compare *Patellaria proxima* Berk. & Br. (1896: 468) = *Odontotrema longius* Nyl.
- 10' Apothecia light (yellowish-)green(-bluish), 0.2-0.9(-1.3) mm; spores *(13-)14-18(-19.2)x4-4.3 µm, 3-7-septate; asci *11-12 µm wide; anamorph yellow, 0.1-0.25 mm, conidia (on ascospores!) *2.2-2.5x1.4-1.6(-1.8) µm; on bark (periderm and bast), rarely wood of *Salix cinerea* or on old basidiocarps of *Hymenochaete tabacina*, Central Europe (rare, xerotolerant) **Claussenomyces "salicicola"**
- 10" On wood of *Alnus*, conidiogenous cells 30 µm long (=spores 7-septate)
 **Coryne virescens = "Claussenomyces virescens"**
- 11 Apothecia 0.2-0.6 mm, some shade of green, with globose cells in ectal excipulum; anamorph of *Dendrostilbella*-type, stalked, up to 1.2 mm tall, exudate pale greenish; asci *115x9.3-11(12.5) µm, IKI-, with croziers; spores *(9-)11-15(-17)x3.5-4 µm, 3-septate, OCI 4; saprobic on wood of *Fagus* but also *Fraxinus*, *Populus*, *Quercus*, *Salix*, Europe (hygro); phen.: VI-X..... • **Claussenomyces prasinulus** (P. Karst.) Korf & Abawi (1971)
Ill.: Ellis & Ellis 1985: fig. 10, Breitenbach & Kränzlin 1981: pl. 169.
- 11' Anamorph unknown, exudate bright blue-green (xerotolerant) 12
- 12 Spores *12-17(-18.5)x(3.5-)4-4.7(-5) µm, OCI 3-4; asci *11-12.3 µm wide, dome immature/mature abruptly thickened (lateral wall thin), with croziers; terminal cells of paraphyses 8-12 µm long; apothecia 0.2-0.5 mm, round, black; on ?*Genista* (Spain), *Arctostaphylos*, USA (rare, xero) **Claussenomyces sp.**
- 12' Spores *(12-)13-15.5x(2.8-)3.3-4 µm, OCI 1-2; asci *9.5-9.7 µm wide, dome immature (+) gradually thickened (lateral wall ± thick), ?without croziers; terminal cells of paraphyses 3-4 µm long; apothecia 0.15-0.4 mm, black, elliptical; on wood of *Cistus*, Spain (rare, xerotolerant) **Claussenomyces sp.**

Collophorina Damm & Crous

Syn.: *Collonophora* Damm & Crous

Type species: *Collophorina rubra* (Damm & Crous) Damm & Crous

Durandiella Seaver

Syn.: anamorph *Chondropodium* Höhn.

Type species: *Durandiella fraxini* (Schwein.) Seaver.

Lit.: Groves 1954: 116, Krieglsteiner 1978: 277, Breitenbach & Kränzlin 1981: 212, Baral & Krieglsteiner 1985: 114, Schmid I. & H. 1990, Magnes 1997: 115 (*D. seriata*).

- 1 On leaves of *Calluna vulgaris*; phen.: ? **Durandiella callunae** E. Müll. & Schläpf.-Bernh. (1968) [1966]
- 1' On twigs and branches 2
- 2 Apothecia erumpent in clusters, irregularly urceolate, hymenium dark olive, flesh gelatinous; mostly in company of anamorph; spores fusiform, slightly curved, 50-65x4.5-5.5 µm, 3-4-septate, smooth, guttulate, hyaline; saprobic on corticated branches of *Abies alba* of freshly cut trees; phen.: III-XII **Durandiella gallica** M. Morelet (1971)
Ill. : Breitenbach & Kränzlin 1981: pl. 255, Schmid I. & H. 1990 : nr. 8.
- 2' Apothecia caespitose in elongated clusters, 0.4-1 mm diam., glabrous, fleshy-leathery when moist, black; spores (30)40-50(60)x2.5-3.5(4) µm, becoming 3-5-septate; saprobic on twigs of *Betula*; phen.: ?
 **Durandiella seriata** (Fr.) J.W. Groves (1954)

Holwaya Sacc.

Syn.: anamorph *Crinula* Sacc.

Type species: *Holwaya ophiobolus* (Ellis) Sacc. = *Holwaya mucida* (Shulzer) Korf & Abawi.

Lit.: Baral & Krieglsteiner 1956 : 119, Benkert 1981: 33, Hansen & Knudsen 2000: 152.

- 1 Apothecia single or caespitose, cupulate to umbilicate, shortly stipitate, 2-15 mm wide, hymenium black, outside tomentose and olivaceous black; asci 120-160x9-10 µm, non-amyloid; spores 30-65(-74)x2.5-4 µm, 11-19-septate, hyaline, sometimes budding off secondary spores; saprobic on rotten logs and branches of *Tilia*, rarely on *Acer*, *Quercus*, often in company of its anamorph *Crinula caliciiformis*; phen.: IX-XII (BE/F, BE/W)
 ○ **Holwaya mucida** (Schulzer) Korf & Abawi (1971)

Micraspis Darker

Syn.: anamorph *Periperidium* Darker

Type species: *Micraspis acicola* Darker

Lit.: Dennis 1971: 362 (*M. strobilina*), Graddon 1984: 379 (*M. tetraspora*).

- 1 Apothecia erumpent, up to 1 mm wide, circular to oblong, black lobed margin, hymenium cream; asci 80x8-10 µm, l-; spores ovoid-clavate, 11-14x3-4 µm, 1(3)-septate, hyaline; saprobic on cones of *Pinus sylvestris*; phen.: VIII
 **Micraspis strobilina** Dennis (1971)
 Ill.: Dennis 1978: fig. 6K.
- 1' Apothecia erumpent, up to 0.3 mm diam., disc dark olive-grey, receptacle black, with lobed margin; asci up to 50x8 µm, l-; spores 12-14x4-5 µm, 3-septate; saprobic on wood of *Picea sitchensis*; phen.: X-XI
 **Micraspis tetraspora** Graddon (1984)

Pragmopora A. Massal.

Type species: *Pragmopora amphibola* A. Massal.

Lit.: Groves 1967: 169.

- 1 Apothecia erumpent-superficial, sessile, 0.3-0.5 mm diam., black, glabrous, leathery; ectal excipulum +/- textura oblita; asci 4-8-spored, (50)55-75(85)x7.5-10 µm, l-; spores elongate-fusiform to subclavate, (12)14-20(27)x2.5-4 µm, 3-8-septate; paraphyses with swollen tip embedded in brownish gel; on branches of *Pinus sylvestris*; phen.: V-VII
 **Pragmopora amphibola** A. Massal. (1855)
 Ill.: Groves 1967: fig. 8.
- 1' Spores more than 27 µm long 2
- 2 Apothecia similar; ectal excipulum textura oblita; asci 8-spored, (60)65-80(100)x(8.5)9-12(13) µm, l-; spores 20-45(57)x(2.5)3-4(4.5) µm, 3-5-septate; paraphyses with swollen tip embedded in brownish gel; on *Picea* sp.; phen.: V
 **Pragmopora bacillifera** (P. Karst.) Rehm (1890)
 Ill.: Groves 1967: fig. 13.
- 2' Apothecia similar; ectal excipulum textura oblita; asci 8-spored, 100-140x10-15 µm, l+; spores filiform, with pointed ends, (45)50-60(75)x3-4 µm, multiseptate; paraphyses with swollen tip embedded in brownish gel; on *Pinus*, *Pseudotsuga* and *Larix*; phen.: X-XII (CH) **Pragmopora pithya** (Fr.) J.W. Groves (1967)
 Ill.: Groves 1967: fig. 10.

Tympanis Fr.

Syn.: anamorph *Sirodothis* Clem.

Type species: *Tympanis saligna* Tode.

Lit.: Groves 1952: 571, Ouellette & Pirozynski 1974: 1889, Hansen & Knudsen 2000: 160.

- 1 On coniferous wood 2
- 1' On deciduous wood 10
- 2 Apothecia erumpent, separate or caespitose, 0.5-1.5 mm broad, 0.4-2 mm high, circular, black, glabrous; asci 85-120x12-16 µm; primary spores 13-20x2-4 µm, becoming multiseptate; saprobic on twigs of *Pinus*; phen.: ? (GB)
 **Tympanis confusa** Nyl. (1868)
- 2' Primary spores 0-1-septate, globose to elongate 3
- 3 Apothecia erumpent, separate or caespitose, 0.5-1.3 mm broad, 0.3-0.8 mm high, undulate to hystericiform, black, glabrous; asci 85-125x11-19 µm; primary spores 3.5-6 µm diam.; saprobic on twigs of *Pinus*; phen.: ?
 **Tympanis neopithya** Ouell. & Piroz. (1974)
- 3' Spores not globose 6
- 6 Spores up to 7.5 µm long 7
- 6' Spores longer 8
- 7 Apothecia erumpent, separate or caespitose, 0.5-1.5 mm broad, 0.4-2 mm high, circular, black, glabrous; asci 100-130x12-15 µm; primary spores 5-7x3-4 µm, 0-1-septate; saprobic on branches of *Abies*, *Picea*, *Pinus*, *Larix*; phen.: X
 ○ **Tympanis truncatula** (Pers.) Rehm (1889)
 Ill.: I. & H. Schmid 1991: nr. 65.
- 7' Apothecia erumpent, caespitose or separate, 0.5-1.2 mm broad, 0.5-1.5 mm high, circular to undulate, black, glabrous; asci 115-130x14-16 µm; primary spores 5-7.5x3-4 µm, 0-1-septate; saprobic on fallen branches of *Picea abies*, *Picea glauca*; phen.: VIII-IX ● **Tympanis piceae** J.W. Groves (1952)
- 8 Apothecia erumpent, caespitose or separate, 0.4-1.2 mm broad, 0.4-1 mm high, undulate, light brown, glabrous; asci 70-90x10-13 µm; primary spores 8-10x2-4 µm, 0-1-septate; saprobic on fallen branches of *Pinus* and *Picea abies*; phen.: X (GB) **Tympanis hypopodia** Nyl. (1868)

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- 8' Apothecia erumpent, caespitose or separate, 0.5-1 mm broad, 0.4-1.3 mm high, circular or undulate, black, glabrous; asci (70-)80-110(-120)x(11-)13-15(-17) μm ; primary spores 7-10x3-4 μm , 0-1-septate; saprobic on branches of *Abies*, *Juniperus*, *Larix*; *Picea*, *Pinus*, *Thuja*; phen.: ? (GB) ... **Tympanis laricina** (Fuckel) Sacc. (1889)
- 10 Primary spores aseptate 11
- 10' Primary spores becoming 1(2)-septate, globose to elongate 16
- 11 Asci up to 135 μm long; primary spores up to 4 μm long 12
- 11' Asci more than 135 μm long 14
- 12 Apothecia erumpent, usually caespitose with up to 15 in a cluster, 0.4-0.8 mm diam., 0.2-0.5 mm high, black, glabrous; asci 85-110x13-16 μm ; primary spores 4-5x3-4 μm , aseptate; saprobic on branches of *Betula* spp.; phen.: ? **Tympanis mutata** (Fuckel) Rehm (1889)
- 12' Primary spores smaller 13
- 13 Apothecia erumpent, gregarious, separate or caespitose, 0.5-0.8 mm broad, 0.5 mm high, circular to undulate, black, glabrous; asci 85-100x11-13 μm ; primary spores 2-4x1-1.5 μm ; saprobic on twigs of *Fagus*; phen.: ? **Tympanis rehmlana** J.W. Groves (1952)
- 13' Apothecia erumpent, gregarious, separate or caespitose, 0.5-1 mm broad, 0.2-0.5 mm high, circular to undulate, black, glabrous; asci 110-135x15-17 μm ; primary spores 2-4x1-1.5 μm ; saprobic on branches of *Salix* spp.; phen.: ? **Tympanis salicina** J.W. Groves (1952)
- 14 Apothecia immersed to slightly erumpent, separate, 0.3-0.5 mm broad, 0.2-0.3 mm high, circular to undulate, greyish-pruinose; asci 150-180x15-18 μm ; primary spores subglobose, 4.5-5.5x3.5-4.5 μm ; saprobic on branches of *Myricaria germanica*; phen.: ? **Tympanis myricaria** Rehm (1906)
- 14' Asci more than 18 μm broad 15
- 15 Apothecia erumpent, in clusters of more than six, 0.3-1 mm broad, 0.5-2 mm high, circular to undulate, black, outside glabrous to pruinose; asci 135-190x18-22 μm ; primary spores subglobose, 5-6x4-5 μm ; saprobic on twigs of *Alnus*, *Betula* and *Malus*; phen.: I-XII • **Tympanis alnea** (Pers.) Fr. (1822)
- 15' Apothecia immersed to erumpent, solitary, rarely subcaespitose, 0.5-1 mm broad, 0.2-0.3 mm high, circular to undulate, black, outside pruinose; asci 160-210x18-23 μm ; primary spores subglobose, 5-8x4-7 μm ; saprobic on twigs of *Salix*; phen.: ? **Tympanis saligna** Tode (1790)
- 16 Asci up to 130 μm long 17
- 16' Asci longer 23
- 17 Asci up to 15 μm broad 18
- 17' Asci broader 22
- 18 Apothecia erumpent, caespitose in clusters of 2-8, 0.5-1.5 mm diam., 0.5-1 mm high, circular to undulate, black, glabrous; asci 90-115x12-15 μm ; primary spores 4-5x2.5-3.5 μm ; saprobic on branches of *Acer* spp.; phen.: IX **Tympanis acerina** J.W. Groves (1952)
- 18' Spores longer 19
- 19 Asci in average less than 90 μm long 20
- 19' Asci in average more than 90 μm long 21
- 20 Apothecia erumpent, separate or caespitose, 0.5-1 mm broad, 0.3-0.5 mm high, circular to undulate, black, outside glabrous; asci 70-90x10-13 μm ; primary spores 5-8x3-4 μm ; saprobic on branches of *Populus* and *Salix*, on rotten trunk of *Populus tremula*; phen.: VI (GB) **Tympanis spermiospora** (Nyl.) Nyl. (1869)
- 20' Apothecia erumpent, separate or with 3-4 in a cluster, 0.5-1 mm diam., 0.3-0.5 mm high, black, outside glabrous; asci 70-85(100)x(9)10-12(13) μm ; primary spores 4-7x3-4 μm , one- or two-celled; saprobic on *Malus*; phen.: II **Tympanis malicola** Groves (1952)
- 21 Apothecia erumpent, caespitose in clusters; asci (75-)90-115x(8.5)11-13 μm ; primary spores ellipsoid, 4-8x3-6 μm ; saprobic on branches of *Sorbus*; phen.: IV (FR) **Tympanis sorbi** J.W. Groves (1952)
- 21' Apothecia erumpent caespitose in clusters; asci (75-)90-120(-145)x10-16(-20) μm ; spores 5-8x3-4 μm ; saprobic on branches of *Viburnum* and *Cornus* (GB) **Tympanis fasciculata** Schwein. (1832)
- 22 Apothecia erumpent, caespitose in clusters of 20 or more, 0.5-0.8 mm broad, 0.5-2 mm high, circular to undulate, black, outside pruinose; asci 100-130x16-18.5 μm ; primary spores ellipsoid, 4-8x3-6 μm ; saprobic on branches of *Malus*, *Prunus spinosa* and *Sorbus*; phen.: VII (GB) • **Tympanis conspersa** (Fr.) Fr. (1822)

- 22' Apothecia slightly erumpent, circular to undulate, black, glabrous to slightly pruinose; asci 110-130x18-20 µm; primary spores 3-6x3-4.5 µm; saprobic on branches of *Syringa vulgaris*; phen.: ? **Tympanis syringae** Fuckel (1867)
- 23 Apothecia erumpent, separate or caespitose, 0.8-2 mm broad, 0.5-1 mm high, circular to undulate or hysteriform, light brown, outside glabrous; asci 135-190x18-23 µm; primary spores 5-6x4.5 µm; saprobic on branches of *Alnus* spp.; phen.: ? **Tympanis hysterioides** Rehm (1889)
- 23' Apothecia black, never hysteriform 24
- 24 Apothecia erumpent, caespitose, 0.5-0.8 mm broad, 0.4-1 mm high, circular to undulate, black, outside glabrous to pruinose; asci 110-145x15-20 µm; primary spores 5-8x3-4 µm; saprobic on branches of *Prunus* spp.; phen.: VIII-X (CH,GB) **Tympanis prunicola** J.W. Groves (1952)
- 24' Apothecia slightly erumpent, usually single, 0.4-0.8 mm diam., 0.2-0.4 mm high, black, glabrous; asci 110-140x15-18 µm; primary spores 4-6x4.5 µm; saprobic on branches of *Ligustrum vulgare*, *Ligustrum japonicum*; phen.: III **Tympanis ligustri** Tul. & C. Tul. (1865)
III.: Ascofrance.
- 24" Apothecia erumpent, separate or in groups of 2-3, 0.5-1 mm broad, 0.2-0.5 mm high, circular to undulate, black, glabrous; asci 125-150x14-16 µm; primary spores 4-5x3.5-4.5 µm; saprobic on branches of *Fraxinus* sp.; phen.: ? **Tympanis columnaria** Höhn. (1917)

Vexillomyces S. Bien, C. Kraus & Damm 2019

Type species: *Vexillomyces verruculosus* S. Bien, C. Kraus & Damm.

Lit.: S. Bien, C. Kraus & Damm 2019: 46, Quijada & Baral 2020 (tree).

The key is based on a vital character, the presence of true ascoconidia, which can be observed with final security only with living material. Within the living asci, these small conidia are held together by an invisible membrane in (4)8 large, ± globose balls which are forcibly discharged as entities. These balls can at first glance easily be taken for ascospores. When the ascus is killed, the ascoconidia fill the complete ascus, and the balls usually become totally obscured.

Ascoconidia long-cylindrical, constantly distinctly allantoid (l/w ratio * c. 3.5-4:1) Key B1

Ascoconidia globose, ovoid, ellipsoid or shortly cylindrical, straight to slightly curved (l/w ratio * c. 1-2:1, rarely more) .. Key B2

Key B1 - Ascoconidia long-cylindrical, thin, always curved.

- 1 Ascospores with traverse and longitudinal septa (muriform) 2
- 1' Ascospores with only traverse septa 4
- 2 Spores distinctly muriform, with c. 3-6 longitudinal, often oblique septa, (mature) fusoid to narrowly trapeziform, *17-22x4-5 µm, ascoconidia, *2-2.5(-3)x0.7-1 µm; ectal excipulum brown; asci *113-135x12-13 µm; exudate on para-physes yellowish to faintly brownish, LBs within paraphyses often larger than half of paraphysis width; apothecia blackish, with distinct dark margin, exudate blackbrown, KOH rather inert; mostly associated with *Dacrymyces* sp., in the field so far always without associated anamorph, in pure culture forming conidia in separate anamorphic fruit bodies; on decorticated branches of *Carpinus*, *Fagus*, *Corylus*, *Populus*, *Quercus*, etc., Europe (very common, xerotolerant). Phen.: IV BE/F) • **Vexillomyces xylophilus** (Kirschst.) Baral, G. Marson & Quijada (2020)
- 2' Spores with only a few longitudinal septa 3
- 3 Apothecia 0.3-1.2 mm, never with dark margin, dark green, almost black when dry; asci †(82-)93-107x11-15(-17) µm, with croziers; spores †12.5-23x2.2-4 µm, 7-12-transverse septa, a few cells with a longitudinal septum; saprobic on *Carpinus* and *Quercus*, Central Europe (rare, xero); phen.: X
..... • **Vexillomyces imperspicuus** (Sacc., E. Bommer & M. Rousseau) Quijada & Baral (2020)
III.: Iturriaga 1991: fig. 1c-f.
- 3' Apothecia 1-4 mm; asci (175-)190-240(-260)x18-23(-25) µm; anamorph forms pycnidia; on *Pseudotsuga*
..... **Vexillomyces pseudotsugae** (J.W. Groves) Baral (2020)
- 4 Spores clavate, during formation of ascoconidia predominantly 7-, rarely upto 15-septate (are, xerotolerant)
..... **Claussenomyces "dacrycarpinae"**
- 4' Spores cylindrical to subclavate (-clavate) 5
- 5 Spores during formation of ascoconidia constantly 15-septate, *19-27x3-3.2 µm; asci *110-166x11.3-13.5 µm, paraphyses apically nearly always unbranched; anamorph usually present, always pure yellow, forming conidia *2.5-3x0.6-0.8 µm (corresponding to the ascoconidia); mostly on wood of *Quercus*, also *Carpinus*, *Salix*, Central Europe (very common, xerotolerant) **Claussenomyces "munathina"**
- 5' Spores vermiform, 20-22x2.5 µm, 4-13-septate; asci *88-100x7-9 µm; without anamorph (rare, ?xerotolerant); on *Hydnum ochraceum* **Vexillomyces hydnicola** (Berk. & Broome) Baral & Marson (2020)
III.: Korf & Zhuang 1987: fig. 3.

Key B2 - *Ascoconidia short and thick, only exceptionally curved.*

- 1 Ascoconidia ± globose, apothecia on resin of *Pinus*, *Larix*, *Picea*, Europe (common, xero). Phen.: V (BE/W)
..... • **Claussenomyces olivaceus** (Fuckel) Sherwood (1981)
- 1' Ascoconidia ovoid, ellipsoid or short-cylindrical, apothecia not resinicolous 2
- 2 Spores ± muriform (with longitudinal septa), often fusoid 3
- 2' Spores not muriform (only traverse septa), usually cylindrical 6
- 3 Apothecia not ionomidotic (adding KOH dissolves some greenish exudates), 0.5-1.5 mm; spores cylindrical to slightly clavate, with a few longitudinal septa, 5-11-septate; ascoconidia cylindric-ellipsoid, rarely very slightly curved 4
- 3' Apothecia ionomidotic (adding KOH dissolves red pigment into medium) 5
- 4 Without anamorph; asci *95-130x8-15 µm, IKI-, with croziers, forming 8 or 4 balls; spores *15-25.5x3.2-5.9 µm; ascoconidia (0.8)1-1.5 µm wide, narrow ellipsoid, sometimes slightly curved; on wood (*Acer*, *Fagus*, *Quercus*), Europe (xerotolerant and hygro?); phen.: (II)IV-VII (BE/F).....
..... • **Vexillomyces atrovirens** ((Pers.) Baral, Quijada & G. Marson (2020)
III.: Ellis & Ellis 1985: fig. 9, Breitenbach & Kränzlin 1981: pl. 168.
A find on *Quercus* (?GM): ascoconidia often slightly curved, apothecia turbinate, with very thick medulla, like *C. "corticicola"*
- 4' With anamorph (with short to medium long thick stalk), conidia slightly allantoid, †1.8-2.9x0.5 µm, phialides †3.4-4.8 x1.4 µm. Sexual morph: spores †(19.4-)22.3-29x4.8-5.8 µm; asci † (126-)162-175x(8.7-)10-12.6 µm; on wood of *Nothofagus*, Patagonia **Vexillomyces pleomorphicus** (Gamundí & Gaiotti) Quijada & Baral (2020)
- 5 Spores clavate, 18-25x3.5-4 µm, with 5–10 transversal septa when mature, not fragmenting into secondary ones ...
..... **Vexillomyces clavatus** (Ouell. & Korf) Quijada & Baral (2020)
- 5' Spores fusoid, 16-26x3-4.5 µm, with 6–13 transversal septa, dividing into secondary ones
..... **Vexillomyces canariensis** (Ouell. & Korf) Quijada & Baral (2020)
- 6 Asci broadly clavate, + c. 40 µm long, apical wall of dead asci thinner than lateral wall; apothecia 0,05-0.15 mm, ± brown; ± parasitic on or in basidiocarps of *Vuilleminia comedens*, on *Crataegus* and *Prunus spinosa*, Central Europe (rare, xerotolerant) **Claussenomyces "minutus"**
- 6' Asci ± cylindric-clavate, >50 µm long, apical wall of dead asci thicker than lateral wall; apothecia larger, blackish 7
- 7 Apothecia 0.5-2.2 mm, olive-brown to black, substipitate, erumpent from bark, with excipular tissue thicker than hymenium, subhymenium olivaceous-brownish; spores 7-septate, *(10.5-)12-15.5x2.8-3.5 µm, ascoconidia *1.9-2.2x1.2-1.4 µm; with striking black sessile anamorph -0.8 mm; on bark of *Salix cinerea*, Central Europe (rare, xerotolerant). Phen.: V (BE/W) • **Claussenomyces corticola** G. Marson
- 7' Apothecia 0.2-0.6 mm, with excipular tissue thinner than hymenium; without anamorph; subhymenium hyaline (always?) 8
- 8 Spores 7-15(-21) septate; lignicolous (rare, xerotolerant). Phen.: V (BE/W)
..... • **Vexillomyces dacrymycetoides** (Ouell. & Korf) Quijada & Baral (2020)
- 8' Spores max. (4-)7-septate 9
- 9 Ascoconidia *2.3-3.3x1.4-1.8 µm, spores *(17-)19-24(-26)x3-3.8(-4.4) µm; asci *60-120x13-15(-17) µm; on Fabaceae (*Cytisus*, *Genista*), also *Erica*?, Spain **Claussenomyces pillariformis**
- 9' Ascoconidia *1.8-2x0.8-1.2 µm, spores *(14-)16-22.5x3-3.5(-4.4) µm; asci *70-100x10.5-11.3 µm; apothecia ± green to black; on or in basidiocarps of (or associated with) *Tubulicrinis glebulosus*, on wood (rarely bark) of *Salix* (rarely *Quercus*), Central Europe (quite common, xerotolerant) **Claussenomyces tubulicrinidis** G. Marson

PHACIDIALES Bessey 1907

Lit.: Jaklitsch & al. 2016: 186, Ekanayaka et al. 2019: .

Only family belonging to this order:

PHACIDIACEAE Fr. 1849

Lit.: Crous et al. 2014: 180, Jaklitsch et al. 2016: 186.

Foliicolous, caulicolous, corticolous, parasitic or saprobic (endophytic).

Sexual morph: Ascomata apothecial, discoid, or circular, initially immersed, becoming erumpent, opening by irregular tears in upper layer, teeth opening to expose hymenium; wall of textura globulosa to textura angularis; inner layer of smooth-walled, hyaline periphysoids invested in mucilage; basal stroma of textura angularis to textura globulosa. Asci arising from croziers, clavate, (4–)8-spored, unitunicate, with or without amyloid dehiscence ring staining blue in Melzer's reagent. Ascospores aseptate, ellipsoid, fusoid, subcylindrical or irregularly so, hyaline or brown, with or without germ slit, straight to curved, lacking gelatinous appendages. Paraphyses branched or simple, septate hyaline, anastomosing, invested in mucilage or not.

Asexual morph: Conidiomata uni- to multilocular, single to aggregated, with one to several ostioles. Walls of textura angularis to textura globulosa. Conidiophores hyaline, smooth, branched, or reduced to conidiogenous cells, arising from inner layer of conidioma. Conidiogenous cells phialidic, at times proliferating percurrently, invested in mucilage. Conidia hyaline, smooth, subcylindrical, ellipsoid-oblong or subreniform, with or without apical, mucoid funnel-shaped appendage.

Genera belonging to this family:

1. *Allantophomopsiella* Crous
2. *Allantophomopsis* Petr.
3. *Bulgaria* Fr.
4. *Darkera* H.S. Whitney
5. *Phacidium* Fr.
6. *Phacidiopycnis* Potebnia
7. *Pseudophacidium* P. Karst.
8. *Starbaeckia* Rehm
9. *Strasseria*

Key to the genera:

- 1 Apothecia large, turbinate, gelatinous throughout, dark brown to black; asci with 4 brown and 4 hyaline spores; paraphyses with strongly curved apices, with gold and purplish exudate, in KOH strongly violet *Bulgaria*
- 1' Apothecia erumpent 2
- 2 Ascomata amphigenous, scattered or gregarious, circular, immersed, becoming erumpent, rupturing host tissue by irregular stellate splits, of dark brown pseudoparenchymatal cells of textura globulosa, inner layer with periphysoids, invested in mucilage. Hymenium of asci and paraphyses; basal stroma present or absent. Asci clavate, (4–)8-spored, with amyloid apical discharge mechanism. Ascospores aseptate, ellipsoid to ellipsoid-fusoid, hyaline, smooth, lacking mucoid appendages. Paraphyses septate, hyaline, smooth, branched, anastomosing, invested in mucilage. Conidiomata pycnidial, immersed, becoming erumpent, uni- to multilocular, brown, with ostiole; wall of textura angularis to textura globulosa. Conidiophores branched or simple, septate, hyaline, smooth, invested in mucilage. Conidiogenous cells phialidic, at times proliferating percurrently, subcylindrical to ampulliform, smooth, hyaline, invested in mucilage. *Conidia* subcylindrical, aseptate, hyaline, smooth, with irregular funnel-shaped apical mucilaginous appendage. Foliicolous or caulicolous. *Phacidium*
- 2' Apothecia erumpent, black, carbonaceous, splitting open to expose a pale disc; asci clavate, 1-; spores oblong-ellipsoid, reniform to cylindrical, straight to curved, aseptate, hyaline. *Conidiomata* brown, pycnidoid, stromatic, gregarious to crowded, immersed, discoid to orbicular, opening by means of irregular ruptures, multilocular; wall of brown *textura globulosa*; basal stroma of pale brown *textura epidermoidea*. *Conidiogenous cells* phialidic, lining inner cavity, lageniform to ampulliform, hyaline, smooth-walled; proliferating percurrently at apex. *Conidia* ellipsoid to oblong or subreniform, apex rounded, base with truncate scar, guttulate, hyaline, smooth-walled *Pseudophacidium*
- 2" Ascomata with upper wall of much strongly blackened fungal tissue, opening by an irregular rupture, but remaining attached to, close and re-open with changing humidity; asci clavate, 1-; spores subglobose to ellipsoid, aseptate, guttulate, hyaline to pale yellow, smooth-walled. *Conidiomata* scattered to aggregated, immersed, subepidermal, depressed globose, papillate, nonostiolate, multilocular, brown, opening by irregular rupture; wall of brown *textura globulosa* to *textura epidermoidea* above, pale brown below, with wall of yellow-brown *textura prismatica*. *Conidiogenous cells* phialidic, lining the inner cavity, subcylindrical, lageniform to ampulliform, straight to curved, hyaline, smooth-walled. *Conidia* subglobose to obovoid, guttulate, aseptate, base truncate, hyaline to pale yellow, smooth-walled; on bark of trees of the Rosaceae *Phacidiopycnis*

3''' Ascomata like *Phacidium*. Conidiomata pycnidial, immersed, becoming erumpent, irregularly multilocular, dark brown, ostiolate; wall of 3–4 layers of dark brown *textura angularis*. Conidiophores arising from inner layer of conidioma, at times reduced to conidiogenous cells, branched, septate. Conidiogenous cells integrated or discrete, ampulliform to subcylindrical or lageniform, hyaline, smooth with minute periclinal thickening at apex. Conidia ellipsoid to fusiform, hyaline, smooth, aseptate, guttulate, bearing mucoid apical appendages (Type C sensu Nag Raj 1993), flabelliform to irregular in shape *Allantophomopsiella*

Allantophomopsiella Crous

Type species: *Allantophomopsiella pseudotsugae* (M. Wilson) Crous

Lit.: Crous & al. 2014: 180.

- 1 Apothecia 0.9-1.3 mm diam., hymenium with pink or lilac tinge; asci 63-125x11 µm; spores 15-22x3.5-5 µm; conidiomata pycnidial, immersed, becoming erumpent, up to 0.6 mm diam.; conidia ellipsoid to fusiform, (4)5–6(7)x(2)3 µm, hyaline, smooth, aseptate, guttulate, bearing mucoid apical appendages (Type C sensu Nag Raj 1993, only visible in water), flabelliform to irregular in shape; parasitic (cancer fungus) on branches of *Larix decidua*, *Picea abies*, *Pinus sylvestris*, *Pseudotsuga menziesii*, needles of *Pinus sylvestris*; phen.: II, IV-VII, IX-XII (DE,NL,NO)
 **Allantophomopsiella pseudotsugae** (M. Wilson) Crous (2014)
 Ill.: Crous & al. 2014: fig. 3.

Allantophomopsis Petr.

Type species: *Allantophomopsis cytispora* (Fr.) Petr.

Syn.: *Apostrassaria* Nag Raj

Lit.: Crous & al. 2015: 169.

- 1 *Conidiomata* pycnidoid, scattered, globose, to 600 µm diam., unilocular but convoluted or irregularly divided, glabrous, dark brown to black, ostiolate, wall up to 40 µm thick, of *textura angularis*, cells of outer layers brown, thick-walled; inner layers hyaline to subhyaline, thin-walled. *Conidiophores* lining the cavity of the conidiomata, reduced to conidiogenous cells or sparsely septate and branched. *Conidiogenous cells* discrete, occasionally integrated, ampulliform hyaline, thin-walled, smooth, 7–12 x 2.5–4 µm with several annellations, invested in mucus. *Conidia* naviculate with a broad rounded apex and narrow truncate base, hyaline, thin-walled, smooth, (5)6–6.5(7) x 2(2.5) µm, bearing a conical or irregular, mucoid, apical appendage; on leaves of *Vaccinium vitis-idaea*, *Oxycoccus macrocarpos*; phen.: IX **Allantophomopsis cytispora** (Fr.) Petr
 Ill.: Crous & al. 2015: fig. 6.
- 1' *Conidiomata* pycnidial to pycnidoid, subepidermal, globose to depressed globose, 170+500 µm diam., 130-300 µm tall, with conical neck 20-40 µm long, glabrous, dark brown to black, wall to 40 µm thick, of *textura angularis*. *Conidiophores* reduced to conidiogenous cells or sparsely septate and branched. *Conidiogenous cells* ampulliform to lageniform or conical, (5)6-8(9)x3-4 µm with several annellations, invested in mucus, thin-walled, hyaline. *Conidia* naviculate with broad rounded apex and narrow truncate base, (8)9-11(12)x(2)2.5-3(3.5) µm, smooth, thin-walled, bearing a conical or irregular, mucoid, apical appendage; on *Lycopodium complanatum*, on roots of conifers; phen.: X-XII **Allantophomopsis lycopodina** (Höhn.) Carris (1990)
 Ill.: Crous & al. 2015: fig. 7.

Bulgaria Fr.

Type species: *Bulgaria inquinans* (Pers.) Fr.

Syn.: *Phaeobulgaria* Seaver.

Lit.: Dennis 1956 : 167, Baral & Krieglsteiner 1956 : 104, Hansen & Knudsen 2000: 138.

- 1 Apothecia turbinate, 5-30 mm diam., gelatinous, hymenium shining brownish black, outside furfuraceous and sooty brown; asci with 4 brown spores and 4 hyaline disintegrating spores, 1+; spores 11-14x6-7 µm; saprobic on recently fallen branches and cut trunks of *Quercus robur*, rarely on *Fagus*, *Carpinus* and *Betula*; phen.: (VII)VIII-XII • **Bulgaria inquinans** Pers.: Fr. (1822)

Phacidium Fr.

Type species: *Phacidium lacerum* Fr.

Syn.: anam. *Ceuthospora* Grev., *Phacidiostroma* Höhn.

Lit.: Terrier 1942: 69, Dennis 1978: 238, Ellis & Ellis 1985: 76 (*P. abietinum*) & 146 (sub *Phacidiostroma multivalve*), Engel & Hanff 1987: 73 (*P. vaccinii*), Crous & al. 2014: 182.

- 1 Only anamorph known 2
- 1' Species with known teleomorph and anamorph 6
- 2 Conidiomata multilocular, with large central ostiole, papillate; conidiophores frequently reduced to conidiogenous cells, branched, 1–3-septate, up to 30 µm long, 3–4 µm diam.; conidiogenous cells hyaline, smooth, terminal and subterminal, 5–15x2.5–3.5 µm, proliferating with periclinal thickening (characteristic of this species); conidia subcylindrical, smooth, granular, hyaline, (17)18-20(22)x3.5(4) µm, with a flared, funnel-shaped apical mucoid appendage; on fallen leaves of *Arbutus unedo*, *Pistacia terebinthus*; phen.: IV-V (ES, IT)
Phacidium calderae (Urries) Crous (2014)
 Ill.: Crous & al. 2014: fig. 5.
- 2' Conidia shorter 3
- 3 Conidia without appendages 4
- 3' Conidia with an apical appendage 5
- 4 Conidia cylindrical, 10-14x1-5-2 µm, one-celled, eguttulate, smooth, hyaline; on dead leaves of *Mahonia japonica*, *M. aquifolium*. Phen.: III-IV (UK) "**Ceuthospora**" **mahoniae** Grove
- 4' Conidia cylindrical, 13.5-16.5x2.5 µm, one-celled, eguttulate, smooth, hyaline. On dead leaves of *Berberis*. Phen.: III (NL) "**Ceuthospora**" **cf. mahoniae** Grove
- 4 Conidiomata stromatic, pycnidoid, scattered, black, subepidermal, multiloculate, up to 600 µm diam, with papillate ostioles; conidiophores arising from inner layers of cavity, subcylindrical, hyaline, smooth, extensively branched, up to 120 µm long, 2.5-3 µm diam, invested in mucus; conidiogenous cells discrete or integrated, subcylindrical with prominent periclinal thickening or percurrent proliferation, hyaline, smooth, 7-19x2-2.5 µm; conidia hyaline, smooth, granular, subcylindrical, tapering at ends, apex subobtuse, base with truncate hilum, 1 µm diam, bearing a funnel-shaped mucoid apical appendage, (11)11.5-12.5(13)x(2)2.5 µm; on dead leaf of *Chamaespartium sagittale*, *Ilex aquifolium*; phen.: V,VIII (CH, NL) **Phacidium pseudophacidioides** Crous (2014)
 Ill.: Crous & al. 2014: fig. 12.
- 4' Conidiomata uni- to multilocular, up to 400 µm diam.; conidiophores branched, up to 45 µm long, 2–3 µm diam. ; conidiogenous cells terminal and lateral, 5–10x2–3 µm, with prominent periclinal thickening, rarely proliferating percurrently; conidia hyaline, smooth, granular, subcylindrical, (9)10-12(13)x(2)2.5 µm; apical mucoid appendage only visible when mounted in water; on leaves of *Eucalyptus*, *Polygonatum odoratum*; phen.: V,VIII (NL,IT)
Phacidium mollerianum (Thüm.) Crous (2014)
 Ill.: Crous & al. 2014: fig. 11.
- 4" Conidiomata pseudostromatic, pycnidoid, scattered to gregarious, black, subepidermal, uniloculate, up to 300 µm diam; walls of the pseudostroma 40-90 µm thick; conidiophores arising from inner layers of cavity, subcylindrical, hyaline, smooth, thin-walled, branched, to 30 µm long, invested in mucus.; conidiogenous cells discrete or integrated, subcylindrical with prominent periclinal thickening, hyaline, smooth, 5-12x2-3 µm; conidia hyaline, smooth, granular, subcylindrical, tapering towards a truncate basal scar, 0.5-1 µm diam, apex subobtuse, bearing a funnel-shaped mucoid apical appendage, 3-5 µm long, 2-4 µm diam at apex, (9)10-11(13)x(2)2.5(3) µm; on leaves of *Trichophorum cespitosum* subsp. *germanicum*; phen.: IV (NL) **Phacidium trichophori** Crous & Quaedvlieg (2014)
 Ill.: Crous & al. 2014: fig. 13.
- 6 On leaves of deciduous trees, shrubs or herbs 7
- 6' On needles or branches of conifers 9
- 7 Apothecia about 1 mm diam., opening by teeth; asci 56-65x8-9 µm; spores 8-10x2-3 µm, guttulate; on leaves of *Vinca minor*; phen.: ? (IT) **Phacidium vincae** Fuckel (1871)
- 7' Spores wider 8
- 8 Sexual morph: Apothecia 1-2 mm diam., opening by teeth, hymenium pale grey; asci IKI+; spores fusiform, 9-11x3-4 µm, OCI=1, hyaline. Asexual morph: *Ceuthospora phacidioides* with black, shining, multilocular conidiomata, conidia cylindrical, 7-17x2-3 µm; saprobic on fallen leaves of *Ilex aquifolium*, *Eucalyptus*, *Hedera helix*, *Prunus laurocerasus*, *Vinca minor*; phen.: anamorph: I-IV(VII), teleomorph seldom: III-V(VI-XII) (BE/F, NL, UK)
• **Phacidium lauri** (Sow.) Crous & D. Hawksw. (2014)
 Ill.: Dennis 1978: fig. 28H, Rubio & al. 2010: p. 251, Crous et al. 2014: fig. 7.
- 8' Apothecia up to 0.5 mm diam., opening by teeth, hymenium pale grey; asci 45-68x8.5-10 µm, I+; spores 7-14.4x3-3.4 µm, 0(1)-septate, guttulate; saprobic on leaves of *Vaccinium vitidis-idaea*; phen.: XI (NL)
Phacidium vaccinii Fr. (1823)
 Ill.: Engel & Hanff 1987: p. 73.
- 9 Apothecia subepidermal, circular, epidermis splitted in 4-6 teeth, hymenium grey, up to 1 mm diam.; asci 70-90x8-9 µm, I+; spores 9-13x3-4 µm, non-septate, hyaline. Asexual morph: *Ceuthospora pinastri* with conidia aseptate, subcylindrical, base bluntly rounded with flattened scar, apex with funnel-shaped mucilaginous appendage, (10)13-

- 15(18)x(2.5) 3(4) µm. Saprophytic on attached leaves of *Juniperus communis*, *Pinus sylvestris* and *Ilex aquifolium*; phen.: IV-V,VIII-X (DE, FR, NL) ○ **Phacidium lacerum** Fr. (1818)
 Ill.: Terrier 1942: fig. 1g-h, Dennis 1978: fig. 28G, Crous & al. 2014: fig. 6 & 7.
 9' Apothecia cf. *P. lacerum*; asci 40-60x7-10 µm, I+; spores 9-11x3.5-4.5 µm, bi- or triguttulate; on needles of *Abies*, *Pinus*; phen.: IV-VIII **Phacidium abietinum** Kunze & J.C. Schmidt (1817)
 Ill.: Terrier 1942: fig. 1e-f.
 Apothecia 0.1-0.2 mm diam., opening by teeth; asci 20 µm long; on leaves of *Silene conica*; phen.: ?
 **Phacidium pumilum** Desm. (1849)
 on needles of *Pinus sylvestris*; phen.: IV (FI) **Phacidium fennicum** Butin (1984)
 Asexual morph: **Phacidium foliicola** (Lib.) W.J. Li & K.D. Hyde (2020)

Phacidiopycnis Potebnia

Type species: *Phacidiopycnis malorum* Potebnia

Syn.: teleom. *Potebniomyces* Smerlis

Lit.: Minter, Fungi of Ukraine, Crous & al. 2014: 190, Baral.

- 1 Apothecia densely gregarious, erumpent by forming 4-5 lobes, 0.8-2 mm diam., disc black; asci 210-230x16-17 µm; paraphyses embedded in gel; spores 17-22(30)x9-12 µm, OCl 5; saprobic on twigs of *Malus sylvestris* and *Pyrus communis*; phen.: III (BE/F, NL) ● **"Potebniomyces" pyri** (Berk. & Broome) Dennis (1978)
 1' Apothecia scattered or subgregarious, erumpent, 1-2 mm, dark-brownish, disc concolorous, cushion-like, closed with margin inrolled when dry; asci 67-136x7-18µm, IKI-, without croziers; spores ellipsoid, 9.7-14.5x6.5-9 µm, 0(1)-septate, guttulate, brown; ectal excipulum with dark brown textura porrecta; on *Pinus canariensis*; phen.: III
 **"Potebniomyces" sp.**

Pseudophacidium P. Karst.

Type species: *Pseudophacidium ledi* (Alb. & Schwein.) P. Karst.

Syn.: *Myxophacidium* Höhn.

Lit.: Saccardo 1889: 776, Rehm 1896: 1213 (*P. necans*), Boudier 1907: 147, Arx & Müller 1954: 121, Egger 1965, Groves 1969: 1325 (sub *Encoeliopsis ledi*), Dennis 1978: 237, Kirk & Spooner 1984: 556 (*P. microspermum*), Ellis & Ellis 1985: 168 (*P. piceae*) & 323 (sub *P. callunae*), Engel & Hanff 1987: 73 (*P. ledi*), Crous & al. 2014:189.

- 1 Spores on average more than 5 µm wide 2
 1' Spores on average less than 5 µm wide 3
 2 Apothecia 1-1.5 mm diam., black, splitting open into four lobes to expose a pale grey to brown hymenium; asci 96-118x10.5-12 µm, I-; spores ellipsoid, 11-16 x 5-9 µm, aseptate, hyaline; saprobic on bark of *Picea*; phen.: V-VI
 **Pseudophacidium piceae** E.Müll. (1963)
 Ill.: Spooner 1981: fig. 29, Ellis & Ellis 1985: fig.737.
 2' Apothecia erumpent, 0.3-0.8 mm diam., splitting open into blackish conspicuous lobes to expose a convex, bright grey to yellowish grey hymenium; asci 65-100x7.5-9 µm, IKI-; spores
 2'' Apothecia erumpent, 0.5-3 mm diam., splitting open into pale grey lobes exposing an ochraceous hymenium; asci 170-200x15-18 µm, I-, with croziers; spores cylindrical to slightly curved, 15-20x5-7 µm, eguttulate; saprobic on twigs of *Corylus avellana*, *Cornus sanguinea*, *Prunus spinosa*, *Salix* sp.; phen.: XII-III
 **Pseudophacidium necans** Rehm (1896)
 Ill.: Baral
 3 Apothecia erumpent, 0.5-2.5 mm diam., black, splitting open to expose a grey yellowish disc; asci (70)75-90(100) x(6)7-9(10) µm, I+ or I-; spores ellipsoid-cylindrical to subreniform, 9-14x4-5 µm, aseptate, eguttulate, hyaline; saprobic on corticated stems and branches of *Betula alba*, *Calluna vulgaris*, *Ledum palustris*, *Rhododendron ferrugineum*, *Salix aurita*, *Vaccinium uliginosum*; phen.: III-IV, VII-VIII (CH,FI, SE).....
○ **Pseudophacidium ledi** (Alb. & Schwein.) P. Karst. (1885)
 Ill.: Groves 1969: fig. 20, Dennis 1978: fig. 5H, Ellis & Ellis 1985: fig. 1399, Schmid I. & H. 1990: nr. 28.
 3' Ascomata 1-2x0.8-1 mm, immersed, palled disc exposed by irregularly splitting of the black covering layer ; asci 82-95x11-14 µm, I- ; spores 12-16(19)x3.5-4.5(5.5) µm, non-septate; saprobic on twigs of *Salix aurita*; phen.: V
 **Pseudophacidium microspermum** (Fuckel) Rehm (1888) [1896]
 Ill.: Kirk & Spooner 1984: fig. 2B.

PHACIDIALES, genera incertae sedis

Coma Nag Raj & W.B. Kendr.
Syn.: teleom. *Ascocoma* H.J. Swart

RHYTISMATALES M.E. Barr ex Minter (1986)

Syn.: *Triblidiales* O.E. Erkss.

Lit. Minter, Fungi of Ukraine, Gernandt & al. 2001: 915, Jaklitsch et al. 2016: 190, Karakehian et al. 2019: 99.

Families belonging to this order:

1. Cudoniaceae P.F. Cannon 2001
2. Rhytismataceae Chevall. 1826
3. Tribliidiaceae Rehm emend. Karakehian

Key to the families:

- 1 Ascomata apothecial, 0.3-2.5 mm in diam., singly or several included in a carbonaceous, black, clypeate stroma, circular to ery elongated, sessile, rarely short-stalked; erumpent, cleistohymenial, covering layer of fungal and partly host tissue rupturing by radial fissures or by longitudinal split; margin forming black lips or teeth; exterior black, smooth or with polygonal pattern. Periphysoids mostly absent, hyaline. Paraphyses mostly present, apically straight to strongly curled, hyaline, covered by or immersed in a gelatinous matrix. Asci usually uniformly thin-walled, apically conical, inamyloid (except *Nothorhytisma*), usually long-stipitate, arising from croziers. Ascospores 4-8 per ascus, usually 0-septate, also dictyo- or phragmosporous, often with a gelatinous coat or with gelatinous caps at the ends, sometimes budding conidia. Anamorphs coelomycetous, holoblastic, with sympodial proliferation; conidia minute, ellipsoid to filiform, usually spermatial **Rhytismataceae**
- 1' Ascomata without covering layer 2
- 2 Ascomata 2-8 cm tall, clavate- to capitate-stipitate; Hymenium spatulate or centrally depressed, cleistohymenial; white to ochraceous or yellow. Paraphyses strongly curved (circinate), hyaline. Asci apically strongly conical, inamyloid. Ascospores filiform, overmature 3(-7)-septate, budding small subglobose to ovoid conidia. Anamorphs unknown. On open nutrient-poor forest soil. **Cudoniaceae**
- 2' Immature apothecia closed, superficial, pulvinate, opening prior to maturity (hemiangiocarpous). In early developmental stages the monolocular centrum consists of paraphysoids that are soon replaced by paraphyses immersed in a gel. The excipulum is stromatic and highly melanized. Asci elongate-cylindrical, unitunicate, IKI-. Ascus apices are undifferentiated or possess a ± reduced apical ring. The walls of discharged asci are often distinctly transverse-riate or wrinkly. Ascospores large, elongated and transverse-septate or ellipsoid and muriform, hyaline, without gelatinous sheath. Conidial states are unknown **Tribliidiaceae**

CUDONIACEAE P.F. Cannon 2001

Lit.: Jaklitsch et al. 2016: 191.

Accepted genera:

- 1 *Cudonia* Fr.
- 2 *Spathularia* Pers.

Key to the genera:

- 1 Ascomata *Leotia*-like but not gelatinous; fertile part separated from the stem by a grooved recess; asci I-; spores slender, <2 µm wide, budding of minute ellipsoid conidia within the ascus; paraphyses hyaline *Cudonia*
- 1' Ascomata with flattened fan-shaped fertile part, forming a flange around the upper part of the stem, yellow or ochraceous; asci I-; spores more than 30 µ long; paraphyses with strongly curled tip *Spathularia*

Cudonia Fr.

Type species: *Cudonia circinans* (Pers.) Fr.

Lit.: Nannfeldt 1942: 10, Eckblad 1963: 144 (*C. circinans*), Dennis 1978: 100, Benkert 1983: 148 & 168, Medardi 2006: 44.

- 1 Apothecia strongly convex, stalked, up to 45 mm high; hymenium whitish to cream, sometimes flesh-coloured or ochraceous; stem dark grey with purplish or violet tinge, 8-12 mm diam.; spores 45x2-2.5 µm, 3-5-septate; on the ground in coniferous woods (*Picea*); phen.: III-X **Cudonia circinans** (Pers.) Fr. (1849)
 Ill.: Boudier 1905-1910: pl. 430, Dennis 1978: pl. XIV L, Medardi 2006: p. 44.
- 1' Hymenium reddish brown, cinnamon, flesh-coloured; stem concolorous, 2-3 mm diam.; spores 35-45x2 µm, septate, on the ground in coniferous woods; phen.: VIII-X **Cudonia confusa** Bres. (1892)
 Ill.: Boudier 1905-1910: pl. 431, Medardi 2006: p. 45.

Spathularia Pers.

Syn.: *Spathulariopsis* Maas Geest.

Type species: *Spathularia flavida* Pers.

Lit.: Nannfeldt 1942: 53, Benkert 1983: 163, Hansen & Knudsen 2000: 182.

- 1 Ascomata up to 100 mm high; fertile part flattened, up to 23x12 mm, hymenium irregularly folded, pale to bright yellow; stem whitish to pale yellowish; asci 73-125x10-19 µm; spores 37-62x2-3.5 µm, one-celled or septate; among mosses and debris in mixed forests, mainly under *Larix*; phen.: V-X • **Spathularia flavida** Pers. (1794)
 Ill.: Breitenbach & Kränzlin 1981: pl. 141.
- 1' Ascomata similar, fertile part folded, ochraceous; stem dirty greyish to yellowish brown; asci 65-110x8-12 µm; spores 32-50x1.5-2 µm, one-celled or septate; in mossy conifer forests; phen.: VIII **Spathularia rufa** Sw. (1812)

RHYTISMATACEAE Chevall. 1826

Lit.: Minter, Fungi of Ukraine, Jaklitsch et al. 2016: 192.

Genera belonging to this family:

1. *Bifusella* Höhn.
2. *Bifusepta* Darker
3. *Bivallium* P.R. Johnst.
4. *Canavirgella* W. Merr, Wenner & Dreisbach
5. *Cavaraella* Speg.
6. *Ceratophacidium* J. Reid & Piroz.
7. *Cerion* Masee
8. *Coccomyces* De Not.
9. *Colpoma* Wallr.
10. *Criella* (Sacc.) Sacc. & P. Syd.
11. *Cryptomyces* Grev.
12. *Davisomycella* Darker
13. *Discocainia* J. Reid & A. Funk
14. *Duplicaria* Fuckel
15. *Duplicariella* B. Erikss.
16. *Elytroderma* Darker
17. *Gelineostroma* H.J. Swart
18. *Heufferia* Auersw.
19. *Hypoderma* De Not.
20. *Hypodermella* Tubeuf
21. *Hypohelion* P.R. Johnst.
22. *Isthmiella* Darker
23. *Lasiostictella* Sherwood
24. *Lirula* Darker
25. *Lophodermella* Höhn.
26. *Lophodermium* Chevall.
27. *Macroderma* Höhn.
28. *Meloderma* Darker
29. *Moutoniella* Penz. & Sacc.
30. *Myriophacidium* Sherwood
31. *Nematococcomyces* C.-L. Hou, M. Piepenbr. & Oberw.
32. *Neococcomyces* Y.R. Lin., C.T. Xiang & Z.Z. Li
33. *Neophacidium* Petr.
34. *Nothorhytisma* Minter, P.F. Cannon, A.I. Romero & Peredo
35. *Parvacoccum* R.S. Hunt & A. Funk
36. *Phaeophacidium* P; Henn. & Lindau
37. *Ploioderma* Darker
38. *Propolidium* Sacc.
39. *Pseudorhytisma* Juel
40. *Pureke* P.R. Johnston
41. *Rhytisma* Fr.
42. *Soleella* Darker
43. *Sporomega* Corda
44. *Terriera* B. Erikss.
45. *Therrya* Sacc.
46. *Tribliopsis* P. Karst.
47. *Virgella* Darker
48. *Vladracula* P.F. Cannon, Minter & Kamal
49. *Xyloschizon* Syd.
50. *Zeus* Minter & Diamandis

Key to the genera:

- 1 Conspicuous stromata produced on living dicot leaves, each stroma then bearing many conidiomata and, after leaf death, many ascomata; on *Acer*, *Andromeda* and *Salix* spp..... [Rhytisma](#)
- 1' Not with this combination of characters 2

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- 2 On dead brittle attached or self-pruned conifer twigs and branches; conidiomata and ascomata so strongly erumpent as to appear superficial; conidia almost filiform; ascospores 1-septate, with a conspicuous mucous sheath; on Pinaceae..... [Tryblidiopsis](#)
- 2' Not with this combination of characters 3
- 3 On dying or recently dead wood or bark attached to living trees (*Salix* spp.), often causing an extensive black crust, typically with a paler orange coloured perimeter; ascomata containing cylindrical asci with ascospores each with inconspicuous apical and basal appendages [Cryptomyces](#)
- 3' Not with this combination of characters 4
- 4 On pale dead parts of otherwise living attached needles of *Pinus* spp., usually infecting only a small number of trees in a stand; ascomata inconspicuous, externally pale brown or grey, elongated; ascospores clavate, aseptate, with a conspicuous mucous sheath [Lophodermella](#)
- 4' Not with this combination of characters 5
- 5 Often with 1 conspicuous black zone line at the needle base; on wholly dead conifer needles still attached to living twigs of *Abies*, *Picea* and *Larix* spp. 6
- 5' Not with this combination of characters 7
- 6 Ascomata usually long and thin; ascospores threadlike; paraphyses long (in Ukraine known only from *Abies* and *Picea* spp.) [Lirula](#)
- 6' Ascomata elliptical; ascospores clavate; paraphyses short [Hypodermella](#)
- 7 On dead parts of otherwise living needles of *Pinus* spp.; ascomata conspicuous; asci saccate, very large; ascospores 1-septate, with a thick mucous sheath [Elytroderma](#)
- 7' Not with this combination of characters 8
- 8 On pale, brittle, often self-pruned twigs and branches of *Pinus* spp.; ascomata circular; spores septate, with mucous sheaths which are very thin or absent [Therrya](#)
- 8' Not with this combination of characters 9
- 9 Spores with a length/width ratio greater than 8:1 10
- 9' Spores with a length/width ratio less than 8:1 18
- 10 Ascomata opening by irregular tearing 11
- 10' Ascomata opening by a regular pattern 13
- 11 Ascomata opening by irregular and crenate tearing; spores filiform, aseptate, often with ascoconidia; paraphyses with curved or coiled tips; saprobic on wood, stems or leaves of deciduous trees or ferns [Discocainia](#)
- 11' Spores bifusoid-isthmoid, aseptate, with mucous coating 12
- 12 Ascomata up to 1 mm, mostly in clusters; covering layer with textura epidermoidea, with radiating peripheral part; paraphyses with curved tips; on *Empetrum* [Duplicaria](#)
- 12' Ascomata without carbonised base; covering layer without structura epidermoidea nor radiating; without paraphyses; on needles of *Pinus* [Bifusella](#)
- 13 Ascomata opening with radial splits (if this option is unsuccessful for bark or wood-inhabiting species, try [Colpoma](#) under the alternative option) 14
- 13' Ascomata opening by a single split..... 15
- 14 Ascomata in a thickened fleshy stroma with a gelatinous interior, and a blackened outer crust [Sporomega](#)
- 14' Ascomata lacking a thickened fleshy stroma (except *C. tumidus*)..... [Coccomyces](#)
- 15 On twigs or bark (if on twigs of the Ericaceae, try [Lophodermium](#) and [Terriera](#) under the alternative option); ascomata often > 1.5 mm in their largest dimension, often with a strongly-developed basal layer and a poorly-defined perimeter [Colpoma](#)
- 15' On angiosperm leaves, conifer needles, conifer cones or twigs of the Ericaceae; ascomata usually < 1.5 mm in their largest dimension, often with a poorly-developed basal layer and a well-defined perimeter 16
- 16 On twigs; ascomata with paraphyses forming an epithecium [Terriera](#)
- 16' On various substrata including twigs of the Ericaceae; ascomata with paraphyses not forming an epithecium; ascospores aseptate or septate [Lophodermium](#)
- 18 On dead conifer needles, usually on dead twigs still attached to living branches; ascomata containing ascospores with a very conspicuous mucous sheath..... [Meloderma](#)

- 18' Not with this combination of characters 19
- 19 Upper wall of ascoma with much strongly blackened fungal tissue, opening by one or more splits, but remaining attached to close and re-open with changing humidity 20
- 19' Upper wall of ascoma with little or no blackened fungal tissue and usually shed, when spore release begins 21
- 20 Ascomata without a blackened lower wall; upper wall of ascoma undifferentiated and without a pre-formed split line; paraphyses apically swollen *Hypohelion*
- 20' Ascomata with a blackened lower wall; upper wall of ascoma with different zone and a pre-formed split line; paraphyses not apically swollen *Hypoderma*
- 21 Apothecia multi-angular, dark brown, opening by teeth or slightly irregular splits, strongly raising above the surface of the substrate; asci 4-spored, I-; spores ellipsoid, aseptate, with filiform, hyaline appendages at both ends; parasitic on twigs *Nematococcomyces*
- 1 **Apothecia immersed in stromatic tissue, opening in irregular way, without excipulum; parasitic on leaves** *Pseudorhytisma*
- 1' **Ascomata intraepidermal, with dark upper layer and hyaline basal layer** *Macroderma*
1. Ascomata elongated, mostly opening with a longitudinal slit; spores IKI+ blue-violet (wall and septa); saprobic on bark of almost exclusively conifers *Pseudographis*

Bifusella Höhn.

Type species: *Bifusella linearis* (Peck) Höhn.

Syn.: anam. *Crandallia* Ellis & Sacc.

Lit.: Terrier 1942: 59, Rossman & al. 2016: 2.

No Western European species known.

Coccomyces De Not.

Type species: *Coccomyces coronatus* (Schumach.) De Not.

Lit.: Darker 1967: 1435, Dennis 1978: 230, Sherwood 1980: 1, Johnston 1986: 104 (*C. lauraceus*).

- 1 Apothecia up to 2 mm diam., stromata square to hexagonal, splitting up into 4 to 6 regular teeth; asci 4(8)-spored, 115-140x12-15 µm; spores 65-90x4.5-5 µm, filled with up to 1.5 µm diam. guttules, OCI 5, with mucous coating; paraphyses up to about 4 µm wide at the tips, straight, often with apical crystalline deposits; saprobic on bleached spots of twigs of *Vaccinium myrtillus*; phen.: VII-X • **Coccomyces leptideus** (Fr.) B. Erikss. (1970) Ill.: Rubio & al. 2010: p. 330.
- 1' Asci 8-spored 2
- 2 Apothecia up to 3 mm diam., brown leathery covering layer opening exposing an ivory hymenium and forming a more or less dentate margin, sitting above the substrate; asci 160-240x12-16 µm; spores 35-50x3.5-4.5 µm, filled with 8-10 large guttules, OCI 4; paraphyses with curved to curled tip; saprobic on bleached fallen leaves of *Betula*, *Fagus* and *Quercus*, according literature on stems of *Rubus* too; phen.: late summer and autumn • **Coccomyces tumidus** (Fr.) de Not. (1847)
- 2' Apothecia with hard carbonaceous covering layer 3
- 3 Covering layer splitting according an irregular pattern 4
- 3' Hard coal-like covering layer splitting up according a regular pattern 5
- 4 Apothecia with 4-5 irregular teeth to expose a yellowish hymenium; asci clavate, 110-120x10 µm; spores filiform, 35-50x1,5-2,5 µm, aseptate, with sheath; paraphyses with curled tip. On dead attached rather brittle twigs of *Pinus strobus*, *P. weymouthii*. Phen.: V-VI (FR) **Coccomyces strobi** J. Reid & Cain (1961)
- 4' Apothecia 1-2 mm diam., covering layer splitting open in 4-6 irregular teeth to expose a sulphur yellow hymenium; asci 100-160x11-13 µm; spores with thin hyaline covering, 60-95x2.5-3 µm, filled with small guttules, OCI 4.5-5; paraphyses with straight to slightly 4-5(6) µm diam. swollen tip, with cylindrical refractive vacuoles; saprobic on bleached spots on fallen leaves of *Betula*, *Fagus*, *Quercus robur* and *Quercus rubra*; phen.: autumn • **Coccomyces coronatus** (Schum.) de Not. (1859)
- 5 Apothecia up to 1 mm diam., angular, 3-sided (rarely 4-sided) and splitting up into 3(4) regular teeth; asci 175-190 x9-10 µm; spores 75-95x2-2.5 µm, filled with minute guttules, OCI 5, with a thin mucous sheath; paraphyses

- cylindrical, lower part moniliform; saprobic on bleached spots of leaves of Lauraceae (*Laurus nobilis*, *Laurus novocanariensis*); phen.: I-VI (●) **Coccomyces delta** (Kunze) Sacc. (1893)
- 5' Spores up to 65 µm long 6
- 6 Apothecia up to 1 mm diam., angular, 4-sided (rarely 5-sided), splitting up in 4(5) regular teeth; asci 70-105x8-10µm; spores 45-65x2.5 µm, 0(1.3)-septate, both poles filled with minute guttules, OCI 3; paraphyses with straight clavate tip; saprobic on bleached spots of fallen leaves of *Castanea sativa*, *Fagus sylvatica*, *Quercus ilex*, *Quercus robur* and *Quercus rubra*; phen.: VI-XI ● **Coccomyces dentatus** (J.C. Schmidt & Kunze) Sacc.(1877)
- 6' Apothecia 0.6-1.3 mm diam., angular, 3-5-sided; asci 104-142 x 7.5-11 µm; spores filiform, 41-60 x 2.2-3 µm, with poorly developed sheath; saprobic on leaves of Lauraceae (*Laurus* sp.); phen.: ? **Coccomyces lauraceus** Johnston (1986)

Colpoma Wallr.

Type species: *Colpoma quercinum* (Pers.: Fr.) Wallr.

Syn.: *Clithris* (Fr.) Endl., *Pragmoparopsis* Höhn.

Lit.: Terrier 1942: 61, Darker 1967: 1435, Remler 1979: 173 (*C. styriacum*), Minter 1996: no. 1296 (*C. juniperi*), Medardi 2006: CXII, Minter – Fungi of Ukraine; Magnes 1997: 150.

- 1 On conifers 2
- 1' On deciduous trees and shrubs 3
- 2 Ascromata immersed, irregularly rounded to oval, 0.5-2.5 mm diam., hymenium pale grey; spores narrowly clavate, 45-50x1.5-2 µm; paraphyses with circinate tips; saprobic on twigs of *Juniperus communis*, *J. communis* subsp. *nana* deep inside old long-established juniper bushes; phen.: III,VIII-IX **Colpoma juniperi** (P. Karst. ex P. Karst.) Dennis (1958)
Ill.: Breitenbach & Kränzlin 1981: pl. 292, Minter 1996: no. 1293.
- 2' Ascromata immersed, opening by thick white lips, hymenium almost bluish, 6-7x2-3 mm; spores narrowly clavate, 40-50x2-2.5 µm; saprobic on bark of Pinaceae (*Picea abies*, *Pinus*); phen.: VI-VII **Colpoma crispum** (Pers.) Sacc. (1891)
Ill.: Medardi 2006: p. 37, Minter 1996: no. 1333.
- 3 Ascromata up to 3.5 mm long; on Ericaceae 4
- 3' Ascromata in average longer; on other substrates 5
- 4 Ascromata immersed, bursting by longitudinal slit, 1.7-3.4 mm long, 0.5-1 mm broad, fusoid or curved, ellipsoid, hymenial surface blue, edge dark; asci 130x9 µm, I-; paraphyses with circinate tips, middle part covered by cilia (pubescent); spores needle-shaped, with small hemispherical appendix at obtuse and elongated at acute end, with inperistant coating, 40-50x1.9–2.3 µm; saprobic on twigs of *Ledum palustre* **Colpoma ledi** (Alb. & Schwein.) B. Erikss. (1970)
- 4' Ascromata 1-2 mm long, 0.6-1mm wide, hymenium greenish-yellow; asci 210-317x19-21 µm; paraphyses with circinate tips; spores 64-91x2-3 µm, 7(8)-septate, with mucous coating, hyaline; saprobic on twigs of *Vaccinium myrtillus*; phen.: VIII **Colpoma styriacum** Remler (1979)
- 5 Ascromata immersed, navicular to irregularly distorsed, 2-10(20) mm long and 0.5-3 mm wide, hymenium yellow-green; spores filiform, 80-95x1-2 µm, multiseptate, hyaline ; paraphyses with circinate tips; parasitic on twigs of *Quercus* sp.; phen.: IV-VIII(XI) ● **Colpoma quercinum** (Pers.) Wallr. (1833)
Ill.: Breitenbach & Kränzlin 1981: Pl. 293.
- 5' Ascromata immersed, irregularly pipe-shaped, sinuous and often forked, 30-35 mm long and 2-3 mm wide; hymenium gelatinous, mat and bluish grey-olivaceous; spores 60-75x2-3 µm; on *Castanea* wood **Colpoma caesium** Medardi (2004)

Cryptomyces Grev.

Type species: *Cryptomyces wauchii* Grev.

Lit.: Dennis 1978: 232, Minter, Fungi of Ukraine, Granmo 2011: 145.

- 1 Stroma forming blistered patches up to 100 mm, blackish brown with a bright yellow margin at first, soon becoming shining black all over the surface; asci up to 250x10-13 µm; spores ellipsoid to ovoid, 20-30x10-13 µm, hyaline, with a thin mucous coating; parasitic on twigs and branches of *Salix* spp.; phen.: VI-VII **Cryptomyces maximus** (Fr.) Rehm (1896)
Ill.: Dennis 1978: fig. 27A, Ellis & Ellis 1985: fig. 1120, Granmo 2011: fig. 1-2.
- 1' Apothecia hypophyllous, subepidermal, developing in black, often parallel stromata, up to 3x0.5 mm, overwintering before opening by longitudinal slits; spores 8-10x5-6 µm, hyaline; conidiomata up to 0.45 mm diam., opening by

irregular longitudinal fissures, with hyaline conidia 17-20x3.5-5 µm; on dead fronds of *Pteridium aquilinum*; phen.: V-VI (teleomorph) **Cryptomyces pteridis** (Rebent.) Rehm (1888)
 Ill.: Ellis & Ellis 1985: fig.: 2100.

Discocainia J. Reid & A. Funk

Type species: *Discocainia treleasei* (Sacc.) J. Reid & Funk.

Lit.: Magnes 1997: 114, Hansen & Knudsen 2000: 146, Raitviir & Huhtinen 2002: 24 (pdf).

- 1 Apothecia 0.7-1 mm diam., first patellate to turbinate, then opening with three lobes, hymenium greyish pink, outside black; asci 90-100x8-10 µm, IKI-; spores 30-35x1.5 µm, aseptate, hyaline; saprobic on stems of *Cassiope tetragona*; phen.: VI **Discocainia arctica** (Ehrenb.) L. Holm (1975)
 To transfer to *Coccomyces*? 2
- 1' Apothecia 2.5-6 mm diam.; asci and spores longer 2
- 2 Apothecia scattered to clustered, 2.5-4 mm diam., to 1.5 mm high, first patellate to turbinate, then opening, hymenium yellowish, outside mealy brown; asci 100-140x9-12 µm; spores 30-55x1.5-2.5 µm, 0(3)-septate, hyaline, budding off minute ascoconidia; saprobic on wood and bark of *Picea abies*, *Pinus sylvestris*, *Betula sp.*; phen.: IX-X **Discocainia treleasei** (Sacc.) J. Reid & A. Funk (1966)
 Ill.: Raitviir & Huhtinen 2002: fig. 11.
- 2' Apothecia scattered, 2.5-4(6) mm diam., first patellate to obconical, then opening, hymenium pale yellow, outside mealy brown; asci 100-130x10-12 µm; spores 50-60x1.5-2 µm, aseptate, hyaline, budding off minute ascoconidia; saprobic on rotten leaves of deciduous trees or ferns; phen.: ? **Discocainia laciniata** (Alb. & Schwein.) Tork. & Eckblad (1977)

Duplicaria Fuckel

Type species: *Duplicaria empetri* (Pers.) Fuckel

Lit.: Terrier 1942: 58, Dennis 1978: 231.

- 1 Ascomata mostly in clusters, up to 1 mm diam.; asci up to 200x28 µm, 8-spored; spores bifusoid, constricted at the middle (isthmoid), 68-80x4-5 µm, aseptate, with mucous coating, hyaline; paraphyses with curved tips; saprobic on leaves of *Empetrum hermaphroditum*; phen.: X **Duplicaria empetri** (Fr.) Fuckel (1871)

Elytroderma Darker

Type species: *Elytroderma deformans* (Weir) Darker

Lit.: Terrier 1942: 60.

No Western European species known.

Hypoderma De Not.

Type species: *Hypoderma rubi* (Pers.) DC.

Lit.: Rehm 1896: 31, Darker 1967: 1427, Spooner 1981: 281 (*H. Alpinum*), Cannon & Minter 1983: 572, Engel & al. 1983: 45 (*H. euphorbia*), Ellis&Ellis 1985: 206 (*H. Illicinum*), Minter – Fungi of Ukraine.

- 1 Ascomata 0.3-0.5 mm long, black; asci 50-70x8-9 µm; spores narrowly clavate, 20-25x2.5 µm, ?eguttulate; saprobic on *Carex aquatilis*, *Carex bigelowii*; phen.: VII **Hypoderma alpinum** Spooner (1981)
- 1' Spores more than 2.5 µm wide 2
- 2 Spores to 20 µm long 3
- 2' Spores longer 4
- 3 Apothecia oval, 0.2-0.6 mm long; asci clavate 44-100x10-12 µm, I-; spores rod-like, 12-14x3-3.5 µm, hyaline; saprobic on leaves of *Dryas*; phen.: VII **Hypoderma dryadis** Nannf. Ex L. Holm (1979)
- 3' Asci 90-100x15-17 µm; spores 15-17x4-5 µm, 1-septate; paraphyses with hooked end; saprobic on *Hedera helix*, saprobic on fallen petioles and paler portions of fallen leaves usually trapped above the ground among *Hedera* stems; phen.: IX ●(●) **Hypoderma hederæ** (T. Nees ex Mart.) De Not.(1847)
- 4 Ascomata 1-3.5x0.3-0.5 mm, black; asci 80-85x13-15 µm; spores 25-27x4-4.2 µm, ?eguttulate; saprobic on stems of *Euphorbia cyparissias*; phen.: IX **Hypoderma euphorbiae** (Rehm) Nannf. (1932)
 Ill.: Engel & al. 1983: p. 45.
- 4' Spores guttulate 5

- 5 Spores fusiform, 20-26x3-4 µm, aseptate, with 6-8 large guttules and many minute ones, OCI 5, with mucous coating; saprobic on leaves of *Castanea* and *Quercus petraea*, *Q. robur*, *Q. rubra*; phen.: (V)IX-XI (BE/F, BE/W) • **Hypoderma ilicinum** De Not. (1847)
- 5' Spores filled with small guttules 6
- 6 Asci 90-120x9-10 µm; spores 21-24x3-4 µm, 1-septate; paraphyses with hooked to cork screw curled end; saprobic on *Aster* sp., *Humulus*, *Potentilla argentea*, *Rubus fruticosus*, *Rubus idaeus*, *R. caesius*; fruiting on paler areas of brittle dead attached twigs, fallen petioles and fallen leaves, most frequently on *Rubus fruticosus* agg.; phen.: (VII)VIII-XI(II) • **Hypoderma rubi** (Pers.) DC. (1815)
 Ill.: Dennis 1978: fig. 8F.
- 6' Apothecia 1.3-2.5 mm long by 0.7-0.8 mm wide; asci 60-115x10.5-13 µm; spores 25-33x3.5-4.5 µm, 0-1-septate, guttulate, with mucous coating; paraphyses straight or with curved end; saprobic on stems of *Aconitum*, *Artemisia*, *Epilobium*, *Eupatorium*, *Humulus*, *Mercurialis*, *Peucedanum*, *Solidago*, *Thalictrum aquilegifolium*, *Vincetoxicum* and *Vitis ussuriensis*; phen.: VIII-XII • **Hypoderma commune** (Fr.) Duby (1862)
 Ill.: Schmid I. & H. 1990: nr. 26.
- On twigs of *Cornus alba* **Hypoderma corni** (Kunze & J.C. Schmidt ex Fr.) De Not. (1847)

Hypodermella Tubeuf

Type : *Hypodermella laricis* Tubeuf

Lit.: Saccardo 1895 : 385, Dearness 1926: 241 (*H. laricis* var. *octospora*), Terrier 1942: 54, Darker 1967: 1422, Dennis 1978: 230.

- 1 Asci 4-8-spored, 110 µm long ; spores clavate, 42-75x17-24 µm, aseptate, hyaline; on needles of *Larix occidentalis*; phen.: IX **Hypodermella laricis** Tubeuf (1895)

Hypohelion P.R. Johnst.

Syn.: anam. *Leptostroma* Fr.

Type species: *Hypohelion scirpinum* (DC.) P.R. Johnst.

Lit.: Dennis 1978: 229 (sub *Hypoderma scirpinum*), Johnston 1990: 219.

- 1 Species with sexual morph 2
- 1' Speies with only asexual morph known 3
- 2 Ascomata superficial, elliptical, 0.8-3(7)x0.5-0.8 mm, opening by an elongate split; spores 40-75x4.5-6.5 µm, 0-1-septate, with a narrow mucous coating; paraphyses clavate to capitate; saprobic on leaves of *Scirpus lacustris*; phen.: (IV)IX-XI **Hypohelion scirpinum** (DC.) P.R. Johnst. (1990).
- 2' Ascomata 0.4-0.7x0.2-0.3 mm; spores 23-32x3-3.5 µm; saprobic on *Carex* sp. **Hypohelion parvum** P.R. Johnst. (1990)
- 3 Conidiomata immersed, brown to black, split longitudinally at maturity Conidia 6-8x1.5-2 µm, mostly biguttulate. On dead stems of *Filipendula ulmaria*. Phen.: III-VI (BE/F, UK) **Leptostroma spiraeinum** (Sacc. & Briard) Vestergr. (1897)
 Ill.: Ellis & Ellis 1985: fig. 1498.
- 3' Conidiomata subcuticular, flat, shield-shaped, black, opening by a slit. Conidia 4-5x0.5-1 µm, hyaline. On dead stems of *Juncus* spp. Phen.: II-IX (UK) **Leptostroma juncacearum** Sacc. (1881)
 Ill.: Ellis & Ellis 1985: fig. 2055.

Lirula Darker

Type species: *Lirula nervisequa* (DC.) Darker

Lit.: Darker 1967: 1420, Hunt & Ziller 1978: 481, Holm & Nannfeldt 1992b: 17 (sub *Hypodermella macrospora*).

- 1 Ascomata and conidiomata on the same side of the needle; asci 100-132(180) µm long; spores 56-68(125) µm long; saprobic on needles of *Picea abies*; phen.: VII **Lirula macrospora** (R. Hartig) Darker (1967)
- 1' Ascomata and conidiomata on different sides of the needle; asci 95-135 µm long; spores 68-75x2-2.5 µm; on *Abies* **Lirula nervisequia** (DC.) Darker (1967)

Lophodermella Höhn.

Type species: *Lophodermella suOCligena* (Link) Tubeuf

Lit.: Darker 1967: 1425, Dennis 1978: 230 (sub *Hypodermella conjuncta* and *H. suOCligena*).

- 1 Apothecia numerous, immersed, elliptical, up to 3.75x0.3 mm, often laterally fused, opening by a longitudinal slit; asci up to 160x16 µm; spores rounded above and pointed below, 75-90x3-3.5 µm, non-septate, each end enclosed in a thin mucous sheath; parasitic on discoloured patches, especially near the tips of living needles of *Pinus sylvestris*; phen.: summer **Lophodermella conjuncta** Darker (1932)
 Ill.: Dennis 1978: fig. 5B.
- 1' Ascomata hysterioid, black; asci 90-100 µm long; spores 27-35x4-5 µm. Conidiomata pycnidial; conidia oval to cylindrical, 11-15x4-5 µm, 2-septate, grey. Parasitic on needles of *Pinus*; phen.: winter(A)-spring(T) (ES)
 **Lophodermella suOCIgena** (Link) Höhn.

Lophodermium Chevall.

Type species: *Lophodermium arundinaceum* (Schrad.) Chevall.

Syn.: *Lophomerum* Quell. & Magasi

Lit.: Rehm 1896: 37, **Tehon 1935: 1 (monograph)**, Darker 1967: 1430 & 1434, Dennis 1978: 227, Minter & al. 1978: 295, Remler 1979: 179 (*L. rhododendri*), Minter 1980: 201, Holm & Nannfeldt 1992b: 17, Johnston 1994: 221, **Johnston 2001: 1-239**, Johnston & Scheuer 2003: 489, Minter - Fungi of Ukraine, Minter 2005: IMI n°1658, Hou &

- 1 Spores septate 2
 1' Spores aseptate 3
- 2 Ascomata up to 0.7 mm long, 0.3-0.4 mm wide, elliptical, opening by a longitudinal split; asci 110-137(154)x9-11.5 µm, stipitate; spores filiform, 60-72x2-2.5 µm, 5-7-septate, upper end rounded, lower end pointed, with mucous sheath, eguttulate; saprobic on leaves of *Rhododendron ferrugineum*; phen.: VII-X
 **Lophodermium rhododendri** Ces. ex Rehm (1881)
 Ill.: Schmid & Schmid 1991: Pl. 75.
- 2' Ascomata 0.6 mm long, elliptical, with black stromatic clypeus opening by a single longitudinal split; asci cylindrical, 65-105x9-15 µm, usually astipitate; spores 45-80x2-3 µm, 1-3-septate, with tapering basal end, with mucous sheath, guttulate; saprobic on lower side of leaves of *Rhododendron ponticum*; phen.: II-III, IX-X
 • "**Lophomerum**" **ponticum** Minter (1980)
- 3 On conifers 4
 3' Not on conifers 11
- 4 On *Pinus* 5
 4' Not on *Pinus* 8
- 5 Thin black zone lines present 6
 5' Thin black zone lines absent 7
- 6 Ascomata 0.8-1.3 mm long, often with reddish lips; asci 110-155x9.5-11.5 µm; spores 75-140x1.5-2 µm, with mucous coating; saprobic on *Pinus sylvestris*; phen.: III-IV, IX-XI (BE/F)
 • **Lophodermium pinastri** (Schrad.) Chevall. (1826)
 Ill.: Johnston 1994: fig. 27.
- 6' Apothecia elliptical, up to 0.8x0.25 mm, with grey broadly rounded lips; asci 90-130x10-12 µm; spores 50-75x1.5-2 µm wide, with mucous coating; ?saprobic on needles of *Pinus excelsa*, *Pinus sylvestris*; phen.: ?
 **Lophodermium pini-excelsae** S. Ahmad (1954)
- 7 Ascomata in surface view 0.4 -0.5x0.8-1,2(1,4) mm, elliptical, grayish black, shiny, wrinkled, opening by a single longitudinal split, lips hyaline. In median vertical section, ascomata subcuticular. Covering stroma up to 45 -60 µm thick near the centre of ascomata, becoming thinner towards the edges, consisting of an outer layer of host cuticle and an inner layer of thick-walled, dark brown textura epidermoidea to textura angularis. Lip cells 10-22x2-3 µm, hyaline, branched and septate, embedded in agelatinous matrix. Basal stroma absent, but sometimes the lower side of epidermal cells under the hymenium slightly tinted. Subhymenium 10-15 µm thick, hyaline, composed of hyphae and textura intricata. Paraphyses filiform, <1 µm wide, apex simple, slightly curved. Asci 90-135x9-14 µm, clavate-cylindric, with a conspicuous stalk up to 30 µm long, thin-walled, J-, without circumapical thickening, 8-spored. Ascospores 60-90x1.5-2 µm, filiform, slightly tapering towards the base, hyaline, aseptate, with gelatinous sheaths 1-2 µm thick, sometimes with a gelatinous cap. On needles of *Pinus mugo*. Phen.: X
 **Lophodermium pini-mugonis** C.L. Hou & M. Piepenbr. (2009)
 Ill. : Hou & Piepenbr. 2009 : fig. 1-3.
- 7 Ascomata totally beneath the needle epidermis; ascomata usually with green or bluish lips; asci 140-170x11-13.5 µm; spores 90-120x2-2.5 µm; pathogenic, on needles attached to living or dead branches of *Pinus sylvestris*, *Pinus* spp., sometimes on cones; phen.: VI **Lophodermium seditiosum** Minter, Staley & Millar (1978)

- 7' Ascomata 0.9-2 mm long, beneath only the cuticle in the area around the split, ascomata often with greenish lips; asci 160-215x11.5-14 µm; spores 90-130x2 µm, with mucous coating; saprobic on mostly still attached needles and cones of *Pinus pinaster*, *Pinus sylvestris*; phen.: IX-XI • **Lophodermium conigenum** (Brunaud) Hilitzer (1929) III.: Johnston 1994: fig. 19.
- 8 Apothecia up to 1x0.4 mm, disc whitish; asci up to 130x17 µm; spores 60-100x2 µm, guttulate, with coating; on needles of *Juniperus*; phen.: I-XII ○(●) **Lophodermium juniperinum** (Fr.) De Not. (1847) III.: Dennis 1978: fig. 8G, Johnston 1994: fig. 22.
- 8' On other substrates 9
- 9 Spores 60-95x1.5-20 µm, guttulate, with mucous coating; on needles of *Picea abies*; phen.: IV-X (DE,FR,NL) (●) **Lophodermium piceae** (Fuckel) Höhn. (1917) III.: Schmid & Schmid 1991: Pl. 74.
- 9' Spores on needles of *Abies*; phen.: V (●) **Lophodermium abietis** Rostr. (1889) ?= *L. piceae* (Fuckel) Höhn.
- 11 On dicots 12
- 11' On monocots 22
- 12 On Ericaceae 13
- 12' On other substrates 17
- 13 Spores 35-55x1 µm; saprobic on leaves of *Rhododendron* **Lophodermium vagulum** N. Wilson & N.F. Robertson (1947)
- 13' Spores wider 14
- 14 Spores up to 60 µm long 15
- 14' Spores longer 16
- 15 Apothecia elliptical, 0.4–0.6x0.35–0.5 mm, shiny, blackish, longitudinal split lined with white to yellowish lips; asci (34)39–52(68)x5–7 µm; spores with rounded at apex, tapering slightly towards base, 17–25x1.5 µm, coated in thin mucous sheath; on pale areas of dead attached leaves and twigs of *Vaccinium macrocarpon*, *V. oxycoccus*; phen.: VI-X **Lophodermium oxycocci** (Fr.) Duby (1862) III.: Minter 2005: IMI n°1658.
- 15' Apothecia up to 1x0.4 mm, ascomatal wall with a paler inner region on either side; asci 70-75x9 µm; spores 50-60x 1.5-2 µm, aseptate, guttulate; paraphyses swollen at the tips; saprobic on twigs and leaves (lower side) of *Vaccinium myrtillus*, *V. oxycoccus*, *V. vitis-idaea*; phen.: X ○ **Lophodermium melaleucum** (Fr.) De Not. (1847) III.: Ellis & Ellis 1985
- 16 Apothecia with uniformly darkened upper ascomatal wall; asci 60-120x5-6 µm; spores 60-95x1.5-2 µm; paraphyses not swollen at the tips, protruding beyond the asci to form an epithecium; saprobic on leaves of *Vaccinium uliginosum*, fruits and twigs of *V. myrtillus*; phen.: VI-X (BE/F) • **Lophodermium maculare** (Fr.) De Not. (1847) III.: Breitenbach & Kränzlin 1981: Pl. 295.
- 16' Asci 120x8 µm; spores 70x2 µm; saprobic on leaves of *Arctostaphylos alpinum* **Lophodermium maculare var. arctostaphyli** Rehm (1912) = *L. maculare* (Fr.) De Not. fide Index Fungorum.
- 17 Spores 40-42x1 µm; saprophtytic on fallen leaves of *Berberis*, *Crataegus* sp., *Pyrus communis* and Rosaceae **Lophodermium foliicola** (Fr.) P.F. Cannon & Minter (1983)
- 17' Spores wider 18
- 18 Spores up to 60 µm long 19
- 18' Spores longer 20
- 19 Spores 45-50x1.5 µm; on leaves and petioles of *Quercus*, *Castanea*; phen.: (IV)V-VI, VIII-X (BE/F, ES) • **Lophodermium petiolicola** Fuckel (1870) [1869-70]
- 19' Spores 50-60x2 µm; saprobic on leaves and petioles of *Sorbus aucuparia*; phen.: VI-VII **Lophodermium aucupariae** (Schleich.) Darker (1967) III.: Rubio & al. 2010: p. 322-333.
- 19" Apothecia 0.5-1 mm long; asci 100-110x10 µm; spores ca. 60x2 µm; saprobic on leaves of *Convellaria majalis* **Lophodermium herbarum** (Fr.) Fuckel (1870)
- 20 Asci 65-80x8 µm; spores 55-65x1.5 µm; on stems of *Paeonia lactiflora*; phen.: IV-V (BE/W) **Lophodermium paeoniae** Rehm ap. Vestergren (1897)
- 20' Not on this substrate 21

- 21 Saprophytic on fallen leaves of *Salix phylicifolia*, *Salix retusa*; phen.: VI **Lophodermium versicolor** (Wahlenb.) Rehm (1887)
 21' Apothecia 0.2-0.5(0.7)x0.15-0.25(0.3) mm, with dark brown margin; asci 80-95x4-6 µm; spores 55-75x1.5-2 µm, with thin mucous coating; saprobic on bleached parts of fallen *Hedera* leaves; phen.: (II)IV-IX **Lophodermium hedericola** S. Ahmad (1971)
- 22 Asci average longer than 100 µm 23
 22' Asci no more than 100x10 µm 24
- 23 Ascomata ovate to broadly-elliptic, 0.5-0.8x0.4-0.6 mm, opening by a longitudinal slit, lips black, hymenium yellow when fresh; spores 110-160(170)x2-3 µm, both ends slightly tapering, ends rounded, 1-septate, with an easily lost mucous coating, with hyaline cylindrical 8-10x4-6 µm mucous caps at both ends, hyaline; saprobic on *Eriophorum vaginatum*; phen.: VIII-X **Lophodermium eriophori** P.R. Johnst. & Scheuer (2003)
 23' Spores 95-120x1.5-2.5 µm; saprobic on *Juncus* **Lophodermium juncinum** (Jaap) Terrier (1977)
- 24 Spores up to 60 µm long 25
 24' Spores average more than 60 µm long 27
- 25 Asci 85-100x9-12 µm; spores 50-60x1.5 µm; saprobic on leaves of *Calamagrostis arundinacea*, *C. purpurea*, *Molinia*; phen.: V-VIII **Lophodermium apiculatum** (Wormsk. Ex Fr.) Duby (1883)
 25' Spores up to 1 µm wide 26
- 26 Asci clavate, 70-90x6-8 µm; spores 35-50x1 µm; saprobic, mostly near the base of leaves of *Carex elata*, *C. flacca*, *C. glauca*, *C. paniculata*, *C. riparia*, *C. sylvatica*; phen.: V-VIII • **Lophodermium caricinum** (Roberge ex Desm.) Duby (1862)
 26' Apothecia 0.5-0.75 mm long; spores 45-55x1 µm; saprobic on leaves of *Typha latifolia*; phen.: IV-XI **Lophodermium typhinum** (Fr.) Lambotte (1880)
- 27 Spores 1 µm wide 28
 27' Spores wider 29
- 28 Asci cylindrical; spores 55-85x1 µm, with thick mucous sheath; saprobic on stems of *Agropyron*, *Arrhenatherum*, *Bromus*, *Dactylis*, *Deschampsia* and *Elymus*; phen.: ? **Lophodermium culmigenum** (Fr.) P. Karst. (1847)
 28' Asci clavate; spores 55-85x1 µm, with a thin mucous sheath; paraphyses without clavate tips; saprobic on leaves of *Agropyron*, *Ammophila*, *Brachypodium*, *Deschampsia*, *Glyceria*, *Molinia* and *Poa*; phen.: III • **Lophodermium gramineum** (Fr.) Chevall. (1826)
 III.: Johnston 1994: fig. 20.
- 29 Asci clavate, up to 120x10-12 µm; spores 60-100x1.5-2 µm; saprobic on *Agropyron*, *Ammophila*, *Elymus*, *Festuca* and *Glyceria*, but particularly on *Phragmites*; phen.: I-XII • **Lophodermium arundinaceum** (Schrad.) Chevall. (1826)
 III.: Breitenbach & Kränzlin 1981: pl. 294, Johnston 1994: fig. 15.
- 29' Asci cylindrical to clavate, 80-110x7-9 µm; spores 50-80x1.5 µm, with a thin mucous coating; paraphyses with clavate tips; saprobic on culms of *Deschampsia flexuosa*; phen.: V-VII **Lophodermium airarum** (Fr.) Hililtzer (1929)
 29'' on living and withered leaves of *Festuca silvatica*; phen.: IX **Lophodermium seriatum** (Lib.) De Not. (1847)

Macroderma Höhn.

Type species: *Macroderma curtisii* (Berk. & Ravenel) Höhn.
 Lit.: Terrier 1942: 81.

No Western European species known.

Meloderma Darker

Type species: *Meloderma desmazieri* (Duby) Darker
 Lit.: Darker 1967: 1399, Dennis 1978: 229 (sub *Hypoderma desmazieri*).

- 1 Apothecia developed beneath the epidermis and raising it into a low black blister, up to 1 mm long; asci up to 150x15-17 µm; spores fusiform-clavate, 25-35x4.5-5 µm, with mucous sheath 4-5 µm thick; paraphyses with curled or forked tip; saprobic on needles of *Pinus strobus*, *Pinus sylvestris*; phen.: X **Meloderma desmazieri** (Duby) Darker (1967)

Nematococcomyces C.-L. Hou, M. Piepenbr. & Oberw.

Type species: *Nematococcomyces rhododendri* C.-L. Hou, M. Piepenbr. & Oberw.

Lit.: Hou & al. 2003: 1381.

No Western European species known.

Pseudographis Nyl.

Type species: *Pseudographis elantina* (Ach.) Nyl.

Lit.: Magnes 1995: 54.

1. Ascus wall apically thinned; spores dictyosporous 2
1. Ascomata up to 2 mm long by 1,5 mm wide, hymenium pale brown; asci with apical ring; spores fusiform to elongate clavate, 30-42(48)x7-9,5 µm, with up to 8 A-transepta, seldomly with a B-longiseptum, wall and septa IKI+ dark violet; saprobic on old bark of *Abies alba*, *Picea abies*, *Pinus cembra*, *Pinus monticola*, *Pinus sylvestris*; phen.: IV-X **Pseudographis pinicola** (Nyl.) Rehm (1888)
Fig.: Magnes 1995: Abb. 15-16.
2. Ascomata 2mm long by 1 mm wide, outer surface black, hymenium orange; spores 30-35x15-19 µm, spore section with 2-4 B-longisepta; saprobic on bark of *Pseudotsuga*; Western USA; phen.: VII-VIII(XII) **Pseudographis elatina var. polyseptata** Magnes (1997)
Fig.: Magnes 1995: Abb. 14.
2. Ascomata first immersed, black, opening by a longitudinal slit; spores 28-40x12,5-15,5 µm, with 3-5 A-septa, spore sections with 1(2) B-longiseptum; saprobic on bark of *Abies alba*, *Fagus sylvatica*, *Larix decidua*, *Picea abies*, *Pinus monticola*; phen.: III-XI (AT) **Pseudographis elatina var. elatina** (Ach.) Nyl.(1855)
Fig.: Magnes 1995: Abb. 11-12.

Pseudorhytisma Juel

Type species: *Pseudorhytisma bistortae* (Lib.) Juel.

Lit.: Schüepp 1959: 262, Declercq 2000: 58.

1. Apothecia crowded, 0.1-1 mm diam., immersed in up to 20 mm large blackish stromatic spots, without excipulum nor hypothecium; asci 75-145x11-13 µm, arising from croziers, I-; spores 12-15x4.5-5.5 µm, with a cluster of minute guttules at both poles, OCI 2-3; parasitic on lower side of leaves of *Polygonum bistorta*, *Polygonum viviparum*, *Polygonum ssp.*; phen.: VI-VIII (BE/W) • **Pseudorhytisma bistortae** (DC.) Juel (1894)
Ill.: Schüepp 1959: Abb. 12.

Rhytisma Fr.

Type: *Rhytisma acerinum* (Pers.) Fr.

Syn.: *Placuntium* Ehrenb.

Lit.: Terrier 1942: 63, Dennis 1978: 225, Rath 1992: 43, Hansen & Knudsen 2000: 214.

1. Apothecia 2-4 mm diam., stromatal covering layer breaking into regular pentagonal or hexagonal pieces; asci 160-190x13-18 µm; spores 60-95x3-3.5 µm, OCI 4-4.5; on living leaves of *Salix caprea*, *S. myrsinifolia*, *S. repens*; phen.: VIII-XI • **Rhytisma salicinum** (Pers.) Fr. (1823)
- 1' Stromata opening by irregular cracks 2
2. Pycnidia and apothecia in multiple small black stromata forming roundish spots; asci 130-140x10-12 µm; spores 75-95x2-2.5 µm. Biotrophic pathogen on leaves of *Acer pseudoplatanus*, *A. campestre*, *A. platanoides*; phen.: ? **Rhytisma punctatum** (Pers.) Fr. (1823)
2. Pycnidia and apothecia in a common black shining stroma 3
3. Stromata with irregular form, 8-13x3-5 mm, shining black; spores clavate, on living and withering leaves of *Andromedia polifolia*; phen.: IV-VII **Rhytisma andromedae** (Pers.) Fr. (1823)
Ill.: Schmid I. & H. 1990: nr. 27.
- 3' Spores filiform; on leaves of *Acer* 4

- 4 Sexual morph: Wrinkled apothecia in a common roundish black stroma, 10-25 mm diam.; greyish hymenium exposed by rupturing; asci 110-130x8-12 µm; spores 55-80x2-3 µm. Asexual morph acervular, conidia cylindrical-allantoid, 5-6.5x1-1.5 µm Ellis & Ellis 1985: 8-10x1 µm). Biotrophic pathogen on leaves of *Acer pseudoplatanus*, *Acer campestre*, *A. platanoides*; phen.: IV-V ● **Rhytisma acerinum** (Pers.) Fr. (1823)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 291.
- 4' Sexual morph: Black stroma 5-10 mm diam.; asci 90-110x9-12 µm; spores 65-70x1.5-3 µm. Asexual morph: Conidia (6)7-9(11)x1-1.5 µm. Biotrophic pathogen on leaves of *Acer pseudoplatanus*. Phen.: VII (a) (CH, IT)
 ● **Rhytisma pseudoplatani** (DC) Müll. (1913)
 = *R. acerinum* fide Index Fungorum.

Sporomega Corda

Type species: *Sporomega degenerans* (Fr.) Corda
 Lit.: Terrier 1942: 50, Dennis 1978: 226.

- 1 Apothecia elongated, erumpent, splitting to expose a yellow disc; asci clavate, *190-220x16-19 µm, (4)8-spored; spores filiform, obtuse above and pointed below, 60-80x2.5 µm(4-spored asci: 85-105x3.5-4.5 µm) µm; paraphyses with bent to strongly coiled upper part; saprobic on twigs of *Vaccinium uliginosum*; phen.: VI
 ● **Sporomega degenerans** (Kunze) Corda (1842)
 To transfer to *Lophodermium* or *Colpoma*?

Terriera B. Erikss.

Type species: *Terriera cladophila* (Lév.) B. Erikss.
 Lit.: Dennis 1978: 227, Minter 1996.

- 1 Ascomata scattered, relatively short and broad, less than 1 mm long, opening by a longitudinal slit to expose a greyish hymenium; asci 80-125 x 6-9 µm, 1-, with croziers; spores (65-)75-90 x 1-2 µm, aseptate, without mucous sheath; paraphyses 1-2 µm diam., branched apical part forming an epithecium; saprobic on pale patches of bark of twigs of *Vaccinium myrtillus*; phen.: III ● **Terriera cladophila** (Lév.) B. Erikss. (1970)
 Ill.: Dennis 1978: fig. 6A.

Therrya Sacc.

Type species: *Therrya gallica* Sacc. & Penz. = *Therrya pini* (Alb. & Schwein.) Höhn. var. *pini*
 Lit.: Reid & Cain 1961: 1117, Dennis 1978: 234.

- 1 Apothecia immersed, erumpent rupturing the periderm irregularly; excipulum carbonaceous, strongly developed, remaining as lobes surrounding an exposed dark brown epithecium, 1-3 mm diam.; spores 50-80x2.5-4.5 µm, sinuous to slightly curved, becoming 3-11-septate, hyaline; saprobic on bark of twigs of *Pinus sylvestris*; phen.: ? ..
 ● **Therrya pini** (Alb. & Schwein.) Höhn. (1917)
 Ill.: Reid & Cain 1961: fig.14.
- 1' Apothecia similar to *T. pini*; asci 4-spored, IKI-; spores (65)75-100(110)x3-4.5(5.5) µm, both acute ends with a 12-18 µm long cilium, becoming 7-11-septate, hyaline; saprobic in bark of branches of *Pinus*; phen.: VI-X
 ● **Therrya fuckelii** (Rehm) Kujala (1950)
 Ill.: Reid & Cain 1961: fig.13, Fungi canadenses n°.48 .

Triblidiopsis P. Karst.

Type species: *Tryblidiopsis pinastri* (Pers.) P. Karst.
 Lit.: Rehm 1896: 194, Baral: N17, Engel & al. 1982: 58, Dougoud 2000: 23.

- 1 Apothecia 0.5-2 mm diam., pale disc with grey-black coarsely dentate margin, subsessile; asci 150-215x22-25(27) µm, IKI-; spores 29-33x7-8 µm, 1(2-3)-septate, with large mucous coating (Dougoud 2000: (39)42-50(59.5)x(9)10.5-12(13) µm coating included); saprobic on corticated branches of *Picea abies*; phen.: IV-VIII
 ● **Tryblidiopsis pinastri** (Pers.) P. Karst. (1871)
 Ill.: Dougoud 2000: p.24-25.

TRIBLIDIACEAE Rehm 1888

Lit.: Magnes 1997: 1-177, Karakehian 2019: 99.

Sexual morph: Ascomata apothecia, scattered or in small clusters, primarily on bark of living or dead trees but occasionally also on decorticated wood, substratum not visibly degraded, without dark zone lines (Fig. 1a, b, e–g); primordia developing within the substratum, gradually emerging becoming superficial; young apothecia closed, pulvinate; excipulum stromatic and highly melanized, surface appearing dark brown-black, highly sculptured with coarse, polygonal areolae or ± cracked; in early developmental stages the monolocular centrum consists of paraphysoids that are replaced by paraphyses; apothecia rupturing the covering layer before full maturity (hemiangiocarpous) by several radial cracks, opening in humid conditions and closing when dry, persistent; approximately 0.6–1 mm high and 1–3 mm diameter; disk generally pale gray or brown or pale orange in some species. Asci elongate-cylindrical; apices ± hemispherical, undifferentiated, thin-walled, iodine negative, dehiscence via apical rupture; dehisced asci often with fine, transverse striations; spore number variable, generally 4–8. Paraphyses narrow, filiform, apices flexuous, sparingly branched, hyaline, embedded in gel, lacking pigmented epithecium/exudate. Ascospores large, hyaline, ellipsoid to oblong-ellipsoid, muriform, smooth (*Triblidium*) or elongate-fusiform, transversely septate, smooth (in *H. novae-fundlandiae*) or coarsely verrucose (in *H. verrucosa*), appearing thick-walled when dead, lacking a gelatinous sheath.

Asexual morph unknown.

Trophic status: presumed saprobes on woody plant hosts in Fagaceae, Ericaceae and Pinaceae.

Distribution: mostly known from Northern Hemisphere, boreal and temperate forests

Genera belonging to this family:

1. *Huangshania* O.E. Erikss.
2. *Triblidium* Rehent.

Key to the genera:

- 1 Spores dictyosporous; saprobic on bark of conifers, Fagaceae and Ericaceae *Triblidium*
- 1' Spores phragmosporous, often verrucose; saprobic on bark of conifers *Huangshania*

Huangshania O.E. Erikss.

Type species: *Huangshania verrucosa* O.E. Erikss.

Lit.: Magnes 1995: 74.

1. Ascomata first globose, 0,5-0,7 mm diam., with stromatic outer layer; asci with apical ring, up to 150x18 µm; spores up to 35x7 µm, 7-transseptate, smooth, hyaline; saprobic on bark of *Pinus*; Canada; phen.: II ***Huangshania novae-fundlandiae*** (Rehm) Magnes (1997)
Fig.: Magnes 1995: Abb. 19-20.
1. Ascomata asci without apical ring, apically thinner, up to 220x20 µm; spores filiform, up to 120-140x8 µm, 15-transseptate, verrucose, hyaline; saprobic on *Pinus*; China; phen.: IX-XI ***Huangshania verrucosa*** O.E. Erikss. (1992)
Fig.: Magnes 1995: Abb. 17-18.

Triblidium Rehent.

Type species: *Triblidium caliciforme* Rehent.: Fr.

Lit.: Hawksworth & Coppins 1973: 597 (*T. octosporum*), Magnes 1995: 28.

1. Asci mostly 8-spored, 150-190x13-23 µm, apex with ringlike thickening; spores 28-35x11-14 µm, with up to 7 A-transsepta about 1 µm thick, central spores segments with 1-2 thin B-longisepta; saprobic on *Pinus*; USA; phen. VIII ***Triblidium sherwoodiae*** Magnes (1997)
Fig.: Magnes 1995: Abb. 9.
1. Ascus wall apically slightly thinner 2
2. Asci mostly 8-spored 3
2. Asci (2)4-6-spored; fruit body slices without crystals in KOH 4
3. Ascomata discoid, 0,5-1 mm diam.; asci 65-75x10-12 µm, IKI-; spores ellipsoid, distoseptate, 16-23x8-10 µm, with 3-5 A-transsepta, 1 A-longiseptum; saprobic on bark of *Fraxinus*; phen.: IV ***Triblidium octosporum*** D. Hawksw. & Coppins (1973)
Ill.: Ellis & Ellis 1985: fig. 604.

3. Ascomata with whitish grey hymenium; asci mostly 8-spored; fruit body slice forming elongated crystals in KOH; spores dictyosporous, elongate ovoid, 25-32x11-15 μm , with 7 A-transsepta, central spore segments with 1(-2) B-longiseptum; saprobic on *Calluna vulgaris*, *Vaccinium ovatum*, twigs of *Salix* sp.; phen.: phen.: V-VII.....
 **Triblidium hafellneri** Magnes (1997)
 Fig.: Magnes 1995: Abb. 7-8.
4. Apothecia erumpent, hymenium yellow-orange; asci 4-6-spored, 200(224)x20(24) μm ; spores 23-50x10-16 μm , with 9 A-transepta, sometimes with B-trnassepta, up to 4 B-longisepta, hyaline; saprobic on twigs of *Rhododendron ferugineum*, *Rhododendron hirsutum*, *Rhododendron* sp., mainly mountainous; phen.: IV-IX
 **Triblidium carestiae** (De Not.) Rehm (1888)
 Fig.: Magnes 1995: Abb. 5-6.
4. Ascomata 2-3,5 mm wide, almost terete, hymenium whitish grey, seldomly yellowish; asci mostly 4-spored, (200-) 230-280(-300)x25-30 μm , IKI-; spores with wall up to 2 μm thick, 30-48(66)x12-20 μm , with 7(-9) up to 1 μm thick A-transsepta, up to 4 thin B-longisepta per spore segment; saprobic on bark of *Aesculus*, *Alnus*, *Betula*, *Castanea sativa*, *Ostrya*, *Quercus alba*, *Quercus petraea*, *Quercus robur* (on cut down trees too) and conifers (*Abies alba*, *Pinus sylvestris*, *Picea abies*); phen.: I-XII (BE/F) • **Triblidium caliciforme** Rebent. (1804)
 Fig.: Ellis & Ellis 1985: fig. 962, Magnes 1995: Abb. 2-4.

RHYTISMATALES, genera incertae sedis

Cryptomycina, *Nymanomyces*, *Laquearia*.

Key to the genera:

- 1 On fronds of ferns *Cryptomycina*
 1' Apothecia immersed-erumpent; hymenium IKI- (except the ascus apex in some species), with white pruinose margin; asci J-; spores ellipsoid-cylindrical; lignicolous *Laquearia*

Cryptomycina Höhn.

Type species: *Cryptomycina pteridis* (Rebent.) Höhn.

Lit.: Sydow 1923: 174 (sub *Cryptomycina osmundae*), Dennis 1978: 238, Holm & Holm 1978:97, Minter, Fungi of Ukraine.

- 1 Stromata forming up to 10(20)x0.3-0.5 mm long, confluent crusts, black; asci (25)30-40x7-9 µm, I+; spores 7-10x2.5-3 µm, aseptate; on stipes of *Osmunda spectabilis*; phen.: V **Cryptomycina filicina** (Fr.) L. Holm & K. Holm (1978)
 1' Stromata up to 3x0.5 mm; asci up to 65x15 µm; spores ellipsoid, 8-10x5-6 µm, aseptate, hyaline; on under surface of *Pteridium aquilinum* fronds; phen.: V-VI(-XII)..... **Cryptomycina pteridis** (Rebent.) Höhn. (1917)
 Ill.: Dennis 1978: fig. 18D.

Laquearia Fr.

Type: *Laquearia sphaeralis* (Fr.) Fr.

Lit.: Dennis 1978: 241.

- 1 Apothecia erumpent, at first closed by a blackish tissue composed of roundish purplish brown cells up to 10 µm across, opening by a pore, disc up to 0.5 mm, brown with white pruinose margin; asci up to 65x8 µm, I-; spores ellipsoid-cylindrical, straight or slightly curved, 6-9x1.5-2 µm, non-septate, hyaline; saprobic on corticated branches of *Fraxinus* **Laquearia sphaeralis** (Fr.) Fr. (1849)
 Ill.: Dennis 1978: fig. 9C.

Nymanomyces P. Henn.

Type species: *Nymanomyces aceris-laurini* Henn.

Lit.: Terrier 1942: 67.

No Western European species known.

“SLEROTINIALES”

Lit: Jaklisch et al. 2016: 159, Ekanayaka et al. 2019: 315.

Families belonging to this order:

Chlorociboriaceae Baral & P.R. Johnst.
 Cenangiaceae Rehm
 Hemiphacidiaceae
 Rutstroemiaceae Holst-Jensen, L.M. Kohn & T. Schumacher 1997
 Sclerotiniaceae Whetzel ex Whetzel 1945

Key to the families:

- 1 Apothecia with blue-green hymenium, staining the substrate greenish. Paraphyses filiform, witou VB's. Asci with apical ring eu- or hemiamyloid of *Calycina*-type, with croziers. Ascospores 0(3)-septate, hyaline; saprobic on wood, herbs and leaves. *Chlorociboriaceae*
- 1 Apothecia otherwise 2

- 2 Apothecia arising from a stroma or sclerotium, or from stromatised host tissue 3
- 2' Apothecia non-stromatal, small, usually subepidermal, erumpent pushing back the covering host tissue as a small scale; asci small, I+ or I-; foliar pathogens on conifers *Hemiphacidiaceae* ss. Korf

- 3 Apothecia cupulate, arising from distinct sclerotia or stroma with a well differentiated rind and medulla; obligatory or facultative parasites; asci with *Sclerotinia* type apical apparatus; spores unicellular *Sclerotiniaceae*
- 3' Apothecia cupulate or campanulate, arising from an indeterminate brown to black crust-like stroma or stromatal host tissue with or without a rind; mainly saprotroph; spores uni-, bi- or multicellular *Rutstroemiaceae*

CHLOROCIBORIACEAE Baral & P.R. Johnst.

Lit.: Pärtel & Baral 2016.

Sexual morph: Apothecia 0.5–10 mm in diam., disc- or cup- to ear-shaped, non-gelatinous, opening in the prothymenial phase; hymenium pale to dark blue-green, rarely white; exterior smooth or felted, ± blue-green; (sub-)stipitate, erumpent or superficial, staining the substrate blue-green. Ectal excipulum of hyaline, vertically oriented *textura prismatica* or *textura intricata*, thick-walled, covered by dark green exudate; medullary excipulum of *textura intricata*, without crystals. Blue-green exudate in KOH reversibly turning yellow-green to ochraceous, not dissolved. Hairs (tomentum hyphae) on exterior present or absent, short, septate, straight to strongly coiling, hyaline or greenish, smooth or warted. Paraphyses filiform, without refractive vacuolar bodies. Asci with apical thickening with eu- or hemiamyloid ring (Calycina-type), with croziers. Ascospores 8 per ascus, ellipsoid-oblong to fusoid, cylindrical, or filiform, straight to slightly curved, hyaline, 0 (–3)-septate, without sheath, lipid content low to medium.

Asexual morph: stromatic, greenish-black, multilocular; phialides with long collarettes; conidia rod-shaped.

Habitat: Lignicolous, also herbicolous or foliicolous, mainly desiccation-sensitive (but green stain developed in xeric wood). Worldwide, especially diverse in the Southern Hemisphere, temperate to subtropical.

Only one genus belonging to this family:

- 1 Apothecia stipitate, disc yellowish green to bluish green, 2-15 mm diam.; ascus annulus strongly amyloid *Chlorociboria*

Chlorociboria Seaver ex Ramamurthi, Korf & L.R. Batra

Syn.: *Dothiorina* Höhn. (anamorph)

Lit.: *Chlorociboria aeruginosa* (Oeder) Seaver ex C.S. Ramamurthi, Korf & L.R. Batra.

Lit.: Dennis 1956 : 45, Dixon 1975 : 196, Dennis 1978 : 148 (sub *Chlorosplenium*), Häffner 1982 : 45, Baral & Krieglsteiner 1985 : 105, Dougoud & al. 2003 : 47, Hansen & Knudsen 2000 : 140, Huhtinen & al. 2010: 421 (*C. lamellicola*).

- 1 Asci IKI blue 2
 1' Asci IKI red or IKI-; not on wood 5
- 2 Saprobic on decayed and decorticated wood of deciduous trees, substrate coloured green 3
 2' Substrate not coloured green 4
- 3 Apothecia up to 25 mm diam., cup-shaped then expanded; hymenium yellowish to pale green; ectal excipulum with incrustated hyphae; asci 75-110x7-8 µm, IKI blue, with croziers; spores 9-14x2-4 µm, 0(1)-septate, with 1(3) small guttules per hemispore, OCI 1; often germinating in ascus; saprobic on blue green stained wood of *Acer*, *Betula*, *?Populus*; phen.: III-V **Chlorociboria aeruginosa** (Pers.) Seaver ex Ramamurthi, Korf & L.R. Batra (1958)
- 3' Apothecia 3-7 mm diam., cup-shaped or spatulate; hymenium blue green; asci IKI blue; spores 5-7.5x1.5-2 µm, with 1(3) medium size guttules per hemispore, OCI 3; saprobic on blue green stained wood of *Alnus*, *Carpinus*, *Fagus*, *Fraxinus*, *Laurus*, *Quercus*, *Salix*; phen.: VI-XII
 • **Chlorociboria aeruginascens** (Nyl.) Kanouse ex Ramamurthi, Korf & L.R. Batra (1958)
 Ill.: Boudier 1905-1910: pl. 485!, Breitenbach & Kränzlin 1981: pl. 199.
- 4 Apothecia up to 0.12 mm diam. when dry, short-stipitate, margin often irregularly crenate, vivid green; asci 28-39x4-5(8) µm, IKI+, with croziers; spores subfusiform, 5.5-8x1.5-2 µm, often with two guttules, hyaline; saprobic on *Polytrichastrum formosum*; phen.: IV,VIII-XI **Chlorociboria lamellicola** Huhtinen & Döbbeler (2010)
 Ill.: Huhtinen & al. 2010: fig. 4.
- 4' Apothecia cupulate to saucer-shaped, shortly stalked, 1-5 mm diam., disc pale yellowish grey; ectal excipulum olivaceous blue-grey, of *textura globulosa-angularis*, with yellowish-ochraceous intercellular exudate, covered by pruina; asci *38-55x4.7-5.6 µm, IKI+, with croziers; spores subcylindrical to suballantoid, *5.5-7.5(-8.5)x1.5-1.7 µm; anamorph pycnidial, with subcylindrical to suballantoid conidia 3.7-5.3x1-1.4 µm; saprobic on corticated branches of *Corylus*, *Prunus spinosa*, *Rosa sp.*, *Salix* and canes of *Rubus fruticosus*; phen.: IX-XII (FR,GB).....
 **Chlorociboria glauca** (Dennis) Pärtel & Baral (2016)
 Ill.: Pärtel & Baral 2016: fig. 10.
- 5 Sexual morph: Apothecia up to 1 mm diam., dark blue-green, receptacle finely downy, substipitate; asci 55-70x6-7.5 µm, IKI red, with croziers; spores *(7)10-13x2.5-3.5 µm, 0(1)-septate. Asexual morph: conidia rod-shaped, 7-8x0.5 µm, hyaline. Saprobic on stems of *Filipendula ulmaria*, leaves of *Crataegus*, *Fagus*, *Reynoutria japonica*; phen.: IX-XI (BE/F, DE, FR, NL, UK)
 • **Chlorociboria aeruginella** (P. Karst.) Dennis, ex C.S. Ramamurthi, Korf & L.R. Batra (1958)

- 5' Apothecia 0.5-1(1.5) mm diam., turbinate to weakly cup-shaped, green; asci 58-70(75)x7.2-7.6 μ m, IKI- or IKI red, with croziers; spores ellipsoid to oblong, (8.5)9.5-11.5(12.8)x(2.8)3-3.2(3.5) μ m, 1-septate, hyaline; paraphyses with green content; saprobic on the base of petioles of *Dryopteris filix-mas*; phen.: X

..... **Chlorociboria pteridicola** Dougoud ad. int. (2003)

Ill.: Dougoud & al. 2003: fig.1.

A synonym of *C. aeruginella* according to Baral.

CENANGIACEAE Rehm

Syn.: Hemiphacidiaceae Korf

Lit.: Korf 1962: 12, Jaklitsch et al. 2016: 162.

Sexual morph: Apothecia opening with a lid or by rupture of the overlying host tissue, immersed or erumpent, cupulate to plane, sessile (in *Heyderia* long-stipitate and capitate); hymenium pale to bright ochraceous, yellowish, greenish, greyish, closing on drying; margin and exterior smooth or sometimes tomentose to pustulate by hyaline to brown hair-like elements; dark stroma absent. Ectal excipulum of hyaline to brown textura globulosa-angularis (sometimes lacking), at margin also textura prismatica, non-ionomidotic, sometimes with crystals. Paraphyses cylindrical, also lanceolate and projecting, containing hyaline or often chlorinaceous, elongate or sometimes multiguttulate VBs, rarely without (*Cenangium*). Asci apically medium to strongly conical, with *Calycina*-like amyloid rim, also hemispherical and inamyloid, with or without croziers. Ascospores (2-4)8 per ascus, ellipsoid, ovoid, fusoid, clavate, allantoid, mature mostly 0-, rarely eccentrically 1-septate, hyaline, sometimes brown, with a low to high lipid content, sometimes with sheath, sometimes budding microconidia.

Asexual morph: Anamorphs known in some genera, acervular in *Rhabdogloeum* and *Rhabdogloeopsis*, sporodochial in *Meria*, stromatic in *Digitosporium*; also hyphomycetous, conidiogenesis holoblastic, or phialidic (*Meria*); conidia 0-septate or staurosporous (*Digitosporium*), micro- and macroconidial.

Habitat: Saprobic or parasitic on mainly woody gymno- and angiosperms, causing leaf blight or branch canker, mostly desiccation-tolerant.

Genera belonging to this family:

1. *Cenangiopsis* Rehm
2. *Cenangium* Fr.
3. *Chlorencoelia* J.R. Dixon
4. *Crumenulopsis* J.W. Groves
5. *Didymascella* Maire & Sacc.
6. *Encoelia* (Fr.) P. Karst. s.str.
7. *Fabrella* Kirschst.
8. *Heyderia* (Fr.) Link
9. *Hysterostegiella* Höhn.
10. *Korfia* J. Reid & Cain
11. ?*Pseudomitrua* Gamundi
12. *Rhabdocline* Syd.
13. *Sarcotrochila* Höhn.
14. *Trochila* Fr.
15. *Velutarina* Korf ex Korf

Key to the genera :

- 1 Apothecia with a capitate or club- or bell-shaped fertile part, stipitate, whitish to brown; asci with annulus of *Calycina*-type, 1+; spores fusiform, aseptate; saprobic on needles of conifers *Heyderia*
- 1' Apothecia otherwise 2
- 2 Apothecia covered by a lid 3
- 2' Apothecia not covered by a lid 4
- 3 Apothecia covered by a lid; margin with hyaline or pale brown, thin-walled, warty hairs; asci cylindrical to clavate, 1+; paraphyses lanceolate, enlarged just below the apex *Hysterostegiella*
- 3' Apothecia subepidermal, exposed by shedding as a lid; lateral excipulum reduced to absent; disc emarginate; asci clavate; spores non-septate, 6-12 µm long; paraphyses with refractive greenish yellow elongate VB's; on leaves of woody dicotyledonous plants *Trochila*
- 3'' Asci 4-spored, 1-; spores becoming 2-celled and faintly greenish brown; on leaves of *Tsuga* *Fabrella*
- 4 Apothecia stipitate, greenish, olive or greenish black, 2-15 mm diam.; ascus annulus strongly amyloid; on rotten wood of angio- and gymnosperms *Chlorencoelia*
- 4' Apothecia yellowish, ochraceous to brownish 5
- 5 Apothecia sessile, cupulate, externally pustulate, marginally hairy; ectal excipulum of hyaline textura prismatica-globulosa covered by brown exudates; paraphyses lanceolate; asci 1+; spores aseptate; lignicolous, herbicolous *Cenangiopsis*
- 5' Paraphyses cylindrical 6

- 6 Apothecia erumpent, cupulate, leathery; ectal excipulum of dark brown, thick-walled textura globulosa, not covered by exudates; asci I+ or I-; spores ellipsoid, non-septate *Cenangium*
- 6' Ectal excipulum covered by brown exudates 7
- 7 Apothecia erumpent, becoming cupulate, hymenium cinnamon to dark brown, leathery, outside mealy to furfuraeous; ectal excipulum of thick-walled, reddish-brown, loose textura globulosa and brown intercellular exudate; asci IKI+ or IKI-; spores allantoid, hyaline..... *Encoelia*
- 7' Apothecia erumpent, sessile, brown, externally pruinose-tomentose; ectal excipulum of loose textura globulosa; spores ellipsoid, brown *Velutarina*
- 9 Asci apical pore I+ or I-, 8-spored; spores becoming 2-celled, one cell becoming brown with pitted wall before germination; parasitic on needles of *Pseudotsuga* *Rhabdocline*
- 9' Asci apical pore I+ or I-, 8-spored; spores first aseptate and hyaline, becoming septate and brown melanised before germination; parasitic on needles of Pinaceae (*Abies*, *Larix*, *Picea*) *Sarcotrochila*
- 9'' Asci 2- or 4-spored, I-; spores 2-celled, with one cell very much smaller than the other, becoming brown with more or less pitted wall; apex of the paraphyses brownish; parasitic on needles of conifers (*Thuja*, *Chamaecyparis*, *Juniperus*) *Didymascella*

Cenangiopsis Rehm

Type : *Cenangiopsis quercicola* (Romell) Rehm

Lit. : Rehm 1896 : 623 (sub *Pyrenopeziza aureola*), Gremmen 1955b: 13, Dennis 1962: 186, Svrček 1979: 196, Schmid I. & H. 1990 : nr. 12.

- 1 Apothecia erumpent, 2-4 mm diam., hymenium pale ochraceous, receptacle greyish brown and radially striate; asci *110x8 µm, †77-96x6-7 µm, I+, with croziers; spores *9-11.5x2.5-3.5 µm, †7.5-9x2-3 µm; paraphyses lanceolate; saprobic on twigs of *Quercus petraea*; phen.: V-VII (ES) **Cenangiopsis quercicola** (Romell) Rehm (1912)
- 1' Spores average more than 9 µm long 2
- 2 Apothecia urceolate to cyathiform, 0.15-0.3 mm diam., hymenium translucent ochraceous, outer surface blackish and radially striate, margin whitish and finely fibrous; spores cylindrical to fusiform, 9-11x1.8-2.2 µm, aseptate, hyaline; saprobic on greenish stained spots on stems of *Aconitum* and *Gentiana*; subalpine; phen. : VII **Cenangiopsis chlorospleniella** (Rehm) Dennis (1962)
 III.: Schmid I. & H. 1990: 12.
- 2' Spores 12-15x3-5 µm; asci I-; saprobic on stems of *Eupatorium cannabinum*; phen.: ? **Cenangiopsis aureola** (Rabenh.) Rehm (1912)
 Asci hemiamyloid; paraphyses not lanceolate. On branch of *Rosa* and *Erica*. Phen.: VIII. Alpine (FR) **Cenangiopsis andreae** B. Perić (2020)

Cenangium Fr.

Type species: *Cenangium ferruginosum* Fr.

Lit. : Dennis 1962: 323 (*C. graddonii*), Dennis 1971: 349, Beyer 1998: 176 (*C. acicola*), Hansen & Knudsen 2000 : 140.

- 1 Apothecia urceolate, 1-2 mm diam., hymenium ochraceous ; ascus porus I- ; spores 13-17x4-5 µm, 0(1-3)-septate, biguttulate ; saprobic on decorticated branches of *Alnus*, *Ilex aquifolium* ; phen. : V **Cenangium graddonii** Dennis (1962)
 III.: Ellis & Ellis 1985: fig. 346.
- 1' Spores wider 2
- 2 Apothecia erumpent, 1 mm diam., hymenium pale yellow, ectal excipulum of textura globulosa ; asci 105-140x11-13 µm, I- ; spores 13x6.5-8 µm, biguttulate ; saprobic on branches of *Juniperus communis*; phen. : VIII **Cenangium juniperi** Dennis (1971)
 III. : Dennis 1971 : fig. 14.
- 2' Spores up to 6 µm wide 3
- 3 Apothecia erumpent, 2-3 mm wide ; ascus porus IKI-; spores broadly ellipsoid to fusiform, 12-14x5-6 µm; saprobic to parasitic on corticated twigs and branches of *Pinus*, sometimes on needles; phen.: IV-VI **Cenangium ferruginosum** Fr. (1818)
- 3' Asci IKI red 4

- 4 Apothecia erumpent, 1-2 mm wide ; ascus porus IKI+ reddish ; spores narrowly ellipsoid to cylindric, 10-16x4-6 µm; saprobic on needles of *Pinus* and *Juniperus*; phen.: VII-IX **Cenangium acuum** Cooke & Peck (1877)
- 4' Apothecia up to 3 mm diam., shortly stalked, hymenium pale to dark ochre; asci 95-125x9-12.5 µm, IKI red; spores 12-15x3.5-4.5 µm; saprobic on needles of *Pinus sylvestris*; phen.: III
 **Cenangium acicola** (Fuckel) Rehm (1888) [1896]
 Ill.: Beyer 1998: Abb. 26.

Chlorencoelia J.R. Dixon

Type species: *Chlorencoelia versiformis* (Pers.) J.R. Dixon

Lit.: Dixon 1975: 223, Baral & Krieglsteiner 1985 : 105, Hansen & Knudsen 2000: 140.

- 1 Apothecia cup-shaped to expanded or eccentric, 5-20 mm diam., hymenium olivaceous yellow, brown when drying; outside dark olivaceous to brownish, pruinose to furfuraceous; stem 3-5x0.5-1 mm, concolorous with the outside; asci strongly I+; spores narrowly ellipsoid to allantoid, 10.5-15.5x2.5-3.5 µm, guttulate, hyaline; saprobic on decaying wood (*Alnus incana*, *Corylus avellana*); phen.: VIII-X
 **Chlorencoelia versiformis** (Pers.) J.R. Dixon (1975)
 Ill. : Ellis & Ellis 1985: fig. 8, Breitenbach & Kränzlin 1981 : pl. 201.

Crumenulopsis J.W. Groves

Typus : *Crumenulopsis pinicola* (Rebent.) J.W. Groves

Lit. : Dennis 1978 : 352, Hanlin 1998: 110, Medardi 2006 : XLVII.

- 1 Apothecia sessile, concave to flat disk pale olive, 1-2 mm diam., receptacle furfuraceous black; asci 100-120x10 µm, I-; spores 15-20(30)x3-4(5) µm, 0(1.3)-septate; paraphyses filiform, with up to 3 µm enlarged tip; on canker of *Pinus laricio*, *Pinus nigra*, *Pinus wallichiana*; phen.: IV-V **Crumenulopsis sororia** (P. Karst.) J.W. Groves (1969)
 Ill. : Dennis 1971 : 352.
- 1' Hymenium grey, receptacle blackish; spores 20-33x3-4 µm
 **Crumenulopsis pinicola** (Rebent.) J.W. Groves (1969)
- 1'' Apothecia 0.25 mm diam., hymenium and hairy margin bright yellow; asci 135-155x18-22 µm, IKI-, without croziers; spores 16-22x6-7.5 µm, 0(1)-septate, OCI 0-1; saprobic on corticated branch of *Pinus sylvestris*; phen.: XI
 **Crumenulopsis** sp.

Didymascella Maire & Sacc.

Type species: *Didymascella oxycedri* Maire & Sacc.

Lit.: Pantidou & Darker 1963: 415, Dennis 1978: 236.

- 1 Apothecia epiphyllous; asci 4-spored, 110-170x12-15 µm; spores 17-25x9-13(14) µm, overmature spores brown; paraphyses 6-9 µm; on needles of *Juniperus oxycedrus* **Didymascella oxycedri** Maire & Sacc. (1903)
- 1' Spores wider 2
- 2 Apothecia immersed, circular to irregular, 1-1.25x0.5 mm, exposed by shedding of an epidermal disc, hymenium olivaceous brown to dark brown; asci clavate, 2-spored, 80-100x18-20 µm; spores ellipsoid, 22-25x15-16 µm, unequally 2-celled, brown and with pitted wall when overmature ; parasitic on brown leaf spots of *Thuja plicata*, *Thuja occidentalis*; phen.: V-VII **Didymascella thujina** (E.J. Durand) Maire (1927)
 Ill.: Dennis 1978: fig. 28K.
- 2' Apothecia immersed, opening by irregular teeth, hymenium blackish-brown, about 1 mm diam.; asci 4(5)-spored, 110-175x14-22 µm; spores 16-25x13-17 µm, overmature spores olivaceous brown; tips of paraphyses 6-9(14) µm wide; on living leaves of *Juniperus communis*, *J. macrocarpa*
 **Didymascella tetraspora** (W. Phillips & Keith) Maire (1927)
 Ill.: Dennis 1978: fig. 28J.

Encoelia (Fr.) P. Karst.

Type species: *Encoelia furfuracea* (Roth) P. Karst.

Lit.: Dennis 1975: 350, Dennis 1978: 154, Baral & Krieglsteiner 1985: 116, Baral & Richter 1997: 39 (key).

- 1 Apothecia with brown non-fibrous outside; ectal excipulum of brown, loose textura globulosa; asci I+; spores 9-11x2-2.5 µm, OCI low; saprobic on branches of Betulaceae (*Alnus*, *Corylus americana*, *Corylus avellana*), drought-tolerant; phen.: XI-IV • **Encoelia furfuracea** (Roth) P. Karst. (1870)
 Ill.: Breitenbach & Kränzlin 1982: fig. 204.

May not belong here:

- | | | |
|----|--|---|
| 1 | Asci I- | 2 |
| 1' | Asci IKI+ | 3 |
| 2 | Apothecia densely gregarious in clusters of ca. up to 80, 1-3 mm diam., disc dark vinaceous brown, margin whitish-fimbriate; ectal excipulum a brown textura globulosa; asci 45-59(63)x7-8.5(9) µm, I-; spores allantoid, 8-10x2.5-3 µm, hyaline; saprobic on bark of <i>Prunus spinosa</i> , <i>Salix cinerea</i> ; phen.: XI-I, V | |
| | • "Encoelia" fimbriata Spooner & Trigaux (1985) | |
| 2' | Apothecia erumpent, concave to convex, up to 10 mm diam. disc pale olivaceous brown to brown; asci 50-55x6 µm, I-; spores 6-10x1-1.5 µm, OCI 1, budding; saprobic on corticated branches of <i>Carpinus betulus</i> , <i>Quercus robur</i> , <i>Salix sp.</i> ; phen.: VII-X | o Encoelia glaberrima (Rehm) Kirschst. (1935) |
| 3 | Paraphyses mostly with clavate apex (4)5.5-7(8.5) µm wide, pale brown when fresh; apothecia cupulate, short-stipitate, medium brown to dark brown, arising from black stromatized tissues, disc 2-4 mm diam., stipe 1-3 x 0.4-1 mm; asci 110-130 x 7-8 µm; spores 13-18.5x3.3-4(4.7) µm, OCI moderate; microconidia subglobose, 2.4-3.3x2.3-2.9 µm; saprobic on remnants of a pyrenomycete growing on <i>Malus sylvestris</i> , <i>Rosa sp.</i> ; phen.: V-VII | o Encoelia rhenana (Kirschst.) Baral & G. Marson (1997) |
| 3' | Paraphyses without swollen apex, in KOH 3-4 µm wide; apothecial base not blackened; spores 14-20(23)x3.4-4(4.4) µm, OCI low; microconidia more ovoid-ellipsoid, 2.8-3.5(4.5)x2-2.5(2.7) µm; saprobic on <i>Ulmus</i> ; phen.: VIII-I(IV) (BE/F) | o Encoelia siparia (Berk. & Broome) Nannf. (1936)
Ill.: Baral & Richter: 1997: fig.1-7. |

Maybe belonging to *Rutstroemia*:

- Asci 95-110x7.5-10.5 µm, IKI?; spores bacilliform to allantoid, 15.2-17x3.5-3.8 µm, forming globular microconidia at both ends; paraphyses slightly enlarged at the apex up to 4.5 µm; on fallen twigs of *Pinus* and *Pseudotsuga*. Phen.: X (NL)
- o **"Encoelia" petrakii** Gremmen (1957)

Fabrella Kirschst.

Type species: *Fabrella tsugae* (Farl.) Kirschst.

Lit.: Wulf & Pehl 1996: 1.

- 1 Apothecia erumpent, hypophyllous, disc brown epidermis forming a raised flap of tissue toward one side.. Asci 55-80x10-13 µm, 4-spored. Ascospores ovoid, 12-17x5-7 µm, 1-septate, constricted. Parasitic on needles of *Tsuga canadensis*. Phen.: XII-VII (BE/F, DE, UK)
- o **Fabrella tsugae** (Farl.) Kirschst. (1941)

Heyderia (Fr.) Link

Type species: *Heyderia abietis* (Fr.) Link.

Lit.: Eckblad 1963: 150, Maas Geesteramus 1964: 10, Dennis 1978: 99, Benkert 1983: 148, Hansen & Knudsen 2000: 151, Baral (CD In vivo veritas 2-2), Bacyk 2005: 41 (key).

- 1 Ascomata 10-25 mm high; apothecia cylindric, 2-9x1-3 mm, yellowish brown; asci 60-75x6-8 µm, amyloid (annulus of *Calycina*-type), arising from croziers; spores fusiform, 11-17x2-3 µm, hyaline, guttulate; on rotting needles of *Abies alba*, *Picea* and *Pinus*; phen.: (VIII)IX-XII (BE/F) o **Heyderia cucullata** (Batsch : Fr.) Bacyk & Van Vooren (2005)
Ill.: Breitenbach & Kränzlin 1981: Pl. 140, Bacyk 2005: pl. 1.
- 1' Ascomata 5-10 mm high; apothecia campanulate, 0.5-2 mm high, yellowish; asci amyloid (annulus of *Calycina*-type), arising from simple septa; spores 13-15x2-2.5 µm, guttulate; on rotting needles of *Pinus*; phen.: X-XI (ES).....
..... **Heyderia pusilla** (Alb. & Schwein.) Link (1833)

Hysterostegiella Höhn.

Type species: *Hysterostegiella fenestrata* (Roberge ex Desm.) Höhn.

Syn.: *Stegopeziza* Höhn.

Lit.: Défago 1967: 30, Müller 1968: 146 (sub *Psilachnum juniperinum*), Graddon 1974: 483 (sub *Hysteropezizella dowardensis*), Svrček 1978: 17 (*H. zelendarkensis*), Spooner 1981: 297 (*H. dumeti* & *H. querca*), Hein 1983a: 669 (key).

- 1 Spores 4-5 µm, saprobic on leaves of *Laurus nobilis*; phen.: IV-XII
- o **Hysterostegiella lauri** (Caldesi) B. Hein
- | | | |
|----|---|---|
| 1' | Spores longer, on other substrates | 2 |
| 2 | Ascomata at least twice as long as wide | 3 |
| 2' | Ascomata with L/W<2 | 4 |

- 3 Lid 1-2 mm long; spores ellipsoid, 5.5-7x2-2.5 µm; saprobic on *Ammophila arenaria*; phen.: (IV)V-IX **Hysterostegiella valvata** (Mont.) Höhn. (1917)
- 3' Lid up to 1 mm long; apothecia mostly 0.5-1x0.2-0.4 mm; spores ellipsoid, (5)6-8x(1.5)2-2.5 µm; saprobic on *Typha angustifolia*, *T. latifolia*; phen.: VII-IX(XI) **Hysterostegiella typhae** Syd. (1921)
- 4 Marginal hairs with hyaline 0.5 to 1 µm wide threads 5
- 4' Marginal hairs without threads 6
- 5 Threads long, only on the hair tips; apothecia 0.4-0.6 mm diam., hymenium pale orange; asci 42-50x3.5-4 µm, I+; spores ellipsoid to slightly clavate, 5-6x1.2-1.5 µm; paraphyses exceeding the asci by up to 15 µm; saprobic on rods of *Rubus fruticosus*, *Rubus* sp.; phen.: III-VII **Hysterostegiella dumeti** (Sacc. & Speg.) B. Hein (1983)
 Ill.: Spooner 1981: fig.: 32.
- 5' Threads only about 10 µm long, also on the sides of the hair cells; apothecia up to 1 mm diam.; asci 50-60x4 µm, I+; spores 4.5-7x1-1.8 µm; saprobic on leaves of *Quercus rubra*; phen.: V-VI **Hysterostegiella quercea** (Fautrey & Lamb.) B. Hein (1983)
 Ill.: Spooner 1981: fig.: 33.
- 6 Receptaculum pale yellowish; on *Carex* 7
- 6' Receptaculum brownish; not on *Carex* 8
- 7 Apothecia 0.2-0.3 mm diam., ochraceous; asci 50x5.5 µm, I+; spores 5-7x1-1.5 µm, biguttulate; saprobic on *Carex flacca*; phen.: IX **Hysterostegiella dowardensis** (Graddon) B. Hein (1983)
 Ill.: Graddon 1974: fig. 6.
- 7' Apothecia 0.3-0.8 mm diam.; asci I+; spores 6-7x1.3-1.7 µm, eguttulate; saprobic on *Carex acutiformis*; phen.: VI .. **Hysterostegiella zelendarkensis** Svrček (1978)
 Ill.: Svrček 1978: fig. 3.3.
- 8 Marginal hairs glued together; saprobic on *Festuca glauca*; phen.: autumn **Hysterostegiella** sp.
- 8' Hairs not glued together 9
- 9 Marginal hairs tangential oriented; spores narrow ellipsoid, 6-8x1.5-2 µm; saprobic on *Scirpus*, *Schoenoplectis*; phen.: VIII-IX (●) **Hysterostegiella fenestrata** (Roberge ex Desm.) Höhn. (1917)
- 9' Apothecia shortly stalked, 0.5-1 mm diam., brown, with a lid; asci 30-40x5-6 µm, J+, with croziers; spores elongate clavate, 4-6x1-2 µm; paraphyses lanceolate; hairs clavate, smooth, hyaline; saprobic on leaves an more rarely on branches of *Juniperus nana*; phen.: IX (CH) **Hysterostegiella juniperina** (E. Müll.) Schmid-Heckel (1988)
 Ill.: Müller 1968: Abb. 3.

Rhabdocline Syd.

Type species: *Rhabdocline pseudotsugae* Syd.

Lit.: Dennis 1978: 239, Butin 1983: 22, Stone & Gernandt 2005: 115.

- 1 Apothecia up to 3x0.3 mm, erumpent, hymenium brown; spores ellipsoid-cylindrical, 15-20x6-9 µm, 0(1)-septate, rarely becoming dark brown, with pitted surface; on living needles of *Pseudotsuga taxifolia*; phen.: V-VI **Rhabdocline pseudotsugae** Syd. (1922)
 Ill.: Dennis 1978: fig. 28C, Butin 1983: Abb. 15.

Sarcotrochila Höhn.

Type species: *Sarcotrochila alpina* (Fuckel) Höhn.

Lit.: Engel & Hanff 1988: 41, Stone & Gernandt 2005: 115.

- 1 Apothecia erumpent, up to 0.8 mm diam., hymenium plano-convex and pale to bright yellow; asci 55-75x11.5-15 µm, I- (Engel & Hanff: I+); spores fusiform, 10-12x3-4.5 µm, 0(1-3)-septate, with many small guttules at both poles, overmature spores rarely pale brown; parasitic on needles of *Larix*; phen.: IV-V (DE,LU,GB) **Sarcotrochila alpina** (Fuckel) Höhn. (1917)
 Ill.: Engel & Hanff 1988: p.41.

Trochila Fr.

Syn.: anamorph *Cryptocline* Petr.

Type species: *Trochila craterium* (DC.) Fr.

Lit.: Greenhalgh & Morgan-Jones 1973: 309, Dennis 1978: 220, Baral 2000 (key).

- 1 Apothecium with a single, large, dark, round or elliptic epidermal lid attached to one side and closing completely the hymenium when dry, up to 1 mm diam.; spores *11.5-13.5(14)x4.7-5.3(5.5) µm; asci *81-120x9.5-13.5 µm, apical ring of *Allophylaria*-type; saprobic on upper, rarely some on lower side of dead fallen leaves of *Ilex aquifolium*; phen.: IV-IX ((BE/F) • **Trochila ilicina** (Nees ex Fr.) Courtec. (1986)
 Ill.: Breitenbach & Kränzlin 1981: pl. 290.
- 1' Spores *7.5-10.4 µm long; asci *60-103 µm long; apothecium tearing off 2-5 short epidermal lobes which more or less cover the hymenium when dry 2
- 2 Sexual morph: Asci *60-93x11.5-13.2 µm, apical ring of *Ploettnera*-type; spores 8-10x(4.5)5.2-6(6.5) µm with 1(2) large LBs; saprobic on the lower side of recently died, dry leaves of *Hedera helix*. Asexual morph *Cryptocline paradoxa* with pale cream acervuli 100-180 µm diam., conidia *7.5-10x4.7-6.2 µm, with 2-3 LBs, strongly resembling the spores in shape and content; phen.: I-X(XII, overmature) (BE/F) • **Trochila craterium** (DC.) Fr. (1849)
- 2' Asci *7-10.4 µm wide, apical ring of *Calycina*-type 3
- 3 Asci *56-78x6,5-7,5 µm, IKI+, with croziers; spores *8-10x3,5-4 µm, with two large LB's and many small ones, with a mucous coating; saprobic on stems of *Rubus fruticosus* agg.; phen.: VII • **Trochila rubicola** nom. prov. Declercq
- 3' Asci wider 4
- 4 Sexual morph: Asci *63-103x7.7-10 µm, IKI+; spores *7.5-10.4x(3.3)3.8-4.5 µm, mostly biguttulate (2 large, slightly unequal-sized LBs and several small ones). Asexual morph *Cryptocline phacidiella* with abundant acervuli, 100-280 µm diam., appearing as pale orange-brown, translucent pustules and oblong conidia *(14)18-20.3x5-8 µm, with 2-4 large and many small drops in each half, with basal short ?setulae; saprobic on lower side (rarely a few on upper side) and on petioles of old, dry or moist, fallen leaves of *Prunus laurocerasus*; phen.: III-VI(a), IX-XII (BE/F)
 • **Trochila laurocerasi** (Desm.) Fr. (1849)
 Ill.: Ellis & Ellis 1985: fig. 868.
- 4' Asci *56-76x8.6-10.4 µm, IKI+, with croziers; spores *8-10.5x4.2-5 µm, with 1-2 large LBs, OCI 5; saprobic on lower face of fallen leaves of *Viburnum tinus*; phen.: VIII-XII (BE/F, ES) • **Trochila tini** (Duby) Quél. (1886)

Velutarina Korf ex Korf

Type species: *Velutarina rufo-olivacea* (Alb. & Schwein.) Korf.

Lit.: Kriegelsteiner & Enderle 1987 : 26, Hansen & Knudsen 2000 : 161, Baral & Perić 2014 :

- 1 Apothecia rehydrated 0.45–0.9 mm diam.; disc deep chestnutbrown, exterior light cinnamon, covered with a whitish powder; cleistohymenial (coveringlayer opens when ascus initials start to develop). Asci *90-110x11–11.7 µm. 8-spored, IKI–. Ascospores *10.5–13 x 5–6(–6.3) µm, hyaline, ellipsoid-ciborioid, containing (1–)2 oil drops and many small ones; overmature spores light ochre-brown. Paraphyses apically slightly inflated, containing a medium refractive, pale to light reddish-ochre vacuole. Medullary excipulum hyaline, textura intricata, with crystal druses, large vesicular cells lacking. Ectal excipulum at flanks of dark red-brown, vertical textura angularis-prismatica, light brownish at margin, here with projecting light yellowish-brown hairs. Crystals abundant on ectal and in medullary excipulum. Pigments unchanged in KOH. On ± corticated, xeric twig of *Salix retusa*. Phen. : V, VIII-IX (CH)
 **Velutarina alpestris** Baral & Perić (2014)
- 1' Ascospores more than 6.5 µm wide 2
- 2 Apothecia 1–4 mm in diam., at first globose then disc- to cup-shaped; exterior cinnamon-brown, strongly pustulate, cleistohymenial; hymenium, sooty black or with a cobalt blue reflex. Asci *(205)212–304(310)x15–20 µm, 8-spored, IKI–, without apical thickening, arising from croziers. Ascospores *(14)16–21(22)x(8)8.5–11 µm, ellipsoidal, smooth, bright to dark honey-brown when still within the living asci, thick-walled, containing two or more large and many small oil drops (LBs). Paraphyses apically slightly inflated, without refractive or pigmented vacuoles. Medullary excipulum of subhyaline to pale yellow, incrustated, non-gelatinized, interwoven hyphae (textura intricata), large vesicular cells absent. Ectal excipulum of vertically elongated polygonal cells incrustated by yellowish-brown exudate, exterior covered by hair-like elements of subglobose to elongate cells that partly converge to form squamules. Crystals abundant on ectal excipulum and hairs, also in hymenium. Pigments unchanged in KOH. On decorticated, xeric branches of *Fagus sylvatica* ssp. *moesiaca*. Phen. : IV-V
 **Velutarina bertiscensis** Perić & Baral (2014)
 Ill.: Baral & Perić 2014 : fig. 7-14.
- 2' Ascospores *10.5–15.5 x 6.5–9.5 µm, hyaline when mature, overmature turning brown and partly warted, thin-walled; apothecia externally only exceptionally pustulate..... 3
- 3 Apothecia solitary or in small clusters, sessile, up to 3 mm diam., hymenium dark olive green, outside with rusty brown powder. Asci with apical ring of *Pezicula* type, IKI strongly blued then dirty red, without croziers. Ascospores ellipsoid, *(10.5)11-14.5(15.5)x(6.5)7-9 (9.5) µm, mostly with two large and several small LBs, OCI 5, brown and rugulose when mature. Upper paraphyse cell with a large refractive VB. Crystals abundant in medullary and ectal excipulum. Saprophytic on still attached branches of Rosaceae (*Cydonia*, *Malus*, *Prunus spinosa*, *Rosa*, *Rubus*

- fruticosus* agg., *Rubus idaeus*, *Sorbus*), on bark of *Acer campestre*, *Carpinus*, *Cornus*, *Corylus avellana*, *Juniperus*, *Larix*, *Picea*, *Salix*. Phen. : I-XII (BE/F)..... • **Velutarina rufo-olivacea** (Alb. & Schwein.) Korf (1953)
 Ill.: Boudier 1904-10 : pl. 558, Dennis 1981 : XXId, Rubio & al. 2010 : p. 270, Baral & Perić 2014 : fig. 1-6.
- 3' Asci IKI- (?); greenish vesicular cells absent; on twigs of *Juniperus communis*, temperate atlantic N- and NW-
 Europe? **Velutarina juniperi** (Dennis) L. Holm & K. Holm (1977)
 Different from *Velutarina rufo-olivacea*?

RUTSTROEMIACEAE Holst-Jensen, L.M. Kohn & T. Schumacher 1997

Lit.: Schumacher 1997, Jaklitsch et al. 2016: 160.

Sexual morph: Apothecia cupulate to plane, 0.5-20 mm in diam., rarely cleistothecial (*Bicornispora*); smooth but sometimes with brown setae; short- to long-stalked, usually with a black-brown stipe base emerging from an indeterminate, flat, dark substratal stroma. Ectal excipulum of textura prismatica, rarely textura globulosa, gelatinized or not, covered by a hyphal cortical layer with yellowish-brownish incrustation, rarely with crystals. Paraphyses cylindrical, often with low- to high-refractive, hyaline or yellowish-brown, elongate VB's. Asci with rounded to subtruncate apex, amyloid ring of *Sclerotinia*-type, rarely inamyloid, with or sometimes without croziers. Ascospores ellipsoid to allantoid, medium- to large-sized, lipid content medium to high, rarely low, 1-nucleate, not rarely with sheath; overmature 1-3-septate and budding microconidia, sometimes turning brown (rarely already when mature).

Asexual morph: Anamorphs hyphomycetous, microconidial, phialidic with small collarete (myrioconium-like).

Habitat: Saprobic, rarely necro- or biotrophic, on wood and bark, leaves, fruits, herbaceous stems, possibly initially paeasitic, mostly desiccation-sensitive.

Genera belonging to this family:

1. *Bicornispora* Checa, Barrasa M.N. Blanco et al.
2. *Dencoeliopsis* Korf
3. *Lambertella* Höhn.
4. *Lanzia* Sacc.
5. *Pseudolanzia* Baral & G. Marson
6. *Rutstroemia* P. Karst.
7. *Torrendiella* Boud. & Torr.

Key to the genera of Rutstroemiaceae:

- 1 Apothecia mostly stipitate, with smooth excipular setae; ectal excipulum of gelatinous textura prismatica; asci I+..... *Torrendiella*
- 1' Apothecia non-setose 2
- 2 Ascomata cleistothecial; asci evanescent *Bicornispora*
- 2' Ascomata not cleistothecial 3
- 3 Ectal excipulum of brown textura globulosa; asci I+ *Dencoeliopsis*
- 3' Ectal excipulum mainly of non-gelatinous textura prismatica 4
- 4 Apothecia yellowish-green to greenish brown; ectal excipulum of textura prismatica; arising from blackish stromatized leaf-nerves and petioles of *Acer*, *Tilia*, *Fagus* and *Quercus* [Lanzia](#)
- 4' Apothecia brownish 5
- 5 On stromatized host tissue, on plants, fungi or dung; ectal excipulum of textura prismatica to angularis, often with hair-like outgrowths; spores normally unicellular, brown at maturity, smooth or punctate or "banded" [Lambertella](#)
- 5' Apothecia arising from an indeterminate stroma; ectal excipulum of textura prismatica; spores becoming septate at maturity, often with secondary spores produced at the poles [Rutstroemia](#)
- 5" Sexual morph: Apothecia greyish-brown, stipe shorter to longer than wide, blackbrown, erumpent through epidermis. Asci 8-spored, arising from croziers. Ascospores cylindric-ellipsoid, hyaline, smooth, containing two groups of minute LBs. Paraphyses cylindrical, containing very long, refractive vacuolar bodies. Medullary excipulum olivaceous, with non-gelatinised, mainly prismatic cells. Ectal excipulum olivaceous, of textura prismatica(-globulosa), with swollen, cylindric-clavate, appressed, olive-brown incrustated cells. Crystals absent. Excipular pigments unchanged in KOH. – Asexual morph: unknown. *Pseudolanzia*

Dencoeliopsis Korf

Type : *Dencoeliopsis johnstonii* (Berk.) Korf.

Lit. : Ellis & Ellis 1985 : 96 (*D. johnstonii*), Zhuang 1988 : 97 (*D. betulicola*), Hansen & Knudsen 2000 : 145.

- 1 Apothecia cup-shaped, up to 2 mm diam., on short fat stalks, dark brown, scurfy, disc yellowish when fresh; asci 110-150x10-13, I+; spores 18-33x6-8 µm, 1-septate; saprobic on branches of *Betula*; phen.: early spring **Dencoeliopsis johnstonii** (Berk.) Korf (1971) Ill.: Dennis 1978: XXIIc.

- 1' Apothecia cupulate, 0.4-0.7 mm diam., short-stipitate, hymenium pale yellow, receptacle dark brown and roughened, margin with roughened hairs; asci 41-52x5-6 µm, I+; spores 9.5-12.5x2-2.5 µm, 1-septate; saprobic on bark of *Betula*; phen.: I **Dencoeliopsis betulicola** W.Y. Zhuang (1988)
 Ill. : Zhuang 1988 : fig. 1 & 2.

Lambertella Höhn.

Type species: *Lambertella corni-maris* Höhn.

Lit.: Svrček 1976: 14 (*L. carpatica*), Abdullah & Webster 1981: 261, Korf & Zhuang 1985: 361, Hansen & Knudsen 2000: 162 (*L. langei*).

- 1 Apothecia appanate to slightly convex, arising 1-4 from stromatized patches, disc 0.5-2.5 mm diam., dark yellowish brown to vinaceous brown, stipe 1-22 x 0.3-0.8 mm; asci 130-180x11.5-1,5 µm; spores unicellular, ellipsoid, brownish mature (at or soon after discharge), 14.5-21x5.6-8 µm; saprobic on leaves of *Andromeda polifolia*; phen.: spring to early summer **"Lambertella " langei** T. Schumach. & Holøs
 1' Spores up to 12 µm long 2
- 2 Apothecia obconical, with broad base, 0.5-0.7 mm diam., with poorly developed substratal stroma; asci 50-70x6-8 µm; spores ellipsoid-subfusiform, when young hyaline and 6.5-8.5x3.5-5 µm, when mature pigmented 8-10x5-6 µm; *Helicodendron tubulosum* anamorph with coiled conidia; saprobic on partly submerged twigs of *Acer pseudoplatanus*; phen.: VIII-X **Lambertella tubulosa** Abdullah & J. Webster (1981)
 Ill.: Abdullah & Webster 1981: fig. 1.
- 2' Apothecia stipitate 3
- 3 Apothecia 1-2 mm diam., disc concave and pale brown, long-stipitate; asci 70-90x5-7 µm, (2-3)4-spored, slightly I+; spores 8.5-12.5x(3.5)4-4.5(5.5) µm, aseptate, eguttulate, hyaline, becoming brown; saprobic on leaves of *Euphorbia carpatica*; phen.: V **Lambertella carpatica** Svrček (1976)
- 3' Spores subellipsoid, flattened on one side, 8-12x4 µm, eguttulate, punctate to banded, brown; parasitic on fruits of *Cornus mas*, *Malus domestica*; phen.: VIII **Lambertella corni-maris** Höhn.(1918)
 Spores with strongly pointed ends, aseptate, guttulate, dark brown; saprobic on leaves of *Quercus ilex*; phen.: II-III.....
 **Lambertella palmeri** Raitv. & R. Galan (1994)

Lanzia Sacc.

Type species: *Lanzia flavorufa* (Sacc.) Sacc.

Lit.: Dumont 1972: 914, Spooner 1981: 283 (sub *Lanzia coracina*, *Lanzia stellariae*), Krieglsteiner & Baral 1985: 200 (sub *Lanzia ulmariae*), Hansen & Knudsen 2000: 162.

- 1 Apothecia cup-shaped, 1-3 mm diam., stipitate, hymenium whitish to cream; asci 130-150x9-11 µm, I+; spores ellipso-fusoid, 13.5-17x5-6 µm, biguttulate; ectal excipulum of textura prismatica; parasitic on lower part of stems of *Stellaria alsine*; phen.: X **Lanzia stellariae** (Velen.) Spooner (1981)
 Ill.: Spooner 1981: fig. 23.

Pseudolanzia Baral & G. Marson

Type: *Pseudolanzia piceetorum* Baral & T. Richt.

Lit. Baral 2017: 151.

- 1 Apothecia scattered, 1-2 mm diam., discoid, stipitate; flat, smooth, light grey to ochraceous, later bright umber-brown; exterior dull chestnut- to umber-brown, with darker brown radial fibres, overall ± downy, margin finely pubescent, with short black-brown to black stipe. Asci *(160)170-180x10.5-11.5 µm, †140-175x9-11 µm, 8-spored, spores (†) uniseriate, apical ring staining light to bright blue in IKI, blackish(-reddish) at very high concentration (type rB), arising from croziers. Ascospores cylindrical-ellipsoid, often slightly heteropolar, *(13.3)14-16.5(17.5)x(5)5.3-6(6.7) µm, †(12)13.5-16(17.5)x4.6-5.5 µm, hyaline, smooth, surrounded by a thin, indistinct sheath that does not detach (visible in IKI), with a faintly visible central nucleus, containing many minute LBs in a group near each end (lipid content 2). Paraphyses cylindrical, apically not or only slightly enlarged (ellipsoid), *4-5 µm wide, straight, containing long, rather strongly refractive, hyaline vacuolar bodies staining blue-green in IKI. Subhymenium ~30 µm thick, bright ochraceous-olivaceous. Medullary of textura intricata-prismatica-globulosa. Ectal of textura prismatica(-globulosa), hyaline; cortical layer of more elongated cells, heavily incrustated by yellowish-olive exudate, ending up in swollen, cylindrical-clavate, appressed hair-like cells *(20)30-50x10-15 µm, containing refractive VBs, heavily incrustated by olive-brown clods; at margin 25-30 µm thick, of t. prismatica-porrecta, bright olivaceous-ochre; in stipe of similar t. prismatica, outer part dark brown, inner part bright reddish-brown. Saprobian on needles of *Picea abies*. Phen.: X (DE, SE) **Pseudolanzia piceetorum** Baral & T. Richt. (2019)
 Ill.: Baral 2019: fig. 1-6.

Rutstroemia P. Karst.

Syn.: *Poculum* Velen.

Type species: *Rutstroemia firma* (Pers.) P. Karst.

Lit.: Dennis 1964b: 52 (*R. maritima*), Dennis 1978: 111, Galán & Honrubia 1988: 557 (*R. allantospora*), Engel & Hanff 1992: 123 (*R. pruni-serotinae*), Medardi 2007: 9 (*R. microsperma*), Pancorbo & al. 2013: 181 (*R. calopus*), Peric & Baral 2019: .

1	Apothecia on Angiospermae.....	2
1'	Apothecia on Gymnospermae	20
2	On dicotyls	3
2'	On monocotyls	16
3	On wood	4
3'	On other substrates	7
4	Apothecia olivaceous brown to orange brown, cupulate to plane, disc 2-10 mm diam., stipe 2-14x1-2 mm; ectal excipulum textura globulosa; asci 110-150x9-12 µm, I+, ?croziers; spores narrowly ellipsoid, 15-20x5-6.5(8) µm, OCI 5, 0(1-3)-septate and producing ascoconidia; saprobic on stromatized patches on fallen twigs of <i>Alnus</i> , <i>Betula</i> , <i>Carpinus</i> , <i>Fagus</i> ; phen.: II-V, summer and autumn (BE/W, FR)	• Rutstroemia bolaris (Batsch) Rehm (1893) Ill.: Breitenbach & Kränzlin 1981: pl. 149.
4'	Ectal excipulum with elongated cells	5
5	Apothecia with short stout stipe, 4-8(-10) mm diam., hymenium ochraceous to dark chestnut-brown, base blackened; ectal excipulum of textura prismatica-porrecta; asci *117-165x(9-)10-11.5 µm, IKI+, with croziers; spores cylindric-suballantoid, *(9-)13-18(-20)x3-3.5(4) µm, 0(1-3)-septate, guttulate; saprobic on corticated twigs and branches of <i>Pinus</i> , <i>Salix</i> , <i>Tilia</i> and <i>Ulmus</i> ; phen.: I-XII (AT, BE/F, DE,DK, ES,GB,SE).....	• Rutstroemia tiliacea (Fr.) K. & L. Holm (1977) Ill.: Rubio & al. 2010: p. 219, Pärtel & Baral 2016: fig. 8.
5'	Spores ellipsoid	6
6	Apothecia medium brown to dark brown, shallowly cup-shaped, soon becoming plane, disc 4-12 mm diam., stipe 6-25 x 0.5-1.5 mm; ectal excipulum of non-gelatinized, large-celled textura prismatica; asci 125-160x9-12 µm, IKI blue, with croziers; spores narrowly ellipsoid, 12-19x3.5-6.5 µm, never multiguttulate 0(1-3)-septate and producing ascoconidia; on stromatized patches on decaying twigs of <i>Quercus petraea</i> , <i>Q. robur</i> ; phen.: IX-I (BE/F, DE, FR, UK)	• Rutstroemia firma (Pers.: Fr.) P. Karst. (1871)
6'	Apothecia plane, stipitate, disc 5 mm diam., reddish brown; ectal excipulum of gelatinized textura porrecta-obliqua; asci 200-215x 12.5-14.5 µm; spores ellipsoid, 16.5-22.5x7.5-9 µm, multiguttulate or with two large and many small guttules, OCI=5; saprobic on branches of <i>Alnus glutinosa</i> and <i>Corylus</i> in lowland; phen.: II-IV,X (BE/F)	• Rutstroemia alni L. Remy (1965) Ill.: Breitenbach & Kränzlin 1981: pl. 153 (sub <i>R. firma</i>).
6"	On branches of <i>Alnus viridis</i> . Phen.: (CH)	• Rutstroemia alnobetulae Dougloud (2015)
7	On leaves of deciduous trees	8
7'	On other substrates	14
8	Spores curved, loaf-shaped, reniform or allantoid	9
8'	Spores ellipsoid to ellipso-fusiform	10
9	Apothecia short-stipitate, solitary or two to three from stromatized areas of petiole and leaf nerves of its hosts, disc 1-3 mm diam., cupulate to plane, reddish brown, stipe 0.5-10x0.5-1 mm; asci 110-130x9-11 µm, with croziers; spores loaf-shaped, unicellular, *14-18x6.3-7.3 µm, †11.5-13.5 x 5-6.5 µm, OCI 5; saprobic on decaying leaves of <i>Castanea</i> , <i>Fagus</i> , <i>Quercus</i> spp.; phen.: VIII-XI	• Rutstroemia sydowiana (Rehm) W.L. White (1941) Ill.: Breitenbach & Kränzlin 1981: pl. 157.
9'	Apothecia long-stipitate, solitary or several from stromatized areas of petiole and leaf nerves of its hosts, disc 1-4 mm diam., medium brown, stipe 2-20x0.5-1 mm; asci 95-120x9-12 µm, with croziers; spores reniform-allantoid, 14-17x4 -6 µm, OCI 5, 0-3-septate, with hemispherical appendage at both ends; saprobic on decaying leaves of <i>Fagus</i> or <i>Quercus</i> ; phen.: VII-X	• Rutstroemia petiolorum (Roberge ex Desm.) W.L. White (1941) Ill.: Breitenbach & Kränzlin 1981: pl. 155.
10	Apothecia rather shallow cup-shaped, up to 5 mm in diam., stalked, hymenium brownish-ochraceous with weak orange reflexes, outside concolorous or slightly darker; spores ellipsoid, 4.5-5.8x2.5-2.8 µm, mostly with two guttules placed towards the extremities; saprobic on rotten stromatized leaves of <i>Salix</i> ; phen.: VIII	

- **Rutstroemia microsperma** (Speg.) Gamundi (1962)
 Ill.: Medardi 2007: fig. 1e-f.
- 10' Spores longer, OCI 5 11
- 11 Apothecia cup-shaped, 1-3 mm diam., yellow-brown with greenish tinge, stipitate; asci 150x10-12 µm, I+ strongly blue, with croziers; spores 12-16x5-7 µm, biguttulate, hyaline; ectal excipulum of textura prismatica; saprobic on black stromatized petioles of *Acer*, sometimes on *Aesculus*, *Tilia*; phen.: IX-XI (BE/F)
 • **Rutstroemia luteovirescens** (Roberge ex Desm.) W.L. White (1941)
 Ill. : Breitenbach & Kränzlin 1981: pl. 154.
- 11' Apothecia without greenish tinge 12
- 12 Apothecia 2-7 mm diam., margin smooth, ivory to pale ochraceous, stipitate; asci 95-115x8.5-10 µm, I+, with croziers; spores ellipsoid, †10-13.5x4-5.5 µm, with two large and many small guttules, OCI 4.5, with a mucous coating; on stromatized petioles and mid-veins of leaves of *Prunus serotina*, *Pyrus communis*, *Malus domestica*; phen.: IX-XI • **Rutstroemia pyri** Baral nom. prov.
 ?= *Rutstroemia pruni-serotinae* Whetzel & W.L. White (1941)
- 12' Apothecia cup-shaped, toothed margin, stipitate, hymenium ochraceous grey, receptacle dark brownish grey or rehydrated reddish brown; asci *115-145x13-13.5 µm, I+, with croziers; spores ellipso-fusoid, *14-17.5x6-7.5 µm (Dennis 1964: spores †11-13x5-6 µm); ectal excipulum with clavate free end cells 4.5-6 µm diam.; saprofitic on leaves of *Quercus ilex*, *Q. rotundifolia*; phen. : III-V, IX **Rutstroemia coracina** (Durieu & Lév.) Dennis (1964)
 Ill.: Spooner 1981: fig. 22.
- 13 Apothecia 1 mm diam., pale greenish brown to pale brown, stipitate, margin crenulate; asci 90-100x9.5-10.5 µm, I+, with croziers; spores (11)12-14(16)x4-5(5.5)µm; with two large and many small guttules, OCI 4-5; saprobic on stromatized petioles of *Filipendula ulmaria*, leaves of *Potentilla vulgaris*; phen.: V-VI(IX) (BE/W, CH)
 • **"Lanzia" ulmariae** L.G. Krieglst. & Baral (1986)
 Ill.: Krieglsteiner & Baral 1985: p. 201.
- 13' Spores forming ascoconidia 14
- 14 Apothecia 1-7(12) mm diam. shortly stalked, disc chestnut-brown, receptacle yellowish brown, ; asci 110-130x10-13 µm, I+, with croziers; spores allantoid, 16-24x5-6 µm, OCI 5, becoming 3-septate and budding globose ascoconidia at both ends; saprobic on cupules of *Castanea sativa* and *Quercus cerris*, *Quercus robur*; phen.: (VIII)IX-XI
 • **Rutstroemia echinophila** (Bull.) Höhn. (1917)
 Ill.: Boudier 1905-1910: pl. 481, Breitenbach & Kränzlin 1981: pl. 151.
- 14' Apothecia dark ochraceous yellow to pale brown, disc up to 4 mm diam., shortly stipitate; asci 93-116x8.2-10.3 µm, I+, with croziers; spores narrow ellipsoid, (12.5)15-18x5-7 µm, OCI 4, overmature spores 3-septate and budding subglobose conidia at both ends; saprobic on stromatized stems of *Rubus fruticosus*; phen.: I-XII
 • **Rutstroemia fruticeti** Rehm (1893) [1896]
 Ill.: Graddon 1979: fig. 4.
- 16 Apothecia 1-2.5 mm diam., ochraceous pink, stipitate; asci 40-50x4-4.5 µm, I+, without croziers; spores ellipsoid, 4.5-5.5x2-2.5 µm, OCI 0-1; saprobic on stromatized leaves of *Phragmites australis*, *Glyceria* and *Carex*; phen.: V-IX
 • **Rutstroemia lindaviana** (Kirschst.) Dennis (1960)
- 16' Spores longer 17
- 17 Apothecia cupulate to flat, up to 4 mm diam., with blackish stalk arising from stromatized areas of host tissues; asci *190-215x13-14.5 µm, IKI blue, without croziers but often with basal protuberance; spores (14)16-19(21)x5-7 µm, 0(1)-septate, with a cluster of small guttules at both poles, OCI 3-4; saprobic on Cyperaceae (*Carex* sp., *Eleocharis palustris*, *Eriophorum* spp., *Scirpus sylvaticus*), Juncaceae (*Juncus effusus*) and *Typha*; phen.: V-VII (BE/F, BE/W)
 • **Rutstroemia henningsiana** (Plött.) Dennis (1956)
- 17' Asci with croziers 18
- 18 Apothecia flat, arising from stromatized areas of host tissues demarcated by a black line, disc 1-6 mm diam., pale ochraceous brown, stipe 0.5-4x0.3-0.8 mm; asci 150-225x8-13 µm, I+, with croziers; spores ellipsoid, 12-21x5.5-7.5 µm, OCI 4, with mucous coating, overmature spores 3-septate and budding subglobose conidia; excipulum with crystals; saprobic on stalks and leaves of Poaceae; phen.: I-VI ... • **Rutstroemia calopus** (Fr.) Rehm (1893) [1896]
 Ill.: Breitenbach & Kränzlin 1981: pl. 156, Pancorbo & al. 2013: fig. 7.
- 18' Apothecia cup-shaped, about 1 mm diam., cinnamon, substipitate; asci 165x13 µm, I+, with croziers; spores ellipsoid, 14-17x5.5-7 µm, OCI 4, not forming ascoconidia; saprobic on leaves of *Ammophila arenaria*; phen.: IX-X, II-IV (NL, BE/F) ○ **Rutstroemia maritima** (Roberge ex Desm.) Dennis (1964)

- 20 Apothecia cupulate, stipitate, disc 0.3-0.8 mm diam., reddish brown; asci 70-115x7-8 μm , I+; spores allantoid, (10.5) 11.5-15.5x2.5-3(3.5) μm , (0)1(2)-septate, producing microconidia at one or both ends; saprobic on corticated branches of *Pinus halepensis*; phen.: (VI)X-XII **Rutstroemia allantospora** R. Galán, Honrubia & J.T. Palmer (1988)
 20' Asci broader; spores more than 4 μm broad 21
- 21 Apothecia cupulate to plane, short-stipitate, disc 0.5-2 mm diam., reddish brown, stipe 1-3x0.5-1 mm; asci 110-130x8-10 μm ; spores ellipsoid, uni- to tetra-cellular, 12-18x5-6(7.5) μm ; saprobic on branchlets and needles of *Juniperus communis*; phen.: VIII **Rutstroemia juniperi** K. Holm & L. Holm (1977)
 Ill.: Rubio & al. 2010: p. 263.
- 21' Apothecia cup-shaped, dark olivaceous brown to blackish, cartilaginous, short-stipitate, cup (disc) 2-6 mm diam., stipe 1-4x0.5-1 mm; asci 130-160x10-13 μm ; spores ellipsoid to allantoid, biguttulate, uni-bicellular, 12-19x4.5-6.5 μm ; saprobic on dead branches and needles of *Abies alba*, still attached or detached from the tree; phen.: X-V
 (●) **Rutstroemia elatina** (Alb. & Schw.: Fr.) Rehm (1896)
 Photo: Van Vooren 2009: 55 – Ill.: Breitenbach & Kränzlin 1981: pl. 152, Van Vooren 2009: 2.

Torrendiella Boud. & Torr. °

Type species: *Torrendiella ciliata* Boud.

Lit.: Graddon 1979: 183, Dennis 1978: 174, Johnston & Gamundi 2000: 493, Hairaud 2009: 19, Rubio & al. 2010: 265, Johnston et al. 2014: 6.

- 1 Apothecia shortly stipitate, diam. and height 1-1.5 mm, outside ochraceous, sparsely covered by brown setae; asci 115-130x12-14 μm , apical ring of *Sclerotinia*-type a and IKI+, base with appendix; spores reniform, 15.5-24x5.5-7.5 μm , 1-3-septate, with 2-3 large LB's; excipulum of gelatinized textura porrecta; saprobic on woody twigs (*Rubus*), leaves of *Quercus ilex* and *Rubus*; phen.: X-XI, V (BE/F) ● **Torrendiella ciliata** Boud. (1911) °
 Ill.: Graddon 1979: fig. 7, Hairaud 2009: p. 19, Rubio & al. 2010: p. 265, Johnston et al. 2016: fig. 4-6.

SCLEROTINIACEAE Whetzel ex Whetzel 1945

Lit.: Schumacher 1997, Jaklitsch et al. 2016: 160.

Sexual morph: Apothecia 0.5-20 mm in diam., opening in the prothymenial, rarely mesothymenial phase, cupulate to plane or pileate; exterior smooth, short- to very long-stalked, usually with a black-brown lower part of stipe emerging from a well-circumscribed, black sclerotium with or without internal remnants of host cells, or from mummified inflorescence parts, rarely from substratal stroma. Ectal excipulum of textura globulosa, rarely textura prismatica, non-gelatinous, sometimes covered by a smooth-walled hyphal cortical layer, with or without crystals. Paraphyses cylindrical, sometimes containing refractive, hyaline, chlorinaceous or vinaceous, globose or elongate VBs. Asci with rounded to subtruncate apex, amyloid ring of *Sclerotinia*-type, rarely inamyloid, with or sometimes without croziers. Ascospores (2)4-8 per ascus small- to large-sized, ellipsoid, rarely fusoid or allantoid, smooth, hyaline, rarely warted, lipid content low (to medium), 1-4-nucleate, often with sheath; overmature 1-3-septate and budding microconidia.

Asexual morph: hyphomycetous (but sporodochial/acervular in *Septotis*, pycnidial in *Acarosporium*); conidiogenesis holoblastic, conidia 0-septate (*Botrytis*, *Monilia*, *Ovulitis*, *Streptobotrys*, *Verrucobotrys*), didymo/phragmosporous (*Acarosporium*, *Septotis*), or multicellular bulbils (*Cristulariella*, *Haradamyces*, *Hinomyces*, *Valdensia*); microconidial synanamorph phialidic [myrioconium-like in most genera, *Rhacodiella* in *Ciboria calyculus* (Batsch) Hengstm.]; rarely sterile mycelial anamorph (*Mycopappus*).

Habitat: Parasitic on various mono- and dicots (herbaceous stems, leaves, flowers, fruits, seeds, rarely on wood or dung), desiccation-sensitive.

Genera belonging to this family:

1. *Amerosporium* Speg.
2. *Botrytis* P. Micheli ex Pers.
3. *Ciboria* Fuckel
4. *Ciborinia* Whetzel
5. *Coprotinia* Whetzel
6. *Cristulariella* Höhn.
7. *Dumontinia* L.M. Kohn
8. *Elliottinia* L.M. Kohn
9. *Grovesinia* M.N. Cline, J.L. Crane & S.D. Cline
10. *Haradamyces* Masuya et al.
11. *Kohninia* Holst-Jensen, Vrålstad & T. Schumach.
12. *Lambertellina* Korf & Lizoñ
13. *Martininia* Dumont & Korf
14. *Moellerodiscus* Henn.
15. *Monilinia* Honey
16. *Mycopappus* Redhead & G.P. White - syn.: *Redheadia* Y. Suto & Suyama
17. *Myriosclerotinia* N.F. Buchw.
18. *Ovulinia* Weiss
19. *Phaeosclerotinia* Hori
20. *Piceomphale* Svrček
21. *Pseudociboria* Kanouse
22. *Pycnopeziza* W.L. White & Whetzel
23. *Schroeteria* G. Winter
24. *Sclerencoelia* Pärtel & Baral
25. *Scleromitrua* S. Imai
26. *Sclerotinia* Fuckel
27. *Seaverinia* Whetzel
28. *Septotinia* Whetzel ex J.W. Groves & M.E. Elliott
29. *Streptotinia* Whetzel
30. *Stromatinia* Boud.
31. *Valdensinia* Peyronel

Key to the genera based on the type of substrate (host) and (macro)morphology:

- | | |
|--|-----------------------------------|
| 1 Ectal excipulum of textura prismatica | 3 |
| 1' Ectal excipulum at least p.p. textura globulosa-angularis | 8 |
| 3 Ectal excipulum gelatinous | 4 |
| 3' Ectal excipulum non-gelatinous | 5 |
| 4 Apothecial outer excipulum with a layer of prismatic, elongate cells (textura prismatica-porrecta) embedded in a gelatinous matrix | <i>Dumontinia</i> |

- 4' Apothecia short-stipitate, margin radially splitting in a stellate manner, hymenium pale yellowish-brown, outside brownish-black, associated with a macroconidial anamorph consisting of arthroconidia in chains (*Acarosporium*) borne in pycnidia; ascospores ellipsoid [Pycnopeziza](#)
- 5 Sclerotia donut-shaped, semi-immersed in remnants of male flowers of *Abies*; apothecia cupulate, stipitate; excipulum of textura prismatica [Elliottinia](#)
- 5' Sclerotia not donut-shaped; on other substrates 6
- 6 Stroma formed within stone and pome-fruits of the family Rosaceae; at margin also with textura globulosa; associated with a *Monilia* macroconidial anamorph [Monilinia](#)
- 6' Anamorph otherwise or wanting 7
- 7 On dung, rotting plant debris [Martininia](#)
- 7' Asci thick-walled, apical ring of *Hymenoscyphus*-type; spores with polar gel cap (to be excluded from Sclerotiniaceae fide Baral) [Dicephalospora](#)
- 7'' Apothecial outer excipulum of textura angularis-prismatica; on stromatized nerves of leaves of *Vaccinium* spp. [Valdensinia](#)
- 8 Ectal excipulum of textura globulosa; stromata without an obvious stromatal rind; macroconidial anamorph wanting; on stromatized fruits of *Betula* or *Alnus* and on stromatized, decaying catkins, rarely on wood [Ciboria](#)
- 8' Ectal excipulum of textura globulosa-angularis; mostly foliicolous [Moellerodiscus](#)
- 8'' Stroma with a determinate stromatal rind 9
- 9 Associated with a macroconidial anamorphic state 10
- 9' Macroconidial anamorphic state wanting 12
- 10 Stroma superficial to immersed sclerotia; associated with a macroconidial anamorph; necrotrophic on a variety of fruits, leaves, stems and roots [Botrytis](#)
- 10' Stroma formed within fruits of Ericaceae, Empetraceae and Pyrolaceae; *Monilia* anamorph with disjunctors, appearing on foliage 2-4 weeks after apothecial (teleomorphic) state [Franquinia](#)
- 10'' Stroma discoid sclerotia; apothecia long-stipitate; macroconidial anamorphic state of *Ovulitis* type; macroconidia borne on short conidiophores; on wilting flowers (petals) of *Rhododendron* and *Azalea* [Ovulinia](#)
- 12 Stroma an immersed sclerotium with pinkish medulla; cyperaceous and juncaceous [Myriosclerotinia](#)
- 12' Stroma a sclerotium, medulla of immature sclerotia white [Sclerotinia](#)
- 12'' Stroma discoid or crustlike; mainly on leaves of deciduous trees [Ciborinia](#)
- 12 Ectal excipulum a textura globulosa of thick-walled cells on outer part, hyaline cells on inner part, with crystals [Sclerencoelia](#)
- Grovesinia, Stromatinia**
- 1 Apothecia campanulate (verpoid, bell-shaped) [Scleromitruia](#)
(see also *Episclerotium* L. M. Kohn (Leotiaceae), Kohn & Nagasawa, 1984)
- 3' Apothecia dark olive-green, short-stipitate, cup discoid, many apothecia scattered on intact cones [Piceomphale](#)

Key to the genera based on the asexual morphs:

- 1 Chlamydo-spores (resting spores) under transmitted light bluish grey to pale yellowish or reddish brown, usually warted epispore. Spore formation thallic by fragmentation of a richly branched mycelium, from which the spores are formed by division of a "spore mother cell" which may be variously curved or spirally twisted. At maturity, the roundish chlamydo-spores often remain coherent as pairs (twin spores) or threes by showing strong constrictions between the individual spores. In contrast to the typical case, *Schroeteria poeltii* forms strongly curved chlamydo-spore chains of 2-7 cells by showing only moderate constrictions at their septa. Biotrophic plant parasites on different *Veronica* spp. [Schroeteria](#)

Botrytis P. Micheli ex Pers.

Syn.: *Amphobotrytis* Hennebert, teleom. *Botryotinia* Whetzel

Type species: *Botrytis cinerea* Pers.

Lit.: Gregory 1938: 201 (sub *Sclerotinia polyblastis*), Gregory 1941: 26, Seaver 1951: Dennis 1956: 154, Hennebert & Groves 1963: 341, Ellis 1971: 178, Morgan 1971: 327, Engel & Hanff 1987: 52 (*B. globosa*), Engel & Hanff 1990: 83, Holst-Jensen, Staats 2007: 1.

All *Botrytis* species are necrotrophic pathogens (i.e. actively killing plant cells and subsequently live on dead tissue). They can have a wide host range (*B. cinerea*, *B. pseudocinerea*) or are specialized on a single host species, e.g. *B. elliptica* on lily. The species are able to produce sclerotia on the surface of diseased hosts. Sclerotia are melanized structures that are important for the survival of *Botrytis* species. Sclerotia remain quiescent on plant debris and in soil

during the over-wintering phase. Early in the growth season, sclerotia can produce macroconidia, which function as a source of primary inoculum. No sexual stage has so far been found for several species (*Botrytis tulipae*, *B. hyacinthi*, *B. galanthina* and *B. croci*)

- | | | |
|----|--|----|
| 1 | On leaves of monocot plants | 2 |
| 1' | On leaves of dicot plants | 11 |
| 2 | On <i>Allium</i> sp. | 3 |
| 2 | On other substrates | 6 |
| 3 | Apothecia 3-5 mm diam., stipitate; sclerotia globose to ellipsoid, 0.5-3 mm diam., black; asci 78-90x10-13 µm; spores oval to citriform, 11-17x8-11 µm. Asexual morph: macroconidia 10-26x10-18 µm. On <i>Allium cepa</i> | 9 |
| | Botrytis squamosa J.C. Walker (1925)
Ill.: Ellis 1971: fig. 121C. | |
| 3' | Asci more than 150 µm long | 4 |
| 4 | Sclerotia plano-convex, deeply furrowed, variable in size, from 2-5 to 18 mm broad, up to 8 mm thick.; apothecia cupulate to plane, light brown, disc 3-12 mm diam., stipe 8-26x1-1.5 mm, apothecia one to four from a sclerotium; in outer leaf sheets of bulb neck of the host; asci 165-245x10.5-14 µm; spores ellipsoid, biguttulate, 12-24x6.5-10 µm. Asexual morph: macroconidia ovoid, 7-19x5-11 µm. On leaves of <i>Allium porrum</i> (BE) | 5 |
| | Botrytis porri N.F. Buchw. (1949) | |
| 4' | Macroconidia globose | 5 |
| 5 | Apothecia up to 7 mm diam., about 2 mm long stipe; sclerotia elongate, furrowed, up to 10 mm long; asci 175-200x 8.4-12 µm, 1+; spores narrow ellipsoid, mostly with pointed ends, 18-23.3x7-8.5 µm, with several small guttules at both poles, OCI 2. Asexual morph: macroconidia globose, 12-18 µm diam. On <i>Allium ursinum</i> ; phen.: IV-V | 6 |
| | o Botrytis globosa A. Raabe (1938)
Ill.: Ellis 1971: fig. 121D, Engel & Hanff 1987: p. 52. | |
| 5' | Sexual morph: Apothecia one or arising from a sclerotium, cup-shaped, becoming discoid, 1-1.5 mm diam., warm sepia, stipe 1.5-33 mm long; asci 240x14-15 µm; spores naviculate, 17-26x8-12 µm, with one or more guttules. Asexual morph: macroconidia globose, 20-28 µm diam. On <i>Allium triquetrum</i> . Phen.: XII-I (UK) | 6 |
| | Botrytis sphaerosperma (P.H. Greg.) N.F. Buchw. (1949) | |
| 6 | No sexual morph known | 7 |
| 6' | Sexual morph known | 8 |
| 7 | Colonies grey to greyish brown, effuse. Sclerotia black, 1-2 mm diam. Conidiophores up to 1.5 mm long, 16-30 µm thick, lower part brown, upperpart hyaline. Conidia, 10-20x8-11 µm, smooth, hyaline to pale brown. On flowers, shoots, young leaves and bulbs of <i>Galanthus</i> (NL) | 7 |
| | Botrytis galanthina (Berk. & Broome) Sacc. (1886)
Ill.: Ellis & Ellis 1985: fig. 150A. | |
| 7a | On leaves of <i>Crocus</i> (NL) | 7 |
| | Botrytis croci Cooke & Massee (1887) | |
| 7b | Macroconidia 16-20x10-13 µm. On leaves, stems and flowers of cultivated <i>Tulipa</i> (BE/W, GB) | 7 |
| | Botrytis tulipae (Lib.) Lind (1913)
Ill.: Ellis & Ellis 1985: fig. 1697. | |
| 7c | On leaves of <i>Hyacinthus</i> (NL) | 7 |
| | Botrytis hyacinthi Westend. & J.F.H. Beyma (1928) | |
| 7d | On leaves of <i>Convallaria majalis</i> | 7 |
| | Botrytis convallariae (Kleb.) Ondřej ex Boerema & Hamers (1988) | |
| 7e | Sexual morph only known in vitro. Asexual morph: Macroconidia ellipsoid, 16-35x10-24 µm. On leaves and flower shoots of <i>Lilium</i> (GB, NL) | 7 |
| | Botrytis elliptica (Berk.) Cooke (1901) | |
| 8 | Apothecia 2-5 mm diam., stipe 1.5-5 mm long or more; sclerotia about globose, 1-1.5 mm diam., black; asci 120-140x8 µm; spores ellipsoid-fusiform, mostly inequilateral, 10-20x5-9 µm. Asexual morph: macroconidia 8-16x7.5-12 µm, pale brown. On leaves and bulbs of <i>Narcissus pseudonarcissus</i> , <i>N. poeticus</i> ; phen.: I-III (GB) | 8 |
| | Botrytis narcissicola Kleb. (1906) | |
| 8' | Asci longer | 9 |
| 9 | Apothecia 3-4 mm diam., stipe 3-8 mm long; sclerotia elongate, up to 8 mm long; asci 150-170x7-10 µm; spores ellipsoid, 14-20x7-10 µm, biguttulate. Asexual morph: macroconidia globose, 30-50 µm diam. On flowers (brown spots) and leaves (yellow leaf-blotch) of <i>Narcissus spp.</i> Phen.: I-IV (GB) | 9 |
| | Botrytis polyblastis Dowson (1926)
Ill.: Dennis 1956: fig. 143. | |
| 9' | Spores maximum 8.5 µm long | 10 |
| 10 | Sexual, morph: Apothecia shallow cupulate to plane, pale brown to cinnamon, disc 2.5-4.5 mm diam., stipe 2-8x0.5-1 mm; sclerotia lenticular to loaf-shaped, convoluted, 1-10 x 0.5-3 mm; asci 150-190x9-13 µm; spores ellipsoid, eguttulate, 11.5-18 x 5-8.5 µm. ; anamorph <i>Botrytis convoluta</i> erect, fasciculate, ca. 1-1.5 mm tall, | |

- pinkish, on decaying leaves of its host, macroconidia light brown, ovate to slightly pyriform, 7-18 x 5-13 µm; on leaves of *Iris pseudacorus*; phen.: early summer. • **Botrytis convoluta** Whetzel & Drayton (19325)
- 10' Apothecia disc 2.5-5 mm diam., stipe 10-13 mm long; sclerotia lenticular, 8-12x3-7 mm, black; asci 140-190x7.5-10 µm; spores ellipsoid to subfusiform, 12-17x6-8 µm, biguttulate; anamorph with macroconidia 8-16x5-7.5 µm; on stems of cultivated *Gladiolus spp.* (NL) **Botrytis gladiolorum** Timmerm. (1941)
- 11 On host plants of the family Ranunculaceae 12
- 11' On host plants of other dicot families 15
- 12 Apothecia one to five from a sclerotium, cup-shaped to plane, medium brown to dark brown, short-stipitate, disc 3-8 mm diam., stipe 2-10x0.5-1.5 mm; sclerotia elongate, 0.5-25 mm long, 0.3-0.8 mm broad, ca. 1-3 mm thick; macroconidial anamorphic state from sclerotia in high summer. Conidiophores erect, fasciculate, whitish, ca. 1-2 mm tall, macroconidia ovoid, 8-15 x 6-9 µm; on stems and leaf petioles of *Aconitum septentrionale*; phen.: high summer "Botryotinia" **aconitincola** (Rehm) T. Schumacher & Holst-Jensen ined.
- 12' On *Ranunculus*, *Caltha* or *Ficaria* 13
- 13 Apothecia 2-10 mm diam.; asci (100)110-125(176)x(7)8-9 µm; spores 13-19.5x3.6-6.6(8) µm, OCI 1-2, tetranucleate. Asexual morph: Macroconidia cf. *B. cinerea*, (7)11-15(17)x(5.5)6-10(11.5) µm. On overwintered sclerotia in decayed stems and petioles of *Ranunculus septentrionalis*, *R. raconitifolius*. Phen.: V-VI (BE/F) ○ **Botrytis ranunculi** Hennebert (1973)
 Ill.: Hennebert & Groves 1963: fig. 3 & 5, Breitenbach & Kränzlin 1981: pl. 159.
- 13' Asci in average longer than 125 µm; spores in average more than 5.5 µm wide 14
- 14 Sclerotia pyramidal, elongate, striate, 3-18x2-10x0.5-2 mm. Apothecia produced in late spring and summer, one to four from a sclerotium, shallowly cupulate to plane, light brown, disc 1-4 mm diam., stipe 2-20x0.5-1.5 mm; asci 110-170x8-11 µm; spores eguttulate, 11-16.5x5-8.8 µm, tetranucleate. Asexual morph: Conidiophores erect, fasciculate, about 1-2 mm tall. Macroconidia ovoid, 8-16.5x6-9 µm, light brown. On withered petioles and leaf nerves of *Caltha palustris* in swampy places. Phen.: III-VI • **Botrytis calthae** Hennebert (1973)
 Ill.: Hennebert & Groves 1963: fig. 1-2, Breitenbach & Kränzlin 1981: pl. 158.
- 14' Sclerotia slender, striate, 3-12x3-10x0.5-1.5 mm. Apothecia one to three from a sclerotium, funnel-shaped to plane or slightly recurved, pale brown, disc 2-5 mm diam., stipe 1-25x0.3-1 mm; asci 125-175 x 7-11 µm; spores 10.5-17.5x4.5-7.5 µm, tetranucleate. Asexual morph on withered leaves, conidiophores in groups of two to three, 0.3-2 mm high, macroconidia ovoid to pyriform, 8.8-18x4.5-9.5 µm. On deeply decayed leaves of *Ficaria verna*. Phen.: III-V ○ **Botrytis ficariarum** Hennebert (1973)
 Ill.: Hennebert & Groves 1963: fig. 4-6.
- 15 Sexual morph unknown 16
- 15' Sexual morph known 17
- 16 Asexual morph: Conidia (14)15-25(29)x(11)13-16(20) µm. On leaves, pods and stems of Fabaceae (*Vicia faba*, *Trifolium*, *Lens culinaris*). Phen.: VIII (ES, NL, GB) **Botrytis fabae** Sardiña (1929)
 Ill.: Ellis 1971: fig. 121G.
- 16 Asexual morph: Conidiophores erect, 500-1000x10-15 µm, branched towards the apex. Conidia mostly ovoid, 6-21x5-13 µm. Causing blossom-blight on *Prunus salicina*, *Vitis vinifera*. (ES) **Botrytis prunorum** E.E. Ferrada & Latorre (2015)
- 16" Conidiophores often swollen at the base. Macroconidia 10-22x7-11 µm. On leaves of *Paeonia* and causing wilt of young shoots in spring. **Botrytis paeoniae** Oudem. (1897)
 Ill.: Ellis 1971: fig. 121E.
- 17 Sexual morph: Apothecia one to four from the sclerotium, shallow cupulate to plane, light brown, disc 1-4 mm diam., stipe 5-15 x 0.5-1.5 mm; sclerotia hemispherical to pyramidal, 2-7 mm broad, 1.5-2 mm thick; asci 120-160 x 7-10 µm; spores narrowly ellipsoid to allantoid, 14-19x6-8 µm. Asexual morph: Macroconidia ovoid, 8.5-16x5-11.5 µm. On leaves of *Pelargonium spp.* (in greenhouse). Phen.: spring **Botrytis pelargonii** Røed (1949)
- 17' Spores smaller; on other substrates 18
- 18 Sexual morph: Sclerotia lenticular, 2-7 mm diam., 1-3 mm thick. Apothecia one to several from the sclerotium, shallow cupulate to plane, pale brown, disc 1.5-7 mm diam., stipe 3-15x0.5-1 mm; asci 100-150x7-12 µm; spores 8-12x4-6 µm, OCI 2-2.5, 1(2)-nucleate. Asexual morph: Conidiophores erect, 1-2 mm tall. Macroconidia 6.5-16x(5)6-10 (12) µm ovoid, hyaline to pale brown. On herbaceous debris of various dicot plants (*Begonia*, *Cucurbita*, *Nerium oleander*, *Ranunculus*, *Solanum lycopersicum*, *Vitis*), commonly on Rosaceae (*Fragaria*, *Prunus cuscica*, *Pyrus*, *Rosa*, *Malus*). Phen.: teleomorph: spring, anamorph: VII-XI (BE/F, DE, FR) . • **Botrytis cinerea** Pers. (1794)
- 18' Sexual morph: Apothecia cupulate and stalked, dark reddish brown, cup infundibuliform up to 3.5 mm diam., stipe flexuous, same color, up to 15mm long, arising from black sclerotia. Asci cylindrical, 8-spored, 150 µm long. Ascospores ovoid, hyaline, 12-16x4.5-5.5 µm. Asexual morph: Conidiophores 1-2 mm tall, with branched apical

part, pale brown. Conidia 7-20.5x6-12 µm. Pathogen on a broad host range (*Brassica napus*, *Cannabis sativa*, *Fragaria*, *Lactuca sativa*, *Malus*, *Paeonia*, *Prunus avium*, *P. domestica*, *Punica granatum*, *Ribes rubrum*, *Rubus fruticosus*, *R. idaeus*, *Vaccinium*, *Vitis*). Phen.: IIII-IV, VII-X (BE/F, DE, ES, FR) • **Botrytis pseudocinerea** A.-S. Walker et al. (2)

Ciboria Fuckel

Type species: *Ciboria caucis* (Reb.:Fr.) Fuckel.

Lit.: Anderson 1996: 155 (sub *C. alni*), Holst-Jensen & al. (1997b), Galan & Palmer 2001: 277 (*C. aestivalis*), Mertens 2008: 5 (*C. rufosusca*).

Ciboria is a heterogeneous assemblage of species characterized by ± determinate stromata, an apothecial outer excipulum consisting of globose cells (textura globulosa) NOT embedded in a gelatinous matrix, and hyaline, unicellular ascospores. The genus is probably polyphyletic. The species on catkins of amentiferous trees constitute a monophyletic group. Based on scientific evidence and educated guess we distinguish five groups within the genus, the true *Ciboria* (on catkins), the warted-spored *Ciboria*, which are presumably obligate parasites and produce apothecia on fruits of amentiferous trees, the deciduous leaf inhabitants, forming a ± well differentiated stroma on leaves of deciduous trees, the herbaceous plant inhabitants, nutritioning on plant remnants of various kind (for groups three and four, see also *Rutstroemia*), and a fifth group of uncommon features, consisting of presumably unrelated taxa classified on the basis of stromatal type.

- 1 Apothecia on catkins of amentiferous trees and shrubs 2
- 1' Apothecia on fruits, inflorescences or leaves 6
- 2 Apothecia ochraceous brown to pale brown, disc 1-4 mm diam., stipe 5-25 x 0.2-0.4 mm; asci 4-spored, clavate, 60-105x5.8-7.5 µm; spores (7.5)10-12(14.5)x4-5.5 µm, binucleate, OCI 1; on male catkins of *Alnus viridis*, *Myrica gale*, *Salix* spp. and *Populus* spp., occasionally on leaves of *Acer* spp., *Salix* spp. and *Rubus chamaemorus*; phen.: spring and early summer (V) ○ **Ciboria acerina** Whetzel & N. F. Buchw. Ex J.W. Groves & M.E. Elliott (1961)
Photo: Van Vooren 2009: 55 – Ill.: Van Vooren 2009: fig.1.
- 2' Asci 8-spored 3
- 3 Apothecia pale brown, disc 3-11 mm diam., stipe 5-35x0.3-1 mm; asci 130-170x7-11 µm; spores subfusoid, 9-15.5 x6-8 µm, binucleate, OCI 2-3; on male catkins of *Corylus avellana*; phen.: III ○ **Ciboria coryli** (Schellenb.) N.F. Buchw. (1943)
- 3' Ascospores < 13 µm long 4
- 4 Apothecia, pale to medium brown, disc 3-10 mm diam., stipe 5-30x0.3-1 mm; asci cylindric-clavate, 75-145x6-10 µm; spores ellipsoid, 5.5-9.5x3-5.5 µm; saprobic on male catkins of *Betula*; phen.: spring **Ciboria betulicola** J.W. Groves & M.E. Elliott (1961)
- 4' Apothecia on other hosts; spores with loosening sheath after ejection 5
- 5 Apothecia pale brown to medium brown, disc 4-15 mm diam., stipe 5-25x0.3-1.7 mm; asci 95-165 x6-10 µm, IKI+, with croziers; spores ellipsoid, (7.5-)9-13x5-6 µm, uninucleate, OCI 1-2; on catkins of *Populus*, *Salix*; phen.: spring • **Ciboria caucis** (Rebent.: Fr.) Fuckel (1870)
- 5' Apothecia ochraceous brown to pale brown, disc 4-12 mm diam., stipe flexuous, 10-35x0.3-1 mm; asci 110-150x9-10.5 µm, IKI+, with croziers; spores ovoid, (7.5-)9-10.5x4.2-6 µm, uninucleate, OCI 1; saprobic on catkins of *Alnus* and *Corylus*; phen.: II-III • **Ciboria amentaceae** (Balbis) Fuckel (1870)
- 6 Apothecia dark brown to medium brown, disc 3-15 mm diam., stipe 2-7x0.7-1.5 mm; asci 65-90x5.5-6.5 µm, I+, with croziers; spores 5-8x2.8-3.5 µm, OCI 1; saprobic on decaying cone scales of *Abies*, rarely on cone scales of *Picea* and *Pseudotsuga*; phen.: III-VI (BE/W) ○ **Ciboria rufosusca** (O. Weberb.) Sacc. (1889)
Ill.: Breitenbach & Kränzlin 1981: pl. 140.
- 6' Apothecia on fruits, bulbils, acorns or leaves 7
- 7 Apothecia on stromatized fruits or female floral organs 8
- 7' Apothecia on leaves 15
- 8 Apothecia on stromatized patches of fruits (carpels) of *Alnus* or *Betula*; very slow growing on PDA (potato dextrose agar), mass ascospore isolates reaching a diameter of 10-20 mm after 6-12 months 9
- 8' Apothecia on fruits or floral organs of other hosts 10
- 9 Apothecia pale brown, disc 1.5-3 mm diam., stipe 1-10 x 0.5-1 mm; asci 90-125x5.5-7.5 µm, I+, without croziers; spores narrowly ellipsoid, with pointed ends, 12-18x3-4.5 µm, uninucleate, OCI 1-2, uninucleate, minutely verrucose; on fruits (carpels) of *Alnus*; phen.: II-III **Ciboria lentiformis** (Velen.) T. Schumach. (19??)
- 9' Apothecia pale brown, disc 1.5-3 mm diam., stipe 4-14x0.5-1 mm; asci 110-160x6-8 µm; spores narrowly ellipsoid, 9.5-15x4-5.5 µm, biguttulate, minutely verrucose; on fruits (carpels) of *Betula*; phen.: late spring 9

- • **Ciboria betulae** (Woronin) W.L. White (1941)
- 10 Apothecia yellowish to olivaceous brown, disc 1-3 mm diam., stipe 2-25 x 0.7-1.5 mm; asci 110-140x7-10 µm; spores ellipsoid, 7.8-10.6x4.2-5.5 µm, OCI 0.5; on female inflorescences of *Alnus*; phen.: X-XI • **Ciboria viridifusca** (Fuckel) Höhn. (1926) = "*Ciboria amenticola* (P. Karst.) Boud.
- 10' Apothecia on other substrates 11
- 11 Spores up to 4.5 µm wide 12
- 11' Spores wider 13
- 12 Apothecia 1-5 mm diam., stipitate, pale orange to grey red; asci 68-92x5-9 µm, ?without croziers; spores (5.5)7.5-11(12)x2-3.5(4) µm, OCI 1; on sclerotised pomaceous (*Cydonia oblonga*, *Malus domestica*) and stone fruit, branches of *Rubus ulmifolius*; phen.: I-XII (ES) **Ciboria aestivalis** (Pollock) Whetzel (1935)
- 12' Apothecia 1-4(6) mm diam.; asci 90-120x8-10.5 µm, I+, with croziers; spores 8-12x3.7-4.5 µm, uninucleate, OCI 0; on fruits and involucre of *Castanea sativa*; phen.: IX-XI **Ciboria americana** E.J. Durand (1902)
- 13 Apothecia (1)2-4 mm diam., stipitate; ascospores mainly *12.5-16.5x6-7.5 µm, with several LBs of 0.5-0.8 µm diam. grouped near each end, (2)4-nucleate; living paraphyses containing ± refractive vacuolar bodies (VBs) in terminal cell; on fallen, heavily stromatized, previous year's seeds of *Veronica hederifolia*, climate temperate humid; phen.: IV-V (DE) **Ciboria ploettneriana** (Kirschst.) N.F. Buchw. (1949)
- 13 Apothecia 6-8 mm diam., stipitate; asci 125-150x6.5-9 µm, I+, with croziers; spores 8.5-9.5x4.7-5.7 µm, binucleate, OCI 0-1; on fruits of *Castanea sativa*; phen.: IX **Ciboria** sp.
- 13' Apothecia pale to medium brown, disc 0.5-2.5 mm diam., stipe 1-12x0.3-0.6 mm; asci 150-180x10-12 µm; spores 13-17x5.5-7 µm, biguttulate; on stromatized bulbils of *Polygonum viviparum*; phen.: VII-VIII **Ciboria polygoni-vivipari** Eckblad (1961)
- 15 Apothecia on leaves of deciduous trees 16
- 15' Apothecia on plant remnants of *Rubus chamaemorus* 17
- 16 Apothecia dark to medium pale brown, disc 0.5-3 mm diam., stipe 0.5-7x0.3-0.6 mm; asci 65-95x6-8 µm, without croziers; spores 6.5-10x4.2-5.5 µm, binucleate, OCI 1; from stromatized patches on decaying leaves of *Alnus*, more exceptionally *Betula* and *Populus*; phen.: IV-VI(X) • **Ciboria conformata** (P. Karst.) Svrček (1982)
- 16' Asci IKI+, with croziers; spores ciborioid, 9.5-13(-14)x(4.5-)5-6 µm, uninucleate, with soon loosening sheath, OCI 0; saprobic on strongly sclerotised main veins of *Alnus* leaves; phen.: V **Ciboria** sp. (BD 02/019)
- 16" Asci IKI+, with croziers; spores 8-11x4-4.5 µm, binucleate; saprobic on twigs of *Salix* spp. **Ciboria** sp. (BD 89/049?, BD 90/032?, BD 00/024?)
- 17 Apothecia reddish brown to pale brown, disc 4-7 mm diam., stipe rather thick, 10-38x0.7-2.1 mm; asci 80-120x5.5-7 µm; spores 9-13.5x5-6 µm, biguttulate; from stromatized patches on leaves and stem of *Rubus chamaemorus*; phen.: spring and early summer **Ciboria latipes** Holst-Jensen & T. Schumach. (1994)
- 17' Apothecia medium brown to dark brown, disc 0.5-3 mm diam., cupulate to plane, stipe slender 1-15x0.2-0.8 mm; asci 90-120x9-11.5 µm; spores ellipsoid, 11.5-15.5x5-6 µm, biguttulate; on stromatized leaf veins and petioles of *Rubus chamaemorus*; phen.: early summer "**Rutstroemia**" **chamaemori** L. Holm & K. Holm (1977)

Ciborinia Whetzel

Type species: *Ciborinia bifrons* (Whetzel) Whetzel

Lit.: Groves & Bowerman 1955: 577, Dennis 1956: 150 (sub *Sclerotinia hirtella*), Batra 1960: 819, Baral & Kriegelsteiner 1985: 16, Lindemann 2011: 63 (sub *Sclerotinia capillipes*).

- 1 Asci (2)4(8)-spored; apothecia cupulate, 2-3.5 mm diam., stipe 10-30x0.2-0.7 mm; asci 75-85x6-7 µm, I+, weakly blue in IKI, with croziers; spores 8-10.5x3.5-4(4.5) µm and binucleate in 4-spored asci, 7.5-10.5x3-3.5 µm and uninucleate in 8-spored asci; on sclerotia on leaf nerves of *Alnus glutinosa*, *Betula* and *Quercus*; phen.: (IV)V-VI(VII) • "**Sclerotinia**" **capillipes** (Quél.) Sacc. (1889)
- 1' Asci always 8-spored 2
- 2 Apothecia stipitate-cupulate to applanate to slightly curved, 1-4 mm diam., pale greyish brown to yellowish brown, stalk 5-25x0.2-0.5 mm; asci 68-80x6-8 µm, I+, with croziers; spores ellipsoid to slightly inequilateral, 6-8x3-4.5 µm, OCI 0, uninucleate; arising from small, lenticular stromata on petioles and leaf nerves of *Quercus* species and *Castanea sativa*; phen.: IV-IX • **Ciborinia candolleana** (Lév.) Whetzel (1945)
- 2' Spores in average more than 8 µm long 3

- 3 Apothecia 1-3.5 mm diam., pale ochraceous, stipe 2-10x0.2-0.5 mm, receptacle and stipe covered by hairs; asci 88-100x7.5-8.5 μm , I+, with croziers; spores *8.5-10.5x4.5-5.5 μm , †(6)7-9(10)x 4-4.5(5) μm , with few minute guttules, OCI 1-2, uninucleate. Arising from flattened sclerotia on *Picea* cone, *Pinus* catkin, *Fagus* cupule, *Myrica* catkins phen.: IV-V ○ **Ciborinia bresadolae** (Rick) J.T. Palmer (1992)
 Ill.: Boudier 1905-1910: pl. 471 (sub *S. hirtella*).
- 3' Apothecia 1-3 mm diam, stipe 4-12 mm long; asci 110-150x7-9(10.5) μm , I+ pore of *Sclerotinia*-type; spores ellipsoid to ovoid, (7.5)9-13.5x4.5-6 μm , OCI 1, binucleate. Arising from sclerotia on leaves of *Populus*; phen.: VII ..
 ● **Ciborinia pseudobifrons** Whetzel ex J.W. Groves & Bowerman (1955)

Dumontinia L.M. Kohn

Type species: *Dumontinia tuberosa* (Bull.) L.M. Kohn

Lit.: Kohn 1979: 432, Baral (unpublished key).

- 1 Apothecia cupulate, 10-30 mm diam., cinnamon to dark umber, tapering stipe 20-100x1-2 mm, stipe base hairy; asci 120-175x7-10 μm , strongly I+, with croziers; spores 11-16x5-8 μm , biguttulate, tetranucleate; ectal excipulum of textura prismatica; parasitic on rhizomes of *Anemone*; phen.: III-IV
 ● **Dumontinia tuberosa** (Bull.) L.M. Kohn (1979)
 Ill.: Kohn 1979: fig. 10.

Elliottinia L.M. Kohn

Type species: *Elliottinia kernerii* (Wettst.) Kohn

Lit.: Kohn 1979: 415, Van Vooren & al. 2009: 9.

- 1 Apothecia cupuliform, shortly stipitate, 3-5 mm diam., hymenium ochraceous brown, margin and outer surface slightly paler, margin with adpressed hairs; asci aporhynch, apical ring reddening in IKI; spores ellipsoid to amygdaliform, smooth, hyaline, (21)27-32x(15)16-18 μm ; paraphyses with slightly enlarged end cell with brown-yellow content and amorphous coating; excipulum of textura prismatica, brown-yellow; originating from black donut-shaped sclerotia immersed in the remnants of male flowerings; saprobic on recently cut branches of *Abies alba*, *Abies balsamea*, *Abies cephalonica*, *Abies grandis*; phen.: III-V ● **Elliottinia kernerii** (Wettst.) Kohn (1979)
 Ill.: Van Vooren & al. 2009: fig. 1-3.

Grovesinia M.N. Cline, J.L. Crane & S.D. Cline

Type species:

Lit.:

Grovesinia pyramidalis

Kohninia Holst-Jensen, Vrålstad & T. Schumach.

Type species: *Kohninia linnaeicola* Holst-Jensen, Vrålstad & T. Schumach.

Lit.: Holst-Jensen & al. 2004: 135.

- 1 Apothecia cupulate to applanate, 0.3-6 mm diam., sessile to shortly stalked; ectal excipulum of hyaline textura globulosa-angularis, with brown clavate surface cells; asci cylindric-clavate, four-spored, 60-75x4-7 μm ; spores ellipsoid, inequipolar and constricted at the middle (isthmoid), tetranucleate, biguttulate, 7-9.5x2.5-4.5 μm ; arising from sclerotia on stems, leaf laminas and petioles of *Linnaea borealis*; phen.: V
 ● **Kohninia linnaeicola** Holst-Jensen, Vrålstad & T. Schumach. (2004)

Martinia Dumont & Korf

Type species: *Martinia panamaensis* Dumont & Korf

Syn.: *Martinia* Whetzel.

Lit.: Dennis 1964: 116, Dumont 1973: 175.

- 1 Apothecia cupulate, 1-3 mm diam., pale olivaceous, with long reddish brown stipe arising from subglobose black sclerotia 2-3 mm across embedded in the substrate; asci 30-48x4-5 μm , I-, with croziers; spores ellipsoid, 4-5x2-3 μm , yellow brown to olivaceous brown, with few guttules; saprobic on horse dung, rotten bark, wood and plant debris; phen.: VII-XI (FR) ● **Martinia panamaensis** Dumont & Korf (1970)
 Ill.: Dennis 1964: fig. 5, Dumont 1973: fig. 1-3.

Moellerodiscus Henn.

Type species: *Moellerodiscus brockesiae* Henn.

Syn.: *Ciboriopsis* Dennis

Lit.: Dennis 1962b: 319 (sub *C. bramley*), Svrček 1975: 131 (sub *C. gemmiger*), Dumont 1976: 233, Engel & Hanff 1987: 63 (*M. lentus*), Beyer 1994: 207 (*M. tenuistipes*).

- 1 Apothecia with flat disc, 1-1.5 mm diam., long-stipitate, pale ochraceous; asci 80-95x6.5-8.5 µm, I+; spores ovoid to inequatorial fusiform, 10-12x4-6 µm, eguttulate, hyaline; saprobic on buds of *Carpinus betulus*; phen.: V
..... **"Ciboriopsis" gemmiger** Svrček (1975)
..... Ill.: Svrček 1975: fig. 1.
- 1' Spores shorter than 10 µm 2
- 2 Apothecia 1.25-2 mm diam., reddish brown, with short blackish stipe; asci 36-43x3 µm, hemiamyloid (I+ after pretreatment with 10% KOH), with croziers; spores narrow ellipsoid, 4-6(6.5)x1.5 µm; saprobic on both sides of leaves of *Hedera helix*; phen.: IV **Moellerodiscus heder**ae Korf & L.M. Kohn (1982)
- 2' Asci amyloid 3
- 3 Apothecia with plano-convex disc, 0.7-0.8 mm diam., long-stipitate, yellowish; ectal excipulum of textura globolosa-angularis with projecting end cells 5-15x2-4 µm; asci 45-55x5-6µm, I+, with croziers; spores narrow ellipsoid, 6-8(10)x2-3 µm, eguttulate, hyaline; saprobic on stems and leaves of *Chamerion angustifolium*, *Filipendula ulmaria*, *Lysimachia vulgaris*, *Potentilla palustris*, *Rubus fruticosus*; phen.: VI-IX
..... • **Moellerodiscus tenuistipes** (J. Schröt.) Dumont (1976)
..... Ill.: Dennis 1962b: fig. 2, Dumont 1976: fig. 10-12.
- 3' Apothecia 1-2(3) mm diam., stipe 1-5(10)x0.15-0.2 mm, ochraceous, yellowish to bright brown; ectal excipulum of textura globolosa-angularis without projecting end cells; asci 35-76x4-5(6) µm, I+, with croziers; spores (4)5-7(9)x2.5-3.2 µm, eguttulate; saprobic on leaves of *Acer*, *Hedera*, *Laurus*, *Populus*.; phen.: (I-IV)V-VIII
..... **Moellerodiscus lentus** (Berk. & Broome) Dumont (1976)
..... Ill.: Dumont 1976: fig. 6-7.

May belong here:

- 1 Apothecia apricot, fully reddish-brown when dry, shortly stalked. Asci 2-spored, *57-62x7 µm, ring of *Sclerotinia*-type and IKI+. Spores elongated ellipsoid, *14-15x5.5-6 µm, non-septate. Saprobic on very wet leaves of *Alnus*, *Salix* and *Betula*. Phen.: V-VIII (FI, NO, SE).....
..... **"Hymenoscyphus" kermesinus** (Fr.) Arendh. (1979)
..... Ill.: Dennis 1956: fig. 161 (sub *Pezizella geminella* Nyl.)

Monilinia Honey

Syn.: *Monilia* Bonord.

Type species: *Molininia fructicola* (G. Winter) Honey

Lit.: Dennis 1978: ; Buchwald 1979: 287, Batra 1983: 131, [Batra 1991](#), Baral & Krieglsteiner 1985: 22, Hansen & Knudsen 2000: 170, Munda 2011: 99, Moral & al. 2011: (*M. linhartiana*)1, Halarewicz & al. 2013: 95 (*M. seaverii*).

- 1 On Rosaceae 2
- 1' On Ericales; macroconidia separated by disjunctors; apothecia cupulate to discoid, 3-12 mm diam., stipitate 8
- 2 Macroconidia not separated by disjunctors 3
- 2' Macroconidia separated by disjunctors 5
- 3 Sexual morph: Apothecia 3-10 mm diam., brown to grey-brown, with long stipe; asci 120-184x9-12 µm; spores ellipsoid with pointed ends, 9-13.5x5-7 µm. Asexual morph: Macroconidial anamorph of buff pustules, 2-5 mm diam., usually in concentric rings on decaying fruits; macroconidia ovoid to limoniform, 12-34x9-13 µm, buff; pathogen on fruits of Rosaceae, mainly *Malus* and *Pyrus* but also on *Cydonia*, *Fragaria*, *Prunus*, *Rubus*, *Sorbus*, *Vaccinium*, *Vitis*; phen.: V-X • **Monilinia frutigena** Honey (1945)
..... Ill.: Ellis & Ellis 1985: fig. 713 (anamorph).
- 3' Spores with rounded ends; conidia infecting blossoms and twigs in addition to fruits 4
- 4 Sexual morph: Apothecia cupulate to discoid, 2-14 mm diam., stipitate, brown; spores ellipsoid to oval, 8.3-11.6x4.5-7 µm, binucleate. Asexual morph: Macroconidia 14.5-16x9.5-11 µm; mainly on fruits of *Prunus* spp., also on *Cydonia*, *Malus* spp. and *Pyrus* spp.; phen.: ? **Monilinia fruticola** (G. Winter) Honey (1928)
- 4' Sexual morph: Apothecia 2.5-8 mm diam., with long stipe; asci 120-190x7-12 µm; spores ovoid-ellipsoid, with rounded ends, 11.5-13.5x4.5-8.5 µm, guttulate. Asexual morph: Macroconidial state of soft grey pustules, 1-2 mm diam.; macroconidia ovoid to limoniform, 8-23x7-16 µm, hyaline; on fruits of *Prunus avium*, *P. armeniaca*, *P. cerasus*, *P. domestica*, *P. persica*, also on *Malus* spp. and *Pyrus* spp.; phen.: VII(a)
..... ○ **Monilinia laxa** (Aderh. & Ruhland) Honey (1945)

It is difficult to differentiate *Monilinia fructigena* from the other two widespread brown rot fungi, *M. fructicola* and *M. laxa*, by its morphological characteristics (Batra, 1979) or by symptoms on hosts. Major distinctions from *M. laxa* include the presence of entire colony margins, buff conidium colour, and long conidium germ tubes (Mordue, 1979a,b). Features distinguishing the species from *M. fructicola* in culture include generally fewer conidia, stromata and microconidia in *M. fructigena*, and slightly larger conidia with a different colour in mass (Mordue, 1979a,c). *Monilinia fructigena* grows more slowly than *M. fructicola* on potato dextrose agar (PDA) medium under long-wave UV light (De Cal and Melgarejo, 1999). Light is essential for sporulation in *M. fructigena* but not in the other two species (Sharma and Kaul, 1989b). Byrde and Willetts (1977) provide a table of contrasted characters of the brown rot fungi, and Lane (2002) has produced a synoptic key to these three species in culture, based on examination of representative isolates.

- 5 Sexual morph: Apothecia cupulate to planoconvex, 15-40 mm diam., stipitate, brown to pale brown; asci 74-124x5.3-9 µm; spores ellipsoid, 9-11x4.5-6.7 µm, binucleate. Asexual morph: Conidia mainly formed along the leaf veins, produced in chains of up to 30, with disjunctors, limoniform, 6.4-17.2x5.1-13.6 µm, hyaline; pathogen on leaves, teleomorph on fruits of *Cydonia oblonga*; phen.: II-IV, V(a) (BE/F) • **Monilinia linhartiana** (Prill. & Delacr.) Dennis (1949)
- 5' Asci and spores longer; on other hosts 6
- 6 On *Prunus* 7
- 6' On fruits of *Sorbus* or *Crataegus* 8
- 7 Sexual morph: Asci 130-160x8-10 µm; spores 8.5-14.5x5-9.5 µm. Asexual morph: Macroconidial state on leaf nerves of the host; macroconidia limoniform, 7.5-15x6-11 µm, in chains with 2-5 µm long disjunctors. Teleomorph on fruits of *Prunus padus*; phen.: spring **Monilinia padi** (Woronin) Honey (1936)
- 7' Asci 155-180x8-11 µm; spores 11-17x5-8 µm; macroconidia limoniform, 7-15 µm long, with 3-4 µm long disjunctors; pathogen on leaves, twigs and fruits, teleomorph on fruits of *Prunus serotina*; phen.: teleomorph: IV-V **Monilinia seaveri** (Rehm) Honey (1936)
- 8 Sexual morph: Asci 100-160x6.5-8 µm; spores ellipsoid, 8-13x4-6 µm. Asexual morph: Macroconidial state on leaf nerves of the host; macroconidia subglobose to limoniform, 7-12.5x5-9.5 µm, in chains with up to 3 µm long disjunctors. Teleomorph on fruits of *Sorbus aucuparia*; phen.: spring **Monilinia aucupariae** (F. Ludw.) Whetzel (1945)
- 8' Sexual morph: Apothecia cupulate, 3-10 mm diam., pale brown to brown, stipitate; asci 140-170x8-10 µm; spores ellipsoid, 12-16x4.5-7.5 µm, binucleate. Asexual morph: Macroconidial state on leaves of the host; macroconidia subglobose, 10.5-21x9-20 µm, separated by needle-like disjunctors up to 5-6 µm long; on stromatized fruits of *Crataegus monogyna*; phen.: (III)IV-VI • **Monilinia johnsonii** (Ellis & Everh.) Honey (1936)
- 9 Sexual morph: Apothecia 1-4 mm diam., brown to dark reddish brown, stipitate; asci 4-spored, 100-135x8-12 µm; spores 13-18x5-6 µm. On stromatized fruits of *Empetrum*; phen.: spring **Monilinia empetri** (Lagerh.) B. Erikss. (1970)
- 9' Species on other substrates 10
- 10 Sexual morph: Apothecia 3-7 mm diam., medium brown, stipitate; asci 130-145x8-10 µm; spores 8-11x5-6 µm. Asexual morph: Macroconidia limoniform, 9-14x5.2-9 µm, in chains with 0.8-1.5 µm long disjunctors. On stromatized fruits of *Pyrola* and *Moneses*; phen.: spring "**Sclerotinia**" **pyrolae** Grosse (1912)
- 10' On Ericaceae 11
- 11 Apothecia from stromatized tissues in capsules of *Cassiope* or *Ledum* 12
- 11' Apothecia from stromatized berries of *Vaccinium* 13
- 12 Apothecia cupulate to flat, 2-4 mm diam., light brown to brown, stipitate; spores 10-12x5-6.5 µm; macroconidial state unknown; on *Cassiope tetragona*; phen.: early spring **Monilinia cassiopes** (Rostr.) L. Holm (1975)
- 12' Sexual morph: Apothecia cupulate to turbinate, 4-8 mm diam., dark reddish brown, stipitate; asci 160-205x12-14 µm; spores 12-14x6.5-8 µm. Asexual morph: Macroconidia limoniform, 17.5-22x11-18 µm, in chains with 2.5-4 µm long disjunctors on leaves of *Ledum palustre*; phen.: early spring **Monilinia ledi** (Navashin) Whetzel (1945)
- 13 Spores monomorphic 14
- 13' Spores dimorphic 16
- 14 Sexual morph: Asci 153-200x9.5-14 µm; spore ellipsoid, 10-17.5x6-8.5 µm, guttulate. Asexual morph: Macroconidia limoniform, 22-42x13.5-25(31) µm, disjunctors 3-9 µm long; on mummified fruits of *Vaccinium vitis-idaea*, often among *Spagnum* moss; phen.: IV-VI **Monilinia urnula** (Weinm.) Whetzel (1945)
- 14' Asci and spores longer 15
- 15 Sexual morph: Asci 200-300x13-22 µm; spores oval to broadly ellipsoid, 17-32x9.5-17.5 µm. Asexual morph: Macroconidia ovoid, 19-27x17-23 µm, with 1-3.5 µm long disjunctors; on *Vaccinium uliginosum*; phen.: III-VI **Monilinia megalospora** (Woronin) Whetzel (1945)

- 15' Sexual morph: Asci 177-230x8-14.5 µm, I+; spores ellipsoid, 15-19x8-10.5 µm. Asexual morph: Macroconidia limoniform to subglobose, (23)26-28(33)x19-21(25) µm, separated by 3-5 µm long disjunctors; on mummified fruits of *Vaccinium corymbosum*; phen.: III-IV **Monilinia vaccinii-corymbosi** (J.M. Reade) Honey (1936)
- 16 Sexual morph: Asci 140-180x10-14 µm; spores ellipsoid, dimorphic, 19-22(24)x9-12 µm and 14.5-20.8x 5.9-7.3 µm. Asexual morph: Macroconidia subglobose, 19-23.5x14-21 µm, with disjunctors; on mummified fruits of *Vaccinium myrtillus*; phen.: IV-V ○ **Monilinia baccarum** (J. Schröt.) Whetzel (1945)
- 16' Sexual morph: Asci 150-190x8-12 µm; spores dimorphic, 9.5-14.5x5.5-8.5 µm and 6-10x4-5 µm, biguttulate. Asexual morph/ Macroconidia limoniform, 14.5-28.5x9.5-25 µm, in chains with 3-6 µm long disjunctors; on *Vaccinium oxycoccus* and *Vaccinium microcarpum*; phen.: V..... **Monilinia oxycocci** (Woronin) Honey (1936)

Mycopappus Redhead & G.P. White

Type species: *Mycopappus alni* (Dearn. & Barthol.) Redhead & G.P. White

Lit.: Tian & al. 2015: 301.

No Western European species known.

Myriosclerotinia N. F. Buchw.

Type species: *Myriosclerotinia scirpicola* (Rehm) N.F. Buchw.

Lit.: Baral & Krieglsteiner 1985: 22, Hansen & Knutsen 2000: 173.

- 1 On juncaceous hosts; spores allantoid to narrowly ellipsoid 2
- 1' On cyperaceous hosts; spores ellipsoid 4
- 2 Sclerotia long, cylindrical, 5-30 x 0.5-1.5 mm; apothecia one to several from each sclerotium, disc 2-6 mm diam., cupulate to applanate, stipe 7-25 x 0.4-1 mm; asci 80-125 x 7-10 µm, 2-4-6 spored; spores ellipsoid to allantoid, 14.5-18.5x5-7 µm; microconidial anamorphic state not observed in nature; on *Luzula pilosa*; phen.: spring **Myriosclerotinia luzulae** T. Schumach. & L. M. Kohn (1985)
- 2' On *Juncus* spp. 3
- 3 Sclerotium cylindrical, 4-20x0.5-3 mm; apothecia one to several from a sclerotium, disc 2-12 mm diam., stipe 3-16x0.5-1.5 mm; asci 60-95x4-5.5 µm; spores narrowly allantoid with rounded ends, 7.5-15x1-2.5 µm; microconidial anamorphic state in sporodochial locules, 0.5-1 x 0.5 mm, irregularly scattered along the upper host culm; saprobic on stems of *Juncus* sp.; phen.: V-VI ● **Myriosclerotinia curreyana** (Berk.) N. F. Buchw. (1947)
Ill.: Rubio & al. 2010: 242.
- 3' Sclerotium cylindrical 6-25 x 0.5-2 mm. Apothecia one to several from each sclerotium, disc 3-7 mm diam., stipe 4-20 x 0.5-1 mm. Asci 65-85 x 5-6 µm. Ascospores narrowly ellipsoid with slightly pointed ends, 7-11 x 2-4 µm; microconidial anamorphic state in sporodochial locules, ca. 1 x 0.5 mm, irregularly scattered along the upper host culm. Apothecia in summer, most abundantly on *Juncus filiformis* **Myriosclerotinia juncifida** (Nyl.) J.T. Palmer (1969)
- 4 On *Carex* spp. 5
- 4' On *Eriophorum*, *Eleocharis* or *Scirpus* 8
- 5 Sclerotia long and slender, curved, with pointed ends, developing inbetween leaf sheaths of young shoots, 30-200 x 4-12 mm; apothecia cup-shaped, arising 2 – 16 from a sclerotium, disc 10-30 mm diam., stipe 30-100x1.5-2.5 mm; asci 190-235x9-13.5 µm; spores ellipsoid, 11-16.5x7-10 µm; microconidial anamorphic state in sporodochial locules, 2-4x0.5-1.5 mm, distributed with regular intervals along the host culm. Apothecia in spring and early summer, on stems of *Carex rostrata* and *C. aquatilis* **Myriosclerotinia caricisampullaceae** (Nyberg) N. F. Buchw. (1947)
- 5' Sclerotia cylindrical to fusoid, or shell-like to tuberoid, less than 30 mm long 6
- 6 Sclerotia shell-like, becoming tuberoid; developing superficially in leaf sheaths of *Carex* spp. and *Eriophorum* spp. .
..... see below *Myriosclerotinia ciborium*
- 6' Sclerotia tuberoid to cylindrical, developing within culms of *Carex* hosts 7
- 7 Spores navicular, flattened to incurved on one side, 10.5-14x5.5-7 µm; sclerotium cylindrical, 5-18x1-3 mm; apothecia cup-shaped, solitary or two to three from a sclerotium, disc 3-7 mm diam., light brown to medium brown, stipe 2-25x0.5-1.5 mm; asci 130-165x7-10 µm; microconidial anamorphic state in sporodochial locules in groups of 3-6, distributed at regular intervals along the host culm, each group dull black, elongate, 1-3 mm long; on *Carex* spp., particularly frequent on *C. chordorrhiza*; phen.: early summer
..... ● **Myriosclerotinia duriaeana** (C. Tul. & Tul.) N. F. Buchw. (1947)
- 7' Spores ellipsoid, with slightly pointed ends, 13-17x5.5-7.5 µm; sclerotium tuberoid to cylindrical, 3-15x2-5 mm; apothecia cup-shaped, solitary or two to three from a sclerotium, cup (disc) 3-9 mm diam., medium brown, stipe 5-

- 20x0.5-1.5 mm; asci 160-220x7.5-10 µm; microconidial anamorphic state in sporodochial locules in groups, 1-5x0.2-0.5 mm, irregularly scattered on stems of its host; on *Carex* spp.; phen.: early summer
 **Myriosclerotinia suOclatula** T. Schumach. & L. M. Kohn (1985)
- 8 Sclerotia shell-like, becoming tuberoid, 10-25 x 4-10 mm, developing superficially in leaf sheaths of *Eriophorum* and *Carex*; apothecia one to several from each sclerotium, disc deeply cupulate to turbinate, 5-15 mm diam., medium to dark brown, stipe 5-40x1.5-2 mm; asci 140-190x7.5-12 µm; spores ellipsoid, flat to concave on one side, bi-triguttulate, 9.5-18x4.5-7.5 µm; microconidial anamorphic state not observed in nature; phen.: VII
 **Myriosclerotinia ciborium** (Vahl: Fr.) T. Schumach. & Vaage (1999) [1998]
- 8' Sclerotia tuberoid, cylindrical or fusoid, developing within culms of *Eriophorum*, *Scirpus* or *Eleocharis* 9
- 9 Sclerotia cylindrical, elongate, 3-30(50)x0.5-2.5 mm; apothecia solitary or two to four from a sclerotium, cup-shaped to plane, disc 2-9 mm diam., light brown to medium brown, stipe 3-30x0.5-1.3 mm; asci 70-140x5-10 µm, I+; spores narrowly ellipsoid, slightly inequilateral, 8-15x3-5.5 µm; microconidial anamorphic state not observed in nature; on sclerotia developing within the stems, or exceptionally in the leaf sheaths of *Eriophorum vaginatum*, *Scirpus cespitosus* or *Eleocharis uniglumis*; phen.: (III-IV)V-VI(VIII)
 **Myriosclerotinia dennisii** (Svrček) J. Schwegler (1978)
- 9' Sclerotia tuberoid to fusoid, from 5-20x3-10 mm (tuberoid: in *Scirpus lacustris*, incl. ssp. *tabernaemontani*, *S. sylvaticus*) to 5-22x1-3 mm (fusoid: in *S. maritimus*, *Eleocharis palustris*); apothecia one to several from each sclerotium, cup-shaped to plane, disc 3-15 mm diam., light brown to medium brown, stipe 3-22x0.5-2 mm; asci 110-150x5.5-9 µm; spores ellipsoid, with slightly pointed ends, 9-16x4.5-7 µm; microconidial anamorphic state in ovoid to elongate sporodochial locules, 0.5-5 mm broad, distributed at irregular intervals along the host culm; phen. IV-VI
 **Myriosclerotinia scirpicola** (Rehm) N. F. Buchw. (1947)

Ovulinia Weiss

Type species: *Ovulinia azaleae* F.A. Weiss

Lit.: Hansen & Knudsen 2000: 175.

- 1 Apothecia cupulate to funnel-shaped, brownish, stipitate, arising from ovoid to discoid sclerotium, 1-4x1-2 mm, formed within petals of host; asci 130-160x9-14 µm; spores ellipsoid, 10-18x8-11 µm, hyaline; macroconidial state consisting of short conidiophores giving rise to broadly ellipsoid to obovoid conidia with empty disjunctors present, 40-60x20-35 µm; on *Rhododendron* and *Azalea*; phen.: spring and early summer
 **Ovulinia azaleae** F.A. Weiss (1940)

Piceomphale Svrček

Type species: *Piceomphale bulgarioides* (Rabenh.) Svrček

Lit.: Breitenbach & Kränzlin 1981: 142.

- 1 Apothecia shallowly cupulate to discoid, dark greenish black, cartilaginous in texture, hymenium often wrinkled, short-stipitate, from blackish patches on cone scales of *Picea*. Disc 2.5-11 mm diam., stipe 0.5-3 (5) mm long. Outer excipulum with an outermost layer of globose cells, inner layer of prismatic cells. Asci 65-85 x 6-7.5 µm. Ascospores hyaline, unicellular, 6-9.5 x 3-5 µm. Macroconidial mitosporic state wanting; on old *Picea* cones lying on the ground; phen.: IV-V (●) **Piceomphale bulgarioides** (Rabenh.) Svrček (1957)
 Ill.: Breitenbach & Kränzlin 1981: pl. 150.

Pycnopeziza W.L. White & Whetzel

Type species: *Pycnopeziza sympodialis* W.L. White & Whetzel ex Sutton.

Lit.: Dennis 1981: 5, Häffner 1984: 139, Schumacher 1990: 236 (*P. pachyderma*), Holm & Nannfeldt 1990a: 4 (*P. sympodiales*), Hansen & Knudsen 2000: 175.

- 1 Apothecia cyathiform to discoid, subsessile to shortly stalked, 3-8 mm diam., hymenium brown; outer surface ochraceous, warted; asci inamyloid, 100-145x6-8 µm; spores ellipsoid, 8.7-12.2x3.9-4.8 µm, with two LB's, hyaline; saprobic on stems and petioles of *Hedera helix*; phen.: V(VI)
 **Pycnopeziza sejournei** (Boud.) Whetzel & W.L. White (1940)
 Ill.: Boudier 1904-1910: pl. 484, Häffner 1984: fig. 3-4.
- 1' Spores smaller 2
- 2 Apothecia up to 4 m wide, disk concave and yellowish brown, receptacle reddish brown with blackish base, shortly stalked, margin even to dentate; asci 45-95x7 µm, amyloid; spores ellipsoid, 6-8x3-4 µm, eguttulate; *Acarosporim*

- quisquiliaris* anamorph with 1 mm diam. subglobose pycnidia and two-celled cylindrical conidia 15-22x2.5-3 µm; saprobic on leaves of *Quercus*, but also on *Alnus*, *Prunus*, *Salix* and *Spiraea*; phen.: IV-VI
 • **Pycnopeziza pachyderma** (Rehm) W.L. White & Whetzel (1940)
- 2' Apothecia with disc 3-5 mm diam., margin irregularly splitted, with short stem, hymenium ochraceous brown, dark brown outside; asci 70-90x6.5-8 µm; spores narrow ellipsoid, 7-9.5x3-4 µm; macroconidial state borne in 0.4-1 mm diam. pycnidia on host among apothecia; conidiophores dichotomously branched, bearing conidial chains of 12-20 conidia; conidia 15-22x2.5-3 µm, 1-septate, with lateral appendages; saprobic on buds and catkins of *Acer*, *Alnus*, *Populus*, leaves of *Betula*, still attached a branch; phen.: V-VI
 **Pycnopeziza sympodialis** W.L. White & Whetzel ex Sutton (1980)

Schroeteria G. Winter

Syn.: *Geminella* Schroeter

Type species: *Schroeteria delastrina* (Tul. & C. Tul.) G. Winter

Lit.: Vánky 1981: 167, Baral et al. 2022: 359.

- 1 Asexual morph: Chlamydospores mostly in pairs, 7.8–11x7–9 µm (without ornamentation), with warts and ridges 0.5-1(2) µm high. Parasitic on seed capsules of *Veronica arvensis*. Phen.: (III)V-VI (BE/F, DE, FR, IT, NL)
 ○ **Schroeteria delastrina** (Tul. & C. Tul.) G. Winter (1881)
- 1' Sexual morph: Apothecia 1-3 mm diam.; asci with apical ring mostly IKI+, of *Sclerotinia* type; ascospores mainly *10–13x5.5–6.5 µm, with 1(2) LBs of 1.4–2.7 µm diam. near each end, uninucleate; living paraphyses without refractive vacuoles in terminal cell (with vacuoles: see *Ciboria ploetneriana*). Asexual morph: Chlamydospores without or with lower ornamentation. 2
- 2 Sexual morph: Apothecial stipes 3–13 mm long; ascospores ellipsoid to fusoid, LBs subpolar, 1.4–2.7 µm diam. Asexual morph: Chlamydospores singly, only sometimes in pairs, pale greyish brown, coarsely warted and with irregular ridges ~ 0.2 µm high, individual cells †8.5–12x8-11 µm (without ornamentation). On light to bright (grey-) brown seed capsules of *Veronica hederifolia* agg., climate temperate humid. Phen.: apothecia: X-I, III-V; anamorph: V-VI (AT, BE/F, CH, CZ, DE, FR, IT)..... ○ **Schroeteria decaisneana** (Boud.) De Toni (1888)
 Ill.: Baral et al. 2022: pl. 3-10.
- 2' Sexual morph: Apothecial stipes 5–25 mm long; ascospores ellipsoid, LBs more polar, 1.5–1.8 µm diam. Asexual morph: Chlamydospores forming strongly curved chains of 2-7 cells, yellowish brown, smooth or with distinct low warts, individual cells *10–11x8–10 µm, †(5.5–)6.5–12x6.5–13 µm (without ornamentation), multiguttulate. On blackened seeds of *Veronica cymbalaria*, climate supramediterranean semihumid. Phen.: VI (ES, FR)
 **Schroeteria poeltii** Vánky (1983)

Sclerencoelia Pärtel & Baral

Type species: *Sclerencoelia fascicularis* (Alb. & Schwein.) Pärtel & Baral

Lit.: Pärtel & Baral 2016.

- 1 Apothecia erumpent from an extensive black, stromatic tissue, gregarious but unclustered, cupulate, 2-4 mm diam., hymenium dark-brown, black when dry; outside pruinose greyish white; asci *(80)84-94(101)x(6)6.5-8(8.5) µm, mostly IKI-; spores cylindric-allantoid, *(11.5) 12-13x(2)3 µm, 0(1)-septate, hyaline; paraphyses with widened brown tips. Asexual morph: slimy sporodochial Myrioconium-like. On trunks and branches of *Populus tremula*, *P. tremuloides*; phen.: I-XII (NO,SE) **Sclerencoelia pruinosa** (Ellis & Everh.) Pärtel & Baral (2016)
- 1' Apothecia in clusters; asci and spores longer 2
- 2 Apothecia erumpent, 1-6 in a cluster, cupulate, 2-10(14) mm in diam., disc umber-brown, olivaceous grey or brownish black, margin mostly crenulate and whitish pruinose, outside greyish- to brownish black. Ectal excipulum of vertical oriented textura prismatica-angularis, cortex composed of dark red-brown incrustated, globose cells; excipulum and hymenium covered by many rhomboid crystals; asci *100-130(140)x(8.5)10-12(12.5) µm, ±IKI-; spores allantoid, *(12)13-15.5(17)x(3)3.5-4(4.5) µm, OCI 1; saprobic on sclerotia immersed in the bark of fallen branches and logs of *Carpinus betulus*, *Populus spp.*; phen.: IX-VI (BE/F)
 • **Sclerencoelia fascicularis** (Alb. & Schwein.) Pärtel & Baral (2016)
 Ill.: Pärtel & Baral 2016: fig. 5.
- 2' Apothecia erumpent, scattered or densely aggregated in groups of 2-3 apothecia; otherwise like *S. fascicularis*; saprobic on sclerotia immersed in the bark of *Fraxinus*; phen.: I-IX (BE/F, BE/W,CH)
 • (•) **Sclerencoelia fraxinicola** Pärtel & Baral (2016)
 Ill.: Pärtel & Baral 2016: fig. 6.

Scleromitrlula S. Imai

Type species: *Scleromitrlula shiraiana* (Henn.) S. Imai

Syn.: *Verpatinia* Whetzel & Drayton, *Scleroglossum* Hara.

Lit.: Krieglsteiner & Baral 1985: 202 (sub *Verpatina spiraeicola*), Schumacher & Holst-Jensen 1997: 55.

- 1 Apothecia stipitate-capitate, cap with longitudinal ridges and furrows, arising from lenticular to pyramidal stromata on its host 2
- 1' Apothecia stipitate-cupulate to applanate to slightly decurved, arising from small, lenticular stromata on petioles and leaf nerves of *Quercus* species and *Castanea sativa*
..... **Scleromitruła candolleana** (Lév.) T. Schumach. & Holst-Jensen (1997)
- 2 Cap minute, 2-5 mm high, 0.8-2 mm broad; asci 35-55 µm; on leaves and stems of its host 3
- 2' Cap large, 3-16 mm high, 2-7 mm broad; asci 65-90 µm; on fruits of *Morus alba* **Scleromitruła shiraiana**
- 3 Cap 1-3 mm high, 0.8-1.5 mm broad, stipe 10-30x0.2-0.4 mm; asci 35-55x4.5-6 µm, faintly I+; spores 5-7x1.5-2.5 µm; stroma lens-shaped; saprobic on leaves of *Filipendula* and *Calystegia*; phen.: V-VI
..... **Scleromitruła spiraeicola** (Dennis) T. Schumach. & Holst-Jensen (1997)
- 3' Ascospores exceeding 7 µm in length 4
- 4 Cap 2-5 mm high, 1-2 mm broad, stipe 10-40x0.3-0.7 mm; asci 40-55x4-6 µm, I+; spores fusiform, inequilateral, 6-9.5x2-3 µm; saprobic on leaves of *Rubus chamaemorus*; phen.: VI
..... **Scleromitruła rubicola** T. Schumach. & Holst-Jensen (1997)
- 4' Cap 2-3 mm high, 1-2 mm broad, stipe 10-30x0.2-0.6 mm; asci 38-50x4-7 µm, I+; spores 6.3-9.8x1.5-2.6 µm; saprobic on leaves of *Caltha palustris* and *Iris pseudacorus*; phen.: V-VI
..... **Scleromitruła cathicola** (Whetzel) T. Schumach. & Holst-Jensen (1997)

Sclerotinia Fuckel

Type species: *Sclerotinia libertiana* Fuckel = *S. sclerotiorum* (Lib.) deBary.

Lit.: Kohn 1979: 365 (monograph), Svrček 1979: 205 (*S. pseudoplatani*), Baral 1989: 121 (*S. verrucispora*), Hansen & Knudsen 2000: 175, Richter & Vega 2014: 147 (*S. spermophila*).

- 1 Sclerotia lenticular to tuberoid, 2-8 x 1-4 mm, developing in leaf sheets and on culm remnants of grasses; apothecia cup-shaped to plane, arising solitary or in groups from a sclerotium, disc 2-7 mm diam., stipe 2-17x1-1.5 mm; asci 175-240x9-13.5 µm; spores ellipsoid, with pointed ends, thick-walled, 14-21x6-9 µm; on a variety of host genera, most frequently on *Poa* spp., *Festuca* spp. and *Dactylis glomerata*; phen.: X
..... **Sclerotinia borealis** Bubák & Vleugel (1917)
- 1' Sclerotia tuberoid, developing in herb debris or among roots of herbaceous plants 2
- 2 Asci 4-spored 3
- 2' Asci 8-spored 4
- 3 Sclerotia cylindrical, 2-12 x 2-5 mm; apothecia shallowly cup-shaped to plane, medium to pale brown, disc 2-6 mm diam., stipe 5-30 x 0.6-1.5 mm; asci 80-105 x 12-14 µm; spores ellipsoid, slightly inequilateral, with minute internal polar guttules when fresh, 10-15x5.6-8 µm, occasionally megaspores to 18-22x8-11 µm are observed; sclerotia developing in last year stems of *Rubus chamaemorus*, embedded in moss carpets in bogs; phen.: VI
..... **Sclerotinia tetraspora** Holst-Jensen & T. Schumach. (1994)
- 3' Sclerotia developing on the leaf base of *Ranunculus glacialis*, tuberoid, cylindrical, 2.5-15x2-8 mm; apothecia cup-to disc-shaped, brownish orange, brick red to henna brown, up to four from each sclerotium, cup (disc) 2-10 mm diam., stipe 1-15x0.5-1.5 mm; asci 130-150x7-12 µm; spores ellipsoid, slightly inequilateral, uni- (bi-) nucleate, 22-27x8-10 µm; phen.: summer **Sclerotinia glacialis** F. Graf & T. Schumach. (1995)
- 4 Apothecia solitary or two to three from a sclerotium, 5-20x2-8 mm, disc 2-10 mm diam., cup-shaped to plane to recurved with a central depression, stipe 10-40x0.5-2 mm; asci 150-240x9-14 µm; spores dimorphic in size, 4 larger spores 12-18x7-10 µm, 4 smaller spores 9-13x6-7 µm; frequently on leguminous hosts, occasionally on non-leguminous hosts, parasitic in cultivated *Trifolium pratense*; phen.: VIII-XII(I-III)
..... • **Sclerotinia trifoliorum** J. Erikss. (1880)
- 4' Spores monomorphic 5
- 5 Apothecia 2-6(10) mm diam., disc flat, ochraceous brown, stipe dark brown and 5-20x1-1.5 mm; sclerotia 10-25x7-10 mm, black; asci 130-150x9.5-10 µm, apical ring of *Sclerotinia*-type, IKI strongly blue, arising from croziers; spores ellipsoid to broadly clavate, (8)8.5-10(10.5)x4-4.5(5) µm, with coarsely warts forming a reticulum, with two large gutules; in the ground, substrate unknown; phen.: V **Sclerotinia verrucispora** Baral & Korf (1989)
..... Ill.: Baral 1989: Taf. 1.
- 5' Spores smooth 6

- 6 Apothecia medium to purplish brown, disc 3-15 mm diam., stipe 3-30x0.8-2 mm; asci 95x6.5 µm; spores 6-11x4.5-6 µm, OCI 0-1, binucleate; saprobic on fully stromatized acorns of *Quercus*; phen.: IX-X • **Sclerotinia pseudotuberosa** (Rehm) Rehm (1885)
- 6' Sclerotia present 7
- 7 Apothecia 0.5-1 mm diam., stipe 0.5-3x0.5 mm; asci 160-185(210)x13-15(16) µm, IKI bb, without croziers; spores (11) 12.5-15(17)x(6)7.5-8.5(10) µm, tetranucleate; on seeds of *Trifolium arvense*; phen.: XI (DE) **Sclerotinia spermophila** Noble (1948)
Ill.: Richter & Vega 2014: Abb. 1-2.
- 7' Asci with croziers 8
- 8 Sclerotia tuberoid, very variable in shape and size, 4-25x2-10 mm x 5-15; apothecia solitary or several from each sclerotium, disc 2-10 mm diam., when mature plane or recurved with a central depression, stipe 4-30x0.5-2 mm; ectal excipulum composed of slightly elongated prosenchymateous cells turning out perpendicular to the apothecial surface; asci 110-150x6-10 µm, IKI bb, with croziers; spores uniform in size, 9-13.5x4-6 µm, binucleate; on a wide range of host plants (> 350 species among 60 plant families); phen.: IV-VII(IX) • **Sclerotinia sclerotiorum** (Lib.) de Bary (1884)
- 8' Spores longer 9
- 9 Sclerotia tuberoid or irregularly shaped, 0.5-2 mm diam.; apothecia one from each sclerotium, disc 2-9 mm diam., applanate or recurved with a central depression when mature, stipe 1-4x1-2 mm; asci 125-180x7-11 µm; spores uniform in size, 8-17x5-7 µm, tetranucleate; phen.: high summer **Sclerotinia minor** Jagger (1920)
- 9' Apothecia 1-2 mm diam., pale ochraceous brown, with long stipe; asci 160-170x10-12, I+, arising from croziers; spores partially citriform, 14-17x5.5-6.5 µm, ?-nucleate, eguttulate; on sclerotia on leaf nerves of *Acer pseudoplatanus*; phen.: V **Sclerotinia pseudoplatani** Svrček (1979)
- 9'' Sclerotia ±ovoid; apothecia ? mm diam., with crystals, like *Dumontinia tuberosa* but ectal excipulum of textura globulosa-angularis; spores 11.5-15.8x6-7.5 µm, binucleate, OCI 0-1, forming ascoconidia when old; saprobic on *Ficaria verna*; phen.: III-IV • **Sclerotinia "ficariaephila"** Baral nom. prov.

Seaverinia Whetzel

Type species: *Seaverinia geranii* (Seaver & W.T. Horne) Whetzel

Lit.: Whetzel 1945: 703.

- 1 Apothecia up to 10 mm diam., stipe 5-30x2 mm, brown, originating from a poorly developed stroma; asci 120-140x8-10 µm; spores ellipsoid to almond-shaped, 12x4-5 µm, mostly biguttulate, hyaline; anamorph *Botrytis*-like with subglobose, verrucose, pale brown conidia 10-12 µm diam.; on rhizomes of *Geranium*; phen.: IV-V **Seaverinia geranii** (Seaver & W.T. Horne) Whetzel (1945)

Septotinia Whetzel ex J.W. Groves & M.E. Elliott

Type species: *Septotinia podophyllina* (Ellis & Everh.) Whetzel

Lit.: Whetzel 1937: 128, Waterman & Cash 1950: 374 (*S. populiperda*).

- 1 Apothecia cup-shaped, 1-4 mm diam., stipitate, erumpent from elongate or circular sclerotia, pale fawn; asci 116-148x7.5-10 µm; spores ovoid, 10-16x5-6 µm, hyaline; on sclerotia in the soil or leafmould of *Podophyllum peltatum*; phen.: V **Septotinia podophyllina** (Ellis & Everh.) Whetzel ex J.W. Groves & M.E. Elliott (1961)
Ill.: Whetzel 1935: fig. 1-18.
- 1' Apothecia cupulate, 2-7 mm diam., long stipitate, erumpent from sclerotia, cinnamon darb; sclerotia formed along the leaf veins, elongate to circular, 3-5x1-2 mm; asci 125-213x6.5-8.5 µm; spores ovoid, 10-13x4-5 µm, hyaline; anamorph *Septotis populiperda* with conidia becoming 1-3-septate, 15-25x4-7 µm, frequently breaking apart into two-celled fragments; causing leaf blotch on hybrid clones of *Populus* spp.; phen.: VI-VII **Septotinia populiperda** Waterman & E.K. Cash ex B. Sutton (1980)

Stromatinia Boud.

Type species: *Stromatinia rapulum* (Bull.) Boud.

Lit.: Dennis 1956: 160, Krieglsteiner & Häffner 1994: 12.

- 1 Apothecia stipitate-cupulate, 5-20 mm diam., hymenium brown to vinaceous brown, outside paler; stipe 10-60 x 1-3 mm, brown, basal part black; asci 120-170x8-11 µm; spores inequilateral ellipsoid, 9.5-12(14)x(4.5)5-8 µm, smooth, biguttulate; on stromatized rhizomes of *Polygonatum odoratum*, *P. multiflorum*, *P. verticillatum*; phen.: IV-V **Stromatinia rapulum** (Bull.) Boud. (1907)
- 1' Apothecia 3-7 mm diam., disc cinnamon-brown, stipe up to 10 mm long; asci 190-235x8.5-9 µm; spores ellipsoid, 10-17x5.5-9.5 µm; on *Acidanthera*, *Crocus*, *Freesia*, *Gladiolus*, *Lapeirousia* and *Tritonia*

- **Stromatinia gladioli** (Drayton) Whetzel (1945)
1" Apothecia 2-4 mm, disc conex to flat, reddish-brown, stipitate; asci 135-190x8-10 μm ; spores ellipsoid to ellipsoid-fusiform, 10-15x4-5.5 μm , becoming pale olive-brown and 1-septate with age; on outern papery scales of *Narcissus* and *Zephyranthes* bulbs **Stromatinia narcissi** Drayton & J.W. Groves (1952)

THELEBOLALES P.F. Cannon 2001

THELEBOLACEAE (Brumm.) Eckblad 1968

Lit.: [Jaklisch et al. 2016: 194.](#)

Accepted genera within this family:

1. *Antarctomyces* Stchigel & Guarro
3. *Ascozonus* (Renny) E.C. Hansen
4. *Caccobius* Kimbr.
5. *Coprobolus* Cain & Kimbr.
8. *Dennisiopsis* Subram. & Chandras.
9. *Leptokalpion* Brumm.
10. *Mycoarctium* K. Jain & Cain
12. *Pseudascozonus* Brumm.
13. *Ramgea* Brumm.
14. *Thelebolus* Tode

Key to the genera:

- 1 Apothecia ca. 0.1 mm diam., without excipulum; asci 8-spored *Pseudascozonus*
- 1' Asci with 8-7000 spores 2
- 2 Apothecia turbinate, 0.1-0.3 mm wide, whitish, outside furfuraceous; asci opening by a split down to an annular thickening near the apex, with 8 to 128 fusoid spores; winter and early spring *Ascozonus*
2. Apothecia globose to pulvinate, white, yellow or brown; asci with 8 to 7000 spores 3
- 3 Apothecia with straight, thick-walled, pointed hairs 4
- 3' Apothecia glabrous 5
- 4 Apothecia with numerous asci; asci 8-spored, evanescent at maturity; spores reticulate *Mycoarctium*
- 5 Apothecia subglobose and subimmersed or disc-shaped and superficial, yellowish to brownish, 0.1-3 mm wide; asci cylindrical to almost globose, with 8-2500 spores, rupturing down to a ring-like thickening below apex (always?); spores ellipsoid, without de Barry bubbles *Thelebolus*

Ascozonus (Renny) E.C. Hansen

Type species: *Ascozonus cunicularius* (Boud.) Marchal.

Syn. : *Streptotheca* Vuill.

Lit.: Brummelen 1967: 224 (*A. leveillei*), Hansen & Knudsen 2000 : 131, Doveri 2007: 539 (key).

- 1 Apothecia with a single, 150-200 spored, ascus; excipulum very reduced, not hairy **Ascozonus monoascus** Brumm. & M.J. Richardson (2000)
- 1' Apothecia with several, less than 150-spored, asci; excipulum well developed, hairs present 2
- 2 Apothecia sessile, 0.4-0.5 mm diam., with marginal hairs and short, often connate, widespread hairs; asci 128-spored, ovoid, 87x37 µm; spores ellipsoid, 7-10x3.5-5 µm; on dung of rabbit; phen.: I **Ascozonus subhirtus** Renny (1874)
- 2' Asci less than 128-spored, different in shape; spores ellipsoid to fusiform; hairs not connate, arranged at the margin, rarely widespread over the whole surface of the receptacle 3
- 3 Asci 16(24)-spored, broadly clavate; spores ellipsoid-fusiform, 13-14x6 µm; apothecia sessile, white at first, with a faint vinous tinge later, fringed with one or two rows of subulate hairs **Ascozonus parvisporus** Renny (1874)
- 3' Asci more than 16(24)-spored; apothecia lacking a vinous tinge 4
- 4 Asci 32-spored, broadly clavate, 75-120x22-25 µm; spores oblong-fusiform, 12-13x3-4 µm; apothecia sessile, with a single row of short, pointed, marginal hairs; on dung **Ascozonus solms-laubachii** (Rabenh.) Brumm. (1998)
- 4' Asci more than 32-spored 5
- 5 Asci less than 64-spored 6
- 5' Asci 64-spored or more 7

- 6 Apothecia substipitate; asci 48-spored, claviform; spores 12-14.5x2.5-4 µm; saprobic on dung of field-mouse; phen.: I ○ **Ascozonus leveillei** (P. Crouan & H. Crouan) Brumm. (1967)
- 6' Apothecia sessile; asci 48-60-spored, oblong ovoid; spores fusiform, 10-16x4 µm **Ascozonus asteriscus** (P. Karst.) Boud. (1907)
- 7 Apothecia stipitate, with a single row of short, marginal hairs; asci 64-96-spored, very broad; spores oblong-fusiform, 11-14.5x5-7 µm **Ascozonus leveilleanus** Renny ex Sacc. (1889)
- 7' Asci 64-spored 8
- 8 Apothecia substipitate or sessile, with a single row of non-septate, marginal hairs, rounded at the apex; asci 80-110x18-30 µm, broadly cylindrical-claviform; spores fusiform-navicular, 17-21x5-7.5 µm **Ascozonus cunicularius** (Boud.) Marchal (1884)
- 8' Apothecia turbinate, 0.1-0.2 mm broad, with one or two rows of septate hairs, white; asci 64-spored, 70-150x19-30 µm; spores narrowly fusiform, often asymmetrical, 12-18x(3.5-)4.5-5.5(-7) µm, smooth; on dung of herbivores; phen.: XI-II ● **Ascozonus woolhopensis** (Renny) Renny (1874)
 Ill.: Breitenbach & Kränzlin 1981: Pl. 118, Doveri 2007: 545.

Mycoarctium K.P. Jain & Cain

Type species: *Mycoarctium ciliatum* K.P. Jain & Cain
 Lit.: Jain & Cain 1973: 305, Korf & Zhuang 1991: 94.

- 1 Apothecia sessile, 0.2-0.4 mm diam., hymenium whitish, setose; setae up to 500 µm long, septate, thick-walled, with slightly curled tip; spores ellipsoid, reticulate, eguttulate; on deer, rodent dung; phen.: VIII **Mycoarctium ciliatum** K. Jain & Cain (1973)
 Ill.: Jain & Cain 1973: fig. 1-15, Korf & Zhuang 1991: 95.

Pseudascozonus Brumm.

Type species: *Pseudascozonus racemosporus* Brumm.
 Lit.: Brummelen 1987: 363, Hansen & Knudsen 2000: 131.

- 1 Apothecia 0.1 mm diam., sessile, +/- globose, hyaline; asci broadly clavate, with an irregular opening at apex, 32-47x12-16 µm, l-; paraphyses absent; spores 7-9.5x3-3.5 µm, sticking together; on dung of sheep and deer; phen.: IV (FR) **Pseudoascozonus racemosporus** Brumm. (1985)

Thelebolus Tode

Type species: *Thelebolus stercoreus* Tode.
 Syn.: *Ascophanus* Boud., *Ryparobius* Boud.
 Lit.: Hansen & Knudsen 2000: 308, Doveri 2007: 525 (key), de Hoog et al. 2005: 33.

- 1 Asci with more than 8 spores; saprobic on dung of sheep, wild rabbit, roe deer; phen.: I-XII ○ **Thelebolus stercoreus** Tode (1790)
 Ill.: Doveri 2007: 536.
- 1' Asci with 8 spores 2
- 2 Cleistohymenial ascomata opening in the meso- or telo-hymenial phase, at first subglobular, often becoming 'apothecioid', forming a palisade of asci and paraphyses (hymenium), usually with forcible discharge of ascospores through an irregular split above a subapical ring at the ascus top; conidia not present; saprobic on dung of cow and sheep; phen.: (III)VI-XII ● **Thelebolus microsporus** (Berk. & Broome) Kimbr. (1967)
 Ill.: Dover 2007: 532, Rubio & al. 2010: p. 338.
- 2' Cleistohymenial ascomata not opening before full maturity or disintegration, subglobular, never becoming 'apothecioid', asci irregularly arranged, paraphyses absent, without forcible discharge of ascospores, abundantly forming conidia 3
- 3 Conidia subglobular or shortly ellipsoid, length/width ratio less than 1.2, 2.5-7.4 µm diam, in rather large clusters (2-40) **Thelebolus globosus**
- 3' Conidia ellipsoid, length/width ratio over 1.2, 4-9x3.5-5.5 µm, in small clusters (1-5) **Thelebolus ellipsoideus**

VEZDAEALES Lumbsch & Lücking

This order, tentatively placed in *Leotiomycetes*, has only one family:

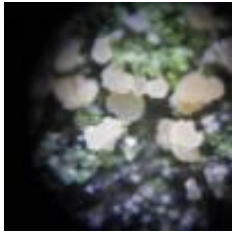
Veizdaeceae Poelt & Vězda ex J.C. David & D. Hawksw.

Veizdaea Tscherm.-Woess & Poelt

Type species: *Veizdaea aestivalis* (Ohlert) Tscherm.-Woess & Poelt

Lit.: [Lumbsch et al. 2009: 389](#).

- 1 Spores (9.6)10.1-13.1(13.3)×(3.3)3.4-3.8(4.1) μm, 1-septate (at least), mostly biguttulate, hyaline. On mosses (GB)
 **Veizdaea leprosa** (P. James) Vězda (1977)



LEOTIOMYCETES, familia incertae sedis

Lit.: Jaklitsch et al. 2016: 196.

1. Bloxamiaceae Locq. 2017
2. Myxotrichaceae Locq. ex Currah 1985
3. Pseudeurotiaceae Malloch & Cain 1970

Key to the families:

BLOXAMIACEAE Locq.

Lit.: Hernández-Restrepo et al. 2017: 53.

Only genus belonging to this family:

Bloxamia Berk. & Broome

Type species: *Bloxamia truncata* Berk. & Broome = *Bloxamia leucophthalma* (Lév.) Höhn.

Lit.: Ellis 1971: 510, Sporeen 2014: 346.

- 1 Conidiomata sporodochial, 2000x1000 µm, amber, greenish when wet. Conidiogenous cells simple, lageniform, pale brown, 8–11x1,5–2 µm; collarete cylindrical, 8–11x1.5 µm. Conidia cylindrical, 3–5.5x1 µm, in chains, hyaline. On *Pinus* needle litter **Bloxamia bohémica** Minter & Hol.-Jech. (1981)
- 1' Conidiomata brown to black 2
- 2 Conidiomata sporodochial, 1500x750 µm, brown to black. Conidiogenous cells simple, lageniform, pale brown, 10–14x1,5–2,5 µm; collarete cylindrical 5–7x1,5–2,5 µm. Conidia globose or with small hilum, 2 µm diam., in chains, hyaline. **Bloxamia sanctae–insulae** Coppins & Minter (1980)
- 2' Conidia not globose 3
- 3 Conidiomata sporodochial, 140–180(500) µm, black. Conidiogenous cells simple, cylindrical to subcylindrical, pale brown, 15–32x2–3 µm. Conidia short cylindrical to oblong, rounded apex, truncate base (or both ends obtuse), 2–4(7)x1.5–2.5 µm, single or easily dispersable chain, hyaline–subhyaline. On *Ulmus*, *Fagus* and *Malus*. Phen.: (BE/F, IT, UK) • **Bloxamia leucophthalma** (Lév.) Höhn (1910)
- 3 Conidiomata sporodochial, 250–500 µm diam., opaque black. Conidiogenous cells simple, lageniform, 14–24x2–3 µm, black; collarete cylindrical, 8–10x2–3 µm. Conidia hyaline, oblong to clavate, 5–6x2–3 µm, single, slimy. On *Schoenoplectus lacustris*, *S. tabernaemontani* and *Eleocharis palustris*. Phen.: V–IX (NL) **Bloxamia hesterae** M Sporeen (2014)

MYXOTRICHACEAE Locq. Ex Currah 1985

Lit.: Tsuneda & Currah 2004: 627, Jaklitsch et al. 2016: 196.

Accepted genera within this family:

1. *Geranomyces* D.R. Simmons
2. ?*Gymnostellatospora* Udag., Uchiy. & Kamiya
3. *Myxotrichum* Kunze
4. ?*Pseudogymnoascus* Raillo

PSEUDEUROTACEAE Malloch & Cain 1970

Lit.: Jaklitsch et al. 2016: 196.

Genera belonging to this family:

1. *Connersia* Malloch
2. *Leuconeurospora* Malloch & Cain
3. ?*Neelakesa* Udaiyan & Hosag.
4. *Pleuroascus* Masee & E.S. Salmon
5. *Pseudeurotium* J.F.H. Beyma

LEOTIOMYCETES, genera incertae sedis

Lit.: Jaklitsch et al. 2016: 197.

Adelodiscus Syd.
Callerascus Whitton, K.D. Hyde & McKenzie
Deltopyxis Baral & G. Marson
Helotiella Sacc.
Melanormia Körb.
Metapezizella Petr.
Ocotomyces H.C. Evans & Minter
Phyllopezis Petr.
Physmatomyces Rehm
Polydiscina Syd.
Polydiscidium Wakef.
Psilothecium Clem.
Riedera Fr.
Schnablia Sacc. & P. Syd.
Tromeropsis Sherwood

Key to the genera based on presence/absence of a stroma, hairs and the texture of the ectal excipulum.

- 1 Sclerotium, stroma or stromatized substrate present Key A
- 1' No sclerotium nor stroma present 2

- 2 Apothecia covered by hairs or hairlike protrudings Key B
- 2' Apothecia without hairs 3

- 3 Ectal excipulum composed of globose to angular cells (sometimes with covering hyphae) Key C
- 3' Ectal excipulum composed of elongated cells Key D

Key A – Genera with sclerotium, stroma or stromatized substrate.

- 1 Apothecia developing within a stroma, such that one or more hymenial areas develop as palisade layers of paraphyses, soon interspersed with asci, the stroma eventually rupturing only after the hymenium is mature (either by one or more longitudinal slits or in a stellate manner); asci mostly clavate, I-; ascospores usually aseptate, often with gelatinous sheath see *Rhytismatales* 2
- 1' Genera with sclerotium or stromatized substrate 20

- 2 Ascospores muriform *Triblidium*

Key B – Genera with apothecia covered by hairs or hairlike protrudings

- 1 Hair tip and protrudings glassy or thick glassy walls Key BA
- 1' Hairs not glassy, exceptionally with thin glassy walls 2

- 2 Hairs predominantly tapering Key BB
- 2' Hairs at least partially cylindrical, straight, bended or flexuous 3

- 3 Hairs cylindrical to slightly tapering or clavate, rounded tip, smooth or almost so Key BC
- 3' Hairs ornamented 4

- 4 Hairs cylindrical to slightly tapering or clavate, rounded tip, spiniculate Key BD
- 4' Hairs cylindrical tot slightly tapering or clavate, predominantly incrustated Key BE

Key BA – Genera with fully or partially glassy hairs

- 1 Hairs with long glassy upper part without lumen, without protrudings, aseptate; apothecia urn-shaped to discoid *Olla*
- 1' Hairs with a lumen 2

- 2 Hairs with narrow or reduced lumen 3
- 2' Hairs with a wide lumen 4

- 3 Hairs with mostly aseptate lumen, glassy substance dissolving in KOH 5%; asci I+ or I- *Urceolella*
- 4 Hairs with hooked glassy tips; paraphyses with mostly hooked glassy tips; lignicolous, herbicolous or fungicolous .. *Unguiculella*
- 4' Hairs not so 5

- 5 Hairs with glassy protrudings, glassy substance not dissolving in KOH ; predominantly foliicolous *Mollisia*
- 5' Hairs without glassy protrudings 6

- 6 Hairs with thin glassy walls, strongly incrustated *Incrupila*
- 6' Hairs with glassy walls, coiled or crisped, smooth; apothecia stipitate *Parachnopeziza*

Key BB – Genera with tapering hairs

- 1 Ectal excipulum with pigmented textura prismatica or globulosa-angularis 2
- 1' Ectal excipulum hyaline 5

2 Hairs with thin olivaceous yellow walls, sometimes bearing concolorous incrustations	Amicodisca
2' Hairs glabrous or almost so	3
3 Ectal excipulum with brown textura globulosa-angularis; hairs with intracellular pigment, at least basally brown	Trichopeziza
3' Ectal excipulum with brown textura prismatica	4
4 Ectal excipulum with brown textura prismatica; hairs glabrous or almost so; associated with <i>Haplographium</i> anamorph	Dematioscypha
4' Ectal excipulum with brown textura prismatica; hairs with brown walls, glabrous, tip curved; associated with <i>Chalara</i> anamorph	Phaeoscypha
5' Hairs straight	6
6 Paraphyses lanceolate	Albotricha
6' Paraphyses cylindrical	7
7 Apothecia with dark basal ring; hairs smooth; paraphyses cylindrical, with a cylindrical refractive body ...	Calycellina
7' Hairs smooth or almost so; paraphyses cylindrical, with non refractive content	Hyaloscypha

Key BC – *Genera with (almost) smooth cylindrical to clavate hairs*

1 Ectal excipulum of textura oblita; apothecia with blackish stalk; asci IKI+	Antinoa
1' Ectal excipulum otherwise; if stipitate then not or only basally blackish	2
2 Hairs on excipulum smooth, glued together; asci I+ or I-; paraphyses with granulate walls (observed in water!); on monocotyls	Hysteropezizella
2' Hairs not glued together; paraphyses smooth	3
3 Ectal excipulum of glassy-walled textura angularis; hairs delicate, coiled or crisped; spores 1-3-septate at maturity; paraphyses propoloid	Polydesmia
3' Ectal excipulum without glassy walls; paraphyses not propoloid	4
4 Ectal excipulum with textura globulosa-angularis	5
4' Ectal excipulum (at least laterally) with textura prismatica	8
5 Ectal excipulum of hyaline textura angularis, covered by hyphoid hairs	Rodwayella
5' Ectal excipulum with brown textura globulosa-angularis	6
6 Paraphyses with elongate VB, mostly cylindrical; hairs mostly grey brown; with or without subiculum	Mollisia
6' Paraphyses without elongate VB	7
7 Hairs cylindrical to clavate, flexuous, originating from the ectal excipulum, mostly grey brown; paraphyses cylindrical (except for <i>P. lanceolata</i>)	Pyrenopeziza
7' Hairs straight, originating from the medullar excipulum, with thick (> 0.5 µm) reddish brown walls, upper part paler; paraphyses lanceolate	Trichopezizella
8 Ectal excipulum pale to dark brown	9
8' Excipulum hyaline	11
9 Subiculum present; ectal excipulum dark brown; hairs hyaline	Eriopeziza
9' No subiculum present	10
10 Hairs mainly cylindrical	Microscypha
10' Hairs cylindrical to clavate, tips loosely roughened in MLZ	Ciliolarina
11 Paraphyses lanceolate	Psilachnum
11' Paraphyses cylindrical	12
12 Hairs cylindrical to clavate, short, smooth; paraphyses guttulate; spores spherical, ornamented	Pithyella

12' Spores not spherical	13
13 Hyphal hairs fasciculate, forming long tentacles; spores ellipsoid	<i>Echinula</i>
13' Hairs not fasciculate	14
14 Hairs cylindrical to clavate, short, rarely incrustated; asci with apical ring of <i>Calycina</i> -type; ectal excipulum slightly gelatinized, near the base of the receptacle and in the stipe the cells may be strongly gelatinized; paraphyses mostly with elongated VBs	<i>Calycina</i>
14' Hairs cylindrical, smooth, septate; paraphyses cylindrical, without refractive body, as long as the asci; apothecia sessile	<i>Psilocistella</i>
Key BD – <i>Genera with spiniculate cylindrical to clavate hairs</i>	
1' No setae present	2
2 Ectal excipulum of hyaline textura prismatica; hairs cylindrical to clavate, bearing sharp cyanophilous spines	3
2' Ectal excipulum of textura prismatica-obliqua; hairs bearing blunt acyanophilic tuberculate warts	4
3 Asci with rounded apex, I-; spores filiform, multiseptate, disarticulating within the ascus	<i>Polaroscyphus</i>
3' Asci with conical apex, I+; spores not filiform, aseptate and not disarticulating	<i>Cistella</i>
4' Ectal excipulum and hairs with violet KOH reaction	<i>Cistellina</i>
Key BE – <i>Genera with incrustated cylindrical to clavate hairs</i>	
1 Hymenium yellow-orange; hairs mostly white; asci hemi- or inamyloid; strictly conifericolous	<i>Lachnellula</i>
1' Combination of characters otherwise	2
2 Ectal excipulum hyaline	3
2' Ectal excipulum pigmented	7
3 Hairs evenly granulate, with crystals	4
3' Hairs without crystals	6
4 Hairs with moderate thick hyaline walls, partially covered with crystals; paraphyses lanceolate, basally with orange content	<i>Capitotricha</i>
4' Hairs hyaline throughout	5
5 Hairs with almost glabrous apical cell, bearing crystal caps; paraphyses lanceolate	<i>Incrucipulum</i>
5' Hairs 0(1)-septate, smooth, bearing spherical crystal caps or upper part incrustated by irregular crystals; paraphyses cylindrical with subclavate apex	<i>Graddonidiscus</i>
6 Hairs evenly granulate; paraphyses lanceolate	<i>Lachnum</i>
6' Hairs granulate, apical part glabrous, mostly with OCI secretion; paraphyses cylindrical to lanceolate, ectal excipulum of textura prismatica	<i>Dasyscyphella</i>
7 Hairs apices covered with crystals or short (-30 µm long) and verrucose (hair dimorphism), pale brown; paraphyses lanceolate	<i>Brunnipila</i>
7' Hairs without crystals (crystals may occur at hair base in <i>Pubigera</i>)	8
8 Ectal excipulum with textura globulosa-angularis	9
8' Ectal excipulum otherwise	12
9 Medullary excipulum consisting of a compactly packed parallel hyphae; hairs mainly cork screw curled, thick-walled	<i>Lasiobelonium</i>
9' Medullary excipulum otherwise	10
10 Apothecia cup-shaped, stipitate; hairs granulate, yellowish; asci I+	<i>Neodasyscypha</i>
10' Apothecia sessile	11
11 Apothecia urceolate, sessile; hairs granulate; asci I+	<i>Solenopezia</i>
11' Apothecia cup-shaped, sessile; hairs with loosely attached granules, pigment dissolving in KOH ; asci I- ...	<i>Perrotia</i>
12 Ectal excipulum of medium gelatinized textura prismatica, with pigment, mostly with violet KOH reaction; asci I-; hairs with tuberculate warts, hyaline	<i>Proliferodiscus</i>

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12' Ectal excipulum not gelatinized	13
13 Ectal excipulum of hyaline or greenish textura prismatica; hairs thick-walled, refractive, septate, smooth or covered by blue-green amorphous material; paraphyses cylindrical to clavate, with obtuse tip; substrate colouring green	<i>Aeruginoscyphus</i>
13' Ectal excipulum not green; substrate not colouring green	14
14 Ectal excipulum of textura prismatica-porrecta, with reddish brown exudate; apothecia stipitate, cyathiform; asci I+; paraphyses branched, embedded in gel; hairs cylindrical, straight to flexuous, irregularly incrustated	<i>Pubigera</i>
14' Ectal excipulum with brownish textura prismatica to angularis	15
15 Apothecia with pruinose hymenium; asci IKI red; paraphyses lanceolate, with granulate wall; on monocotyls	<i>Coronellaria</i>
15' Asci not IKI red; paraphyses not lanceolate	16
16' Hairs cylindrical, helicoid, brownish; asci IKI blue, with croziers	<i>Tapesina</i>

Key C – Genera with naked apothecia with ectal excipulum composed of globular to angular cells

1 Ectal excipulum hyaline	2
1' Ectal excipulum pigmented	10
10 Apothecia discoid, black, subhymenium olive-brown; asci IKI -, with croziers; paraphyses with swollen apices with olive-brown cap; spores one-celled	<i>Patinella</i>

Synonym list

- Allophylaria filicum* (W. Phillips) Svrček
Allophylaria soederholmii Svrček
Allophylaria sublicoides (P. Karst.) Nannf.
Amicodisca brdensis (Velen.) Svrček
Arachnopeziza monoseptata (R. Galán & Raitv.) Huhtinen
Arachnopeziza variepilosa (R. Galán & Raitv.) Huhtinen
Ascocoryne solitaria (Rehm) Dennis
Belonopsis iridis (P. Crouan & H. Crouan) Graddon
Belonopsis junciseda (P. Karst.) Le Gal & Mangelot
Betulina fuscospititata Graddon
Betulina hirta Velen.
Bisporella citrina (Batsch: Fr.) Korf & S.E. Carp.
Bisporella drosodes (Rehm) S.E. Carp.
Bisporella lactea (Sacc.) Stadelmann
Bisporella scolochloae (De Not.) Spooner
Bisporella sulfurina (Sacc.) S.E. Carp.
Calloria neglecta (Lib.) B. Hein
Calloria urticae (Pers.) J. Schröt. ex Rehm
Calloriella umbrinella (Desm.) Höhn.
Calycellina asperipila (Svrček) Baral
Calycellina castanea (Sacc. & Ellis) Dennis
Calycellina phalaridis (Lib. ex P. Karst.) Höhn.
Calycellina populina (Fuckel) Höhn.
Calycina gemmarum (Boud.) Baral
Calycina trabinella (P. Karst.) O. Kuntze
Chalara microchona W. Gams
Chloroscypha cryptomeriae Terrier
Chlorosplenium sericeum (Alb. & Schwein.) Boud.
Ciboria alni (O. Rostr.) N. F. Buchw.
Ciboria batschiana (Zopf) N. F. Buchw.
Ciboria calyculus (Batsch) Hengstm.
Ciboria dumbirensis (Velen.) Spooner 1988
Ciborinia hirtella (Boud.) Batra & Korf
Ciboriopsis bramleyi Dennis
Ciboriopsis simulate (Ellis) Dennis
Cistella atenuipilus Graddon
Cistella hoehnelii Scheuer
Coccomyces juniperi P. Karst.
Coleophoma oleae (DC.) Höhn.
Crustomollisia roburnea (Velen.) Svrček
Cyathicula guttulisporea Baral sp.nov.
Dasyscyphella acutipila (P. Karst.) Baral & Weber
Dasyscyphella pulverulenta (Lib.) Baral
Dematioscypha delicata (Berk. & Broome) Svrček
Diplocarpon earlianum (Ellis & Everh.) F.A. Wolf
Diplocarpon mespili (Sorauer) B. Sutton
Drepanopeziza populi-albae (Kleb.) Nannf.
Discohainesia oenotherae (Cooke & Ellis) Nannf.
Encoelia carpini (Rehm) Boud.
Encoelia fascicularis (Alb. & Schwein.) P. Karst.
Encoelia fuckelii Dennis
Encoelia glauca Dennis
Encoelia pruinosa (Ellis & Eerh.) Torkelson & Eckblad
Encoelia tiliacea (Fr.) P. Karst.
Encoeliopsis loricata (Ettl.) J.W. Groves
Fuscoscycpha acicularum (Velen.) Svrček
Geoglossum arenarium (Rostr.) Lloyd
Geoglossum atropurpureum (Batsch) Pers.
Geoglossum gelatinosum Pers.
Geoglossum glabrum var. *inflatum* Mains
Geoglossum littorale (Rostr.) Nannf.
Geoglossum nigrum Cooke ss.auct. pl.
Geoglossum sphagnophilum Ehrenb.
Heterosphaeria veratri Nespiak & E. Müll.
Heyderia abietis (Fr.) Link
Hyalopeziza pygmaea (Mouton) Huhtinen
Hyaloscypha albohyalina var. *spiralis* (Velen.) Huhtinen
Hyaloscypha aureliella (Nyl.) Huhtinen
Hyaloscypha britannica var. *britannica* Huhtinen
Hyaloscypha britannica var. *roseoguttata* Huhtinen
Hyaloscypha candida (Starbäck) Boud.
Hyaloscypha paludosa Dennis
Allophylaria campanuliformis (Fuckel) Svrček
Micropeziza umbrinella (Desm.) Baral, Helleman & U. Lindemann
Allophylaria subliciformis P. Karst.
Amicodisca virella (P. Karst.) Huhtinen
Resinoscypha monoseptata (R. Galán & Raitv.) T. Kosonen et al.
Resinoscypha variepilosa (R. Galán & Raitv.) T. Kosonen et al.
Ascocoryne albida (Berk.) Seifert
Mollisia iridis (P. Crouan & H. Crouan) Le Gal
Mollisia junciseda P. Karst.
Hyaloscypha fuscospititata (Graddon) Baral & Huhtinen
Urceolella hirta (Velen.) Svrček, De Sloover & Baral
Calycina citrina (Hedw.) Gray
Calycina drosodes (Rehm) Baral & Declercq
Calycina lactea (Ellis & Everh.) Baral, R. Galán & G. Platas
Calycina scolochloae (De Not.) Baral
Calycina clariflava (Grev.) Baral, R. Galán & G. Platas
Calloria tremelloides (Grev.) L. Lombard
Calloria tremelloides (Grev.) L. Lombard
Micropeziza umbrinella (Desm.) Baral, Helleman & U. Lindemann
 "Phialina" *carpinacea* (Velen.) Raitv. & Galán
Micropeziza castanea (Sacc. & Ellis) Baral & Guy Garcia
Mollisia phalaridis (Lib. ex P. Karst.) Rehm
Calycina populina (Fuckel) Kuntze
Gemmina gemmarum (Boud.) Raitv.
Leptodontidium trabinellum (P. Karst.) Baral, Platas & R. Galán
Infudichalara microchona (W. Gams) Réblová & W. Gams
Chloroscypha saeveri Rehm ex Seaver
Aeruginoscyphus sericeus (Alb. & Schein.) Dougoud
Ciboria lentiformis (Velen.) T. Schumach.
Sclerotinia pseudotuberosa (Rehm) Rehm
Sclerotinia pseudotuberosa (Rehm) Rehm
Tatraea dumbirensis (Velen.) Svrček 1993
Ciborinia bresadolae (Rick) J.T. Palmer
Moellerodiscus tenuistipes (J. Schröt.) Dumont
Moellerodiscus lentus (Berk. & Broome) Dumont
Cistella deflexa (Graddon) Raitv.
Cistella graminicola (Raitv.) Raitv.
Colpoma juniperi (P. Karst.)
Dothiora oleae (DC.) Crous
Micropeziza mollisoides (Höhn.) Baral, Helleman & U. Lindemann
Cyathicula paludosa (Velen.) Baral comb. nov.ined.
Albitricha acutipila (P. Karst.) Raitv.
Lachnellula pulverulenta (Lib.) Sasagawa & Hosoya
Dematioscypha delicata (Berk. & Broome) Hosoya
Diplocarpon fragariae (Lib.) Rossman
Entomosporium mespili (DC.) Sacc.
Drepanopeziza castagnei (Desm. & Mont.) Rossman & W.C. Allen
Pilidium lythri (Desm.) Rossman
Sclerencoelia fascicularis (Alb. & Schwein.) Pärtel & Baral
Sclerencoelia fascicularis (Alb. & Schwein.) Pärtel & Baral
Xeropilidium dennisii Baral, Pärtel & G. Marson
Chlorociboria glauca (Dennis) Pärtel & Baral
Sclerencoelia pruinosa (Ellis & Eerh.) Pärtel & Baral
Rutstroemia tiliacea (Fr.) K. & L. Holm
Gremmeniella loricata (Ettl.) Petrini, L.E. Petrini, Laf. & Ouell.
Hyaloscypha acicularum (Velen.) Baral & Huhtinen
Sabuloglossum arenarium (Rostr.) Hustad & al.
Microglossum atropurpureum (Batsch) P. Karst.
Glutinoglossum gelatinosum (Pers.) Hustad & al.
Geoglossum inflatum (Mains) Arauzo
Hemileucoglossum littorale (Rostr.) Arauzo
Geoglossum umbratile Sacc.
Geoglossum glabrum Pers.
Heterosphaeria sublineolata (Thüm.) Leuchtm.
Heyderia cucullata (Batsch : Fr.) Bacyk & Van Vooren
Hyphopeziza pygmaea (Mouton) J.G. Han, Hosoya, H.D. Shin
Hyaloscypha albohyalina var. *spiralis* (Velen.) J.G. Han et al.
Eupezizella aureliella (Nyl.) T. Kosonen, Huhtinen & K. Hansen
Eupezizella britannica (Huhtinen) T. Kosonen, Huhtinen & K. Hansen
Eupezizella roseoguttata (Huhtinen) T. Kosonen, Huhtinen & Hansen
Eupezizella candida (Starbäck) Höhn.
Mimicoscypha mimica T. Kosonen, Huhtinen & K. Hansen

- Hyalotricha salicicola* Graddon
Hymenoscyphus angustisporus Svrček
Hymenoscyphus epiphyllus (Pers.) Rehm ex Kauffman
Hymenoscyphus pileatus (P. Karst.) O. Kuntze
Hymenoscyphus pseudoalbidus V. Queloz & al.
Hymenoscyphus rhytididelpi Svrček 1978
Hymenoscyphus rhodoleucus (Fr.) W. Phillips
Hysteropezizella foecunda (W. Phillips) Nannf. 1936
Hysteropezizella hebridensis Graddon 1977
Hysterostegiella lapponica Défago 1968
Hysterostegiella hydrophila (Bomm., Rouss. & Sacc.) Défago
Incrupila viridipilosa Graddon
Lachnellula tricolor (Sowerby: Fr.) Dennis
Lachnum albidroseum (Rehm) Nannf.
Lachnum brevopilum (Höhn.) Nannf.
Lachnum castaneicola (Graddon) Galán
Lachnum deflexum (Graddon) Galán
Lachnum patulum (Pers.) Rehm
Lachnum pteridialis (Graddon) Spooner
Lachnum tenuissimum (Qué.) Korf & Zhuang
Lachnum washingtonense (Dennis) Nannf.
Lanzia aesculi (Velen.) Svrček
Lanzia luteovirescens (Roberge ex Desm.) Dumont & Korf
Microscypha ellisii Dennis
Microscypha grisella (Rehm) H. & P. Sydow
Mollisia lacustris (Fr.) Gillet
Mollisia humidicola Graddon
Mollisia perelegans Haglund ex Nannf.
Mollisia rabenhorstii (Auersw.) Rehm
Myriosclerotinia vahliana (Rostr.) N. F. Buchw.
Naemacyclus minor Butin
Neobulgaria lilacina (Wulfen) Dennis
Neobulgaria pura (Pers.) Petr. var. *pura*
Neofabraea alba (E.J. Guthrie) Verkley
Niptera filispora (Cooke) Svrček
Niptera melatephroides Sacc.
Niptera phaea (Rehm) Sacc.
Niptera pilosa (Crossl.) Boud.
Niptera pulla (W. Phillips & Keith) Boud.
Pachydisca pilatii Svrček
Perrotia phragmiticola (P. Henn. & Ploettn.) Dennis
Pezicula carnea (Cooke & Ellis) Rehm
Pezicula corni Petr.
Pezicula houghtonii (W. Phillips) Massee
Pezicula paradoxa Dennis
Pezizella ericae D. J. Read
Pezizella roburnea Velen.
Pezizella sordida (Fuckel) Fuckel
Phacidium aquifolii (DC.) Höhn.
Phacidium coniferarum (G.G. Hahn) DiCosmo & al.
Phacidium infestans P. Karst.
Phacidium multivalve (DC.) Kunze & J.C. Schmidt
Phaeohelotium italicum (Sacc.) Dennis
Phialina puberula (Lasch) Dennis
Phragmiticola rhopalospermum (Kirschst.) Sherwood
Poculum henningsianum (Plötn.) T. Schumach. & L. M. Kohn
Poculum petiolorum (Roberge) Dumont & Korf
Propolis faginea (Schrud.) P. Karst.
Propolis versicolor (Fr.) Fr.
Protounguicularia barbata var. *barbata* (Velen.) Huhtinen
Protounguicularia barbata f. *resinacea* (Dennis) Huhtinen
Pseudohelotium vernale (Velen.) Svrček
Pseudopeziza bistortae (Lib.) Fuckel
Pyrenopeziza eriophori E. Müll.
Pyrenopeziza lychnidis (Desm.) Rehm
Pyrenopeziza lycopi (Rehm) Rehm
Pyrenopeziza nervicola (Desm.) Boud.
Rutstroemia macrospora (Peck) Kanouse
Rutstroemia paludosa (E.K. Cash & Davidson) Groves & Elliott
Rutstroemia rhenana (Kirschst.) Dennis
Rutstroemia sydowiana (Rehm) White
Sarcoleotia platypus (DC.) Maas Geest.
Sarcoleotia turficola (Boud.) Dennis
Sclerotinia aschersoniana Henn. & Plötn.
Urceolella hirta (Velen.) Svrček, De Sloover & Baral
Calycina subcitrina (Velen.) Baral
Phaeohelotium epiphyllum (Pers.) Hengstm.
Ombrophila pileata (P. Karst.) P. Karst.
Hymenoscyphus fraxineus (T. Kowalski) Baral, Queloz, Hosoya
Bryoscyphus dicrani (Ade & Höhn.) Spooner
Roseodiscus rhodoleucus (Fr.) Baral
Hysteronaevia scirpina (Peck) Nannf. 1984
Hysteronaevia scirpina (Peck) Nannf.
Hysteronaevia scirpina (Peck) Nannf.
Hysteropezizella hydrophila (Bomm., Rouss. & Sacc.)
Hyphodiscus viridipilosa (Graddon) Baral
Proliferodiscus tricolor (Sowerby: Fr.) Baral
Lachnum luteodiscum (Peck) Haines
Lachnum grevillei (Berk.) Nannf. var. *sporid longis*
Dasyscyphella castaneicola (Graddon) Raitv.
Cistella deflexa (Graddon) Raitv
Capitotricha bicolor (Bull.) Baral
Cistella pteridialis (Graddon) ...
Lachnum pudicellum (Qué.) Schröter
Albotricha washingtonensis (Dennis) Raitv.
Hymenoscyphus aesculi (Velen.) Baral & E. Rubio
Rutstroemia luteovirescens (Roberge ex Desm.) W.L. White
Psilachnum ellisii (Dennis) Weber & Baral
Microscypha arenula (Alb. & Schwein.) Svrček
Niptera lacustris (Fr.) Fr.
Mollisia luctuosa Boud.
Mollisia olivascens (Feltgen) Le Gal & Mangelot
Mollisia nervicola (Desm.) Gillet
Myriosclerotinia ciborium (Vahl: Fr.) Holst-Jensen & al. ined.
Cyclaneusma minus (Butin) DiCosmo, Peredo & Minter
Ombrophila lilacina (Wulfen) Baral
Ombrophila pura (Pers.)
Neofabraea vagabunda (Desm.) P.R. Johnst.
Mollisia filispora (Cooke) Baral
Nimbomollisia (*Niptera*) *macrospora* (P. Karst.) Nannf.
Mollisia phaea Rehm
Mollisia pilosa (Crossland) Baral & T. Richter
Mollisia pulla (W. Phillips & Keith) Baral
Hymenoscyphus eichleri (Bres.) Baral
Perrotia distincta (Peck) Haines
Pezicula cinnamomea (DC.: Fr.) Sacc.
Pezicula cornina (Peck) P.R. Johnst.
Pezicula sepium (Desm.) Dennis
Pezicula aesculea Kirschst.
Pezoloma ericae (D. J. Read) Baral
Micropeziza mollisioides (Höhn.) Baral, Helleman & U. Lindemann
Calycina vulgaris (Fr.) Baral
Phacidium lauri (Sow.) Crous & D. Hawksw.
Allantophomopsiella pseudotsugae (M. Wilson) Crous
Gremmenia infestans (P. Karst.) Crous
Phacidium lauri (Sow.) Crous & D. Hawksw.
Calycina italica (Sacc.) Baral
Calycellina punctata (Fr.) Lowen & Dumont
Phragmiticola phragmitis (Daern. & House) Magnes
Rutstroemia henningsiana (Plötn.) Dennis
Rutstroemia petiolorum (Roberge) White
Propolis farinosa (Pers.) Fr.
Propolis farinosa (Pers.) Fr.
Oilla transiens (Höhn.) Baral
Oilla transiens (Höhn.) Baral
Pseudohelotium sordidulum (P. Karst.) Huhtinen
Pseudorhytisma bistirtae (DC.) Juel
Lachnum eriophoricola Nannf.
Pirottaea lychnidis (Desm.) Suková
 "Phacidium" (*Spilopodia*) *simulatum* Berk. & Broome
Mollisia nervicola (Desm.) Gillet
Tatraea macrospora (Peck) Baral
Rutstroemia henningsiana (Plötn.) Dennis
Encoelia rhenana (Kirschst.) Baral & Marson
Poculum sydowiana (Rehm) Dumont
Sarcoleotia globosa (Sommerf.: Fr.) Korf
Ascocoryne turficola (Boud.) Korf
Gloeotinia aschersoniana (Henn. & Plötn.) Baral

Skyttea cruciata Sherwood, D. Hawksw. & Coppins	Rhymbocarpus cruciatus (Sherwood & al.) Etayo & Diederich
Skyttea thallophila (P. Karst.) Sherwood, D. Hawksw. & Coppins	Unguiculariopsis thallophila (P. Karst.) W.Y. Zhuang
Symphysirinia heraclei E.A. Ellis	Symphysirinia angelicae E.A. Ellis
Tapesia strobilicola (Rehm) Sacc.	Mollisia fallax (Desm.) Gillet
Thuemenidium arenarium (Rostr.) Korf	Sabuloglossum arenarius (Rostr.) Hustad & al.
Trichoglossum leucosporum Benkert & Hardtke	Leucoglossum leucosporum (Benkert & Hardtke) Arouza
Trichopeziza albotestacea (Desm.) Sacc	Albotricha albotestacea (Desm.)
Trichopeziza hepaticola Grelet & Croz.	Hyaloscypha hepaticola (Grelet & Croz.) Baral & al.
Trichopezizella myricae (P. Karst.) K. & L. Holm	Obscurodiscus myricae (P. Karst.) Raitv.
Tympanis piceina J.W. Groves	Tympanis hypopodia Nyl.
Tympanis pinastri (Pers.) Tul. & C. Tul.	Trybliopsis pinastri (Pers.) P. Karst.
Tympanis pithya (P. Karst.) P. Karst.	Tympanis truncatula (Pers.) Rehm
Unguicularia costata Boud.	Olla costata (Boud) Baral comb. nov. ined.
Unguicularia scrupulosa (P. Karst.) Höhn.	Olla scrupulosa (P. Karst.) Svrček
Unguicularia millepunctata (Lib.) Dennis	Olla millepunctata (Lib.) Svrček
Unguiculella xylemicola H.C. Bøhler	Urceolella pani (Velen.) Huhtinen
Urceolella conspicua Huhtinen	Urceolella juniperi (Velen.) Huhtinen
Urceolella salicicola Raschle	Urceolella hirta (Velen.) Svrček, De Sloover & Baral
Verpatinia calthicola Whetzel	Scleromitrlula calthicola (Whetzel) T. Schumach. & Holst-
Verpatinia morchelloides (Mains) A. Redhead	Scleromitrlula morchelloides (Mains) T. Schumach. & Holst-Jensen
Verpatinia spiraeicola Dennis	Scleromitrlula spiraeicola (Dennis) T. Schumach. & Holst-Jensen
Vibrissea torrenticola	Vibrissea flavovirens (Pers.) Korf & J.R. Dixon
Vibrissea pezizoides	Vibrissea flavovirens (Pers.) Korf & J.R. Dixon
Zoellneria rosarum Velen.	Chaetomella oblonga Fuckel

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