

Morels and the like

All species belong to the operculate cup fungi, *i.e.* *Ascomycota*, and have an exposed hymenium and asci that open with a lid (an operculum). All have inamyloid asci. They produce the largest fruitbodies (apothecia) within the ascomycotes – species of *Morchella* ▷ and *Gyromitra* ▷▷ can reach more than 20 cm in height. The

hymenophore is often highly folded, resulting in the hymenium having a large surface area.

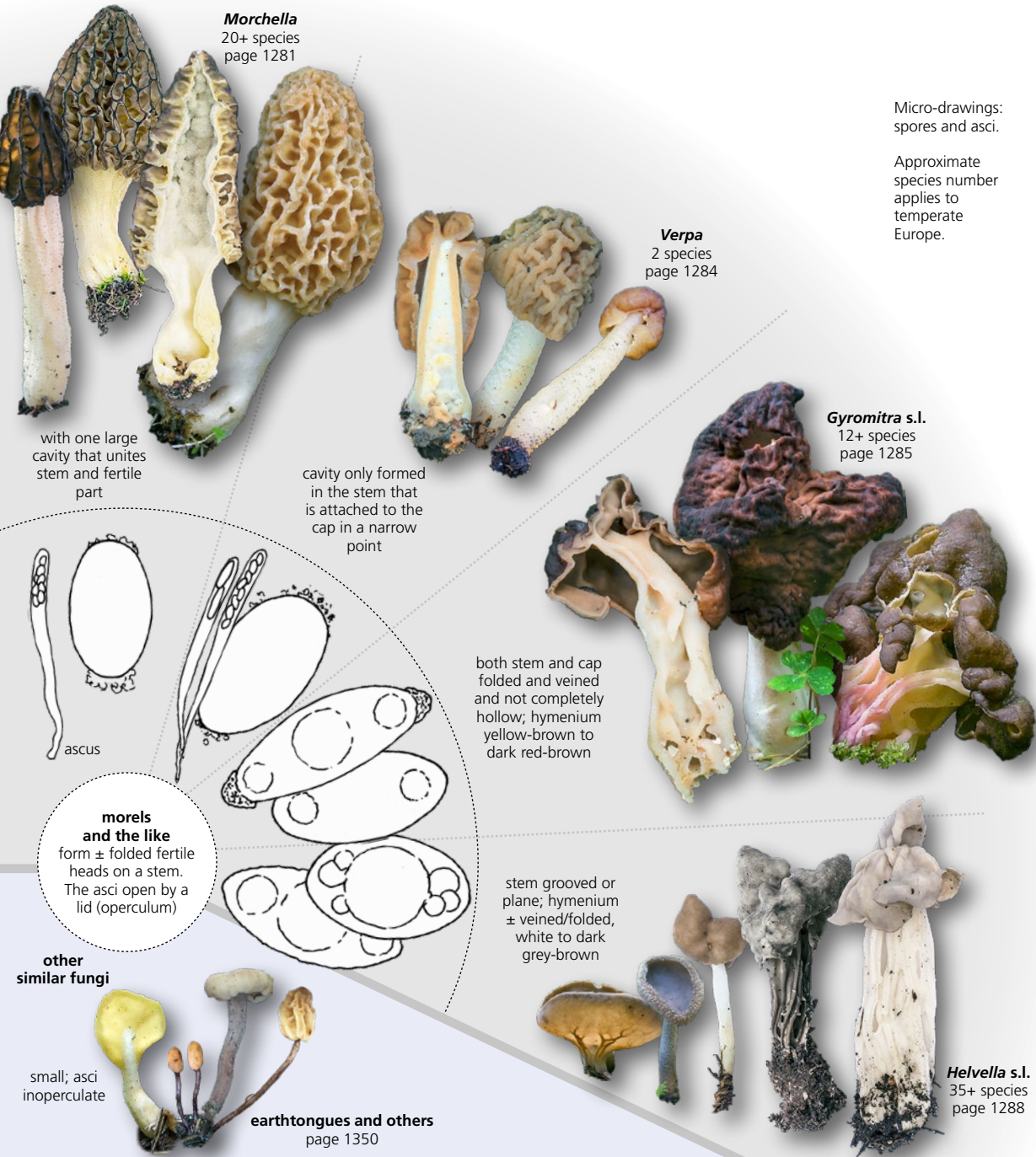
Morchella may form mycorrhizal-like associations with plants, *e.g.* with *Rosaceae*, *Ulmus* or herbs. *Gyromitra* is saprotrophic, while *Helvella* is ectomycorrhizal.

OTHER SIMILAR FUNGI:

– some species in the group ‘earthtongues and the like’ may look similar to tiny morels. These, however, have inoperculate asci (page 1350).

See also the main wheel, page 1278.

FURTHER READING: 101, 180, 266, 301 328.

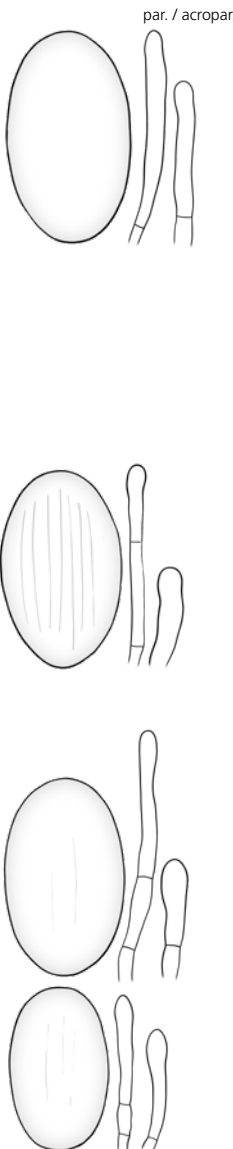


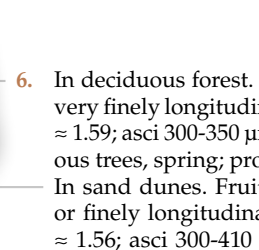
Key to groups of morel-like fungi

1. Stem and top forming one continuous cavity **key A – *Morchella***
Top not forming a continuous cavity with the stem 2
2. Spores without large, internal drops but often with small drops outside the ends; fruitbodies a stem fused to the central underside of a hanging, bell-shaped cap **key B – *Verpa***
Spores with large, internal drops and without small drops outside the ends (but possible with apical ornaments); fruitbodies sessile or stipitate with a cup-shaped, saddle-shaped or irregularly folded top 3
3. Fruitbodies sessile or stipitate with a cup-shaped to irregularly folded top; spores often with two drops near the ends, rarer with one central drop **key C – *Gyromitra* s.l.**
Fruitbodies sessile or stipitate with a cup-shaped, saddle-shaped or irregularly folded top; spores often with one large, central drop surrounded by two or more smaller drops **key D – *Helvella* s.l.**

Key A – *Morchella*

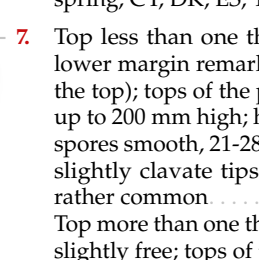
1. The vertical main ridges of the top are split in two (somewhat like the gill edge of *Schizophyllum*). Fruitbodies up to 150 mm high, slender; hymenium first ± vinaceous grey, then clay pink, clay buff to fawn; ridges orange brown when bruised; spores (21-) 23-25 × (13-) 14-16 μm, Qav. ≈ 1.6; asci up to 350 μm long; paraphyses with somewhat fusiform tips; acroparaphyses (sterile cells at the ridges) cylindrical to clavate; with deciduous and coniferous trees; southern ***Morchella tridentina* (Mel-2)**
Vertical ridges not split in two 2
2. Pattern at mature fruitbodies dominated by open, 4-6-edged pits or dense, almost labyrinthine folds; ridges becoming ± orange brown to brownish orange (■ ■ ■) when bruised; acroparaphyses (sterile cells at the ridges) at maturity embedded in brownish orange (■) goo 3
Pattern at mature fruitbodies dominated by oblong, longitudinal crests and open pits; ridges becoming rather dark grey brown (■ ■ ■); acroparaphyses; ascoparaphyses at maturity imbedded in dark brown (■) goo 7
3. Top at mature fruitbodies with compressed, almost labyrinthine folds (pits); known from dry grassland, especially after fire. Fruitbody up to 120 × 90 mm, but often smaller; spores smooth to finely longitudinally striate in cotton blue, 18-24 (29) × (10-) 11.5-14 (-16.5) μm; Q 1.5-1.8; asci 300-370 μm long; paraphyses with clavate tips; spring to early summer, eastern Europe ***Morchella steppicola* (Mes-1)**
Top with open, 4-6-edged pits; with deciduous shrubs and trees 4
4. Smell weak; hymenium buff to cinnamon buff (■ ■ ■); pits of ± equal size; top-stem transition without a furrow [*Morchella esculenta* s.l.] 5
Smell strong; hymenium at mature fruitbodies mostly rather dark grey brown (■ ■ ■ ■ ■), rarely paler; pits of very varying size; top-stem transition often with a small furrow [*Morchella vulgaris* s.l.] 6
5. Spores on average more than 21.5 μm long; with various deciduous trees. Fruitbody to 220 mm high; spores smooth to very finely longitudinally striate in cotton blue, (19-) 21-24 (-26) × (12-) 13-15 (-16) μm, Qav. ≈ 1.65; asci 250-300 μm long; paraphyses ± cylindrical; with deciduous trees, spring; widespread and rather common ***Morchella esculenta* (Mes-8)**
Spores on average less than 21.5 μm long; mostly with *Populus* and *Fraxinus*. Fruitbody to 220 mm high; spores smooth to very finely longitudinally striate in cotton blue (17-) 18-22 (-24) × 11-13 (-15) μm, Qav. ≈ 1.55; asci 225-325 μm long; paraphyses tips cylindrical to clavate is known; known from Germany, France and Spain, spring; probably rare and possibly introduced from North America ***Morchella americana* (Mes-4)**





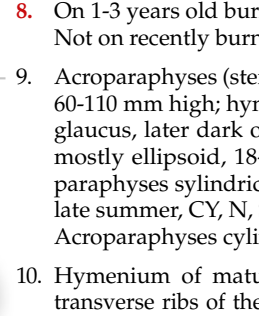
6. In deciduous forest. Fruitbodies up to 150 mm high; spores smooth or very finely longitudinally striate in cotton blue, 20-23 x 12-14.5 µm, Qav. ≈ 1.59; asci 300-350 µm long; paraphyses with clavate tips; with deciduous trees, spring; probably widespread *Morchella vulgaris* (Mes-17 s.l.)

In sand dunes. Fruitbodies up to 80 (-120) mm high; spores smooth or finely longitudinally striate in cotton blue, 19-21 x 13-14 µm, Qav. ≈ 1.56; asci 300-410 µm; paraphyses with cylindrical to clavate tips; spring; CY, DK, ES, TR *Morchella dunensis* (Mes-17)



7. Top less than one third of the full height of the fruitbody; the tops lower margin remarkably free (incision to ¼ or ⅓ of the total height of the top); tops of the paraphyses clavate to almost capitate. Fruitbodies up to 200 mm high; hymenium pinkish buff, fawn to dark grey brown; spores smooth, 21-28 x 12-16 µm; asci 70-310 µm long; paraphyses with slightly clavate tips; with deciduous trees, spring; widespread and rather common *Morchella semilibera* (Mel-3)

Top more than one third of the full height of the fruitbody; margin only slightly free; tops of the paraphyses cylindrical to clavate 8

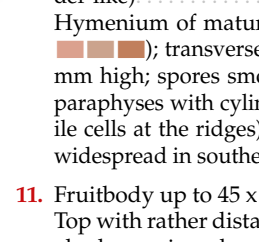


8. On 1-3 years old burned places 9

Not on recently burned places 11

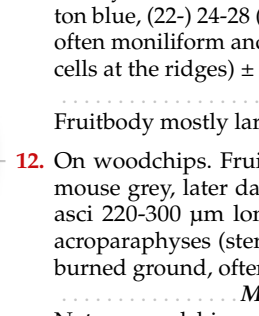
9. Acroparaphyses (sterile cells at the ridges) strongly capitate. Fruitbody 60-110 mm high; hymenium first buff to olivaceous buff, rarely almost glaucous, later dark orange brown; spores smooth, shape variable, but mostly ellipsoid, 18-25 (-27) x 12-17 (-19) µm; asci 175-320 µm long; paraphyses cylindrical or with somewhat clavate tips; spring or rarely late summer, CY, N, S, TR *Morchella exuberans* (Mel-9)

Acroparaphyses cylindrical, fusiform to subcapitate 10



10. Hymenium of mature fruitbodies rather dark brown (☞ ■■■■); transverse ribs of the top (mature specimens) remarkably parallel (ladder-like) see *Morchella importuna*, cp. xxx

Hymenium of mature fruitbodies caly pink, clay buff to cinnamon (☞ ■■■■); transverse ribs of the top more irregular. Fruitbody up to 110 mm high; spores smooth, 20-23 (-24) x 13-15 µm; asci 240-310 µm long; paraphyses with cylindrical to slightly clavate tips; acroparaphyses (sterile cells at the ridges) clavate; under recently burned *Pinus* spp., spring; widespread in southern Europe *Morchella eximia* (Mel-7)

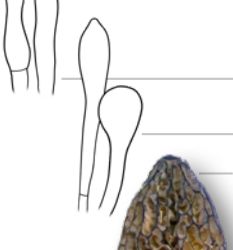
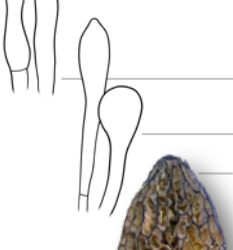


11. Fruitbody up to 45 x 10 mm large; spores on average about 26 x 16 µm. Top with rather distant ridges, fawn to grey brown, ridges and possibly also hymenium downy; spores smooth to extremely finely striate in cotton blue, (22-) 24-28 (-31) x 15-18 µm; asci 300-340 µm long; paraphyses often moniliform and with small, capitate tips; acroparaphyses (sterile cells at the ridges) ± fusiform; with deciduous trees; southern, rare *Morchella pulchella* (Mel-31)

Fruitbody mostly larger; spores smaller 12

12. On woodchips. Fruitbody up to 200 mm high; hymenium first pale mouse grey, later dark brown; spores smooth, 18-24 x 10-13 (-14) µm; asci 220-300 µm long; paraphyses with cylindrical to clavate tips; acroparaphyses (sterile cells at the ridges) clavate; on woodchips and burned ground, often in towns and gardens, spring; widespread *Morchella importuna* (*M. elata* ss. Clowez) (Mel-10)¹

Not on woodchips 13



13. Acroparaphyses (sterile cells at the ridges) tips cylindrical to ± clavate 14

Acroparaphyses tips ± fusiform to capitate 15



14. Hymenium ± downy; spore-Q-av. ≈ 1.55. Fruitbody up to 100 mm high; hymenium fawn to dark orange brown (☞ ■■■■); spores smooth to finely longitudinally striate in cotton blue, shape quite variable, (18.5-) 20-27 x (10-) 12-17 µm; asci 200-300 µm long; paraphyses with clavate tips; on disturbed soil, often with coniferous trees, late spring; widespread *Morchella norvegiensis* (Mel-19)

Hymenium smooth (?); spore-Q-av. ≈ 2. Fruitbody up to 90 mm high; hymenium clay pink, fawn to vinaceous grey (☞ ■■■■); spores smooth or extremely finely wrinkled-striate in cotton blue, (19-) 21-24 (-25) x 10-13 µm, Qav. ≈ 1.56; asci 280-310 µm; paraphyses with ± clavate tips; on disturbed soil with deciduous and coniferous trees, spring; northern *Morchella eximoides* (Mel-16)



15. Acroparaphyses tips ± capitate. Fruitbody up to 150 mm high; hymenium vinaceous to vinaceous grey (☞ ■■■■); spores smooth to finely longitudinally striate in cotton blue, (21-) 23-27 (-30) x 13-16 (-17) µm; asci 280-310 mm long; paraphyses with clavate tips; with coniferous and deciduous trees, often in gardens, spring; widespread *Morchella purpurascens* (Mel-20)

Acroparaphyses tips ± fusiform 16



16. Fruitbody up to 60 mm high; spores 12-14 µm wide. Hymenium fawn to orange brown; spores smooth to finely longitudinally striate in cotton blue, 21-25 x 12-14 µm; asci 280-370 mm long; paraphyses somewhat moniliform; with coniferous trees, spring; probably widespread *Morchella conifericola* (Mel-32)

Fruitbody up to 150 mm high; spores 14-17 mm wide. Hymenium clay pink, fawn to dark grey brown; spores smooth or very finely wrinkled-striate in cotton blue, (21-) 22-26 x (13.5-) 14-17 (-18) µm, Qav. 1.56; asci 250-450 mm long; with coniferous trees, early spring; probably widespread and rather common *Morchella deliciosa* (Mel-26)



1. *Morchella oweri*, described from China, where it is cultivated, is very similar, but probably has less regular transverse ribs. It probably has been introduced to Europe, where it grown on woodchips.

Key B – *Verpa*

1. Hymenium planar (not folded); asco 8-spored; spores 21-25 x 11-15 µm. Fruitbody up to 130 x 30 mm (but often smaller); hymenium cinnamon to cinnamon-buff; stem whitish; asci to 350 µm long; paraphyses with somewhat clavate tips; on calcareous soil among deciduous shrubs and in grassland, spring; widespread but rare *Verpa conica*
Hymenium folded into wrinkles; asci 2-spored; spores 55-87 x 17-20 µm. Fruitbody up to 150 x 40 mm; hymenium dull orange brown to curry-yellow; stem whitish; asci up to 350 µm long; paraphyses ± cylindrical; on calcareous soil among deciduous shrubs, spring; south-eastern, rare *Verpa bohemica*

Key D - *Gyromitra* s.l.

The key contains only stemmed species. For the non-stemmed species, see key M, page xxx.

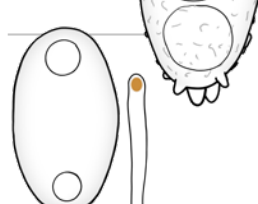
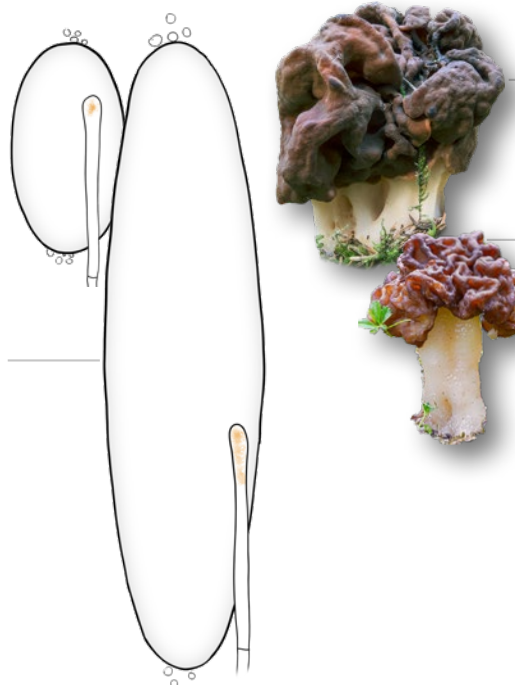
Spores measured from dry material (†), when nothing else is mentioned. Note that it may be difficult to find mature spores – try always to obtain a pore deposit.

Spring species:

Discina gigas, *Discina grandis*, *Gyromitra esculenta*, *Gyromitra splendida*, *Pseudoverpa anthracobia*.

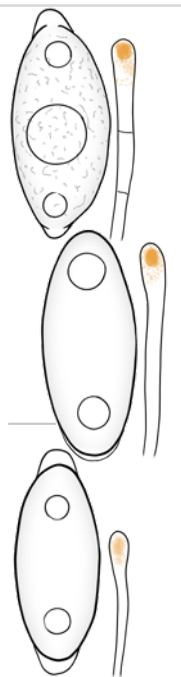
1. Stem with pinkish (☹️) shades; spores spherical. Fruitbody up to 180 mm high; hymenium reddish brown to fawn; stem cream above; spores smooth, 8-12 µm; asci 100-320 µm long; paraphyses with clavate tips; on coniferous and deciduous wood, summer; continental, very rare *Pseudorhizina korshinskii?*
Stem white, cream to brownish (☺️); spores ellipsoidal to fusiform 2
2. Top with two to three pointed tips 3
Top with rounded, brainlike folds 5
3. Spores 20-23 µm long. Fruitbody up to 180 x 140 mm; hymenium orange brown, red brown to dark vinaceous brown; stem whitish to brown; spores smooth, 20-23 x 7.5-10 µm; asci 200-260 µm long; paraphyses with clavate to capitate tips; on deciduous wood, autumn; widespread, rather common *Paragyromitra infula*
Spores on average more than 23 µm long 4
4. On soil and debris near *Pinus*; spores 7.5-12 µm wide. Like *Paragyromitra infula*, but hymenium with more vinaceous brown colours; spores smooth, 22-33 (-37) x 7.5-12 µm; asci 210-280 µm long; paraphyses with somewhat clavate tips; summer-autumn; mostly northern, rare *Paragyromitra ambigua*
On wood in deciduous forests; spores 12-14 µm wide. Fruitbody up to 270 x 180 mm; hymenium red brown; stem whitish to cream; spores finely reticulate in cotton blue, 26.5-36.5 x 12-14 µm; spring-early summer; continental, rare *Neogyromitra grandis*
5. Stem cylindrical; hymenium hairy; asci 150-270 µm long; on burned ground. Fruitbody 10-40 (-60) x 10-30 mm; hymenium yellowish brown to dark reddish brown; stem finely tomentose, white to cream; spores smooth with two drops (16-) 18-21 (-22) x (9-) 10-11.5 (-12) µm; paraphyses cylindrical to slightly clavate at the tips; spring; very rare *Pseudoverpa anthracobia*
Stem compressed or furrowed; hymenium smooth; asci more than 270 µm long; not on burned ground 6

2. If this and the North American species *Pseudorhizina sphaerospora* are conspecific, the latter name has priority.



6. Spores finely reticulate, with no drops but with apical appendages; typically in association with rotten wood of conifers. Fruitbodies up to 140 x 130 mm; hymenium orange brown to reddish brown; stem relatively thick, white to cream; spores finely reticulate in cotton blue 23-32 x 10-15 µm; asci 290-330 µm; paraphyses clavate at the tips; spring; widespread *Maublancomyces gigas*³
Spores smooth, with two drops and without apical appendages; on soil and woodchips near *Pinus* 7
7. Spores ellipsoidal. Fruitbodies typically 2-3-times higher than wide; hymenium orange brown, reddish brown to dark reddish brown; stem white to cream; spores 20-27 x 9.5-12.5 µm; asci 330-350 µm long; paraphyses ± cylindrical; on the ground, associated with *Pinus*, spring; widespread *Gyromitra esculenta*
Spores fusiform with a loosening perispore at the ends. Fruitbodies strikingly slender, up to 120 x 70 mm; hymenium ± brown; stem 50-80 x 15-25 mm, buff to pale brown; spores 23-28 x 11.5-13.5 µm; asci ca. 280 µm long; paraphyses ± cylindrical; on the ground, associated with *Pinus*, spring; northern, rare *Gyromitra splendida*

***Gyromitra neuwirthi*?**



3. *Discina ticiniana*, known from southern Europe should have more narrow spores (smooth, w24-28 x 8-10 µm), but intermediates are reported. It prefers deciduous forest.

Key D - *Helvella* s.l.

The key contains species with morchelloid and cup-shaped, $\pm$ stipitate fruitbodies.

Spores measured from dry material (†), when nothing else is mentioned.

Temperate spring species (at low altitudes):

Dissingia confusa – cupulate

Dissingia leucomelaena – cupulate

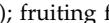
Helvella acetabulum – cupulate

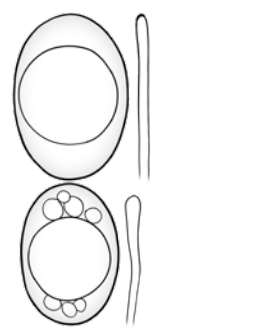
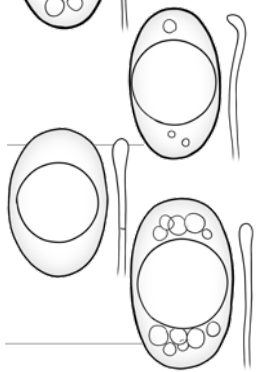
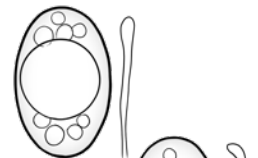
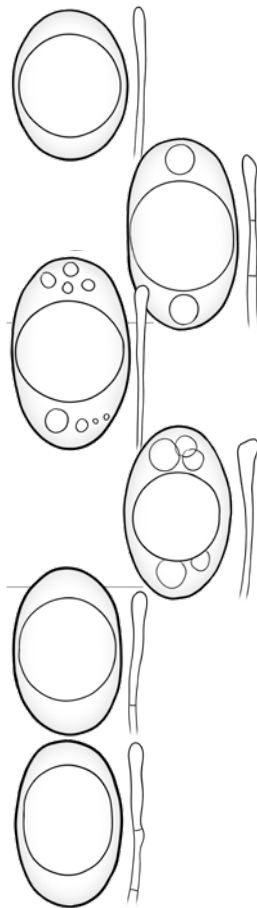
Helvella fusca – saddle-shaped with ribbet stem

Helvella monarchella – saddle-shaped with ribbet stem

Helvella queletiana – saddle-shaped with ribbet stem

- | | | |
|-----|--|---------------------------------------|
| 1. | Stem or base veined to intricately ribbed | 2 |
| | Stem not veined, but often compressed or with a few longitudinal ribs | 22 |
| 2. | Top cup-shaped | 3 |
| | Top saddle-shaped to irregularly folded | 11 |
| 3. | Fruiting from spring to middle of June (later at high altitudes – <i>Morchella</i> -season) | 4 |
| | Fruiting from summer to autumn | 6 |
| 4. | With broadleaved trees; short stipitate; hymenium yellowish brown to cinnamon (☞   ); asci with croziers. Fruitbody 15-70 mm wide; outside downy, pale yellowish brown to pale cinnamon; stem whitish; spores 15.5-19 x 10.5-11.5 µm | <i>Helvella acetabulum</i> |
| | With conifers; sessile to short stipitate; hymenium ± greyish brown (☞    ); asci without croziers | 5 |
| 5. | With <i>Pinus</i> ; with a reduced stem; hymenium dark grey brown (☞   ); spores 10.5-13 µm wide. Fruitbody 15-70 (-100) mm wide; outside downy, pale grey brown, whitish below; spores 19.5-24 x 10.5-13 µm | <i>Dissingia leucomelaena</i> |
| | With <i>Picea</i> ; with an obvious stem; hymenium grey brown to fawn (☞  ); spores 12-15 µm wide. Fruitbody 10-40 mm wide; outside downy, pale grey brown, whitish below; spores 19-24 x 12-15 µm | <i>Dissingia confusa</i> |
| 6. | Ribs almost only at the stem | 7 |
| | Ribs extending far up the underside of the top | 9 |
| 7. | Hymenium dark brown (☞   ); stem white to cream (☞  ). Fruitbody 20-60 (-80) mm wide; outside downy, pale grey to olivaceous buff; stem downy; spores 18-22 x 11.5-13 µm | <i>Helvella solitaria</i> |
| | Hymenium ± black (☞   ); stem grey to black (☞    ) | 8 |
| 8. | Outside and margin almost smooth; mostly arctic-alpine; probably not associated with <i>Salix</i> . Fruitbody 10-30 mm wide, sometimes almost saddle-shaped; outside grey to black; stem dark grey, paler below; spores 17-21 x 10-12.5 µm | <i>Helvella philonotis</i> |
| | Outside and especially margin with black or pale warts; both alpine and lowland; associated with <i>Salix</i> | see <i>Helvella corium</i> , cp. 24xx |
| 9. | Spores 17.5- 21 µm long; asci without croziers. Fruitbody 15-50 mm wide, outside almost smooth, ± dull yellowish brown; stem paler; spores 17.5-21 x 10.5-13 µm | <i>Dissingia oblongispora</i> |
| | Spores 14-17.5 µm long; asci with croziers | [<i>Helvella costifera</i> s.l.] 10 |
| 10. | Hymenium ± brown (☞   ); margin often paler. Fruitbody 20-75 mm wide; outside delicately downy, pale greyish brown with whitish veins; stem downy, whitish below; spores 14.5-17.5 x 9.5-12 µm | <i>Helvella calycina</i> |
| | Hymenium ± grey to brownish grey (☞    ); margin concolorous | |

- (?). Fruitlet body 15-40 mm wide; outside delicately downy, pale grey to olivaceous buff with whitish veins; stem downy, whitish below; spores 14-16.5 x 10.5-13.5 µm *Helvella costifera*
11. Hymenium white to pale brown (☞ ); [*Helvella crispa* s.l.] 12
Hymenium brown, grey to blackish (☞ ) 15
12. Stem and head pinkish buff to olivaceous buff (☞ ). Top 30-70 mm wide, outside and stem finely downy; spores 16-19 x 10-12 µm *Helvella leucophaea*
Stem and/or head paler (☞ ) 13
13. Top with the margin partially fused to the stem. Top 6-20 mm wide, outside almost smooth; hymenium white to greyish cream; spores 15-18 x 10-13 µm *Helvella pallescens*
Margin totally free of the stem 14
14. Outside almost smooth; stipe 15-30 mm long; asci 240-260 µm long. Top 15-30 mm wide; hymenium white to cream; stem white; spores 15.5-17 x 10-12 µm *Helvella lactea*
Outside pubescent; stipe 30-120 (-200) mm long; asci 270-320 µm long. Top 15-60 mm wide; hymenium white to cream; spores 18-21.5 x 11-12.5 µm *Helvella crispa*
15. Top arched, with age possibly somewhat folded; outside of top strongly veined 16
Top saddle-shaped, then 2-3-4-lobed to brain-like folded; outside veined or not 17
16. Fruiting from spring to early summer (June); spores 17-19 µm long. Top 20-30 mm wide, outside delicately downy; hymenium greyish to brownish; stem pale mouse grey; spores 17-19 x 11-13.5 µm; with deciduous trees (e.g. *Fagus*) *Helvella queletiana*
Fruiting from summer to autumn; spores 15-16 µm long. Top 5-15 mm wide; hymenium dark grey; stem pale grey; spores 15-16 x 9-10 µm *Helvella phlebophora*
17. Hymenium ± brown (☞ ); stem white, cream to pinkish buff (☞ ); fruiting from spring to middle of June; with *Populus*. Top 15-40 mm wide, outside almost smooth to delicately downy; spores 17.5-21 x 11-13 µm *Helvella fusca*
Hymenium grey to black (☞ ); stem ± grey, but paler than the hymenium; from summer to autumn; with various trees [*Helvella lacunosa* s.l.] 18
18. Spores on average up to 16.5 µm long. Top 10-40 mm wide, outside almost smooth; hymenium pale to dark mouse grey or almost black; stem almost smooth, pale mouse grey; spores 14-17 x 10.5-13 µm *Helvella sulcata*
Spores on average more than 16.5 µm long 19
19. In bogs. Top 10-45 mm wide, margin sometimes partially fused to the stem, outside almost smooth; hymenium dark grey; stem relatively thin compared to the top, paler grey; spores 16.5-19 x 10-12.5 µm; mostly subalpine *Helvella palustris*
Ecology different 20
20. With a dark mouse grey to black (☞ ) hymenium and a conspicuously paler (☞ ) stem; margin at mature specimens often bend away from the stem. Top 30-60 mm wide, often fused to the stem at several points, outside almost smooth; spores 17-19 x 9-11.5 µm; with coniferous and deciduous trees, *Dryas* and arctic herbs; mostly boreal to arctic-alpine *Helvella lacunosa*
Hymenium and stem more uniformly grey to black (☞ ); margin mostly bend towards the stem 21





21. Hymenium and stem ± uniformly grey (☹️); paraphyses somewhat bend at the top. Top 20-60 mm wide, outside dark mouse grey, almost smooth; hymenium dark mouse grey; stem almost smooth, ± mouse grey; spores 16.5-19 x 10.5-12 µm *Helvella nigra*
Hymenium and stem ± black (☹️); paraphyses not bend at the top. Top 5-15 mm wide, outside downy, mouse grey; hymenium mouse grey; stem downy, mouse grey; spores 15.5-18.5 x 10-12.5 µm *Helvella atra* ss. Skrede

22. Top cup-shaped to flat 23
Top ± saddle-shaped to irregularly folded 28

23. Spores 50-60 x 10-15 µm, fusiform; top up to 10 mm wide. Hymenium dark vinaceous brown; outside paler, hairy to felted; spores smooth (in SEM finely warty), living spores multi-guttulate with one large guttule at each end, dead spores with one large guttule; often along river banks *Pindara terrestris*
Spores smaller, ± elliptical; top mostly wider 24

24. Hymenium black (☹️); outside and especially margin with black or pale warts. Top 10-50 mm wide; hymenium ± black; outside and stem dark mouse grey to black, often with some ribs near the base; spores 18-22 x 11-13 µm; both alpine and lowland; associated with *Salix* *Helvella corium*⁴
Hymenium grey to brownish (☹️); outside and margin without warts 25

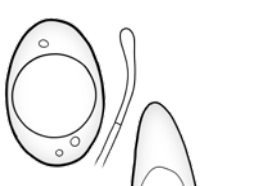
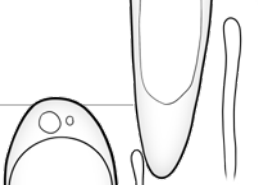
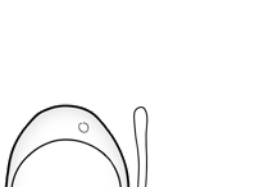
25. Spores on average up to 20 µm long; outside downy to moderately hairy 26
Spores on average more than 20 µm long; outside downy to distinctly hairy 27

26. Hymenium ± olivaceous buff to almost curry-yellow (☹️). Top 20-35 mm wide, outside delicately downy; stem downy, brownish; spores 17-21 x 10-11.8 µm; with conifers and deciduous trees, often in roadsides *Helvella pubescens*
Hymenium greyish brown to mouse grey (☹️). Top 10-25 mm wide, outside downy, greyish brown to mouse grey; stem downy, pores 17-21 µm long, ellipsoid, almost smooth. Spores 17-21 x 9-12.5 µm *Helvella fibrosa*

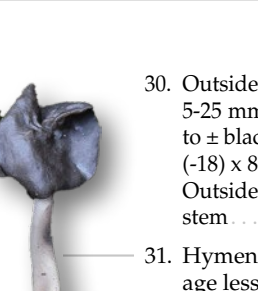
27. Spores up to 20-27 µm long, ± fusiform and often with fine warts (best seen in Cotton Blue); outside very hairy; hymenium ± grey, greyish brown to dark greyish brown (☹️). Top 20-30 mm wide; hymenium; stem greyish, paler below; spores 20-27 x 9-12 µm; with deciduous trees, often in roadsides and on rotten wood *Helvella macropus*
Spores up to 22 µm long, ellipsoid, smooth; outside downy; hymenium ± cinnamon (☹️). Top 5-20 mm wide, outside downy; stem clay buff to whitish, downy; spores 20.5-22 x 12-14.5 µm *Helvella hypocrateriformis*⁵

28. Fruiting from spring to middle of June (later at high altitudes – *Morchella*-season). Top 10-35 mm wide, margin bend away from the stem, outside almost smooth; hymenium very dark brown; stem whitish; spores 20.5-24 x 12.5-15 µm *Helvella monachella*
Fruiting from summer to autumn 29

29. Hymenium very dark (☹️) 30
Hymenium whitish, pinkish buff, olivaceous buff to medium grey (☹️) 32





30. Outside of the top hairy to warty; margin bend away from the stem. Top 5-25 mm wide, margin bend away from the stem; hymenium dark brown to ± black; stem hairy, whitish, brown to grey, paler below; spores 14.5-16.5 (-18) x 8.5-9.5 (-12) µm, sometimes slightly warty *Helvella pezizoides*
Outside of the top almost smooth; margin mostly bend towards from the stem 31

31. Hymenium dark grey to black (☹️); stem hairy; spores on average less than 11 µm wide. Top 10-20 mm wide, outside almost smooth; stem hairy, ± grey; spores 17-19 x 10-11 µm *Helvella fallax* (= *Helvella atra* ss. van Voren & Dissing)
Hymenium dark grey (☹️); stem downy; spores on average more than 11 µm wide. Top 5-15 mm wide, outside somewhat downy; stem grey, sometimes with a whitish base; spores 17.5-19 x 10.5-12 µm *Helvella pulla*

32. Outside of top mouse grey and hairy to warty. Top 5-20 mm wide, outside downy to hairy; hymenium olivaceous buff, grey to grey brown; stem cream to ± olivaceous buff; spores 19-21.5 x 10.5-12.5 µm *Helvella sublicia*
Outside whitish and/or smooth to finely downy 33

33. The margin of the top fused with the stem in several points; outside smooth. Fruitbody strongly elastic; underside of top almost smooth; hymenium clay-buff to cinnamon (5-7D4-8); spores 19-22 x 10.5-12 µm; flesh ± gelatinized *Helvella elastica*
Margin free of the stem; outside most often downy or warty 34

34. Hymenium whitish, pinkish buff to olivaceous buff (☹️) 35
Hymenium darker brown to grey (☹️) 37
[*Helvella bicolor* s.l.]

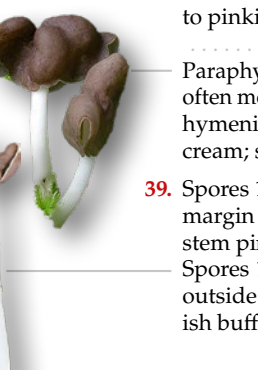
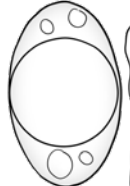
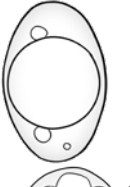
35. Fruitbody 5-10 (-15) mm wide; outside white, hymenium white to pale olivaceous buff (☹️). Outside and stem downy to warty; spores 16-22 x 11-14 µm, av. ≈ 20.4 x 12.9 µm; Qav. 1.5-1.6 *Helvella corbierei*
Fruitbody larger; possibly with darker colours 36

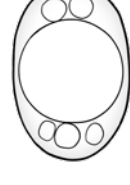
36. Fruitbody strongly elastic; flesh ± gelatinized; spores 11.5-13.5 mm wide, Q 1.6-1.7. Hymenium pale buffish; underside of top finely downy, paler; spores 19-24 x 11.5-13.5 µm *Helvella panormitana*
Fruitbody not strongly elastic; flesh hardly gelatinized; spores 12-18 µm wide, Q 1.3-1.5. Top 15-30 mm wide; hymenium whitish, pinkish buff to olivaceous buff; outside almost smooth, whitish; spores 18-21 x 12-18 µm *Helvella levis*

37. Paraphyses wider towards the tips 38
Paraphyses cylindrical 39

38. Paraphyses widest just below the tips; asci 300-340 µm long; stem 15-35 mm long. Top 12-30 mm wide; hymenium honey-yellow; stem whitish to pinkish buff, almost smooth; spores 19.5-22.5 x 12-13 µm *Helvella danica*
Paraphyses widest at the tips (clubshaped); asci 260-300 µm long; stem often more than 35 mm long. Top 5-15 mm wide, outside almost smooth; hymenium clay buff to dark cinnamon; stem almost smooth, whitish to cream; spores 19-22 x 11-13.5 µm *Helvella bicolor*

39. Spores 18-20 x 11.5-12.5 µm; asci 270-300 mm long. Top 5-15 mm wide, margin free, outside delicately downy; hymenium dull orange brown; stem pinkish buff, downy *Helvella carnosa*
Spores 19-21.5 x 12-13.5 µm; asci 300-320 µm long Top 5-10 mm wide, outside delicately downy; hymenium ± dull orange brown; stem pinkish buff *Helvella fistulosa*




4. A number of similar species with tops 5-20 mm wide are found in arctic/alpine climate zones. *Helvella alpina* has a longer stipe. *Helvella nannfeldtii* has a pale stipe base and a downy, not warty margin. *Helvella alpestris* and *H. macrosperma* are small with short, black stipes.

5. The very similar *Helvella scyphoides*, described from a single Norwegian specimen, is maybe a bit more grey-brown.

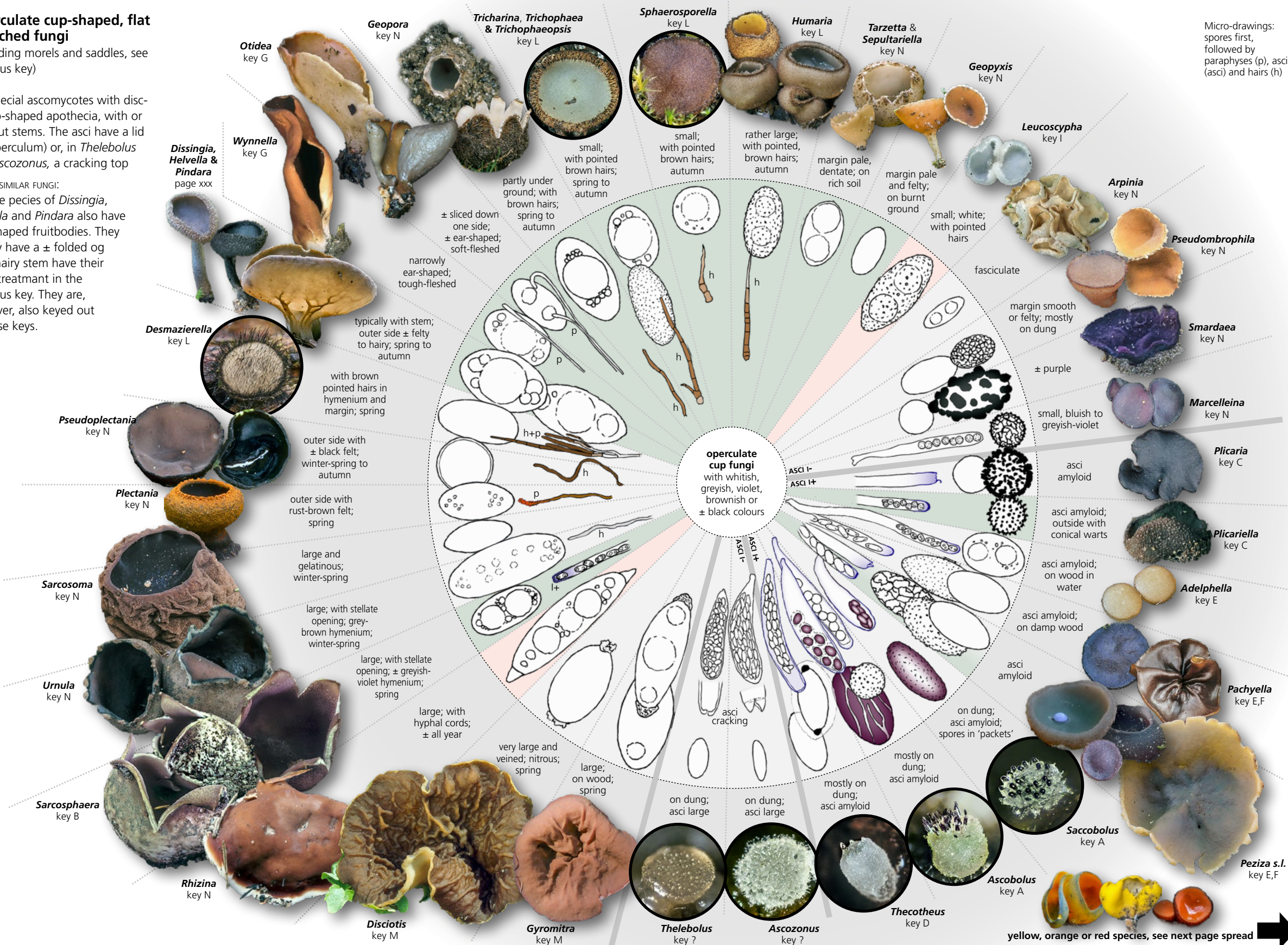
Operculate cup-shaped, flat or arched fungi

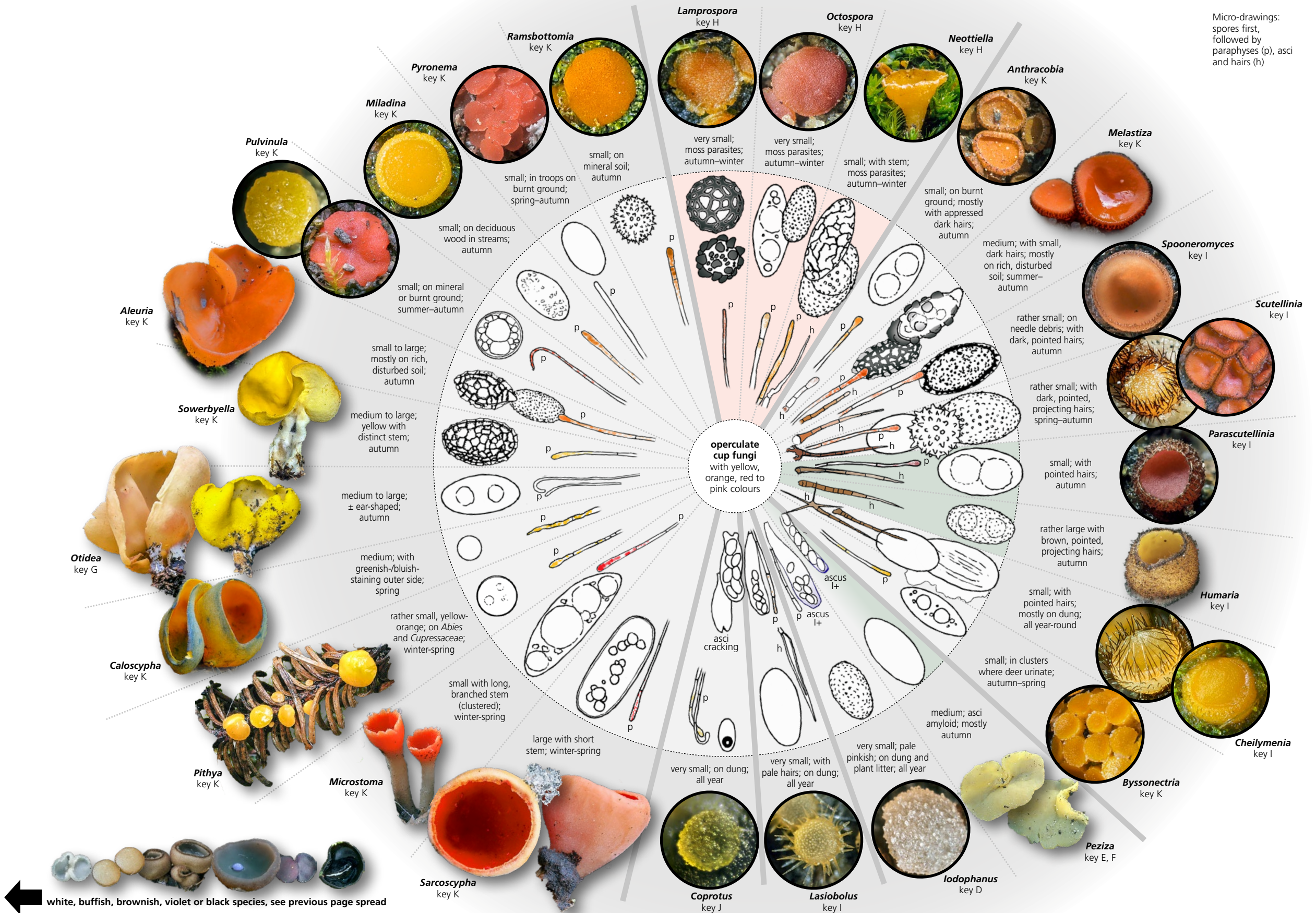
(excluding morels and saddles, see previous key)

Apothecial ascomycotes with disc- to cup-shaped apothecia, with or without stems. The asci have a lid (an operculum) or, in *Thelebolus* and *Ascozonus*, a cracking top

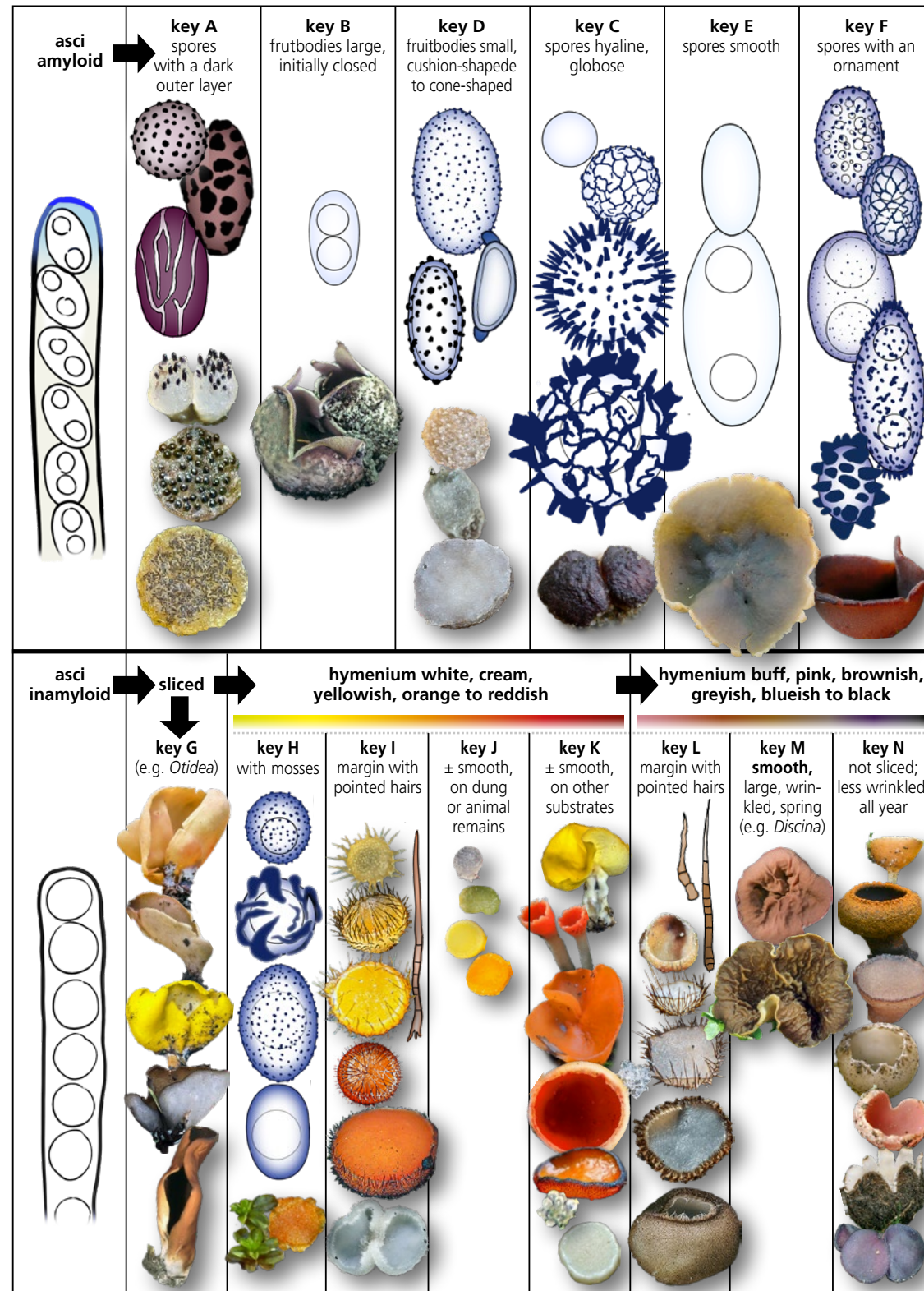
OTHER SIMILAR FUNGI:

– some species of *Dissingia*, *Helvella* and *Pindara* also have cup-shaped fruitbodies. They mostly have a ± folded or long hairy stem have their main treatment in the previous key. They are, however, also keyed out in these keys.





Overview of the keys to the operculate cup-shaped, flat or arched fungi



How to microscope cup fungi

- Make a preparation in tap water to measure the spores and observe guttules in these. Use discharged spores, preferably from a deposit on a slide. Don't include the ornament in the measurement.
- Make a preparation in cotton blue or chlorazol black B (Chlorazolschwarz) to observe possible spore ornaments. Photograph the top surface to illustrate this.
- Make a preparation in an iodine reagent to observe possible amyloid reactions of the asci.

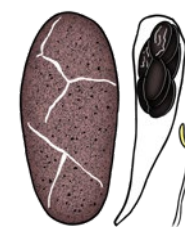
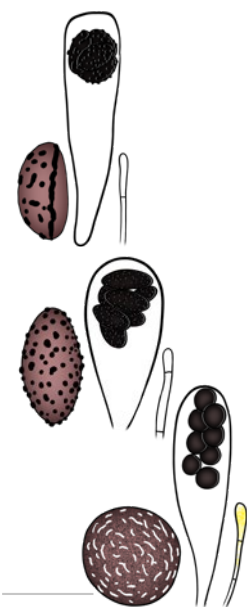
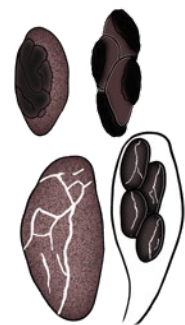
Key to groups of operculate, cup-shaped to flat or arched operculate fungi

- | | | |
|-----|---|--|
| 1. | Mature spores with a dark violet, dark brown to black outer wall (an episore) often cracking or breaking into flakes or dark warts on a pale background | [<i>Ascobolus</i> & <i>Saccobolus</i>] . . key A |
| | Mature spores hyaline to pale brown | 2 |
| 2. | Asci (and hymenium) I+ | 3 |
| | Asci I- | 7 |
| 3. | Fruitbodies initially as closed, 50-120 mm broad, hollow balls, later splitting from the top into triangular rays and then exposing an greyish violet hymenium | [<i>Sarcosphaera</i>] . . key B |
| | Fruitbodies open from the start, mostly smaller | 4 |
| 4. | Spores globose | key C |
| | Spores ellipsoid to spindle-shaped | 5 |
| 5. | Fruitbodies 0.2-3 (-8) mm wide, cushion-shaped to cone-shaped; hymenium whitish, salmon, pale apricot-orange, clay buff or greyish (☞ ); on dung or rotten, moist debris or moist earth | [<i>Iodophanus</i> & <i>Thecotheus</i>] . . key D |
| | Fruitbodies 1-200 mm wide, mostly cup-shaped and/or hymenium with brighter or darker colours; on a wide range of substrates incl. dung | 6 |
| 6. | Spores smooth | key E |
| | Spores with an ornament (x 1000 and coloured in cotton blue) | key F |
| 7. | Fruitbodies sliced at one side | key G |
| | Fruitbodies not sliced at one side | 8 |
| 8. | In association with mosses or liverworts; fruitbodies mostly small and orange | key H |
| | Not in association with mosses or liverworts; fruitbodies often different | 9 |
| 9. | Hymenium white, cream, yellowish, orange to reddish (☞ ); paraphyses in coloured species often with yellow, orange or red guttules | 10 |
| | Hymenium pinkish, buff, brownish, greyish, blueish to blackish (☞ ); paraphyses in dark species often with brownish to violet guttules | 12 |
| 10. | Margin with pointed (setose) hairs | key I |
| | Margin smooth, floccose or with hyphoid or adpressed, blunt hairs | 11 |
| 11. | On dung or animal remains; fruitbodies often less than 1 mm wide (asci operculate or opening by a vertical tear) | key J |
| | On other substrates; often larger | key K |
| 12. | Margin with pointed hairs | key L |
| | Margin smooth, floccose or with blunt or hyphoid hairs | 13 |
| 13. | Fruitbodies large (more than 40 mm wide); hymenium mostly coarsely wrinkled; first ± cup-shaped but soon arched; spring species | key M |
| | Fruitbodies smaller; and/or hymenium not coarsely wrinkled; all year round | key N |

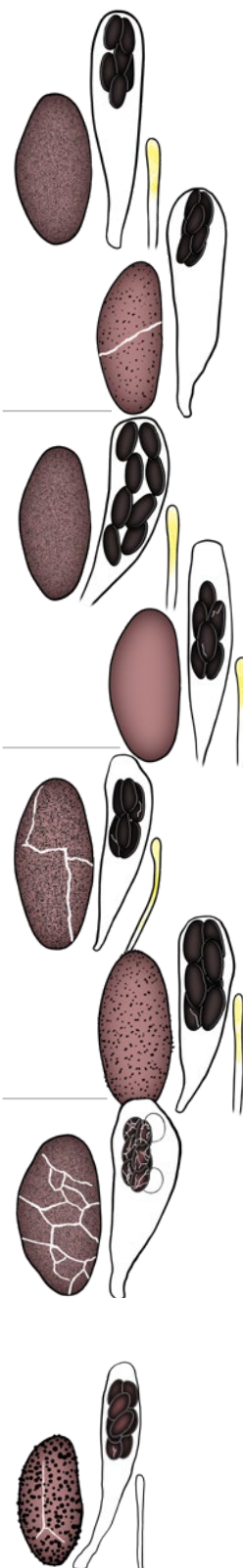


Key A – with amyloid asci and dark spores (*Ascobolus* & *Saccobolus*)

1. Spores gathered in a cluster, typically glued together and situated in the upper half of the ascus [*Saccobolus*] .. 2
Spores free and more distributed in the ascus [*Ascobolus*] .. 22
2. Asci 4-spored 3
Asci 8-spored 4
3. Spores 11-13.5 x 7-9.5 µm. Fruitbody 0.2-0.5 mm wide, whitish to pale lilac; asci club-shaped; spores spindle-shaped, Qav. ≈ 1.4; spore cluster 26-31 x 11-14 µm, with surrounding slime coat; paraphyses tips club-shaped to branched; saprobic, known from dung of goose; rare or overlooked *Saccobolus chenocopriscus*
Spores 16.5-19.5 x 9.5-10.5 µm. Fruitbody 0.4-0.7 mm wide, dark brown to lilac; asci club-shaped; spores ellipsoid to spindle-shaped to subglobose, Qav. ≈ 1.8, longitudinally striped; spore cluster 42-51 x 14-17 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, known from dung of goose; rare or overlooked *Saccobolus quadrisporus*
4. Spore clusters globose to broadly ellipsoid (Q below 1.4) 5
Spore clusters more oblong 6
5. Spores ± triangular in section (somewhat like the single segments of an orange) and only with warts on the outward-facing parts; asci club-shaped with a rather flat top. Fruitbody 0.1-0.5 mm wide, whitish; asci club-shaped; spores spindle-shaped, 11.5-14.5 x 5-9 µm, Qav. ≈ 1.8, with ± rounded warts; spore cluster 19-26 x 15-20 µm, without slime coat; paraphyses tips club-shaped; saprobic, known from dung of dog, fox, rabbit, mouse, raven, pheasant and finch; rare or overlooked *Saccobolus dilutellus*
Spores more round in section and mostly with warts on all surfaces; asci pear-shaped with an arched top. Fruitbody 0.1-0.4 mm wide, whitish; asci balloon-shaped; spores spindle-shaped, 11.5-13.5 x 5.5-7 µm, Qav. ≈ 2, with ± rounded warts; spore cluster 17-25 (-39) x 15-22 µm, without slime coat; paraphyses tips club-shaped; saprobic, known from dung of horse, rodents; rare or overlooked *Saccobolus globuliferellus*
6. Spores globose. Fruitbody 0.2-0.5 mm wide, yellowish; asci club-shaped, 8-spored; spores 10-11 x 10-11 µm, Qav. ≈ 1, with ± oblong to sinuose warts; spore cluster 44-85 x 11-22 µm, with surrounding slime coat; paraphyses tips club-shaped, with yellow content; saprobic, known from dung of sheep; rare or overlooked *Saccobolus sphaerosporus*
Spores ellipsoid to spindle-shaped 7
7. Fruitbodies yellowish (☹️🟡🟡🟡); paraphyses with yellow content; spore clusters with surrounding slime coat, with four rows of each two, longitudinally oriented spores 8
Fruitbodies first whitish, rose or lilac (☹️🟡🟡🟡), later often brownish; paraphyses without yellow contents; spore clusters often with 1-sided, 2-sided or 2-ended slime coats; spore clusters either with some rows of 3 spores or with some oblique spores 14
8. Spores more than 22 µm long. Fruitbody 0.2-1 mm wide, yellowish; asci club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 22-29 x 8.5-14.5 µm, Qav. ≈ 2.2; spore cluster 50-68 x 16-25 µm, with surrounding slime coat; paraphyses tips club-shaped to branched; saprobic, known e.g. from dung of cow, horse, sheep, deer and bear; rather common *Saccobolus glaber*
Spores shorter 9



9. Spores on average less than 17 µm long 10
Spores on average more than 17 µm long 11
10. Spore clusters shortening at maturity and cluster-Q then approaching 1.6. Spores smooth or very finely warted and at maturity possibly with a slightly cracking episore. Fruitbody 0.1-0.3 mm wide, yellowish to pale brown; asci club-shaped, 8-spored; spores spindle-shaped, 14-17.5 x 7.5-8.5 µm, Qav. ≈ 1.9; spore cluster 29-42 x 16-19 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, known from dung of cow, horse, sheep, rabbit, raven and partridge; rather common *Saccobolus truncatus*
Spore clusters not shortening at maturity, cluster-Q persistently 2-2.5. Fruitbody 0.1-1 mm wide, yellowish to pale brown; asci club-shaped, 8-spored; spores spindle-shaped, 11.5-17 x 5.5-8 µm, Qav. ≈ 2.1, with ± rounded warts; spore cluster 29-42 x 12-16 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, known from dung of cow, goat, sheep, deer, burro and muskrat; rare or overlooked *Saccobolus minimus*
11. Spore clusters at maturity rather loose (spores not glued together by dark pigment). Fruitbody 0.2-1 mm wide, yellowish; asci club-shaped, 8-spored; spores spindle-shaped, 16-19.5 x 7.5-10.5 µm, Qav. ≈ 1.9; spore cluster 34-40 (-50) x 19-24 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, on debris and dung of pig; rare or overlooked *Saccobolus saccoboloides*
Spore cluster more compact (spores glued together by dark pigment) 12
12. Spores smooth but possibly cracking. Fruitbody 0.2-0.6 mm wide, yellowish; asci club-shaped, 8-spored; spores spindle-shaped, 18.5-20 x 8-10 µm, Qav. ≈ 2.1; spore cluster 46-50 x 15-16.5 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, known from dung of muskox; rare or overlooked *Saccobolus ovibovinus*
Spores with small warts 13
13. Spores 7.5-9 (-9.5) µm wide; all spores maturing normally. Fruitbody 0.1-0.3 mm wide, yellowish; asci club-shaped, 8-spored; spores spindle-shaped, 16-22 x 7.5-9 µm, Qav. ≈ 2.3, with ± rounded warts; spore cluster 45-50 x 16-25 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, known from dung of cow, horse, sheep, goat and birds; rare or overlooked *Saccobolus citrinus*
Spores 9-10 µm wide; spore clusters often with several spores that remain pale. Fruitbody 0.1-0.2 mm wide, yellowish; asci club-shaped, 8-spored; spores spindle-shaped, 16-20.5 x 9-10 µm, Qav. ≈ 1.9, with ± rounded warts; spore cluster 37-55 x 14-19 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, known from dung of deer, horse; rare or overlooked *Saccobolus succineus*
14. Dark episore almost smooth, but cracking into a mesh-like pattern. Fruitbody 0.1-0.3 mm wide, pinkish to pale lilac; asci club-shaped, 8-spored; spores spindle-shaped, 17.5-19 x 8.5-9.5 µm, Qav. ≈ 2; spore cluster 44-50 x 16-19 µm, slime coat 2-ended; paraphyses tips club-shaped; saprobic, known from dung of sheep, deer; rare or overlooked *Saccobolus reticulatus*
Episore warty or with distant plates 15
15. Dark episore finely warty 16
Dark episore breaking into coarse, distant plates or warts 18
16. Spore clusters up to 37 µm long; spores 10-15 µm long. Fruitbody 0.1-0.3 mm wide, whitish to pale lilac; asci club-shaped, 8-spored; spores spindle-shaped, 10-15 x 5-7.5 µm, Qav. ≈ 2, with ± rounded warts; spore cluster 28-37 x 10-13 µm, slime coat 1-sided or 2-ended; paraphyses tips club-shaped; saprobic, known from dung of e.g. horse, cow, sheep, deer, chamois, rabbit and hare; rare or overlooked *Saccobolus depauperatus*



- Spore clusters more than 37 µm long; spores mostly more than 15 µm long 17
17. Outer side of fruitbody with very small, whitish scales. Fruitbody 0.1-0.5 mm wide, whitish to pale lilac; asci club-shaped, 8-spored; spores spindle-shaped, 16-19 x 7-8.5 µm, Qav. ≈ 2.2; spore cluster 38-52 x 12-17 µm, with surrounding slime coat; paraphyses tips club-shaped; saprobic, known from dung of sheep and rabbit; rare or overlooked *Saccobolus caesariatus*
Outer side of fruitbody without small, whitish scales. Fruitbody 0.2-1.5 mm wide, pale lilac to dark brown; asci club-shaped, 8-spored; spores spindle-shaped, 13-21.5 x 6.5-9.5 µm, Qav. ≈ 2.1; spore cluster 40-62 x 14-21 µm, slime coat 1-sided or 2-ended; paraphyses tips club-shaped to branched; saprobic, on dung or debris of e.g. cow, horse, goat, sheep, deer, hare, rabbit, lemming, muskrat and mouse; rather common *Saccobolus versicolor*
18. Spore clusters at maturity rather loose (spores not glued together by dark pigment). Fruitbody 0.1-0.3 mm wide, whitish to pinkish to pale lilac; asci club-shaped, 8-spored; spores spindle-shaped, 16.5-17.5 x 6.5-7.5 µm, Qav. ≈ 2.4, with ± rounded, oblong to sinuose warts; spore cluster not well defined in size, slime coat 1-sided; paraphyses tips club-shaped to branched; saprobic, on dung or debris of pheasant; rare or overlooked *Saccobolus eleutherosporus*
Spore clusters more compact (spores glued together by dark pigment) 19
19. Spores on average more than 18 µm long; spore clusters 41-60 x 18-24 µm. Fruitbody 0.1-0.7 mm wide, whitish to pale lilac; asci club-shaped, 8-spored; spores spindle-shaped, 17.5-23 x 8.5-15 µm, Qav. ≈ 1.7; spore clusters 41-60 x 18-24 µm, slime coat 1-sided; paraphyses bent to straight, contents hyaline; saprobic, known from dung of deer and cow; rather common *Saccobolus beckii*
Spores on average less than 18 µm long; spore clusters smaller 20
20. Spore clusters with gelatinous coatings at each end. Fruitbody 0.2-0.4 mm wide, whitish to pale lilac to pinkish; asci club-shaped, 8-spored; spores spindle-shaped, 15-18 x 9-10 µm, Qav. ≈ 1.7, with ± rounded warts; spore clusters 39-43 x 15-18 µm, slime coat 2-ended; paraphyses tips club-shaped; saprobic, known from dung of sheep; rare or overlooked *Saccobolus tuberculatus*
Spore clusters with 1-sided, slime coat 21
21. Fruitbodies first white, later bluish-violet, outside with tufts of whitish hyphae. Fruitbody 0.1-0.2 mm wide; asci club-shaped, 8-spored; spores spindle-shaped, 12.5-17 x 5-9 µm, Qav. ≈ 2, with ± rounded warts; spore clusters 33-39 x 11-16 µm; paraphyses tips club-shaped; saprobic, known from dung of deer; rare or overlooked *Saccobolus verrucisporus*
Fruitbodies ± brown without tufts of whitish hyphae. Fruitbody 0.2-0.8 mm wide, dark brown; asci club-shaped, 8-spored; spores spindle-shaped, 13.5-18 x 7.5-9.5 µm, Qav. ≈ 1.8, with ± rounded warts; spore clusters (23-) 26-43 x 13-19 µm; paraphyses tips club-shaped; saprobic, on debris of rotten fabric or dung of donkey, goat, horse, hare and rabbit; rather common *Saccobolus obscurus*
22. Spores globose to subglobose (Q below 1.2) 23
Spores more oblong 25
23. Episore forming dark, rounded warts. Fruitbody 0.2-1.5 mm wide; hymenium flat to arched, whitish; asci cylindrical, 8-spored; spores globose, 10-13.5 x 10-13.5 µm, Qav. ≈ 1, 0-guttulate, without slime coat; paraphyses tips cylindrical to branched; saprobic, on dung of fox, lemming, rabbit, hare, mouse, owl-pellets and on rotten cabbage; rather common *Ascobolus brassicae*
Episore breaking into a striped to mesh-like pattern 24
- Detailed illustrations of various Saccobolus and Ascobolus species. The drawings show fruitbodies of different sizes and colors (whitish, lilac, brown, violet), and individual spores with various shapes (spindle-shaped, globose, oblong) and surface patterns (smooth, warty, striped, mesh-like). Some drawings also show asci (club-shaped or cylindrical) and paraphyses (tips club-shaped or branched).

24. Spores 11.5-13.5 µm wide. Fruitbody 0.5-2 mm wide; hymenium flat to arched, yellowish; asci cylindrical to club-shaped, 8-spored; spores globose, 11.5-13.5 x 11.5-13.5 µm, Qav. ≈ 1, with interconnected striped pattern, 0-guttulate, slime coat 1- to 2-sided; paraphyses tips club-shaped; saprobic, known from dung of dog; rare or overlooked *Ascobolus crosslandii*
Spores 13-15.5 µm wide. Fruitbody 0.1-0.5 mm wide; hymenium flat to arched, yellowish; asci club-shaped, 8-spored; spores globose to subglobose, 13-19.5 x 13-15.5 µm, Qav. ≈ 1.1, with incomplete mesh-like pattern, 0-guttulate, with surrounding slime coat; paraphyses tips cylindrical to club-shaped; saprobic, known from dung of e.g. goose, sheep and deer; rare or overlooked *Ascobolus reticulatus*¹
25. Episore loosening to form a strongly wrinkled/pustulose covering. Fruitbody 0.3-0.6 mm wide; hymenium flat to arched, yellowish; asci club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 12-15 x 6.5-8.5 µm, Qav. ≈ 1.8, 0-guttulate, without slime coat; paraphyses tips ± head-shaped; saprobic, known from dung of voles; rare or overlooked *Ascobolus rhytidosporus*
Episore different 26
26. Spores predominately with transverse stripes. Fruitbody 0.4-1 mm wide; hymenium flat to cup-shaped, yellowish; asci cylindrical to club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 11.5-14.5 x 6-8.5 µm, Qav. ≈ 1.7, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped; saprobic, known from dung of rat; rare or overlooked *Ascobolus lineolatus*
Spores different 27
27. Episore at maturity cracking into a net-like pattern with many transverse connections 28
Episore not cracking or cracking into longitudinal cracks 32
28. Spores 24-27 µm long. Fruitbody 0.3-0.5 mm wide; hymenium arched, yellowish; asci cylindrical to club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 24-27 x 11-13 µm, Qav. ≈ 2.1, 0-guttulate, slime coat 1- to 2-sided; paraphyses tips club-shaped; saprobic, known from dung of cow; very rare *Ascobolus densereticulatus*
Spores shorter 29
29. Spores up to 17 µm long 30
Spores longer than 17 µm 31
30. Spores 10-12.5 mm long; on burnt ground. Fruitbody 0.4-1.2 mm wide; hymenium flat to arched, dark brown; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 10-12.5 x 6.5-7.5 µm, Qav. ≈ 1.6, with mesh-like pattern, 0-guttulate, without slime coat; paraphyses tips club- to head-shaped; saprobic; rare or overlooked *Ascobolus pusillus*
Spores 13-17 µm long; on dung. Fruitbody 0.5-1.5 mm wide; hymenium flat, whitish; asci cylindrical, 8-spored; spores ellipsoid to spindle-shaped, 13-17 x 7-8.5 µm, Qav. ≈ 1.9, with mesh-like pattern, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped to branched; saprobic, known from dung of capercaillie and grouse; rare or overlooked *Ascobolus carletonii*
31. Episore with a mesh-like pattern from the beginning. Fruitbody 0.3-1 mm wide; hymenium arched to flat, dark brown; asci cylindrical to club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 19-22.5 x 11-13.5 µm, Qav. ≈ 1.6, 0-guttulate, without slime coat; paraphyses tips club-shaped to branched; saprobic, on soil; rare or overlooked *Ascobolus behmitziensis*
- Detailed illustrations of various Ascobolus species. The drawings show fruitbodies of different sizes and colors (yellowish, brown, dark brown), and individual spores with various shapes (globose, ellipsoid, spindle-shaped) and surface patterns (striped, mesh-like, smooth). Some drawings also show asci (cylindrical or club-shaped) and paraphyses (tips club-shaped or branched).

1. *Ascobolus grandisporus* (Spain) has even larger, 32-36 µm wide spores. Known from dung of rabbit.

49. Paraphyses tips surrounded by colourless (□) slime; fruitbody rather dark brown (■). Fruitbody 0.3-0.5 mm wide; hymenium arched, dark brown; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 20-26 x 11.5-13 µm, Qav. ≈ 1.8, with ± rounded warts, 0-guttulate, slime coat 1- to 2-sided; paraphyses tips club-shaped; saprobic, known from dung of cow, horse, hare, rabbit; very rare

Ascobolus boudieri

Paraphyses tips surrounded by yellowish (■) slime; fruitbody ± yellowish (■)

50. Spores 19-24 x 10-12 µm. Fruitbody 0.3-0.5 mm wide; hymenium flat to arched, yellowish; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 19-24 x 10-12 µm, Qav. ≈ 1.9, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped; saprobic, on dung of horse, hare and rabbit and on rotting leaves; rare or overlooked

Ascobolus mancus

Spores 23-29 x 11.5-15 µm. Fruitbody 0.3-0.5 mm wide; hymenium flat to arched, yellowish; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 23-29 x 11.5-15 µm, Qav. ≈ 1.9, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped, branched to cylindrical; saprobic, known from dung of e.g. horse, cow, rabbit, hare and goose; rare or overlooked

Ascobolus elegans

51. Spores on average more than 31 µm long
Spores shorter

see *Ascobolus degluptus*, cpl. xx

52. Young fruitbodies whitish (■); paraphyses tips surrounded by colourless slime
Young fruitbodies yellowish to vinaceous (■); paraphyses tips surrounded by yellowish to vinaceous slime

53. Spores up to 20.5 µm long. Fruitbody 0.5-2 mm wide; hymenium flat, whitish; asci club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 16-20.5 x 8.5-10 µm, Qav. ≈ 1.9, longitudinally striped, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped to branched; saprobic, known from dung of deer; rather common

Ascobolus sacchariferus

Spores more than 20.5 µm long. Fruitbody 0.2-1 mm wide; hymenium flat to arched, whitish; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped to ellipsoid, 20.5-36 x 9.5-14 µm, Qav. ≈ 2.4, longitudinally striped, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped to branched; saprobic, known from dung of cow, horse, sheep, goat, moose, dog, wolf, rabbit, hare and muskrat; rather common

Ascobolus albidus

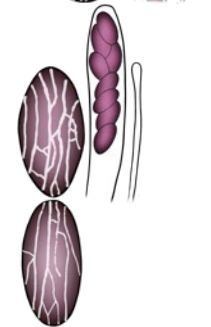
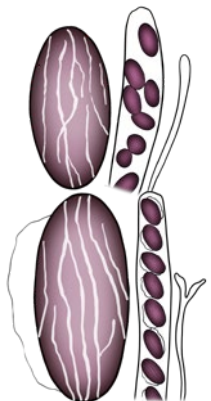
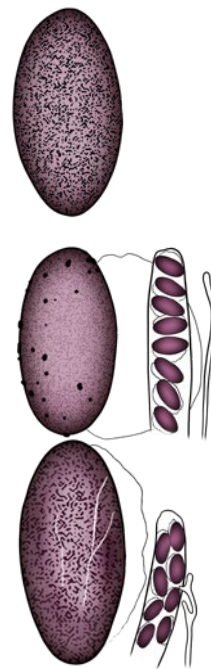
54. Spores on average less than 16.5 µm long
Spores on average more than 16.5 µm long

55. Known from dung of beaver. Fruitbody 1-2.6 mm wide; hymenium flat, yellowish; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 14-17 x 7-9 µm, Qav. ≈ 1.9, longitudinally striped, 0-guttulate, slime coat 1- to 2-sided; paraphyses tips club-shaped to branched; saprobic; rare or overlooked

Ascobolus castorensis

Known from dung of deer. Fruitbody to 1.5 mm wide; hymenium flat to arched, yellowish; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 14.5-16 x 8-9 µm, Qav. ≈ 1.7, longitudinally striped, 0-guttulate, slime coat 1- to 2-sided; paraphyses tips club-shaped to branched; saprobic; rare or overlooked

Ascobolus cervinus



56. Young fruitbodies ± vinaceous (■). Fruitbody 0.7-2 mm wide; hymenium flat to arched, whitish to pinkish; asci club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 18-28 x 10-13.5 µm, Qav. ≈ 1.9, longitudinally striped, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped to branched; saprobic, known from dung of cow, horse, sheep, deer, dog, hare and rabbit; rare or overlooked

Ascobolus roseopurpurascens

Young fruitbodies yellowish (■)

57. Spores narrowly spindle-shaped with broad longitudinal ridges
Spores more ellipsoid

58. Spores only slightly cracking, spores 23-29 x 11.5-15 µm
Spores with more cracks, smaller

see *Ascobolus elegans*, cpl. xxx

59. Spores with 7-10, narrow longitudinal cracks
Spores with 4-6 very coarse longitudinal ribs, often also with larger, dark pustules. Fruitbody 0.8-1.5 mm wide; hymenium flat to cup-shaped, yellowish to pale brown; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 17-20.5 x 8-10.5 µm, Qm ≈ 2, longitudinally striped, 0-guttulate; paraphyses tips club-shaped, bend to straight; saprobic, on soil to dung of pigeon; rare or overlooked

see *Ascobolus epimyces*, cpl. xx

Ascobolus hanssenii

60. On debris
On dung

61. Spores 19-29 x 10-13 µm
Spores up to 22 x 11.5 µm

see *Ascobolus furfuraceus*, cpl. xx

62. Fruitbodies ± stalked; margin ± downy
Fruitbodies not stalked; margin ± smooth

see *Ascobolus foliicola*, cpl. 39xx

see *Ascobolus denudatus*, cpl. 39xx

63. Spores more than 22 µm long. Fruitbodies 1-8 (-10) mm wide, hymenium- to cup-shaped. Fruitbody 1-8 (-10) mm wide; hymenium flat to cup-shaped, yellowish; asci cylindrical to club-shaped, 8-spored; spores ± ellipsoid, 22-29 x 11-13 µm, Qav. ≈ 2.1, longitudinally striped, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped, branched or cylindrical; saprobic, known from dung of many mammals and debris; common

Ascobolus furfuraceus

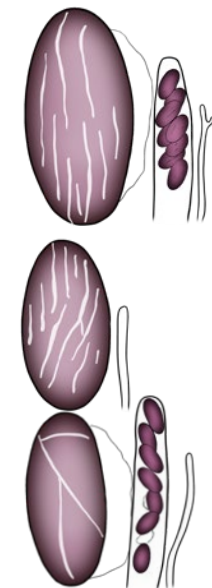
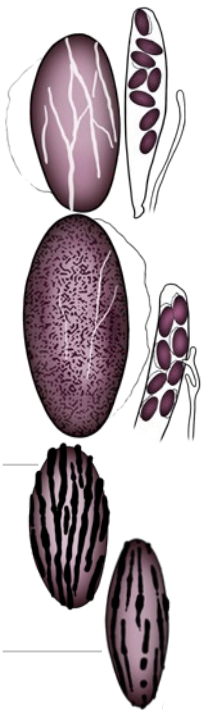
Spores up to 22 µm long

64. Epispore with many, dense, mostly longitudinal cracks but also with some transverse ones. Fruitbody 0.5-3 mm wide; hymenium flat to arched, yellowish; asci cylindrical to club-shaped, amyloid to inamyloid, 8-spored; spores ± ellipsoid, 19-22 x 9.5-13 µm, Qav. ≈ 1.8, 0-guttulate, slime coat 1-sided; paraphyses tips club-shaped to branched; saprobic, known from dung of sheep and kangaroo; rare or overlooked

Ascobolus perplexans

Epispore with rather few longitudinal cracks. Fruitbody 0.7-2 mm wide; hymenium flat to cup-shaped, yellowish; asci cylindrical, 8-spored; spores ± ellipsoid, 17-22 x 9.5-12 µm, Qav. ≈ 1.8, 0-guttulate, slime coat 1- to 2-sided; paraphyses tips branched or club- to flame-shaped; saprobic, known from dung of cow, horse and rabbit; rare or overlooked

Ascobolus michaudii

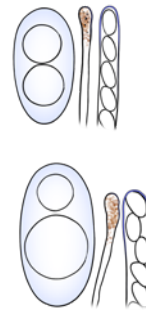


Key B – large, first closed and ± buried (hypogaeous), opening in star-like fashion (*Sarcosphaera*).

1. Spores on average less than 14.5 µm long; ectomycorrhizal with at least *Abies*, *Picea* and *Fagus*. Fruitbody 50-100 mm wide; hymenium cup-shaped, ± greyish violet; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 12.5-15.5 × 6-7.5 µm, Qav. ≈ 2.07, smooth or with almost invisible warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; in or on soil; rare or overlooked

Sarcosphaera coronaria

Spores on average more than 14.5 µm long; ectomycorrhizal with at least *Pinus*. Fruitbody 70-120 mm wide; hymenium cup-shaped, ± greyish violet; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 13-17 × 6.5-9 µm, Qav. ≈ 1.93, smooth or with almost invisible warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; in or on soil; rare or overlooked

Sarcosphaera crassa**Key C – amyloid species with globose spores.**

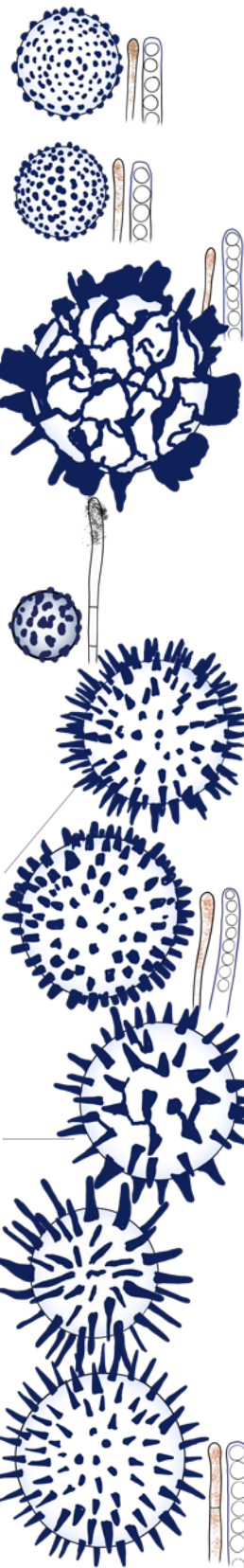
Spore measurements exclude the ornament. The spore ornament must be observed in cotton blue.

1. On burnt ground or charcoal; fruitbodies often rather flat and with a wavy margin [*Plicaria*] . 2
Not on burnt substrate; either cup-shaped or flat with a straight margin 5
2. Spores smooth. Fruitbody 20-80 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores 8.5-9.5 µm, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth or with goo, contents hyaline; saprobic; rare or overlooked *Plicaria endocarpoides*
Spore ornament warty, spiny or mesh-like 3
3. Spore ornament mesh-like. Fruitbody 2-20 mm wide; hymenium cup-shaped to flat, blackish; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores 12-13.5 µm, 0-multiguttulate; paraphyses tips club-shaped, straight, wall smooth or with goo, contents hyaline; saprobic, on burnt ground; very rare *Plicaria acanthodictya*
Spore ornament warty to spiny 4
4. Spore ornament less than 1 µm high. Fruitbody 5-20 mm wide; hymenium cup-shaped, dark brown; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores 10-13 µm, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on burnt ground; very rare *Plicaria trachycarpa*
Spore ornament 1.5-2 µm high. Fruitbody 5-20 mm wide; hymenium cup-shaped, flat to arched, blackish; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores 12-14 µm, with truncate spines, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth or with goo, contents hyaline; saprobic, on burnt ground; very rare *Plicaria carbonaria*

5. Outside with large, conical warts; fruitbodies cup-shaped, 5-25 mm wide; asci strongly amyloid at the top; spores up to 15.5 µm wide [*Plicariella*] . 6
Outside without large, conical warts; fruitbodies flat to arched, 1-8 (-10) mm wide; asci ± equally amyloid in full length; spores more than 18 µm wide [*Boudiera* & *Scotopezia*] . 7



6. Hymenium mostly with a greenish shade; spores 14-15.5 µm. Fruitbody 5-20 mm wide; hymenium cup-shaped, olive-brown; asci cylindrical, 8-spored, with croziers; spores with ± rounded warts, 0-1-guttulate; paraphyses tips club-shaped, straight, wall smooth or with goo, contents hyaline, on soil; very rare *Plicariella flavovirens*
Hymenium dark reddish brown without a greenish shade; spores 11.5-14 µm. Fruitbody 10-20 mm wide; hymenium cup-shaped, dark brown; asci cylindrical, 8-spored, with croziers; spores with ± rounded warts or spines, 0-1-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline, on soil; very rare *Plicariella scabrosa*
7. Spore ornament ± mesh-like 8
Spore ornament warty or spiny 9
8. Spores 21.5-26.5 µm, with partly connected, 4-6 µm high spines see *Boudiera echinulata*, cpl. 12xx
Spores 25-35 µm, with 3-6 µm high crests. Fruitbody 1-4 mm wide; hymenium flat to arched, reddish brown; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores multiguttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera areolata*
9. Spores with low, broad warts, 7-8.5 × 7-8.5 µm. Fruitbody 3-7 mm wide; hymenium cup-shaped to flat, dark violet; asci cylindrical, inamyloid to amyloid, 180-260 × 8-12.5 µm, 8-spored, with croziers; spores globose, 7-8.5 × 7-8.5 µm, Qav. ≈ 1, wit broad, low warts, 1-guttulate; paraphyses tips club-shaped, straight, contents bluish; on soil; very rare *Scotopezia pseudoanthracina*
Spores spiny, larger 10
10. Spores with 1-4 µm high spines 11
Spores with more than 3-6 µm high spines 12
11. Fruitbodies 2-3 mm wide. Fruitbody -2 mm wide; hymenium flat to arched, blackish vinaceous; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores 20-24 µm, spines up to 4 µm high, multi-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera purpurea*
Fruitbodies 6-10 mm wide. Fruitbody 6-10 mm wide; hymenium flat to arched, blackish vinaceous; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores 22-25 µm, spines 1.5-3 µm high, 1-multiguttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline to bluish; saprobic, on soil; very rare *Boudiera dennisii*
12. Spines partly connected. Fruitbody 1-8 mm wide; hymenium flat to arched, blackish vinaceous; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores 21.5-26.5 µm, 4-6 µm high spines, multi-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera echinulata*
Spines isolated 13
13. Spores 18.5-23 µm. Fruitbody 1-4 mm wide; hymenium flat to arched, blackish vinaceous; asci cylindrical, amyloid in full length, 8-spored; without croziers; spores with spines, 3-6 µm high, multiguttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera acanthospora*
Spores 22-26 µm. Fruitbody 2-3 mm wide; hymenium flat to arched, dark brown to blackish vinaceous; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores with spines, 4-6 µm high, 1-guttulate (?); paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera tracheia*



Key D – small amyloid, pale-spored and pale species (*Iodophanus* and *Thecotheus*).

1. Hymenium salmon, pale apricot-orange or clay buff (☞☞☞☞☞); spores rather thin-walled, without slime coating; fruitbody margin with short, blunt hairs (strong lens!) [*Iodophanus*] . 2
Hymenium white to greyish (☞☞☞☞☞); spores thick-walled, in asci mostly with slime coating; fruitbody margin without hairs. . [*Thecotheus*] . 7
2. Spores completely smooth. Fruitbody 0.5-1 mm wide; hymenium flat to arched, pale pinkish buff; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid, 16.5-23 x 10-12.5 µm, Qav. ≈ 1.8, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on dung or debris; rare or overlooked
Iodophanus difformis
Spores with an ornament (x1000 and stained in cotton blue) 3
3. Apical spore ornament obviously higher (up to 2 µm) than the general ornament. Fruitbody up to 1 mm wide; hymenium flat to arched, pale pinkish buff; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid, 23-27.5 x 14-17 µm, Qav. ≈ 1.6, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on dung; rare or overlooked
Iodophanus subgranulatus
Without a higher apical ornament 4
4. Spore ornament 1-2 µm high. Fruitbody 1-2 mm wide; hymenium flat to arched, pale pinkish buff; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid, 25-30 x 15-20 µm, Qav. ≈ 1.5, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on dung or debris; rare or overlooked
Iodophanus sarcobius
Spore ornament up to 1 µm high 5
5. Spores 22-27 x 14-16 µm; hymenium mostly ± clay buff (☞☞☞☞☞). Fruitbody 0.5-2 mm wide; hymenium flat to arched; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid, 22-27 x 14-16 µm, Qav. ≈ 1.6, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on dung or debris; rare or overlooked
Iodophanus verrucosporus
Spores 15-22.5 x 7.5-14.5 µm; hymenium pale salmon to pale apricot-orange (☞☞☞☞☞) 6
6. Hymenium pale salmon (☞☞☞☞☞); mainly on dung. Fruitbody 0.5-2 mm wide; hymenium flat to arched; asci cylindrical, club-shaped to truncate, amyloid in full length, 8-spored, without croziers; spores ellipsoid, 15-20 x 7.5-11 µm, Qav. ≈ 1.8, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped to cylindrical, straight, wall smooth, contents hyaline; saprobic; rather common
*Iodophanus carneus*²
Hymenium pale apricot-orange (☞☞☞☞☞); mainly on moist paper, cloth or similar materials. Fruitbody 0.5-3 mm wide; hymenium flat to arched; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid, 18-22.5 x 11-14.5 µm, Qav. ≈ 1.5, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, rare or overlooked
Iodophanus testaceus

2. This includes *Iodophanus hyperboreus* with 1-guttulate spores and habit on wet sand in arctic-alpine riverbanks (Norway).

7. Asci with 16-64 spores. Fruitbody 0.2-3 mm wide; hymenium flat, whitish to greyish; asci club-shaped, amyloid in full length, 16-32-64-spored, with croziers; spores spindle-shaped, 35-42 x 17-22 µm, Qav. ≈ 1.9, smooth, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; on dung; rare or overlooked
Thecotheus pelletieri
Asci with 4-8 spores 8
8. Spores without apical appendages 9
Spores with apical appendages 14
9. Spores smooth 10
Spores warty 12
10. Spores 19-25 x 8.5-11 µm. Fruitbody 1-2 mm wide; hymenium flat, pale greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores ellipsoid to spindle-shaped, Qav. ≈ 2.2, smooth, 0-guttulate; paraphyses tips club-shaped, straight to bent, wall smooth, contents yellowish to brown; saprobic, on dung or debris; rare or overlooked
Thecotheus crustaceus
Spores larger 11
11. On dung; spores ± ellipsoid. Fruitbody 0.5-3 mm wide; hymenium flat, greyish; asci club-shaped, amyloid in full length, 8-spored, without croziers; spores 32-41 x 14-18 µm, Qav. ≈ 2.2, smooth, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; rare or overlooked
Thecotheus cinereus
On soil and debris; spores spindle-shaped. Fruitbody 1-3 mm wide; hymenium flat, whitish to greyish; asci club-shaped, amyloid in full length, 8-spored, without croziers; spores 31.5-42 x 12.5-18 µm, Qav. ≈ 2.4, smooth, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; rare or overlooked
Thecotheus pallens
12. Spores 22-26 x 11.5-16 µm; spores with up to 1.2 µm high warts. Fruitbody 0.5-2 mm wide; hymenium flat, whitish to greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores ellipsoid to spindle-shaped, Qav. ≈ 1.7, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; on dung; rare or overlooked
Thecotheus strangulatus
Spores 14-17 x 6-9 µm; spores with lower warts or wrinkles 13
13. Spore-Q below 2.1; paraphyses thread-shaped with sinuose tips. Fruitbody 0.2-1 mm wide; hymenium flat, whitish to greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 14-17 x 7-9 µm, Qav. ≈ 1.9, with ± rounded warts, 0-guttulate; paraphyses wall smooth, contents hyaline; on dung; rare or overlooked
Thecotheus uncinatus
Spore-Q above 2.1; paraphyses of two types with narrow, cylindrical and more broadly club-shaped tips. Fruitbody 0.2-5 mm wide; hymenium flat to cup-shaped, whitish to greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores spindle-shaped, 14-16 x 6-7 µm, Qav. ≈ 2.3, with ± rounded warts, 0-guttulate; paraphyses wall smooth, contents hyaline; on dung; rare or overlooked
Thecotheus himalayensis
14. On soil, leaves and twigs in periodically submerged/inundated habitats 15
On dung 16
15. Spores 16-22.5 x 7-10 µm; 8-spored. Fruitbody 1-7 mm wide; hymenium flat, pale greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores spindle-shaped to loaf-shaped, Qav. ≈ 2.2, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth to finely warty, contents hyaline; on soil; rare or overlooked
Thecotheus rivicola
Spores 30-37 x 15-16.5 µm; mostly 4-spored. Fruitbody 1-5 mm wide;







9. Fruitbodies 2-6 mm wide, ± flat; spores 16-18.5 µm long
..... see *Elaiopezia simplex*, cpl. xx
Fruitbodies 30-60 mm wide, deeply cup shaped; spores 20-23.5 µm long. Hymenium cup-shaped, greyish violet to dark brown; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 20-23.5 x 10-12 µm, Qav. ≈ 1.9, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on soil; rare or overlooked
..... *Geoscypha ampelina*



10. Spores multi-guttulate. Fruitbody 5-15 mm wide; hymenium cup-shaped, pale brown; with a stem; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, without croziers; spores ellipsoid to spindle-shaped, 14-16 x 6.5-7.5 µm, Qav. ≈ 2.1; paraphyses tips club-shaped, straight to bent, wall smooth, contents brownish with age; saprobic, on potting peat; very rare
..... *Lepidotia hispida*
Spores 0-1-guttulate 11



11. On dung (including faeces or urin soaked substrates) 12
On sand, soil, dead herbaceous stems or wood 15



12. Spores 14-17.5 µm long 13
Spores more than 18 µm long 14



13. Fruitbody up to 10 mm wide; spores smooth, also in SEM and at high magnification when stained with cotton blue; spore-Q-av. ≈ 1.9. Hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 14-17 x 7-9 µm, Qav. ≈ 1.9, 0-guttulate; paraphyses tips club-shaped, bent, wall smooth, contents hyaline; saprobic, on dung of moose; rare or overlooked
..... *Peziza alcis*⁴
Fruitbody 15-150 mm wide; spores finely warty in SEM and mostly also at high magnification when stained with cotton blue; spore-Q-av. ≈ 1.6 see *Peziza varia*, key F, cpl. 56xx



14. Fruitbody almost flat, 5-20 mm wide. Hymenium pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 18-23 x 9.5-13 µm, Qav. ≈ 1.8, 0-1-guttulate, with 1-sided slime coating; paraphyses tips club-shaped, straight to bent, wall smooth, contents yellowish; saprobic, on dung, wood, debris or soil; rather common
..... *Peziza fimetis*⁵
Fruitbody deeply cup-shaped, 20-100 mm wide. Hymenium pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 20.5-24 x 11-12.5 µm, Qav. ≈ 1.8, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents yellowish; saprobic, on dung, manure, fertilized rotation fields and dung-fertilized potting soil; common
..... *Peziza vesiculosa*



15. On dead stems of larger herbs (e.g. *Phragmites* and *Typha*) in moist or wet habitats see *Peziza subuliginosa*, key F, cpl. xx⁶
On sand, soil or wood 16



16. With a pronounced stem, deeply rooting in sand in *Ammophila* dunes. Fruitbody 20-70 mm wide; hymenium cup-shaped, pale brown to dark brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 15-20 x 9-12 µm, Qav. ≈ 1.6, 0-guttulate; paraphyses tips club- or head-shaped, straight, wall smooth, contents hyaline; saprobic; rather common
..... *Peziza ammophila*
Not rooting in sand 17



17. Spores on average less than 17 µm long; spores very finely warty at high magnification (use cotton blue), never with a slime coating see *Peziza varia*, key F, cpl. 56xx
Spores on average more than 17 µm long; spores absolutely smooth in the light microscope, often with a slime coating 18

18. On soil and debris 19
On wood, including wood-chips 21

19. Spores 22-24 x 12.5-14.5 µm see *Peziza fimetis*, cpl. 14xxx
Spores smaller 20

20. Spores 16-18.5 x 8.5-10 µm; fruitbodies 2-6 mm wide. Hymenium cup-shaped to flat, ± dark brown; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.8, 2-guttulate, with 1-sided slime coat; paraphyses tips club-shaped, ± bent, wall smooth, contents brown; saprobic; very rare
..... *Elaiopezia simplex*
Spores 19-23 x 10.5-14 µm; fruitbodies 10-70 mm wide. Hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.7, 0-1-guttulate, with 1-sided slime coat; paraphyses tips club-shaped, straight, wall smooth, contents yellowish; saprobic; very rare
..... *Peziza megalochondra*

21. Spores 18-21.5 µm long, spore Qav. ≈ 1.7; fruitbodies 10-30 mm wide, sessile. Fruitbody 10-30 mm wide; hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 18-21.5 x 9.5-13 µm, 0-1-guttulate, presence of slime coat not known; paraphyses tips club- to head-shaped, straight to bent, wall smooth, contents hyaline; saprobic; rare or overlooked
..... *Peziza ampliata*
Spores more than 21 µm long, spore Qav. above 2; fruitbodies 10-60 mm wide, ± stipitate 22

22. Paraphyses 3-4.5 µm wide at the basal part; known from Bosnia-Herzegovina and Montenegro, on occasionally submerged wood of *Fagus*, *Abies* and *Picea*. Fruitbody 10-60 mm wide; hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 21-26.5 x 9.5-12.5 µm, Qav. ≈ 2.1, 0-guttulate, with 1-sided slime coat; paraphyses tips club- to head-shaped, straight, wall smooth, contents yellowish; saprobic; very rare
..... *Peziza montirivicola*
Paraphyses 5-7 µm wide at the basal part; known from Norway on occasionally submerged wood of *Betula* and *Salix*. Fruitbody 10-80 mm wide; hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 23.5-25 x 11.5-12 µm, Qav. ≈ 2, 0-guttulate, slime coat apparently absent; paraphyses tips club- to head-shaped, straight to bent, wall smooth, contents yellowish; saprobic; very rare
..... *Peziza nordica*

4. There is an additional, undescribed species known from dung of beaver with 16-17 x 8-9.5 µm large spores.

5. Both the name *Peziza granularis* and *P. granulosa* has been applied to this taxon, but *P. fimetis* has priority.

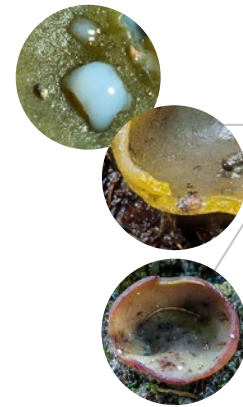
6. *Peziza paludicola*, on e.g. *Carex*, has a more orange colour and may be a distinct smooth-spored species.

66 key E – mostly larger operculates with amyloid asci and oblong, smooth spores

+ *Peziza subvesiculosa* Donadini & van Voren?

Peziza heimii (flos-niveum) smooth, 24-30 x 13-17 µm, snow beds

P. nivalis 16-18 x 9.5-11, snow beds + *P. ninguis* 18.5-21 x 10-11.5, snow beds
- vortrt, er med)

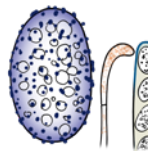
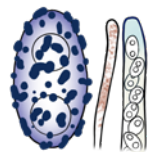
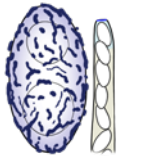
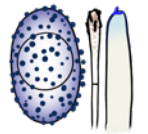
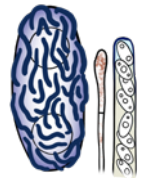


key F – mostly larger operculates with amyloid asci and oblong, ornamented spores 67

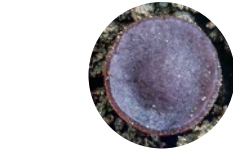
Key F – amyloid, mostly larger species with ellipsoid, ornamented spores.

Spore measurements exclude the ornament. The spore ornament must be observed at x 1000 in cotton blue.

1. Flesh with coloured, yellowish or bluish milk 2
Flesh without milk or with clear milk 13
2. Milk blue to whitish blue 3
Milk whitish to yellowish 7
3. Spore ornament densely sinuose to almost labyrinthine; hymenium often with olive-green (☞ ) shades. Fruitbody 10-60 mm wide; hymenium cup-shaped, ± dark brown to greenish; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 17-19 x 8-9.5 µm, Qav. ≈ 2, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline to brown; ectomycorrhizal, on soil or possibly burnt ground; apparently rare *Legaliana phlebospora*
Spore ornament of more dispersed, sinuose warts; hymenium mostly red-brown, dark grey-brown to almost blackish blue (☞ , , ), rarely with an olive tint 4
4. Spores with round warts, 1-guttulate. Fruitbody 10-25 mm wide; hymenium cup-shaped, reddish brown with an olive tint; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 13-15 x 9-10 µm, Qav. ≈ 1.4; paraphyses tips club-shaped, straight, wall smooth or with goo, contents hyaline to brown; saprobic , on soil; apparently rare *Peziza badiofusca*
Spores with comma-shaped, oblong to sinuose warts, 1-2-guttulate 5
5. Spores 16.5–19 x 8–9 µm. Fruitbody 5-10 (-30) mm wide, with very pale bluish milk; hymenium cup-shaped, dark brown, possibly with an olive tint; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores somewhat spindle-shaped, Qav. 2-2.4, with ± oblong to sinuose warts, mostly 2-guttulate, without slime-coating; paraphyses tips cylindrical to club-shaped, straight, wall smooth, contents brown; ectomycorrhizal, on soil; rare *Legaliana subsaniosa*?
Spores shorter 6
6. Hymenium dark reddish brown (☞ ). Fruitbody 5-30 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 15-17 x 7.5-9 µm, Qav. ≈ 1.9, with ± oblong to sinuose warts, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth or with goo, contents yellowish; ectomycorrhizal, on soil; rare or overlooked *Legaliana badiofuscoide* ss. auct.
Hymenium blackish brown (☞ ). Fruitbody xxx mm wide, with bluish milk; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 13.5-17 x 7-9 µm, Qav. ≈ 1.9, with ± rounded, oblong to sinuose warts, 2-guttulate; paraphyses tips cylindrical to club-shaped, straight, wall smooth, contents brownish; saprobic, on soil; rather common *Galactinia saniosa*
7. On wood. Fruitbody 25-45 mm wide; hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 14-15.5 x 8.5-9.5 µm, Qav. ≈ 1.6, with ± rounded warts, 0- (or many small)-guttulate; paraphyses tips cylindrical to club-shaped, straight, wall smooth, contents brown; saprobic; very rare *Phylloscypha retrocurvatoides*
On soil 8



7. This is close to or even identical with *Legaliana limnaea*.



8. Hymenium yellowish grey, olivaceous buff to honey yellow (☞ ■ ■ ■ ■); milk abundant 9

Hymenium reddish brown, greyish brown to vinaceous brown (☞ ■ ■ ■ ■); milk often scarce, but slowly colouring the flesh 10

9. Fruitbodies 7-20 mm wide; spores 15-17.5 µm long, mostly 1-guttulate. Hymenium cup-shaped, pale brown to greyish; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, without croziers; spores ellipsoid to spindle-shaped, 15-17.5 x 9-10 µm, Qav. ≈ 1.7, with ± oblong to sinuose warts; paraphyses tips club-shaped, straight, wall smooth, contents brown to hyaline; ectomycorrhizal, on soil; rather common *Paragalactinia succosella*

Fruitbodies 10-50 mm wide; spores 16-21 µm long, mostly 2-guttulate. Hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, without croziers; spores ellipsoid, 16-21 x 8-12 µm, Qav. ≈ 1.8, with ± rounded, oblong to sinuose warts; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; ectomycorrhizal, on soil; common *Paragalactinia succosa*

10. Outer fruitbody with a gelatinous layer; on moist wood see *Pachyella aquatilis*, cpl. xx

Outer fruitbody without a gelatinous layer; on soil 11

11. Asci without croziers. Fruitbody 20-40 mm wide, with yellow milk; hymenium cup-shaped, dark brown; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored; spores ellipsoid, 15-19 x 8.5-10 µm, Qav. ≈ 1.8, with ± rounded warts, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline to brown; ectomycorrhizal, on soil; very rare *Paragalactinia infuscata*

Asci with croziers 12

12. Hymenium dark vinaceous brown to dark greyish brown (☞ ■ ■ ■ ■); at rather high altitudes with *Betula* and *Salix*. Fruitbody 7-20 mm wide, with yellow milk; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 15-17 x 9-10 µm, Qav. ≈ 1.6, with ± rounded, oblong to sinuose warts, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline to brownish; ectomycorrhizal, on soil; very rare *Paragalactinia benatii*

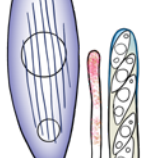
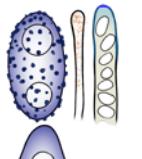
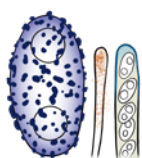
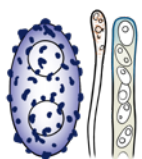
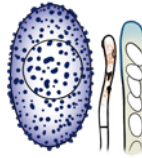
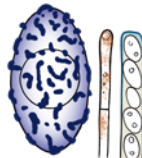
Hymenium paler brown (☞ ■ ■ ■ ■); at low altitudes with e.g. *Fagus*, *Betula* and *Corylus*. Fruitbody 10-40 mm wide, with yellow milk; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 15-18 x 7-9.5 µm, Qav. ≈ 2, with ± round, oblong to sinuose warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; ectomycorrhizal, on soil; rather common *Paragalactinia michelii*

13. Fruitbodies composed of numerous deformed cups forming an almost *Sparassis*-like structure. Fruitbody 70-200 (-500) mm wide; hymenium greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 11.5-12.5 x 5-6.5 µm, Qav. ≈ 2, with somewhat oblong to sinuose warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on burnt or sterilized ground; very rare *Daleomyces phillipsii*

Fruitbodies more regular cup- to cushion-shaped or flattened 14

14. Spores 25-30 µm long, spindle-shaped, finely striate; fruitbodies 3-15 mm wide, ± violet. Hymenium cup-shaped to flat; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores 25-30 x 8-10 µm, Qav. ≈ 3, mostly 3-guttulate; paraphyses tips club-shaped, straight, wall with goo, contents reddish violet; ectomycorrhizal, on soil; rare or overlooked *Ionopezia gerardii*

Spores different; fruitbodies different 15



15. Hymenium whitish. Fruitbody 10-35 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 11.5-15.5 x 7.5-10 µm, Qav. ≈ 1.5, with ± sinuose warts, 1-2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Peziza pudicella*

Hymenium coloured 16

16. On debris, potting peat and dead stems of larger herbs, often in swamps; fruitbodies 5-20 mm wide, disk mostly ± flat and ± cinnamon to clay-buff (☞ ■ ■ ■ ■) 17

On other substrates *and/or* with different shapes or colours 20

17. Fruitbodies obviously stipitate; on potting peat; spores multi-guttulate see *Lepidotia hispida*, E10xx

Fruitbodies ± sessile; on debris of herbs; spores 0-2-guttulate 18

18. Spores 20-25 x 10-13.5 µm, 2-guttulate. Fruitbody somewhat *Pachyella*-like, 5-10 mm wide; hymenium flat to cup-shaped, pale brown; with a stem; asci cylindrical, amyloid in full length (?), 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.9, smooth or with very fine warts; paraphyses tips club-shaped, somewhat bend, wall smooth, contents hyaline to brownish; saprobic, on large herbs; rare or overlooked *Peziza subuliginosa*⁸

Spores smaller, 0-guttulate 19

19. Spore with a thick cap at the ends, ornament warty. Fruitbody 5-20 mm wide; hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores spindle-shaped, 16-18.5 x 8.5-9.5 µm, Qav. ≈ 1.9, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight to bent, wall smooth, contents yellowish; saprobic, on herbaceous debris; very rare *Peziza acropapulata*

Spores without a thickened cap at the ends, warty. Fruitbody 5-20 mm wide; hymenium cup-shaped, pale brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 16.5-19 x 8-10 µm, Qav. ≈ 1.9, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic, on herbaceous debris; rare or overlooked *Peziza palustroides*

20. At least some spores with a high and obviously aberrant ornament at the ends 21

End ornament similar to body ornament or at most slightly larger, denser or slightly thick-walled 27

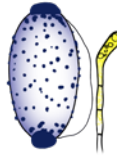
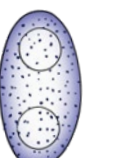
21. Spore length on average below 18.5; spores often with several drops 22

Spore length on average above 18.5; spores 0-guttulate 25

22. Spores almost smooth but with a few warts at the spore ends when seen in cotton blue. Fruitbody 5-20 mm wide; hymenium cup-shaped, orange brown to reddish brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 19-24.5 x 10-13 µm, Qm ≈ 1.8, 0-guttulate; paraphyses tips club-shaped, ± bend, wall smooth, contents yellowish; saprobic, on clayey soil with conifers and *Alnus*; very rare *Peziza acroornata*

Spores obviously ornamented 23

23. On wood. Fruitbody 10-20 mm wide; hymenium cup-shaped, greenish; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 14-20 x 8-10 µm, Qav. ≈ 1.8, with ± rounded warts



8. *Pachyella pseudoampelina* is microscopically very similar, but has slightly a more coarse spore ornament (warts to 0.5 µm), a more violet hymenium and grows on moist soil.

and xxx µm long extensions at the ends, 0 (or many small)-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents brown to yellowish; saprobic; very rare *Elaiopezia obtusapiculata*
On soil 24

24. Spores with round warts; fruitbody cup-shaped, 15-55 mm wide. Hymenium dark brown; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 16-19 x 8-9 µm, Qav. ≈ 2, 2-many-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic; very rare *Phylloscypha badioides*
Spores with sinuose warts; fruitbody rather flat, 5-15 mm wide
see *Elaiopezia polaripapulata*, cpl. 33xx

25. Spores 11-13.5 µm wide; on soil. Fruitbody 4-12 mm wide; hymenium cup-shaped, dark brown to bluish; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores spindle-shaped, 22-27.5 x 11-13.5 µm, Qav. ≈ 2, with ± rounded, oblong to sinuose warts, 2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents brown; ectomycorrhizal; very rare *Phaeopezia vagneri*
Spores 9-10.5 µm wide; on wood 26

26. Ornament at the spore ends of numerous, up to 4.5 µm long, thin spines. Fruitbody 10-20 mm wide; hymenium cup-shaped, fawn with an olive shade; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores spindle-shaped, 17-24 x 9-10.5 µm, Qav. ≈ 2.1, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth or with goo, contents brown; saprobic, on wood; very rare *Phaeopezia polarispinosa*
Ornament at the spore ends mostly a single broad spine. Fruitbody 10-20 mm wide; hymenium cup-shaped, grey brown, with an olive shade; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores spindle-shaped, 18-24 x 9-10.5 µm, Qav. ≈ 2.1, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on wood; very rare *Phaeopezia apiculata*

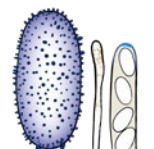
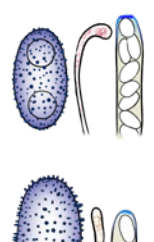
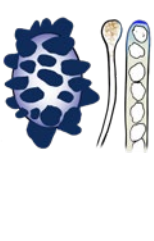
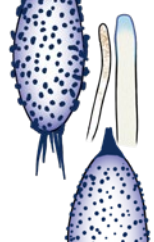
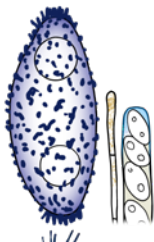
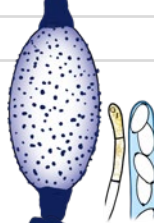
27. On burnt or sterilized soil or charcoal 28
Not on burnt or sterilized substrate 32

28. Fruitbodies 3-10 mm wide, ± flat; spore-Q ≈ 1.4; spore ornament of 1.5-2.7 µm high, ± flattened “teeth”. Hymenium dark grey brown; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores ellipsoid, 12.5-14.5 x 9.5-10.5 µm, Qav. ≈ 1.3, 0-guttulate; paraphyses tips club- to head-shaped, straight, wall smooth or with goo, contents brown; saprobic, on burnt ground; very rare *Velenovskya vacini*
Fruitbodies more than 10 mm wide, cup-shaped; spore-Q above 1.6; spore ornament of lower warts or spines 29

29. Spore ornament of circular warts or spines 30
Spore ornament of sinuose warts 31

30. Hymenium lilac; spores 10.5-13.5 µm long; spore ornament of small warts. Fruitbody 3-20 (-60) mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 10.5-13.5 x 6-8 µm, Qav. ≈ 1.7, 2-guttulate; paraphyses tips club-shaped, bent, wall smooth, contents brown to yellowish; saprobic, on burnt ground; rather common *Geoscypha tenacella*
Hymenium orange-brown; spores 14-17 mm long; spore ornament of pointed spines. Fruitbody 10-70 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 14-17 x 6-8 µm, Qav. ≈ 2.2, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline to brown; saprobic, on burnt ground; rather common *Peziza echinospora*





31. Spores 10-13 x 5-6.5 µm, Q ≈ 2; spore ornament irregular oblong warts and ridges. Fruitbody 15-40 mm wide; hymenium cup-shaped, cinnamon, fawn to greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 2-guttulate; paraphyses tips club-shaped, straight to bent, wall smooth, contents brown; saprobic, on burnt ground; rare or overlooked *Daleomyces petersii*
Spores 12-15 x 7-10 µm, Q ≈ 1.6; spore ornament ± mesh-like. Fruitbody 5-22 mm wide; hymenium flat to cup-shaped, ± fawn; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; with an asexual state of branched, cylindrical hyphae with numerous spores; saprobic, on burnt ground; very rare or overlooked *Peziza ostracoderma*

32. Spores longitudinally striped. Fruitbody 20-120 mm wide; hymenium cup-shaped, dark fawn; with a stem; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 10.5-13.5 x 5-7 µm, Qav. ≈ 2, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; ectomycorrhizal, on soil; very rare *Iodowynnea auriformis*
Spores not longitudinally striate 33

33. Asci rather equally amyloid in full length 34
Asci most strongly amyloid at the top 46

34. Spores multi-guttulate. Fruitbody 20-65 mm wide; hymenium cup-shaped to arched, fawn; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 13-16.5 x 7-9 µm, Qav. ≈ 1.8, with ± rounded, oblong to sinuose warts; paraphyses tips club-shaped, straight to bent, wall smooth, contents brown; saprobic, on wood; very rare *Hansenopezia retrocurvata*
Spores not multi-guttulate 35

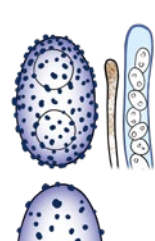
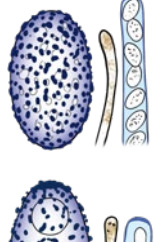
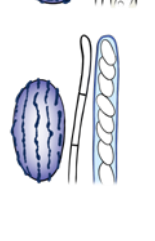
35. Spores with a thicker wall in the ends. Fruitbody 5-15 mm wide; hymenium cup-shaped, olive-brown; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 16-20 x 8.5-11 µm, Qav. ≈ 1.8, with ± rounded, oblong to sinuose warts, 1-2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents yellowish to brown; saprobic, on soil; very rare *Elaiopezia polaripapulata*
Spores without thicker walls in the ends, but maybe with higher warts 36

36. Fruitbodies without a gelatinous outer layer; on soil and debris [Phylloscypha p.p.] 37
Fruitbodies often with a gelatinous outer layer; on soil or wood [Adelphella & Pachyella] 40

37. Spores with rather distant, round warts 38
Spores with more confluent, somewhat sinuose warts 39

38. Spores 14-16 µm long; hymenium dark reddish brown to dark vinaceous brown (☞☛☛☛). Fruitbody 7-35 mm wide; hymenium cup-shaped; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 14-16 x 8.5-9.5 µm, Qav. ≈ 1.6, with ± rounded warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on soil, often during winter; very rare *Phylloscypha labessiana*
Spores 17-19.5 mm long; hymenium pale coral, peach to bright yellowish brown (☞☞☞☞☞☞☞☞). Fruitbody 20-60 mm wide; hymenium cup-shaped; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 17-19.5 x 6-8 µm, Qav. ≈ 2.6, with ± rounded warts, 0 (or many small)-guttulate; paraphyses tips club-shaped to almost globose, straight, wall smooth, contents hyaline (?); outside with 150 µm long hairs; saprobic, on soil; very rare *Phylloscypha coquandii*





74 key F – mostly larger operculates with amyloid asci and oblong, ornamented spores



53. Spores with a densely sinuose or labyrinthine ornament, 14-18 μm long; on ground with high nitrogen levels, e.g. where deer have urinated. Fruitbody 10-40 mm wide; hymenium cup-shaped, dark brown to greenish; asci cylindrical, 24/12/2024, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 14-18 $\times$ 7-8.5 μm , Qav. $\approx$ 2, multi-guttulate; paraphyses tips cylindrical, bent, wall smooth, contents hyaline to brown; saprobic, on soil; very rare

Peziza natrophila



54. Hymenium dark brown to almost black (☞☛☛☛). Fruitbody 3-20 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores ellipsoid, 18-22 $\times$ 8.5-10 μm , Qav. $\approx$ 2.1, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents brownish; ectomycorrhizal, on soil; very rare

Legaliana alaskana

Hymenium reddish brown to slightly olive brown (☞☛☛☛) 55

55. Spores with rather short, comma-shaped warts; hymenium $\pm$ orange brown, but often also with olive tints; on moist soil. Fruitbody 10-70 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 17-20 $\times$ 8-10 μm , Qav. $\approx$ 2, 2-guttulate; paraphyses tips cylindrical, straight, wall smooth to with goo, contents brownish; ectomycorrhizal; rather common

Legaliana limnaea

- Spores with almost linear, sinuose warts; hymenium orange brown to reddish brown; on rather dry, poor soil. Fruitbody 10-100 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores spindle-shaped to ellipsoid, 17-20 $\times$ 7-10 μm , Qav. $\approx$ 2.1, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents brownish; ectomycorrhizal; common

Legaliana badia

56. Mature spores 0-(1)-guttulate 57
Spores 2-multi-guttulate 61

57. Fruitbodies 20-110 (-150) mm wide 58
Fruitbodies 5-25 mm wide 59

58. Warts very small, only observed at $\times$ 1000 in cotton blue. Fruitbody 20-150 mm wide; hymenium cup-shaped, clay buff to cinnamon; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 14-17.5 $\times$ 8-11 μm , Qav. $\approx$ 1.6, 0-guttulate, without slime coating; paraphyses tips club-shaped, straight, often with constrictions at the septae, wall smooth, contents hyaline; saprobic, on wood to soil; common

Peziza varia

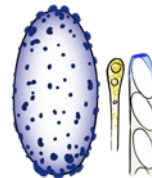
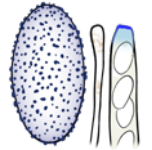
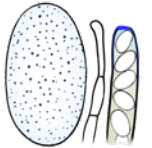
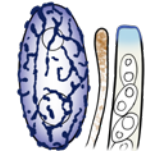
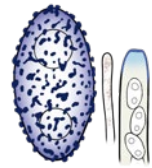
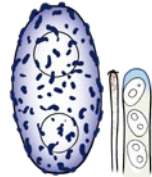
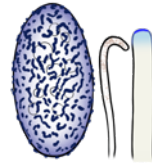
- Warts large, easily observed at $\times$ 400. Fruitbody 20-110 mm wide; hymenium cup-shaped, clay buff to cinnamon; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 16-17.5 $\times$ 7.5-10 μm , Qav. $\approx$ 1.9, 0-guttulate, without slime coating; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; rather common

Peziza arvernensis

59. Spores with dense clusters of warts at the ends. Fruitbody 10-25 mm wide; hymenium cup-shaped, yellowish brown to cinnamon; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores spindle-shaped, 18-20 $\times$ 8.5-9.5 μm , Qav. $\approx$ 2.1, with $\pm$ rounded warts, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents yellowish; saprobic, on soil; very rare

Peziza sublaricina

Warts more equally spread over the entire spore 60



key F – mostly larger operculates with amyloid asci and oblong, ornamented spores 75

60. Fruiting in spring after snow melt; fruitbodies 10-25 mm wide. Hymenium cup-shaped, $\pm$ orange brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 17.5-22 $\times$ 10-12.5 μm , Qav. $\approx$ 1.7, with $\pm$ rounded warts, 0-1-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic, on soil; very rare

Peziza ninguis

- Fruiting later in the year; fruitbodies 5-10 mm wide. Hymenium flat, orange brown to reddish brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 19-22 $\times$ 11-12.5 μm , Qav. $\approx$ 1.7, with $\pm$ rounded warts, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline to brown; saprobic, on soil; very rare

Peziza recedens

61. Spores multi-guttulate 62
Spores 2-guttulate 64

62. On soil or debris; fruitbodies 5-10 mm wide; spores 14-19 $\times$ 9-11 μm . Hymenium cup-shaped, $\pm$ fuscous; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, Qav. $\approx$ 1.6, with $\pm$ rounded warts or spines; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on soil; very rare

Peziza brunneoatra

- On wood; spores 13-16.5 $\times$ 7-9.5 μm ; fruitbodies more than 20 mm wide 63

63. Asci almost amyloid in full length; on coniferous wood
see *Hansenopezia retrocurvata*, cpl. xx
Asci only amyloid at the top; on deciduous wood

see *Phylloscypha retrocurvatoides*, cpl. xxx

62. Hymenium clay-buff to brown (☞☛☛☛) 65
64 with violet, lilac to wine-red shades (☞☛☛☛) 67

65. On mortar in or around buildings. Fruitbody 10-50 mm wide; hymenium cup-shaped, orange brown to cinnamon; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 14-16 $\times$ 7-8 μm , Qav. $\approx$ 2, with $\pm$ rounded warts, 2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic; rare or overlooked

*Peziza domiciliana*⁹

- On soil in nature 66

66. Hymenium clay-buff (☞☛☛☛); spore ornament rather low. Fruitbody 10-40 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 17-19 $\times$ 10-11 μm , Qav. $\approx$ 1.7, with $\pm$ rounded warts, 2-guttulate; paraphyses tips club-shaped, straight to bent, wall smooth, contents hyaline; saprobic; rare or overlooked

Malvepezia emileia

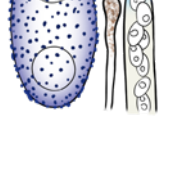
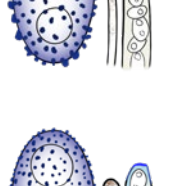
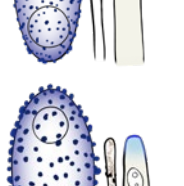
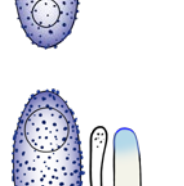
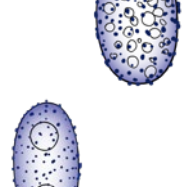
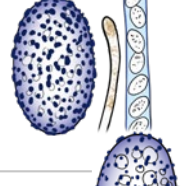
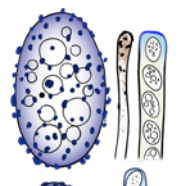
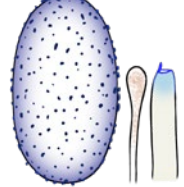
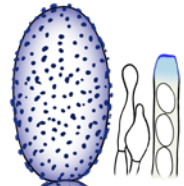
- Hymenium darker brown (☞☛☛☛); spore ornament conspicuous. Fruitbody 10-40 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 17-19 $\times$ 9.5-11 μm , Qav. $\approx$ 1.7, with $\pm$ rounded warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline to brown; ectomycorrhizal, on soil; rather common

Peziza [*Legaliana*] *depressa*

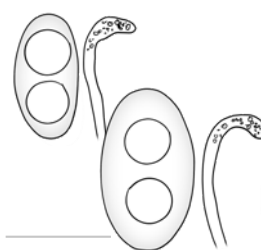
67. Spores ellipsoid; spore-Q mostly below 1.9 [*Daleomyces* p.p.] . 68
Spores $\pm$ spindle-shaped; spore Q mostly above 1.9 . [*Malvepezia* p.p.] . 70

68. Asci without croziers. Fruitbody up to 16 mm wide; hymenium cup-shaped, $\pm$ greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored; spores ellipsoid, 16.5-19 $\times$ 9.5-10.5 μm , Qav. $\approx$ 1.7, with $\pm$ rounded warts, 2-guttulate; paraphyses tips club-shaped, bent, wall smooth, contents brown; saprobic, on soil; very rare

Daleomyces brunneoviolaceus



9. Some authors give smaller spores, e.g. 11-12.5 $\times$ 6-6.5 μm .



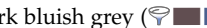
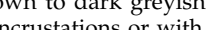
with coniferous trees; widespread; rare *Otidea propinquata*
 Fruitbody sideways split, either ± hare-ear-shaped or boat-shaped 9

9. Outside ± dark brown to dark bluish grey (☞ 
 [*Otidea bufonia* s.l.] 10
 Outside ± buff, honey-yellow to pale brown (☞ ) 14

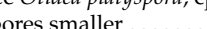
10. Spores 20-24.5 µm long. Fruitbody up to 30 x 15 mm large; hymenium cinnamon, greyish brown to reddish brown; spores ± spindle-shaped, 20-24.5 x 9-11 µm, Q-av. 2.1; paraphyses hooked; with coniferous trees; widespread; rare *Otidea apophysata*
 Spores shorter 11

11. Spores 10.5-12 µm wide. Fruitbody up to 70 x 75 mm large; hymenium dark yellowish brown to reddish brown; spores 18-22 x (9.5-) 10.5-12 µm spore-Q-av. 1.7-1.8; paraphyses mostly hooked; widespread; rare *Otidea platyspora*
 Spores more narrow 12

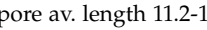
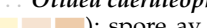
12. Spores ellipsoid; spore-Q-av. 1.6-1.7. Fruitbody up to 35 x 25 mm large; hymenium dark orange brown; spores (11-) 11.5-14 (-15) x 6.5-8.5 µm, Q-av. 1.6-1.7; paraphyses hooked; with coniferous trees on calcareous soil; boreal; rare *Otidea brunneoparva*
 Spores spindle-shaped; spore-Q-av. higher 13

13. Outside as fresh with vinaceous grey to dark bluish grey (☞ ) colours; middle flesh without or with wing-like crystals. Fruitbody up to 65 x 50 mm large; hymenium rather dark brown, sometimes with olivaceous tinges; spores ± spindle-shaped (13-) 13.5-16 (-17) x 6-7 (-7.5) µm, Q-av. 2.1-2.3; paraphyses curved to hooked; predominately with *Picea* and *Pinus* on calcareous soil; widespread; rare *Otidea mirabilis*
 Outside dark orange-brown, reddish brown to dark greyish brown (☞ ); flesh with dark brown incrustations or with brown, irregular crystals. Fruitbody up to 45 x 35 mm large; hymenium rather dark brown, sometimes with olivaceous tinges; spores ± spindle-shaped, (12-) 13-16.5 (-18) x 6-7.5 (-8) µm, Q-av. 1.9-2.5; paraphyses hooked; with *Abies* and deciduous trees; widespread; common *Otidea bufonia*

14. In deciduous forest [*Otidea alutacea* s.l.] 15
 In coniferous forest [*Otidea leporina* s.l.] 18

15. Outside ± honey-yellow (☞ ), with age darker; spores 18-22 x (9.5-) 10.5-12 µm see *Otidea platyspora*, cpl. 10xx
 Outside ± buff to cinnamon (☞ ); spores smaller 16

16. Spores 6.5-7.5 µm wide. Fruitbody up to 75 x 50 mm large; hymenium ± clay buff; spores 13.5-) 14.5-16.5 (-17.5) x 6.5-7.5 (-8) µm, Q-av. 2.1-2.2; paraphyses curved to hooked; often in parks and roadsides; widespread; common *Otidea alutacea*
 Spores less than 6.5 µm wide 17

17. Hymenium ± cinnamon buff (☞ ); spore av. length 11.2-11.8 µm. Fruitbody up to 60 x 50 mm large; spores (10.5-) 11-12.5 x 5.5-6.5 µm, Q-av. 1.9; paraphyses curved to hooked; often in parks and roadsides; widespread; rare *Otidea caeruleopruinosa*
 Hymenium cream to pinkish buff (☞ ); spore av. length 10-10.6 µm. Fruitbody up to 70 x 50 mm large; spores 9.5-11 x (4.5-) 5-6 µm, Q-av. 1.9-2; paraphyses ± curved; ± boreal; rare *Otidea flavidobrunneola*

18. Fruitbody narrowly boat-shaped 19
 Fruitbody broader, cup to paper cone-like 21



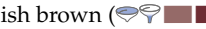
19. Outside often with prominent, often dark warts; flesh yellow with KOH. Fruitbody up to 60 x 30 mm large; outside felty; hymenium cream to cinnamon buff; spores (9.5-) 10-11 (-12) x 5.5-6.5 (-7) µm, Q-av. 1.7-1.9; paraphyses curved to hooked; widespread; rather common. *Otidea tuomikoskii*

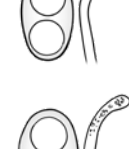
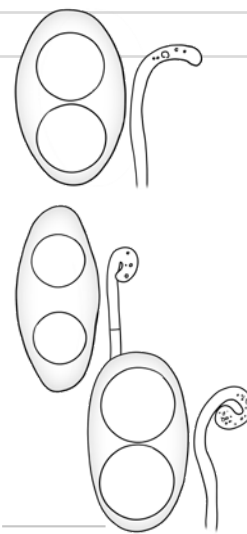
Outside with small, inconspicuous warts; flesh reddish or not reacting with KOH 20

20. Spores (9-) 9.5-10.5 (-11.5) x 5.5-6.5 (-7) µm, Q-av. 1.6-1.9. Fruitbody up to 35 x 15 mm large; hymenium ± cinnamon buff; paraphyses curved to hooked; widespread; rather common *Otidea nannfeldtii*
 Spores (12-) 12.5-14 (-15) x 7-8.5 µm, Q-av. 1.6-1.8. Fruitbody up to 55 x 25 mm large; hymenium ± cinnamon buff to cinnamon; paraphyses curved to hooked; widespread; common *Otidea leporina*

21. Spores 12.5-14 µm long; widespread see *Otidea leporina*, cpl. xx
 Spores shorter; boreal, alpine or southern 22

22. Outside with prominent, often dark warts; fruitbodies up to 30 x 33 mm. Fruitbody up to 55 x 25 mm large; hymenium cinnamon to cinnamon buff; spores 9.5-11 (-11.5) x 5.5-6.5 µm, Q-av. 1.6-1.7; paraphyses curved to hooked; boreal (Finland); rare *Otidea papillata*
 Without prominent warts; fruitbodies larger 23

23. Hymenium and outside grey to reddish brown (☞ ); spore av. length 10-10.7 µm; boreal or alpine. Fruitbody up to 22 x 20 mm large; spores 9.5-11 (-11.5) x (5.5-) 6-7 µm, Q-av. 1.6-1.7; paraphyses curved to hooked; rather common *Otidea formicarum*
 Hymenium and outside ± cinnamon (☞ ); spore av. length 11.1-11.7 µm; southern. Fruitbody up to 22 x 20 mm large; spores 10.5-12 x 6-6.5 µm, Q-av. 1.7-1.9; paraphyses curved to hooked; rare *Otidea subformicarum*



Key H – in association with mosses or liverworts.

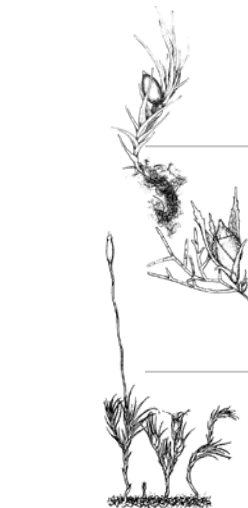
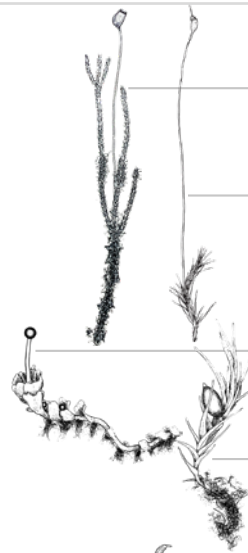
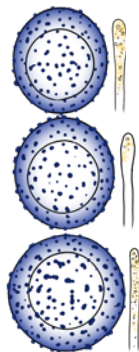
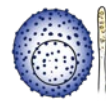
Spore measurements include the ornament. The spore ornament must be observed in cotton blue.

Note: There are also a great number of inoperculate discomycetes growing in mosses. Most of these are whitish or pale brown, but e.g. species of *Roseodiscus* are bright pink.

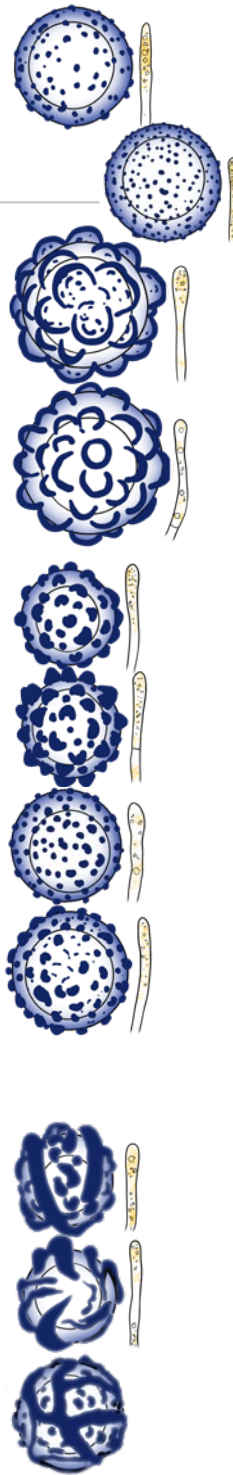
Overview

Spores globose to subglobose (spore-Q 1-1.15)	2
Spores more oblong (spore-Q above 1.15)	45
Spores with an ornament (must be observed in cotton blue)	46
Spores smooth	64
Asci 2-4 (6)-spored	65
Asci 8-spored	69

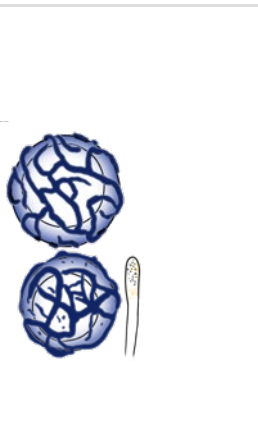
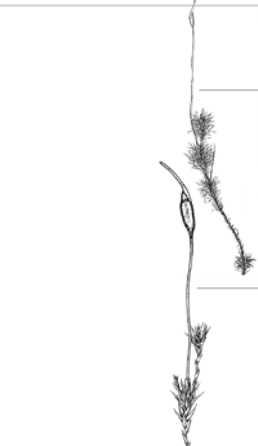
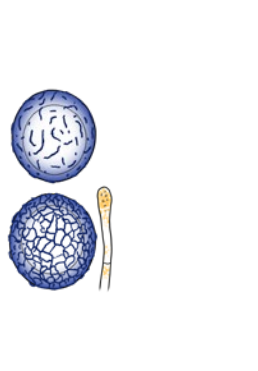
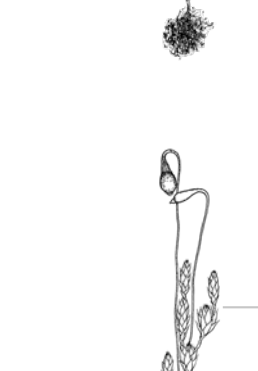
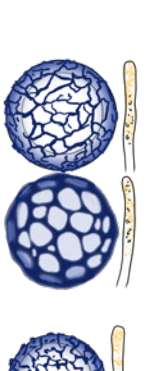
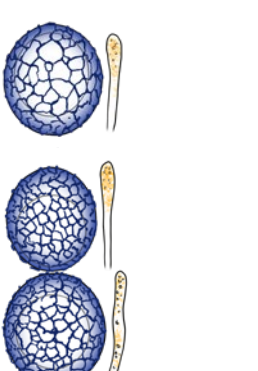
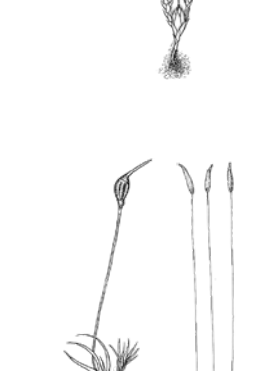
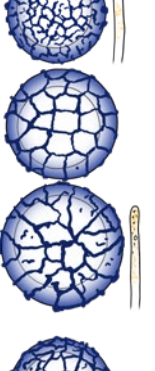
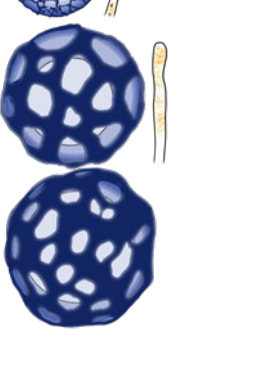
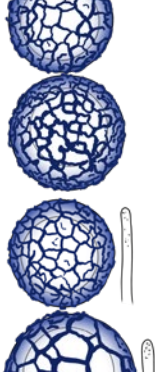
1. Spores globose to subglobose (spore-Q 1-1.15) 2
Spores more oblong (spore-Q above 1.15) 45
2. Spores smooth; on *Bryum*. Fruitbody 0.5-1 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores subglobose, 15-18 x 14-15 µm, Qav. ≈ 1.1; known from *Bryum pseudotriquetrum*; very rare 46
Octospora subglobispora
Spores with ornamentation; on different hosts 3
3. Spores with an ornamentation of warts only 4
Spores with a net-like ornament, holes or with ridges, possibly surrounded by warts 16
4. Spores with rather distant and often less than 1 (-1.5) µm high warts (warts obviously more narrow than the distance between the warts); on *Amblystegium*, *Campylopus*, *Cratoneuron*, *Hennediella*, *Phascum*, *Philonotis* 5
Spores with more crowded, tuberculate warts; often on different hosts 11
5. Spores 12-14 x 11-12.5 µm; on *Amblystegium*. Fruitbody 1-2.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores subglobose, Qav. ≈ 1.1; known from *Amblystegium serpens* and *A. varium*; rather common 6
Octospora wrightii
Spores larger; on different hosts 6
6. Spores subglobose (spore-Q 1.1); on *Brachytheciastrum*, *Cratoneuron* or *Phascum* 7
Spores globose (spore-Q 1); on different hosts 9
7. Spores with oblong, sinuate warts; on *Brachytheciastrum*. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores ellipsoid, 14.5-17 x 13.5-15 µm, Qav. ≈ 1.1; on *Brachytheciastrum velutinum*; very rare 8
Octospora pannosa
Spore with ± round warts 8
8. Fruitbodies with an obvious, membranous-dentate margin; on *Phascum*. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-16 x 13-14.5 µm, Qav. ≈ 1.1; on *Phascum curvicolle*; very rare 9
Lamprospora ecksteinii
Fruitbodies without an obvious, membranous-toothed margin; on *Cratoneuron*. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-16 x 13-15 µm, Qav. ≈ 1.17; known from *Cratoneuron filicinum*; rare or overlooked 10
Octospora svrcekii
9. Spores with some elongated, comma-shaped, 2-3 µm long warts; on *Hennediella* on salt-affected soil. Fruitbody 2-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-18 µm; known from *Hennediella heimii*; rare or overlooked 10
Lamprospora lubicensis
Spores with ± round warts; on different hosts 10



10. Spores with remarkably distant warts; on *Philonotis* on moist sandy soil. Fruitbody 1.5-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 13-18 µm; known from *Philonotis fontana*; rare or overlooked 11
Lamprospora lutziana
Spores with more crowded warts; on *Campylopus*. Fruitbody 1-2.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-17 µm; known from *Campylopus pyriformis*; very rare 12
Lamprospora verrucispora
11. Spores 19-25 µm; on *Archidium*, *Fossombronia* or *Pleuroidium* 12
Spores 14-20 µm; on *Dicranodontium*, *Fissidens*, *Pleuroidium* or *Weissia* 13
12. On the liverwort *Fossombronia* (or possibly *Archidium alternifolium*, see¹¹). Fruitbody 0.3-4 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 19-25 µm; known from *Fossombronia*; rare or overlooked 14
Lamprospora maireana
On *Pleuroidium*. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 20-25 µm, Qav. ≈ 1; on *Pleuroidium acuminatum*; very rare 15
Lamprospora rehmi
13. Spores with very broad, ± conical warts; on *Dicranodontium* or *Pleuroidium* 14
Spores with ± hemiglobose warts; on *Fissidens* or *Weissia* 15
14. Spores 14-16 µm large; on *Dicranodontium*. Fruitbody 1-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 14-16 µm; on *Dicranodontium denudatum*; very rare 16
Lamprospora esterlechnerae
Spores 15-20 µm large; on *Pleuroidium*. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 15-20 µm; known from *Pleuroidium acuminatum* and *P. subulatum*; rare or overlooked 17
Lamprospora tuberculata
15. On *Fissidens*. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 14-17 µm; on *Fissidens crassipes*; very rare 18
Lamprospora gibbosa
On rhizoids of *Weissia* on soil with pioneer mosses. Fruitbody 0.3-1 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 15-20 µm; known from *Weissia controversa*; rare or overlooked 19
Lamprospora tuberculatella
16. Spores with an ornamentation of sinuose ridges 17
Spores with a ± regular reticulum or with holes 22
17. Ridges 1.5-3 µm high 18
Ridges 0.3-1.5 µm high 19
18. With rounded warts between the ridges; on *Pleuroidium* or *Ephemerum*. Fruitbody 1 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 13-20 µm; known from *Pleuroidium* and *Ephemerum minutissimum*; rather common 20
Lamprospora annulata
Without warts between the ridges; on *Ephemerum*. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 14-18 µm; known from *Ephemerum minutissimum*; rare or overlooked 21
Lamprospora moynei
19. With rounded warts between the ridges; on *Ditrichum*. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 13-18 µm; known from *Ditrichum heteromallum*; rather common 22
Lamprospora dicranellae
Without warts between the ridges; on different hosts 20



11. *Lamprospora maireana* was originally described from the liverwort genus *Fossombronia* from Algeria. Findings on *Archidium* from temperate Europe probably represent an undescribed species.

	20. Ridges very narrow, up to 0.3 µm wide; on <i>Aneura</i> see <i>Lamprospora aneurae</i>, cpl. xx Ridges broader; on different hosts 21 21. Spores globose, (spore-Q 1); on <i>Bryum</i>. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 13-16 µm; known from <i>Bryum archangelicum</i>; rare or overlooked <i>Lamprospora paechnatzii</i> Spores subglobose (spore-Q 1.1); on <i>Trichostomum</i>. Fruitbody 0.4-1 mm wide; hymenium flat to cup-shaped, orange; asci cylindrical, 8-spored; spores 13-16.5 x 12-14.5 µm; known from <i>Trichostomum crispulum</i>; rare or overlooked <i>Lamprospora benkertii</i>			31. Spore-width-av. below 16.5 µm; on <i>Tortella</i>. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-17 µm; known from <i>Tortella tortuosa</i>; rare or overlooked <i>Lamprospora cailletii</i> Spore-width-av. above 16.5 µm; on <i>Ceratodon</i>. Fruitbody 2-4 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 16-20 µm; known from <i>Ceratodon purpureus</i>; rather common <i>Lamprospora arvensis</i> 32. On <i>Ceratodon</i> 33 On different hosts 35 33. Spores 16-19 µm wide; reticulum with 3-5 visible meshes per spore diameter. Fruitbody 1-2.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 16-19 µm, Qav. ≈ 1; on <i>Ceratodon purpureus</i>; rare or overlooked <i>Lamprospora kristiansenii</i> Spores 14-17 µm wide; reticulum with 4-8 visible meshes/spore diameter 34	
	22. Spores subglobose (spore-Q ≈ 1.1); on the liverwort <i>Aneura</i> or the mosses <i>Aloina</i>, <i>Barbula</i>, <i>Funaria</i> or <i>Tortula</i> 23 Spores globose, (spore-Q 1); mostly on other liverworts or mosses 28 23. Spores 12-15 µm long; on liverwort <i>Aneura</i> or the moss <i>Funaria</i> 24 Spores 14-17 (-18) µm long; on <i>Aloina</i>, <i>Barbula</i> or <i>Tortula</i> 25 24. Spore reticulum incomplete; on the liverwort <i>Aneura</i>. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 12.5-15 x 12-13 µm, Qav. ≈ 1.1; known from <i>Aneura pinguis</i>; rare or overlooked <i>Lamprospora aneurae</i> Spore reticulum complete; on the moss <i>Funaria</i>, often on burnt places. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-17 x 13-16 µm, Qav. ≈ 1.06; known from <i>Funaria hygrometrica</i>; rare or overlooked <i>Lamprospora carbonicola</i>			34. Spores 14-16 µm; reticulum with 6-8 visible meshes per spore diameter. Fruitbody 1-4 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; known from <i>Ceratodon purpureus</i>; rare or overlooked <i>Lamprospora seaveri</i> Spores 15-17 µm; reticulum with 4-7 visible meshes/holes per spore diameter. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; known from <i>Ceratodon purpureus</i>; rather common <i>Lamprospora feurichiana</i> 35. On <i>Bryum</i> 36 On different hosts 38 36. Spores 12-15.5 µm. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; known from species of <i>Bryum</i>; rare or overlooked <i>Lamprospora minuta</i> Spores more than 15 µm wide 37	
	25. Spore reticulum incomplete; on <i>Brachytheciastrum</i> see <i>Ocotospora pannosa</i>, cpl. xx Spore reticulum well defined 26 26. Spore reticulum with rather large, 4-7 µm wide meshes; on <i>Barbula</i>. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 15-17 x 12-15 µm, Qav. ≈ 1.15; known from <i>Barbula convoluta</i>; very rare <i>Lamprospora gotlandica</i> With more narrow, 1-2 µm wide meshes; on different hosts 27 27. On <i>Tortula</i>, mostly on stones and buildings. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-17 x 13-16 µm, Qav. ≈ 1.06; known from <i>Tortula muralis</i>; rare or overlooked <i>Lamprospora dictydiola</i> On <i>Aloina</i> on soil. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-18 x 13-17 µm, Qav. ≈ 1.06; known from <i>Aloina ambigua</i>; rare or overlooked <i>Lamprospora densireticulata</i>			37. Spores with a dotted reticulum. Fruitbody 0.5-1 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 15-17 µm; known from species of <i>Bryum</i>; very rare <i>Lamprospora faroensis</i> Spores with a smooth reticulum. Fruitbody 1-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 15-20 µm; known from species of <i>Bryum</i>; rare or overlooked <i>Lamprospora rugensis</i> 38. On <i>Ditrichum</i> or <i>Dicranella</i>; spores with a very dense reticulum with 6-9 meshes/diameter 39 On different hosts; reticulum less dense 40 39. On <i>Dicranella</i>; spores 14-16 µm. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; known from <i>Dicranella cerviculata</i>; rare or overlooked <i>Lamprospora hanffii</i> On <i>Ditrichum</i>; spores 16-17 µm wide. Fruitbody 1-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores globose, 16-17 µm, Qav. ≈ 1; on <i>Ditrichum flexicaule</i>; rare or overlooked <i>Lamprospora ditrichi</i>	
	28. Spore-av. width above 19 µm; on <i>Paraleucobryum</i> or <i>Pleuridium</i> 29 Spore-av. width below 19 µm; on different hosts 30 29. Spore reticulum with 4-6 visible meshes/holes per spore diameter; on <i>Pleuridium</i>. Fruitbody 0.5-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 18-25 µm; known from <i>Pleuridium acuminatum</i>; rather common <i>Lamprospora pseudoarvensis</i> Spore reticulum with 5-7 visible meshes/holes per spore diameter; on <i>Paraleucobryum</i>. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 20-25 µm; known from <i>Paraleucobryum longifolium</i>; very rare <i>Lamprospora bavarica</i>			40. On <i>Barbula</i>; spores 12-15 µm. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; known from <i>Barbula unguiculata</i> and <i>B. convoluta</i>; rare or overlooked <i>Lamprospora miniata</i> var. <i>parvispora</i> On different hosts; spores 14-20 µm wide 41 41. On <i>Syntrichia</i>. Fruitbody 2-4 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 16-19 µm; known from <i>Syntrichia ruralis</i>; rare or overlooked <i>Lamprospora tortulae-ruralis</i> On different hosts 42	
	30. Spores with a net-like ornament with more than 1.5 µm between the holes/ meshes 31 Spores with a net-like ornament of less than 1.5 µm between the meshes 32				



42. On *Didymodon*. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-17 µm; known from *Didymodon rigidulus* and *D. vinealis*; rare or overlooked
Lamprospora miniata var. *ratisbonensis*
On different hosts 43

43. On *Encalypta*, *Phascum* or *Pottia*. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 14-16 µm; known from *Encalypta streptocarpa*, *E. vulgaris*, *Phascum cuspidatum* and species of *Pottia*; common
Lamprospora miniata
On different hosts 44

44. On *Campylopus*. Fruitbody 1 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 15-20 µm known from species of *Campylopus*; rare or overlooked
Lamprospora campylopodis
On *Dicranum*. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 16-19 µm; known from *Dicranum montanum*; rare or overlooked
Lamprospora sylvatica

45. Spores with an ornament (must be observed in cotton blue) 46
Spores smooth 64

46. Spores with an ornamentation of ridges or a net-like ornament 47
Spores with round or oblong warts 51

47. Fruitbodies more than (3-) 4 mm wide; spore-Q above 1.7; on *Polytrichum*, *Polytrichastrum* or *Oligotrichum* 48
Fruitbodies smaller; spore-Q lower; on different hosts 49

48. Spore net of very thin lines, faint and first obvious after colouring with cotton-blue. Fruitbody 6-13 mm wide, with a stem; hymenium cup-shaped, orange; asci cylindrical, 8-spored; spores ellipsoid, 19-24 x 10-12.5 µm, Qav. ≈ 1.9, with a partial net; known from *Polytrichum juniperinum* and *Polytrichastrum alpinum*; rare or overlooked
Neottiella aphanodictyon
Spore net of coarse lines, also obvious seen without colouring. Fruitbody 3-12 mm wide, with a stem; hymenium cup-shaped, orange; asci cylindrical, 8-spored; spores ellipsoid to fusiform, 20-26 x 12-15 µm, Qav. ≈ 1.7, mostly with a rather complete net; on *Polytrichum*, *Polytrichastrum* and *Oligotrichum*; common
Neottiella rutilans

49. Spore-Q below than 1.2; on *Brachytheciastrum*
see *Octospora pannosa*, cpl. xx
Spore-Q above 1.2; on *Syntrichia* 50

50. Spores 11-12 µm wide. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores ellipsoid, 16-19 x 11-12 µm, Qav. ≈ 1.5; known from *Syntrichia ruralis* s.l.; very rare
Octospora neerlandica
Spores 14-16 µm wide. Fruitbody 1-4 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores broadly ellipsoid, 17-21 x 14-16 µm, Qav. ≈ 1.3; known from *Syntrichia* spp.; rare or overlooked
Lamprospora retispora

51. Spores on av. less than 16.5 µm long 52
Spores on av. more than 16.5 µm long 55

52. Spores 12-13 x 9-10.5 µm; on *Splachnum*. Fruitbody 1.5-4 mm wide; hymenium flat, orange; asci cylindrical to club-shaped, 8-spored; spores ellipsoid, Qav. ≈ 1.3; known from *Splachnum ampullaceum* and *S. vasculosum*; very rare
Octospora splachnophila
Spores larger; on different hosts 53

53. Spores spindle-shaped; spore-Q above 1.6; on *Tetraplodon*. Fruitbody 2-5 mm wide; hymenium flat, orange; asci cylindrical, 4-8-spored; spores spindle-shaped, 14-17 x 8-10 µm, Qav. ≈ 1.7; known from *Tetraplodon minioides* and *T. angustatus*; rare or overlooked
Octospora alpestris
Spores ellipsoid; spore Q below 1.6; on different hosts 54



54. Spores 10-12 µm wide; asci 4-spored; on *Pohlia*. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci cylindrical; spores ellipsoid, 14-16 x 10-11 µm, Qav. ≈ 1.4; known from *Pohlia lutescens*; rare or overlooked
Octospora phagospora
Spores 12-14 mm wide; asci 8-spored; on *Orthotrichum*. Fruitbody 1-1.5 mm wide; hymenium flat, orange; asci cylindrical; spores ellipsoid, 14.5-16.5 x 12.5-14 µm, Qav. ≈ 1.2; known from *Orthotrichum affine*; rather common
Octospora affinis

55. Spores on av. more than 22 µm long 56
Spores on av. less than 22 µm long 58

56. Fruitbodies 2-20 mm wide; spores 13-15 µm wide, 1-guttulate; on *Polytrichum* or *Polytrichastrum*. Fruitbody 2-20 mm wide; hymenium cup-shaped, orange; stem yes; asci cylindrical, 8-spored; spores ellipsoid to spindle-shaped, 22-27 x 13-15 µm, Qav. ≈ 1.8; known mostly from *Polytrichum piliferum*, rarer on *P. strictum* and *Polytrichastrum formosum*; rather common
Neottiella vioida
Fruitbodies 0.5-1.5 mm wide; spores more narrow, 2-guttulate; on different hosts 57

57. Paraphyses hooked. Fruitbody 0.5-1 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores ellipsoid to spindle-shaped, 21-26 x 10-12.5 µm, Qav. ≈ 2.1; host possibly *Pholia* (found on sandy soil with *Dicranella heteromalla*, *Cephaloziella divaricata*, *Pohlia nutans*); very rare
Octospora megapolitana
Paraphyses ± straight. Fruitbody 0.5-1.5 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores spindle-shaped, 23-25 x 11-12.5 µm, Qav. ≈ 2; known from *Ephemerum minutissimum*; very rare
Octospora bridei

58. Spores with one flat side; on *Orthotrichum*. Fruitbody 1-2 mm wide; hymenium flat, orange; asci club-shaped, 8-spored; spores loaf-shaped, 17-19 x 10-12 µm, Qav. ≈ 1.6; known from *Orthotrichum diaphanum*; rare or overlooked
Octospora orthotrichi
Spores ellipsoid to spindle-shaped; on different hosts 59

59. Spore width 13-16 µm; on *Schistidium* or *Racomitrium*. Fruitbody 1-4 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores ellipsoid, 19-22 x 13-16 µm, Qav. ≈ 1.4; known from *Schistidium crassipilum* and rarely *Racomitrium heterostichum*; rare or overlooked
*Octospora pseudoampezzana*¹²
Spores more narrow; on different hosts 60

60. Spore-Q 1.2-1.6; on *Bryum*. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores ellipsoid, 16-18 x 11-13 µm, Qav. ≈ 1.4; known from species of *Bryum*, e.g. *B. dichotomum* and *B. subapiculatum*; rare or overlooked
Octospora similis
Spore Q higher; on different hosts 61

61. Spores ellipsioid; on *Grimmia*. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 18-21 x 10-13 µm, Qav. ≈ 1.7; known from *Grimmia pulvinata*; rare or overlooked
Octospora meslinii
Spores ± spindle-shaped; on different hosts 62

62. Spores 1-guttulate; spores 11-12 µm wide; on *Tortula*
Octospora variornata nom. prov.
Spores 2-guttulate; spores 9-11 µm wide; on *Fissidens* or *Marchantia* 63

63. Hymenium brownish vinaceous (☞☞☞); on the moss *Fissidens bryoides*. Fruitbody 0.6-1.5 mm wide; hymenium flat, red; asci cylindrical, 8-spored; spores 17-21 x 9-10.5 µm, Qav. ≈ 1.9; rare or overlooked
Octospora fissidentis
Hymenium orange (☞☞☞); on the liverwort *Marchantia polymorpha*

12. Findings on *Racomitrium* may represent an undescribed species.

pha. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical, 8-spored; spores 18-22 x 9-11 µm, Qav. ≈ 2; rare or overlooked

Octospora ithacaensis

64. Asci 2-4-(6-)spored 65
Asci 8-spored 69

65. Spore-Q above 2.5 66
Spore-Q below 2.5 67

66. Spore-Q above 2.8; spores mostly with two large and two smaller drops; on *Bryum*. Fruitbody 1.5-2.5 mm wide; hymenium flat, orange; asci cylindrical to club-shaped, 4-spored; spores spindle-shaped, 30-35 x 9-12 µm, Qav. ≈ 3; known from species of *Bryum*, e.g. *B. rubens*; rare or overlooked

Octospora coccinea var. *tetraspora*

Spore-Q below 2.8; spored mostly with one large and two smaller drops; on *Phascum*. Fruitbody 0.8-1.5 mm wide; hymenium flat, orange; asci cylindrical, 2-4-spored; spores spindle-shaped, 26-32 x 10-12 µm, Qav. ≈ 2.6; known from *Phascum cuspidatum*; rare or overlooked

Octospora axillaris var. *tetraspora*

67. Asci cylindrical, 170-270 µm long; on *Pterygoneurum*. Fruitbody 1-2.5 mm wide; hymenium flat, orange; asci cylindrical, 4-spored; spores ellipsoid to spindle-shaped, 22-27 x 11.5-15 µm, Qav. ≈ 1.84; known from *Pterygoneurum ovatum* and *P. subsessile*; rare or overlooked

Octospora itzerottii

Asci club-shaped, 120-220 µm long; on *Bryum* 68

68. Spore less than 11 µm wide; spore-Qav. above 2.2. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci club-shaped, 4-spored; spores spindle-shaped, 22-26 x 9.5-10.5 µm, Qav. ≈ 2.4, contents hyaline to orange; known from *Bryum erythrocarpum* s.l.; rare or overlooked

Octospora gemmicola var. *tetraspora*

Spores more than 11 µm wide; spore-Qav. below 2.2. Fruitbody 1-2 mm wide; hymenium flat, orange; asci club-shaped, 4-spored; spores spindle-shaped, 23-27 x 11-13 µm, Qav. ≈ 2.1; known from *Bryum argenteum*; rare or overlooked

Octospora leucoloma var. *tetraspora*

69. Spores with almost parallel sides (subcylindrical) 70
Spores ellipsoid to spindle-shaped 71

70. On *Schistidium*; spores 19-25 x 9-11 µm. Fruitbody 1-5 mm wide; hymenium flat, orange; asci club-shaped; spores 19-25 x 9-11 µm, Qav. ≈ 2.2; known from species of *Schistidium*; rare or overlooked

Octospora musci-muralis var. *neglecta*

On *Grimmia*; spores 21-28 x 10-11 µm. Fruitbody 1-5 mm wide; hymenium flat, orange; asci club-shaped; spores 21-28 x 10-11 µm, Qav. ≈ 2.3; known from *Grimmia pulvinata*; rather common

Octospora musci-muralis

71. Spore-Q above 2.7 72
Spore-Q below 2.7 73

72. Fruitbodies hymenium shaped and much wider than high, 1.5-2.5 mm wide; on *Acaulon*, *Bryum* or *Encalypta*. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci club-shaped; spores spindle-shaped, 24-33 x 8-10.5 µm, Qav. ≈ 3.1; known from *Acaulon muticum*, *Bryum klinggraeffii* and *Encalypta vulgaris*; rather common

Octospora coccinea

Fruitbodies higher than wide, 0.3-0.5 mm wide; on the liverwort *Frullania*. Fruitbody 0.3-0.5 mm wide; hymenium cup-shaped, orange; asci club-shaped; spores spindle-shaped, 27-35 x 8-12 µm, Qav. ≈ 3.1; known from *Frullania tamarisci*; very rare

Filicupula suboperculata

73. Spores 27-39 µm long; on the liverwort *Lunularia*. Fruitbody 2-7 mm wide; hymenium flat, orange; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 27-39 x 15-19 µm, Qav. ≈ 1.9; known from *Lunularia cruciata*; very rare

Octosporopsis nicolai

Spores shorter; on different hosts 74

74. Spores spindle-shaped to ovoid (± spindle-shaped towards one end) 75
Spores ellipsoid 81

75. Spores 14-17 µm wide; on *Riccia*. Fruitbody 0.2-1 mm wide; hymenium flat, orange; asci cylindrical; spores spindle-shaped with one more rounded end, 21-27 x 14-17 µm, Qav. ≈ 1.54; margin with acute, up to 200 µm long hyaline hairs; known from *Riccia eyrichiana*, *R. glauca*, *R. sorocarpa* and *R. nigrella*; rare or overlooked

Neottiella ricciae

Spores more narrow; on different hosts 76

76. Spores 14-17 µm long; on *Rhizomnium* see *Octospora mnii*, cpl. xx
Spores longer; on different hosts 77

77. Spores narrowly egg-shaped; with one large and one smaller drop; on *Fissidens*. Fruitbody 0.2-1.5 mm wide; hymenium flat, orange; asci cylindrical to club-shaped; spores ellipsoid to spindle-shaped, 18-21 x 8.5-10.5 µm, Qav. ≈ 2.1; known from *Fissidens bryoides*; very rare

Octospora nemoralis

Spores spindle-shaped with equal ends; with one or two equally large drops; on different hosts 78

78. On *Bryum* 79
On *Phascum* 80

79. Spores 11-14 µm wide; spore-Q below 2; on *Bryum argenteum*. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical; spores spindle-shaped, 20-24 x 11-14 µm, Qav. ≈ 1.8; rare or overlooked

Octospora leucoloma

Spores 8.5-10.5 µm wide; spore-Q above 2; on *Bryum ruderal*, *B. dichotomum*, *B. radiculosum*, *B. rubens* or *B. subapiculatum*. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci club-shaped; spores spindle-shaped, 19-23 x 8.5-10.5 µm, Qav. ≈ 2.2; rare or overlooked

Octospora gemmicola

80. Spore-Q below 2, spores 1-guttulate. Fruitbody 0.5-2 mm wide; hymenium flat, orange; asci cylindrical; spores spindle-shaped, 17-22 x 9-13 µm, Qav. ≈ 1.8; known from *Phascum cuspidatum*; rather common

Octospora gyalectoides

Spore-Q above 2, spores 2-guttulate. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical; spores spindle-shaped, 20-26 x 10-11 µm, Qav. ≈ 2.2; known from *Phascum cuspidatum*; rare or overlooked

Octospora axillaris

81. Fruitbodies as high as wide, 0.3-0.6 x 0.4-0.6 mm large; spores often asymmetrical, irregularly egg-shaped; on *Rhizomnium*. Fruitbody 0.3-0.6 mm wide; hymenium flat, pale yellow; asci cylindrical; spores 14-17 x 10-13 µm, Qav. ≈ 1.3; known from *Rhizomnium punctatum*; very rare

Octospora mnii

Fruitbodies wider than high, mostly larger; spores ± ellipsoid; on different hosts 82

82. Mature spores with two large or one large and many smaller drops; on *Polytrichum*, *Oligotrichum* or *Tortella* 83
Mature spores with one large drop; on different hosts 84

83. Fruitbodies 2-15 mm wide; on e.g. *Polytrichum* or *Oligotrichum*. Fruitbody 2-15 mm wide; hymenium flat to cup-shaped, orange; asci cylindrical; spores 20-23 x 11-13 µm, Qav. ≈ 1.8; known from *Oligotrichum hercynicum*, *Polytrichastrum formosum*, *Polytrichum piliferum*, *Pogonatum aloides* and *P. nanum*; rather common ***Octospora humosa***

Fruitbodies 0.5-1 mm wide; on *Tortella*. Fruitbody 0.5-1 mm wide; hymenium flat, orange; asci cylindrical; spores 22-22.5 x 11.5-13 µm, Qav. ≈ 1.81; known from *Tortella tortuosa*; very rare ***Octospora guestfaliensis***

84. Outside and margin with 150-200 µm long, tapering, white hairs. Fruitbody 0.5-3 mm wide; hymenium flat, orange; asci cylindrical; spores 14-18 x 9-13 µm, Qav. ≈ 1.5; known from *Ceratodon purpureus* and *Funaria hygrometrica*; rather common ***Octospora hetieri***

Outside and margin without such hairs 85

85. On *Ceratodon purpureus* 86

On different hosts 87

86. Hymenium remarkably red; paraphyses with many coloured drops. Fruitbody 1-3 mm wide; hymenium flat, red; asci cylindrical; spores 15-18 x 10-12 µm, Qav. ≈ 1.5; rare or overlooked ***Octospora rubens***

Hymenium orange; paraphyses without coloured drops. Fruitbody 1-4 mm wide; hymenium flat, orange; asci cylindrical; spores 15-18 x 10-12 µm, Qav. ≈ 1.5; rather common ***Octospora rustica***

87. On *Phascum* see *Octospora gyalectoides* cpl. xx

On different hosts 88

88. Spores more than 19 µm long; on *Aphanorrhagma*, *Funaria*, *Grimmia* or *Physcomitrium* 89

Spores shorter; on different hosts 90

89. On *Grimmia*. Fruitbody 1-2 mm wide; hymenium flat, orange; asci cylindrical; spores 20-24 x 12-14 µm, Qav. ≈ 1.7; known from *Grimmia pulvinata*; rare or overlooked ***Octospora grimmiae***

On *Aphanorrhagma*, *Funaria* or *Physcomitrium*. Fruitbody 0.5-5 mm wide; hymenium flat, orange; asci cylindrical; spores 19-27 x 13-17 µm, Qav. ≈ 1.5; known from *Aphanorrhagma patens*, *Funaria hygrometrica* and *Physcomitrium sphaericum*; rather common ***Octospora excipulata***

90. Hymenium ± brownish vinaceous; possibly on protonema of *Pleuroidium*. Fruitbody 0.3-1.5 mm wide; hymenium flat, red; asci cylindrical; spores 14-18 x 10-11 µm, Qav. ≈ 1.5; known from *Pleuroidium subulatum*?; rare or overlooked ***Octospora lilacina***

Hymenium ± orange; on different hosts 91

91. On *Bryum*. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical; spores 15-17 x 11-12 µm, Qav. ≈ 1.4; known from *Bryum argenteum*; rare or overlooked ***Octospora bryi-argentei***

On *Lewinskya* or *Pseudotaxiphyllum* 92

92. On *Pseudotaxiphyllum*. Fruitbody 0.2-0.5 mm wide; hymenium flat, ored; asci cylindrical; spores 14-18 x 10-13.5 µm, Qav. ≈ 1.4; known from *Pseudotaxiphyllum elegans*; very rare ***Octospora oscarrii***

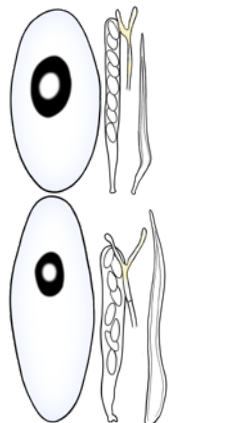
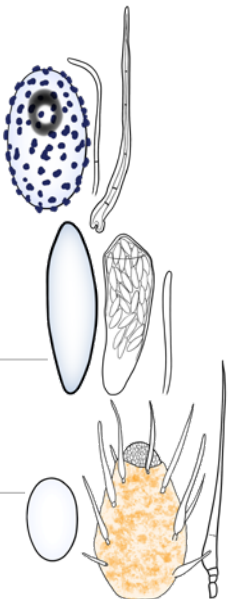
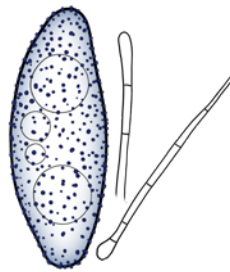
On *Lewinskya*. Fruitbody 0.3-1 mm wide; hymenium flat, orange; asci club-shaped; spores 16-19 x 10-12 µm, Qav. ≈ 1.6; known from *Lewinskya speciosa*; very rare ***Octospora bicarpa***

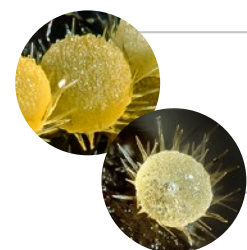
+ *Octospora bridei*?



Key I – hymenium yellowish, orange to reddish; margin with thick-walled, projecting hairs

1. Fruitbodies whitish; spores 27-33 x 11.5-14 µm, spindle-shaped and warty. Fruitbody 1-3 mm wide; hymenium flat to cup-shaped; asci cylindrical, inamyloid, 350-400 x 18-20 µm, 8-spored, with croziers; spores Qav. ≈ 2.4, 2-guttulate; paraphyses tips cylindrical, straight, contents hyaline; marginal hairs 600 (-1000) µm long; on soil and debris; rare or overlooked ***Leucoscypha leucotricha***
- Fruitbodies yellowish, orange or reddish; spores different 2
2. Spores without oil guttules (but may contain highly refractive gaseous bubbles (de Bary bubbles) in KOH and lactophenol preparations) [*Chaetothiersia* p.p., *Cheilymenia*, *Lasiobolus*, *Luciotrichus*] ... 3
- Spores with one to many guttules. ... [*Aurantiolechnia*, *Chaetothiersia* p.p. *Parascutellinia*, *Scutellinia*, *Spaniodiscus*, *Spooneromyces*] ... 47
3. On leaves (Spain); spores with coarse warts. Fruitbody 0.3-0.4 mm wide; hymenium, whitish to pale brown to orange; asci club-shaped, inamyloid, 8-spored, with croziers; spores 15-17 x 8-8 µm, Qav. ≈ 2, often developing a highly refractive gaseous bubble (de Bary bubble); paraphyses not widened towards the tops, 1-2 µm wide, ± bend; hairs 150-300 µm long, hyaline; saprobic, known from debris of *Quercus faginea* and *Pistacia*; very rare (S) ***Luciotrichus lasioboloides***
- On dung, debris, carcasses, wood or soil; spores smooth, finely striate or finely warty 4
4. Asci with 16 to thousands of spores 4a
- Asci 8-spored 6
- 4a. Asci 16-64-spored; spores fusiform see *Ascozonus*, Jxx
- Asci with thousands of spores; spores ellipsoid. Fruitbody 0.2-0.3 mm wide; hymenium whitish; asci balloon-shaped, inamyloid, 300-450 x 175-250 µm; spores 7.5-9.5 x 4-5 µm, Qav. ≈ 1.9, smooth, 0-guttulate; paraphyses tips cylindrical, straight, contents hyaline; saprobic, on dung of rabbit, rat; very rare ***Lasiobolus monascus***
5. Hairs n'mostly without septae or with a single septum near the base, ± hyaline; spores develop highly refractive gaseous bubbles (de Bary bubbles) in e.g. KOH [*Lasiobolus*] ... 6
- Hairs multi-septate, mostly pale brown to brown; spores without or with gaseous bubbles [*Chaetothiersia* p.p., *Cheilymenia*] ... 15
6. Spore-Qav. higher than 1.9 7
- Spore-Qav. lower than 1.9 10
7. Hairs longer than 600 µm 8
- Hairs shorter than 600 µm 9
8. Spores 17-25.5 µm long; hymenium pale yellow to orange (☐☐☐☐). Fruitbody 0.4-1 mm wide; hymenium flat to arched, orange; asci cylindrical, inamyloid, 8-spored; spores ellipsoid to different to spindle-shaped, 17-25.5 x 8.5-12 µm, Qav. ≈ 2, smooth, slime-coating surrounding; marginal hairs 350-1000 µm long, hyaline to pale yellow, smooth; saprobic, known from dung of deer and goat. ***Lasiobolus macrotrichus***
- Spores 22.5-40 µm long; hymenium pale orange to apricot-orange (☐☐☐☐). Fruitbody 0.4-1 mm wide; hymenium flat to arched, orange to reddish; asci truncate to club-shaped, inamyloid, 8-spored; spores ellipsoid to spindle-shaped, 22.5-30 x 7-13.5 µm, Qav. ≈ 2.5, smooth, 0-guttulate to surrounding; marginal hairs 280-950 µm long, hyaline to pale yellow, smooth; saprobic, known from dung of cow and deer; rare or overlooked ***Lasiobolus ruber***





9. Spores 19.5-25 x 10-12 µm. Fruitbody 0.3-1 mm wide; hymenium flat to arched, ± orange; asci cylindrical to club-shaped, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 2, smooth, slime-coating surrounding; marginal hairs 200-500 µm long, hyaline to pale yellow, smooth; saprobic, known from dung of cow, deer, moose, horse and rabbit; common *Lasiobolus ciliatus*

Lasiobolus ciliatus

- Spores 24-34 x 12-16 µm. Fruitbody 0.3-0.6 mm wide; hymenium flat to arched, orange; asci ± club-shaped, inamyloid, 8-spored; spores ellipsoid, Qav. ≈ 2, smooth, slime-coating surrounding; marginal hairs 200-375 µm long, hyaline to pale yellow, smooth; saprobic, known from dung of cow and goat; rare or overlooked. *Lasiobolus diversisporus*

Lasiobolus diversisporus

- | | |
|--|----|
| 10. Spores shorter than 12 μm | 11 |
| Spores longer than 12 μm | 12 |

11. Hairs 50-110 μm long; asci up to 90 μm long, Fruitbody 0.1-0.3 mm wide; hymenium flat to arched, $\pm$ orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 8.5-11.5 $\times$ 6-9 μm , Qav. $\approx$ 1.3, smooth; marginal hairs 50-110 μm long, hyaline to pale yellow, smooth; saprobic, known from dung of cow and goat; present in Europe?

Lasiobolus trichoboloides

Hairs 120-270 µm long; asci 90-150 µm long. Fruitbody 0.4-0.6 mm wide; hymenium flat to arched, ± orange; asci cylindrical, inamyloid, 8-spored; spores ellipsoid, 9-11.5 × 6.5-8.5 µm, Qav. ≈ 1.3, smooth; marginal hairs 120-270 µm long, hyaline to pale yellow, smooth to with goo; saprobic, known from dung of horse, goat and pig; rare or overlooked

Lasiobolus microsporus

Lasiobolus microsporus

12. Spores on average longer than 20 μm . Fruitbody 0.2-0.7 mm wide; hymenium flat to arched, orange; asci club-shaped, inamyloid, 8-spored, with croziers; spores ellipsoid, 18-24 x 10.5-14 μm , Qav. $\approx$ 1.7, smooth; marginal hairs 145-450 μm long, hyaline to pale yellow, smooth; saprobic, known from dung of deer, cow, hare, goat, horse, sheep, rabbit, etc.; common *Lasiobolus cuniculi*

Lasiobolus cuniculi

- | | |
|---|----|
| Spores on average shorter than 20 μm | 13 |
|---|----|

13. Hairs 200-400 µm long. Fruitbody 0.2-0.7 mm wide; hymenium flat to arched, ± orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 13-18 × 7.5-11.5 µm, Qav. ≈ 1.6, smooth, slime-coating 2-sided to surrounding; marginal hairs hyaline to pale yellow, smooth; saprobic, known from dung of deer, sheep and donky; rare or overlooked
- Lasiobolus intermedius*

Lasiobolus intermedius

- | | |
|---------------------------------|----|
| Hairs 65-250 μm long | 14 |
|---------------------------------|----|

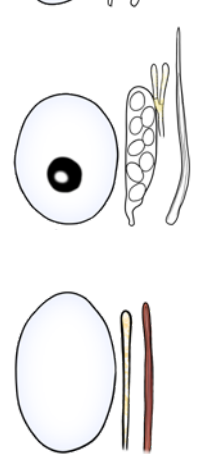
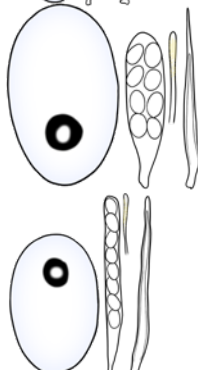
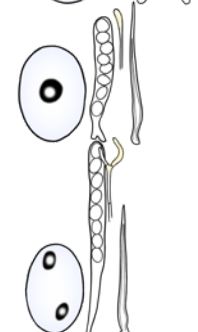
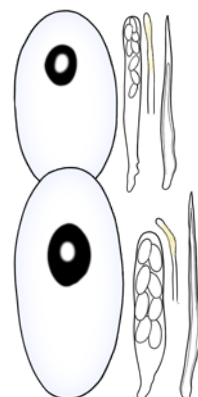
14. Hymenium whitish to pale yellowish (☹ ☐ ☐); spores developing a highly refractive gaseous bubble (de Bary bubble) in KOH and lactophenol preparations. Fruitbody 0.3-0.8 mm wide; hymenium flat to arched; asci cylindrical to truncate, inamyloid, 8-spored; spores ellipsoid, 13-18 x 9-13.5 µm, Qav. ≈ 1.3, smooth; marginal hairs 65-200 µm long, hyaline to pale yellow, smooth; saprobic, known from dung of moose, deer, goat, rat and sheep; very rare *Lasiobolus lasioboloides* Hymenium ± cinnamon buff (☹ ☐ ☐); spores not developing a highly refractive gaseous bubble ... see *Trichobolus dextrinoidesetosus*, Kxx

extrinoideosetosus, Kxx

15. On wood and debris of *Abies*; hairs dark brown, $\pm$ cylindrical with blunt tops and non-rooting bases. Fruitbody 2-6 mm wide; hymenium cup-shaped, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 17-18.5 $\times$ 11-12 μ m, Qav. $\approx$ 1.5, smooth, paraphyses tips cylindrical, straight, contents yellowish; outside hairs 195-735 μ m long, smooth; saprobic; very rare
Chaetothiersia egguttulata

On dung, debris, carcasses or soil; hairs different

..... [*Cheilymenia* – all species (also hairless) are keyed out here] . . 16



- | | |
|------------------------------|----|
| 16. Also with stellate hairs | 17 |
| Without stellate hairs | 20 |

17. Spores 12-13.5 x 6.5-7.5 µm; on dung of moose. Fruitbody 0.4-2.5 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.8, paraphyses contents yellowish to orange; marginal hairs 180-1150 µm long, pale brown, rooting, smooth; saprobic; very rare. *Cheilymenia parvispora* 18
Spores larger; on other substrates

18. Spores with obvious, sinuose warts and sometimes with a higher ornament at the ends; hairs 100-370 µm long; hymenium reddish orange (☞   ). Fruitbody 2.5 mm wide; hymenium cup-shaped to flat; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15.5-18 x 7-10 µm, 0- to 2-guttulate, warty; paraphyses contents orange; marginal hairs pale brown, rooting, smooth; saprobic, on dung, dung infused soil and rotten debris; very rare *Cheilymenia crucipila*
Spores smooth or with very small warts; hairs up to 100 µm long; hymenium ± orange (☞   ) 19

19. Spores 14-16 x 8-9 µm. Fruitbody 2-4 mm wide; hymenium cup-shaped to flat, yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. $\approx$ 1.7, with $\pm$ rounded warts, paraphyses contents yellowish; marginal hairs 100-800 µm long, pale brown; saprobic, known from mossy soil and debris; very rare. *Cheilymenia asteropila* — Spores 16-23 x 9-12.5 µm. Fruitbody 0.5-3.5 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. $\approx$ 1.8, smooth, 0-guttulate to surrounding; paraphyses contents orange; marginal hairs 140-1000 µm long, pale brown to brown, rooting, smooth; saprobic, known from dung of e.g. cow, including dung-infused soil and debris; common

Cheilymenia stercorea

- | | |
|---|----|
| 20. Without setose marginal hairs (but possibly with hyaline hypohid hairs) | 21 |
| With $\pm$ setose, often pale brown marginal hairs | 27 |

21. Spores 21-27 x 13.5-16.5 μm see *Cheilymenia bohémica* cpl. xx
 Spores smaller 22

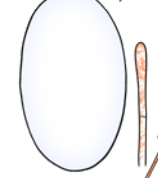
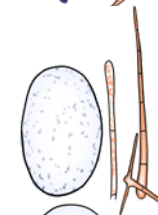
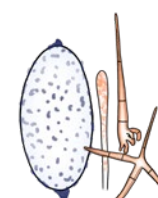
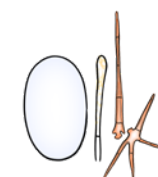
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| 22. Spores smooth or very finely warty | 23 |
| Spores with a longitudinal pattern of ridges or wrinkles seen in chlorazol black (and possibly in cotton blue without heating) | 24 |

23. Spores very finely warty in chlorazol black; spores 14-18 x 11-14 μm see *Cheilymenia stercoraria*, cpl. xx
 Spores smooth, 8.5-20 x 11-11.5 μm see *Cheilymenia laevispora*, cpl. xx

24. Hymenium reddish-orange (, 2-8 mm wide; paraphyses mostly with a capitate top see *Cheilymenia granulata*, cpl. xx
Dics paler or more yellowish (, 0.3-10 mm wide; paraphyses with a club-shaped top 25

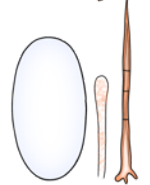
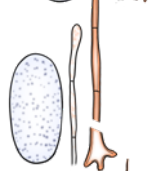
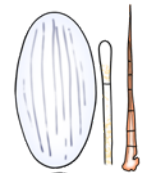
25. Fruitbodies 2-9 mm wide; hymenium clear yellow (☞  ). see *Cheilymenia theleboloides*, cpl. xx
Fruitbodies 0.3-1.5 mm wide; hymenium paler buff to apricot
orange (☞   ). 26

26. Spore Q (in water) ca. 1.8 see *Cheilymenia crassistriata*, cpl. xx
 Spore Q (in water) ca. 2.1 see *Cheilymenia karstenii*, cpl. xx





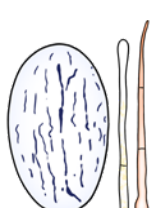
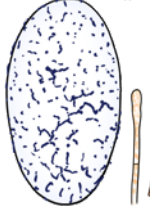
27. Longest setose hairs more than 600 µm long 28
Setose hairs shorter 31
28. On soil, often mull soil among *Urtica*. Fruitbody 3-20 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 13.5-19.5 x 7.5-9.5 µm, Qav. ≈ 1.9, longitudinally striped; paraphyses tips cylindrical to club-shaped, straight, contents yellowish; marginal hairs 100-700 µm long, pale brown, rooting, smooth; saprobic; common *Cheilymenia vitellina*
On dung 29



29. Spores 21.5-27.5 x 12.5-14 µm. Fruitbody 1-4 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.8, finely warty, paraphyses contents yellowish to orange; marginal hairs 400-1100 µm long, pale brown; saprobic, known from dung of cow, sheep, deer and rabbit; very rare *Cheilymenia megaspora*
Spores smaller 30
30. Spores 5.5-7.5 µm wide. Fruitbody 3-10 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 12-15 x 5.5-7.5 µm, Qav. ≈ 2, finely warty; paraphyses contents yellowish to orange; marginal hairs 400-1600 µm long, pale brown, rooting, smooth; saprobic, on dung; very rare *Cheilymenia magnipila*
Spores 7.5-10.5 mm wide. Fruitbody 3-10 mm wide; hymenium cup-shaped to flat, yellowish to orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 13.5-19 x 7.5-10.5 µm, Qav. ≈ 1.8, smooth, slime-coating surrounding; paraphyses tips cylindrical, straight, contents yellowish to orange; marginal hairs 150-1000 µm long, pale brown; saprobic, known from dung of cow and moose; rather common *Cheilymenia coprinaria*



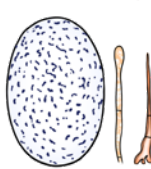
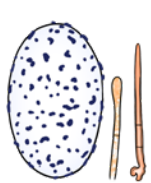
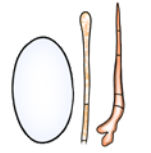
31. Longest setose hairs more than 320 µm 32
Setose hairs shorter 36
32. Spores with an obvious higher ornament at the ends. Fruitbody 4-7 mm wide; hymenium cup-shaped to flat, orange to yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 12-15 x 7.5-9 µm, Qav. ≈ 1.6, longitudinally striped; paraphyses tips flame-shaped to club-shaped, straight, contents yellowish; marginal hairs 60-540 µm long, pale brown, rooting, smooth; saprobic, on dung of hen and on soil *Cheilymenia polaripustulata*
Spores not with an aberrant ornament at the ends 33



33. Spores 21-28 x 10.5-16.5 µm. Fruitbody 0.6-1.5 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.8, finely warty; paraphyses contents yellowish to orange; marginal hairs 60-380 µm long, pale brown, rooting, smooth; saprobic, known from dung of cow, deer, rabbit, etc.; rare or overlooked *Cheilymenia insignis*
Spores up to 22 x 13 µm and often much smaller 34
34. Fruitbodies 2-9 mm wide; hymenium clear yellow (☞☞☞☞). Fruitbody 2-9 mm wide; hymenium cup-shaped to flat, yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15-22 x 8-13 µm, Qav. ≈ 1.7, longitudinally striped; paraphyses contents yellowish; marginal hairs absent or 80-480 µm long, hyaline to pale brown, smooth; saprobic, known from debris, cloth, paper, soil or dung; common *Cheilymenia theleboloides*
Fruitbodies 0.3-1.5 mm wide; hymenium ± apricot orange (☞☞☞) 35



35. Spores less than 9 µm wide, smooth. Fruitbody 3-10 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 14-16 x 7.1-8.5 µm, Qav. ≈ 1.9, smooth, paraphyses contents orange; marginal hairs 150-400 µm long, pale brown; saprobic, known from dung of horse, moose and cow; rather common *Cheilymenia gemella*

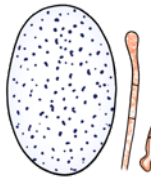


- Spores more than 9 µm wide, finely warty in chlorazol black (and possibly in cotton blue without heating). Fruitbody 2-5 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15.5-19.5 x 9.5-13 µm, Qav. ≈ 1.5, finely warty; paraphyses contents orange; marginal hairs 90-500 µm long, pale brown; saprobic, on dung, e.g. of cow and horse; common *Cheilymenia dennisii* (= *fimicola*)

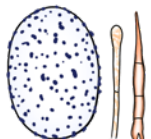
36. Arising from sclerotia on arctic mosses. Fruitbody 3-12 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 14-17 x 8.5-10 µm, Qav. ≈ 1.6, finely warty; paraphyses contents orange; marginal hairs 120-310 µm long, pale brown; saprobic, known from moss of subarctic on/with mosses; rare or overlooked *Cheilymenia sclerotiorum*
Not arising from sclerotia 37

37. Margin densely marked by small, rather dark brown hairs; hairs typically broad and stout, widest around the middle part 38
Margin with paler hairs; hairs rather slender and widest in the lower part 40

38. Hairs dark brown in full length. Fruitbody 1-7.5 mm wide; hymenium cup-shaped to flat, orange to reddish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15-21 x 9-13.5 µm, Qav. ≈ 1.6, finely warty; paraphyses tips head-shaped, straight, contents orange; marginal hairs 80-320 x 12-28 µm, brown; saprobic, on dung, debris and wood; rare or overlooked *Cheilymenia rubra*
Hairs with paler tips (may be conspecific with *Cheilymenia rubra*) 39



39. Hymenium brownish red to brownish (☞☞☞☞); asci with 8 ellipsoide spores. Fruitbody 2-4 mm wide; hymenium cup-shaped to flat, orange to pale brown; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 14.5-19 x 9.5-12 µm, Qav. ≈ 1.5, finely warty; paraphyses contents yellowish to orange; marginal hairs 80-270 x 15-24 µm, pale brown; saprobic, known from cadavers and peat in greenhouses *Cheilymenia cadaverina*



- Hymenium reddish orange (☞☞☞☞); asci with a variable number of ellipsoid and often also subglobose spores. Fruitbody 1-5 mm wide; hymenium cup-shaped to flat, orange to reddish; asci cylindrical, inamyloid, 8 to 4 to 2-spored, with croziers; spores ellipsoid, 12-19.5 x 9-13.5 µm, Qav. ≈ 1.4, finely warty; paraphyses contents orange; marginal hairs 68-270 x 8-19 µm, pale brown; saprobic, on dung *Cheilymenia fraudans*



40. Growing on sandy soil (subarctic). Fruitbody 3-8 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 14-17 x 8.5-10.5 µm, Qav. ≈ 1.6, finely warty; paraphyses tips club-shaped to head-shaped, straight, contents yellowish to orange; marginal hairs 90-210 µm long, pale brown; saprobic, on soil; rare or overlooked *Cheilymenia chionophila*
On dung 41



41. Fruitbodies more than 2 mm wide; on goose, deer or reindeer 42
Fruitbodies less than 2 mm wide; on horse, cow or sheep 43

42. Spores 10.5-12 µm wide. Fruitbody 1-5 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 18.5-21 × 10.5-12 µm, Qav. ≈ 1.7, with small ± rounded, oblong to sinuose warts, paraphyses contents orange; marginal hairs 90-240 µm long, hyaline to pale brown, rooting, smooth; saprobic, known from dung of reindeer, deer and goose; rare or overlooked *Cheilymenia liskae*

Spores 11.5-14 µm wide. Fruitbody 2-3 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 19-23 × 11.5-14 µm, Qav. ≈ 1.6, finely warty; paraphyses contents orange; marginal hairs 80-300 µm long, pale brown; saprobic, known from dung of goose; very rare *Cheilymenia pseudohumarioides*

43. Spores 12-14 × 8-9 µm. Fruitbody 0.3-0.6 mm wide; hymenium cup-shaped to flat, yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.5, finely warty to almost smooth; paraphyses contents yellowish to orange; marginal hairs 60-245 µm long, pale brown; saprobic, known from dung of cow; very rare *Cheilymenia lundqvistii*

Spores larger 44

44. Spores 10-12 mm wide. Fruitbody 0.2-1 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 16.5-20.5 × 10-12 µm, Qav. ≈ 1.6, smooth, finely warty to almost smooth; paraphyses contents yellowish to orange; marginal hairs 95-250 µm long, pale brown; saprobic, known from dung of cow; very rare *Cheilymenia aurantiacorubra*

Spores wider 45

45. Spores 18-25.5 µm long, Qav. ≈ 1.6. Fruitbody 0.3-1 mm wide; hymenium cup-shaped to flat, orange to yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 18-25.5 × 12-14.5 µm, finely warty to almost smooth; paraphyses contents yellowish to orange; marginal hairs 80-280 µm long, pale brown; saprobic, known from dung of horse and cow; very rare *Cheilymenia pulcherrima*

Spores more than 23 µm long, Qav. ca. 1.8. 46

46. Spores smooth; hymenium whitish to cream (☹ ☐ ☐ ☐ ☐). Fruitbody 0.3-1 mm wide; hymenium cup-shaped to flat; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 23-27 × 12-16 µm, Qav. ≈ 1.7, smooth, paraphyses contents hyaline; marginal hairs 90-210 µm long, pale brown; saprobic, known from dung of cow; very rare *Cheilymenia lacteoalba*

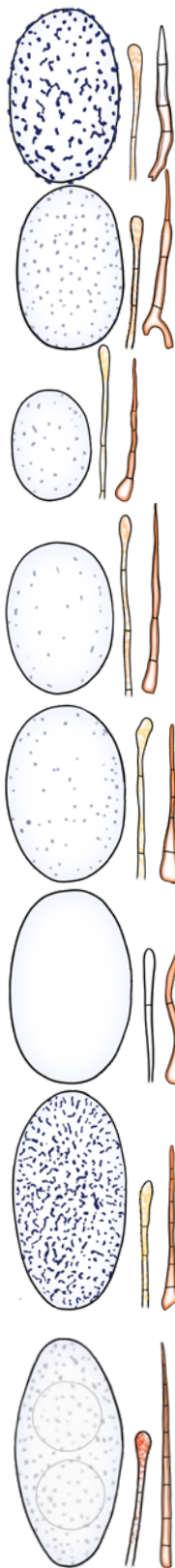
Spores (as seen in chlorazol black and possibly in cotton blue without heating) with small sinuose warts that may fuse to an incomplete reticulum; hymenium ± orange (☹ ☐ ☐ ☐ ☐). Fruitbody 0.3-1.5 mm wide; hymenium cup-shaped to flat, orange to yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 23-29 × 12-16.5 µm, Qav. ≈ 1.8, paraphyses contents yellowish to orange; marginal hairs 90-280 µm long, pale brown; saprobic, known from dung of cow and sheep; rare or overlooked *Cheilymenia raripila*

47. Mature spores smooth in outline, but possibly with very small surface dots seen in cotton blue 48

Mature spores ornamented with obvious warts, spines or with a reticulum [*Scutellinia* (most species), *Spooneromyces*] . . 52

48. Spores 24-28.5 × 12.5-15.5 µm. Fruitbody 3-8 mm wide, cup-shaped, reddish to pinkish; asci cylindrical, inamyloid, 8-spored, with croziers; spores spindle-shaped to ellipsoid, Qav. ≈ 1.9, 2-guttulate, smooth or very finely warty; paraphyses tips club-shaped, straight, contents red; marginal hairs 130-750 µm long, brown, smooth; on soil (ectomycorrhizal); rare or overlooked *Parascutellinia carneosanguinea*

Spores smaller 49



49. Hymenium ± yellow (☹ ☐ ☐ ☐ ☐); on branches and debris of *Cupressus*. Fruitbody 3-10 mm wide; hymenium cup-shaped, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 18-19 × 10.5-12.5 µm, Qav. ≈ 1.6, smooth, 2-guttulate, without slime-coating; paraphyses tips cylindrical, straight, contents yellowish; marginal hairs 200-1100 µm long, brown, smooth; saprobic; very rare (S) *Chaetothiersia cupressicola*

Hymenium ± apricot-orange (☹ ☐ ☐ ☐ ☐); not associated with *Cupressus* 50

50. Fruitbodies deeply cup-shaped, 5-25 mm wide. Hymenium orange; hairs brown; ssci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 15-18 × 7-9 µm, Qav. ≈ 2, smooth, 2-guttulate, without slime-coating; paraphyses tips cylindrical to head-shaped, straight, wall smooth, contents orange; marginal hairs 100-850 µm long, brown, wiht age with finely encrusted; on soil and wood; rare *Aurantiolechnea solsequia*

Fruitbodies flat or shallowly cup-shaped, 1-4 mm wide 51

51. Marginal hairs 450-900 × 15-30 µm. Hymenium 1-4 mm wide, ± apricot-orange; marginal hairs brown; spores 18-20.5 × 10-12.5 µm; on wood *Scutellinia setosa*

Marginal hairs smaller. Fruitbody 1-4 mm wide, ± apricot-orange to orange; spores 18-23 × 10-13.5 µm; margin with brown, 150-300 µm long, 1-rooted hairs; on soil (S) *Spaniodiscus fuckelii*

52. Spores ± globose to subglobose (Q=1-1.15) 53

Spores ellipsoid to spindle-shaped 60

52. Spores with a 2.5-4 µm high, coarse reticulum. Fruitbody 3-8 mm wide, orange to reddish; margin with dense, 135-650 (-840) µm long, brown, 2-3-rooted hairs; spores 16-18 µm wide; on soil *Scutellinia rotundisperma*

Spores with warts, spines or a low reticulum 54

54. Spores with (1.5-) 2-5 µm high spines 55

Spores with lower warts 57

55. Spores with 2-4.5 µm high, rounded warts. Fruitbody 1-2.2 mm wide, reddish margin with moderately crowded, 600-1000 µm long, brown, 2-3-rooted hairs; spores 15-19 µm wide; on soil *Scutellinia sinensis*

Spores with pointed or truncate spines 54

56. Spores with pointed spines; marginal hairs up to 100-800 µm long. Fruitbody 1-5 mm wide, orange to reddish margin with dense, brown, 2-3-rooted hairs; spores 15.5-18.5 µm wide, with 2-6 µm high spines; on soil *Scutellinia legaliae*

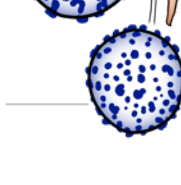
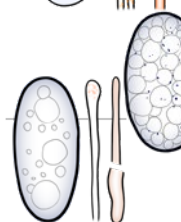
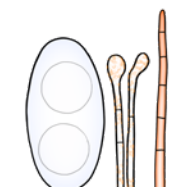
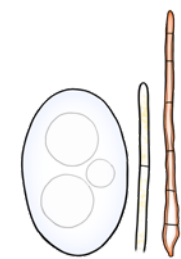
Spores with truncate spines; marginal hairs 400-1950 (-2100) µm long. Fruitbody 1.5-9 mm wide, reddish; margin with dense, brown, 2-3-rooted hairs; spores 15-17.5 µm wide, with 1.5-4 µm high spines; on soil *Scutellinia trechispora*

57. Marginal hairs 80-130 µm long; spores with sinuose warts. Fruitbody 0.5-2.5 mm wide, reddish; margin with pale brown, 80-130 µm long, 1-rooted hairs; spores 15-21 µm wide, with up to 1.4 µm high sinuose warts; on soil *Scutellinia peloponnesiaca*

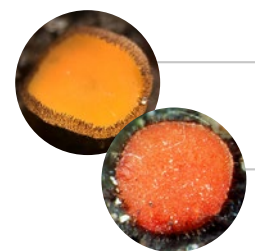
Marginal hairs longer; spores with round or truncate warts 58

58. Spores 14-16.5 (-19) µm with 1-2 µm high, truncate warts; marginal hairs often with 2-3 roots. Fruitbody 3-8 mm wide, reddish; margin with brown, 200-500 µm long hairs; on soil *Scutellinia minor*

Spores more than 18 µm wide, with rounded warts; marginal hairs with 1-2 roots 59



96 key I – whitish, yellowish, orange to reddish operculates with a setose margin



59. Marginal hairs up to 400 μm long, mostly 1-2-septate; mainly southern. Fruitbody 3-10 mm wide, apricot-orange to reddish; margin with brown, 100-400 μm long, 1-rooted hairs; spores 18-22 μm wide, with up to 1.8 μm high warts; on soil *Scutellinia barlae*

- Marginal hairs up to 700 μm long, with up to 10 septae; mainly boreal or arctic. Fruitbody 2-6 mm wide, apricot-orange to reddish; margin with brown to greyish brown, 100-700 μm long, 1-3-rooted hairs with paler tips; spores 19-23.5 μm wide, with up to 1 μm high warts; on soil *Scutellinia hyperborea*

60. Also with stellate hairs see *Cheilymenia crucipila*, cpl. xx
Without stellate hairs 61

61. Hairs very pale, typically not divided and rooted at the base 62
Hairs yellowish brown, orange-brown, to reddish brown, 1-2-many-rooted 64

62. Spores with an up to 1.5 μm high, mesh-like ornament. Fruitbody 5-15 mm wide, apricot-orange; margin with pale brown, 160-410 μm long hairs; spores 18.5-23 $\times$ 8.5-9.5 μm ; paraphyses constricted above the septae; on wood and debris including conifer needles *Spooneromyces helveticus*
Spores with a labyrinthine or warty ornament 63



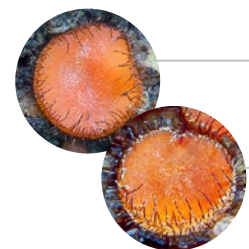
63. Spores 16-23.5 $\times$ 8-10.5 μm , with an ornament of labyrinthine warts. Fruitbody 4-10 mm wide, clay-pink, salmon, apricot-orange to orange; margin with pale brown, 50-480 μm long hairs; paraphyses constricted above the septae; on debris, especially under coniferous trees *Spooneromyces laeticolor*

- Spores 14-17 $\times$ 7-8 μm , with an ornament of scattered, round warts. Fruitbody 3-9 mm wide, clay-pink, salmon, apricot-orange to orange; margin with pale brown, 100-400 μm long hairs; on debris and burnt places *Spooneromyces velenovskiyi*

64. Longest marginal hairs 1100-2000 μm long 65
Marginal hairs shorter than 1100 μm 68

65. Spores ornamented by 1-3.3 μm high, truncate warts. Fruitbody 4-11 mm wide, scarlet; margin with brown, 400-1600 μm long, 3-many-rooted hairs; spores 19-23 $\times$ 13.5-18 μm large; mostly on wood *Scutellinia decipiens*
Spores with a lower ornament 66

66. Spores with large, up to 1.5 μm high, sinuose warts almost forming a net-like ornament. Fruitbody 2-6 mm wide, coral to scarlet; margin with brown, 200-2000 μm long, 3-many-rooted hairs; spores 17-20 $\times$ 10-11.5 μm large; mostly on wood *Scutellinia colensoi*
Spores with less prominent warts 67

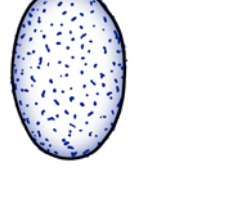
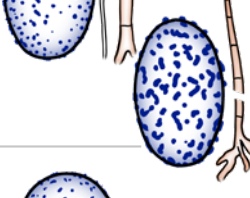
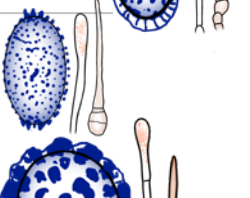
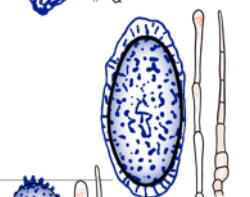
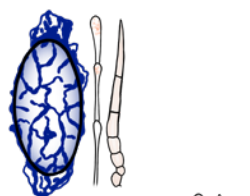
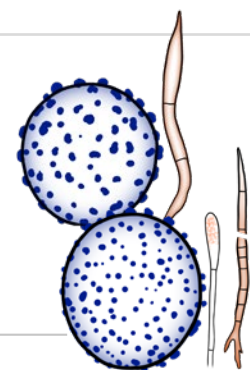


67. Spores with very tiny, up to 0.6 μm high warts; spore-Q-av. below 1.6. Fruitbody 3-8 mm wide, coral to scarlet; margin with brown, 300-2000 μm long, 2-many-rooted hairs; spores 16.5-22 $\times$ 10.5-14 μm large; mostly on wood *Scutellinia crinita*

- Spores with slightly larger, up to 1 μm high, sinuate warts; spore-Q-av. above 1.6. Fruitbody 4-11 mm wide, coral to scarlet; margin with brown, 360-1600 μm long, 3-many-rooted hairs; spores 17.5-23 $\times$ 10.5-13 μm large; on soil, debris and wood *Scutellinia scutellata*

68. Longest marginal hairs 600-1100 μm long 69
Marginal hairs shorter than 600 μm 76

69. Spores with very low, up to 0.3 μm high ornamentation of sinuose warts. Fruitbody 3-12 mm wide, coral to apricot-orange; margin with brown, 600-1000 μm long, 2-many-rooted hairs; spores 21-27.5 $\times$ 13.5-16.5 μm large; on wood *Scutellinia pilatii*
Warts up to at least 1 μm 70



key I – whitish, yellowish, orange to reddish operculates with a setose margin 97



70. Spores $\pm$ spindle-shaped; spores ornamented by long and sinuose warts; with a loosening perispore. Fruitbody 3-8 mm wide, $\pm$ scarlet; margin with brown, 200-1100 μm long, 1-2-rooted hairs; spores 23.5-28 $\times$ 11.5-15 μm large, with low, sinuose warts; on soil *Scutellinia mirabilis*

- Spores $\pm$ ellipsoid; ornamentation mostly different; perispore not loosening 71

71. Spores 15.5-19.5 $\times$ 9.5-12 μm . Fruitbody 1-5 mm wide, brownish red; margin with brown, to 300-1000 μm long, 2-many-rooted hairs; spores 15.5-19.5 $\times$ 9.5-12 μm large, with up to 1.2 μm high, round warts; on soil, debris and wood *Scutellinia vitreola*
Spores on average more than 19 $\times$ 12 μm 72

72. Spores with sinuose warts or crests. Fruitbody 3-20 mm wide, scarlet; margin with brown, to 150-1000 μm long, 2-many-rooted hairs; spores 19.5-27 $\times$ 13-17.5 μm large, with up to 1.2 μm high, sinuose warts; on soil *Scutellinia olivascens*
Spores with rounded warts 73

73. Spores with many small and fewer larger, up to 1.5 μm high warts; hairs 1-2-rooted. Fruitbody 3-15 mm wide, apricot-orange to scarlet; margin with brown, to 800 μm long hairs; spores 19-22 $\times$ 11-13.5 μm large, with up to 1.5 μm high; on soil and debris, e.g. in dune areas *Scutellinia heterosculpturata*

- Spores with more uniform ornamentation; hairs often 2-many-rooted 74

74. Spores with up to 2 μm high warts. Fruitbody 3-8 mm wide, brownish red to scarlet; margin with brown, to 200-1000 μm long, 2-many-rooted hairs; spores 17-25 $\times$ 13-20 μm large, with round warts; on debris including herbs *Scutellinia umbrorum*
Warts up to 1.2 μm high 75



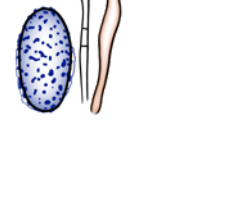
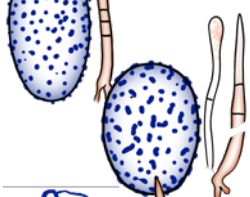
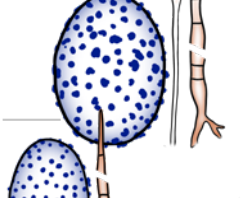
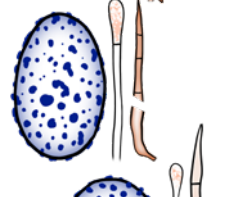
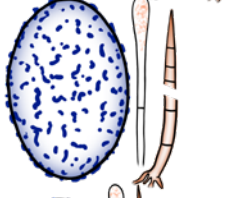
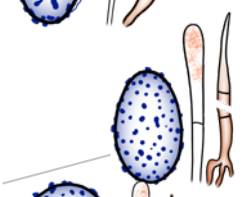
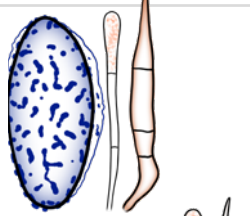
75. Hairs with 1-3 furcate base; spore-Q higher than 1.4. Fruitbody 3-7 mm wide, coral to scarlet; margin with brown, to 150-650 (-950) μm long, 1-3-rooted hairs; spores 17.5-23.5 $\times$ 12-15 μm large, with up to 1.1 μm high, $\pm$ round warts; on soil and debris *Scutellinia subhirtella*
Hairs with many-branched base; spore-Q 1.2-1.3. Fruitbody 2-10 mm wide, apricot orange; margin with brown, to 200-1000 μm long, 1-many-rooted hairs; spores 18-23 $\times$ 13.5-18.5 μm large, with up to 1.2 μm high, $\pm$ round warts; on soil and debris *Scutellinia patagonica*

76. Spores with 1.6-4.3 (-6) μm high crests, forming a net-like ornament. Fruitbody 1.5-4 mm wide, apricot orange to scarlet; margin with brown, to 120-280 μm long, 1-2-rooted hairs; spores 19-24 $\times$ 10-13.5 μm large; on soil *Scutellinia pseudotrechispora*
Spores with lower, round or sinuose warts 77

77. Spores on average less than 20 μm long 78
Spores on average more than 20 μm long 84

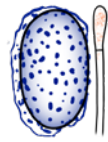
78. Also with stellate hairs; spores 15.5-18 $\times$ 7-10 μm with a semimesh-like pattern and much higher ornament at the ends see *Cheilymenia crucipila*, cpl. XX
Without stellate hairs, but hairs often with multiple roots; spores different 79

79. Spores 13-16 $\times$ 7-9 μm with very small, to 0.3 μm high, sinuose warts. Fruitbody 0.5-4 mm wide, apricot orange to brownish red; margin with brown, to 50-170 μm long, 1-2-rooted hairs; on soil *Scutellinia minutella*
Spores larger and with more conspicuous ornament 80





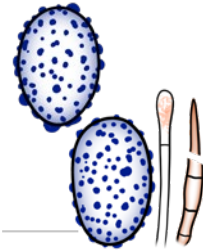
80. Spores with a loosening perispore; spore ornament of low, up to 0.6 μm high, sinuous warts. Fruitbody 2-8 mm wide, apricot orange; margin with brown, to 100-320 (-400) μm long, 2-3-rooted hairs; spores 15.5-19 $\times$ 8-11.5 μm large; on soil *Scutellinia torrentis*
Spores without a loosening perispore; spore ornament identical or higher 811



81. Spores with up to 0.7 μm high, sinuose warts. Fruitbody 2-4 mm wide, brownish red; spores 16-20 $\times$ 10-12.5 μm ; margin with brownish, 300-600 μm long, 3-multirooted hairs; on wood *Scutellinia subcervorum*
Spores with at least up to 1.1 μm high, round warts 82

82. Spores 17.5-23.5 $\times$ 12-15 μm large, with up to 1.1 μm high, $\pm$ round warts; hairs up to 600 μm long see *Scutellinia subhirtella* cpl. 74xx
Spores smaller and with higher warts; hairs to 410 μm long 83

83. With 75-140 μm long, 1-3-celled, pale brown hairs. Fruitbody 1-4 mm wide, apricot orange; hairs 1-rooted; spores 15-20 $\times$ 9-13.5 μm large, with up to 1.2 μm high, $\pm$ round warts; on soil *Scutellinia ahmadii*
With 100-410 μm long, many-celled, brown hairs. Fruitbody 3-5 mm wide, apricot orange to reddish; hairs 1-rooted; spores 16.5-19.5 $\times$ 11-14 μm large, with up to 1.4 μm high, $\pm$ round warts; on soil *Scutellinia parvispora*



84. Spores with up to 1.3 μm high, round warts 85
Spores with up to 0.5 mm high, $\pm$ sinuose warts 86

85. Spores 17.5-23.5 $\times$ 12-15 μm large, ellipsoid, Q 1.4-1.6 see *Scutellinia subhirtella* cpl. 74xx

- Spores 22-26 $\times$ 10-14 μm large, ellipsoid to subspindle-shaped, Q 1.8-2.2. Fruitbody 3-14 mm wide, coral to scarlet; hairs to 500 (-550) μm long, 2-many-rooted; spores with up to 1.3 μm high, round warts; on soil, debris and wood *Scutellinia cepjii*



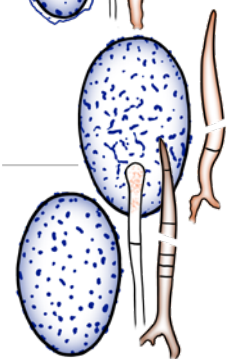
86. Spores on average longer than 26 μm , $\pm$ spindle-shaped. Fruitbody 2-8 mm wide, brownish red to scarlet; hairs brown, 100-400 μm long, 1-3-rooted; spores 25-30 (-36) $\times$ 12-15 (-16) μm large, with low, up to 0.4 μm high, oblong warts; on soil *Scutellinia macrospora*
Spores on average shorter than 26 μm , $\pm$ ellipsoid 87



87. With a loosening perispore when heated in cotton blue. Fruitbody 2-6 mm wide, apricot orange to brownish red; hairs brown, 60-360 μm long, 1-3-rooted; spores 19-24 $\times$ 11-16 μm large, with low, up to 0.5 μm high, irregular warts; on soil *Scutellinia superba*
Without a loosening perispore 88

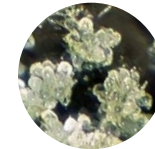
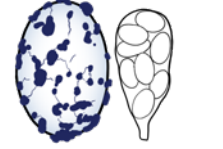
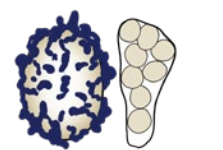
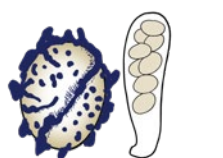
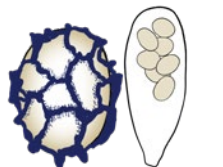
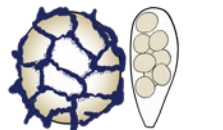
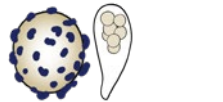


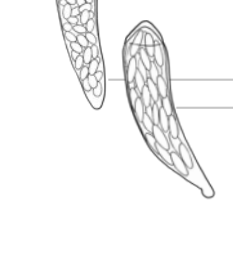
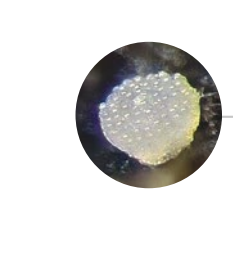
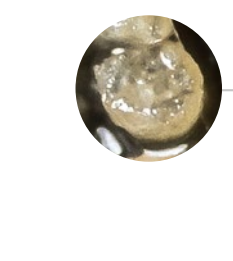
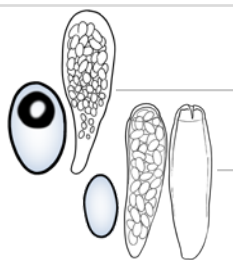
88. Spores with an ornament of small, sinuose warts which in some places almost forms a net-like ornament; hairs macroscopically brown. Fruitbody 4-15 mm wide, $\pm$ scarlet; hairs 130-500 μm long, 1-2-rooted; spores 22-28 $\times$ 14.5-19 μm large, with low, up to 0.3 μm high warts; on soil; northern/alpine *Scutellinia kerguelensis*
Spores with an ornament of small, sinuose, isolated warts; hairs macroscopically almost black. Fruitbody 4-10 mm wide, $\pm$ scarlet; hairs 150-420 μm long, 1-2-rooted; spores 19.5-26.5 $\times$ 14-16.5 μm large, with low, up to 0.4 μm high warts; on soil *Scutellinia nigrohirtula*



Key J – white, yellow, orange or reddish, smooth or soft-haired species on dung or animal remains (including both true operculate species and *Thelebolaceae* opening by a vertical tear)

1. Mature spores brownish, reticulate or coarsely warty; Qav. 1-1.4 2
[*Ascodesmis*] 7
Mature spores hyaline, smooth, striate to warty, Q mostly higher 7
2. Spores 19-21 $\times$ 14-18 μm . Fruitbody very small; hymenium arched, whitish to buffish; asci club-shaped to balloon-shaped, inamyloid, 84-150 $\times$ 35-42 μm , 8-spored; spores ellipsoid, Qav. $\approx$ 1.3, $\pm$ reticulate, without slime-coating; paraphyses tips cylindrical to club-shaped; known from dung of crocodile; rare or overlooked *Ascodesmis macrospora*
Spores smaller 3
3. Spores $\pm$ globose to subglobose, Qav. ca. 1-1.15 4
Spores broadly ellipsoid, Qav. 1.2-1.4 5
4. Spores 8.5-10.5 μm long. Fruitbody 50-200 μm wide; hymenium arched, whitish to buffish; asci club-shaped to balloon-shaped, inamyloid, 44-50 $\times$ 21-30 μm , 8-spored; spores globose to subglobose, 8.5-10.5 $\times$ 8.3-10 μm , Qav. 1-1.15, crested to reticulate, without slime-coating; paraphyses tips cylindrical to club-shaped; known from dung of bird, pig, fox; rare or overlooked *Ascodesmis nana*
Spores 10.5-14 μm long. Fruitbody 200-300 μm wide; hymenium arched, whitish to buffish; asci club-shaped to balloon-shaped, inamyloid, 50-92 $\times$ 24-30 μm , 8-spored; spores globose to subglobose, 10.5-14 $\times$ 10.5-13 μm , Qav. 1-1.15, reticulate, without slime-coating; paraphyses tips cylindrical to club-shaped; known from dung of dog, rabbit, moose, pig; rare or overlooked *Ascodesmis sphaerospora*
5. Spores with a $\pm$ complete reticulum, Qav. below 1.3. Fruitbody 100-300 μm wide; hymenium arched, whitish to buffish; asci club-shaped to balloon-shaped, inamyloid, 70-100 $\times$ 24-31 μm , 8-spored; spores globose to subglobose, 12-16 $\times$ 10-12.5 μm , Qav. $\approx$ 1.2, reticulate, without slime-coating; paraphyses tips cylindrical to club-shaped; known from dung of dog, wolf, rabbit, goat, rat, horse, fox, hedgehog; rare or overlooked *Ascodesmis microscopica*
Spores with crests and warts, Qav. above 1.3 6
6. Spores with long crests. Fruitbody 50-200 μm wide; hymenium arched, whitish to buffish; asci club-shaped to balloon-shaped, inamyloid, 65-80 $\times$ 20-30, 8-spored; spores ellipsoid, 11.5-13.5 $\times$ 7.5-10 μm , Qav. $\approx$ 1.4, without slime-coating; paraphyses tips cylindrical to club-shaped; known from dung of rat, pig, goat, donkey; rare or overlooked *Ascodesmis porcina*
Spores with $\pm$ isolated oblong teeth-like warts. Fruitbody 200-600 μm wide; hymenium arched, whitish to buffish; asci club-shaped to balloon-shaped, inamyloid, 47-57 $\times$ 18-24 μm , 8-spored; spores ellipsoid, 10-15 $\times$ 7.5-10.5 μm , Qav. $\approx$ 1.4, without slime-coating; paraphyses tips cylindrical to club-shaped; known from dung of dog, fox, rat, pig, sheep, goat, donkey, rabbit, hedgehog, cattle; rare or overlooked *Ascodesmis nigricans*
7. Spores with 0.5-2 μm high, rounded warts. Fruitbody 50-200 μm wide; hymenium flat, whitish; asci club-shaped to balloon-shaped, inamyloid, 60-70 $\times$ 25-35 μm , 8-spored, with croziers; spores ellipsoid, 14-17.5 $\times$ 10-12 μm , Qav. $\approx$ 1.4, with $\pm$ rounded warts, 2-multi-guttulate, without slime-coating; paraphyses tips cylindrical, straight; saprobic, known from dung of hedgehog *Chalazion erinaceum*
Spores smooth, striate or with minute warts 8
8. Asci with 16-256 spores 9
Asci with 4-8 spores 24





9. Spores with time forming highly refractive gaseous bubbles (de Bary bubbles) in e.g. KOH; asci without a ring below the top, opening by a lid [Coprotus p.p.] . 10

Spores not forming de Bary bubbles; asci often with a ring below the top (may only be seen in certain developmental stages), opening by a vertical tear [Ascozonus & Thelebolus p.p.] . 15

10. Asci with 256 spores. Fruitbody 400-500 µm wide; hymenium flat to arched, whitish; asci club-shaped, inamyloid, 160-210x45-55 µm, with croziers; spores ellipsoid, 10-11 x 5-6 µm, Qav. ≈ 1.9, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical, coiled, contents hyaline; saprobic, known from dung of cow; rare or overlooked *Coprotus winteri*
Asci with 16-64 spores 11

11. Asci with 16 spores. Fruitbody 500-800 µm wide; hymenium flat to arched, yellowish to whitish; asci club-shaped, inamyloid, 90-140x20-30 µm, with croziers; spores ellipsoid, 11-16 x 7-10 µm, Qav. ≈ 1.6, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical to branched, bend, contents hyaline; saprobic, known from dung of cow, mice, pig; rare or overlooked *Coprotus sexdecimsporus*
Asci with 32-64 spores 12

12. Asci with 64 spores. Fruitbody 200-500 µm wide; hymenium flat to arched, yellowish to whitish; asci balloon-shaped to club-shaped, inamyloid, 80-130x28-40 µm, with croziers; spores ellipsoid, 8-12 x 4-7.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical, bend to straight, contents hyaline; saprobic, known from dung of ; rare or overlooked *Coprotus niveus*
Asci with 32 spores 14

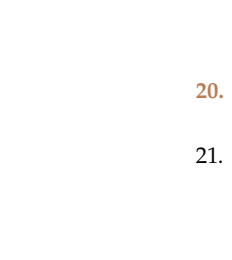
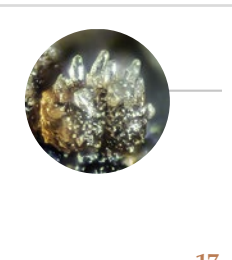
14. Spores 10-12.5 µm long. Fruitbody 200-700 µm wide; hymenium flat, whitish; asci club-shaped, inamyloid, 75-112x19-30 µm, with croziers; spores ellipsoid, 10-12.5 x 5-7.5 µm, Qav. ≈ 1.8, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, bend to coiled, contents hyaline; saprobic, known from dung of cat, cow, hare, rabbit; rare or overlooked *Coprotus albidus*
Spores 13.5-17 µm long. Fruitbody 100-400 µm wide; hymenium flat, whitish; asci club-shaped to balloon-shaped, inamyloid, 100-175x48-75 µm, with croziers; spores ellipsoid, 13.5-17 x 7-8 µm, Qav. ≈ 2, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical, bend, contents hyaline; saprobic, known from dung of cow, hare; rare or overlooked *Coprotus rhyarobioides*

15. Asci with an arched top [Thelebolus p.p.] . 15
Asci with a pointed top [Ascozonus]¹³ . 17

15. Spores 4-4.7 x 2.8-3 µm. Fruitbody 100-200 µm wide; hymenium flat to arched, whitish; asci balloon-shaped to club-shaped, inamyloid, 43-57 x 11-20 µm, 64 to 48-spored; spores ellipsoid, 4-4.7 x 2.8-3 µm, Qav. ≈ 1.5, smooth, 0-guttulate; paraphyses absent; saprobic, known from the marine sponge *Dysidea fragilis*; rare or overlooked *Thelebolus balaustiformis*
Spores larger 16

16. Asci up to 60 µm long. Fruitbody 40-250 µm wide; hymenium flat to arched, whitish; asci balloon-shaped, inamyloid, 37-57 x 50-70 µm, more-spored; spores ellipsoid, 7-9.5 x 3-4 µm, Qav. ≈ 2.4, smooth, 0-guttulate; paraphyses absent; saprobic, known from the marine sponge *Dysidea fragilis*; rare or overlooked *Thelebolus spongiae*

13. We key out eight species of *Ascozonus*, mainly based on the number of spores in the asci. In *Thelebolus* this character have proven less useful, and it is possible, that a number of the *Ascozonus* taxa are conspecific. A modern revision of *Ascozonus* is very much needed.



17. Asci 16-24-spored. Fruitbody very small; hymenium flat, whitish; asci broadly club-shaped, inamyloid; spores spindle-shaped, 13-14 x 6-6 µm, Qav. ≈ 2.3, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; marginal hairs short, hyaline; saprobic, on dung; rare or overlooked *Ascozonus parvisporus*
Asci with more spores 18

18. Asci with more than 64 spores 19
Asci 32-48-64-spored 20

19. Fruitbodies with only one ascus; without hairs. Fruitbody 50-100 µm wide; hymenium flat, whitish; asci broadly club-shaped, inamyloid, 110-145 x 39-50 µm, 150-200-spored; spores spindle-shaped, 8.5-11.5 x 3.5-4.5 µm, Qav. ≈ 2.5, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; saprobic, known from dung of rabbit; rare or overlooked *Ascozonus monascus*
Fruitbodies with more asci; with hairs. Fruitbody very small; hymenium flat, whitish; asci broadly balloon-shaped, inamyloid, 128-spored; spores spindle-shaped, 7-10 x 3.5-5 µm, Qav. ≈ 2, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; marginal hairs short, hyaline, also with hairs on the fruitbody sides; ectomycorrhizal, on dung; rare or overlooked *Ascozonus subhirtus*

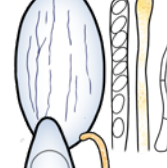
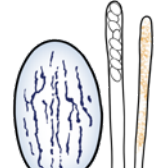
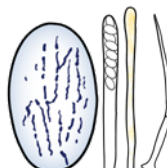
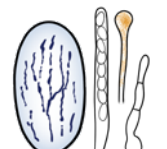
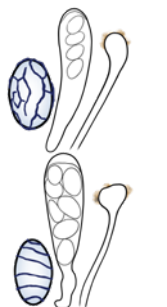
20. Asci 32-48-spored 21
Asci 64-spored 22

21. Asci 32-spored; fruitbodies sessile. Fruitbody very small; hymenium flat, whitish; asci broadly balloon-shaped, inamyloid, 75-120 x 22-25 µm, 32-spored; spores spindle-shaped, 12-13 x 3-4.5 µm, Qav. ≈ 3.3, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; marginal hairs short, hyaline; saprobic, on dung; rare or overlooked *Ascozonus solms-laubachii*
Asci 48-spored; fruitbodies sometimes short-stemmed. Fruitbody very small; hymenium flat, whitish; asci broadly balloon-shaped, inamyloid, 75-120 x 22-25 µm, 48-spored; spores spindle-shaped, 12-14.5 x 2.5-4 µm, Qav. ≈ 4.1, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; marginal hairs short, hyaline, superficial, smooth; saprobic, on dung; rare or overlooked *Ascozonus leveillei*

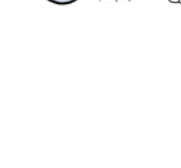
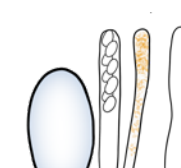
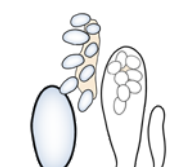
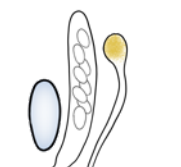
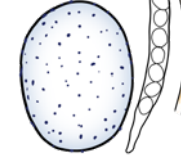
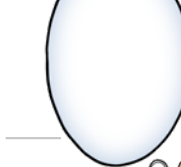
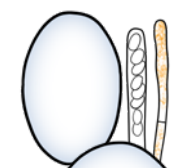
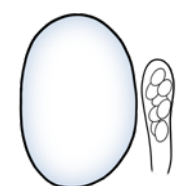
22. Spore Qav. lower than 2.5. Fruitbody very small; hymenium flat, whitish; asci broadly balloon-shaped, inamyloid, 75-120 x 22-25 µm, 64-spored; spores spindle-shaped, 11-14.5 x 5-7 µm, Qav. ≈ 2.1, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; marginal hairs short, hyaline; saprobic, on dung; rare or overlooked *Ascozonus leveilleanus*
Spore Qav. higher than 2.5 23

23. Spores 12-18 x 3-5.5 µm. Fruitbody 200-500 µm wide; hymenium flat, whitish; asci broadly club-shaped, inamyloid, 100-150 x 19-35 µm, 64-spored; spores spindle-shaped, 12-18 x 3-5.5 µm, Qav. ≈ 3.5, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; marginal hairs 30-60 µm long, hyaline (far right); saprobic, on dung; rather common *Ascozonus woolhopensis*
Spores 17-21 x 5-7.5 µm. Fruitbody very small; hymenium flat, whitish; asci club-shaped, inamyloid, 80-110 x 18-30 µm, 64-spored; spores spindle-shaped, 17-21 x 5-7.5 µm, Qav. ≈ 3, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; marginal hairs short, hyaline; saprobic, on dung; rare or overlooked *Ascozonus cunicularius*

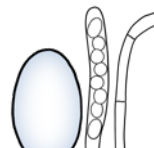
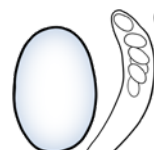
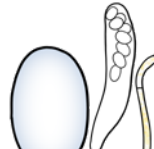
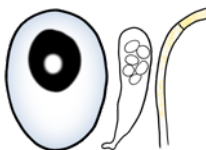
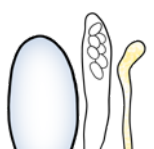
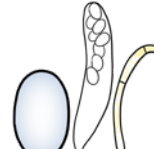
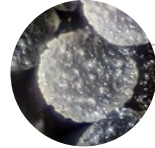
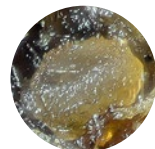
24. Spores reticulate or with a pattern of ridges or wrinkles (best seen in chlorazol black or in cotton blue without heating) 25
Spores smooth or very finely warty 30
25. Spores shorter than 10 µm 26
Spores longer than 10 µm 27
26. Spores with a longitudinal or reticulate ornament; mature asci 8-spored. Fruitbody 100-400 µm wide; hymenium flat to arched, whitish; asci club-shaped, inamyloid, 43-60 x 10.5-13 µm, with croziers; spores spindle-shaped, 6-8.5 x 4-5.5 µm, Qav. ≈ 1.5, 0-guttulate; paraphyses tips head-shaped, contents hyaline, top with yellowish to brownish goo; saprobic, on dung of bat; rare or overlooked *Ramgea ozimecii*
Spores transversely striate; mature asci 4-spored, mostly also with four degenerated spores. Fruitbody 40-150 µm wide; hymenium flat to arched, whitish; asci club-shaped, inamyloid, 27-35 x 6.5-9 µm, with croziers; spores spindle-shaped, 5.5-8 x 4-5 µm, Qav. ≈ 1.5, 0-guttulate; paraphyses tips head-shaped, contents hyaline, top with brownish-yellow goo; saprobic, on dung of pheasant; rare or overlooked *Ramgea annulispora*
27. Hymenium reddish-orange (☹️🔴), 2-8 mm wide; paraphyses mostly with a capitate top. Fruitbody 2-8 mm wide; hymenium cup-shaped to flat, orange; asci , inamyloid, 8-spored, with croziers; spores ellipsoid, 12.5-17.5 x 6.5-8.5 µm, Qav. ≈ 2, longitudinally striped, 0-guttulate, without slime-coating; paraphyses tips head-shaped, straight, contents orange; saprobic, known from dung of cow, rarely of other herbivores; common *Cheilymenia granulata*
Dics paler or more yellowish (☹️🟡🟠🔴), 0.3-10 mm wide; paraphyses with a club-shaped top 28
28. Fruitbodies 2-9 mm wide; hymenium clear yellow (☹️🟡). Fruitbody 2-9 mm wide; hymenium cup-shaped to flat, yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15-22 x 8-13 µm, Qav. ≈ 1.8, longitudinally striped, 0-guttulate, without slime-coating; paraphyses tips club-shaped, straight, contents yellowish; with or without small hairs; saprobic, known from debris, cloth, soil and dung; common *Cheilymenia theleboloides*
Fruitbodies 0.3-1.5 mm wide; hymenium paler buff to apricot orange (☹️🟡🟠) 29
29. Spore Q (in water) ca. 1.8. Fruitbody 0.3-1 mm wide; hymenium cup-shaped to flat, yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15-18 x 8-10 µm, Qav. ≈ 1.8, longitudinally striped, 0-guttulate, without slime-coating; paraphyses tips cylindrical, straight, contents yellowish; saprobic, known from dung; rare or overlooked *Cheilymenia crassistriata*
Spore Q (in water) ca. 2.1Fruitbody 0.3-1.5 mm wide; hymenium cup-shaped to flat, yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 16.5-21 x 8-9.5 µm, Qav. ≈ 2.1, longitudinally striped, 0-guttulate, without slime-coating; paraphyses tips club-shaped, straight, contents yellowish; saprobic, known from dung of Cow; very rare *Cheilymenia karstenii*
30. Fruitbodies orange; spores spindle-shaped, Qav. higher than 2.3 see *Byssonectria*, cpl. xx
Fruitbodies white, cream to yellow; spores ± ellipsoid, Qav. lower than 2.3 31
31. Spores on average longer than 18 µm 32
Spores on average shorter than 18 µm 34



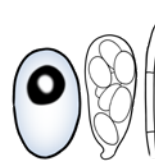
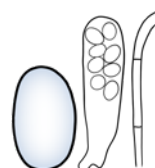
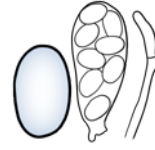
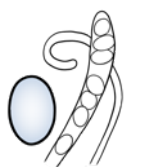
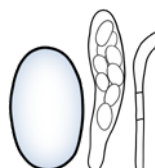
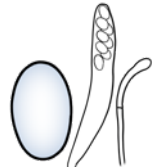
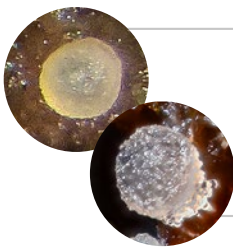
32. Asci ± club-shaped, less than 100 µm long. Fruitbody 0.3-1 mm wide; hymenium flat to arched, yellowish to pinkish; asci balloon-shaped to club-shaped, inamyloid, 65-100x20-28 µm, 8-spored, with croziers; spores ellipsoid, 17-25 x 11-14 µm, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, straight, contents yellowish; saprobic, known from dung of cow; rare or overlooked *Coprotus vicinus*
Asci ± cylindrical, 160-255 µm long 33
33. Spores 18.5-20 x 11-11.5 µm Fruitbody 1-4 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 215-255 x 19-23.5 µm, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical, straight, contents orange; saprobic, known from dung of cow; very rare *Cheilymenia laevispora*
Spores 21-27 x 13.5-16.5 µm. Fruitbody 0.1-1 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 160-220 x 22.5-27 µm, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.6, smooth, 0-guttulate, without slime-coating; paraphyses tips club-shaped, straight, contents yellowish to orange; saprobic, known from dung of cow; very rare *Cheilymenia bohémica*
34. Spores very finely warty, 11-14 µm wide, Qav. ca. 1.3. Fruitbody 3-10 mm wide; hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 160-180 µm, 8-spored, with croziers; spores ellipsoid, 14-18 x 11-14 µm, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, straight, contents orange; saprobic, known from dung to debris of cow and human *Cheilymenia stercoraria*
Spores different 33
35. Asci opening by a vertical tear; spores without de Bary bubbles 36
Asci opening by a lid; spores with time forming highly refractive gaseous bubbles (de Bary bubbles) in e.g. KOH [*Coprotus* p.p.] 37
36. Spore Qav. lower than 2.2. spores 6-8 µm long. Fruitbody 200-300 µm wide; hymenium flat to arched, whitish, yellowish to pale brown; asci ± cylindrical, inamyloid, 25-50 x 6-19 µm, 8-spored, with croziers; spores ellipsoid, 6-8 x 3.5-4.5 µm, Qav. ≈ 1.8, smooth, 0-guttulate; paraphyses tips head-shaped, straight, contents yellowish; saprobic, on dung of various mammals and birds; rather common *Thelebolus microsporus*
Spore Qav. higher than 2.2; spores 8-11 µm long. Fruitbody 50-100 µm wide; hymenium flat to arched, whitish; asci broadly club-shaped, inamyloid, 28-50 x 11-17 µm, 8-spored, with croziers; spores ellipsoid, 8-11 x 2.5-4 µm, Qav. ≈ 2.9, smooth, 0-guttulate, connected in a bundle after release; paraphyses tips cylindrical, straight, contents hyaline; saprobic, on dung of cow and sheep; rare or overlooked *Pseudascozonus racemosporus*
37. Disc margin with protruding, up to 200 µm long and about 30 µm wide club-like cells (illustration far right). Fruitbody up to 500 µm wide; hymenium flat, yellowish to orange; asci cylindrical, inamyloid, 150-185 x 10-16 µm, 8-spored, with croziers; spores ellipsoid, 12.5-15.5 x 6.5-7.5 µm, Qav. ≈ 2, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical, straight, contents orange; saprobic, known from dung of pig and deer; rare or overlooked *Coprotus arduennensis*
Margin without such cells 38
38. Paraphyses with yellow or orange contents; hymenium buff-yellow, cinnamon buff to apricot-orange (☹️🟡🟠🔴) 39
Paraphyses ± hyaline; hymenium whitish, greyish cream to pale buff (☹️🟡🟠) 44



39. Spores shorter than 11.5 µm 40
Spores longer than 11.5 µm 41
40. Some paraphyses are strongly capitate, 5-10 µm wide and form an epithecium above the ascus tops. Fruitbody 100-500 µm wide; hymenium flat to arched, buff-yellow; asci club-shaped, inamyloid, 60-75 x 13-16 µm, 8-spored, with croziers; spores ellipsoid, 8-9.5 x 5-5.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses contents yellowish to orange; saprobic, known from dung of chamois (*Rupicapra rupicapra*); very rare *Coprotus epithecioides*
Paraphyses thread-like, 1.5-3.5 µm wide, not forming an epithecium. Fruitbody 200-800 µm wide; hymenium flat to arched, yellowish to apricot-orange; asci cylindrical, inamyloid, 75-105x10-15 µm, 8-spored, with croziers; spores ellipsoid, 8-11 x 4.5-7 µm, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses contents yellowish to orange; saprobic, known from dung of cow; rare or overlooked *Coprotus luteus*
41. Spores narrowly ellipsoid, Qav. ca. 2. Fruitbody 0.3-1 mm wide; hymenium flat to arched, ± yellowish; asci club-shaped to cylindrical, inamyloid, 80-120 x 15-25 µm, 8-spored, with croziers; spores ellipsoid, 14-17.5 x 6.5-9 µm, Qav. ≈ 2, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, straight to bend, contents yellowish; saprobic, known from dung of cow and hare; rare or overlooked *Coprotus subcylindrosporus*
Spores ellipsoid, Qav. below 1.9 42
42. Asci club- to balloon-shaped, 45-60 x 20-28 µm. Fruitbody 200-600 µm wide; hymenium flat to arched, ± yellowish to apricot-orange; asci inamyloid 8-spored, with croziers; spores ellipsoid, 12.5-18 x 7.5-12 µm, Qav. ≈ 1.6, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, bend to straight, contents yellowish; saprobic, known from dung of cow; rare or overlooked *Coprotus brevisascus*
Asci cylindrical, more than 70 µm long 43
43. Fruitbodies 0.2-0.7 mm wide; asci 75-140 µm long. Fruitbody 200-700 µm wide; hymenium flat to arched, ± yellowish to apricot-orange; asci cylindrical, inamyloid, 75-140x12-17 µm, 8-spored, with croziers; spores ellipsoid, 12-15 x 6-9 µm, Qav. ≈ 1.8, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, bend, contents yellowish; saprobic, known from dung of cow and rodents; rare or overlooked *Coprotus aurora*
Fruitbodies 0.5-2 mm wide; asci 100-190 µm long. Fruitbody 0.5-1.8 mm wide; hymenium flat to arched, ± yellowish to apricot-orange; asci cylindrical, inamyloid, 100-190x16-28 µm, 8-spored, with croziers; spores ellipsoid, 14-18.5 x 9-12 µm, Qav. ≈ 1.5, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, bend to straight, contents yellowish; saprobic, known from dung of rodents; rather common *Coprotus ochraceus*
44. Asci 60-140 µm long 45
Asci 40-95 µm long 48
45. Spore Qav. higher than 2 see *Pseudocoprotus catenipilus*, Nxx
Spore Qav. lower than 2 46
46. Disc margin with protruding terminal, 25 x 15 µm large cells; asci ± cylindrical, 10-16 µm wide. Fruitbody 100-900 µm wide; hymenium flat to arched, whitish; asci club-shaped to cylindrical, inamyloid, 60-120 x 10-16 µm, 8 to 4-spored, with croziers; spores ellipsoid, 10-15 x 5-9.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped to cylindrical, bend to straight, contents hyaline; saprobic, known from dung of cow, rodents and birds; rare or overlooked *Coprotus disculus*
Disc margin smooth; asci 14-24 µm wide 47



47. Spores 11-13 µm long. Fruitbody 100-500 µm wide; hymenium flat to arched, whitish to yellowish; asci club-shaped, inamyloid, 80-125 x 16-24 µm, 8-spored, with croziers; spores ellipsoid, 11-13 x 7.5-10 µm, Qav. ≈ 1.4, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped to branched, bend to straight, contents hyaline; saprobic, known from dung of cow and hare; rare or overlooked *Coprotus dextrinoideus*
Spores 14-18 µm long. Fruitbody 200-500 µm wide; hymenium flat to arched, yellowish to whitish; asci club-shaped, inamyloid, 80-120 x 14-24 µm, 8-spored, with croziers; spores ellipsoid, 14-18 x 7.5-11.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped to cylindrical, bend, contents hyaline; saprobic, known from dung of cow and rodents; rare or overlooked *Coprotus leucopocillum*
48. Spores 6-10 µm long. Fruitbody 200-900 µm wide; hymenium flat to arched, yellowish to whitish; asci club-shaped, inamyloid, 40-70x7-14 µm, 8-spored, with croziers; spores ellipsoid, 6-10 x 3.5-6 µm, Qav. ≈ 1.7, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical to branched, coiled, contents hyaline; saprobic, known from dung of cow, rodents; rare or overlooked *Coprotus glaucellus*
Spores 9-14.5 µm long. 49
49. Spores 5-6 µm wide, Qav. ca. 2. Fruitbody 100-200 µm wide; hymenium flat to arched, whitish; asci balloon-shaped to club-shaped, inamyloid, 50-60x20-26 µm, 8-spored, with croziers; spores ellipsoid, 9-14 x 5-6 µm, Qav. ≈ 2.1, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, bend to coiled, contents hyaline; saprobic, known from dung of possum; rare or overlooked *Coprotus trichosuri*
Spores 6-9.5 µm wide, Qav. below 1.8 50
50. Paraphyses cylindrical, 1.5-3 µm wide. Fruitbody 200-600 µm wide; hymenium flat to arched, whitish to yellowish to pale brown; asci club-shaped, inamyloid, 65-95x12-20 µm, 8-spored, with croziers; spores ellipsoid, 9.5-14.5 x 6-9.5 µm, Qav. ≈ 1.5, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips cylindrical, coiled to bend, contents hyaline; saprobic, known from dung of cow and rodents; rare or overlooked *Coprotus lacteus*
Paraphyses with club-like, 4-8 µm wide tips. Fruitbody 200-600 µm wide; hymenium flat to arched, yellowish to whitish; asci club-shaped, inamyloid, 38-58x14-20 µm, 8-spored, with croziers; spores ellipsoid, 9.5-14.5 x 6-9.5 µm, Qav. ≈ 1.5, smooth, 0-guttulate, slime-coating surrounding; paraphyses tips club-shaped, bend, contents hyaline; saprobic, known from dung of cow; rather common *Coprotus granuliformis*





Key K – white, yellow, orange or reddish, smooth or soft-haired species on other substrates than dung

1. Spores globose 2
Spores different 22

2. Fruitbodies deeply cup-shaped, 5-40 mm wide; outside blueing. Hymenium cup-shaped, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores smooth, 0-guttulate; paraphyses tips cylindrical, straight, contents orange; on soil; rare or overlooked *Caloscypha fulgens*
Fruitbodies flat to shallowly cup-shaped, up to 15 mm wide, but mostly much smaller; outside not blueing 3

3. On wood or needles of conifers (e.g. *Abies*, *Chamaecyparis*, *Cupressus*, *Juniperus*) 4
On plant debris, burnt ground or soil 5

4. On *Chamaecyparis*, *Cupressus*, *Juniperus* or other members of the *Cupressaceae*; fruitbodies 1-3 mm wide. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, inamyloid, μm , 8-spored, with croziers; spores smooth, 9-12 x 9-12 μm , 0-guttulate; paraphyses tips cylindrical, straight, contents orange to hyaline *Pithya cupressina*
On *Abies*; fruitbodies 3-15 mm wide. Fruitbody 3-15 mm wide; hymenium flat, orange; asci cylindrical, inamyloid, μm , 8-spored, with croziers; spores smooth, 10-15 x 10-15 μm , Qav. $\approx$ 1, smooth, 0-guttulate; paraphyses tips cylindrical, straight, contents hyaline to orange *Pithya vulgaris*

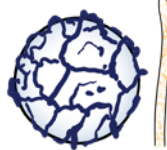
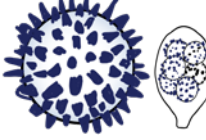
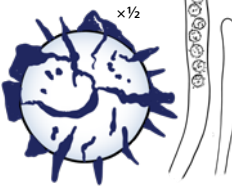
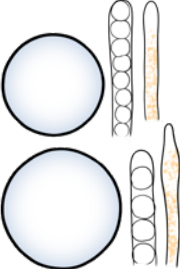
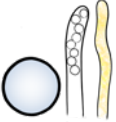
5. Spores ornamented; paraphyses rather straight 6
Spores smooth; paraphyses bend to coiled at the tips. [*Pulvinula*] 12

6. Spores 24-32 μm wide. Fruitbody 0.1-1 mm wide; hymenium arched, greyish cream to buff; asci cylindrical to club-shaped, inamyloid, 310-350 x 30-35 μm , 8-spored, with croziers; spores $\pm$ reticulate, 0-guttulate; paraphyses tips club-shaped, contents hyaline; saprobic, on dead herbs in swamps, e.g. *Typha* and *Carex*; very rare *Oviascoma paludosum*¹⁴
Spores smaller 7

7. Spores 10-12 μm wide. Fruitbody 0.1-0.3 mm wide; hymenium flat, whitish; asci balloon-shaped, inamyloid, 40-55 x 32-40 μm , 6- to 8-spored, with croziers; spores brownish with 1.5-2.5 μm high, $\pm$ oblong to sinuose warts; on soil, with a growth maximum at 35°C *Eleutherascus tuberculatus*
Spores larger 8

8. Spores 11.5-14 μm wide, with a reticulate, up to 2 μm high ornament. Fruitbody 1-1.5 mm wide; hymenium flat, reddish to orange; asci cylindrical, inamyloid, 150-200 x 17-21 μm , 8-spored, with croziers; spores globose, 12-14 x 11.5-13 μm , Qav. $\approx$ 1.1, reticulate, 0 (or many small)-guttulate; paraphyses tips club-shaped, contents orange; on soil with mosses; very rare *Moravecia hvaleri*
Spores larger and with a spiny ornament [*Ramsbottomia*] 9

9. Spines 1.5-3 μm long 10
Spines more than 3 μm long 11

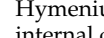


14. *Oviascoma paludosum* is described with an ornament of 4-6 μm long, slender, curved spines. Danish material on *Typha* (see illustration) revealed an ornament of mainly crests. It is to be seen, if there are more species involved.



10. Spores slightly oblong (Qav. ca. 1.1). Fruitbody 2-6 mm wide; hymenium flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores globose, 16.5-19 x 16-17 μm , with 1.5-3 μm long spines; paraphyses tips club-shaped, contents orange; saprobic, on soil *Ramsbottomia asperior*
Spores globose (Qav. 1). Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores globose, 16-18 x 16-18 μm , with 2-3 μm long spines; paraphyses tips club-shaped, contents orange; saprobic, on soil *Ramsbottomia crechqueraultii*

11. Outer surface with hyaline, 150-290 μm long, smooth, blunt hairs; spores with up to 5 μm long spines. Fruitbody 1-3 mm wide; hymenium flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores globose, 17-20 x 17-20 μm ; paraphyses tips club-shaped, contents orange; saprobic, on soil *Ramsbottomia lamprosporoidea*
Outer surface without hairs; spores with up to 10 μm long spines. Fruitbody 1-3 mm wide; hymenium flat, orange to yellowish; asci cylindrical, inamyloid, 8-spored, with croziers; spores globose, 18-23 x 18-23 μm ; paraphyses tips club-shaped, contents orange; saprobic, on soil *Ramsbottomia macracantha*

12. Hymenium whitish
(); paraphyses with hyaline internal drops 13
Hymenium red to orange (); paraphyses with orange internal drops 16

13. Spores 10-12.5 μm wide 14
Spores larger 15

14. Asci 4-spored. Fruitbody 1-2 mm wide; hymenium flat to arched; asci cylindrical, inamyloid, 160-180 x 11-13, with croziers; spores globose, 10-12.5 x 10-12.5 μm , multi-guttulate; on soil *Pulvinula lacteoalba*
Asci 8-spored. Fruitbody 0.5-3 mm wide; hymenium flat to arched; asci cylindrical, inamyloid, 160-180 μm , with croziers; spores globose, 10-12 x 10-12 μm , multi-guttulate; on soil *Pulvinula niveo-alba*

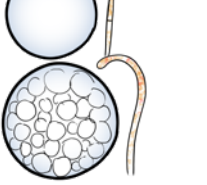
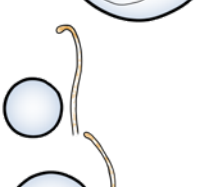
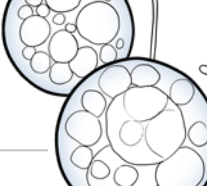
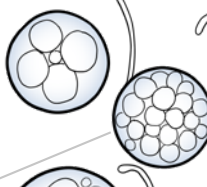
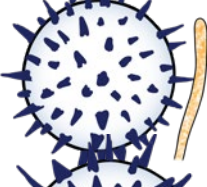
15. Spores 13-16 μm wide. Fruitbody 3-12 mm wide; hymenium flat to arched, whitish; asci cylindrical, inamyloid, 220-255 x 15-18 μm , 8-spored, with croziers; spores 1-guttulate; on soil *Pulvinula globifera*
Spores 17-20 μm wide. Fruitbody 0.5-2 mm wide; hymenium flat to arched, whitish; asci cylindrical, inamyloid, 220-270 x 22-26 μm , 8-spored, with croziers; spores multi-guttulate; on soil *Pulvinula alba*

16. Spores on average less than 14.5 μm wide 17
Spores on average more than 14.5 μm wide 19

17. Spores 6-7.5 μm wide. Fruitbody 4-7 mm wide; hymenium flat to arched, orange to reddish; asci cylindrical, inamyloid, 135-150 x 5-10 μm , 8-spored, with croziers; spores, multi-guttulate; on soil *Pulvinula archeri*
Spores larger 18

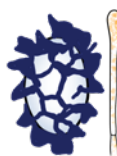
18. Spores 9-12 μm wide. Fruitbody 2-5 mm wide; hymenium flat to arched, $\pm$ coral-red; asci cylindrical, inamyloid, 170-200 x 12-14.5 μm , 8-spored, with croziers; spores 1- to many-guttulate; on soil *Pulvinula johannis*
Spores 11-15 μm wide. Fruitbody 2-6 mm wide; hymenium flat to arched, $\pm$ coral-red; asci cylindrical, inamyloid, 140-200 x 12.5-15 μm , 8-spored, with croziers; spores multi-guttulate; on soil *Pulvinula laeterubra*

19. Asci 200-250 μm long; burnt or unburnt soil 20
Asci (230-) 250-320 μm long; on unburnt soil 21



-

15. *Pulvinula cinnabarina* may be conspecific with *Pulvinula convexella*, which is then the valid name.





53. Spore ornament of rounded warts connected by thin lines; paraphyses tips club-shaped 54
Spore ornament reticulate by connecting crests; paraphyses tips capitate 55
54. Spore width 7-9.5 µm. Fruitbody 3-7 mm wide; hymenium flat to cup-shaped; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid, 13.5-18 x 7-9.5 µm, Qav. ≈ 1.9; paraphyses contents orange; hairs up to ca. 100 µm long, pale brown; on soil; rare or overlooked ..
Melastiza flavorubens
Spore width 9-12.5 µm. Fruitbody 5-12 mm wide; hymenium flat to cup-shaped; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid, 16-19.5 x 9-12.5 µm, Qav. ≈ 1.7; paraphyses contents orange; hairs 70-250 µm long, pale brown; on soil; very rare ..



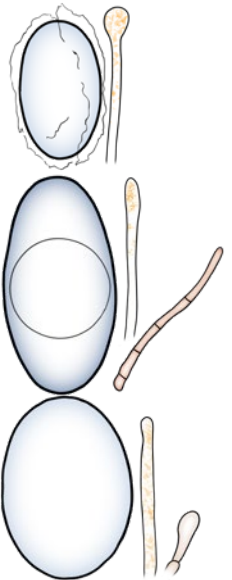
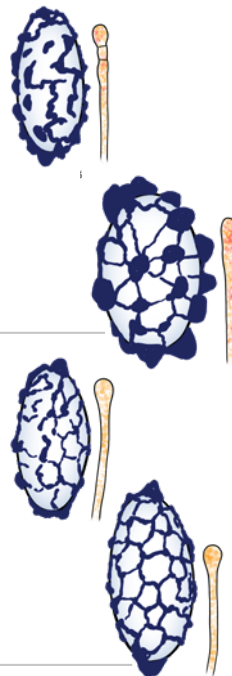
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Melastiza boudieri
55. Mostly on burnt ground; ornament at the spore ends 3.5-6 µm high; hairs up to 230 µm long. Fruitbody 4-10 mm wide; hymenium flat to cup-shaped; asci cylindrical, inamyloid, 270 x 10.5 µm, 8-spored, with croziers; spores ellipsoid, 14.5-18 x 7-10 µm, Qav. ≈ 1.9; paraphyses tips head-shaped, straight, contents orange; hairs pale brown; very rare ..
Melastiza carbonicola
On unburnt soil; ornament at the spore ends up to 3.5 µm high; hairs 80-160. Fruitbody 5-20 mm wide; hymenium flat to cup-shaped; asci cylindrical, inamyloid, 180-300 x 10-15 µm, 8-spored, with croziers; spores ellipsoid, 15-21 x 8.5-11 µm, Qav. ≈ 1.8, reticulate, 2-many-guttulate; paraphyses tips head-shaped, straight, contents orange; hairs pale brown; common ..
Melastiza cornubiensis

56. Spores with a loosening outer wall; hairs 150-450 µm long. Fruitbody 8-15 mm wide; hymenium cup-shaped, orange; asci cylindrical, inamyloid, 200-250 x 12-15 µm, 8-spored, with croziers; spores ellipsoid, 12.5-18.5 x 7.5-9 µm, Qav. ≈ 1.9, 0-guttulate; paraphyses tips head-shaped, straight, contents orange; marginal hairs 150-450 µm long, pale brown to hyaline, superficial, ; on soil of ; very rare .. *Pseudaleuria fibrillosa*
Spores without a loosening outer wall; hairs shorter 57

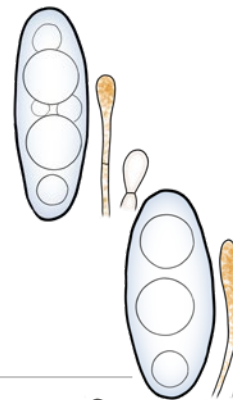
57. Fruitbody 5-20 mm wide, deeply cup-shaped. Hymenium orange to pale brown; asci cylindrical, inamyloid, 220-280 x 14-19 µm, 8-spored, with croziers; spores ellipsoid, 23.5-27.5 x 11-13 µm, Qav. ≈ 2.1, 1-guttulate; paraphyses tips cylindrical, straight, contents orange; marginal hairs 60-140 µm long, brown, superficial, smooth; on soil; very rare ..
Hoffmannoscypha pellita
Fruitbody mostly smaller, ± flat 58

58. On unburnt ground; asci 285-315 µm long. Fruitbody 2-4 mm wide; hymenium cup-shaped, brownish orange to brownish red; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 19-23.5 x 15-17 µm, Qav. ≈ 1.3, 0-guttulate; paraphyses tips club-shaped, straight, contents ± orange; hairs 35-60 µm long, pale brown; very rare ..
Tricharina glabra
On burnt ground; asci shorter [*Anthracobia*] 59

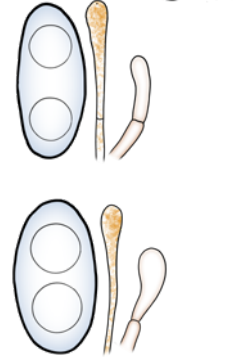
59. Spores 13.5-16 µm long, Qav. ca. 1.8. Fruitbody 1.5-4 (-6) mm wide; hymenium ± flat, orange; asci cylindrical, inamyloid, 150-180 x 8-11 µm, 8-spored, with croziers; spores ellipsoid, 13.5-16 x 7.5-9 µm, 2-guttulate; paraphyses tips club-shaped, straight, contents orange; hairs 50-80 µm long, pale brown; on burnt ground; rather common
Anthracobia larsenii
Spores longer; Qav. higher 60



60. Spores longer than 21.5 µm 61
Spores shorter than 21.5 µm 62
61. Spores 9-10 µm wide; spore Qav. ca. 2.7. Fruitbody 0.7-3 mm wide; hymenium ± flat, orange; asci cylindrical, inamyloid, 160-210 x 14-17 µm, 8-spored, with croziers; spores ellipsoid, 24-27 x 9-10 µm, 2-multi-guttulate; paraphyses tips club-shaped, straight, contents orange; hairs 90-110 µm long, pale brown; very rare ..
Anthracobia macrospora
Spores 10.5-12 µm wide; spore Qav. ca. 2.1. Fruitbody 2-5 mm wide; hymenium ± flat, yellowish orange to orange; asci cylindrical, inamyloid, 130-177 x 12-20 µm, 8-spored, with croziers; spores ellipsoid, 22-25.5 x 10.5-12 µm, 2-multi-guttulate; paraphyses tips club-shaped, straight, contents orange; hairs 34-52 µm long, pale brown; very rare ..
Anthracobia platyspora

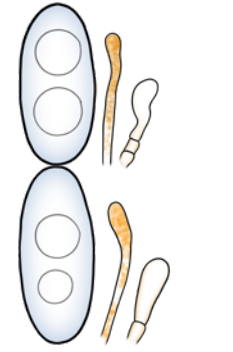


62. Outside hairs up to 90 (-115) µm long. Fruitbody 1-5 (-14) mm wide; hymenium ± flat, orange; asci cylindrical, inamyloid, 235-270 x 11-12.5 µm, 8-spored, with croziers; spores ellipsoid, 17-20.5 x 8-9.5 µm, Qav. ≈ 2.1, smooth, 2-guttulate; paraphyses tips club-shaped, straight, contents orange; marginal hairs pale brown; rather common ..
Anthracobia melaloma
Outside hairs up to 65 µm long 63



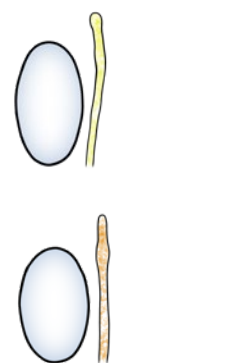
63. Spore Qav. lower than 2.1. Fruitbody 1-5.5 mm wide; hymenium ± flat, orange; asci cylindrical, inamyloid, 280-320 x 13-15 µm, 8-spored, with croziers; spores ellipsoid, 17-19 x 8.5-10 µm, Qav. ≈ 1.9, smooth, 2-guttulate; paraphyses tips club-shaped, straight, contents orange; marginal hairs 40-60 µm long, pale brown; rare or overlooked
Anthracobia nitida
Spore Qav. higher than 2.1 64

64. Spores 17-19 µm long. Fruitbody 1.5-5 mm wide; hymenium ± flat, orange; asci cylindrical, inamyloid, 180-230 x 12-18 µm, 8-spored, with croziers; spores ellipsoid, 17-19 x 7.5-8.5 µm, Qav. ≈ 2.3, smooth, 2-guttulate; paraphyses tips club-shaped to head-shaped, straight, contents orange; marginal hairs 38-60 µm long, pale brown; rather common ..
Anthracobia tristis
Spores 19-21 µm long. Fruitbody 1-3 mm wide; hymenium ± flat, orange; asci cylindrical, inamyloid, 170-215 x 9-12.5 µm, 8-spored, with croziers; spores ellipsoid, 19-21 x 7.5-8.5 µm, Qav. ≈ 2.5, smooth, 2-guttulate; paraphyses tips club-shaped, straight, contents orange; marginal hairs 50-66 µm long, pale brown; rare or overlooked
Anthracobia macrocystis



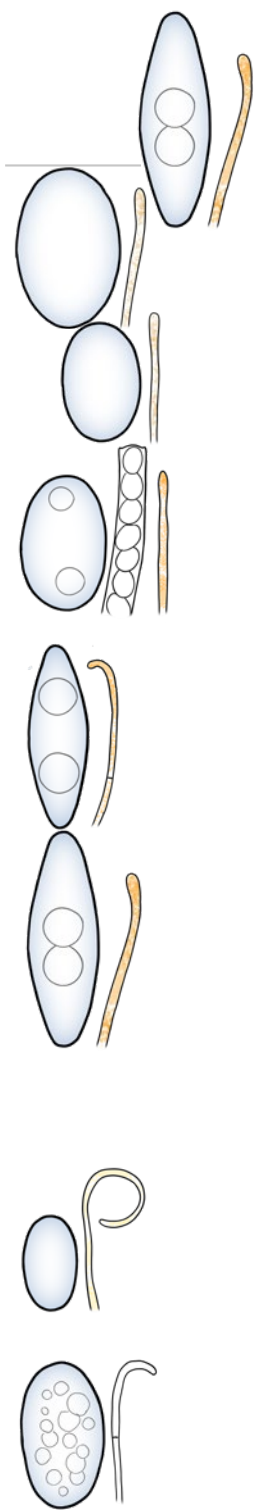
65. Spores smooth 66
Spores ornamented 79

66. Fruitbodies resupinate, 5-15 mm wide, ± buff yellow (☁️🟡). Asci cylindrical, inamyloid, 150-250 x 8-15.5 µm, 8-spored, with croziers; spores ellipsoid, 12.5-16 x 6.5-8.5 µm, Qav. ≈ 1.9, smooth, 0-guttulate; paraphyses tips cylindrical, straight, contents yellowish; saprobic, on soil under deciduous trees (e.g. *Corylus*); very rare *Karstenella vernalis*
Not resupinate, yellow to orange (☁️🟡🟠🔴) 67



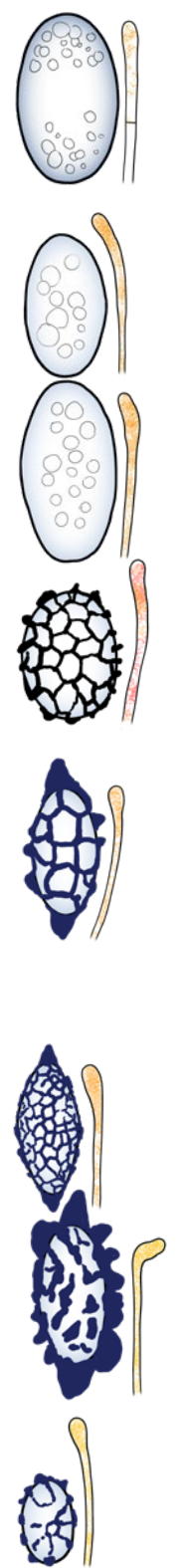
67. Fruitbodies deeply cup-shaped, 8-20 mm wide. Hymenium cup-shaped, brownish orange to yellowish brown; asci cylindrical, inamyloid, 180-200 x 10-12 µm, 8-spored, with croziers; spores ellipsoid, 11-15 x 6-9.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate; paraphyses tips club-shaped, straight, contents orange; on burnt ground with conifers
Geopyxis delectans
Mature fruitbodies ± flat to shallowly cub-shaped, 0.5-8 mm wide 68

68. On burnt ground 69
On unburnt soil, wood or debris 71
69. Fruitbodies shallowly cup-shaped to flat, 1-6 mm wide; spores 21-29 µm long see *Byssonectria fusispora*, cpl. xx
Fruitbodies flat to arched, 0.5-1 mm wide; spores smaller 70
70. Margin with small, hyaline hairs (strong lens!); spores 10-12 µm wide. Hymenium coral to peach; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid, 14-20 x 10-12 µm, Qav. ≈ 1.5, smooth, 0-guttulate; paraphyses tips cylindrical, straight; common
Pyronema domesticum
Margin without hairs; spores 6.5-9.5 µm wide. Hymenium coral to peach; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid, 11.5-16 x 6.5-9.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate; paraphyses tips cylindrical, straight; common *Pyronema omphalodes*
71. On branches and leaves of *Cupressus*. Fruitbody 1-4 mm wide; hymenium flat, orange; asci cylindrical to truncate, inamyloid, 8-spored, with croziers; spores ellipsoid, 14-17.5 x 9.5-11.5 µm, Qav. ≈ 1.5, smooth, 2-guttulate; paraphyses tips cylindrical, straight, contents orange *Pseudopithyella minuscula*
On soil or debris of other hosts 72
72. Spore Qav. above 2.2 73
Spore Qav. below 2.2 75
73. Paraphyses tips bend. Fruitbody 1-6 mm wide; hymenium flat, orange; asci cylindrical, inamyloid, 8 to 4-spored, with croziers; spores ± spindle-shaped, 18.5-25.5 x 8-9.5 µm, Qav. ≈ 2.5, smooth, 2-multi-guttulate; paraphyses tips club-shaped to head-shaped, contents orange; on soil where deer have urinated; rather common *Byssonectria terrestris*
Paraphyses tips straight or at most slightly bend 74
74. Spores 22-29 x 7-10 µm, on average longer than 23 µm; subiculum absent or sparse. Hymenium orange; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores spindle-shaped, Qav. ≈ 2.9, smooth, 2-guttulate; paraphyses tips club-shaped, straight, contents orange; rather common
Byssonectria fusispora
Spores 20-24 x 8-9.5 µm, on average shorter than 23 µm; subiculum well developed. Fruitbody 1-1.5 mm wide; hymenium flat, orange; asci cylindrical, inamyloid, 8-spored, with croziers; spores ± spindle-shaped, Qav. ≈ 2.5, smooth, 2-guttulate; paraphyses tips cylindrical, contents orange; on soil and rodent dung; very rare
Byssonectria cartilagina
75. Spores 11-12.5 x 6-7 µm. Fruitbody 2-4 mm wide; hymenium flat, buff-yellow; asci cylindrical, inamyloid, 95-125 x 8-10.5 µm, 8-spored, with croziers; spores spindle-shaped to ellipsoid, Qav. ≈ 1.8, smooth, 0-1-guttulate; paraphyses tips cylindrical, bend to coiled; on soil.
*Boubovia ovalispora*¹⁶
Spores larger 76
76. Hymenium ± buff-yellow (☹️🟡). Fruitbody 1-8 mm wide; hymenium arched to flat; asci cylindrical, inamyloid, 250-300 x 13-16 µm, 8-spored, without croziers; spores ellipsoid, 14.5-18.5 x 8.5-10.5 µm, Qav. ≈ 1.7, smooth, multi-guttulate; paraphyses tips club-shaped, bend, contents yellowish; saprobic, on soil and debris of *Pinus halepensis* and *Cupressus sempervirens* *Pseudoboubovia benkertii*
Hymenium ± orange (☹️🟠) 77



16. This is *Boubovia nicholsonii* ss. auct.

77. Fruitbodies 4-6 mm wide; margin smooth; spore Qav. ca. 1.4. Hymenium flat, reddish to pinkish; asci cylindrical, inamyloid, 375-417 x 18-21 µm, 8-spored, without croziers; spores ellipsoid, 18.5-26 x 13-19 µm, multi-guttulate; paraphyses tips cylindrical to club-shaped, straight, contents hyaline to orange; on soil; very rare *Komposocypha chudei*
Fruitbodies 1-4 mm wide; margin somewhat crenelate; spore Qav. higher 78
78. Spores 14-18 µm long. Fruitbody 1-4 mm wide; hymenium flat; asci cylindrical, inamyloid, 200-230 x 12-14 µm, 8-spored, with croziers; spores ellipsoid, 14-18 x 8-11 µm, Qav. ≈ 1.7, smooth, multi-guttulate; paraphyses tips club-shaped, straight, contents orange; on soil; very rare *Byssonectria deformis*
Spores 19-21 µm long. Fruitbody 1-1.5 mm wide; hymenium flat; asci cylindrical, inamyloid, 240-275 x 11.5-15 µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 19-21 x 10-11 µm, Qav. ≈ 1.9, smooth, multi-guttulate; paraphyses tips club-shaped, bend, contents orange; on soil of arctic/alpine, in moist places; very rare *Byssonectria carestiae*
79. Ornament of crests, mostly forming a ± complete reticulum 80
Ornament of round or somewhat oblong warts 86
80. Fruitbodies 1-2 mm wide, brownish red with a paler, flat, crenelate sterile margin. Hymenium flat; asci cylindrical, inamyloid, 220-300 x 15-20 µm, 8-spored, with croziers; spores subglobose, 13-15 x 10-12 µm, Qav. ≈ 1.3, reticulate, 0-many-guttulate; paraphyses tips club-shaped, straight, contents orange; on soil; very rare *Moravecia calospora*
Fruitbodies larger, without an eye-catching, pale margin [*Aleuria*] 81
81. Fruitbodies 10-160 mm wide, deeply orange (☹️🟠🟠). Hymenium cup-shaped to flat, orange; asci cylindrical, inamyloid, 185-250 µm, 8-spored, with croziers; spores ellipsoid, 12-16.5 x 6-9.5 µm, Qav. ≈ 1.8, with up to 4 µm high reticulate crests, highest at the ends, 2-guttulate; paraphyses tips club-shaped, straight, contents orange; on soil, often in gravel roads and paths; common *Aleuria aurantia*
Fruitbodies mostly smaller than 10 mm, rarely up to 20 mm, yellowish orange to apricot orange (☹️🟡🟠) 82
82. Spores longer than 14 µm 83
Spores shorter than 14 µm 84
83. Spores with a regular, up to 1 µm high, reticulate ornament. Fruitbody 2-5 mm wide; hymenium cup-shaped to flat, apricot orange; asci cylindrical, inamyloid, ~280 µm, 8-spored, with croziers; spores ellipsoid, 14.5-18 x 7-9 µm, Qav. ≈ 2, 1-guttulate, ornament higher at the ends; paraphyses tips club-shaped, straight, contents orange; on soil; rare or overlooked *Aleuria exigua*
Spores with an irregular, up to 3 µm high, crested ornament. Fruitbody 2-10 mm wide; hymenium cup-shaped to flat, yellowish orange; asci cylindrical, inamyloid, 185-215 µm, 8-spored, with croziers; spores ellipsoid, 15-17 x 7.5-9 µm, Qav. ≈ 1.9, 1-2-guttulate, ornament higher at the ends; paraphyses tips club-shaped, straight to bend, contents orange; on soil; rare or overlooked
Aleuria congrex
84. Spores 8.5-10 µm long. Fruitbody 2-7 mm wide; hymenium flat to cup-shaped, apricot orange; asci cylindrical, inamyloid, 130-180 µm, 8-spored, with croziers; spores ellipsoid, 8.5-10 x 5-7 µm, Qav. ≈ 1.5, with up to 1.8 µm high crests forming a ± reticulate pattern, 2-guttulate; paraphyses tips club-shaped, straight to bend, contents orange; on soil; rare or overlooked *Aleuria cestricea*
Spores longer 85





85. Fruitbodies 1-5 mm wide. Hymenium flat to cup-shaped, yellowish orange; asci cylindrical, inamyloid, 170-265 µm, 8-spored, with croziers; spores ellipsoid, 10.5-13 x 6-7.5 µm, Qav. ≈ 1.7, with up to 2.5 µm high crests forming a somewhat reticulate pattern, 2-guttulate; paraphyses tips club-shaped, straight, contents orange; on soil; rare or overlooked *Aleuria bicucullata*

Fruitbodies 5-20 mm wide. Fruitbody 5-20 mm wide; hymenium cup-shaped to flat, yellowish orange; asci cylindrical, inamyloid, 160-210 µm, 8-spored, with croziers; spores ellipsoid, 10-14 x 7-8.5 µm, Qav. ≈ 1.5, with up to 1.6 µm high crests forming a somewhat reticulate pattern, 1-guttulate; paraphyses tips club-shaped, straight to bend, contents orange; on soil *Aleuria luteonitens*

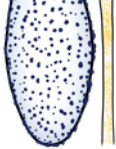
86. On deciduous wood in creeks and rivers. Fruitbody 0.5-5 mm wide; hymenium flat, ± yellowish; asci cylindrical, inamyloid, 180-264 x 14-16.5 µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 20.5-26 x 10.5-13.5 µm, Qav. ≈ 1.9, with ± rounded warts, multi-guttulate; paraphyses tips club-shaped, straight, contents orange; rather common *Miladina lecithina*
On soil or on fruitbodies of *Russulales* 87

87. Spores 12-14 µm long; on fruitbodies of *Russulales*. Fruitbody 1-3 mm wide; hymenium arched to flat, reddish to orange; asci cylindrical, inamyloid, 110-135 x 9-12 µm, 8-spored, with croziers; spores ellipsoid, 12-14 x 6-7.5 µm, Qav. ≈ 1.9, with ± rounded, oblong to sinuose warts, 2-multi-guttulate; paraphyses tips club-shaped, straight; known from the base of a fruitbody of *Lactarius vellereus* *Galeoscypha pileiformis*
Spores longer; ecology different 88

88. Spores 18-22 µm long 89
Spores 23.5-35.5 µm long 90

89. Hymenium yellowish; spores finely warty, Qav. ca. 2.3. Fruitbody 1-4 mm wide; hymenium flat to arched; asci cylindrical, inamyloid, 140-180 x 12-18 µm, 8-spored, with croziers; spores spindle-shaped, 19-22 x 8-10 µm, multi-guttulate; paraphyses tips cylindrical, bend to coiled, contents yellowish; on soil *Boubovia luteola*
Hymenium whitish; spores coarsely warty, Qav. ca. 1.9. Fruitbody 0.2-1 mm wide; hymenium flat; asci cylindrical, inamyloid, 130-160 x 20-27 µm, 8-spored, with croziers; spores spindle-shaped, 18-20 x 9-10.5 µm, Qav. ≈ 1.9; paraphyses tips cylindrical, bend to coiled, contents hyaline; on soil *Boubovia vermiphila*

90. Spores 23.5-27 µm long. Fruitbody 0.2-0.3 mm wide; hymenium whitish; asci club- to balloon-shaped, inamyloid, 130-145 x 30-36 µm, 8-spored, with croziers; spores ellipsoid, 23.5-27 x 11-16 µm, Qav. ≈ 1.9, with ± rounded warts; paraphyses tips club-shaped, bend, contents hyaline; on soil *Chalazion helveticum*
Spores 32-35.5 µm long. Fruitbody 0.3-0.6 mm wide; hymenium whitish to cream; asci club-shaped to balloon-shaped, inamyloid, 165-200 x 30-40 µm, 8-spored, with croziers; spores ellipsoid, 32-35.5 x 15-17.5 µm, Qav. ≈ 2.1, with ± rounded warts; paraphyses tips club-shaped, bend, contents hyaline; on soil *Chalazion sociabile*



Key L – with pinkish, greyish to brownish hymelium and a margin with pointed (setose) hairs

1. Fruitbodies 0.1-0.4 mm (100-400 µm) large, ± chleistocarp blooms with one to a few asci; on dung [*Trichobolus*] 2
Fruitbodies larger, ± well developed apothecia; on various substrates including dung 6

2. Asci with eight spores; asci cylindrical to club-shaped 3
Asci with thousands of spores; asci balloon-shaped 4

3. Spores 11-13.5 x 9-11.5 µm. Fruitbody 0.2-0.4 mm wide; hymenium arched, whitish to buffish; asci ± club-shaped, 120-150 x 19-25 µm, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.2, smooth, 0-guttulate; marginal hairs 60-160 µm long, pale yellow to hyaline; on dung *Trichobolus octosporus*
Spores 14-21 x 9-13 µm. Fruitbody 0.2-0.4 mm wide; hymenium arched, whitish to buffish; asci ± club-shaped, 95-150 x 20-35 µm, inamyloid, 8-spored, without croziers; spores ellipsoid, Qav. ≈ 1.6, smooth, 0-guttulate; marginal hairs 65-250 µm long, pale yellow to hyaline; saprobic, on dung of deer; very rare *Trichobolus dextrinoideosetosus*

4. Fruitbodies with several, mostly tree asci. Fruitbody 0.2-0.3 mm wide; asci balloon-shaped, 140-150 x 180-220 µm, inamyloid, more-spored, with croziers; spores ellipsoid, 10.5-11 x 7-7.5 µm, Qav. ≈ 1.5, smooth, 0-guttulate; marginal hairs 150-225 µm long, hyaline; on dung *Trichobolus pilosus*
With only one ascus 5

5. Spores develop de Bary bubbles; spore Qav. ca. 1.2. Fruitbody with only one ascus. Fruitbody 0.3-0.4 mm wide; asci balloon-shaped, 250-450 x 200-325 µm, inamyloid, with hundreds of spores, with croziers; spores ellipsoid, 11.5-12.6 x 9.5-10.5 µm, smooth, 0-guttulate; marginal hairs 180-350 µm long, pale yellow to hyaline; on dung *Trichobolus zukalii*
Spores without de Bary bubbles; spore Qav. ca. 1.1. Fruitbody 0.3-0.4 mm wide; asci balloon-shaped, 125-150 x 150-200 µm, inamyloid, with hundreds of spores, with croziers; spores globose, 9-10 x 8.5-9 µm, Qav. ≈ 1.1, smooth, 0-guttulate; marginal hairs 110-160 µm long, hyaline to pale yellow; on dung *Trichobolus sphaerosporus*

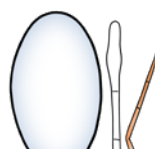
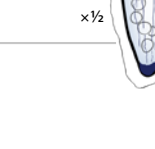
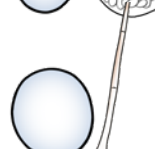
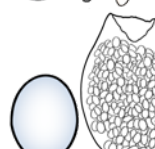
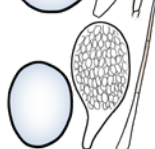
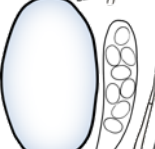
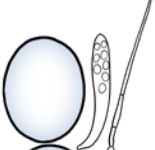
6. Hymenium with brown setae (strong lens!) [*Desmazierella*] 7
Hymenium without brown setae 8*

7. Spores 16-19 x 8-11; on needles of Pinus. Fruitbody 0.5-1 mm wide; hymenium flat, pale brown; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.8, smooth, 2-multi-guttulate; paraphyses tips cylindrical, straight, branched, contents; marginal hairs brown; rather common *Desmazierella acicola*
Spores 48-52 x 11-12 µm; on needles of Picea. Fruitbody 0.5-1 mm wide; hymenium flat, pale brown; asci cylindrical, inamyloid, 4-spored, with croziers; spores spindle-shaped, Qav. ≈ 4.3, multi-guttulate; paraphyses tips cylindrical, straight, branched; marginal hairs brown; rare or overlooked *Desmazierella piceicola*

8. Hairs with bifurcate or stellate bases [*Trichophaeopsis* p.p.] 9
Hairs not furcate at the base 11

9. Asci 4-spored; on dung. Fruitbody 0.3-0.5 mm wide; hymenium flat, greyish; asci cylindrical, inamyloid, 4-spored, with croziers; spores ellipsoid, 17.5-20.5 x 10-13 µm, Qav. ≈ 1.8, smooth, 0-guttulate, sometimes with a loosening, wrinkled perispore; paraphyses tips cylindrical, straight; marginal hairs up to 550 µm long, pale brown to brown, with one or more stellate branchings from the base *Trichophaeopsis tetraspora*
Asci 8-spored; on debris or burnt ground 10







10. Spores with small, rounded wart; spore Qav. ca. 1.3. Fruitbody 1-1.5 mm wide; hymenium flat, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 16.5-19 x 12-15 µm, Qav. ≈ 1.3, 0-guttulate; paraphyses tips cylindrical, straight; marginal hairs 80-270 µm long, pale brown; on debris of *Picea* and on burnt ground
Trichophaeopsis latispora

11. Spores warty or stribed seen in cotton blue
Spores smooth

12. Spores with 2-3 µm high, rounded warts
Spores with fine warts or stripes seen in cotton blue

13. Spores 15-16 x 8-9 µm; on burnt ground. Fruitbody 2-8 mm wide; hymenium , buffish to greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.8, with ± rounded, up to 2 µm high warts, 2-guttulate; paraphyses tips club-shaped, straight; marginal hairs 500 µm long, pale brown; very rare
Perilachnea carbonicola

14. Spores longitudinally stribed seen in cotton blue. Fruitbody 4-6 mm wide; hymenium cup-shaped, buffish to greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores spindle-shaped, 15.5-19.5 x 8-10.5 µm, Qav. ≈ 1.9, longitudinally striped, 0-guttulate; paraphyses tips club-shaped to cylindrical, straight; marginal hairs 180-550 µm long, pale brown; on soil, often with *Olea*
Tricharina striispora

15. Spores longer than 19 µm
Spores shorter than 19 µm

16. Hairs 600-1500 µm long; fruitbodies 6-30 mm bwide, deeply cup-shaped. Hymenium cup-shaped, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 19.5-27 x 10-13 µm, Qav. ≈ 2, with ± rounded warts, 2-guttulate; paraphyses tips club- to flame-shaped, straight; marginal hairs brown, smooth or with goo; on soil; common
Humaria hemisphaerica

17. Hairs arising from a bulbous base; spores with one large guttule; asci shorter than 200 µm
Hairs arise from a chain of thick-walled cells; spores 1-many-guttulate; asci longer than 200 µm

18. Spores ellipsoid. Fruitbody 2-5 mm wide; hymenium cup-shaped, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores 22-25 x 11.5-12.5 µm, Qav. ≈ 2, with ± rounded warts, multi-guttulate; paraphyses tips club-shaped, straight; marginal hairs 80-350 µm long, pale brown to brown, smooth; on soil, possibly ectomycorrhizal with conifers
Wilcoxina moynei

19. Spores 0-guttulate; marginal hairs 150-270 (-340) µm long
Spores 2-many-guttulate; marginal hairs up to ca. 650 mm long

20. Fruitbody 1-1.5 mm wide; spore Qav. ca. 1.3
Fruitbody 2-5 mm wide; spore Qav. ca. 1.8

21. Spores 12-13.5 x 6.5-8 µm. Fruitbody 2-6 mm wide; hymenium cup-shaped, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.8, 2-guttulate, without slime-coating; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; marginal hairs 400-680 µm long, pale brown; on burnt ground
Perilachnea hemisphaerioides

22. Spores 9-10 µm wide, Qav. 1.7; on debris of *Cypressus*. Fruitbody 3-18 mm wide; hymenium cup-shaped, greyish to buffish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15.5-17.5 x 9-10 µm, Qav. ≈ 1.7, with ± rounded warts, 2-guttulate; paraphyses tips club-shaped, straight; marginal hairs 164-640 µm long, pale brown
Perilachnea verrucispora

23. Spores globose
Spores ellipsoid to spindle-shaped

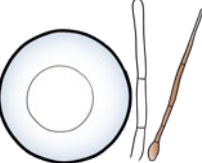
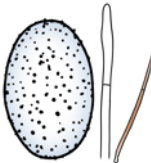
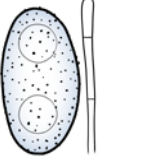
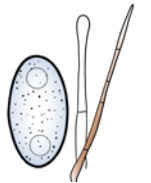
24. Outside black and densely felty
Outside brownish

25. Fruitbodies less than 1 mm wide, as tufts of brown hairs. Fruitbody 0.2-1 mm wide; hymenium pale brown to buffish; asci cylindrical, inamyloid, 8-spored, with croziers; spores globose, 13-17 x 13-17 µm, Qav. ≈ 1, smooth, 1-guttulat; paraphyses tips club-shaped, straight; marginal hairs up to 250 µm long, pale brown; on soil
Trichophaea minuta

26. On burnt ground. Fruitbody 1-5 mm wide; hymenium cup-shaped to flat, pale brown to buffish to dark brown; asci cylindrical, inamyloid, 8-spored, with croziers; spores globose, 12-16.5 x 12-16.5 µm, Qav. ≈ 1, smooth, 1-guttulate; paraphyses tips club-shaped, straight, wall with brown goo; marginal hairs 25-105 µm long, pale brown
Trichophaea brunnea

27. Spores 0-guttulate
Spores 1-2-many-guttulate

28. Spores on average longer than 20 µm
Spores on average shorter than 20 µm



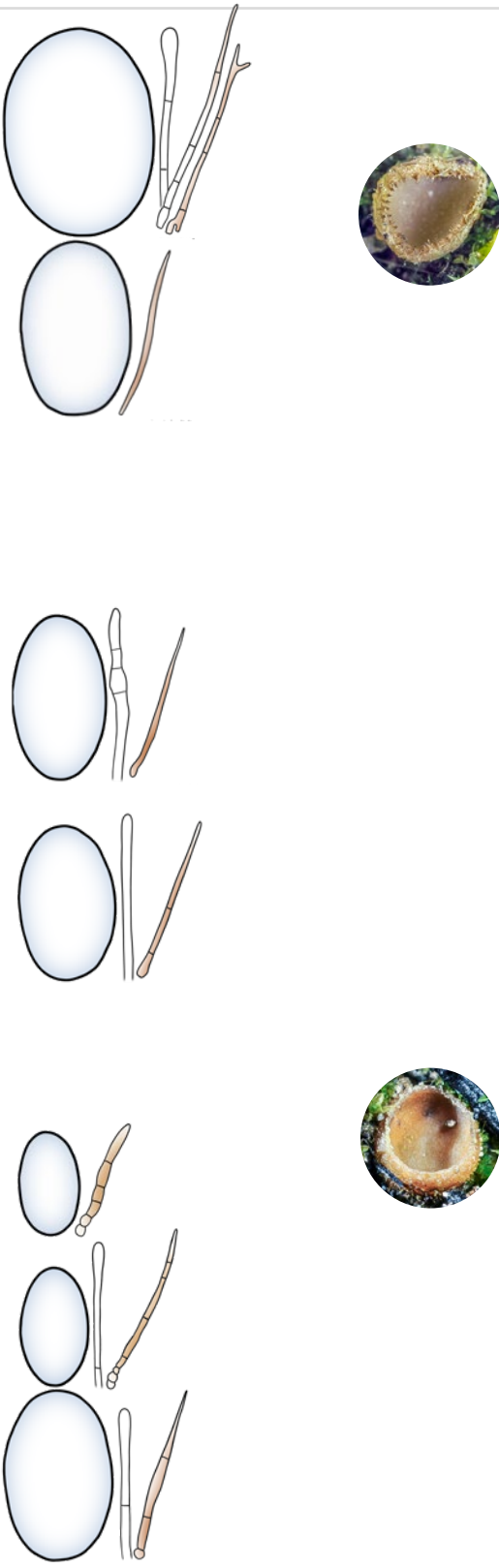
Trichophaeopsis bicuspis

Pseudotrichophaea paludosa

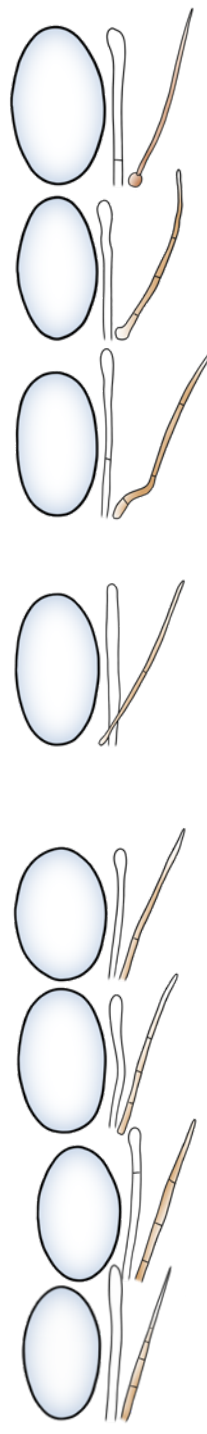
Trichophaea minima

Trichophaea scutelloides

29. Spore Qav. lower than 16. Fruitbody 1-5 mm wide; hymenium flat, pale brown to dark brown; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 20-27 x 16-20 µm, Qav. ≈ 1.3, smooth, 0-guttulate, sometimes with surrounding slime-coating; paraphyses tips club-shaped, straight, contents brown; marginal hairs 350-510 µm long, brown, smooth or with crystals; on soil; very rare *Lotinia verna*
Spore Qav. higher than 16. Fruitbody 0.5-1 mm wide; hymenium flat, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 20-24 x 11-13 µm, Qav. ≈ 1.8, smooth, 0-guttulate, without slime-coating; paraphyses tips club-shaped, straight; marginal hairs 100-700 µm long, pale brown to brown; on dung og e.g. cow and horse; very rare *Paratrachophaea michiganensis*
30. Marginal hairs longer than 500 µm 31
Marginal hairs shorter than 500 µm 33
31. Spores without slime coating, often with small internal granules at the ends; paraphyses 5.5-7.7 µm wide at the tops
see *Tricharina tophiseda* cpl. xxx
Spores sometimes with slime coating, without small internal granules; paraphyses 1.5-4.5 µm widt at the tops 32
32. On dung; margin also with up to 100 x 30 µm large, hyaline macro-cells; paraphyses sometimes moniliform. Fruitbody 1-2 mm wide; hymenium flat, greyish; asci cylindrical, inamyloid, 8 to 4-spored, with croziers; spores ellipsoid, 18-20 x 10-12 µm, Qav. ≈ 1.7, smooth, 0-guttulate, without slime-coating; paraphyses tips club-shaped, straight; marginal hairs 400-1000 µm long, brown; on dung of e.g. cow and horse; rare or overlooked *Lasiobolidium coprophilum*
On soil and wood; without such macro-cells; paraphyses not moniliform. Fruitbody 2-4 mm wide; hymenium flat, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15-20 x 10-12 µm, from 4-spores asci up to 26 x 15 µm, Qav. ≈ 1.6, smooth, 0-guttulate, often with 2-sided or surrounding slime-coating; paraphyses tips cylindrical, straight; marginal hairs 600-850 µm long, brown, superficial; on soil, wood or wood chips; rare or overlooked *Lasiobolidium boudieri*
33. Spores width below 9 µm; marginal hairs arising from a chain of thick-walled cells [*Wilcoxina* p.p.] 34
Spores width above 9 µm; marginal cells different 35
34. Spores 11-14 µm long. Fruitbody 1-8 mm wide; hymenium cup-shaped to flat, greyish to buffish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 11-14 x 6-9 µm, Qav. ≈ 1.7, smooth, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth; marginal hairs 100-300 µm long, pale brown; on burnt ground of conifers, ectomycorrhizal *Wilcoxina mikolae*
Spores 13-15.5 µm long. Fruitbody 1-3 mm wide; hymenium cup-shaped, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 13-15.5 x 7-9 µm, Qav. ≈ 1.8, smooth, 0-guttulate; paraphyses tips club-shaped, straight; marginal hairs 150-220 (-440) µm long, pale brown; on debris to soil of *Picea* and *Pinus*, ectomycorrhizal *Wilcoxina rehmi*
35. Spores 19-21 x 12-13.5 µm. Fruitbody 0.5-1 mm wide; hymenium flat, greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.6, smooth, 0-guttulate; paraphyses tips cylindrical, straight; marginal hairs 190-340 µm long, brown; saprobic, on soil; rare or overlooked *Lasiobolidium mercantourense*
Spores smaller 36



36. On dung see *Pseudombrophila subalpina* Nxx
On soil, burnt ground or debris 37
37. On burnt ground or debris of *Larix* 38
On unburnt soil or on debris of other hosts 39
38. Fruitbodies 2-5 mm wide; on burnt ground. Fruitbody 2-5 mm wide, often partly immersed; hymenium cup-shaped, buffish to pale brown; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 14-18 x 9-11.5 µm, Qav. ≈ 1.6, 0-guttulate; paraphyses tips club-shaped, straight; marginal hairs 150-340 µm long, pale brown; all year round, ectomycorrhizal *Ascorhizoctonia praecox*
Fruitbodies 5-25 mm wide; on debris of *Larix*. Fruitbody 5-25 mm wide; hymenium cup-shaped to flat, pale brown; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15.5-18 x 9-10 µm, Qav. ≈ 1.8, smooth, 0-guttulate; paraphyses tips cylindrical, straight; marginal hairs 70-380 µm long, pale brown; summer *Chaetothiersia laricina*
39. Margin and outside with very few and small hairs; arctic (Greenland) under *Salix*. Fruitbody 2-4.5 mm wide; hymenium cup-shaped, buffish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 14-18.5 x 7.5-10.5 µm, Qav. ≈ 1.8, smooth, 0-guttulate; paraphyses tips club-shaped, straight; marginal hairs (if present) pale brown; on soil of *Salix* *Tricharina groenlandica*
Margin with numerous hairs; temperate or southern 40
40. Paraphyses 5.5-7.7 µm wide at the top; spores often with small internal granules at the ends. Fruitbody 3-7 mm wide; hymenium cup-shaped, buffish to greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 15-19 x 9-10.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate; paraphyses tips club-shaped to cylindrical, straight; marginal hairs 360 (-930) µm long, pale brown; on soil with deciduous trees *Tricharina tophiseda*
Paraphyses 3-5 (-6.5) µm; spores without internal granules 41
41. Hairs less than 300 µm long 42
Hairs more than 300 µm long 43
42. Fruitbodies 2-5 mm wide; known from soil under *Cupressus* in Greece. Hymenium cup-shaped, buffish; asci cylindrical, inamyloid, 190-225 x 12-15 µm, 8-spored, with croziers; spores ellipsoid, 13-16 x 9.5-10.5 µm, Qav. ≈ 1.5, smooth, 0-guttulate; paraphyses tips club-shaped, straight; marginal hairs 200-250 µm long, pale brown *Tricharina gilvoides*
Fruitbodies 5-7 mm wide; widespread, mostly on soil under deciduous trees. Hymenium cup-shaped, buffish to greyish; asci cylindrical, inamyloid, 160-190 x 12-16 µm, 8-spored, with croziers; spores ellipsoid, 14-18 x 8.5-10 µm, Qav. ≈ 1.7, smooth, 0-guttulate; paraphyses tips club-shaped, straight; marginal hairs 60-300 µm long, pale brown *Tricharina gilva*
43. Spore Qav. ca. 1.5. Fruitbody 3-5 (-11) mm wide; hymenium cup-shaped, buffish to greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 13.5-16.5 x 8.5-11 µm, smooth, 0-guttulate; paraphyses tips club-shaped, straight; marginal hairs 110-450 µm long, pale brown; on soil under deciduous trees *Tricharina subhiemalis*
Spore Qav. ca. 1.7. Fruitbody 3-5 (-11) mm wide; hymenium cup-shaped, buffish to greyish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 13-18 x 7.5-11 µm, smooth, 0-guttulate; paraphyses tips club-shaped, straight; marginal hairs 110-450 µm long, pale brown; on soil *Tricharina hiemalis*





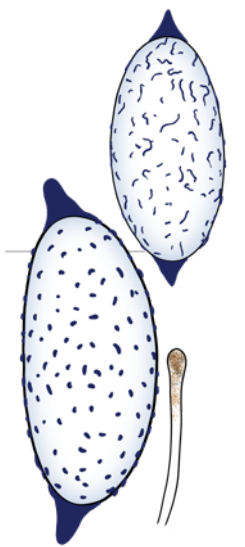
The diagram illustrates the life cycle of a parasite, showing the progression from a simple egg to a more complex, segmented form. The stages are as follows:

- Stage 1:** A simple, oval-shaped egg with a large, clear central space.
- Stage 2:** The egg is slightly more elongated, with a small, dark, rounded structure appearing at one end.
- Stage 3:** The egg is further elongated, and the dark structure has grown into a long, thin, segmented appendage.
- Stage 4:** The egg is now filled with several small, circular structures, indicating internal development.
- Stage 5:** The egg is filled with many small, circular structures, and the appendage is more pronounced.
- Stage 6:** The egg is filled with many small, circular structures, and the appendage is very long and thin.
- Stage 7:** The egg is filled with many small, circular structures, and the appendage is very long and thin, with a distinct, rounded tip.



Key M – brownish, thick-fleshed, large and ± wrinkled; spring to early summer

- 1. Spores broadly ellipsoid (Qav below 1.9), without guttules 2
Spores narrower, often somewhat spindle-shaped, with 1-2-many guttules 3
- 2. Spores up to 22 µm long; smell insignificant 3
see *Helvella* & *Dissingia*, page xxx
Spores 20.5-25 µm long; with a strong smell of chlorine. Fruitbody 50-200 mm wide; hymenium flat to cup-shaped, ± cinnamon; asci cylindrical, inamyloid, 8-spored; spores ellipsoid, 20.5-25 x 12-15.5 µm, smooth; paraphyses tips ± club-shaped, straight, contents brown; saprobic, on soil, spring; rather common. *Disciotis venosa*
Spores more narrow, , with 1-2-many guttules [*Discina* s.l.] ... 2
- 3. On burned ground; underside many-rooted trough thick hyphal cords 4
see *Rhizina*, Nxx
On unburned ground, debris or wood; without hyphal cords [*Discina* s.l.] ... 4
- 4. Spores with up to 4 (-5) µm high, acute spines. Fruitbody 50-80 mm wide; hymenium ± flat or arched, ± cinnamon; with a short stem; asci cylindrical, inamyloid, 8-spored; spores ellipsoid to spindle-shaped, 29-33 x 15-18 µm, Qav. ≈ 1.8-1.9, 1-2-guttulate; paraphyses tips ± club-shaped, straight, contents brown; on soil with conifers, e.g. *Larix*, spring-early summer; very rare *Gyromitra spinosospora*
Spores not with such an ornament 5
- 5. Spores shorter than 23 µm 6
Spores longer than 23 µm 7
- 6. Spores without a higher ornament at the ends, mostly 2-guttulate. Fruitbody 20-80 mm wide; hymenium cup-shaped to flat to arched, dark reddish brown to dark greyish brown; asci cylindrical, inamyloid, 8-spored; spores ellipsoid, 16-22 x 8-10 µm, Qav. ≈ 2.2, with ± rounded warts, 2-(3-) guttulate; paraphyses tips ± club-shaped, straight; on soil with deciduous and coniferous trees, spring; rare or overlooked *Paradiscina melaleuca*
Spores with a higher ornament at the ends, mostly 1- to 3-guttulate. Fruitbody 10-30 mm wide; hymenium arched to flat, COLOUR; asci cylindrical, inamyloid, 8-spored; spores ± fusiform, 18-23 x 8-9 µm, Qav. ≈ 2.4, XXX-guttulate; paraphyses tips ± club-shaped, straight, contents; on soil with XXX; rare *Gyromitra intermedia*
- 7. Ornament at the spore ends higher than 2 µm, ± conical 8
Ornament at the spore ends lower than 2 µm, rounded or concave ... 9
- 8. Spores 23-30 µm long. Fruitbody 60-150 mm wide; hymenium ± cinnamon; asci cylindrical, inamyloid, µm, 8-spored; spores spindle-shaped to ellipsoid, 23-30 x 12-14 µm, Qav. ≈ 2, with ± rounded, oblong to sinuose warts tending to form a fine reticulum, 1- to 3- to multi-guttulate; paraphyses tips ± club-shaped, straight; on soil and wood of conifers, spring-early summer; rare *Discina mcknightii*
Spores 24-29 µm long. Fruitbody 30-150 mm wide; hymenium ± cinnamon; asci cylindrical, inamyloid, 8-spored; spores spindle-shaped, 27-40 x 12-15 µm, Qav. ≈ 2.5, with rather coarse, sinuose warts, 1-2-many-guttulate; paraphyses tips ± club-shaped, straight; on wood, especially of conifers, spring-early summer; rather common. *Discina perlata*¹⁷



17. *Discina fluctuans* is very similar, but a modern description is needed. It should have an even higher ornament at the spore ends.



- 9. Spores never more than 30 µm long. Fruitbody 55-75 mm wide; hymenium flat to cup-shaped to arched, ± greyish brown to dark brown; asci cylindrical, inamyloid, 400-485 x 16-19 µm, 8-spored; spores ellipsoid to spindle-shaped, 24-29 x 11-13 µm, Qav. ≈ 2.2, with ± rounded warts, 1-2-multi-guttulate; paraphyses tips ± club-shaped, straight; on sandy soil, spring-early summer; rare *Maublancomyces geogenia*
Some spores longer than 30 µm 10
- 10. Ornament at the spore ends consisting of many small warts 11
Ornament at the spore ends of broad, singular elements 12
- 11. Spores shorter than 30 µm. Fruitbody 50-100 mm wide; hymenium arched, ± cinnamon; asci cylindrical, inamyloid, 8-spored; spores ellipsoid to spindle-shaped, 26-28.5 x 13-14.5 µm, Qav. ≈ 2, reticulate, 1-guttulate; paraphyses tips ± club-shaped, straight; on wood of deciduous trees, spring-early summer; rare *Neogyromitra parma*
Spores longer than 30 µm. Fruitbody 100-150 mm wide; hymenium arched to flat, ± cinnamon or darker brown; asci cylindrical, inamyloid, 480-600 x 18-20 µm, 8-spored; spores spindle-shaped, 31-38 x 12-15.5 µm, Qav. ≈ 2.5, 1-2-multi-guttulate; paraphyses tips ± club-shaped, straight; on wood, spring-early summer; rare *Neogyromitra martinii*
- 12. Spores 25-35 µm long. Fruitbody 40-80 mm wide; hymenium arched to flat, ± cinnamon; asci cylindrical, inamyloid, 8-spored; spores spindle-shaped, 25-35 x 10-15 µm, Qav. ≈ 2.4, smooth, 1-2-multi-guttulate; paraphyses tips ± club-shaped, straight; on soil with conifers (subalpine), spring-early summer; rare *Piscidiscina leucoxantha*
Spores 35-52 µm long. Fruitbody 35-150 mm wide; hymenium flat to arched to cup-shaped, ± cinnamon; asci cylindrical, inamyloid, 380-570 x 22-24 µm, 8-spored; spores spindle-shaped, 35-52 x 12-15 µm, Qav. ≈ 3.2, 1-2-multi-guttulate; paraphyses tips ± club-shaped, straight; on soil with conifers, spring-early summer; rare *Maublancomyces accumbens*



Key N – smooth to floccose with pinkish, violet, buff, brownish, greyish to blackish colours

1. Hymenium with violet colours (  ) 2

Hymenium not violet 18

2. Spores subglobose, ellipsoid, cylindrical to spindle-shaped (Q larger than 1.1) [Smardaea p.p.] 3

Spores globose (Q ca. 1-1.1) 6

3. Spores smooth. Fruitbody 8-15 mm wide; hymenium cup-shaped to flat, blackish to bluish; asci cylindrical, inamyloid, 8-spored, with croziers; spores ellipsoid, 12-14 x 9-10 µm, Qav. ≈ 1.4, multi-guttulate; paraphyses tips club-shaped, bend, contents ± violet; on soil with Cedrus and Pinus; very rare Smardaea ovalispora

Spores ornamented 4

4. Spores with large warts, at the ends up to 2.5 µm high. Fruitbody 2-10 mm wide; hymenium cup-shaped to flat, blackish to bluish; asci cylindrical, inamyloid, 260-300 x 14-19 µm, 8-spored, with croziers; spores spindle-shaped, 16-22 x 8.5-10 µm, Qav. ≈ 2.1, 2-guttulate; paraphyses tips flame-shaped to club-shaped to head-shaped, straight, contents ± violet; on soil ; very rare Smardaea amethystina

Spores with lower, equally high warts or a reticulum 5

5. Spores 16.5-18 x 7.5-9.5 µm. Fruitbody 3-6 mm wide; hymenium cup-shaped to flat, blackish to bluish; asci cylindrical, inamyloid, 190-210 x 10-12 µm, 8-spored, with croziers; spores ellipsoid,, Qav. ≈ 2, reticulate, 2-guttulate; paraphyses tips flame-shaped to club-shaped, straight, contents ± violet; on soil; very rare Smardaea microspora

Spores 19-24 x 10-13 µm. Fruitbody mm wide; hymenium cup-shaped, blackish to bluish to dark brown; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores spindle-shaped, Qav. ≈ 1.9, 2-guttulate; paraphyses tips flame-shaped to club-shaped, straight, contents ± violet; on soil; very rare Smardaea purpurea

6. Both outside, flesh and hymenium dark violet ( ) [Smardaea p.p.] 7

Outside and flesh mostly whitish to pale violet ( ); hymenium violet ( ) [Marcelleina p.p.] 12

7. Spores smooth or at most with an almost invisible ornament when coloured with cotton blue. Spores with very small, almost invisible warts. Fruitbody 5-20 mm wide; hymenium cup-shaped to flat, dark violet; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores 10-12 x 10-12 µm, 1-2-multi-guttulate; paraphyses tips flame-shaped to club-shaped, straight to slightly bend, contents ± violet; on soil with Cupressocyparis, Cupressus and Juniperus; very rare Smardaea planchonis

Spores obviously ornamented 8

8. Spores with a reticulate ornament. Fruitbody 10-40 mm wide; hymenium cup-shaped to flat, blackish to dark violet; asci cylindrical, inamyloid, 240-260 x 12-14 µm, 8-spored, with croziers; spores 10-11 x 10-11 µm, 1-2-multi-guttulate; paraphyses tips flame-shaped to club-shaped, somewhat bend, contents dark violet; on soil with Cedrus; very rare Smardaea reticulosperma

Spores with a very fine to obvious, warty ornament 9

9. Spores 13-15 x 12-14 µm. Fruitbody 4-5 mm wide; hymenium cup-shaped to flat, blackish to dark violet; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores with obvious warts, 1-2-many-guttulate; paraphyses tips flame-shaped to club-shaped, straight, contents ± violet; on soil with Pinus; very rare Smardaea marchica

Spores 10-12 x 10-12 µm 10
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10. Spores with very small, almost invisible warts see Smardaea planchonis, cpl. xx

Spores with obvious warts. Fruitbody 5-10 mm wide; hymenium cup-shaped to flat, blackish to dark violet; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores 10-12 x 10-12 µm, 2-guttulate; paraphyses tips flame-shaped to club-shaped, straight, contents ± violet; on soil with Cedrus; very rare Smardaea verrucispora

11. Spores smooth. Fruitbody 5-9 mm wide; hymenium cup-shaped to flat, ± violet; asci cylindrical, inamyloid, 190-250 x 12-16.5 µm, 8-spored, with croziers; spores globose, 9-11.5 x 9-11.5 µm, Qav. ≈ 1, smooth, 1-guttulate; paraphyses tips club-shaped to cylindrical, strongly bend, contents bluish; on soil; very rare Marcelleina benkertii

Spores obviously ornamented 12

12. Spore ornament forming a labyrinthine pattern of lists 13

Spore ornament of more isolated, elongate warts 14

13. Spores 7.5-10.5 x 7.5-10.5 µm; paraphyses somewhat bend; ornament up to 0.8 µm high. Fruitbody 3-6 mm wide; hymenium cup-shaped to flat, violet; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores 1-guttulate; paraphyses tips club-shaped, contents bluish; on soil; very rare Marcelleina rickii

Spores 9-12 x 9-12 µm; paraphyses straight; ornament up to 0.6 µm high. Fruitbody 4-10 mm wide; hymenium cup-shaped to flat, violet asci cylindrical, inamyloid, 140-180 x 11-12 µm, 8-spored, with croziers; spores 1-guttulate; paraphyses tips club-shaped to cylindrical, contents bluish; on soil; very rare Marcelleina persoonii

14. Spores 12.5-14.5 x 12.5-14.5 µm. Fruitbody -10 mm wide; hymenium cup-shaped to flat, violet; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores with ± rounded, oblong to sinuose warts, 1-guttulate; paraphyses tips club-shaped, bend, contents bluish; on soil; very rare Marcelleina donadinii

Spores smaller 15

15. Young asci slightly amyloid see key C

Asci never amyloid 16

16. Spores 11.5-12.5 x 11.5-12.5 µm. Fruitbody 1.5-3.5 mm wide; hymenium cup-shaped to flat, violet; asci cylindrical, inamyloid, 200-260 x 12.5-17.5 µm, 8-spored, with croziers; spores with rounded, 0.4-1.3 µm high warts, 1-guttulate; paraphyses tips cylindrical, straight, contents bluish; on soil of ; very rare Marcelleina tuberculispora

Spores smaller 17

17. Warts up to 0.7 µm high. Fruitbody 3-10 mm wide; hymenium cup-shaped to flat, violet; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores globose, 7.5-10 x 7.5-10 µm, Qav. ≈ 1, with oblong to sinuose warts, 1-guttulate; paraphyses tips club-shaped, straight, contents bluish; on soil; very rare Marcelleina georgii

Warts up to 1.5 µm high. Fruitbody 5-10 mm wide; hymenium cup-shaped to flat, violet; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores globose, 8-10 x 8-10 µm, Qav. ≈ 1, with oblong to sinuose warts, 1-guttulate; paraphyses tips club-shaped to cylindrical, straight, contents bluish; on soil; very rare Marcelleina brevicostatispora

18. Spores ornamented (x1.000 + cotton blue) 19

Spores smooth 37

19. Spores on average shorter than 15 µm; fruitbodies often ± flat with a darker margin [Pseudombrophila p.p.] 20

Spores on average longer than 15 µm; 27
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20. Spores with a spiralling ornament. Fruitbody 5-10 mm wide; hymenium cup-shaped to flat, pale brown to buffish; asci cylindrical, inamyloid, 140-150 x 9-10 µm, 8-spored; spores ellipsoid, 11-14 x 6.5-7.5 µm, Qav. ≈ 1.8, 0-guttulate; paraphyses tips cylindrical, straight, with encrusting brownish pigment; on dung of cow, horse, moose, mostly associated with *Byssonectria* sp.; rare or overlooked . . . *Pseudombrophila petrakii*
Spore ornament ± reticulate 21


21. On burned ground. Fruitbody 7-15 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 135-150 x 9-10.5 µm, 8-spored; spores ellipsoid, 13-15.5 x 7-8 µm, Qav. ≈ 1.9, 2-guttulate, with low crests or an incomplete reticulum, ornament higher at the spore ends; paraphyses tips club-shaped, straight, with encrusting brownish pigment; very rare *Pseudombrophila disciformis*
On dung or dung/urine permeated substartes 22


22. Spores with higher onamentation at the ends; on or near dung of moose, mostly associated with *Byssonectria* sp. 23
With equal ornamentation all over 25


23. Asci always 8-spored; spores 8-11(-13) µm long. Fruitbody 1-2.5 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 90-100 x 9.5-10.5 µm; spores ellipsoid, 8-11 (-13) x 5.5-7 (-8.5) µm, Qav. ≈ 1.5, 1-2-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; very rare *Pseudombrophila maekinenii*
Asci mostly with only with 4-6 fully developed spores; spores 10-14.5 µm long 24

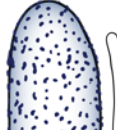

24. Spores 10-12 µm long, Qav. ca. 1.6. Fruitbody 1-5 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 120-145 x 10-12 µm; spores ellipsoid, 0 to 2-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; rare or overlooked *Pseudombrophila minor*
Spores 11-14.5 µm long. Qav. ca. 2. Fruitbody 3-5 mm wide; hymenium cup-shaped to flat, dark brown to pale brown; asci cylindrical, inamyloid, 85-95 x 7-9 µm; spores ellipsoid, 0-guttulate; paraphyses tips cylindrical, straight, with encrusting brownish pigment; rare or overlooked *Pseudombrophila microtetraspora*


25. Spore Qav. ca. 1.5; on rotten herbs. Fruitbody 3-4 mm wide; hymenium cup-shaped to flat, dark brown to pale brown to greyish; asci cylindrical, inamyloid, 100-120 x 10-12 µm; spores ellipsoid, 10.5-12.5 x 7-8 µm, Qav. ≈ 1.5, 0-guttulate; paraphyses branched, tips cylindrical, straight, with encrusting brownish pigment; rare or overlooked *Pseudombrophila ramosa*
Spore Qav. higher than 1.65 26


26. Spore Qav. ca. 1.8. Fruitbody 1-4 mm wide; hymenium cup-shaped to flat to arched, buffish to pale brown; asci cylindrical, inamyloid, 155-190 x 13-16 µm, 8-spored; spores ellipsoid, 12.5-14 x 7-8 µm, 0-guttulate; paraphyses tips club-shaped to cylindrical, straight, with encrusting brownish pigment; known from dung of horse; rare or overlooked *Pseudombrophila albicans*
Spore Qav. ca. 2.1. Fruitbody 6-12 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 155-170 x 9.5-11 µm, 8-spored; spores ellipsoid, 11-13 x 5-6 µm, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of bird; rare or overlooked *Pseudombrophila stercofringilla*



27. With a long stem – at least as long af the with of the cup 28
Stem shorter or absent 29

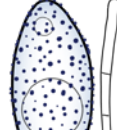

28. Outside and hymenium olivaceous buff, clay-buff to greyish brown (■ ■ ■ ■ ■ ■ ■ ■ ■ ■); on soil and debris of conifers, e.g. *Cedrus*. Fruitbody 15-40 mm wide; hymenium cup-shaped; asci cylindrical, inamyloid, 380-460 x 11.5-13 µm, 8-spored, with croziers; spores cylindrical, 22-29.5 x 8.5-11 µm, Qav. ≈ 2.6, with ± rounded warts; paraphyses tips club-shaped, straight; very rare *Neourmula poucheti*
Outside and hymenium dark grey to blackish (■ ■ ■ ■ ■ ■ ■ ■ ■ ■); on wood of *Taxus baccata*. Fruitbody 3-7 mm wide; hymenium cup-shaped; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 22-28 x 9-13 µm, Qav. ≈ 2.3, with ± rounded, oblong to sinuose warts, multi-guttulate; paraphyses tips cylindrical to branched, straight, contents brown; very rare *Donadinia helvelloides*


29. On or near dung of moose, mostly associated with *Byssonectria* sp. Fruitbody 2.5-20 mm wide; hymenium deeply cup-shaped, dark brown; asci cylindrical, inamyloid, 130-180 x 9-13 µm, 8 to 4-spored; spores ellipsoid, 15-21.5 x 5.5-9 µm, Qav. ≈ 2.5, with ± oblong to sinuose warts and higher ornament at the ends, 2-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; rare or overlooked *Pseudombrophila guldeniae*
On soil 30


30. Spores 28-33 µm long. Fruitbody 10-70 mm wide; hymenium cup-shaped, pinkish buff to clay pink; asci cylindrical, inamyloid, -320 x 15-25 µm, 8-spored, with croziers; spores , 28-33 x 10-12.5 µm, Qav. ≈ 2.7, with ± rounded, oblong to sinuose warts, 2-guttulate; paraphyses tips cylindrical to club-shaped, straight; outside hairs twisted, pale brown; on soil with deciduous trees; very rare *Jafnea semitosta*
Spores shorter 31


31. Spores subglobose, Qav. ca. 1.2. Fruitbody 1-4.5 mm wide; hymenium flat, buff to cinnamon buff; asci cylindrical, inamyloid, 200-220 x 15-18 µm, 4-spored, with croziers; spores subglobose to ellipsoid, 18.5-22.5 x 15-18.5 µm, Qav. ≈ 1.2, multi-guttulate; paraphyses tips club-shaped, straight, contents hyaline; outside hairs 100 µm long, hyaline; on soil; rare or overlooked *Paratricharina multiguttulata*
Spores ellipsoid, cylindrical to spindle-shaped 32


32. Spores spindle-shaped; hymenium mostly deeply cup-shaped. Fruitbody 3-6 mm wide; hymenium olivaceous buff to cinnamon; asci cylindrical, inamyloid, 165-195 x 10-12 µm, 8-spored, with croziers; spores 20.5-23 x 10-12 µm, Qav. ≈ 2, with ± rounded warts, 1-guttulate; paraphyses tips cylindrical to club-shaped, straight, contents hyaline; outside hairs 62-460 µm long, hyaline; on soil, often with *Olea europaea*; rare *Pseudotrucharina intermedia*
Spores ellipsoid to cylindrical 33


33. Outside with 55-350 µm long hairs 34
Outside ± smooth [Aleurina] 35


34. Outside hairs blunt, brown, 80-350 µm long see *Wilcoxina moynei* Lxx
Outside hairs hyaline, 55-120 µm long. Fruitbody 2-6 mm wide; hymenium flat, buff to olivaceous buff; asci cylindrical, inamyloid, 210-300 x 11-21 µm, 8-spored, with croziers; spores ellipsoid, 17-21 x 10-12 µm, Qav. ≈ 1.7, 0-guttulate; paraphyses tips club-shaped, straight, contents hyaline; on soil; rare or overlooked *Paratricharina confusa*



35. Spores 2-guttulate; spores with up to 1 µm high warts, most dense at the ends of the spores. Fruitbody 5-12 mm wide; hymenium flat to cup-shaped, mustard yellow to olivaceous buff; asci cylindrical, inamyloid, 240-280 x 10-14 µm, 8-spored, with croziers; spores ellipsoid, 13.5-20 x 7.5-10.5 µm, Qav. ≈ 1.9; paraphyses tips cylindrical, straight, contents olive-brown and often with a cap of encrustations at the top; on debris and wood of *Acer* and *Fagus*; rare
Aleurina olivaceofusca
Spores 0- or multi-guttulate; spores with lower and evenly distributed warts
3



36. Spores 19-23.5 x 10-14.5 µm. Fruitbody 1-4 mm wide; hymenium flat, mustard yellow to olivaceous buff; asci cylindrical, inamyloid, 195-270 x 14-16.5 µm, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.7, with ± oblong to sinuose warts, mostly multi-guttulate; paraphyses tips cylindrical, straight, contents olive-brown; on moist soil and debris; rare
Aleurina subvirescens
Spores 15.3-17 x 9-10 µm. Fruitbody 3-10 mm wide; hymenium flat to cup-shaped, mustard yellow to olivaceous buff; asci cylindrical, inamyloid, 265-315 x 13.5-14.5 µm, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.7, with ± rounded warts, mostly multiguttulate; paraphyses tips cylindrical, straight, contents olive-brown; on soil; rare
Aleurina tenuiverrucosa



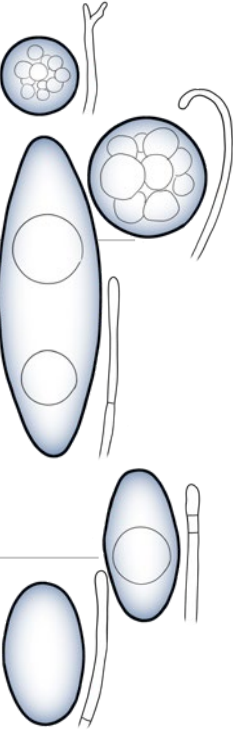
37. With several fruitbodies from a common base
Fruitbodies singular
38

38. Hymenium pinkish
Hymenium ± clay-pink, buffish, brownish, greyish to blackish



39. Spores globose (Q ca. 1-1.1)
Spores subglobose, ellipsoid, cylindrical to spindle-shaped (Q larger than 1.1)

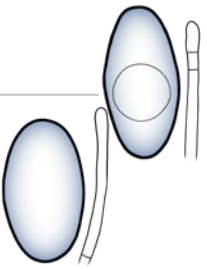
40. Spores 7-9 x 7-9 µm. Fruitbody 5-16 mm wide; hymenium cup-shaped, pinkish; asci cylindrical, inamyloid, 145-215 x 9-11.5 µm, 8-spored, with croziers; spores smooth, multi-guttulate; paraphyses tips cylindrical to branched, straight, contents hyaline; ectomycorrhizal, on soil with *Eucalyptus*; very rare
Kallistoskypha incarnata
Spores 12.5-15 x 12.5-15 µm. Fruitbody 1-5 mm wide; hymenium flat to arched, reddish to pinkish; asci cylindrical, inamyloid, µm, 8-spored, without croziers; spores smooth, multi-guttulate; paraphyses tips cylindrical, coiled to bend, contents orange to red; on soil (Spain)
Pulvinula orichalcea



41. Spores 33-46 x 10-16.5 µm; on soil or dung. Fruitbody 3-10 mm wide; hymenium cup-shaped; asci cylindrical, inamyloid, 385-425 x 14-17 µm, 8-spored, with croziers; spores spindle-shaped, Qav. ≈ 3, smooth, 2-multi-guttulate; paraphyses tips cylindrical, straight, contents red; outside hairs 150-230 µm long, hyaline; rare
Rhodoscypha ovilla
Spores smaller; on burned ground
42



42. Spores 1-2-guttulate, Qav. ca. 2.1; outside often with a white hyphal felt. Fruitbody 3-15 mm wide; hymenium cup-shaped; asci cylindrical, inamyloid, 175-220 x 11-15 µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 16-20 x 7.5-10 µm; paraphyses tips cylindrical, straight; rare or overlooked
Rhodotarzetta euchroa
Spores 0-guttulate, but sometimes multi-guttulate as immature, Qav. ca. 1.8; outside smooth or with very short, multi-celled hairs. Fruitbody 10-20 mm wide; hymenium pinkish; asci cylindrical, inamyloid, 170-195 x 13-16 µm, 8-spored, with croziers; spores ellipsoid, 13.5-17.5 x 7.5-10 µm; paraphyses tips cylindrical, straight; on burned ground; rare or overlooked
Pyropyxis rubra



43. On dung
On soil, debris, wood, burned ground, etc.

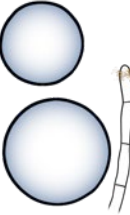
[Pseudombrophila p.p. and Pseudocoprotus]

44

59

44. Spores ± globose (Q ca. 1-1.1)
Spores subglobose, ellipsoide to spindle-shaped

45. Spores 8-10 x 8.5-9.5 µm. Fruitbody 2-6 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 160-200 x 14-17 µm, 8-spored; spores smooth, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of rabbit; rare or overlooked
Pseudombrophila dentata
Spores 10-15.5 x 10-14.5 µm. Fruitbody 2-10 (-18) mm wide; hymenium cup-shaped to flat, ± clay buff; asci cylindrical, inamyloid, 160-220 x 14-18 µm, 8-spored; spores smooth, 0-many-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of herbivores; rare or overlooked
Pseudombrophila bulbifera

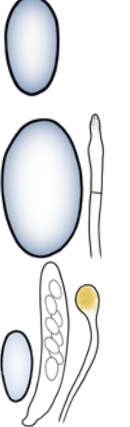


46. Hymenium pale greyish, pale yellowish to pale brownish red
Hymenium ± darker



47. Spores 10-12 x 5-6 µm. Fruitbody 1.5-4 mm wide; hymenium cup-shaped to flat; asci cylindrical, inamyloid, 100-130 x 8-10 µm, 8-spored; spores ellipsoid, Qav. ≈ 2, 0-guttulate; paraphyses tips cylindrical, straight; known from dung of cow and birds; rare or overlooked
Pseudombrophila virginea
Spores 12.5-16.5 x 6.5-8.5 µm. Fruitbody 1-4 mm wide; margin ± smooth, sometimes dark; hymenium cup-shaped to flat, buffish to pale brown; asci cylindrical, inamyloid, 155-180 x 13-15 µm, 8-spored; spores ellipsoid, Qav. ≈ 1.9, 0-guttulate; paraphyses tips cylindrical, straight; known from dung of herbivores and man; rare or overlooked
Pseudombrophila theioleuca





48. Spores on average shorter than 11 µm
Spores on average longer than 11 µm

49. Fruitbodies 200-300 µm wide without a well defined margin; asci opening by a vertical tear
Fruitbodies wider and with a well defines margin; asci opening by a lid

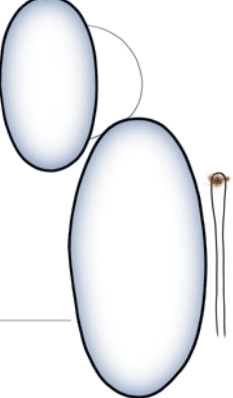
see *Thelebolus microsporus*, Jxx

50. Spores 3.5-5 µm wide, Qav. ca. 2.2. Fruitbody 1-4 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 65-100 x 7-8 µm, 8-spored; spores ellipsoid, 8-10.5 x 3.5-5 µm, 0-guttulate; paraphyses tips club-shaped, straight; known from dung of deer and horse; very rare
Pseudombrophila equina
Spores 6.5-7.5 mm wide, Qav. ca. 1.5. Fruitbody 1.5-5 mm wide; hymenium cup-shaped to flat, pale brown; asci cylindrical, inamyloid, 125-140 x 9-10.5 µm, 8-spored; spores ellipsoid, 9.5-11.5 x 6.5-7.5 µm, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of herbivores and birds; rare or overlooked
Pseudombrophila coprina



51. Spores on average longer than 18 µm
Spores on average shorter than 18 µm

52. Spores 18.5-21 µm long, Qav. ca. 1.8. Fruitbody 0.5-1 mm wide; hymenium cup-shaped to flat, ± vinaceous brown; asci cylindrical, inamyloid, 140-170 x 13-16 µm, 8-spored; spores ellipsoid, 18.5-21 x 10.5-11.5 µm, 0-guttulate; paraphyses tips cylindrical to club-shaped, straight, with encrusting brownish pigment; known from dung of sheep; rare or overlooked
Pseudombrophila fuscolilacina
Spores 22-35 µm long, Qav. ca. 2.3. Fruitbody 1-4 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 170-200 x 19-25 µm, 8-sporeds; spores ellipsoid, 22-35 x 10-15 µm, 0-guttulate; paraphyses tips club-shaped, straight to bend, with encrusting brownish pigment; known from dung of deer, lemming and sheep; rare or overlooked
Pseudombrophila hepatica



53. Spores broadly ellipsoid, Qav. lower than 1.5 54
- Spores ellipsoid, Qav. higher than 1.5 55

54. Paraphyses with clavate, 5-10 µm wide tops. Fruitbody 0.5-3 mm wide; hymenium cup-shaped to flat, ± cinnamon; asci cylindrical, inamyloid, 150-160 x 11-14 µm, 8-spored; spores ellipsoid, 13-16.5 x 10-12 µm, Qav. ≈ 1.3, 0-guttulate; paraphyses tips club-shaped to head-shaped, straight, with encrusting brownish pigment; known from dung to soil of cow, dog and rabbit; rare or overlooked

Pseudombrophila misturæ

Paraphyses with ± cylindrical, 2-5 µm wide tops. Fruitbody 1-3 mm wide; hymenium cup-shaped to flat, dark brown; asci cylindrical, inamyloid, 130-140 x 14-15 µm, 8-spored; spores ellipsoid, 12-16 x 8.5-11 µm, Qav. ≈ 1.4, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of rabbit, hare, mouse, cow, deer and sheep; rare or overlooked

Pseudombrophila leporum

55. Spore Qav. higher than 2.1; fruitbody without a raised, dark or crenulate margin. Fruitbody 1-7 mm wide; hymenium flat, buff yellow, pinkish buff to cinnamon buff; asci cylindrical, inamyloid, 100-140 x 9-11 µm, 8-spored; spores ellipsoid, 11-14 x 5-6.5 µm, Qav. ≈ 2.2, 0-guttulate; paraphyses tips club-shaped to flame-shaped, straight, contents hyaline; outside hairs short, hyaline, of short rows of broad cells with a longer end cell; known from dung of cow; rare *Pseudocoprotus catenipilus*
Spore Qav. lower than 2.1; fruitbody with a raised or dark or crenulate margin 56

56. Asci longer than 200 µm; fruitbodies arising from a sclerotium. Fruitbody 2-28 mm wide; hymenium cup-shaped to flat, dark brown to pale brown; asci cylindrical, inamyloid, 240-300 x 14-16 µm, 8-spored; spores ellipsoid, 13.5-17.5 x 8.5-9.5 µm, Qav. ≈ 1.7, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from old dung of cow, sheep and moose; rare or overlooked

Pseudombrophila ripensis

Asci shorter than 200 µm; without sclerotium 57

57. Spores on average longer than 13 µm. With a crenulate margin; spores on average longer than 15.5 µm. Fruitbody 1.5-3 mm wide; hymenium cup-shaped to flat, dark brown to buffish to pale brown; asci cylindrical, inamyloid, 150-175 x 10-12.5 µm, 8-spored; spores ellipsoid, 14.5-19 x 7-9.5 µm, Qav. ≈ 2, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of cow, deer, moose, goat, horse, rabbit, sheep; rare or overlooked

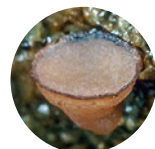
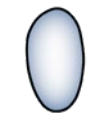
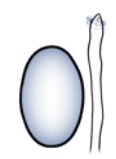
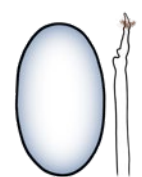
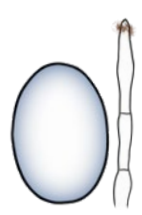
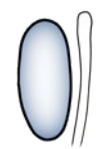
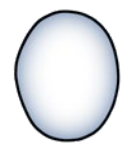
Pseudombrophila cervaria

Spores on average shorter than 13 µm 58

58. Asci 100-125 µm long; fruitbodies growing on a subiculum. Fruitbody 1-5 (-10) mm wide; hymenium cup-shaped to flat, dark brown to pale brown; asci cylindrical, inamyloid, 100-125 x 9-12 µm, 8-spored; spores ellipsoid, 11-12.5 x 7-8 µm, Qav. ≈ 1.6, smooth to very finely warted, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of various animals and from decaying plants; rare or overlooked *Pseudombrophila merdaria*

Asci 140-160 µm long; without a subiculum. Fruitbody 2-10 mm wide; hymenium cup-shaped to flat, dark brown to pale brown; asci cylindrical, inamyloid, 140-160 x 9-13 µm, 8-spored; spores ellipsoid, 11-13 x 6.5-7.5 µm, Qav. ≈ 1.7, smooth, 0-guttulate; paraphyses tips club-shaped, straight, with encrusting brownish pigment; known from dung of pig, dog, deer, cow, horse, moose and goose; rare or overlooked

Pseudombrophila porcina



59. Spores bend, 35-52 µm long, pale brown. Fruitbody 1-4 mm wide; hymenium ± flat, dark brown to blackish; asci club-shaped, inamyloid, 270-300 x 18-24 µm, 8-spored; spores 35-52 x 15.5-23.5 µm, Qav. ≈ 2.2, multi-guttulate; paraphyses tips cylindrical to club-shaped, straight, contents brown; on soil among mosses *Selenaspora guernisacii*
Spores different 60

60. On burned ground 61
Not on burned ground 66

61. Spores on average shorter than 18 µm 62
Spores on average longer than 18 µm 64

62. Hymenium brownish orange (☞☞☞); spores ellipsoid, 11-15 µm long see *Geopyxis delectans*, key Kxx
Hymenium cinnamon buff to yellowish brown (☞☞☞☞☞☞☞☞☞☞); spores ± fusiform 63

63. Fruiting in spring; usually without a stem. Fruitbody 5-25 mm wide; hymenium cup-shaped; asci cylindrical, inamyloid, 220-260 x 10-13 µm, 8-spored, with croziers; spores 13-18.5 x 7-10.5 µm, Qav. ≈ 1.8, 0-guttulate; paraphyses tips club-shaped to cylindrical, straight; on burned ground with conifers; rare or overlooked *Geopyxis majalis*

Fruiting in autumn; with an obvious stem. Fruitbody 3-25 mm wide; hymenium cup-shaped, buffish to pale brown; asci cylindrical, inamyloid, 190-250 x 9-13 µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 12-18 x 6.5-11 µm, Qav. ≈ 1.7, 0-guttulate; paraphyses tips club-shaped, straight; ectomycorrhizal, on burned ground with conifers; rather common *Geopyxis carbonaria*

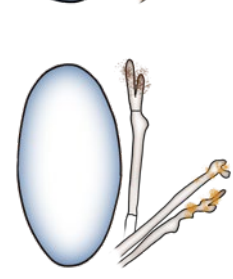
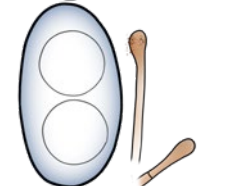
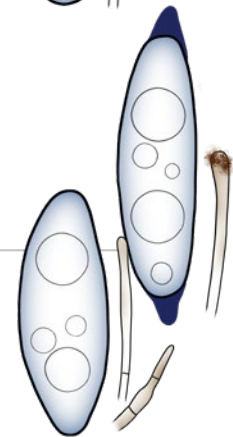
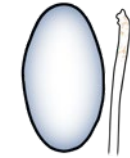
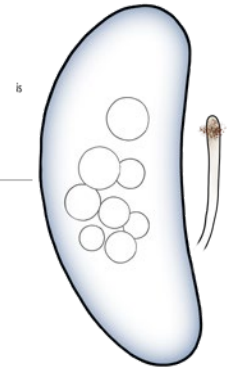
64. Hymenium clay pink to cinnamon (☞☞☞☞☞☞☞☞☞☞) see *Sepultariella*, cpl. xx
Hymenium more dull or darker (☞☞☞☞☞☞☞☞☞☞☞☞☞☞☞☞) 65

65. Fruitbody 20-150 mm wide. Hymenium arched, ± dark brown with a paler margin; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores spindle-shaped, 27-33 x 10-11.5 µm, Qav. ≈ 2.8, multi-guttulate; paraphyses tips club-shaped to flame-shaped, straight; on burned ground with conifers; rather common *Rhizina undulata*
Fruitbody smaller 66

66. Spores 18-23 µm long. Fruitbody 4-12 mm wide; hymenium rather dark brown; asci cylindrical, inamyloid, 300 x 25 µm, 8-spored, with croziers; spores ellipsoid, 18-23 x 10-14 µm, Qav. ≈ 1.7, 1-guttulate; paraphyses tips club-shaped, straight, contents hyaline; outside hairs pale brown; on burned ground; rather common *“Anthracobia” [Trichophaea] subatra*
Spores 25-31 µm long. Fruitbody 2-4 mm wide; hymenium flat to cup-shaped, clay buff to cinnamon; asci cylindrical, inamyloid, 180-290 x 12-25 µm, 8-spored, with croziers; spores spindle-shaped, 25-31 x 9-10 µm, Qav. ≈ 2.9, 2-guttulate; paraphyses tips cylindrical, straight, contents hyaline to brown; outside hairs 40-75 µm long, pale brown to hyaline; saprobic, on burned ground, often close to *Rhizina undulata*; rare or overlooked *Paranthracobia rehmlii*

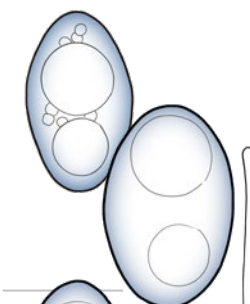
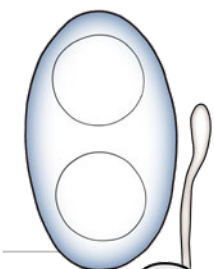
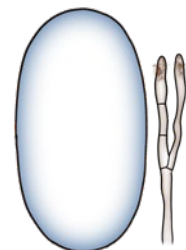
67. Hymenium dark brown to blackish (☞☞☞☞☞☞☞☞☞☞☞☞☞☞☞☞); mostly winter to spring 68
Hymenium paler; in various seasons 78

68. Outside coloured orange by orange hairs. Fruitbody 10-30 mm wide; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores spindle-shaped, 21-25 x 9-12.5 µm, Qav. ≈ 2.1, 0-guttulate; paraphyses tips cylindrical to branched, straight, contents hyaline to brown; outside hairs, with orange encrustation, superficial, with crystals; on soil *Plectania melastoma*
Outside not orange 69



69. Spores globose (Q ca. 1-1.1) [*Pseudoplectania*] . 70
 Spores subglobose, ellipsoide to spindle-shaped 74
70. On *Sphagnum* or soil 71
 On wood 72
71. On *Sphagnum*. Fruitbody 5-20 mm wide; hymenium cup-shaped, blackish to dark brown; with a stem; asci cylindrical, inamyloid, 200-400 x 12-15 µm, 8-spored, without croziers; spores 9.5-13 x 9.5-13 µm, with many small guttules, with or without 1-sided slime-coating; paraphyses tips cylindrical to club-shaped and branched, straight, contents brown; mostly in raised bogs; rare or overlooked *Pseudoplectania epispagnum*
 On soil. Fruitbody 10-30 mm wide; hymenium cup-shaped, blackish; asci cylindrical, inamyloid, µm, 8-spored, without croziers; spores 9-12.5 x 9-12.5 µm, with many small guttules, with 1-sided slime-coating; paraphyses tips ± club-shaped and branched, straight, contents brown; on soil with conifers; common *Pseudoplectania nigrella*
72. On branches of *Erica arborea*. Fruitbody 3.5-10 mm wide; hymenium cup-shaped, blackish to dark brown; asci cylindrical, inamyloid, 250-300 x 11-13 µm, 8-spored, without croziers; spores 11.5-13 x 11.5-13 µm, with many small guttules, with 1-sided slime-coating; paraphyses tips branched to cylindrical, straight, contents brown; very rare *Pseudoplectania ericae*
 On *Abies* 73
73. With 1-sided slime-coating. Fruitbody 15-60 mm wide; hymenium cup-shaped, blackish to dark brown; with a stem; asci cylindrical, inamyloid, 330 x 10-12 µm, 8-spored, without croziers; spores 11.5-12.5 x 11.5-12.5 µm, with many small guttules; paraphyses tips cylindrical, straight, contents brown; very rare *Pseudoplectania melaena*
 With surrounding slime-coating. Fruitbody 10-30 mm wide; hymenium cup-shaped, blackish to dark brown; asci cylindrical, inamyloid, 250-300 x 12-14 µm, 8-spored, without croziers; spores 11-12 x 11-12 µm, with many small guttules; paraphyses tips branched to club-shaped, straight, contents brown; very rare *Pseudoplectania lignicola*
74. Fruitbodies extremely thick-fleshed, water-filled; spores spindle-shaped. Fruitbody 50-120 mm wide; outside with a felt of dark, curly hairs; hymenium rather flat, dark brown to blackish, shiny; with a broad stem; asci cylindrical, inamyloid, 250-500 x 12-15 µm, 8-spored; spores 20-30 x 7-10 µm, Qav. ≈ 2.9, 0-guttulate; paraphyses tips club-shaped, straight; on soil with conifers; rare *Sarcosoma globosum*
 Fruitbodies more leathery or thin-fleshed, not water-filled; spores ellipsoid to cylindrical 75
75. Spores with one large, central guttule see *Helvella* & *Pindara*, p. xxx
 Spores 0-2- to multi-guttulate 76
76. Fruitbodies 5-12 mm wide with a 10-30 mm long, thin stem; spores shorter than 22 µm. Fruitbody 5-12 mm wide; hymenium cup-shaped, blackish; with a stem; asci cylindrical, inamyloid, 300-360 x 8.5-15 µm, 8-spored; spores ± ellipsoid, 14.5-21 x 8.5-11.5 µm, Qav. ≈ 1.8, multi-guttulate; paraphyses tips cylindrical to branched, straight, with brownish encrustations; outside hairs brown; on debris of *Cupressus*; rare *Donadinia lusitanica*
 Fruitbodies wider and with a more robust stem; spores longer than 22 µm 77
77. On deciduous wood. Fruitbody 30-60 mm wide; hymenium cup-shaped, dark brown to blackish; with a stem; asci cylindrical, inamyloid, 8-spored; spores cylindrical to ellipsoid, 25-35 x 12-14 µm, Qav. ≈ 2.5, 0-guttulate; paraphyses tips cylindrical, straight, with brownish encrustations; on wood of *Acer*, *Carpinus*, *Quercus* and *Ulmus*; rare *Urnula craterium*

- On soil. Fruitbody 10-50 (-70) mm wide; hymenium cup-shaped, dark brown to blackish; with a stem; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores cylindrical to ellipsoid, 24.5-30 x 12.5-13.5 µm, Qav. ≈ 2.1, smooth, 0-guttulate; paraphyses tips cylindrical, straight, with brownish encrustations; on soil; rare *Urnula hiemalis*
78. On wood [*Psilopezia*] . 79
 On soil or herbs 81
79. Fruitbodies 3-7 mm wide. Hymenium flat, pale brown to buffish; asci cylindrical, inamyloid, 325-375 x 22-27 µm, 8-spored, with croziers; spores ellipsoid, 28-35 x 15-20 µm, Qav. ≈ 1.8, 2-guttulate; paraphyses tips club-shaped, straight, contents brown; on wet wood; rare *Psilopezia deligata*
 Fruitbodies larger 80
80. Spores 12-14 µm wide. Fruitbody 10-30 mm wide; hymenium flat to arched, buffish to pale brown; asci cylindrical, inamyloid, 400 x 18-22 µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 26-29 x 12-14 µm, Qav. ≈ 2.1, 2-guttulate; paraphyses tips club-shaped, straight, contents brown; on wet wood of *Alnus*, *Fraxinus*, *Picea*, *Populus* and *Salix*; rare *Psilopezia nummularialis*
 Spores 14-20 µm wide. Fruitbody 10-25 mm wide; hymenium flat to arched, pale brown to dark brown; asci cylindrical, inamyloid, 350-450 x 18-23 µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 24-40 x 14.5-20 µm, Qav. ≈ 1.9, 2-guttulate; paraphyses tips club-shaped, straight, contents brown; on wet wood of *Alnus*, *Fraxinus*, *Populus*, *Picea* and *Salix*; rare *Psilopezia nummularia*
81. With a stem [*Tarzetia* p.p. and others] . 82
 Without a stem 90
82. Spores 1-guttulate see *Helvella*, p. xxx
 Spores 2-guttulate 83
83. Paraphyses tops bend or coiled; outside ± smooth see *Otidea propinquata*, Gxx
 Paraphyses tops ± straight, but sometimes branched; outside warty 84
84. Fruitbodies 45-85 mm wide, develops partly underground; spores on average longer than 24 µm. Fruitbody 45-85 mm wide; hymenium cup-shaped, greyish cream; asci cylindrical, inamyloid, 370-400 x 18-20 µm, 8-spored, without croziers; spores ellipsoid, 23-27 x 13-17 µm, Qav. ≈ 1.7, 2-guttulate; paraphyses tips club-shaped, straight, contents hyaline; on soil with *Cedrus* and possibly rarer with *Pinus* and *Pseudotsuga*; rare *Tarzetia insignis*
 Fruitbodies up to 45 mm wide, above ground; spores on average shorter than 24 µm 85
85. Fruitbodies 20-50 mm wide 86
 Fruitbodies 5-20 mm wide 87
86. Paraphyses tops clavate. Fruitbody 20-40 mm wide; hymenium cup-shaped, buffish; with an obvious stem; asci cylindrical, inamyloid, 8-spored, without croziers; spores ellipsoid to spindle-shaped, 20-24 x 10-14 µm, Qav. ≈ 1.8, 2-guttulate; on soil with deciduous trees *Tarzetia catinus*
 Paraphyses tops branched. Fruitbody up to 50 mm wide; hymenium cup-shaped, buffish; only with a short stem; asci cylindrical, inamyloid, 8-spored, without croziers; spores ellipsoid, 21-25 x 11-13.5 µm, Qav. ≈ 1.9, 2-guttulate; on soil with deciduous trees *Tarzetia ochracea*
87. With *Salix* (subalpine-alpine); outside ± smooth. Fruitbody 5-11 mm wide; hymenium cup-shaped, buffish; asci cylindrical, inamyloid, 250-300 x 14-16 µm, 8-spored, without croziers; spores spindle-shaped, 20.5-23 x 11-13.5 µm, Qav. ≈ 1.8, 2-guttulate; paraphyses tips cylindrical to branched, straight; on soil *Tarzetia alpina*
 With other hosts; outside warty 88





88. With *Quercus ilex*; spores 12-13 µm wide. Fruitbody 3-15 mm wide; hymenium cup-shaped, buffish; with a stem; asci cylindrical, inamyloid, 250-300 x 13-18 µm, 8-spored, without croziers; spores ellipsoid, 20-23 x 12-13 µm, Qav. ≈ 1.7, smooth, 2-guttulate; paraphyses tips club-shaped to branched, straight, contents hyaline; on soil
Tarzetta quercus-ilicis
With other trees; spores 13-15 µm wide 89

89. With *Alnus*; spores (21-) 22-25 µm long; paraphyses tips slightly club-shaped to flame-shaped. Fruitbody 2.5-9 (-18) mm wide; hymenium cup-shaped, buffish to whitish; with a stem; asci cylindrical, inamyloid, 280-340 x 14-17 µm, 8-spored, without croziers; spores ellipsoid to spindle-shaped, 22-25 x 13-15 µm, Qav. ≈ 1.7, 2-guttulate; on soil
Tarzetta alnicola
With other deciduous trees; spores 19-22 µm long; paraphyses tips ± branched. Fruitbody 3-15 mm wide; hymenium cup-shaped, buffish; with a stem; asci cylindrical, inamyloid, 180-300 x 13.5-16 µm, 8-spored, without croziers; spores ellipsoid, 19-22 x 13-15 µm, Qav. ≈ 1.5, 2-guttulate; on soil with e.g. *Fagus*, *Quercus* and *Castanea* *Tarzetta cupularis*

90. Hymenium pale mouse grey (☹️); fruitbodies 5-50 (-70) mm wide, cup-shaped with a splitting margin, often halfway buried in the soil; with small, blunt, brown outside hairs [Geopora] . 91
Hymenium clay-pink to ± brownish (☹️); fruitbodies 1-30 mm wide, flat to cup-shaped, mostly with an entire margin, superficial; with or without outside hairs 98

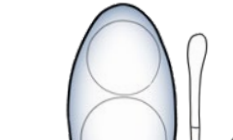
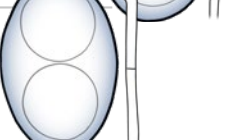
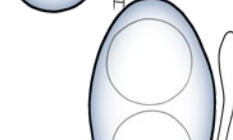
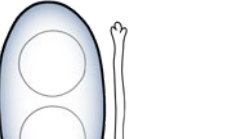
91. With *Cedrus* in spring; spore Qav. ca. 2.2. Fruitbody 20-70 mm wide; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ± spindle-shaped, 26.5-37 x 12.5-16.5 µm, Qav. ≈ 2.2, 2-guttulate; paraphyses tips cylindrical to club-shaped; ectomycorrhizal, on soil
Geopora sumneriana
With other trees or/and in autumn; spore Qav. mostly lower 92

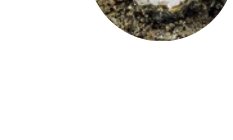
92. Spores with remarkably parallel sides. Fruitbody 20-50 mm wide; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid to cylindrical, 24-30 x 12-16 µm, Qav. ≈ 1.9, 2-guttulate; paraphyses tips cylindrical to club-shaped, straight; ectomycorrhizal, on soil with deciduous trees *Geopora foliacea*
Spores ellipsoid to spindle-shaped 93

93. With conifers. Fruitbody 5-25 mm wide; ; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 24-35 x 13-18 µm, Qav. ≈ 1.9, 1-guttulate; paraphyses tips cylindrical to club-shaped, straight; ectomycorrhizal, on soil *Geopora nicaeensis*
With deciduous trees or orchids 94

94. Fruitbodies 30-60 mm wide; spores 15-18 mm wide. Asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid, 24-28 x 15-18 µm, Qav. ≈ 1.6, 1-guttulate; paraphyses tips cylindrical to club-shaped; ectomycorrhizal, on soil of deciduous trees, e.g. *Populus* and *Salix* *Geopora sepulta*
Fruitbodies 5-30 mm wide; spores less than 15 µm wide 95

95. Fruitbodies only slightly immersed in soil 96
Fruitbodies deeply immersed in soil 97





96. Spores 18-24 x 9.5-12.5 µm, Qav. ≈ 1.9. Fruitbody 5-20 mm wide; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores spindle-shaped to ellipsoid, 1-2-guttulate; paraphyses tips cylindrical to club-shaped, straight; ectomycorrhizal, on soil of deciduous trees
Geopora tenuis
Spores 21-28.5 x 10-13.5 µm, Qav. ≈ 2.1. Fruitbody 5-15 mm wide; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores spindle-shaped, 2-guttulate; ectomycorrhizal, on soil of deciduous trees *Geopora cervina*

97. Spores 20-27.5 µm long with rounded ends. Fruitbody 5-30 mm wide; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores ellipsoid, 20-27.5 x 12-15 µm, Qav. ≈ 1.8, 1-2-guttulate; paraphyses tips cylindrical to club-shaped, straight; ectomycorrhizal, on soil of deciduous trees or *Epipactis* spp.; rather common *Geopora arenicola*
Spores 26-30.5 mm long with rather acute ends. Fruitbody 5-25 mm wide; asci cylindrical, inamyloid, µm, 8-spored, with croziers; spores spindle-shaped, 26-30.5 x 12.5-15 µm, Qav. ≈ 2.1, 1-2-guttulate; paraphyses tips cylindrical to club-shaped, straight; ectomycorrhizal, on soil of deciduous trees; rather common *Geopora arenosa*

98. Spores 11-12.5 µm long see *Pseudombrophila merdaria*, cpl. xx
Spores longer 99

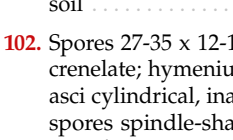
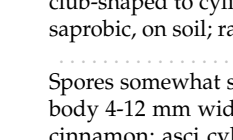
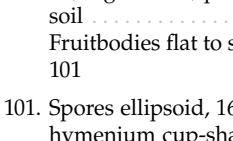
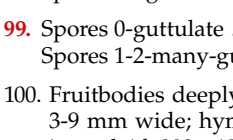
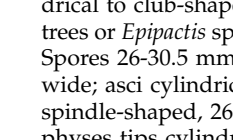
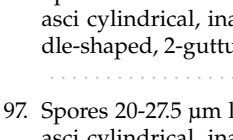
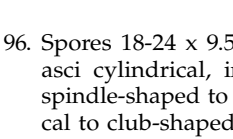
99. Spores 0-guttulate 100
Spores 1-2-many-guttulate (when alive) 102

100. Fruitbodies deeply cup-shaped; spores 14.5-17 x 7-9.5 µm. Fruitbody 3-9 mm wide; hymenium cup-shaped, ± cinnamon; asci cylindrical, inamyloid, 300 x 12 µm, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.9, 0-guttulate; paraphyses tips cylindrical to club-shaped, straight; on soil *Geopyxis alpina* s.l.
Fruitbodies flat to shallowly cup-shaped; spores larger than 16 x 8.5 µm 101

101. Spores ellipsoid, 16-18 x 8.5-10 µm, Qav. ≈ 1.8. Fruitbody 2-5 mm wide; hymenium cup-shaped to flat to arched, ± cinnamon; asci cylindrical, inamyloid, 220-280 x 10-12 µm, 8-spored, with croziers; paraphyses tips club-shaped to cylindrical, straight, with encrusting brownish pigment; saprobic, on soil; rare or overlooked *Pseudombrophila danuviana*
Spores somewhat spindle-shaped, 17.5-22.5 x 9-11.5 µm, Qav. ≈ 2. Fruitbody 4-12 mm wide; hymenium shallowly cup-shaped, pinkish buff to cinnamon; asci cylindrical, inamyloid, 185-220 x 15-17 µm, 8-spored, with croziers; paraphyses tips club-shaped to cylindrical, straight; on soil *Tricharinopsis herinkii*

102. Spores 27-35 x 12-13.5 µm, Qav. ≈ 2.4. Fruitbody 2-4 mm wide, margin crenelate; hymenium flat to cup-shaped, clay-pink to yellowish brown; asci cylindrical, inamyloid, 270-325 x 22-26 µm, 8-spored, with croziers; spores spindle-shaped, multi-guttulate; paraphyses tips club-shaped, straight, contents yellowish; on soil; rare or overlooked *Cupulina montana*
Spores smaller, Qav. lower 103

103. With brown outside hairs 104
Smooth or with white hairs 105



104. Spores 15-20 x 9-11 µm, Qav. ≈ 1.8. Fruitbody 5-25 (-40) mm wide; hymenium flat to cup-shaped, yellowish brown; asci cylindrical, inamyloid, 300-350 x 14-18 µm, 8-spored, with croziers; spores ellipsoid, 2-guttulate; paraphyses tips club-shaped, straight; outside hairs 30-70 µm long, pale brown; on soil; rare or overlooked *Paratracharina poiraultii*
 Spores 23.5-27.5 x 11-13 µm, Qav. ≈ 2.1. Fruitbody 5-20 mm wide; hymenium cup-shaped, yellowish brown; asci cylindrical, inamyloid, 220-280 x 14-19 µm, 8-spored, with croziers; spores ellipsoid, smooth, 1-guttulate; paraphyses tips cylindrical, straight; outside hairs 60-140 µm long, brown; on soil; very rare *Hoffmannoscypha pellita*

105. Spores ellipsoid, Qav. ca. 1.7 106
 Spores ± spindle-shaped, up to 13 µm wide, Qav. 1.7-2 107

106. Spores 16.5-22.5 x 10-13 µm. Fruitbody 1-4 mm wide; hymenium ± flat, orange; asci cylindrical, inamyloid, 160-220 x 14-21 µm, 8-spored, with croziers; spores ellipsoid, Qav. ≈ 1.7, 0-guttulate; paraphyses tips cylindrical, straight, contents hyaline; marginal hairs 70-240 µm long, hyaline; on soil *Cupulina ascophanoides*
 Spores 21-24.5 x 12.5-15 µm. Fruitbody 1-3 mm wide; hymenium cup-shaped, pinkish buff to pale cinnamon; asci cylindrical, inamyloid, 310-360 x 15-17 µm, 8-spored, without croziers; spores, Qav. ca. 1.7, 2-guttulate; paraphyses tips cylindrical, straight; on soil *Tarzettia gregaria*

107. Fruitbodies deeply cup-shaped; hymenium pale mouse grey to pinkish buff (). Fruitbody 4-6 mm wide; asci cylindrical, inamyloid, 260-280 x 12-13 µm, 8-spored, with croziers; spores 22-25 x 12-13 µm, Qav. ≈ 1.9, 2-guttulate; paraphyses tips club-shaped, straight; on soil *Tarzettia sepultarioides*
 Fruitbodies flat to shallowly cup-shaped; hymenium clay pink to cinnamon (). 108

108. Fruitbody 1-4 mm wide; margin without hairs (but lower outside with hyaline 45-700 µm long hyphoid hairs). Hymenium cup-shaped, clay pink to pale brown; asci cylindrical, inamyloid, 210-260 x 14-27 µm, 8-spored, with croziers; spores 20.5-25.5 x 10.5-12 µm, Qav. ≈ 2, 2-guttulate; paraphyses tips cylindrical, bend, contents hyaline; outside hyphae; on soil including burned soil *Sepultariella semi-immersa*
 Fruitbody 3-12 mm wide; margin with 40-180 µm long, thickwalled, hyaline hairs (and outside with hyaline 80-300 µm long hyphae and with up to 40-180 µm long, ± hyphoid hairs). Hymenium cup-shaped to flat, clay pink to yellowish brown; asci cylindrical, inamyloid, 190-250 x 15-22 µm, 8-spored, with croziers; spores 20.5-28 x 9.5-13 µm, Qav. ≈ 2.2, 2-guttulate; paraphyses tips club-shaped, straight, contents hyaline; on soil *Sepultariella patavina*

