

Overview of the keys to the operculate cup fungi

asci amyloid

key A
spores with a dark outer layer

key B
fruitbodies large, initially closed

key C
fruitbodies small, cushion-shaped to turbinate

key D
spores hyaline, globose

key E
spores smooth

key F
spores with an ornament

asci inamyloid

hymenium yellowish, orange to reddish

key G
on mosses

key H
margin with pointed hairs

key I
margin smooth, floccose or with ± hyphoid hairs

hymenium white, cream, buff, brownish, blueish to black

key J
margin with pointed hairs

key K
fruitbodies sliced (Otidea and more)

key L
not sliced

How to . . .

1.

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.
2.

Make a preparation in Cotton Blue to observe possible spore ornaments.
3.

Make a preparation in an iodine reagent to observe possible amyloid reactions of the asci.

Key to groups of operculate, goblet-, cup- to ± discshaped fungi.

1.

Mature spores with a dark violet, dark brown to black outer wall (an epispore) often cracking or breaking into flakes or dark warts on a pale background [Ascobolus & Saccobolus] . . **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 [Sarcosphaera] . . **key B**
Fruitbodies open from the start, mostly smaller 4
4.

Fruitbodies 0.2-3 (-8) mm wide, cushion-shaped to turbinate; hymenium whitish, salmon, pale apricot-orange, clay buff or greyish (); on dung or rotten, moist debris or moist earth [Iodophanus & Thecotheus] . . **key C**
Fruitbodies 1-200 mm wide, mostly cup-shaped and/or hymenium with brighter or darker colours; on a wide range of substrates incl. dung 5
5.

Spores globose **key D**
Spores ellipsoid to spindle-shaped 6
6.

Spores smooth **key E**
Spores with an ornament (x 1000 and coloured in cotton blue) . . **key F**
7.

In association with mosses and liverworts; fruitbodies mostly small and orange **key G**
Not in association with mosses and liverworts; mostly different . . . 8
8.

Hymenium yellowish, orange to reddish () . . . 9
Hymenium white, cream, buff, brownish, blueish to blackish () 10
9.

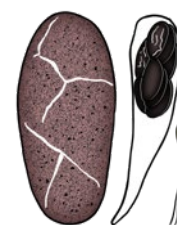
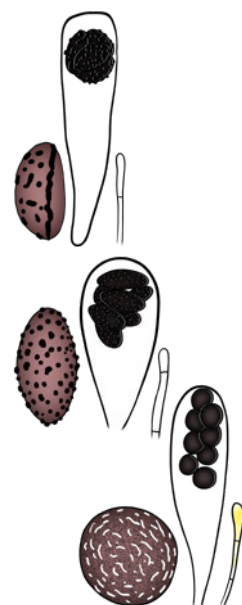
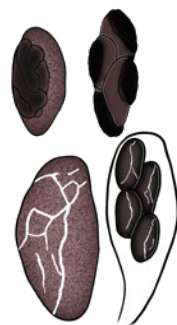
Margin with pointed hairs **key H**
Margin smooth, floccose or with blunt or hyphoid hairs **key I**
10.

Margin with pointed hairs **key J**
Margin smooth, floccose or with blunt or hyphoid hairs 11
11.

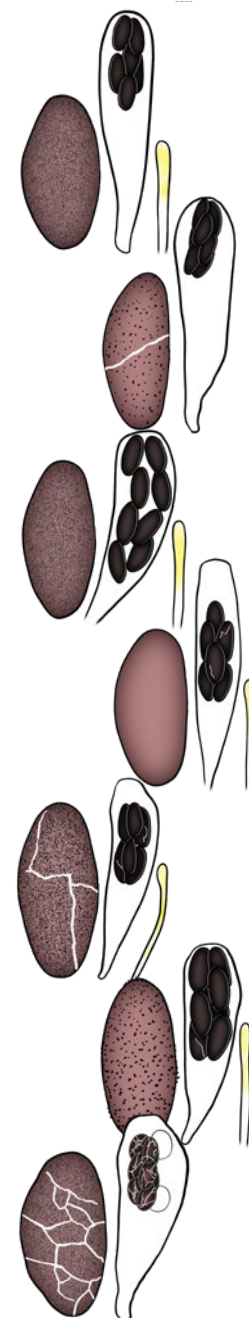
Fruitbodies sliced at one side **key K**
Fruitbodies not sliced at one side **key L**

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, Qm ≈ 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, Qm ≈ 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 **turbinate** 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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 episporium. 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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 episporium 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, Qm ≈ 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*
Episporium warty or with distant plates 15
15. Dark episporium finely warty 16
Dark episporium 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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

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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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, 13-17 x 6-9 µm, Qm ≈ 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, Qm ≈ 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

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, Qm ≈ 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

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, Qm ≈ 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, Qm ≈ 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

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, Qm ≈ 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, Qm ≈ 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 mesh-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, Qm ≈ 2.1, 0-guttulate, slime coat 1- to 2-sided; paraphyses tips club-shaped; saprobic, known from dung of cow; very rare

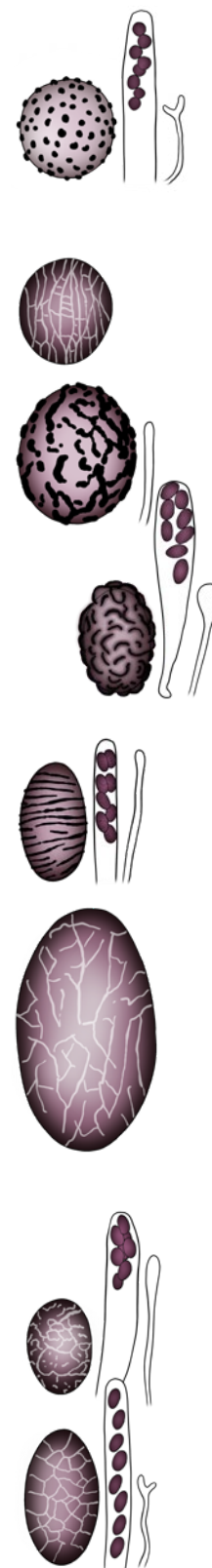
..... *Ascobolus densereticulatus*
Spores shorter 29

29. Spores up to 17 µm long 30
Spores longer than 17 µm 31

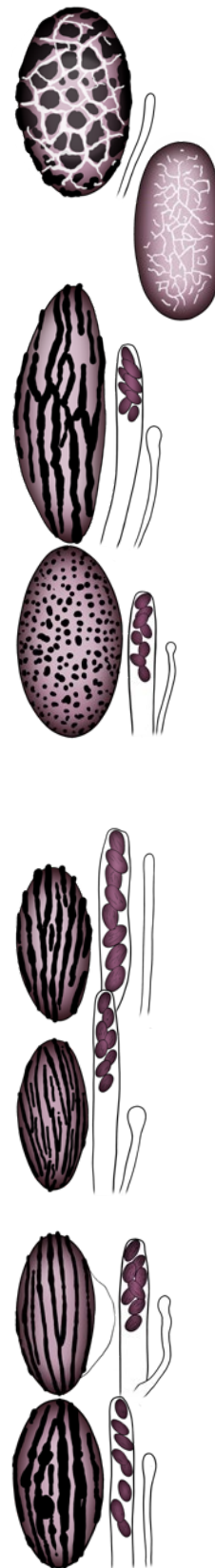
30. Spores 10-12.5 mm long; on burnt ground. Fruitbody 0.4-1.2 mm wide; hymenium flat to arched, dark brown; asci cylindrical to club-shaped, 8-spored; spores spindle-shaped, 10-12.5 x 6.5-7.5 µm, Qm ≈ 1.6, with mesh-like pattern, 0-guttulate, without slime coat; paraphyses tips club- to head-shaped; 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, Qm ≈ 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

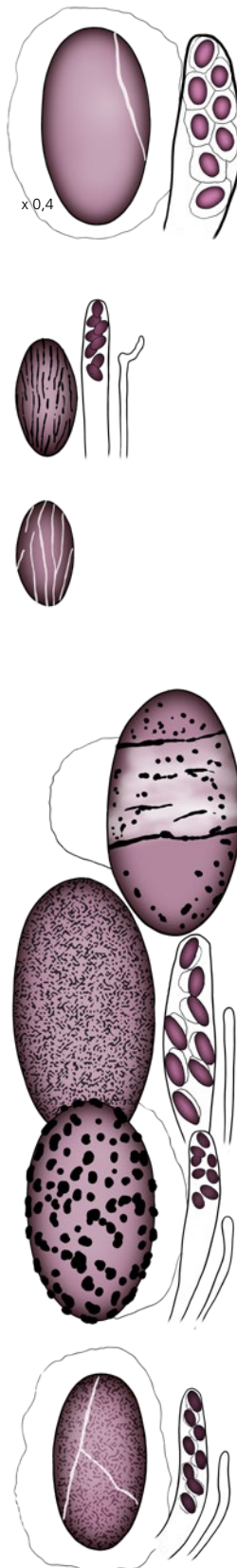
..... *Ascobolus carletonii*



- Ascobolus denudatus*



48. Known from dung of geese. Fruitbody 0.5-1 mm wide; hymenium flat to arched, whitish; asci club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 19.5-23 x 10-11 μm , Qm \approx 2, 0-guttulate, slime coat 2-sided to surrounding; paraphyses tips branched to cylindrical; saprobic, known from dung of geese (pink-footed and barnacle); rare or overlooked *Ascobolus brantophilus*
Known from dung of sheep. Fruitbody 0.2-0.3 mm wide; hymenium



flat to arched, whitish; asci club-shaped, 8-spored; spores ellipsoid to spindle-shaped, 15-21 x 8.5-11.5 µm, Qm ≈ 1.8, with ± rounded warts, 0-guttulate, with surrounding slime coat; paraphyses tips club-to flame-shaped; saprobic, known from dung of sheep; rare or overlooked *Ascobolus hawaiiensis*

49. Paraphyses tips surrounded by colourless (□) mucus; 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, Qm ≈ 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 (■) mucus; fruitbody ± yellowish (■) 50

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, Qm ≈ 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, Qm ≈ 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*

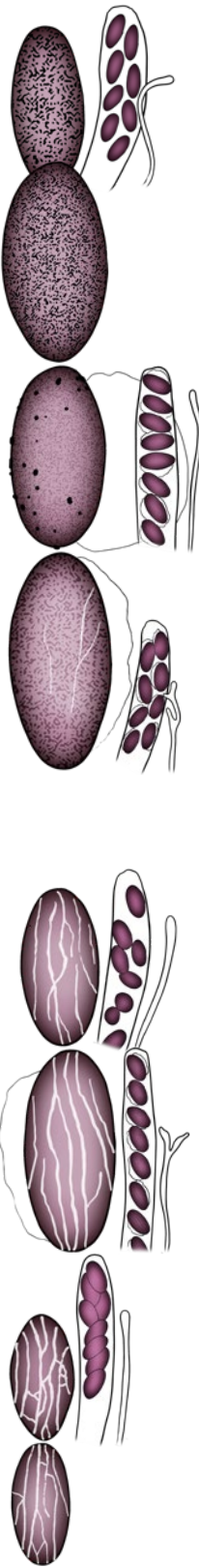
51. Spores on average more than 31 µm long see *Ascobolus degluptus*, cp. xx
Spores shorter 52

52. Young fruitbodies whitish (□); paraphyses tips surrounded by colourless mucus 53
Young fruitbodies yellowish to vinaceous (■); paraphyses tips surrounded by yellowish mucus 54

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, Qm ≈ 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, Qm ≈ 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 55
Spores on average more than 16.5 µm long 56

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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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

57. Spores narrowly spindle-shaped with broad longitudinal ridges 58
Spores more ellipsoid 59

58. Spores with 7-10, narrow longitudinal cracks see *Ascobolus epimyces*, cp. xx
Spores with 4-6 very coarse longitudinal ribs, often also with larger, dark pustules see *Ascobolus hansenii*, cp. xx

59. On debris 60
On dung 62

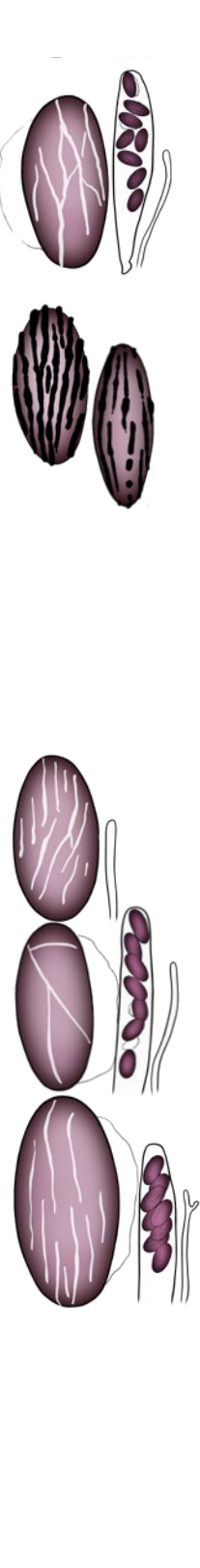
60. Spores 19-29 x 10-13 µm see *Ascobolus furfuraceus*, cp. xx
Spores up to 22 x 11.5 µm 61

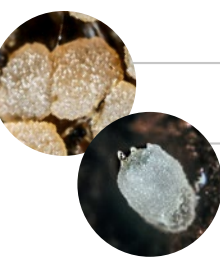

61. Fruitbodies ± stipitate; margin ± downy see *Ascobolus foliicola*, cp. 39xx
Fruitbodies not stipitate; margin ± smooth see *Ascobolus denudatus*, cp. 39xx

62. Spores up to 22 µm long 63
Spores more than 22 µm long 64

63. 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, Qm ≈ 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, Qm ≈ 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*

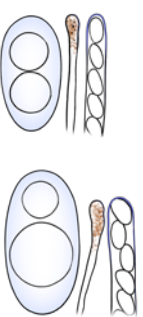
64. Fruitbodies 0.3-0.5 mm wide, ± cushion-shaped see *Ascobolus elegans*, cp. xx
Fruitbodies 1-8 (-10) mm wide, disc- to cup-shaped. Fruitbody 1-8 (-10) mm wide; hymenium flat to cup-shaped, yellowish; asci cylindrical to club-shaped, 8-spored; spores ± ellipsoid, 22-29 x 11-13 µm, Qm ≈ 2.1, longitudinally 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*

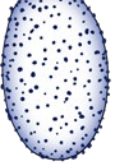

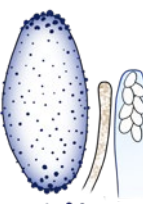
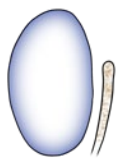




Key B – large, first closed and ± buried (hypogeous), opening in star-like fashion (*Sarcosphaera*).

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 x 6-7.5 µm, Qm ≈ 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 x 6.5-9 µm, Qm ≈ 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 – small amyloid, pale-spored and pale species (*Iodophanus* and *Thecotheus*).

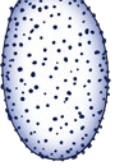

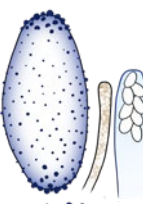
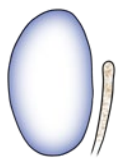
1. Hymenium salmon, pale apricot-orange or clay buff (☞☞☞☞☞); spores rather thin-walled, without slime coating; fruitbody margin with short, blunt hairs (strong lens!) *Iodophanus* . 2 Hymenium white to greyish (☞☞☞☞☞); spores thick-walled, in asci mostly with slime coating; fruitbody margin without hairs *Thecotheus* . 7

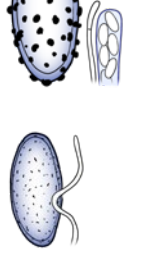
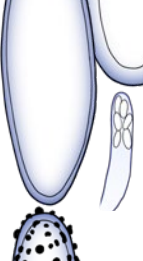
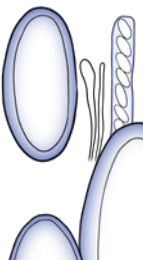

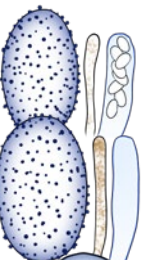
2. Spores completely smooth. Fruitbody 0.5-1 mm wide; hymenium flat to arched, pale pinkish buff; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid, 16.5-23 x 10-12.5 µm, Qm ≈ 1.8, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 1.8, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped to cylindrical, straight, wall smooth, contents hyaline; saprobic; rather common *Iodophanus carneus*¹ Hymenium pale apricot-orange (☞☞☞☞☞); mainly on moist paper, cloth og 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, Qm ≈ 1.5, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, rare or overlooked *Iodophanus testaceus*

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, Qm ≈ 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

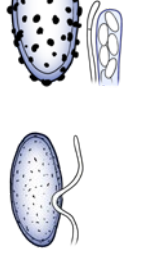
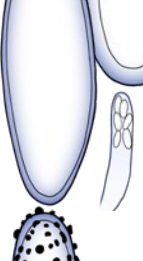
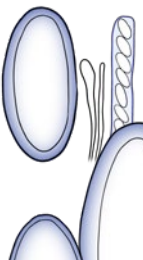

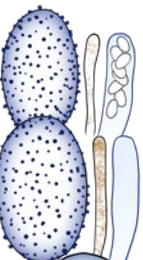
9. Spores smooth . 10 Spores warty . 12

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, Qm ≈ 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, Qm ≈ 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, Qm ≈ 2.4, smooth, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; rare or overlooked *Thecotheus pallens*

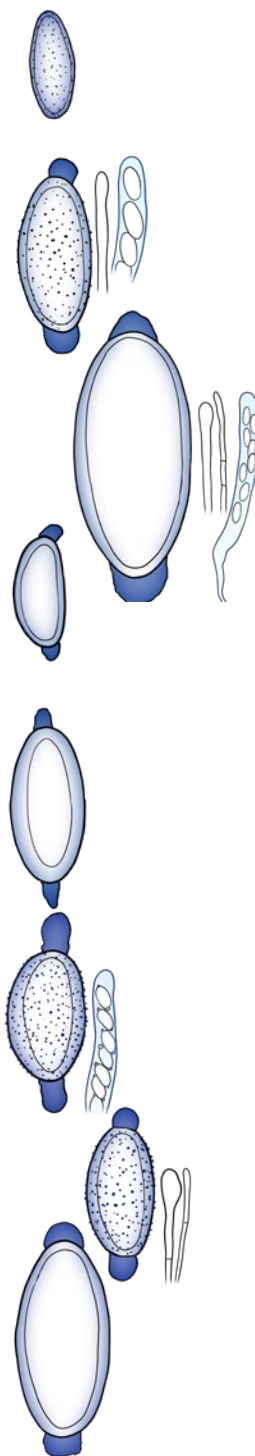
12. Spores 22-26 x 11.5-16 µm; spores with up to 1.2 µm high warts. Fruitbody 0.5-2 mm wide; hymenium flat, whitish to greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores ellipsoid to spindle-shaped, Qm ≈ 1.7, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, 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, Qm ≈ 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 -2.5 mm wide; hymenium flat to cup-shaped, whitish to greyish; asci club-shaped, amyloid in full

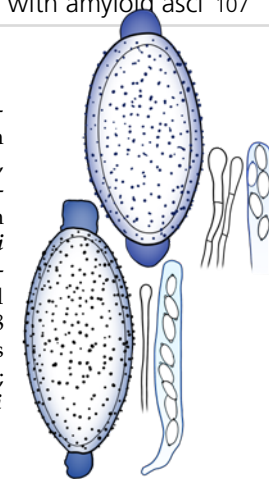


1. This includes *Iodophanus hyperboreus* with 1-guttulate spores and habit on wet sand in arctic-alpine riverbanks (Norway).

- length, 8-spored, with croziers; spores spindle-shaped, 14-16 x 6-7 μm , $Q_m \approx 2.3$, with \pm 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, $Q_m \approx 2.2$, 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; hymenium flat, whitish to pale greyish; asci club-shaped, amyloid in full length, with croziers; spores ellipsoid to spindle-shaped, $Q_m \approx 2.1$, smooth, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; on soil; rare or overlooked *Thecotheus phycophilus*
16. Spores 13-16 μm long. Fruitbody 0.5 mm wide; hymenium flat, pale greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores loaf-shaped, 13-16 x 7-8.5 μm , $Q_m \approx 1.8$, smooth, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; on dung; very rare *Thecotheus inaequilateralis*
Spores longer 17
17. Spores less than 23 μm long 18
Spores more than 23 μm long 20
18. Spores smooth. Fruitbody 5-8 mm wide; hymenium flat, whitish to pale greyish; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores spindle-shaped, 17-21 x 7.5-10 μm , $Q_m \approx 2.1$, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; on dung; rare or overlooked *Thecotheus keithii*
Spores warty (x 1000 + cotton blue) 19
19. Fruitbodies 1-4 mm wide; paraphyses of one type with narrow, 1-2 mm wide, cylindrical tips. Hymenium flat, whitish to pale greyish; asci club-shaped, amyloid in full length, 8-spored, without croziers; spores ellipsoid to loaf-shaped, 16-19 x 7-9 μm , $Q_m \approx 2.1$, with \pm rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline; on dung; rare or overlooked *Thecotheus biocellatus*
Fruitbodies 0.2-1 mm wide; paraphyses of two types with narrow, cylindrical and more broadly club-shaped tips. Hymenium flat, greyish to whitish; asci club-shaped to cylindrical, amyloid in full length, 8-spored, with croziers; spores spindle-shaped to loaf-shaped, 18-20 x 7.5-8.5 μm , $Q_m \approx 2.3$, with \pm rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline; on dung; rare or overlooked *Thecotheus formosanus* f. *collariatus*
20. Spores smooth. Fruitbody 0.5-5 mm wide; hymenium flat, pale greyish; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores spindle-shaped, 25-29 x 12-14 μm , $Q_m \approx 2$, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; on dung; rare or overlooked *Thecotheus neoapiculatus*
Spores warty 21




21. Spores 12.5-14.5 μm wide; hymenium \pm greyish to brownish. Fruitbody 0.2-1.5 mm wide; hymenium flat; asci club-shaped, amyloid in full length, 8-spored, with croziers; spores ellipsoid to spindle-shaped, 25-30 x 12.5-14.5 μm , $Q_m \approx 2$, with \pm rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; on dung; rare or overlooked *Thecotheus lundqvistii*
Spores 13.5-18 μm wide; hymenium whitish to greyish. Fruitbody 0.3-2 mm wide; hymenium flat; asci club-shaped to cylindrical, amyloid in full length, 8-spored, with croziers; spores spindle-shaped, 28-38 x 13.5-18 μm , $Q_m \approx 2$, with \pm rounded warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; on dung; rare or overlooked *Thecotheus holmskjoldii*



Key D – 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] . 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; saprobic [?], 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; saprobic [?], on soil; very rare *Plicariella scabrosa*

7. Spore ornament ± mesh-like 8
Spore ornament spiny 9

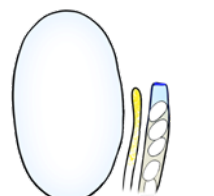
8. Spores 21.5-26.5 µm, with partly connected, 4-6 µm high spines see *Boudiera echinulata*, p. 11
Spores 25-35 µm, with 3-6 µm high crests. Fruitbody 1-4 mm wide; hymenium flat to arched, reddish brown; asci cylindrical, amyloid in full length, 8-spored, with croziers; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera areolata*








9. Spores with 1-4 µm high spines 10
Spores with more than 3-6 µm high spines 11

10. 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 xxx 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 xxx µm high, xxx guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline to bluish; saprobic, on soil; very rare *Boudiera dennisii*

11. 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 with spines, xxx µm high, xxx-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera echinulata*
Spines isolated 12

12. 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, xxx µm high, multi-guttulate; 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, µm high, zxx-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Boudiera tracheia*





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, 15-19 x 9-12 µm, Qm ≈ 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) . . . see *Peziza varia*, key F, cp. 56xx
Spores on average more than 17 µm long; spores absolutely smooth in the light microscope 18

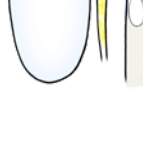
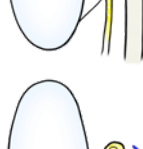
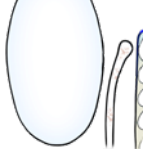
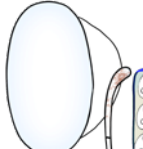
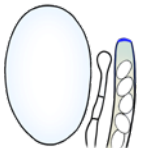
18. On soil and debris 19
On wood, including wood-chips 21







19. Spores 22-24 x 12.5-14.5 µm see *Peziza fimeti*, cp. 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, Qm ≈ 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, Qm ≈ 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-Qm ≈ 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-Qm 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, Qm ≈ 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, Qm ≈ 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*





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 juice 2
Flesh without coloured juice 12

2. Juice bluish 3
Juice whitish to yellowish 6

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, Qm ≈ 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 (☞☞☞☞☞) . 4

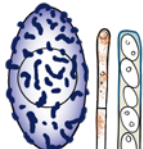
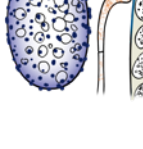
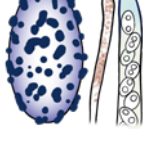

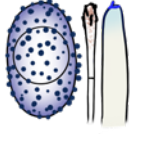

4. Spores with round warts, 1-guttulate. Fruitbody 10-25 mm wide; hymenium cup-shaped, dark brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 13-15 x 9-10 µm, Qm ≈ 1.4; paraphyses tips club-shaped, straight, wall smooth or with goo, contents hyaline; saprobic [?], on soil; apparently rare *Peziza badiofusca*
Spores with oblong to sinuose warts, 1-2-guttulate 5

5. 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, Qm ≈ 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 badiofuscoides* ss. auct.
Hymenium blackish brown (☞☞☞☞). Fruitbody xxx mm wide, with bluish juice; 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, Qm ≈ 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*

6. 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, Qm ≈ 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 7

7. Hymenium yellowish grey, olivaceous buff to honey yellow (☞☞☞☞☞); juice abundant 8
Hymenium reddish brown, greyish brown to vinaceous brown (☞☞☞☞☞☞); juice often scarce, but slowly colouring the flesh 9

8. 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, Qm ≈ 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 \times 8-12 μm , $Q_m \approx 1.8$, with \pm rounded, oblong to sinuose warts; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; ectomycorrhizal, on soil; common

Paragalactinia succosa

9. Outer fruitbody with a gelatinous layer; on moist wood see *Pachyella aquatilis*, cp. xx
Outer fruitbody without a gelatinous layer; on soil 10

10. Asci without croziers. Fruitbody 20-40 mm wide, with yellow juice; hymenium cup-shaped, dark brown; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored; spores ellipsoid, 15-19 \times 8.5-10 μm , $Q_m \approx 1.8$, with \pm 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 11

11. Hymenium dark vinaceous brown to dark greyish brown (■ ■ ■); at rather high altitudes with *Betula* and *Salix*. Fruitbody 7-20 mm wide, with yellow juice; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 15-17 \times 9-10 μm , $Q_m \approx 1.6$, with \pm rounded, oblong to sinuose warts, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline; 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 juice; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top, but without a darker ring, 8-spored, with croziers; spores ellipsoid, 15-18 \times 7-9.5 μm , $Q_m \approx 2$, with \pm round, oblong to sinuose warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; ectomycorrhizal, on soil; rather common

Paragalactinia michelii

12. 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 \times 5-6.5 μm , $Q_m \approx 2$, 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 13

13. Spores 25-30 μm long, spindle-shaped, finely striate; fruitbodies 3-15 mm wide, \pm 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 \times 8-10 μm , $Q_m \approx 3$, mostly 3-guttulate; paraphyses tips club-shaped, straight, wall with goo, contents hyaline to reddish violet; ectomycorrhizal, on soil; rare or overlooked

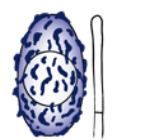
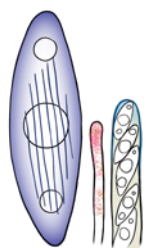
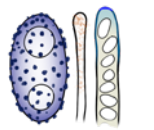
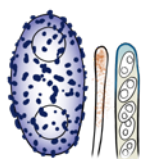
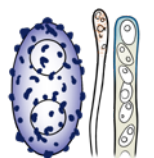
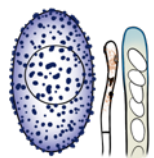
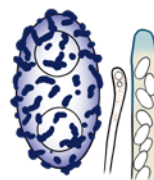
Ionopezia gerardii

Spores different; fruitbodies different 14

14. 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 \times 7.5-10 μm , $Q_m \approx 1.5$, with \pm sinuose warts, 1-2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic, on soil; very rare

Peziza pudicella

Hymenium coloured 15



15. On debris, potting peat and dead stems of larger herbs, often in swamps; fruitbodies 5-20 mm wide, disk mostly \pm flat and \pm cinnamon to clay-buff (■ ■ ■ ■ ■) 16
On other substrates and/or with different shapes or colours 19

16. Fruitbodies obviously stipitate; on potting peat; spores multi-guttulate see *Lepidotia hispida*, E10xx
Fruitbodies \pm sessile; on debris of herbs; spores 0-2-guttulate 17

17. Spores 20-25 \times 10-13 μm , 2-guttulate. Fruitbody 5-10 mm wide; hymenium flat to cup-shaped, pale brown; with a stem; asci cylindrical, amyloid in full length, with dark ring?, 8-spored, with croziers; spores ellipsoid, $Q_m \approx 1.9$; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on herbs; rare or overlooked

Peziza subuliginosa

Spores smaller, 0-guttulate 18

18. 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 \times 8.5-9.5 μm , $Q_m \approx 1.9$, with \pm 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 \times 8-10 μm , $Q_m \approx 1.9$, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic, on herbaceous debris; rare or overlooked

Peziza palustroides

19. At least some spores with a high and obviously aberrant ornament at the ends 20
End ornament similar to body ornament or at most slightly larger, denser or slightly thick-walled 25

20. Spore length on average below 18.5; spores often with several drops 21
Spore length on average above 18.5; spores 0-guttulate 23

21. 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 \times 8-10 μm , $Q_m \approx 1.8$, with \pm rounded warts 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 22

22. 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 \times 8-9 μm , $Q_m \approx 2$, 0 (or many small)-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic; very rare

Phylloscypha badioides

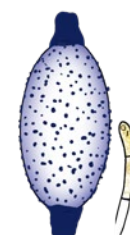
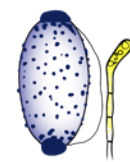
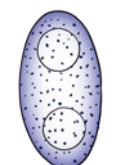
Spores with sinuose warts; fruitbody rather flat, 5-15 mm wide

..... see *Elaiopezia polaripapulata*, cp. 33xx

23. 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 \times 11-13.5 μm , $Q_m \approx 2$, with \pm 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 24



24. 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, Qm ≈ 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, Qm ≈ 2.1, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on wood; very rare . . .

Phaeopezia apiculata

25. On burnt or sterilized soil or charcoal; fruitbodies often rather flat and with a wavy margin . . . 26
Not on burnt or sterilized substrate . . . 30

26. 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, Qm ≈ 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 . . . 27

27. Spore ornament of circular warts or spines . . . 28
Spore ornament of sinuose warts . . . 29

28. 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, Qm ≈ 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, Qm ≈ 2.2, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline to brown; saprobic, on burnt ground; rather common . . .

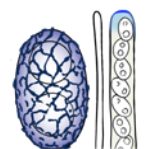
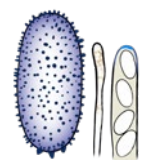
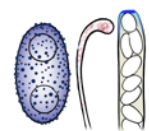
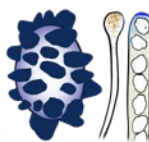
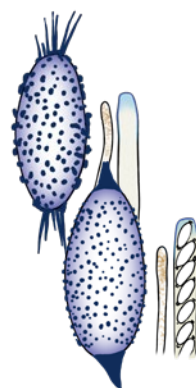
Peziza echinospora

29. 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



30. 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, Qm ≈ 2, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; ectomycorrhizal, on soil; very rare . . .

Iodowynnea auriformis

Spores not longitudinally striate . . . 31

31. Asci ± equally amyloid in full length . . . 32
Asci most strongly amyloid at the top . . . 44

32. Spores 13-16.5 x 7-9 µm, 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, Qm ≈ 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 larger, not multi-guttulate . . . 33

33. 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, Qm ≈ 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 . . . 34

34. Spores 0-guttulate (but possibly with numerous small guttules at the ends); fruitbodies without a gelatinous outer layer; on soil and debris . . . [Phylloscypha p.p.] . . . 35
Spores 1-2-guttulate; fruitbodies often with a gelatinous outer layer; on soil or wood . . . [Adelphella & Pachyella] . . . 38

35. Spores with rather distant, round warts . . . 36
Spores with more confluent, somewhat sinuose warts . . . 37

36. 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, Qm ≈ 1.6, with ± rounded warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on soil; very rare . . .

Phylloscypha labessiana

Spores 17-19.5 mm long; hymenium pale coral to peach (☞☞☞). 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, Qm ≈ 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 . . .

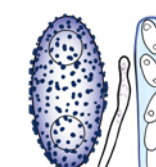
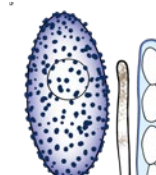
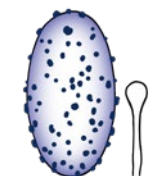
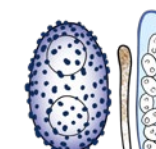
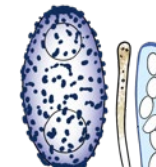
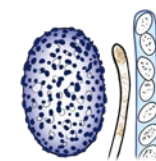
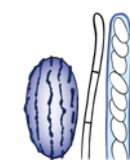
Phylloscypha coquandii

37. Hymenium dark brown with greenish shades (☞☞☞); with smell of geranium. Fruitbody 20-80 mm wide; hymenium cup-shaped; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores spindle-shaped, 19-21 x 8-10 µm, Qm ≈ 2.2, with ± rounded, oblong to sinuose warts, 1-2-guttulate; paraphyses tips club-shaped to cylindrical, straight, wall smooth, contents hyaline to brown; saprobic, on soil to debris; very rare . . .

Phylloscypha phyllogena

Hymenium greyish violet to dark purple-brown (☞☞☞); probably without smell. Fruitbody 15-100 mm wide; hymenium cup-shaped; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 16-20 x 7.5-9.5 µm, Qm ≈ 2.1, with ± rounded, oblong to sinuose warts, 0 (or many small)-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline; saprobic, on soil; rare or overlooked . . .

Phylloscypha boltonii





38. Fruitbodies ± flat, 5-15 mm wide; outer layer with balloone-shaped to globose cells in a gelatinous matrix; asci in dried specimen mostly non-amyloid. Hymenium flat to arched, buff to fawn; asci cylindrical, weakly amyloid in full length, 8-spored, with croziers; spores ellipsoid, 15-21 × 9-13 μm, Qm ≈ 1.6, with very small rounded warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on wood; common *Adelphella babingtonii*

Fruitbodies with an upturned or wavy margin; outer layer mostly with hair-like hyphae or rows of club-shaped cells; asci in dried specimens amyloid 39

39. On soil or debris 40
On wood 41

40. Spores 14-17 × 6-8 μm, with an ornament of irregular spines. Fruitbody 20-50 mm wide; hymenium cup-shaped, fuscous to greyish violet; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid, Qm ≈ 2.2, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Pachyella celtica*

Spores 20-25 × 9-12 μm, with an ornament of very small warts. Spores 9-12 μm wide; spore-Q above 1.95. Fruitbody 5-40 mm wide; hymenium cup-shaped, fuscous to greyish violet; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, Qm ≈ 2.1, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; very rare *Pachyella pseudoampelina*



41. Hymenium cinnamon to orange brown (☞☞☞☞). Fruitbodies 7-25 mm wide; hymenium cup-shaped; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 21-25 × 12-15 μm, Qm ≈ 1.7, with ± rounded warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on wood; very rare *Pachyella punctispora*

Hymenium darker (☞☞☞☞) 42

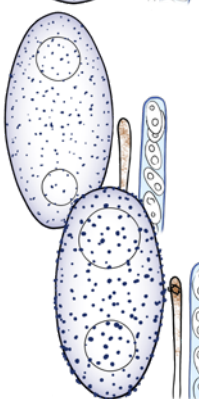
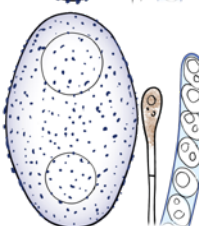
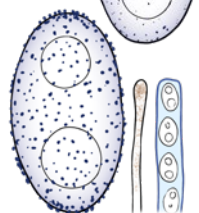
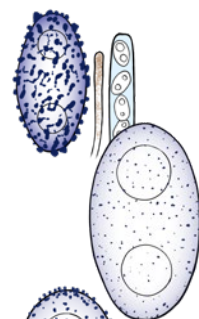
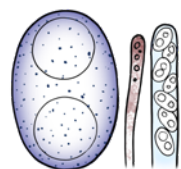
42. Outer layer of loose hyphae/hairs in a gelatinous matri. Spores 12-15 μm wide; spore-Q below 1.95. Fruitbody 10-20 mm wide; hymenium cup-shaped, ± reddish brown; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 22-26.5 × 12.5-15 μm, Qm ≈ 1.7, with ± rounded warts, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on wood; very rare *Pachyella hydrophila*

Outer layer of hyphae forming a palisade in a gelatinous matrix . . . 43

43. Hymenium dark reddish brown (☞☞☞☞); possibly with yellow juice colouring the flesh. Fruitbody 30-80 mm wide; hymenium cup-shaped; asci cylindrical, amyloid in full length, 8-spored, without croziers; spores ellipsoid to spindle-shaped, 22-26 × 12-13 μm, Qm ≈ 1.9, with ± rounded warts, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on wood; very rare *Pachyella aquatilis*

Hymenium ± fuscous (☞☞☞☞); never with yellow juice. Fruitbody 10-50 mm wide; hymenium cup-shaped; asci cylindrical, amyloid in full length, 8-spored, with croziers; spores ellipsoid, 19-27 × 11-13 μm, Qm ≈ 1.9, with ± rounded warts, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo to with epithecium, contents hyaline; saprobic, on wood; very rare *Pachyella violaceonigra*

44. On dung (including faeces or urin soaked substrates) 45
On soil, mortar, debris or wood 47



45. Spores ± spindle-shaped, possibly with slime coating. Fruitbody 5-20 mm wide; hymenium flat to cup-shaped, clay buff; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores 15.5-19 × 7.5-9.5 μm, Qm ≈ 2, with ± rounded warts, 0-guttulate, possibly with double-sided slime coating; paraphyses tips club-shaped to head-shaped, straight to bent, wall smooth, contents hyaline to brown; saprobic, on dung; rare or overlooked *Peziza merdae*

Spores ± ellipsoid, without slime coating 46

46. Spores 6.5-8 μm wide, spore-Q ≈ 2; paraphyses hardly constricted. Fruitbody 10-40 mm wide; hymenium flat to cup-shaped, ± cinnamon; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores 13-16 × 6.5-8 μm ellipsoid, Qm ≈ 2, with ± rounded warts, 0-guttulate; paraphyses tips club-shaped, ± straight, wall smooth, contents hyaline; saprobic, on dung; rare or overlooked *Peziza perdicina*

Spores 8-11 μm wide, spore-Q ≈ 1.6; paraphyses often with constrictions at the septae see *Peziza varia*, cp. 56xx

47. Spores 11-14 μm long 48
Spores longer 50

48. Spores 0-guttulate; often in debris together with *Byssonectria* spp. Fruitbody 5-15 mm wide; hymenium cup-shaped, clay buff to orange brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, Qm ≈ 1.9, with ± slightly oblong to sinuose warts, 0-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents orange; saprobic; very rare *Peziza perparva*

Spores 2-guttulate; ecology different 49

49. Hymenium ± greyish violet; on soil. Fruitbody -30 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 11-13.5 × 7-9 μm, Qm ≈ 1.5, with ± rounded warts, 2-guttulate; paraphyses tips club-shaped, bent, wall smooth, contents brown; saprobic, on soil; very rare *Daleomyces bicolor*

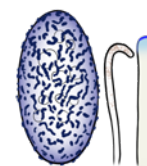
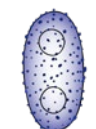
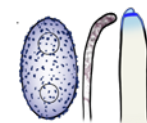
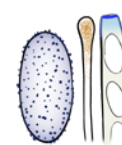
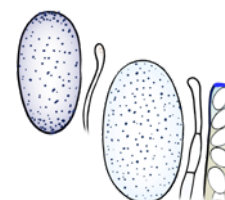
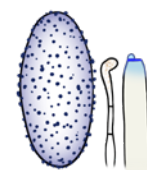
Hymenium ± cinnamon; on mortar in or around buildings. Fruitbody 10-50 mm wide; hymenium cup-shaped; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, 11-14 × 6-8 μm, Qm ≈ 1.7, with ± rounded warts, 2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic; rare or overlooked *Peziza domiciliana*

50. Spores with comma-shaped to sinuose warts 51
Spores with ± round warts or spines 54

51. 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 × 7-8.5 μm, Qm ≈ 2, multi-guttulate; paraphyses tips cylindrical, bent, wall smooth, contents hyaline to brown; saprobic, on soil; very rare *Peziza natrophila*

Spores with a more distant, sinuose ornament, 17-22 μm long; ecology different 52

52. 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, $18-22 \times 8.5-10 \mu\text{m}$, $Q_m \approx 2.1$, 2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline; ectomycorrhizal, on soil; very rare

Legaliana alaskana

Hymenium reddish brown to slightly olive brown () 53

53. Spores with rather short, comma-shaped warts; on rather dry, poor soil. Fruitbody 10-70 mm wide; hymenium cup-shaped, \pm reddish brown; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores ellipsoid, $17-20 \times 8-10 \mu\text{m}$, $Q_m \approx 2$, 2-guttulate; paraphyses tips cylindrical, straight, wall smooth to with goo, contents hyaline; ectomycorrhizal, on soil; rather common. *Legaliana limnaea*
- Spores with almost linear, sinuose warts; on moist soil. Fruitbody 10-100 mm wide; hymenium cup-shaped, reddish brown but often also with greenish shades; asci cylindrical, predominantly amyloid at the top, 8-spored, with croziers; spores spindle-shaped to ellipsoid, $17-20 \times 7-10 \mu\text{m}$, $Q_m \approx 2.1$, 1-2-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents hyaline; ectomycorrhizal, on soil; common. *Legaliana badia*

54. Mature spores 0-(1)-guttulate 55
Spores 2-multi-guttulate 59

55. Fruitbodies 20-110 (-150) mm wide 56
Fruitbodies 5-25 mm wide 57

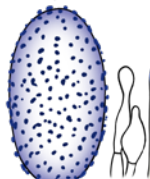
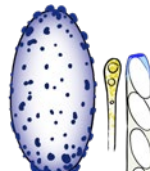
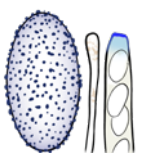
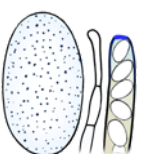
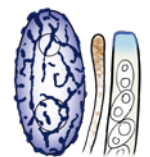
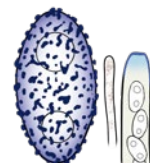
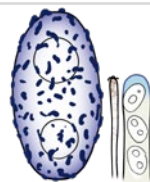
56. Warts very small, only observed at $\times 1000$ in cotton blue. Fruitbody 20-150 mm wide; hymenium cup-shaped, clay buff to cinnamon; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, $14-17.5 \times 8-11 \mu\text{m}$, $Q_m \approx 1.6$, 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, $16-17.5 \times 7.5-10 \mu\text{m}$, $Q_m \approx 1.9$, 0-guttulate, without slime coating; paraphyses tips club-shaped, straight, wall smooth, contents hyaline; saprobic, on soil; rather common. *Peziza arvernensis*

57. 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, $18-20 \times 8.5-9.5 \mu\text{m}$, $Q_m \approx 2.1$, 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 58

58. 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, $17.5-22 \times 10-12.5 \mu\text{m}$, $Q_m \approx 1.7$, 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 brown; asci cylindrical, predominant-



ly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, $19-22 \times 11-12.5 \mu\text{m}$, $Q_m \approx 1.7$, with \pm rounded warts, 0-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline to brown; saprobic, on soil; very rare. *Peziza recedens*

59. Spores multi-guttulate 60
Spores 2-guttulate 62

60. On soil or debris; fruitbodies 5-10 mm wide; spores $14-19 \times 9-11 \mu\text{m}$. Hymenium cup-shaped, \pm fuscous; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored, with croziers; spores ellipsoid, $Q_m \approx 1.6$, 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 $13-16.5 \times 7-9.5 \mu\text{m}$; fruitbodies more than 20 mm wide 61

61. Asci almost amyloid in full length; on coniferous wood
see *Hansenopezia retrocurvata*, cp. xx
Asci only amyloid at the top; on deciduous wood
see *Phylloscypha retrocurvatoides*, cp. xxx

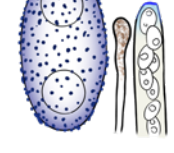
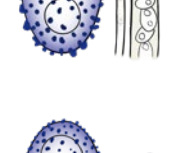
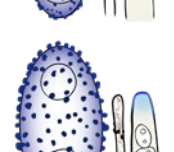
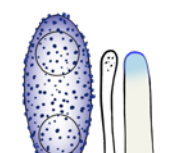
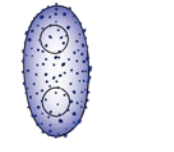
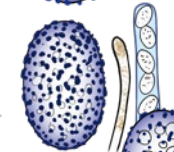
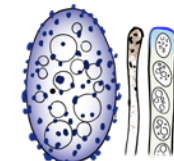
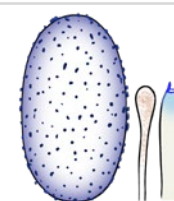
62. Hymenium clay-buff to brown () 63
Hymenium with violet, lilac to wine-red shades () 65

63. 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, $14-16 \times 7-8 \mu\text{m}$, $Q_m \approx 2$, with \pm rounded warts, 2-guttulate; paraphyses tips cylindrical, straight, wall smooth, contents hyaline; saprobic; rare or overlooked. *Peziza domiciliana*⁶
- On soil in nature 64

64. 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, $17-19 \times 10-11 \mu\text{m}$, $Q_m \approx 1.7$, with \pm rounded warts, 2-guttulate; paraphyses tips club-shaped, straight to bent, wall smooth, contents hyaline; saprobic; rare or overlooked. *Malvipezia 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, $17-19 \times 9.5-11 \mu\text{m}$, $Q_m \approx 1.7$, 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*

65. Spores ellipsoide; spore-Q mostly below 1.9 [Daleomyces p.p.] 66
Spores \pm spindle-shaped; spore Q mostly above 1.9 [Malvipezia p.p.] 68

66. 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, without croziers; spores ellipsoid, $16.5-19 \times 9.5-10.5 \mu\text{m}$, $Q_m \approx 1.7$, with \pm rounded warts, 2-guttulate; paraphyses tips club-shaped, bent, wall smooth, contents brown; saprobic, on soil; very rare. *Daleomyces brunneoviolaceus*
- Asci with croziers 67



6. Some authors give smaller spores, e.g. $11-12.5 \times 6-6.5 \mu\text{m}$.



67. Fruitbody with a gelatinous outer layer; mostly cup-shaped. Fruitbody 14-35 mm wide; hymenium greyish violet to vinaceous brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spores; spores ellipsoid, $14.5-19 \times 8-9.5 \mu\text{m}$, $Q_m \approx 1.9$, with \pm rounded warts, 2-guttulate; paraphyses tips club-shaped to head-shaped, straight, wall smooth, contents brown; saprobic, on soil; rare or overlooked

Daleomyces exogelatinosus

Fruitbody without an outer gelatinized layer; quickly flat. Fruitbody 4-20 mm wide; hymenium greyish violet to vinaceous brown; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored; spores ellipsoid, $14-16.5 \times 8.5-9.5 \mu\text{m}$, $Q_m \approx 1.6$, with \pm rounded warts, 2-guttulate; paraphyses tips club-shaped, straight to bent, wall smooth, contents brown to yellowish; saprobic, on soil; very rare

*Daleomyces brunnescens*⁷

68. Spore length on average below $15.5 \mu\text{m}$; spore- $Q_m \approx 1.9$. Fruitbody 15-40 mm wide; hymenium cup-shaped, fawn to greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored; spores ellipsoid to spindle-shaped, $14.5-16 \times 7.5-8.5 \mu\text{m}$, with \pm rounded, up to $0.5 \mu\text{m}$ high warts, 2-multi-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on soil; very rare

Malvipezia violeopallens

Spore length on average above $15.5 \mu\text{m}$ 69

69. Spore ornament of up to $0.5 \mu\text{m}$ high warts. Fruitbody 10-35 mm wide; hymenium cup-shaped, \pm greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored; spores ellipsoid to spindle-shaped, $17-19 \times 9-10 \mu\text{m}$, $Q_m \approx 1.8$, with \pm rounded warts, 2-multi-guttulate; paraphyses tips club-shaped, straight, wall smooth, contents brown; saprobic, on soil; very rare

Malvipezia similis

Spore ornament higher 70

70. Spores less than $18 \mu\text{m}$ long. Fruitbody 30-110 mm wide; hymenium cup-shaped, fawn to greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored; spores ellipsoid, $15-18 \times 7-8.5 \mu\text{m}$, $Q_m \approx 2.1$, with \pm rounded warts, 2-guttulate; paraphyses tips club-shaped, straight to bent, wall smooth, contents brown; saprobic, on soil; rare or overlooked

Malvipezia howsei

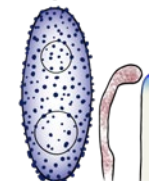
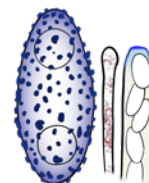
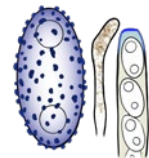
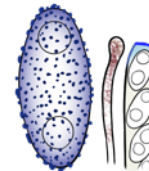
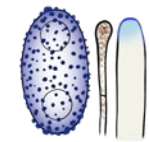
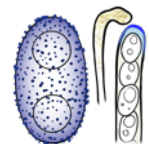
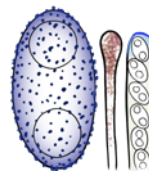
Spores more than $18 \mu\text{m}$ long 71

71. Fruitbodies mostly flat, 5-10 (-25) mm wide. Hymenium cup-shaped to flat, \pm greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored; spores ellipsoid to spindle-shaped, $18-21 \times 8.5-10 \mu\text{m}$, $Q_m \approx 2.1$, with \pm rounded warts, 2-multi-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents orange to brown; saprobic, on soil; very rare

Malvipezia lividula

Fruitbodies mostly cup-shaped, 10-50 mm wide. Hymenium cup-shaped to flat, \pm greyish violet; asci cylindrical, predominantly amyloid at the top and with a darker ring, 8-spored; spores ellipsoid to spindle-shaped, $18-21 \times 8.5-10 \mu\text{m}$, $Q_m \approx 2.1$, with \pm rounded warts, 2-multi-guttulate; paraphyses tips club-shaped, straight, wall smooth to with goo, contents orange to brown; saprobic, on soil; very rare

Malvipezia pseudohowsei



7. *Geoscypha montana*, known from the Alps, is very similar.