

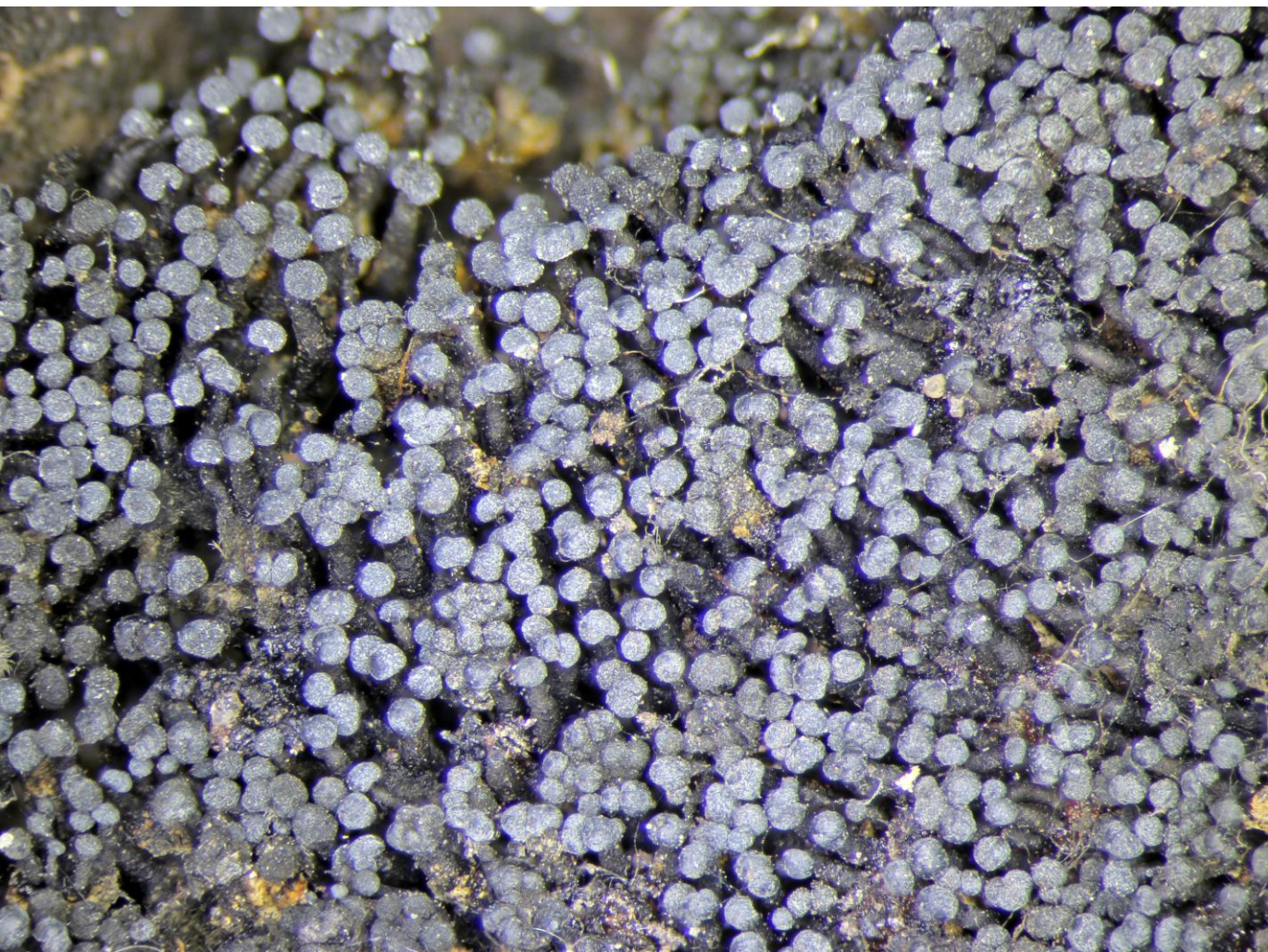
Revisions of British and Irish Lichens



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Mycocaliciales: Sphinctrinaceae

Cover image: *Chaenothecopsis caespitosa* in a rain track on bark of *Taxus baccata*, Writtle, S. Essex.

Revisions of British and Irish Lichens is a free-to-access serial publication under the auspices of the British Lichen Society, that charts changes in our understanding of the lichens and lichenicolous fungi of Great Britain and Ireland. Each volume will be devoted to a particular family (or group of families), and will include descriptions, keys, habitat and distribution data for all the species included. The maps are based on information from the BLS Lichen Database, that also includes data from the historical Mapping Scheme and the *Lichen Ireland* database. However, these are not comprehensive and there are many further records that have not yet been digitized. The choice of subject for each volume will depend on the extent of changes in classification for the families concerned, and the number of newly recognized species since previous treatments.

To date, accounts of lichens from our region have been published in book form. However, the time taken to compile new printed editions of the entire lichen biota of Britain and Ireland is extensive, and many parts are out-of-date even as they are published. Issuing updates as a serial electronic publication means that important changes in understanding of our lichens can be made available with a shorter delay. The accounts may also be compiled at intervals into complete printed accounts, as new editions of the *Lichens of Great Britain and Ireland*.

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Mycocaliciales: Sphinctrinaceae

including *Chaenothecopsis*, *Mycocalicium*, *Phaeocalicium*, *Sphinctrina* and *Stenocybe*.

by

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MYCOCALICIALES Tibell & Wedin (2000)

The order was considered to contain two families, the Mycocaliciaceae and Sphinctrinaceae, but recent molecular data (Thiyagaraja *et al.* 2022, Beimforde *et al.* 2023) suggest that they should be combined under the earlier name, Sphinctrinaceae. The description has been adapted from Tibell & Wedin (2000). The Microcaliciaceae is similar in morphological terms, but sequence data show it to have affinities to the Pertusariales (Beimforde *et al.* 2020, Prieto *et al.* 2013) so it will be dealt with elsewhere.

SPHINCTRINACEAE M. Choisy (1950)

Thallus absent, though sometimes loosely associated with algal colonies. **Apothecia** stalked or sessile, the head discoid to globose or obovoid. **Exciple** at least in part sclerotized, blackish brown, the margin sometimes thickened or constricted, hyphae of the stalk periclinally or irregularly arranged. **Hamathecium** absent or poorly developed. **Asci** cylindrical, formed singly from ascogenous hyphae with croziers with a single functional wall layer, discharging actively and without a mazaedium, or passively to form a mazaedial mass. **Ascospores** ellipsoidal or spherical to cuboid, aseptate or transversely 1- to 7-septate, the wall dark brown, smooth or with an ornamentation formed within the plasmalemma. **Anamorphs**: conidiomata pycnidia when present, sometimes formed on long branched stalks, hyphomycetous morphs may be found in culture. **Chemistry**: vulpinic acid derivatives occur in a few species, unidentified pigments rather common. **Ecology**: parasites or commensals on lichens, or saprotrophs.

Five genera occur in Britain and Ireland. The family appears to be monophyletic, but major revision is needed at genus level (e.g. Tuovila *et al.* 2014, Beimforde *et al.* 2023).

Literature:

Beimforde *et al.* (2020, 2023), Stordeur *et al.* (2010), Tibell & Wedin (2000), Tuovila *et al.* (2014, 2020), Van Dort & Horvers (2021).

- | | |
|------|--|
| 1 | Ascospores multiseptate at maturity; on liverworts or bark of living trees <i>Stenocybe</i>
Ascospores aseptate or at least predominantly 1-septate at maturity..... 2 |
| 2(1) | Ascomata strongly constricted around the rim, appearing flask-shaped; asci evanescent,
the spores aggregated into a mazaedium; lichenicolous <i>Sphinctrina</i>
Ascomata not strongly constricted around the rim; asci persistent, mazaedium not present;
ecology varied 3 |
| 3(2) | Ascus apices penetrated by a canal, visible at least in semi-mature stages; asci mostly
< 55 µm long <i>Chaenothecopsis</i>
Asci strongly and uniformly thickened at the apex 4 |
| 4(3) | Ascospores aseptate, sometimes laterally flattened (elliptical in transverse section); asci
< 45 µm long; on wood (more rarely on bark) <i>Mycocalicium</i>
Ascospores septate, round in transverse section; asci > 65 µm long; on living twigs
and small branches of deciduous trees (especially <i>Populus</i>) <i>Phaeocalicium</i> |

CHAENOTHECOPSIS Vain. (1927)

Thallus usually indistinct or absent, ± loosely associated with algal colonies, lichenicolous or saprotrophic. **Photobionts**, when present, chlorococcoid or *Trentepohlia*. **Ascomata** apothecia, short- to long-stalked, black or with the stalk pale below; head obovoid to lens-shaped. **Exciple** of a few rows of periclinally arranged or interwoven hyphae; stalk ± colourless in the central part, usually brown, reddish or greenish in the outer part; hyphae periclinally to irregularly arranged. **Hamathecium** absent in most species. **Asci** 8-spored, ± cylindrical, with a thickened apex penetrated by a narrow canal; persisting until ascospores mature. **Ascospores** aseptate or 1-septate, ellipsoidal to cylindrical- or fusiform-ellipsoidal, brown; septum colourless to dark brown; surface smooth to minutely warted; not aggregated into a dry spore-mass. **Anamorphs** pycnidia, walls of outwardly pointed cells (*Asterophoma* species), amongst the spore-masses of host Caliciales, or sometimes borne on long, branched stalks. **Conidiogenous cells** narrowly ampulliform to subcylindrical, arising singly, acrogenous. **Conidia** rod-shaped to cylindrical-ellipsoidal, aseptate, colourless. **Chemistry**: no secondary substances detected but head and stalk with various pigments that change colour with application of K or N (HNO₃). **Ecology**: encompassing saprotrophic, parasitic and parasymbiotic taxa. Most are associated with the dry bark or wood of old, hollowed or dead trees but can also be found on squamules of *Cladonia* spp. and *Hypocenomyce scalaris*, rotting wood, polypores and under rock overhangs.

Distinguished from *Calicium*, *Chaenotheca* and *Microcalicium* by the ascospores not forming a dry spore-mass. *Mycocalicium*, *Phaeocalicium* and *Stenocybe* differ in having a uniformly thickened ascus apex, while the last two genera have longer asci and larger ascospores. In the field, a note of the host species may be helpful (e.g. on *Calicium/Cladonia*) while attention to pigmentation and specific colour changes with reagents can assist identification in the laboratory. The species of *Chaenothecopsis* are generally difficult to identify and the genus awaits a thorough revision.

The genus is clearly polyphyletic (Beimforde *et al.* 2023), and there is some evidence that species associated with resinous exudates occupy different clades from the mycoparasitic taxa. Several unidentified species are referred to here as species 1 to 3 and many additional specimens await critical study.

Literature:

Beimforde *et al.* (2023), Giavarini & Coppins (2009), Selva & Tuovila (2017), Temu *et al.* (2019), Tibell & Titov (1995), Titov & Tibell (1993), Tuovila *et al.* (2011, 2014).

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	Apothecial head in squash K– (yellow pigment absent).....	species 1
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	Ascospores dark green-brown; asci to 40 µm long; on <i>Trentepohlia</i> -containing lichens	australis
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Ascospores $6-7.5 \mu\text{m}$, medium brown, septum as dark as the spore wall; stem with
intertwined hyphae that swell in K..... *tasmanica*

Chaenothecopsis australis Tibell (1998)

NE

Apothecia (0.15–) 0.2–0.5 mm high, not pruinose. Head lenticular, 0.1–0.3 mm diam., shining black. Stalk 0.04–0.06 mm diam., shining black but typically paler at the base in GBI material, in the central part consisting of pale greenish, irregularly to largely periclinally arranged hyphae, the outermost part forming a dark brownish cover of sclerotized hyphae; epithecium thin, aeruginose in section; hypothecium green, K+ slightly yellow in places; exciple of periclinally arranged, brownish-aeruginose, short cylindrical cells. Asci $34-40 \times 3.3-3.7 \mu\text{m}$, cylindrical, with the apex strongly thickened and penetrated by a broad canal. Ascospores (5.5–) $6-7 \times 2.5-3.5 \mu\text{m}$, aseptate, dark green-brown, smooth-walled, with rounded ends. All parts of the apothecia K– and N–. **BLS 2917.**

Parasitic on *Dendrographa decolorans* and *Lecanactis abietina*, on dry bark of old *Quercus* in mostly oceanic woods, rare. S.W. England from Hampshire (New Forest) to Cornwall, also in Wales and N. Ireland.

Similar to *C. savonica*, but parasitic on *Trentepohlia*-containing lichens, with darker spores and longer asci.

Chaenothecopsis caespitosa (W. Phillips) D. Hawksw. (1980)

NT

Apothecia in effuse masses of compact tufts, 1.2–4 mm tall, black; heads 0.18–0.38 mm diam., hemispherical to lens-shaped, dark grey to black, sometimes pruinose; the stalk very robust, 0.12–0.25 mm diam. near the base, sometimes branched, cylindrical to distinctly tapering, similarly coloured to the head. Hamathecium of paraphyses, 1–1.5 μm diam. Asci $65-85 \times 5-6 \mu\text{m}$, narrowly cylindrical, the apex thickened and with an internal canal to ca 3 μm in length, 8-spored. Ascospores arranged uniseriately, (7.5–) $9-12 (-14) \times 3-4.5 \mu\text{m}$, cylindrical-ellipsoidal to \pm

cylindrical, mostly 1-septate but with occasional aseptate spores within the same asci as 1-septate spores, not constricted at the septa, thick-walled, smooth to slightly rough, without a perisporium. **BLS 1938.**

On bark of *Taxus*, especially in wound tracks and areas of decay, recorded once from a decaying polypore; rare but probably overlooked. S. and C. England (Buckinghamshire, Gloucestershire, Herefordshire, Kent, Nottinghamshire, Surrey), Scotland (Selkirk).

Not associated with algae. Easily distinguished by its large robust apothecia that arise in tufts, and unlikely to be congeneric with the type of *Chaenothecopsis*. The presence of paraphyses is not typical of the genus, but has been reported for other resinicolous species (e.g. Tuovila *et al.* 2014).

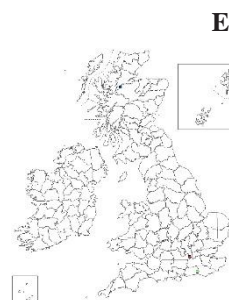


Chaenothecopsis debilis (Sm.) Tibell (1975)

Apothecia 0.7–1.2 mm tall, black; heads 0.2–0.4 mm diam., lenticular, occasionally with white cottony hyphae on the lower side; stalk 0.04–0.1 mm diam.; epithecium and exciple reddish brown, K–, N–; hypothecium brownish or with a greenish tinge, N± slightly intensifying reddish brown; stalk pale wine-red, K± purplish red, N+ violet-red. Ascospores 7–9 × 2.5–3 µm, 1-septate, medium brown, sometimes constricted at the septum; septum distinct, of about the same thickness as the spore wall; surface smooth or minutely cracked. Pycnidia sometimes present, black, globose or elongate parallel to the wood grain. Conidia 3–6 × ca 1 µm, distinctly curved. **BLS 0778.**

Long thought to be extinct [hence the conservation evaluation], with a historical record on dry, weathered timber of a building from S. England (Sussex). However, it has recently been rediscovered on old oak lignum in Berkshire (Windsor Great Park).

Usually not associated with algae. Distinguished from *C. pusilla* by the internal pigmentation, and darker ascospore septum.

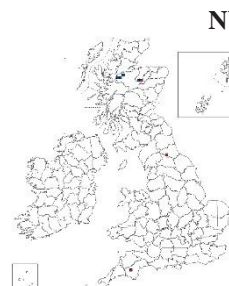


Chaenothecopsis epithallina Tibell (1975)

Apothecia 0.7–1 mm tall, entirely black or with the stalk brown below; heads 0.2–0.3 mm diam., lenticular; stalk 0.05–0.07 mm diam.; epithecium thin, brown; hypothecium aeruginose or brownish, K–, all parts N–. Ascospores 6–8 × 2–2.5 µm, 1-septate, ellipsoidal, medium brown, smooth; septum of the same thickness as the spore wall. **BLS 1939.**

On thalli of *Chaenotheca trichialis* (containing *Stichococcus*) on decorticate trees in native pinewoods, parasitic; local. N. Scotland, also England (Devon, Durham).

C. vainioana has more slender apothecia and longer spores. *C. viridireagens* has a reddish, K+ green pigment.

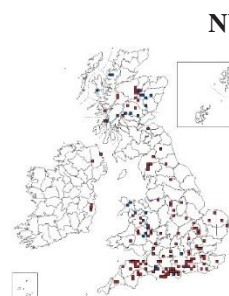


Chaenothecopsis nigra Tibell (1987)

Apothecia 0.7–1.1 mm tall, black; heads 0.18–0.30 mm diam., lenticular to hemispherical; stalk 0.04–0.08 mm diam., the outermost part dark brown, with periclinally arranged hyphae, stem hyphae not swelling in K; exciple poorly developed; epithecium and hymenium brown, K–, N–; hypothecium and stalk greenish brown to dark brown, K– or dulling, N–. Ascospores 5–6 × 1.5–2.0 µm, pale greyish brown, smooth, 1-septate, the septum markedly darker than the spore wall. **BLS 1831.**

Usually on poorly lichenized or deteriorating algal crusts on lignum; local. Associated with *Stichococcus*, on wood of *Pinus*, *Alnus*, *Betula*, *Corylus* and *Quercus*. Throughout Britain (apparently rare in N. England), also N. and E. Ireland.

Easily distinguished by its small pale grey-brown ascospores with more darkly pigmented septa. *C. tasmanica* is similar but this has longer ascospores (6–7.5 µm) which are darker brown, with darkened cell walls and the stalk has irregularly intertwined hyphae.



Chaenothecopsis parasitaster (Bagl. & Carestia) D. Hawksw. (1978)

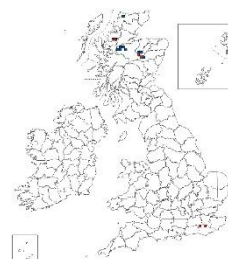
Apothecia 0.34–0.7 mm tall, black; head 0.12–0.24 mm diam.; stalk 0.04–0.075 mm diam.; epithecium and hymenium reddish brown; stalk greenish; all parts K–, N–. Ascospores (5–) 6–9.5 (–14) × 2.3–3 (–3.5) µm, 1-

Nb

septate; septum brown but thinner than the spore wall; surface minutely warted. **BLS 1515**.

On *Cladonia digitata*, *C. macilenta* and *C. polydactyla*, parasitic (infected parts are discoloured brownish), on dry sides of large stumps and peaty overhangs in pinewoods; rare. N. Scotland, England (E. Sussex). Also on squamules of *Hypocomyce scalaris* (Rothiemurchus pinewood).

Placed into synonymy with *Chaenothecopsis pusilla* by Tibell (1999a) and Groner (2006), but it was suggested that *C. pusilla* is a species complex so the two taxa are kept separate for the present.



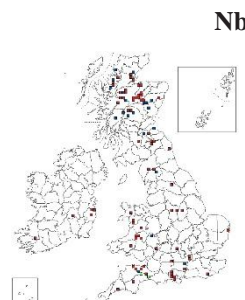
Chaenothecopsis pusilla (Ach.) A.F.W. Schmidt (1970)

Apothecia 0.5–0.9 mm tall, black or more usually with the stalk greenish or grey-brown below, not pruinose or occasionally ± white-pruinose; head 0.2–0.3 mm diam., lenticular; epithecium thin, greenish to brown; hypothecium pale or greenish to brownish; stalk 0.04–0.08 mm diam.; internally dull greenish or brownish, swelling in K, K–, N–. Ascospores 6–7 × 2–2.5 μm, 1-septate, medium brown, septum thin, much paler than the spore wall; surface ± smooth. **BLS 1931**.

On wood of various trees (e.g. *Alnus*, *Betula*, *Castanea*, *Quercus*, *Pinus*); associated with globose-celled algae, sometimes apparently parasitic on *Calicium glaucellum*. Scattered throughout Britain, a few records from S. Ireland.

This is probably an aggregate of a number of species, the true identity of which is still to be confirmed. Of other GBI taxa, *C. debilis* has septa the same thickness as the spore wall, *C. savonica* has lighter coloured, aseptate spores, and *C. vainioana* has more slender apothecia with longer spores.

Some unidentified collections are like *C. pusilla* but have entirely black stalks and are associated with *Stichococcus*. They have been found on wood of *Alnus* and *Pinus* in S. England and Scotland (C. & E. Highlands).

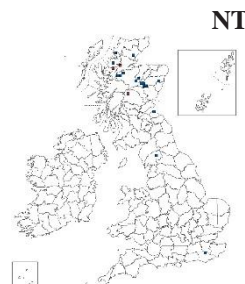


Chaenothecopsis pusiola (Ach.) Vain. (1927)

Apothecia 0.3–0.5 mm tall, black or rarely with the stalk brown below; head 0.15–0.22 mm diam., lenticular to hemispherical; stalk 0.04–0.1 mm diam.; epithecium thin, brown; hypothecium colourless to yellowish brown; exciple well-developed; internally all parts with diffuse, yellow pigment, K+ red (dissolving). Ascospores 6–7 × 2.0–2.5 μm, 1-septate, the septum colourless or weakly pigmented and much thinner than the spore wall, the surface smooth. **BLS 0351**.

On wood of *Pinus* (rarely *Betula*), usually on thalli of *Chaenotheca brunneola*, sometimes associated with *Stichococcus*, mostly in native pinewoods; local. England (Cumbria, Sussex), throughout Scotland but mainly in the Highlands.

The K+ red reaction is distinctive (though rapidly dissipating), and shared by *C. rubescens* that has aseptate spores.

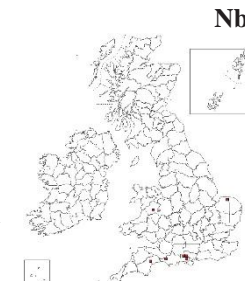


Chaenothecopsis retinens (Nyl.) Tibell (1991)

Apothecia 0.1–0.25 mm tall, solitary, black; head 0.12–0.20 mm diam.; stalk 0.08–0.11 mm tall, immersed in the host thallus; exciple dark yellowish red, epithecium reddish brown, stalk in section red; all parts K–, N–. Ascospores 7–11 × 2.3–3.5 μm, 1-septate, minutely warted, septum of similar thickness as the spore wall. **BLS 1396**.

On thalli of *Sporodophoron cretaceum* on *Quercus*; rare. S. England (Devon, Dorset, Somerset, Hampshire, Norfolk), Wales (Montgomery), Channel Is (Jersey).

Characterized by very short stalks that are almost completely immersed in the host thallus, the red epithecium, exciple and stalk and rather large, 1-septate ascospores. Known also from *Inoderma byssaceum* in Sweden.



Chaenothecopsis rubescens Vain. (1927)

Apothecia 0.4–0.7 mm tall, black; head 0.1–0.3 mm diam., lenticular; epithecium thin, medium brown; hypothecium colourless to yellowish brown; exciple dark yellowish brown; stalk 0.04–0.07 mm diam., internal part of apothecium and stalk with yellowish-red pigment, all K+ persistent red. Spores aseptate, 7.0–9.0 × 3.0–3.5 μm, allantoid to ellipsoidal with a minute but distinct surface ornamentation. **BLS 1940**.

Nb

Associated with *Trentepohlia*; rare. A single collection from England (Buckinghamshire, on bark of *Quercus*).

The combination of aseptate spores and persistent K+ red pigment is diagnostic for GBI species, though these characters are shared with the non-British *C. hospitans*, a parasite on *Glaucomaria carpinea* and *Haematomma ochroleucum* (Tibell 1999a).

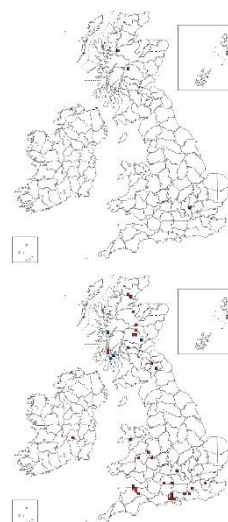
Chaenothecopsis savonica (Räsänen) Tibell (1984)

NT

Apothecia 0.4–0.8 mm tall, black or with a slight greenish hue, not pruinose; head 0.1–0.3 mm diam., globose to lenticular; epithecium thin, aeruginose to brownish, hypothecium similarly pigmented; stalk 0.03–0.07 mm diam., noticeably paler than the head, greenish to brown, internally pale or reddish brown, K–, N–, or partly aeruginose (K+ dull brownish, N± green intensifying). Asci to 35 µm long. Ascospores 5–7 × 2–2.5 µm, aseptate, pale green, ellipsoidal with rounded ends, the surface minutely warted. Small black conidiomata are sometimes present, the conidia 2–3.5 × ca 1 µm, colourless, truncate below. **BLS 1832.**

Loosely associated with *Stichococcus* on bark or lignum of old *Quercus* and other acid-barked trees; S. England and Wales, scattered throughout Scotland, rarely seen in Ireland. Elsewhere, considered to be a parasite of *Chaenotheca* or found with free-living colonies of algae on both coniferous and deciduous trees (Tibell 1999a).

C. pusilla differs in possessing darker brown, 1-septate spores. Similar species with aseptate spores are found parasitising *Trentepohlia*-containing lichens, see *Chaenothecopsis australis* and *Chaenothecopsis* species 1.



Chaenothecopsis subparoica (Nyl.) Tibell (1995)

Apothecia 0.2–0.3 mm tall, solitary to densely grouped, short-stalked, black, not pruinose; head 0.2–0.3 mm diam., hemispherical to lenticular; exciple aeruginose; epithecium dark brown; hypothecium pale yellowish brown; stalk 0.06–0.08 mm diam.; all parts K–. Ascospores 7–8 × 2.5–4 µm, 1-septate with a minute surface ornamentation, the septum distinct, of similar thickness to the spore wall. **BLS 2313.**

On *Haematomma ochroleucum* on shaded rock in a gorge; known from a single site in England (S. Northumberland).

The non-British *C. hospitans* may occur on the same host, but that has a transient K+ reaction and aseptate ascospores.



Chaenothecopsis tasmanica Tibell (1985)

NE

Apothecia 0.5–0.7 mm tall, black; head 0.2–0.3 mm diam., lenticular to hemispherical; epithecium reddish brown, hypothecium pale to medium brown; stalk 0.04–0.07 mm diam., black to brown, shining, outer hyphae interwoven and reddish to greenish brown sclerotized, stem hyphae swelling in K. Epithecium, hypothecium and stalk K+ yellowish to reddish brown. Ascospores 6–7.5 × 2–3 µm, 1-septate, medium brown, ellipsoidal, the septum dark as or slightly darker than the spore walls. **BLS 2916.**

On dry *Quercus* bark, and on wood of decorticate or hollowed trunks of *Pinus*, *Alnus* and *Quercus* in Scotland (Highlands). Elsewhere, it additionally has been recorded as a parasite of *Chaenotheca* (Tibell 1998).

Similar to *C. nigra* in its dark septate spores, but has shorter ascospores (5–6 µm in length) which are pale grey-brown, with the cell walls distinctly paler than the septa and the stalk has periclinally arranged hyphae.

Chaenothecopsis tigillarlis (Berk. & Broome) D. Hawksw. (2014)

NE

Apothecia 0.15–0.2 mm tall, scattered over the hymenophore surface of the host basidiomata, black, somewhat glossy, not pruinose; head ca 0.2 mm diam., hemispherical; exciple dark brown; epithecium brown; hypothecium dark brown; all parts K–. Ascospores (4.5–) 6–7 × (1.5–) 2–2.5 (–3) µm, narrowly ellipsoidal, pale brown, 1-septate, the septum slightly darker in pigmentation compared with the spore wall, with a helical verruculose ornamentation evident at high magnification. **BLS 2639.**

On basidiomata of *Perenniporia meridionalis* on oak beams inside a church, England (Northamptonshire). Not refound since its original publication in 1865, and considered by Hawksworth *et al.* (2014) as a probable introduction that did not establish permanently.

Hawksworth *et al.* (2014) noted that the ascus structure in the type material was poorly preserved, and considered that this species might be appropriately placed in *Mycocalicium*. That option was discounted due to the helical

spore ornamentation, but this type is atypical of *Chaenothecopsis* also. The species name is not linked nomenclaturally with *Calicium* (*Cyphelium*) *tigillare* (Ach.) Pers.

Chaenothecopsis vainioana (Nádv.) Tibell (1979)

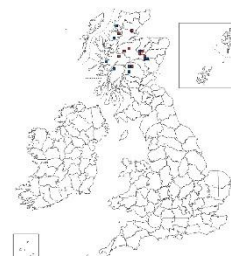
Apothecia 0.4–0.6 mm tall, black or with the stalk dark brown (to partly colourless); head 0.2–0.3 mm diam., broadly obovoid; stalk 0.04–0.07 mm diam.; exciple and outer part of stalk brown; epithecium brown; hymenium and hypothecium aeruginose; all parts K+ yellowish brown, N–, the outermost part of the stalk N+ red-brown (intensifying). Ascospores 8–10 × 2.5–3.5 μm, 1-septate, medium brown, smooth, the septum distinct, paler than the spore wall. **BLS 1833.**

Associated with *Trentepohlia* or *Trentepohlia*-containing lichens (*Arthonia leucopellaea*, *Lecanactis abietina*), on bark or more rarely on wood of *Pinus* and *Ilex*; local. Scotland (Highlands).

C. epithallina and *C. pusilla* are similar but have generally more robust apothecia, shorter ascospores, and are not associated with *Trentepohlia*.

Three further species, as yet unidentified, are associated with *Trentepohlia*; see *Chaenothecopsis* species 1 to 3. *Chaenothecopsis* species 1 and 2 have aseptate spores, *Chaenothecopsis* species 3 has 1-septate brown spores but with a dark septum and the hymenium and hypothecium are reddish brown and K–.

NT



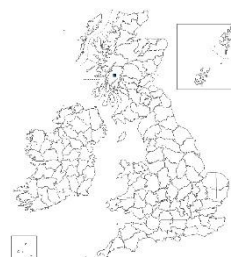
Chaenothecopsis viridialba (Kremp.) A.F.W. Schmidt (1970)

Apothecia 1.1–1.8 mm tall, black; head 0.2–0.3 mm diam., initially lenticular but becoming hemispherical and irregular; exciple poorly developed; epithecium thin, brownish; hypothecium pale but yellowish brown below; stalk to 0.06–0.09 mm diam., appearing white-pruinose to whitish granular; hypothecium and stalk reddish brown, K+ aeruginose. Ascospores 7–9 × 3–4 μm, aseptate, medium to dark brown, minutely ornamented. **BLS 1941.**

Apparently not associated with algae, on the decorticated part of a *Quercus* trunk by a stream; possibly saprotrophic or on *Chaenotheca* spp.; rare. S.W. Scotland (Argyll).

Distinctive for the long pale ascomatal stalks, the aseptate spores and the K+ aeruginose reaction.

Nb



Chaenothecopsis viridireagens (Nádv.) A.F.W. Schmidt (1970)

Apothecia 0.6–1.4 mm tall, black; head 0.1–0.3 mm diam., hemispherical to subglobose; stalk 0.04–0.07 mm diam., the upper part often with a reddish tinge; inner stalk hyphae pale, strongly swollen; epithecium and stalk mainly brown or olive-brown, but stalk sometimes reddish in parts; hypothecium brown-red or orange-red; reddish parts with K+ persistently olive-green pigment. Ascospores 5–7 × 1.5–2.5 μm, 1-septate; septum weakly pigmented, paler than the spore wall. Stalked pycnidia may be present, with minute conidia. **BLS 1942.**

On thalli of *Chaenotheca stemonea* and *C. trichialis* (both with a *Stichococcus* photobiont), parasitic, on wood; rare. N.W. England, E. Scotland.

C. epithallina is also a *Chaenotheca* parasite, but lacks the reddish, K+ green pigment.

NT



Chaenothecopsis species 1

Apothecia 0.45–1.0 mm tall, black, head 0.2–0.3 mm diam; stalk 0.04–0.05 mm diam., brown, K+ darkening; hypothecium brown-green, K+ darkening. Asci 35–45 × ca 4 μm. Ascospores 5.5–8.5 × 2–4 μm, aseptate, brown.

Parasitic on *Arthonia vinosa*, on dry bark and lignum on broadleaved trees, mainly old *Alnus* and *Quercus*, in sub-oceanic woods, rare. Eastern Scotland. Differs from *Chaenothecopsis rubescens*, also parasitic on *Trentepohlia*-containing lichens and with large aseptate spores, in the lack of a K+ persistent red pigment.

Chaenothecopsis species 2

Apothecia 0.5–0.6 mm tall, black and shiny, head 0.2–0.3 mm diam.; stalk 0.04–0.05 mm diam., internally dark brown with a pale narrow core, also paler at the base; hypothecium reddish brown, exciple dark brown, K–. Asci 35–43 × 3–4 μm. Ascospores 5.5–7 (–10) × (2–) 2.5–3 μm, 1-septate, brown with dark septa, variable in size with

a few long narrow spores.

Parasitic on *Trentepohlia*-containing lichens (*Arthonia arthonioides*), on rocks and rarely old *Quercus* [and *Pinus*?], rare. N. Ireland & N. England, Scottish Highlands. A collection with darkly septate ascospores, ca 5–6.3 × 2 µm in size, and growing on *Opegrapha vulgata* on old *Quercus* in S.E. England, may also belong to this taxon. Not a good match to any published species. *C. lecanactidis*, parasitic on *Lecanactis abietina* in Chile is similar but the stalk is much paler internally (Tibell 1998).

MYCOCALICIUM Vain. (1890)

Thallus pale, but **photobiont** absent. **Ascomata** apothecia; upper part obovoid to lenticular, stalked; stalk consisting of parallel hyphae, dark brown to blue-green. **Exciple** ± well-developed, of dark brown, angular pseudoparenchymatous cells or of radiating hyphae. **Hamathecium** of paraphyses, unbranched or sparsely branched; the apices forming an epithelial layer over the hymenium. **Asci** cylindrical, formed singly from ascogenous hyphae with croziers, with a strongly and uniformly thickened apex (without an internal canal), with a single functional wall layer, persisting until maturity of ascospores. **Ascospores** aseptate, uniseriately arranged in the asci, not actively released but a mazaedium does not usually develop, dark brown. **Conidiomata** pycnidia (in one species campylidium-like), pyriform to spherical, black and sclerotized. **Conidia** pale brown, slightly curved or ± globose with filiform appendages. **Chemistry**: vulpinic and pinastric acids in some species. **Ecology**: saprotrophic on woody substrata or lichenicolous, not lichenized.

Similar to *Chaenothecopsis* but ascomata tend to be somewhat stouter and the asci have a uniformly thickened apex, without an internal canal. The genus appears to be monophyletic, but nests within *Chaenothecopsis* s.l. (Beimforde *et al.* 2023, Ertz *et al.* 2023). Only one species is known from our region.

Literature:

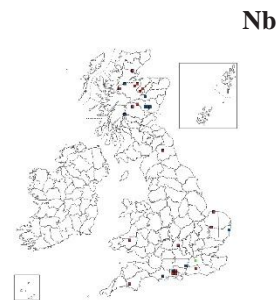
Ertz *et al.* (2023), Purvis & Giavarini (2009), Tibell (1990, 1999b).

Mycocalicium subtile (Pers.) Szatala (1925)

Lignum whitened by an apparent thallus. Apothecia 0.4–0.8 mm tall, dark brown to black, stalk shiny black or dull; head 0.16–0.32 mm diam., obconical to lenticular; exciple variable in structure, poorly to very well-developed; hypothecium dark brown; stalk 0.05–0.08 mm diam., not pruinose, K– or K+ slightly reddish brown. Asci with a strongly and uniformly thickened apex, without an internal canal. Ascospores (5.5–) 7–9 × (2.3–) 3.5–4 µm, aseptate, ellipsoidal to broadly subfusiform, smooth or with a minutely warted surface ornamentation. Pycnidia frequent, ovoid to globose with a distinct neck, black. Conidia 4–5 × 1–1.5 µm, ± curved. Lichen substances not detected by TLC. **BLS 1428**.

On dry acid wood and bark, mostly *Quercus* and *Pinus*, typically an early pioneer on standing dead wood, appearing before *Chaenothecopsis* spp. Scattered throughout Britain; apparently commoner in S. England and the Scottish Highlands, but certainly under-recorded.

Very variable, but characterized by the dark greenish to brownish stalk tissue. Easily confused with *Chaenothecopsis* spp. in which the ascus apex is penetrated by a narrow canal and the aseptate spores are larger than those of *Chaenothecopsis* spp. with similar spores. In the field the combination of whitened lignum, frequent ovoid to globose black pycnidia and the stalked apothecia is quite distinct.



PHAEOCALICIUM Alb. Schmidt (1970)

Thallus absent. **Photobiont** absent. **Ascomata** apothecia, stalked, black to brown-black; head obovoid to lenticular or strongly compressed. **Exciple** well-developed, persistent, consisting of dark brown periclinally arranged hyphae. **Asci** cylindrical, formed singly from ascogenous hyphae with croziers, with a single wall layer, the apex strongly and uniformly thickened, deliquescing after the ascospores mature. **Ascospores** not aggregated into a dry spore mass (mazaedium), uniseriately arranged, aseptate or 1-septate, ellipsoidal with rounded apices, dark brown, smooth or warted. **Conidiomata** not known. **Ecology**: mainly on the decaying twigs and branches of trees and shrubs, the species are usually confined to one genus of host plants. One species occurs on polypore fungi. **Chemistry**: lichen products not detected by TLC, some species with pigments that change colour upon addition of K or N.

Close in phylogenetic terms (e.g. Ertz *et al.* 2023) to *Stenocybe*, which has longer, (1-) 3- or more septate ascospores and apparently a similar nutritional status. The lignicolous *Mycocalicium subtile* has aseptate, somewhat fusiform ascospores. *Chaenothecopsis* has smaller ascospores and an ascus apex penetrated by a narrow canal. In addition to the two species included below there is a single collection of an un-named *Phaeocalicium* sp. on *Alnus* (Outer Hebrides) and another on *Sorbus* (Argyll). The genus appears to be more diverse in Scandinavia (see Tibell 1999c), but species are inconspicuous and may well have been overlooked.

Literature:

Aguirre-Hudson & Spooner (2019), Ertz *et al.* (2023), Giavarini & Purvis (2009a), Ladd & Morse (2022), Tibell (1996, 1999c).

- 1 Ascospores 1-septate; apothecial stalk K+ reddish *populneum*
Ascospores aseptate; apothecial stalk K+ blue-green *praeceadens*

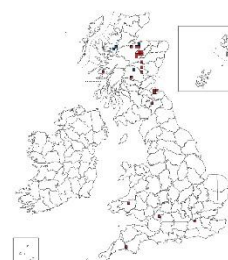
Phaeocalicium populneum (Brond. ex Duby) A.F.W. Schmidt (1970)

Apothecia 0.4–0.7 mm tall, not flattened laterally, black- or olivaceous brown; head 0.2–0.3 mm diam., lenticular, not pruinose; epithecium brown to reddish brown; hypothecium colourless; stalk 0.04–0.06 mm diam., the outer part consisting of colourless, swollen hyphae, inner part K+ reddish brown, surrounded by a thick gelatinous coat. Ascospores 12–13 × 4–5 μm, medium brown, 1-septate, the septum weakly pigmented and formed tardily, smooth-walled. **BLS 0019**.

On *Populus* twigs and branches, especially within bark lenticels; rare. England (Devon, Gloucestershire, Surrey), Wales (Carmarthen), N. & C. Scotland. Old Irish records require confirmation.

P. praeceadens differs in the aseptate ascospores, K+ blue-green reaction of the stalk and taller apothecia. British specimens reported as *Phaeocalicium (Stenocybe) tremulicola* belong here.

Nb



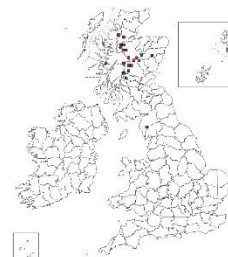
Phaeocalicium praeceadens (Nyl.) A.F.W. Schmidt (1970)

Apothecia 0.6–0.9 mm tall, dark greyish to black, not pruinose; head 0.2–0.3 mm diam., lenticular; exciple brown with an aeruginose inner part; epithecium brown; hypothecium medium brown, sometimes tinged yellowish or aeruginose; stalk 0.04–0.07 mm diam., black, internally reddish brown, K+ aeruginose, usually without a gelatinous coat. Ascospores 11–13 × 4–5 μm, aseptate, smooth. **BLS 1312**.

On thin, living *Populus tremula* twigs and branches, especially within bark lenticels; rare, N. & C. Scotland (E. & W. Inverness, S. Aberdeen, Perth), England (Cumbria).

P. populneum differs in the 1-septate ascospores, K+ reddish reaction of the stalk and shorter apothecia.

Nb



SPHINCTRINA Fr. (1828)

Thallus absent, or rarely developing an autonomous thallus. **Ascomata** apothecia, sessile to stalked, black, without pruina; head globose to ovoid, often vase-shaped. **Exciple** well-developed, constricted at the margin, consisting of dark brown to reddish brown or in part pale, \pm periclinally arranged and interwoven hyphae; central part of stalk pale, outermost part dark brown or reddish brown. **Hamathecium** of paraphyses, often well-developed, branched and anastomosing. **Asci** cylindrical, formed singly from ascogenous hyphae with croziers, with a single functional wall layer, K/I–, disintegrating at a rather late stage; (4-) 8-spored. **Ascospores** globose to ellipsoidal, aseptate, uniseriately arranged in asci; wall thick, dark brown with a gelatinous coat (when semi-mature); mature spores smooth or ornamented with ridges or verrucae, accumulating in a black spore mass. **Conidiomata** unknown. **Chemistry**: no lichen products reported. **Ecology**: pathogenic or commensalistic on lichens, mainly on bark, sometimes also on rocks according to the host habitat.

The genus was considered separate at family level from the Mycocaliciaceae (Tibell & Wedin 2000), but recent studies suggest that one family should be recognized and Sphinctrinaceae has nomenclatural priority. *Sphinctrina* is closely related to the tropical genus *Pyrgidium* (Thiyagaraja *et al.* 2022).

With the exception of *S. turbinata*, all species have become much rarer during the past 100 years in the eastern part of Britain.

Literature:

Giavarini & Purvis (2009b), Muñiz *et al.* (2013), Thiyagaraja *et al.* (2022), Tibell (1999d).

- | | | |
|------|--|--------------------|
| 1 | Ascospores ellipsoidal..... | <i>tubaeformis</i> |
| | Ascospores \pm globose..... | 2 |
| 2(1) | Apothecia sessile or with a very short stalk; exciple in section reddish, K+ red | <i>turbinata</i> |
| | Apothecia with a distinct stalk, at least as tall as the head; exciple dull brown, K–..... | 3 |
| 3(2) | Stalk about as long as the width of the head, black; ascospores 7–10 μ m long, with a distinct ornamentation comprising minute warts | <i>anglica</i> |
| | Stalk about twice as long as the width of the head, dark to pale brown; ascospores 4.5–6 μ m long, with an indistinct ornamentation | <i>leucopoda</i> |

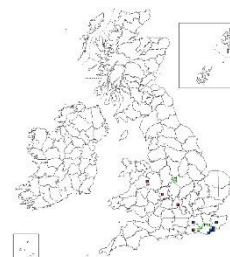
Sphinctrina anglica Nyl. (1860)

Apothecia 0.19–0.4 mm tall, with a short but distinct stalk, 0.6–1.7 times as long as the width of the head, black or rarely dark brown; head 0.11–0.23 mm diam., \pm globose but often slightly irregular, shiny, black; exciple in section dull brown, sclerotized, K–; hypothecium colourless; stalk consisting of periclinally arranged hyphae with strongly gelatinized walls, with isodiametric sclerotized cells above. Ascospores 7–10 \times 6.5–9.0 μ m, dark brown, \pm globose, aseptate, with a surface ornamentation of minute warts, gelatinous perispore poorly developed. **BLS 1957.**

On sterile thalli of *Protoparmelia oleagina* on lignum, particularly gate rails; rare. S. & S.E. England, one record from Wales (Montgomeryshire).

Unusual in its parasitism of a lichen other than *Pertusaria* spp., but recent molecular data suggest that it is appropriately placed.

Nb



Sphinctrina leucopoda Nyl. (1860)

Nb

Apothecia 0.2–0.3 mm tall, distinctly stalked; stalk 0.8–2.4 times as long as the width of the head, pale to dark brown, rarely black; head 0.12–0.19 mm diam., \pm globose but often somewhat compressed vertically, regular and smooth, glossy dark brown, rarely black, stalk usually paler; exciple in section dark brown, K–. Ascospores 4.5–6.0 \times 4–6 μ m, \pm globose, with surface ornamentation indistinct or almost absent, gelatinous perispore well-developed. **BLS 1958.**

Pathogenic or commensalistic on *Pertusaria pertusa*, or more rarely other *Pertusaria*



spp., particularly on old deciduous trees, also rarely on *Diploschistes* on rock; rare. Recent record from a parkland in England (Sussex), with old records from the Channel Islands, W. Ireland (Galway),

Characterized by the distinctly stalked brown shiny top-like apothecia, the small, globose ascospores and the K- apothecia.

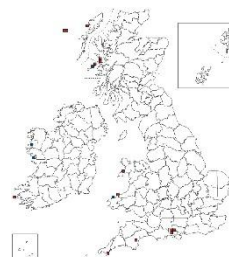
Sphinctrina tubaeformis Massal. (1853)

Apothecia 0.15–0.36 mm tall, often ± immersed; stalk short to absent, 0–1.2 times as long as the width of the head, black or dark brown; head 0.14–0.36 mm diam., ± globose, often somewhat extended vertically and slightly irregular, shiny black or dark brown; exciple in section dark brown, K-. Paraphyses well-developed, ca 1.5 µm diam. Ascospores 10–15.5 × 6.5–9 µm, fusiform-ellipsoidal, the ends pointed, with a surface ornamentation of coarse longitudinally arranged ridges, gelatinous perispore well-developed. **BLS 1959.**

Commensal to pathogenic on *Pertusaria pustulata* in the New Forest (recent records), older records from *P. leioplaca* from here may be errors for the former host. Records on *P. pseudocorallina* in the maritime west (Scotland: St Kilda, Coll and Muck; and Wales: Caernarvon) may refer to a different species.

Recognized by the large and broadly fusiform-ellipsoidal ascospores with a distinctive surface ornamentation of longitudinally arranged and reticulately interconnected ridges.

Nb



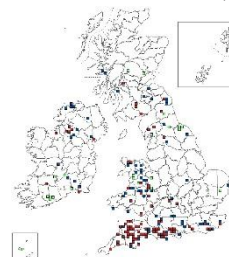
Sphinctrina turbinata (Pers.) De Not. (1846)

Apothecia 0.16–0.33 mm tall; stalk short to absent, 0–1 times as long as the width of the head, dark to pale brown, rarely black; head 0.16–0.36 mm diam., ± globose but often slightly irregular, glossy, black or dark brown; exciple in section dark reddish brown, K+ red. Ascospores 5–7.5 × 4.5–6.5 µm, ± globose, surface ornamentation consisting of ± distinct minute warts, often with some irregular cracks. **BLS 1261.**

Commensalistic to pathogenic on *Pertusaria pertusa*, more rarely on other *Pertusaria* spp., mainly on old trees of *Quercus* and *Fagus*. Scarce in Britain, mainly to the south west but scattered records to the north where it appears to be declining, rare in Ireland.

The commonest *Sphinctrina* in our region, characterized by its virtually sessile apothecia and K+ red exciple. Two collections on *Pertusaria leioplaca* from E. Perthshire differ in having 4-spored asci and may represent an undescribed species.

Nb



STENOCYBE Nyl. ex Körb. (1852)

Thallus absent. **Photobiont** absent. **Ascomata** apothecia, clearly stalked, black to olivaceous brown; head obovoid. **Exciple** well-developed, consisting of dark brown periclinally arranged hyphae, in some species with a thickened margin surrounding a ± sunken pore-like disc. **Stalk** consisting of dark brown, periclinally arranged hyphae. **Hamathecium** of paraphyses. **Asci** cylindrical, formed singly from ascogenous hyphae with croziers, uniformly thickened at the apex, with a single functional wall layer, ± persisting until the maturity of the ascospores. **Ascospores** aseptate to 3(-7)-septate, ellipsoidal, rarely elongate-fusiform, uniseriately arranged in the asci, pale to dark brown-grey. **Conidiomata** not known. **Chemistry:** lichen products not detected by TLC. **Ecology:** in humid and rather shaded situations on broad-leaved trees or hepatics, saprobic or parasitic; the species are mainly confined to a single host.

A genus of the non-mazaediate group of calicioid fungi, whose asci do not degenerate early. Close in morphological and phylogenetic terms to *Phaeocalicium*, which has shorter, 0- to 1-septate ascospores.

Literature:

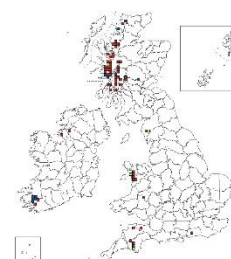
Döbbeler & Feuerer (2004), Giavarini & Purvis (2009c), Tibell (1999e).

- 1 Ascospores <20 µm long, the cells equal; stalk <1 mm tall; on *Alnus**pullatula*
 Ascospores >20 µm long, the cells unequal; stalk >1 mm tall 2
- 2(1) On leafy liverworts; ascospores with pale apical cells*nitida*
 On bark, usually *Ilex*; ascospore cells concolorous*septata*

Stenocybe nitida (Mont.) R. Heim (1941)

Nb

Apothecia 1–1.5 (–2) mm tall; stalk 0.08–0.12 mm diam., pale to dark olive- or grey-black; head (0.2–) 0.3–0.6 (–0.7) mm diam., narrowly obconical, dark grey to nearly black with a distinctly thick cartilaginous tumid shining exciple surrounding a narrow, 0.1–0.2 mm diam., pore-like black roughened disc; paraphyses *ca* 1 µm diam., numerous, branched or ± anastomosing, persistent. Asci (175–) 200–300 × 15–25 (–28) µm, cylindrical, wall persisting. Ascospores (30–) 34–43 (–50) × (11–) 13–17 (–18.5) µm, 3-septate, ellipsoidal, wall thin or slightly thickened, comprising two large dark red-brown median cells with large rounded oil droplets and two much smaller and paler end cells. **BLS 1548.**



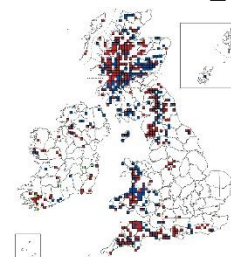
Partially buried in old tufts of leafy liverworts (usually *Plagiochila punctata*), especially on old trees and rocks in damp, humid situations in temperate rainforests; rather rare. W. Britain and Ireland.

Distinguished by the tough shining grey-black golf-tee-like apothecia associated with tufts of leafy hepatics.

Stenocybe pullatula (Ach.) Stein (1879)

LC

Apothecia very slender, 0.5–0.8 mm tall, black; stalk to 0.07 mm thick, rarely branched; head 0.08–0.15 mm diam., ± matt, cup- to top-shaped, the asci often somewhat extruded; paraphyses frequently branched and anastomosed, 1–1.5 µm diam. Asci narrowly cylindrical, 84–90 × 4.5–6 µm. Ascospores (10–) 13–18 (–20) × 4–5 (–6) µm, at first aseptate, becoming 1- to 3-septate, uniformly pale grey-brown, minutely warted. **BLS 1563.**



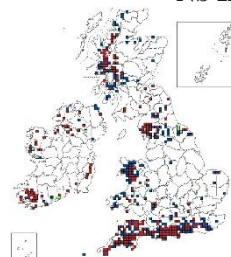
On bark of thin decaying and living *Alnus glutinosa* branches, particularly overhanging streams, lakes and bogs in unpolluted hilly districts; frequent especially in W. & N. Britain.

With its small, tardily septate ascospores, this species has similarities to *Phaeocalicium*.

Stenocybe septata (Leight.) A. Massal. (1860)

Nb IR

Apothecia to 1.8 mm tall, black, single or sometimes united at the base in clusters of two or three; stalk to 0.15 mm diam., sometimes branched; head narrowly clavate, glossy, with an elevated ± incurving exciple, black. Hamathecium a network of very narrow, frequently anastomosing pseudoparaphyses. Ascus walls thin-walled, persistent. Ascospores (35–) 45–60 (–90) × (11–) 15–20 µm, variable, (1-)3(-6)-septate, ellipsoidal or elongate-ellipsoidal, red-brown, the outer small cells and septa ± uniformly thickened (distoseptate), 2–2.5 µm thick, except for a small, paler, sometimes shortly extended nipple at one or both apical cells. **BLS 1564.**



Mainly on bark of *Ilex* trunks, rarely also on *Betula*, *Quercus*, *Sorbus* and *Corylus*, especially in old woodlands; common. S. & W. Britain and Ireland, extending to N. Scotland.

Sometimes grows through the thalli of other lichens, e.g. *Graphis elegans* and *Thelotrema lepadinum*, then appearing as a parasite. The hamathecium and ascospore structure differs from other species of *Stenocybe* and it is likely to be mis-placed. No sequences are available.

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