

Revisions of British and Irish Lichens



British
Lichen
Society

Volume 47

March 2025



Coniocybales

Cover image: *Chaenotheca brunneola* on rotten wood of *Pinus sylvestris*, Rothiemurchus Forest, E. Inverness-shire.

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to compile new printed editions of the entire lichen biota of Britain and Ireland is extensive, and many parts are out-of-date even as they are published.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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ISSN 2634-7768

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Revisions of British and Irish Lichens vol. 47

Coniocybales

including *Chaenotheca*, *Chaenotricha*, *Coniocybe* and *Sclerophora* (Coniocybaceae)

by

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This publication can be cited as:

Cannon, P., Coppins, B., Aptroot, A., Sanderson, N & Simkin, J. (2025). Coniocybales, including *Chaenotheca*, *Chaenotricha*, *Coniocybe* and *Sclerophora* (Coniocybaceae). *Revisions of British and Irish Lichens* **47**: 1–11.

CONIOCYBALES M. Prieto & Wedin (2013)

The order contains a single family, the Coniocybaceae.

CONIOCYBACEAE Rchb. (1837)

Thallus crustose, superficial or immersed, farinose, granular, verrucose or squamulose, variously coloured. **Photobiont** various genera of green algae. **Ascomata** apothecia, stalked; stalk short to long and slender, consisting of periclinally arranged brown hyphae; head globose to obconical. **Thalline margin** absent. **Exciple** \pm well-developed, formed as a continuation of the stalk tissue, sometimes forming a distinct collar. **Hamathecium** absent. **Asci** K/I–, cylindrical to ellipsoidal, evanescent at an early stage, formed from ascogenous hyphae with or without croziers, either singly or in chains. **Ascospores** globose to ellipsoidal or cylindrical, brown to pale brown, forming a dry brown spore mass (mazaedium); spore wall \pm thick, variously ornamented. **Anamorph** various, both pycnidial or hyphomycetous, only known in culture. **Ecology**: mainly on dry bark and wood, mostly in sheltered situations.

The four genera currently recognized have traditionally been included in broad treatments of mazaedial lichens (e.g. Tibell 1999, Van Dort & Horvers 2021), but phylogenetic research by Prieto *et al.* (2012) and Prieto & Wedin (2013) established that they occupy an isolated clade that is sister to the Lichinales, whereas the Caliciaceae belongs to the Lecanoromycetes. Separation of *Sclerophora* into its own family has been advocated by some (e.g. Tibell 1984, 2001b), but molecular phylogenetic data do not support this action (Suija *et al.* 2023). The genus *Coniocybe* has recently been reintroduced (Temu *et al.* 2024), and *Chaenotricha* adopted for species on polypore fungi (Suija *et al.* 2023).

Literature:

Prieto *et al.* (2012), Prieto & Wedin (2013), Tibell (1984, 1999, 2001b), Van Dort & Horvers (2021).

- | | | |
|------|---|---------------------|
| 1 | Ascospores with distinctly pigmented walls, the mazaedium brown to blackish | 2 |
| | Ascospores with colourless walls, the mazaedium pale | <i>Sclerophora</i> |
| 2(1) | On old polypore fungi (specifically <i>Trichaptum</i>)..... | <i>Chaenotricha</i> |
| | On wood and bark, rarely on soil rocks..... | 3 |
| 3(2) | Pruina on apothecia and stalk bright yellow-green; ascospores spherical, the walls ornamented
with short reticulate or irregularly arranged ridges; photobiont <i>Stichococcus</i> | <i>Coniocybe</i> |
| | Not this combination of characters | <i>Chaenotheca</i> |

CHAENOTHECA (Th. Fr.) Th. Fr. (1860)

Thallus crustose, superficial or immersed, farinose, granular, verrucose or squamulose, grey, greenish grey, golden yellow or brownish. **Photobiont** *Dictyo chloropsis*, *Stichococcus*, *Trebouxia*, or *Trentepohlia*. **Ascomata** apothecia, stalked; stalk short to long and slender, consisting of periclinally arranged brown hyphae; head globose to obconical. **Thalline margin** absent. **Exciple** \pm well-developed, formed as a continuation of the stalk tissue. **Hamathecium** absent. **Asci** cylindrical, ellipsoidal or irregular in shape, evanescent at an early stage, formed from ascogenous hyphae with or without

croziers, either singly or in chains. **Ascospores** globose to cylindrical-ellipsoidal, brown to pale brown, forming a dry brown spore mass (mazaedium), aseptate or rarely 1- to 5-septate; spore wall \pm thick, pigmented, smooth or with an ornamentation of irregular cracks. **Conidiomata** absent (except in culture). **Chemistry**: pulvinic acid derivatives occur as a pruina and more rarely within the thallus; sometimes also contain unidentified Pd⁺ yellow-red depsides or depsidones. **Ecology**: mainly on bark and wood, rarely on soil and rocks, mostly in very sheltered situations with high humidity and low light levels.

Calicium differs in the black ascospore mass and exclusively ellipsoidal ascospores; it also always has *Trebouxia* as photobiont. In *Microcalicium* the ascospore mass is greenish black or dark brown, and all the species are saprobes or grow on lichens. Separated from *Sclerophora* by the different ascocarp ontogeny and pigment of the ascospore walls.

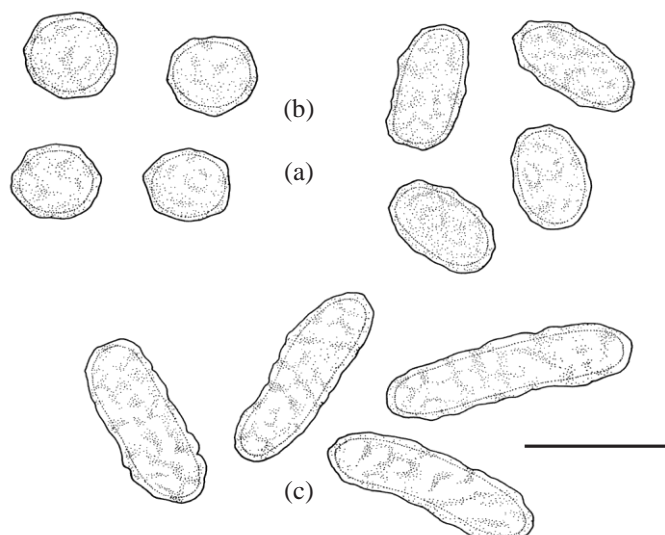
The genus *Coniocybe* has recently been resurrected (Temu *et al.* 2024). Species of *Chaenotheca* occupy several distinct clades within the genus (Suija *et al.* 2016, 2023, Tibell *et al.* 2019) and it is likely that the group will be split further in the future. The three species with ellipsoidal to cylindrical ascospores have been assigned to the provisionally named “*Chrysotheca*”, though that name is preoccupied for a genus of algae.

Literature:

Giavarini *et al.* (2009), McMullin *et al.* (2018), Suija *et al.* (2016), Tibell (1980, 1999a, 2001a,b), Tibell *et al.* (2019).

1	Ascospores ellipsoidal or shortly cylindrical; pruina on apothecia yellow-green	2
	Ascospores spherical; pruina on apothecia white, yellow-green or absent	4
2(1)	Thallus bright yellow, of rounded coarse granules; ascospores 6–9 × 4–5 μ m	<i>chrysocephala</i>
	Thallus olive-yellow to grey-green or immersed; ascospores 5–9 × 3–4 μ m	3
3(2)	Photobiont cells elliptical or rectangular in outline, <10 μ m diam., in short chains (<i>Stichococcus</i>); thallus of olive-yellow-green granules or immersed	<i>chlorella</i>
	Photobiont cells rounded, 10–15 μ m diam., separate or in clusters (chlorococcoid); thallus granular-verrucose, grey-green to green	<i>laevigata</i>
4(1)	Photobiont cells with bright green contents, the walls thinner	5
	Photobiont cells with red-green contents, the walls thick (<i>Trentepohlia</i>); ascospores 5–8 μ m diam.	<i>hispidula</i>
5(4)	Photobiont cells elongate or rectangular in outline, in short chains, transversely septate, the cells <10 μ m diam. (<i>Stichococcus</i>)	6
	Photobiont cells rounded, clustered or solitary, not transversely septate, the cells 10–15 μ m diam. (chlorococcoid)	12
6(5)	Pruina on apothecia bright yellow-green	7
	Pruina on apothecia white or absent	8
7(6)	Thallus inconspicuous, immersed; ascospores 3–4 μ m diam.	<i>Coniocybe brachypoda</i>
	Thallus conspicuous, leprose, bright yellow-green; ascospores 2.3–3 μ m diam.	<i>Coniocybe furfuracea</i>
8(6)	Thallus farinose.....	9
	Thallus immersed to well-developed and then granular to squamulose	10
9(8)	Thallus Pd ⁺ yellowish red; ascospores medium brown, 4–5 μ m diam.	<i>stemonea</i>
	Thallus Pd ⁻ ; ascospores pale brown to colourless, 2.5–3 μ m diam.	<i>gracilentia</i>

- 10(8) Stalk pale, especially in the lower part; edge of exciple irregularly dissected, strongly pruinose *cinerea*
Stalk black, sometimes pruinose; edge of exciple smooth and even 11
- 11(10) Thallus superficial, greenish grey, distinctly squamulose or coarsely granular; lower part
of exciple lacking or almost lacking white pruina *trichialis*
Thallus immersed; lower part of exciple usually with a thick whitish pruina *xyloxena*
- 12(5) Thallus without rusty spotting; ascospores 3.5–7.0 µm diam. 13
Thallus grey with yellow-orange to rusty spots and patches; ascospores 5.5–7.5 µm diam. *ferruginea*
- 13(12) Thallus superficial; apothecia stout, with yellow-green pruina; ascospores 6–7 µm diam. *phaeocephala*
Thallus immersed; apothecia ± white-pruinose or pruina absent; ascospores 3.5–4.5 µm diam. 14
- 14(13) Ascoma stalk short (mean length 0.5 mm), sometimes K+ red; on old polypores (*Trichaptum*)
..... *Chaenotricha cilians*
Ascoma stalk longer (mean length 0.8 mm), K–; on wood or rarely bark *brunneola*



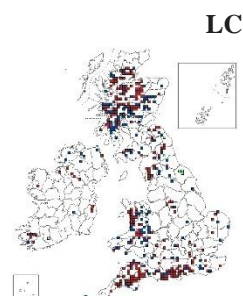
Chaenotheca ascospores. (a) *C. brunneola*; (b) *C. chlorella*; (c) *C. laevigata*. Scale bar = 5 µm.

***Chaenotheca brunneola* (Ach.) Müll. Arg. (1862)**

Thallus immersed, or more rarely poorly developed on the substrate surface and then finely granular-verrucose, not corticate. Photobiont *Dictyochloropsis* or *Trebouxia*. Apothecia 0.5–1.5 mm tall, 9–23 times higher than the width of the stalk; stalk 0.05–0.1 mm diam., shining black, without pruina, often branched so that one stalk carries 2–5 heads; head ± globose; exciple poorly developed, without pruina, but the lower side sometimes appearing pruinose from pale hyphae projecting from the surface. Asci varied in shape, produced in chains, with 1- to 2-seriately arranged ascospores. Ascospores 3.5–4.5 µm diam., smooth or with irregular fissures. Thallus C–, K–, KC–, Pd± yellow-red, UV+ white (baeomycesic and squamatic acids). **BLS 0341**.

On wood of both coniferous and deciduous trees, rarely on bark of old trees, especially *Quercus*. Throughout Britain except where impacted by air pollution, rare in Ireland.

Characterized by the globose head with a usually strongly reduced exciple, the shiny, black, non-pruinose stalks which are often branched and the poorly differentiated, usually Pd+ yellow-red thallus. When farinose, *Ch.*



brunneola may resemble *Ch. stemonea*, which has *Stichococcus* as photobiont and a thick hyphal web on the lower side of the head. It may also resemble *Ch. ferruginea*, which has a greyish thallus and frequently yellow to red, K+ deep red spots and larger ascospores and *Ch. trichialis*, which has a Pd- thallus and contains *Stichococcus*.

Populations on polypore fungi (specifically *Trichaptum abietinum*) have been found to belong to a semi-cryptic species, *Chaenotricha cilians* (Suija *et al.* 2016, 2023). They have shorter stalks (mean 0.5 mm versus 0.8 mm in *Ch. brunneola* s. str.). Other Scottish populations on polypores should be investigated for this taxon.

Occasionally host to *Chaenothecopsis pusiola*, particularly in northern areas.

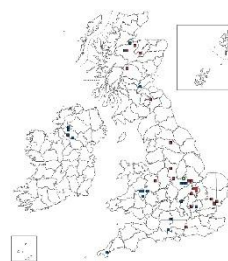
Chaenotheca chlorella (Ach.) Müll. Arg. (1862)

NT

Thallus superficial, usually well-developed, granular-verrucose, not corticate, greyish green to green; photobiont *Stichococcus*. Apothecia 0.7–0.9 mm tall, stalk 0.05–0.08 mm diam., black, with a dense yellowish green pruina in the upper part; head broadly obovoid to lens-shaped; exciple mostly well-developed (sometimes reduced to a short collar around the base of the mazaedium), with a dense yellowish green pruina on the lower side. Asci cylindrical, stalked, not produced in chains. Ascospores uniseriately arranged, 4.5–9 × 3–4 µm diam., globose to ellipsoidal, with a coarse and irregular ornamentation when mature. The pruina contains vulpinic acid. **BLS 0342.**

On dry undersides and inside hollow trunks of deciduous trees; rare. Scattered throughout eastern Britain and Ireland (Fermanagh).

Usually recognized by the short apothecia with greenish yellow pruina, the granular, greyish green thallus, and the ± ellipsoidal ascospores with a coarse and irregular surface ornamentation. Specimens with a fully immersed thallus may resemble poorly developed morphs of *C. chrysocephala*, which contains *Trebouxia*.



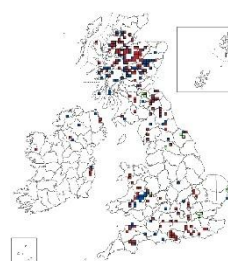
Chaenotheca chrysocephala (Turner ex Ach.) Th. Fr. (1860)

LC

Thallus usually well-developed, forming a continuous crust of rather small non-corticate ± globose bright yellow granules, more rarely immersed; photobiont *Trebouxia*. Apothecia 0.6–1.3 mm tall, developing from the lower side of thalline granules; stalk 0.04–0.08 mm diam., with a dense yellow pruina in the upper part, the lower part black to pale brown; head obovoid or broadly obconical; exciple well-developed, with a dense yellowish green pruina on the lower side. Asci cylindrical, with uniseriately arranged ascospores, not produced in chains. Ascospores 6–9 × 4–5 µm diam., shortly ellipsoidal to globose, with a coarse and irregular ornamentation. Thallus C-, K-, KC-, Pd- (thallus and pruina with vulpinic acid). **BLS 0343.**

On bark and wood of conifers, *Betula* and *Quercus*; common. Widely distributed throughout Britain and Ireland, especially in mid Wales & Highland Scotland.

The only *Chaenotheca* with a well-developed, bright greenish yellow, granular thallus. Specimens with a poorly developed thallus may resemble *C. chlorella*, which contains *Stichococcus*.



Chaenotheca cinerea (Pers.) Tibell (1980)

NE

Thallus exposed, greyish white, granular to verrucose to almost immersed; photobiont *Stichococcus*. Apothecia 0.6–1.0 mm tall; Stalk 0.07–0.12 mm diam., dark in the upper part and covered by a very thick white pruina, but pale brown to almost white in the lower part; outermost layer of stalk colourless, 10–15 µm thick, consisting of strongly gelatinized, periclinally arranged hyphae; head obovoid to obconical with a well-developed exciple that is often irregularly and deeply split, and covered by a dense white pruina on the lower side; mazaedium dark brown. Asci not stalked, ellipsoidal or of variable shape, formed in chains. Ascospores irregularly arranged, 4.5–5.5 µm diam., globose, smooth or with irregular cracks. **BLS 2793.**

On the shaded underside of a massive leaning *Salix* tree, England (Suffolk); currently known only from a single British collection.

Resembles a heavily pruinose, short-stalked *C. trichialis*, with a paler stalk and somewhat larger ascospores.

Chaenotheca ferruginea (Turner ex Sm.) Mig. (1931)

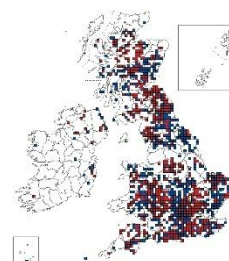
LC

Thallus usually exposed, not corticate, granular-verrucose, pale whitish grey, often with limited yellow to rusty reddish patches, rarely immersed; photobiont *Trebouxia*. Apothecia 1–2 mm tall; stalk 0.07–0.15 mm diam., shiny, black, without pruina; head broadly to narrowly obconical; exciple well-developed, without pruina; ascospore mass

pale brown, often with a yellow tinge. Asci cylindrical to narrowly clavate, not formed in chains. Ascospores 7–8 μm diam., globose, when mature coarsely and irregularly fissured, 1- to 2-seriately arranged in the asci. Yellow-red, quinonoid pigment in thallus, K+ deep red; ascospore mass with yellowish K+ red pigment. **BLS 0344.**

On acid bark, decorticate tree stumps, wooden fencing, and more rarely on siliceous outcrops and stonework; tolerant of SO air pollution; common. Throughout Britain and Ireland, but rarer in the west and now declining in formerly SO₂ polluted areas in the south.

Usually recognized by the yellow- to rusty-red, K+ deep red spots on the grey, verrucose, often sterile thallus. When the pigment is absent, may be mistaken for *C. trichialis*, but differs in having larger ascospores and \pm globose photobiont cells.



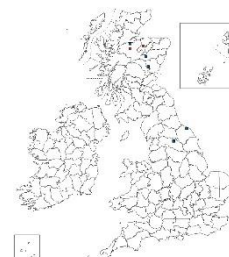
Chaenotheca gracilentata (Ach.) Mattsson & Middelb. (1987)

Thallus thin, farinose, greyish green; photobiont *Stichococcus*. Apothecia 2.5–3.5 mm tall, with long slender flexuose stalks; stalks black, covered with a greyish, granular pruina; lower surface of head with a faint, greyish white pruina; exciple poorly developed; mazaedium pale grey. Asci ellipsoidal, formed in chains. Ascospores 2.5–3 μm diam., globose, very pale brown to colourless, smooth or with a slightly cracked surface. Unidentified substances in TLC. **BLS 0467.**

On dry bases of old *Acer pseudoplatanus* and *Ulmus glabra* and in a hollow below large boulders; rare. N. England (Yorkshire, not seen recently) & Scotland (Angus, S. Aberdeen, Easternness).

Formerly included in the genus *Cybebe* (Tibell 1984, 2001b) on the basis of its \pm colourless ascospores and pale mazaedium, and likely to return there following further molecular analysis. It is related to *C. biesboschii* and *C. gracillima* (Suija *et al.* 2023). Neither of these species is currently recorded from Britain, but the former in particular should be sought in southern England. See Tibell *et al.* (2019) for more information.

EN



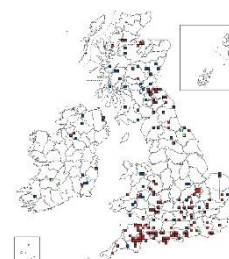
Chaenotheca hispidula (Ach.) Zahlbr. (1922)

Thallus immersed, inconspicuous; photobiont *Trentepohlia*. Apothecia 0.5–1 mm tall; stalk 0.05–0.08 mm diam., black in the lower part with a thick yellowish green pruina on the upper part; head obconical-obovoid; exciple well-developed, with dense yellowish green or rarely ochraceous pruina on the lower side. Asci cylindrical, either without a stalk and produced in chains or with a well-developed stalk and formed singly. Ascospores 5–8 μm diam., globose, when mature with an ornamentation formed by irregular, reticulate fissures surrounding small, polygonal areas. Lichen products not detected by TLC. **BLS 0345.**

On dry, less acid bark and wood, especially on trees by the edge of clearings. Throughout Britain and Ireland.

Characterized by the short-stalked apothecia, which have a greenish yellow pruina on the lower side of the exciple and by the large, globose ascospores; the only *Chaenotheca* species in Britain and Ireland with a *Trentepohlia* photobiont.

Nb



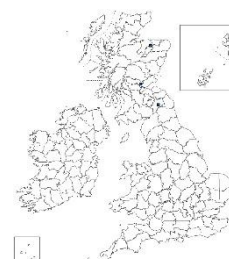
Chaenotheca laevigata Nád. (1934)

Thallus immersed or, when well-developed, exposed as globose, grey-green to green granules with a distinct cortex, 8–15 μm thick; photobiont chlorococcoid. Apothecia 1.3–1.9 mm tall, stalk 0.06–0.09 mm diam., usually covered by a dense, greenish-yellow pruina; head obovoid-broadly obconical; exciple well-developed, with dense, yellowish green pruina on the lower side. Asci cylindrical, not developing in chains. Ascospores 6–7 \times 3.0–3.5 μm diam., ellipsoidal to shortly cylindrical, with a roughly cracked surface, 1- to 2-seriately arranged in the ascus. Pruina on the head and stalk contains vulpinic acid. **BLS 0346.**

On bark in crevices of *Fraxinus* and *Ulmus*; very rare. E. Scotland.

Characterized by the greenish yellow pruina on the lower side of the exciple, the short cylindrical ascospores and the chlorococcoid photobiont.

EN



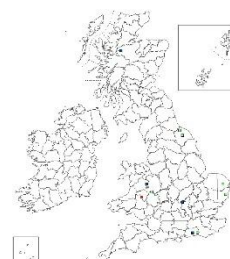
Chaenotheca phaeocephala (Turner) Th. Fr. (1860)

CR

Thallus normally thick, squamulose, with large convex uneven verrucae, or thinner and then verrucose-granular, rarely fully immersed, dark grey to greenish brown. Photobiont *Trebouxia*. Apothecia 0.5–1.2 mm tall, stout; stalk 0.06–0.1 mm wide, pale to dark brown, not pruinose or distinctly thinly yellowish green-pruinose over the uppermost part; head deep purple-brown, ± brown-orange when abraded, broadly obconical-lenticular; exciple well-developed. Asci cylindrical to narrowly clavate, produced singly from branched ascogenous hyphae. Ascospores 6–7 µm diam., globose, with a surface ornamentation of irregular polygonal areas, 1- to 2-seriately arranged in asci. Pruina on lower side of head contains vulpinic acid. **BLS 0347.**

On old worked timber, forming extensive patches especially on uncreosoted barns, also on dry bark of ancient oak; not seen since 2003 but with post 1990 records from mid-Wales (Radnor & Montgomery) and Sussex.

Characterized by the well developed exciple, which is greenish yellow pruinose on the lower side, the rather robust apothecia, the usually well-developed verrucose-squamulose thallus and the globose ascospores.

**Chaenotheca stemonea** (Ach.) Müll. Arg. (1862)

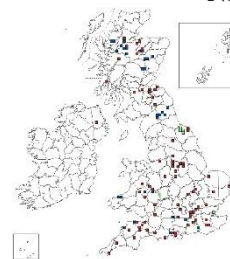
Nb

Thallus thin, farinose, green to bluish green; photobiont *Stichococcus*. Apothecia 0.7–1.6 mm tall; stalk 0.05–0.09 mm diam., the upper part dull whitish brown, the lower part brown-black; head globose; exciple poorly developed; lower side of exciple and upper part of stalk covered by a loose, whitish pruinose-like hyphal collar. Asci cylindrical or irregular, produced in chains. Ascospores 3.5–4.0 µm diam., globose, smooth, with some irregular cracks, 1- to 2-seriately arranged in asci. Thallus C-, K-, KC-, Pd+ yellowish red (barbatic and obtusatic acids). **BLS 0348.**

On dry bark and decorticated wood, particularly *Alnus*, *Betula*, *Quercus* and *Pinus*, often in deeply shaded situations, including tree bases; occasional. N. & S. England, Wales, C. & E. Scotland, one record in N. Ireland.

Characterized by the thin, farinose thallus and almost globose heads, which have a whitish brown, pruinose-like web on the lower side. *C. trichialis* has a well-developed exciple without a hyphal web on the lower side and never has a farinose thallus, although it may be minutely granular. Specimens where the hyphal web is poorly developed should be checked against *C. brunneola*, which has a photobiont other than *Stichococcus*. The Pd spot test can be difficult to observe, but can be enhanced by using a UV light.

Parasitized very rarely by *Chaenothecopsis viridireagens*.

**Chaenotheca trichialis** (Ach.) Th. Fr. (1860)

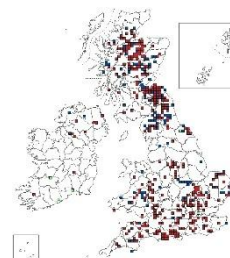
LC

Thallus granular-squamulose, often rather glossy, more rarely finely granular, greenish grey, forming a crust or restricted to small patches; photobiont *Stichococcus*. Apothecia 1–1.9 mm tall, stalk 0.05–0.1 mm diam., the upper part often with a faint whitish pruinose, the lower part black; head obconical to lens-shaped; exciple well-developed, sometimes with a faint whitish pruinose below. Asci shortly cylindrical or irregular, formed in chains. Ascospores 3–4 µm diam., globose, smooth, with irregular, narrow cracks, 1(-2) seriately arranged in the asci. Lichen products not detected by TLC. **BLS 0349.**

In dry, acid bark crevices and less frequently on wood. Frequent except in formerly heavily polluted areas and occasional in the west, rare in Ireland.

Morphologically variable but usually with a distinct Pd-, verrucose-squamulose thallus, medium-sized apothecia and a faint white pruinose on the lower side of the head. The thallus may be ± completely immersed, the apothecia vary in size and shape, the pruinose may be absent and the stalk sometimes brown rather than black. *C. xyloxena* differs in the totally immersed thallus, and more slender apothecia with a thick, white pruinose. The thallus of *C. brunneola* is regularly Pd+ yellow-red and contains trebouxoid algae. *C. stemonea* has a poorly developed exciple and farinose thallus.

Parasitized rarely by *Chaenothecopsis epithallina* and *C. viridireagens*.

**Chaenotheca xyloxena** Nád. (1934)

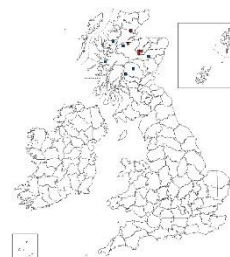
VU

Thallus immersed, sometimes visible as a greenish grey tinge; photobiont *Stichococcus*. Apothecia 0.9–1.6 mm

tall, stalk 0.04–0.08 mm diam., the upper part usually with a thick white pruina, the lower part shining black; head obconical; exciple well-developed, cushion-like, usually with a thick, white pruina below. Asci \pm cylindrical or irregular in shape, formed in chains. Ascospores 3–4 μ m diam., globose, smooth or with irregular, narrow cracks, 1- to 2-seriately arranged. Lichen products not detected by TLC. **BLS 0350**.

On wood of old *Alnus*, *Betula*, *Quercus* and *Pinus*; rare. Scotland (Highlands).

Usually distinguished by the completely immersed thallus, and slender apothecia which are densely white pruinose on the lower side of the head and upper part of the stalk. The thickened and cushion-like outer part of the exciple distinguish it from *C. trichialis*.



CHAENOTRICHA Suija, McMullin & P. Löhmus (2023)

Thallus immersed or inconspicuous. **Ascomata** stalked, stalk dark brown to black, mostly shiny, straight to somewhat curved, consisting of periclinally arranged brown hyphae, surface uneven, stalk K– or K+ red (color bleeds from the stalk). **Head** spherical to obconical, not pruinose. **Mazaedium** powdery. **Exciple** and **hypothecium** well-developed, brown to dark brown, formed as a continuation of the stalk, with similar hyphal structure. **Asci** cylindrical, stalked, raising singly and directly from the ascogenous hyphae, without croziers, 8-spored. **Ascospores** uniseriately arranged, aseptate, initially colourless but brown when mature, smooth, \pm spherical. **Anamorph** not known. **Ecology**: forming loose associations with unicellular green algae on the surface of *Trichaptum* sporocarps, infrequently episubstratal forming ecarticate, granular aggregations of hyphae and algae.

A genus of three species, all associated with old fruit-bodies of the polypore genus *Trichaptum* (Suija *et al.* 2016, 2023). Their status as lichens is not clear. The genus description and that of *C. cilians* below is derived from these works.

Literature:

Suija *et al.* (2016, 2023)

Chaenotricha cilians Suija, McMullin & P. Löhmus (2023)

NE

Thallus inconspicuous, mycobiont hyphae loosely connected with cells of trebouxioid algae on the substratum surface. Ascomata 0.45–0.65 mm tall, the stalk 0.045–0.06 mm diam., developed on the upper surface and at the edge of the fungal sporocarp; stalk not pruinose, dark brown, K– or K+ reddish (in microscope preparations, bleeding into the mounting medium); head spherical to obconical, 0.10–0.14 mm diam.; exciple well-developed, mazaedium dark brown, powdery. Asci cylindrical, born singly on a stalk. Ascospores arranged uniseriately, colourless when young, brown, smooth, \pm spherical to irregularly spherical, (3–) 4.5–5 μ m diam. **BLS 2912**.

On old fruit-bodies of *Trichaptum abietinum* on dead pine trunks, from two sites in Scotland (Moray).

This species is a look-alike for *Chaenotheca brunneola*, which now appears to be confined to wood and bark rather than polypore fungi. *Chaenotricha cilians* can be distinguished from that species by the generally shorter-stalked ascomata and apothecial stalks that are sometimes K+ reddish, but the habitat may provide a more clear indication of identification (Suija *et al.* 2016, 2023).

CONIOCYBE Ach. (1816)

Thallus crustose, well-developed and farinose to granular, then bright yellow-green, or inconspicuous and immersed. **Photobiont** *Stichococcus*. **Ascomata** with long stalks and rounded heads, strongly yellow-green pruinose. **Exciple** inconspicuous or reduced to a narrow basal collar below the mazaedium. **Mazaedium** well-developed, coloured as for the spores but often also yellow-green

pruinose. **Asci** formed in chains, with croziers. **Ascospores** spherical, aseptate, small, pale brown, with an ornamentation of minute irregularly arranged ridges, sometimes appearing as small warts under the light microscope. **Anamorph** hyphomycetous where known: conidiomata absent. **Conidiophores** ± erect, colourless. **Conidia** ellipsoidal, adhering in chains, colourless, aseptate. **Chemistry**: dominated by vulpinic acid derivatives. **Ecology**: on dry bark and wood, rarely on rock.

Recently re-established for four species with apothecia with yellowish green-pruinose, slender stalks and small globose heads and *Stichococcus* photobionts.

Literature:

Honegger (1985), Temu *et al.* (2024).

- 1 Thallus inconspicuous, immersed; ascospores 3–4 µm diam. *brachypoda*
 Thallus conspicuous, leprose, bright yellow-green; ascospores 2.3–3 µm diam. *furfuracea*

Coniocybe brachypoda Ach. (1816)

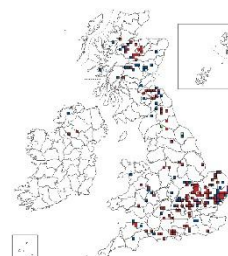
LC

Chaenotheca brachypoda (Ach.) Tibell (1987)

Thallus immersed; photobiont *Stichococcus*. Apothecia 0.4–1.4 mm tall, stalk 0.04–0.08 mm diam.; head and stalk covered in a dense yellow-green pruina; stalk sometimes black beneath; head 0.1–0.2 mm diam., ± globose; exciple poorly developed, sometimes forming a small basal collar below the mazaedium; ascospore mass dark brown, but covered in yellowish green pruina. Asci cylindrical or irregular in form, formed in chains. Ascospores 3–4 µm diam., globose to cuboid, with irregularly thickened walls and a slightly cracked surface. Pruina with vulpinic and pulvinic acids. **BLS 0470**.

On dry bark in crevices of deciduous trees and wood of hollow trunks. Throughout Britain but commoner in the east, rare in N. and W. Ireland.

Characterized by the immersed thallus and rather short bright yellow-green stalks. *C. furfuracea* has a distinct leprose thallus, longer stalks, pale brown spore mass and smaller ascospores.



Coniocybe furfuracea (L.) Ach. (1816)

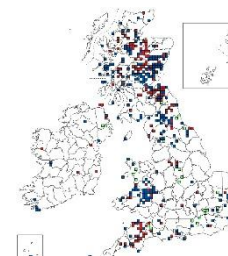
LC

Chaenotheca furfuracea (L.) Tibell (1984)

Thallus leprose, usually well-developed, bright yellow-green; photobiont *Stichococcus*. Apothecia 1.6–2.6 mm tall, slender; stalk 0.06–0.1 mm diam., head and stalk covered in a yellowish green pruina, black beneath; head 0.1–0.2 mm diam., ± globose; exciple indistinct; ascospore mass at first also covered in pruina, becoming pale brown. Asci irregular in shape, formed in chains. Ascospores 2.3–3.0 µm diam., globose, ornamentation of minute irregularly arranged ridges, sometimes appearing as small warts under the light microscope. Conidiomata absent, anamorph hyphomycetous, of dispersed, ± erect, colourless conidiophores; conidia ellipsoidal, adhering in chains, colourless, aseptate. Thallus and pruina with vulpinic acid, pulvinic acid and pulvinic dilactone. **BLS 0466**.

In heavily shaded humid crevices amongst tree roots and on rock under overhangs; most frequent in upland situations. Throughout Britain, mostly in the north and west; scattered throughout Ireland.

Characterized by the yellow-green, leprose thallus with very slender apothecia. When sterile, it may resemble *Psilolechia lucida*, which normally has *Trebouxia* and contains rhizocarpic acid. *C. brachypoda* has an immersed thallus, short stalks, dark brown spore mass and larger ascospores.



SCLEROPHORA Chevall. (1826)

Thallus crustose, immersed. **Photobiont** *Trentepohlia*. **Ascomata** apothecia, stalked; stalk short to long, pale or reddish brown. **Exciple** well-developed, forming a distinct collar at the base of the fertile head, lower part of collar ± extended and enclosing the stalk, head globose to obconical. **Asci**

cylindrical, with a single functional wall layer, K/I–, dissolving at an early stage, formed singly from ascogenous hyphae with croziers. **Ascospores** globose, pale, wall colourless, minutely warted, accumulating in a well-developed, pale mass. **Conidiomata** not seen. **Chemistry**: apothecia may have pruina containing ?anthraquinone (K+ violet). **Ecology**: on dry bark or wood of old trees.

Chaenotheca has a different ascocarp ontogeny and the ascospore walls are brown. The current status of *Sclerophora* is that the genus nests within *Chaenotheca* s. lat. (Suija *et al.* (2023).

Literature:

Giavarini & Purvis (2009), Kirchmair *et al.* (2008), Yao & Spooner (1999), Suija *et al.* (2023).

- | | | |
|------|---|------------------|
| 1 | Ascospores 3–3.5 µm diam., smooth-walled..... | <i>peronella</i> |
| | Ascospores 7–8 µm diam., warted | 2 |
| 2(1) | Ascomata 0.7–1.2 mm tall, stalk brown | <i>farinacea</i> |
| | Ascomata 0.4–0.7 mm high, stalk pale yellow | <i>pallida</i> |

Sclerophora farinacea (Chevall.) Chevall. (1826)

Thallus crustose, immersed. Ascomata 0.7–1.2 mm tall, the stalk 0.09–0.14 mm diam., medium brown, with an outer layer of colourless cells, not pruinose, shiny; exciple well-developed, raised, forming a distinct collar surrounding the stalk at the base of the fertile head; lower surface of head with thick white crystalline pruina; mazaedium inspersed with minute dark yellow crystals. Ascospores 7–8 µm diam., globose, the surface with a wart-like ornamentation. Pruina on the mazaedium K+ reddish, that on the exciple K+ reddish violet. **BLS 2366**.

On bark of old deciduous trees; long considered as extinct in Britain but recently rediscovered in Huntingdonshire on bark of maple. Formerly in E. England (Teesdale, S. Essex).



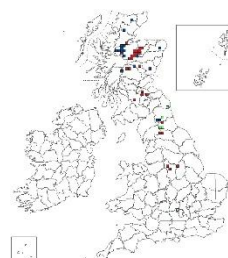
Sclerophora pallida (Pers.) Y.J. Yao & Spooner (1999)

Thallus crustose, immersed. Apothecia 0.4–0.7 mm tall, the stalk 0.06–0.1 mm diam.; exciple well-developed, raised, forming a distinct collar surrounding the stalk at the base of the fertile head; lower surface of head and stalk pale yellow, translucent when wet, becoming grey and non-pruinose when senescent; young apothecia sessile, globose and yellow-pruinose; mazaedium pale brown, inspersed with minute dark yellow crystals that are K+ purple-violet. Ascospores 7–8 µm diam., the surface with a wart-like ornamentation. **BLS 0468**.

In dry bark crevices and on wood of deciduous trees. England (Peak District, N. Pennines), Scotland (C. & E. Highlands, Lanark, Midlothian).

Distinguished from *S. farinacea* by the smaller size and pale yellow or grey colour of the ascomata and presence on young apothecia of yellow pruina. Due to nomenclatural misunderstandings this species has often been confused with the non-lichenized *Roesleria subterranea* (Weinmann) Redhead (1985), which is not at all closely related.

VU



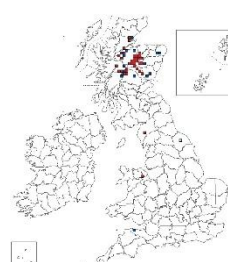
Sclerophora peronella (Ach.) Tibell (1984)

Thallus crustose, immersed. Apothecia 0.5–0.8 mm tall, pale pinkish brown, often strongly white-pruinose, the stalk 0.06–0.12 mm diam., pale grey, not pruinose, the outer layer colourless and with a red-brown core visible when wet; exciple poorly developed, not raised, not forming a distinct collar, yellow-pruinose (K–) when young, becoming reddish brown on the lower surface of the head; mazaedium pale brown, sometimes white-pruinose. Ascospores 3–3.5 µm diam., globose, the surface smooth. **BLS 0469**.

In hollows, dry bark crevices and on wood of deciduous trees; rare. England (Somerset, Cumbria, formerly Yorkshire), N. Wales, Scotland (C. & E. Highlands).

Characterized by the pinkish brown apothecia, the red-brown central core of the stalk, and the small smooth ascospores.

NT



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