

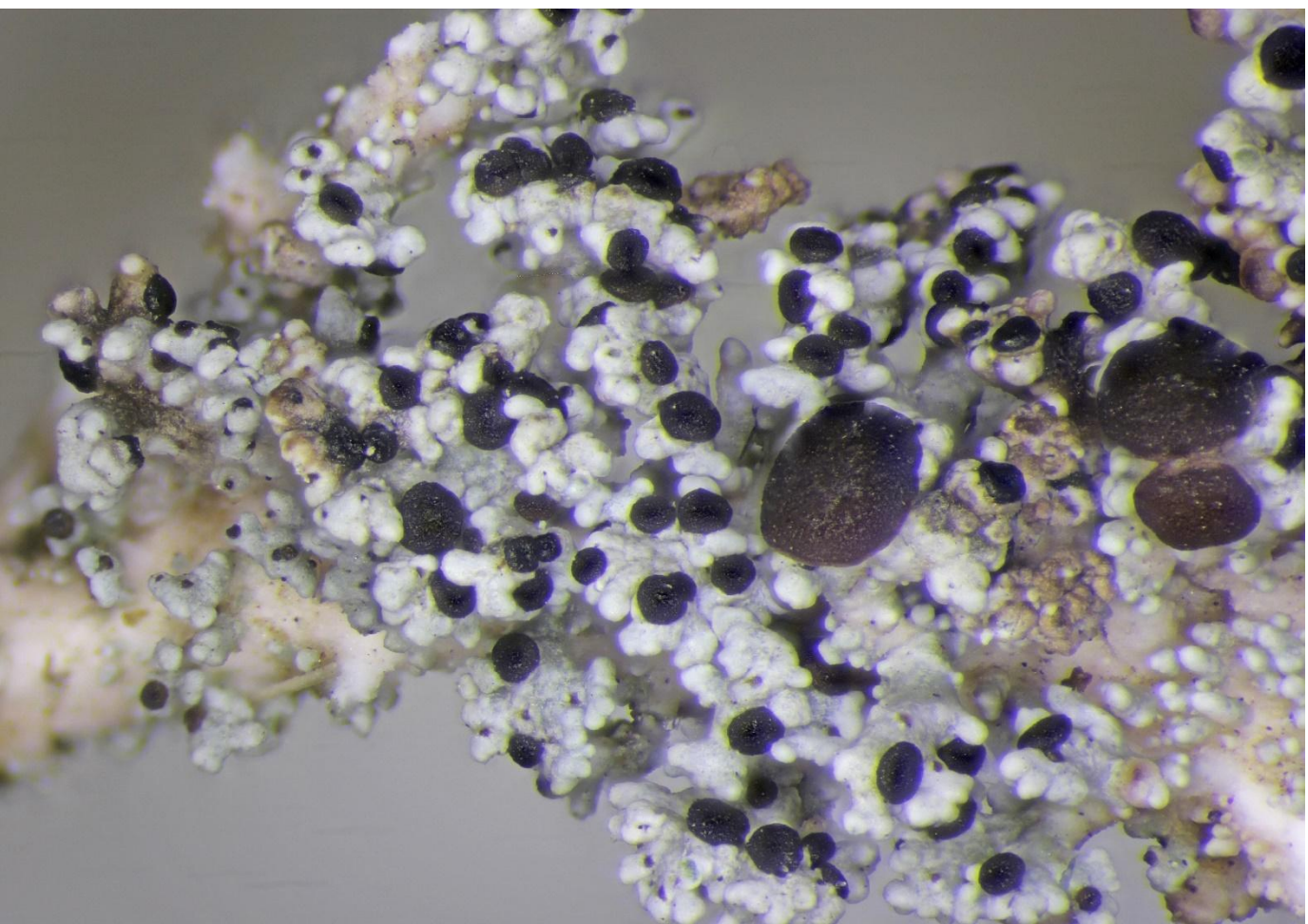
Revisions of British and Irish Lichens



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Lecanorales: Catillariaceae

Cover image: *Catillaria stereocaulicola*, parasite on the thallus of *Stereocaulon dactylophyllum*, Strontian, West Inverness, Scotland.

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.

Key to map date classes

- 2000+
- 1960 - 1999
- 1650 - 1959

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. Conservation assessments use the [codes](#) listed in the BLS website. The four-digit number at the end of each description refers to BLS numbers which are part of the recording scheme; they link to species rather than names, and are unchanged (with rare exceptions)

when names alter following improvements in taxonomy.

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to compile new printed editions of the entire lichen biota of Britain and Ireland is extensive, and many parts are out-of-date even as they are published.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

including the genera *Catillaria* and *Solenopsora*

by

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CATILLARIACEAE Hafellner (1984)

Thallus various: crustose (also fruticose in non-GBI species), rimose, warted or areolate, small-squamulose or placodioid, sometimes \pm immersed or evanescent; absent in lichenicolous species. **Photobiont** chlorococcoid. **Ascomata** apothecia, brownish or black, usually not pruinose. **Thalline margin** absent or present but becoming excluded. **True exciple** well-developed in most species, usually evident at least when young, coherent (in K), of branched radiating hyphae. **Hamathecium** of unbranched or sparingly branched septate paraphyses, the apices abruptly swollen with a dark brown apical cap. **Asci** 8 (–16)-spored, subcylindrical to clavate, with a blue outer coat and uniformly blue apical dome in K/I (*Catillaria*-type), or sometimes with a small ocular chamber. **Ascospores** usually 1-septate, colourless, without a perispore (gelatinous sheath). **Conidiomata** pycnidia, usually immersed and inconspicuous. **Conidiogenous cells** arranged in chains with conidia borne terminally and laterally or in a single layer and broadly ampulliform. **Conidia** ellipsoidal to bacillar, colourless, aseptate.

The Catillariaceae currently contain five genera (Lücking *et al.* 2016) of which *Catillaria* and *Solenopsora* occur in Great Britain and Ireland. The family is reasonably well-defined in morphological terms, with black lecideine apothecia, a distinctive ascus type and paraphyses with prominent pigmented apices. However, molecular data are sparse in some areas and a number of extraneous taxa without more appropriate placements are retained for pragmatic reasons.

Catillaria was placed in the Leprocaulaceae by Fačková *et al.* (2020), but only one species (not the type) was included in their analysis and were that action to be justified, Catillariaceae Hafellner 1984 would have priority over Leprocaulaceae Lendemer & B.P. Hodk. 2013. The two families are kept separate pending more complete taxon sampling.

Literature:

Fačková *et al.* (2020), Kistenich *et al.* (2018), Lücking *et al.* (2016), Miadlikowska *et al.* (2014).

- | | |
|---|--|
| 1 | Thallus crustose, often inconspicuous, or lichenicolous; thalline exciple absent <i>Catillaria</i> |
| | Thallus squamulose to crustose and placodioid; thalline exciple present at least |
| | when young..... <i>Solenopsora</i> |

CATILLARIA A. Massal. (1852)

Thallus crustose, immersed, evanescent, rimose, warted or areolate, white, grey, green, brown or black; absent in lichenicolous species. **Cortex** absent or rudimentary. **Photobiont** chlorococcoid (e.g. *Dictyochloropsis*, *Myrmecia*, *Trebouxia*). **Ascomata** apothecia, black, usually not pruinose. **Thalline margin** absent or narrow. **True exciple** well-developed in most species, usually evident at least when young, coherent in K, of branched, radiating hyphae. **Hamathecium** of unbranched or sparingly branched septate paraphyses, the apices abruptly swollen with a dark brown apical cap. **Asci** 8 (–16)-spored, subcylindrical to clavate, with a blue outer coat and uniformly blue apical dome in K/I (*Catillaria*-type). **Ascospores** usually 1-septate, colourless, without a perispore (gelatinous sheath). **Conidiomata** pycnidia, usually immersed and inconspicuous. **Conidiogenous cells** arranged in chains with conidia borne terminally and laterally or in a single layer and broadly ampulliform. **Conidia** ellipsoidal to bacillar, colourless, aseptate. **Chemistry**: lichen products not detected by TLC.

Catillaria s. str. is characterized by asci with a uniformly K/I+ apical dome, abruptly swollen apices to the paraphyses with a dark brown cap, ascospores without a perispore and conidiogenous cells typically in chains. *Halecania* shares these features except for the thick-walled ascospores with a distinct perispore, but is unrelated in phylogenetic terms.

A number of species were placed in this genus provisionally by Fletcher & Coppins (2009), which do not conform to the generic description given above but lacked more appropriate generic placements. These taxonomic shortcomings are still unresolved for several of them and are retained here pending further research, but are listed separately in the descriptions below. Several others, including *Catillaria aphana*, *C. modesta*, *C. picila* and *C. scotinodes*, have affinities with *Toninia* (Reese Naesborg *et al.* 2007, Kistenich *et al.* 2018), and all apart from *C. picila* were included in the treatment of the Ramalinaceae (Cannon *et al.* 2021). *C. contristans* was found by Kistenich *et al.* (2018) to have a high degree of similarity with species of *Brianaria*, *Micarea*, *Psora* and *Sphaerophorus*, and it was transferred to the Sphaerophoraceae as *Gilbertaria contristans* (Nyl.) M. Svensson & Fryday by Svensson & Fryday (2022). *C. minuta* shares some characteristics with *Catinaria*. *C. alba* has been transferred to *Biatora* (as *B. veteranorum*).

Since 2009, *Catillaria fungoides* and *C. flexuosa* have been added to the British and Irish list. Fačkovcová *et al.* (2020) presented sequences of *Catillaria lenticularis*, suggesting that it belongs in the Leprocaulaceae rather than the Catillariaceae. Other species of *Catillaria* were not included in the analysis, but subsequent research (Van den Boom & Alvarado 2021) indicate that *C. lenticularis* may not be congeneric with other species of *Catillaria*.

Halecania laevis Brand & Van den Boom (Van den Boom 2009) has recently been transferred to *Catillaria* by Roux (2020). Though the two genera share some morphological characteristics, they are not closely related, but as no sequence data are available the species is retained in *Halecania* for the present. It has been included in the key below.

Several species of *Catillaria* are obligate parasites of other lichens and do not form their own thalli; some others, including *C. atomarioides* and *C. nigroclavata* can be facultatively parasitic on a wide range of other lichens (Van den Boom 2002).

Literature:

Andersen & Ekman (2005), Cannon *et al.* (2021), Coppins (1989), Fletcher & Coppins (2009), Fryday & Coppins (1996), Kiliás (1981), Kistenich *et al.* (2018), Kondratyuk *et al.* (2019), Reese Naesborg *et al.* (2007), Roux (2020), Svensson & Fryday (2022), Van den Boom (2009), Van den Boom & Alvarado (2021), Van den Boom & Etayo (2001).

In the following key, species marked with * are treated in the Ramalinaceae account (Cannon *et al.* 2021), and those with † in the Leprocaulaceae account (Cannon *et al.* 2022).

1	Not parasitic on other lichens [though occasionally facultatively parasitic; see above].....	2
	Obligate parasites of lichen thalli	19
2(1)	Apices of paraphyses abruptly swollen, with a well-defined, dark brown apical cap; asci <i>Catillaria</i> -type	3
	Apices of paraphyses not or indistinctly swollen, if pigmented then without a distinct cap; asci <i>Bacidia</i> - or <i>Biatora</i> -type	12
3(2)	True exciple dark brown throughout	4
	True exciple pale, or dark coloured only at the outer edge	8
4(3)	Hypothecium dark brown	5
	Hypothecium colourless	7

5(4)	Thallus thin and often evanescent, varied in colour but usually olivaceous to dark grey-brown; ascospores mostly 9–12 µm long	6
	Thallus relatively thick, olive green, granular and subsquamulose; ascospores mostly 7–10 µm long	<i>flexuosa</i>
6(5)	Exciple or hymenium with some blue or green pigment; habitats various	<i>chalybeia</i>
	Exciple and hymenium lacking blue or green pigment; habitat exclusively freshwater	<i>baliola</i>
7(4)	Apothecia 0.1–0.2 mm diam.; ascospores 8 per ascus	<i>atomarioides</i>
	Apothecia 0.3–0.7 mm diam.; ascospores 12–16 per ascus	<i>gilbertii</i>
8(3)	Hypothecium brown, at least in the upper part; on bark	9
	Hypothecium colourless to straw-coloured; on rock	10
9(8)	Thallus sorediate, developing in a dark algal crust; ascospores 10–12 × 3–3.5 µm	<i>fungoides</i>
	Thallus not sorediate, often inconspicuous; ascospores 8–10 × 2–3 (–4) µm	<i>nigroclavata</i>
10(8)	Ascospores mostly 10–16 × 4.5–6 µm; apothecia with a persistent black margin	<i>subviridis</i>
	Ascospores 7–12 × 2.5–3.5 µm; apothecial margin with a black outer and a paler inner layer	11
11(10)	Ascospores without a perispore; on limestone, concrete etc., widespread	<i>lenticularis</i>
	Ascospores with a sometimes inconspicuous perispore; on mesic-supralittoral schist and conglomerate	<i>Halecania laevis</i> †
12(2)	Hypothecium dark brown, K+ purple; on rocks	13
	Hypothecium colourless or pale-coloured K– or, if K+ purple then on bark	14
13(12)	Apothecia 0.2–0.4 (–0.5) mm diam., appressed; ascospores 8–11 (–15) × (2.5–) 3–4 (–5) µm	<i>“Catillaria” modesta</i> *
	Apothecia 0.3–0.8 mm diam., constricted below; ascospores (8–) 12–16 × 3–4.5 µm	<i>“Catillaria” picila</i>
14(12)	Ascospores 1.5–3 µm diam.; on bark (<i>Biatora</i>)	15
	Ascospores >3.5 µm diam.; if narrower then not on bark	16
15(14)	Pycnidia immersed, inconspicuous, black	<i>Biatora globulosa</i> *
	Pycnidia stalked, white-pruinose	<i>Biatora veteranorum</i> *
16(14)	Apothecia dark brown to black	17
	Apothecia pale, pale red-brown or red-orange	<i>“Catillaria” minuta</i>
17(16)	On calcareous rocks	18
	On mosses or plant debris over rocks or on the ground; in acidic habitats	<i>“Catillaria” contristans</i>
18(17)	Ascospores (8–) 9–11 (–13) × 3.5–4.5 µm	<i>“Catillaria” aphana</i> *
	Ascospores (10–) 12–17 (–19) × 4.5–5 µm	<i>“Catillaria” scotinodes</i> *
19(1)	Ascospores aseptate; on <i>Usnea</i> spp.	<i>usneicola</i>
	Ascospores 1-septate; not on <i>Usnea</i> spp.	20
20(19)	On <i>Lobarina scrobiculata</i>	<i>lobariicola</i>
	On <i>Stereocaulon</i> spp.	<i>stereocaulorum</i>

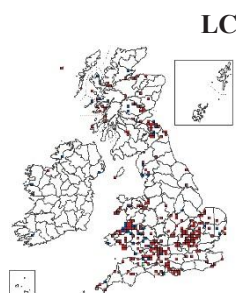
Catillaria atomarioides (Müll. Arg.) H. Kilius (1981)

Like *C. chalybeia*, but apothecia 0.1–0.2 mm diam.; hymenium 30–40 µm tall, colourless; true exciple green-black throughout; hypothecium colourless; ascospores $7\text{--}10 \times 2.3\text{--}3.5$ µm. Chemistry unknown. **BLS 1609**.

On hard, siliceous rocks (including river shingle and slate), brick and stonework; frequent. Throughout most of Britain and Ireland, but previously much overlooked.

Easily mistaken for a diminutive form of *C. chalybeia* or *C. subviridis* (coastal, pale inner true exciple), or even *Amandinea punctata*. *Micarea erratica*, found in similar habitats, usually has abundant black pycnidia.

The species may be a non-specific facultative parasite of other lichens, though this has not been observed in Britain and Ireland.



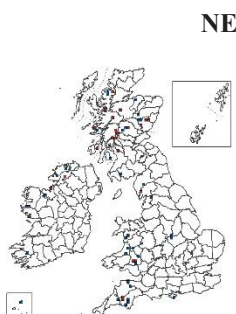
Catillaria baliola (Nyl.) Orange (2022)

Catillaria chalybeia var. *chloropoliza* (Nyl.) H. Kilius (1981) (?auct.)

Thallus grey-green to dark grey, to 185 µm thick, smooth, unbroken or locally cracked, but only rarely into discrete areoles. Apothecia to 700 µm diam., sessile but mostly more or less adnate or weakly constricted at the base, disc dark grey-brown to black, eventually shallowly convex; margin black or more usually dark grey at the crest and light grey on sides. Exciple in section dark brown, dense throughout, or frequently colourless on the outer surface below. Hypothecium dull brown. Epithecium brown, paraphyses with brown pigment caps, though sometimes poorly pigmented in shade. Hymenium 40–55 µm high. All parts of apothecium lacking blue or green pigment. Spores 1-septate, $8\text{--}11.5 \times 2.5\text{--}3.5$ µm. Pycnidia numerous, especially near junctions of conspecific thalli, black, 35–75 µm diam. Conidia bacilliform, $3\text{--}4 \times 1.2\text{--}1.3$ µm. **BLS 1863**.

On frequently inundated siliceous rocks beside streams, associated with freshwater lichens and bryophytes, tolerant of shade. Occasional, especially in north and west Britain.

Distinguished from *Catillaria chalybeia* by the absence of blue or green pigments in the apothecium, the apothecia less constricted at the base and often with a grey margin, the smoother thallus and the freshwater habitat. *C. chalybeia* can occur beside streams, but in a less distinctly freshwater zone. The distinction is supported by molecular data. See p. 12 of this paper for the combination into *Catillaria*.

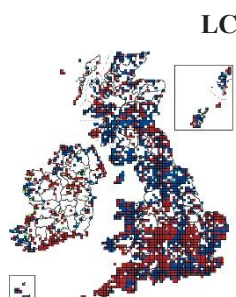


Catillaria chalybeia (Borrer) A. Massal. (1852)

Thallus effuse or delimited, sometimes mosaic-forming, evanescent or thin, smooth or rimose to verrucose-areolate, with areoles 0.1–0.4 mm diam., beige to more usually dark olivaceous to grey-black or dark grey-brown, matt or slightly glossy; prothallus black, delimiting; photobiont *Myrmecia*; cells 7–17 µm diam. Apothecia (0.15–) 0.2–0.5 (–1) mm diam., scattered or a few clustered, mostly flat, sometimes becoming convex, black (rarely dark brown); margin thin, slightly raised, usually concolorous with the disc but sometimes paler; true exciple green-black throughout; epithecium dark brown to green-black; hymenium 40–60 µm tall, colourless or more usually pale blue-green (at least in the lower part); hypothecium dark brown, K–; green pigment in epithecium, hymenium and proper margin K– (or green intensifying), N+ purple-red; paraphyses 1.5–2 µm diam., unbranched or rarely forked; apices capitate to 6 µm diam., with a dark brown cap. Ascospores (7.5–) 9–12 (–15) $\times 2.5\text{--}4$ µm, cylindrical to ovoid-ellipsoidal. Pycnidia 50–100 µm diam., the wall dark green, the outer cells with dark brown caps; conidia $1.8\text{--}3.5 \times 0.5\text{--}0.8$ µm. Lichen products not detected by TLC. **BLS 0306**.

On a wide range of slightly base-rich or nutrient-enriched siliceous rocks (including sea-shore) and stonework, rare on highly calcareous substrata; occasionally on dust-impregnated timberwork and tree trunks; common below 600 m. Throughout Britain and Ireland.

Very common but variable, especially in thallus appearance, and sequence data suggests that more than one species may be involved. The matt black or ± micaceous sessile apothecia on a thin dark grey smooth thallus are distinctive. Could be confused with *C. atomarioides* (smaller apothecia and spores), *C. gilbertii* (12- to 16-spored asci), *C. lenticularis* (brown, rather than black, common on highly calcareous substrata), *C. nigroclavata* (on



bark and with a pale inner exciple), *C. subviridis* (coastal and with a pale inner exciple). *Micarea erratica* usually has abundant pycnidia. *Amandinea punctata* on rocks can also be a source of confusion. Host to *Intralichen* sp. and *Muellerella lichenicola* (Sommerf.) D. Hawksw. (1979).

Catillaria flexuosa van den Boom & P. Alavarado (2021)

NE

Thallus relatively thick, continuous to weakly rimose, areolate, with knobby granules, sometimes becoming subsquamulose, dark green, often with a brownish tinge, matt; prothallus not present. Apothecia abundant, 0.3–0.9 mm diam., flat or rarely slightly convex; margin conspicuous in young apothecia as a small rim, often flexuose especially in mature apothecia (then 30–60 µm thick), persistent, somewhat shiny; disc black, matt; hymenium 40–50 µm high, without oil droplets; epithecium dark brown to greenish black, without crystals, K–; hypothecium dark brown, K–; paraphyses unbranched to rarely sparingly branched, the apices dark brown to blackish, 3–6 µm diam.; asci 8-spored, *Catillaria*-type; ascospores ellipsoidal, (6–) 7–10 (–11) × 2.5–3.5 (–4) µm, 1-septate, thin-walled, often with oil droplets, not or only rarely slightly constricted at the septum. Pycnidia often present, immersed to somewhat erumpent, 100–150 µm diam., dark brown to blackish; conidia ellipsoidal, colourless, 2–3 × 0.9–1.2 µm. Chemistry: no chemical compounds detected by TLC.

On a weathered softwood fencepost on a sea cliff, Wales (Cardiganshire); probably overlooked elsewhere. Known elsewhere from bark of *Fraxinus*, it probably does not have specific habitat requirements.

Distinguished from *Catillaria chalybeia* by the dark green, relatively thick thallus (to 0.4 mm thick), slightly larger apothecia with margins that are often flexuose, slightly smaller ascospores, and larger pycnidia with broader conidia.

Catillaria fungoides van den Boom & Etayo (2001)

NE

Thallus effuse, not clearly delimited, whitish, thin, with rounded to irregular dark brown to blackish soralia. Soralia 0.1–0.25 mm diam., flat to slightly convex, rough, sometimes confluent. Soredia globose, farinose, 12–20 µm diam., composed of clusters of algal cells surrounded by short-celled hyphae (cells 4–8 × 2.5–4 µm); surface of hyphae in soredia dark brown to blackish, but pale brownish to ± colourless in the inner part, K–, N–. Photobiont chlorococcoid. Apothecia 0.2–0.4 mm diam.; disc flat to sometimes slightly convex, black; thalline margin thin, persistent, sometimes whitish due to a thin covering layer of colourless hyphae. True exciple hyaline, interspersed with oil droplets, the outer layer brown, with dark capitate hyphae. Hypothecium brown-greenish to brownish, 10–15 µm thick, interspersed with oil droplets. Hymenium colourless, interspersed with oil droplets, 35–40 µm tall. Paraphyses capitate, 1.5–2 µm diam., to 3–5 µm diam. in the brown apical part (K–, N–), unbranched or slightly branched. Asci clavate, 25–30 × 7–10 µm, 8-spored. Ascospores colourless, 1-septate, with several oil droplets, 10–12 × 3–3.5 µm. Conidiomata not seen. Lichen products not detected by TLC. **BLS 2647.**

On eutrophicated *Fraxinus* bark in Xanthorion communities, S.E. England; probably overlooked. *Candelariella xanthostigmoides* and *Phaeophyscia orbicularis* are common co-habitants.

The black soralia on a thin pale thallus combined with dark apothecia containing *Catillaria*-type asci and 1-septate spores is unique in Britain. However, dark fungal and cyanobacterial crusts are common in similar situations to *C. fungoides* and can have a similar appearance in the field. The apothecia of *C. fungoides* are very similar to those of *C. nigroclavata*, but that species lacks soredia.

Catillaria gilbertii Fryday & Coppins (1996)

NT IR

Thallus effuse, cracked-areolate, dark chocolate-brown to dark grey, dark blue-grey when wet; areoles flat to slightly convex with an irregular surface, when discrete 0.15–0.27 µm diam.; cortex with dark blue-green (N+ red) hyphae, some often brown (N–). Apothecia black to dark brown, 0.3–0.7 mm diam., disc flat to slightly convex, sometimes with a central umbo; true exciple persistent, slightly raised, very narrow, 40–100 µm thick, colourless inside, dark brown (K–, N–) outside, outermost cells with dark apical caps (3–5 µm diam.); hymenium 55–60 µm high; epithecium dark brown, K–, N–; hypothecium colourless to pale straw-brown, of strongly conglutinate hyphae; paraphyses unbranched or occasionally branched towards the apex, 0.8–1 (–1.5) µm diam. in mid-hymenium; apical cells clavate to capitate with a dark brown hood, 2.5–4 µm diam., the subtending cell often slightly swollen and pale brown. Asci broadly cylindrical to clavate, 45–



48 × 15–20 µm, (12–) 16-spored. Ascospores 10–12 × 2.5–3 µm, cylindric-ellipsoidal, colourless, 1-septate. Pycnidia immersed, 60–80 µm diam., wall pale, brown around the ostiole (K–, N–). Conidiophores multiseptate, conidia lateral and terminal, 2.5–3 × 0.8–1.4 µm. Lichen products not detected by TLC. **BLS 0290**.

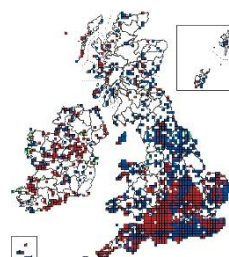
On montane mica-schist rock faces; rare. Scotland, (Perthshire, Angus), N. Wales. Endemic.

The 12- to 16-spored asci are distinctive. Similar in appearance to *Catillaria chalybeia*, but with a browner thallus and slightly larger apothecia. *Halecania rhypodiza* has a thalline margin around the young apothecia. Microscopically *C. chalybeia* has a green hymenial pigment and dark brown hypothecium, while *H. rhypodiza* has larger ascospores with a distinct perispore.

Catillaria lenticularis (Ach.) Th. Fr. (1874)

LC

Thallus usually effuse, immersed to thin and rimose, white, beige or pale brown, sometimes dark brown or olivaceous due to invasive cyanobacteria; photobiont *Dictyochloropsis*; cells 7–15 µm diam. Apothecia 0.15–0.4 mm diam., numerous, scattered or in small groups, often partly immersed in the thallus or substratum, dull red- to dark brown, rarely black (then brown when wet), convex; true exciple sometimes paler than the disc, pale to dark brown at the outer edge (many hyphae with brown apical caps), pale brown to colourless within; epithecium pale to dark brown, K–, N–; hymenium 35–50 (–70) µm tall, colourless; hypothecium colourless or pale straw; paraphyses and asci as in *C. chalybeia*. Ascospores 7–10 (–12) × (2–) 2.5–3.5 (–4) µm, cylindrical or cylindric-ellipsoidal. Pycnidia 50–70 µm diam., the wall brown, the outer cells with dark caps; conidia 2–3.5 × 0.7–1.3 µm. Lichen products not detected by TLC. **BLS 0311**.



On limestones and other highly calcareous rocks and building materials; widespread and rather common, especially in areas with abundant limestone. Throughout Britain and Ireland.

Often confused with *Catillaria chalybeia* which has a black true exciple, dark brown hypothecium, usually green pigment in the hymenium and is relatively rare on highly calcareous substrata. The uniformly dark apical caps of the paraphyses help to distinguish it from small *Lecania* species, e.g. *L. atrynoides*, occurring in similar habitats.

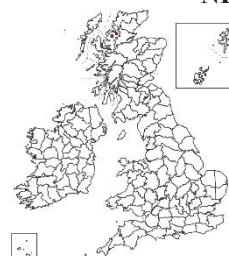
Host to *Intralichen* sp. and *Muellerella lichenicola*.

Catillaria lobariicola (Alstrup) Coppins & Aptroot (2008)

NE

Thallus absent. Apothecia (0.1–) 0.3–0.4 mm diam., dark brown to black; true exciple brown; hymenium 55–65 µm tall, colourless to pale brown; hypothecium colourless; paraphyses unbranched, apices capitate with a dark brown hood, ca 4 µm diam. Asci 55–60 × 15–17 µm, with a uniformly amyloid apical dome (*Catillaria*-type). Ascospores (9.5–) 11.5–13 (–14) × 4–5 µm. **BLS 2476**.

Parasitic on slightly discoloured lobes of *Lobarina scrobiculata*. Scotland (W. Ross); rare.



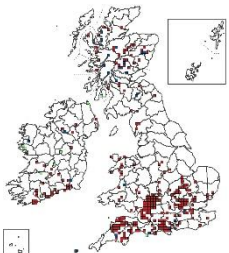
The apothecia are accompanied by numerous conidiomata of the supposed anamorph, *Phoma lobariicola* Alstrup (1997), which has pycnidia 40–70 µm diam., black, sessile; outer wall cells with dark brown thickening; conidia 5–7.5 × 2–2.5 µm. The connection with *Catillaria lobariicola* needs confirmation (Hafellner & Mayrhofer 2020) and it probably does not belong to *Phoma* in its current circumscription.

Catillaria nigroclavata (Nyl.) J. Steiner (1898)

LC

Like *C. lenticularis*, but differing mainly in growing on bark, and in the pale to dark brown hypothecium (at least in the upper part). Thallus thin and often immersed, pale to dark grey or grey-brown. Apothecia sessile, 0.15–0.3 mm diam., dark brown to black; hymenium 30–40 µm tall, colourless. Ascospores 8–10 × (2–) 2.5–3 (–4) µm. Pycnidia not seen. Chemistry unknown. **BLS 0316**.

On smooth or rough bark of deciduous trees (e.g. *Alnus*, *Corylus*, *Populus*, *Quercus*); locally common on twigs in young woodland groves in Ireland, S. & W. England and Scotland. In wound tracks and naturally nutrient-rich bark in clean air areas, but has spread rapidly and widely in areas with high ammonia pollution in recent years.



Easily mistaken in the field for common species such as *Amandinea punctata*. *C. chalybeia* occasionally occurs on bark, but has slightly larger apothecia with a black true exciple and usually a green pigment in the hymenium. The species may be a non-specific facultative parasite of other lichens, though this has not been observed in Britain and Ireland.

Catillaria stereocaulorum (Th. Fr.) H. Olivier (1905)

Apothecia 0.15–0.4 mm diam., dark red-brown, flat and shallowly marginate to slightly convex and immarginate; true exciple and epithecium dark red-brown; hymenium 35–43 μm tall; hypothecium colourless to pale yellow-brown; paraphyses with dark brown apical caps, to ca 5 μm diam. Asci *Catillaria*-type. Ascospores $11\text{--}20 \times (3\text{--}) 3.5\text{--}6$ (–6.5) μm . Pycnidia not seen. **BLS 2203.**

Parasitic on pseudopodetia and phyllocladia of *Stereocaulon* spp., but showing little damage to the host; mostly on *S. condensatum*, less often on *S. dactylophyllum*; rare. E. & S.W. Scotland, Wales.

Apothecia of the host are similar, but larger and with 3- or more-septate ascospores. The host is often also infected by *Polycoccum trypethelioides*.

NT



Catillaria subviridis (Nyl.) Zahlbr. (1926)

Thallus effuse, thin and rimose, beige to green-grey or grey-brown, matt; photobiont cells 8–12 μm in length, ellipsoidal, ovoid or cylindrical. Apothecia 0.1–0.2 (–0.3) mm diam., flat and narrowly marginate, black; true exciple dark brown at the outer edge (ends of hyphae with dark brown caps), \pm colourless within; hypothecium colourless. Ascospores mostly $10\text{--}16 \times 4.5\text{--}6$ μm . Pycnidia not seen. Lichen products not detected by TLC. **BLS 0321.**

On nutrient-enriched (e.g. by birds) rocks, in the submesic supralittoral zone with *Hydropunctaria maura*; rare. Channel Islands, Isles of Scilly.

Superficially like *C. chalybeia* and *C. atomarioides* but with a pale inner true exciple. *C. lenticularis* has brown apothecia, and *C. subviridis* differs from all three species by having larger ascospores.

VU (D2)



Catillaria usneicola Etayo (2000)

Thallus absent. Apothecia to 0.1 mm diam., sessile, black. Hymenium 20–25 μm high, hypothecium hyaline. True exciple and paraphyses with dark caps; ascus tip with a K/I+ blue apical dome. Ascospores aseptate, \pm biguttulate, $4.5\text{--}6 \times 1.5\text{--}2$ μm . **BLS 2465.**

Parasitic on the main branches of *Usnea* spp., which show no symptoms of damage; in our region reported from *Usnea cornuta*, *U. dasopoga* and *U. wasmuthii*; rare. W. Scotland and Easternness.

Unusual in having aseptate ascospores, although all other characters place this species in *Catillaria* s. str.

NE



The following species do not belong to the genus *Catillaria*, but no more appropriate placement can be confirmed at present.

Catillaria minuta (A. Massal.) Lettau (1912)

DD

Thallus endolithic, effuse, white. Apothecia 0.2–0.3 (–0.4) mm diam., pale red-brown to red-orange, sessile, at first with a concave disc, later flat or weakly convex; true exciple at first prominent, later shallow or excluded, often paler than the disc, with a pale yellow outer part, K–, inner part colourless; epithecium pale yellow, K–; hymenium 50–55 μm tall, colourless; hypothecium colourless; paraphyses unbranched, 1–1.5 μm diam.; apices swollen to ca 2.5 μm diam. Asci with a uniformly amyloid apical dome, or sometimes appearing *Biatora*-type. Ascospores $12\text{--}17 \times 4\text{--}6$ μm , ellipsoidal- to ovoid-fusiform, \pm constricted at the septum; old spores with a warted

surface. Pycnidia not seen. Chemistry unknown. **BLS 0315.**

In shaded crevices on hard limestone and limestone scree; rare. S.W. England (Devon), S. Pennines (Derbyshire), W. Scotland (Argyll), W. Ireland (Connemara, Kerry).

Molecular data are not available, but the morphological features of this species suggest that it is incorrectly placed in *Catillaria*, not least by its orange apothecia, whose K⁻ reaction distinguishes them from those of *Caloplaca* and *Protoblastenia* species. The warted ascospores could suggest an affinity with *Catinaria*.

Catillaria picila (A. Massal.) Coppins (1989)

Ex

Like *C. modesta* and probably belonging to the Ramalinaceae, but apothecia 0.3–0.8 mm diam., mostly constricted at the base or shortly stalked; ascospores (8–) 12–16 × 3–4.5 µm. Chemistry unknown. **BLS 0304.**

On calcareous schist and limestone. Scotland (Mid-Perthshire), Ireland (Connemara, Galway). No modern records, possibly extinct in Britain and Ireland.

The species resembles *Clauzadea monticola*, that species having *Porpidia*-type asci (dark, amyloid axial tube) and a red-brown (K⁻) excipular pigment. No sequences are available.



SOLENOPSORA A. Massal. (1855)

Thallus crustose, small-squamulose or placodioid with lobed margins firmly attached, rhizines absent (except for *S. holophaea*); prothallus absent or blue-black. **Upper surface** corticate. **Photobiont** chlorococcoid; cells mostly globose, a few ellipsoidal. **Ascomata** apothecia, sessile. **Thalline margin** present, sometimes becoming excluded. **Epithecium** yellowish brown to red-brown, sometimes interspersed with granules. **Hymenium** colourless to red-brown, I⁺ blue. **Hypothecium** colourless to yellowish brown, reddish brown or orange-brown. **Hamathecium** of unbranched paraphyses with swollen apices that often have an internal brown apical cap. **Asci** 8-spored, clavate, *Catillaria*-type but sometimes with a small ocular chamber. **Ascospores** colourless, ellipsoidal to fusiform, 0- to 1-septate, without a thick perispore. **Conidiomata** pycnidia, immersed in the thallus. **Conidia** bacillar, aseptate, colourless. **Chemistry**: orcinol and β-orcinol depsidones, triterpenes and various unidentified substances. **Ecology**: on rocks and soil, particularly in coastal or sunny calcareous areas.

Distinguished from *Catillaria* by features of the thallus, and from *Squamarina* and placodioid *Lecanora* species by the septate ascospores. *Psora* lacks a thalline margin and has aseptate ascospores.

Fačková *et al.* (2020) found that *Solenopsora* as currently circumscribed is polyphyletic, with one clade (including *S. holophaea*) sister to species of *Catillaria*, and another (including the other British and Irish species) related to *Leprocaulon* (Leprocaulaceae). The type of *Solenopsora*, *S. requenii* A. Massal., is a synonym of *S. holophaea* (Guttová & Nimis 2021), so it is likely that our other species need placement in a separate genus.

The lichenicolous fungi associated with *Solenopsora* species have been studied by Darmostuk *et al.* (2022).

Literature:

Darmostuk *et al.* (2022), Fačková *et al.* (2020), Gilbert *et al.* (2009), Guttová & Nimis (2021), Guttová *et al.* (2014), Miądlowska *et al.* (2014).

- 1 Thallus placodioid, with \pm distinct radiating marginal lobes; on basic rocks2
 Thallus small-squamulose; lobes not radiating; on siliceous rocks3
- 2(1) Upper surface white or pale grey, thickly white-pruinose; lobes flattened; mostly on limestone *candicans*
 Upper surface olive-grey, margin pale blue-pruinose; lobes \pm convex; on serpentine rock *liparina*
- 3(1) Thallus red-brown or brown, distinctly squamulose; soredia absent; apothecia present *holophaea*
 Thallus pale, glaucous or grey-white, almost crustose; isidia-like lobules mixed with granular soredia; apothecia usually absent *vulturienensis*

***Solenopsora candicans* (Dicks.) J. Steiner (1915)**

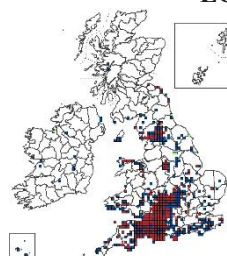
Thallus to 4 (–5) cm diam., rosette-forming, placodioid, shortly radiating, orbicular or irregular, of indistinctly defined flattened contiguous lobes 0.4–0.8 (–1) mm broad, overlapping secondary lobes sometimes present in older parts; upper surface uneven, pale whitish to bluish grey-white, matt, thickly white-pruinose, appearing roughened or scurfy, usually rimose towards the centre; prothallus blue-black. Apothecia to 1.2 mm diam., at first immersed, becoming sessile; disc flat, dark grey-blue to brown-black, faintly pruinose or roughened; thalline margin \pm persistent, concolorous with the thallus, eventually sometimes excluded, thickly crystalline (calcium oxalate); epithecium yellow-brown, \pm granular but without crystals, granules not dissolving in K; apices of paraphyses mostly colourless, but a few swollen brown-capitate apices present especially in young apothecia; hymenium 50–60 μ m tall, colourless; hypothecium colourless to pale straw. Ascospores (10–) 14–18 \times 3–4 μ m, narrowly ellipsoidal or somewhat clavate. Thallus C–, K–, KC–, Pd+ orange, UV+ grey (unidentified substances). **BLS 1324.**

On sunny exposed hard calcareous rocks, especially limestones, often near soil, frequent on limestone monuments in churchyards. Almost throughout England, S. and N. Wales, less common in Ireland, extending northwards to S. Scotland & Lismore, mostly coastal in the north and west.

Characterized by the spreading flattened placodioid thallus, emergent dark apothecia with a prominent thalline margin and the complex chemistry. Similar to *Diploicia canescens*, which has narrower, low convex lobes, is sorediate, has a K+ yellow and Pd– medulla, and is rarely fertile, with the apothecia lacking a thalline margin.

Host to *Muellerella lichenicola*.

LC



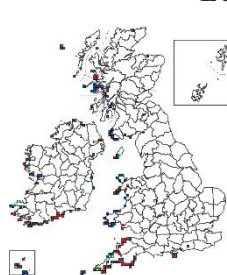
***Solenopsora holophaea* (Mont.) Samp. (1921)**

Thallus of numerous overlapping \pm horizontal squamules to 2.5 mm diam., often with rounded indented \pm raised margins, irregular, not radiating; upper surface pale to deep red-brown, olive-green when wet, smooth, occasionally partly rugose; lower surface pale fawn with scattered pale rhizines. Apothecia soon emergent, becoming sessile; thalline margin at first rather regular, later excluded; disc red- to brown-black, concolorous with or darker than the margin; epithecium red-brown; hymenium ca 50 μ m tall, \pm red-brown; hypothecium colourless or tinged pale red-brown. Ascospores 1-septate, 12–16 (–20) \times 4–5 μ m, narrowly ellipsoidal. Thallus C–, K–, KC–, Pd–, UV– (\pm atranorin, unidentified terpene). **BLS 1325.**

On soil and soft rocks, chiefly in slightly sheltered clefts on vertical cliffs or old walls, coastal; local. Throughout western parts of Britain and Ireland, very rare in S.E. England.

Often confused with *Romjularia lurida*, which occurs on inland calcareous rocks, lacks a thalline margin, has \pm globose, aseptate ascospores and very thick (3.5–5 μ m) paraphyses with a red-brown pigment upon the apices.

LC



***Solenopsora liparina* (Nyl.) Zahlbr. (1919)**

VU (D2)

Like *S. candicans* but the lobes are narrower, more strongly convex, often forming scattered clusters of loosely appressed, \pm indented lobes or small compact rosettes; upper surface pale, olivaceous grey, bluish pruinose at the periphery, sometimes nodular towards the centre. Apothecia sessile, with a thick smooth or scabrid thalline



margin, uneven, becoming excluded later; epithecium brown, granular, granules not dissolving in K. Ascospores (9–) 13–16 × 4–4.5 µm, straight or slightly curved, not or somewhat constricted at the septum. Thallus C–, K–, KC–, Pd+ orange, UV– (chemistry as in *S. candicans*). **BLS 1678.**

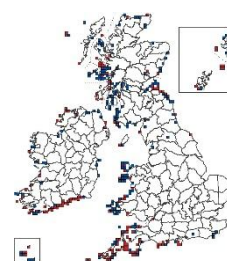
On sunny serpentine rocks near the coast; localized. S.W. England (Cornwall, Lizard).

S. candicans has a more even, whitish pruinose thallus, more flattened lobes and occurs on hard calcareous rocks.

Solenopsora vulturiensis A. Massal. (1856)

LC

Thallus very variable, usually of numerous nodular overlapping rounded or slightly expanded, ± radiating lobes, very crowded or discrete and ± scattered, often forming twisted coralloid ± isidiate clusters; upper surface whitish, glaucous, pale grey- to olive-green, ends white-pruinose, opalescent grey-green when wet; lobes to 0.5 mm broad, apices often swelling and breaking down into coarse granular soralia, paler or concolorous with the thallus. Apothecia rare, sessile, ± globose; thalline margin ± persistent, thin and irregular, later becoming excluded; disc 0.3–0.6 mm diam., pinkish or red-brown, flat to convex; epithecium brown to red-brown; hypothecium colourless to bright orange-brown. Ascospores 9–11.5 (–14) × 4.5–5 (–6) µm, aseptate, rarely 1-septate. Thallus C–, K+ faint yellow, KC+ faint yellow, Pd–, UV– (± atranorin). **BLS 1326.**



In moist crevices of mud-covered rocks, and on decaying vegetation and consolidated soil, mostly associated with sheltered nutrient-enriched coastal rocks and damp banks, submesic to xeric supralittoral; often locally frequent. S., W. & N. Britain and Ireland.

The development of soralia is very variable; the thallus may be ± entirely dissolved in granular soredia or (rarely) they may be completely absent. Resembles *Trapeliopsis wallrothii*, which is C+ red. When densely sorediate, *S. vulturiensis* may also superficially resemble *Lepraria* spp. with which it often grows; the small congested, sorediate lobes are usually diagnostic.

Host to an unidentified species of *Arthonia* (from St. Kilda).

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