

Revisions of British and Irish Lichens



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Lecanorales: Lecanoraceae

Cover image: *Lecanora pulicaris*, on a wooden post, Denbies Hillside, Ranmore Common, Surrey, England.

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to compile new printed editions of the entire lichen biota of Britain and Ireland is extensive, and many parts are out-of-date even as they are published.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

including the genera *Ameliella*, *Bryonora*, *Carbonea*, *Claurouxia*, *Clauzadeana*, *Glaucomaria*, *Japewia*, *Japewiella*, *Lecanora*, *Lecidella*, *Miriquidica*, *Myriolecis*, *Palicella*, *Protoparmeliopsis*, *Pyrrhospora* and *Traponora*.

by

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LECANORACEAE Körb. (1855)

Thallus crustose, granular or \pm squamulose, sometimes areolate and/or with radiating margins, sometimes internal, rarely absent (in parasitic or commensal species), rhizoids absent or poorly developed, sometimes sorediate, isidia and cephalodia absent, prothallus absent to blue-black. Photobiont chlorococcoid. Ascomata apothecia, sessile or short-stalked, rarely \pm immersed, usually with a well-developed thalline margin that is usually concolorous with the thallus and sometimes becomes excluded, the disc often strongly pigmented. Interascal tissue of branched or anastomosing paraphyses, often with clavate tips and a pigmented and/or crystalline epithecium. Asci *Lecanora*-type, rarely *Bacidia*- or *Biatora*-type, cylindrical to clavate, thick-walled, with a well-developed J+ apical cap, a usually well-developed ocular chamber and apical cushion, with an outer layer of J+ gelatinized material, 8- to (rarely) 32-spored. Ascospores ellipsoidal, clavate or elongate, rarely acicular, almost always colourless, smooth, aseptate or septate, without a gelatinous sheath or appendages. Anamorphs pycnidial, varied in form, \pm immersed in thallus tissue, colourless or brown. Conidiogenous cells often borne on short branched conidiophores, elongate, proliferating percurrently with well-developed collarettes. Conidia usually filamentous and curved, colourless, aseptate, with some species producing up to four distinct conidial morphs (macroconidia, mesoconidia and microconidia *sensu* Coppins (1983); leptoconidia *sensu* van den Boom and Brandt (2008).

The Lecanoraceae is here accepted as defined by Zhao *et al.* (2015a) and Lücking *et al.* (2016), except that *Carbonea* (Hertel) Hertel (1983) is preferred over *Huea* C.W. Dodge and G.E. Baker (1938) for reasons of nomenclatural stability (see Fryday *et al.* 2022), and *Tylothallia* which has recently been moved into the Ramalinaceae (Kistenich *et al.* 2018). Additionally, *Japewia* is included within the Lecanoraceae (Maliček *et al.* 2020), though its position needs further clarification. The Lecanomics website (<https://lecanomics.org/>) provides much new information, and a focus for research on these lichens.

The Lecanoraceae contain some of the most familiar lichen species in Great Britain & Ireland, but the family is difficult to define in morphological terms. Even characters that might be expected to be diagnostic such as lecanorine apothecia and the *Lecanora*-type ascus are not universal within the family, and occur in many unrelated groups. Rather than a traditional key to genera, a table of distinctive features is presented here.

Two newly developed spot tests are generally useful in this family. K/UV (dry) + bright neon yellow, the fluorescence only developing as the spot test dries, indicates the presence of atranorin and is much more sensitive than the K+ yellow reaction. Also of use is K/UV (wet) + bright green-yellow, with the fluorescence developing immediately; it is indicative of the presence of xanthenes and is more sensitive than the C+ orange test.

Genus	Distinctive features
<i>Ameliella</i>	Apothecia initially immersed in the thallus; thalline margin becoming excluded; paraphyses with dark brown caps; montane, overgrowing bryophytes
<i>Bryonora</i>	Thallus reduced, granular or effuse; paraphyses strongly conglutinated with dark brown caps; ascospores large, elongate, often becoming multiseptate; montane, overgrowing bryophytes
<i>Carbonea</i>	Most species lichenicolous, without an obvious separate thallus; apothecia black; thalline margin absent; epithecium dark blue-green; hymenium often aeruginose
<i>Claurouxia</i>	Apothecia black; thalline margin absent, true exciple well-developed, carbonaceous; asci <i>Candelariella</i> -like; montane, rare
<i>Clauzadeana</i>	Apothecia immersed in a dark crustose thallus; prothallus black, well-developed, paraphyses rarely branched with swollen apical cells; hypothecium purple to brown

<i>Glaucomaria</i>	Segregate from <i>Lecanora</i> with strongly pruinose, often semi-immersed apothecia; containing sordidone, the disc pruina C+ yellow or orange
<i>Japewia</i>	Thalline margin poorly developed or absent; true exciple reduced and weakly gelatinized; asci <i>Biatora</i> -type; ascospores with multilayered walls
<i>Japewiella</i>	Thalline margin poorly developed; true exciple well-developed, persistent; asci \pm <i>Lecanora</i> type; paraphyses branched below; hypothecium pale, I+ blue; ascospores thick-walled
<i>Lecanora</i>	Apothecia sessile; thalline margin usually conspicuous and raised, often with crystalline inclusions; true exciple poorly differentiated; hypothecium pale; paraphyses sparsely branched, the apices often swollen and pigmented; asci mostly <i>Lecanora</i> -type; ascospores aseptate
<i>Lecidella</i>	Thallus usually C+ orange; apothecia sessile; thalline margin absent; true exciple well-developed, sometimes crystalline; epithecium dark; hymenium often aeruginose, I+ blue; asci <i>Lecanora</i> -type
<i>Miriquidica</i>	Thallus usually containing miriquidic acid; apothecia dark, immersed or \pm sessile; thalline margin usually absent; hypothecium pale; paraphyses sparsely branched, the apices often swollen and pigmented; asci mostly <i>Lecanora</i> -type
<i>Myrriolecis</i>	Thallus usually inconspicuous, mostly immersed in the substratum; apothecial margins white, prominent; xanthonenes present as primary compounds or lichen chemistry absent.
<i>Palicella</i>	Apothecia ranging from light yellow to greenish black, thalline margin \pm excluded when old; hypothecium colourless; hymenium colourless or pale bluish green or ochre above; asci <i>Lecanora</i> -type; atranorin as primary compound; apparently extinct in GBI.
<i>Protoparmeliopsis</i>	Thallus with lobe-like margins, typically greyish or yellowish green; apothecia sometimes crenulate; asci <i>Lecanora</i> -type
<i>Pyrrhospora</i>	Thalline margin absent; true exciple containing red granules; epithecium K+ purplish; asci <i>Lecanora</i> -type; thallus containing xanthonenes
<i>Traponora</i>	Apothecia erumpent, irregular and sometimes surrounded by radial splits in the thallus; thalline margin thin and quickly excluded; true exciple sometimes crystalline; asci <i>Lecanora</i> -type; atranorin and xanthonenes

Literature

Kistenich *et al.* (2018), Lücking *et al.* (2016), Malíček *et al.* (2020), Miądlikowska *et al.* (2014), Zhao *et al.* (2015a).

AMELIELLA Fryday & Coppins (2008)

Thallus crustose, grey to brown, matt, thin or of small verrucose to subsquamulose areoles, forming small patches (1–2 cm diam.); cortex thin or poorly differentiated; algal layer occupying the remainder of the thallus; medulla not developed and prothallus not evident. **Photobiont** chlorococcoid. **Ascomata** apothecia, often covering much of the thallus, initially immersed in thalline warts but becoming half to three quarters emergent, small, flat to slightly convex, becoming strongly convex and distorted when over-mature. **Disc** pale to dark brown (translucent when moist). **True exciple** usually evident, paler than the disc; hyaline but with brown or dull green (K+ brown, N+ red) pigment at the outer edge, I+ deep blue or mauve. **Thalline margin** (remains of thalline warts) present in young apothecia but soon becoming excluded. **Epithecium** with brown granules decolorizing in K. **Hymenium** I+ pale bluish or greenish. **Hypothecium** colourless, strongly conglutinated. **Hamathecium** of paraphyses, branched above but not anastomosing, septate, slightly swollen at the apex with a brown cap. **Asci** numerous, 8-spored, cylindric-clavate, *Lecanora*-type. **Ascospores** aseptate, colourless, narrowly ellipsoidal-fusiform to cylindric-ellipsoidal, without a distinct perispore or ornamentation. **Conidiomata** pycnidia, immersed in areoles. **Conidia** curved to hamate. **Chemistry**: lichen products not detected by TLC. **Ecology**: on bryophytes on low boulders or on the ground in exposed montane heaths and areas of late snow-lie.

Miriquidica is very similar, but is primarily saxicolous and has a thallus with a well-defined cortex and medulla, and most species contain lichen products detectable by TLC. *Bryonora* species have a similar habit, but a better developed true exciple and bacilliform conidia.

Literature:

Fryday & Coppins (2008, 2009).

- 1 Ascospores ellipsoidal-fusiform, $18-24 \times 5-7 \mu\text{m}$ *andreaeicola*
 Ascospores cylindric-ellipsoidal, $10-14 \times 5-7 \mu\text{m}$ *grisea*

Ameliella andreaeicola Fryday & Coppins (2008) NT

Thallus forming small patches (to ca 2 cm diam.) of small verrucose to subsquamulose areoles 0.1–0.45 mm diam., which sometimes coalesce with the thallus which may become secondarily cracked, chestnut to dark brown (paler in shade) or occasionally greyish. Cortex thin, 5–7 μm thick, of brown-walled (K–, N–) rounded cells 3–3.5 μm diam., sometimes overlain by a colourless external layer 2–4 μm thick; photobiont chlorococcoid, cells (6–) 8–10 (–12) μm diam., or to 15 μm when dividing internally to form 4 (–8) autospores. Apothecia abundant, (0.1–) 0.2–0.4 mm diam.; disc chestnut to dark brown, usually with a paler proper exciple, flat to slightly convex, becoming strongly convex and distorted when over-mature; initially immersed in thalline warts and appearing only as a narrow slit; pseudothalline margin present in young apothecia but soon becoming excluded; true exciple a narrow indistinct zone, when well developed 10–20 μm thick, colourless but brown (K–, N–) or dull green (K+ brown, N+ red) pigmented at its outer edge, I+ deep blue or mauve, composed of outwardly radiating conglutinated hyphae with lumina 2–2.5 μm diam.; hymenium 100–120 μm tall, I+ blue around the asci, but I± pale bluish elsewhere. Hypothecium hyaline, strongly conglutinated. Asci 45–50 \times 17–22 μm . Ascospores narrowly ellipsoidal-fusiform, $18-24 \times 5-7 \mu\text{m}$, often wider at one end. Pycnidia rare, inconspicuous, 50–100 μm diam.; wall colourless or pale brown in part; conidiogenous cells 5–10 \times ca 1.5 μm ; conidia 11–12 \times 0.7–1 μm . **BLS 0150.**

On mosses, usually overgrowing *Andreaea* species on the flat upper surfaces of siliceous rocks around areas of late snow-lie in the Scottish Highlands at altitudes of 1000 m or more; occasional.

Bryonora curvescens grows in similar habitats, but has much larger, ± sessile apothecia and longer ascospores.



Ameliella grisea Fryday & Coppins (2008) NT

Similar to *A. andreaeicola*, but thallus grey-white, matt, thin to verrucose-areolate, areoles 0.15–0.3 (–0.4) mm diam., forming small patches (to 1 cm diam.), usually in montane heaths. Cortex indistinct and outer cells not pigmented, sometimes with a colourless external layer ca 5 μm thick. Apothecia 0.15–0.23 mm diam., with an often paler disc. Ascospores cylindric-ellipsoidal, $10-14 \times 5-7 \mu\text{m}$. Pycnidia not found. **BLS 0052.**

On the ground in exposed montane heaths at altitudes of 1000 m or more. Scottish Highlands (Ben Lawers range and Cairngorms).



BRYONORA Poelt (1983)

Thallus crustose. **Photobiont** chlorococcoid. **Ascomata** apothecia, sessile. **Thalline margin** present but superficially often appearing biatorine. **True exciple** distinct, continuous, strongly conglutinated, swollen; outer layer consisting of anastomosing net-like randomly-oriented hyphae in a firm gelatinous matrix, the marginal hyphae with globose, ± swollen apices; inner layer non-swollen, red-

brown, strongly conglutinated. **Epithecium** red-brown. **Hypothecium** strongly conglutinated, with photobiont cells below, pale brown. **Hamathecium** of narrow unbranched paraphyses, the apices thickened. **Asci** 8-spored, with an K/I+ blue outer wall layer and a distinctly I+ blue tholus. **Ascospores** thick-walled, ellipsoidal-elongate to spindle-shaped, aseptate or septate, colourless. **Conidiomata** pycnidia. **Conidia** bacilliform. **Chemistry**: lichen products not detected by TLC. **Ecology**: on mosses, arctic-alpine.

Closely related to *Miriquidica* and the non-British *Psorinia* from which it is distinguished by the conglutinated cortex of the exciple and its bryophilous habit.

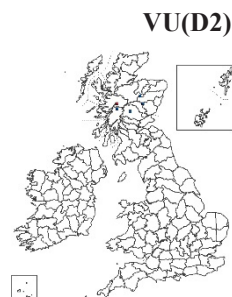
Literature:

Gilbert & Purvis (2009), Svensson *et al.* (2022).

Bryonora curvescens (Mudd) Poelt (1983)

Thallus mostly within mosses, indistinct, grey- to black-brown, irregularly granular, nodulose or ± continuous and film-like, effuse. Apothecia scattered to crowded, ± sessile, 0.5–1 mm diam.; disc dark brown to black-brown, initially ± grey-white-pruinose, at first ± rounded, concave, later becoming irregularly lobate, flat or often ± convex, to 5 mm diam., the margin grey to deep red-brown, mostly concolorous or somewhat paler than the disc; true exciple, when evident, 30–50 µm broad; paraphyses with apices to 4 µm diam.; end cell red-brown. Ascospores (18–) 24–35 (–41) × 5–6.5 (–8) µm, aseptate to 4(–6)-septate, ellipsoidal-subcylindrical, rarely clavate, with rounded or weakly pointed apices, straight, curved or weakly S-shaped. **BLS 0645**.

On *Andreaea*, *Grimmia* and other mosses on damp inclined to horizontal north-facing rock outcrops, mostly above 900 m; very rare. C. Scotland (Ben Lawers, Ben Nevis range, Caenlochan, Cairngorm, Glen Coe).



CARBONEA (Hertel) Hertel (1983)

Thallus crustose, continuous to dispersed, areolate, sometimes scurfy-granular or lumpy-verrucose, absent in commensal lichenicolous species. **Photobiont** chlorococcoid. **Ascomata** apothecia, black, glossy or dull. **Thalline margin** absent. **True exciple** well-developed, black, opaque, hyphae dark-pigmented, narrow and raised, or excluded and colourless in some species. **Epithecium** intense blue-black-green to aeruginose-green. **Hymenium** colourless in lower parts to vivid aeruginose-green above. **Hypothecium** colourless to dark brown-black. **Hamathecium** of conglutinated unbranched or branched-anastomosed paraphyses, the apical cell sometimes swollen, coherent in a gelatinous matrix. **Asci** 8-spored, *Lecanora*-type, clavate; outer ascus wall very thin. **Ascospores** cylindrical-ellipsoidal to ovoid-fusiform, colourless, aseptate, perispore absent. **Conidiomata** pycnidia, immersed. **Conidiogenous cells** elongate, ampulliform, proliferating percurrently, arising singly or in small groups. **Conidia** curved, thread-like, aseptate to septate, colourless. **Chemistry**: atranorin, zeorin, 7-chloroexoin and various xanthenes, but lichen products not reported or with traces of argopsin in all known British taxa. **Ecology**: on siliceous and calcareous rocks, walls and boulders in upland areas, or on lichens.

Distinguished from morphologically similar genera, e.g. *Lecidella* or *Micareia*, by a combination of the *Lecanora*-type ascus, very thin outer ascus wall, large-celled photobiont, intense aeruginose-blue upper hymenium, more strongly conglutinate paraphyses and opaque, often black true exciple.

Scoliciosporum has similar glossy black apothecia, but elongate, septate ascospores; it is currently placed in its own family within the Lecanorales.

Fryday (2011) concluded that the generic name *Huea* C.W. Dodge and G.E. Baker (1938) was an earlier name for *Carbonea*, but their work was much misunderstood and was not taken up generally. *Huea* was not included in the list of fungal generic names proposed for protection by Kirk *et al.* (2013). As none of the necessary new combinations have been made and the change would result in significant instability, we retain *Carbonea* as the accepted name for this group of fungi. Fryday *et al.* (2022) have proposed *Huea* for conservation with a different type, thus protecting *Carbonea* and allowing *Huea* to be used for a genus of Teloschistaceae.

Literature

Chambers *et al.* (2009), Fryday (2011), Kirk *et al.* (2013), Pirogov *et al.* (2014), Svensson & Owe-Larsson (2019).

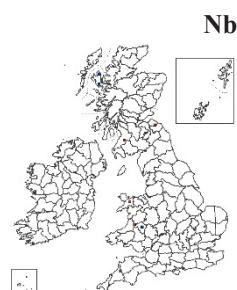
- | | | |
|------|---|--|
| 1 | Lichenicolous; establishing directly on or around the prothalline zones of other lichens; thallus absent or delimited and lumpy-verrucose; pycnidia absent | 2 |
| | Not on lichens; thallus distinct (but often endolithic), crustose, wide-spreading or in small patches, not lumpy-verrucose; pycnidia usually present | <i>vorticosa</i> |
| 2(1) | Thallus absent, vegetative tissues immersed within the host; discrete or grouped black apothecia present; on <i>Lecanora</i> or <i>Candelariella</i> | 3 |
| | Thallus distinct, of convex areoles or scurfy-granular, developed peripherally around or on other crustose lichens | 5 |
| 3(2) | On <i>Candelariella vitellina</i> ; ascospore apices rounded; epithecium blue-black to emerald | <i>vitellinaria</i> |
| | On <i>Lecanora polytropa</i> or <i>L. soralifera</i> ; ascospore apices pointed-attenuate or rounded; epithecium vivid blue-black-aeruginose | 4 |
| 4(3) | Apothecia often clustered, disc becoming strongly convex; ascospores 3–4 µm broad, apices rounded | <i>aggregantula</i> |
| | Apothecia dispersed or loosely grouped, disc concave to flat; ascospores 4.5–7 µm broad, apices acutely attenuated | <i>supersparsa</i> |
| 5(2) | Apothecia immarginate; true exciple soon excluded, colourless or pale brown in section; subhymenium and contents of asci and spores sometimes with an orange, K+ purple-red pigment; ascospores 0-1(-3)-septate | [Scoliciosporaceae] <i>Scoliciosporum intrusum</i> |
| | Apothecia marginate; proper exciple raised, persistent, opaque black in section; tissues K–; ascospores aseptate | <i>assimilis</i> |

Carbonea aggregantula (Müll. Arg.) Diederich & Triebel (2003)

Thallus absent, lichenicolous, not causing obvious damage to the host lichen. Apothecia glossy, jet black, 0.2–0.4 mm diam., sometimes clustered, sessile, the base sometimes slightly constricted; true exciple becoming excluded; disc shallowly to strongly convex; epithecium gelatinized, intense aeruginose-green-black, K+ bright blue-green; hypothecium dark brown. Ascospores 9.5–12 × 3–4 µm, cylindrical-ellipsoidal to slightly ovoid, often curved, with rounded apices, aseptate, colourless.

BLS 2393.

Lichenicolous on *Lecanora polytropa* and *L. soralifera*, on acid rock, scree and mine spoil; rare, but probably overlooked. Scotland, (Skye, E. Lothian, Dumfries), England (Lake District), N. and C. Wales.



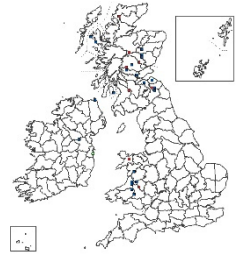
Carbonea assimilis (Körb.) Hafellner & Hertel (1987)

Like *Carbonea vorticosa*, but the thallus is thicker, brown and areolate-verrucose; apothecia 0.2–0.6 (–0.8) mm

diam., sessile, black, glossy; epithecium aeruginose-green; hypothecium colourless. Ascospores aseptate, apices rounded, (8–) 10–15 × 5–8 μm . **BLS 1860**.

An obligate parasite of crustose lichens on hard steeply sloping to \pm horizontal, neutral to weakly basic rock, particularly mineral-rich basalt, gneiss and slate, in exposed submontane sunny situations; rare. Scotland (Westernness, Isle of Skye, East Lothian). The identity of the host lichens seems generally to be uncertain.

The species can easily be confused with *Lambiella insularis*, a parasite of *Glaucomaria rupicola* with a very similar thallus and ascospores of comparable size. *L. insularis* has frequently anastomosing paraphyses and *Trapelia*-like asci.

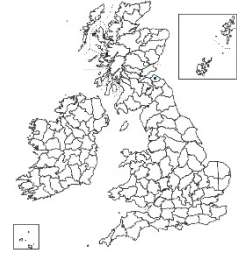


Carbonea supersparsa (Nyl.) Hertel (1983)

Thallus absent, hyphae inhabiting the host lichens, which retain their normal appearance. Apothecia jet black, 0.2–0.4 (–0.5) mm diam., sessile on the thallus and apothecia (both discs and margins) of the host; true exciple persistent, raised and narrow; disc flat or remaining concave; epithecium intense aeruginose-green-black, K+ bright blue-green; hypothecium colourless. Ascospores 8.5–13 × 4.5–7 μm , aseptate, ovoid-ellipsoidal to fusiform, the apices acutely attenuated. **BLS 0706**.

Lichenicolous (commensal) on *Lecanora polytropa*, perhaps also on *Rhizocarpon* and *Toninia* spp., on well-lit hard acid rocks, boulders and mine spoil, in upland and montane areas; very local. Scotland, Wales (Caernarvonshire, Merionethshire, Cardiganshire, Radnorshire), a couple of records from Ireland.

Nb

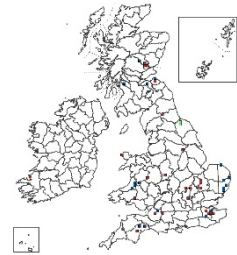


Carbonea vitellinaria (Nyl.) Hertel (1983)

Thallus absent, vegetative tissues inhabiting the host, the thallus of which appears outwardly unaffected. Apothecia black, shiny, subsessile to immersed in the squamules of the host, 0.2–0.3 (–0.5) mm diam., round or oval from compression; true exciple persistent and raised; epithecium deep blue-black, K+ bright emerald-blue. Ascospores 7–12 × (4–) 5–6 (–7) μm , aseptate, ellipsoidal, the apices rounded. **BLS 1880**.

Lichenicolous (commensal) on the thallus and apothecia of *Candelariella vitellina*, on weakly nutrient-enriched acid rocks and boulders; widespread but local. S. England northwards to the Scottish Highlands, C. Wales (Merionethshire, Cardiganshire, Radnorshire), W. Ireland.

Nb



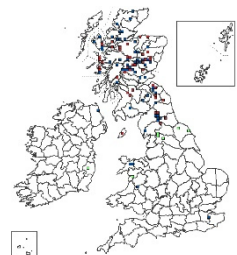
Carbonea vorticosa (Flörke) Hertel (1983)

Thallus thin, in small to wide-spreading irregular patches 5–20 (–60) mm across, dull olivaceous-brown, grey-brown or olive-black, irregularly wrinkled-granular to subareolate or cracked-areolate, often evanescent along cracks in the substratum, matt or shining; photobiont cells 6–19 μm diam. Apothecia small, 0.1–0.5 (–1) mm diam., numerous, scattered or mostly closely clustered in tight groups, rounded to oval and \pm distorted through mutual pressure; disc black, matt or shining, below the level of the true exciple, concave and persistently crater-like, rarely flat; true exciple raised, narrow, black and opaque in section, entire, sometimes subflexuose; epithecium intense dark blue-black, K+ bright blue-aeruginose; hypothecium dark brown-black. Ascospores aseptate, colourless, (7–) 9–12 (–15) × 3.5–4.5 (–6) μm , cylindric-ellipsoidal, straight or slightly curved, apices rounded. Pycnidia ca 60 μm diam., frequent; wall green-brown in upper part, \pm colourless below; conidia 17–30 × ca 0.7 μm . K–, KC–, Pd+ orange (argopsin), UV–. **BLS 0793**.

On siliceous rocks, boulders and walls in upland to montane habitats; widespread, but often overlooked. C. & N. Wales (rare), N. England, Scotland. Ireland (Antrim).

Carbonea vorticosa is a widespread bipolar-alpine lichen known from most of the high mountain ranges throughout the world. It is the most southerly (86°30'S) and one of the highest recorded (7400 m) lichen. Lowland records outside arctic regions need to be rechecked.

Nb



CLAUROUXIA D. Hawksw. (1988)

As this is a monotypic genus, the description below (*C. chalybeioides*) constitutes the generic description.

Clauroxia is distinguished amongst the lecideoid lichens by the ascus structure, moniliform paraphyses, and, particularly, the thick, black and friable exciple and hypothecium which are continuous and extend below the whole apothecium. It shows some affinity in ascus structure to *Candelariella*. No molecular data are available, and its position within the Lecanoraceae is questionable.

Literature

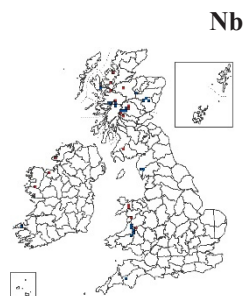
Clauzade & Roux (1984, as *Pseudolecidea*), Gilbert & Hawksworth (2009a).

Clauroxia chalybeioides (Nyl.) D. Hawksw. (1988)

Thallus crustose, superficial, blackish, composed of angular greenish grey areoles 0.1–0.2 mm diam., each surrounded by a prominent black prothalline rim; medulla I–; prothallus black, conspicuous; photobiont trebouxiod. Apothecia black, 0.2–0.4 mm diam., immersed to erumpent; thalline margin absent; true exciple well-developed, raised, black, carbonaceous and easily fragmenting; epithecium blue-green; hypothecium purple-black to black, ± continuous with the exciple, K+ reddish purple in parts; paraphyses to 3 µm diam. at the apices; hamathecium 50–60 µm tall, of mainly unbranched paraphyses, ± moniliform with several swollen cells towards the tip, the apical cell more strongly swollen with a brown apical cap, I+ blue. Asci 8-spored, elongate-clavate, strongly thickened at the apex, with a densely I+ blue colour subtending a conspicuous I– apical cushion. Ascospores broadly ellipsoidal to subglobose, (4–) 5–8 (–9) × (3–) 4–5 µm, aseptate, colourless, smooth, without a distinct epispore. Conidiomata not known. No lichen products reported, but with an unidentified K+ reddish purple pigment in the true exciple and hypothecium. **BLS 1709.**

On hard, often fine-textured igneous rocks in damp or sporadically inundated situations; rare. England (Devon, Lake District), C. and N. Wales, Scotland (Highlands), W. Ireland.

Resembles *Clauzadeana macula* but is very different microscopically (q.v.).



CLAUZADEANA Cl. Roux (1984)

As this is a monotypic genus the description below (*C. macula*) constitutes the generic description. The aspicilioid ascomata have led to this taxon being subsumed under *Aspicilia*, but it differs in the nature of the hamathecial tissues and ascus structure. Aspicilioid apothecia also occur in *Amygdalaria* and *Schaereria*, but *Clauzadeana* differs from both these genera on the basis of ascus structure, and further by the presence of algal cells in the exciple and under the hymenial tissues.

Literature

Gilbert & Hawksworth (2009b).

Clauzadeana macula (Taylor) Coppins & Rambold (1989)

Nb

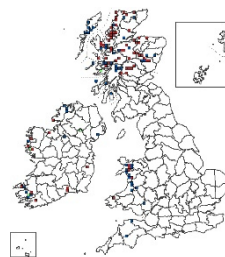
Thallus crustose, composed of regular reddish brown angular ± shiny areoles 0.2–0.8 mm diam., dispersed on a well-developed black prothallus which is often dominant, giving the whole a uniform black colour without study with a hand lens; medulla I–; photobiont trebouxiod. Apothecia 0.1–0.2 (–0.3) mm diam., immersed in thallus areoles, aspicilioid, the algal cells extending below the hymenium and into the excipular tissues; disc flat to

slightly convex; thalline margin not raised, ± colourless; epithecium brownish to bluish green, N+ purple-red; hypothecium ± colourless; hamathecium 50–60 µm tall, I+ blue, of richly branched and anastomosing paraphyses, composed of short, irregularly shaped cells; not swollen or capitate. Asci 30–40 × ca 15 µm, broadly clavate, with a thick apical dome, tholus K/I+ blue but penetrated by a broad K/I– canal (*Lecanora*-type). Ascospores (7–) 8–10 (–14) × (3–) 3.5–5 (–6) µm, ellipsoidal, aseptate, colourless, without a distinct perispore. Conidiomata unknown. Medulla Pd+ red, K–, KC–, C– (argopsin). **BLS 0746.**

On exposed hard siliceous rocks, especially granite, upland; local. S.W. England (Dartmoor, Exmoor), Wales, C. & N. Scotland (incl. Outer Hebrides), Ireland (Galway, Mayo and mountains in the east).

In *Claurouxia chalybeioides* the paraphyses are mainly unbranched or infrequently branched, the terminal cells swollen, and the hypothecium purple to brown. The habit and thallus colour superficially recall *Schaereria fuscocinerea*, with which the species not infrequently occurs, but that species differs in the blackish areoles and in the ascus apices being thin-walled and without any K/I+ blue internal apical structures. Other superficially similar ‘blackish’ species in similar habitats include *Orphniospora moriopsis* and *Rimularia gryzans*.

The lichenicolous *Epithamnolia xanthoriae* (Brackel) Diederich & Suija has been recorded from this host.



GLAUCOMARIA M. Choisy (1929)

Thallus crustose, pale yellow, yellowish green, yellowish grey or greyish brown, usually above the substratum and conspicuous, smooth to cracked-areolate. **Soredia** and **isidia** absent [but see under *G. rupicola* below]. **Ascomata** apothecia, initially immersed, ± sessile or exposed at maturity. **Thalline margin** prominent but sometimes becoming ± excluded. **Disc** strongly white- or cream-pruinose. **Chemistry**: C+ yellow or orange.

This constitutes the *Lecanora rupicola* group as defined by Grube *et al.* (2004), Blaha & Grube (2007) and Zhao *et al.* (2015a). It appears to occupy a basal clade within the Lecanoraceae, possibly having diverged from the main lineage prior to well-recognized genera such as *Lecidella*.

Kondratyuk *et al.* (2019) included *Lecanora sulphurea* (Hoffm.) Ach. in *Glaucomaria* but the sequence underpinning the new combination was actually of the unrelated taxon *L. rupicola* subsp. *sulphurata* (Ach.) Leuckert & Poelt (1989). The combination unfortunately still stands, but *L. sulphurea* belongs in the *L. symmicta* clade and not in *Glaucomaria*.

Edwards *et al.* (2009) indicated that the *Glaucomaria* group included *L. ochroidea* and *L. subcarnea*, but these species appear not to produce sordidone in the epithecial layer of the apothecia (the chemical causing the C+ yellow/orange reaction). The former species has not been sequenced to date and the latter was excluded from *Glaucomaria* by Grube *et al.* (2004) and placed provisionally near *Lecanora albella*.

Literature

Blaha & Grube (2007), Edwards *et al.* (2009), Grube *et al.* (2004), Hafellner (1984), Kondratyuk *et al.* (2019), Zhao *et al.* (2015a).

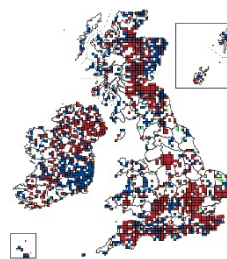
- | | |
|------|--|
| 1 | Thallus C– (the apothecial disc C+ yellow/orange); apothecia immersed to sessile 2 |
| | Thallus C+ orange; apothecia with a strongly constricted base; montane <i>swartzii</i> |
| 2(1) | Corticolous (or almost exclusively so); apothecia sessile <i>carpineae</i> |
| | On siliceous rocks; apothecia not emerging above the thallus surface <i>rupicola</i> |

Glaucomaria carpinea (L.) S.Y. Kondr., L. Lőkös & Farkas (2019)

LC

Lecanora carpinea (L.) Vain. (1888)

Thallus forming discrete patches, generally continuous and smooth, thin, pale grey to white, tending to become darker and somewhat cracked in the centre with age; prothallus white. Apothecia 0.5–1 (–1.5) mm diam., sessile, constricted at the base, often crowded; thalline margin well-developed with fine crystals readily soluble in K, entire, persistent though sometimes becoming almost excluded with age; disc pale red-brown to cream or purple, flat to somewhat convex, densely white-grey pruinose; epithecium granular, pale yellow-brown, the granules dissolving in K; hymenium 45–65 µm tall; paraphyses 1–2 µm diam., sparsely branched and anastomosed, apices not or slightly swollen. Asci 55–70 × 14–18 µm, clavate, stalked. Ascospores (9–) 10–12.5 (–14) × (5–) 6–8 µm., subglobose to ellipsoidal. Conidia 15–16 × ca 1 µm, thread-like to curved. Thallus C–, K+ yellow, Pd± pale yellow, UV–; apothecial disc (epithecium in section) C+ yellow or orange, UV+ pale orange (atranorin, chloratranorin, sordidone, roccellic acid). **BLS 0636**.



On smooth bark of deciduous trees, particularly on twigs, small branches and young trunks, exceptionally on stonework; frequent in nutrient-enriched habitats. Throughout Britain and Ireland.

Lecanora albella has a similarly pale coloured thallus, densely white-pruinose apothecia but the apothecial discs react C–, Pd+ red and the thallus is Pd+ yellow→red and it occurs on acid bark in less nutrient-enriched habitats.

Glaucomaria subcarpinea (Szatala) S.Y. Kondr., L. Lőkös & Farkas (2019) differs by larger apothecia and a more pronounced white thallus with a strong P+ yellow reaction (psoromic acid); it was suggested by Edwards *et al.* (2009) that some specimens on *Acer* from Scotland (East Lothian) might be referable to this species, but no confirmed collections exist. Additionally, some populations assigned to *G. carpinea* in GBI have crystals within the thalline margin that do not dissolve in K, and these may be referable to *G. leptyroides* (G.B.F. Nilsson) S.Y. Kondr., Lőkös & Farkas (2019). More work is needed to distinguish these two species. See also *Myriolecis populicola*.

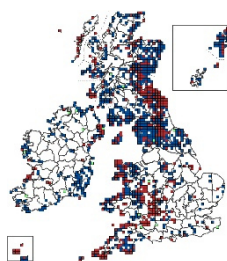
Lichenicolous fungi recorded on this host are: *Arthonia subfuscicola*, *Lichenocodium erodens* M.S. Christ. & D. Hawksw. (1977), *L. lecanorae* (Jaap) D. Hawksw. (1979), *Lichenostigma cf. chloroteræ* (F. Berger & Brackel) Ertz & Diederich (2013), *Muellerella lichenicola* (Sommerf.) D. Hawksw. (1979), *Sphaerellothecium propinquellum* (Nyl.) Cl. Roux & Triebel (1994), *Stigmidium congestum* (Körb.) Triebel (1991), *Unguiculariopsis thallophila* (P. Karst.) W.Y. Zhuang (1988) and *Vouauxiella lichenicola* (Linds.) Petr. & Syd. (1927).

Glaucomaria rupicola (L.) P.F. Cannon (2022)

LC

Lecanora rupicola (L.) Zahlbr. (1928)

Thallus forming continuous patches or mosaics, clearly delimited, rimose, often thick and uneven, areoles flat to slightly convex, white-grey or sometimes deeper grey to green- or brown-grey, surface ± smooth; prothallus whitish or little evident, but grey-black when between other thalli of this species; soredia absent (but see var. *efflorens* below). Apothecia 0.5–2 (–3) mm diam., immersed to slightly raised, arising singly or juxtaposed; thalline margin entire and crenulate to flexuose or convoluted, not extending above the thallus surface; disc pink to brown, flat to convex, densely pale grey to blue-grey pruinose; epithecium pale brown to dark olivaceous brown, interspersed with crystals not dissolving in K; hymenium 80–90 µm tall; paraphyses 2–3 µm diam., sparsely branched, apices to 3.5 µm diam., not or slightly thickened, colourless. Ascospores (8–) 9–14.5 (–15) × 5.5–7 (–7.5) µm. Conidia 14–25 × ca 1 µm, thread-like to curved. Thallus C–, K+ yellow, medulla UV+ yellow, apothecial disc C+ yellow, Pd–, UV+ pale orange; (atranorin, chloratranorin, sordidone, eugenitol, roccellic and thiophanic acids). **BLS 0674**.



On hard exposed siliceous rocks, frequent in the xeric-supralittoral zone on coastal rocks but also locally frequent inland. Widespread in N. & W. Britain and Ireland but very local in S.E. England where it is largely confined to churchyards.

The species varies considerably throughout its range and several subspecies have been recognized; all material from the British Isles conforms to *Glaucomaria rupicola* s. str. *G. swartzii* differs in the C+ yellow-orange thallus and white prothallus and also occurs below rock overhangs. The vivid C+ yellow reaction of the apothecial disc in *G. rupicola* is diagnostic. See also *Lecanora ochroidea*.

The apothecia are often blackened by the lichenicolous *Arthonia varians*. The thallus is occasionally colonized by *Phacographa glaucomaria* (black apothecia, rounded with prominent exciple, <1 mm diam., hymenium exposed, sometimes arranged in arcs on the host: rare), *Lambiella insularis* (grey-brown to brown or somewhat olivaceous areoles: locally common) or *Rinodina insularis* (Anglesey, rare). Also host to *Sclerococcum montagnei* Hafellner (1996) and the plurivorous *Marchandiomyces corallinus* (Roberge) Diederich & D. Hawksw. (1990) and *Muellerella pygmaea* (Körb.) D. Hawksw. (1979).

Lecanora rupicola var. *efflorens* Leuckert & Poelt (1989) **BLS 1767** resembles *Glaucomaria rupicola*, but differs in the presence of soralia. This variety is known only from dolerite and basalts in N. England (N. Northumberland), Wales (Montgomery) and S.E. Scotland. Its status needs further examination, and it is likely not to belong in this genus.

Glaucomaria swartzii (Ach.) S.Y. Kondr., L. Lökös & Farkas (2019)

Lecanora swartzii (Ach.) Ach. (1810)

Thallus continuous at the margins, rimose in the centre, uneven or wrinkled or discontinuous and restricted to around the apothecia, grey-brown to grey-orange, surface smooth to roughened; prothallus white to beige. Apothecia 0.3–1 (–2) mm diam., at first immersed, becoming sessile, base strongly constricted and apothecia easily detached; thalline margin entire, flexuose, becoming inconspicuous and excluded; disc yellow-brown, becoming strongly convex, densely blue-grey pruinose; epithecium colourless to olivaceous green, ± interspersed with granules; hymenium 60–85 µm tall, colourless; hypothecium pale yellow to yellow; paraphyses 2–2.5 µm diam., mainly unbranched, very rarely anastomosing, apices not or slightly thickened.

Ascospores (9–) 10–12 (–14) × 5–6 (–7) µm, ellipsoidal. Thallus C+ orange, K+ yellow, Pd–, UV+ pale orange; disc C+ yellow (atranorin, chloratranorin, sordidone, eugenitol, roccellic acid). **BLS 0687**.

Below overhangs of siliceous rocks, upland; local. E. Scotland, old records from N.E. England.

The British material conforms to subsp. *swartzii*. Separated from *G. rupicola*, which occurs in more exposed situations, by the C+ orange reaction and the sessile apothecia, strongly constricted below. *Lecanora praepostera*, which occurs only in coastal sites, is K+ yellow → blood red (crystals) and C–. Occurs in the same habitats and has an almost identical appearance to *L. subcarnea*, which differs in its C– and P+ orange-red reactions.

Nb



JAPEWIA Tønsberg (1990)

Thallus crustose, in or on the substratum, ± effuse, forming irregular patches usually up to 20 mm diam., sometimes becoming confluent, forming an irregular crust, green-grey or usually ± tinged greenish brown to brown on more exposed surfaces. **Photobiont** chlorococcoid. **Prothallus** indistinct, weakly developed, web-like. **Soralia** sometimes present. **Ascomata** apothecia, often sparsely present, ± immarginate, biatorine, discrete, chestnut brown, not pruinose, matt to glossy, somewhat turgid, ± translucent when moist, ± flat or rarely markedly convex. **True exciple** reduced, weakly gelatinized, similar in structure to the hamathecium. **Epithecium** red-brown, K+ fuscous brown, sometimes covered by a thick colourless gelatinous layer. **Hymenium** colourless or dilute brown, often with yellowish oily droplets, K/I– except for asci. **Hypothecium** ± concolorous with the hymenium. **Paraphyses** conglutinated, richly branched and interconnected throughout, narrow, the apical cell slightly swollen, with a dark brown cap. **Asci** subglobose to broadly ellipsoidal, with a well-developed amyloid tholus with a distinct ocular chamber, a non-amyloid wall and an amyloid outer cap, 1- to 8-spored, ?*Biatora*-type. **Ascospores** colourless, aseptate, ovoid-ellipsoidal to globose, the wall thick, distinctly multilayered in K. **Chemistry**: unidentified pigments of fatty acids, lobaric acid (accessory), or no substances. **Ecology**: on acid bark of deciduous and coniferous trees, or on saxicolous bryophytes.

Japewia was placed in an uncertain position within the Lecanorales by Lücking *et al.* (2016), but studies by Schmull *et al.* (2011) and Malíček *et al.* (2020) indicate a position within the Lecanoraceae. A more detailed phylogeny including more representatives from other families of the Lecanorales would be valuable, but the genus is included here pending more comprehensive study.

The ascospore wall in *Japewiella* is thinner and the secondary chemistry consists of chlorinated depsides and xanthones. *Mycoblastus* (Tephromelataceae) has very large ascospores, a well-developed exciple and a K/I+ blue cap over the ascus apex.

Literature

Czarnota (2009), James (2009a), Lücking *et al.* (2016), Malíček *et al.* (2020), Printzen & Tønsberg (2004), Schmull *et al.* (2011), Tønsberg (1990, 1992).

Key to species of *Japewia* and *Japewiella*

- 1 Thallus sorediate, soredia gloden brown; apothecia rarely present*subaurifera*
 Thallus lacking soredia; apothecia normally present.....2
- 2(1) Ascospore wall distinctly multilayered in K; montane, on bryophytes*tornoensis*
 Ascospore wall not multilayered in K; on young branches and twigs, mostly woodland
 *Japewiella tavaresiana*

Japewia subaurifera Muhr & Tønsberg (1990)

Thallus crustose, effuse, forming ± irregular patches between other crustose lichens, non-sorediate areoles indistinct or absent, greenish when shaded, greenish brown to brown when exposed, flat to slightly convex, to 0.15 mm diam., mostly discrete; soralia medium to dark brown, usually with a golden tinge, delimited to effuse, punctiform, rounded, ± convex, discrete, to 0.4 mm diam., often confluent and forming a ± thickish, leprose crust; soredia to ca 30 µm diam., brown to dark brown externally, yellow or yellow-green internally or when abraded, sometimes in ± rounded aggregations to 75 µm diam., with yellowish oily droplets (in fresh material); prothallus indistinct, sometimes brownish, weakly developed. Apothecia rare, and then only sparingly present, 0.4 (–0.6) mm diam., ± circular, ± flat but rarely markedly convex; true exciple reddish brown, K+ fuscous brown; hymenium to 75 µm thick, colourless or dilute brown with a ± yellowish or greenish tinge, with yellowish, oily droplets which become reddish brown in sections of preserved material, K/I– except for asci; hypothecium ± concolorous with the hymenium, containing abundant K/I+ blue ascogenous elements, to 75 µm deep. Asci subglobose or broadly ellipsoidal, 1- to 8-spored. Ascospores largest in monosporous asci, 11–20 × (8–) 12–13 (–14) µm; wall thick, with an outer episporous layer that swells, becomes disrupted and then easily detached. Soredia C± intensifying, K+ fuscous brown, yellow pigment K± intensifying, KC± fugitive pale orange, UV± bluish white in specimens with lobaric acid. Unidentified pigments, lobaric acid (accessory). **BLS 1758.**

On acid bark of deciduous or coniferous trees, often in moist, sheltered habitats; rare. Highland Scotland, including Mull and Skye.

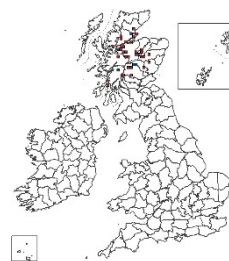
Readily identified by the mixture of brown and yellow soredia in the soralia. *Placynthiella dasaea*, which occurs in similar habitats, has similar bicoloured, brown or yellow-green soredia. However, the thallus is C+ red (gyrophoric acid). Similar lichens with a C– thallus and uniformly brown soredia/blastidia may be *Japewia aliphatica* (Malíček *et al.* 2020), not yet recorded from Britain and Ireland.

Japewia tornoensis (Nyl.) Tønsberg (1990)

VU

Thallus dark brown and uneven, or evanescent; not sorediate. Apothecia 0.3–0.5 (–0.8) mm diam., strongly convex, deep red-brown; true exciple excluded; epithecium red-brown to brown; hymenium 50–80 µm tall; hypothecium ± colourless; paraphyses branched and anastomosed, the apices swollen, capitate, red-brown, to 3.5 µm diam. Asci 55–70 × 24–37 µm, broadly clavate, the apex thickened with an internal apical

Nb



beak, *Lecanora*-type. Ascospores (15–) 17–20 (–24) × (8–) 12–15 μm, broadly ellipsoidal to subglobose, with strongly thickened (2–3.5 μm thick) walls and a thick gelatinous sheath. Thallus C–, K–, KC–, Pd– (no lichen products detected by TLC). **BLS 0786**.

On bryophytes in sheltered rock crevices above 800 m; rare. C. Scotland (Perth, Breadalbane Mtns).

This species, distinguished especially by the massively thickened ascospore walls, has sometimes been placed in *Mycoblastus*, but belongs neither to that genus nor to *Lecidea* s. str. See also Czarnota (2009) and Schmall *et al.* (2011).

JAPEWIELLA Printzen (1999)

Thallus crustose, effuse, whitish. **Prothallus** usually absent, sometimes with black lines between thalli. **Photobiont** trebouxoid. **Soralia** present in some species. **Ascomata** apothecia, round, sessile; thalline margin absent (biatorine), the disc reddish brown to black, flat to strongly convex, sometimes white- or bluish-pruinose. **True exciple** well-developed, composed of outwardly radiating narrow sparsely branched and interconnected gelatinized hyphae. **Epithecium** orange to greenish brown. **Hymenium** colourless. **Hamathecium** of paraphyses, sparingly branched except in the lower part adjacent to the hypothecium. **Asci** clavate, 8-spored, *Lecanora*-type. **Ascospores** ellipsoidal, aseptate, colourless, with a thick homogeneous wall. **Conidiomata** not known. **Chemistry**: atranorin, depsides and xanthenes. **Ecology**: on acid bark of deciduous or coniferous trees.

Resembles *Japewia* (Lecanorales, of uncertain position) but differs in the true exciple which is well-developed, composed of outwardly radiating narrow sparsely branched and interconnected gelatinized hyphae, and the hymenium which is composed of paraphyses which are only sparingly branched except in the lower part adjacent to the hypothecium, rather than the copiously branched and anastomosed paraphyses in *Japewia*. In addition, the ascospore walls of *Japewiella* are thinner and homogeneous (not layered) in K.

Literature

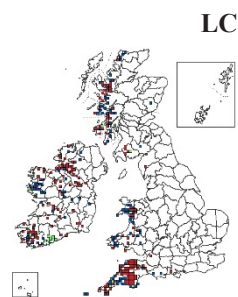
Allen & Lendemer (2015), James (2009b), Printzen (1999, 2004).

Japewiella tavaresiana (H. Magn.) Printzen (2000)

Thallus immersed to superficial, thin, whitish; prothallus black, thin. Apothecia 0.2–0.7 mm diam., flat, regular, pale to dark red-brown; true exciple persistent, colourless within, edge and epithecium pale red-brown, K+ dull brown, N–; hymenium 60–70 μm; hypothecium 20–45 μm tall, colourless, I+ blue; paraphyses branched below, occasionally anastomosed, apices slightly thickened with brown caps. Asci 55–65 × 15–20 (–28) μm, ± *Lecidella*-type with a broad apical cushion. Ascospores 13–18 (–22) × 7–11 μm, ellipsoidal, thick-walled, the wall homogeneous. Thallus C–, I–, K± faint yellow, KC–, Pd–, UV– (atranorin). **BLS 0708**.

On ± smooth bark of young deciduous trees, especially on *Salix* spp. and on twigs in the canopy, especially in cars and sheltered woodland; local. W. Britain, from Jersey to Isle of Skye, throughout Ireland.

Japewiella tavaresiana is often found with *Lecanora jamesii*. This species and *Lecidea erythrophaea* have previously been misidentified as *Lecidea tenebricosa* (Ach.) Nyl. (1861) by British authors. *L. erythrophaea* differs in its narrower, thin-walled ascospores. *Traponora varians* is superficially similar but is distinguished by the KC+ orange thallus and smaller, thin-walled ascospores, 7–13.5 × 4–7 μm in size.



LECANORA Ach. (1809)

Thallus crustose, granular, areolate, rimose or placodioid, rarely immersed; with or without soredia, isidia and cephalodia absent. **Photobiont** *Trebouxia* and perhaps other chlorococcoid algae. **Ascomata** apothecia, sessile or shortly stipitate, rarely immersed. **Thalline margin** present in most species, generally conspicuous, ± persistent and concolorous with the thallus, but in some species disappearing at an early stage or becoming excluded. **True exciple** poorly differentiated in most species. **Epithecium** green-brown to dark brown or red-brown, sometimes granular. **Hymenium** ± colourless, I+ blue. **Hypothecium** colourless or pale. **Hamathecium** of paraphyses, unbranched, sparsely branched or anastomosed, septate, apices slightly swollen to capitate, often pigmented (never ‘*Aspicilia*-green’). **Asci** elongate-clavate, *Lecanora*-type, a few *Bacidia*-type, apex strongly thickened with a K/I+ blue apical dome and a broad K/I– apical cushion, outermost gelatinous coat K/I+ blue, 8- (rarely 32-) spored. **Ascospores** ellipsoidal to subglobose, usually rounded at the apices, rarely apiculate, colourless, aseptate, sometimes with a central protoplasmic strand, walls thin or thick, lacking a distinct perispore, smooth-walled. **Conidiomata** pycnidia, immersed, walls colourless but brown around the ostiole. **Conidiogenous cells** sessile or borne on short, branched conidiophores, elongate-ampulliform, proliferating percurrently with broad collarettes. **Conidia** bacilliform, filamentous, curved or broadly falcate, colourless, aseptate. **Chemistry**: atranorin often in the cortex, a wide range of depsides and depsidones, terpenoids or xanthenes in the medulla. **Ecology**: on a wide range of natural and man-made substrata.

This generic name has traditionally been applied to a wide range of lichens whose apothecia have thalline margins and which produce aseptate colourless ascospores. This somewhat simplistic description has led to disparate taxa being subsumed under a single generic name, as has also been the case with *Lecidea* s. lat., and a full modern reappraisal of the circumscription of the genus using phylogenetic methods is required.

A series of species groups can be recognized within the genus, only some of which are widely used. The *L. subfusca* group, to which the type of the genus belongs, broadly comprises the species with atranorin in the thallus. They generally have relatively large, often flat, apothecia and a well-developed thallus. Calcium oxalate crystals are present in the thalline margin and granules (POL+) are frequent in the epithecium. Soredia are common in this group, soralia are usually delimited.

The *Lecanora dispersa* group has been recognized as distinct within *Lecanora* by a number of recent authors (e.g. Śliwa 2007, Śliwa *et al.* 2012, Zhao *et al.* 2015a), for which the generic name *Myriolecis* Clem. (1909) has been taken up. Species lack atranorin or usnic acid in the thallus; xanthenes are sometimes present, but in the apothecia. They usually have relatively small apothecia, that are often quite concave and their thallus is generally little developed. Large crystals are only present as pruina on the outer surface of the apothecia. Soredia are never formed.

Protoparmeliopsis M. Choisy (1929) is now broadly recognized as a segregate, for the placodioid taxa *P. achariana* and *P. muralis* (Zhao *et al.* 2015a). It forms a major clade along with *Rhizoplaca* and *Myriolecis*, the latter genus now containing two other placodioid species formerly placed in *Lecanora*, *M. pruinosa* and *M. straminea*.

L. rupicola and its relatives occupy a distinct clade (Zhao *et al.* 2015a). The name *Glaucomaria* M. Choisy (1929) has been taken up for these species, characterized by densely pruinose apothecia. The group includes *L. carpinea*, *L. rupicola* and *L. swartzii* (Blaha & Grube 2007, Grube *et al.* 2004).

A further major clade was identified by Zhao *et al.* (2015) that includes the *L. polytropa* group, along with the *L. symmicta* and *L. varia* groups which appear to form further distinct subclades within this assemblage. Edwards *et al.* (2009) referred the *L. polytropa* group to *Straminella* M. Choisy (1929), but the type of that genus refers to the *L. varia* group *sensu* Śliwa & Wetmore (2000). The *L. polytropa* group appears to be much larger and more diverse than in the concepts of Choisy (1929) or Eigler (1969), according to Zhang *et al.* (2022). It includes corticolous species with well-developed greenish-yellow thalli and with usnic acid but lacking atranorin. The generic name *Zeora* Fr. (1825;

lectotype *Z. orosthea* (Ach.) Flot. 1849) is available for the *L. symmicta* group.

Lecanoropsis M. Choisy (1949), characterized by broadly falcate, crescent-shaped or reniform (macro)conidia, includes *L. albellula*, *L. quercicola* and *L. saligna*. It appears to belong in a sister clade of *Lecanora* sensu stricto, including the genera *Myriolecis*, *Protoparmeliopsis*, *Rhizoplaca* and the *L. polytropa* group (Medeiros *et al.* 2021).

A further group is characterized by black apothecia with a thalline margin that soon disappears. It contains species that have often been included in *Lecidea* or *Lecidella*, viz. *L. atomarginata*, *L. formosa* and *L. marginata*; *L. viridiatra* probably belongs to this group also. Preliminary molecular data (Zhao *et al.* 2015a) suggest that *L. formosa* at least belongs to a distinct clade.

Finally, *L. cadubriae*, *L. fuscescens* and *L. hypoptella* may best be combined with some species still to be excluded from *Lecidea*, e.g. *Lecidea hypopta*, *L. nylanderii* and *L. turgidula*, into a separate, still unnamed, group. They share the thin evanescent thalline margin and dark, glossy coloration. *L. alboflavida* stands apart and is considered to be the correct name for *Ochrolechia inversa*.

The inter-relationships of the other *Lecanora* groups recognized by Edwards *et al.* (2009) remain uncertain; the study by Zhao *et al.* (2015a) gives some indications but much is based only on a two-locus data set.

Most British species can be accommodated rather well in the above groups, but the assignment of some species remains unclear and needs further study. In the treatment below, the assignment of the species to the different groups is given if not mentioned above.

The fluorescence with UV is a particularly useful character in this genus, especially to distinguish the various xanthenes and cortical substances, which are often difficult to recognize with TLC. Lichexanthone gives a bright yellow fluorescence; rhizocarpic acid, arthothelin, thiophanic acid and vinetorin are bright orange; the *conferta*-unknowns are bright pink; usnic acid is dull, deep orange when present in quantity or pale orange or negative when concentrations are low; chloratranorin is pale orange when present in quantity, while the xanthenes aotearon, 2,7-dichlorolichexanthone and 2,5-dichlorolichexanthone give no reaction. Many species of the *L. subfusca* group, without any of the above substances, reflect mauve-purple light from the UV lamp and this is probably without taxonomic significance. A few species have a UV+ white medulla, due to lobaric acid or unknown substances.

The K reaction can be difficult to interpret in some species. A true K+ yellow reaction gives a product that stains a tissue yellow. Artefactual colours will not absorb onto tissue. Weak K+ colours can arise from the colour of the photobiont showing through the cortex, or can arise from algae on the thallus surface.

Literature

Brodo (1984), Edwards *et al.* (2009), Grube *et al.* (2004), Guzow-Krzemińska *et al.* (2017), Ivanovich *et al.* (2021), Lumbsch *et al.* (1995, 1996, 1997), Malíček (2014), Malíček & Powell (2013), Malíček *et al.* (2017), Medeiros *et al.* (2021), Pérez-Ortega *et al.* (2010), Śliwa (2007), Śliwa *et al.* (2012), Van den Boom & Brand (2008), Zhao *et al.* (2015a).

Key to species of *Glaucmaria*, *Lecanora*, *Myriolecis*, *Palicella* and *Protoparmeliopsis*

- | | | |
|------|--|-----------------------------|
| 1 | Thallus placodioid, margins lobe-like in surface view | 2 |
| | Thallus crustose, margins not lobe-like in surface view | 5 |
| 2(1) | Thallus C+ orange..... | 3 |
| | Thallus C– or weakly yellowish..... | 4 |
| 3(2) | Thallus surface granular-pruinose; lobes plane; on calcareous rocks | <i>Myriolecis pruinosa</i> |
| | Thallus surface rarely pruinose; lobes swollen and convex; on nutrient-enriched, siliceous rocks | <i>Myriolecis straminea</i> |

- 4(2) Thallus grey-green to yellow-brown; lobes flat to almost concave, closely appressed, not or scarcely overlapping; apothecia yellow-brown to red-brown *Protoparmeliopsis muralis*
 Thallus pale yellow-green to greyish white; lobes flat to slightly convex, often loosely attached and overlapping; apothecia grey to pinkish brown, greenish in shade
 *Protoparmeliopsis achariana*
- 5(1) Soredia present 6
 Soredia absent 30
- 6(5) Soredia yellow-green, generally with usnic acid or xanthonenes 7
 Soredia grey-green, white or grey, rarely pale yellow [see couplet 20], without usnic acid or xanthonenes 19
- 7(6) Soredia C- 8
 Soredia C+ orange 17
- 8(7) Thallus and/or soredia K+ yellow or yellow-brown 9
 Thallus K- 11
- 9(8) Thallus yellowish, K+ yellow-brown, KC+ yellow (usnic acid), often entirely covered by soredia; mostly on rock but also on wood or acid bark *orosthea*
 Thallus grey, K+ yellow, KC- (atranorin), on bark or wood, rarely on rock 10
- 10(9) Soralia discrete, convex; soredia yellow (usnic acid) *jamesii*
 Soralia firstly delimited, later often confluent; soredia whitish (atranorin), sometimes with a yellow or pink tinge *farinaria*
- 11(8) Thallus not areolate, soralia discrete or coalescing 12
 Thallus areolate, yellow-green, yellowish brown, greenish grey or blackish green; soredia in ± delimited, convex mounds or not 14
- 12(11) Zeorin absent; thallus diffuse, entirely composed of leprose soralia, no medulla; mainly on sheltered rock [Lecanorales, uncertain position] *Lithocalla ecorticata*
 Zeorin present; soredia in a continuous layer, at least in older thalli 13
- 13(12) Thallus delimited at the margin, grey and verrucose; medulla whitish, much paler than the soredia; soralia usually initially delimited but often merging into a continuous layer; in GBI so far only found on exposed bark of trees; elsewhere also on rock *compallens*
 Thallus thin and ± endosubstratal, with a ± continuous layer of soredia from the beginning; soredia tending to be bluish green; on smooth bark *stanislai*
 [these two species should be sequenced to ensure correct identification]
- 14(11) Thallus bright yellow- (rarely dark) green, KC-, UV+ bright orange (rhizocarpic acid); on iron-rich rocks 15
 Thallus yellowish grey to yellow-green, KC+ yellow, UV+ dull orange (usnic acid) 16
- 15(14) Thallus Pd+ orange to red; soralia mainly arising on areole margins, the soredia rarely forming a continuous crust *subaurea*
 Thallus Pd-; soralia arising from the areole surface, the soredia often forming a continuous crust *epanora*
- 16(14) Areoles flattened but subsquamulose, margins often crenulate, soralia arising from the surface of the areoles *soralifera*
 Areoles flat, irregular in shape but not crenulate, yellow-green, sometimes not evident and the thallus leprose; soralia arising from the areole margins but spreading to cover the whole thallus surface *orosthea*

- 17(7) Thallus irregular and often poorly developed; soralia sometimes coalescing but mostly remaining discrete; apothecia dark brown to blackish; on lignum in maritime habitats in the far north.....*orae-frigidae*
Thallus well-developed, the soralia becoming effuse and largely covering the thallus surface
apothecia (when present) yellowish to brown 18
- 18(17) Thallus areolate, sometimes inconspicuously so; corticate at least in patches; soredia at first in clearly delimited convex soralia; with atranorin*alboflavida*
Thallus effuse and farinose-sorediate, rarely rimose; soredia developing as a ± continuous crust; lacking atranorin.....*expallens*
- 19(6) Soredia arising in excavate soralia; on peat, mosses and decaying plant material*epibryon*
Soredia arising superficially; on bark or rocks 20
- 20(19) On bark 21
On rock 25
- 21(20) Thallus K-, Pd+ rusty red; without a white prothallus *conizaeoides*
Thallus K+ yellow, Pd- or yellow; generally with a white prothallus 22
- 22(21) Thallus with roccellic acid, soredia pale cream to pinkish; thalline margin containing large crystals; on wood and acid bark, *Calluna* etc; mostly northern.....*farinaria*
Thallus without roccellic acid, soredia pale yellow; thalline margin containing large or small crystals; on basic bark in nutrient-enriched communities, mostly southern 23
- 23(22) Thallus UV+ pale orange, without zeorin; exciple with large crystals, soralia not surrounded by a thalline ring; southern England..... 24
Thallus UV-, containing zeorin; exciple with small crystals, young soralia often surrounded by a narrow thalline ring; on bark of *Fraxinus* or *Sambucus*, Derbyshire.....*impudens*
- 24(23) Thallus often sterile, soralia very soon became confluent; apothecial discs not or slightly pruinose.....*barkmaniana*
Thallus usually fertile, soralia at least partly delimited, apothecial discs heavily pruinose....*variolascens*
- 25(20) Thallus K- 26
Thallus K+ yellow..... 27
- 26(25) Thallus KC-, Pd+ orange-red; soredia arising over the whole thallus surface *conizaeoides*
Thallus KC+ yellow, Pd-; soredia mainly arising on the margins of the areoles*handelii*
- 27(25) Thallus KC+ yellow; on Magnesian limestone*campestris* subsp. *dolomitica*
Thallus KC-; on acid or somewhat basic siliceous rock 28
- 28(27) Thallus UV+ pale orange; prothallus black.....*rupicola* var. *efflorens*
Thallus UV-; prothallus absent or concolorous with the thallus..... 29
- 29(28) Soralia distinctly blue-grey, usually darker than the yellowish-white to grey thallus; with gangaleoidin.....*pannonica*
Soralia white or blue- to yellow-white, paler than the thallus which may be minutely brownish-granular; without gangaleoidin.....*caesiosora*
- 30(5) On bark, wood, decaying plant material, mosses, or lichenicolous 31
On rocks 80

- 31(30) Thallus yellow, yellow-green to grey-green (with distinct yellow tones), generally with usnic acid 32
Thallus white, grey, orange or absent, without yellow tones, generally with atranorin or without
cortical substance 44
- 32(31) Thallus C⁺ orange 33
Thallus C⁻ 34
- 33(32) Thallus always C⁺ orange; exciple when young crenulate and containing algae *confusa*
Thallus C[±] orange; exciple when young smooth and lacking algae *symmicta*
- 34(32) On mosses or decaying plant material *leptacina*
On bark or wood 35
- 35(34) Thallus Pd⁺ yellow or orange to deep red 36
Thallus Pd⁻ 38
- 36(35) Thallus Pd⁺ yellow; apothecia often over 0.5 mm diam. *varia*
Thallus Pd⁺ orange to red; apothecia usually under 0.5 mm diam. 37
- 37(36) Apothecia with greenish grey discs, thalline margin persistent; ascospores
10–14 (–16) × 4–6 (–7) µm; with fumarprotocetraric acid..... *conizaoides* f. *variola*
Apothecia with pale pink to brown or brown-black discs, thalline margin becoming excluded;
ascospores (7–) 8–11 × 3–4 µm; with norstictic acid *cadubriae*
- 38(35) Thallus areolate, areoles often dispersed and sometimes reduced and obscured by apothecia,
yellow-green, grey-green to pale grey..... 39
Thallus not clearly areolate, ± continuous or granular, yellowish white to yellow-green
or green-black 42
- 39(38) Apothecia pinkish brown to dark grey-brown 40
Apothecia yellowish green or becoming bluish green or green-black..... 41
- 40(39) Thallus pale grey to grey-green; epithecium ochre to orange-brown with copious coarse
grains between the tips of paraphyses, often streaking deeply into the hymenium
[Scotland, ?extinct in GBI]..... *Palicella filamentosa*
Thallus pale yellow-green; epithecium ± colourless, sparsely interspersed with brown granules
[S England and Wales, rare and very local] *sublivescens*
- 41(39) Thallus of ± contiguous areoles with crenulate margins or minutely lobed; discs often
becoming dark greenish *intricata*
Thallus inconspicuous or of dispersed granular or convex areoles, not lobed or crenulate;
discs usually remaining yellowish or yellow-green *polytropa*
- 42(38) Apothecium disc dark red-brown to blackish (greyish in morphs with low usnic acid
content) *mughicola*
Apothecium disc yellow, green, pink or orange-brown 43
- 43(42) Thalline margin containing algae, excluded with age, often crenulate; thallus non-corticate *strobilina*
Thalline margin not containing algae, soon excluded, not crenulate; thallus corticate..... *symmicta*
- 44(31) Thallus and/or thalline margin or discs Pd⁺ deep yellow to orange or red..... 45
Thallus, exciple and discs Pd⁻ 50

- 45(44) Ascospores exceeding 4 µm diam.; conidia where present filiform; thallus K+ yellow 46
 Ascospores not exceeding 4 µm diam.; conidia bacilliform; thallus K+yellow→red; on
 coniferous wood and bark, Scottish Highlands *cadubriae*
- 46(45) Apothecial discs pinkish-rose to pale brown, densely pruinose; thalline margin becoming
 excluded *albella*
 Apothecial discs orange-brown to red-brown, dark brown or black, not or weakly pruinose 47
- 47(46) Thalline margin broad, swollen and flexuose, without a distinct cortex, usually pruinose ... *intumescens*
 Thalline margin corticate, not pruinose 48
- 48(47) Thalline margin becoming excluded; thallus UV+ white (possibly extinct in GBI)..... *fuscescens*
 Thalline margin persistent; thallus UV– but reflecting mauve-purple..... 49
- 49(48) Young apothecia immersed, margin strongly crenulate, discs brownish-red; with pannarin. *cinereofusca*
 Apothecia sessile, margin smooth or very slightly crenulate, discs variable in colour, usually
 red-brown to black; with fumarprotocetraric acid..... *pulicaris*
- 50(44) On decaying plant material or lichenicolous 51
 On bark or wood 53
- 51(50) Ascospore ends pointed; lichenicolous on *Lecanora epanora*, *L. handelii* or *L. subaurea*;
 thallus absent, or of orange-grey or grey-brown lobules *gisleriana*
 Ascospore ends rounded; on decaying plant material; thallus whitish to pale grey 52
- 52(51) Thallus K+ yellow; upland *epibryon*
 Thallus K–; coastal *Myriolecis zosteræ*
- 53(50) Apothecial discs C+ orange-yellow *Glaucomaria carpinea*
 Apothecial discs C– 54
- 54(53) Thallus K+ yellow 55
 Thallus K– or indistinctly yellowish 62
- 55(54) Older medullary parts of the thallus, especially below the apothecium, with an orange,
 K+ purple anthraquinone (skyrin); disc black *gangaleoides*
 Thallus lacking anthraquinones; disc variously coloured (including black)..... 56
- 56(55) Thalline margin containing massive oxalate crystals 57
 Thalline margin containing small irregular crystals 61
- 57(56) Epithecium without crystals; thalline margin crenulate; discs red-brown *argentata*
 Epithecium with crystals, sometimes extending amongst the paraphysis tips; thalline margin
 crenulate or smooth; discs various 58
- 58(57) Epithecium with a conspicuous layer of coarse pale brown crystals above but hardly between
 the paraphysis tips; epithecial crystals soluble in K and (slowly) N *chlarotera*
 Epithecium with fine crystals between and below the paraphysis tips; epithecial crystals
 soluble in K but not N 59
- 59(58) Thalline margin Pd+ orange-red [Pd– morphs are reported from Europe]; apothecia red-brown
 to almost black (rarely pale brown); thallus thin, apothecial margin usually smooth..... *pulicaris*
 Thalline margin Pd–; apothecia various shades of pale brown; thallus relatively thick, apothecial
 margin often flexuose or crenulate..... 60

- 60(59) Thallus thick, mostly obscured by raised warts that are in fact young apothecia, often with sinuous margins; apothecial margin massive, sometimes contorted..... *sinuosa*
Thallus varied but usually moderately thick; apothecial margin not markedly thickened.....*hybocarpa*
- 61(56) Apothecia matt brown to black, sessile and hardly constricted at the base; usually on rock but also reported on dusty bark, tree bases etc. *campestris* subsp. *campestris*
Apothecia glossy brown to black, constricted at the base; usually on bark*horiza*
- 62(54) Apothecial discs piebald or with dark spots; rare species on bark and lignum of coniferous trees, Scotland 63
Apothecial discs variously coloured but not dark-spotted 64
- 63(62) Paraphyses with swollen and darkened tips; thallus K- (no substances); poorly known *hypoptella*
Paraphyses tips not distinctly swollen, colourless (but *Cinereorufa*-green and unidentified brown pigment often present around the paraphyses; thallus K+ yellowish (atranorin).....*Palicella filamentosa*
- 64(62) Apothecial margin usually thin to disappearing, not elevated above the disc, yellowish due to presence of isousnic/usnic acid (or its derivatives) or brown in some species; pycnidia common 65
Apothecial margin usually thick, elevated above the disc, white or rarely brown; never with usnic acid derivatives; pycnidia not known (*Myriolecis*) 76
- 65(64) Apothecial margin ± biatorine, algae at most at the very base 66
Apothecial margin containing algae 68
- 66(65) Apothecial discs cream to pale orange or brown; thallus C± orange (xanthones).....*symmicta*
Apothecial discs ochre to red-brown or black; thallus C- (without xanthones)..... 67
- 67(66) Thallus K+ yellowish (atranorin); margin in section often with minute oil droplets (paraensic acids) in addition to granules*Palicella filamentosa*
Thallus K- (usnic acid and zeorin, but no atranorin); margin in section without oil droplets*aitema*
- 68(65) Ascospores to 4 µm diam..... 69
Ascospores 3.5–5 µm diam. 73
- 69(68) Ascospores 6–8.5 µm long 70
Ascospores usually >8 µm long 71
- 70(69) Thallus and apothecia margin yellow (usnic acid); disc yellowish beige or grey, becoming dark olive brown, ± slightly white or bluish pruinose *subintricata*
Thallus and apothecia margin greyish (isousnic acid); disc bluish pruinose *coppinsii*
- 71(69) Thallus KC+ yellow (pseudoplacodiolic acid); apothecia mostly flat, whitish pruinose, the pruina sometimes lost in old apothecia *sarcopidoides*
Thallus KC-; apothecia often becoming convex; disc not or usually slightly pruinose 72
- 72(71) Thallus warted, thick (to 0.35 mm); apothecia without a yellowish tinge; disc reddish brown to dark brown, becoming blackish, not pruinose; ascospores rarely 1-septate; thallus and apothecia with minute oil droplets *hypoptoides*
Thallus thinner; apothecia with a pale yellowish margin; disc pale yellowish, yellowish brown to medium brown, ± pruinose *albellula*
- 73(68) Macroconidia abundantly present, aseptate, curved, >6 µm long and >1.5 µm diam.; margin of apothecia often persistent; epithecium yellow-brown to olive brownish, N- 74
Macroconidia absent; epithecium brownish, N+ reddish 75

- 74(73) Macroconidia 6–8 × 2–2.5 µm; lignicolous or corticolous *saligna*
 Macroconidia 8.5–9.5 × 2.7–3 µm; corticolous or on decorticated trunks *quercicola*
- 75(73) Thallus ± rimose-cracked, waxy; apothecial disc red-brown to black; thalline margin containing
 algae even when mature, persistent *mughicola*
 Thallus not waxy; apothecial disc light ochre to pinkish brown, rarely charcoal grey, often
 piebald; margin of mature apothecia without algae, often excluded *Palicella filamentosa*
- 76(64) Apothecia becoming large, at least some over 1 mm diam.; thallus often forming distinct patches 77
 Apothecia small, rarely reaching 1 mm diam; thallus often inconspicuous or of widely scattered
 granules 78
- 77(76) Apothecia immersed, at first ± urceolate, usually pruinose *Myriolecis populicola*
 Apothecia sessile to raised, not pruinose *Myriolecis zosteræ*
- 78(76) Apothecial disc pale brown; predominantly on calcareous rock, occasional on dust-impregnated
 or nutrient-enriched bark *Myriolecis dispersa*
 Apothecial disc chestnut to dark brown; pioneer species on twigs and branchlets 79
- 79(78) Thalline margin whitish grey, contrasting in tone with the disc and forming a prominent raised
 rim around it; young discs frequently pruinose *Myriolecis hagenii*
 Thalline margin dull, dark grey or brownish, not contrasting in tone with the disc and forming
 a low ring around it; discs never pruinose *Myriolecis persimilis*
- 80(30) On calcareous or other base-rich rocks 81
 On siliceous rocks 93
- 81(80) Thallus K+ yellow or red 82
 Thallus K– or indistinctly yellowish 83
- 82(81) Thalline margin soon excluded, true exciple well-developed and persistent; thallus usually
 lemon-yellow (rare, Scottish Highlands)..... *atromarginata*
 Thalline margin ± persistent, true exciple not visible; thallus white or grey (widespread) *campestris*
- 83(81) Thallus C+ yellow, orange, pink or red 84
 Thallus C– [or ± endolithic]..... 86
- 84(83) Thallus C+ pink or red *Myriolecis congesta*
 Thallus C+ yellow or orange..... 85
- 85(84) Thallus continuous, thick, margins somewhat lobed and pruinose..... *Myriolecis pruinosa*
 Thallus often not continuous, thin, without lobes *Myriolecis antiqua*
- 86(83) Apothecia black; epithecium blue-green 87
 Apothecia pinkish brown to dark red-brown; epithecium pale to dark brown..... 88
- 87(86) Apothecia formed in pits in limestone; ascospores 8–10 × 3.5–5 µm *Myriolecis agardhiana*
 Apothecia sessile or slightly constricted at the base; ascospores 9–12 × 6–7.5 µm;
 sometimes invading other lichen thalli..... *Myriolecis invadens*
- 88(86) Thalline margins regularly deeply crenate; apothecial discs grey, white to blue-grey
 pruinose *Myriolecis crenulata*
 Thalline margins entire or irregularly crenate; apothecial discs pinkish to brown, not or
 lightly pruinose 89

- 89(88) Thallus composed of swollen white areoles, forming a continuous crust *Myriolecis albescens*
Thallus granular, oily or inconspicuous, when white with large spaces between the apothecia 90
- 90(89) Apothecium margin distinctly yellowish, UV+ bright yellow *Myriolecis semipallida*
Apothecium margin white to grey 91
- 91(90) Thallus varied, smooth and oily-textured or consisting only of apothecium initials;
apothecium margin UV- 92
Thallus a grey to blackish stain (best seen without lens); apothecium margin
UV+ orange *Myriolecis semipallida*
- 92(91) Epithecium without granules or indistinctly so (POL- or slightly POL+) *Myriolecis hagenii*
Epithecium with distinct POL+ granules, insoluble in K *Myriolecis dispersa*
- 93(80) Thallus some shade of white or grey, or inconspicuous 94
Thallus some shade of yellow green, generally with usnic acid 116
- 94(93) Thallus and/or apothecium disc C+ yellow or orange to red 95
Thallus and apothecium discs C- 101
- 95(94) Thallus C+ yellow or orange 96
Thallus C- (apothecium disc C+ yellow to orange) 100
- 96(95) Thallus rimose-areolate, K+ yellow; apothecia densely pruinose *Glaucomaria swartzii*
Thallus various, K- or weakly yellowish; apothecia not or weakly pruinose 97
- 97(96) Apothecial margin C- or C± yellow, PD- (± vinetorin); often invading other lichen thalli; not
maritime *Myriolecis invadens*
Apothecial margin and/or disc C+ orange, PD+ orange (arthrothelin and pannarin); on siliceous
maritime rocks 98
- 98(97) Thallus sparse, dispersed areolate to granulose 99
Thallus well-developed, not dispersed, rimose to areolate, sometimes lobed at
margins *Myriolecis massei*
- 99(98) Thallus white or inconspicuous; apothecial discs pale brown to red-brown *Myriolecis andrewii*
Thallus yellowish brown or tawny brown; apothecial discs yellowish to
reddish brown *Myriolecis fugiens*
- 100(95) Thallus usually continuous; apothecia sessile from the start, 0.5–1 (–1.5) mm diam., discs
pale reddish brown; very rare on rock *Glaucomaria carpinea*
Thallus cracked-areolate throughout; apothecia immersed at first, 0.5–2 (–3) mm diam.,
discs pinkish brown; exclusively on rocks *Glaucomaria rupicola* var. *rupicola*
- 101(94) Thallus K+ yellow or K+ yellow→red 102
Thallus K- or indistinctly yellowish 110
- 102(101) Thallus Pd+ yellow to red 103
Thallus Pd- or Pd+ pale yellowish 106
- 103(102) Thallus Pd+ yellow; thalline margin absent or evenascent *formosa*
Thallus Pd+ orange to red; thalline margin prominent but can become excluded 104
- 104(103) Thallus K+ yellow (atranorin) *subcarnea*
Thallus K+ yellow→red (norstictic acid) 105

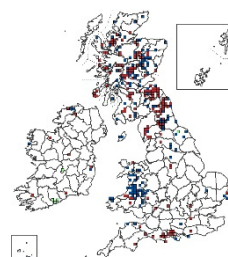
- 105(104) Thalline margin becoming excluded; disc pale to pinkish brown, strongly convex *ochroidea*
Thalline margin persistent; disc pale to dark brown or black, ± flat..... *praeopostera*
- 106(102) Apothecial discs black (young discs pruinose, at least in European populations); thalline margin soon becoming excluded (or entirely absent)..... *marginata*
Apothecial discs brown, or when black, thalline margin persistent 107
- 107(106) Apothecial discs black; older lower parts of the thallus orange, K+ purple (skyrin), especially below the apothecium *gangaleoides*
Apothecial discs red-brown to red-black, blackish green or yellowish brown; no orange pigment in the lower parts of the thallus 108
- 108(107) On siliceous rocks, generally in shaded situations; thalline margin with large crystals *cenisia*
On more basic or nutrient-enriched rock or building materials; thalline margin with small irregular crystals 109
- 109(108) Apothecia matt brown to black, sessile and hardly constricted at the base *campestris* subsp. *campestris*
Apothecia glossy brown to black, constricted at the base *horiza*
- 110(101) Apothecial discs greenish black/blue 111
Apothecial discs pinkish, olivaceous, pale brown to red-brown 113
- 111(100) Apothecial margin C– or C± yellow, PD– (± vinetorin); often invading other lichen thalli; not maritime` *Myriolecis invadens*
Apothecial margin and/or disc C+ orange, PD+ orange (arthrothelin and pannarin); on siliceous maritime rocks..... 112
- 112(111) Thallus yellowish white *Myriolecis actophila*
Thallus grey *helicopis*
- 113(110) Thallus areolate, areoles granular to papillate *Myriolecis poliophaea*
Thallus continuous, of dispersed granules, oily or inconspicuous, without papillae 114
- 114(113) Thallus of rounded or even lobed granules..... *Myriolecis salina*
Thallus oily or inconspicuous, consisting only of apothecium initials 115
- 115(114) Epitecium without granules or indistinctly so (POL– or slightly POL+) *Myriolecis hagenii*
Epitecium with distinct POL+ granules, insoluble in K *Myriolecis dispersa*
- 116(93) Thallus C+ yellow-orange *atrosulphurea*
Thallus C– or weakly yellow 117
- 117(116) Areoles strongly convex, to 1–1.5 mm diam.; Pd+ orange-red *frustulosa*
Areoles flat to slightly convex, mainly under 1 mm diam.; Pd– 118
- 118(117) Thalline margin soon excluded 119
Thalline margin persistent 121
- 119(118) Apothecia at first immersed, not constricted below 120
Areoles usually dispersed, convex and warted; apothecia sessile from the first, constricted below, discs black *chlorophaeodes*
- 120(119) Areoles forming a ± continuous crust, ± flat; discs yellowish to pinkish brown, blue-green or green-black; UV+ dull orange *sulphurea*
Areoles flat to convex; discs black; UV+ pink *viridiatra*

- 121(118) Thallus of \pm contiguous areoles with crenulate margins or minutely lobed; discs often becoming blackish *intricata*
 Thallus granular or of dispersed areoles with entire margins; discs usually remaining yellow, yellow-green, or greenish- to pale brown 122
- 122(121) Ascospores (4.5–) 5–6.5 (–7) μm wide; thallus yellow-green to green-grey; apothecial discs pale yellow to pale yellow-green *polytropa*
 Ascospores 3–4 μm wide; thallus greenish brown to green-grey; apothecial discs pale brown to greenish brown *stenotropa*

Lecanora aitema (Ach.) Hepp (1853)

LC

Thallus in small patches, dispersed to continuous, uneven to granular or irregularly areolate, cream-white; prothallus inconspicuous or pale brown. Apothecia 0.2–0.5 (–0.6) mm diam., sessile; thalline margin distinct in young apothecia, soon excluded; disc dark green, red-brown to black, sometimes mottled, strongly convex, not pruinose; epithecium yellow-brown; hymenium 55–75 μm tall; paraphyses 2–2.5 μm diam., branched and anastomosed, short-celled, apices to 3.5 μm diam., slightly swollen, yellow-brown, with granules dissolving in K. Asci 35–45 \times 10–15 μm . Ascospores (10–) 12–17 \times 4.5–5.5 μm , narrowly ellipsoidal. Thallus C–, K–, KC \pm faint yellow, Pd–, UV+ pale orange (\pm usnic acid, \pm zeorin). **BLS 0626.**



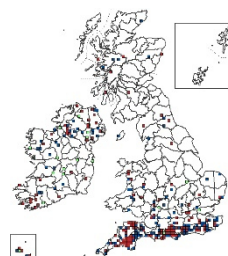
On acidic bark, predominantly twigs, and commonly wood and worked timber, especially upland areas; local. Widespread in Britain and Ireland, mostly in the north and west. Rare in the south, where occurs mainly in areas of low nutrient deposition.

This characteristic upland member of the *L. symmicta* group is primarily distinguished by the darker discs of the apothecia, and is a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). *Palicella filamentosa* (q.v.) also looks similar in the field, but the thallus has a K+ yellowish reaction. The early exclusion of the thalline margin has led to this species historically being treated in *Lecidea*. Many early records of *L. symmicta* var. *saepincola* (Ach.) Hedl. (1892) from Britain and Ireland refer to this species. See also *Ramboldia insidiosa* (Lecanorales, Ramboldiaceae).

Lecanora albella (Pers.) Ach. (1810)

LC

Thallus \pm continuous, becoming rimose in the centre, clearly delimited and forming small patches, pale to medium grey, surface smooth to slightly granular. Apothecia 0.5–1.5 mm diam., dispersed to closely aggregated, sessile, slightly constricted at the base; thalline margin well-developed, usually entire, conspicuous at first but becoming excluded, medulla with fine granular crystals dissolving in K; disc pink to rose or occasionally pale brown, flat to convex, densely white-pruinose; epithecium yellow-brown, interspersed with coarse granules dissolving in K; hymenium 60–85 μm tall; paraphyses 1.5–2.5 μm diam., sparsely branched and anastomosed, apices not or only slightly swollen. Ascospores (9–) 10–13 (–15) \times (5–) 6–8 (–9) μm , broadly ellipsoidal. Thallus C–, K+ yellow; exciple and discs Pd+ yellow to red, UV+ pale orange (atranorin, chloratranorin, protocetraric acid, nephrosteranic acid). **BLS 0754.**



On acid bark of deciduous trees, particularly twigs, in areas with low nutrient deposition. Frequent in S. England but becoming scarce northwards, very rare in Scotland (Highlands), scattered in Ireland.

A member of the *L. subfusca* group in its broad sense. The separation from *Glaucomaria carpinea* is discussed under that species. *Myriolecis populicola* is confined to *Populus tremula* and differs in its chemistry.

Lichenocodium lecanorae has been reported on this host.

Lecanora albellula (Nyl.) Th. Fr. (1871)

Nb

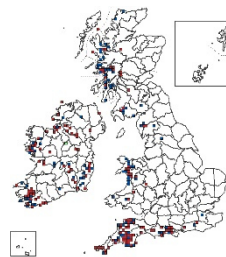
Thallus of scattered granules or inconspicuous, not clearly delimited, grey, yellow- or green-grey, sometimes entirely immersed in bark. Apothecia 0.2–0.4 (? rarely to 0.75) mm diam., scattered or in small groups, sessile, somewhat constricted at the base; thalline margin entire to slightly crenate, white to brown-grey, generally persistent but becoming thinner and often excluded with age; disc pale beige/yellow, ochre, brown to dark grey/brown, flat, not or finely white-pruinose; epithecium colourless to pale golden-brown, interspersed with

granules; hymenium 35–65 μm tall; paraphyses 1.5–2 μm diam., branched and anastomosed, apices to 2.5–4 μm diam., yellow-brown, slightly swollen, capitate. Asci 30–40 \times 9–11 μm , broadly clavate. Ascospores (7–) 8–12 (–16) \times 2.5–4 μm , narrowly ellipsoidal. Pycnidia immersed, colourless to brown. Conidia of four types: macroconidia [often present], 7–10 (–14) \times 1–2 μm , 1(–3)-septate, curved; microconidia [frequent], 5.5–10 \times 0.8–1.3 μm , slender, \pm curved; mesoconidia [rare], 3–5 \times 1.5–2 μm , cylindric-ellipsoidal; leptoconidia [rare], 20–25 \times 0.7–1 μm , curved. Thallus C–, K– weakly yellow, KC–, Pd–, UV– (isousnic, \pm usnic acids). **BLS 0665**.

On wood and worked timber (often on twigs in Central Europe), also bark of *Pinus sylvestris*; local. S.W. England, Wales, Scotland (Highlands), very rare or overlooked in Ireland.

A distinctive but often overlooked species of the *L. saligna* group, distinguished by the inconspicuous or dispersed granular thallus, the minute and generally densely pruinose apothecia, and characters of the pycnidia. *L. albellula* is a candidate for segregation into the genus *Lecanoropsis* Choisy (Ivanovich *et al.*, in prep.). Recent studies have suggested further division of this species including *L. albellula* var. *macroconidiata* M. Brand & van den Boom (2008) **BLS 2521** with larger, 1- to 3-septate macroconidia, 12.5–14 \times 1.8–2.3 μm in size, which is known from a 19th century collection on worked timber in Middlesex.

Several lignicolous collections from Scotland are now referable to *L. coppinsii*; this mainly differs in its smaller ascospores (6–8 (–8.5) \times 2.5–3.5 μm), shorter microconidia (4.5–5.5 \times ca 1 μm), apparent absence of macroconidia and a less well-developed thalline margin. See also *L. sarcopidoides* and *L. subintricata*.



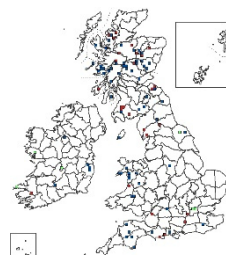
Lecanora alboflavida Taylor (1836)

Thallus of dispersed to aggregated areoles, pale green- to brown-yellow, convex, margins entire, surface granular and composed of low warts or papillae; soredia arising on the surface of the areoles, initially from circular soralia but becoming confluent and spreading over the surface but usually leaving the margin of the thallus corticate, paler than the areoles, yellow-green to green-white; prothallus inconspicuous to black. Apothecia when present to 1.2 mm diam.; thalline margin becoming contorted and crenate to irregularly lobed; disc pale red-brown, shiny, not pruinose. Thallus C+ orange, K+ weakly yellow, Pd–, UV+ bright orange (atranorin, arthothelin, unidentified substances). **BLS 0628**.

On old acidic bark (e.g. *Quercus*, *Fagus*, *Salix* and *Pinus*), rare or overlooked on slate or sandstone rocks, in moist old woodlands, especially in sheltered poorly drained boggy sites; local. S. & W. Britain and Ireland.

Thalli on rock closely resemble *Pertusaria flavicans* (Pertusariales, Pertusariaceae) which has larger soredia (to 100 μm diam.) and lacks atranorin. *Loxospora elatina* (Sarrameanales, Sarrameanaceae) has a K+ immediately bright yellow reaction and soft soralia. *Pertusaria flavida* and *P. flavocorallina* are K– and have isidia rather than soralia.

Nb



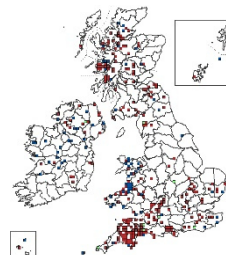
Lecanora argentata (Ach.) Malme (1931)

Thallus continuous, yellow- to green-white, smooth at the margins but uneven to warted centrally; prothallus usually black and well-developed. Apothecia 0.4–1 mm diam., sessile, dispersed or aggregated, constricted below; thalline margin persistent, smooth to strongly crenulate, containing massive crystals not soluble in K; disc red or dark brown, sometimes piebald; epithecium red-brown, without granules, not pruinose; hymenium (60–) 75–90 (–100) μm tall; paraphyses 1.5–2 μm diam., sparsely branched and anastomosed, apices to 3 μm diam., slightly swollen, faintly yellow. Asci 45–55 \times 18–22 μm , broadly clavate. Ascospores (10.5–) 11.5–14.5 (–17.5) \times (5.5–) 6–8.5 μm , broadly ellipsoidal, walls 0.5–1 μm thick. Thallus C–, K+ yellow, Pd+ weakly yellow, UV– (atranorin, gangaleoidin, usually traces of norgangaleoidin and rarely roccellic acid). **BLS 0685**.

On bark of deciduous trees; much overlooked and confused especially with *L. chlarotera*. Records scattered throughout Britain and Ireland, commoner in the west.

A distinctive member of the *L. subfusca* group, distinguished from *L. chlarotera* and allied species by the absence of granules in the epithecium. The dominant member of the *L. subfusca* group on the trunks of mature

LC



trees and generally within woodland in the west, but it does occur occasionally on twigs with other members of the *L. subfusca* group. Typically noted in more mature habitats as having a brighter white thallus and darker disks than typical of either *L. chlorotera* or *L. hybocarpa*, but microscopic examination is recommended to confirm the identity.

Commonly host to *Vouauxiella lichenicola*, and more rarely to *Skyttea lecanorae* Diederich & Etayo (2000) and *Lichenodiplis* cf. *pertusariicola* (Nyl.) Diederich (2003).

Lecanora atromarginata (H. Magn.) Hertel & Rambold (1997)

Thallus thin to well-developed, continuous or rimose to areolate, rarely dispersed, lemon-yellow to yellow-white or rarely deep yellow; prothallus prominent, white or blue-grey to black. Apothecia 0.5–1.5 (–2.5) mm diam., immersed, eventually becoming almost sessile; thalline margin soon becoming excluded; true exciple persistent, black; disc flat to somewhat convex, not pruinose; epithecium yellow-green to green-black; hymenium 55–75 µm tall, colourless; paraphyses 1.5–2.5 µm diam., unbranched or sparsely branched and anastomosed, apices 3.5–5 (–6) µm diam., swollen, capitate, brown. Ascospores (8–) 10–14 × (4–) 4.5–6 (–7.5) µm, ellipsoidal. Pycnidia frequent; conidia 11–15 × 0.5–1 µm, vermiform to falcate. Thallus C–, K+ yellow, KC+ yellow, Pd+ weakly orange, UV– (usnic acid, stictic acid complex). **BLS 1765.**

On hard calcareous rocks or other base-rich rocks, montane; very rare. Scotland (Highlands).

The only species of the genus in the British Isles with a predominantly yellow thallus occurring on calcareous or other base-rich rocks. It differs from *L. marginata*, which occurs on siliceous rock, in the chemistry and the initially immersed apothecia. Sequence data from Haugan *et al.* (2013) suggests that the species might be included within *Miriquidica*, but more data are needed before a transfer is appropriate.

VU(D2)



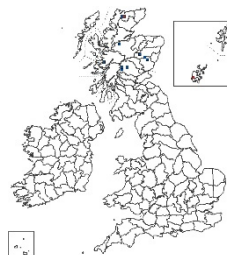
Lecanora atrosulphurea (Wahlenb.) Ach. (1814)

Thallus irregularly rimose, the margin often diffuse and the centre compacted, pale sulphur- to green-yellow or green-grey, surface smooth or granular; prothallus indistinct. Apothecia 0.5–2 (–2.5) mm diam., at first immersed, finally sessile and somewhat constricted at the base; thalline margin at first thin and crenulate, scarcely protruding above the level of the disc and soon becoming excluded; discs becoming strongly convex, often uneven, olivaceous black to green-black or black; epithecium brown-black or blue-brown, K+ green, N+ purple-red; hymenium 50–75 µm tall, blue-brown or dark brown above; hypothecium to 0.2 mm tall, becoming increasingly thick with age; paraphyses 1–2 µm diam., branched and anastomosed, some apices expanded to 3–5 µm diam. and others scarcely so, blue-brown to black. Asci elongate-clavate, long-stalked, apices only moderately thickened, 50–60 × 11–14 µm. Ascospores (8–) 11–15 (–16.5) × 4–5 (–6) µm, narrowly ellipsoidal. Pycnidia 0.1–0.15 mm diam., frequent, immersed, black; conidia 22–28 × 0.5–0.75 µm, thread-like, curved to sigmoid. Thallus C+ yellow-orange, K+ yellow, Pd–, UV+ orange (usnic acid, zeorin, ± arthothelin, ± norstictic acid, ± thiophanic acid, ? skyrin). **BLS 0632.**

On exposed montane siliceous rocks, especially calcareous schists at over 1000 m alt. Scotland (Highlands, Orkney).

A member of the *L. symmicta* group and a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.), resembling *L. sulphurea* but differing in the C+ yellow to orange reaction. See also *L. gangaleoides*.

NT



Lecanora barkmaniana Aptroot & Herk (1999)

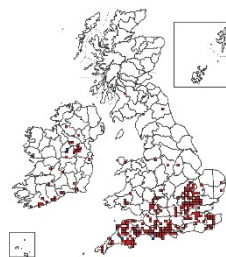
LC

Thallus determinate, rimose-verruculose, to 5 cm diam, pale grey, warts 0.1–0.2 mm diam., to 0.1 mm thick, angular to rounded, corticate, surrounded by a pale grey prothallus; soralia initially 0.1–0.3 mm diam., punctiform, soon coalescing to form irregular patches and usually covering most of the centre of the thallus; soredia granular, 15–30 µm diam., in a dense mass, pale yellow to yellowish grey, contrasting in colour with the thallus. Apothecia rare, sessile, but sometimes appearing immersed between the soredia; 0.4–0.7 mm diam., margin strongly crenulate, pale grey to pale yellow, often sorediate; disc concave, pale brown to buff, with some isolated pale grey granules, not pruinose; hymenium colourless to pale brown, 50–75 µm high, hypothecium colourless and copiously filled with chlorococcoid algae and large (15–50 µm) colourless angular packets of

crystals. Ascospores $12\text{--}15 \times 8.5\text{--}10 \mu\text{m}$, narrowly ellipsoidal. Pycnidia not observed. Thallus C⁻, K⁺ yellow, Pd[±] yellow; thalline margin Pd⁻, UV⁺ pale orange (chloratranorin, zeorin and atranorin). **BLS 2121**.

On the nutrient- or dust-enriched bases of mature parkland and wayside trees, particularly *Fraxinus* and *Quercus*, also on twigs, shrubs and younger trees in areas with higher nitrogen deposition; overlooked but now recorded more frequently. S. England, occasional in the Midlands and S. Wales. S. and C. Ireland.

A sorediate member of the *L. subfusca* group (in its very broad sense), when sterile superficially resembling *L. compallens*, *L. expallens*, *L. farinaria* and *L. strobilina*, but differing in its chemistry. The pale yellow (not yellow-green) tinge of its soredia is diagnostic. Also somewhat resembles *Buellia griseovirens* which contains norstictic acid, K⁺ red (crystals) and often has darker grey soralia. The recently discovered *Lecanora variolascens* (q.v.) is similar but has heavily pruinose disks and delimited soralia.



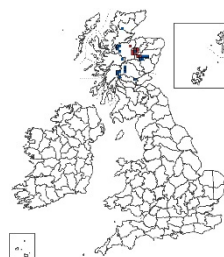
Lecanora cadubriae (A. Massal.) Hedl. (1892)

Thallus granular, sometimes dispersed or scale-like, white to grey-white, sometimes with a cream tinge; prothallus white, sometimes well-developed and \pm fibrous. Apothecia 0.2–0.6 (–0.8) mm diam.; thalline margin at first thin and entire, often becoming excluded with age; disc flat to strongly convex, pale pink to pale brown or brown-black, often weakly pruinose; epithecium brown, not distinctly granular; hymenium 30–45 μm tall; paraphyses 1.5–2 μm diam., unbranched or sparsely branched above, apices to 4 μm diam., swollen, brown-capitate. Asci 35–45 \times 10–14 μm , clavate, *Bacidia*-type. Ascospores (7–) 8–11 \times 3–4 μm , narrowly ellipsoidal. Pycnidia 60–100 μm diam., frequent, immersed to somewhat erumpent, black, sometimes gaping; conidia (3–) 4–5 (–6) \times 1–1.5 μm , bacilliform. Thallus and thalline margin C⁻, K⁺ yellow \rightarrow orange or red, Pd⁺ orange, UV⁻ (norstictic, \pm stictic and \pm salazinic acids). **BLS 1626**.

On bark and wood of aged *Pinus*, often associated with *Lecidea hypopta*; very local. Scotland (Caledonian pine forest).

The ascus type indicates that this species is not satisfactorily placed in either *Lecanora* or *Lecidea* s. str., and its phylogenetic position is unresolved. It may be related to *Lecidea turgidula* which occurs in similar habitats but is K⁻ and Pd⁻ and lacks a thalline margin. See also *Lecanora sarcopoidoides*.

Nb



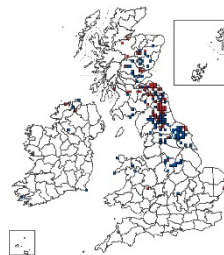
Lecanora caesiosora Poelt (1966)

Thallus areolate, composed of almost contiguous convex areoles, surface roughened, white to grey or sometimes brown with minute dark brown granules; soredia arising from soralia on the surface of the areoles, soralia mainly 1–2 mm diam., convex, the whole surface sometimes sorediate, white or blue- to yellow-white, always paler than the thallus. Apothecia (rare in our region) 0.5–0.7 mm diam., \pm sessile; thalline margin persistent; disc dark brown to black, often slightly pruinose; epithecium green-brown, coarsely granular; hymenium 45–50 μm tall; paraphyses *ca* 1.5 μm diam., conglutinate, apices to 2 μm diam., slightly swollen. Asci 40–45 \times *ca* 15 μm , broadly clavate. Ascospores 12–14.5 \times (6–) 7.5–8 μm , ellipsoidal. Pycnidia *ca* 100 μm diam.; conidia 20–25 \times 0.5–1 μm , curved. Thallus C⁻, K⁺ yellow, KC⁻, Pd[±] yellow, UV⁻ (atranorin, chloratranorin, roccellic and/or rarely nephrosteranic acids). **BLS 0634**.

On vertical and often well-lit faces of siliceous walls and rocks; local. N. England, N. & W. Wales, Scotland; apothecia only known from Scotland (Angus, Perth).

A sorediate member of the *L. subfusca* group, and considered to be a sorediate counterpart of *L. cenisia* by Malíček *et al.* (2017). Material lacking apothecia and without the characteristic dark brown granules on the areoles may be difficult to separate from sorediate morphotypes of *L. campestris* (subsp. *dolomitica*, see below) without TLC.

LC

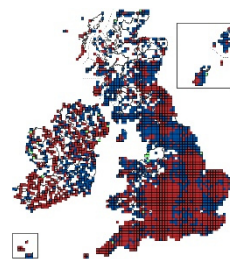


Lecanora campestris (Schaer.) Hue (1888)

Thallus generally forming \pm circular patches, composed of dispersed to more usually contiguous areoles, surface rough to warted with small rounded protruberances, greyish white to grey; prothallus often conspicuous,

LC

fimbriate, white. Apothecia 0.6–0.8 mm diam., usually abundant, often crowded over most of the thallus, sessile, slightly constricted at the base; thalline margin persistent, raised, entire or variously flexuose or contorted, containing small irregular crystals in the medulla; disc flat or sometimes slightly convex, dark reddish brown, matt or slightly shiny; epithecium pale orange to red-brown, not granular; hymenium (60–) 70–85 (–90) μm tall; paraphyses 1.5–2.5 μm diam., sparsely branched, especially towards the apices, apices 3–4.5 μm diam., slightly swollen, red-brown. Asci 50–60 \times 12–21 μm , broadly clavate, stalked. Ascospores 10–14 (–17) \times 6–8.5 (–9) μm , broadly ellipsoidal. Conidia 12–20 (–30) \times ca 1 μm , thread-like to curved. Thallus C–, K+ yellow, KC+ yellow, Pd+ weakly yellow, UV–, reflecting UV mauve-purple light (atranorin, chloratranorin and unidentified terpenoids). **BLS 0635**.



On mortar, asbestos-cement, asphalt pathways, mildly basic and nutrient-enriched siliceous rocks and walls, also on bark in areas of high nitrogen deposition and (rarely) worked wood; very common. Widespread in Britain and Ireland, becoming scarcer in N. & N.W. Scotland.

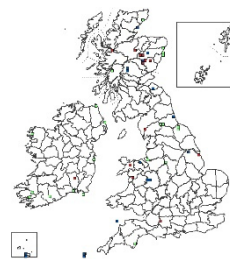
A member of the *L. subfusca* group. This species superficially recalls *L. horiza* which differs in larger apothecia (>0.8 mm diam.), with shiny brown discs and a more strongly constricted base, and a white thallus usually without prothallus. Both species occur on rock and bark but *L. campestris* is found in more strongly nutrient-enriched habitats.

Soredia are present in subsp. **dolomitica** O.L. Gilbert (1984) **BLS 1685** which has white convex circular soralia 0.5–1.0 mm diam., sometimes coalescing with age. This subspecies is known only from Magnesian Limestone outcrops, man-made structures and dust-contaminated bark in the N. Midlands of England (Leics, Notts, Derbyshire Peak District). The thalli sometimes form orbicular patches on fertile thalli of subsp. *campestris* suggesting a pathogenic association. See also *L. caesiosora* and *L. chlarotera*.

This species is commonly parasitised by *Muellerella lichenicola* and *Vouauxiella verrucosa* (Vouaux) Petr. & Syd. (1927), less often by *Lichenodiplis lecanorae*, *Lichenocodium reichlingii* Diederich (1986) and *Toninia subfuscae*. *Muellerella erratica* (A. Massal.) Hafellner & V. John (2006) has been reported from subsp. *dolomitica*.

Lecanora cenisia Ach. (1810)

Thallus a \pm continuous granular crust, or composed of dispersed to aggregated warted areoles, cream-white to pale or yellowish grey, blue- to pale grey when dry, areoles \pm flat with entire to crenate margins; prothallus when evident white or blue; soredia absent. Apothecia 1–2 (–2.5) mm diam., sessile, strongly constricted below and somewhat elevated; thalline margin well-developed, persistent, entire to crenulate or flexuose, with large crystals in clumps in the medulla; disc red-brown to black, yellow-brown, grey or green-black, sometimes yellow-white or greyish pruinose; epithecium brown to olivaceous brown, with coarse granules dissolving in K, K+ green, N+ purple-red; hymenium 60–90 μm tall; paraphyses 1.5–2 μm diam., sparsely branched, apices slightly swollen, olivaceous. Asci 45–50 \times 7–9 μm . Ascospores (7–) 9–15 (–19) \times (4.5–) 6–8.5 μm . Thallus C–, K+ yellow or yellow \rightarrow red (with crystals), Pd+ yellow or yellow \rightarrow orange-red, UV– (atranorin, chloratranorin, roccelic acid, gangaleoidin (rare), \pm norstictic acid). **BLS 0637**.



Nb

On coarse siliceous rocks, often in shaded or sheltered recesses, in inland or coastal sites; local. Channel and Scilly Is, scattered throughout upland Britain.

A member of the *L. subfusca* group. Specimens with black apothecial discs and sparse pruina [var. *atrynea* (Ach.) Clauz. & Roux (1985)] recall *L. gangaleoides*, in which the epithecium lacks coarse granules. Sorediate thalli are probably referable to *L. caesiosora*. Reports of *L. cenisia* from the British Isles on wood appear to result from confusion with other species.

Lecanora chlarotera Nyl. (1872)

LC

Thallus continuous, forming neatly delimited patches, smooth to roughened or warty, pale grey or sometimes yellow-grey; prothallus white, sometimes conspicuous in rapidly growing thalli. Apothecia 0.4–0.8 (–1.5) mm diam., sessile, often aggregated; thalline margin well-developed, persistent, entire to irregularly crenulate or slightly warted, the medulla with massive irregular crystal clusters not dissolving in K; disc flat, pale dull brown to rose-, orange- or red- brown, sometimes very dark brown on twigs in the south, not or rarely slightly pruinose; epithecium rarely with reddish-brown pigment, but brown due to numerous coarse granules which do not extend

down below the paraphysis tips and are soluble in K and slowly in N; hymenium 70–95 µm tall; paraphyses 1.5–2 µm diam., unbranched or sparsely branched, apices 2.5–4 µm diam., slightly swollen and yellow-brown, not capitate. Asci 65–80 × 10–15 µm, subcylindrical to elongate-clavate. Ascospores (9–) 11–15 × 6.5–7.5 (–8.5) µm, broadly ellipsoidal. Conidia 10–14 µm long, cylindrical. Thallus C–, K+ yellow, Pd–, UV reflecting mauve-purple (atranorin, chlorotera-unknown, ± gangaleoidin with derivatives, ± roccellic acid). **BLS 0639.**

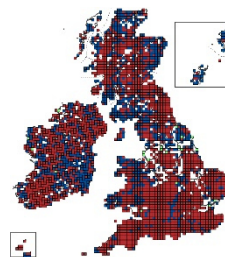
On bark and wood, mainly of deciduous trees and also worked timber, not infrequently on calcareous sandstone, brick etc.; common. Throughout Britain and Ireland but over-recorded in many areas.

Traditionally considered to be the commonest corticolous member of the *L. subfusca* group in the region, but is extremely variable and needs more study; the map should be interpreted with caution.

Much confused with *L. hybocarpa*, which has pale brownish crystals that extend down between the paraphyses that dissolve in K but not in N. *L. hybocarpa* appears more frequent than *L. chlorotera* in the south and eastern lowlands at least. Many woodland collections named *L. chlorotera* in the past prove to be *L. argentata*, which lacks a granular layer above the paraphysis tips. Care should be taken when separating the superficially similar and primarily saxicolous *L. campestris*; specimens of that species on timber or dust-impregnated bark can be distinguished by the presence of small crystals only in the thalline margin. *L. pulicaris* differs in the Pd+ red exciple and the red to orange-brown epithecium with fine granules, not soluble in N. A Pd– chemotype of *L. pulicaris* may occur but seems not to have been recorded in GBI.

Specimens with well-developed, irregularly warted thalline margin and coarsely uneven-warted thallus are sometimes called *L. rugosella* Zahlbr. (1928). See also *L. horiza* and *Myriolecis populicola*. Small-fruited specimens resemble *Lecania fuscella*.

In a broader concept (i.e. including *L. hybocarpa*), *L. chlorotera* is host to many species. The most commonly recorded are *Voauxiella lichenicola* (its black pycnidia often occur at the junction between the exciple and disc), *Lichenocodium lecanorae*, *Lichenodiplis lecanorae*, *Lichenostigma chloroterae*, *Skyttea lecanorae*, *Stigidium congestum*, *Tremella macrobasidiata* J.C. Zamora *et al.* (2011) and *Unguiculariopsis thallophila*. There are also less common or rare occurrences of *Briancoppinsia cytospora* (Vouaux) Diederich *et al.* (2011), *Everniicola flexispora* D. Hawksw. (1982), *Illosporopsis christiansenii* (B.L. Brady & D. Hawksw.) D. Hawksw. (2001), *Intralichen* sp. (recorded as *I. christiansenii* and *I. lichenicola*), *Lichenodiplis* cf. *pertusariicola*, *Paranectria oropensis* (Ces.) D. Hawksw. & Piroz. (1977) and *Pyrenidium actinellum* Nyl. (1865). *Bellamyces quercus* Crous, Coppins & U. Braun (2020) has been isolated from apothecia infected by *Tremella macrobasidiata*.



Lecanora chlorophaeodes Nyl. (1873)

Thallus areolate, areoles <1 mm, dispersed to contiguous, convex to aggregated, pale yellow-green to green-grey, surface warted or squamulose; prothallus absent. Apothecia 0.4–1 (–1.2) µm diam., sessile, constricted at the base, scattered; thalline margin entire to crenulate and slightly raised at first but soon becoming excluded; disc black, often somewhat shiny, becoming strongly convex and uneven; epithecium blue-green, interspersed with yellow-brown granules dissolving in K, N+ weakly purple-red; hymenium 60–75 µm tall; hypothecium becoming massively developed; paraphyses 1–2 µm diam., unbranched or sparsely branched, occasionally anastomosed below, apices to 2.5–3 µm diam., not or only slightly thickened. Asci 45–55 × 12–18 µm, broadly clavate, long-stalked. Ascospores (9–) 10–12 (–13) × 4–5 µm, occasionally 1-septate, narrowly ellipsoidal. Conidia 18–27 (–30) × 1–1.5 µm, filiform, flexuose to curved or sigmoid. Thallus C± weakly yellow, K+ yellow, KC+ faint yellow, Pd–, UV+ deep orange (usnic acid, zeorin, fatty acids). **BLS 1657.**

On exposed siliceous (syenite) rock, montane; very rare. N. Scotland (Sutherland, Ben Loyal).

A member of the *L. polytropa* group. Resembling *L. leptacina* but with a less yellow thallus and different chemical components. Grey specimens recall the more coastal *L. gangaleoides*, which has broader ascospores. Earlier reports from Britain refer to *L. fugiens*, which has a paler, C+ orange thallus and is mainly coastal.

VU(D2)



Lecanora cinereofusca H. Magn. (1932)

VU(D2)

Thallus continuous or irregularly rimose, pale to medium grey, smooth to warted; prothallus absent or black. Apothecia 0.7–1.5 mm diam., immersed at first, finally sometimes sessile; thalline margin well-developed,

persistent, coarsely crenate to almost dentate, flexuose with age, white or a paler grey than the thallus, medulla with very large crystals not soluble in K; disc flat to slightly convex, orange-brown or red-brown; epithecium red-brown, interspersed with coarse granules also present on the surface, ? not dissolving in K, Pd+ orange (with the formation of crystals); hymenium 60–85 μm tall; paraphyses 2–3 μm diam., sparsely branched and anastomosed, apices not or slightly swollen. Ascospores (7.5–) 10–14.5 \times (6–) 7–8.5 (–9.5) μm , broadly ellipsoidal. Conidia 10–14 μm long, cylindrical. Thallus C–, K+ yellow, Pd–, UV– reflecting mauve-purple; thalline margin and epithecium Pd+ yellow-orange (atranorin, pannarin, \pm placodialic acid, \pm roccellic acid). **BLS 1762.**

On *Betula* and *Salix*; very rare. W. Scotland (Argyll, Westernness).

A member of the *L. subfusca* group in its broad sense. *L. cinereofusca* can often be separated from *L. pulicaris* by its young apothecia that are immersed in the thallus, more orange/red apothecial discs with a distinctive crenulate to flexuose margin that may resemble a double structure, and the Pd+ yellow-orange, not rust-red, reaction.



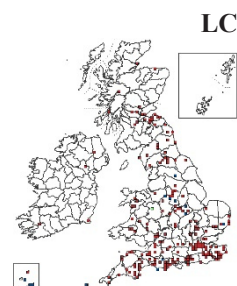
Lecanora compallens Herk & Aptroot (1999)

Thallus to 3 cm diam., immersed, continuous, shiny, usually with glaucous-grey warts 0.1–0.2 mm diam.; medulla below soredia white; soralia initially 0.1–0.3 mm diam., punctiform, soon aggregating into irregular patches, usually covering most of the thallus except for a marginal zone; soredia granular, 15–30 μm diam., in a dense mass, layered and up to 0.4 mm thick, yellow to slightly mint-green, contrasting in colour with the thallus. Apothecia rare, not known from British or Irish material. Thallus C–, Pd–, K–, UV–; soredia C–, Pd–, K+ yellow to yellow-brown, K/UV (wet)–, UV \pm pale orange (usnic acid, zeorin). **BLS 1996.**

On trunks of wayside and parkland trees and shrubs, also on timber, gravestones and church walls; probably widespread; mainly in nutrient-enriched habitats, and apparently more restricted to lignum in less polluted sites. Throughout Britain, commoner in the south; apparently rare in Ireland but likely to be under-recorded.

A member of the *L. symmicta* group according to Guzew-Krzemińska *et al.* (2017), thus a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). Identical in chemistry to *L. strobilina* but lacking apothecia and with soredia. *L. stanislai* is very similar and also has identical chemistry, but can be distinguished by sequencing; it tends to have smaller, slightly bluer soredia that form a uniform layer at an earlier stage of development.

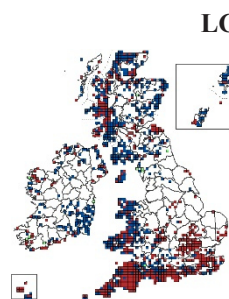
The very similar *L. expallens* is normally C+ orange and always K/UV (wet)+ bright green-yellow, while *L. barkmaniana* is greyer and contains atranorin. *L. compallens* tends to favour the more exposed sides of trees, in contrast to *L. expallens*. Populations of *L. expallens* from a shaded habitats may have xanthone levels undetectable by TLC. Then, the best diagnostic features are at least partially delimited soralia and a thicker grey thallus in *L. compallens*.



Lecanora confusa Almb. (1955)

Thallus granular to granular-areolate, forming small discrete patches, green- to yellow-grey, smooth. Apothecia usually present, generally abundant, 0.4–0.7 mm, sessile, slightly constricted below, in small groups; thalline margin generally slightly paler than the thallus, at first crenulate but rarely becoming excluded and then only represented by a few irregular granules; disc flat to somewhat convex, pale yellow-green, more rarely pink or brown; epithecium brown, with coarse granules; hymenium 65–85 μm tall; paraphyses 1–2 μm diam., branched and anastomosed, apices not swollen. Asci 32–45 \times 11–15 μm , broadly clavate, long-stalked. Ascospores (8–) 10–14 (–16) \times 4–5 μm , narrowly ellipsoidal. Thallus C+ orange, K–, K/UV (wet)+ bright green-yellow, KC+ orange, Pd–, UV+ bright orange (usnic acid, \pm zeorin, thiophanic acid, \pm arthothelin and other xanthones). **BLS 0641.**

On bark, particularly twigs and small branches of deciduous trees and shrubs, and occasionally wood and especially coastal, worked timber; locally abundant, especially near the coast. Widespread except in northern and central England and East Anglia.



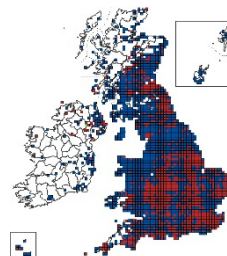
A distinctive member of the *L. symmicta* group, thus a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). It is separated from the predominantly eastern *L. varia* and sparsely sorediate specimens of *L. conizaeoides* by the more yellow colour of the thallus, the gradually excluded exciple, the C+ thallus and Pd- (not rust-red) reactions. *L. expallens* can also resemble *L. confusa*; both can show similar thallus coloration, outer texture, soredia and ascospore size. However, *L. expallens* commonly tends to form a rounded and well-defined thallus, has a pale yellow epithecium, and reacts K+ pale yellow, KC-. *L. symmicta* has an overall grey, KC+ pale yellow, thallus and paler immarginate and ± confluent apothecial discs.

Lichenicolous fungi recorded are: *Lichenocodium erodens*, *Lichenodiplis lecanorae* and *Vouauxiella lichenicola*.

Lecanora conizaeoides Nyl. ex Cromb. (1885)

LC

Thallus coarsely granular to verrucose, warted to areolate, thick, ± continuous, grey-green; soredia forming over the whole thallus surface, grey-green, coarsely granular, often predominating. Apothecia 0.4–1 (–1.5) mm diam., frequent, sessile, narrowed at the base, often at or beneath the level of the soredia; thalline margin persistent, crenulate to granular, sorediate or irregularly flexuose; disc pale green-grey to grey-brown, sometimes tinged pink, flat or concave, rarely slightly convex; epithecium colourless to pale yellow-brown, generally with granules dissolving in K; hymenium (45–) 55–70 (–85) µm tall; paraphyses 1.5–2.5 µm diam., branched and anastomosed, most frequently branched towards the apices, apices to 3 µm diam., not or slightly swollen. Asci 40–50 × 12–18 µm, broadly clavate, apical dome K/I+ blue with an K/I- internal cone. Ascospores 10–14 (–16) × 4–6 (–7) µm. Conidia 12–22 × 0.5–1 µm, curved to thread-like. Thallus C-, K+ weakly yellow, Pd+ orange to deep red, UV+ dull orange (usnic and fumarprotocetraric acids).



BLS 0643.

Formerly the commonest lichen on trees throughout lowland England and Scotland where air pollution restricted the occurrence of other species, on a wide range of acidic substrata including bark, wood, siliceous rocks, walls, decaying plant debris, peaty soils and rubberized materials; becoming much rarer now and mainly restricted to conifer bark and worked timber in the Channel Islands (Guernsey), London, S.W. England, Wales (Pembroke), N.W. Scotland. Possibly introduced into Ireland and there restricted to eastern coastal areas.

The forma **variola** (Arnold) J.R. Laundon (2003) **BLS 2381** is a morph where apothecia predominate and soredia are lacking; these specimens recall *L. confusa* and *L. varia* which respectively differ in the Pd± yellow (not changing to red) thalli.

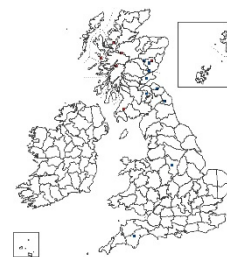
A member of the *L. varia* group, and likely to be segregated into the genus *Straminella* Choisy (Ivanovich *et al.*, in prep.). Depauperate specimens can still be recognized by the strong Pd+ red reaction, which is uncommon in crustose lichens. *Fuscidea arboricola* can resemble sterile *L. conizaeoides* but has a delimiting brown prothallus. *Pycnora sorophora* can also be overlooked for this species on lignum and timber, but is paler yellow, and is C+ red, Pd + yellow.

Colonies are commonly infected by the parasitic fungus *Athelia arachnoidea* (Berk.) Jülich (1972) causing pale brown circular lesions with felted white margins and pink ellipsoidal sclerotia. Apothecial discs infected by *Lichenocodium lecanorae* (Jaap) D. Hawksw. turn black and *L. erodens* M.S. Christ. & D. Hawksw. is associated with bleached areas of the thallus. Other lichenicolous fungi recorded are: *Briancoppinsia cytospora*, *Erythricium aurantiacum* (Lasch) D. Hawksw. & A. Henrici (2015), *Marchandiomyces corallinus*, *Monodictys cellulosa* S. Hughes (1958), *Muellerella lichenicola* and *Trichonectria hirta* (A. Bloxam) Petch (1937).

Lecanora coppinsii M. Brand & van den Boom (2008)

NE

Thallus very thin, sometimes slightly rimose-areolate, uneven, to 4 cm diam.; upper surface smooth, grey, yellowish grey or pale to dark brownish grey. Apothecia 0.4–0.8 mm diam., closely appressed to broadly sessile and slightly constricted at the base, sometimes innate, irregular in appearance; margin at first prominent, initially raised, becoming level with the disc, concolorous with the thallus or paler, becoming darker and concolorous with the disc, ± crenulate, finally excluded; disc at first flat, later convex to sometimes nearly subglobose, pale pinkish brown to pale orange, cream, yellowish brown, pale to intensively grey-brown to blueish brown or greyish, grey to bluish pruinose. Hymenium with orange-brown scattered to clustered granules, 25–50 µm high. Epithecium yellowish to greyish brown with olive parts (spotted), filled with



many coarse, yellowish granules, N⁻. Hypothecium hyaline to pale yellowish, 40–60 µm high. Paraphyses immersed within a gelatinous matrix, often strongly branched, 1–1.5 µm diam., apices not swollen, colourless to sometimes weakly ± brown to olive greyish pigmented. Asci clavate, *Lecanora* type, 25–30 × (7–) 8–10 (–11) µm. Ascospores 6–8 (–8.5) × 2.5–3.5 µm, ellipsoidal. Conidia of two types; microconidia bacilliform to slightly curved, 4.5–5.5 × ca 1 µm, mesoconidia short bacilliform to weakly curved, 2.8–3.3 × ca 1 µm. Thallus and soredia K± yellow, C⁻, KC⁻, P⁻. Isousnic acid (major) (TLC). **BLS 2520**.

On rotting wood of conifer trunks, central and southern Scotland, possibly overlooked elsewhere.

A member of the *L. saligna* group, similar to *L. albellula* but differing mainly in its smaller ascospores, shorter microconidia, apparent absence of macroconidia and a less well-developed thalline margin. It is a candidate for segregation into the genus *Lecanoropsis* Choisy (Ivanovich *et al.*, in prep.)

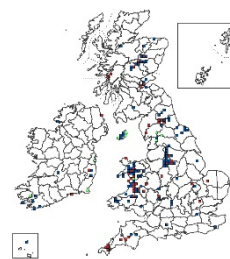
Lecanora epanora (Ach.) Ach. (1810)

Thallus coarsely granular or forming a continuous areolate crust, bright yellow- or sometimes black-green, areoles strongly warted and convex; prothallus when visible black; soralia arising on the upper surface of the areoles, soredia dull yellow to lemon-yellow, usually paler than but sometimes concolorous with the thallus, 0.2–0.5 mm diam., but often coalescing to form an almost continuous sorediate crust. Apothecia 0.5–1.5 (–2) mm diam., rare, sessile; thalline margin well-developed, entire to crenate or coarsely lobed, often flexuose or sorediate, raised; disc yellow-brown to pale red-brown, flat to slightly convex; epithecium yellow, green or brown, interspersed with yellow granules not dissolving in K; hymenium 70–80 µm tall; paraphyses 1–2 µm diam., branched and anastomosed, apices not or slightly swollen. Ascospores 8–12 (–13) × 5–6.5 µm. Thallus and soredia C⁻, K⁻, Pd⁻, UV⁺ bright orange (epanorin, rhizocarpic acid, zeorin). **BLS 0647**.

Under shaded overhangs and in dry crevices of iron sulphide-rich rocks and walls; widespread but localized. Concentrations in S.W. England, N. and C. England (Peak District, Northumberland, S. Pennines, Leicestershire), Isle of Man, Wales, Scotland (Highlands, also Fife and Lothians), rare in Ireland.

Of uncertain affinity within *Lecanora* s.l. In *L. subaurea* the soralia mainly arise on the margins, not on the surface of the areoles and rarely coalesce to form a sorediate crust; thallus and soralia of that species are also consistently Pd⁺ orange or red and contain pannarin. The lichenicolous *L. gisteriana* is occasionally present.

LC



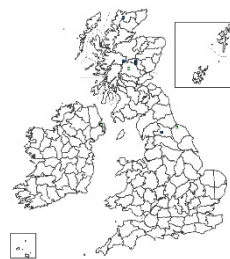
Lecanora epibryon (Ach.) Ach. (1810)

Thallus weft-like or of dispersed convex wart-like granules, white to pale grey; soralia when present excavate, soredia coarsely granular, pale grey. Apothecia 1–2 (–3) mm diam., sessile, constricted at the base, often short-stalked, frequently in dense groups; thalline margin persistent, entire to crenulate or flexuose, containing small irregular crystals in the cortex and sometimes the medulla, not dissolving in K; disc dark red-brown, shiny or sometimes with small patches of pruina, ± flat; epithecium red-brown, sometimes with small oil drops; hymenium 60–85 µm tall; paraphyses 1.5–2 µm diam., unbranched or sparsely branched, apices to 3.5 µm diam., somewhat swollen, red-brown. Asci 48–55 × 12–18 µm, broadly clavate, short-stalked. Ascospores (11–) 13.5–18 (–19) × (5–) 8–9.5 µm, narrowly ellipsoidal. Thallus C⁻, K⁺ yellow, Pd⁻, UV⁻ (atranorin, various terpenoids). **BLS 0648**.

On peat, mosses and other plant remains, arctic-alpine, 800–1000 m; very rare. N. England (W. Yorkshire), Scotland (Highlands).

A member of the *L. subfusca* group, resembling a terricolous and bryophilous version of the corticolous *L. allophana* (that species not yet recorded from our region). See Malíček (2014) and Malíček *et al.* (2017) for more information.

VU(D2)



Lecanora expallens Ach. (1810)

Thallus effuse and granular to rimose, usually forming circular to elongate patches, yellow-green, sometimes with radially orientated crystals evident on the surface; soredia initially arising from discrete, somewhat excavate, lens-shaped soralia 0.1–0.3 mm diam., soon becoming confluent to make a continuous sorediate crust, farinose, pale to lemon yellow; prothallus inconspicuous or when on smooth bark blue-grey. Apothecia when present 0.3–

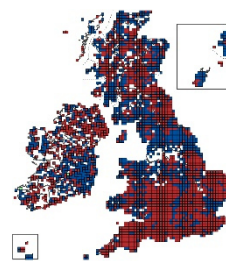
LC

0.8 (–1.5) mm diam., sessile, not constricted below, sometimes angular by compression; thalline margin at first crenulate but becoming excluded, sometimes sorediate; disc pale yellow, pink or brown, flat to slightly convex, sometimes pruinose, matt to waxy; epithecium colourless to pale yellow; hymenium 35–55 μm tall; paraphyses 1.5–2 μm diam., sparsely branched and anastomosed, apices not or slightly thickened. Ascospores 10–16 (–17) \times 4–7 (–7.5) μm , broadly ellipsoidal. Thallus C+ deep yellow or orange (? to red), K+ yellow, K/UV (wet)+ bright green-yellow, Pd–, UV+ orange (zeorin, thiophanic and usnic acids, \pm arthothelin and ‘expallens unknown’). **BLS 0649.**

On bark, wood and worked timber, generally in well-lit or xeric situations, occasionally also on dry siliceous rock faces and vertical memorials or walls; common. Throughout Britain and Ireland.

A member of the *L. symmicta* group, thus a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). When sterile, this species may be confused with *Pyrrhospora querneae*, which has a somewhat duller, yellow rather than yellow-green or citrine thallus and coarser, nearly isidioid soredia; it also contains arthothelin and not usnic acid. Poorly developed material can be C–, but appears always to show a K/UV (wet)+ bright green-yellow reaction. For comparison with *L. compallens* and *L. stanislai* see those species, also *L. barkmaniana*. *L. strobilina* is always fertile and is not sorediate.

Lichenicolous fungi recorded are: *Athelia arachnoidea*, *Diplolaeviopsis ranula* Giralt & D. Hawksw. (1991), *Erythricium aurantiacum*, *Lichenodiplis lecanorae* and *Paranectria oropensis*.



Lecanora farinaria Borrer (1834)

Thallus immersed or of thin contiguous areoles, grey-white, sometimes slightly yellow, green or brown, smooth; soredia arising in small mounds which may coalesce and cover the whole thallus surface, farinose (20–50 μm diam.), yellowish, white or pinkish. Apothecia rare, 0.4–1 (–1.5) mm diam., dispersed or aggregated, at first immersed amongst the soredia but finally erumpent; thalline margin at first well-developed, later becoming excluded, sorediate when young, the medulla with very large crystals not dissolving in K; disc black or sometimes red-brown, sometimes partly pallid, finally convex; epithecium yellow- to green-brown, interspersed with fine granules dissolving in K but not N; hymenium 50–75 μm tall; paraphyses *ca* 1 μm diam., anastomosed below, sparsely branched above, apices green-brown, not swollen. Ascospores (10–) 14–17 (–20) \times 7–15 μm , broadly ellipsoidal to subglobose. Thallus and soralia C–, K+ bright yellow, Pd+ weakly yellow, UV– (atranorin, roccellic acid, \pm traces of additional fatty acids). **BLS 0650.**

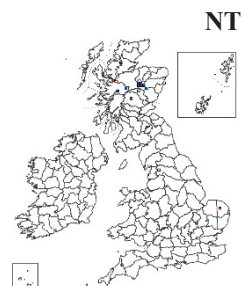
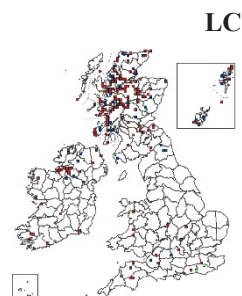
On wood (and occasionally adjacent loose bark), also on bark of healthy shrubs and trees, such as *Salix* in carr and leggy *Calluna*. Widespread in Highland Scotland, occasional in southern England, Wales and northern Ireland.

A member of the *L. subfusca* group. Most easily separated from other sorediate taxa on wood (e.g. *L. jamesii*) when fertile as the blackened apothecial discs are surrounded by a characteristic thick sorediate thalline margin. The K+ yellow reaction is bright and distinct in *L. farinaria* and rather weak in *L. jamesii*. When on smooth bark of deciduous trees, with pustulate thalli and mostly delimited soralia, consider *L. substerilis* Malíček & Vondrák (2017); not yet known from Britain and Ireland. See also *L. barkmaniana*.

There is a single report of *Skyttea lecanorae* on this host.

Lecanora formosa (Bagl. & Carestia) Knoph & Leuckert (2000)

Thallus moderately thick, white to grey-white, verrucose, of irregular convex and occasionally bullate granules to *ca* 1.5 mm diam.; surface \pm eroded, at times plected. Apothecia to 1.5 mm diam., sessile to almost immersed, at first flat, later convex, occasionally sublobulate and then to 3 mm diam.; disc usually black, grey-pruinose; thalline margin soon excluded; true exciple at first prominent, black, later excluded, dark brown in section, usually extending beneath the hypothecium; epithecium crystalline, the crystals dissolving in K; hymenium 40–65 (–90) μm , colourless, not interspersed with crystals; hypothecium 2-layered, lower part densely crystalline, crystals dissolving in K. Ascospores 7–12 \times 5–8 μm . Thallus and/or apothecia C–, K+



yellow, KC+ yellow, Pd± deep yellow, UV– (atranorin, zeorin, ± psoromic acid, ± 2'-O-demethylpsoromic acid). **BLS 0795.**

On vertical non-calcareous, often metal-rich rocks, also beneath overhangs, montane. Scotland (Highlands).

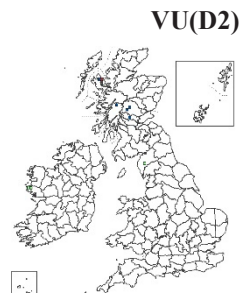
Resembles a *Lecidella* owing to the absence of a thalline margin, but is generally characterized by the Pd+ yellow reaction. According to Zhao *et al.* (2015a) the species clusters with *Palicella*, and relationships with that genus should be explored further.

Lecanora frustulosa (Dicks.) Ach. (1810)

Thallus of scattered to contiguous strongly convex areoles, areoles 1–1.5 mm diam., the outermost areole margins crenulate to almost palmate, pale to medium yellow or yellow-green, surface minutely roughened; prothallus well-developed, extensive, black. Apothecia 0.4–2 (–3) mm diam., at first immersed in or between the areoles, finally ± sessile; thalline margin at first well-developed and entire, becoming crenate, flexuose or irregular, often excluded with age; disc brown to red-brown, flat to convex; epithecium red-brown, not granular; hymenium 60–90 µm tall; paraphyses 1.5–2.5 µm diam., mainly unbranched or sparsely branched above, apices 3.5–5 µm diam., capitate, red-brown or brown. Ascospores 10–15 (–18) × 5–7 (–9) µm. Thallus C–, K+ yellow, Pd+ orange-red, UV+ dull orange (usnic acid, unidentified fatty acids; ± stictic, ± norstictic and ± cryptostictic acids, ± atranorin, ± epanorin, zeorin, ± unidentified fatty acids). **BLS 0651.**

On siliceous rocks in montane areas; rare. N. England (Lake District), Scotland (Highlands, Ben Lawers).

A member of the *L. polytropa* group. The strongly convex areoles separate this species from all other yellow and yellow-green species of the genus in Great Britain. Of the various chemotypes, that with fatty and usnic acids is the commonest in our region, although the stictic acid-group chemical race also occurs.



Lecanora fuscescens (Sommerf.) Nyl. (1873)

Thallus effuse, granular, granules 50–300 (–500) µm diam., poorly delimited, white or grey; prothallus sparsely developed, black. Apothecia (0.2–) 0.4–0.6 (–0.8) mm diam., sessile; thalline margin at first entire, becoming excluded; disc pale to dark brown; hymenium 35–50 µm tall; paraphyses lax in K, apices swollen and brown to red-brown. Ascospores (5–) 6–10 (–13) × 4–7 (–8) µm, broadly ellipsoidal to subglobose. Conidia needle-like. Thallus C–, K+ yellow, Pd+ orange to red, UV+ white (fumarprotocetraric and lobaric acids). **BLS 0723.**

On pine bark and wood; Scotland (Highlands), reported in the 19th century and probably extinct in our area.

The status of this species requires further study. Records made in recent decades mainly refer to *L. cadubriae* which has narrowly ellipsoidal ascospores, 3–4 µm broad and a Pd+ orange thallus.

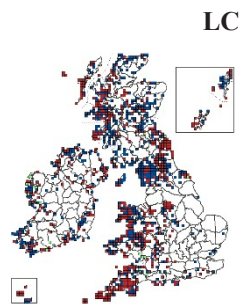
Ex

Lecanora gangaleoides Nyl. (1872)

Thallus irregularly areolate, delimited, separate thalli often coalescing, areoles warty to strongly convex, grey, sometimes with a greenish tinge; lower medulla often orange; prothallus white. Apothecia to 1.5 (–2) mm diam., sessile, slightly constricted at the base; thalline margin persistent, entire or rarely crenate, the medulla with large crystals not dissolving in K; disc black, flat; epithecium green or brown-green, not granular, K+ green and N+ purple-red; hymenium 70–90 (–100) µm tall, often with an olivaceous green tinge; hypothecium colourless to pale pink-brown; paraphyses 1–1.5 µm diam., infrequently branched and anastomosed, apices not swollen or capitate. Asci 55–70 × 11–15 µm, broadly cylindrical, with a distinct ocular chamber. Ascospores (10–) 12–15 (–18) × (5–) 6–8 (–9) µm. Thallus C–, K+ yellow, Pd± yellow or red, UV± pale orange (atranorin, chloratranorin, gangaleoidin with its accessories), older medullary parts of the thallus especially below the apothecium with an orange, K+ purple anthraquinone (skyrin). **BLS 0653.**

On hard siliceous rocks in both exposed and shaded sites, commonest on coastal rocks in the xeric-supralittoral zone, exceptionally on worked timber, also locally abundant inland. Widespread but absent from large parts of C. & S.E. England.

A member of the *L. subfusca* group. This species is most commonly confused with *Tephromela atra* (Lecanorales, Tephromelataceae) which generally has a rather paler grey thallus without any green tinge, a purple-red, K+ violet hymenium (often demonstrable in the field by hand sections), a dark red-brown



hypothecium and never forms orange, K+ purple anthraquinones in the medullary part of the thallus (extracted and easily observed in acetone). The two species may occur intermixed in the xeric-supralittoral zone. Green-tinged thalli should be compared with *L. atrosulphurea* in which the thalline margin becomes excluded. The colour of the epithecium distinguishes *L. gangaleoides* (pale green) from *L. cenisia* (brown). See also *L. chlorophaeodes*.

Especially in N.W. Scotland, thalli of this species have a dark grey 'smutty' appearance owing to effuse colonies of a hyphomycetous fungus (? *Taeniolella*). Other reported fungi on this host are *Epithamnolia xanthoriae*, *Muellerella pygmaea* and an unidentified *Stigmidium* sp. (in the thallus).

Lecanora gisleriana Müll. Arg. (1874)

Thallus absent or represented by small orange-grey to grey-brown lobules intermixed with the host lichen. Apothecia 0.2–0.7 (–1) mm diam., dispersed; thalline margin persistent, entire to irregularly crenulate or crenate, pale grey; disc orange- to red-brown, flat to somewhat convex; epithecium dark red-brown; hymenium 40–55 µm tall; paraphyses 1–2 µm diam., sparsely branched, apices 2–3 µm diam., slightly swollen, not capitate. Asci 40–48 × 12–15 µm, broadly clavate, outer coat and apical dome K/I+ blue, with a broad K/I– apical cushion. Ascospores (7–) 8.5–11 × 4–5 µm, broadly fusiform, apices pointed. Thallus C–, K–, KC+ yellow, Pd–, UV– (usnic acid).

BLS 1763.

A lichenicolous lichen, on thalli of *L. epanora*, *L. handelii* and *L. subaurea*, on metal-rich spoil heaps; very rare. S. England (N. Somerset, Mendip Forest), C. & W. Wales, upland Scotland.

A member of the *L. polytropa* group. Distinguished from other lichenicolous taxa of *Lecanora* by the pointed ascospores.

Nb



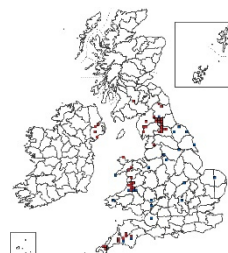
Lecanora handelii J. Steiner (1909)

Thallus areolate, dispersed or forming a continuous crust, areoles flattened and subsquamulose or more commonly convex, sometimes strongly so, grey-green to grey; soredia arising from soralia on the margins of the areoles, more rarely from their surface, concolorous with the thallus or white to blue-green or slightly yellow; prothallus absent. Apothecia 0.2–0.5 mm diam., often absent, sessile; thalline margin persistent, not or scarcely raised, entire; disc pale to pink-brown, flat, sometimes with blue-black pruina; epithecium colourless to pale yellow, not granular; hymenium 50–65 µm tall; paraphyses 1.5–2.5 µm diam., sparsely branched and anastomosed, apices not or slightly swollen. Ascospores not found in British material. Thallus C–, K–, KC+ yellow, Pd–, UV+ dull orange (usnic acid, zeorin). **BLS 1692.**

On metal-rich siliceous rocks, particularly spoil heaps from copper mines; rare. England (N. Pennines, Lake District, S.W. England), Wales. Rare in N.E. Ireland.

A member of the *L. polytropa* group. *L. subaurea* has a much brighter yellow-green thallus and contains rhizocarpic acid and pannarin in addition to zeorin. *L. handelii* is related to *L. soralifera*, which has distinctly yellow-green soredia produced on the surface of flattened and darker areoles; in *L. handelii* the soralia are initiated from the margins of the areoles. The lichenicolous *L. gisleriana* is occasionally present.

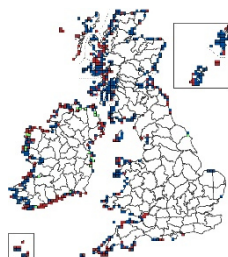
NT



Lecanora helicopsis (Wahlenb.) Ach. (1814)

Thallus rimose, forming continuous discrete patches, medium to dark grey, the surface smooth and somewhat glossy to slightly roughened; prothallus often conspicuous, white, dark blue or black. Apothecia 0.2–0.5 (–0.7) mm diam., at first immersed, becoming sessile, not strongly constricted below; thalline margin at first entire and concolorous with the thallus, becoming brown to black, finally almost excluded; disc dark brown to black; epithecium yellow or brown, K+ yellow, N–; hymenium 40–45 µm tall, colourless or greenish grey below and greenish to olivaceous above; hypothecium grey; paraphyses 2–3 µm diam., sparsely branched, apices to 3.5–4 µm diam., swollen, bluish green to dark brown. Asci 28–35 × 12–20 µm, broadly clavate. Ascospores 9–15 × 4–6 µm, often guttulate and appearing 1-septate. Pycnidia to 60 µm diam., often numerous, black; conidia 18–25 × 0.5–1 µm, thread-like to curved, sigmoid or irregularly

LC



contorted. Thallus C–, K–, Pd–, UV– (no lichen substances detected by TLC). **BLS 0655**.

On siliceous, often shaded and sheltered coastal rocks with *Flavoplaca* (*Caloplaca*) *marina* and *Hydropunctaria maura* in the mesic-supralittoral zone, often in association with *Myriolecis actophila*; common. Widespread in western and northern Britain and on most coasts of Ireland.

A member of the *L. dispersa* group. For separation from *M. actophila* see that species. May also be confused with the rarer *Halecania ralfsii* (Caliciales, Leprocaulaceae) which has an oily, blue-grey thallus and truly 1-septate ascospores, upturned pale grey margins to the areoles and a Pd+ red medulla (argopsin). Although *L. helicopsis* has been referred to *Lecania*, its asci are not of the *Bacidia*-type so it is retained here pending molecular analysis.

Arthonia varians, more usually occurring in the apothecia of *Glaucomarina rupicola*, has occasionally been found in this species. Also recorded is a *Stigmidium* sp. (ascospores 16–17 × 2.3–2.5 µm).

Lecanora horiza (Ach.) Linds. (1869)

Thallus continuous, in small patches, white, thick, rough to slightly warted, rarely smooth; prothallus poorly developed or absent. Apothecia 0.8–1.5 (–2) mm diam., sessile, strongly constricted at the base, often densely crowded; thalline margin well-developed, persistent, entire or sometimes flexuose, raised, medulla with small irregular crystals not dissolving in K, cortex usually distinctly delimited (better seen in KOH), 10–25 µm thick, at the base expanding to 40–60 (–80) µm, composed of branched hyphae 2–3 µm diam. with fine granules soluble in KOH; disc brown to blackish brown, not pruinose, shiny especially when young; epithecium red-brown, without granules; hymenium 65–80 µm tall; paraphyses 1.5–2.5 µm diam., unbranched or sparsely branched, rarely anastomosed, apices 2.5–4 µm diam., yellow-brown, slightly swollen. Ascospores (11–) 12–15 (–17) × (4.5–) 6.5–8.5 (–9.5) µm. Thallus C–, K+ yellow, Pd–, UV+ pale orange (atranorin, ± chloratranorin, unidentified triterpenoids). **BLS 1764**.

On bark of deciduous trees, especially mature *Acer*, *Fraxinus* and *Ulmus*; either increasing or more frequently recorded. Also on rock, especially vertical gravestones and brick of churches. Mainly in S. & E. Britain.

A member of the *L. subfusca* group. Frequently overlooked for *L. chlarotera* which has a coarsely granular epithecium, particularly large crystal clusters in the medulla of the exciple, crenulate apothecial margin, and usually paler and less glossy apothecial discs. Can be confused with *L. campestris*, which differs in having more inset apothecia 0.6–0.8 mm diam, reddish brown, matt to slightly shiny discs, a greyish-white to grey thallus, and usually a medium thick, white, fimbriate prothallus.

There are several finds of *Muellerella lichenicola* and *Vouauxiella verrucosa* on this host, and a single record of *Unguiculariopsis thallophila*.

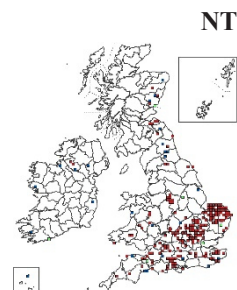
Lecanora hybocarpa auct. br., *non* (Tuck.) Brodo (1984)

Thallus continuous to dispersed, smooth to warted, granulose or of scattered areoles, determinate, yellow-white to grey; prothallus white, sometimes conspicuous when the thalli are expanding rapidly. Apothecia (0.3–) 0.5–1 (–2) mm diam., dispersed or loosely aggregated, somewhat elevated or sessile, constricted below; thalline margin well-developed, with large irregular crystals not dissolving in K; disc pale brown to pink-brown or red-orange, flat or concave, often lightly pruinose; epithecium pale to red-brown, interspersed with pale brownish granules that extend down between the paraphyses, that dissolve in K but not in N and are typically yellow in polarized light; hymenium 60–85 µm; paraphyses sparsely branched, apices capitate. Ascospores 10–12 (–15) × 6–7 µm. Thallus C–, K+ yellow, Pd–, UV+ efflorescent (atranorin, ± roccellic acid, ± fatty acid). **BLS 2506**.

On mesic bark, distribution incompletely known but probably common on sunny trunks and particularly twigs throughout the lowlands and extending into the uplands. Locally can be more frequent than *L. chlarotera*.

Similar to *L. chlarotera*, which mainly differs in the coarse granules in the epithecium not extending down into the hymenium, which are soluble in both K and N (slowly), but the two species occur together and show subtle additional differences. The distribution of crystals in the apothecia is identical to that of *L. sinuosa*, which has the thallus dominated by apothecial initials, and the thallus and apothecial margin are often thick. Similar to *L. pulicaris*, which has a usually smooth apothecial margin (not crenulate), is often Pd+ red, and has darker discs.

This taxon is probably not conspecific with the American *L. hybocarpa*, but it is also possible that *L. sinuosa*



is a habitat form of European populations identified as *L. hybocarpa*, in which case *L. sinuosa* may be the correct name for this taxon. However, there are also (at least) two other undescribed "*L. hybocarpa*" species in Britain, which cannot currently be separated using morphological characters. Unfortunately, *L. sinuosa* is very variable as well, adding to the complexity.

Refer to *Lecanora chlarotera* for lichenicolous fungi likely found on this host.

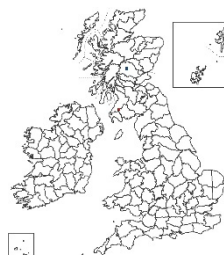
Lecanora hypoptella auct. br., non (Nyl.) Grummann (1963)

DD

Thallus poorly delimited, white or grey. Apothecia 0.2–0.5 mm diam., sessile, convex; thalline margin at first entire, becoming excluded; disc pale to dark brown, often black-dotted due to darkened paraphysis-tips; exciple of radiating hyphae; hymenium 35–55 μm tall; paraphyses lax in K, apices swollen and brown-black. Ascospores 8–15 \times 3–4.5 μm , often guttulate and appearing 1-septate. Conidia 2–4 \times ca 1.5 μm . Thallus C–, K–, KC–, Pd–, UV– (no lichen substances detected by TLC). **BLS 0601**.

A single record, on bark of an old *Larix* in Scotland (Mid-Perthshire).

A poorly known species, with typification problems that have not yet been resolved.



Lecanora hypoptoides (Nyl.) Nyl. (1872)

NE

Thallus effuse, in patches of up to 2 cm diam., sometimes diffusely covering larger surfaces, 100–350 μm thick, warted to granular, thalline units \pm subglobose and to 0.25 mm diam., sometimes disintegrated and nearly sorediate; upper surface pale to dark grey or pale yellowish brown to brown, matt to slightly shiny. Photobiont chlorococcoid, cells 8–20 μm diam. Prothallus not developed. Apothecia 0.4–0.6 mm diam, appressed to sessile, sometimes constricted at the base, the margin level with the disc or slightly raised, entire to irregular or crenulate, often becoming excluded, concolorous with the thallus, 40–120 μm thick; disc flat to slightly convex, pale or reddish brown, dark greyish brown to dark brown, not pruinose. Epithecium pale to dark reddish brown or dark brown, sometimes slightly olivaceous, without granules, N+ reddish violet. Hymenium colourless, with a few orange granules, 35–60 μm tall. Hypothecium colourless, 45–55 μm tall. Paraphyses mostly branched and anastomosing, 2–2.5 μm diam., the apices sometimes widened to 4 (–5) μm diam., colourless to dark greyish brown. Asci *Lecanora*- to *Lecidella*-type, 25–35 \times 12–17 μm . Ascospores ellipsoidal, rarely 1-septate, 9.5–13.5 \times 3–4 μm . Micropycnidia rather rare, inconspicuous, immersed or partially emergent, 50–80 μm diam.; microconidia bacilliform to slightly curved, 5–5.5 \times ca 1 μm . Mesopycnidia sometimes abundant, immersed, globose, ca 150 μm diam., dark brown to bluish green in the upper part, colourless below; mesoconidia ellipsoidal to tear drop-shaped, 2.5–4 \times 1.5–2 μm . Thallus K–, C–, KC–, Pd–. Paraensic acid D (major), paraensic acid C (minor).

A single record on lignum of a fallen veteran *Quercus*, Oxfordshire.

Similar to *L. saligna* but with differences primarily in conidial characters. The species has been well documented by van den Boom & Brand (2008).

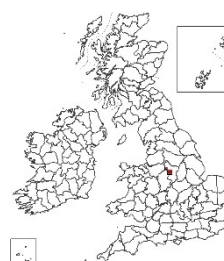
Lecanora impudens Degel. (1944)

NE

Thallus thin to medium thick, usually smooth; soralia more or less delimited, 0.3–0.6 (–1.0) mm diam., sometimes slightly confluent, rounded, concave or flat when young, later convex, a thin thalline rim along the base of soralia often present, mainly in young soralia; soredia finely granulose, greyish to more often yellowish. Apothecia not known in British material, sessile to slightly constricted at the base, 0.5–1 mm diam.; discs reddish brown; margin smooth, later sorediate. Ascospores 10–14 (–15.5) \times 5.5–8 μm . Thallus containing atranorin and sometimes traces of an unknown terpenoid and a fatty acid. **BLS 2623**.

On bark of *Fraxinus* and *Sambucus*, Derbyshire; potentially overlooked on high pH bark on trees in open landscapes.

Similar in appearance to the siliceous rock-inhabiting *L. caesiosora*, but with a thinner thallus and smaller soralia that are often surrounded by a thin thalline rim. The chemistry is distinctive, and is described by Malíček (2014). Old records of the species are referable to *L. jamesii*.

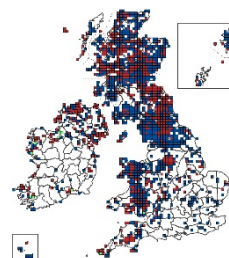


Lecanora intricata (Ach.) Ach. (1810)

LC

Thallus of well-developed flattened areoles, each 0.2–0.5 mm diam., contiguous or sometimes dispersed, areole

margins \pm indented, grey- or yellow-green, surface smooth or finely wrinkled; prothallus, when present, black. Apothecia (0.4–) 0.8–1 (–1.5) mm diam., immersed or sessile, not constricted at the base, one to several per areole; thalline margin at first entire and slightly raised but becoming flexuose and often \pm excluded; disc emerald to black-green or green-brown, concave to slightly convex; epithecium green-brown or brown, interspersed with granules dissolving in K; hymenium 60–70 μ m tall; paraphyses unbranched or sparsely branched, apices slightly swollen to 2.5 μ m diam. Ascospores (8–) 10–14 (–15) \times (4.5–) 5–7 μ m. Conidia 23–25 \times 0.5–1 μ m, curved. Thallus C–, K \pm indistinctly yellow, KC+ yellow, Pd–, UV \pm dull orange (usnic acid, zeorin). **BLS 0656.**



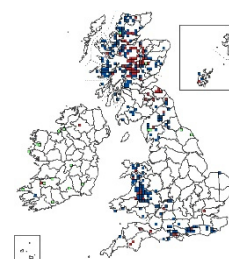
On siliceous rocks and walls, more rarely worked timber, xeric-supralittoral to montane. Widespread in Britain but rare in the lowlands; often coastal in Ireland.

A member of the *L. polytropa* group. Distinguished from the more common *L. polytropa* by the indented margins of the more strongly emergent areoles, mainly immersed apothecia with darker discs that do not become strongly convex and especially the generally more continuous thallus, that tends to form jig-saw-like patterns towards the margin. Not all specimens can be identified with certainty; intermediates between the two species possibly occur.

Reported lichenicolous fungi are: *Carbonea aggregantula*, *C. supersparsa*, *Cercidospora epipolytropa* (Mudd) Arnold (1874), *Muellerella erratica* and *M. lichenicola*.

Lecanora intumescens (Rebent.) Rabenh. (1845)

Thallus continuous, smooth or minutely cracked, only becoming areolate in old central parts of the thallus, often poorly delimited, pale grey; prothallus black or absent. Apothecia (0.8–) 1–2.5 (–3) mm diam., sessile, slightly constricted at the base, dispersed or rarely aggregated when they may be angular by compression; thalline margin well-developed, appearing swollen, persistent, entire to flexuose, raised, white-grey, often pruinose, without a differentiated cortex, with small crystals; disc variably coloured, from pale to mid brown, also orange-, red- or dark brown, pruinose when young but becoming convex and non-pruinose with age; epithecium interspersed with coarse yellow granules dissolving in K; hymenium (70–) 80–110 μ m tall; paraphyses 1.5–2.5 μ m diam., unbranched or sparsely branched and anastomosed, apices to 3.5 μ m diam., slightly swollen, colourless to yellow-brown. Ascospores 11.5–18 \times 5–8 μ m. Thallus C–, K+ yellow; exciple Pd+ deep yellow, UV+ pale orange to yellow (atranorin, chloratranorin, \pm psoromic and 2'-O-demethylpsoromic acids, \pm lichexanthone, zeorin). **BLS 0657.**



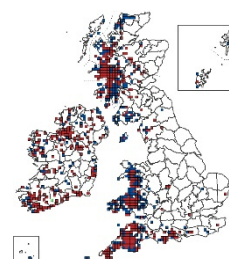
LC

On smooth bark of deciduous trees in wayside and woodland situations; widespread but rather scarce. C., S. & N. England, Wales, Scotland, Ireland.

A distinctive species of the *L. subfusca* group in its broad sense, characterized by the regular swollen white decorticate margins of the apothecia and (usually) the presence of psoromic acid (Pd+ deep yellow).

Lecanora jamesii J.R. Laundon (1963)

Thallus to 2–3 cm diam., forming continuous smooth to granular patches, grey; prothallus when present black; soredia arising in delimited \pm circular convex soralia to 1 mm diam., farinose, pale yellow (to white in dried collections); large crystal clusters occur in the thallus and are visible as translucent spots when the thallus is moistened. Apothecia usually absent, to 0.8 mm diam., dispersed, immersed or sessile; thalline margin entire to delicately crenulate, becoming excluded, including large crystal clusters; disc pale green-, pink-brown or rarely almost black, flat; epithecium pale yellow-brown interspersed with small granules; hymenium 35–60 μ m tall; paraphyses sparsely branched, apices not swollen or pigmented. Asci 45–50 \times 10–15 μ m. Ascospores (7–) 10–14 \times (4–) 6–8 μ m. Thallus C–, K \pm weak yellow, soralia KC+ yellow, Pd–, UV \pm pale orange (atranorin, \pm chloratranorin, 2-O-methylsulphurellin and usnic acid). **BLS 0658.**



LC

On smooth bark towards the base of deciduous trees, often on *Salix* in damp situations, rarely on wood or siliceous rocks; locally abundant. S.W. & W. England, recently recorded in the Midlands and E. England, Wales & Scotland, scattered in Ireland.

A member of the *L. polytropa* group. The discrete clusters of large oxalate crystals in the thallus of *L. jamesii*

help distinguish it from other sterile crusts with a greyish thallus and green/yellowish soralia.

The superficially similar *L. farinaria*, also occurring in carr woodland, has a different chemistry and much darker discs. *L. barkmaniana* can occur on *Salix* and may look like *L. jamesii* when poorly developed, but has deeper yellow soralia and a very strong K+ yellow reaction. *Biatora britannica* (Lecanorales: Ramalinaceae) grows in the same woodland habitats and looks broadly similar, and appears to have been misrecorded as *L. jamesii* in the past. It has green-yellow soralia and is Pd+ orange. *Coccotrema citrinescens* (Pertusariales: Coccotremataceae) may resemble *L. jamesii* when it occurs on rocks, but the vivid K+ yellow reaction of the soralia of the former is diagnostic.

Pyrenidium actinellum has been recorded several times on this host.

Lecanora leptacina Sommerf. (1826)

Thallus of dispersed to aggregated, convex to subglobose squamules, the margins somewhat crenulate, tending to form an uneven areolate thallus with somewhat flattened and radiating margins, yellow to yellow-green; prothallus black. Apothecia (0.4–) 1–1.5 mm diam., at first immersed, becoming sessile but not or slightly constricted below; thalline margin persistent, well-developed, entire, becoming flexuose, crenate and bead-like with age; disc olivaceous to green-black or black, uneven to slightly convex, matt, often thinly white-blue pruinose; epithecium yellow-brown, with or without granules, K+ blue-green; hymenium 60–80 µm tall, yellow-brown above; paraphyses 1.5–2 µm diam., sparsely branched and anastomosed, apices to 4.5 µm diam., slightly thickened and brown. Ascospores (9–) 10–13 (–15) × (4.5–) 6–9 µm, ellipsoidal or narrowly ellipsoidal, walls ca 1 µm thick. Thallus C–, K–, Pd± yellowish, UV– (atranorin, psoromic and consporomic acids). **BLS 0660.**

On mosses (especially *Andreaea*) and decaying plant material, usually in areas of late-lying snow, montane, over 650 m alt.; rare. Scotland (Highlands).

A distinctive member of the *L. subfusca* group in its broad sense, characterized by the habitat and its chemistry. See also *L. chlorophaeodes*.

Nb



Lecanora marginata (Schaer.) Hertel & Rambold (1985)

Thallus ± rimose-cracked with some scattered discrete areoles, becoming thick and congested, surface uneven, pale green-yellow, somewhat waxy, shining. Apothecia subsessile to sessile, black, rounded or somewhat irregular, disc roughened; thalline margin soon becoming excluded; true exciple uneven, persistent or becoming occluded; disc shining black, to 0.5 mm diam.; hymenium 55–65 µm tall; epithecium blue-black to aeruginose. Ascospores 11–13 × 6–7 µm. Thallus C–, K± yellow, Pd–, UV– (atranorin). **BLS 1766.**

On acid boulders, e.g. mica-schist, on mountain tops; rare. Scottish Highlands (Mid-Perthshire, Aberdeen, Sutherland).

All British material lacks usnic acid, the apothecial discs are not reported to be pruinose when young (as with populations from the Alps), and the thalline margin may be entirely absent. A separate species may be involved, but further observations of Scottish material are needed. See also *L. atromarginata*.

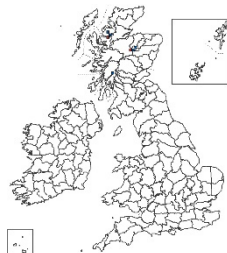
Nb



Lecanora mughicola Nyl. (1872)

Thallus wide-spreading, uneven, continuous, ± rimose-cracked, whitish-grey or yellowish-grey to grey or fawn-grey to dark brown, rarely with a green hue, the surface matt or shiny and appearing waxy, or sometimes endophloedal, not sorediate. Apothecia numerous, scattered or more often becoming contiguous, occasionally fused, evenly rounded at first, becoming irregularly rounded to somewhat angular, innate but becoming sessile, 0.4–0.7 mm diam., thalline margin concolorous with the thallus, thick, raised and smooth to subrugose in young apothecia, becoming uneven and level with the disc when older, at times almost nodular, persistent; disc rarely concave at first, generally flat, becoming weakly convex, minutely roughened, matt, brown to jet black, less frequently pale ochre to light brown, red-brown or dark blue-grey; hymenium 50–65 µm tall, colourless; epithecium brown to dark olive-brown, with a layer of golden-brown

NT



granules above that dissolve in KOH. Ascospores $12\text{--}14 \times 4.5\text{--}5.5 \mu\text{m}$, wall *ca* $1 \mu\text{m}$ thick. Conidia of three types: microconidia [rare], $6\text{--}9 \times 0.8\text{--}1 \mu\text{m}$, bacilliform to slightly curved; leptconidia [frequent], $16\text{--}20 \times 0.8\text{--}1 \mu\text{m}$, strongly curved; mesoconidia [rare] $3.5\text{--}4 \times 1.5\text{--}2 \mu\text{m}$, bacilliform. Thallus C⁻, K⁻, KC⁻, Pd⁻, UV⁻ (isousnic acid). **BLS 1872**.

On hard lignum of dead pine trees in native Caledonian pinewoods; very rare. Scotland (Abernethy and Rothiemurchus Forests).

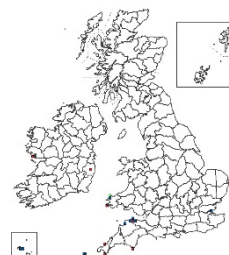
A member of the *L. saligna* group. Similar to the widespread *L. pulicaris* which is K⁺ yellow and Pd⁺ orange-red.

Lecanora ochroidea (Ach.) Nyl. (1896)

Thallus continuous and finely cracked to areolate, clearly delimited, areoles often uneven in height, \pm flat, margins crenulate, white or pale grey, surface coarsely granular to warted; prothallus white, fibrous, generally well-developed. Apothecia $0.7\text{--}2 \text{mm}$ diam., scattered or aggregated, sessile and finally constricted below; thalline margin entire, tending to be paler than the thallus, becoming excluded; disc pink- to pale grey-brown, convex to almost subglobose, usually densely white-pruinose; epithecium brown, granular, K⁺ red (with needle-like crystals); hymenium $60\text{--}80$ ($\text{--}100$) μm tall; paraphyses $1.5\text{--}2 \mu\text{m}$ diam., unbranched or sparsely branched, especially above, apices to $3.5 \mu\text{m}$ diam., generally with the terminal cell subglobose. Ascospores (8--) $10\text{--}14 \times (5\text{--}) 6\text{--}8.5 \mu\text{m}$. Thallus C⁻, K⁺ yellow \rightarrow red, Pd⁺ orange to red, UV \pm pale orange (atranorin, chloratranorin, protocetraric, norstictic and connorstictic acids). **BLS 0694**.

On sheltered, \pm vertical faces or below overhangs, on siliceous coastal rocks in the xeric-supralittoral zone, also on woodland rocks inland in Ireland. S.W. England, W. Wales (Pembroke), Channel Islands; rare.

L. ochroidea was confused with *L. subcarnea* but is distinguished by its K⁺ yellow \rightarrow red reaction (norstictic acid) and its pale UV fluorescence. *L. subcarnea* is largely confined to inland upland rocks, but *L. ochroidea* has been found inland in oceanic woodland in Ireland and habitat should not be taken as a guide, especially in more oceanic areas. *Glaucomaria rupicola* also has white pruinose discs that are C⁺ yellow, immersed and flat, and grows in exposed situations.



Nb

Lecanora orae-frigidae R. Sant. (1984)

Thallus yellowish or pale creamish grey, variably developed; sometimes thick and distinctly verrucose, reduced to irregular coalescing areoles or inconspicuous (then only soralia visible). Soralia to $800 \mu\text{m}$ diam., round to elliptical in outline, bright yellow, greyish-yellow to bluish-yellow [colourless in preserved specimens], dense or \pm diffuse, discrete or coalescing; crateriform, flat or strongly convex. Apothecia $0.6\text{--}0.9$ ($\text{--}1.1$) mm diam., at first \pm flat but later usually strongly convex, sessile. Margin yellowish, thick, smooth or sorediate, becoming excluded. Discs brownish to black, shiny, occasionally pruinose when young. Epithecium brown, granulose, granules disappearing in KOH. Paraphyses thick, septate, sometimes branched near the dark brown-pigmented apices. Ascospores $10\text{--}14 \times 4\text{--}5 \mu\text{m}$, somewhat irregular in shape but usually ellipsoidal or slightly cylindrical-clavate. Conidia filiform, curved, colourless, $15\text{--}19.5 \times ca 0.5 \mu\text{m}$ [data from Brodo & Vanska 1984]. Chemistry: thallus and soralia C⁺ orange, K⁺ yellow, K/UV⁺ green, P⁻ (usnic acid, zeorin, and thiophanic acid). **BLS 2817**.

On a softwood plank embedded in grass above the shoreline, Shetland (Whalsay).

Ascospores in the Scottish collection are slightly shorter and broader than those reported by Sliwa & Wetmore (2000), but other characters fit the species well. No sequences are available for *L. orae-frigidae*, and its affinities remain unclear. Its chemistry suggests similarity with *L. expallens* and it is here provisionally accepted as a member of the *L. symmicta* group (and thus likely to be transferred to *Zeora* Fr.; Ivanovich *et al.*, in prep.). The species has an arctic-maritime distribution, and is at the southern edge of its range in our region.

Lecanora orosthea (Ach.) Ach. (1810)

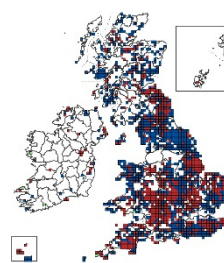
Thallus continuous, often poorly delimited, areolate, areoles flat, irregular in shape, yellow-green; soredia arising from soralia at the margins of the areoles, spreading to cover the whole thallus surface, yellow-green; prothallus white or blue-tinged. Apothecia $0.3\text{--}0.7$ ($\text{--}1.0$) mm diam., sparse or absent, dispersed, sessile, scarcely exceeding the level of the soredia; thalline margin evident only in young apothecia, soon excluded; disc pink-brown to yellow-green or grey-black, somewhat convex, not or slightly pruinose; epithecium green to brown, interspersed with granules dissolving in K; hymenium $50\text{--}60$ ($\text{--}70$) μm tall; paraphyses mainly unbranched, slightly swollen at the apices. Ascospores (8--) $9\text{--}16$ ($\text{--}20$) $\times (3\text{--}) 4.5\text{--}6$ ($\text{--}7$) μm . Conidia $13\text{--}20 \times ca 1 \mu\text{m}$, needle-like. Thallus

LC

C-, K+ yellow→brown, KC+ yellow, Pd-, UV+ dull orange (usnic acid, zeorin, ± gangaleoidin, ± skyrin). **BLS 0757**.

On dry vertical siliceous rocks, in recesses and below overhangs, occasionally spreading to the upper exposed surfaces, on gravestones and old walls, wood or bark (particularly of *Fagus*); frequent. Widespread in N. & W. Britain and Ireland, now also common in churchyards in S. and E. England.

A member of the *L. symmicta* group, and type of the segregate genus *Zeora* Fr. Densely sorediate specimens in which the areoles are reminiscent of *Lithocalla ecorticata* (Lecanorales, family position uncertain), are distinguished by the leprose soredia. *L. orosthea* belongs to the same group as *L. sublivescens* and *L. sulphurea*, both of which lack soredia.

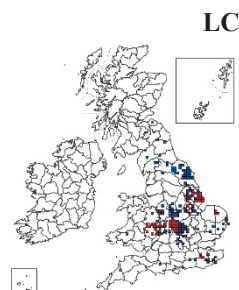


Lecanora pannonica Szatala (1954)

Thallus bullate-areolate to dispersed verrucose, verrucae 0.7–1.5 mm diam., yellowish white to grey, shiny, prothallus absent; soralia round and discrete to elongate, bordering the areole, excavate to flat, 0.5–1.5 mm diam., soredia 30–50 µm diam., blue-grey. Sterile in Britain and Ireland; foreign material with apothecia 0.8–1.5 mm diam., sessile to slightly constricted at the base; disc dark grey- to dark red-brown, not pruinose, margin thick, prominent, flexuose when older, concolorous with the thallus or blackening on inner rim, epithecium yellow-brown turning olivaceous in K, granular on the surface (*chlarotera*-type); hymenium 45–55 µm tall; paraphyses slightly branched at the tips, but not swollen. Ascospores 9–15 × (5–) 6.3–7.5 µm. Thallus cortex and soralia C-, K+ yellow, KC-, Pd± weakly yellow, UV- (atranorin, chloratranorin, roccellic acid, gangaleoidin, ± unidentified fatty acids). **BLS 1837**.

On weakly basic, siliceous stone walls, particularly church walls, rare on natural rock outcrops; local. C. & S. England, N. to Yorkshire, S.E. Scotland.

A member of the *L. subfusca* group. Resembles a large and exuberant *Porpidia tuberculosa* or a sterile *Tephromela atra* (both are K+ yellow). Most often confused with *Lecidella scabra*, which is C+ orange. The thallus of *Tephromela grumosa* is covered by diffuse soredia formed by the breakdown of the upper cortex, not in discrete to sometimes confluent, flat or excavate soralia as in *L. pannonica*.



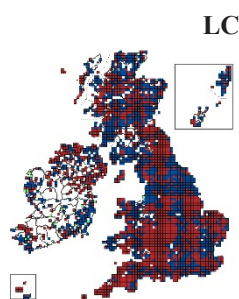
Lecanora polytropa (Hoffm.) Rabenh. (1845)

Thallus immersed and inconspicuous, or of dispersed granules or areoles, sometimes forming a continuous areolate crust, areoles when present ± rounded, 0.1–0.3 mm diam., surface flat and with even margins, usually yellow-green, occasionally becoming grey-green or brown, surface smooth; prothallus black when evident. Apothecia 0.3–1 (–1.5) mm diam., dispersed, sessile, constricted below, tending to arise singly on areoles which are then obscured; thalline margin initially well-developed and entire but becoming crenulate and excluded; disc pale yellow to pale yellow-green, occasionally green-brown or pale brown, finally convex, glaucous; epithecium colourless to yellow- or red-brown, interspersed with granular crystals dissolving in K; hymenium 45–60 µm tall; paraphyses 1.5–2 (–2.5) µm diam., sparsely branched, apices slightly thickened. Asci 32–50 × 12–17 µm. Ascospores (9–) 10–14 (–15) × (4.5–) 5–6.5 (–7) µm. Conidia (12–) 18–22 (–25) × ca 1 µm, needle-like to curved. Thallus C-, K+ indistinctly yellow, KC+ yellow, Pd-, UV- (usnic acid, rangiformic acid, zeorin, ± eulecanoral acid). **BLS 0667**.

On siliceous rocks and walls, also on worked timber (especially in upland areas); common. Throughout Britain and Ireland.

The delimitation of species within the *L. polytropa* group is still not clear (Zhang *et al.* 2022). Often confused with, and at one time merged with *L. intricata*, which has darker, emerald green-brown discs, is always areolate and the areoles are usually contiguous and have crenate, jig-saw-like margins and a wrinkled surface. See also *L. stenotropia*, which has a brownish-grey rather than yellowish thallus and narrower ascospores.

The most commonly recorded lichenicolous fungi are *Carbonea supersparsa*, *Cercidospora epipolytropa* and *Lichenoconium lecanorae*, with occasional records of *Carbonea aggregantula*, *Intralichen* sp., *Muellerella lichenicola* and *M. pygmaea*.



Lecanora praepostera Nyl. (1873)

Thallus rimose, often uneven, effuse, areoles convex and often raised in clusters, white to yellow-white; prothallus zoned white and blue. Apothecia (0.3–) 0.5–1.5 (–1.8) mm diam., dispersed or in small groups, sessile, somewhat constricted below; thalline margin well-developed, crenulate to crenate, persistent, green-grey or as the thallus; disc pale brown to dark brown or black, often piebald, flat to slightly convex, sometimes white-grey pruinose; epithecium colourless or olivaceous, ± interspersed with granules, K+ red (with abundant red needle-like crystals); hymenium 70–90 µm tall; paraphyses 1.5–2 µm diam., unbranched or sparsely branched, anastomosed below, apices 2–3 µm diam., slightly swollen. Asci 50–65 × 16–18 µm, elongate-clavate. Ascospores (8–) 11–15 × (5–) 6–8 µm, ellipsoidal. Conidia 22–31 × ca 1 µm, thread-like to curved. Thallus C–, K+ yellow→red (crystals), Pd+ orange-red, UV– (atranorin, norstictic acid).

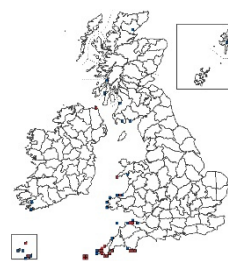
BLS 0669.

On ± vertical, somewhat sheltered coastal siliceous rocks; local. S.W. England, Wales, Channel Islands, Isles of Scilly, Ireland.

A distinctive member of the *L. subfusca* group, easily recognized by its ecology and K+ yellow→red reaction. See also *Glaucomaria swartzii*.

Rosellinula cf. *haplospora* has been recorded from this host in S. Devon.

Nb

**Lecanora pulicaris** (Pers.) Ach. (1814)

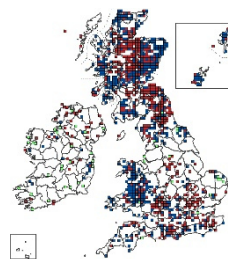
Thallus continuous, often thin but generally clearly delimited, yellow-white to grey, surface smooth to roughened or warted; soralia very rare, 0.1–0.2 mm diam., when present green-white (these possibly the result of misinterpretation of thallus erosion/fragmentation); prothallus white, blue-black or absent. Apothecia 0.3–1 (–1.5) mm diam., sessile, somewhat constricted at the base; thalline margin well-developed, entire to slightly warted, persistent, medulla with large crystals not dissolving in K; disc red-brown or black, ± flat; epithecium red to orange-brown, with granules on the surface and interspersed between paraphyses dissolving in K but not N; hymenium 60–85 µm tall; paraphyses 1.5–2.5 µm diam., unbranched or sparsely branched, apices to 3.5 µm diam., not or slightly swollen. Ascospores (9–) 11–15 (–16) × (6.5–) 7.5–9.5 (–11) µm, broadly ellipsoidal. Thallus C–, K+ yellow, KC–, Pd+ orange red (sometimes confined to the thalline margin); Pd– morphs not yet reported from our region), UV–, reflecting UV mauve-purple light (atranorin, fumarprotocetraric acid, ± roccellic acid). **BLS 0672.**

On decorticated wood, worked timber and bark of both coniferous and deciduous trees. Widely distributed, most common in N.E. England & Scotland.

A member of the *L. subfusca* group. Discussed further under *L. chlorotera*. Rare forms with crenulate apothecial margins, pale discs and lacking fumarprotocetraric acid are almost indistinguishable from *L. hybocarpa*. See also *L. cinereofusca*.

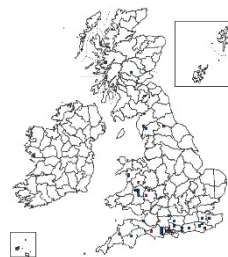
Commonly recorded lichenicolous fungi are *Vouauxiella lichenicola*, *Lichenostigma chloroterae* and *Skyttea lecanorae*, with occasional records of *Briancoppinsia cytospora*, *Lichenocodium erodens*, *L. lecanorae*, *Lichenodiplis lecanorae* and anamorphic *Spirographa* spp. (recorded as *Cornutispora ciliata* and *C. lichenicola*). There are also several problematic collections referable to e.g. *Arthonia*, *Epithamnolia*, *Muellerella* and *Tremella*.

LC

**Lecanora quercicola** Coppins & P. James (1979)

Thallus dispersed or composed of continuous, contiguous patches, pale grey to pale green-grey, surface finely warted or granular; prothallus indistinct. Apothecia 0.2–0.6 (–0.7) mm diam., dispersed, immersed at first but becoming sessile with slightly constricted bases; thalline margin at first irregularly crenate, persistent; disc pale brown to dull red-brown, rarely pink-brown, flat to slightly convex, white or yellow pruinose; epithecium pale yellow or red-brown; hymenium (40–)50–65 µm tall; paraphyses ca 1 µm diam., mainly unbranched, apices not or slightly expanded to ca 3.5 µm, colourless or a few brown. Asci 40–45 × 6–8 µm. Ascospores 8–11 (–12) × 4–5 µm, narrowly ellipsoidal. Pycnidia ca 70 µm diam., common, immersed to erumpent, red-brown; conidia of two types, macroconidia (frequent) 8–10 × 2.5–3 (–

VU(D1)



3.5) μm , broadly crescent-shaped, truncated at the base; microconidia (rare) $8\text{--}13 \times ca\ 0.5\ \mu\text{m}$, curved, pointed. Thallus C $^-$, K $^+$ weakly yellow, KC $^-$, Pd $^-$, UV $^+$ pale grey-white (isousnic and neousnic acids). **BLS 0673**.

Confined to well-lit somewhat base-rich bark, in areas with lower bryophyte cover, often in transitions to dry rough bark of ancient deciduous trees, especially *Quercus*, in open woodland and parkland; rare. Mainly S. England and C. Wales, but extending to N. England (Lake District) and W. Scotland (Ardnamurchan).

Part of the *L. saligna* group, and a candidate for segregation into the genus *Lecanoropsis* (Ivanovich *et al.*, in prep.). *L. saligna* has smaller macroconidia and usually less strongly pruinose apothecia.

Lecanora saligna (Schrad.) Zahlbr. (1928)

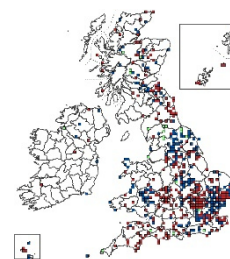
Thallus to 8 cm or more across, of dispersed to \pm contiguous granules, forming poorly delimited but often extensive patches, whitish-grey, yellow-grey to grey, beige or rarely greenish-grey or pale greenish white; prothallus indistinct. Apothecia 0.2–0.8 (–1.1) mm diam., scarcely exceeding the thallus granules, sessile, often densely aggregated and then becoming angular by compression; thalline margin persistent, entire to crenulate but becoming inconspicuous with age, usually with a yellow tinge; disc pale ochre to dark red-brown, flat to slightly convex, often slightly pruinose especially at first; epithecium colourless or more rarely olivaceous green to brown; hymenium 45–65 μm tall; paraphyses 1.5–3 μm diam., sparsely branched especially above, apices swollen to *ca* 3.5 μm diam., colourless or olivaceous brown. Asci 50–60 \times 13–18 μm . Ascospores 7–10 (–13) \times 4–6 μm , ellipsoidal. Pycnidia frequent, red-brown to black. Conidia of three types: macroconidia [usually abundant], 6–8 (–9) \times 1.5–2.5 (–3) μm , crescent-shaped, truncate at the base; leptoconidia [rare], 8–11 \times 1–2 μm , slightly curved; mesoconidia [rare], 3–5 \times 1.1–1.5 μm , bacilliform; microconidia [rare] 7–10 \times *ca* 1 μm , bacilliform, straight. Thallus C $^-$, K $^-$, KC $^-$, Pd $^-$, UV $^-$ (isousnic acid, \pm neousnic acid, \pm atranorin, \pm zeorin). **BLS 0675**.

On wood and worked timber, more rarely decaying wood, generally in exposed situations, often on coastal fence posts; frequent. S.E. England, extending to C. & E. Scotland.

The central species of the *L. saligna* group and type of the segregate genus *Lecanoropsis* M. Choisy (1949). Without macroconidia, (almost) indistinguishable from *L. albellula* and *L. quercicola*. See also *L. sarcopidoides* and *L. subintricata*.

The only known host to *Unguiculariopsis lesdainii* (Vouaux) Etayo & Diederich (2000); other recorded lichenicolous fungi are: *Intralichen* sp. (recorded as *I. christiansenii*), *Lichenocodium lecanorae*, *Lichenodiplis lecanorae* and *Psammina simplex* Earle.-Benn. & D. Hawksw. (1999).

LC



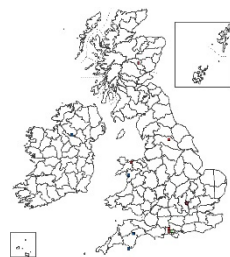
Lecanora sarcopidoides (A. Massal.) A.L. Sm. (1918)

Thallus mainly endophloedal, when exposed of irregular areoles, *ca* 0.5 mm diam., sometimes aggregated into convex groups about 2 mm diam., poorly delimited or forming extensive patches, cream to grey, greyish green to greyish brown; prothallus absent. Apothecia 0.25–0.5 (–0.7) mm diam., dispersed or aggregated into small groups, constricted at the base; thalline margin at first paler than the thallus but later concolorous and disappearing, entire to crenulate, persistent; disc pale yellowish brown, grey-brown, blueish-grey to black, often densely white-pruinose, flat to convex; epithecium interspersed with granules; hymenium 35–45 μm tall; paraphyses 1–1.5 μm diam., sparsely branched, apices not or slightly thickened. Ascospores 8–10 \times 3.3–3.7 μm , aseptate (to 1-) septate. Conidia of three types: microconidia [rare], 4–5.7 \times 1–1.2 μm , bacilliform; mesoconidia [frequent], 2.7–4 \times 1.3–1.7 μm , ellipsoid; leptoconidia [rare] *ca* 19 \times 0.7 μm , curved. Thallus C $^-$, K $^-$, KC $^+$ bright yellow, Pd \pm faint yellow, UV $^-$ (pseudoplacodiolic acid, \pm placodiolic and usnic acids by TLC). **BLS 0678**.

On wood and worked timber, coniferous trees and *Quercus*, *Pinus* bark; rare but certainly under-recorded. Recently found to be characteristic, if rare, on *Quercus* dead wood in parks and pasture woodlands in the south and east of England. Also N. England (Lake District), Scotland (Highlands), Ireland (Fermanagh).

A little collected member of the *L. saligna* group, and thus a candidate for segregation into the genus *Lecanoropsis* M. Choisy (Ivanovich *et al.*, in prep.). It differs from *L. saligna* in the absence of the distinctive broadly falcate macroconidia and different chemistry, with the KC $^+$ bright yellow spot test distinctive. In *L. albellula* the thallus and thalline margin is KC $^-$. *L. subintricata* is similar, but has smaller ascospores, a rather rather more concave disc and is usually not pruinose (when so finely), and has usnic acid as the major substance

Nb



(TLC). *L. cadubriae* differs in the exciple structure and the Pd+ orange reaction.

Lecanora sinuosa Herk & Aptroot (1999)

Thallus corticolous, usually 1–3 cm diam., continuous, whitish grey to grey, verrucose, mostly covered with raised warts 0.1–0.4 mm diam. and 0.1–0.3 mm high, with sinuous outlines and/or cracks, resembling and homologous to the thalline margins of the apothecia, without a differentiated hypothallus. Apothecia sessile, numerous, disc concave to flat, pale to medium brown, 0.4–1.0 mm diam., margin raised, relatively thick, often incurved, whitish grey to grey, 0.1–0.3 mm thick and high, with sinuous outlines, corticate with a gelatinous cortex 12–18 μm thick and to 25 μm thick at the base, cortex and hypothecium with chlorococcoid algae (mostly just below the cortex) and copiously filled with large colourless angular clusters of crystals 15–70 μm diam. Hymenium colourless, medium brown (in section) in the upper 6–9 μm , 60–85 μm high, copiously or sparsely filled with fine pale brownish granules between the paraphyses, which dissolve in K but not in N and are typically yellow in polarized light. Hypothecium colourless. Ascospores ellipsoidal to broadly ellipsoidal, 13–17 \times 7.5–9 μm , wall *ca* 0.7 μm thick. Pycnidia unknown. Thallus C–, Pd–, K+ yellow, UV–; atranorin, roccellic acid. **BLS 2561**.

On well-lit and exposed wayside trees, usually *Quercus* but also on *Acer*, *Fagus* *Fraxinus* and *Populus*. Distribution not fully known but probably widespread in the lowlands.

A member of the *L. subfusca* group. Similar to *L. chlorotera*, which differs in the smooth thallus and the eipsamma crystals not extending down into the hymenium, the crystals dissolving in both K and N (slowly). The apothecial anatomy is identical to that in *L. hybocarpa*, but this has a smooth thin thallus not dominated by apothecial initials. However, both species are very similar and their variability and diagnostic characters require a detailed study.

Nb



Lecanora soralifera (Suza) Räsänen (1931)

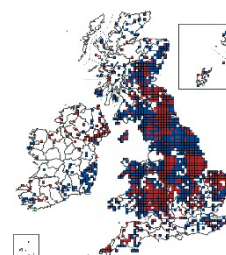
Thallus to 2 cm diam., aggregated or more rarely of dispersed areoles, areoles flattened, subsquamulose and often with crenulate margins, yellow-green to green-grey, green-brown or green-black, often not clearly delimited; soralia abundant, 0.2–0.5 (–0.7) mm diam., arising on the surface of the areoles, usually discrete and circular but sometimes becoming confluent to form a continuous crust, pale yellow; prothallus inconspicuous. Apothecia to 0.5 mm diam., usually absent, arising on single areoles, sessile and somewhat constricted below; thalline margin well-developed, entire to crenulate, becoming excluded with age, green- to pink-brown; disc finally slightly convex, yellow, pink-brown, green-black, or brown-black; epithecium brown, crystalline inclusions absent. Ascospores 7–13 \times 4–7 μm . Thallus C–, K–, KC+ yellow, Pd–, UV+ dull orange (usnic acid, zeorin). **BLS 0679**.

On siliceous rocks and walls, often on metal-rich substrata in exposed situations, also on wood or worked timber (especially in upland areas), moderately tolerant of air pollution; local. Throughout Britain and Ireland, but more frequent in the N.E. and Midlands, scattered in Ireland.

A member of the *L. polytropha* group. Allied to the non-sorediate *L. intricata* of which it has been considered a variety. The thallus recalls *L. handelii*, with which it can occur, which is grey-green to grey and in which the soralia strictly originate from the margins and not the surface of the areoles. When on wood see *L. jamesii*.

Occasionally host to *Carbonea aggregantula*.

LC



Lecanora stanislai Guzow-Krzemińska, Łubek, Maliček & Kukwa (2017)

NE

Thallus sorediate, indeterminate, very thin and in most cases completely endosubstratal in non-sorediate parts, rarely with small (*ca* 0.05 mm) convex green or blue-green areoles soon bursting to form soredia; prothallus often dark brown to almost black, sometimes indistinct; soralia yellow-green to grey-green, sometimes with a distinct bluish tinge, becoming effuse and forming a \pm continuous layer over thalli; soredia simple, in older specimens covered with colourless crystals of zeorin, round, to 35 μm diam., rarely in irregular consoredia to 50 μm diam.; soredial wall well-developed but not complete, without distinct projecting hyphae. Apothecia and conidiomata unknown.

Recently reported from Hampshire (New Forest). The first British record was from the bark of a younger

Fagus tree in old-growth *Quercus petraea* pasture woodland, which matches its central European habitat where it is mainly found on the smooth bark of deciduous tree in well preserved woods, often old growth stands. Similar material was later found nearby on hard dry lignum on a long fallen *Quercus*; smooth dry lignum is also a subsidiary habitat in central Europe.

A member of the *L. symmicta* group, a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). *L. compallens* forms a distinct grey thallus and at least partly delimited soralia without a bluish tinge. *L. expallens* with low concentration of xanthones (usually from shady sites) can be indistinguishable from *L. stanislai* without molecular methods, but it typically shows a K/UV (wet)+ bright yellow-green fluorescence that is absent in *L. stanislai*. Sterile thalli of *Fellhanera bouteillei* have a similar bluish tinge, but usually also typical pycnidia and sometimes produce asemone. More information can be found in Guzow-Krzemińska *et al.* (2017).

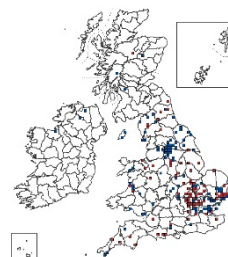
Lecanora stenotropia Nyl. (1872)

Thallus of dispersed to somewhat coalescing rounded granules, sometimes forming a ± continuous areolate crust, brown-green to green-grey; prothallus black or absent. Apothecia (0.2–) 0.4–0.8 (–1) mm diam. (0.5–1.8 mm diam. recorded elsewhere), sessile, dispersed to densely aggregated and then angularly compressed; thalline margin entire to flexuose, white to grey, scarcely raised and becoming almost excluded; disc pale brown to grey-brown, flat to slightly convex, not pruinose; epithecium colourless, granular; hymenium 45–60 µm tall (15–20 µm thick as reported elsewhere); paraphyses 1.5–2 µm diam., unbranched or sparsely branched, apices slightly swollen. Ascospores 8–12 × 3–4 µm, narrowly ellipsoidal. C–, KC+ weakly yellow or KC–, Pd–, UV– (usnic and isorangiformic acids, zeorin). **BLS 0680.**

On coarse siliceous rocks, particularly sandstone walls and memorials where there is base-rich run-off from mortar, rarely on worked timber or directly on basic substrata; especially in air-polluted areas. Widespread but under-recorded in Britain and Ireland.

A member of the *L. polytropa* group. Easily confused with *L. polytropa* which has a more distinctly yellow-green to grey-green thallus, generally greener apothecial discs and notably broader ascospores, (4.5–) 5–6.5 (–7) µm.

LC



Lecanora strobilina (Spreng.) Kieff. (1895)

Thallus continuous or dispersed, granular to irregularly subareolate, ± undelimited, uneven, white to white-yellow or pale yellow-green, surface not corticate and developing a pruinose coating of projecting crystals to 0.1 mm in length in dried specimens; prothallus inconspicuous. Apothecia to 1 mm diam., aggregated, sessile, the base slightly constricted; thalline margin entire to crenulate, finally excluded, not corticate, whitish-grey or sometimes concolorous with the thallus; disc flat to somewhat convex, grey-yellow to pale red-, orange- or grey-brown; epithecium colourless, often interspersed with colourless granular crystals; hymenium 35–55 µm tall; hypothecium with small granular crystals; paraphyses 1–1.5 µm diam., unbranched or sparsely branched, the apices not swollen. Asci 35–45 × 10–17 µm. Ascospores 10–13 (–16) × (3–) 3.5–4 (–5) µm, narrowly ellipsoidal and often somewhat reniform. Conidia ca 25 × 1 µm, curved. Thallus C–, K+ yellow to brown, KC± yellow, Pd–, UV+ pale orange [spot tests on European material are reported as all negative]; (usnic acid, ± zeorin, ± decarboxysquamatic acid). **BLS 0682.**

On hard dry lignum of *Quercus*, also on bark, mainly of conifers and on worked timber; rare, but either under-recorded or recovering from past declines due to pollution. Channel Islands, Isles of Scilly, southern England, N. Wales, Lake District, S.W. Ireland.

A member of the *L. symmicta* group and thus a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). Most likely to be mistaken for C– chemotypes of *L. symmicta* which are separable by the corticate thallus and exciple that becomes excluded, the less strongly yellow colour (usnic acid absent), and the K/UV (wet)+ bright green-yellow fluorescence. Old dried specimens have a distinctive whitish, waxy appearance. Has a similar chemistry to *L. compallens*, but this is sorediate and is sterile.

VU(D2)

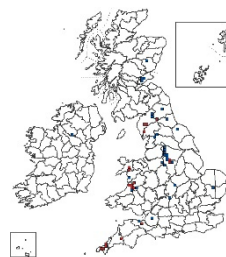


Lecanora subaurea Zahlbr. (1928)

Thallus areolate, forming continuous crusts or more rarely somewhat dispersed, areoles flat to convex or almost

Nb

squamulose, grey-green to bright yellow-green; soredia arising on the margins of the areoles, occasionally coalescing to form a sorediate crust, bright yellow or pale yellow-green, paler than the thallus; prothallus absent. Apothecia (not known in British material) 0.3–0.6 mm diam., sessile, ± immersed amongst the soredia; thalline margin well-developed, persistent, often sorediate; disc concave to flat, red-brown to olivaceous brown; epithecium red-brown to olivaceous, sparsely interspersed with granules; hymenium 50–60 µm tall; hypothecium with oil drops; paraphyses unbranched, the apices red-brown and slightly expanded. Ascospores 7–10 × 6–8 µm, broadly ellipsoid to subglobose. Thallus and soredia C–, K–, KC–, Pd+ orange to red, UV+ bright orange (pannarin, rhizocarpic acid, zeorin). **BLS 0683.**



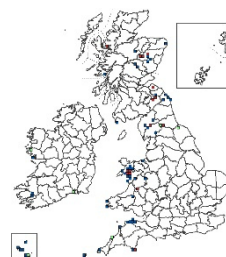
On metal-rich siliceous rocks, especially sandstones and siltstones in well-lit situations; local. Mainly N.E. England (Derbyshire, Peak District, S.W. Yorkshire), but scattered sites from S.W. England (Somerset), C. & N. Wales, N. to E. Scotland (Angus).

Occupies an uncertain position within *Lecanora* s.l. See also *L. epanora*, which occurs in similar but generally more shaded habitats, has laminal soralia and is Pd–. The lichenicolous *L. gisleriana* is occasionally present. See also *L. handelii*.

***Lecanora subcarnea* (Sw.) Ach. (1810)**

Thallus continuous and finely cracked to areolate, clearly delimited, areoles often uneven in height, ± flat, margins crenulate, white or pale grey or pale yellow to yellowish grey, surface coarsely granular to warted; prothallus white, fibrous, generally well-developed. Apothecia (0.2–) 0.4–1 (–1.7) mm diam., aggregated, immersed to sessile and finally constricted below; thalline margin entire, concolorous with or tending to become paler than the thallus, excluded with age; disc pink- to pale grey-brown, convex to almost subglobose, usually densely white or blue-white pruinose; epithecium brown, granular; hymenium 35–55 µm tall; paraphyses 1.5–2 µm diam., unbranched or sparsely branched especially near the tips, apices to 3.5 µm diam., generally with the terminal cell subglobose. Ascospores (8–) 10–14 × (5–) 6–8 µm. Thallus C–, K+ yellow, Pd+ orange→red, UV– (atranorin, chloratranorin, protocetraric acid). **BLS 0684.**

Nb



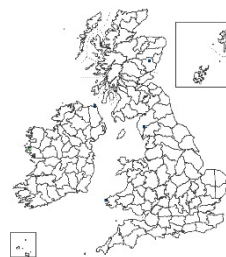
In dry recesses of base-rich siliceous rocks, or rarely on calcareous rocks by lakes and in woodlands; local. England (Westmorland), N. Wales, C. & E. Scotland. Channel Isles. Records from S.W. England and Pembrokeshire, and perhaps also Ireland (as shown on the map) are erroneous.

Confused with *L. ochroidea*, which differs in the K+ yellow-red (crystals) reaction due to presence of norstictic acid and is mainly restricted to lowland coastal rocks. Also likely to be confused with *Glaucomaria swartzii* (q.v.), which often shares the same habitat.

***Lecanora subintricata* (Nyl.) Th. Fr. (1871)**

Thallus immersed and inconspicuous or of dispersed fine granules, yellow-grey or yellow-green to pale yellowish brown, poorly delimited; prothallus inconspicuous. Apothecia (0.2–) 0.3–0.6 (–0.7) mm diam., dispersed, becoming sessile and usually constricted below; thalline margin, raised in young apothecia, becoming level with age, sometimes becoming excluded, smooth, yellow; disc flat to convex, pigmentation variable within individual collections and even single apothecia; yellowish, olive-brown, olive-grey or brown-black, sometimes pruinose, with a blue bloom when moist; epithecium colourless, olive-grey or golden brown, interspersed with granules that dissolve in K; hymenium 30–50 µm tall; paraphyses 1–2 µm diam., sparsely branched, anastomosed, apices to 3.5 µm diam., swollen, colourless or occasionally brown or bluish grey. Ascospores (5–) 6–9 (–12) × 3–4 µm, ellipsoidal. Conidia of two types: microconidia [rare], 6–7 × 1–1.3 µm, shortly bacilliform; mesoconidia [frequent], 2.8–3.4 × 1.4–1.6 µm, ellipsoidal. Thallus C–, K± yellow, KC± yellow, Pd–, UV– (usnic acid, ± brialmontin 1). **BLS 0686.**

DD



On bark, wood and worked timber; rare. Scotland (Highlands) and S. Wales.

A member of the *L. saligna* group, and a candidate for segregation into the genus *Lecanoropsis* (Ivanivich *et al.*, in prep.). The small ascospores separate it from *L. albellula*, *L. mughicola*, *L. saligna* and *L. sarcopoidoides*, whereas *L. coppinsii* has narrower ascospores and a grey (never yellowish) thallus and thalline margin. Differs from C– chemotypes of the *L. symmicta* group in the shorter ascospores and conidia.

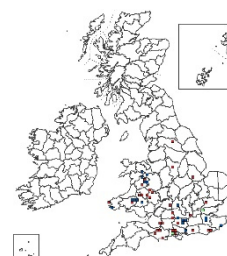
Lecanora sublivescens (Nyl. ex Cromb.) A.L. Sm. (1918)

Thallus areolate, dispersed or forming a continuous crust, areoles flattened with somewhat irregular margins, pale yellow-green, surface \pm smooth to granular; prothallus inconspicuous. Apothecia 0.5–1.0 mm diam., dispersed to compacted, arising on single areoles, at first immersed but becoming almost sessile; thalline margin visible only when young, becoming level with the disc and soon excluded; disc concave or more commonly convex to undulate, often convoluted, pink-brown; epithecium \pm colourless, sparsely interspersed with brown granules; hymenium 40–65 μ m tall; paraphyses 1–2 μ m diam., branched and anastomosed, the apices not thickened. Ascospores 10–14 (–15) \times 4–5 μ m, narrowly ellipsoidal. Thallus C–, K+ weakly brownish-yellow, KC+ yellow, Pd–, UV+ dull orange (atranorin, gangaleoidin, thiophanic acid, zeorin, α -collatolic and usnic acids). **BLS 0779.**

On flushed mesic bark often at the junction with dry bark of ancient *Quercus*, rarely on other tree species; rare and very local. S. England, Wales.

A member of the *L. symmicta* group, and likely to be transferred to the segregate genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). Recalling a pale and poorly developed *L. sulphurea* with a thin thallus and smaller apothecia.

NT IR

**Lecanora sulphurea** (Hoffm.) Ach. (1810)

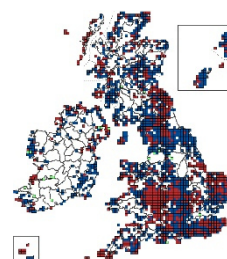
Thallus rimose, rather thick, forming \pm continuous crusts, yellow-green to yellow-grey or green-yellow, areoles flat to slightly convex, surface smooth to granular or roughened; prothallus green-black. Apothecia 1–1.5 (–2.5) mm diam., initially immersed, scarcely extending above the thallus surface; thalline margin entire, irregular, becoming \pm excluded; disc yellow to pink-brown, green-brown, blue-green or green-black, flat to strongly convex, densely grey-pruinose; epithecium green- or blue-grey, K+ green-black, interspersed with granular crystals dissolving in K; hymenium 55–90 μ m tall; paraphyses 2–2.5 μ m diam., sparsely branched, the apices slightly thickened. Ascospores (9–) 9.5–12.5 (–16) \times 4.5–5.5 (–6) μ m. Conidia 14–20 \times 0.5–1 μ m, thread-like to curved. Thallus C–, K \pm yellow-brown, KC+ yellow, Pd–, UV+ dull orange (\pm atranorin, \pm gangaleoidin, zeorin, \pm α -collatolic and usnic acids). **BLS 0783.**

On exposed, somewhat nutrient-rich siliceous rocks and walls, especially in the xeric-supralittoral on the coast but also inland; common. Widespread in Britain and Ireland.

A member of the *L. symmicta* group, and thus a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). Often growing initially as a parasite on *Tephromela atra*. Separated from other yellow-green saxicolous non-soresiate species by chemical tests. Sometimes confused with weakly soresiate examples of *L. orosthea*. See also *L. atosulphurea* and the corticolous *L. sublivescens*.

Lichenicolous fungi are rarely recorded on this host, so far only *Licheniconium erodens* and *Taeniolella delicata* M.S. Christ. & D. Hawksw. (1979).

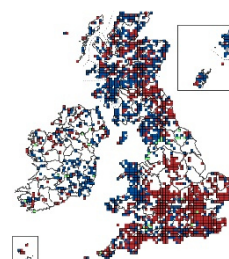
LC

**Lecanora symmicta** (Ach.) Ach. (1814)

Thallus of dispersed granules to irregularly areolate, often forming discrete patches but sometimes almost leprose, very variable in colour, typically pale yellow-green, sometimes white or green-grey; prothallus inconspicuous. Apothecia 0.3–0.8 (–1) mm diam., dispersed to aggregated, sessile, scarcely constricted below; the margin poorly developed, entire and soon excluded or perhaps missing altogether, often devoid of algal cells and composed of radiating narrow hyphae; disc variable in colour, cream to pink, pale orange or brown, flat to strongly convex; epithecium colourless or yellow-brown to olivaceous, interspersed with yellow-brown granules dissolving in K; hymenium 40–60 μ m tall; paraphyses 2–2.5 μ m diam., branched and anastomosed, the apices 2.5–3.5 μ m diam., not or slightly thickened. Ascospores 9–12 (–14) \times 4–5 (–6) μ m. Conidia 18–25 \times 0.5–1 μ m, thread-like to curved. Thallus C \pm orange, K–, KC \pm weakly yellow, Pd–, UV+ dull orange (usnic acid, zeorin, arthothelin, \pm thiophanic acid, up to three other xanthenes). **BLS 0688.**

On acid-barked trees such as *Pinus*, or as a pioneer species particularly on twigs, also frequently on wood and

LC



worked timber, especially old garden seats and railings. Widespread in Britain and Ireland.

The central species of the *L. symmicta* group, and thus a candidate for segregation into the genus *Zeora* Fr. (Ivanovich *et al.*, in prep.). *L. aitema*, formerly often included within this species, is primarily separated by the darker apothecial discs. At least some C- thalli still show K/UV (wet)+ bright yellow-green fluorescence. A related unnamed species with 3-septate ascospores occurs on *Juniperus* in the Speyside native pinewoods of the Scottish Highlands. See also *L. confusa*, *L. strobilina*, *L. subintricata*.

Reported lichenicolous fungi are: *Diplolaeviopsis symmictae* Diederich & Coppins (2014), *Everniicola flexispora*, *Lichenocodium erodens*, *L. lecanorae*, *Spirographa flexispora* s. lat. (as teleomorph) and two anamorphic species (recorded as *Cornutispora ciliata* and *C. lichenicola*).

Lecanora varia (Hoffm.) Ach. (1810)

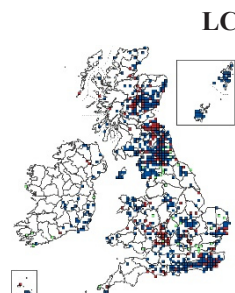
Thallus of dispersed to contiguous rounded granules, sometimes thickening into an areolate crust, yellow-grey to dark green-grey, the surface somewhat shiny when areolate; prothallus inconspicuous. Apothecia 0.4–1 (rarely to 1.5) mm diam., dispersed to closely aggregated, not compacted, sessile, slightly constricted at the base; thalline margin well-developed, entire to crenulate or convoluted, persistent, raised; disc pink- to green-brown, ± flat to concave, sometimes finely white-pruinose; epithecium ± colourless, interspersed with minute granules; hymenium (60–)70–80 (–90) µm tall; paraphyses 1–2 µm diam., sparsely branched and anastomosed, apices slightly thickened. Asci 35–60 × 14–18 µm. Ascospores (7–)9–11.5 (–13) × 5–7 (–8) µm. Conidia 12–22 × 0.5–1 µm, thread-like to curved. Thallus C–, K+ weakly yellow, KC± yellow, Pd+ yellow, UV± dull orange (usnic, psoromic, ± 2'-*O*-demethylpsoromic and ± diffractaic acids).

BLS 0690.

On wood and worked timber, rarely on bark of living trees; locally frequent. Predominantly in E. England & Scotland, scattered in Ireland.

The central species of the *L. varia* group and type of the segregate genus *Straminella* M. Choisy, distinguished by the cup-like, young apothecia. In the past much confused with abundantly fertile and poorly sorediate specimens of *L. conizaeoides*, which can be recognized by the Pd+ red reaction. Often occurring with *L. symmicta*, which has a shallow, ± evanescent exciple without algae and a Pd–, often paler thallus. See also *L. confusa*, *L. mughicola*.

The rare or overlooked *Ramboldia insidiosa* begins as a parasite on the thallus, but later develops its own green-brown, granular to rimose thallus. *Arthonia caeruleascens*, occupying the hymenium of this host, has been found several times in S.E. Scotland.



Lecanora variolascens Nyl. (1881)

Lecanora bavarica Poelt (1952)

Thallus quite variable, smooth to rough, often verrucose especially in the centre, greyish; soralia flat to slightly convex, concolorous with the thallus, at first delimited (0.3–1.0 mm diam.), later more or less confluent and rarely forming a sorediate crust covering the thallus, farinose soredia. Apothecia frequently present, 0.5–1.0 (–1.5) mm diam., sessile or rarely with constricted bases, plane; discs reddish brown to dark brown, medium to strongly whitish to bluish pruinose, rarely non-pruinose; margin smooth to coarse, matt, thick, partly flexuose, elevated, sometimes slightly crenulate; epithecium reddish brown, with coarse brown granules 3–5 (–8) µm diam. on the surface of paraphyses tips, soluble in K, very slowly soluble in N; thalline margin with very large crystals; hypothecium colourless to yellowish; hymenium 60–80 µm high. Asci 8-spored. Ascospores broadly ellipsoid, (9–0–) 10.0–12.5 × 6–8 (–9) µm. Pycnidia unknown. Disc C–; soralia K+ yellow, Pd+ yellow, C– (atranorin, chloratranorin and zeorin). **BLS 2803.**

On ± acidic bark but usually in slightly eutrophicated places. Hampshire (New Forest); recorded twice, on low *Quercus* branches in a glade in pasture woodland, and on a tree in heathland. Generally rare in Europe.

Closely related to *Lecanora barkmaniana* and is physically quite similar but has a paler thallus with more delimited soralia, and strongly pruinose apothecia discs; see Malíček *et al.* (2017).

Lecanora viridiatra (Stenh.) Nyl. (1872)

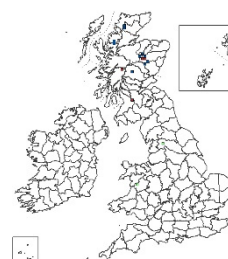
Lecidea luteoatra Nyl. (1873)

Thallus pale yellowish green, areolate, medulla I–; areoles flat to convex, 0.3–0.8 mm broad; prothallus distinct, black, often coating the sides of the areoles. Apothecia black, 0.3–0.8 mm diam., immersed, later convex, with a

thin, dark brown exciple; epithecium olive brown-green to dark bluish; hypothecium hyaline. Asci *Lecanora*-type. Ascospores $11\text{--}15 \times 5\text{--}7 \mu\text{m}$. Pycnidia immersed in areoles, black; conidia curved, $20\text{--}29 \times ca\ 0.5 \mu\text{m}$. Thallus C⁻, K⁺ faintly yellow, Pd⁻, UV⁺ pink (usnic acid). **BLS 0745**.

On fine-grained acidic rocks, especially granite and quartzite; uncommon. Scottish Highlands, mostly above 800 m.

The colour of the thallus is distinct, being something between a yellow *Rhizocarpon* and a *Lecanora* of the *L. polytropa* group. Fryday & Coppins (2012) confirmed its place within *Lecanora* s.l.



LECIDELLA Körb. (1855)

Thallus crustose, immersed or superficial, continuous to verrucose-areolate. **Medullary hyphae** I⁻, prothallus absent or black to blue-black. **Ascomata** apothecia, sessile, usually constricted at the base, brown-black or red-brown in shade. **Thalline margin** absent. **True exciple** of radiating hyphae, dark green, blue-black or brown, at times crystalline, often pale inside, not black and friable. **Epithecium** blue-black, green-black or brown. **Hymenium** colourless to pigmented, I⁺ blue. **Hypothecium** colourless, yellow or brown to red-brown. **Hamathecium** of paraphyses, usually lax (especially in K), sparsely branched and mostly in the upper part, the apices scarcely swollen, rarely capitate. **Asci** 8-spored, clavate, *Lecidella*-type (similar to the *Lecanora*-type but with the apical cushion not extending to the apex of the tholus). **Ascospores** aseptate or rarely 1-septate, colourless, ellipsoidal, rather uniformly thick-walled, lacking a distinct perispore. **Conidiomata** pycnidia, immersed. **Conidia** thread-like, often strongly curved. **Chemistry**: atranorin, chloratranorin, zeorin, diploicin and frequently a range of xanthenes; psoromic acid present in one species. **Ecology**: widely distributed, especially in nutrient-enriched habitats.

Lecidella is separated from *Lecidea* by the non-carbonaceous, brown-black exciple, often pale inside, the usually blue-green upper hymenium, *Lecanora*-type asci, ascocarp ontology (which is typical of the Lecanoraceae), and chemistry which includes a preponderance of xanthenes making the thallus react C⁺ orange. *Carbonea* differs in its combination of narrow spores, large-celled photobiont, intense aeruginose-blue upper hymenium and opaque black true exciple. *Pyrrhospora* belongs to the Lecanoraceae on the basis of the ascus structure, even though no thalline margin is present; it could be related to *Lecidella* but preliminary molecular data (Zhao *et al.* 2015a) does not clearly support that hypothesis.

There is considerable variation in the epithecial and excipular pigments, and also in the presence of crystals within these structures; their taxonomic significance seems to be important but not well understood. Careful vertical sections of the ascocarp are essential to distinguish the structure and internal colour of the exciple.

Literature:

Fletcher *et al.* (2009), Haugan & Tønsberg (2018), Kantvilas & Elix (2013), Knoph (1990), Knoph & Leuckert (1994, 2000), Leuckert *et al.* (1989, 1992), Zhao *et al.* (2015a, b).

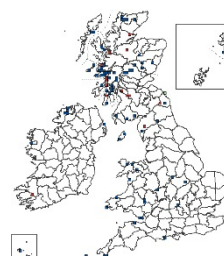
- | | | |
|------|--|------------------|
| 1 | Thallus sorediate or blastidiate | 2 |
| | Thallus lacking soredia or blastidia | 7 |
| 2(1) | Thallus scurfy, densely blastidiate, blastidia to 0.1 mm diam.; hypothecium dark brown; on siliceous rock, rarely wood, coastal; sometimes fertile | <i>meiococca</i> |
| | Thallus sorediate, soredia usually <i>ca</i> 20 μm diam..... | 3 |

- 3(2) Soralia UV+ yellow, punctiform, discrete; usually on coastal twigs and branches *elaeochroma* [forma *soralifera*]
Soralia UV-, usually confluent, rarely punctiform; substrata various 4
- 4(3) Cortex and soralia C+ yellow; soralia minute, to 0.2 mm diam., punctiform; rare, on
upland juniper *subviridis*
Cortex and soralia C+ orange; soralia usually larger, 0.2–2 mm diam. 5
- 5(4) Soralia originating from pustules; finally forming a leprose crust; sterile; mainly on aspen bark
..... *flavosorediata*
Soralia superficial, discrete to ±confluent; often fertile 6
- 6(5) Thallus pale to dark grey with a green tinge; hypothecium dull yellow to brown; mostly on
siliceous or slightly base-rich rocks, occasionally on dry bark or lignum; widespread..... *scabra*
Thallus white to pale grey; hypothecium pale yellow; on worked timber and fence rails,
probably extinct in GBI..... *pulveracea*
- 7(1) On mosses, or lichenicolous..... 8
Directly on rock or bark, mainly lowland; exciple usually blue-green in section, rarely brown 9
- 8(7) On mosses on ± calcareous substrata, montane; exciple brown in section *wulfenii*
Lichenicolous, on thalli of *Pyrrosopora quernei*; exciple green-yellow in section *parasitica*
- 9(7) Cortex white to grey, C- 10
Cortex shades of yellow to brown, C+ orange 13
- 10(9) Exciple entirely brown in section *anomaloidea*
Exciple blue-green in section 11
- 11(10) Apothecia to 3 mm diam., hymenium with numerous oil droplets *patavina*
Apothecia 1–2 mm diam., hymenium lacking oil droplets 12
- 12(11) Hypothecium red-brown, intensified in K *carpathica*
Hypothecium pale, K- *stigmatea*
- 13(9) Cortex K+ yellow; hypothecium brown-orange, intensified in K; epithecium and hymenium
blue-green 14
Cortex K-; hypothecium colourless or pale straw; epithecium and exciple brown in section..... *viridans*
- 14(13) Usually on bark or wood; thallus very variable but usually ± smooth or weakly granular.... *elaeochroma*
On maritime rocks; thallus coarsely granular-papillate..... *asema*

Lecidella anomaloidea (A. Massal.) Hertel & H. Kilius (1980)

Thallus thin, scurfy, indistinctly areolate to granular, continuous, wide-spreading or forming a thin, film-like covering, usually scattered between rock granules, pale to dark grey or dull dirty green. Apothecia frequent, following crevices, 0.4–0.7 mm diam., sessile, flat to slightly convex; disc shiny, true exciple well-developed, often wavy, persistent, 50–70 µm thick in section, mostly opaque within, dark brown, becoming paler brown to white towards the hypothecium; epithecium dense, shiny, green-black to brown, without crystals; hypothecium colourless or pale brown, red-brown when old, often K+ faintly red. Ascospores 9–15 × 7–8 µm. Thallus, C-, K± yellow, Pd± yellow (atranorin – sometimes faint). **BLS 0794.**

On shaded, often vertical damp siliceous rocks, often in well-wooded situations or in sheltered gullies; local, scattered, W. Britain and Ireland, rare in the east.



Nb

The entirely opaque brown exciple and preference for strongly acidic substrata distinguishes *L. anomaloides* from dispersed forms of *L. stigmatea* with poorly developed thalli.

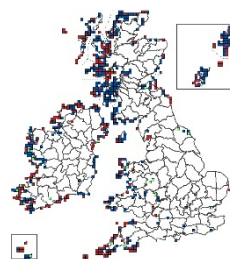
Lecidella asema (Nyl.) Knoph & Hertel (1990)

Thallus coarsely granular-papillate, rather thick, often strongly verrucose, coarsely rimose, pale fawn-ochre to yellow-green or rarely pale grey in shade. Apothecia frequent, 0.5–1 mm diam., black, at first flat, later becoming somewhat convex, often shiny, at least when young; true exciple becoming excluded, grey-green to grey-blue at the outer edge, pale brown to red-brown within, inner part with crystals; epithecium blue-green; hymenium with crystals that dissolve in K; hypothecium yellow to deep red-brown, intensifying in K. Ascospores 10–13 (–20) × 6–9 μm. Thallus C+ orange, K± yellow, Pd–. Chemistry variable: (1) atranorin, thiophanic acid, (2) atranorin, thiophanic acid, asemone, (3) atranorin, thiophanic acid, asemone and several xanthenes. Arthothelin and chloratranorin may also be present. **BLS 0804.**

On coastal, siliceous rocks in the xeric-supralittoral zone, occasionally on decaying *Armeria* tufts; widespread and common on exposed rocky shores, rarely on sheltered montane rocks. W. and N. Britain (very rare in the east), all around the Irish coast.

A very variable species, particularly regarding its chemistry. It is characterized by the fawn-ochre, strongly verrucose thallus with jet-black, shiny apothecia and the coastal habitat. Thallus colour seems to vary with the degree of exposure to light. Two extreme thallus colour morphs are sometimes distinguished: var. *asema*, with a greenish shade, and var. *elaeochromoides* (Nyl.) Hertel & Leuckert (1969), pale ochre (biscuit-coloured).

LC



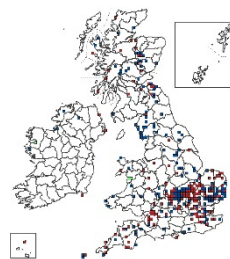
Lecidella carpathica Körb. (1861)

Thallus verrucose to unevenly coarsely granular, usually well-developed, white or pale to dark grey, becoming stained brown or green. Apothecia 0.5–1 mm diam., semi-immersed and flat, becoming sessile and convex; true exciple thin, wavy, shiny, later excluded, in section green or black-blue at the edge, distinctly red-brown within, the colour intensifying in K; hymenium 40–65 μm high, partly green-black, brown-tinged, crystals absent; hypothecium semi-opaque, bright red-brown, K+ bright orange-brown; epithecium dark green. Ascospores 10–16 × 6–8.5 μm. Thallus C–, K+ yellow, KC+ yellow, Pd ± yellow (atranorin, diploicin, thuringione and chloratranorin). **BLS 0796.**

On weakly basic, nutrient-enriched rocks and walls, also slate and asbestos cement roofing and worked timber, churchyards; sometimes coastal; uncommon, until recently much overlooked. Throughout Britain, especially in the S. and E.; a few records from Ireland.

The semi-opaque, bright red-brown hypothecium and interior of the exciple distinguishes *L. carpathica* from *L. stigmatea*. *Buellia spuria* (Caliciales, Caliciaceae) closely resembles *L. carpathica* in habit but has brown, 1-septate ascospores.

LC

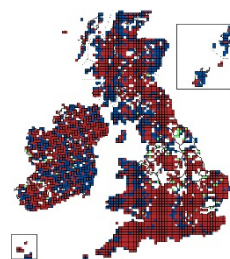


Lecidella elaeochroma (Ach.) M. Choisy (1950)

Thallus rather smooth, even and continuous or granular-verrucose, pale, yellow-grey to yellow-green in sunny exposed sites, becoming grey-green in shade, at times forming mosaics; prothallus black or blue-black. Apothecia to 1 mm diam., closely appressed, rounded to irregular, sometimes in small clusters, at first flat, later convex; disc black (especially in exposed, well-lit situations), but pale blue-black, brown-red or ± piebald morphs with a darker true exciple also exist; true exciple persistent, flexuose, finally excluded; epithecium and edge of true exciple sections blue-green to dull grey-blue, with crystals, crystals dissolving in K; hymenium 40–70 μm tall, with inclusions in the lower part and in the hypothecium; paraphyses lax, aseptate, non-capitate; hypothecium brown-orange, rarely colourless, intensifying to bright red-brown in K. Ascospores 10–17 × 6–9 μm. Thallus C+ orange, K+ yellow, KC+ yellow, Pd– (reactions often faint, but the K/UV (wet)+ bright yellow-green test for xanthenes is effective in such material); arthothelin, granulosin, ± 4,5 dichlorolichexanthone). **BLS 0797.**

On well-lit smooth bark, especially twigs and small branches, also wood, often forming mosaics; also found on church walls etc.; moderately tolerant of SO₂ pollution; very common. Throughout Britain and Ireland.

LC



An extremely variable species as the pigmentation in the apothecia and thallus can be almost absent, especially in shaded situations. The species can be distinguished by the lax, unbranched paraphyses, the red-brown hypothecium intensifying in K, and at least a part of the thallus reacting C⁺ orange. *Buellia disciformis* is often confused with morphs of *L. elaeochroma* with a pale thallus. *Megalaria grossa* (Ramalinaceae) can appear like a large form of *L. elaeochroma* but is C⁻. The rare *M. laureri* can also superficially resemble some morphs of *L. elaeochroma*. The mainly continental and Asian *L. euphorea* (Flörke) Hertel (1980), distinguished by the thallus reactions C⁻, K⁺ yellow (?atranorin), is poorly understood and is probably not correctly recorded from Britain and Ireland; its status needs further research.

L. elaeochroma forma *soralifera* (Erichsen) D. Hawksw. (1972) **BLS 0798** is similar to f. *elaeochroma* but has bright yellow-green soralia, 0.5–1 mm diam., punctiform and discrete, scattered all over or restricted to only part of the thallus. Apothecia are always present and the production of soralia does not inhibit their formation. The soralia possess lichexanthone and are UV⁺ yellow. It occurs in similar habitats to, and usually with, f. *elaeochroma*, but is less frequent. It is most common near sea coasts. Mainly W. Britain. Its recognition as a distinct taxon needs further evaluation.

Reported lichenicolous fungi are: *Arthonia intexta* (in the hymenium), an unnamed *Arthonia* (on the thallus), *Crittendenia lecidellae* Diederich *et al.* (2022), *Epithamnolia* sp. (in hymenium), *Feltgeniomyces luxemburgensis* Diederich (1990), *Lichenochora lecidellae* Boqueras & Nav.-Ros. (1998), *Lichenostigma* sp. (anamorph), *Marchandiomyces corallinus* and *Stigmidium lecidellae* Triebel *et al.* (1995).

Lecidella flavosorediata (Vězda) Hertel & Leuckert (1992)

Thallus white to pale grey, very thin, filmy, weakly cracked with a minutely bullate surface, usually mosaic-forming with other crustose lichens; soredia arise from pustules, soon coalescing to form irregular, farinose areas and finally a continuous crust, ca 20 µm diam., pale green- to brown-yellow. British specimens are sterile. C⁺ orange, K⁻, Pd⁻ (arthothelin, granulosin). **BLS 2383**.

On bark of *Populus tremula* and *Sorbus* in montane, aspen/birch/juniper pasture woodland. N.C. Scotland.

Distinguished from *L. elaeochroma* f. *soralifera* which has UV⁺ yellow lichexanthone in ± discrete soralia, is always fertile and a cortex that usually persists, at least at the thallus edge. *Pyrrhospora querneae* has red-brown apothecia. *L. pulveracea* (once widespread, now probably extinct in Britain and Ireland) has a pale yellow-grey thallus with undetermined xanthenes and was found only on lignum. Fertile European specimens of *L. flavosorediata* have black apothecia, to 0.8 mm diam., convex, with excluded proper exciple. Conidia are hair-like, strongly curved into a 'U' shape, about 25 µm long.

LC NR



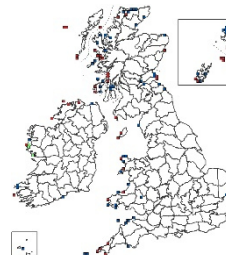
Lecidella meiococca (Nyl.) Leuckert & Hertel (1990)

Thallus thin to thick, composed of numerous aggregations of apically proliferating blastidia to 0.1 mm diam., dispersed in scattered clusters or becoming continuous, forming a coarsely cracked scurfy crust, dull pale ochre, becoming grey-ochre in shade. Apothecia infrequent, 1–1.5 mm diam., scattered or rarely crowded, often intermingled with blastidia; disc flat, rarely convex, matt; true exciple thin, shiny, flexuose, persistent, dark black-brown, paler within (section needed), rich in crystals; epithecium dark blue-green, non-crystalline; hymenium 60–90 µm, crystalline, crystals not dissolving in K; hypothecium brown to dark red-brown. Ascospores 10–20 × 6–9 µm. Thallus C⁺ orange (often faint), K⁺ yellow (atranorin, thiophanic acid, isoarthothelin, dichloro-norlichexanthone and several other xanthenes, particularly 2,5,7-trichloro-3- *O*-methyl norlichexanthone). **BLS 0800**.

On siliceous coastal rocks, rarely on decorticated wood, and decaying *Armeria* tufts, coastal; rather rare and local. S. & W. Britain and Ireland (Channel Islands to Shetland).

The thallus is a deeper grey than *L. asema*, has a characteristic scurfy appearance and is rarely fertile.

Nb



Lecidella parasitica Sanderson (2022)

NE

Immersed in the thallus of *Pyrrhospora querneae*, usually with limited impact on the host but heavy infections may darken the thallus. Apothecia 0.15–0.5 (–0.6) mm diam., black, some a bit distorted but mainly flat; thalline margin absent, exciple green-yellow internally, composed of radiating hyphae; epithecium blue, K⁺ intensifying

to a degree; paraphyses lax, rather broad (to *ca* 4 μm diam.), apices barely swollen; hymenium *ca* 40 μm tall, pale straw, often with reddish and blue patches; hypothecium pale yellow to brown, K⁻. Asci *Lecanora*-type, 8-spored. Ascospores aseptate, (7⁻) 10–12 \times (4⁻) 6–7 (–8) μm , ellipsoidal to broadly ellipsoidal, some more pointed at one end, thick-walled. **BLS 2821**.

Parasitic on *Pyrrhospora querneae*, on veteran *Quercus* and *Fagus* and on *Quercus* lignum on fallen trees in parkland and old growth pasture woodland. Hampshire (New Forest), Hereford (Moccas Park) and Cumbria (Glencoyne Park).

The species is validated on p. 76 of this publication. Easily overlooked as immature apothecia of *Pyrrhospora querneae*, but can be detected by their small size, pure black colour (no trace of reddish pigmentation) and the disks remaining flat. Apothecia may develop but do not always appear to produce ascospores.

In Fletcher *et al.* (2009), this species keys out as *Lecidella pulveracea*, if the parasitic nature of the fungus was not realized. Compared with this poorly known species, *L. parasitica* has smaller apothecia and ascospores and a more colourful hymenium.

Lecidella patavina (A. Massal.) Knoph & Leuckert (1990)

Similar to *L. stigmatea*, but thallus grey, thick (to 2 mm), but often endolithic or dispersed between rock fragments and hardly apparent. Apothecia sessile, large, to 3 mm diam., black; exciple blue-green, hyphae 8–10 μm diam.; hymenium pale, to 110 μm high, containing an opaque crystalline substance and oil droplets ('interspersed'); epithecium blue-green; hypothecium pale yellow. Ascospores 11–19 \times 6–10 μm . Thallus C⁻, K⁺ yellow, KC⁻, Pd⁺ yellow (atranorin, lichexanthone). **BLS 0602**.

On nutrient-enriched siliceous rocks near to water, rare, Central and N.W. Scotland.

The only *Lecidella* containing \pm numerous oil droplets within the hymenium. Readily distinguished by the thick thallus, and when present, large apothecia with an opaque hymenium with crystals and oil droplets. The oil droplets extend to the exciple and hypothecium. The thallus of *L. stigmatea* is thinner, apothecia are 1–2 mm diam., the excipular hyphae are 6–7 μm diam. and the hymenium *ca* 85 μm high, usually lacking crystals.

Nb



Lecidella pulveracea (Flörke ex Th. Fr.) P. Syd. (1887)

Similar to *L. elaeochroma* f. *soralifera* but with a thick fine coarsely granular white to pale grey thallus dissolving into small proliferating blastidia to 0.1 mm diam., becoming cracked into coarse areoles, forming a continuous, wide-spreading crust. Apothecia always present, <1 mm diam., semi-immersed, later sessile and convex, often contorted; hymenium containing crystals; epithecium and exciple blue-green; hypothecium pale yellow. Ascospores 13–17 \times 7–8 μm . Blastidia C⁺ orange, K⁺ yellow, KC⁺ orange (undetermined xanthones). **BLS 0801**.

On wood, confined to worked timber of barns and fence rails, especially near farms, formerly widespread and frequently collected. England (Midlands and the S.E.); not seen since 1879 and likely to be extinct here.

The identity of this species is unclear and shows affinities with *Pyrrhospora querneae* which has red-brown apothecia. All potential *Lecidella* gatherings from worked timber should be carefully examined for this species.

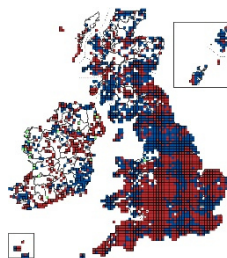
Ex

Lecidella scabra (Taylor) Hertel & Leuckert (1969)

Thallus very thin to coarsely granular, becoming rimose-areolate, pale to dark grey with a green tinge; prothallus pale to dark grey; soralia scattered at first, becoming confluent, green- to yellow-white, concolorous with the thallus, grey-green when abraded with a finger; soredia about 20 μm diam., containing a brown pigment soluble in K and a green pigment, K⁺ green, N⁺ violet; the \pm corticate thallus usually persists around the thallus edge. Apothecia frequent, *ca* 1 mm diam., \pm scattered, sessile, concave or later convex, often convoluted and irregular, occasionally subgyrose; true exciple well-developed, shiny, becoming excluded, dark brown at the edge, paler within (section needed), K⁺ intensified red-brown, crystalline; epithecium green to blue-black, K⁻, N⁻; hypothecium dull yellow to brown. Ascospores 10–15 \times 6–8 μm . Cortex K⁺ yellow, soredia C⁺ orange (atranorin, arthothelin, thuringione, 4,5-dichloro-norlichexanthone). **BLS 0802**.

On siliceous or slightly base-rich rocks, often on walls and memorials, occasionally on dry and often dust-impregnated wood, worked timber, or bark. Common throughout Britain and Ireland.

LC



The only sorediate, sometimes corticolous species containing thuringione. *L. scabra* is not generally corticolous while *L. carpathica*, also with thuringione, is mostly saxicolous but may occur on lignum. The number and extent of soralia are very variable. When sterile, the thallus often becomes continuously sorediate except towards the margin. When fertile, soralia are usually few and scattered. The surfaces of soralia are concolorous with the thallus and when abraded become pale green. *L. scabra* is most often confused with *Lecanora pannonica* which is also C+ orange. Care needs to be taken when separating *Rinodina aspersa* (Caliciales, Physciaceae) as it has gyrophoric acid (C+ orange-red), and a black, fimbriate prothallus.

Reported lichenicolous fungi are *Endococcus* cf. *rugulosus* and *Paranectria oropensis*.

Lecidella stigmatea (Ach.) Hertel & Leuckert (1969)

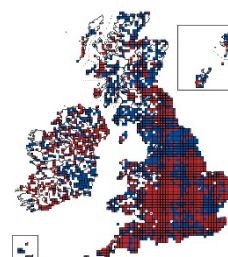
Thallus white to pale grey, becoming stained green or brown, even black- or rust-red, superficial and continuous, often in round patches, faintly rimose-cracked or granular-verrucose. Apothecia to 1.5 mm diam., flat or rarely convex; true exciple well-developed when young, the edge shiny, blue-black, indigo to green-black, colourless within, non-crystalline, unchanging in K; epithecium brown to purple-brown, K+ purple intensifying; hymenium 60–80 µm tall, not interspersed with crystals or oil droplets; hypothecium colourless to pale yellow-brown. Ascospores 10–16 × 6–9 µm. Thallus C–, K± yellow, Pd–, UV–. Chemistry: (1) atranorin and zeorin; (2) lichexanthone, norlichexanthone and zeorin; (3) zeorin only. **BLS 0803**.

On weakly calcareous and base-enriched siliceous rocks, cement and mortar; often very common, a pioneer colonizer of urban walls and paths. Very common throughout Britain and Ireland.

Very variable in the shape of apothecia and thickness of thallus. In section, the contrasting brown to purple-brown epithecium, the thin black or indigo external layer, pale inner part of the true exciple, and the colourless or pale hypothecium, are diagnostic and separate this species from *L. carpathica*. *L. stigmatea* is a useful indicator of weakly calcareous rocks. *Clauzadea monticola* (Lecideales, Lecideaceae) has a red-brown pigmentation in the hymenium and hypothecium, and shorter ascospores. *L. carpathica* has a bright, red-brown hypothecium; *L. patavina* has oil-droplets in the hymenium.

Reported lichenicolous fungi are *Muellerella lichenicola* (common), *M. erratica* and *Intralichen* sp. (recorded as *I. christiansenii*).

LC



Lecidella subviridis Tønsberg (1992)

Thallus white to pale grey, smooth to weakly bullate, very thin, of minute areoles; soralia green-yellow, punctiform, scattered and later coalescing to obscure the thallus; soredia farinose, to 20 µm diam. (coarser in some European populations). Apothecia rare, pale brown, 0.2–0.3 mm diam., flat; exciple darker brown, pale green-translucent in section, with brown crystals dissolving in K; hypothecium pale, usually containing crystals; paraphyses very narrow, with brown apical caps, K+ brown intensified. Ascospores 13–15.5 (–21) × 7.5–9 µm. Cortex C+ yellow, K+ yellow, KC+ orange (atranorin, thiophanic acid, arthothelin, *expallens* unknown). **BLS 0707**.

On *Juniperus* twigs with *Marchantiana (Caloplaca) asserigena* (Teloschistales, Teloschistaceae); rare. N.W. Scotland.

Lecanora expallens contains usnic acid and zeorin; it is common and widespread on bark, wood and worked timber. The minute, punctiform soralia and uniform yellow-green colour distinguish *L. subviridis* from other sorediate corticolous *Lecidella* spp.

Nb



Lecidella viridans (Flot.) Körb. (1855)

Thallus thin, scurfy or finely granular, usually small, often scattered, in cracks and fissures, grey- to green-yellow. Apothecia 0.2–0.3 mm diam., scattered to crowded, flat; true exciple persistent, often grey-green pruinose, brown to grey-green at the edge (section needed), paler within; epithecium dark brown, brown-green or green-grey, granular, crystals dissolving in K; hymenium 50–60 µm tall, not interspersed with granules; hypothecium colourless to pale straw; paraphyses clavate, apices brown. Ascospores 9.5–12 × 5–7 µm. Thallus C+ orange (arthothelin, thiophanic acid and 4,5-dichloro-norlichexanthone). **BLS 0805**.

Nb



On hard, siliceous rocks, often coastal, occasionally inland; very local. Scattered throughout W. and N. Britain. *L. stigmata* in section has a blue-black edge to the true exciple, paraphyses which lack clavate apices, a C– thallus, and a different chemistry. *L. carpathica* has a red-brown hypothecium.

Lecidella wulfenii (Hepp) Körb. (1861)

Thallus resembling *L. asema* but overgrowing mosses, of white to pale grey granules, ca 0.1 mm diam. Apothecia flat, exciple becoming excluded, to 1 mm diam., true exciple dirty drab black at the edge, red-brown within (section needed); epithecium dark brown-black or blue-green, crystalline; hypothecium pale orange-brown above, darker below. Ascospores 13–16 × 6–7 µm, ellipsoidal. Thallus C+ orange, K+ yellow. Chemistry unknown. **BLS 1659.**

On mosses overgrowing calcareous substrata, 700–1100 m; rare, C. Scotland (Ben Lawers, Caenlochan Glen).

Superficially resembles the muscicolous *Bacidia baglioettiana* (Ramalinaceae) which has fusiform, multi-septate spores.



MIRIQUIDICA Hertel & Rambold (1987)

Thallus crustose, of continuous to scattered areoles; areoles corticate, often with a distinct epinecral layer; medulla I–; black prothallus sometimes present. **Photobiont** chlorococcoid. **Ascomata** apothecia, black or dark brown, remaining immersed or becoming sessile. **Thalline margin** usually absent. **True exciple** of radially orientated hyphae 5–7 µm diam. at the outer edge (in water mounts), reduced in species with immersed apothecia, greenish or brownish at least at the outer edge, never black and brittle; photobiont cells usually absent, occasionally present in the inner part of the exciple in some specimens. **Epithecium** greenish (N+ red) or brownish (N–). **Hymenium** colourless, I+ blue. **Hypothecium** colourless. **Hamathecium** of paraphyses, ± branched and anastomosed; apices ± clavate and surrounded by a closely adhering pigmented hood. **Asci** clavate, 8-spored, similar to the *Lecanora*-type but the apical cushion is often weakly defined and the ocular chamber scarcely developed. **Ascospores** aseptate, occasionally with a false cytoplasmic septum, rarely 1-septate when old, usually cylindrical-ellipsoidal. **Conidiomata** pycnidia, immersed in areoles. **Conidia** 15–28 × 0.5–1 µm, curved, thread-like, aseptate, colourless. Dark thalloconidia are produced in one species. **Chemistry**: orcinol and β-orcinol depsides and depsidones; miriquidic acid present in many species, easily identified on TLC plates as a peacock blue spot. **Ecology**: on acidic rocks, rarely on wood.

The genus *Miriquidica* was originally described as a close relative of *Bryonora*, *Protoparmelia* and *Psorinia*, but differing in ascus structure and the presence of miriquidic acid. Molecular phylogenetic studies by Singh *et al.* (2013, 2015) indicate that *Miriquidica* and *Protoparmelia* occupy basal positions within the Lecanoraceae and Parmeliaceae clades respectively, and that miriquidic acid is not an essential diagnostic character for *Miriquidica*. *Protoparmelia atriseda* and *P. nephaea* are therefore transferred to *Miriquidica* based on these studies.

Several species of *Miriquidica* appear to be initial parasites of other lichens (Rambold & Triebel 1992). *M. atriseda* and *M. intrudens* are associated with thalli of *Rhizocarpon geographicum*. *M. invadens*, not yet recorded from Britain & Ireland but likely to be present, develops in thalli of *Sporastatia polyspora* (Hafellner *et al.* 2014).

Literature:

Giavarini *et al.* (2009), Hafellner *et al.* (2014), Haugan *et al.* (2013), Hertel & Rambold (1987), Owe-Larsson & Rambold (2001), Rambold & Schwab (1990), Rambold & Triebel (1992), Singh *et al.* (2013, 2015).

- 1 Thallus with dark patches of greenish black thalloconidia *nephaea*
 Thalloconidia not produced..... 2
- 2(1) Areoles with soredia; apothecia few or absent 3
 Areoles not sorediate; apothecia usually numerous 8
- 3(2) Thallus ochre or orange; soralia K+ yellow *atrofulva*
 Thallus not ochre or orange; K-, (stictic acid [K+ yellow] rare) 4
- 4(3) Thallus brown; soralia mostly marginal 5
 Thallus dark grey, grey or white; soralia laminal and marginal 6
- 5(4) Areoles glossy, brown, small (0.4–1.1 mm diam), soralia black *intrudens*
 Areoles matt, brown, larger (to 2 mm diam.), soralia beige to pale brown *complanata*
- 6(4) Medulla K+ yellow (atranorin); areoles pale; soralia black *pyncocarpa*
 Medulla K-; areoles light to dark grey; soralia dark grey abraded white 7
- 7(6) Thallus without psoromic acid (always Pd-), dark grey, glossy *nigroleprosa*
 Thallus with psoromic acid (Pd± yellow); thallus light grey to white, matt
 *nigroleprosa* var. *liljenstroemii*
- 8(2) Areoles K+ yellow→red (crystals) 9
 Areoles K± yellowish (no crystals) 10
- 9(8) Areoles hemispherical to subglobose, chestnut brown; associated with *Rhizocarpon*
geographicum *atriseda*
 Areoles ± flat, angular, grey to brownish; not associated with *Rhizocarpon*..... *lulensis*
- 10(8) Hypothecium dark reddish brown 11
 Hypothecium colourless..... 12
- 11(10) Areoles dispersed, sometimes scarce, not lobate; apothecia mostly arising in compact groups of
 up to 25 on a common black stroma, ± botryose..... *pyncocarpa*
 Areoles scattered to contiguous, often minutely lobate at the margin; apothecia borne singly
 and not on a stroma *griseoatra*
- 12(10) Apothecia becoming emergent and sessile 13
 Apothecia remaining immersed *complanata*
- 13(12) Areoles dark brown, glossy; medulla Pd+ orange *garovaglii*
 Areoles pale grey and ± glossy, or dark brown- or bluish grey and matt; medulla Pd- 14
- 14(13) Areoles grey-white to brownish grey, often glossy, rarely minutely lobed *leucophaea*
 Areoles grey-brown to dark bluish grey, matt, often minutely lobed *subplumbea*

Miriquidica atrofulva (Sommerf.) A.J. Schwab & Rambold (1990)

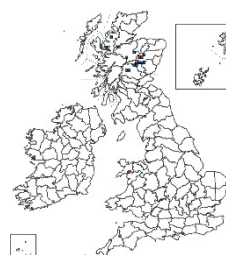
LC

Thallus areolate, ochre to dull orange-yellow or rusty yellow-brown, the areoles mainly 0.2–1 mm diam., often dispersed, uneven to strongly convex, medulla I-; prothallus grey or black, with crateriform to tuberculate dark blue-grey to blackish soralia 0.1–0.2 mm diam. Apothecia rare, 0.2–0.6 mm diam., brown-black; true exciple dark brown at the outer edge, colourless within, of radiating hyphae with short swollen cells; epithecium olive-brown to pale brown; hymenium 50–60 µm tall; hypothecium colourless; paraphyses mainly unbranched, apices not markedly swollen but often with brown caps. Asci 55–65 × 14–18 µm, *Lecanora*-type. Ascospores 8–12 ×

(5–) 5.5–7.5 (–8) μm , broadly ellipsoidal. Conidia 8–22 \times 0.5–1 μm , thread-like. Thallus, medulla and soralia C–, K+ yellow, KC–, Pd \pm yellow (stictic, cryptostictic, \pm norstictic acids; additionally, \pm atranorin and confluent acid reported in Norway). **BLS 0700.**

On metal-rich siliceous rocks, often with *Acarospora sinopica*, *Lecidea silacea* and *Tremolecia atrata*; rare. N.W. England (Lake District), Wales (Merionethshire), Scotland (Highlands).

In the shade the soralia can predominate and the thallus is paler yellow. Easily recognized by the distinctive thallus colour, which is always much yellower than *Rhizocarpon oederi* or *Tremolecia atrata*, neither of which are sorediate.



Miriquidica atriseda (Fr.) P.F. Cannon (2022)

Protoparmelia atriseda (Fr.) R. Sant. & V. Wirth (1987)

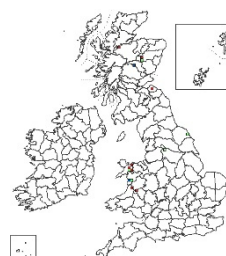
Thallus forming small patches up to ca 3 cm across, composed of contiguous to dispersed, hemispherical to subglobose, glossy chestnut brown areoles 0.2–0.6 mm diam., seated on a black prothallus; areoles sometimes arising between those of the host lichen. Apothecia 0.2–0.6 (–0.8) mm diam., concolorous with the thallus, immersed and poriform at first, eventually \pm sessile, disc shiny red-brown; hymenium 45–50 μm tall. Ascospores 8–13.5 \times 4–6.5 μm , cylindrical-ellipsoidal to cylindrical, ends rounded. Pycnidia not seen. Sections (esp. cortex) K+ yellow to red (spicule-like crystals), KC–, Pd+ yellow or orange, UV– (norstictic acid, trace amounts of unidentified substances, including a fatty acid (? rangiformic acid); sometimes also with psoromic acid from the *Rhizocarpon*). **BLS 0631.**

On hard, well-lit, sedimentary and especially igneous siliceous rock, in upland to submontane situations, also on blocky mine spoil; rare. C. & N. Wales, Shropshire, Scotland (Highlands). Closely associated with and presumably initially parasitic on thalli of *Rhizocarpon geographicum* agg.

Included within *Protoparmelia* by Coppins & Chambers (2009) and many other authors, but molecular data (Singh *et al.* 2013, 2015) show that the species clusters within *Miriquidica*. The necessary new combination is made on p. 77 of this work.

Recognized by the small shiny strongly convex red-brown areoles, \pm cylindrical ascospores and K reaction, which can be tardy and best checked microscopically in squash preparation. Young sterile areoles can resemble juvenile *Lecidea fuliginosa*, which occurs in similar habitats.

VU(D2)



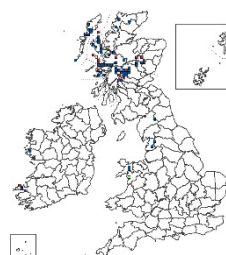
Miriquidica complanata (Körb.) Hertel & Rambold (1987)

Thallus of scattered or more rarely contiguous white to beige, more rarely dark brown to black areoles on a conspicuous black prothallus; areoles to ca 1 mm diam., rounded, \pm minutely lobed, flat to slightly convex, pale to brownish grey, matt; superficial epinecral layer indistinct. Soralia occasionally present; developing mainly from the periphery of the areoles, sometimes encircling them and also arising from more central parts, appearing as small, delimited spots that are rarely confluent; soredia (20–) 25–40 μm diam. Apothecia 0.2–0.7 mm diam., immersed, mostly one per areole; disc brown to black, usually immarginate; true exciple reduced, the outer edge dark brown to greenish; epithecium brown. Ascospores 10–16 (–18) \times (4–) 5–6 (–7) μm . Thallus C–, K–, KC–, Pd– (miriquidic acid). **BLS 0106.**

On moist, schistose rocks, mostly above 700 m; local. Scotland (Highlands), Wales (Snowdonia), N.E. England.

Sorediate morphs have been distinguished as *M. complanata* forma *sorediata* Owe-Larss. & Rambold (2001), but there are currently no molecular data available and its status is uncertain. *M. intrudens* is similar but can be identified by the mirror-like, glossy sheen of the dark brown areoles.

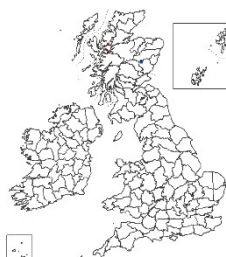
Nb



Miriquidica complanata forma **sorediata** Owe-Larss. & Rambold (2001)

Nb

As *M. complanata* but with soralia developing mainly from the periphery of the white to beige, more rarely dark brown to black areoles, sometimes encircling the areoles



and also arising from more central parts, appearing as small, delimited spots that are rarely confluent; soredia (20–) 25–40 μm diam. Apothecia common. **BLS 2342.**

On exposed siliceous rocks in coastal areas; rare. Scotland (Highlands).

There are currently no molecular data available for this taxon, and its status is uncertain.

Miriquidica garovaglii (Schaer.) Hertel & Rambold (1987)

Thallus areolate; areoles 0.2–0.8 mm diam., contiguous, angular to rounded, flat to often convex, brown, glossy; superficial epinecral layer distinct; medulla I–. Apothecia 0.3–1 (–1.3) mm diam., circular, sessile, the base \pm constricted, black; disc flat to convex; true exciple thin and usually persistent, olive-brown to dark green at the outer edge, pale straw within; epithecium olive-brown to green; hymenium colourless below, olivaceous above, 50–70 μm high, hypothecium colourless. Asci clavate; ascospores 11–16.5 \times 5–6.5 μm . Medulla (especially upper part) C–, K+ yellow, KC–, Pd+ orange (miriquidic and stictic acids). **BLS 1688.**

On schistose rocks on exposed SW-facing cliffs; very rare. N. Scotland (W. Ross, near Loch Maree).

Distinguished by the dark brown glossy thallus that is strongly fragmented. The black apothecia are noticeably constricted at the base. *Lecidea paupercula* (see Fryday & Coppins 2012) is of similar appearance and chemistry, but has flatter areoles, an I+ blue medulla, a dark hypothecium and lacks miriquidic acid.

VU(D2)



Miriquidica griseoatra (Flot.) Hertel & Rambold (1987)

Thallus of scattered to contiguous areoles; areoles ca 1 mm diam., rounded, convex, often minutely lobate and becoming verrucose, grey-brown to dark bluish grey, matt; superficial epinecral layer absent or indistinct. Hypothallus indistinct. Apothecia 0.3–1.2 mm diam., sessile, the base \pm constricted, black, flat to convex; true exciple usually persistent, greenish throughout or inner part brownish; epithecium olive-green. Hypothecium reddish brown, at least in part. Asci *Lecanora*-type, 8-spored, 50–65 \times 12–15 μm . Ascospores (13–) 14–16 (–17) \times (4–) 4.5–6 μm . Spot tests negative. **BLS 0781.**

On siliceous rocks and boulders by late snow patches; local. Scotland (Highlands).

Differs from *M. leucophaea* in the darker coloured, always matt and more frequently lobate areoles. Many records of *M. griseoatra* may instead refer to *M. subplumbea* (Hafellner *et al.* 2014), which has a colourless hypothecium, thallus areoles that are not lobate and smaller ascospores.

Nb



Miriquidica intrudens (H. Magn.) Hertel & Rambold (1987)

Thallus areolate, obligately lichenicolous (mainly on *Rhizocarpon geographicum*); areoles contiguous, mostly aggregated, small, dark, glossy, chestnut brown, with a paler border delimited by blackish marginal soralia, occasionally becoming confluent on the top surfaces of the areoles and then visible as blackish patches to 20 mm diam.; soredia mostly 10–15 μm diam. Apothecia rare, (0.2–) 0.6–1.1 mm, diam., immersed to sessile, brown to blackish brown; exciple with edge zone olivaceous brown or green; internally colourless; hymenium 40–70 μm thick; epithecium brown. Ascospores (7–) 9–15 (–18) \times (4–) 5–6 (–8) μm . Pycnidia rare. Spot tests negative, miriquidic acid (by TLC); this is replaced by the stictic acid complex in only a very small fraction of specimens. **BLS 2429.**

On siliceous rock of exposed crags; very local, Scotland (Roxburghshire).

According to Hafellner *et al.* (2014), *M. intrudens* is not host-specific, growing on a wide range of crustose lichens, including *Rhizocarpon geographicum*, *Lecanora polytropa*, *Lecidea confluens* and *L. lapicida*. It appears to be dependent on the host lichen for its entire life cycle.

Nb



Miriquidica leucophaea (Flörke ex Rabenh.) Hertel & Rambold (1987)

LC

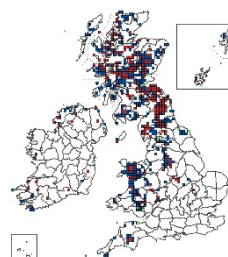
Thallus areolate; areoles 0.2–0.8 mm diam., mostly contiguous, flat to convex or verrucose, rarely a few minutely lobate, grey-white, grey or brownish grey, often glossy; superficial epinecral layer usually distinct. Apothecia 0.3–1.2 mm diam., immersed at first but usually soon becoming sessile, appressed or \pm constricted at the base; disc flat to convex, brown to black, \pm glossy; true exciple thin, often persistent, concolorous with or paler than

the disc, brownish or green at the outer edge, pale straw within, the inner part sometimes containing algae; epithecium olive-brown, rarely brown. Ascospores 8–15 × 4–7 µm. Thallus C–, K–, KC± faintly pink, Pd–; exciple C± faint pink (miriquidic acid). **BLS 0739.**

On siliceous and metal-rich rocks, rarely on wooden fencing; locally common. Throughout upland Britain and Ireland, but very rare in S. and E. England and absent from central Ireland.

The commonest member of the genus in Britain and Ireland; very variable. Several of the rarer species (e.g. *M. griseoatra*, *M. lulensis*) can easily be mistaken for it.

Endococcus perpusillus Nyl. (1857) has been found once on this host.



Miriquidica lulensis (Hellb.) Hertel & Rambold (1987)

NT

Like *Miriquidica leucophaea*, but the thallus is flatter with more angular areoles and the medulla is I+ blue. Thallus (especially upper medulla) K+ yellow→red (crystals), Pd+ orange (norstictic, ± connorstictic and ± stictic acids). **BLS 0744.**

On siliceous boulders (often on iron-rich rocks) and on mine spoil; rare. Wales (Cardiganshire & Caernarfonshire), Scottish Highlands.

Haugan *et al.* (2013) indicate that there may be more than one species within the *M. lulensis* complex, but more research is needed and the identity of British populations needs to be established with molecular data.

Miriquidica nephaea (Sommerf.) P.F. Cannon (2022)

NT

Protoparmelia nephaea (Sommerf.) R. Sant. (1990)

Thallus of chestnut-brown, dull to shiny areoles on a prominent black prothallus, forming minute radiating lobes at the margin; prothallus and areole margins sooty-black in places due to coarsely warted, greenish black thalloconidia, 9–14 (–20) × 7–12 µm in size; soralia sometimes present, one per areole, brown or abraded white, 0.2–0.3 mm diam. Apothecia rare, sessile, 0.3–0.8 mm diam., margin concolorous with the areoles, disc black. Ascospores ellipsoidal to cylindric-ellipsoidal, 7–10 × 3–3.5 µm. Pycnidia immersed; conidia curved, 12–14 × 0.8–1 µm. Medulla C–, K+ yellow, KC–, Pd+ orange, UV– (stictic acid). **BLS 1792.**

Below dry, siliceous, often mineral-rich rock overhangs; rare and local. C. & E. Highland Scotland (Perth, Angus, S. Aberdeen).

Included in *Protoparmelia* by Coppins & Chambers (2009), but phylogenetic studies (Singh *et al.* 2015) show that placement in *Miriquidica* is more appropriate. It appears to be most closely related to *M. nigroleprosa*. The necessary combination into *Miriquidica* is made on p. 77 of this publication.



Miriquidica nigroleprosa (Vain.) Hertel & Rambold (1987)

Nb

Thallus of scattered to contiguous areoles; areoles 0.2–0.8 mm diam., ± rounded, convex, often minutely lobate, dark grey, glossy, many sorediate; soralia 0.1–0.2 mm diam., usually one per areole, developing from the upper surface, dark blue-grey but abrading whitish; external cells of cortex and exposed soredia olive-green, N+ red; superficial epinecral layer distinct. Apothecia unknown in British material. Spot tests negative (miriquidic acid, replaced only occasionally by lobaric acid). **BLS 1627.**

On exposed siliceous boulders, rarely on wood; rare. N.E. England (Northumberland), Scotland (Highlands).

Miriquidica pycnocarpa forma *sorediata* has blackish soralia and is locally common in similar habitats in the Scottish Highlands; it has been misidentified as *M. nigroleprosa* but differs in having whitish areoles with a K+ yellow cortex (atranorin and an unidentified substance).



Miriquidica nigroleprosa var. *liljenstroemii* (Du Rietz) Owe-Larss. & Rambold (2001)

Nb

Differs from *Miriquidica nigroleprosa* in the dull, paler, light grey thallus and presence of both miriquidic and psoromic acid (Pd+ yellow), the latter of which can be variable even within the same thallus. **BLS 1259.**

Rare; on exposed rock above 970 m alt., Perthshire (Breadalbane).

Molecular studies at the University of Oslo (Haugan *et al.* 2013) indicate that *M. nigroleprosa* var. *liljenstroemii* is a separate species from var. *nigroleprosa*, but the detailed analysis has not yet been published and it appears that not all populations can be distinguished using chemical characters. The combination within *Miriquidica* at species rank was referred to by Santesson (1993), but it was not validly published in that work.

Miriquidica pycnocarpa (Körb.) Andreev (2004)

Nb

Thallus white to pale grey, of dispersed \pm shiny verrucae or areoles, sometimes scarce, the medulla I+ violet in parts; prothallus black, fimbriate, sometimes dominant. Apothecia 0.15–0.25 (–0.35) mm diam., black, mostly arising in compact groups of up to 25 on a common black stroma, \pm botryose, sessile; disc \pm flat to slightly convex; true exciple at first raised, later excluded; epithecium aeruginose to greenish-brown, intensifying in K, N+ reddish purple; hymenium 30–50 μ m tall, often pigmented as the epithecium; hypothecium dark red-brown; paraphyses branched and occasionally anastomosed, the apices olivaceous and swollen to 5 μ m diam. Asci 40–50 \times 12–15 μ m, *Bacidia*- or *Biatora*-type with a narrow apical cushion. Ascospores (9–) 10–18 (–22) \times (3–) 4–6 μ m, elongate-ellipsoidal. Thallus C–, K+ yellow, KC+ yellow, Pd+ weakly yellow, UV– (atranorin and unidentified substance). **BLS 0766.**

On coarse siliceous rocks, especially granites, in upland areas; localized. N. England, Wales, Scotland; old reports also from N.W. Ireland (Sligo, Leitrim).

The characteristic botryose clusters of minute apothecia are otherwise consistently seen only in *Hertelidea botryosa*, which grows on bark. Preliminary molecular data (Haugan *et al.* 2013) indicate that *M. pycnocarpa* does not belong in the genus, but no more appropriate placement has been proposed to date.

Muellerella pygmaea has been found once on this host.

Miriquidica pycnocarpa forma **sorediata** Coppins & Fryday) Coppins (2008)

Nb

A mainly sterile sorediate form of *M. pycnocarpa* has convex whitish areoles with black soralia. It resembles *M. nigroleprosa* but differs in its K+ yellow cortex due to atranorin. **BLS 1771.**

On siliceous rocks (esp. schists and basalt), in montane regions of N. England, Wales and Scotland.

The status of this taxon needs further examination; no molecular data are available.

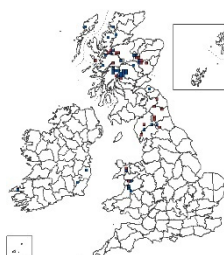
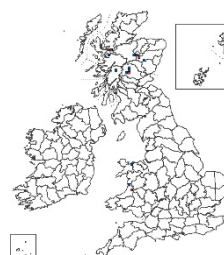
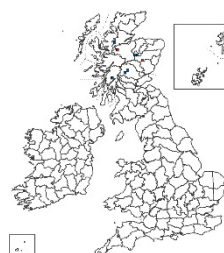
Miriquidica subplumbea (Anzi) Cl. Roux (2011)

Nb

Thallus lead grey to dark grey, matt, areolate, usually rather thick, to several cm diam. Areoles dense, verrucose, not or only somewhat lobed, to 1.5 mm diam., flat to slightly convex. Hypothallus usually indistinct. Apothecia scarce, black, 0.5–1.2 mm diam., laterally attached to areoles, sessile, flat and marginate when young, later convex and virtually immarginate. Exciple externally blue-green to olive-brown, internally brownish to almost colourless. Hypothecium colourless. Hymenium colourless, 55–65 μ m high, the upper 10–15 μ m olive-green to greenish brown forming an epithelial layer. Paraphyses mostly unbranched, the apical cells hardly or slightly enlarged and then to 4 μ m diam. Asci *Lecanora* type, 8-spored, 40–50 \times 14–18 μ m. Ascospores colourless, aseptate, ellipsoidal, 10–13 \times 5–6 (–7) μ m. Cortex K–, P–, C–, medulla K–, P–, C–, containing miriquidic acid. **BLS 2641.**

On exposed acidic siliceous rocks, sometimes initially growing on other crustose lichens. Confirmed UK records are from the Central Scottish Highlands (Ben Lawers, Breadalbane) with a historic record from Shropshire.

Similar to *M. griseoatra* but with areoles that are not strongly lobate, a hyaline hypothecium and smaller ascospores. It is likely that most former British records of *M. griseoatra* are referable to this species. See Hafellner *et al.* (2014) for further information.



MYRIOLECIS Clem. (1909)

Thallus crustose, often immersed, where exposed areolate or of scattered granules; soredia, isidia and cephalodia absent. **Photobiont** *Trebouxia* and perhaps other chlorococcoid algae. **Ascomata** apothecia, sessile or shortly stipitate. **Thalline margin** present, conspicuous, ± persistent and white or concolorous with the thallus, sometimes contorted or crenulate, in some species becoming excluded at an early stage. **True exciple** poorly differentiated in most species. **Epithecium** pigmented, sometimes granular, the granules often interspersed between the paraphyses or in a layer above them. **Hymenium** ± colourless, I+ blue. **Hypothecium** colourless or pale. **Hamathecium** of paraphyses, aseptate, sparsely branched or anastomosed, septate, apices slightly swollen to capitate, often pigmented. **Asci** elongate-clavate, *Lecanora*-type, apex strongly thickened with a K/I+ blue apical dome and a broad K/I– apical cushion, outermost gelatinous coat K/I+ blue, 8 (rarely multi)-spored. **Ascospores** ellipsoidal to subglobose, usually rounded at the apices, colourless, aseptate, sometimes with a central protoplasmic strand, walls thin or thick, lacking a distinct perispore, smooth-walled. **Conidiomata** pycnidia, immersed, walls colourless but brown around the ostiole. **Conidiogenous cells** sessile or borne on short branched conidiophores, elongate-ampulliform, with broad collarettes. **Conidia** bacilliform, filamentous, curved or broadly falcate, colourless, aseptate. **Chemistry**: a wide range of depsides and depsidones, terpenoids or xanthenes in the medulla. **Ecology**: on a wide range of natural and man-made substrata.

Equivalent to the *Lecanora dispersa* group as described in Edwards *et al.* (2009), following Śliwa (2007). The group was demonstrated to be monophyletic and distinct from *Lecanora* by Śliwa *et al.* (2012) and Zhao *et al.* (2015a). The genus can generally be characterized by a thallus that is usually ± immersed in bark or rock, apothecia with conspicuous white thalline margins, and either containing xanthenes or without lichen substances (Śliwa 2007).

Kondratyuk *et al.* (2019) claimed that the genus *Polyozosia* A. Massal. (1855) has priority over *Myriolectis*, and made a number of new combinations into that genus. However, the name change serves no useful purpose, and the phylogenetic research on which their work was based needs further examination.

Literature

Edwards *et al.* (2009), Kondratyuk *et al.* (2019), Laundon (2010), Lumbsch *et al.* (1997), Powell (2014), Śliwa (2007), Śliwa *et al.* (2012), Zhao *et al.* (2015a).

- | | | |
|------|--|-------------------|
| 1 | Thallus placodioid, margins lobe-like in surface view | 2 |
| | Thallus crustose, margins not lobe-like in surface view | 3 |
| 2(1) | Thallus surface granular-pruinose; lobes plane; on calcareous rocks | <i>pruinosa</i> |
| | Thallus surface rarely pruinose; lobes swollen and convex; on nutrient-enriched, siliceous rocks | <i>straminea</i> |
| 3(1) | On bark, wood or decaying plant material | 4 |
| | On rocks | 9 |
| 4(3) | Asci (8-) 16- or 32-spored | <i>sambuci</i> |
| | Asci 8-spored | 5 |
| 5(4) | Apothecia becoming large, at least partly over 1 mm diam.; thallus often forming distinct patches..... | 6 |
| | Apothecia small, rarely reaching 1 mm diam; thallus inconspicuous or of scattered granules | 7 |
| 6(5) | Apothecia immersed, at first ± urceolate, usually pruinose; on smooth bark | <i>populicola</i> |
| | Apothecia sessile to raised, not pruinose; maritime, usually on decaying plant material | <i>zosteriae</i> |

- 7(5) Apothecium disc pale brown; epithecium distinctly granular (POL+), granules insoluble in KOH; predominantly on calcareous rock, occasional on dust-impregnated or nutrient-enriched bark ...*dispersa*
Apothecium disc chestnut to dark brown; epithecium indistinctly granular (POL- or POL+ but not much); pioneer species on twigs and branchlets 8
- 8(7) Thalline margin whitish grey, contrasting in tone with the disc and forming a prominent raised rim around it; young discs frequently pruinose*hagenii*
Thalline margin dull, pale to dark grey, not contrasting in tone with the disc and forming a low ring around it; discs never pruinose*persimilis*
- 9(3) On calcareous or other base-rich rocks 10
On siliceous rocks 19
- 10(9) Thallus C+ yellow, orange, pink or red 11
Thallus C- [or ± endolithic] 13
- 11(10) Thallus C+ pink or red*congesta*
Thallus C+ yellow or orange 11
- 12(11) Thallus continuous, thick, margins somewhat lobed and pruinose*pruinosa*
Thallus often not continuous, thin, without lobes *antiqua*
- 13(10) Apothecia black; epithecium blue-green 14
Apothecia pinkish brown to dark red-brown; epithecium pale to dark brown 15
- 14(13) Apothecia formed in pits in limestone; ascospores 8–10 x 3.5–5 µm*agardhiana*
Apothecia sessile or slightly constricted at the base; ascospores 9–12 x 6–7.5 µm; sometimes invading other lichen thalli *invadens*
- 15(13) Thalline margins regularly deeply crenate; apothecial discs grey, white to blue-grey pruinose *crenulata*
Thalline margins entire or irregularly crenate; apothecial discs pinkish to brown, not or lightly pruinose 16
- 16(15) Thallus composed of swollen white areoles, forming a continuous crust *albescens*
Thallus granular, oily or inconspicuous, when white with large spaces between the apothecia 17
- 17(16) Apothecium margin distinctly yellowish, UV+ bright yellow*semipallida*
Apothecium margin white to grey 18
- 18(17) Apothecium disc chestnut to dark brown; epithecium indistinctly granular (POL- or POL+ but not much)*hagenii*
Apothecium disc pale brown; epithecium distinctly granular (POL+), granules insoluble in KOH*dispersa*
- 19(9) Thallus and/or apothecium disc C+ yellow or orange to red 20
Thallus and apothecium discs C- 23
- 20(19) Apothecial margin C- or C± yellow, PD- (± vinetorin); often invading other lichen thalli; not maritime *invadens*
Apothecial margin and/or disc C+ orange, PD+ orange (arthrothelin and pannarin); on siliceous maritime rocks 21

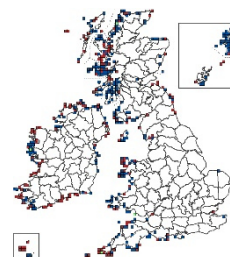
- 21(20) Thallus sparse, dispersed areolate to granulose 22
 Thallus well-developed, not dispersed, rimose to areolate, sometimes lobed at
 margins *massei*
- 22(21) Thallus white or inconspicuous; apothecial discs pale brown to red-brown *andrewii*
 Thallus yellowish brown or tawny brown; apothecial discs yellowish to
 reddish brown *fugiens*
- 23(19) Apothecial discs greenish black/blue *actophila*
 Apothecial discs pinkish, olivaceous, pale brown to red-brown 24
- 24(23) Thallus areolate, areoles granular to papillate *poliophaea*
 Thallus continuous, of dispersed granules, oily or inconspicuous, without papillae 25
- 25(24) Thallus of rounded or even lobed granules *salina*
 Thallus oily or inconspicuous, often consisting only of apothecium initials 26
- 26(25) Apothecium disc chestnut to dark brown; epithecium indistinctly granular (POL- or POL+
 but not much) *hagenii*
 Apothecium disc pale brown; epithecium distinctly granular (POL+), granules insoluble in KOH
 *dispersa*

Myriolecis actophila (Wedd.) M. Bertrand & Cl. Roux (2016)

LC

Lecanora actophila Wedd. (1875)

Thallus forming continuous crusts, dull yellow-white, smooth, rimose, prothallus white or bluish. Apothecia 0.3–0.6 (–1) mm diam., sessile, sometimes constricted below; thalline margin persistent, raised, rarely slightly excluded, sometimes crenulate or flexuose; disc finally black with a distinct green-blue tinge, not distinctly pruinose but often with a faint blue bloom when wet; epithecium pale blue to yellow-brown or olivaceous, N+ purple-red, sometimes with yellow-brown granules dissolving in K; hymenium 45–50 µm tall; paraphyses 1.5–2.5 µm diam., conglutinate, sparsely branched, rarely branched above, apices to 3.5 µm diam., swollen, pale blue to olivaceous, weakly capitate. Ascospores 8–14 × 5–6 µm, sometimes guttulate and then appearing 1-septate. Pycnidia 50–100 µm diam., immersed, blue-black; conidia 15–20 × 0.5–0.75 µm, curved. Thallus and medulla C–, K–, KC+ weakly yellowish, Pd–, UV+ dull pink (usnic acid, unidentified pigments). **BLS 0624.**



Confined to sunny ± exposed siliceous coastal rocks with *Flavoplaca* (*Caloplaca*) *marina* and *Hydropunctaria maura* s.l. in the mesic-supralittoral zone; common. Widely distributed on rocky coasts throughout Britain and Ireland, very rare in E. and S.E. England.

Myriolecis massei is comparable with this species and is also maritime, but has a brownish thallus that is C+ and KC+ orange. *Lecanora helicopsis*, which occurs in similar or more sheltered and shaded situations, has a grey thallus and the apothecial disc is not pruinose and lacks a green-blue tinge, especially when wet.

Myriolecis agardhiana (Ach.) Śliwa, Zhao Xin & Lumbsch (2015)

Nb

Lecanora agardhiana Ach. (1814)

Thallus thin, ± immersed, white to bluish white or inconspicuous, indeterminate; prothallus absent. Apothecia 0.2–0.5 mm diam., forming in pits in the rock, often irregular in shape; thalline margin thin, white, at first raised, crenulate or flexuose, finally excluded; disc black to brown-black, concave to strongly convex, blue-grey pruinose; epithecium blue-green or olivaceous, K+ intensifying blue-green, N+ purple-red; hymenium 30–45 µm tall; paraphyses 1–2 µm diam., sparsely branched, apices to 2.5 µm diam., pale blue-green, not or slightly swollen. Asci 25–38 × 8–12 µm. Ascospores 8–10 × 3.5–5 µm, ellipsoidal. Thallus C–, K± slightly yellow, KC–,



Pd–, UV– (nil or traces of atranorin). **BLS 0625.**

On hard calcareous rocks, especially limestones, coastal; rare but easily overlooked. S. England (Devon, Dorset, Somerset), N. & S. Wales, N.W. England, Scotland (Wigtown), E. Ireland.

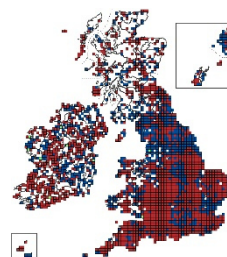
A small inconspicuous species most likely to be confused with the larger *M. crenulata*, which may occur in similar habitats but has sessile apothecia that are not immersed in pits, and are neatly crenulate with persistent thalline margins; it also lacks the distinctive blue-green epithecium of *M. agardhiana*. Unrelated species such as *Pyrenodesmia alociza* or *Rinodina immersa* may also resemble this species in the field.

Myriolecis albescens (Hoffm.) Śliwa, Zhao Xin & Lumbsch (2015)

LC

Lecanora albescens (Hoffm.) Branth & Rostr. (1869)

Thallus to 1 cm diam., in compact patches of convex or swollen areoles, sometimes almost lobe-like and notched at the margins, starkly white or rarely pale grey, surface slightly rough to granular. Apothecia 0.1–0.7 (–1.5) mm diam., abundant, generally compacted in the centre, sessile, broad at the base; thalline margin persistent, sometimes crenulate or wavy; disc pale pink- to yellow-brown or olivaceous, white-pruinose or not; epithecium pale brown or colourless, N–; hymenium usually N+ purple-red; paraphyses to 2 µm diam., apices 1.5–3 µm diam. Ascospores (7–) 11–13 (–16) × (3–) 5–6 µm, ellipsoidal. Conidia 20–25 × ca 1 µm. Thallus and apothecial margin C–, K–, KC–, Pd–, UV– (2,7-dichlorolichexanthone); a Pd+ orange reaction (pannarin) has been reported from non-British material. **BLS 0627.**



On hard calcareous rocks, mortar, concrete, walls, paving stones and memorials in well-lit situations; very common, exceptionally on basic, dust-impregnated trees. Widespread throughout Britain and Ireland, especially common in C. & E. England.

Distinguished from other members of *Myriolecis* by the white well-developed semi-placodioid, mound-like thallus; *M. andrewii*, *M. antiqua*, *M. congesta* and *M. pruinosa* have C+ yellow, orange or red thalli and disc. See also *M. crenulata*, *M. salina*.

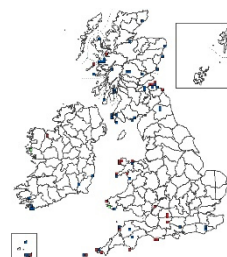
Sometimes host to the lichenicolous lichen *Diplotomma parasiticum*. The lichenicolous *Arthonia apotheciorum* commonly blackens the disc. Other lichenicolous fungi on this host are: *Intralichen* sp. (recorded as *I. christiansenii* and *I. lichenum*), *Lichenocmium lecanorae*, *Lichenodiplis lecanorae*, *Muellerella erratica*, *M. lichenicola*, *Phaeospora parasitica*, *Skyttea* sp. (spores aseptate, 6.5–7 × 2–2.3 µm), *Vouauxiella lichenicola* (a single report) and *Zwackhiomyces lecanorae* (Stein) Nik. Hoffm. & Hafellner (2000).

Myriolecis andrewii (B. de Lesd.) Śliwa, Zhao Xin & Lumbsch (2015)

Nb

Lecanora andrewii B. de Lesd. (1913)

Thallus of coarse, ± scattered granules, often inconspicuous and sparse, white, granules rounded and unequal in size; prothallus inconspicuous. Apothecia 0.5–1.5 mm diam., aggregated, sessile; thalline margin well-developed, persistent, conspicuously white, raised, coarsely crenulate-uneven to almost lobulate or contorted; disc pale- to red-brown, flat to concave, sometimes white-pruinose; epithecium interspersed with yellowish brown granules; hymenium 50–65 µm tall; hypothecium yellowish; paraphyses 1.5–2.5 µm diam., sparsely anastomosed below and sometimes branched above, apices 3–4.5 (–5) µm diam., swollen, capitate, pale yellow. Asci 35–50 × 12–15 µm; ascospores 9–12 (–13) × 5–6 µm, often guttulate. Disc and inner part of thalline margin C+ orange-red, K– or weakly yellow, KC+ red, Pd+ orange-red, UV+ bright orange (arthothelin, 2,7-dichlorolichexanthone, ± pannarin). **BLS 0629.**



On siliceous coastal rocks, especially basalt, quartzite and schists, in the xeric-supralittoral zone, exceptionally inland; rare. S.W. England, N. & S. Wales, W. & E. Scotland, W. Ireland.

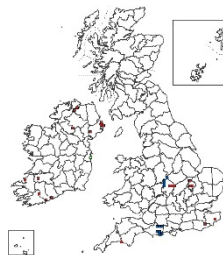
Confused with *M. congesta* which may be found in similar habitats, but is characterized by the C+ pink (gyrophoric acid) chemical reaction. The apothecia also tend to be larger and to have better developed, often very flexuous thalline margins and more red-brown discs than *M. dispersa*. The more common *M. fugiens* differs in the yellow-brown to yellow-green thallus and more red-brown discs.

Myriolecis antiqua (J.R. Laundon) Śliwa, Zhao Xin & Lumbsch (2015)

LC

Lecanora antiqua J.R. Laundon (2010)*Lecanora conferta* auct. brit.

Thallus absent to thick and areolate, ochre to pale grey, surface smooth to warted. Apothecia 0.3–0.8 mm diam., sessile, constricted at the base, generally crowded and becoming angular by compression; thalline margin yellow or yellow-grey, relatively broad at first, entire or rarely crenulate, sometimes excluded when mature; disc pale brown, grey-brown or olivaceous, ± pruinose, flat to slightly convex; epithecium colourless, yellow or slightly brown, granules absent; hymenium 45–55 µm tall; paraphyses 1.5–2 µm diam., sometimes branched, apices slightly swollen. Asci 35–48 × 10–13 µm. Ascospores (8–) 9–12 (–15) × 4–7 µm. Conidia 10–15 × ca 0.5 µm. Thallus C+ yellow to orange, K–, KC+ yellow to orange, Pd–, UV+ bright pink; discs and exciple C+ yellow-orange, UV+ bright pink (specific xanthones called the *conferta*-unknowns). **BLS 0640.**



On limestone, mortar, etc., particularly church walls and occasionally on other basic rocks in ± extensive sheets on vertical surfaces; widespread. Common throughout England, Wales, C. & E. Scotland, N. Ireland; the map omits historical records assigned to *Lecanora conferta*.

Distinguished primarily by the C+ yellow to orange reaction and characteristic UV+ bright pink fluorescence. There is considerable variation in the C reaction particularly where the thallus is poorly developed, but the reaction in the disc is consistent and very noticeable. The superficially similar *M. fugiens* is found on siliceous coastal rocks and differs in its UV– reaction.

Reported lichenicolous fungi are: *Arthonia apotheciorum* (in the hymenium), *Intralichen* sp. (recorded as *I. christiansenii*) and *Lichenocodium lecanorae*.

Myriolecis congesta (Clauzade & Vězda) M. Bertrand & Cec. Roux (2016)

?Ex

Lecanora congesta Clauzade & Vězda (1969)

Thallus to 1 cm diam., forming patches, areolate, to 1 mm thick, the centre often disintegrating, the margins not or slightly lobed, white, not pruinose; prothallus absent. Apothecia 0.8–1.2 mm diam., sessile, constricted below and slightly raised, often crowded and becoming angular by mutual compression; thalline margin well-developed, persistent, ± wavy; disc pale brown-grey, flat, not pruinose; epithecium brown, interspersed with minute brown granules dissolving in K, K–, N–; hymenium 60–70 µm tall; paraphyses 1.5–2 µm diam., unbranched or sparingly branched, apices slightly thickened. Ascospores (9.5–) 10–12 × 5–6.5 (–7) µm. Thallus C+ pink to red, K–, Pd–, UV– (gyrophoric acid). **BLS 0642.**

On steep to vertical north-facing hard limestones on sea cliffs; not recorded for over 150 years and perhaps extinct in Britain and Ireland. N.E. Ireland (Down).

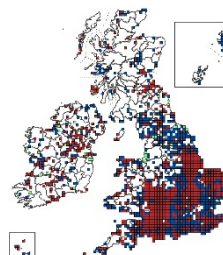
The thallus recalls *M. albescens*, in which the apothecial discs are paler and the thallus C–. In *M. pruinosa* the margins of the thallus are somewhat lobed, pruinose and C+ orange. See also *M. andrewii*.

Myriolecis crenulata (Ach.) Śliwa, Zhao Xin & Lumbsch (2015)

LC

Lecanora crenulata (Dicks.) Hook. (1844)

Thallus usually immersed and inconspicuous, more rarely areolate, pale grey, surface smooth to finely granular. Apothecia (0.1–) 0.2–0.6 (–0.9) mm diam., constricted at the base, slightly raised, often in small groups and then becoming angular by compression; thalline margin well-developed, persistent, white, regularly deeply crenate with 5–8 segments, rarely not crenate; discs rather variable in colour, red-brown to yellow- or brown-black, grey or blue-grey pruinose; epithecium shades of brown (more intense in N), almost always granular, the granules superficial, coarse (insoluble in K, slowly soluble in N); hymenium 55–70 µm tall, yellow-brown above; paraphyses ca 2 µm diam., sparsely branched, apices capitate, the terminal cell brown and swollen to about 3 µm diam. Ascospores 6–10 (–15.5) × (4–) 4.5–6 (–7) µm. Conidia 11–15 × ca 0.5 µm. Thallus C–, K–, Pd–, UV– (no lichen substances detected by TLC). **BLS 0644.**



On hard calcareous rocks, walls and mortar; scattered. Widespread, commonest in S.E. & E. England.

In *M. albescens*, *M. dispersa* and *M. semipallida* which occur in similar habitats, the exciple is never regularly deeply crenate and the apothecial discs are not or lightly pruinose and are usually paler in colour. The much rarer *M. agardhiana* has smaller apothecia that are immersed in pits in the substratum and have a green epithecium.

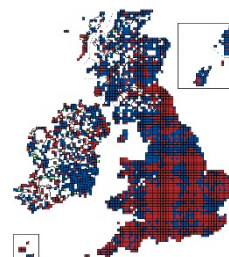
Reported lichenicolous fungi are: *Arthonia apotheciorum* (in the hymenium), *Intralichen* sp. (recorded as *I. christiansenii*) and *Lichenocodium erodens*.

Myriolecis dispersa (Pers.) Śliwa, Zhao Xin & Lumbsch (2015)

LC

Lecanora dispersa (Pers.) Sommerf. (1826)

Thallus immersed or sometimes consisting of scattered granules, white to pale grey. Apothecia (0.15–) 0.2–1 (–3) mm diam., sessile, constricted below, scattered or aggregated into dense groups; thalline margin well-developed, persistent, entire to crenulate to contorted or flexuose, usually pruinose when young; discs very variable in colour, pinkish to olivaceous brown, or pale yellow- or green-grey, sometimes white-pruinose (especially when young or on highly calcareous substrata); epithecium pale yellow-brown or brown, densely interspersed with granules not dissolving in K, N± pale brown; hymenium 70–100 µm tall; hypothecium sometimes brown; paraphyses 1.5–2 µm diam., branched and frequently anastomosed, apices to 3.5 µm diam., slightly swollen and brownish. Asci 50–65 × 12–18 µm, broadly clavate, short-stalked. Ascospores (7–) 8.5–14 × (3–) 4–7 µm. Thallus C–, K–, Pd–, UV– or UV± yellow; inner side of the apothecium margins sometimes Pd+ orange (2,7-dichlorolichexanthone, ± aotearone, ± pannarin, 0–3 other xanthonnes, or no substances). **BLS 0646**.



On a wide range of calcareous substrata, including rocks, walls, mortar and many man-made substrata and artefacts, also on nutrient-enriched or dust-contaminated bark; common. Throughout Britain and Ireland, becoming less frequent in upland regions.

In heavily soot-contaminated areas the thallus may incorporate soot particles to form disfiguring, blackened stains on concrete buildings. The separation from *M. albescens* and *M. crenulata* is discussed under those species.

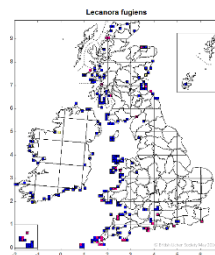
Reported lichenicolous fungi are: *Arthonia apotheciorum* (in the hymenium; spores 1-septate), *Arthonia* sp. (similar to *A. apotheciorum* but spores 2-septate), *Intralichen* sp. (recorded as *I. christiansenii*), *Lichenocodium erodens*, *L. lecanorae*, *Lichenodiplis lecanorae*, *Marchandiomyces corallinus*, *Muellerella lichenicola*, *Phaeospora parasitica*, *Pyrenidium actinellum*, *Vouauxiella lichenicola* and *Zwackhiomyces lecanorae*.

Myriolecis fugiens (Nyl.) Śliwa, Zhao Xin & Lumbsch (2015)

LC

Lecanora fugiens Nyl. (1873)

Thallus immersed or of scattered to loosely aggregated rounded granules, exceptionally irregularly areolate, pale yellow to yellowish brown. Apothecia 0.3–0.9 (–3) mm diam., often originating from a single granule, dispersed or aggregated, constricted at the base; thalline margin persistent, entire, becoming crenate to strongly flexuose; disc yellow- to red-brown, flat or slightly convex, sometimes slightly white- or grey-pruinose; epithecium pale red-brown, interspersed with minute granular crystals; hymenium 45–60 µm tall; paraphyses ca 1.5 µm diam., unbranched, apices to 2 µm diam., swollen. Asci 40–50 × 6–10 µm, broadly clavate, short-stalked. Ascospores (8–) 9–12 (–14) × (4–) 5–6 µm, narrowly ellipsoidal. Thallus C+ orange to orange-red, K+ faintly yellow, KC+ red to orange-red; thallus, exciple, disc and epithecium Pd+ orange to orange-red, UV+ bright orange (arthothelin, ± pannarin). **BLS 0652**.



On coastal siliceous rocks, xeric-supralittoral, very rarely on decaying *Armeria maritima*; local, rarely inland on sarsen stones. Channel Islands, Ireland, western coasts of Britain, E. Scotland.

The distinctive Pd + orange reaction, best demonstrated on the apothecia, separates this from the similar *M. antiqua* (UV+ pink) on base-rich rocks; *M. andrewii* has a white, crenulate thalline margin. There appear to be two or three other closely related, possibly undescribed, taxa similar to *M. fugiens*; the complex is in need of critical evaluation.

Myriolecis hagenii (Ach.) Śliwa, Zhao Xin & Lumbsch (2015)

NE

Lecanora hagenii (Ach.) Ach. (1810)

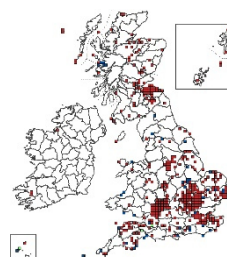
Thallus usually conspicuous, smooth, oily-textured, grey, sometimes with a grey to black hypothallus. Apothecia 0.3–0.6 (–0.9) mm diam., emergent, becoming constricted at the base, often in small groups and then becoming angular by compression; thalline margin thin but initially well-developed, persistent or not, whitish grey, extending above the level of the disc, smooth or crenulated, having spots of white pruina when young; discs generally red-brown, also yellow- or brown-black, pruinose especially in young apothecia; epithecium brown or

blue-tinged, often interspersed with fine granules, N–, not dissolving in K; hymenium 40–60 µm tall; paraphyses *ca* 2 µm diam., sparsely branched, apices capitate, the terminal cell brown and swollen to *ca* 3 µm diam. Ascospores 8–13 × (4–) 4.5–6 (–7) µm. Thallus and apothecia C–, K–, KC–, Pd–, UV– (no lichen substances detected by TLC). **BLS 0621.**

Common on all substrata, especially on soft and/or neutral bark, less so on brick and pavement stones. Distinctly nitrophilic.

Similar to *M. persimilis* which is a pioneer species, predominantly on hard- and smooth-barked twigs, which also has minute fruits often clustered in small groups. Differs from that species by the presence of a distinct white or pale grey thalline margin that extends above the disc, at least in young stages, and non-pruinose discs. Other species of *Myriolecis* differ in their chemistry and usually also in the more continuous pruina on apothecial margin.

Lichenodiplis lecanorae is the commonest lichenicolous fungus on this host; others reported are *Intralichen* sp. (recorded as *I. baccisporus* and *I. christiansenii*), *Muellerella hospitans*, *Phaeospora parasitica* and *Vouauxiella lichenicola*.



Myriolecis invadens (H. Magn.) Śliwa, Zhao Xin & Lumbsch (2015)

Lecanora invadens H. Magn. (1940)

Thallus indistinct, crustose, sometimes restricted to around apothecia, pale to greenish grey, sometimes appearing bluish, hypothallus not distinct. Apothecia 0.4–1.0 mm diam., sessile, constricted at the base, sometimes in small clusters and then becoming angular by compression; thalline margin well-developed, persistent, whitish grey, level with or extending slightly above the disc, smooth or flexuose, pruinose; discs flat or convex, dark brown to bluish black, often strongly pruinose; epithecium olivaceous, sometimes partly bluish green, sparsely granular, N–, not dissolving in K; hymenium 45–65 µm tall; paraphyses *ca* 2 µm diam., sometimes branched in the upper part, apices hardly swollen, the terminal cell greenish. Ascospores 9–12 × 6–7.5 µm, ellipsoidal. Thallus and apothecia C– or C+ yellow, K– or K± yellow, KC+ yellow, Pd–, UV± yellowish. **BLS 2585.**

On siliceous, sometimes weakly calcareous rock, rarely on iron railings or lignum; often overgrowing other lichens, sometimes found interspersed with *M. dispersa*. Only recently recognized as British, and almost certainly under-recorded. Currently known from E. and S.E. Scotland, Yorkshire and S.E. and central England.

Characterized most easily by its clusters of dark blueish black apothecia with pale margins. The variation in chemical reactions could possibly be linked to its parasitic tendency.



NE

Myriolecis massei M. Bertrand & J.-Y. Monnat (2018)

NE

Thallus crustose, moderately thick, with polygonal or irregular areoles 0.2–0.8 mm diam., often discontinuous and irregularly spread over the substrate, pale yellowish brown or sometimes slightly greyish, with an inconspicuous dark grey hypothallus. Apothecia 0.3–0.6 mm diam., usually numerous and scattered over the entire thallus, soon becoming sessile with a constricted base; thalline margin concolorous with the thallus, narrow, rarely becoming excluded, sometimes mottled with bluish grey pigment; disc brown to dark brown, flat or slightly convex, very finely granular, dull, not pruinose; epithecium light brown to yellowish olivaceous, not granular; hymenium 60–75 µm high, sometimes locally interspersed with granules; hypothecium colourless, filled with crystals; paraphyses 1–2 µm diam., rarely branched in the upper part, swollen apically to 3.5–5 µm diam. Asci 42–55 × 13–20 µm. Ascospores (8–) 11–14.5 (–15.5) × 4–6 (–7) µm, ellipsoidal. Pycnidia frequent, completely sunken in the thallus, only visible on the surface by the brown ostioles. Conidia 19–32 × *ca* 1 µm, filiform, curved. Thallus K+ yellowish, C+ orange, KC+ orange, PD–. **BLS 2729.**

Maritime, on siliceous acidic rocks in the supralittoral zone. Currently reported from sites in the Channel Is (Jersey), Wales (Anglesey) and N.W. Scotland, but should be sought in similar habitats in western Britain and Ireland.

Similar to *M. actophila*, but with a more yellowish thallus that is C+ and KC+ orange, and by the dark brown apothecial discs (dark greenish in *M. actophila*).

Myriolecis persimilis (Th. Fr.) Śliwa, Zhao Xin & Lumbsch (2015)

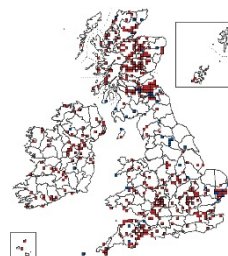
LC

Lecanora persimilis (Th. Fr.) Nyl. (1876)

Thallus delimited, seldom exceeding 1–2 cm diam., often forming rounded patches amongst other crustose lichens, evanescent, pale to dark grey, comprising ± scattered areoles on a grey or black hypothallus. Apothecia 0.2–0.5 mm diam., regular, crowded, soon emergent and sessile, disc flat, orange- to dark brown, not pruinose, margin pale to dull grey or pale brown, thin, hardly raised, even, smooth to crenate; epithecium red-brown; hymenium 50–60 μm tall; paraphyses *ca* 1 μm diam., with swollen apices 2–4 μm diam. Ascospores 11–14 × 6–8 μm. Thallus C–, K–, Pd–, UV– (no lichen substances detected by TLC). **BLS 1836**.

On twigs or small branches, particularly at the nodes and leaf scars, of trees and shrubs with hard ± neutral bark, especially *Fraxinus*, in well-lit sites such as hedgerows, pastures and woodland edges; apparently common and widespread. Throughout Britain and Ireland, but overlooked until recently. Reported in Europe from siliceous pebbles, usually in dusty places, and basic pebbles.

A distinctive pioneer species with very small clustered apothecia with thin, persistent margins. Most likely to be confused with *Lecania cyrtella* which differs in the 1-septate spores, or with *M. sambuci* (with multisporous asci). Often found together with *Amandinea punctata*.

**Myriolecis poliophaea** (Wahlenb.) P.F. Cannon (2022)

LC

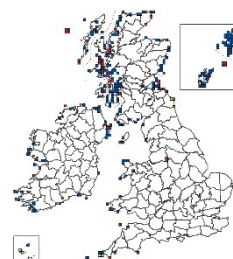
Lecanora poliophaea (Wahlenb.) Ach. (1810)

Thallus continuous, irregularly rimose, grey to brown- or blue-grey, surface densely granular to warted or papillate, papillae rounded to flattened or branched; prothallus often prominent, fimbriate, with alternating white, green and black zones. Apothecia to 1 mm diam., often aggregated, constricted at the base, scarcely exceeding the level of the papillae; thalline margin crenulate to strongly crenate, sometimes papillate, persistent; disc dull red-brown, flat or slightly convex; epithecium yellow-brown, not granular; hymenium 45–70 μm tall; paraphyses 2–3 μm diam., mainly unbranched, some sparsely branched, apices 3.5–5 μm diam., pale yellow-brown, markedly swollen, capitate. Asci 35–45 × 12–15 μm, clavate. Ascospores (7–) 9–13 (–15) × (4–) 5–7 μm, ellipsoidal. Thallus C–, K–, Pd–, UV– (no lichen substances detected by TLC). **BLS 0666**.

On ± flat nutrient-enriched coastal and lakeside siliceous rocks, especially in seepage tracks or near bird colonies, in the mesic-supralittoral zone on seacoasts; local, increasing in abundance in the north. S.W. England, Wales, Scotland, Ireland, Channel Islands but rarely elsewhere.

A distinctive coastal species with a roughened grey to bluish thallus and clustered red-brown fruits. *Lecania aipospila*, also papillate, has 1-septate spores.

Considered a likely member of the *Lecanora dispersa* group (i.e. *Myriolecis*) by Edwards *et al.* (2009), and confirmed as a member of that genus with sequences contributed by Kistenich *et al.* (2018).

**Myriolecis populicola** (DC.) P.F. Cannon (2022)

Nb

Lecanora populicola (DC.) Duby (1830)

Thallus continuous, becoming areolate in the centre, forming clearly delimited patches, concentrically zoned, grey; prothallus fibrous, grey. Apothecia to 1.5 mm diam., aggregated in small groups, ± immersed in the thallus; thalline margin entire to irregularly contorted, persistent, often pruinose and including numerous crystals; disc pale brown to pale yellow-brown, flat, grey-white pruinose when young; epithecium colourless to brown, interspersed with numerous granules; hymenium 45–75 μm tall; hypothecium with small granules; paraphyses 1–2 μm diam., sparsely branched, apices not swollen. Ascospores 10–16 × 6–9 μm. Thallus C–, K–, KC–, Pd–, UV– (2,5-dichlorolichexanthone). **BLS 0668**.

On smooth bark, trunks and twigs of *Populus tremula*; rare but locally abundant. C. & N.E. Scottish Highlands, apparently extinct in England (E. Norfolk, Coltishall).

Listed as a member of the *Lecanora dispersa* group (i.e. *Myriolecis*) by Edwards *et al.* (2009), and sequences of material in RBG Edinburgh confirm that placement. The combination into *Myriolecis* is formally made on p. 77 of this publication. Possibly confused with *Lecanora albella*, *Glaucomarina carpinea* (in which the apothecia



are either C+ yellow or Pd+ rust red) and pale-fruited forms of *L. chlarofera*.

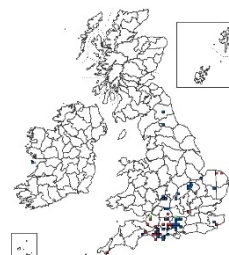
It is sometimes host to *Candelariella superdistans*, and *Arthonia lecanoricola* often causes blackening of the disc.

Myriolecis pruinosa (Chaub.) Śliwa, Zhao Xin & Lumbsch (2015)

Nb

Lecanora pruinosa Chaub. (1821)

Thallus 1.5–4 cm diam., placodioid, forming circular patches, ± areolate in the centre, marginal lobes 0.4–0.8 mm broad, radiating, flattened to slightly convex, white to yellow-white or pale yellow-green, surface granular-pruinose; prothallus absent. Apothecia 0.3–0.8 (–1.5) mm diam., sessile, slightly constricted below; thalline margin well-developed, persistent, entire to crenulate, raised, pruinose; disc pink-brown to dark red-brown, white-grey pruinose; epithecium yellow-brown, interspersed with coarse angular crystals not dissolving in K; hymenium 55–80 µm tall; paraphyses 1.5–2.5 µm diam., unbranched or sparsely branched, apices 2.5–3.5 µm diam., slightly swollen, yellow-brown, capitate. Asci *Lecanora*-type, 45–52 × 10–14 µm. Ascospores 8–13 × 4–7 µm. Thallus C+ orange, K+ weakly yellow, Pd–, thallus margin UV+ bright orange (arothethelin, 2,7-dichloronorlichexanthone). **BLS 0670.**



On limestone, especially church walls, in C. & S. England, local; rare on natural limestone rock outcrops in S. England (Dorset [Portland], Somerset [Cheddar Gorge]), very rare in N. England, Ireland (Aran Islands).

Unlikely to be confused with any other British species. The placodioid *L. straminea* on nutrient-enriched siliceous rocks is also C+ orange but has swollen, convex lobes lacking pruina. *Protoparmeliopsis muralis* is much larger and is C–, UV–. See also *M. congesta*.

Myriolecis salina (H. Magn.) Śliwa, Zhao Xin & Lumbsch (2015)

Nb

Lecanora salina H. Magn. (1926)

Thallus ca 0.25 cm diam., of dispersed rounded granules, more rarely aggregated with the larger ones somewhat lobed, not clearly delimited, white-grey to grey or yellow-grey; prothallus indistinct. Apothecia 0.2–0.6 (–0.8) mm diam., dispersed or aggregated, sessile, constricted below; thalline margin entire or irregularly crenulate to somewhat flexuose, persistent, medulla lacking crystals; disc pale brown to red-brown or yellow-grey, flat to slightly convex, sometimes weakly pruinose when young; epithecium colourless to pale brown-yellow, granular; hymenium 45–55 (–65) µm tall; paraphyses 1.5–2.5 µm diam., richly branched, apices 2.5–3.5 µm diam., not or slightly thickened and capitate, yellow-brown. Ascospores 8–11 (–15) × 4.5–6.5 (–7) µm. Thallus C± pink, K–, KC–, Pd–, UV– (2,5-dichlororlichexanthone, ± gyrophoric acid). **BLS 0676.**



On siliceous pebbles on coastal shingle beach; very rare. England (Somerset [Porlock], Hampshire (Solent), East Suffolk), with a few scattered records elsewhere including E. Scotland (Moray) and some inland sites.

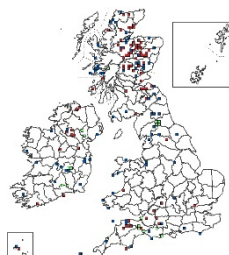
A poorly understood species, distinguished from *M. albescens* by the granular thallus, smaller apothecia that are non-pruinose when mature, and the shorter hymenium, and from *M. dispersa* also by the colour of the apothecial discs and broader paraphyses. It also recalls a diminutive *Lecanora campestris*, but doubtful specimens can best be separated by the smaller ascospores.

Myriolecis sambuci (Pers.) Clem. (1909)

LC

Lecanora sambuci (Pers.) Nyl. (1861)

Thallus of clusters of minute granules ca 1 mm diam., more rarely ± continuous and irregularly cracked, poorly delimited, white to grey; prothallus not conspicuous. Apothecia 0.2–0.4 (–0.8) mm diam., dispersed or aggregated, sessile, arising amongst the thallus granules, slightly constricted at the base; thalline margin entire or slightly crenulate at first but becoming irregular and finally almost excluded; disc pink- to red-brown, flat to slightly convex; epithecium colourless to pale red-brown, not or finely granular; hymenium (40–) 55–65 (–70) µm tall; paraphyses 1.5–2 µm diam., unbranched or sparsely branched, apices 2.5–3.5 µm diam., colourless to brown, the final two cells capitate. Ascospores (6–) 8–12 × 4–6 (–7) µm, (8–) 16–32 per ascus. Pycnidia 50–100 µm diam., frequent, black, erumpent; conidia 10–12 × ca 1 µm,



irregularly curved to \pm straight. Thallus C–, K–, KC–, Pd–, UV– (no lichen substances detected by TLC). **BLS 0677**.

On nutrient-enriched bark, especially twig axils of *Fraxinus*, *Populus tremula* and *Sambucus*, in areas of low air pollution; local. Mainly in S.W., W. & N. Britain and Ireland; there are indications that the species is either under-reported or has extended its range in recent years.

The only member of the genus occurring in our region that has more than 8-spored asci. Also superficially resembles *Lecania cyrtella* and *M. persimilis*, which often grow in similar habitats.

Reported lichenicolous fungi are: *Lichenodiplis lecanorae* and *Vouauxiella lichenicola*.

Myriolecis semipallida (H. Magn.) Śliwa, Zhao Xin & Lumbsch (2015)

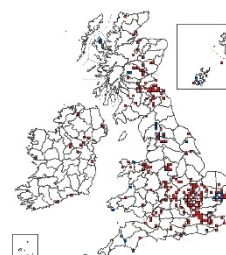
LC

Lecanora semipallida H. Magn. (1940)

Thallus endolithic, grey to blackened, strongly contrasting in colour with the apothecium margin. Apothecia 0.5–1.4 mm diam., widely dispersed to partly crowded, sessile to constricted, margin 50–150 μ m thick, white or faintly yellow, sometimes with a blue pigment, smooth, farinose or slightly crenulate; disc pale to grey-brown, not or slightly pruinose; epithecium granular, the pigment dissolving in K but not in N, without crystals; paraphyses as in *M. albescens*. Thallus C–, K–, Pd–, UV–; apothecium margin C \pm yellow, K+ yellow, KC+ yellow, Pd–, UV+ yellow or bright orange (vinetorin). **BLS 0610**.

On calcareous rocks, especially hard limestone; also found on concrete in Europe. Common and widespread in Britain and Ireland, but not distinguished until recently.

Specimens with a yellow colour on the thalline margin and the UV+ orange rather than bright yellow reaction were previously referred to *Lecanora xanthostoma*. Often confused with *M. dispersa* which differs in the absence of a UV reaction; the white, never black, thallus; the more crowded, never bluish apothecia, and epithelial granules insoluble in KOH. See also *M. crenulata*.



Myriolecis straminea (Ach.) Śliwa, Zhao Xin & Lumbsch (2015)

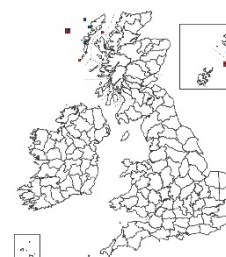
NT

Lecanora straminea Ach. (1810)

Thallus to ca 5 cm diam., forming circular placodioid patches or rosettes, the margins of radiating convex lobes 3–6 \times ca 1.5 mm, the centre becoming uneven and irregularly areolate, pale yellow-green, the centre darkest, surface smooth to slightly warted, not or sometimes white-pruinose. Apothecia 2–3 mm diam., sessile, eventually constricted at the base; thalline margin well-developed, swollen, striate to crenulate, flexuose or granular, scarcely exceeding the disc and sometimes excluded; disc flat to slightly concave, red-brown to dark brown, not or slightly pruinose; epithecium well-developed, yellow-brown, slightly granular; hymenium 80–90 μ m tall; paraphyses 1.5–3 μ m diam., unbranched or branched especially above, \pm contorted, apices to 3–4 μ m diam., irregularly thickened. Ascospores 8–12 (–14) \times 4.5–6 (–6.5) μ m. Thallus C+ orange, K–, Pd–, UV+ bright orange (arthothelin, thiophanic acid, 2,7-dichloronorlichexanthone, 1–3 other xanthenes). **BLS 0681**.

On nutrient-enriched rocks, especially the tops of boulders frequented by birds in extreme coastal situations; rare and local. Scotland (Outer Hebrides, Shetland Isles, St. Kilda).

One of the few *Myriolecis* species with placodioid thalli. *Protoparmeliopsis muralis* is distinguished by the broader and flattened, not convex, lobes and C– thallus.

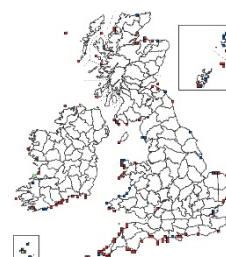


Myriolecis zosteræ (Ach.) Śliwa, Zhao Xin & Lumbsch (2015)

Nb

Lecanora zosteræ (Ach.) Nyl. (1860)

Thallus thin to evanescent, pale grey; prothallus not apparent. Apothecia to 3.5 mm diam., scattered or clustered, flat and orbicular at first, peltate, becoming concave and sinuous when old; thalline margin 60–140 μ m thick, persistent, entire, becoming raised above the disc and involute to flexuose when old, pale grey; disc smooth, becoming concave, pale to mid brown, not pruinose; hypothecium colourless; hymenium 45–60 μ m tall; epithecium narrow, colourless to brown, with a few crystals which dissolve in K; paraphyses compact, ca 1 μ m diam., septate, unbranched or sparsely branched, the apices colourless, not or slightly swollen to ca 3 μ m diam. Asci clavate, 33–45 \times 10–15 μ m. Ascospores ellipsoidal to ovoid, aseptate, colourless, 9–



13 (–16) × 4–6 µm. Thallus and apothecia C–, K–, KC–, Pd–, UV– (no lichen substances detected by TLC). **BLS 2287**.

On dead and decaying *Armeria* tufts, plant debris, soil and worked timber, or more rarely epiphytic, on exposed sea coasts; local. Scattered around the coastline of Britain and Ireland in windswept sites.

A distinctive species, characterized by the large, peltate apothecia with a thin, white, flexuose margin contrasting with the brown discs, the negative reactions and habitat.

Reported lichenicolous fungi are: *Lichenodiplis lecanorae* and *Muellerella lichenicola*, as well as *Arthonia* cf. *varians* with 3-septate ascospores (16–) 19–22 × 3–4 µm, from Shetland.

PALICELLA Rodr. Flakus & Printzen (2014)

Thallus crustose, rimose-areolate, partially continuous, initially developing within bark layers. **Photobiont** chlorococcoid. **Apothecia** very variable in colour from light yellow to greenish black, sometimes pruinose, margin always present but frequently reduced when old. **Exciple** hyaline or brownish inside, often with a pigmented outer layer, composed of strongly gelatinized branched and anastomosing hyphae, often interspersed with crystalline granules or oil droplets. **Hypothecium** colourless. **Epithecium** with colourless to pale ochre granules, sometimes greenish black-pigmented. **Hymenium** colourless or pale bluish green or ochre above. **Hamathecium** composed of gelatinized weakly branched and anastomosing paraphyses, with not or slightly expanded apices. **Asci** 8-spored, tholus I+ blue with a wide axial body that is mostly surrounded by a distinct darker staining layer (*Lecanora/Lecidella*-type). **Ascospores** narrowly to rarely broadly ellipsoidal, colourless, aseptate or rarely 1-septate. **Chemistry**: containing atranorin.

Palicella is a recently recognized genus containing three species, only one of which occurs in Europe (Rodríguez Flakus & Printzen 2014). Phylogenetic studies indicate that it forms a sister group to *Pyrrhospora*, but it is morphologically close to *Lecidella* and the *Lecanora varia* group.

Literature

Palice *et al.* (2011), Pérez-Ortega *et al.* (2010), Printzen & May (2002), Rodríguez Flakus & Printzen (2014).

Palicella filamentosa (Stirt.) Rodr. Flakus & Printzen (2014)

NE

Lecanora filamentosa (Stirt.) Elix & Palice (2010)

Thallus crustose, usually indeterminate, usually rimose-areolate and strongly warted, not glossy, light grey or greenish white to greenish grey; prothallus white. Apothecia 0.2–0.6 (–0.9) mm diam., single or densely crowded and then angular due to compression, sessile with a weakly constricted base; disc yellow-brown pinkish or dull greyish brown, sometimes darkening to charcoal grey, flat to moderately convex, sometimes with a very thin whitish pruina; true exciple present except in very young apothecia, not prominent, excluded in older apothecia; thalline margin usually only present in young, innate apothecia; hypothecium 15–90 (–150) µm thick, colourless to weakly yellowish, IKI+ weakly blue; hymenium (35–) 40–50 µm thick, colourless to pale ochre above, IKI+ blue; epithecium 5–15 (–20) µm thick, ochre to orange-brown with copious coarse grains between the tips of paraphyses, often streaking deeply into the hymenium, dissolving in KOH but not in N; paraphyses moderately branched and anastomosing, not or only slightly swollen at the apex; asci clavate, 30–35 (–45) × 9–11 µm; ascospores aseptate or rarely one-septate, (10–) 12.5–13.5 (–16) × (3.5–) 4–5 µm. Pycnidia uncommon, immersed in the thallus; conidia (9–) 11–15 (–17) × 0.8–1.0 µm, the longer conidia sometimes gently curving. Thallus C–, K+ yellowish, PD± yellowish; secondary metabolites atranorin, usnic acid in small amounts. **BLS 2579**.

On bark and lignum of coniferous trees, central Scotland (Argyll and Mid Perths) and W. Yorkshire; not

recorded since 1934. Potentially extinct in our region, but could well be overlooked. At least in Central Europe, *P. filamentosa* does not seem to be that rare. There, it has a rather special ecology, often being found on conifer twigs in humid or boggy places.

A variable species especially in disc pigmentation and extent of pruina. Some forms with pale discs are very similar to *Lecanora symmicta* (with which the species was formerly placed in synonymy), which can be distinguished by a K⁻ rather than K⁺ yellowish reaction and a generally more yellowish green tinge of thallus and apothecia.

PROTOPARMELIOPSIS M. Choisy (1929)

Thallus crustose, placodioid with distinct marginal lobes, sometimes areolate in the centre, forming rosettes or cushions; soredia, isidia and cephalodia absent. **Photobiont** *Trebouxia*. **Ascomata** apothecia, sessile, often densely aggregated. **Thalline margin** present, conspicuous, persistent and concolorous with the thallus, rarely becoming excluded in old fruit-bodies. **True exciple** poorly differentiated. **Epithecium** pale yellow to brown, sometimes granular. **Hymenium** ± colourless, I⁺ blue. **Hypothecium** colourless or pale. **Hamathecium** of paraphyses, unbranched, sparsely branched or anastomosed, septate, the apices hardly swollen, not pigmented. **Asci** elongate-clavate, *Lecanora*-type, 8-spored. **Ascospores** ellipsoidal, rounded at the apices, colourless, aseptate, lacking a distinct perispore, smooth-walled. **Conidiomata** pycnidia, immersed, the walls colourless but brown around the ostiole. **Conidiogenous cells** sessile or borne on short branched conidiophores, elongate-ampulliform, with broad collarettes. **Conidia** filamentous, curved, colourless, aseptate. **Chemistry**: usnic acid, zeorin, sometimes murolic and/or psoromic acids. **Ecology**: on rocks and man-made substrata, also on nutrient-enriched bark, wood etc.

Frequently treated as a subgroup of *Lecanora*, but shown to be phylogenetically distinct and sister group to *Myriolecis* by Zhao *et al.* (2015a). The description above is applicable to European and North American species, further work is needed to compare these with those from other regions. The crustose thalli with placodioid margins are only matched in *Lecanora s.l.* from Great Britain and Ireland by *Myriolecis pruinosa* and *M. straminea*, which have C⁺ orange thalli. *P. garovaglii* has been recorded from Europe (Szczepańska *et al.* 2019) and could occur in our region.

Literature

Kondratyuk *et al.* (2014), Szczepańska *et al.* (2019), Zhao *et al.* (2015a).

- 1 Thallus grey-green to yellow-brown; lobes flat to almost concave, closely appressed, not or scarcely overlapping; apothecia yellow-brown to red-brown *muralis*
 Thallus pale yellow-green to greyish white; lobes flat to slightly convex, often loosely attached and overlapping; apothecia grey to pinkish brown, greenish in shade *achariana*

Protoparmeliopsis achariana (A.L. Sm.) Moberg & R. Sant. (2004)

CR(B, C2)

Lecanora achariana A.L. Sm. (1918)

Thallus placodioid, forming rosettes or cushions, pale yellow to yellow-green or grey-white, central lobes often ± ascending, overlapping and loosely attached, marginal lobes 0.8–1.5 (–2) mm broad, white below, not marginate, flat to slightly convex. Apothecia 1–2 mm diam., generally abundant, sessile to short-stalked; thalline margin becoming crenulate and wavy; disc pale grey-brown to pinkish brown, sometimes greenish in shade, not pruinose. Ascospores 10–15 (–16) × 4–6 μm. Medulla C⁻, K⁻ (rarely K⁺ yellow→red), Pd⁻, UV⁻ (zeorin, usnic acid, unidentified triterpenoids). **BLS 0623**.

On upland siliceous rocks, typically bird-perching rocks in or at the edges of upland tarns or streams; very rare. N. Wales (Snowdonia), N. England (Lake District), W. Scotland (Beinn Dearg, Loch Maree) & W. Ireland (Brandon Mt.).

Similar to *P. muralis*, with which it often grows, but has a more yellow-green thallus and paler apothecia. *P. achariana* also has less appressed, flat to convex lobes, which tend to overlap towards the centre of the thallus giving the whole thallus a more robust appearance.

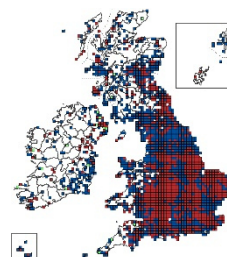


Protormeliopsis muralis (Schreb.) M. Choisy (1929)

Lecanora muralis (Schreb.) Rabenh. (1845)

Thallus to 10 cm diam., forming placodioid circular patches or rosettes, usually closely appressed but becoming uneven when old; marginal lobes 0.5–0.8 mm broad, flat to concave, corticate below, thallus centre sometimes areolate, in extreme habitats reduced to dispersed granules or areoles, pale green-yellow to yellow-brown, tending to be darker centrally, ± shiny to slightly pruinose, the undersurface and edges of the marginal lobes pale grey. Apothecia 0.5–1.5 (–2) mm diam., sessile, densely aggregated in the centre of the thallus; thalline margin well-developed, entire to crenulate or flexuose, often angular by compression, pruinose, generally persistent, sometimes almost excluded in old apothecia; disc yellow-brown to red-brown, flat to slightly convex, not pruinose; epithecium pale yellow to brown, with granular crystals on the surface that do not dissolve in K; hymenium (50–) 65–75 (–80) μm tall; paraphyses 2–3 μm diam., mainly unbranched or sparsely branched above, apices not swollen or capitate. Asci 30–40 × 8–12 μm. Ascospores 9–15 (–16) × (4–) 5–7 μm. Conidia 20–25 × 0.75–1 μm, thread-like to curved. Thallus C–, K–, KC+ pale yellow, Pd± yellow, UV+ dull orange (usnic acid, zeorin, ± murolic acid, ± psoromic acid). **BLS 0661.**

LC



On nutrient-enriched bird perches in unpolluted areas and calcareous rocks, common on a wide variety of man-made substrata in urban areas (concrete, asbestos-cement, tarmac, paving slabs, tiles, etc.), also dust and nutrient-rich bark, wood and worked timber; air-pollution tolerant. Extremely common in lowland Britain and Ireland, but becoming rarer in S.W. England and the Scottish Highlands.

Unlikely to be confused with any British species apart from the northern, exclusively coastal *Myriolecis straminea* which has a C+ orange thallus with convex lobes and the very rare *P. achariana* which has more loosely attached and ± convex lobes; specimens with a thallus reduced to round, isolated, apothecium-like areoles are easily confused with *Lecanora polytropa*. Urban populations may represent a different ecotype from the montane, ornithocoprophilous ones. Popularly called the chewing-gum lichen.

Reported lichenicolous fungi are: *Arthonia protormeliopseos*, *Cercidospora macrospora* (Uloth) Hafellner & Nav.-Ros. (2004) and an anamorphic *Spirographa* (reported as *Cornutispora ciliata*).

PYRRHOSPORA Körb. (1855)

Thallus crustose, superficial, granular to subareolate, rarely slightly squamulose. **Soredia** present in some species. **Photobiont** *Trebouxia*-like. **Ascomata** apothecia, sessile, reddish brown to black, convex, shiny. **Thalline margin** absent. **True exciple** concolorous with the disc, raised in young apothecia, becoming excluded and scarcely apparent when mature, of conglutinated thick-walled, elongate radially orientated hyphae. **Epithecium** with brownish granules, K+ reddish purple (visible in section). **Hymenium** colourless, to about 50–60 μm high, K/I+ blue, sometimes with anthraquinone crystalline inclusions. **Hypothecium** colourless. **Hamathecium** of paraphyses, unbranched or branched towards the apices, apices not conspicuously swollen, septate, constricted at the septa. **Asci** 8-spored, broadly clavate, *Lecanora*-type. **Ascospores** broadly ellipsoidal, aseptate, colourless to slightly brownish, smooth, without a distinct perispore. **Conidiomata** not known. **Chemistry**: anthraquinone, 7-chloro-emodin and xanthenes in apothecia; atranorin, fumarprotocetraric, norstictic,

connorstictic, thiophanic acids, arthothelin, iso-arthothelin, usnic acid and xanthone 2-chloro-norlichexanthone, lichexanthone, in the thallus. **Ecology:** restricted to natural undisturbed localities on acid rock, bark and lignum.

Pyrrhospora belongs to the Lecanoraceae on the basis of the ascus structure, even though no thalline margin is present; it appears to be closely related to *Lecidella*. No molecular data appear to be available. Characterized by the orange-red to brown-black apothecia with a K⁺ purple red epithecium and exciple and the thallus which is C⁺ orange, KC⁺ orange due to xanthenes. *Pycnora* and *Ramboldia* are close morphologically but the apothecia are not K⁺ crimson to purple; they are now placed in the Pycnoraceae and Ramboldiaceae respectively.

Literature:

Hafellner (1993), Hitch & Hawksworth (2009), Kalb *et al.* (2008).

- 1 Thallus thick, of coarsely granular blastidia, yellowish or greenish fawn; mostly on bark*quernea*
 Thallus thin, pale yellow, farinose, areolate; on rock below sunny, dry overhangs*rubiginans*

Pyrrhospora quernea (Dicks.) Körb. (1855)

Thallus thick, blastidiate with granules to ca 0.15 mm diam. arising over the surface of the thallus and breaking down into soredia, even, often indistinctly areolate, yellowish or greenish fawn; prothallus generally present, forming a delimiting black line to 0.25 mm wide. Apothecia 0.4–1 (–1.5) mm diam., strongly convex, often irregular in shape, dark reddish brown; true exciple becoming excluded; epithecium interspersed with reddish brown granules, K⁺ dissolving, purplish (7-chloro-emodin). Ascospores (7–) 8–12 (–14) × (5–) 6–7 (–8) μm. Thallus C⁺ orange, K[–], KC⁺ orange, Pd[–] or weakly yellowish, UV[±] blackish orange (arthothelin and thiophanic acid). **BLS 1228.**

On ± acidic, rough bark, occasionally wood, especially of *Quercus*, mostly in well-lit situations avoiding high nutrient levels, very rarely on sandstone rocks. Throughout lowland Britain and Ireland, becoming scarcer in the N. and extreme Atlantic areas, still absent from formerly acidified areas of central England.

Lecanora expallens has a thinner, finer, less uniformly sorediate and much more distinctly yellowish green thallus, lacking a fawn tint and is without a distinct black prothallus; its thallus contains usnic as well as thiophanic acid. *Pertusaria flavida* can be similar but has at least some distinct isidia and lacks the fawn tints and arthothelin of *Pyrrhospora quernea* and is UV⁺ very bright orange.

Rarely parasitised by the small black disks of *Lecidella parasitica* (q.v.). These are easily overlooked as immature apothecia of *Pyrrhospora quernea*, but can be detected by their small size, pure black colour (no trace of reddish pigmentation) and the disks remaining flat.

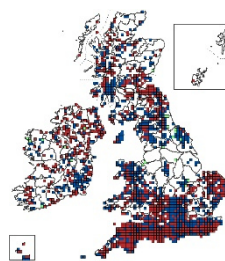
Pyrrhospora rubiginans (Nyl.) P. James & Poelt (1981)

Thallus pale yellow, moderately thin, forming wide-spreading subleprose rimose patches, sometimes a metre or more in extent. Apothecia opaque, convex, biatorine, dark rusty red-brown, 0.4–0.6 mm diam., pale within. Ascospores colourless, subglobose, 7–9 × ca 6 μm. Thallus C[–], K[–], Pd[–], UV[–] (usnic acid) (epithecium interspersed with reddish brown granules, K⁺ purplish, dissolving [7-chloro-emodin and two unknown substances]). **BLS 1972.**

Below overhangs on south- to southeast-facing siliceous rock, boulders or basalt outcrops; rare. E. Scotland, N.E. England (Northumbria).

Similar to *Lecanora orosthea* which has a different chemistry and apothecia which are yellowish-grey and innate.

LC



Nb



TRAPONORA Aptroot (1997)

Thallus whitish grey, continuous, smooth to granular or warted-areolate, corticate, surrounded by a black prothallus. **Soredia** and **isidia** not present. **Photobiont** protococcoid. **Ascomata** apothecia, erumpent through the thallus, becoming closely adnate, concave to convex, often irregular in outline, often confluent, pale to dark brown, in some species surrounded by flaking thallus parts which may give them a star-like appearance. **Thalline margin** thin and becoming excluded. **True exciple** pale to dark brown laterally, paler below, composed of radiating branched and anastomosed hyphae, sometimes crystalline. **Epithecium** red-brown to grey, gelatinized or with small brown crystals. **Hymenium** colourless, sometimes interspersed with oil globules. **Hypothecium** colourless or brownish. **Hamathecium** of paraphyses, sparingly branched and anastomosing near the base and swollen at the apices. **Asci** clavate, 8-spored, *Lecanora*-type. **Ascospores** ellipsoidal to pyriform, often asymmetrical, colourless, aseptate, sometimes with a gelatinous sheath. **Conidiomata** not known. **Chemistry**: atranorin (sometimes in small quantities), also xanthenes in some species. **Ecology**: corticolous, often on twigs, rarely on wood.

The genus includes six species, mainly in tropical habitats. Only one is present in our region.

Literature:

Aptroot (2009), Hertel & Printzen (2004), Kalb & Kalb (2017).

Traponora varians (Ach.) J. Kalb & Kalb (2017)

Lecidea exigua Chaub. (1821)

Thallus thin, superficial, whitish, with a thin black prothallus. Apothecia small, often aggregated, 0.15–0.25 µm diam., flat, pale yellowish brown to dark red-brown; epithecium red-brown, hymenium *ca* 60 µm high. Ascospores thin-walled, 9–10.5 (–15) × 4.8–6 µm. Thallus C–, K+ yellow, KC+ orange, Pd–, UV+ pinkish (a xanthone).

BLS 1769.

On bark of broadleaved trees in shaded valley woodlands and parkland; rare. S.W. England, Herefordshire, Worcestershire.

Superficially similar to *Japewiella tavaresiana* but distinguished by the KC+ orange thallus. The species was described from American collections with somewhat different chemistry (Hertel & Printzen 2004), and the identity of British material needs further investigation.

Nb



Nomenclature

Glaucomaria rupicola (L.) P.F. Cannon, **comb. nov.**

IF559833

Basionym: *Lichen rupicola* L., *Mant. Pl.* 1: 132 (1767).

Typification: “supra rupes planiusculas nudas apricas in sylvis”, coll. J. Zoëga. A type specimen is not listed in the Linnean Collection (LINN).

Choisy (1929) introduced the genus *Glaucomaria* to contain three species, listed as *Lecanora glaucoma* (Hoffm.) Ach. (= *L. rupicola* (L.) Zahlbr.), *L. angulosa* (Schreb.) Ach. (= *L. carpinea* (L.) Vain. and *L. albella* (Pers.) Ach. The genus was provided with a description that fulfils the requirements for valid publication, but none of the three constituent species was formally combined into *Glaucomaria* and Choisy did not indicate a type. The genus was adopted by Hafellner (1984) who lectotypified it with *L. rupicola*, but again the necessary combination was not made, and although Kondratyuk *et al.* (2019) referred to *G. rupicola* as a binomial in their outline treatment of the genus, no formal combination was made. That oversight is rectified here.

Lecidella parasitica Sanderson, **sp. nov.****IF559834**

Immersed in the thallus of *Pyrrhospora quernea*, usually with limited impact on the host but heavy infections may darken the thallus. Apothecia 0.15–0.5 (–0.6) mm diam., black, some a bit distorted but mainly flat; thalline margin absent, exciple green-yellow internally, composed of radiating hyphae; epithecium blue, K⁺ intensifying to a degree; paraphyses lax, rather broad (to ca 4 µm diam.), apices barely swollen; hymenium ca 40 µm tall, pale straw, often with reddish and blue patches; hypothecium pale yellow to brown, K⁻. Asci *Lecanora*-type, 8-spored. Ascospores aseptate, (7–) 10–12 × (4–) 6–7 (–8) µm, ellipsoidal to broadly ellipsoidal, some more pointed at one end, thick-walled.

Typification: UK: England, Herefordshire, Moccas Park, GB grid reference SO 34284305, on thalli of *Pyrrhospora quernea* on bark of *Quercus robur*, 17 May 2018, *P.F. Cannon* P3723 (K(M) 253923, holotype of *Lecidella parasitica*).

Other specimens examined: UK: England, South Hampshire, New Forest, Denny Wood, GB grid reference SU 3352606275, on thalli of *Pyrrhospora quernea* on well-lit trunk of veteran *Fagus*, 27 July 2022, *N.A. Sanderson* (herb. Sanderson 2920). England, South Hampshire, New Forest, Stricknage Wood, GB grid reference SU26111243, on thalli of *Pyrrhospora quernea* on trunk of veteran *Fagus* in glade, 5 May 2016, *N.A. Sanderson* 2219 (BM). England, South Hampshire, New Forest, Rushpole Wood, GB grid reference SU31550954, on thalli of *Pyrrhospora quernea* on trunk of veteran *Fagus* in glade, 24 April 2016, *N.A. Sanderson* 2218 (BM). England, South Hampshire, New Forest, Denny Wood, GB grid reference SU33180687, on thalli of *Pyrrhospora quernea* on trunk of veteran *Fagus*, 30 April 2016, *N.A. Sanderson* 2217 (BM). England, South Hampshire, New Forest, Denny Wood, GB grid reference SU3328706907, on thalli of *Pyrrhospora quernea* on trunk of veteran *Fagus*, 30 April 2016, *N.A. Sanderson* 2216 (BM). England, Cumberland, Matteredale, Glencoyne Park, GB grid reference NY3878319160, on thalli of *Pyrrhospora quernea* on lignum of fallen dead *Quercus* in parkland, 12 May 2016, *N.A. Sanderson* 2158 (BM).



Lecidella parasitica, on thallus of *Pyrrhospora quernea*, Denny Wood, Hampshire (*Sanderson* 2920). Bar = approx. 1 mm.

- Miriquidica atriseda** (Fr.) P.F. Cannon, **comb. nov.** **IF559835**
 Basionym: *Parmelia badia* var. *atriseda* Fr., *Lichenes Sueciae Exsiccati*, Fasc. **13**: 6 (1827) (as *P. badia* γ *atriseda*).
- Miriquidica nephaea** (Sommerf.) P.F. Cannon, **comb. nov.** **IF559836**
 Basionym: *Lecanora nephaea* Sommerf., *Suppl. Fl. lapp.* (Oslo): 103 (1826).
 Typification: Norway: Nordland, Saltdalen, in saxis micaceis, May 1822, *Sommerfelt* (O-L 000354, holotype).
- Myriolecis poliophaea** (Wahlenb.) P.F. Cannon, **comb. nov.** **IF559837**
 Basionym: *Parmelia poliophaea* Wahlenb., in Acharius, *Methodus, Suppl.* (Stockholmia): 38 (1803).
 Typification: Norway, Finnmark, “in scopulis maritimis Qualöae, Hojöae etc.”
- Myriolecis populicola** (DC.) P.F. Cannon, **comb. nov.** **IF559838**
 Basionym: *Patellaria populicola* DC., in Lamarck & de Candolle, *Fl. franç.*, Edn 3 (Paris) **2**: 363 (1805).
 Typification: “sur le peuplier blanc, aux environs de Paris, et a été observée par le C. Dufour.”

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