

KEY III

Neither Isidiate Nor Sorediate;
Corticolous/lignicolous

KEY IIIA

Pycnidia conspicuous; photobiont Chlorococcoid.
Corticolous/lignicolous

1. Thallus C+ red, becoming subsquamiform. Pycnidia black. Trapeliopsis xanthococca
1. Thallus C, thin to endophloedal. 2
2. Thallus K+ red (norstictic acid). Thallus thin, smooth, becoming areolate or chinky, pale greenish gray to white; pycnospores 47 um long, straight, bacilliform. Corticolous/lignicolous. Buellia curtisii and B. stillingiana
2. Thallus K (?). 3
3. Pycnidia white or pinkbrown to rarely brownblack; conidia curved. On shaded bark. 4
3. Pycnidia black or bluish black; conidia straight. Usually on ± welllit bark or wood. 6
4. Thallus olivaceous to blackish green, well developed, rugose to verruculose; pycnidia common, brown; pycnospores 1.2 x 0.5 um. Bacidia chlorantha
4. Thallus pale graygreen, or yellowgreen to fawn. 5
5. Pycnidia pinkbrown, rarely brownblack, sessile, ± globose or elongated vertically, 180200 um diam., to 300 um tall; conidia (20)3043 x 0.81 um. Thallus pale graygreen, thin, scurfy. On deciduous trees in woodlands. Bacidia vezdae
5. Pycnidia white, ± immersed, ca. 100200 um diam.; conidia (21)2640(47) x 1(1.5) um. Thallus yellowgreen to fawn, finely granular. On basic bark, especially Sambucus. Bacidia arnoldiana and B. delicata
6. Pycnidia stalked, bluish black, to 0.2 mm diam., often with a globose white spore mass extruded from ostiole; wall brown or green in K; conidia ca. 3.74 x 1.51.7 um, simple. Thallus gray, leprosegranular. On acid bark and wood of old trees. Lecidea doliiformis

6. Pycnidia sessile or immersed, often contorted, black; wall purpleviolet in K. Thallus smooth and cracked to granularwarted.
..... 7

7. Pycnidia 0.20.6 mm diameter, irregularly convex and contorted. Thallus of light brown or yellowish brown convex granules or evanescent. Pycnospores cylindrical to ovoid, 25 x 12 um. On acid bark and wood. Cliostomum corrugatum
7. Pycnidia 0.10.3 mm diameter, plane at first. Pycnidia immersed in the thallus at first, so that they frequently appear to have a thalline margin; pycnidial walls K+ grayish red; pycnospores ellipsoid or clavate to cylindrical, ca. 36 x 1.52 um. Thallus whitish gray, usually irregularly developed but with a ± smooth and areolate where wellformed; with scattered pycnidia. Cliostomum griffithii

KEY IIIB

Pycnidia conspicuous; photobiont "Micareoid"
(cells 47 um, ± globose, thinwalled).
Corticolous/lignicolous

After Purvis, et al., 1992

1. With stalked or sessile pycnidia containing mesoconidia (smaller, ± immersed pycnidia containing microconidia sometimes present); never with curved or flexuose macroconidia. 2
1. Pycnidia innate, sometimes becoming emergent with gaping ostioles, or with small, sessile, apothecialike sporodochia; pycnidia sometimes containing curved or flexuose macroconidia. 7
2. Pycnidia black. 3
2. Pycnidia whitish to reddish brown, never black. 5
3. Pycnidial wall olivaceous brown, K+ violet. Mesoconidia 3.55 x 11.5(1.7) um. Micarea misella
3. Pycnidial wall K or K+ olivaceous. 4
4. Pycnidial wall and stalk dark purplebrown, K+ dark green; mesoconidia 3.44.3 x 1.21.6 um. Micarea nigella
4. Pycnidial wall dark olivaceous, K; stalk fuscous or reddish brown, K; mesoconidia 3.54.8 x 11.5 um.
Micarea botryoides
5. Thallus indistinctly areolate or rimose, or endoxylic, without goniocysts, K. Pycnidia whitish, without tomentum. 6
5. Thallus of pale to dark green goniocysts, 1240 um diam.; goniocysts containing purple, oily substance in K. Pycnidia brown tihw white tomentum. Mesoconidia (4)4.5(6) x 1.31.7 um. Micarea hedlundii
6. Pycnidia C+ red (gyrophoric acid), simple; mesoconidia 46 x 11.5 um. Micarea pycnidiphora
6. Pycnidia C, often branched; mesoconidia 68 x 11.8 um. Micarea stipitata
7. With whitish, cushionlike, apothecialike sporodochia ca. 0.10.25 mm diam., bearing oblongellipsoid macroconidia 610 x 23 um (immersed, inconspicuous pycnidia containing mesoconidia 45.3 x 1.21.5 um may also be present); all parts C (no

substances). Micarea adnata

7. Without sporodochia. Thallus and/or pycnidia C+ red (gyrophoric acid) or C (prasina unknowns). 8

8. Thallus of pale to dark green (sometimes K+ violet) goniocysts 1260 um; pycnidia, if present, 3080 um diam., containing either (5)5.58 x 0.71 um microconidia, or (3.5)46 x 1.21.7 um mesoconidia; all parts C (prasina unknowns). Micarea prasina

8. Thallus areolate, or scurfy (invaded by dematiaceous hyphae and foreign algae), or ± endoxylic; sometimes with curved or flexuose macroconidia. Thallus and/or pycnidia usually C+ red (gyrophoric acid). 9

9. With numerous pycnidia containing mesoconidia 3.54.5 x 1.32 um, often extruded as conspicuous white blobs; in addition, pycnidia containing microconidia (4)4.56(6.5) x 0.71 um, or curved macroconidia 1221 x 1 um, sometimes present; pycnidial walls with pale olivaceous pigment, K+ violet. Usually on wood, commonly on worked timber. Micarea denigrata

9. Pycnidia usually with longer, curved or flexuose macroconidia; smaller pycnidia with microconidia sometimes present; mesoconidia unknown; pycnidial walls colorless or greenish, K. On various substrata, rarely on worked timber. 10

10. Macroconidia curved or hamate, 2140 x 11.5 um; microconidia (5)67(7.7) x 0.40.7 um. On bark of old trees (especially Quercus) in old woodlands. Micarea peliocarpa

10. Macroconidia flexuose, 50110 x 1 um; microconidia (3.8)4.5 x 0.50.7 um. On shaded wood in woodlands. Micarea cinerea

ADD:

Soralia numerous, discrete, green. Thallus and pycnidia P, K, C+ red (gyrophoric and 50methylhiascic acids. Resembling Trapelia corticola. On acid bark of Betula, Calluna, Myrica and Sorbus, and on acid rocks. Micarea coppinsii

KEY IIIB

Pycnidia conspicuous; photobiont Trentepohlia

[NEED TO COMBINE THIS SET WITH THE NEXT]

1. Thallus lichenicolous, on Enterographa and Lecanactis, pale pink with scattered, ± regular hemispherical warts (sporodochia), 0.31 mm diam., which develop over effete apothecia or pycnidia of the host; sporodochia composed of ± vertically oriented hyphae, forming 1-septate, ellipsoid conidia in chains; thallus and sporodochia C+ red (lecanoric and schizopeltic acids). [Not reported for N. America]. (Blarneya hibernica)
1. Thallus not lichenicolous, pale to violetgray; conidiomata pycnidial; conidia simple; pycnidial pruina when present C or C+ red. 2
2. Pycnidia whitish to dull yellowish, or whitepruinose. 3
2. Pycnidia dark brown to black, not pruinose. 7
3. Pycnidia white pruinose; pycnidial wall dark colored. 4
3. Pycnidia not pruinose, mostly dull yellowish; pycnidial wall ± colorless. 6
4. Apices of pycnidia C+ red (lecanoric acid); thallus C (schizopeltic acid); conidia 12.17 x 2.3 um. Pycnidia with a distinct white pruina, protuberant, 0.10.3 mm diameter. Pycnidial walls K+ dark olivaceous; pycnosporangia rod-shaped to narrowly ellipsoid, ca. 13.16 x 2.54.5 um. Lecanactis abietina
4. Apices of pycnidia C (without lecanoric acid); thallus C, without schizopeltic acid; conidia under 10 um long. 5
5. Conidia 3.75 x 1.21.7 um; pycnidia with a dark brown-black wall, K+ oliveblack; pruina of pycnidia K+ yellow, KC, C, P; thallus contains confluent acid and accessory lepruric acid. On predominantly acid substrata in old woodlands. Lecanactis subabietina
5. Conidia 4.56.7 x 11.4 um; pycnidia with a brown wall, K; pruina of pycnidia K, KC, C, P; thallus contains two unidentified pigments. On trees with a basic or nutrient-rich bark in parklands and woodlands. Opegrapha vermicellifera
6. Conidia ellipsoid, 34(5) x 1.31.8 um. Dimerella

lutea

6. Conidia oblong, ± with a median constriction, 67(8) x 1.82.6 um. Dimerella pineti

7. Conidia globose, ellipsoid or oblong, not curved.
Pycnosporos straight. Pycnida black, C. 8

7. Conidia curved, or if straight then cylindrical.
Pycnidiasmall, usually under 0.2 mm diameter, black,
C. 11

8. Conidia oblong, 1septate, 1116.5 x 2.53 um. Thallus brown or dark olivaceous. Strigula taylorii

8. Conidia globose, ellipsoid or oblongellipsoid, simple, mostly under 11 um long. Thallus whitish, graygreen or pale buff. 9

9. Conidia oblongellipsoid, ± with a slight median constriction, 7.612 um long. Arthopyrenia ranunculospora

9. Conidia globose to ellipsoid, without a median constriction, under 5 um long. 10

10. Pycnidia conical; conidia released in chains of cylindrical packets; conidia ellipsoid, 3.54.5 x 1.82 um.
Ditremis (Anisomeridium) nyssaegenum

10. Pycnidia ± globose; conidia free, either subglobose to ellipsoid and 2.34 x 1.82.7 um, or globose and 11.5 um diam. Ditremis (Anisomeridium) biforme

11. Pycnosporos cylindrical, 45 x 11.5 um. Pycnidia 0.10.3 mm diameter, plane at first, not appearing to have a thalline margin. Thallus grayish white, well developed, with abundant pycnidia. Opegrapha atra

11. Pycnosporos curved. 12

12. Conidia short and curved, under 7(9) um long, 0.72 um wide. 13

12. Conidia sickleshaped, over 10 um long. 14

13. Conidia of two types: 47 x 11.5 um or 79 x 0.7 um. Thallus dull grayolive or whitish. Opegrapha niveoatra

13. Conidia 58 x 12 um (34 um wide and reniform according to ?). Thallus dull olive to reddish brown. Pycnidia scattered evenly over the thallus Opegrapha rufescens

14. Conidia 1218 x 0.51.5 um (of two types: 915 x 11.3 um or

914(18) x 0.50.7 um). Thallus whitish, pale grayish, dull olive, or yellowish brown. Opegrapha vulgata s. lato
14. Not as above. 15

15. Pycnospores 1015 um long (measured end to end, in a straight line), very strongly curved. Opegrapha cinerea
15. Pycnospores 1520 um long (measured as above), slightly curved. (unknown no. 5, Brodo, Long Island)

ADD:

Pycnidia raised, black, barrelshaped, with extruding white pycnospores (appearing pruinose?). Lecanactis megaspora

1. Thallus very thin or hypophloedal, or, if thicker, ashy or pale greenish gray. Pycnidia common, black; pycnospores over 4 um long.

2. Pycnidia ± clustered in small groups; pycnospores 45 x 1 um, straight, bacilliform. On Ilex and Fagus. Trypethelium virens

Thallus KC+ red. Pycnospores 1216 x 0.51 um. Arthonia "impolita"
Thallus KC. Pycnospores 56 um long.

Thallus P. Pycnospores 12 um wide. Arthonia byssacea

Thallus P+ orange. Pycnospores 0.51 um wide.
Arthonia cinereopruinosa

Thallus white to graywhite, with numerous scattered, pale brown, spotform, to 0.5 mm wide soralia, K, KC, P. On old "Eichen". Lecanactis amyacea

Eopyrenula spp.

Mycomicrothelia spp.

Arthopyrenia spp.

KEY IVA

**Without pycnidia, sporodochia, or vegetative propagules;
Photobiont Trentepohlioid**

1. Thallus pale gray to chalky white with pale brown flecks (?
ascomatal initials). Lecanactis amylacea
1.

KEY IVB

Without pycnidia, sporodochia, or vegetative propagules;
Photobiont Chlorococcoid

IIIB1 Thallus ± dark, olive or brown

1. Thallus consisting of my discrete, round, translucent, dark olive or yellowish green spherical granules, ca. 0.050.2 mm diameter. Growing on mosses, wood and old plant remains in moist habitats. "Omphalina" spp.

1. Thallus dark grayish to reddish brown, minutely granulose. Generally in relatively dry habitats. 2

2. Thallus gray mottled orangebrown, the orange patches reacting K+ purple. On dry, acid bark. Chaenotheca ferruginea

2. Thallus fawn to deep brown, olive green, or blackish, K..... 3

3. Thallus squamulose; squamules 1(1.5) mm diam., round or irregular, often crowded, bullate or irregularly ascending; margin ± crenulate; upper surface grayish green to dark brown, matt. On bark and wood tolerating atmospheric pollution. Hypocenomyce carodocensis

3. Thallus granularsquamulose or granular; granules to 0.1(0.3) mm diam. 4

4. Thallus fawn to deep brown or olive. On bark or moss over bark. Grnaules ca. 0.1 mm diam. 5

4. Thallus olive to blackish. On rotten wood. 6

5. Granules matt, brown or olive green with paler, often white margins. On mossy, acidbarked trees, especially Quercus, often over bryophytes. Lopadium disciforme

5. Granules shiny brown, unifrom. Mainly on Betula and conifer trunks. Protoparmelia ochrococca

6. Thallus consisting of granules < 0.1 mm diameter. Placynthiella uliginosa

6. Thallus consisting of rounded, usually roughsurfaced, corticate granules, 0.10.3 mm diameter. Placynthiella oligotropha

IIIB2 Thallus yellow or bright yellowgreen

1. Thallus bright yellowish green, of convex granules to 0.5 mm diam. On wood and coniferous bark. Chaenotheca chrysocephala

1. Thallus of yellow, coralloid granules 60-120 um diam., the surface smooth, sometimes slightly glossy, never brownish (outer hyphae colorless). Thallus graygreen to yellowgreen, thinly to richly isidioidgranular. Photobiont cells 5-17 um diam. Containing atranorin. Pycnidia pale pink to redbrown; pycnosporos 16-24 x 0.5 um, curved or sigmoid. On deciduous trees with nutrientrich bark.. Bacidia rubella

IIIB3 Thallus whitish gray to pale gray or glaucous green

1. Thallus with occasional C+ red or rose apothecial initials. Ochrolechia spp.

1. Thallus without C+ red apothecial initials. 2

2. Thallus P, forming superficial, granular verrucae; granules ca. 80-120 um diam., but granules never loose and soralialike; forming large patches on mossy trunks in old woodlands. Biatora vernalis

2. Thallus P+ orangered; minutely granular-squamulose or ± smooth, continuous. 3

3. Thallus smooth, ± continuous, very thin, often with erose patches; prothallus absent; K+ red (crystals) (norstictic acid). Phlyctis argena

3. Thallus of minute, flattened to granular, pale bluish gray, faintly white pubescent; squamulose; ± delimited by a ± arachnoid prothallus; K or faint yellow (argopsin).
Phyllopsora rosei

ADD: On bark or wood

Thallus finely granular, dark green to blackish green, K, P.
Mostly corticolous. Scoliciosporum chlorocccum

Thallus K+ deep yellow, P+ orange (thamnolic acid). Thallus +
continuous and smooth, at least at the margins, ashy or darker,
with sorediate verrucae scattered evenly over the thallus.
Corticolous/lignicolous. Pertusaria
trachythallina

Brodo unknowns.

Thallus composed of scattered verrucae or areoles, some bursting
into soredia. Medulla C. Corticolous/lignicolous.
"Lecidea" botryosa

Thallus bright yellowish green, C; composed of convex granules,
to 0.5 mm diameter. On wood and coniferous
bark. Chaenotheca
chrysocephala

Thallus distinct, of whitish gray to gray, irregularly convex
granules which form irregular scattered groups. Soredia rust
colored, (usually?) K+ red, C. On shaded old rough acid bark and
wood. Chaenotheca ferruginea

Soralia black. Soredia and soredialike isidia 3040 um diameter.
Thallus gray, thick, verrucose, P. Medulla I+ blue. On wood or
at the base of trees in high montane regions. Thallus K, with
distinctly delimited, to 1 mm wide soralia.
Thelomma ocellatum

**Thallus sorediate; medulla and soredia P+ orange, K+ yellow
(stictic and constictic); corticolous, especially on conifers.**

Thallus crustose, white to yellowish gray, often covering
extensive areas, rough to verrucose; margin definite or
indefinite; coarsely granular soredia produced in irregular to
orbicular, often hemispherical patches over all parts of thallus;
soralia ± orange or pinkish. Prothallus thin, white, not often
seen. Cephalodia 0.61.0 mm diam., hemispherical to irregular,
rough textured, constricted at base, dark pink to gray. On bark of
trees, especially conifers, Along coast, Alaska to
Oregon. C. pocillarium

Thallus diffuse, leprose, pale yellowish or whitish green, K. On decorticate wood of Chamaecyparis, etc., in bogs.
Chaenotheca phaeocephala

Thallus squamulose; squamules dark greenbrown to olivaceous, 0.50.76(1.0) mm across. Thallus P+ red (fumarprotocetraric acid). Hypcenyomyce anthracophila

Thallus medulla C, cortex C+ red. Isidia coarse, 0.10.3 mm diam., to 1.2 mm long, knobby, persistent, growing out of or merging into verrucae; thallus rather thick, yellowish gray; prothallus often conspicuous, paler than thallus. On bark of deciduous trees (especially Quercus) in mostly hardwood forests, 7601500 m, Appalachian and Ozark regions. Ochrolechia yasudae

Pertusaria "coccodes"

Pertusaria amara f. isidiata, etc.

Thallus of tiny squamules ca. 0.30.8 mm wide; soralia lipshaped at apices of squamules. On moist, rotting wood.
Trapeliopsis percrenata

Thallus composed of pale gray, powdery granules surrounded by a white, fibrous prothallus; thallus UV (atranorin, zeorin, porphyrilic acid). Haematomma ochroleucum v. porphyrium

Thallus thin and continuous, with scattered, delimited, erose soralia; soredia farinose. Nitrophilous. Caloplaca chrysophthalma

Thallus superficial, irregularly warted; medulla I+ blue. On wooden fencing. Thelomma ocellatum

Thallus widespreading, ± immersed, white to pale gray; soralia numerous, slightly elevated, often confluent, dark brown with a ± violet tinge (greenish when abraded), 0.150.6 mm diam. Thallus and soralia P, K, KC, C, UV, without substances. On dry fissured bark of mature Fraxinus and Quercus at woodland edge or in pasture woodland. "Buellia violaceofusca"

Soralia P, containing atranorin and placodiolic acid. On wood and bark of old pines. Buellia arborea

Soralia 0.140.3(0.4) mm diam., mainly discrete, UV (atranorin and

zeorin). On ± basic bark. Rinodina griseosoralifera

Thallus and soralia UV+ orange (lichexanthone). On dry, shaded bark in woodlands. Bacidia viridifarinsa

Thallus of convex verrucae often obscured by extensive sorediate patches; soredia bluegray. At base of trunks of old parklandtrees, especially Ulmus. Caloplaca virescens

Thallus very thin; prothallus absent; soralia ± efflorescent, contiguous, granular, yellowish to pale buff. No substances. Bacidia epixanthoides

Thallus consisting of a primary leprose thallus from which simple or sparingly branched, granular pseudopodetia develop. Usually on soil. Leprocaulon microscopicum

Pseudopodetia ± dorsiventral, forming flattened fronds with mainly distichous branching, when well developed elegantly dendroidplumose, bearing minute, softly pulverulent, ± powdery particles. P+ orangered to miniate red, containing protocetraric and physodalic acids, or sometimes also with didymic and grayanic acids and unknowns. Usually on bark or wood. Leprocaulon arbuscula

Thallus and soralia UV+ white. On moderately exposed bark of trunks and branches.

Thallus distinct, of smooth, corticate granules 0.10.25 mm diam., thick; soralia often well developed and ulcerose, especially towards edge. Containing divaricatic acid. Fuscidea lightfootii

Thallus indistinct, ± immersed or of convex, scattered to confluent verrucae 0.080.16 mm diam.; soralia efflorescent and irregular, rarely well developed and ulcerose. Perlatolic or divaricatic acid.

Perlatolic acid present. Fuscidea viridis
Divaricatic acid present. Fuscidea pusilla

Soralia developing from thallus pustules that split open so that a resultant concave soraliu is delimited by a reflexed ring of thallus.

Thallus white, without bluish tinge; soralia 0.120.3 mm diam., pale yellowish green or greenish white, concave, discrete or

confluent. On trunks of mature parkland and wayside trees. Caloplaca ulcerosa

Thallus pale gray often with bluish tinge; soralia pale green but often tinged bluegray, often persisting as delimited concavities after becoming emptied of soredia. On nutrientenriched bark of tree trunks and branches. Caloplaca obscurella

Prothallus bright red in outer part, red to whitish in inner part, distinct. Thallus greenish gray to reddish or violet, tightly to loosely attached to substrate, 0.150.30 mm thick.; medulla whitish but lower part red; photobiont cells ca. 815 x 511 um; isidia many, granular, 0.10.4 x 0.1 mm. Sexual structures and pynidia unknown. Thallus C, K+ purplered (red pigment), P, UV, containing confluent acid, unknown substance accessory to confluent, and chiodectonic acid; sometimes also with atranorin and various unknowns. On rough or rarely smooth bark in sheltered and shaded habits in moist and dense subtropical and tropical forests, rarely also on rocks or leaves; also found in hammocks (hardwood forests) and swamps which have standing water at least part of the year., and in oak or oakpine scrub vegetation, in eastern temperate areas. Common in Florida to eastern Texas (and south to Central and South America), less common north along east coast to Delaware. Cryptothecia rubrotincta (synonyms: Chiodecton sanguineum, Herpothallon sanguineum)