

**Miriquidica** Hertel & Rambold

After Hertel & Rambold

Rev. 5/94

Thallus crustose, continuous or scattered areolate, brown to brownblack or gray to white; areoles corticate, often with a distinct epinecral layer; medulla I; black prothallus sometimes present. Photobiont chlorococcoid.

Apothecia black or dark brown, remaining immersed or becoming sessile, usually biatorine, or rarely lecanorine; thalline exciple usually absent; proper exciple well developed, with radially arranged hyphae 57 um wide at outer edge (in water) or reduced (in species with immersed apothecia), at least the outer part dark greenish or sometimes brownish, never black and brittle; photobiont cells usually absent, but occasionally present in inner part of exciple; hypothecium hyaline or dark violetbrown; epihymenium olive to pale green, N+ red, rarely brownish, N; hymenium colorless, I+ blue; paraphyses ± branched and anastomosed, the apices ± clavate and surrounded by a closely adhering pigmented hood. Asci clavate, 8spored, probably Lecanora type but apical cushion often weakly defined and ocular chamber scarcely developed; tholus weakly amyloid; outer wall of ascus amyloid. Spores simple, occasionally with a false cytoplasmic septum, rarely 1septate when old, ellipsoid to usually oblongellipsoid.

Pycnidia immersed; pycnospores filiform, 1528 x 0.51 um, curved, simple, colorless. Thallus containing miriquidic acid (K, C, KC, P; a ± peacock blue spot on TLC plates) as main substance in almost all species, but some species containing other substances (with positive reactions), including norstictic acid or lobaric acid. On acidic rock, rarely on wood. Borealmontane.

A segregate from Lecidea; I don't really understand it, other than that it has ± Lecanora type asci, and usually contains miriquidic acid.

This key still has some bugs in it.

**1. Thallus uniformly rusty colored, yellowish, vivid orange, or brownish, to 10 cm across;** areoles scattered to grouped, convex, mostly 0.10.5(0.7) mm broad, 0.10.5 mm thick, irregularly round to sublobate, slightly constricted at base; surface smooth to rough; on black to partially reddish orange prothallus which is obvious

between the areoles; soralia well defined, small and rounded, black or flecked with black, forming on areoles. Thallus C; cortex (soralia) K+ yellow, P+ orange (stictic acid). Medulla K, P, C, I. Cortex 1530 um thick; upper cell layer 1030 um thick, encrusted with orange granules of iron oxides; hyphae ca. 3.55.5 um diam.; epinecral layer mostly not developed; algal layer ca. 5085 um thick; algal cells c. 89(16) um diam. ; medulla hyphae ca. 4 um thick. Apothecia extremely rare, round, dispersed, 3060/cm<sup>2</sup>, slightly constricted at base, ca. 0.3(0.5) mm diam.; disc plane to convex, black, epruinose; margin black, rather indistinct. Excipulum with dark ectal zone; inner zone colorless to grayish (color impression caused by incrustations of stictic acid); hyphae 4.57.5 um; medullary zone not obvious; K+ yellow, P+ orange. Hypothecium colorless; subhymenium colorless, 3045 um; hymenium 5065 um, colorless, I+ bluish, Iconc.; epihymenium pale brown; paraphyses occasionally branched and anastomosing, 1.52 um thick, apically 34 um; asci ca. 4055 x 1315 um; outer amyloid wall layer I+ blue, Iconc. + blue; axial mass ca. 2 um broad; spores ellipsoid, 7.59 x 66.5 um. Pycnidia immersed, 80100 um diam.; conidia curved, 1822 x 0.60.9 um. On ironrich rocks, submontane to alpine in humid habitats. New Brunswick. .... Miriquidica atrofulva

**1. Thallus not rusty colored. .... 2**

**2. Apothecia immersed; excipulum reduced. Thallus blackbrown; spores 4.55.5 um wide.** Thallus small, to 23 cm across, commonly only 1 cm diam. or less, forming a mat to ca. 1 mm thick, areolate to squamuloseareolate, usually dark colored, graybrown to brownish or brownblack; areoles white or graymargined, pale brownish or brownish to greenbrown or olivaceous in the center, to 1 mm diam., commonly 0.4 mm diam., or less (especially marginal and ± dispersed ones), contiguous throughout most of the thallus, often clustered into larger compound "areoles", round to roundangular to sublobate, ± plane or slightly concave or convex, surface smooth to minutely rugoseundulate or ± furrowed, often cereus, matt, epruinose; I, K, C, P. Hypothallus dark colored, commonly evident at thallus margin and below and between the areoles. Apothecia often absent, redbrown to dark redbrown, to 0.5(0.6) mm diam., dispersed to 23 contiguous, round to roundishangular, usually immersed and provided with a complete or incomplete thalline rim; disc plane to slightly convex, smooth, matt to subnitid, epruinose; margin usually not evident, then thin and not elevated. Excipulum weakly developed or ± absent, brownish or brownolivaceous (or faintly bluegreen in places) externally, colorless inside, to 65 um thick at sides, composed of branched, parallelradiate hyphae in a gelatinous matrix, the

hyphae 1.02.5 um thick at edge; I, K, C, P. Hypothecium colorless, 5065 um thick, subtended by the algal layer and thalline medulla, I+ blue (at least weakly above), K, C, P. Hymenium colorless, 5065 um thick, I+ blue or pale blue (asci I+ yellow or reddishbrown), K, C, P; epithecium brown to reddish brown, sometimes olivebrown in places, paler in K; paraphyses coherent and indistinct or subdiscrete in water, somewhat more distinct in K, predominantly simple and sparingly branched or predominantly oncebranched and weakly anastomosed mixed with some simple, 12 um thick below, apical cells not thickened or somewhat clavate, 2.03.5 um thick. Asci clavate, 8spored; spores ellipsoid to ovid, 816 x 47 um. On noncalcareous talus boulders on Nfacing slopes, upper montane to alpine tundra.

Colorado. .... M. instrata (Nyl.) Hertel & Rambold (description from Anderson; may need some revision)

**2. Apothecia not immersed; excipulum + developed, mostly without algae; thallus paler (except in M. intrudens). ....3**

**3. Thallus (medulla?) K+ yellow or red, P+ yellow (stictic or norstictic acid), or K, P+ red (protocetraric acid). ....4**

**3. Thallus K, P (?) (mostly miriquidic acid only). ....6**

**4. Thallus K+ yellow or red, P+ yellow (stictic or norstictic) Excipulum hyphae 5 um wide; hymenium 4550 um .....5**

**4. Medulla (especially upper part) K, P+ red (protocetraric and miriquidic acids) (K+ yellow, with stictic and miriquidic according to Coppins & Purvis). Excipulum hyphae 7 um. wide; hymenium 65 um. Thallus areolate; areoles 0.20.8 mm wide, contiguous, angular to rounded, flat to often convex, brown, glossy; superficial epinecral layer distinct. Apothecia 0.31(1.3) mm diam., sessile, the base ± constricted, black; disc flat to convex; true exciple thin and usually persistent, olive brown to dark green at outer edge, pale straw within; epithecium olive brown to green. Spores 1116.5 x 56.5 um. .... M. garovaglii (Schaerer) Hertel & Rambold (syn. Lecidea garovaglii, L. aenea)**

**5. Thallus K+ yellow then red (norstictic acid only). ....M. griseoatra chemotype 2**

**5. Thallus K+ persistent yellow (miriquidic acid only). (norstictic, ± connorstictic, and ± stictic acids, according to Coppins & Purvis, who state that it is similar to M. leucophaea**

except for chemistry need to check Hertel & Rambold again, since if my original idea that this species contains only miriquidic acid, that's the same chemistry as M. leucophaea!). Thallus moderately thick to thick, areolate; areoles  $\pm$  convex or plane, smooth or verruculose uneven, white or rarely grayish; areoles ca. 0.21.5 mm wide, contiguous or dispersed, I, C, K+ yellow then red; soredia absent; hypothallus black. Apothecia frequent, adnate, 0.51.2(1.5) mm, often confluent and then broader, thin or moderately thick, not or scarcely constricted at base; disk plane or becoming convex, brownblack or rarely black, epruinose, usually nitid; margin thin, not prominent, entire, concolorous, often nitid, long persistent, often finally excluded. Hypothecium pale or hyaline, I+ blue; hyphae thinwalled; bottom part K+ red with acicular crystals, upper part with vertical, narrow hyphae, otherwise the hyphae irregularly interwoven. Excipulum hyphae radiating, thin, conglutinate, slightly thickwalled, subviolaceous=brown or in thin outer part of base paler, below hypothecium broadly continuous. Hymenium 6070  $\mu$ m, I+ blue then violet. Epihymenium redbrown to brown or rarely glaucous or bluegreen, nongranular, K, covered by a  $\pm$  distinct colorless gelatinous layer. Paraphyses strongly coherent, simple, thin, the apices slightly thickened. Asci clavate, the apical wall thick. Spores 8, distichous, oblongellipsoid, 1017 x 46  $\mu$ m. Pycnosporos filiform, arcuate, elongate, as in M. leucophaea. Several forms named as variations. On hard siliceous rocks (e.g., granite, diorite, argillaceous schist) in exposed boulder fields. Arcticalpine. Colorado.....M. lulensis (Hellbom) Hertel & Rambold (syn. Lecidea lulensis)

6. Thallus irregularly contiguous to  $\pm$  dispersed areolate, to 80 mm diam., ca. 0.20.5(1) mm thick; areoles irregularly shaped, gray, dark gray to rusty colored (brownish gray to brownish), plane to irregularly convex, with smooth to rough surface, ca. 0.21.0 mm diam. Cortex 1235  $\mu$ m thick; apical cells  $\pm$  brownish; upper cell layer sometimes incrustated with orange colored granules of iron oxide; hyphae ca. 3.55.5  $\mu$ m diam.; epinecral layer to 10  $\mu$ m thick, mostly absent; algal layer ca. 70120  $\mu$ m thick; algal cells ca. 810(14)  $\mu$ m diam.; medulla I; hyphae 2.55.5  $\mu$ m thick. Hypothallus dark gray to black, obvious at thallus margin and between the areoles. Apothecia roundish, dispersed to crowded, 20100/cm<sup>2</sup>, subimmersed to immersed, ca. 0.4(1.0) mm diam.; disc plane to subconvex, black to blackbrown, matt, epruinose or with rusty pruina; margin thin, at first obvious or not, later mostly vanishing, black, matt. Excipulum  $\pm$  reduced; ectal zone brown to dark greengray, diffusely pigmented; inner zone graybrown to dark

brown; hyphae 3.55 um diam.; lumina ca. 1.02.0 um wide; medullary zone not obvious. Hypothecium reddish brown to dark violet brown; subhymenium colorless to pale brown, 2035 um thick. Hymenium (35)4055(60) um tall, colorless, I± bluish, Iconc.. Epihymenium olivaceous to dirty brown, 1015 um tall; paraphyses rarely branched and anastomosing, 1.52.5 um, apically 2.54.0 um thick. Asci ca. 4050 x 1113 um; outer amyloid wall layer I+ bluish, Iconc. ± bluebrown; axial mass c. 2 um thick, not always obvious. Spores ellipsoid, 811 x 4.57 um. Pycnidia immersed, ± globular, rarely ± cerebriform; conidia filiform, curved, ca. 1320 x 0.60.8 um. Cortex, medulla and excipulum K, P, C (no substances). On siliceous, occasionally inundated rocks close to rivers or waterfalls. .... M. plumbeoatra

**6. Not as above. .... 7**

**7. Excipulum often with algae. .... 8**

**7. Excipulum completely without algae.** Without lobaric acid. (This choice is not the best one; more info. needed) .... 9

**8. Thallus brown, without epinecral layer. Epihymenium brown to green. Sometimes with lobaric acid.** Thallus moderately to rather thick, at first areolate, the areoles 0.21.0 mm diam., angular to rounded or difform, becoming subsquamulose and slightly lobate and ascending, plane or slightly convex or concave, badius brown or rarely blackish brown, often shiny, contiguous or rarely partly subdispersed; medulla I; hypothallus blackish. Apothecia immersed, then adnate, 0.30.7 mm diam., rather thin, not constricted at base; disc plane or rarely becoming convex, black, epruinose, matt; margin becoming distinct, thin, not prominent, black, epruinose, often persistent. Hypothecium hyaline or pale; epithecium reddish brown; paraphyses strongly coherent, the tips clavate; spores 1015 x 56 um. Pycnospores 1630 um long. On granitic, gneissaceous, porphyritic or other siliceous rocks. .... M. deusta (Stenham.) Hertel & Rambold (syn. Lecanora deustata)

**8. Thallus pale gray to pale beige, with epinecral layer. Epihymenium olive. Without lobaric acid.** Thallus areolate; areoles 0.20.8 mm diam., mostly contiguous, flat to convex or verrucose, rarely a few minutely lobate, graywhite, gray or brownish gray, often glossy; superficial epinecral layer usually distinct. Apothecia 0.31.2 mm diam., immersed then usually soon becoming sessile, adpressed or ± constricted at base; disc flat to convex, brown to black, ± glossy; true exciple thin, often persistent, concolorous or paler than disc, brownish or green at outer edge, pale straw within, the inner part sometimes

containing algae; epithecium olivebrown, rarely brown. Spores 815 x 47 um. Thallus P, K, KC+ faintly pink, C; exciple ± faintly pink (miriquidic acid). On siliceous and metalrich rocks, rarely on wooden fending. Very variable. ....M. leucophaea (Flrke ex Rabenh.) Hertel & Rambold (syn. Lecidea leucophaea)

**9. Thallus (at least apparently) brownish to brownblack.**

**Apothecia rare; epihymenium brown; spores often not developed.**

Separate thallus usually not developed. Apothecia probably sitting indirectly on the blackened, dead thallus of a yellow Rhizocarpon species, the affected, blackened zone ca. 3 mm diam. Apothecia 0.10.4 mm diam., to 0.2 mm high, carbonaceous black, often densely crowded, appressed sessile, with constricted base, without visible margin, strongly convex. Epihymenium ca. 12 um high, dirty bluegreen. Hymenium (weakly delimited) 3540 um, colorless. Hypothecium to over 50 um high, dark brown, K. Excipulum 3045 um wide, carbonaceous, K. Paraphyses 2.02.5 um thick, apical cells weakly thickened, rarely branched, strongly conglutinate. Asci clavate, 8spored, 3035 x 1114 um, with large, strongly amyloid tholus. Spores oblong to oblongellipsoid, simple, 81216 x 3.54.05 um (L:W = 3:1). Pycnidia unknown. ....M. intrudens (Magnusson) Hertel & Rambold

**9. Thallus gray to beige gray. Apothecia often present;**

**epihymenium olive green. Spores 5.57 um.** Thallus of scattered to contiguous areoles; areoles ca. 1 mm diam., rounded, convex, often minutely lobate and becoming verrucose, graybrown to dark bluish gray, matt; superficial epinecral layer absent or indistinct. Apothecia to 0.31.2 mm diam., sessile, the base + constricted, black, flat to convex; true exciple usually persistent, greenish throughout or inner part brownish; epithecium olive green. Spores 913(14) x (4)57 um. On siliceous rocks by late snow patches. ....M. griseoatra (Flotow) Hertel & Rambold, chemotype 1

## Literature

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