

Fuscidea V. Wirth & Vezda
(LECANORALES)

after Poelt & Vezda, and others

Rev. 5/94

Thallus crustose, rimose to regularly areolate; pale brownish gray to dark brown or olive; medulla white; distinct marginal prothallus commonly present. Upper cortex undifferentiated, sometimes with a layer of brownish surface cells; lower cortex absent. Medulla usually I-, rarely I+ blue. Photobiont chlorococcoid.

Apothecia biatorine, immersed to sessile; disk red-brown to brown-black. Thalline exciple usually absent, at most poorly developed. True exciple \pm distinct, persistent or occulded, concolorous with disc or paler; inner part colorless or pale brownish; outer part brown or black-brown. Hypothecium colorless or pale straw; hyphae vertical. Epihymenium brown, the pigment partly granular. Hymenium colorless or sometimes pale brownish, I-. Paraphyses 1.5-2 μ m wide, simple or sparsely branched, weakly conglutinated in water, especially at the apices, becoming \pm free in K, a brown pigment surrounding the 1-2 uppermost cells; upper cell clavate, to 5 μ m wide. Asci 8-spored, subcylindrical to clavate, with a thin external and internal K/I+ dark blue cap, surrounded by a thick, K/I+ pale blue, gelatinous apical cap. Spores colorless, sometimes brown when old, \pm spherical to usually ellipsoid, rarely elongate, straight to curved or bean-shaped, typically simple (but to 7-septate if Ropalospora is included); walls moderately to strongly thickened.

Pycnidia immersed in thalline warts at thallus margin; pycnospores cylindrical, with obtuse apices, or ellipsoid, 2.5-5 x 1.2-2 μ m. Containing orcinol para-depsides and tridepsides; also fumarprotocetraric, alectorialic and fatty acids. On siliceous rock or rarely acidic bark, usually in nutrient-deficient sites in relatively moist regions, \pm temperate.

A segregate from Lecidea. Some authors lump Ropalospora under Fuscidea, but the most recent study supports their separation.

I. Thallus sorediate.

1. Medulla and soredia C+ orange to red. Thallus deeply and regularly cracked, thick; areoles to 0.4 mm diam., contiguous to discrete, flat to mostly warty convex, pale grey to dark brown, often turning reddish in herbarium, delimited by black prothallus, rounded, tuberculate. Soralia 0.2-0.5 mm diam., at first punctiform and rounded, pale greenish or ochre or cream-colored to grey-yellowish, soon becoming brownish, and \pm confluent, when old often craterform sunken. Apothecia very rare, to 0.8 mm diam., sessile, black; disc slightly convex; true exciple narrow; spores 9.5-12 x 3-4 μ m, bean-shaped. Soralia P+ yellow, KC+ red, UV+ faintly yellowish, with alectorialic acid. On \pm vertical, shaded, siliceous rocks, often under overhangs. E. praeruptarum

1. Medulla and soredia C-. 2

2. Soralia P+ red. Soralia occasional, discrete, pale yellow brown to pale greenish, at most under favorable conditions becoming corticate and then darker; very irregularly

distributed, rounded to oval or irregular in outline, 0.5-1.5(-2) mm wide, convex. F. cyathoides v. sorediata

2. Thallus and soralia P-. Thallus areolate or warty-areolate, whitish to grey or brownish gray; areoles 0.1-0.5 mm diam., usually contiguous, discrete, rounded and uneven-convex or tuberculate. Soralia 0.2-0.7 mm diam., at first whitish, soon becoming brownish and confluent, uneven, sometimes convex. Prothallus dark brown, thin, \pm visible between areoles and delimiting the thallus. Apothecia infrequent, 0.4-0.8 mm diam., sessile, black, rounded; disc flat to slightly convex; true exciple thin, conspicuous. Medulla and soralia UV+ white, with divaricatic and \pm nordivaricatic acids. On hard, often \pm vertical, siliceous rocks. F. recensa

II. Not Sorediate.

1. **On bark**, e.g. Betula and Alnus. Thallus rather thick. Not sorediate. see L. cyathoides (v. corticola)

1. **On rock**. 2

2. **Spores septate**. (Ropalospora lugubris (treated by Purvis, et al., 1992 as Fuscidea lugubris)

2. **Spores (when developed) simple**. 3

3. **Apothecia often gyrose, at least when older**. Spores, when developed, bean-shaped, 10 x 5-6 μ m. Apothecia sparse, between verrucae, often constricted at base, \pm uniformly dispersed, when young often regularly orbicular, but often from the beginning flexuose gyrose with the disc reduced to a winding furrow, sometimes dividing into 2-3 very irregular parts each with its prominent opaque margin, thus reaching 1-1.5 mm diam. Thallus broadly expanded, effuse, gray-brown to brown, verrucose; verrucae 0.3-0.6 mm wide and equally high, the younger ones broadly attached, convex or semiglobose, the older ones constricted at the base, subglobose or even subpodicellate, at least 0.5 mm high, easily loosening, smooth, partly irregular; subcontiguous, variable in shape, K-, C-; hypothallus brown-black, thin, \pm visible as an 0.6 mm wide margin and also between younger areoles. disc black, plane; margin flexuose, elevated, brown-black; excipulum dark brown; hymenium 60-65 μ m; epithecium dark brown; hypothecium 35 μ m, hyaline. Spores rarely developed, bean-shaped, Pycnospores 2-2.5 x 1 μ m. On granitic rock, Tennessee. F. gyrodes (Magn.) ined.

3. **Apothecia not gyrose**. 4

4. **Spores mostly curved, kidney-shaped**. 5

4. **Spores straight, ellipsoid to globose**. Apothecia without thalline collar, but in some species \pm immersed in thallus. 6

5. **Spores 9.5-13(-14) x (4-)5-5.5(-6) μ m**. Apothecia to 1.5 mm diam., immersed, with a cuff-like thalline exciple to closely sessile, rounded to strongly flexuose; disc brown-black, flat or \pm convex; ture exciple concolorous with, or often paler than disc, persistent or \pm disappearing. Spores bean-shaped. Thallus thin to rather thick, very variable, pale gray-fawn to dark gray, usually with a \pm strong brown tinge, rimose-cracked, rarely sorediate; areoles irregular, falt or, in part, uneven-convex, to 0.6 mm wide; prothallus dark brown or black, bordering thallus; often mosaic forming. Thallus P+ red, K+ brownish yellow, UV-, with fumarprotocetraric acid. On coarse-grained, nutrient-deficient, silicoues rocks, rarely (f. corticola on bark). F. cyathoides

5. **Spores (8.5-)9.5-12(-14) x 3.5-4(-4.5) μ m**, kidney-shaped. (F. recensa)

6. **Medulla I+ blue**. 7

6. **Medulla I-**. 8

7. **Apothecia immersed in the areoles or sessile on them**. Paraphyses 1.7-2.0 μ m thick below. 7a

7. **Apothecia situated between the areoles**. Paraphyses 2.5-3 μ m thick below.

7b

7a. Apothecia entirely immersed in the areoles or somewhat emergent. Apothecial margin virtually absent, or less commonly prominent; thallus usually smooth to rimose-areolate, less frequently dispersed areolate. Queen Charlotte Islands, British Columbia. F. thomsonii Brodo & Wirth

7a. Apothecia sessile to slightly immersed in thallus but with prominent apothecial margins. Queen Charlotte Islands, British Columbia. F. cf. thomsonii

7b. Thallus moderately thick; areoles verruciform. Hymenium (55-)60-65(-70) um; epihymenium 12-17 um. Asci 10-12 um wide, clavate. Spores broadly ellipsoid, for a long time globulose. New York. Superficially resembling a Rhizocarpon. F. lowensis

7b. Thallus thin; areoles plane, angular. Apothecial disc plane to slightly concave; margin persistent. Hymenium ca. 74-85 um; epihymenium ca. 20-30 um. Asci ca. 13-15 um wide, cylindrical to slightly clavate. Alaska. [Due to the lack of comparable information on many characters, it is uncertain whether this is a separate taxon; based only on the slight differences given here I would be inclined to lump it]. F. cf. lowensis ("Lecidea aleutica")

8. Apothecial margin thickish, prominent, persistent. Apothecia sessile, simple, not in distinct groups. Spores to 10 um long and 6 um wide. Prothallus distinct. 9

8. Apothecial margin thin and mostly soon disappearing, or inconspicuous.
..... 10

9. Spores (6-)8(-9.5) x (4-)5.5-6(-6.5) um, broadly ellipsoid. Apothecia often pruinose (v. caesiopallescens). Exciple dark. Medulla thin, K-. Thallus finely, deeply and regularly rimose-areolate, thick, whitish, ashy or brownish grey, often with violaceous tone, to dark gray; areoles 0.3-1 mm wide, irregular, flat; prothallus dark brown-black, delimiting. Apothecia 0.3-1 mm diam., sessile, rounded to slightly flexuose, discrete; disc black, flat to slightly convex; true exciple black, elevated. Medulla UV+ bluish white (divaricatic acid). On damp, serpentine rocks. F. mollis

9. Spores 8-10 x (4)5-6 um, ovoid. Apothecia not pruinose. Exciple paler. Medulla thicker, K+ yellow. Thallus rimose-areolate, grey-brown. F. scrupulosa

10. Asci Lecanora-type, with non-amyloid axial mass, without outer amyloid layer. On N-facing granitic rocks, New York. (Lecidella placidensis)

10. Asci Fuscidea-type, without axial mass, with outer amyloid layer. 11

11. Medulla P+ yellow. Thallus often strongly bullate areolate. Apothecia broadly sessile when young, constricted when old. Thallus pale to dark brown. F. subreagens

11. Thallus P-. Thallus of flat to convex areoles. Apothecia immersed or somewhat emergent. 12

12. Apothecia circular; thalline exciple distinct; asci at one level within apothecia. F. intercincta

12. Apothecia irregularly rounded; thalline exciple absent; asci at several levels within apothecia. Thallus of flat areoles. Apothecia immersed. Medulla UV+ bluish white, containing divaricatic acid. Thallus pale to medium gray often tinged brown, thick,

deeply cracked; areoles 0.5-2.5 mm wide, coarse, irregular, flat; prothallus usually well developed, brown-black, broadly delimiting. Apothecia usually numerous, to 3 mm wide; disc brown-black, flat, usually irregular and \pm angular; true exciple excluded, pale brown, narrow, with an epinecral layer. Asci commonly at varying lengths in the apothecium. Spores 8-11 x 5-7 μ m, broadly ellipsoid, becoming red-brown. On exposed, coarse-grained, siliceous and sandstone rocks in open situations. 13

13. Thallus grey white, finely rimose-areolate, UV+. Paraphyses capitate, dark. Apothecia dark brown to black, \pm pruinose. Exciple I-. F. kochiana v. albescens

13. Thallus grey, brown-grey or blackish. Apothecia \pm immersed. Prothallus dark or indistinct. Thallus often thickish. Hyphae thick-walled. F. kochiana v. kochiana

ADDITIONAL SPECIES:

F. lightfootii

F. subfilamentosa

Detailed Descriptions:

F. intercincta (Nyl.) Poelt

Thallus moderately thick, 0.2-0.4 mm, rimose-areolate to dispersed areolate or only rimose, pale to dark gray-brown to brown; areoles to 0.6 mm wide, irregular, flat to convex; prothallus black to brown-black, delimiting and \pm in patches within thallus. Soredia absent. Prothallus black, very conspicuous, surrounding and between patches of areoles.

Apothecia often numerous, 0.3-0.5(-0.6) mm diam., discrete or crowded, immersed or somewhat emergent, sessile, usually rounded, sometimes irregular; thalline exciple absent, or concolorous with thallus, very thin, halo-like and \pm elevated, often whitish; true exciple brown-black, paler in young apothecia, even, thick and prominent in mature apothecia or thin to almost excluded; disc black, unchanged when wet, flat to slightly convex, matt, rarely gnarled, often umbonate. Exciple very reduced in sunken apothecia, and consists of only a few parallel and anticlinal rows of hyphae bordering the hymenium. Hypothecium 50-80(-100) μ m, hyaline. Hymenium 45-80 μ m. Paraphyses simple to slightly branched, not or barely expanded at the tips, slightly pigmented brown in the walls at the tips of some of them. Asci with I+ light blue or yellow walls, and an expanded cap. Spores (8.5-)9.5-11.5(-13) x (4-)5.0-6.5(-8) μ m, colorless, broadly ellipsoid, L:W = 1.4-1.8, walls thin, without a halo.

Pycnidia rather strongly raised, black; conidia bacilliform, 3-3.5 x 1-1.5 μ m.

Med. UV+ blueish white (divaricatic acid).

On moist, often steeply inclined, siliceous rocks. Queen Charlotte Islands, British Columbia.

F. cf. lowensis ("Lecidea aleutica")

Thallus thin, brown to dark gray, matt, finely areolate; areoles \pm contiguous, plane, angular, mostly 0.3-0.5 mm wide; soredia and isidia absent; hypothallus thin, often indistinct, black. Hyphae conglutinate, "subdestructis", ca. 3.5-4.5 μ m thick. Algae protococcoid, numerous, ca. 6.5-10.5(-13) μ m diam.

Apothecia numerous (ca. 100 per square cm), mostly ca. 0.3-0.5 mm diam., adpressed, round, black, epruinose; disc plane to slightly concave, usually matt; margin slightly prominent, rather thin, \pm nitid, persistent. Hymenium ca. 74-85 μ m, hyaline. Epihymenium ca. 20-30 μ m, in part brown. Paraphyses loosely coherent, not gelatinous, simple to slightly branched, not distinctly septate, ca. 2-3 μ m thick, apices thickened to ca. 4.5 μ m, brown. Asci ca. 50 x 13-15 μ m, cylindrical to slightly clavate, the wall not distinctly thickened. Spores 8, monostichous, simple, broadly oblong, rounded at the apices, thin-walled, ca. 8.5-10.5 x 6.5 μ m. Hypothecium and excipulum hyaline, of thin hyphae or partly rather thick hyphae, densely arranged. Thallus K-, C-, KC-; medulla I+ blue. Apothecium inside entirely I+ blue, K-. On noncalcareous rock. Alaska.

F. lowensis

Thallus gray-brown, verrucose-areolate, moderately thick; areoles 0.2-0.5 mm across, verruciform, C-, K-, I+ deep blue; thallus below apothecia 0.3-0.4 mm thick, there almost without algae, on the sides the areoles thicker, with 100-200 μ m thick, dense algal layer. Algae 8-11 μ m diam., with scarce hyphae between them. Cortex little developed, 5-10 μ m thick

without visible cells, yellow brownish, with uneven surface. Medulla \pm lax or not, with numerous dead algae and air, \pm transparent or gray; hyphae 4-5 μ m thick, short-celled, thick-walled, intricate; cells ca. 1.7 μ m thick, \pm cylindric; lower or lateral side sometimes with exterior 5-6 μ m dark green brown.

Apothecia frequent, situated between the areoles, almost level with thallus, 0.4-0.6 mm diam. or sometimes composite and then to 1 mm; 0.25-0.3 mm thick; disk plane to slightly convex, brown-black; margin distinct, thin, paler, scarcely prominent, becoming excluded. Exciple with exterior 15-25 μ m thick laterally, and at the base dark brown with a bluish or violet shade, hyphae there anticlinal, 3.5-4.5 μ m thick; internally colorless and air-filled with radiating to intricate hyphae. Hypothecium hyaline, 50-60 μ m, without limit to the exciple and the hymenium, I+ dark blue; hyphae vertical. Hymenium (55-)60-65(-70) μ m, I+ dark blue. Epihymenium 12-17 μ m, dark brown, N- or indistinctly dark red-violet brown. Paraphyses distinct, \pm contiguous, 2.5-3 μ m thick, apices firmly conglutinated, thickened, 3.5 μ m, K+ green brown, \pm discrete in K. Asci 40-55 x 10-12 μ m, clavate, upper 8-10 μ m I+ darker blue. Spores 8, broadly ellipsoid, for a long time globulose, 8-10(-12) x 6-7 μ m, often with 1-2 guttules. On granitic rock. New York. Superficially resembling a Rhizocarpon.

F. mollis

Thallus clearly visible, thin, or thick in places, mostly continuous, rimose to areolate, grouped into patches in a mosaic pattern, pale, pinkish brown or pale gray to pinkish gray; soredia absent; edge indefinite. Prothallus black, conspicuous between patches of pale thallus.

Apothecia 0.5-0.8 mm diam., occurring singly, sessile to constricted at base, or almost raised on a stalk or stipe, flat when mature, smooth, without umbos; discs black or almost black, epruinose or sometimes lightly pruinose; margin prominent, smooth, thick, even, the same color as the disc close to the disc, or paler than the disc proximally. Exciple cyathoides-type, variable: dark or carbonaceous only at edge, pale to hyaline within, but filled with opaque brown granules, unchanged or paler with K, unchanged with N. Hymenium 65-87 μ m high, hyaline. Epihymenium brown, with inspersed or superficial granules, unchanged in K (except granules dissolve). Hypothecium colorless or almost so, distinct from exciple; tissue between exciple and hypothecium often very lax, almost creating a cavity. Paraphyses coherent in water, free in K; tips elongate, slightly expanded, or \pm capitate with a rounded apical cell, constricted below the apical cell or not, 3.8-5.2 μ m diam. Asci clavate, Fuscidea-type, but with a poorly developed gelatinous envelope. Spores 8.0-9.5-11 x 5.0-6.0-6.8(-9), L:W = 1.4-1.7; 8 per ascus.

Pycnidia common, brown, immersed. Conidia bacilliform to ellipsoid, 3.0-4.9 x 1.4-1.6 μ m.

Chemistry: Thallus medulla and cortex P-, K-, C-, KC-; medulla almost always I-. Contains divaricatic acid.

Ecology: On non-calcareous dry rocks on ridges and bluffs, low elevations.

Distribution: Alaska, Queen Charlotte Islands, Arctic Canada, New England.

F. recensa

F. scrupulosa

Thallus areolate, rimose, gray-brown, rather thin; areoles angular, plane, externally K- but thick sections in the microscope producing a distinct yellow mist, eventually reddish at least

in places, C-, I-, ca. 35 μ m thick; sections in water quite whitish gray without visible algae or hyphae, in K transparent. Cortex ca. 17 μ m thick, hyaline, the exterior 6-7 μ m dark brown; hyphae very intricate. Algae dense, often 2-4 together, thick-walled, 7-10 μ m diam., scattered through the thallus. Hyphae very intricate, 4-5 μ m thick, short celled, thick walled, lumina 1.6(-2.5) μ m thick.

Apothecia scattered, 0.5-1 mm diam., sessile; disc plane, often irregular in shape; margin flexuose, prominent, concolorous; ca. 250 μ m thick. Exciple 25-35 μ m thick throughout, dark brown, especially externally, also in K, while the interior part becomes paler, yellow olive, hyphae distinct, 5-6 μ m thick, thick-walled. Hypothecium colorless, confluent with medulla which is \pm lax, grayish white, with 3.5 μ m thick hyphae, the whole 130-150 μ m high; hypothecium and colorless parts of exciple I+ pale blue. Hymenium 50-80 μ m thick, I+ dark blue; lower limit very indistinct. Epihymenium 10-15 μ m, \pm dark yellow brown. Paraphyses distinct, \pm lax, 2-2.5 μ m thick; apices 3.5-4.5 μ m, \pm brown, discrete under pressure. Asci 25-50 x 10-12 μ m, swollen oblong, in one apothecium only asci I+ blue with upper 7-9 μ m dark blue. Spores \pm uniseriate, 8-10 x (4-)5-6 μ m, ovoid, not easily escaping. Pycnidia 170 μ m deep, 100 μ m broad near base; sterigmata 8-10 μ m long; pycnosporos 3-3.5 x 0.7 μ m. On granitic rock. Labrador.

F. subreagens

Thallus rather dark brown-gray; areoles smooth, without cracky or rough surface, K+ very faintly yellowish. Structure apparently similar to that of F. kochiana, and externally not distinguishable. Apothecia more prominent (or sometimes almost level with the thallus surface), usually \pm distinctly marginated; margin concolorous with disc, not or very slightly prominent; apothecia K+ distinctly yellow, especially the exciple. Exciple with exterior stratum uniformly dark brown, ca. 35 μ m thick, gradually colorless internally (vs. 35-50 μ m, pale brown and internally distinctly limited, in F. kochiana). Hymenium 65-90 μ m, with the asci at uniform height, therefore apparently more distinctly limited at the base than in F. kochiana. Epihymenium very dark brown. On granitic rocks. New York, West Virginia.

F. thomsonii

Thallus clearly visible, mostly continuous to dispersed areolate, \pm smooth or rimose to areolate, light to dark grayish brown or yellowish brown; soredia absent; edge definite, not lobate (but almost so). Prothallus usually present, black, conspicuous at thallus edge or between patches of pale thallus.

Apothecia 0.25-0.73 mm diam., occurring singly, either entirely immersed in thallus with disk level with thallus, or somewhat emergent; smooth, without umbos or rarely umbonate in part; discs black or almost black, epruinose; margin absent or even with disk to somewhat prominent, smooth, dark gray to dark brown, paler than the disk. Hymenium (45-)67-77(-90) μ m high, hyaline, or brownish above. Epihymenium brown, not at all granular. Hypothecium colorless or almost so, distinct from exciple. Exciple intercincta- to atlantica-type, dark or carbonaceous only at edge, pale to poorly defined within; unchanged with K or N; paraphyses 1.7-2.0 μ m thick, simple, or slightly branched at tips, slightly expanded but not constricted at septa, tips 3.1-4.0-4.7 μ m wide, pigmented for a third to half its length, coherent in water, free in K. Asci clavate, clearly double-walled, with a darkly IKI-staining, thick, inner layer and a

weakly amyloid, gelatinous, outer wall. Spores (6.2-)7.2-8.8-9.2(-11.2) x (4.6-)5.2-6.0-6.8(-7.2) um, L:W = 1.47-1.64, 8 per ascus.

Pycnidia brown-black, embedded in thallus, sometimes abundant and conspicuous, but can be rare or sometimes absent. Conidia bacilliform-ellipsoid, 3-3.5 um long.

Chemistry: Thallus medulla and cortex P-, K-, C-, KC-, UV++ blue-white; medulla I+ blue. Contains divaricatic acid.

Ecology: On siliceous, shoreline rocks in aerohaline zone, at stream edges or on ridges in subalpine habitats.

Distribution: Queen Charlotte Islands.

Lecidella placidensis

Thallus indeterminate, gray to dirty whitish, areolate, thin, K+ yellow, I-; areoles contiguous to approximate, 0.4-0.6 mm wide, ca. 0.3 mm thick, irregular in size and shape, convex with sloping edges, smooth, strongly adnate, separated by thin cracks or \pm isolated, slightly shiny; surface very uneven. Apothecia numerous, often between areoles, not or scarcely prominent, 0.4-0.6 mm diam., circular; disc black, sometimes thinly pruinose, plane or slightly convex; margin concolorous with disc, indistinct, hardly prominent, thin or often excluded. Excipulum sordid blue-green, ca. 50 μ m thick below the upper margin; epihymenium green-black; hypothecium hyaline, 50 μ m thick or more; hymenium 65 μ m; spores 8-14 x 5-6 μ m, ellipsoid. On N-facing granitic rocks, New York.

Literature

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