Pyrenula Massal. (s. lato)
(PYRENULALES: PYRENULACEAE)

After Harris, 1973, 1990, 1995, and others

Rev. November 16, 1998

Thallus crustose, uniform, endo- or more rarely epiphloic, continuous, areolate in some immersed species, whitish, grayish, pale greenish olive, yellow-olive to ochraceous, sometimes spotted with pigmentation, shining or matt, some species with scattered, minute maculae (x10 lens); ± effigurate, sometimes delimited by a thin, irregular, ± black fringe (prothallus); ± pseudocyphellate; ecorticate.

Perithecia immersed to erumpent or naked; ± globose to flattened, simple and solitary or crowded and 2-3 confluent, with fused walls and/or ostioles, globose, subglobose or ± flattened; ostioles erect, central (apical) or in some species marginal or lateral and ± horizontal, depressed to papillate; at least the outer part of wall usually completely carbonized, often with a distinct clypeus. Involucrellum dark brown to black spreading laterally to developed around and adhering closely to the exciple from which it is then not distinct, of fungal hyphae interspersed with bark cells and often crystals, K± reddish or violet, much thickened laterally, usually thinner at the base. True exciple brown to pale brown, entire or dimidiate (not developed below the cavity); sometimes basally columellate; crystals often dense at the wall lining the locule, of two types (1) colorless (calcium oxalate?) and (or) (2) orange (anthraquinones?) and K± orange or K± reddish purple. Hymenium gelatin I- or + greenish blue in parts, ± oil drops or crystals. Hamathecium at first of branched and anastomosed (rarely branched, not anastomesed, according to Awasthi), sparsely septate paraphysoids; ± unbranched, fine (1-2 um thick), septate paraphyses later developing from the base and replacing the paraphysoids; periphyses developed in the ostiolar canal; asci cylindrical to clavate, long-stalked, multilayered in structure, thickened at the apex with an internal apical beak and also with a refractive subapical cap, I-, without ocular chamber; discharge fissitunicate, the different wall layers extending to differing extents. Spores 8, usually biseriate, ellipsoid to narrowly ellipsoid or broadly fusiform, the apices rounded to apiculate, sometimes attenuated; transversely 3-septate (rarely to 7-septate), becoming olive to dark brown or blackish; distoseptate, the walls unevenly very thickened resulting in relatively small, lenticular or often angular or rhomboidal locules; with at least indications of eusepta in most transverse distosepta, with or without longitudinal septa; walls smooth, without perispore.

Pycnidia immersed; fulcrum exobasidial; pycnospores filiform, curved. Crystals, lichexanthone and/or anthraquinones often present; sometimes also phenolic substances. Mostly lichenized. Photobiont Trentepohlia. Mostly on ± smooth bark, mostly tropical (to temperate), in humid situations (especially rainforests).

This description may need some modification to include all the genera that Harris has recently lumped under this genus.

Most of the numerous species are tropical to subtropical, and my key to those is not yet complete. As far as I know the ones in the first key are the only ones definitely known from northern areas of N. America.

I. Northern Species.

1. Spore walls not thickened, lumina cylindrical. ..... (Eopyrenula spp.)

1. Spore walls thickened, lumina lenticular to subspherical. 2

2. Spores submuriform or with more than three transverse septa. 3

2. Spores with only three transverse septa. 4

3. Hymenium not inspersed; ascospores 13-16 x 4.5-6 um, **4-7-septate. Perithecia not more than 0.4 mm across. Thallus indistinct, commonly indicated by a whitish or yellowish coloration**. Florida; also Massachusetts and Delaware according to Fink. ..... P. apistea (Ach.) Ach.

3. Hymenium IKI+ pinkish orange, inspersed with small granules or droplets; spores 24-35(-46) x 10-15(-17) um; perithecia 0.4-0.8 mm across. Thallus olive, yellowish olive to tan or yellowish tan.. On bark of hardwoods. New York to Great Lakes area. ..... (abnormal forms of P. imperfecta)

4. Thallus UV+ bright yellow to yellow-orange (lichexanthone). 5

4. Thallus UV- (or very weakly + pale yellowish white); hymenium IKI- or IK+ pinkish orange; spores with terminal lumina separated from outer spore wall by a layer of endospore. 6

5. Thallus yellowish brown, with ± scattered, orange-brown flecks, which sometimes become ± continuous, rarely absent; pseudocyphellae absent. Perithecia 0.4-0.6(-0.7) mm diam., the surface K+ reddish purple in parts, lacking K+ purplish crystals inside the ascomatal wall. Spores (1-)3-septate, (17-)18-22 x (7-)8.5-10.5(-11) um. Pycnidia often frequent; conidia ± hooked, 20 x 1 um. Thallus P+ pale orange, K+ yellowish and + purplish in parts, KC- (unidentified anthraquinones), C-, UV+ golden yellow (lichexanthone). On smooth bark of hardwoods, in ± shaded, constantly humid woodland and sheltered stream valleys. Pacific NW. ..... P. occidentalis (R. C. Harris) R. C. Harris (see Ahti, et al., 1987)

5. Thalus grayish olive to pale green, ± thick, very smooth and often appearing waxy. Hymenium IKI+ bluish, heavily inspersed with oil; spores with terminal lumina directly against outer wall, 13-22(-24) x (7-)8-11(-12) um. Perithecia dark brown to black, dull to shiny, scattered or occasionally clustered and fused, 0.5-0.8 mm diam., at first immersed, becoming about one-half emergent, hemispherical; ostiole usually evident, flush with ascocarp surface or often raised in a small papilla; involucrellum dark brown, below mostly lacking or at least very thin; exciple brownish, indistinct; interthecial hyphae ca. 1 um thick, septate, not branched; asci cylindrical to somewhat clavate, not thickened at tip, 70-85 x 15-18 um; spores 8, mostly uniseriate, pale yellowish brown, not constricted at septa; terminal lumina smaller, often projecting and forming a small papilla at either end of the spore. Thallus yellowish-olivaceous or grayish green, often shiny, upper layer ca. 100 um thick, composed of compacted hyphae and bark cell remnants, somewhat cortex-like. Trentepohlia abundant, forming a definite layer. On bark of hardwoods. SE Canada to Great Lakes area, S to Louisiana; also reported from Pacific NW, but Harris, 1973 stated that western material seemed distinct enough to merit taxonomic recognition (as P. occidentalis). ..... P. pseudobufonia (syn.: P. neglecta)

6. Hymenium IKI+ pinkish orange, inspersed with small granules or droplets; spores 24-35(-46) x 10-15(-17) um. Thallus olive, yellowish olive to tan or yellowish tan, shiny, often with scattered minute white pseudocyphellae, translucent in section, 40-75 um thick. Trentepohlia abundant and well developed. Perithecia scattered, crowded or occasionally fused, brown-black, globose, subglobose, or occasionally somewhat flattened, mostly almost completely immersed, 0.4-0.8 mm diam.; ostiole usually flush

with surface, rarely raised; involucrellum usually entire, brown-black, often including colorless crystals, 50-100(-150) um thick, thinner below; exciple brownish, indistinct; interthecial hyphae ca. 1-2 um wide, septate, not branched and anastomosing; asci cylindrical-clavate, only slightly thicker at tip, ca. 100-115 x 25-35 um; spores 8, usually biseriate, light brown, broadly elliptical, commonly with true septa continuous with outer wall, terminal lumina shorter and broader than median ones, separated from outer wall by layer of endospore. On bark of hardwoods. New York to Great Lakes area. ..... P. imperfecta

6. Hymenium IKI-, not inspersed; spores 15-30 x 8-13 um. 7

7. Thallus silvery white or cream color to yellowish or greenish white, or immersed; spores with lumina separated only by endospore, lacking septa continuous with outer wall, 14-19(-21) x 7-9(-11) um. Thallus very thin; pseudocyphellae absent; prothallus generally absent. Perithecia 0.2-0.4 mm diam., at first immersed, flattened, becoming emergent, hemispherical. Involucrellum often spreading somewhat laterally, lacking K+ purplish crystals inside the perithecial wall. Thallus P-, K+ yellow, KC-, C-, UV-. On smooth bark of hardwoods, in oceanic woodlands. SE Canada and New England to Great Lakes area; Pacific NW; also to Louisiana and Florida according to Fink, but not mentioned by Harris, 1990, 1995. ..... P. laevigata

7. Thallus olivaceous; spores with septa between lumina continuous with outer spore wall, 22-30 x 8-12 um. Thallus shiny, without pseudocyphellae, translucent in section, composed of compacted hyphae and remnants of bark cells, ca. 75 um thick. Perithecia quite crowded, brown-black, globose or subglobose, occasionally somewhat flattened at the base, immersed, 0.5-0.7 mm diam., 0.35-0.5 mm in height; involucrellum entire, brown-black, including bark cells, without colorless crystals, 40-100 um thick, thinner below; exciplum brownish, not distinct; interthecial hyphae ca. 1-2 um, septate, not branched and anastomosed; asci cylindrical, not much thickened at tip, ca. 110-115 x 15-18 um; spores 8, uniseriate, light brown, fusiform-elliptical, 3-septate, commonly with true septa continuous with the outer wall, terminal lumina separated from outer spore wall by a layer of endospore, 22-30 x 8-12 um. On bark of hardwoods. Great Lakes area. ..... P. macounii

ADD:

Terminal locules separated from outer spore wall by a layer of endospore. .....

Spores 21-30 x 9-12 um. British Columbia; Alaska. ..... P. sp. (Harris, 1972)

Spores 19-22 x 7-7.5 um. British Columbia. ..... P. sp. (Harris, 1972)

ADD?:

Hymenium I+ pinkish orange, inspersed with small granules or droplets; spores 3-septate, 24-35(-46) x 10-15(-17) um, with terminal lumina separated from outer spore wall by a layer of endospore, sometimes submuriform. Thallus UV-. Distribution? ..... P. subelliptica (Tuck. in Lea) R. C. Harris (not mentioned by Harris 1995)

II-A. Southern Species.
Ascospores muriform.

1. Ascospores (2-)4(-6)/ascus, 100-150(-190) x 30-41(-48) um; ostioles lateral, sometimes several fused. Florida. ..... P. falsaria (Zahlbr.) R. C. Harris (Synonym: Anthracothecium falsarium)

1. Ascospores 8 per ascus, under 65 um long. 2

2. Thallus some shade of red, orange or yellow, occasionally only over ascomata, K+ purple. 3

2. Thallus not red, orange or yellow, K-. 6

3. Thallus red; hymenium inspersed; ascospores 30-42 x 15-20 um. On bark of hardwoods, Florida, Louisiana..... P. cruentata (Müll. Arg.) R. C. Harris

3. Thallus orange to yellow. 4

4. Ascospores with 4 rows of 4 locelli each, 13-23 x 9-13 um. Florida. ..... P. ochraceoflava (Nyl.) R. C. Harris (Synonym: Anthracothecium ochraceoflava)

4. Ascospores with 6-8 rows of up to 6-8 locelli each, 23-35 x 11-17 um. Florida. ..... P. ochraceoflavens (Nyl.) R. C. Harris (synonym: Anthracothecium ochraceoflavens)

5. Ascomata fused in groups by their lateral ostioles. 6

5. Ascomata solitary; ostioles apical. 9

6. Pseudostromata melanothecoid, looking much like an Arthonia except for the central ostiole; margins crenulate; ascomata recumbend, fused at the single ostiole; ascospores with 8 rows of locelli, 33-40 x 12-14 um. Florida. ..... P. sp. 208a (Harris 1995)

6. Pseudostromata pyrenastroid; pseudostromatal shells not completely fused into a flat Arthonia-like plate. 7

7. Spores (30-)33-42(-50) x (8-)13-18(-20) um, 1-3-septate longitudinally; ascomata usually distinctly recumbent. Spores 5-9(-11) septate transversely, 8/ascus, ovoid to ovoid-ellipsoid. Thallus greenish gray to straw-colored or buff, smooth to wrinkled and slightly warty; stromata elevated, to 2 mm diam., (2-)4-6-carpous; ascocarps 0.3-0.7 mm across, black, radially arranged, converging but not meeting; excipulum black, with oblique ostiolar canals united into a single pale white prominent ostiole; centrum I+ vinose. On trees, Florida, South Carolina and Texas. ..... P. astroidea (Fée) R. C. Harris

7. Spores over 45 x 18 um; ascomata often only at an angle, sometimes solitary. 8

8. Spores (38-)45-65(-76) x (16-)18-27 um, 4-5-septate longitudinally, 7-9-septate longitudinally. Thallus thin, smooth to somewhat wrinkled, waxy, greenish to yellowish brown; perithecia small, 0.3-0.6 mm across, black, flask-shaped, borne in slightly elevated stromata, radially arranged; escipulum black; ostioles minute, canal-like, convergent, brownish black with pale mouth. On trees, Florida and Texas. ..... P. ravenelii (synonym: Parmentaria ravenelii)

8. Spores 65-85 x 25-32 um (60-72 x 25-30 um in Florida specimen). Florida. .... P. sp. 47 (Harris 1997)

9. Thallus white, UV+ yellow (lichexanthone); ascospores 14-23 x 8-13 um. Florida. ..... P. confinis (Nyl.) R. C. Harris (Synonym: Anthracothecium corticatum)

9. Thallus UV-. 10

10. Postmature ascospores filled with red or colorless oily substance. 11

10. Postmature ascospores empty, collapsing. 12

11. Oily substance red; ascospores 40-53 x 17-22 um. Florida. ..... P. macularis (Zahlbr.) R. C. Harris (Synonym: Anthracothecium maculare)

11. Oily substance colorless; ascospores 37-51 x 14-19 um. Florida. ..... R. oleosa R. C. Harris

12. Ascospores 30-42)-53) x 11-15 um. Florida. ..... P. thelomorpha Tuck. (synonym: Anthracothecium thelomorphum)

12. Ascospores over 45 x 16 um. 13

13. Locelli large, often angular, in 8 rows of up to ca. 6 each; ascospores 45-60 x 16-22(-25) um. Florida. ..... P. leucostoma (Synonym: Anthracothecium leucostomum)

13. Locelli smaller, spherical, in 8-10 rows of up to 10 each; ascospores 50-62 x 18-24 um. 14

14. Ascospores (45-)50-65 x (18-)20-26 um, relatively narrow with pointed ends. Florida. ..... P. mucosa (Vainio) R. C. Harris

14. Ascospores 50-70 x 24-30 um, broad with rounded ends. Mississippi. ..... P. pyrenuloides (Mont.) R. C. Harris (Synonym: Anthracothecium pyrenuloides)

II-B. Southern species.
Ascospores transversely septate
or rarely with a few cells longitudinally divided

II-A-1. Ostiole lateral, or apical but several fused to form compound ascomata.

1. Ascospores with terminal lumina elongate and directly against exospore. 2

1. Ascospores with terminal lumina separated from exospore by a layer of endospore. 5

2. Several ascomata joined by fused ostioles; ascospores 17-21 x 7-7.5 um. Florida. ..... P. personata (Malme) R. C. Harris

2. Ascomata solitary. 3

3. Ascospores 45-65 x 20-25 um, often with 2-3 cells longitudinally subdivided. Florida. ..... P. erumpens R. C. Harris

3. Ascospores less than 35 um long. 4

4. Ascospores 25-32 x 10-13 um. Centrum I-, without oil globules; spores 3-septate, 22-27 x 10-12 um, the terminal locules triangular. Thallus whitish gray, smooth. Perithecia 0.5-1.0 mm diam., immersed in thalline verrucae; ostiole plane; excipulum black, crabonaceous, oblique. On bark of hardwoods, Florida, Louisiana. ..... P. cuyabensis (Malme) R. C. Harris

4. Ascospores 18-22(-25) x 7-9 um. On bark of hardwoods, Florida, Lousiana. ..... P. subferruginea (Malme) R. C. Harris

5. Ostiole surrounded by bright red ring, lateral; hymenium inspersed to top of asci; gel IKI-; ascospores uniseriate, 3-septate, soon dark brown, with darker bands between cells (usually obscuring septation), 18-24 x 10-14 um. Thallus olive green, areolate, UV+ whitish. Ascomata flask-shaped, ca. 1.0 x 0.5 mm; crystals absent. Georgia. ..... P. wetmorei R. C. Harris

5. Ostiole not red ringed. 6

6. Several ascomata joined by fused ostioles. 7

6. Ascomata solitary. 8

7. Ascospores 21-25 x 8-10 um; numerous crystals around ostiole. Florida. ..... P. cubana (Müll. Arg.) R. C. Harris

7. Ascospores 16-21 x 6-8 um; crystals absent. Superficial thallus thin, yellowish brown, smooth to becoming slightly roungh and cracked. Perithecia 0.2-0.6 mm across, partly immeresed, the whitish ostiole protruding, the superficial portion convex, black; tinged brownish within; asci cylindrico-clavate; spores 8/ascus, ellipsoid, tinged bronw, 3-septate, 16-18 x 5-6.5 um. On trees, Florida, Louisiana. ..... P. septicollaris (Eschw.) R. C. Harris

8. Hymenium inspersed, the gel IKI+ orangish; ascospores biseriate, 4-celled, pale brown, acute at both ends, 13-17 x 5-6 um. Thallus not evident. Ascomata flask-shaped, ca. 0.4-0.3 mm; ostiole lateral; crystals absent. Florida. ..... P. wheeleri R. C. Harris

8. Hymenium not inspersed. 9

9. Ascospores 18-25 x 8-10 um; hymenial gel IKI+ blue-green or IKI-. Florida. ..... P. microtheca R. C. Harris

9. Ascospores 37-45 x 15-22 um; hymenial gel IKI+ orangish. Florida. ..... P. martinicana (Vainio) R. C. Harris

II-A-2. Ostiole apical, erect

(pseudostromatic shells may be laterally fused to form extensive pseudostromata in P. anomala).

1. Ascospores fusiform-clavate, tapering to a long tail, in a single bundle in the ascus, 7-10-celled, 60-70 x 4.5-5 um; asci markedly clavate; hymenium inspersed, I-; thallus UV-, not pseudocyphellate. On shrub at edge of salt marsh, Florida. ..... P. sp. 30018 (Harris 1995)

1. Ascospores elliptical or fusiform, not tapering to a tail. 2

2. Ascospores over 21 um long (if thallus ecorticate see P. microcarpa). 3

2. Ascospores less than 21 um long (to 25 um in P. microcarpa). 10

3. Thallus orange or red at least near the ascomata. 4

3. Thallus greenish when fresh, whitish to brown in herbarium. 5

4. Thallus orange, pseudocyphellate; ascospores 26-42 x 12-15 um. Florida. ..... P. cerina Eschw.

4. Thallus red, in shade forms pigmented only near ascomata; hymenium heavily inspersed; ascospores 27-35 x 13-17 um. Florida. (see Fink, under Melanotheca cruenta & M. subincruenta). ..... P. cruenta (Mont.) Vainio

5. Postmature ascospores with red or colorless oily substance. 6

5. Postmature spores empty, collapsing. 7

6. Oily substance red; ascospores 4- or 6-celled, 28-34 x 12-15 um. Spores 5-septate (strict sense) or 3-septate ("P. bahiana"). On bark of hardwoods, Florida, Louisiana. (see Fink, under Melanotheca) ..... P. concatervans (Nyl.) R. C. Harris s. lato

6. Oily substance colorless; ascospores 4-celled, 28-35(-40) x 10-15(-17) um. On bark of hardwoods, Florida, Louisiana. ..... P. quassiaecola Fée

7. Ascospores apiculate or at least pointed at one or both ends, rather dark brown when mature, 22-29 x 9-11 um; hymenium inspersed only in a layer just below ostiole; hymenial gel I-. Florida. ..... P. acutalis R. C. Harris

7. Ascospores with rounded ends; hymenium not inspersed; hymenial gel I+ orange. 8

8. Ascospores 44-50(-56) x 17-24 um. On Ficus. Florida. ..... P. sp. 29916 (Harris 1995)

8. Ascospores reaching 45 x 18 um. 9

9. Thallus UV-; ascospores 27-38 x 12-18 um; gelatinous sheath lacking dark terminal caps. Not common, Florida. ..... P. punctella (Nyl.) Trevisan

9. Thallus UV+ yellow (lichexanthone) or UV-; ascospores 36-45 x 12-17 um; ascospore sheath gelatinous with dark terminal caps. Florida. ..... P. caryae R. C. Harris

ascospores 32-42 x 13-17 um; hymenial gel IKI+ orangish. On bark of hardwoods, Florida, Lousiana, S. Carolina, Ohio. ..... P. punctella (Nyl.) Trevisan

10. Ascospores with terminal lumina directly against exospore; hymenial gel IKI+ blue-green. 11

10. Ascospores with terminal lumina separated from exospore by an obvious layer of endospore (but endospore very reduced in P. tenuispora). 14

11. Hymenium not inspersed. 12

11. Hymenium inspersed. 13

12. Thallus UV+ yellow (lichexanthone); pseudostromatal wall lacking crystals; ascospores 18-21 x 10-13 um. Florida. ..... P. cocoes Mull. Arg.

12. Thallus UV-; pseudostromatal wall containing colorless crystals; ascospores 18-20 x 11-12 um. Florida. ..... P. nitidula (Bresadola) R. C. Harris

13. Thallus UV-; ascomata 0.3-0.6 mm across; ascospores often citriform, 14-18 x 8-10 um. Florida. ..... P. citriformis R. C. Harris

13. Thallus UV+ yellow (lichexanthone); ascospores 13-22 x 8-11 um, 3-septate. Hymenium IKI+ bluish. Great Lakes Region to Florida. ..... P. pseudobufonia (Rehm) R. C. Harris

14. Ascomata fused laterally to form an extensive pseudostromata (melanothecoid). 15

14. Ascomata solitary. 18

15. Ascospores with a distinct dark brown median plate or sometimes in old spores plates between all four lumina, 18-20 x 7-8 um; thallus brown to blackish brown. On Ilex. Florida. ..... P. atrolaminata R. C. Harris

15. Ascospores ± uniformly colored; thallus usually tan to yellow-brown. 16

16. Ascospores with thicker endospore. Florida. ..... P. sp. 6121 (Harris 1995)

16. Ascospores with thin endospore, 17-21 x 7-9 um. 17

17. Pseudostromata raised, not forming extensive network, brown, with crowded ascomata. Ascospores 17-21 x 7-9 um. On bark of hardwoods, Florida, Louisiana. Common. ..... P. anomala (Ach.) Vainio

17. Pseudostromata flush with thallus, forming an extensive network, shiny black, with scattered ascomata. ..... P. sp. 415 (Harris 1995)

18. Thallus ecorticate, white; ascospores 19-25 x 8-12 um, pale; hymenial gel IKI-. Perithecia 0.2-0.25 mm diam. On bark of hardwoods, S. Carolina to Florida, west to Texas, very common. ..... P. microcarpa Müll. Arg. (synonym: P. texana, P. cinerea; Parathelium microcarpum) (=? Pyrenula microtheca)

18. Thallus corticate. 19

19. Ascomata large, 0.7-1.5 mm across, flattened conical. 20

19. Ascomata smaller, to 0.7 mm. 22

20. Hymenium heavily inspersed; ascospores 15.5-21 x 5.5-8 um. On bark of hardwoods, Florida, Louisiana. ..... P. marginata Hook. in Kunth

20. Hymenium not inspersed; ascomata with a thin translucent thalline covering. 21

21. Ascospores 15-19 x 6-8 um. On bark of hardwoods, Florida, Louisiana. ..... P. santensis (Nyl.) Müll. Arg.

21. Ascospores 12.5-15.5 x 4.5-5 um. Florida. ..... P. sp. 30313 (Harris 1995)

22. Endospore very reduced; ascospores 14-17 x 5-7 um. Florida. ..... P. tenuispora R. C. Harris

22. Endospore developed. 23

23. Endospore with a distinct, additional layer around lumina. 24

23. Endospore uniform. 25

24. Endospore with additional layer around lumina; ascospores 17-19 x 7.5-9 um; ostiole usually red-pigmented, K+ blue. Florida, Louisiana. ..... P. rubrostoma R. C. Harris

24. Endospore with darker bands between the lumina; ascospores 15-19 x 6-7.5 um; ostiole not pigmented. Florida. ..... P. confoederata R. C. Harris

25. Hymenium not inspersed; ascospores 13-16 x 4.5-6 um, 4-7-septate. Perithecia not more than 0.4 mm across. Thallus indistinct, commonly indicated by a whitish or yellowish coloration. Florida; also Massachusetts and Delaware according to Fink. ..... P. apistea (Ach.) Ach.

25. Hymenium inspersed; ascospores 13-15 x 4.5-6 um. Thallus scanty or well developed. Florida. ..... P. laetior Mull. Arg.

ADDITIONAL SPECIES IN GROUP II:

Spores 4-7-septate

Perithecia not more than 0.4 mm across. Thallus indistinct, commonly indicated by an ashy coloration. ...(see Eopyrenula leucoplaca)

"P. farrea pluriloculata" = ? Eopyrenula leucoplaca

ADDITIONAL SPECIES (GROUP I OR II)

Thallus olive-black, with white pseudocyphellae. Perithecia 0.5-0.6 mm diam.; hymenium not inspersed, gel I+ slightly orange; spores 12-15(-16.5) x 4-5(-6) um, with an unusual sinuate outline in optical section. On bark of hardwoods, Louisiana. .....P. aquila R. C. Harris (not mentioned by Harris 1995)

P. maculata (R. C. Harris) R. C. Harris

ADD (species formerly in Parathelium; change endings of epithets to belong in Pyrenula)

P. micheneri R. C. Harris
P. furvella R. C. Harris
P. plittii R. C. Harris
P. confoederata R. C. Harris
P. lucifera R. C. Harris

Excluded

P. subaggregata Müll. Arg. not in N. America (Harris, 1989 [1990?)

Descriptions of Species

P. atrolaminata

Thallus chestnut brown initially but soon blackening to blackish brown, corticate, not pseudocyphellate, UV-. Ascomata partly solitary, hemispherical, ca. 0.5 mm diam. but mostly laterally aggregated into slightly raised, blackish pseudostromata containing several to c. 30 ascomata, initially appearing pruinose due to disrupted bark cells; ostioles dark; crystals lacking. Hymenium not inspersed; hymenial gel I-. Ascospores subbiseriate, 4-celled, 18-20 x 7-8 um, with a dark brown median plate and occasionally in older ascospores all three septa with brown plates.

P. caryae

Thallus usually yellowish or yellowish tan but occasionally green, corticate, somewhat shiny, usually with a waxy look, pseudocyphellate, UV+ yellow (lichexanthone) or less often UV–. Ascomata flask-shaped, 0.5-0.8 mm diam., immersed, often entirely covered by thallus with only the pale ostiole visible, in some (with age?) the black ascomatal apex exposed; numerous colorless crystals in upper ascomatal wall. Hymenium not inspersed; hymenial gel I-. Ascospores subbiseriate to uniseriate, 4-celled, (30-)36-45(-50) x 12-17(-21) um, with a darker pigmented median band and with a brownish apical cap at both ends (outside the expospore) which in fresh material is often reflexed, looking like a little sombrero, gelatinous sheath otherwise not readily evideent. Alabama, Arkansas, Florida, Georgia, Mississipi, Missouri, North Carolina, South Carolina.

P. laevigata (Pers.) Arnold

Thallus white or cream color, UV-; spores with lumina separated only by endospore, lacking septa continuous with outer wall, with terminal lumina separated from outer spore wall by a layer of endospore, 15-19(-21) x 8-9(-11) um. Hymenium I-, not inspersed.
Great Lakes area (see Harris, 1973).

P. macounii R. C. Harris

Thallus olivaceous, UV-. Ascospores with septa between lumina continuous with outer spore wall, with terminal lumina separated from outer spore wall by a layer of endospore, 22-30 x 8-12 um. Hymenium I-, not inspersed. Great Lakes area (see Harris, 1973).

Index

November 16, 1998

corticata (Müll. Arg.) R. C. Harris Syn.: Anthracothecium corticatum
cruenta (Mont.) Vainio Syns.: Melanotheca cruenta, M. subincruenta
cruentata (Müll. Arg.) R. C. Harris Syn.: Bottaria cruentata
cubana (Müll. Arg.) R. C. Harris Syn.: Pyrenastrum cubanum
cuyabensis (Malme) R. C. Harris Syn.: Parathelium cuyabense
erumpens R. C. Harris Syn.: Parathelium emergens
falsaria (Zahlbr.) R. C. Harris Syn.: Anthracothecium falsarium
laetior Müll. Arg. (Harris 1995a)
laevigata (Pers.) Arnold
leucostoma Ach. Syns.: Anthracothecium leucostomum, Parmentaria rappii
lucifera R. C. Harris
macounii R. C. Harris
macularis (Zahlbr.) R. C. Harris Syn.: Anthracothecium maculare
maculata (R. C. Harris) R. C. Harris
mamillana (Ach.) Trevisan (fide R. Harris)
martinicana (Vainio) R. C. Harris Syn.: Parathelium martinicanum
micheneri R. C. Harris
microcarpa Müll. Arg.
microtheca R. C. Harris Syn.: Parathelium microcarpum
mucosa (Vainio) R. C. Harris (Harris 1995a)
nitidula (Bresadola) R. C. Harris ined. (Harris 1995a)
occidentalis (R. C. Harris) R. C. Harris
ochraceoflava (Nyl.) R. C. Harris Syn.: Anthracothecium ochraceoflavum
ochraceoflavens (Nyl.) R. C. Harris Syn.: Anthracothecium ochraceoflavens
oleosa R. C. Harris
personata (Malme) R. C. Harris
plittii R. C. Harris
pseudobufonia (Rehm) R. C. Harris
punctella (Nyl.) Trevisan
pyrenuloides (Mont.) R. C. Harris Syn.: Anthracothecium pyrenuloides
quassiaecola Fée
ravenelii (Tuck.) R. C. Harris Syn.: Parmentaria ravenelii
rubrostoma R. C. Harris
santensis (Nyl.) Müll. Arg.
septicollaris (Eschw.) R. C. Harris Syns.: Pyrenastrum fuscum, P. pyrenastraeum
subelliptica (Tuck.) R. C. Harris
subferruginea (Malme) R. C. Harris Syn.: Parathelium subferrugineum
tenuisepta R. C. Harris
thelomorpha Tuck. Syn.: Anthracothecium thelomorphum
wetmorei R. C. Harris
wheeleri R. C. Harris

bahiana Malme = P. concatervans
brunnea Fée = misidentifications for North America
cinerea Zahlbr. = P. microcarpa
farrea auct. = Eopyrenula leucoplaca
fulvella R. C. Harris = P. personata
glabrata (Ach.) A. Massal. = P. laevigata
herrei Fink = Arthopyrenia plumbaria
imperfecta (Ellis & Everh.) R. C. Harris = P. subelliptica
leucoplaca (Wallr.) Körber = Eopyrenula leucoplaca
leucoplaca var. pluriloculata Fink = Eopyrenula intermedia
mamillana (Ach.) Trevisan = misidentifications for North America
marginata Hook. = P. mamillana
megalospora Fink = Acrocordia megalospora
neglecta R. C. Harris = P. pseudobufonia
nitida (Weigel) Ach. = misidentifications for North America
nitidella (Flörke ex Schaerer) Müll. Arg. var. maculata R. C. Harris = P. maculata
pinguis (Sprengel) Fée = misidentifications for North America
subaggregata Müll. Arg. Not in North America
texana Tuck. ex R. C. Harris = P. microcarpa
xyloides (Eschw.) Müll. Arg. = P. mamillana

Non-North American Species

P concastroma

Thallus grayish brown, corticate, not pseudocyphellate, UV-. Pseudostromata sessile, constricted at base, mostly oval, c. 2 x 1 mm, occasionally fused into larger groups, brown, filled with large oxalate (?) Crystals and a whitish powder bleeding yellow in K. Ascomata many/pseudostroma with apical ostioles. Hymenium not inspersed. Hymenial gel I+ orangish. Asci with 8 biseriate spores. Ascospores 4-celled, becoming filled with reddish oily substance as contents disintegrate, 31-40 x 15-16 um. Puerto Rico.

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