

III. ON BARK OR WOOD.

Rev. 1/94

This group is the most difficult one, partly because there are so many species, including a lot of unpublished ones on which I have little info.

1. Spores pale brownish gray, often almost cylindrical; wall very thin (ca. 0.5 μ m), appearing uniform under light microscope. Thallus immersed to superficial and then brownish gray. Apothecia biatorine to mostly lecanorine; disc dark brown to black; margin mostly dark brown. On calcareous rock, or on wood. Rinodinella (see R. lobulata at end of key; other species may also belong in this segregate genus; if hypothecium light or dark brown, see Amandinea milliaria and A. dakotensis).

1. Spores usually dark, greenish then dark brown, usually \pm ellipsoid, to oblong; wall thicker, several-layered (examine under 100x oil immersion lens!), with a mostly very thin, often scarcely visible outermost gelatinous layer, then a thin outer layer, then a very thin, tenacious inner layer, which forms the septum, and finally a thin to very thick innermost gelatinous layer around the lumina. Thallus and apothecial color and morphology and ecology various. Rinodina

III-A-1. On bark or wood.
Thallus with minute granules
(vegetative propagules that are neither soredia nor isidia)

1. Granules very dark (blackish) on a gray thallus; epihymenium bluish, K+, N+ violet/reddish purple. Northern Great Plains, southern Boreal. Thallus blue-gray or dark gray or black to blue-black, continuous or more usually cracked, lumpy, warty-granular to blastidiate, sorediose and sometimes composed only of soredia and consoredia, indeterminate, thin or disappearing; prothallus inconspicuous. Apothecia not frequent, scattered or grouped, sessile, 0.35-0.45(-0.7) mm diam., lecanorine, the margin thick (0.05 mm), entire and persistent, concolorous with thallus or lighter; disc black, smooth to warty-granular, becoming only slightly convex. Epihymenium gray or bluish to greenish gray, 10-15 µm. Hymenium (60-)70-80(-100) µm, hyaline; hypothecium 70(-115?) µm, hyaline to slightly yellowish or beige. Parathecium fan-shaped, to 40 µm wide above. Cortex to 50 µm, I-. Outer zone of apothecial margin on upper side gray pigmented, K+ violet. Asci clavate, 70-80 x 10-15 µm. Paraphyses simple or branched, with clavate to capitate apical cells 3-5 µm wide; pigment deposited between the paraphyses tips. Subhymenium to 40 µm. Spores tunicata-type (according to ?; changing during their development from pachsporaria-type through physcia-type to mischoblastia-type, according to Ropin & Mayrhofer, 1995), polarlocular, with lumina angular or irregular at first, becoming rounded, without torus, smooth, thick-walled, (12-)17-20(-23.5) x (5.0-)7-9(-11.5) µm. Pycnidia not found. Soredia K-, C-; upper surface gray-pigmented, C+, K+ and N+ violet. No substances. On bark or wood or hardwoods. Washington and British Columbia and Great Lakes region.

..... R. colobina (Ach.) Th. Fr.

1. Granules a similar color to thallus; epihymenium brown, K-, N-.
Western. 2

2. Thallus with glaucous surface; granules limited to margins of areoles; apothecia erumpent; spores Physcia-type, not markedly elongate when young. Xeric. Areoles typically developing marginal granules. Spores (13-)17-20 x (6-)8-11 µm, polarlocular, persistently thick-walled, not dilated in K, the lumina becoming rounded but retaining thick apical wall. Thallus brownish, continuous to rimose, ± lobate at margin, K-, P-, smooth, ± waxy. Apothecia sub-immersed, becoming convex. Hypothecium pale brownish. Southwestern. R. juniperina Sheard ined.

2. Thallus matt; granules developing across surface of thallus; apothecia not erumpent; spores dubyana-type, elongate-ellipsoid when young. Mesic. R. rivula Sheard ined.

III-A-2. On bark or wood.

Thallus sorediate, isidiate, or papillate.

Apothecia often absent or rare; spores 8/ascus.

1. Thallus and apothecial margin greenish yellow. Apothecia 0.3-0.8 mm, plane, black. Hymenium 100 µm. Paraphyses tips 5-7 µm. Spores Pachyosporaria-type, 20-24 x 11-13 µm. Chem.: thiomelin and zeorin. On bark, Eastern coastal plain, south to Florida. R. lepidia (Nyl.) Müll. Arg.

1. Thallus and apothecial margin gray, brown, or not evident. 2

2. Thallus K+ lemon yellow, P-, K-, P+ cinnabar (red-orange), or K+ yellow, P+ orange-red. 3

2. Thallus K-, P-. 6

3. Thallus K+ yellow, P+ orange-red (stictic acid). Thallus usually endophloedal in esorediate parts. Soralia 0.4-0.5(-0.8) mm diam., pale green or grayish to grayish blue, usually discrete; soredia 15-20 µm, forming consoredia to 50 µm diam.; exposed surface of external soredia with brown pigment in cell wall of hyphae. Areoles, when present, pale gray, convex, to 0.20-0.25 mm diam., merge to form minutely verrucate, more angular areoles, to 0.6 mm wide. Thallus indeterminate; hypothallus dark brown, fimbriate. Apothecia sessile, broadly attached, to 0.6-1.1 mm diam.; disc black, persistently plane; margin concolorous with thallus; surface often rough, prominent, ca. 0.15 mm wide, entire and persistent. Spores with callispore-like locules when immature, then with physcia-like locules and a septal disc, and finally pachysporaria-type, 19.7-(23.8-25.3)-29.4, 24.5 x 13.2, 10.5-(12.8-13.6)-15.9 µm; walls not ornamented. Chem.: stictic with traces of satellites, atranorin, ± chloratranorin, zeorin. On hardwood bark, Washington. R. stictica Sheard & Tonsberg

3. Thallus either K+, P- or K-, P+. 4

4. Thallus K+ lemon yellow, P- (atranorin); soredia whitish, contrasting with grayish thallus; spores Physcia-type when apothecia present. [also see R. griseosoralifera, which contains atranorin but apparently in quantities too low to be detected by K]. R. degeliana Coppins (syn. R. soredifera Sheard in herb.)

4. Thallus K-, P+ cinnabar (pannarin). 5

5. Apothecia always present; spores pachysporaria-type, averaging 24.3-25.8 x 13.2-14.1 µm; thallus ± continuous at maturity. Thallus granular-sorediate to coralloid. Medulla P+ orange. Spores 8, ± Physcia-type (21-30)25 x 13.5(13-16) µm, with walls thickened at apices and septum, finally ± evenly thin-walled and constricted at center. Thallus to 2 cm diam., thick, becoming slightly coralloid, grayish olive with coralloid portions brown tipped; hypothallus absent; K+ faint yellow. Apothecia few but crowded, sessile, 0.5-1.0 mm wide; thalline margin thick, crenulate, becoming pulverulent; proper margin thin but turgid and raised; disc plane, black, lightly white pruinose or epruinose. Hymenium 80-100 µm; epithecium orange-brown. On bark, boreal, mainly eastern, but also in British Columbia. R. willeyi Sheard, ined.

5. Apothecia rarely present; spores Physcia-type, averaging 17.9-18.8 x 9.8-10.3 µm; thallus consisting of ± discrete areoles. Thallus effuse, often occurring as small patches among

other lichens, composed of scattered to contiguous areoles; areoles 0.1-0.5 mm wide, brown-white or brown-gray, sometimes with greenish tinge, matt, \pm flat or slightly convex, usually remaining discrete and appearing as minute flattened squamules, ca. 80-100 μ m thick. Soralia scattered, sometimes becoming confluent but not forming a continuous leprose crust, erupting from surface or margins of areoles, 0.2-0.8 mm across; soredia whitish, pale greenish or dull greenish yellow, often tinged brownish. Apothecia extremely rare. Thallus P+ red, K-, C-, UV-, containing pannarin. On acid bark, especially of horizontal branches, on Betula papyrifera, Alnus spp., and rock, usually on dead or dying thalli of Parmelia s. str. Not uncommon in wet belt of southern interior of British Columbia; southern Ontario. Similar to Fuscidea lightfootii, which is P-, UV+ white (divaricatic acid). R. efflorescens Malme (syn. R. sp. 1 of Noble, R. farinosa Sheard in herb.)

6. Thallus with distinct soralia; zeorin present; spores Physcia-type, averaging 22.3-26.2 x 11.6 x 13.7 μ m. Alaska. Spores 16-30(-35) x 8-17 μ m. Soralia yellow, yellow-brown, or pale brown, or where the external soredia have been shed, yellowish-green or green, usually discrete, irregularly rounded, \pm convex, to 0.5 mm diam. Spore torus prominent; walls not pitted. Thallus usually glaucous, \pm areolate to continuous. Apothecia absent or sparse to abundant, \pm erumpent, to 0.5 mm wide. Soralia C+ orange or C-. Containing zeorin and unknowns. R. sheardii Tonsb.

6. Thallus granular-sorediate or isidiate. 7

7. Thallus isidiate or papillate (sometimes also sorediate in R. excrescens). 8

7. Thallus granular-sorediate, without isidia or papillae. 11

8. Spores \pm Buellia-type, 15-20 x 7-20 μ m. Thallus medium greenish gray, usually entirely covered by coralloid and upright to digitate-constricted and dorsiventrally oriented isidia. Apothecia usually scarce, adnate (to sessile and constricted), to 0.8 mm; discs plane; margin prominent. Hymenium 85-100 μ m. Thallus K-, P-. On wood. British Columbia. R. excrescens Vainio (syn. R. thujae (Magn.) Sheard)

8. Spores dubyana-type or pachysporaria-type. 9

9. Spores dubyana-type, many swollen at septum particularly when young, averaging 18.6-20.7 x 9.6-10.5 μ m. Pacific NW. R. thomsonii Sheard ined. (syn. R. isidiata Sheard ined.)

9. Spores pachysporaria-type, not swollen at septum, averaging >18.5 μ m long. Not from Pacific NW. 10

10. Epihymenium reddish orange. Southeastern coastal plane. Thallus light gray, composed almost entirely of light gray granules developing into minute isidia. Spores 15-19(-21) x 6.5-8.5(-10) μ m. Epihymenium yellowish brown to olivaceous brown, filled with a yellowish orange pigment reacting K+ purple rose, N-, C-. Large parts of thalline and apothecial tissues also containing this pigment. Oceanic. R. colobinoides (Nyl.) Zahlbr. (syn. R. erysiphaea (Nyl.) Zahlbr.)

10. Epihymenium brown. Great Lakes-northeastern. Thallus surface plane, with papillae developing. Thallus cortex with outer necrotic layer. Spores Pachysporaria-type, with \pm uniformly thick walls, and rounded lumina ca. half spore breadth; thallus

continuous, plane, usually developing papillae; cortex with outer necrotic layer. Thallus almost lead gray, effuse, thin, K-, C-, P-; hypothallus indistinct. Apothecia frequent, immersed (and with disc \pm covered by margin) then adpressed to subsessile with exposed disc, 0.5-0.7 mm diam.; thalline margin thin, slightly elevated, becoming smooth; disc brown-black, plane to slightly convex. Hypothecium hyaline. Hymenium 100 μ m. Paraphyses lax; tips 3 μ m in K. Spores 17-19 x 8-9 μ m; septum distinct. On bark of juniper, Wisconsin. R. papillata Magnusson

11. Spores Physcia-type, averaging > 25 μ m long. Pacific NW. Sphaerophorin present. Thallus episubstratal, indeterminate, irregularly spreading, to 10 cm or more across, sorediate. Prothallus distinct in some specimens, forming \pm radiating bundles of brown hyphae, ramifying on, between or below the uppermost hyaline bark cells of the substratum. Areoles usually distinct, sometimes lacking, grayish white, pale grayish green to green, sometimes with a brown tinge, discrete and scattered or, rarely, some becoming contiguous and \pm fused, circular to irregular in outline, usually convex, sometimes constricted at base, sometimes blister-like, to 0.3 mm diam. Soralia green or greenish brown, discrete and scattered, diffuse, sometimes becoming contiguous forming a thick crust which secondarily cracks, hard, rough, not compact, efflorescent, diffuse, very irregular in form and size. Soredia in firm, irregularly elongate, sometimes \pm flattened consoredia (to 120 x 60 μ m), not easily separated in squash mounts; wall distinct, of colorless, \pm globose cells. Photobiont green, globose, to 13 μ m diam. Apothecia sparsely or, more rarely, abundant, lecanorine, to 1.3(-2.0) mm diam.; thalline margin \pm concolorous with thallus, often crenulate, often with soralia, to 0.2 mm wide; proper exciple sometimes distinct, to 0.1 mm wide; disc brown to black, rarely slightly pruinose towards center, plane to convex in mature apothecia. Spores 19-31 x 10-15 μ m. On hardwood bark. R. disjuncta Sheard & Tonsb. (syn. R. columbiensis Sheard in herb.; R. norvegica Tonsb. in herb.)

11. Spores dubyana-type, averaging < 25 μ m long. Rocky Mountain front ranges. R. rivula Sheard ined.

ADD:

Spores 24-28.5 x 12-16.5 μ m. Soralia blue-gray (fading in herbarium). Thallus dull greenish white to pale gray, effuse, wide-spreading or forming patches among other epiphytes, of scattered to contiguous areoles; areoles 0.08-2 mm wide, slightly convex to \pm hemispherical, sometimes almost subsquamulose, usually inconspicuous and often obscured by soralia and superficial algae, etc., Soralia 0.14-0.3(-0.4) mm diam., numerous, discrete, sometimes a few confluent, but never forming a continuous leprose crust, efflorescent, each erupting from upper surface of an areole (never ulcerose), convex, blue-gray (fading in herbarium). Apothecia 0.3-0.4 mm diam., very rare, sessile; thalline exciple ca. 0.1 mm thick, whitish gray, sometimes sorediate. Spores ellipsoid, Pachysporaria-type. Thallus P- or \pm faint yellow, K-, KC-, C-, UV-, I-, with atranorin and zeorin. On bark (e.g., Acer, Platanus and Ulmus) along streets. Washington, Oregon. R. griseosoralifera Coppins

Thallus with isidioid granules, tan. No lichen substances. Ascospores with globose lumina, 16-19 x 9-10 μ m. Florida. R. sp. (Harris, 1990)

Thallus thin, gray-white, continuous, subscabrid, with scattered granules sometimes developing. Amphithecium often late and poorly developed; cortex cellular when present; spores with elongate lumina (pachyspermous), elongate-ellipsoid, 16-19 x 7-8.5 um, long remaining simple with thick walls, finally with septum; lumina rounded, globular or ovoid (to elongate). Apothecia sessile, constricted at base, plane, the margin thin; amphithecium often developing late, rarely prominent. K-. No lichen substances. SE Coastal Plain.(R. maculans Müll. Arg.) (syn. R. applanata)

III-B. On bark or wood.

Not sorediate or isidiate. Apothecia usually common.

1. Spores more than 8/ascus, under 25 μm long. Thallus K-, P-. 2

1. Spores 8/ascus. 4

2. Spores 12-16/ascus, with well developed lumina, averaging 15.0-15.8 x 7.2-7.5 μm , the walls not pitted; apothecia often swollen, the margin becoming excluded; disc brownish, dark grayish brown to black, convex. Spores not constricted at septum, (12-)16 in ascus, walls \pm smooth, rather thin except at apex. Thallus light gray, light greenish gray to whitish, immersed or thin or \pm thick, smooth to very finely cracked. Apothecia 0.2-0.5 mm diam., at first immersed (level with thallus), becoming sessile and broadly attached; margin thin, smooth R. polyspora Th. Fr.

2. Spores (12-?)16-32/ascus, without lumina, averaging 12.1-12.7 x 6.5-7.0 μm , the walls pitted (x1250); apothecia with persistent margins and plane, black discs.

Thallus gray-green or ashy; apothecia broadly attached; spores 12-16(-20) in ascus. Thallus effuse, \pm thin, rimose, K-, C-, P-; hypothallus indistinct. Apothecia frequent, partly contiguous, 0.3-0.4 mm diam. when immersed, to 0.5-0.7 mm when \pm prominent on thicker parts of thallus; disc black, plane, round; margin thin, minutely crenulate, becoming smooth, persistent. Spores 12-15 x 5.5-7 μm , thin-walled (thicker walled when young), slightly constricted when young. Hypothecium hyaline. Paraphyses branched. (Note: in Sheard's earlier key, forms with thallus brownish, apothecia rather narrowly attached, and spores 16-32 in ascus were called R. palustris Willey nom. inval.) R. populicola Magnusson

3. Spores 3-septate, with 4-6 lumina. Thallus thin and disappearing, pale gray to brown-gray, continuous, flat, cracked, or of \pm discrete warts, effuse; prothallus inconspicuous. Apothecia 0.3-0.85 mm diam., sessile, often contiguous; thalline exciple ca. 0.05 mm wide, concolorous with thallus, entire and persistent; disc often dark brown, soon becoming black, flat, sometimes becoming convex; epithecium brown or more usually red-brown; hymenium 90-130 μm tall; hypothecium 25-75 μm tall. Asci 65-95 x 23-28 μm . Spores 18-30 x 8.5-14 μm ; lumina rounded, uniformly thick-walled. No substances. On bark or wood. R. conradii Körber

3. Spores 1-septate only. 4

4. Spores averaging over 25 μm long. KEY III-B-1

4. Spores averaging under 25 μm long. 6

5. Thallus K+ yellow (atranorin) or P+ red-orange (pannarin). KEY III-B-2

5. Thallus K-, P-. KEY III-B-3

III-B-1. ON BARK OR WOOD.
Spores averaging over 25 um long.

1. **Thallus (usually white or light gray), K+ yellow, P+ yellow (atranorin), or K-, P+ orange-red (pannarin).** 2
1. **Thallus (usually a shade of brown), K-, P-.**4
 2. **Spores callispora-type**, the lumina angular; wall warted to ridged, thickened just inside apex; spores 24-32 x 11-15 um. Apothecia adnate to sessile, buelliioid (lecidienne), to 1 mm, plane to somewhat convex, black, the margin blackish brown. Hymenium 110-130 um, interspersed with oil. Hypothecium dark brown. Paraphyses tips 3-5 um. Thallus white to pale gray, membranous to rimose, K+ sordid yellow, P+ orange. On bark or wood. (Hafellia dissa)
 2. **Spores pachysporaria-type or Physcia-type.**3
3. **Thallus continuous, glaucous, K-, P+ cinnabar (pannarin). Spores pachysporaria-type, with rounded lumina and thick walls, wall slightly irregularly thickened. Apothecia erumpent, broadly attached; lower cortex not expanded. Eastern.** Spores (30-)35 x 13-17 um, the septum distinct. Thallus light gray or cinnabar, thin, indistinct, smooth. Hymenium 100 um; paraphyses intricately branched at tips, with granules insoluble in K. Northeastern. R. adirondackii Magnusson
3. **Thallus areolate, matt, K+ yellow, P+ yellow (atranorin). Spores Physcia-type, with angular locules. Apothecia not erumpent; lower cortex expanded. Coastal Pacific NW.** R. macrospora Sheard ined.
4. **Spores pachysporaria-type, with rounded lumina and thick walls. Southern coastal plain.** Apothecia with prominent excipular ring; thalline margin sometimes absent. R. dolichospora Malme
4. **Spores otherwise. Distribution otherwise.** 5
5. **On wood (usually on moss or humus), arctic-alpine.** Spores mostly under 30 um long.6
5. **On bark; distribution otherwise.** Spores often over 30 um long.7
 6. **Thallus thin or indistinct, finely granulose. Apothecial margins prominent; disks persistently plane. Sphaerophorin present. Lower cortex of apothecia expanded, columnar in structure, I+ faint blue; thallus of discrete or contiguous verrucae, P-.** Apothecia to 1.5 mm, concave to plane or somewhat convex, discs brown or black. Spores ± Physcia-type, uniformly pigmented, 21-28 x 10-14 um.(R. turfacea)
 6. **Thallus thick, granulose-verrucose. Apothecial margins excluded as disks become convex. Sphaerophorin absent. Lower cortex of apothecia not expanded; Thallus and apothecia not pruinose. paraphyses tips to 3.5 um; spores 25-32 x 12-17 um. Thallus brown-red, K-; apothecia becoming very convex and immarginate.**(R. mniarea)
7. **Spore walls pitted (x1250). Eastern and southern boreal.** 8

7. Spore walls not pitted. Western. 9

8. Thallus glaucous; apothecia often with a prominent excipular ring; lower cortex not expanded. Great Lakes-Appalachian. Thallus well developed, thin or thick, \pm continuous, smooth to weakly verrucose, or areolate, becoming subsquamulose, tan, brownish gray, or gray, with waxy or shiny appearance. Apothecia 0.4-1.0 mm diam., usually abundant, sessile; disc plane, brown or reddish brown to black; margin thick, usually prominent, finely radiately cracked; cortex distinct. Spores (29-)35-40 x 14-16 μ m; walls becoming more evenly thickened with age. Eastern-Great Lakes distribution. R. ascociscana (Tuck.) Tuck.

8. Thallus matt; apothecia lacking excipular ring; lower cortex expanded. Southern boreal. R. austroborealis Sheard ined.

9. Proper exciple pigmented light brown and extending below hypothecium; apothecial cortex columnar below; spore L:W < 2. R. badiexcipula Sheard ined.

9. Proper exciple not pigmented and not visible below hypothecium; apothecial cortex cellular below; spore L:W > 2. Thallus poorly developed, thin, of scattered verrucae or disappearing, brown. Apothecia sessile, often constricted, disc plane, brown-black, margin regular, thick, prominent, pale red-brown. Apothecial cortex distinct. Spores 25-37 x 12-18 μ m, septum thin, indistinct, apical walls convex inward, lumina round. Oregon. R. oregana Magnusson

ADD? (not mentioned in Sheard's latest key)

Thallus dull greenish gray, rugose-verrucose, K-, C-. Apothecia to 1 mm, concave to flat, the thalline margin persistent, turgid, entire. Hymenium 135-140 μ m. Spores 20-32 x 11-16 μ m, ovoid-ellipsoid, constricted, the lumina round, without isthmus. On bark of Pseudotsuga, S. California. R. "sucedens" sensu Hasse

III-B-2. ON BARK OR WOOD.

Spores averaging under 25 um long.

Thallus K+ yellow or P+ red-orange.

1. Thallus K- or K+ faint yellow, P+ cinnabar red-orange (pannarin), of discrete or contiguous verrucae becoming sublobate. Spores polarilocular with broad, angular lumina; thallus not continuous; cortex cellular or absent. Thallus K-, cortex P+ yellow to orange; composed of dispersed verrucae or areoles, thick, becoming subsquamulose. Apothecia sessile, not erumpent; amphithecium lacking granules; spores 14-19 x 7-10 um, the lumina rounded, the end walls. On Thuja. Great Lakes Region. R. excrescens Vainio (syn. R. thujae (Magnusson) Sheard)

1. Thallus K+ yellow (atranorin) and often P+ yellow. 2

2. Epihymenium P+ orange-brown with red crystals forming (pannarin), or P+ darker (with or without crystals); apothecial disks lightly pruinose (best seen when moist). 3

2. Epihymenium P-; apothecial disks not pruinose.5

3. Disks persistently plane. 4

3. Disks becoming markedly convex and margin excluded; epihymenium P+ darker (with or without red crystals of pannarin). Rocky Mountains. Spores 18-25 x 8-12 um, \pm Physcia-type (or Orcularia-type), lumina angular, frequently connected by a canal, walls thickened at ends and sides. Apothecial discs brown; margin K+ yellow; cortex on lower side 50-70 um thick, I+ pale blue. Epihymenium granular, P+ orange. Thallus white, areolate. Apothecia to ca. 0.5 mm, the margin whitish. Thallus thin. Paraphyses tips 3-4 um. On bark, Arizona. R. corticola (Arnold) Arnold

4. Thallus and apothecial margin with beaded appearance; dark, limiting hypothallus often present; eastern seaboard. Epihymenium granular, P+ orange. Thallus and apothecial margin white or pale gray, well developed (resembling a Lecanora). Thallus continuous or rimose-areolate, K+ yellow, P+ lemon-yellow (or P-?: atranorin, zeorin according to Harris, 1990). Amphithecium full of granules (soluble in K); spores 12-15 x 6-7 um, with angular lumina. Eastern Coastal Plain, south to Florida. R. granuligera Magnusson

4. Thallus and apothecial margin plane; dark, limiting hypothallus absent; western. Thallus blackish gray, minutely granular, K+ yellow, KC+ orange-red. Apothecial discs black; margin whitish, K- (?); cortex on lower side expanded, 17-20 um thick. Spores (15-)18-20(-22.5) x (8-)9-10(-11) um, polarilocular, not constricted, walls thickened at ends, lumina \pm rounded, small. Epihymenium P+ orange. Washington. R. marysvillensis Magnusson

5. Older apothecia with well developed excipular ring; exciple often pigmented within; apothecial cortex expanded to twice lateral width below. R. duplicata Sheard ined.

5. Apothecia lacking excipular ring; exciple hyaline; apothecial cortex not or hardly expanded below. 6

- 6. Apices of paraphyses lightly pigmented and immersed in dispersed pigment forming a red-brown epihymenium.** Rocky Mountain front ranges. Spores 13-18 x 6.5-9 um, dubyana type, dilated at septum, thin-walled when young. Thallus whitish to ochraceous, gray-brownish or grayish. Thallus areolate-verrucose. Hypothecium hyaline; epihymenium brown. On bark or wood, Colorado and Arizona. R. boulderensis Sheard ined.
- 6. Apices of paraphyses darkly pigmented and forming a dark brown epihymenium.** 7

- 7. Spores Physcia-type, developing a torus. Eastern N. America.** R. exigua S. Gray
- 7. Spores dubyana-type, lacking a torus but often with prominent septal disk. Pacific distribution.** R. santamonicae Magnusson

KEY III-B-3. ON BARK OR WOOD.

Spores under 25 µm long.

Thallus K-, P-.

1. Spores with locules rapidly filling cells and walls therefore thin and equally thickened at maturity. 2

1. Spores with more persistently angular locules or locules small and rounded, walls therefore very thick if equally thickened. 3

2. Apothecial disks quickly becoming convex; spores averaging 13.8-15.1 x 6.2-6.7 µm, elongate-ellipsoid. Widely distributed. Thallus K-, P-, C- (no substances); spores Physconia-type (polarilocular, ellipsoid, the walls thickened only around septum; canal narrow, elongated; lumina seen best when young; walls unevenly thickened) and often slightly curved, when mature appearing Buellia-type (rounded lumina, uniformly thin walled), (10-)12-14(-16) x 5-7 µm, smooth or minutely warted; torus not or poorly developed. Thallus gray-greenish or dark gray, thin, effuse, minutely verrucose or finely and irregularly granular. Apothecia usually numerous and crowded, lecanorine, subinnate, broadly attached, confluent, 0.2-0.4(-0.5) mm diam.; disc dark brown to black, flat, often soon convex; thalline margin distinct, thallus colored, persistent or not. Excipulum thallinum 50-80 µm wide. Apothecial cortex usually indistinct, sometimes expanded to 10-(-20) µm below, I-. Excipulum proprium indistinct laterally, to 20-35 µm wide above. Hymenium 40-75 µm. Epihymenium dark brown, not granular, P-. Hypothecium 40-60 µm deep. Paraphyses 2-2.5 µm wide, apices to 5 µm. Spores polarilocular (Pycnidia not seen. On bark and wood, Northeastern to Great Lakes and Rocky Mountains. R. pyrina (Ach.) Arnold

2. Apothecial disks persistently plane; spores averaging 17.3-17.9 x 9.4-9.8 µm, broadly ellipsoid. Arid plains and mountain states. Thallus grayish brown, areolate, thick. Apothecia to 0.8 mm, adnate to sessile, bare, black, ± plane, the margin thick, persistent, concolorous with thallus or often slightly whitish. Spores (14-)19-24 x (7-)10-12 µm, polarilocular, the walls fairly thick (Pachysporaria-type?), becoming fairly thin (Buellia-type?) On bark and rock, Colorado. [Need to know P reaction]. R. grandilocularis Sheard ined.

3. Spores pachysporaria-type, with small rounded or irregular locules and thick walls. 4

3. Spores otherwise, with ± angular locules and thin lateral walls. 6

4. Spores narrowly ellipsoid and often curved; thalline margin of apothecia often poorly developed but when well developed with a prominent excipular ring. R. maculans Müll. Arg.

4. Spores broadly ellipsoid; apothecial margin without a prominent excipular ring. 5

5. Thallus continuous, never areolate; apothecia persistently adnate with poorly developed thalline margins; spores 16.5-17.1 x 9.3-9.6 µm. Southern coastal plain. R. intrusa (Nyl.) Malme

5. Thallus quickly becoming areolate; apothecia sessile with persistent and prominent margins; spores averaging 15.1-16.0 x 8.5-9.2 um. Great Lakes-northeastern. Spores broadly ellipsoid, (12-)15-17 x 8-9(-10) um, the lumina rounded, lateral walls greatly thickened. Apothecia widely attached, with prominent margin. Lower cortex of apothecia thin, I-. Thallus gray, continuous, rimulose, K-, P-. Northeastern and Great Lakes region. R. pachysperma Magnusson

6. Apothecial margins concolorous with disk (apothecia biatorine). 7

6. Apothecial margins concolorous with thallus (apothecia lecanorine). 8

7. Apothecia lecanorine at first, the thalline margin becoming excluded and replaced by proper exciple; spores averaging 18.0-18.6 x 9.0-9.4 um. R. convexula Magnusson

7. Apothecia biatorine from first, lacking algal cells in margin; spores averaging 21.2-22.6 x 10.4-10.9 um. Spores 20-25 x 8.5-9.5 um, \pm Physcia-type, the lumina round, with some indication of an isthmus, the apical wall at first slightly convex inwards, septum distinct. Apothecia often pruinose. Thallus pale brown, thin, smooth but cracky, with limiting black hypothallus, K-, P-. Apothecia to 1 mm, blackish brown, soon convex; margin thin, soon disappearing. On bark, Pacific Northwest and California. R. hallii Tuck.

8. Spores Physcia-type, with sharply angular locules at least when young and well developed torus at maturity, never swollen at septum. 9

8. Spores otherwise, with rounded or less angular locules and usually lacking a torus. 20

9. Spores with hyaline appendages at ends, averaging 20.6-22.2 x 9.1-9.8 um. Lignicolous, arctic-alpine or central plains. Spores with hyaline appendages at ends, 22-25 x 8-9 um, \pm Orcularia-type, walls thickened at apices and septum. Thallus very thin, whitish to gray-brown, K-. Apothecia to 0.5 mm, black-brown, contiguous, margin \pm crenulate. Cortex thin or indistinct, cells 4-5 um. Hymenium 80-85 um. Thallus effuse, thin, white. Apothecia sessile, 0.4-0.5 mm; thalloid margin cellular, I-; outer edge of exciple brown; disk black, the margin minutely crenulate; hypothecium hyaline to gray; epihymenium brown; hymenium 75-85 um, hyaline, I+ blue; paraphyses 1.5-2 um, tips 3-4 um and darkened; additional dark granules in the epihymenium; spores with curiously bladdery appearance at tips (not really mucronate), ellipsoid, dark brown, with prominent porus and lamella, 22-30 x 8-9 um. R. mucronatula Magnusson

9. Spores not as above. 10

10. Thallus light gray (whitish). 11

10. Thallus dark gray or brown. 13

11. Apothecia erumpent at first; spores averaging 19.4-20.3 x 9.4-10.5 um; locules remaining angular. Apothecia erumpent, compressed, broadly attached (to constricted?), to 0.5 mm; disc \pm persistently plane. Apothecial margins often crenulate, in part lighter than thallus. Thallus P-. Containing zeorin. Epihymenium red-brown from pigment dispersed in hymenial gelatin.

Spores tending to be elongate-ellipsoid, 14-20 x (7-)9-11 um, with prominent end thickenings, thin lateral walls, angular lumina. On wood or rough bark. Thallus pale gray, pale greenish gray, or whitish, smooth, poorly developed or immersed. Epihymenium red-brown, granular, P+ orange. Apothecia erumpent, beginning within thallus and breaking through surface, becoming broadly attached; proper exciple faintly pigmented; thalline margin ragged when young, becoming smoother with age, persistent; hymenium gelatinized. Spores Physcia-type, with irregularly thickened walls and distinctly hour-glass-shaped lumina, variable in size, 16-22(-24.5) x 8-13 um. Hypothecium hyaline to light yellowish brown. On bark. Eastern N. America..... R. subminuta Magnusson

11. Apothecia not erumpent. 12

12. Spores averaging 16.5-17.5 x 8.0-8.5 um; locules becoming rounded. Eastern.

Thallus thin or rarely evanescent, pale to dark gray, continuous or cracked, flat or more rarely granular, effuse; prothallus inconspicuous. Apothecia 0.3-0.6 mm diam., sessile, frequent and often contiguous; thalline exciple ca. 0.05 mm wide, concolorous with thallus, entire and persistent; disk black, rarely dark brown; epihymenium dark brown; hymenium 70-110 um; hypothecium 45-115 um; asci 45-65 x 13-20 um; spores 11.5-23 x 5.5-9.5 um, Physcia-type. Atranorin may be present in low concentration. On rough bark of old tree trunks. Temperate. R. exigua S. Gray

12. Spores averaging 17.9-18.8 x 9.1-9.6 um; locules persistently angular until spores overmature. California. Thallus K-, P-, white, thin, uneven or absent.

Apothecia innate to adnate, brown-black, \pm plane, the margin gray-white, scarcely elevated. Spores mischoblastia-type (walls unevenly thickened, convex inwards, the lumina often twice as wide as long, connected by isthmus, septum indistinct), 16-17 x 8-9 um. On twigs. R. herrei Magnusson

13. Apothecia becoming convex at maturity. 14

13. Apothecia persistently plane (rarely convex when overmature). R. archaea agg. 16

14. Apothecia erumpent; spores averaging 16.5-17.0 x 8.0-8.5 um. Arid regions of (south-?)western U.S.A. (R. juniperina Sheard ined.)

14. Apothecia not erumpent; spores averaging >17.5 um long. Boreal. Apical wall of spores not convex inward; middle girdle of spores not strikingly swelling in K; lumina angular. 0.4-0.5 mm wide. Discs soon convex; margin thin or lacking. 15

15. Thallus glaucous, gray; apothecial margins typically possessing an excipular ring; spores averaging 19.8-20.4 x 9.4-9.7 um. Thallus indefinite. Apothecia scattered, with sunken bases. Cortex ca. 35 um thick, I+ blue, with cells ca. 3 um wide; margin algae-poor. Thallus thin, light gray to gray-green, rarely brownish, continuous or of flat, scurfy, or thick rugose areolae, dull or glaucous. Apothecia sessile, to 0.85 mm; margin of same color as thallus or more brownish, entire to becoming excluded, its cortex I+ blue; exciple brownish exterior, hyaline within; disk black or sometimes brown at first, flat to becoming convex; hypothecium hyaline, I+ blue; epihymenium red-brown; hymenium 70-100 um, hyaline; paraphyses 2-3 um, tips 4-6 um, tips slightly darkened and in the dispersed pigment of the epihymenium; asci clavate; spores

polarilocular, lumina angular, then soon round, porus disappearing, septum well developed and tips thin-walled, 17-24 x 10-12 μ m. Thallus K-, C-, KC-, P-, I-. On wood, especially of junipers, boreal. R. granulans Vainio (syn. R. lignaria Magnusson)

15. Thallus matt, usually pale; apothecial margins lacking a prominent excipular ring; spores averaging 18.0-18.6 x 9.0-9.4 μ m. Thallus gray-white, thin, coherent. Paraphyses tips free in K, 2.5-3 μ m thick. On deciduous bark, boreal. R. convexula Magnusson

16. Spores averaging > 20 μ m long. Apothecia not constricted at base. Spores 15-20 x 7-9(10) μ m, Physcia-type or Dubyana-type, the lumina angular, the walls \pm thin at sides, prominently thickened at ends. Apothecia margin olive-brownish, thin and smooth. Epihymenium dark. Containing zeorin. Usually on wood. Lower cortex not expanded (under 20 μ m thick), or 35 μ m but of indistinct structure and brownish; thallus not well developed, often absent. [Description may be based on the aggregate rather than the restricted concept]. R. archaea (Ach.) Vainio emend. Malme

16. Spores averaging < 20 μ m long. 17

17. Thallus gray- or green-brown. 18

17. Thallus copper-brown, rarely lighter (whitish to greenish, or grayish or brownish gray). Thallus usually discontinuous, composed of scattered convex verrucae, without a perceptible prothallus. Apothecia lecanorine, sessile, markedly constricted at base, usually scattered and regularly round, 0.3-0.5(-0.7) mm diam., rarely contiguous and deformed by mutual pressure; thalline margin concolorous with thallus, smooth, prominent, entire to flexuous, persistent; lacking an excipular ring; disc dark reddish brown to black, persistently plane; excipulum thallinum 45-70(-100) μ m wide; cortex indistinct, or 10-25(-35) μ m wide below, usually I-, cellular, the cells to 7 μ m, rounded; excipulum proprium expanded to 20-30(-45) μ m above. Hymenium 60-80(-90) μ m high. Epihymenium red-brown. Hypothecium colorless, (30-)40-50(-80) μ m deep. Paraphyses to 2 μ m wide, apices (3-)4-5(-7) μ m. Thallus very thin, K-, P-. Spores (12-)14-18(-21) x 6-8(-9) μ m, Physcia-type, smooth to minutely warted, not or slightly constricted at septum, torus well developed, walls sometimes convex inward when young, mostly not, septum distinct. Pycnidia not seen. Mostly on smooth bark of young twigs of conifers and deciduous shrubs and trees, temperate to Arctic. R. septentrionalis Malme

18. Apothecia with a reddish brown excipular ring (most evident when moist); spore walls not pitted. 19

18. Apothecia always lacking an excipular ring; spore walls faintly pitted (x1250).

Lower cortex of apothecia massive 25-35(-70) μ m, hyaline; thallus of plane, contiguous or discrete areolae, very thin, pale, on grayish brown to brown hypothallus. Apothecia broadly adnate, to 0.6 mm, flat, the margin thin. Spores Physcia-type or Dubyana-type (walls thickened at ends and septum, lumina angular), 18-22 x 7-9 μ m. Apothecia not pruinose. Usually on smooth bark. Arctic (and south?). R. laevigata (Ach.) Malme

19. Spores averaging 15.0-15.7 x 7.4-7.7 μ m; locules inflating but retaining thickened apical wall. Typically corticolous. Thallus and apothecial margin brownish. Thallus epiphloedal, thin, verruculose, compacted to discontinuous, rimose-areolate to coarsely warted,

often indistinct, dirty white, gray, gray-brown, or brown. Apothecia sessile, \pm constricted to broadly adnate or sunken (then often angular to areole form) but not erumpent, to 0.5 mm, lecanorine; disc flat then convex, dark brown to black; thalline margin concolorous with thallus or slightly brownish, thin, persistent, smooth to granular-knotted, swollen when young, reduced in age, well developed, usually slightly prominent. Hymenium hyaline, to 100 μ m high; epihymenium 15 μ m, yellowish brown; paraphyses simple or branched; apical cells clavate to capitate, with a yellow-brown cap; hypothecium slightly beige-brownish, to 40 μ m; parathecium flattened, to 30 μ m wide above; cortex without crystals. Spores 16-21 x 7-9 μ m, *Physcia*-type, with irregularly thickened walls and distinctly hour-glass-shaped lumina. Hypothecium hyaline to light yellowish brown. Thallus K-, C-, P-. On twigs, Minnesota; New Brunswick. *R. glauca* Ropin (syn. *R. magnussonii* Sheard ined. but cited by Gowan & Brodo, 1988 as though published])

19. Spores averaging 19.2-20.0 x 9.2-9.5 μ m; locules inflating and apical walls loosing thickening. Typically lignicolous. Thallus brown, thickish. Spores 14-18 x 7.5-9 μ m, polarlocular, the lumina becoming rounded, the walls thin to \pm thick when young, over 1/2 the spore width. Epihymenium brown. Hypothecium hyaline. Lower cortex well developed or not. On wood. Southwestern. [Need to know P reaction] *R. lignicola* Sheard, ined.

20. Spores *pachysporaria*-type, with small, rounded locules and thick walls. 21

20. Spores with angular locules when young and thin lateral walls. 22

21. Spores averaging 20.4-21.3 x 11.0-11.7 μ m; thallus areoles > 0.5 mm wide, the surface glaucous, often with raised margins, giving a subsquamulose appearance. Coastal southern California. *R. dilatata* Sheard ined.

21. Spores averaging 14.8-15.5 x 8.4-8.9 μ m; thallus areoles discrete, < 0.2 mm wide, the surface matt, or thallus rimose-areolate, never with subsquamulose appearance. Rocky Mountain front ranges. Thallus indistinct, K-, P- (according to Sheard) but apothecia K+ yellow (according to Magnusson). Spores (13-)15-17 x 6.5-8.5 μ m, "pachyspermous" (walls thick, lumina at first boomerang-shaped, later becoming rounded, ca. 1/2 spore width; septum distinct), *Mischoblastia*-type when young, \pm *Dubyana*-type when mature. Apothecia to 0.5 mm, plane, the margin thin, brown to brown-gray. On wood or bark. Colorado and Arizona. *R. coloradana* Magnusson

22. Spores averaging > 19.5 μ m long. 23

22. Spores averaging < 19.5 μ m long. 25

23. Spores averaging 19.8-21.2 x 9.9-10.5 μ m, lacking faint pigmented bands across each cell. *R. albertana* Sheard ined.

23. Spores averaging > 22.0 μ m long, with faint pigmented band across each cell. 24

24. At least some spores markedly dilated at septum; walls not pitted.

Colorado. *R. riparia* Sheard

24. Spores not markedly dilated at septum except after application of K; walls

pitted (x1250). California. R. endospora Sheard ined.

25. Lignicolous in marine habitats subject to salt water spray, usually on coastal rocks. (R. gennarii Bagl.)

25. Not in marine environment. 26

26. Spores with inner wall lightly pigmented, forming an endospore at maturity.

Pacific distribution. Thallus pale yellow-gray, thin, areolate, limited by black hypothallus. Apothecia appressed, brown-black, subplane, the margin thin, gray-white. Cortex cellular. Paraphyses capitate. Spores 15-17 x 7.5-8 μ m, \pm constricted, walls and septum uniformly thin. On bark, S. California. R. santamonicae

Magnusson

26. Spores lacking pigmented inner wall. Boreal. Apothecia immarginate. Thallus olive-gray, verrucose-areolate, K-, thin. Apothecia 0.35 mm, plane to convex, immarginate, brown. Cortex to 35 μ m, I-, cells 3 μ m. Spores \pm Orcularia type, 15-17 x 7-9 μ m, the center turgid in K, the walls thickened at apices and septum, the apical wall not convex inward, the lumina rounded. Epihymenium not granular, P-. Thallus thin, olive-gray, verruculose-areolate, the verrucae dispersed. Apothecia to 0.8 mm broad, dispersed, broadly attached; margin pale brown to brown when present; exciple 35-90 μ m, cellular, I-; disc convex, black, bare, at first flat and marginate, soon immarginate. Hypothecium hyaline or brownish; epihymenium brownish; hymenium 60-96 μ m, I+ blue; paraphyses 1.5-2.5 μ m, tips 3.5-6 μ m and dark brown; spores slightly swollen at septum and becoming more pronouncedly so in K, apical wall 2.5-3 μ m, not convex inward, septum 3 μ m, spores 13.5-23 x 6.5-10.5 μ m. Usually on bark. Arctic-boreal. R. metaboliza Vainio

Spores 15-20 x 7-9(10) μm , Physcia-type or Dubyana-type, the lumina angular, the walls \pm thin at sides, prominently thickened at ends. Apothecia margin olive-brownish, thin and smooth. Epithymenium dark. Containing zeorin. Usually on wood. Lower cortex not expanded (under 20 μm thick), or 35 μm but of indistinct structure and brownish; thallus not well developed, often absent. [Description may be based on the aggregate rather than the restricted concept]. R. archaea (Ach.) Vainio emend. Malme

R. archaea (description from Giralt & Mayrhofer)

Thallus usually effuse, discontinuous, thin and smooth, whitish to pale red-brown. Apothecia lecanorin, subinnate to sessile, broadly attached, abundant, scattered to confluent, 0.3-0.6(0.7) mm diam. Thalline margin thin, entire, often darker than thallus, usually persistent. Disc plane to subconvex, dark reddish brown. Excipulum thallinum (40-)70-80(-100) μm wide. Cortex nearly indistinct or to 15-35 μm thick below, often I+ blue. Excipulum proprium expanded to 20-50 μm above. Hymenium 70-90(-120) μm high. Hypothecium to 60 μm deep. Epithymenium red-brown. Spores Physconia-type, (15-)17-20(-23) x (7-)8-10(-11) μm , often curved, not constricted at septum, smooth to minutely. On rough or smooth bark or wood of coniferous and deciduous trees. Tely warted; torus always well developed. Pycnidia not seen.

ADD? (not mentioned in Sheard's latest key)

Thallus K+ sordid yellow; spores thick walled. Coastal Plain to Mass. Apothecia with discs becoming distinctly convex. Spores averaging under 15 μm long, polarilocular (lumina seen best when young; walls unevenly thickened). Epithymenium not granular, P-. R. reagens Sheard, ined.

Spores 15-22 x 7-10 μm , dubyana-type when mature, pachysporaria-type (thick-walled) when young. Thallus whitish or gray. Apothecia bare, black, \pm plane, the margin thin, persistent. On bark, Arizona. (Note: the name of this species implies that something about it is orange; I'm not sure what--possibly the epithymenial reaction with P?). R. capensis Hampe in Massal. (syn. R. aurantiaca Sheard in herb.)

Thallus thin or absent. Apothecia to 0.5 mm, adpressed, not erumpent, disc becoming markedly convex, brown-black, margin thin, gray-white; spores tending to be broadly ellipsoid, 17-20 x 8.5-10 μm , walls thickened, apical wall not convex inwards, central lamella distinct. Apothecial margin ecorticate. Apparently restricted to smooth bark. Northeastern. R. subminuta Magnusson (syn. R. annulata Magnusson)

Thallus pale gray-green, granular, uneven. Apothecia 0.5-0.8 mm, dense, constricted at base, \pm sessile, plane, the margin prominent. Cortex 50-70 μm , K-, I+ blue; cortical cells lengthened. Hymenium 85-100 μm . Spores 20-25 x 9-12 μm , wall thickened at apices and septum. On bark. Boreal. R. turfacea (syn. R. cinereovirens auct.)

Mature spores polarilocular, with \pm angular lumina; lumina much greater than half spore breadth; septum distinct or not. Thallus distinct, continuous (sometimes cracked, but not becoming areolate), plane (or papillate); cortex with outer necrotic layer (therefore smooth and waxy?). Thallus ochraceous, plane, very thin, K-. Southern. R. sanfordensis Sheard,

ined.

Thallus dark green-gray or greenish tan, \pm continuous, \pm well-developed, P-. Thallus effuse, variable in thickness, uneven, here and there cracked, K-. Apothecia partly dense, 0.4-0.5 mm diam., immersed at base or becoming prominent; disc brown-black, plane; thalline margin elevated, pale, scarcely corticate. Hymenium 80-90 μ m. Hypothecium grayish. Spores 22-24 x 8(-10) μ m, hardly constricted; lumina \pm hour-glass-shaped to somewhat rounded; walls very thick and unevenly thickened; apical wall thickened, not convex inwards. On bark of maple, Wisconsin. (Note: neither Magnusson nor Sheard mention this species as having a granular, P+ orange epihymenium). R. subminuta Magnusson (syn. R. halei Magnusson)

Spores 15-18 x 8-9 μ m, Physcia-type or Dubyana-type, the lumina angular, the lateral walls thin. Apothecia 0.3-0.6 mm, sessile, numerous and often contiguous; margins \pm concolorous with thallus, entire or often somewhat crenulate, persistent; disc black, rarely dark brown; epihymenium dark brown without red-brown pigment in hymenial gelatin; hymenium 70-100 μ m; hypothecium 45-115 μ m. Thallus well-developed, continuous or rimose-areolate, flat or more rarely granular, effuse, greenish tan or pale to dark gray, K+ yellow (atranorin in low concentrations) or K-, P-; prothallus inconspicuous. Epihymenium non-granular, P-. R. exigua (auct. non Ach.?)

Thallus pale olive-gray, K-, thin. Apothecia to 0.45 mm, constricted, plane, the margin thin. Cortex I-, 17 μ m, pale yellow, granular. Epihymenium granular (P+?). Spores 17-21 x 7-9 μ m, the walls thick at apices and septum, the center K+ turgid. On bark. Not mentioned by Esslinger. R. turgescens

Spores 20-25 x 9-10 μ m, walls strongly thickened at apices and septum, otherwise thin. Thallus \pm brown, thin to indistinct. Apothecia very dense, red-brown, constricted at base, \pm sessile, the margin thin, undulate, red-brown. Cortex I-; cortical cells 3-8 μ m. Apices of paraphyses 4-5 μ m. Hymenium 75-85 μ m. On wood, boreal-arctic. R. archaea (Ach.) Vainio emend. Malme (syn. R. arctica Magnusson)

Spores 17-20 x 7-8.5 μ m, apical walls convex inward, septum 2-3.5 μ m, not K+ turgid. Thallus not evident. Apothecia to 0.5 mm, constricted, flat to concave, dark brown, the margin thin to thick, pale to dark brown, smooth, prominent. Cortex I-, under 35 μ m, the cells under 5 μ m. On wood. Boreal-subalpine. R. archaea (Ach.) Vainio emend. Malme (syn. R. lecideoides (Nyl.) Kernst.)

Apothecia constricted at base. Spores 17-19 x 7.5-8.5 μ m, not K+ turgid, apical walls sometimes convex inward, the central lamella dark. Thallus absent. Apothecia to 0.5 mm, plane, the margin thin, continuous, persistent, brownish ashy. Cortex I-, under 35 μ m thick, cells under 5 μ m. On bark. Boreal. Lower cortex not expanded (under 20 μ m thick), or 35 μ m but of indistinct structure and brownish; thallus not well developed, often absent. R. septentrionalis Malme (syn. R. hyperborea Magnusson)

Thallus usually somewhat areolate, often poorly developed, gray-brownish, not shiny. Thallus P-, without lichen substances. Spore lumina not constricted in middle; apothecia with at least

remnants of thalline margin. Spore lumina distinctly longer than broad; spores 15-18 x 6-7.5 um. Apothecia sessile, sometimes constricted below. Florida. R. sp. (Harris, 1990)

Thallus continuous, smooth, shiny, gray-brownish. No lichen substances. Apothecia immersed. Ascospores with subglobose lumina, 15-19 x 9-10 um. Florida. R. sp. (Harris, 1990)

(The following have been confused with R. pyrina, R. annulata and R. pachysperma):R. juniperina Sheard, ined., R. boulderensis Sheard, ined., R. aurantiaca Sheard, ined.

Rinodina americana B. de Lesd.--type not found

Rinodina-like Species of Amandinea
ON BARK OR WOOD

1. Thallus typically light gray; spores elongate-ellipsoid, averaging 10.8-11.5 x 5.3-5.6 um; hypothecium dark brown. Apothecia erumpent, becoming sessile and broadly attached, the thalline margin thin, disappearing, the proper margin well developed; Spores (9-)11-12(-14) x (6-)7-8 um, \pm Buellia-type. Thallus typically light gray, K+ yellow. Hypothecium medium or dark brown. Spores with \pm strongly but evenly thickened walls, and rounded lumina. Disc plane or convex, brown or blackish. Amandinea milliaria (Tuck.) P. May & Sheard

1. Thallus dark gray; spores broadly ellipsoid, averaging 11.0-11.5 x 6.1-6.4 um; hypothecium light brown, sometimes hyaline. Apothecia broadly attached but never erumpent, the thalline margin thin, persistent; without proper margin. Spores (9-)11-14 x (5-)7-8 um, Buellia-type (according to Harris) or Phycia-type (according to Brodo).
Amandinea dakotensis (Magnusson) P. May & Sheard

Apothecia sessile, sometimes constricted below. Thallus usually somewhat areolate, often poorly developed, gray-brownish, not shiny. No lichen substances. Ascospore lumina elongated, constricted in the middle, shaped like a bowling pin or dumbbell; spores 17-20 x 7.5-9 um. Apothecia without thalline margin. Florida. [Need to know P reaction]. (Buellia placodiomorpha Vainio--not mentioned in Sheard's latest key)

Rinodinella
ON BARK OR WOOD

Thallus thin, indistinct, pale, \pm brown. Apothecia bare, brown-black, under 0.5 mm, becoming convex, the margin concolorous with thallus. Epihymenium brown; hypothecium hyaline. Spores 20 x 8 μ m, "simply 1-septate" (Buellia-type?). On wood, New Mexico. [Need to know P reaction].Rinodinella lobulata Sheard ined.