

**KEY SAX2**  
**Isidiate,**  
**Saxicolous**

Thallus granularisidiate, green. In shaded, maritime  
habitats. .... Bacidia scopulicola

Thallus scurfyisidiate, grayish. .... Aspcilia leproscenscens

6. Soralia developed at tips of thick erect isidial growths, craterform. Hypothecium lensshaped. .... Dirinaria confusa v. saxicola

2. **Thallus isidioid.** Substrate? Queen Charlotte Islands, British Columbia. .... Loxospora sp. Brodo ined.

2. **Thallus verrucose, pustulate; pustules often forming erect plates or columns by the disintegration of the pustule summits, leaving the vertical portions of the walls intact, but sometimes breaking down into coarse granular soredia. With elatinic acid as a rare accessory.** Primarily in the eastern United States. Substrate? ..... Loxospora pustulata

2. **Lobes very distinct, elongated,** very narrow (mostly to ca. 0.5 mm or less), graybrown; soredia or isidioid granules often present. Thallus with pseudoparenchymatous true cortex. .... (Hyperphyscia)

1. **Isidia present (do not confuse with verruculose pycnidia), Isidia terete, simple, 0.1 mm diam., subglobose, often crowded centrally; soredia absent.** Thallus forming ± orbicular and often confluent patches, to 6 cm diam.; marginal lobes closely attached, flattened, simple or irregularly branched, usually richly divided and markedly crenulate, discrete, separated by narrow cracks, with rounded or subcrenulate ends; surface creamy or whitish to pale olivebrown, matt, erpuinose; centrally cracked or indistinctly areolate, pittedpunctate with minute pocklike depressions resulting from abrasion of isidia. Cephalodia sessile, scattered, flattened orbicular or depressed convex, 0.85.0 mm diam., radially folded and wrinkled or cracked, yellowish brown or pinkish, matt. Pycnidia immersed, forming minute swellings with punctiform brownish ostioles; pycnosporos filiform, slightly curved, 2129 x 0.5 mm. Cortex K+ yellowish, C+ rose; medulla K+ yellow (faint), C+ rose, P. On rocks, rarely on sandy soil. .... Placopsis cribellans

2. **Isidia small (always less than 1 mm tall).** Thallus C+ orange or red, UV+ dark red (xanthonenes, with or without gyrophoric acid). Thallus K, P, C+ orange, UV+ dark red, containing only xanthonenes (arthothelin and granulysin, in N. American material; thiophanic acid in British material). Isidia pale yellow, with a soft surface, to 0.6 mm tall; On tops of calcareous, schistose boulders. .... Pertusaria flavocorallina Coppins & Muhr

2. **Isidia large (generally more than 1 mm tall.** Thallus C or C+

red (gyrophoric acid), UV, without xanthoncs. Isidia frequent, columnar or coralloid, but never sorediate, predominantly associated with fruit bodies. .... 3

3. Isidia mainly coralloid, fruit bodies absent or present, borne laterally on isidia or on nonisidial portions of the thallus; thallus gray, verrucae large (1.4(+0.6) mm wide), medulla K+ yellow becoming redbrown, P+ yellow becoming orangered (fumarprotocetraric acid), and KC± red (gyrophoric acid); substrate? ..... Pertusaria oculata

3. Isidia mainly columnar, fruit bodies always present, rarely borne other than terminally on isidia; thallus graywhite; verrucae small, ..... 4

4. Thallus gray; medulla with all chemical tests negative; verrucae at times lateral on isidia; substrate? ..... Pertusaria panyrga

4. Thallus white; medulla with at least one spot test positive; verrucae always terminal on isidia. Medulla P+ yellow becoming orangered, K+ yellow becoming redbrown (fumarprotocetraric acid). Substrate?..... Pertusaria dactylina

1. Thallus isidiate. Medulla C; cortex C+ red. Isidia coarse, 0.10.3 mm diam. to 1.2 mm long, knobby, persistent, growing out of or merging into verrucae. Thallus yellowish gray, thick, tartareous and verrucose, with large, coralloidbranched isidia ("O. tuckermanni" morph) or thin, rimose, verrucose toward center, with small, cylindrical, simple to coralloid isidia ("O. pennsylvanica" morph) ± covered by isidia; prothallus often conspicuous, paler than thallus. Apothecia often present. Without variolaric acid. On rocks (often sandstones) in mostly hardwood forests, 7601500 m, Applachian and Ozark regions. [Note: O. turneri, a European species apparently incorrectly reported from British Columbia, has a completely C thallus, containing variolaric acid]. .....  
Ochrolechia yasudae Vainio

1. Sorediate, without isidia. ....2

2. Thallus and soralia P, C+ red. Thallus thickish, coherent, wartyfissured, irregularly breaking up into granular to almost isidiate sorediate surfaces. .... (see Ochrolechia androgyna "v. saxosum")

1. On various crustose lichens (but this is not always recognizable in the herbarium) on exposed siliceous rocks. Medulla P+ yellow, K+ yellow to red, C, or P, K, C+ rose, with gyrophoric acid and varying proportions of norstictic acid; other reported substances are probably contaminants from host lichens. Areoles rough granuloseisidiatefurfuraceous to sorediate. Thallus rimoseareolate or irregularly areolate, to 0.8 mm thick, dark olivebrown to dark brown or blackish; areoles irregular in outline, flat to slightly convex, 0.40.5 mm across; surface minutely isidioid or granular, the granules (20)30(50) um diam. Hypothallus not visible. Photobiont cells 612 um diam. Nova Scotia. .... "Rimularia" furvella

1. Directly on rock. Thallus C+ red (gyrophoric acid major), usually K, P. .... 2

2. Thallus thickish (0.10.4 mm), ± bullateareolate, light brown to beige, or gray brown to dark brown, sterile with elongated papillae (isidialike outgrowths), or becoming sorediate; or richly fruiting and then mostly with few or no soralia. Thallus bullateareolate; areoles irregularly angular, 0.30.7 mm broad, mostly scattered on a black hypothallus (occasionally visible between areoles), seldom flat, mostly convex to nearly spherical; upper surface rough or smooth; papillae 0.150.25 mm broad, 0.5 mm high, the tips finally convex, mostly with somewhat paler outgrowths, slightly erose, occasionally breaking into whitish (or yellowish) soralia 0.20.5 mm wide, or the soralia replacing the papillae. Thallus K, P, with gyrophoric acid only. .... Rimularia (Mosigia) gibbosa

2. Thallus thin (to 0.2 mm), crackedareolate to dispersed areolate, graybrown to dark brown or light brown, or occasionally yellowish to pinkish brown (paler brownish when wet), without papillae or soralia, or papillatesorediate to finely isidiate. Areoles 0.20.7(1.2) mm wide, ± flat, swollen but not bullate, irregularly angular to at margin sublobulate; surface smooth to rough; black hypothallus present, visible at margin, not conspicuous between the areoles. Soralia 0.1 mm broad; isidia (0.05)0.1(0.15) mmbroad, to 0.2 mm high, cylindrical or spherical; prothallus dark brown to black. Medulla usually K, P, but rarely K+ red, P+ orange (norstictic). .... Rimularia badioatra

**1. Thallus isidiatefurfuraceous**, areolate, dark olivebrown to black, I, P+ yellow, C+ red. Parasitic. ...(Rimularia furvella) Thallus (usually) with isidioid soralia towards center, brown or graybrown; lobes very narrow (under 0.5 mm wide), thin (ca. 100200 um), plane and closely appressed, appearing cellular throughout inside; hyphae thinwalled (walls thinner than lumina). Apothecia unknown. Spermatia bacilliform, 57 um long. Chem.: no substances, or traces of unknown substances. On dry, steep or overhanging silicates at low to moderate elevations. [Note: various Hyperphyscia spp. (Physciaceae) will also key out here; they generally have a prosoplectenchymatous medulla and some lack soredia, but some are extremely difficult to separate from true L. demissa] . . . . . INCERTAE SEDIS: "Lecanora" demissa

**3. Thallus K+ red, papillatetuberculate, without isidia or soralia (or with simple to branched isidia?according to Ozenda & Clauzade, or with soredia?according to Wetmore).** Thallus + effigurate at margin, rather thick, somewhat tartareous, uneven, rimoseareolate, with wartypapillose or branchedgranular areoles, dark or grayish ashy olive. In f. pseudoradiata, the thallus is regularly orbicular, 12 cm wide, radiating and appearing lobed, somewhat violetgrayish. (If thallus effuse, see A. cinerea). Usually at higher elevations. Arctic (Greenland); S. Dakota and Wyoming; very common in California; Washington?; probably elsewhere. . . . . Aspicilia mastrucata

**3. Thallus not papillatetuberculate, but isidiate, sorediate, or both.** . . . . . 4

**4. Isidiate; with or without soredia.** . . . . . 5

**5. Isidia scattered, short, + dark gray, eventually becoming sorediose at the tips; soredia whitish or yellowwhite. Thallus + dark gray.** Thallus 0.30.5 mm thick, rimoseareolate or irregularly areolate, covering + large areas; areoles partly smooth, uneven, partly very minutely verruculose (x 20 lens). Upper cortex (15)2535(50) um thick, the surface hardly darker; epinecral layer sometimes present; cells 35(6) um diam. Algae 818 um diam.; algal layer 5070 um thick, frequently interrupted or broken up. Medulla airfilled. Pycnospores straight, 710 x 1 um. Thallus K+ rusty crystals (norstictic acid). On somewhat moist rocks. . . . . Aspicilia simoensis v. isidiata (typical strain)

**5. Isidia developing on edges of areoles, few to abundant, minute and papillate or larger, flattenedcoralloid, constricted variously along their length, becoming bent over, + hollow or**

**opening along one side, whitegray to medium gray or often blackening; not becoming sorediose. Thallus ± pale gray.**

Thallus rimoseareolate; areoles plane or occasionally somewhat convex, contiguous, usually with upper surface minutely cracked to give a scurfy appearance. Hypothallus absent or visible only at the margin, narrow, shiny, black. Thallus K<sup>+</sup> yellow, sometimes turning red with rusty crystals; P<sup>+</sup> yellow to ± orange. On sandstone and conglomerate, especially in the supralittoral zone, sometimes inland. British Columbia. .... Aspicilia leproscenscens sensu Noble

**10. Thallus with isidia, becoming sorediose.** [If soredia lacking, see A. leproscenscens sensu Noble]. .... K<sup>+</sup> yellow strain of Aspicilia simoensis v. isidiata ("f. inferior")

**10. Thallus without isidia,** verrucosepapillate, broadly expanded, thick, scarcely rimose, dark grayblack to brownblack, limited by black, radiate hypothallus; verrucae subdiscrete to contiguous, epruinose. Pycnidia rare; pycnosporos 1523 um long. On siliceous rock. Arctic (Greenland, and elsewhere). Other nonisidiate, nonsorediate, K<sup>+</sup> yellow species will probably also key out here. The report by Ryan & Nash, 1990, of a stictic acid strain of A. mastrucata from California, may be based on A. mastoidea instead. Both taxa are very similar; aside from the chemical difference, A. mastrucata has a more olivaceous and somewhat effigurate thallus. ....  
Aspicilia mastoidea

**12. Thallus ± effuse (sometimes delimited, but not at all radiate), ± papillate or isidiate, becoming sorediate.** .... 13

**13. Thallus (at least towards center) of easily detached flattenedglebulose (subsquamulose) to ± papillate granules, at times later becoming ± granularsorediate,** pale to dark bluish gray, rimoseareolate, smooth to scurfy or scabridtartareous; prothallus sometimes evident, conspicuous, dark greengray, delimiting. Thallus P, K, containing aspicilin. Pycnidia unknown. Usually on nutrientenriched siliceous rocks on or near the seashore. The report of this species from N. America (British Columbia) is based on K<sup>+</sup> yellow to red, isidiate material that is probably a separate taxon. ....Aspicilia leproscenscens s. str.

**13. Thallus partly with narrow, verruciform isidia soon dissolving into grayish white soredia.** Areoles ± verruciform, dark bluish gray, with irregularly scattered, 0.51.5 mm across, low heaps of densely clustered isidia. Pycnidia numerous, at

least partly composite, up to 250 um broad; pycnospores 78 um long. On siliceous rocks. "Probably an accidental form, found only once" [in Norway] according to Magnusson; not definitely known from N. America. ....Aspicilia caesiocinerea v. isidiata

**7. Thallus rimoseareolate**, the areoles contiguous (but separated by deep, sometimes wide, cracks). **Edges of areoles often becoming papillate to flattened coralloid isidiate**. Surface of areoles minutely cracked, giving a scurfy appearance. Usually fertile. On sandstone. British Columbia. .... (A. leproscens sensu Noble)