

Lobaria (Schreber) Hoffm.
(LOBARIACEAE)

After Jordan (1973), Yoshimura (1971) and Thomson (1984)

Rev. 5/94

Thallus foliose, dorsiventral, heteromerous, irregularly spreading, prostrate or ascending, attached to substrate by a bushy tomentum; lobes branched, rounded at the apices or truncate, often \pm incised; margins entire or dissected-phyllidiate or sorediate; upper surface smooth, flat or wrinkled, sometimes with prominent depressions with a network of ridges; soredia, isidia or phyllidia sometimes present; lower surface glabrous, smooth or wrinkled-bullate, \pm tomentose; rhizines present, simple to squarrose, sparse to frequent. to 5 mm long, concolorous with lower surface or paler; pseudocyphellae and cyphellae absent; corticate on both surfaces, both cortex layers paraplectenchymatous; medulla woolly.

Apothecia rather rare, marginal or laminal, sessile to stipitate, hemiangiocarpic, initially urn-like, later more open; disc concave, red-brown, imperforate; thalline exciple with paraplectenchymatous cortex; hypothecium pale or brown; paraphyses threadlike, septate, unbranched; asci cylindrical-clavate, unitunicate, Peltigera-type; tholus I+ blue; spores 8, fusiform-acicular, transversely 1-7-septate, hyaline to pale brown, fusiform to elongate, thin walled.

Pycnidia immersed in small, pimple-like warts; ostiole punctiform, black or dark red-brown; fulcrum endobasidial, small celled; pycnospores \pm cylindrical-elongate, bacilliform or somewhat constricted at the center (i.e., slightly swollen at both ends). Gyrophoric, norstictic, stictic, methylgyrophoric, constictic, thelephoric, atranorin, triterpenes, tenuiorin, scrobiculin, usnic acid, retigeric acid. Photobiont green (Myrmecia or Trebouxia) or bluegreen (Nostoc or Scytonema, as main photobiont or in internal or shrubby cephalodia). On bark, rock or soil, mostly in wet or humid, sheltered areas, characteristic of ancient woodlands, mainly temperate.

1. Algal layer containing bluegreen algae; cephalodia absent. Tomentum on underside usually forming \pm distinct netlike or veined pattern corresponding to network of ridges on upper side. Apothecia rare, usually absent. 2

1. Algal layer containing green algae; bluegreen algae in internal cephalodia. Thallus with reticulate patterns or not. Apothecia common or absent. 6

2. Isidia or soredia absent (but lobules rarely present). Tomentum K+ blue-green (thelephoric acid). Thallus to 9-11 cm broad, leathery; upper surface ridged and scrobiculate, brown to yellowish brown, darker when wet, tips darkest and shining; upper cortex K-, KC-, but medulla may be K+. Lobes irregular, overlapping and \pm ascending; margins crenate to truncate-crenate; underside with smooth naked areas surrounded by black tomentum; rhizines squarrose, to 3-4 mm long. Outer part of upper cortex reddish brown. Spores 3-septate, fusiform. 3

2. Isidia or soredia present. 4

3. Lower surface pale lemon yellow or yellowish white at margins, grading to pale or dark ochraceous; lobes somewhat elongate and weakly to strongly canaliculate, the margins

undulate to becoming lacerate or lobulate. On bark or wood, old growth forest, Pacific NW. Thallus loosely attached, to 3.5-7.5 cm diam.; lobes stiff, averaging 3-5(-7) mm wide. Upper surface plumbeous gray (dry), matt, even, bearing conspicuous laminal maculae, these somewhat reticulate; isidia occasionally present as finger-like marginal projections to 0.5 mm long; green lobules sometimes present, laminal, peltate, averaging 1-3 mm wide. Lower surface corticate, somewhat shiny at margins, becoming densely hirsute inward, the hairs concolorous with lower surface. Medulla white. Apothecia unknown. Upper cortex K-, C-, KC-, P-; medulla C-, KC-, K+ yellow, P+ pale orange, or apparently P-. Contains usnic acid, stictic, norstictic, constictic and cryptostictic acids, and trace of unknown. British Columbia and Washington. Lobaria silvae-veteris (typical phycotype)

3. Not as above. 3a

3a. Medulla K+ yellow or red, P+ orange (stictic and/or norstictic acids, terpenoids). Upper cortex 28-38 μ m, of 3-5 cell layers. On soil and among mosses, sometimes over rocks, northwest Arctic, to British Columbia. L. pseudopulmonaria

3a. Medulla and cortex K-, P-, KC-, C- (without stictic or norstictic acids, and without terpenoids; with retigeric acids A and B and several unknowns). Upper cortex 33-70 μ m, of 5-9 cell layers. Among mosses over soil and rock. Alaska. L. kurokawae

4. Isidia present, soredia absent. Medulla K-. See Galloway, Flora of New Zealand Lichens, for full description. North American reports are misidentifications of L. pseudopulmonaria according to Thomson. Abnormal specimens of L. pulmonaria may also resemble this species. If medulla K+ yellow or red, see L. silvae-veteris. [L. retigera]

4. Isidia absent, soredia present. Medulla K+ orange-red or K-. 5

5. Medulla and lower cortex K+ orange-red, P+ orange, KC+ red, C-, containing norstictic, stictic and constictic acids and scrobiculin, plus unknown; cortex K-, KC+ yellow (usnic acid). Lobes to 2 cm across. Upper surface without tomentum, pale yellow to yellowish brown or dark yellow or olive-buff when dry, blackish when wet. Lower side smooth or rugose, not distinctly veined or netlike, densely tomentose with small scattered naked areas; tomentum often blackening, present to margins; rhizines often abundant in clusters, to 3 mm long. Spores fusiform. On tree bases, rocks and soil, usually in rather open dryish situations, boreal, often oceanic, northern California to Alaska, northeastern N. America to Greenland, and scattered occurrences in various parts of Canada. L. scrobiculata

5. Medulla K-, KC-, C-, P-, with unknowns; cortex K+ yellow, KC- (unidentified yellow pigment). Lobes to 4 cm across. Upper surface smoky gray to grayish olive when dry, much darker when wet; on young lobes with varying amounts of fine pale tomentum. Lower side with flat naked areas separated by tomentose veins (often resembling those of Peltigera), cream-colored to yellowish brown, the tomentum darkening, with clusters of dark rhizines to 3 mm long. Spores acicular. On twigs and trunks of woody plants, northern California to Alaska, east to Montana, with disjunct in Greenland. L. hallii

6. Underside with \pm dark tomentum arranged in a veined or network pattern, around large, convex, paler, non-tomentose areas; pattern on underside

corresponding to network of ridges on upper side. Thallus C-, KC- (no gyrophoric), K+ red or K-. Western or eastern, mostly northern. 7

6. Underside with diffuse tomentum or non-tomentose, and without distinct convex areas; upper side sometimes wrinkled or pitted, but not reticulately ridged. Medulla and/or lower cortex K+ red; medulla C+ red (gyrophoric). Eastern or southeastern. 9

7. Medulla K-, P- (norstictic acid absent, tenuorin, methyl gyrophorate, methyl evernate plus other substances and several linitins irregularly present present). Soredia and lobules absent. Apothecia usually common on upper surface and margins. Thallus to 30 cm broad, irregularly lobate; lobes broad and rounded, rarely linear; tips often ascending, more or less shining, greenish gray to brown, greener when wet, reticulately ribbed or rugose; lower side with pale naked swellings, separated by smooth, blackened veins; tomentum light colored when young; rhizines dark, to 4 mm long. On tree bases, rocks or earth, often among mosses, arctic-alpine, mainly from Alaska to Oregon and east to the west coast of Hudson Bay.

L. linita

7. Medulla K+ yellow/red, P+ orange (norstictic, and often stictic and constictic acids present, tenuorin absent). Soredia or lobules present. Apothecia present or absent. Often very abundant, especially in the canopies of trees in moist, mature forests, in the Pacific NW. 8

8. Coarse soredia or isidia or both usually present (at least in reasonably mature thalli) along ridges and margins; lobules absent; upper side greenish or brownish when dry (bright green when wet), KC- (no usnic). Two medullary strains (I.--with stictic acid agg., II.--with unknown), both with norstictic. Thallus wide-spreading, often exceeding 30 cm diam., \pm loosely attached at one end, at times \pm hanging and strap-shaped; lobes 1-3 cm wide, \pm dichotomously divided, often rather elongate, sinuate-indented with truncate apices. Apothecia usually absent, but occasionally present. On broad-leaved trees or conifers, or occasionally on mossy rocks, usually in mature forests, lowland to montane, widely distributed in Pacific NW (extending well inland to Alberta and Idaho, though restricted to moist localities), and also common in the Appalachian and Great Lakes regions. L. pulmonaria

8. Soredia and isidia absent; toothlike lobules usually present along the margins; upper side when dry greenish yellow to somewhat brownish (dull green when moist), KC+ yellow (usnic). Thallus to 25 cm broad; central portions firmly attached, peripheral parts loosely attached to free; texture coriaceous-membranaceous; lobes spatulate, often subdivided, rarely linear, up to 10 cm long and 6 cm wide; margins not thickened, undulate-crenate and fringed with concolorous lobules; lobules often abundant in older portions, usually also present laminally in clusters. Apothecia common., lateral, scattered, 1.0-3.5 mm broad; disk chestnut brown, black when parasitized. On conifers and mossy rocks in open moist forests. Oregon to Alaska, west of Cascades except for disjuncts in SE British Columbia. [Note: the statement by Vitt, et al. (1988) that the [main] photobiont of this species is blue-green is incorrect]. L. oregana

9. Marginal and laminal lobules abundant on upper surface, often so dense as to obscure portions of surface; apothecia rare. Thallus to 6 cm broad, adnate, coriaceous, smooth to faintly

pitted and rugose; upper surface pale olive gray or grayish olive, greener when wet; lobes \pm imbricate, broad and rounded, often flabelliform, to 4 x 4 mm; tips often free; margins sinuate-waved; sinus not appreciably thickened. Lower surface smooth or slightly irregular, mostly naked, creamy to brown; pale or dark rhizines usually abundant and scattered, often to the margins, to 1 mm long, terminating in haptera. Apothecia rare. Upper cortex usually K+ yellow; lower cortex and medulla K+ red, KC+ red; C+ rose or C-, P-; containing gyrophoric acid, + or - 4-O-methyl-gyrophoric acid and atranorin. On trees, southeastern (Georgia and Florida). L. tenuis

9. Lobules absent or rare; apothecia common. 10

10. Pycnidia in prominent swellings on upper side; apothecial margins not lobulate; thallus lobes often over 5 cm broad. Thallus P-; medulla and lower cortex K+ orange-red, KC+ red; lower cortex C+ red; upper cortex usually K+ yellow. Gyrophoric acid and LQ unknown; atranorin and other substances present or not; usually without 4-O-methyl-gyrophoric acid. Thallus to 15(-36) cm across, adnate, cartilaginous-coriaceous; upper surface smooth to rugose, often periclinally wrinkled in older parts, creamy buff to olive gray, greener when wet; lobes \pm imbricate, broad and rounded or narrow, to 2.5 x 2.0 cm; tips free or attached; margins sinuate to almost entire; sinus not appreciably thickened; lower surface smooth or wrinkled, creamy to pale olive buff and darkening, variable tomentose; rhizines simple, scattered, pale or darkened. On trees, eastern (mostly Appalachian and Great Lakes regions), frequent. L. querzicans

10. Pycnidia abundant but not prominent; apothecial margin lobulate; thallus lobes less than 5 mm broad. Lower cortex K+ red, KC+ red, C+ rose or C-; upper cortex usually K-; containing gyrophoric and usually 4-O-methyl-gyrophoric acid. Thallus to 8 cm broad, usually adnate, cartilaginous; upper surface smooth to strongly pitted, creamy buff to olive brown when dry; lobes often imbricate, rounded or elongate; tips pulverulent to subtomentose; margins occasionally thickened, crenulate or truncate-crenate; lobation and crenulations dichotomous; lower surface usually smooth and naked, pale to blackish brown, sometimes densely tomentose in young parts. On trees, southeastern (Carolinias to Florida and eastern Texas). L. ravenelii

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