

FRUTICOSE KEY

Rev. 11/13/92

I. THALLUS (OR AT LEAST APOTHECIA) ± BRIGHT ORANGE, K+ RED-VIOLET

1. Branches ± flattened in cross-section, or very slender and finely dissected and sorediate. Cortex usually evenly thickened, not forming pale maculae. Spores polarlocular; pycnospores baciliform.2

1. Branches rounded to compressed in cross-section, not finely dissected; Cortex often unevenly thickened, forming pale maculae. Thallus to about 5 mm high, with abundant apothecia. On rocks.3

2. Cortical hyphae running parallel to the surface. Thallus usually (except in T. contortuplicatus), 1 cm or more tall, with main trunk and holdfast; orange, yellow, or gray. Branches oval to flattened in cross section, on bark and rocks.Teloschistes

2. Cortical hyphae vertically oriented. Thallus to a few mm high, forming turfs, without a main trunk or holdfast; yellow-orange. Branchlets finely dissected, sorediate. On bark and stone.Xanthoria candelaria

3. Spores simple. Pycnospores filiform. Branches dorsiventrally compressed. Farallone Islands, California.Edrudia constipans

3. Spores polarlocular. Pycnospores baciliform. Branches mostly round in cross-section. Coast and inland, California to Baja California (and Oregon).Caloplaca (C. coralloides, C. thamnoides, C. cladodes)

II. THALLUS DARK BROWN, OLIVE OR BLACK

1. Thallus filamentous, the filaments very thin and delicate, each filament composed of a Trentepohlia filament surrounded by fungal hyphae.1
1. Thallus not filamentous (but sometimes thin and hairlike); algae non-filamentous, green (or bluegreen).2
 2. Hyphae straight, \pm parallel-oriented. Filaments smooth. Racodium
 2. Hyphae twisted, irregular. Filaments nodulose. Cystocoleus
3. Cortical hyphae running parallel to the surface; branches often thin and hairlike; thallus erect to prostrate or pendulous, \pm round in section.4
3. Cortical hyphae vertically oriented or irregular; branches usually not hairlike, but thicker, normally erect or ascending, sometimes pendulous, \pm flattened or angular, rigid. Apothecia terminal.Cornicularia s. lato. (including Bryocaulon and Cetraria; also see keys to Cetraria sensu lato)
4. Thallus closely appressed to rock, usually less than 1 cm tall, forming rosettes attached over most parts of the thallus. Alpine.Pseudephebe
4. Thallus not closely appressed to rock, usually exceeding 1 cm in height or length, not forming rosettes attached over most parts of the thallus.5
5. Branches with very long (at least 4 mm) deep furrows or grooves (sulci) breaking into the medulla. On bark. Rare.Sulcaria
5. Branches without such furrows or grooves. On various substrates. Common.Bryoria

III. THALLUS PALE OR BRIGHT YELLOW, GREENISH, OR WHITISH

1. Thallus Cladoniaform, composed of a primary thallus which is crustose, squamulose, or foliose, and a secondary thallus of \pm erect lobes, stalks, or branches (podetia or pseudopodetia), which are round in cross-section or at least somewhat inflated. (Note: a rare form of Sphaerophorus globosus, with a primary thallus of tiny fingerlike projections, also keys out here)

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1. Thallus not differentiated into primary and secondary thalli.7

2. Ascocarps (always present) mazaedia, on somewhat inflated, crowded, 1 cm high podetia seated on a foliose thallus. On conifer twigs, subalpine.(see Tholurna dissimilis)

2. Ascocarp, if present, not a mazaedium.3

3. Podetia hollow, simple to branched, often yellowish, brownish, or greenish; thallus usually with squamules at base or on the podetia; cephalodia and phyllocladia lacking.Cladonia s. lato

3. Podetia solid; on soil or rock.4

4. Pseudopodetia with soredia and/or granular to coralloid outgrowths (phyllocladia), usually \pm branched, whitish or grayish.5

4. Pseudopodetia without soredia or phyllocladia, usually \pm unbranched.6

5. Pseudopodetia minute, 0.3-1.0 cm high; phyllocladia decorticate, granular or powdery; cephalodia lacking; sterile.Leprocaulon

5. Pseudopodetia coarse, usually more than 1 cm high; phyllocladia distinct, corticate; cephalodia and apothecia often present.Stereocaulon

6. Apothecia black; pseudopodetia corticate; cephalodia present.Pilophorus

6. Apothecia pinkish to brown; pseudopodetia ecorticate; cephalodia absent.Baeomyces

7. Thallus hollow or inflated, \pm round in cross-section. Usually on rock, moss, or soil.8

7. Thallus solid, or if hollow and inflated then \pm flattened in cross-section.

8. Thallus richly branched, or if sparingly branched then with squamules.Cladonia s. lato

8. Thallus simple to sparingly branched, without squamules. Arctic-alpine, on soil.9

9. Thallus white, worm-like, prostrate, twisted.Thamnolia

9. Thallus yellowish-brown, inflated, \pm erect.Dactylina

10. Thallus with phyllocladia. On rock or soil.Stereocaulon

10. Thallus without phyllocladia; on various substrates.11

11. Ascocarps, if present, mazaedioid (spores forming a powdery black mass inside of globular swellings at tips of branches); thallus richly branched, bushy, \pm erect, stiff, the branches rounded to flattened in cross section, with thick, coralloid, shiny branchlets; grayish, brownish or whitish, KC- (no usnic acid).Sphaerophorus

11. Ascocarps, if present, not mazaedioid. Branchlets not coralloid.
(NEXT 2 KEYS)

**THALLUS GRAYISH, BROWNISH OR WHITISH,
KC- (OR AT LEAST WITHOUT USNIC ACID)**

Thallus (at least upper side) whitish to grayish green, not yellowish, without usnic or vulpinic acids, often K⁺ yellow (atranorin).

1. **Thallus loosely attached to soil**, erect but not tufted, without holdfast, flattened to canaliculate, \pm erect. Arctic-alpine. Cetraria
1. **Thallus closely attached to bark, wood or rock**, usually tufted or pendulous. 2
 2. **Branches about 1 mm wide, flattened, \pm linear, with long marginal cilia (no lens); underside pale.** 3
 2. **Branches mostly 2 mm or more wide, always without cilia. and rhizines.** 4
3. **Both sides corticate; cilia 1-2 mm long.** Physcia (tenella group)
3. **One side ecorticate; cilia 2-4 mm long.** Heterodermia (leucomelos group)
 4. **Branches \pm flat in section or canaliculate, or inflated, but distinctly dorsiventral, with pale upper side and \pm dark lower side.** 5
 4. **Branches rounded in section, or if flattened then the same (\pm pale) color on all sides, or lower side paler than upper one** 7
5. **Branches hollow, inflated, not canaliculate.** (Hypogymnia)
5. **Branches solid, not inflated.** 6
 6. **Thallus with a single main basal trunk and holdfast. Lower surface without rhizines. If branches canaliculate then curved downward. Medulla containing depsides or depsidones.** Pseudevernia
 6. **Thallus usually loosely attached, without a main trunk or holdfast. Lower surface with well developed prosoplectenchymatous cortex and few scattered rhizines. If branches canaliculate then curved upward. Medulla containing only a fatty acid (caperatic).** Platismatia
7. **Ascomarps, if present, round or lirellate pseudothecia. Algae Trentepohlia.** Hypothecium carbonaceous. Thallus whitish, or grayish to brownish but usually not very dark. Spores septate. Growing on rocks or bark, on or near the seashore, California and Baja California. 8
7. **Ascomarps, if present, apothecia. Algae trebouxoid.** Hypothecium hyaline. Thallus dark greenish, grayish, brownish, or olive yellow. 12
 8. **Thallus subfruticose, lobate, effigurate, or subfoliose.** 9
 8. **Thallus fruticose. Spores 3-septate.** 10
9. **Ascomata lirelliform, or if ascomata absent and soredia present, then thallus hollow.** Thallus very fragile when dry, whitish on all sides, lobes scarcely branched. Cortex C⁺ red. On rock, coast of California and Baja California. Hubbsia
9. **Ascomata apothecioid, or if ascomata absent and soredia present, then thallus solid.** Roccellina
 10. **Branches very short and stubby, 1-3 cm high, round to irregular in cross-section, whitish, C⁺ red, soft, rather fragile. Spores brown, verrucose. Medulla white, cretaceous. Nonsorediate. Cortical hyphae anticlinal. Ascomarps terminal; discs black to white pruinose; without algae below hypothecium. California, Baja California. Rare (less so on the Channel Islands), on shrubs and cliffs.** Schizopelte

californica

- 10. Branches usually over 5 cm tall or long, erect or pendulous, relatively thin, often flattened in cross-section. Spores hyaline, smooth. Sorediate or not. Ascocarps round. Thallus C+ red or C-. 11**
- 11. Cortical hyphae anticlinal. Branches uniformly flat in cross-section. Thallus or soredia usually C+ red. Roccella**
- 11. Cortical hyphae periclinal. Branches flat in section or round toward the tips. Thallus C-. Soredia absent. Terminal branches and branchlets ecorticate; well developed holdfast present. Dendrographa**
- 12. Thallus C+ red; apothecia lecanoreine; spores simple, hyaline, usually over 40 um long; thallus whitish. Arctic-alpine. (Ochrolechia frigida)**
- 12. Thallus C-. 13**
- 13. Thallus white, erect, composed of basally branched, crowded, elongated branches, resembling turf. Ascocarps unknown. Siphula**
- 13. Thallus greenish, grayish, brownish, or olive yellow, prostrate, brittle. Apothecia rare, immersed to adnate or sessile. 14**
- 14. Thallus surface distinctly pubescent-tomentose; thallus terete, often partly angular and flattened. On shrubs, rare, Channel Islands of southern California Tornabea scutellifera**
- 14. Thallus surface glabrous. On various substrates, mostly inland. 15**
- 15. Growing in the alpine. Apothecia, if present, sessile. Cortex grayish or brownish, KC- or KC+ reddish. (Bryoria and Alectoria)**
- 15. Growing at low to moderate elevations. 16**
- 16. On soil or humus. Discs black or with white pruina. Asci I- or pale greenish or bluish. Spores simple. Semi-arid areas of the West. Aspicilia spp.**
- 16. On calcareous rocks. Discs reddish brown. Ascus tips I+ deep blue. Spores 1-septate. Kansas and Arkansas south to western Texas and Mexico. Speerschneidera (euploca)**

THALLUS YELLOW OR YELLOW-GREEN, MOSTLY K-

Thallus bright greenish yellow (vulpinic acid), pale to dark yellowish or yellowish green (usnic acid), or rarely reddish; usually K-. (without atranorin).

1. Thallus bright greenish yellow, KC- (vulpinic acid), contorted and furrowed, irregularly angular in section. Branches soft, or if stiff and brittle when dry, then not erect; medulla \pm loose, but with several tougher cords running through it; thallus tufted to pendulous. Usually on conifers.Letharia

1. Thallus pale to dark yellowish or yellowish green, KC+ yellow (usnic acid).
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2. Thallus \pm rounded in cross-section, with distinct central cord which becomes visible when the cortex is broken by stretching or bending, or (tropical species) a hollow central axis; often with numerous short side branches (fibrils); yellowish, greenish, or rarely reddish, brownish, or whitish.Usnea

2. Thallus without central cord or hollow axis, without fibrils.3

3. Branches \pm rounded in cross-section, with pseudocyphellae usually present.4

3. Thallus \pm flattened or angular in cross-section, or if round then tufted.
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4. Apices of branches sorediate or granular, often hooked; cortex of anticlinal hyphae, often with a noncellular network beneath the cortex; medulla C-, KC-; thallus pendent to subpendent, 8-20 cm or long; on bark.Ramalina thrausta

4. Apices of branches not sorediate or granular, not hooked. Cortex of long-celled hyphae running parallel to surface; branches partly rounded or angular in cross-section. Thallus tufted or pendulous. On bark, soil or rock.Alectoria

5. Thallus loosely attached to soil, erect but not tufted, without holdfast.
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5. Thallus closely attached and tufted with holdfast, or pendulous.7

6. Growing in the northern Great Plains or Rocky Mtns.Rhizoplaca haydenii

6. Growing in Baja California.Niebla spp.

7. Branches soft, or if stiff and brittle when dry, then not erect; medulla \pm loose, but with several tougher cords running through it; thallus tufted to pendulous; usually on bark or wood. Branches sometimes whitish on one side, flattened to angular in section.Evernia

7. Branches firm, leathery, or brittle; medulla compact to hollow, without cords. Cortex of vertically oriented hyphae, often with a noncellular network beneath the cortex; branches usually

entirely flat to canaliculate in cross-section.Ramalina s. lato (including Niebla)

