

**Parmelia s. lato**

**KEY TO GENERA OR GROUPS IN THE PARMELIACEAE S. LATO**

After Elix (unpubl. and 1993)

1. Thallus fruticose with dorsiventral erect lobes (canalicate to plane), brownish or yellowish, K. ....Cetraria s. lato  
.....(also see Cornicularia s. lato).....12
1. Thallus truly foliose, with dorsiventral, often prostrate, lobes (infrequently subcrustose, subfruticose or umbilicate). ....  
.....2
2. Without true rhizines on lower side; without marginal cilia. ....3
2. With true rhizines on the lower side; sometimes scanty, as in some species of Xanthoparmelia or in the velvety under surface of Arctoparmelia; marginal cilia present or absent. ....  
.8
3. Thallus foliose. ....4
3. Thallus foliosesubfruticose. ....("Hypogymniaceae"). ....6
4. Lobes rotund to irregular, not elongate; medulla with alectoronic acid. ....Asahinea
4. Lobes elongated to long linear; branching dichotomous or subdichotomous, sometimes irregular; medulla with or without alectoronic acid. ....5
5. Thallus cartilaginous, prostrate, not attached to the ground; medulla only with alectoronic acid. On soil, arctic. ....Masonhalea richardsonii
5. Thallus not cartilaginous; medulla without alectoronic acid; rhizines sometimes present on lobe margins; subtropical. ....  
Everniastrum
6. Lobes hollow. ....Hypogymnia

6. Lobes solid. ....7
7. Lobes  $\pm$  inflated, 0.5-1.5 mm wide; upper cortex paraplectenchymatous; adnate and prostrate on rock, arctic-alpine. ....Brodoa oroarctica  
(if thallus dark olive to black, see Allantoparmelia)
7. Lobes plane to conalliculate, 2-4 mm wide; upper cortex constituted by palisade plectenchyma; ascending to erect, on bark, temperate to boreal. ....Pseudoevernia
8. Lobe margins usually ascending to erect; apothecia and pycnidia, if present, on the margins or under side of the margins. ....("Cetrarioid Genera")....9
8. Lobe margins usually appressed to weakly ascending; apothecia and pycnidia, if present, on the upper surface of the lobes. ....(see separate key to Parmelia s. lato)
9. Apothecia nephromoid, developing marginally on the lower side of the thallus; thallus brown to greenish or yellowish, not gray or white; without atranorin. On bark or wood. ....Tuckermannopsis
9. Apothecia not developing on the lower side of the thallus; thallus upper surface gray-white, with atranorin. On bark or wood. ....10
10. Underside and edges of thallus black. Upper side without pseudocyphellae. Apothecia and pycnidia common; soredia and isidia absent. California to Pacific Northwest. ....Esslingeriana idahoensis
10. Underside of thallus white to brown or mottled; edges not black. Upper side often pseudocyphellate. ....  
...11
11. Conidia sublageniform. Caperatic acid always present as main medullary substance. Upper side usually IKI+ blue, usually pseudocyphellate. ....Platismatia
11. Conidia bifusiform. Caperatic acid never present; medullary substances diverse. Upper side IKI-, always pseudocyphellate. ....

...Cetrelia

12. Growing firmly attached to rocks, alpine. Thallus blackish, 0.5-1.5 cm high; forming tufts. ....13

12. Thallus terricolous or corticolous; lobes unattached or attached by a small discoid holdfast, brown, gray, blackish green, or yellowish. ....14

13. Lobes  $\pm$  terete, without marginal cilia; apothecia abundant. Cortical layer extremely thick, composed of an outer thin layer of isodiametric cells overlying an up to 230  $\mu$ m thick layer of strongly gelatinized periclinial hyphae; lichen products absent. ....Cornicularia normoerica

13. Lobes  $\pm$  flattened, with marginal cilia ( $\pm$  sparse). Cortical layer much thinner; lichen products present. ....Cetraria

14. Growing on bark. ....15

14. Growing on soil. ....18

15. Thallus pendent to subpendent, rather large and Bryoria-like; rarely fertile; pseudocyphellae small and raised; on conifers, Pacific Northwest. ....Bryocaulon

15. Thallus erect; frequently fertile; apothecial margin and base with  $\pm$  distinct lobules; pycnidia immersed; pseudocyphellae depressed; on conifers, western N. America. ....16

16. Lobes  $\pm$  flattened; distinctly wrinkled; blackish green; apothecial laminal on upper surface; very variable. ....Tuckermannopsis merrillii

16. Lobes terete or slightly flattened; with  $\pm$  longitudinal furrows; gray or reddish brown. ....17

17. Lobes gray or grayish brown, ca. 1.5 cm high; with rather distinct longitudinal furrows; apothecial disc blackish; coastal. ....Cetraria californica

17. Lobes brown or reddish brown; up to 3 cm long; surface with

less distinct furrows; apothecial disc reddish brown; on conifers in intermountain regions. ....(Bryoria abbreviata)

18. Thallus yellowish. Arcticalpine. ....Cetraria

18. Thallus some other color. ....19

19. Medulla C+ reddish (olivetric acid); outer cortical layer composed of anticlinal cells; fatty acids lacking. ....Bryocaulon divergens

19. Medulla C; outer cortical layer composed of isodiametric cells; fatty acids common. ....20

20. Lobes ± flattened, canaliculate, pseudocyphellae ± plane; pycnidia on the tips of marginal projections or immersed. ....Cetraria

20. Lobes ± terete or angular; pseudocyphellae ± concave or absent; pycnidia on tips of projections. ....Coelocaulon

#### KEY TO GENERA OF PARMELIA S. LATO

I. Thallus brown to olive green or blackish, K, KC (containing neither atranorin nor usnic acid)

1. Without rhizines below. On rock, Arcticalpine. ....Allantoparmelia

1. With rhizines. ....2

2. Upper cortex N+ bluegreen or rarely N+ violet. Thallus foliose to somewhat subcrustose or subfruticose; upper cortex neither sorediate nor pseudocyphellate. On rock or soil. ....Neofuscelia

2. Upper cortex N (reddish brown). Thallus foliose; upper cortex commonly pseudocyphellate, sometimes sorediate. On bark, wood, moss or rock. ....Melanelia  
(also see Punctelia stictica and Parmelia omphalodes)

II. Thallus yellow or pale greenish yellow, KC+ yellow  
(containing usnic acid, rarely also with atranorin)

1. With punctiform pseudocyphellae on upper surface. On bark or  
rock. ....Flavopunctelia

1. Surface continuous, without pores (but sometimes palespotted).  
.....2

2. Rhizines mainly furcate or dichotomously branched; lobes  
generally truncate or subacute apically; conidia  
bifusiform. ....  
.Hypotrachyna, p.p.

2. Rhizines simple. ....3

3. On rocks or soil, very rarely on wood. Conidia bifusiform to  
sublageniform, rarely cylindric. Lobes variable. ....4

3. On bark or wood. ....6

4. Thallus with atranorin and alectoronic acid as well as usnic  
acid. Lower side velvety, almost without rhizines. On rock or  
soil. ....Arctoparmelia

4. Thallus without atranorin and alectoronic acid; lower side  
with abundant to scanty rhizines. On rock, soil, or  
bark. ....5

5. Lobes mostly narrow, to 13(6) mm wide, quite various in  
shape. Mature spores less than 15  $\mu$ m long. Medullary substances  
diverse (salazinic, stictic, and psoromic acids are very common;  
protocetraric group less common). Medullary hyphae with lichenin  
in their walls. ....Xanthoparmelia

5. Lobes mostly broad, to (3)59 mm wide, rotund to subrotund.  
Mature spores more than 15  $\mu$ m long. Medullary substances of the  
protocetraric acid group and/or fatty acids (rarely other  
substances). Medullary hyphae without lichenin in their  
walls. ....Flavoparmelia

(also see a few species of Parmotrema, and Pseudoparmelia  
sphaerospora)

6. Margins with bulbate cilia (bulbous at base).

Tropicalsubtropical. ....Relicina

6. Margins without cilia. Widespread. ....7

7. Soredia lacking; on fir trees at high elevations,  
western. ....Ahtiana  
sphaerosporella

7. Soredia present. ....8

8. Lobes ca. 1 mm wide, sublinear; thallus 26 cm diam.; pycnidia  
emergent, laminal or marginal; conidia falcate; spores reniform  
or allantoid. collected on bark or wood of conifers and  
smoothbarked hardwoods, low to moderate  
elevations. ....Parmeliopsis

8. Lobes mostly 2 mm wide or more; collected on oaks and other  
trees at lower elevations. ....8

9. Soredia marginal. ....Flavopunctelia soredica

9. Soredia laminal. ....Flavoparmelia caperata

III. Thallus whitish to greenish gray, K+ yellow  
(Containing atranorin, without usnic acid)

1. Pseudocyphellae present on upper surface. Lobes narrow, 23  
mm wide, without cilia on the margins. Apothecia adnate or  
shortly stipitate. On bark, rock, or soil. ....2

1. Pseudocyphellae lacking (however, less distinct white maculae  
may be present). Usually on bark. ....3

2. Pseudocyphellae elongate, marginal and laminal, often forming  
a reticulate pattern. Medulla C, K+ red or K, P+ red or P, with  
salazinic, protocetraric or echinocarpic  
acids. ....Parmelia

2. Pseudocyphellae punctiform, round, laminal, not forming a  
reticulate pattern. Medulla C+ red or C, K, P, with lecanoric,  
gyrophoric or fatty acids. ....Punctelia

3. Lobes broad, 410 mm wide, irregular, subrotund or rotund apically, rarely strapshaped, frequently with ascendent apices; thallus loosely attached; lobe margins often with cilia. Apothecia stipitate to substipitate, cupshaped. Pseudocyphellaeabsent. Conidia filiform, cylindric, less frequently subnlageniform. Usually on bark. ....4
3. Lobes narrow, 25(10) mm wide, irregular, subrotund or sublinear, tips mostly not ascendent; thallus tightly to loosely attached; apothecia adnate to shortly stipitate. Conidia of various types. ....5
4. Upper surface continuous (or here and there weakly and irregularly cracked); rhizines not squarrose; apothecia not perforate. ....Parmotrema
4. Upper surface strongly reticulately cracked and maculate; rhizines dense, furcate to squarrosely branched; apothecia perforate; conidia cylindrical to filiform .....Rimelia
5. Rhizines mainly simple or not dichotomously branched (when furcate or dichotomous, then non predominant but mixed with simple or other types); conidia of different types, including bifusiform. ....6
5. Rhizines mainly furcate or dichotomously branched; lobe margins not ciliate. Lobes mostly linearelongate, truncate or subacute apically. Conidia bifusiform. Mostly subtropical. ....Hypotrachyna
6. Lobe margins ciliate (cilia sometimes only weakly developed or confined to the sinuses of the lobes) .....7
6. Lobe margins not ciliate. ....11
7. Cilia not bulbate. Underside black. (Parmelina s. lato) .....8
7. Cilia bulbate (swollen at base). Tropicalsubtropical. ....Bulbothrix
8. Medulla yellow or yelloworange at least in part, containing secalonc acids. Rhizines simple to squarrose. Spores 510 x 815

um; conidia 57 um. Upper side maculate or not. Cilia mainly in axils, sometimes very tiny and scant. ....Myelochroa

8. Medulla white, without or rarely with traces of secalonic acids. ....9

9. Cilia evenly dispersed; lobes sublinear and narrow, apices truncate; rhizines mixed with furcate to weakly dichotomously divided or squarrose; conidia small (35 um). Upper side not maculate. Spores 812 x 1218 um. Conidia cylindric to bifusiform. Thallus tightly to loosely attached. On rock or bark. ....Parmelinopsis

9. Cilia mainly in lobe axils (sometimes very tiny and scant); apices of lobes rotund; rhizines simple; conidia usually larger (48 um); spores smaller. ....10

10. Lobes narrow (16 mm), rotund to subirregular; medulla containing lecanoric acid or fatty acids; spores 57 x 812 um. Upper side often slightly maculate. Medulla often C+ red (lecanoric acid). Conidia cylindric or sublageniform. ....Parmelina

10. Lobes broad (510 mm), apically rotund; medulla containing norstictic acid; spores 36 x 78 um. Upper side not maculate, + flaking. Conidia cylindric, 35 um. ....Parmotremopsis

11. Lobes broad, 24 mm or more wide, + rotund. (Pseudoparmelia sensu lato). ....13

11. Lobes narrow, ca. 1 mm wide, linear; thallus 25 mm diameter, adnate. (Parmeliopsis sensu lato). ....12

12. Conidia falcate; spores reniform or allantoid. ....Parmeliopsis

12. Conidia not falcate; spores + ellipsoid. Pycnidia emergent, laminal or marginal. Thamnolic acid in the medulla. ....Imshaugia

13. Medulla pigmented (yellow); lobes short, narrow; spores 47 x 69 um; conidia 1220 um; isidiate; underside brown; rhizines moderately dense, simple. ....Pseudoparmelia



13. Medulla (usually) white. Isidiate, soresiate or  
pustulate. ....14

14. Lobes sublinear or subirregular, narrow, tightly or loosely  
adnate; margins eciliate. Spores 46 x 710 um; conidia 57 um,  
bifusiform. Underside pale brown to black; rhizines simple,  
stout, short. On rock. ....Paraparmelia

14. Lobes subrotund, ± medium in width. Spores 68 x 1014 um;  
conidia 710 um. Underside black. Medulla  
white. ....  
.Canoparmelia

Rogers, 19 . Genera of Australian Lichens. Elix, J. 1993.  
Genera of Parmeliaceae.