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 (canaliculate 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 rhzines 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 foliose-subfruticose. ....("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 ± inflated, 0.5-1.5 mm wide; upper cortex paraplectenchyamtous;

adnate and prostrate on rock, arctic-alpine. .....Brodoa oroarctica
(if thallus dark olive to black, see Allantoparmelia)

7. Lobes plane to conaliculate, 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 ± terete, without marginal cilia; apothecia abundant. Cortical layer extremely thick, composed of an outer thin layer of isodiametric cells overlying an up to 230 um thick layer of strongly gelatinized periclinal hyphae; lichen products absent. .....Cornicularia normoerica

13. Lobes ± flattened, with marginal cilia (± 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; apothecail margin and base with ± distinct lobules; pycnidia immersed; pseudocyphellae depressed; on conifers, western N. America. 16

16. Lobes ± flattened; distinctly wrinkled; blacksih green; apothecial laminal on upper surface; very variable. .....Tuckermannopsis merrillii

16. Lobes terete or slightly flattened; with ± 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; upt to 3 cm long; surface with less distinct furrows; apothecial disc reddish brown; on conifers in intermountain regions. .....(Bryoria abbreviata)

18. Thallus yellowish. Arctic-alpine. .....Cetraria

18. Thallus some other color. 19

19. Medulla C+ reddish (olivetoric 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, Arctic-alpine. .....Allantoparmelia

1. With rhizines. 2

2. Upper cortex N+ blue-green 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 continous, without pores (but sometimes pale-spotted). 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 1-3(-6) mm wide, quite various in shape. Mature spores less than 15 um 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)-5-9 mm wide, rotund to subrotund. Mature spores more than 15 um long. Medullary sunbstances 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). Tropical-subtropical. .....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 2-6 cm diam.; pycnidia emergent, laminal or marginal; conidia falcate; spores reniform or allantoid. collected on bark or wood of conifers and smooth-barked 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, 2-3 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, 4-10 mm wide, irregular, subrotund or rotund apically, rarely strap-shaped, frequently with ascendent apices; thallus loosely attached; lobe margins often with cilia. Apothecia stipitate to substipitate, cupshaped. Pseudocyphellae absent. Conidia filiform, cylindric, less frequently subnlageniform. Usually on bark. 4

3. Lobes narrow, 2-5(-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 linear-elongate, 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). Tropical-subtropical. .....Bulbothrix

8. Medulla yellow or yellow-orange at least in part, containing secalonic acids. Rhizines simple to squarrose. Spores 5-10 x 8-15 um; conidia 5-7 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; lobses sublinear and narow, apices truncate; rhizines mixed with furcate to weakly dichotomously divided or squarrose; conidia small (3-5 um). Upper side not maculate. Spores 8-12 x 12-18 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 (4-8 um); spores smaller. 10

10. Lobes narrow (1-6 mm), rotund to subirregular; medulla containing lecanoric acid or fatty acids; spores 5-7 x 8-12 um. Upper side often slightly maculate. Medulla often C+ red (lecanoric acid). Conidia cylindric or sublageniform. .....Parmelina

10. Lobes broad (5-10 mm), apically rotund; medulla containing norstictic acid; spores 3-6 x 7-8 um. Upper side not maculate, ± flaking. Conidia cylindric, 3-5 um. .....Parmotremopsis

11. Lobes broad, 2-4 mm or more wide, ± rotund. (Pseudoparmelia sensu lato). 13

11. Lobes narrow, ca. 1 mm wide, linear; thallus 2-5 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 4-7 x 6-9 um; conidia 12-20 um; isidiate; underside brown; rhizines moderately dense, simple. .....Pseudoparmelia

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

14. Lobes sublinear or subirregular, narrow, tightly or loosely adnate; margins eciliate. Spores 4-6 x 7-10 um; conidia 5-7 um, bifusiform. Underside pale brown to black; rhizines simple, stout, short. On rock. .....Paraparmelia

14. Lobes subrotund, ± medium in width. Spores 6-8 x 10-14 um; conidia 7-10 um. Underside black. Medulla white. .....Canoparmelia

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