

MELANELIA

Melanelia Essl.

The Brown Lichens

Small to occasionally medium **stratified foliose lichens**, corticate above and below, sorediate or isidiate or not, pseudocyphellate or not, lobes **closely appressed** to rather loosely appressed, **short to elongate**, 0.4–4 (–7) mm wide, thin or sometimes rather thick. Upper surface **brown**, K-, **HNO₃-** (ours), pruinose or not. Lower surface pale to blackish, bearing short, simple rhizines. Medulla white. Photobiont green. Apothecia located over upper surface, disc brown; spores simple, ellipsoid, colourless, 8 (–32) per ascus. Over bark or rock.

References: Ahti (1966); Kristinsson (1974); Esslinger (1977a, 1978a).

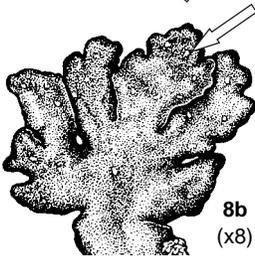
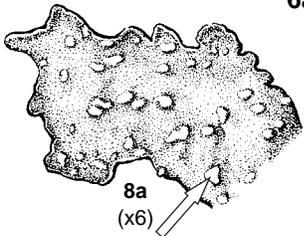
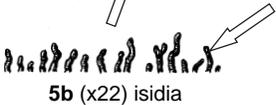
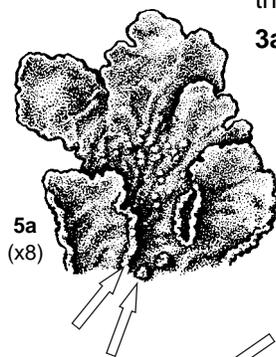
Common Name: Describes the colour of the upper surface in this genus.

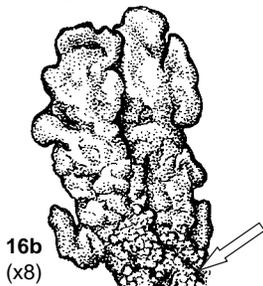
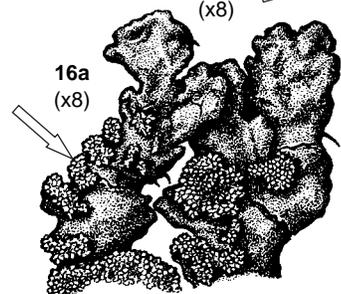
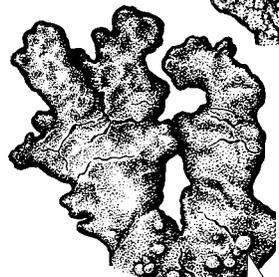
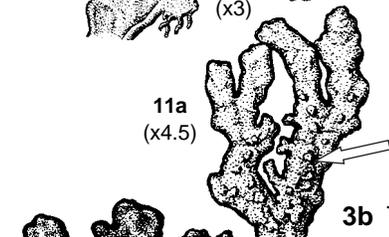
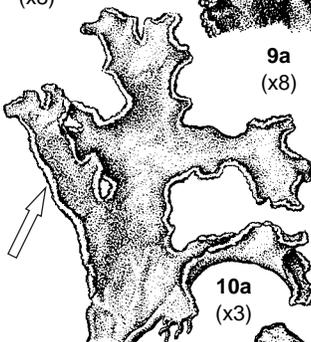
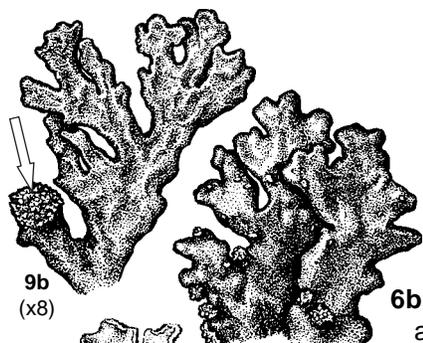
Notes: *Melanelia* is primarily a temperate and boreal genus consisting of about 35 species worldwide. Twenty-three of these occur in North America and 17 in B.C. *Melanelia* was one of several genera recently segregated from the classic genus *Parmelia*.

Two keys are provided. The first key emphasizes vegetative characters, while the second key stresses chemical characters.

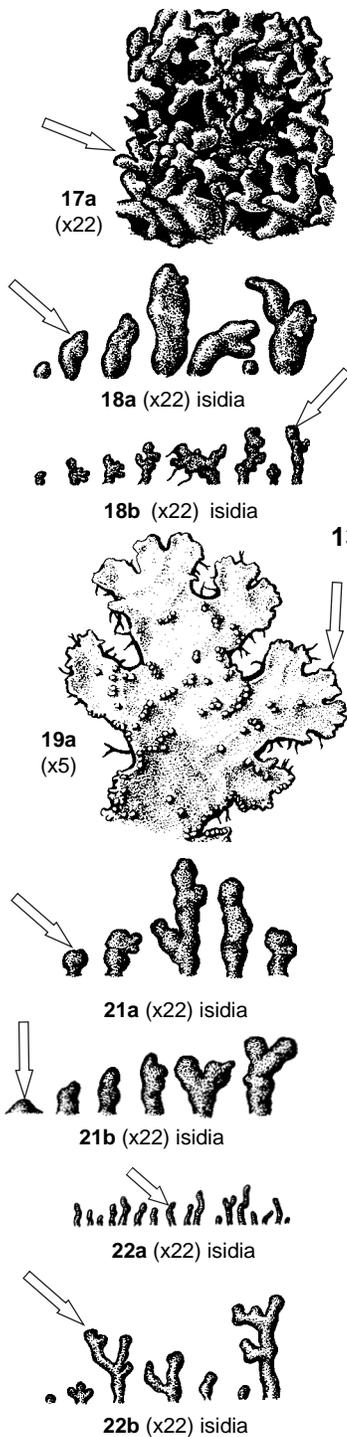
Key to *Melanelia* and Similar Lichens Stressing Vegetative Characters

- 1a Soredia and/or isidia present 2
 - 2a Thallus sorediate, soredio-isidiate (i.e., isidia with “soft” appearance) or, if strictly isidiate, then isidia coloured differently from upper surface 3
 - 3a Thallus sorediate or if isidiate, then mature isidia either distinctly associated with soralia or strictly cylindrical; over bark, wood or rock; upper surface HNO₃- 4
 - 4a Soralia arising through gradual disintegration of upper cortex, tending to be diffuse, not tightly packed with soredia (or isidia); over bark or wood (rare over mossy rock) 5
 - 5a Soralia located both along lobe margins and over upper surface(←), arising mostly from wart-like outgrowths of upper cortex; lobe tips loosely appressed to ascending, often bearing sparse, minute, colourless cortical hairs; “isidia” granular; rare; intermontane ***Melanelia subargentifera***
 - 5b Soralia located over upper surface, usually arising directly from upper cortex; lobes more or less appressed throughout; cortical hairs absent; isidia cylindrical at maturity(←); widespread and frequent ***Melanelia subaurifera***
 - 4b Soralia distinctly delimited and generally tightly packed with soredia (or isidia); habitat various 6
 - 6a Upper surface generally dark brown or blackening; lobes closely appressed; over rock (very rare over wood) 7
 - 7a Upper surface bearing distinct scattered pseudocyphellae throughout; lobes typically more than 1.5 mm wide; medulla C+ reddish 8
 - 8a Pseudocyphellae often more than 0.5 mm across(←), generally raised above upper surface; lobes concave to plane; apothecia absent; coastal ***Punctelia stictica***
 - 8b Pseudocyphellae less than 0.3 mm across(←), impressed or occasionally lying in same plane as upper surface; lobes convex when mature; apothecia often present; inland ***Melanelia tominii***
 - 7b Upper surface without pseudocyphellae or, if pseudocyphellae present, then these located along margins; lobes typically less than 1.5 mm wide; medulla C- 9

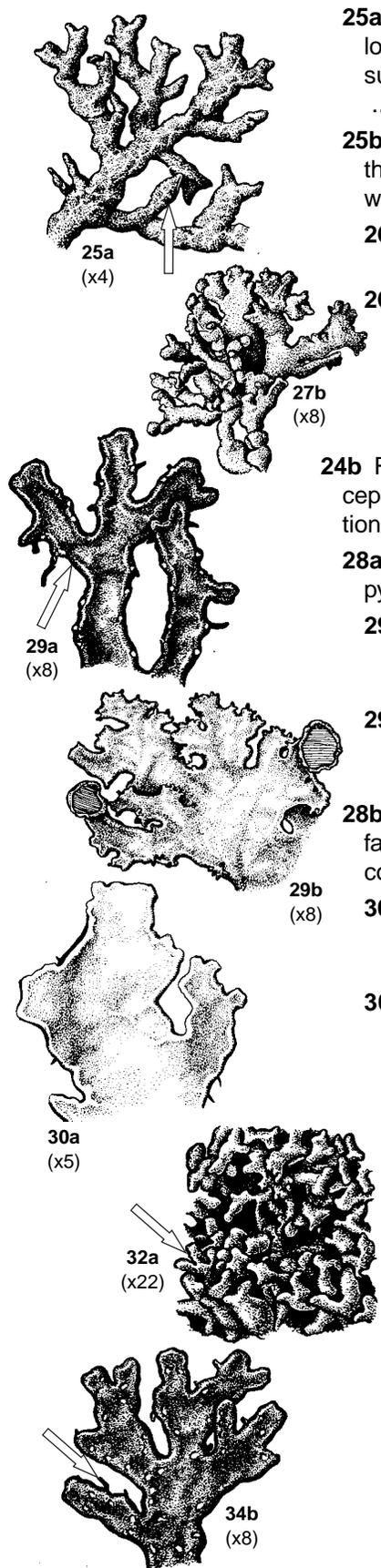




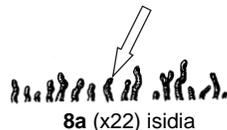
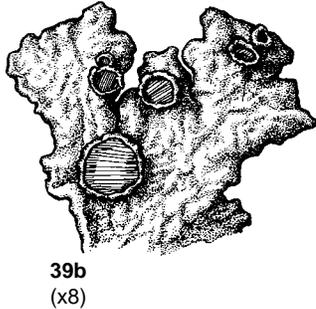
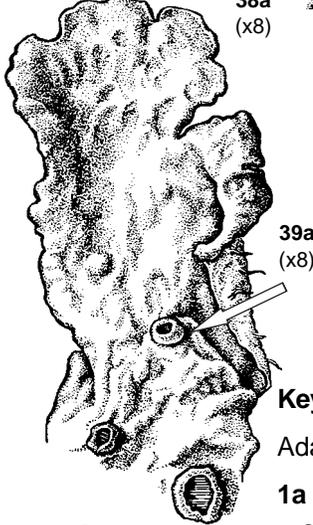
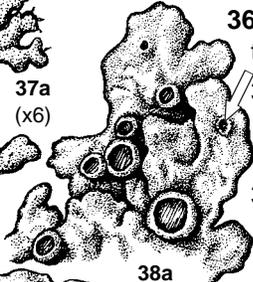
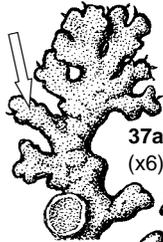
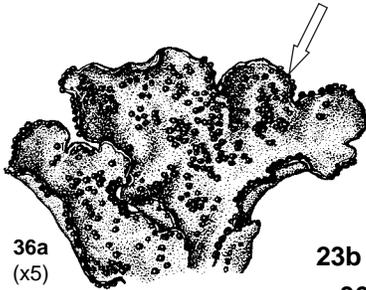
- 9a Soralia discrete or coalescing, located over upper surface, often near lobe margins, generally not elevated above upper surface; upper surface with distinct or inconspicuous pseudocyphellae located near lobe margins; lobes rather short and tending to broaden at tips; upper surface generally shiny **Melanelia disjuncta**
- 9b Soralia discrete (never coalescing), located mostly on tips of small, raised lateral lobes(←); pseudocyphellae absent; lobes generally elongate-linear; upper surface dull **Melanelia soreliata**
- 6b Upper surface medium brownish; lobes closely appressed to often loosely appressed; over bark, wood or mossy rock 10
- 10a Lobes usually linear-elongate; lower surface pale; soralia restricted to lobe margins(←); widespread; frequent **Cetraria chlorophylla**
- 10b Lobes usually short; lower surface blackening; soralia marginal and/or over upper surface; rare 11
- 11a Soralia restricted to upper surface(←), circular in outline, often very small; medulla C-; boreal **Melanelia olivaceoides**
- 11b Soralia partly located along lobe margins, elongate; medulla C+ rose; intermontane 12
- 12a Soralia exclusively located along lobe margins; upper surface rarely white-pruinose; over aspen [**Melanelia albertana**]
- 12b Soralia located along lobe margins and over upper surface; upper surface often white-pruinose; over conifers, deciduous trees, or mossy rock **Melanelia subargentifera** (see lead 5a)
- 3b True soredia absent; isidia or soredio-isidia present, these never clearly associated with soralia (Note: some may, however, be heaped in coralloid masses that resemble soralia); mature isidia often enlarged and globular, but never cylindrical; over rock; upper surface HNO₃+ blue-green **Neofuscelia** (see lead 15a)
- 2b Thallus bearing distinctly corticate isidia, these coloured alike with upper surface; soredia absent 13
- 13a Mature isidia predominantly globular, barrel-shaped or elongate-dorsiventral, sometimes also in part granular or narrow-cylindrical, sometimes hollow 14
- 14a Mature isidia at most globular (never rhizinate), often partly heaped in coralloid masses; upper surface often transversely wrinkled or cracked; over rock; cortex HNO₃+ blue-green 15
- 15a Upper surface yellowish brown to reddish brown (occasionally darker); lobe tips often distinctly pale checkered-maculate above; larger isidia generally more than 0.2 mm wide(←), often pale-checked; medulla KC+ rose becoming dingy orange **Neofuscelia loxodes**
- 15b Upper surface medium brown to dark brown; lobe tips weakly pale-checked to more often not at all checkered; larger isidia generally less than 0.2 mm wide, never pale-checked; medulla KC- or KC+ pale yellow or rose-red (not becoming dingy orange) 16
- 16a Isidia often partly heaped in coralloid masses(←), these sometimes darker than upper surface; widespread in southern regions; medulla K-, PD- **Neofuscelia verruculifera**
- 16b Isidia scattered to clustered(←), but not heaped in coralloid masses, coloured alike with upper surface; mostly intermontane; medulla K+ yellow becoming slowly orange, PD+ slowly pale orange **Neofuscelia subhosseana**



- 14b** Mature isidia barrel-shaped or elongate-dorsiventral, lower surface (of dorsiventral isidia) generally bearing rhizines; isidia occasionally branched, but not heaped in coralloid masses; upper surface not distinctly transversely wrinkled or cracked; over bark, wood or rock; cortex HNO_3^- 17
- 17a** Mature isidia loosely appressed and lobe-like(←), never inflated; over rock
..... **Melanelia panniformis**
- 17b** Mature isidia partly erect and cylindrical or barrel-shaped, inflated or not; over bark or wood (rare over rock) 18
- 18a** Isidia hollow-inflated and barrel-shaped(←), only rarely dorsiventral, with distinct greasy lustre above; lobes often rather loosely appressed toward thallus periphery, rarely white-pruinose **Melanelia exasperatula**
- 18b** Isidia never hollow-inflated: either upright and long-cylindrical(←) or if more or less appressed, then soon dorsiventral, often somewhat shiny above, but without greasy lustre; lobes usually closely appressed throughout, often weakly white-pruinose **Melanelia subelegantula**
- 13b** Mature isidia either strictly granular and unbranched or strictly narrow-cylindrical (in the latter case sometimes branched), never globular, barrel-shaped or elongate-dorsiventral (immature isidia, however, may occasionally be globular), never hollow 19
- 19a** Lobe tips generally somewhat angular in outline(←); upper surface pale checkered-maculate and/or checkered-pseudocyphellate (check lobe tips); medulla K+ yellow becoming orange-red, PD+ bright orange **Parmelia saxatilis**
- 19b** Lobe tips generally rounded in outline; upper cortex lacking pale-checking and pseudocyphellae; medulla K-(or K+ violet), PD- 20
- 20a** Neither isidia nor upper cortex readily abrading; medulla generally not exposed in patches; upper surface often white-pruinose (check lobe tips); lower surface pale throughout or blackening; arid or dry inland localities; medulla C-, KC- 21
- 21a** Isidia arising as small hemispherical and globular warts(←) (these often basally constricted)(←) at various stages of development near thallus centre; over rock **Melanelia infumata**
- 21b** Isidia arising as small conical to hemispherical warts(←) (not basally constricted) progressively better developed toward thallus centre; over bark, wood or rock
..... **Melanelia elegantula**
- 20b** Isidia and/or upper cortex in part readily abraded to reveal whitish medullary patches; upper surface rarely white-pruinose; lower surface blackening; distribution various; medulla C+ red, KC+ red 22
- 22a** Upper surface often dull (except shiny near lobe tips); isidia short, less than 0.3 mm long, generally unbranched(←); medulla white throughout; widespread
..... **Melanelia subaurifera**
- 22b** Upper surface usually shiny throughout; isidia elongate (generally more than 0.3 mm long) with age, often heavily branching(←); medulla usually bearing scattered orange patches (check near lower cortex); generally coastal
..... **Melanelia fuliginosa**
- 1b** Soredia and isidia absent (Note: low, white-tipped conical warts/papillae may develop over upper surface of some species) 23
- 23a** Over rock or (rarely) soil 24
- 24a** Rhizines absent (sparse, peg-like cortical outgrowths may, however, be present); lobes strongly convex throughout; alpine or subalpine 25



- 25a Upper surface partly checkered-maculate(←), K+ yellow (check near lobe tips); lobes in part raised, sparsely branched, seldom completely obscuring substrate; lower surface apparently somewhat white-pruinose; medulla PD+ orange or PD- ***Brodoa oroarctica***
- 25b Upper surface not at all checkered-maculate, K- throughout; lobes usually appressed throughout, densely branched, generally obscuring substrate; lower surface not at all white-pruinose; medulla PD+ strong yellow or PD- 26
- 26a Upper surface bearing numerous pseudocyphellae, these sometimes sunken; medulla KC- (rare form of) ***Melanelia stygia*** (see lead 34b)
- 26b Upper surface lacking pseudocyphellae; medulla KC+ reddish 27
- 27a Lower surface mostly pale brownish; coastal in alpine and subalpine localities; medulla K-, PD- ***Allantoparmelia almquistii***
- 27b Lower surface mostly black; widespread in alpine localities; medulla K+ pale yellow, PD+ strong yellow ***Allantoparmelia alpicola***
- 24b Rhizines present below (check near lobe tips); lobes in part concave to plane, (except convex throughout in rare specimens of *Melanelia stygia*, see lead 35a); distribution various 28
- 28a Pseudocyphellae and pycnidia present, located primarily along lobe margins, pycnidia protruding and barrel-shaped to elongate-cylindrical 29
- 29a Lobe margins more or less distinctly rimmed(←); lower surface typically blackening; pseudocyphellae restricted to vicinity of lobe margins (but not actually marginal); medulla KC- ***Cetraria hepaticon***
- 29b Lobe margins not distinctly rimmed; lower surface typically rather pale or at least not blackening; pseudocyphellae more or less strictly marginal (i.e., positioned at right angles to upper surface); medulla KC+ rose (flash) ***Cetraria commixta***
- 28b Pseudocyphellae and pycnidia absent or, if present, then scattered over upper surface, pycnidia either somewhat sunken or at most slightly protruding above upper cortex 30
- 30a Upper surface greyish and K+ yellow (check sheltered lobes), white-pruinose or not; pseudocyphellae, when present, soon elongate-angular, especially near lobe tips; medulla K+ yellow becoming orange-red ***Parmelia omphalodes***
- 30b Upper surface brownish or blackish throughout, K-, never white-pruinose; pseudocyphellae, when present, spot-like or at least not elongate-angular; medulla K- (except often K+ orange in *Melanelia tominii*) 31
- 31a Pseudocyphellae absent (or apparently absent) over upper surface 32
- 32a Lobes mostly less than 1 mm wide, generally densely lobulate toward thallus centre(←); apothecia uncommon; medulla KC- ***Melanelia panniformis***
- 32b Lobes mostly more than 1 mm wide, not densely lobulate; apothecia often present; medulla KC+ rose or rose-red (rare nonsorediate form of) ***Melanelia tominii*** (see lead 8b)
- 31b Pseudocyphellae distinct over upper surface (check in vicinity of lobe tips) 33
- 33a Lower surface blackening (check toward thallus centre); medulla KC+ reddish or PD+ strong orange 34
- 34a Rhizines broadcast over lower surface; medulla KC+ reddish, PD- (rare nonsorediate form of) ***Melanelia tominii*** (see lead 8b)
- 34b Rhizines essentially restricted to margins of lower surface(←); medulla KC-, PD+ strong orange ***Melanelia stygia***

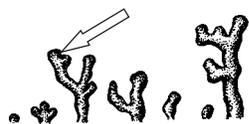


- 33b** Lower surface primarily pale brown to medium brown (or black in localized areas); medulla KC- or KC+ pale orangish, PD- 35
- 35a** Lobes strongly convex; pseudocyphellae averaging to less than 0.2 mm long; medulla KC- **Melanelia stygia**
- 35b** Lobes concave or weakly convex (check near lobe tips); pseudocyphellae averaging to more than 0.3 mm long; medulla KC+ finally orange or KC- **"Cetraria" agnata** (see page 81)
- 23b** Over bark or wood 36
- 36a** Thallus loosely appressed to semi-erect; lobe margins generally bearing pycnidia and/or cilia(←); apothecia located primarily along lobe margins **Cetraria**
- 36b** Thallus more or less closely appressed, never semi-erect; lobe margins bearing neither pycnidia nor cilia; apothecia located over upper surface 37
- 37a** Lobes mostly elongate-linear, less than 1.5 mm wide; upper surface generally convex(←); lower surface often strongly net-ridged (older specimens); spores 16–32 per ascus; inland **Melanelia trabeculata**
- 37b** Lobes short to more or less elongate, broadest averaging to more than 1.5 mm wide; upper surface convex to concave; lower surface smooth to wrinkled, but never net-ridged; spore number and distribution various 38
- 38a** Apothecia often well developed almost to lobe tips(←); essentially boreal; medulla PD+ orange or rarely PD- (check apothecia margins); spores 8 per ascus **Melanelia septentrionalis**
- 38b** Apothecia usually well developed only toward thallus centre(←); coastal and/or intermontane; medulla PD- (check apothecia margins); spores sometimes more than 8 per ascus 39
- 39a** Over conifers and deciduous trees and shrubs in dry intermontane forests; spores 8 per ascus **Melanelia subolivacea**
- 39b** Over deciduous trees and shrubs in humid coast and intermontane forests; spores more than 8 per ascus **Melanelia multispora**

Key to Melanelia and Similar Lichens Stressing Chemical and Spore Characters

Adapted in part from Esslinger (1977a).

- 1a** Isidia and/or soredia present 2
- 2a** Isidia present, these sometimes pustular and fragmenting into soredia-like masses; true soredia absent 3
- 3a** Medulla K+ yellow becoming orangish **Neofuscelia subhosseana**
- 3b** Medulla K- or K+ very faint 4
- 4a** Medulla PD+ orangish red; containing fumarprotocetraric and protocetraric acids **Melanelia olivaceoides**
- 4b** Medulla PD-; lacking fumarprotocetraric and protocetraric acids 5
- 5a** Medulla C+ reddish 6
- 6a** Upper surface HNO₃+ blue-green 7
 - 7a** Glomelliferic, glomellic and perlatolic acids present **Neofuscelia loxodes**
 - 7b** Divaricatic (or very rarely stenosporic) acid present **Neofuscelia verruculifera**
- 6b** Upper surface HNO₃- 8
- 8a** Isidia averaging to less than 0.3 mm long, usually unbranched(←) **Melanelia subaurifera**



8b (x22) isidia



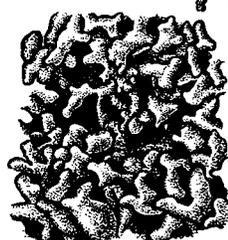
13a (x22) isidia



13b, 14a (x22) isidia



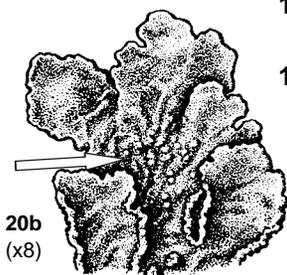
14b (x22) isidia



15a (x22)

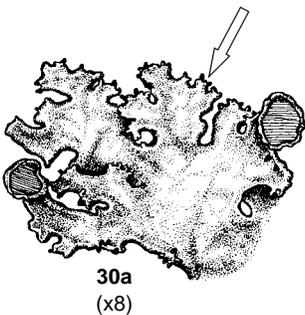
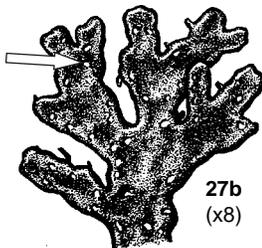
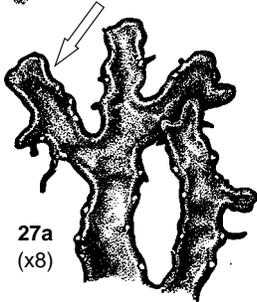
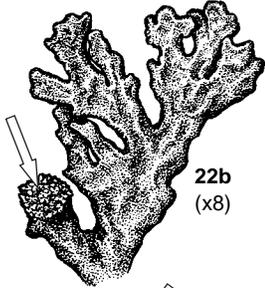
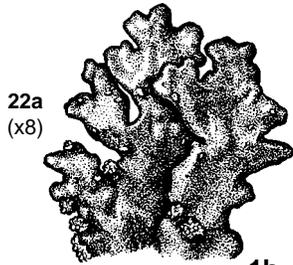


16a (x22) isidia



20b (x8)

- 8b Isidia averaging to more than 0.3 mm long, often branched(←) **Melanelia fuliginosa**
- 5b Medulla C- 9
- 9a Medulla KC+ reddish 10
- 10a Medulla KC+ rose, usually fading fast, containing divaricatic acid (or rarely stenosporic acid) **Neofuscelia verruculifera**
- 10b Medulla KC+ reddish becoming dingy orange, containing glomelliferic, glomellic and perlatolic acids **Neofuscelia loxodes**
- 9b Medulla KC- 11
- 11a Upper surface HNO₃+ blue-green; medulla containing divaricatic acid **Neofuscelia verruculifera**
- 11b Upper surface HNO₃- or HNO₃ slightly reddish 12
- 12a Isidia distinctly cylindrical 13
- 13a Isidia arising as small conical to hemispherical papillae(←) with (sometimes obscure) pseudocyphellae at tip **Melanelia elegantula**
- 13b Isidia arising as small spherical to hemispherical papillae(←) without pseudocyphellae at tip 14
- 14a Over rock; isidia upright or somewhat appressed, but not dorsiventral **Melanelia infumata**
- 14b Mostly over bark; isidia developing into somewhat appressed dorsiventral lobules when mature(←) **Melanelia subelegantula**
- 12b Isidia not distinctly cylindrical 15
- 15a Upper surface more or less covered in small, overlapping lobules; over rock **Melanelia panniformis**
- 15b Upper surface not covered in small, overlapping lobules; mostly over bark 16
- 16a Isidia barrel-shaped(←), hollow; no substances present **Melanelia exasperatula**
- 16b "Isidia" more or less granular, never hollow; fumarprotocetraric and protocetraric acids present or absent **Melanelia olivaceoides**
- 2b True soredia present, sometimes accompanied by isidia 17
- 17a Medulla C+ reddish 18
- 18a Soralia located strictly along lobe margins [**Melanelia albertana**]
- 18b Soralia located over upper surface and sometimes also along lobe margins 19
- 19a Pseudocyphellae conspicuous over upper surface; over rock; lecanoric acid absent **Melanelia tominii**
- 19b Pseudocyphellae absent or obscure; mostly over bark; lecanoric acid present 20
- 20a Soralia located strictly over upper surface, arising through disintegration of upper cortex; true isidia usually also present **Melanelia subaurifera**
- 20b Soralia located over upper surface and along lobe margins, those over upper surface arising from small "warts"/pustules(←); true isidia absent **Melanelia subargentifera**
- 17b Medulla C- 21
- 21a Mostly over bark; medulla lacking perlatolic and stenosporic acids **Melanelia olivaceoides**



- 21b Over rock; medulla containing perlatolic and stenosporic acids 22
- 22a Upper surface often rather shiny, bearing obscure to conspicuous pseudocyphellae; soralia located over upper surface and along lobe margins, arising partly from pseudocyphellae **Melanelia disjuncta**
- 22b Upper surface usually rather dull, lacking pseudocyphellae; soralia mostly terminal on main lobes and/or on small, often somewhat erect lateral branches(←), arising by gradual disintegration of cortex **Melanelia soredata**
- 1b Isidia and soredia absent 23
- 23a Medulla PD+ yellow or orangish 24
- 24a Lower surface lacking rhizines (peg-like rhizines, however, sometimes present); medulla PD+ bright yellow, containing alectorialic and barbatolic acids **Allantoparmelia alpicola**
- 24b Lower surface bearing rhizines; medulla PD+ orangish or if PD+ yellow, then norstictic and/or salazinic acid present; alectorialic and barbatolic acids absent 25
- 25a Over bark or wood 26
- 26a Medulla K+ yellow becoming orangish, PD+ yellow, containing norstictic and salazinic acid **Melanelia trabeculata**
- 26b Medulla K- or K+ pale dingy orange, PD+ orangish red, containing fumarprotocetraric and protocetraric acids, or (rarely) lichen acids absent **Melanelia septentrionalis**
- 25b Over rock or (rarely) wood 27
- 27a Pseudocyphellae usually restricted to lobe margins(←); medulla usually rather thin, PD+ slowly pale orange, containing stictic and norstictic acids **Cetraria hepaticon**
- 27b Pseudocyphellae scattered freely over upper surface of lobes(←); medulla usually distinctly thick, PD+ rapidly strong orange, containing fumarprotocetraric acid **Melanelia stygia**
- 23b Medulla PD- 28
- 28a Medulla KC+ reddish 29
- 29a Lower surface lacking rhizines (peg-like outgrowth, however, sometimes present); medulla containing olivetoric acid **Allantoparmelia almquistii**
- 29b Lower surface bearing distinct rhizines (these, however, occasionally restricted to lobe margins); medulla containing gyrophoric, alectoronic and/or alpha-collatolic acid 30
- 30a Pycnidia numerous, restricted to lobe margins(←), usually elongate-cylindrical. **Cetraria commixta**
- 30b Pycnidia usually absent or sparse, positioned partly over upper surface, globular 31
- 31a Rhizines mostly restricted to lobe margins; medulla containing alectoronic acid "**Cetraria**" **agnata** (see below)
- 31b Rhizines freely scattered over entire lower surface; medulla containing gyrophoric acid (a rare nonsorediate form of) **Melanelia tominii**
- 28b Medulla KC- 32
- 32a Central portions of upper surface bearing numerous small, overlapping lobules 33
- 33a Upper surface bearing conspicuous pseudocyphellae **Melanelia stygia**
- 33b Upper surface lacking pseudocyphellae or occasionally with very inconspicuous pseudocyphellae **Melanelia panniformis**

- 32b Overlapping lobules absent over upper surface 34
- 34a Over bark or wood 35
- 35a Spores 8 per ascus *Melanelia subolivacea*
- 35b Spores more than 8 per ascus *Melanelia multispora*
- 34b Over rock 36
- 36a Upper surface strongly convex, often minutely pitted with “sunken” pseudocyphellae (rare form of) *Melanelia stygia*
- 36b Upper surface more or less concave (check near lobe tips), not at all pitted “*Cetraria*” *agnata* (see below)

“*Cetraria*” *agnata* (Nyl.) H. Krist.

Map 56

Leather brown

Habitat/Range: Rare over acid rock in exposed outcrops in inland alpine and subalpine localities; possibly incompletely circumpolar, S to BC.

Reactions: Medulla C- or C+ slowly pale yellow, KC- or KC+ slowly pale yellow or orange.

Contents: (Alectoronic acid and various unknowns.) (Often lacking chemical substances.)

Notes: Though presently placed in *Cetraria*, this species is more closely related to *Melanelia*, especially to *M. stygia*. Kristinsson (1974) stated that “*Cetraria*” *agnata* lacks chemical substances. However, a few specimens (including Hale No. 306, cited in Kristinsson 1974) have subsequently been found to contain alectoronic acid.

[*Melanelia albertana* (Ahti) Essl.]

(Syn. *Parmelia albertana* Ahti)

Powdered brown

Habitat/Range: Over deciduous trees in open forests at lower elevations in central N Am, N to NWT, S to CO.

Reactions: Medulla C+ reddish, KC+ reddish.

Contents: Lecanoric acid.

Notes: Not yet reported from B.C., but present in western Alberta near the B.C. border.

***Melanelia disjuncta* (Erichsen) Essl.**

(Syn. *Melanelia granulosa* (Lyngé) Essl.; *Parmelia disjuncta* Erichsen; *Parmelia granulosa* Lyngé)

Powdered brown (black starburst)

Habitat/Range: Frequent over acid rock in open sites throughout, though probably absent from hypermaritime localities; circumpolar, S to CA.

Reactions: Medulla KC- or rarely KC+ faint rose.

Contents: Perlatolic and stenosporic acids (and various unknown substances).

***Melanelia elegantula* (Zahlbr.) Essl.**

(Syn. *Melanelia incolorata* (Parr.) Essl.; *Parmelia elegantula* (Zahlbr.) Szat.)

Elegant brown

Habitat/Range: Common over trees and shrubs, infrequent over mossy rock, in open dry intermontane forests, also infrequent in dry maritime forests; (western) N Am – western Eurasia, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Melanelia exasperatula* (Nyl.) Essl.**

(Syn. *Parmelia exasperatula* Nyl.)

Lustrous brown

Habitat/Range: Frequent over trees and shrubs in open to somewhat sheltered inland forests; circumpolar, S to NM.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Melanelia fuliginosa* (Fr. ex Duby) Essl.**

(Syn. *Melanelia glabratula* (Lamy) Essl.; *Parmelia glabratula* (Lamy) Nyl.)

Abraded brown

Habitat/Range: Infrequent over bark or rock in open to somewhat sheltered coast forests at lower elevations, also rare in humid intermontane old-growth forests; circumpolar, S to CA.

Reactions: Medulla C+ red, KC+ red.

Contents: Lecanoric acid and one unknown.

***Melanelia infumata* (Nyl.) Essl.**

(Syn. *Parmelia infumata* Nyl.)

Elegant brown

Habitat/Range: Infrequent over acid rock in open to somewhat sheltered inland sites; N Am – western Eurasia, S to CO.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Melanelia multispora* (A. Schneider) Essl.**

(Syn. *Parmelia multispora* A. Schneider)

Eyed brown

Habitat/Range: Frequent over deciduous trees and shrubs in coastal and humid intermontane forests (especially the ICH zone); western N Am, N to AK, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Melanelia olivaceoides* (Krog) Essl.**

Map 57

(Syn. *Parmelia olivaceoides* Krog)

Powdered brown

Habitat/Range: Rare over bark and (possibly) sometimes rock in open boreal regions; western N Am, N to AK, S to BC.

Reactions: Medulla PD+ reddish or PD-.

Contents: (Fumarprotocetraric and protocetraric acids.)

***Melanelia panniformis* (Nyl.) Essl.**

(Syn. *Parmelia panniformis* (Nyl.) Vainio)

Lattice brown

Habitat/Range: Frequent over acid rock in open sites throughout; circumpolar, S to CO.

Reactions: Medulla KC- or rarely KC+ dingy rose.

***Melanelia septentrionalis* (Lyngé) Essl.**

Map 58

(Syn. *Parmelia septentrionalis* (Lyngé) Ahti)

Northern brown

Habitat/Range: Infrequent over deciduous trees and shrubs in open boreal forests, also rare in intermontane localities (ICH zone) at lower elevations; circumpolar, S to BC.

Reactions: Medulla K- or rarely pale yellowish, PD+ orangish or rarely PD-.

Contents: (Fumarprotocetraric and protocetraric acids.)

***Melanelia sorediata* (Ach.) Goward & Ahti**

(Syn. *Melanelia soresiosa* (Almb.) Essl.; *Parmelia sorediata* (Ach.) Th. Fr.; *Parmelia soresiosa* Almb.)

Powdered brown (crape lichen)

Habitat/Range: Infrequent over acid rock in open inland sites; circumpolar, S to CO.

Reactions: Medulla KC- or rarely KC+ faint rose.

Contents: Perlatolic and stenosporic acids (and various unknown substances).

***Melanelia stygia* (L.) Essl.**(Syn. *Parmelia stygia* (L.) Ach.)

Leather brown

Habitat/Range: Frequent over acid rock in open inland sites; circumpolar, S to WA.

Reactions: Medulla PD+ orangish or PD-

Contents: (Caperatic, fumarprotocetraric and protocetraric acids and various unknown substances; occasionally lacking lichen substances.)

Notes: The material assigned to this species is morphologically diverse and may represent two or more taxa.

***Melanelia subargentifera* (Nyl.) Essl.**

Map 59

(Syn. *Parmelia subargentifera* Nyl.)

Powdered brown

Habitat/Range: Infrequent among moss over base-rich outcrops in open to somewhat sheltered dry intermontane forests, also rare over trees; incompletely circumpolar, N to BC, S to CA.

Reactions: Medulla C+ reddish, KC+ reddish.

Contents: Lecanoric acid.

***Melanelia subaurifera* (Nyl.) Essl.**(Syn. *Parmelia subaurifera* Nyl.)

Abraded brown

Habitat/Range: Common over trees in open to somewhat sheltered forests at lower elevations throughout; incompletely circumpolar, S to CA.

Reactions: Medulla C+ reddish, KC+ reddish.

Contents: Lecanoric acid.

***Melanelia subelegantula* (Essl.) Essl.**(Syn. *Parmelia subelegantula* Essl.)

Subelegant brown

Habitat/Range: Frequent over trees and shrubs mostly in open dry intermontane forests; western N Am, N to southern BC, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Melanelia subolivacea* (Nyl. in Hasse) Essl.**(Syn. *Parmelia subolivacea* Nyl. in Hasse)

Eyed brown

Habitat/Range: Frequent over trees and shrubs in open dry intermontane forests, also reported once in CDF zone; western N Am – eastern N Am – western Eurasia, N to southern BC, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Melanelia tominii* (Oxner) Essl.**(Syn. *Melanelia substygia* (Räsänen) Essl.; *Parmelia saximontana* R. Anderson & W. Weber; *Parmelia substygia* Räsänen)

Powdered brown

Habitat/Range: Frequent over acid rock in open inland sites in dry regions; circumpolar, S to NM.

Reactions: Medulla C+ reddish, KC+ reddish.

Contents: Gyrophoric acid and two unknown substances.

***Melanelia trabeculata* (Ahti) Essl.**

Map 60

(Syn. *Parmelia trabeculata* Ahti)

Baby brown

Habitat/Range: Infrequent over trees and shrubs, especially deciduous, in open intermontane (ICH zone) and especially boreal forests; N Am, N to AK, S to BC.

Reactions: Medulla K- or K+ yellow becoming orange, PD- or PD+ pale yellow or orange.

Contents: (Norstictic acid.)

MENEGAZZIA

Menegazzia Massal.

The Treeflute Lichens

Small to medium **stratified foliose lichens**, corticate above and below, sorediate (ours), lobes rather closely appressed, **hollow**, averaging to 1–2 mm wide. Upper surface **pale greyish, perforate**. Lower surface black, shiny, wrinkled, **lacking rhizines**. Medulla white. Photobiont green.

Apothecia unknown in the B.C. material.

Over deciduous trees.

Reference: Santesson (1943).

Common Name: Describes the hollow lobes and perforated upper surface characteristic of this genus.

Notes: *Menegazzia*, with approximately 30 species worldwide, is primarily a genus of temperate latitudes in the southern hemisphere; only one species occurs in North America.

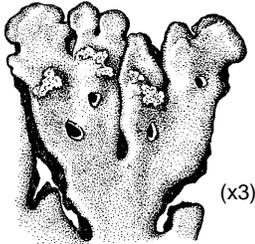
Menegazzia terebrata (Hoffm.) Massal.

Magic treeflute

Habitat/Range: Infrequent over deciduous trees and shrubs in open to somewhat shady coast forests at lower elevations; incompletely circumpolar, N to AK, S to CA.

Reactions: Cortex K+ yellow; medulla K+ yellow, PD+ slowly orange.

Contents: Atranorin, constictic and stictic acid.



(x3)

NEOFUSCELIA

Neofuscelia Essl.

The Brown Lichens

Small to medium **stratified foliose lichens** (ours), corticate above and below, nonsorediate, isidiate or not, non-pseudocyphellate, lobes **closely appressed** (ours), short to elongate, averaging to 1–3 (–5) mm wide, thin. Upper surface **brown, K-, HNO₃+ blue-green**, dull to shiny. Lower surface black (ours), shiny, bearing short, simple rhizines. Medulla white. Photobiont green.

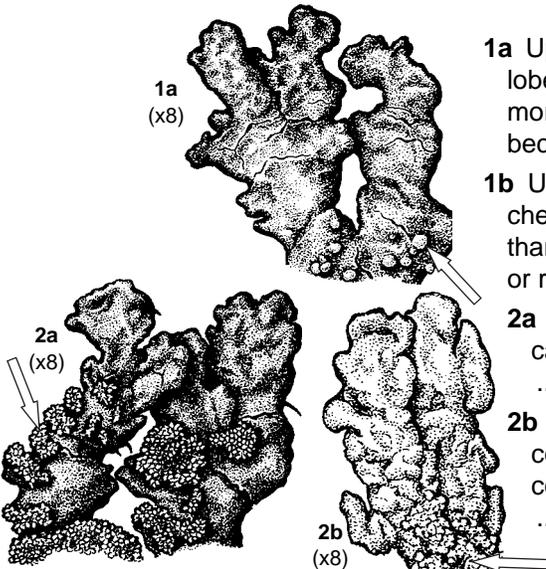
Apothecia unknown in B.C. material.

Over rock, or rarely over mosses on rock.

References: Esslinger (1977a, 1978a).

Common Name: Describes the colour of the upper surface in this genus.

Notes: *Neofuscelia* is primarily a temperate genus consisting of approximately 60 species worldwide. Ten species occur in North America and three in B.C. *Neofuscelia* was formerly treated within *Parmelia*. For points of distinction with similar species in other genera, see the key under *Melanelia*.



1a (x8)

2a (x8)

2b (x8)

1a Upper surface yellowish brown to reddish brown (occasionally darker); lobe tips often distinctly pale checkered/maculate above; isidia averaging to more than 0.2 mm wide(←), often pale checkered; medulla KC+ reddish becoming dingy orange ***Neofuscelia loxodes***

1b Upper surface medium brown to dark brown; lobe tips not at all pale checkered/maculate to at most weakly checkered; isidia averaging to less than 0.2 mm wide, never pale checkered; medulla KC- or KC+ pale yellow or reddish (but never dingy orange) **2**

2a Isidia often partly heaped in branching/coralloid masses(←), these occasionally darker than upper surface; widespread; medulla K-, PD- ***Neofuscelia verruculifera***

2b Isidia scattered to clustered(←), but not heaped in coralloid masses, coloured alike with upper surface; mostly inland; medulla K+ yellow becoming slowly orange, PD+ slowly pale orange ***Neofuscelia subhosseana***

Neofuscelia loxodes (Nyl.) Essl.

Map 61

(Syn. *Parmelia loxodes* Nyl.)

Blistered brown

Habitat/Range: Infrequent over rock in open arid to dry inland sites at lower elevations, also rare over mossy rock and grassland shrubs; western N Am – western Eurasia, N to southern B.C., S to CA.

Reactions: Cortex HNO₃+ pale to dark blue-green; medulla C- or C+ slowly yellow, KC+ reddish to becoming orangish.

Contents: Glomellic, glomelliferic, perlatolic (and gyrophoric acids).

Neofuscelia subhosseana (Essl.) Essl.

Map 62

(Syn. *Parmelia subhosseana*) Essl.

Blistered brown

Habitat/Range: Rare over rock in open arid inland sites at lower elevations, especially in BG zone; western N Am, N to southern BC, S to CA.

Reactions: Cortex HNO₃+ dark blue-green; medulla K+ yellow becoming red, PD+ very pale orange.

Contents: Various unidentified substances.

Neofuscelia verruculifera (Nyl.) Essl.(Syn. *Parmelia verruculifera* Nyl.)

Powdered brown

Habitat/Range: Frequent over rock in open coastal and inland sites at lower elevations, especially in CDF, BG and PP zones; western N Am – western Eurasia, N to southern BC, S to CA.

Reactions: Cortex HNO₃+ dark blue-green; medulla KC- or KC+ reddish.

Contents: Divaricatic acid (and stenosporic acid, gyrophoric acid and two unknown substances).

NEPHROMA**Nephroma Ach.****The Paw Lichens**

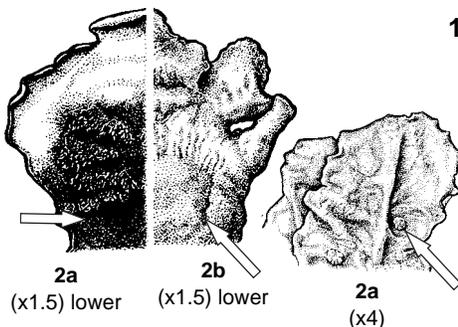
Small to **medium or large stratified foliose lichens**, corticate above and below, sorediate or isidiate or not, lobes loosely appressed to loosely attached, short to elongate, averaging to 0.5–2 (–3) cm wide, thin. Upper surface greenish, greyish or brownish, dull or shiny. Lower surface pale to dark, naked or more or less covered in dense woolly tomentum, occasionally also tuberculate, **lacking rhizines**. Medulla white (yellow to orange). **Photobiont green and/or blue-green.**

Apothecia appressed over lower surface near lobe tips, disc brown; spores 4-celled, spindle-shaped, pale brown, 8 per ascus.

Over trees, logs, mossy rocks.

References: Wetmore (1960, 1980); James and White (1987); White and James (1988); Goward and Goffinet (1993).

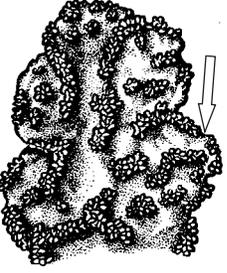
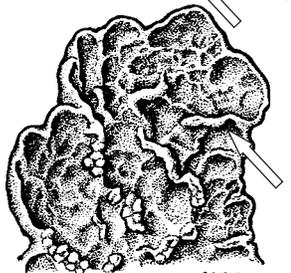
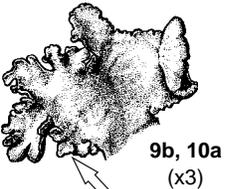
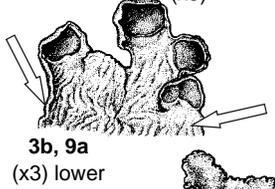
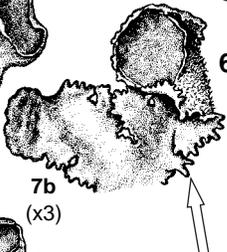
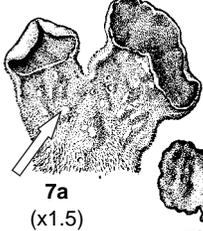
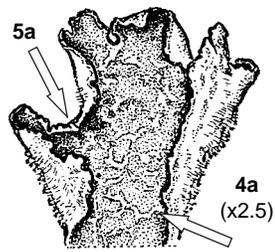
Common Name: Alludes to the presence of brown, paw-like apothecia on the lower surface; in all other genera the apothecia are located over the upper surface or along the lobe margins.

Notes: *Nephroma* is a cosmopolitan genus of about 40 species worldwide. Nine are known from North America and all occur in B.C. Although thin-layer chromatography has been used successfully in the elucidation of some *Nephroma* species (see for example James and White 1987), spot tests are of little taxonomic value in this genus.

1a Photobiont a grass-green alga; upper surface usually at least in part greenish (especially when wet: check sheltered lobes); soredia and isidia absent; over mossy rock or decaying logs; restricted to cool, snowy districts 2

2a Upper surface more or less shiny, mostly yellowish green; internal cephalodia visible from above as scattered darker patches(←); lower surface blackening toward thallus centre(←); apothecia common ***Nephroma arcticum***

2b Upper surface dull, greenish to brownish; internal cephalodia not visible from above; lower surface dark brown toward thallus centre(←); apothecia rare ***Nephroma expallidum***



- 1b Photobiont a dark blue-green cyanobacterium; upper surface brownish, greyish, or if greenish, then also sorediate or isidiate; ecology and distribution various 3
- 3a Lower surface distinctly and more or less evenly covered in dense, woolly hairs, these tending to obscure the fine details of the surface wrinkles; soredia absent 4
- 4a Upper surface greyish, sparsely covered in minute, linear white markings/maculae(←); lower surface pale; rare 5
- 5a Lower surface pale lemon yellow; lobe margins tattered/lacerate(←); over branches of conifers in old-growth forests ***Nephroma silvae-veteris***
- 5b Lower surface whitish; lobe margins even; over mossy logs or ground (blue-green phototype of) ***Nephroma arcticum***
- 4b Upper surface brownish, not at all maculate; lower surface dark brownish 6
- 6a Upper surface ridged and isidiate, isidia clustered and branched(←), usually restricted to ridges ***Nephroma isidiosum***
- 6b Upper surface more or less plane; isidia absent or, if isidia-like lobules present, then these usually occurring singly 7
- 7a Lower surface sparsely “warty”/papillate(←) (check fertile lobes); backs of apothecia broadly wrinkled and often covered in minute erect hairs; lobe margins usually (but not always) lacking lobules ***Nephroma resupinatum***
- 7b Lower surface lacking “warts”/papillae; backs of apothecia occasionally rough-textured, never hairy; lobe margins distinctly lobulate(←) ***Nephroma helveticum***
- 3b Lower surface naked(←) or minutely woolly, “woolliness” not obscuring fine details of surface wrinkles; soredia present or absent 8
- 8a Thallus lobulate, but lacking soredia or isidia (Note: lobules may, however, occasionally appear isidia-like; in this case “isidia” are usually borne singly) 9
- 9a Lobe margins and upper surface usually not at all lobulate(←); upper surface naked; medulla white, K- (or occasionally K+ pale yellow); apothecia present; over bark and rock ***Nephroma bellum***
- 9b Lobe margins and/or upper surface usually lobulate; upper surface naked or minutely woolly; medulla white or orange, K- or K+ reddish; apothecia present or absent; generally over rock 10
- 10a Medulla at least in part orange, K+ reddish; coastal ***Nephroma laevigatum***
- 10b Medulla white throughout, K-; widespread ***Nephroma helveticum*** (see lead 7b)
- 8b Thallus sorediate or, if apparently isidiate, then “isidia” densely clustered(←) 11
- 11a Upper surface yellowish green, more or less net-ridged/reticulate(←); restricted to old-growth forests; rare ***Nephroma occultum***
- 11b Upper surface brownish or greyish, plane to weakly wrinkled, but never reticulate; widespread and common ***Nephroma parile***

***Nephroma arcticum* (L.) Torss.**

Green paw (arctic kidney lichen)

Habitat/Range: Frequent over moss and mossy rocks and logs in open upland sites throughout, especially in snowy districts; circumpolar, S to BC.

Reactions: All spot tests negative.

Contents: Both phototypes: nephroarctin, phenarctin, usnic acid, zeorin (and methyl gyrophorate).

Notes: *Nephroma arcticum* contains internal cephalodia that may occasionally develop into separate thalli of medium size. These thalli represent the blue-green phototype of *Nephroma arcticum*, which was recently detected in B.C. in humid intermontane forests (ICH zone) at lower elevations. Though closely resembling *Nephroma silvae-veteris*, it differs in having a chemistry identical to that of green *N. arcticum* (medulla K-, PD-) and in being attached to typical lobes of *N. arcticum*.

***Nephroma bellum* (Sprengel) Tuck.**

Cat paw

Habitat/Range: Frequent over trees and mossy rocks in open to somewhat shaded forests throughout, except possibly absent from boreal regions; circumpolar, S to AZ.

Reactions: All spot tests negative.

Contents: Zeorin and various other triterpenoids.

***Nephroma expallidum* (Nyl.) Nyl.**

Alpine paw

Habitat/Range: Infrequent over moss in open inland sites at higher elevations, especially in AT zone; circumpolar, S to BC.

Reactions: All spot tests negative.

Contents: Zeorin and various other triterpenoids (also various other substances).

***Nephroma helveticum* Ach.**

Dog paw (Swiss lichen)

Habitat/Range: Frequent over trees and mossy rocks in open to shady forests at lower elevations throughout; incompletely circumpolar, S to MX.

Reactions: All spot tests negative.

Contents: Various triterpenoids.

Notes: Two varieties occur in B.C.:

1a Marginal lobules minute, 0.1–0.4 mm in length, generally dorsiventral; mostly over rock ..
..... ssp. *helveticum*

1b Marginal lobules varying in size, but generally 0.3–0.5 (–1.5) mm in length, often cylindrical; over bark and (occasionally) over mossy rock ..
..... ssp. *sipeanum* (Gyelnik) Goward & Ahti

***Nephroma isidiosum* (Nyl.) Gyelnik**

Map 63

Pepper paw

Habitat/Range: Infrequent over mossy rocks and conifers in humid intermontane forests at lower elevations; incompletely circumpolar, S to BC.

Reactions: All spot tests negative.

Contents: Methyl gyrophorate, various triterpenes (and gyrophoric acid).

***Nephroma laevigatum* Ach.**

(Syn. *Nephroma lusitanicum* Schaerer)

Seaside paw (smooth Swiss lichen)

Habitat/Range: Frequent over rock and occasionally deciduous trees and shrubs in open coastal localities; incompletely circumpolar, S to CA.

Reactions: Medulla K+ reddish.

Contents: Various triterpenoids, an orange anthraquinone and various other substances.

***Nephroma occultum* Wetm.**

Cryptic paw

Habitat/Range: Infrequent over conifers in open old-growth maritime and intermontane (ICH zone) forests at lower elevations; western N Am, N to B.C., S to OR.

Reactions: All spot tests negative.

Contents: Nephroarctin, phenarctin, usnic acid, zeorin and an unidentified triterpenoid.

***Nephroma parile* (Ach.) Ach.**

Powder paw (chocolate-coloured nephroma, powdery Swiss lichen)

Habitat/Range: Common over trees and mossy rocks in open to shaded inland forests at lower elevations, especially humid regions; circumpolar, S to AZ.

Reactions: All spot tests negative.

Contents: Zeorin and other triterpenoids (and also various other substances).

Notes: The material included here appears to be heterogeneous.

***Nephroma resupinatum* (L.) Ach.**

Blister paw (black-fruiting lichen)

Habitat/Range: Frequent over trees, infrequent over rock, in open to somewhat shady forests at lower elevations throughout, except probably absent in boreal regions; circumpolar, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Nephroma silvae-veteris* Goward & Goffinet**

Map 64

Old-growth paw

Habitat/Range: Rare over conifers in open transition coast-intermontane old-growth forests at lower elevations; western N Am, N to B.C., S to WA.

Reactions: Medulla K+ yellow, PD+ pale orange.

Contents: Constrictic, cryptostictic, norstictic, stictic and usnic acids and one unknown.

Notes: See comments under *Nephroma arcticum*.

NORMANDINA

***Normandina* Nyl.**

The Elf-ear Lichen

A **minute stratified squamulose lichen**, weakly corticate above, noncorticate below, **sorediate**, thallus **attached to substrate at one edge**, rotund "ear-shaped," averaging to 1–2 (–3) mm across. Upper surface **greenish to pale bluish grey**, often with distinct **raised rim**. Lower surface whitish, lacking rhizines. Medulla white. Photobiont green. Apothecia unknown.

Over trees and mossy outcrops in sheltered sites.

References: Culberson and Hale (1966); Aptroot (1991).

Common Name: Describes the tiny, rimmed, ear-shaped lobes characteristic of the species.

Notes: *Normandina* is a monotypic genus of temperate distribution.

***Normandina pulchella* (Borr.) Nyl.**

Elf-ear (confetti lichen)

Habitat/Range: Infrequent (overlooked?) over moss, mossy bark, or over other lichens in humid, sheltered lowland sites throughout, except absent in boreal regions; probably incompletely circumpolar, S to AZ and NM.

Reactions: All spot tests negative.

Contents: No lichen substances reported.



PANNARIA

Pannaria Delise in Bory**The Mouse Lichens**

Minute to small or occasionally medium **stratified squamulose, foliose or occasionally crustose lichens**, corticate above, **noncorticate below**, sorediate or (apparently) isidiate or not, rarely pruinose, lobes closely appressed, subrotund to elongate, averaging to 1–3 (–4) mm wide, thin to thick. Upper surface **pale tan to greyish blue or dark brownish** (lobe margins often whiter), smooth to slightly roughened. Lower surface pale and often **resting on dark hypothallus**. Medulla white. **Photobiont blue-green**.

Apothecia located over upper surface, disc usually reddish brown; spores simple, ellipsoid to somewhat spindle-shaped, colourless, 8 per ascus.

Over bark, rock, moss and soil.

Common Name: Reflects the miniature size of the lobes and the dull greyish brown colour of the upper surface in many species.

References: Ohlsson (1973); Jørgensen (1978, 1991).

Notes: *Pannaria* is primarily a temperate genus of approximately 80 species worldwide. Of the 17 species reported for North America, seven are known to occur in B.C., while several other possibly undescribed species also occur. The following account is therefore preliminary, pending further study of the western species.

Key to Pannaria and Similar Lichens

1a Photobiont a grass-green alga **Psoroma**

1b Photobiont a dark (greenish) blue to dark greyish blue cyanobacterium 2

2a Thallus sorediate, soredia usually originating on undersides of lobes, but marginal when mature 3

3a Upper surface bearing stiffly erect or appressed-tomentose hairs (check carefully); hypermaritime, rare 4

4a Upper surface partly covered in dense minute, stiffly erect hairs(←); medulla PD+ orange **Erioderma sorediatum**

4b Upper surface partly covered in sparse appressed woollen hairs/tomentum; medulla PD- **Leioderma sorediatum**

3b Upper surface lacking hairs (except a few cobwebby hairs rarely present at lobe tips in *Pannaria mediterranea*); distribution and frequency status various 5

5a Lower surface distinctly veined; thallus more than 4 cm in diameter **Peltigera collina**

5b Lower surface lacking veins; thallus usually less than 2 cm in diameter 6

6a Upper surface somewhat roughened/scabrid; soredia usually brownish grey; over trees; lobes rather elongate, often more than 2 mm long; coastal **Pannaria ahlneri**

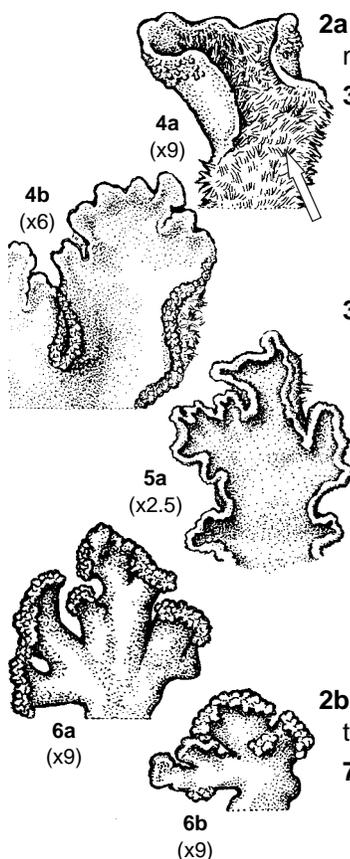
6b Upper surface smooth; soredia usually bluish grey; over trees or moss; lobes scale-like/isodiametric, less than 1 (–1.5) mm long; widespread in humid sites **Pannaria mediterranea**

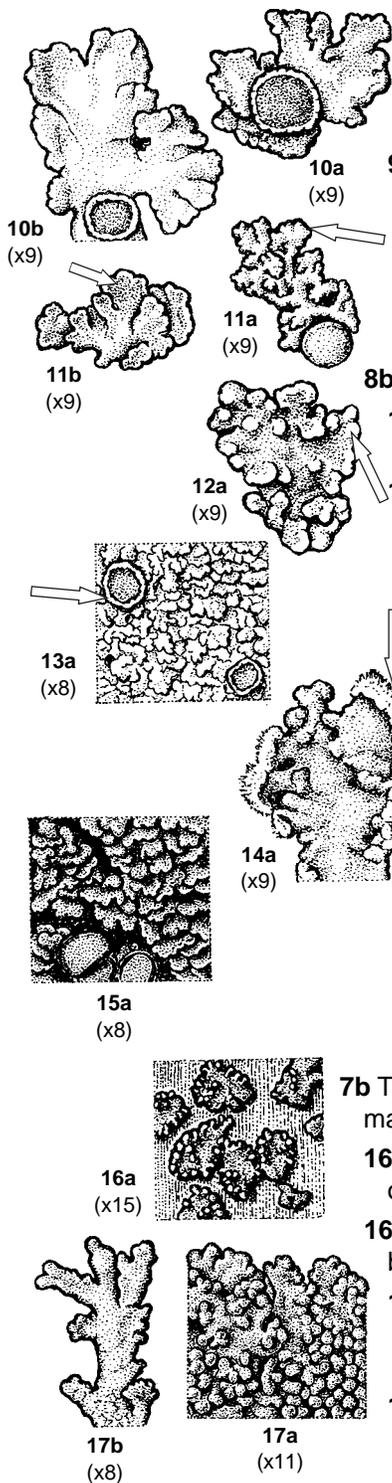
2b Thallus lacking true soredia (Note: Soredia-like “isidia” may sometimes be present, but these never originate on undersides of lobes) 7

7a Thallus lacking isidia (Note: Some species may produce flattened, isidia-like lobules, though these usually lie in same plane as lobes) 8

8a Over bark or wood (or over moss on bark or wood); coastal 9

9a Upper surface somewhat roughened/scabrid, especially toward lobe margins; marginal lobes usually radiating, flattened to concave, usually broader than central lobes; apothecial rim thalline (i.e., coloured alike with upper surface of lobes), “warty,” often covered below in minute white hairs 10





- 10a Marginal lobes averaging to less than 1.2 mm wide; medulla PD- *Pannaria leucostictoides*
- 10b Marginal lobes usually averaging to more than 1.5 mm wide; medulla PD+ orange or yellow (rarely PD-) *Pannaria rubiginosa*
- 9b Upper surface smooth throughout; marginal lobes not radiating, similar in size to central lobes; apothecial rim thalline or not, never warty or hairy 11
- 11a Upper surface of lobes distinctly dull, strongly convex(←); apothecial rim never thalline *Pannaria "saubinetii"*
- 11b Upper surface of lobes somewhat shiny, predominantly plane(←); apothecial rim often thalline *Pannaria laceratula*
- 8b Over soil or rock (or over moss on soil or rock); distribution various 12
- 12a Lobes tips strongly white- or blue-felted(←); upper surface dark brown; coastal, most common in rock crevices near ocean *Pannaria maritima*
- 12b Lobe tips white-felted or not (never blue-felted); upper surface pale or dark; habitat and distribution various 13
- 13a Thallus usually forming tight crust; apothecia abundant, disc generally plane or at most weakly convex, rimmed by distinct thalline margin(←); spores distinctly warted *Pannaria pezizoides*
- 13b Thallus looser, lobes to some extent overlapping; apothecia sparse or abundant, disc plane or hemispherical, rimmed or not with thalline margin; spores apparently smooth 14
- 14a Peripheral lobes averaging to more than 0.8 mm wide, convex upper surface; lobe margins often strongly white-felted (shade form of) *Pannaria praetermissa*
- 14b Peripheral lobes averaging to less than 0.6 mm wide; upper surface plane or convex; lobe margins never strongly white-felted 15
- 15a Growing directly over rock; upper surface convex; inland *"Parmeliella" cheiroloba* (see page 91)
- 15b Over bark or mossy rock; upper surface predominantly plane; hypermaritime *Pannaria laceratula* (see lead 11b)
- 7b Thallus isidiate or apparently isidiate; isidia erect and granular or long-cylindrical when mature 16
- 16a Thallus resting on conspicuous black hypothallus; lobes mostly scalelike/isodiametric; over bark or moss in humid regions *Parmeliella triptophylla*
- 16b Hypothallus absent or inconspicuous; lobes scalelike or elongate; habitat and distribution various, but never over bark 17
- 17a Upper surface pale greyish brown to almost black; lobe tips and/or "isidia" often soft-corticate or pale-felted (check sheltered lobes); forming dense mats completely obscuring substrate; spores 1-celled *Pannaria praetermissa* aggregate
- 17b Upper surface pale to more often dark medium brown (never blackish); lobe tips and "isidia" hard-corticate, never pale-felted; forming loose mats not usually completely obscuring substrate; spores 2-, 3- or 4-celled *Massalongia*

***Pannaria ahlneri* P.M. Jørg.**

Map 65

Roughened mouse

Habitat/Range: Infrequent over conifers in humid transition coast–intermontane forests at lower elevations; incompletely circumpolar, in N Am known only in BC.

Reactions: All spot tests negative.

Contents: Terpenoids and unknown fatty acids (Jørgensen 1991).

“Parmeliella” cheiroloba Müll. Arg.

Map 66

Rock mouse

Habitat/Range: Rare over exposed base-rich outcrops in intermontane localities at lower elevations; western N Am, N to BC, S to MT.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Notes: The combination to *Pannaria cheiroloba* has yet to be made. The B.C. material is very similar to some forms of *Pannaria praetermissa* and may possibly be conspecific.

***Pannaria laceratula* Hue**

Map 67

Cushion mouse

Habitat/Range: Infrequent over mossy conifers and mossy rock in open hypermaritime localities; tentatively western N Am – eastern Eurasia, N to AK, S to BC.

Reactions: All spot tests negative, except hymenium I+ pale blue, gradually fading.

Contents: Atranorin and various unknown fatty acids and terpenoids (P.M. Jørgensen, Bergen, pers. comm., 1993)

Notes: The spores range in size to 18–20 x 10 μ .

***Pannaria leucostictoides* Ohlsson**

Map 68

Petalled mouse

Habitat/Range: Infrequent over conifers and deciduous trees in open coastal forests; western N Am, N to AK, S to CA.

Reactions: All spot tests negative, except hymenium I+ pale blue, partly fading or becoming orange.

Contents: Atranorin and various unknown fatty acids (Ohlsson 1973) and terpenoids.

Notes: See the comments under *P. rubiginosa*. The type locality of this species is at Skidegate Lake on Moresby Island, B.C.

***Pannaria maritima* P.M. Jørg.**

Seaside mouse

Habitat/Range: Frequent over thin moss and rock in open coastal localities near upper tide mark, also infrequent at inland sites west of coast ranges; western N Am, S to OR.

Reactions: All spot tests negative, except hymenium I+ pale blue, partly fading.

Contents: Atranorin and unknown fatty acids (Jørgensen 1978).

Notes: The type locality is at Terrace Beach, near Ucluelet, B.C. Though originally described as a strictly maritime lichen, material similar to *P. maritima* has been seen from several localities west of the coast ranges. The delimitation of *P. maritima* and *P. praetermissa* warrants further study.

***Pannaria mediterranea* Tavares**

Map 69

Blue-edged mouse

Habitat/Range: Infrequent over conifers and mossy rock or soil in sheltered intermontane and maritime localities at lower elevations; tentatively western N Am – western Eurasia, S to Or.

Reactions: All spot tests negative.

Contents: Terpenoids and unknown fatty acids (Jørgensen 1991).

Notes: Soil-dwelling specimens from the semi-arid intermontane are often abundantly covered in blue soredia and may be referred to *P. cyanolepra* Tuck. The taxonomic distinctness of this material is, however, questionable.

***Pannaria pezizoides* (G.H. Weber) Trevisan**

Peacock mouse (auburn lichen)

Habitat/Range: Common over moss in open sites throughout; circumpolar, S to CA, NM.

Reactions: All spot tests negative, except hymenium I+ persistently strong blue.

Contents: No lichen substances reported.

Pannaria praetermissa Nyl. in Chyd. & Furuhj. aggregate

Moss mouse

Habitat/Range: Infrequent over (base-rich) mossy rock in open sites throughout, except apparently absent in hypermaritime regions; circumpolar, S to CA.

Reactions: All spot tests negative, except hymenium I+ pale blue, partly fading.

Contents: Terpenoids and unknown fatty acids (Jørgensen 1991).

Notes: The B.C. material assigned here to *P. praetermissa* is heterogenous and probably includes two or more taxa.

Pannaria rubiginosa (Ach.) Bory

Map 70

Petalled mouse

Habitat/Range: Rare over conifers in open coastal forests at lower elevations; incompletely circumpolar, S to NM.

Reactions: Medulla PD+ orange or yellow, or rarely PD-; hymenium I+ persistently strong blue.

Contents: (Pannarin.)

Notes: PD- strains of *P. rubiginosa* lack chemical substances altogether. The similar *P. leucostictoides*, though also PD-, contains atranorin and various fatty acids and terpenoids.

Pannaria "saubinetii" (Mont.) Nyl.

Map 71

Pink-eyed mouse

Habitat/Range: Infrequent over conifers and deciduous trees in open, but humid, coastal forests at lower elevations; western N Am – western Eurasia, S to CA.

Reactions: All spot tests negative, except hymenium I+ pale blue, partly fading.

Contents: No lichen substances reported.

Notes: The spores in the B.C. material range to 18–21 x 7.5–10 μ and are thus larger than European reports for this species: 15–17 x 5–6 μ (Jørgensen 1978). Probably a distinct taxon.

PARMELIA

Parmelia Ach.

The Shield Lichens

Medium stratified foliose lichens, corticate above and below, sorediate or isidiate or not, checkered-pseudocyphellate (ours), lobes **loosely attached to rather closely appressed, elongate**, averaging to 1.5–10 mm wide, thin. Upper surface **whitish or pale greyish blue**, somewhat shiny. **Lower surface blackening, shiny**, bearing short or rather long, simple or branched rhizines. Medulla white. Photobiont green.

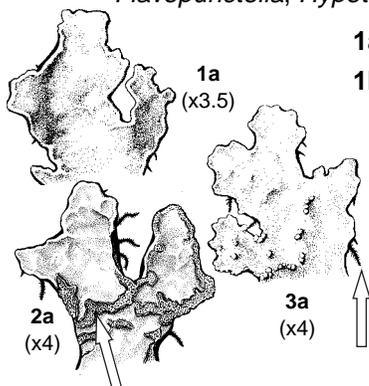
Apothecia located over upper surface, disc brown; spores simple, ellipsoid, colourless, 8 per ascus.

Over rock and trees.

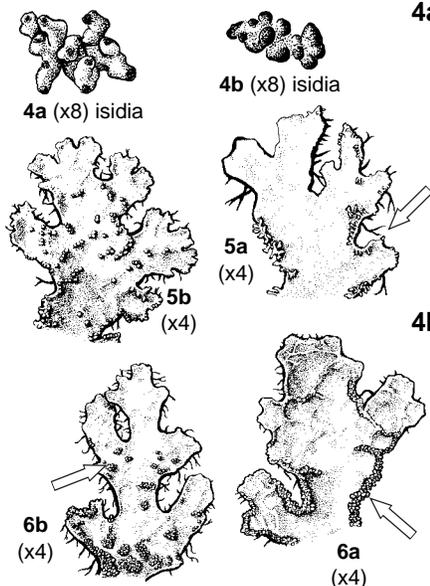
Common Name: Traditional.

References: Goward and Ahti (1983); Hale (1987); Skult (1987).

Notes: *Parmelia* is primarily a boreal and temperate genus consisting of 39 species worldwide. Eight of these are reported for North America and seven occur in B.C. As originally circumscribed by Acharius in 1803, *Parmelia* encompassed an enormous assemblage of foliose lichens, including *Lobaria*, *Pannaria* and *Xanthoria*. Beginning in the latter half of the 19th century, and apparently concluding only in the past decade, lichenologists have divided *Parmelia* into dozens of new genera, most of which are now widely accepted. Local species accommodated until recently in *Parmelia* are now dispersed among the following genera: *Ahtiana*, *Arctoparmelia*, *Flavopunctelia*, *Hypotrachyna*, *Melanelia*, *Neofuscelia*, *Punctelia*, and *Xanthoparmelia*.



- 1a Soredia and isidia absent; over rock ***Parmelia omphalodes***
- 1b Soredia and/or isidia present (rarely sparse); ecology various 2
- 2a Thallus sorediate; soredia dull, confined to discrete soralia(←) ***Parmelia sulcata***
- 2b Thallus isidiate; isidia hard and shiny or occasionally with soft, cottony appearance but never associated with soralia 3
- 3a Rhizines side-branched/squarrose(←) when mature; restricted to coastal localities ***Parmelia squarrosa***
- 3b Rhizines unbranched or at most sparsely forking/dichotomous; distribution various 4



- 4a** Isidia distinctly hard-corticate, often somewhat shiny, granular to long-cylindrical (in doubtful cases, check young isidia); medulla K- or K+ yellow becoming orange 5
- 5a** Lobes more or less closely appressed, seldom overlapping; rhizines rather freely forking/dichotomous(←); over bark; medulla K- ***Parmelia pseudosulcata***
- 5b** Lobes often rather loosely attached and overlapping; rhizines mostly unbranched; over rock (rare over bark); medulla K+ yellow becoming orange ***Parmelia saxatilis***
- 4b** Isidia “soft”, not at all hard-corticate, never shiny, generally short and granular (but occasionally elongate in *P. hygrophila*); medulla K+ yellow becoming orange 6
- 6a** Upper surface faintly yellowish; isidia mostly marginal(←), densely clustered; over rock; inland ***Parmelia fraudans***
- 6b** Upper surface pale bluish grey to more often greenish; isidia mostly restricted to upper surface(←), only rather weakly clustered; over bark (rare over rock); widespread in humid regions ***Parmelia hygrophila***

***Parmelia fraudans* (Nyl.) Nyl.**

Green shield

Habitat/Range: Frequent over acid rock in cool, somewhat sheltered inland localities; incompletely circumpolar, S to AZ.

Reactions: Cortex K+ yellow, medulla K+ yellow becoming red, PD+ orange.

Contents: Atranorin, protolichesterinic acid, salazinic acid, usnic acid (soredia only).

***Parmelia hygrophila* Goward & Ahti**

Salted shield

Habitat/Range: Common over trees in coastal and intermontane (ICH zone) forests, also rare over base-rich rock; western N Am, N to AK, S to OR.

Reactions: Cortex K+ yellow, medulla K+ yellow becoming red, PD+ orange.

Contents: Atranorin and salazinic acid.

Notes: The type locality is at Kokanee Creek, near Nelson, B.C.

***Parmelia omphalodes* (L.) Ach.**

Unsalted shield (black crottle, corks, smoky shield lichen)

Habitat/Range: Infrequent over acid rock in open sites throughout; circumpolar, S to MT.

Reactions: Cortex K+ yellow, medulla K+ yellow becoming red, PD+ orange.

Contents: Atranorin, protolichesterinic acid, salazinic acid.

Notes: The B.C. material can be assigned to ssp. *omphalodes* (Skult 1987).

***Parmelia pseudosulcata* Gyelnik**

(Syn. *Parmelia kerguelensis* auct., non Wilson)

Salted shield

Habitat/Range: Infrequent over conifers in lowland coastal forests, also rare in intermontane forests (ICH zone); western N Am, N to AK, S to CA.

Reactions: Cortex K+ yellow, medulla PD+ orange to red.

Contents: Atranorin, lobaric acid and protocetraric acid.

***Parmelia saxatilis* (L.) Ach.**

Salted shield (crottle, boulder lichen, stane-raw)

Habitat/Range: Common over acid rock in open sites throughout, also infrequent over conifers in open coastal forests; widespread; circumpolar.

Reactions: Cortex K+ yellow, medulla K+ yellow becoming red, PD+ orange to red.

Contents: Atranorin, lobaric acid and salazinic acid.

Notes: Included under *Parmelia saxatilis* are two rather distinct morphologies that may deserve separate taxonomic recognition. These are distinguished as follows:

- 1a Upper surface pale bluish grey (brownish where exposed), generally pale or concave; pseudocyphellae in netlike patterns throughout; isidia generally originating in part over upper surface ***Parmelia saxatilis***
- 1b Upper surface greenish (but turning yellowish in herbarium), often convex; pseudocyphellae generally confined to area of lobe tips; isidia tending at first to arise along lobe margins (though later also developing over upper surface) ***Parmelia* sp. 1**

***Parmelia squarrosa* Hale**

Map 72

Salted shield

Habitat/Range: Infrequent over conifers in open coastal forests at lower elevations; incompletely circumpolar, S to CA.

Reactions: Cortex K+ yellow, medulla K+ yellow becoming red, PD+ orange.

Contents: Atranorin and salazinic acid.

***Parmelia sulcata* Taylor**

Powdered shield (furrowed shield lichen, waxpaper lichen)

Habitat/Range: Common over trees throughout, also infrequent over acid rock, circumpolar, N to AK, S to CA.

Reactions: Cortex K+ yellow, medulla K+ yellow becoming red, PD+ orange.

Contents: Atranorin and salazinic acid.

PARMELIELLIA

***Parmeliella* Müll. Arg.**

The Mouse Lichens

Minute to small stratified squamulose lichens (ours), corticate above, **noncorticate below, isidiate** (ours), squamules closely appressed, subrotund to elongate, averaging to 0.5–1 mm wide (ours), thin. Upper surface **greyish brown**, smooth. Lower surface pale, **resting on dark hypothallus**. Medulla white. **Photobiont blue-green**.

Apothecia unknown in B.C. material.

Over trees and mossy rock.

Reference: Jørgensen (1978).

Common Name: Reflects the minute size and dull greyish brown colour of the species.

Notes: Of the nine species of *Parmeliella* reported for North America, only one is known to occur in B.C. *Parmeliella* is closely related to *Pannaria* and differs primarily in the character of the apothecial rim, which is non-thalline (i.e., coloured differently from the upper surface) in the former genus and thalline in the latter. The taxonomic value of this distinction, however, is questionable. For points of distinction with similar lichens, see the key under *Pannaria*.

***Parmeliella triptophylla* (Ach.) Müll. Arg.**

Map 73



(x15)

Fingered mouse

Habitat/Range: Infrequent over trees and seasonally moistened mossy rock in humid localities at low elevations throughout, except probably absent from boreal regions; circumpolar, S to OR.

Reactions: All spot tests negative, except hymenium I+ strong blue.

Contents: No lichen substances present (P.M. Jørgensen, Bergen, pers. comm., 1993).

PARMELIOPSIS

***Parmeliopsis* (Nyl.) Nyl.**

The Starburst Lichens

Small stratified foliose lichens, corticate above and below, **sorediate**, lobes **closely appressed, elongate-linear** to elongate, averaging to 1–2 mm wide, thin. Upper surface **whitish grey or pale yellowish green**, more or less **shiny**, especially at lobe tips. Lower surface pale brown to blackening, bearing short, simple rhizines. Medulla white. Photobiont green.

Apothecia located over upper surface, disc brown; spores simple, **sausage-shaped**, colourless, 8 per ascus.

Reference: Meyer (1982).

Common Name: Describes the centrifugal growth pattern characteristic of the species.

Notes: *Parmeliopsis* is a boreal–temperate genus consisting of three species worldwide. All of these occur in North America, though only two are present in B.C.

Key to *Parmeliopsis* and Similar Lichens

1a Upper surface yellowish or yellowish green; soredia present 2
 2a Over rock; upper surface generally shiny throughout; coastal; medulla K+ yellow, PD+ orange ***Xanthoparmelia mougeotii***
 2b Over bark (very rare over rock); upper surface generally dull toward thallus centre when mature; widespread; medulla K-, PD- ***Parmeliopsis ambigua***
 1b Upper surface whitish; soredia present or absent 3
 3a Isidia present over upper surface(←); soredia absent; over bark ***Imshaugia aleurites***
 3b Isidia absent; soredia present; over bark or rock 4
 4a Upper surface somewhat shiny near lobe tips; over acid bark; medulla KC+ rose. ***Parmeliopsis hyperopta*** (see lead 2b)
 4b Upper surface dull near lobe tips; over base-rich bark or rock; medulla KC- ***Physcia***

***Parmeliopsis ambigua* (Wulfen in Jacq.) Nyl.**

(Syn. *Foraminella ambigua* (Wulfen in Jacq.) S.F. Meyer)

Green starburst (sulphur-dust lichen)

Habitat/Range: Common over trees and shrubs, especially conifers, also rare over rock, in open to shady forests throughout, except perhaps absent from hypermaritime localities; circumpolar, N to AK, S to NM.

Reactions: Cortex KC+ yellow.

Contents: Divaricatic and usnic acids.

***Parmeliopsis hyperopta* (Ach.) Arnold**

(Syn. *Foraminella hyperopta* (Ach.) S.F. Meyer)

Grey starburst (chalky shield lichen)

Habitat/Range: Common over trees and shrubs, especially conifers, also rare over acid rock in open to shady forests throughout; circumpolar, N to AK, S to CO.

Reactions: Cortex K+ yellow.

Contents: Atranorin and divaricatic acid.